REPRODUCTIVE ENDOCRINOLOGY OF THE FLORIDA MANATEE (*TRICHECHUS MANATUS LATIROSTRIS*): ESTROUS CYCLES, SEASONAL PATTERNS AND BEHAVIOR

By

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To Roger Reep, for inspiring and encouraging me;
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The study of Florida manatee reproduction is important to determine correctly their actual reproductive potential in establishing population models, making management decisions, identifying sensitive periods of the year, and recognizing differences between healthy and unhealthy states related to reproduction. The objectives of this study were to measure fecal steroid hormone concentrations (17β-estradiol, progesterone and testosterone) with a fecal radioimmunoassay to 1) determine the length and frequency of estrous cycles in female manatees, 2) identify seasonal hormone fluctuations, 3) correlate hormone concentrations with behavior, 4) correlate hormone concentrations with reproductive tissues, 5) determine if food availability and water temperature affect seasonal fluctuations. Elephants are used as a model from which to pose hypotheses. The results indicate that the mean gut transit time for the Florida manatee is 6-8 days. This suggests a time delay of approximately one-week between fecal hormone concentrations and plasma hormone concentrations. The current technique can not distinguish different reproductive groups (e.g. pregnant vs. non-pregnant, adult vs. calf), but it may be able to distinguish gender among adult manatees. The estrous cycle of the Florida manatee is approximately 28–42 days in length. Seasonal fluctuations of captive manatee hormone concentrations suggest slight peaks during the spring and fall. Data from wild manatees were non-significant; thus comparisons between wild and captive animals were inconclusive. The majority of behavioral data analyses were non-significant; however, a small number of behaviors were correlated with fluctuations in hormone concentrations. Vulva swelling and a behavior described as female mounting were correlated with increased estradiol and/or decreased progesterone concentrations. A model for manatee reproductive patterns and future research objective are presented.

CHAPTER 1
INTRODUCTION AND BACKGROUND REVIEW

Introduction

Sirenians represent a unique mammalian order that has a number of specialized adaptations for a life of aquatic herbivory. Sirenians are the only true aquatic herbivores among living mammals. Sirenians have been known to exist for about 60 million years. Manatees have evolved to inhabit a tropical distribution in both fresh and salt waters (Domning 1982; Owen 1855; Savage et al. 1994). Unlike some well-studied marine mammals, manatees do not form stable social groups. Manatees are considered semi-social, meaning that they do interact with other individuals, but not on a long term or permanent basis (Hartman 1979; Reynolds 1981). The only long-term interaction found to occur in Florida manatees is between a mother and her calf, which lasts approximately 1-2 years. A reproductively mature female (~5 years in age), has a calf about every 3 years. Calves are born throughout the year; however, peaks in calving and reproductive activity have been documented in spring months (Hernandez et al. 1995; Rathbun et al. 1995; Reid et al. 1995).

Currently, the survival of the Florida manatee has been jeopardized both directly and indirectly by human expansion. To ensure and maintain this endangered species' reproductive viability, more knowledge of their reproductive physiology needs to be obtained. A better understanding of the manatee estrous cycle will increase our knowledge of the actual reproductive potential of female manatees. The identification of seasonal hormonal fluctuations will indicate reproductively sensitive periods of the year. In addition, a clear understanding of the basic reproductive physiology of manatees will allow us to identify abnormal or unhealthy states. All of these data will contribute to more accurate modeling of population dynamics of the species. These population models are key tools used by management agencies to make decisions on how best to protect a species and curtail human impact. Human-related collisions with watercraft represents the largest cause of known, identifiable manatee mortality, which further emphasizes the importance of management for manatee survival (Ackerman et al. 1995).

Objectives

The Florida manatee is protected by legislation, including the Endangered Species Act (1973), Marine Mammal Protection Act (1972) and Florida Manatee Sanctuary Act (1978). In addition, there is the Manatee Recovery Plan (1995), a draft of non-regulatory objectives and goals to aid in the management and recovery of Florida manatees. The current studies are directly related to the above mentioned objectives of the Florida Manatee Recovery Plan (U.S. Fish & Wildlife Service 1995). The goals of this study are as follows:

1) To document manatee reproductive steroid hormone concentrations (17β–estradiol, progesterone and testosterone) for both males and females in wild and captive populations:

a) To define the length and frequency of estrous cycles in female manatees. Known patterns in elephants will be used as a model for comparison with manatee reproductive physiology.

b) To determine if seasonal fluctuations of these hormone concentrations occur in male and female manatees.

2) To correlate measured hormone concentrations with the behavior of female manatees observed in captivity.

3) To correlate measured hormone concentrations from necropsied animals with the status of their reproductive tissues.

4) To determine whether light cycle dynamics and water temperature influence any seasonal changes in captive manatee hormone concentrations.

Hypotheses

These objectives will allow testing of the following hypotheses:

1) Female manatees have a reproductive cycle similar to that of elephants, with low hormonal concentrations and very long luteal phases (10 week periods of increased progesterone concentrations) between follicular phases and estrus.

2) Male manatees show seasonal fluctuations, having higher testosterone concentrations that correspond to active spermatogenesis in warmer months. Female manatees also show seasonal fluctuations, with increased reproductive hormone concentrations from spring to fall.

3) There are differences between captive and wild manatees with regard to seasonal reproductive activity. Cold water temperatures and food availability in the winter are important factors.

Elephants (order Proboscidea) have been chosen as a model for comparison to Florida manatee reproductive patterns because of key reproductive similarities that are unique among mammals. Female manatees and elephants have multiple corpora lutea on their ovaries (Hanks & Short 1972; Marmontel 1988; Perry 1953; Short 1966). These corpora lutea may be formed either by ovulation or luteinization. Horses are one of the few other known mammals to have multiple corpora lutea; however, they are strongly seasonal breeders (Allen et al. 1987; Urwin & Allen 1982). Elephants may have calves at any time of the year but are influenced by proximate factors such as rain, in locations where water and nutritious food availability are limited during dry periods (Eisenberg et al. 1971; Jainudeen et al. 1972a; Jainudeen et al. 1972b; Katugaha 1993; Poole 1987; Poole & Moss 1981). Proboscidea are also evolutionarily related to sirenia, so other reproductive similarities may still be discovered despite their separation through time and differences in ecology and habitat. Information gathered from what is already known about manatees, what this study contributes, and what we know of other mammalian breeding patterns, especially elephants, will be utilized to create a model for Florida manatee reproductive biology.

Background Review

Conservation

The Florida manatee is protected legislatively by the Endangered Species Act (1973), Marine Mammal Protection Act (1972) and Florida Manatee Sanctuary Act (1978). In addition, there is the Manatee Recovery Plan (1995), a draft of non-regulatory objectives and goals to aid in the management and recovery of Florida manatees. The Endangered Species Act (ESA) is designed to stimulate development of a harmonious balance between the welfare of species and bio-diversity of the environment with the health and well-being of mankind. The ESA is a declaration to protect those species that are “of aesthetic, ecological, educational, historical, recreational, and scientific value to the Nation and its people”. The Marine Mammal Protection Act and Florida Manatee Sanctuary Act further specify legislation to protect the health and stability of marine ecosystems, obtain stable populations of marine mammals and decrease the harassment and/or taking of marine mammals. To take things one step further, the Florida Manatee Recovery Plan (FMRP) and part of the ESA have set forth goals, objectives and tasks to restore the Florida manatee population, and ultimately de-list the species under the ESA. Assessment of population trends is imperative to accomplish these goals. Data and models are utilized to determine population trends, based on estimates of survival and birth rates. There are four main objectives outlined by the FMRP: 1) identify and minimize causes of injury and mortality, 2) protect important habitat, 3) monitor the population and important habitat, 4) establish recovery activities, monitor progress and revise the Recovery Plan. In particular the third objective further outlines the need for studying the physiology, ecology and life history of the Florida manatee, including analysis of calf production and expanding long term studies of individual animals. The long-term studies should provide information on reproductive traits, behavior, age specific birth rates and success in calf rearing.

The present study will provide information on manatee endocrinology related to their estrous cycle and possible seasonal fluctuations in hormone concentrations. These data can be utilized by population models to refine information on calving intervals and the fertility of manatees. Reproductively sensitive periods of the year may be identified and subsequently management would be able to curtail negative human impact. In addition, this study provides a non-invasive tool that can have important future uses on captive and wild animals: to monitor hormone concentrations that provide information on reproductive status, characterize hormone concentrations during breeding events, and identify clinical signs of unhealthy states related to steroid hormone concentrations, such as neonatal mortality. This study is only the first step in accessing the physiological information that new non-invasive, scientific techniques can provide from living animals.

Evolution

The known fossil record of the Florida manatee can be traced back to the origin of sirenians in the early Eocene and has introduced us to a unique herbivorous marine mammal unlike other extant aquatic mammals. Manatees are derived from the same lineage as other unique species including the elephant, hyrax (order Hyracoidea) and aardvark (order Tubulidentata). This section reviews the evolution of manatees in relation to the development of other sirenia and other orders. By understanding how the Florida manatee has evolved and adapted until the present, and how other species similarly developed, then perhaps important ecological factors related to reproduction may be identified. The early studies based lineage on bone morphology, but more recent studies corroborate these associations based on DNA, amino acid sequencing and immunological comparisons of proteins from bone extracts and sera.

Within the order Sirenia there are two extant families, *Trichechidae* and *Dugongidae*. Presently the *Dugongidae* is represented by only one species, the dugong (*Dugong dugon*, Müller, 1776). The most recently extinct species of the *Dugongidae* is Steller's sea cow (*Hydrodamalis gigas*, Zimmermann, 1780). There are three species of manatees (*Trichechidae*) the West Indian manatee (*Trichechus manatus* Linnaeus, 1758), which is further subdivided into two subspecies, the Florida manatee (*T. manatus latirostris* Harlan, 1824) and the Antillean manatee (*T. manatus manatus* Linnaeus). There are also the Amazonian manatee (*T. inunguis* Natterer, 1883) and the West African manatee (*T. senegalensis* Link, 1795) (Bertram & Bertram 1973; Domning 1978; Domning & Hayek 1986).

In comparison to the number of extant species, there has been a much richer history of sirenians throughout geological time. Excluding the five extant sirenians, there have been 31 species and subspecies discovered from the Eocene to the Pliocene epochs (Domning 1994). The earliest known sirenian, *Prorastomus sirenoides* (Owen 1855), is dated from the early Eocene age and is the best ancestral representative for the order Sirenia (Savage et al. 1994). Domning (1982) speculated that protosiren-like sirenians had an Old World Tethyan origin and dispersed to South America. The earliest known trichechid *Potamosiren* dates from the Middle

Miocene. As the Andes Mountains formed minerals and nutrients eroded into lower waterways and true aquatic grasses developed. Manatees of this Mio-Pliocene age (*Ribodon*) were able to take full advantage of this rough herbage because they possessed supernumerary molars that were continually replaced throughout their lifetime. With further evolution manatees of the Pliocene-Recent (genus *Trichechus*) gained more teeth, which were smaller in size to aid in resistance of wear. As access to the Pacific was closed off, forming the Amazonian lakes, some manatees, similar to modern *T. inunguis,* specialized even further by developing smaller more complex wear-resistant teeth as they continued to eat aquatic grasses. Although *T. manatus* did not specialize to the extent of *T. inunguis* they both were able to adapt, unlike the *Dugong* which, outside of the Indopacific region, did not develop root hypsodonty in response to the abrasiveness of seagrasses. It is thought that the West African *T. senegalensis* resulted from a waif dispersal of primitive *Trichechus* during the Pliocene or Pleistocene (Domning 1982).

In relation to other Orders, evolutionary development of the Sirenia can be traced back to the Paleocene where ancestral Ungulata differentiated into at least five lines: Eparctocyon, Cete, Meridungulata, Phenacodonta, and Tethytheria. Simpson (1945) originally defined the superorder Paenungulata with African ungulates and included the orders Proboscidea (elephants), Sirenia, and Hyracoidea (hyrax), plus Desmostyliformes, an extinct herbivore inhabiting inter-tidal coastal areas (Inuzuka et al. 1995) as a suborder. Later, McKenna (1975) classified Proboscidea, Sirenia and Desmostylia as orders within the mirorder Tethytheria, separating the Hyracoidea order under the mirorder Phenacodonta along with Perissodactyla (e.g. horses, tapirs, and rhinoceroses).

Several molecular studies have provided data suggesting phylogenetic relationships among the manatee, elephant, hyrax and aardvark. The eye lens protein α–crystallin A amino acid sequence of the aardvark was compared with several species and found to have unique similarities with Sirenia, Hydracoidea and Proboscidea (de Jong et al. 1981). Similarly, cladistics utilizing α– and β–hemoglobin sequences grouped the elephant, hyrax and manatee into a monophyletic clade supporting Simpson's (1945) superorder Paenungulata (Kleinschmidt et al. 1986). Additional DNA sequences of mitochondrial cytochrome *b* gene segments (Ozawa et al. 1997), and 16S rRNA plus, 12S rRNA and tRNA (Springer et al. 1997) group the elephant, hyrax and manatee together. These findings suggest a considerable radiation from a common ancestor for these diverse species. Studying these related, extant species may provide a point from which to explore reproductive similarities, and identify a model species similar to Florida manatees.

Distribution

Environmental factors, such as ambient temperature, food availability and the severity of fluctuations and changes in the environment, directly affect the ability of a species to reproduce. The Sirenia represent the only marine mammals that are obligate herbivores. Manatees and dugongs, unlike other marine mammals, have a relatively low metabolic rate and are not adapted to cold water temperatures (Irvine 1983; Scholander & Irving 1941). Their distribution throughout the world is primarily tropical (Bertram & Bertram 1973). This is in contrast to the North Pacific range of the now extinct Steller's sea cow (Anderson 1995; Domning 1977; Steller 1751). The West Indian manatee is found in fresh, brackish and salt waters along the coasts of the Gulf of Mexico (including both the U.S. and Mexico), Central America, the north and northeast of South America, and throughout the Caribbean and southeastern U.S. along the Atlantic (Husar 1977; Lefebvre et al. 1989; Odell 1982). Within the United States Florida manatees are found in relatively calm, shallow waters that have grass beds, such as estuaries that are protected by barrier islands, bays, and large rivers. During summer months, Florida manatees spread north to Georgia and the Carolinas, and west to Louisiana and Mississippi. This range contracts drastically during colder months of the year, with the majority of animals wintering in Florida and often utilizing warm water refugia (Powell & Rathbun 1984; Rathbun et al. 1982). Even within Florida there is a seasonal north/south migration depending upon the individual manatee's range (Deutsch et al. 1998; Reid et al. 1991). Water temperatures and food availability are important proximate factors influencing these migrations and in turn affect reproductive patterns.

Manatee Reproduction

This section will review information on manatee reproductive anatomy, behavior, and natural history, ending with some reproductive parameters that are still unknown.

Reproductive anatomy of the female manatee has been characterized extensively. Some of the earliest studies examined gross anatomical characteristics and a few histological aspects of female reproductive tracts (Freund 1930; Garrod

1877; Grassé 1948; Murie 1872; Quiring & Harlan 1953; Wislocki 1935). Marmontel (1988) wrote a brief review of these early studies. Ovaries of female manatees are located just postero-lateral to the kidneys, suspended by mesovarium from the dorsal abdominal wall. The ovaries are oval in shape and are unusual in that the active cortex is a two-dimensional layer on one side of the ovary, as is the case in dugong (Bonde et al. 1983; Marsh et al. 1984a; Mossman & Duke 1973; Quiring & Harlan 1953). Follicles and corporal lutea developing on the ovarian surface protrude outward from the two-dimensional surface. Corpora lutea (CL) may range in size from 4.8 to 7.6 mm in diameter; however, large Graafian follicles may be twice the size of CL, ranging from 5 mm to a maximum of 12 mm in diameter (Marmontel 1988; Odell 1982). The uterus is bicornuate with the ovaries ovulating with equal frequency to either uterine horn (Marmontel 1988). However, not all corpora lutea are representative of follicles that have ovulated, as mentioned above.

In comparison to the female data, relatively few studies have focused on male manatee anatomy. Externally, females can be distinguished from males by the closer association of the genital aperture with the anus, where in males the genital aperture is in closer proximity to the umbilicus in the center of the abdomen (Bonde et al. 1983; Husar 1977). Male gross anatomical descriptions and figures are provided by Vrolik (1852). One early study (Chapman 1875) briefly describes the ischiocavernosus, bulbourethrae, and retractor penis muscles as well developed and a penis length of 12 inches. The mean testicle diameter is 3 inches and the testis appears to be divided into two or three lobes. Male manatees have internal testes, like most other marine mammals including cetaceans (Odell 1982; Schroeder 1990). The testes are located postero-lateral to the kidneys and measure up to 15 x 10 cm in an adult male (Bonde et al. 1983). A study of testicular weights relative to body length suggests that sexual maturity occurs in males having a body length of 275 cm or greater (Odell et al. 1981). However, a more recent study suggests that smaller animals, as young as two years of age, may produce sperm capable of impregnating females (Hernandez et al. 1995). The seminal vesicles are relatively large and the prostate gland, differing from other species, is characterized by erectile muscular tissue rather than glandular tissue (Harrison & King 1965).

Florida manatees are considered a semi-social species, interacting with each other without forming long term bonds, except in the case of a mother and her calf (Hartman 1979; Reynolds 1981). A calf may remain with its mother for 1-2 years and the calving interval is approximately 2.5-3 years (Hartman 1979; Rathbun et al. 1995; Reid et al. 1995). Manatees reach sexual maturity at approximately 2-5 years of age (Marmontel 1995; Odell et al. 1995; Rathbun et al. 1995). Once a female becomes sexually mature and comes into estrus, it is generally thought that manatees form a mating herd or herd of consorting males. However, copulation has rarely been directly observed in the wild and it has not yet been verified that the female in any such aggregate is actually in estrus (Rathbun et al. 1995). The mating herd is certainly the most visible potential breeding behavior manatees exhibit, but a more subtle, breeding scenario noted from field observations, may include a single male diligently shadowing a female until she becomes receptive (personal communication, R. K. Bonde, U.S.G.S., 2000). The relative frequency of these contrasting behaviors is unknown. The mating herd consists of one focal female being pursued by several males. The individual male members participating in the herd are transitory, try relentlessly to hold on to her, and roll over in attempts to gain access to her ventrum. A major difficulty in consistently identifying the exact composition of these herds derives from the hazardous nature of swimming among manatees to identify the sex of individuals on their ventral side, from otherwise indistinguishable individuals. The female may be pursued for 2-4 weeks (Hartman 1979; Rathbun et al. 1995). However, physiological estrus may not necessarily be indicative of this entire period of pursuit, but instead last only a brief period during the whole mating herd scenario. The majority of 2-4 weeks of male pursuit may characterize behavioral estrus on the part of the female, the establishment of dominance among males, or relate to a strategy of sperm competition, with males breeding as frequently as possible while she is receptive (Gomendio et al. 1998). Female manatees are thought to exhibit promiscuous breeding behavior, mating with several males in the herd (*sensu* Wilson 1975; Wittenberger 1978). This mating system may more specifically be described as "scramble competition polygyny" (Alcock 1983). This reproductive strategy has also been described for the humpback whale (*Megaptera novaeangliae*) (Tyack & Whitehead 1982). In manatees, there appears to be a peak of this reproductive behavior occurring in April-May (Rathbun et al. 1995). Gestation length is estimated at 12-14 months (Odell et al. 1995; Rathbun et al. 1995; Reid et al. 1995). It has been suggested that Florida manatees may have a suppression of reproductive activity during the colder months of the year, indicating a diffusely seasonal reproductive pattern (Hernandez et al. 1995). The fact that fewer mating herds are seen during the winter months when individuals are in closer proximity to each other as they congregate in warm water refuges further supports the hypothesis that reproductive behavior is suppressed during the winter.

Among many unknowns are the following: What are the hormonal parameters associated with estrus in female manatees and how frequently does this occur? Can the presence of males or other females influence cycling, by accelerating or inhibiting estrus? What hormonal parameters and profiles are associated with manatee reproductive cyclicity and seasonality, the latter potentially in both males and females? Can females conceive while lactating? By answering these questions a better understanding of the reproductive biology of manatees, and the relationship between their physiology and behavior will be gained. Ultimately these answers will provide information on the growth potential of the Florida manatee population and will improve ongoing population modeling efforts. However, the current study can only address some of these questions.

Other Mammalian Reproductive Patterns

This section is presented to give some examples of hormonal patterns possible within the range of mammalian physiology, as well as ecological factors that influence reproduction. Information on the physiology and natural history of other mammalian species aids in outlining what may or may not be a possible pattern of reproduction given what is currently known of Florida manatees.

In general, mammalian females are born with an excessive but fixed number of primordial follicles in their ovaries. Only some of these follicles will begin development towards ovulation, and a smaller number of those will actually reach the potential to ovulate (Bronson 1989). Theca cells associated with the follicle are influenced by luteinizing hormone (LH) and produce androgens that diffuse into the follicular fluid surrounding the oocyte. Follicle stimulating hormone (FSH) stimulates the granulosa cells of the follicle to produce enzymes that convert the androgens into estrogens (Gore-Langton & Armstrong 1988). Pre-ovulatory follicles secrete relatively high concentrations of estrogens, which characterize the period of estrus (Clark & Markaverich 1988). The actual release of the oocyte during ovulation is induced by a LH surge (Lipner 1988). The corpora lutea (CL) then develops from the luteinization of the remaining granulosa and theca cells, which shift to the secretion of progesterone, beginning the luteal phase of the estrous cycle (Niswender & Nett 1988).

Hormonal variations of the female reproductive cycle varies greatly among different mammalian species (Feder 1981; Short 1984). Some of the various factors that affect this cycle are: the life span of the CL; length of the estrus cycle; spontaneous or induced ovulation; the degree to which behavioral or pheromonal cueing is involved; whether hormones originate from the ovary or adrenals; the types of hormones secreted (i.e. estrone, estradiol or other metabolites); and the number of cycles per season (i.e. polyestrous, monestrous and use of postpartum estrus).

Information on life history strategies among different species, in addition to reproductive physiology, will also provide clues to the type of breeding system a species may exhibit. One general life history concept is referred to as *r* and *K* selection (Boyce 1984; MacArthur & Wilson 1967; Pianka 1970). In brief, the concept stems from types of habitat and resource dispersion that select for *r*- or *K*-species. *K*- and *r*- are parameters in the logistic equation. An *r*- selected species is usually characterized by a small body size, a large allocation of energy to reproduction, with a greater number of small offspring, and early sexual maturity and activity. There is typically little investment in survivorship of the offspring, and survivorship is highly dependent on environmental conditions. These species live in unpredictable or ephemeral habitats that directly affect the mortality of both adults and juveniles with periods of rapid population growth and large-scale mortality. In contrast, *K*- selected species live in more resource stable environments with either constant or predictable seasonal fluctuations. *K*- selected species are often characterized by a large body size, a proportionally smaller allocation of energy to reproduction, and a small number of larger offspring, with a greater amount of investment into the survivorship of those offspring. Sexual activity is often delayed beyond sexual maturity due to competition with conspecifics (Begon et al. 1990). Within this *r/K* concept manatees best fit the *K*- selected characteristics given their large size, long lives, single calves born, calves weaned at 1-2 years, and sexual maturity between 2-5 years. The *r/K* theory would also suggest that there is some type of competition between breeding individuals so that sexual activity is delayed beyond sexual maturity, as might be the case with male competition in the mating herd.

An example of an *r*-selected species would be the rat (*Rattus norvegicus)* (Baker 1979; Freeman 1988; Robinson 1979). The adult female rat lives a maximum of ~3 years, has her maximum fertility between 100-300 days of age, is polyovular, bearing several young per litter and has a short estrous cycle of 4 to 5 days (see Figure **1-1)**. The rat estrous cycle is entrained to light/dark changes and ovulation

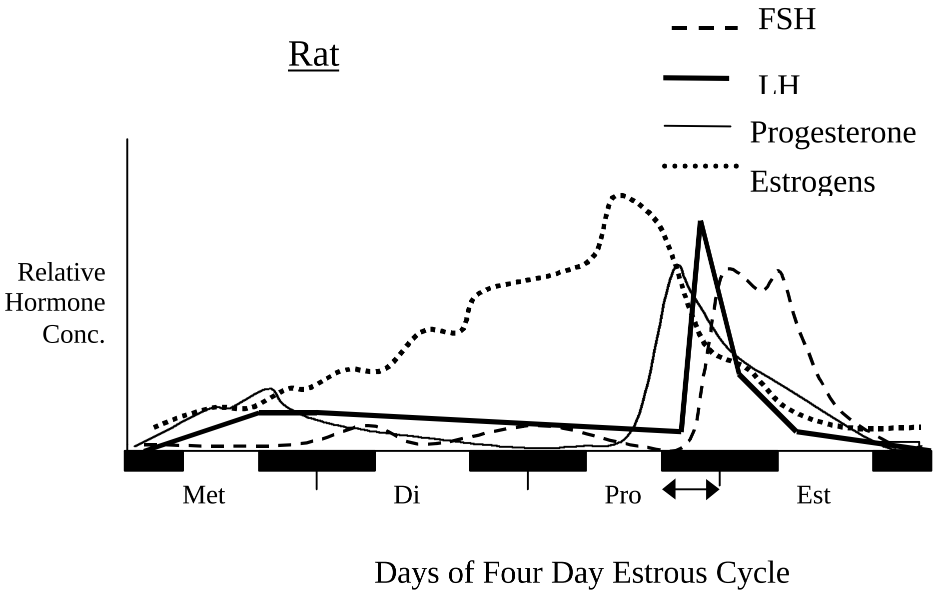


Figure **1-1.** Serum hormonal changes in the rat during the estrous cycle, metestrus (Met), diestrus (Di), proestrus (Pro) and estrus (Est). The dark boxes indicate time at night. The arrows indicate period receptive to breeding. Diagram developed from information provided in Bronson (1989) and Freeman (1988).

can be timed to within a few hours in the early morning of the day of vaginal estrus (i.e. detection of cellular cornification) (Feder 1981). The reproductive physiology is characterized by FSH at low concentrations except for a surge that occurs around the time of ovulation. This surge overcomes normal inhibitory influences of inhibin and gonadal steroids, thus stimulating follicular development that will mature after the current ovulation occurs. LH is secreted in a pulsatile manner and a surge of LH is caused by an increased frequency of these pulses, coordinated with high levels of estradiol which cease inhibiting LH secretion, thus promoting ovulation. High concentrations of estradiol are necessary to promote female searching activity and receptivity. Without estradiol, female rats will not exhibit receptivity and lordosis to males. Sexual receptivity in the rat may be enhanced by progesterone concentrations (part of which is adrenal in origin), and progesterone may also be important in terminating receptivity (Beach 1976; Fahrbach & Pfaff 1982; Feder & Marrone 1977; Pfaff 1980; Pfaff 1982; Pfaff & Schwartz-Giblin 1988).

By comparison, the rhesus monkey (*Macaca mulatta*) is a more *K*-selected species with a longer life span and a longer estrous or menstrual cycle of about 28 days, which is characterized by bleeding as the uterine endometrium is sloughed off (see Figure **1-2**). Generally, the female is monovulatory, having one or occasionally two offspring. The CL persists much longer, relative to the rat. With a longer menstrual cycle, both the follicular and luteal phases are protracted. The follicular phase is characterized by high concentrations of estradiol, and the luteal phase by high concentrations of progesterone. Unlike the rat, hormones play a more diminished role in female receptivity to mating, since rhesus monkeys copulate throughout the female's cycle. There is, however, a greater frequency of copulation near ovulation. The rhesus monkey also lacks the circadian affects that dominate the female rat's cycle (Bronson 1989; Pohl & Hotchkiss 1983). A model utilizing characteristics similar to the rhesus monkey would be a step closer to something representative of the Florida manatee, in comparison to the rat.

For a further comparison, the rhesus monkey and rat are spontaneous ovulators, meaning that preovulatory maturation of follicles and ovulation can occur in the absence of males. Other mammals, such as cats (*Felis*) (see Figure **1-3**), rabbits (*Oryctolagus*) and voles (subfamily Arvicolinae) are induced ovulators, defined as

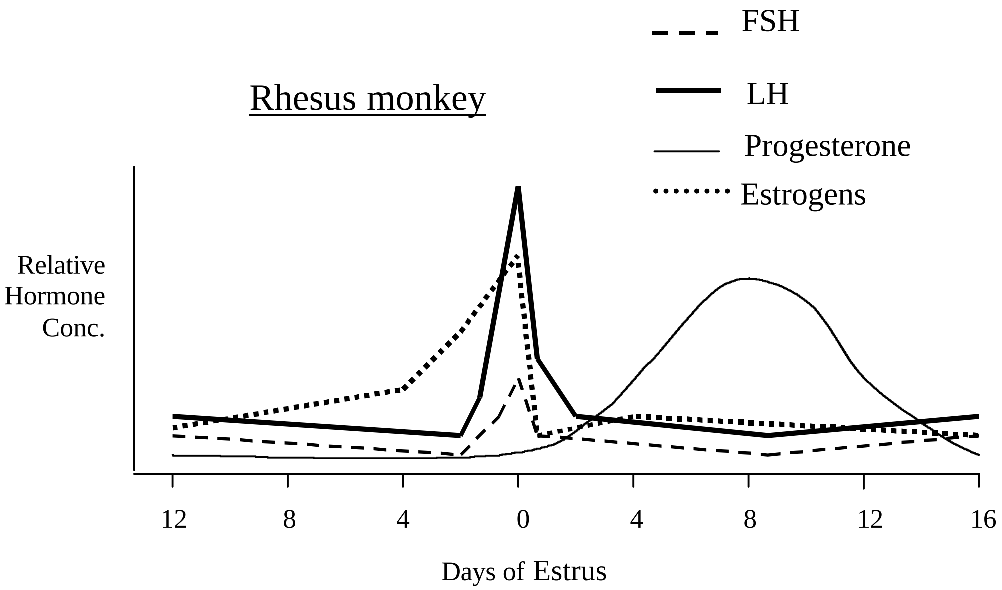


Figure **1-2.** Serum hormonal changes in the rhesus monkey during the estrous cycle. Day zero marks the beginning of estrus. Diagram developed from Feder (1977).

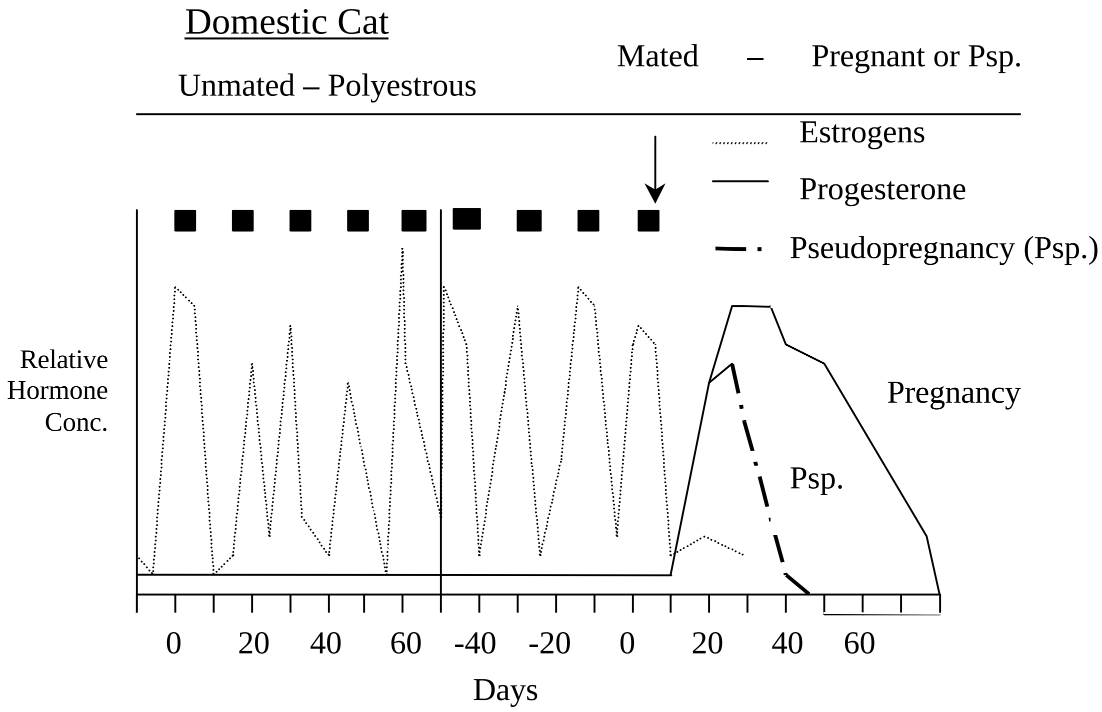


Figure **1-3.** Serum hormonal changes in the unmated cat during polyestrus cyclic activity. The dark boxes indicate periods of estrus, which last 2-10 days. The average interval between estrous periods is 17 days. The arrow denotes when mating occurred. Day zero marks the beginning of estrus that leads to ovulation. Diagram developed from Feder (1977).

species whose preovulatory maturation of follicles and ovulation generally fail in the absence of males but are stimulated by copulation to induce ovulation (Bearden & Fuquay 1992; Concannon & Lein 1983; Feder 1981). The ovaries of induced ovulators constantly have waves of follicular development and atresia (degeneration) occurring when the animals are in season. Thus, estradiol concentrations and receptivity are at a relatively high level throughout the breeding season. With stimulation of copulation a neural impulse elicits the ovulatory surge of LH (Bronson 1989; Feder 1981). The presence of multiple CL on manatee ovaries throughout various stages of the estrous cycle is a good indicator that manatees are spontaneous ovulators. Fluctuations of progesterone without mating would further suggest that Florida manatees are spontaneous ovulators.

Essentially, all of these species mentioned have variations of hormonal patterns that revolve around the physiological conditions stated above. There are two other groups of species that may be potential models for manatee reproduction, those species that live in a similar aquatic environment (i.e. other marine mammals such as cetaceans and pinnipeds) and species that are evolutionarily related. Additionally, a model species should be well studied so that questions and hypotheses may be posed from known data. Of the two groups, some pinnipeds and the bottlenose dolphin (*Tursiops truncatus*) have been extensively studied among marine mammals. Elephants, both the Asian (*Elephas maximus*) and African (*Loxodonta africana*), are well-researched distant relatives of the manatee. Reasons for choosing elephants as a model over other marine mammals include the following: extensive field work has been done on male and female cues and detection of reproductive state between elephants, both elephants and manatees have similar energetic factors related to life as a herbivore, and because a unique characteristic such as multiple CL was conserved through time, perhaps other reproductive features such as hormone metabolites might be conserved. This does not mean to indicate that another species might not also be a good model for manatee reproduction, but only that elephants are a good starting point from which to propose hypotheses. A graph of current data related to elephant hormone fluctuations during the estrous cycle is presented in Figure **1-4**.

Elephant Reproduction

Some of the decisions made in approaching the present study were based on elephants as a model due to reasons mentioned above, such as important reproductive similarities between manatees and elephants (Marmontel 1988). This section will review elephant reproduction and discuss some of the similarities and differences between elephants and manatees.

Elephants, unlike manatees, have a permanent social structure that is organized around a matriarch, her direct offspring and their young. The matriarch is usually the mother, aunt, older sister, or grandmother of the other elephants in the family unit. Unlike young females that remain with their natal unit, once young males in the group become sexually mature, they disperse to travel independently or with bull herds that consist of males ranging in age from puberty and upwards (Buss 1990; Moss 1983; Sikes 1971). Sexual maturity occurs in both sexes near 9-10 years of age (Perry 1953), although this may be extended in certain environmental conditions (Laws 1969). Young males, despite being sexually mature, generally are

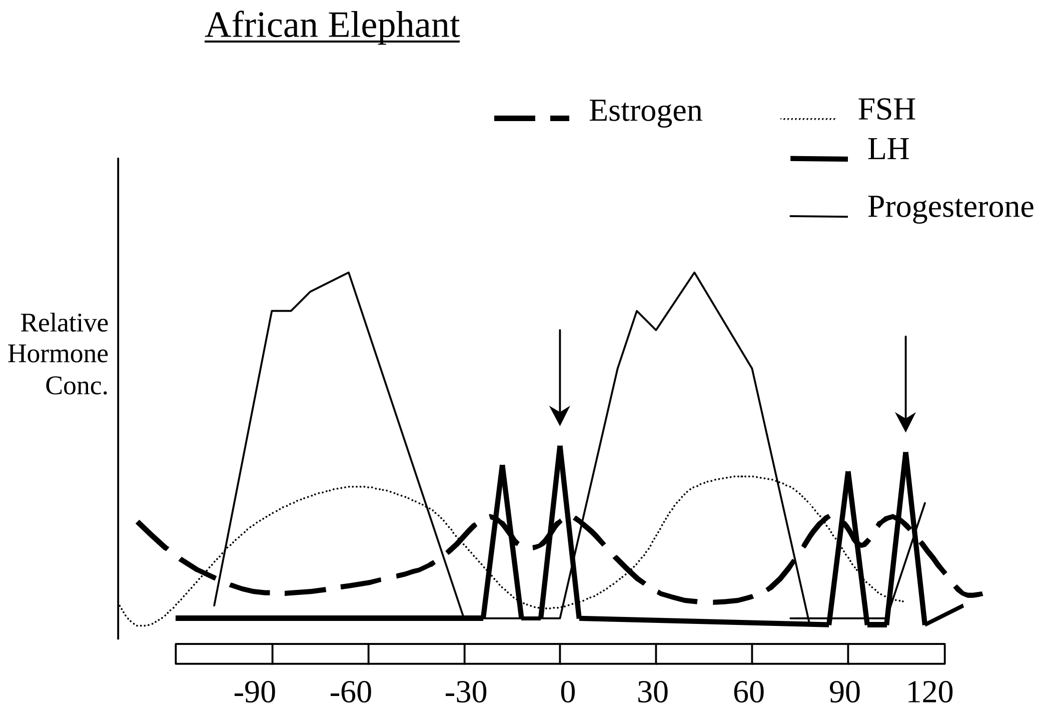


Figure **1-4.** Serum hormonal changes in the African elephant. The LH peaks indicated by the arrows are considered ovulatory LH surges. The duration between consecutive LH surges is 23-30days. Diagram developed from Hodges (1998).

not able to compete successfully against older bull males to gain access to females until they are about 20 or 30 years old.

Sexually mature male elephants periodically go through a physiological state known as musth, similar to the rutting behavior in ungulates (Eisenberg et al. 1971; Poole 1987). This was first described in detail for Asian elephants (Jainudeen et al. 1972a; Jainudeen et al. 1972b) and subsequently identified in African elephants (Poole & Moss 1981). Musth is characterized as a period of aggressive behavior, temporal gland enlargement and secretion, a recurrent discharge of urine, increased testosterone concentrations, and tends to last 2-3 months. It is suggested that, although males are continually capable of mating with females, musth aids male elephants in securing dominance over other non-musth male elephants, as well as overcoming the aggressive and protective behaviors of matriarchal females. A positive correlation has been found between musth and males searching for and associating with female herds (Eisenberg et al. 1971; Poole 1987; Poole & Moss 1981). Younger, sexually mature males sporadically experience musth, but older males (20 or 30+ yr.) have an annual musth period, thus securing their access to breeding females on a regular basis. Annual periods of musth, however, are not synchronized as a population and it is suggested that older musth males can inhibit musth in lower ranking males (Poole 1982). This de-synchronization of musth between males consequently decreases the frequency of fights between males to establish dominance. However, there may be peaks of musth activity during environmentally beneficial times of the year, such as the rainy season, when vegetation is more abundant (Eisenberg et al. 1971; Jainudeen et al. 1972a; Jainudeen et al. 1972b; Katugaha 1993; Poole 1987; Poole & Moss 1981).

Anatomically, female manatees and elephants have a similar deciduate placentation and bicornuate uterine structure (Cooper et al. 1964; Perry 1974; Shoshani & Eisenberg 1982; Wislocki 1935). Both species have ovaries that lie near the kidneys as well as mammary glands that are axillary in their location (Laursen & Bekoff 1978; Marmontel 1988; Perry 1953; Sikes 1971). A unique characteristic of elephant reproductive anatomy is the particularly long urogenital canal (~90 cm - Balke et al. 1988a; Balke et al. 1988b) which travels ventrally to an anterior position relative to the hind legs. Unlike manatees, female elephants have a glans clitoris that is relatively large and well developed, with a prepuce. The glans clitoris is long enough to extend beyond the vulval orifice and may have resulted in incorrect sexing of some individuals (Perry 1953; Shoshani & Eisenberg 1982; Sikes 1971).

In contrast to other land mammals, but similar to marine mammals including manatees, male elephants have intra-abdominal testes that weigh between 2-3 kg, lying medial and slightly posterior to the kidneys (Perry 1953; Sikes 1971). The development of mature sperm and the cellular components of the seminiferous tubules have been described by 9 phases of development and suggest cyclicity in the spermatogenic process (Johnson & Buss 1967). Another feature of the elephant testis is the absence of a distinct epididymis (Eales 1929; Short et al. 1967). The elephant penis has large paired levator penis muscles and a very well developed corpus cavernosum penis, without an os penis or cartilage (Sikes 1971).

When a female elephant comes into estrus, some behavioral signs may indicate her receptivity to males. A male will often ‘test’ a female by placing his trunk on the female’s vulva or her urine on the ground and then put his trunk in his mouth (Eisenberg et al. 1971; Jainudeen et al. 1971). This is reflective of a flehmen response, an important means of chemical communication between males and females, indicating a female’s reproductive state (Rasmussen et al. 1993; Rasmussen et al. 1996). A study of wild African elephants has suggested 5 types of behavior that indicate a female is receptive to breeding: wariness, the estrus walk, the chase, mounting and consort behavior. In brief, wariness is a behavioral indication that the female is nervous in the presence of a male. A female exhibiting the estrus walk will move away from her group to avoid a male who is following her. The chase is an increase in the intensity of an estrus walk. The female may run a considerable distance (1 km or more) from her family group with a male in pursuit, and this may last several hours. Mounting often occurs after a chase. The female will stand while the male places his trunk, then head on her back. The male will then rear up and put his forelegs on her back while he gains intromission, which lasts less than a minute. Consort behavior is more subtle, involving participation of both the male and female to remain in close proximity to each other, with the male following the female and the female staying close to the male to avoid advances of other males (Moss 1983). Females exhibit some mate choice, with older, large males successfully stopping a female after a chase and mounting more frequently, in comparison to smaller, younger males. In addition, large males in musth more frequently display consort behavior with females, allowing the female to avoid harassment from other, younger males (Moss 1983). Both elephant species are reported to be polyestrus and breed throughout the entire year; however, they may have a peak of births during more beneficial times of year (Katugaha et al. 1999; Laursen & Bekoff 1978; Shoshani & Eisenberg 1982), similar to manatees. Behaviorally, female elephants are polyandrous while they are receptive to males, as are female manatees, and the intensity of sexual activity is periodic (Buss 1990; Buss & Smith 1966; Hartman 1979; Short 1966). However, it has been suggested that female elephants mating with several males may be the result of unnatural conditions due to over crowding or captivity (Sikes 1971).

Initial studies of elephant behavior, hormonal estrogens and estrogen driven characteristics such as vaginal cytology suggested an estrous cycle length of approximately 3-4 weeks (Eisenberg et al. 1971; Jainudeen et al. 1971; Ramsay et al. 1981; Watson & D'Souza 1975). Estrus was defined as the period a female would stand to be mounted by a male and tended to last 4 days. Male behavioral cues such as urine testing or a flehmen response could help to detect the onset of estrus. Ramsay et al. (1981) found a correlation between behavior and concentrations of estrone and estradiol, and confirmed previous indications of a 3-week cyclical pattern. However, vaginal cytology and mucous smears did not correlate well with behavior and the apparent onset of estrus.

In contradiction to the information provided by estrogen related cyclicity, progesterone concentrations suggest a much longer estrous cycle of 14-16 weeks, with a luteal phase of ~10 weeks and an interluteal phase of ~4-5 weeks (Brannian et al. 1988; Hess et al. 1983; Plotka et al. 1988). This longer estrous cycle was subsequently supported by measurements of testosterone (Taya et al. 1991), FSH and inhibin (Brown 1991). To reconcile the differences between the estrogen and progesterone data sets, Plotka et al. (1988) proposed a model of follicular waves concurrent with the 3-week estrogen cycle which eventually would culminate in an ovulatory event that produced a functional CL and the 10 week luteal phase. This 3-week estrogen cycle during the interluteal phase was subsequently supported by measurements of LH peaks 3 weeks apart, with the second peak classified as an ovulatory peak which initiated the 10 week luteal phase (Kapustin et al. 1996). However, the data from Brown et al. (1991) would not support a continuation of the 3-week estrogen cycle to produce waves of follicles during the 10-week luteal phase.

A recent model incorporating this hormonal data has been proposed by Hodges (1998) and is represented graphically in figure **1-4**.

African and Indian female elephants, like adult female manatees, exhibit a large number of CL on their ovaries. Both elephants and manatees have CL that develop from ovulated and unovulated follicles. This is a rare characteristic of mammalian reproduction. The function of these numerous CL is not well understood. Several previous studies have tried to correlate the function of the CL in relation to progesterone concentrations and the number, size or mass of CL on the ovaries in different reproductive states from wild elephants shot for population control (Hanks & Short 1972; Laws 1969; Ogle et al. 1973; Perry 1953; Short & Buss 1965; Smith et al. 1969; Smith & Buss 1975). However, extremely low progesterone concentrations in elephants, compared to other mammals, and a wide range in the number of CL (2-50) have proven difficult to interpret. An early hypothesis suggested for elephants, and subsequently for manatees, is that a certain number or mass of CL had to develop during several non-fertile cycles or silent heats before enough progesterone could be secreted by the CL to result in an ovulation, lead to a subsequent luteal phase, and support pregnancy (Hanks & Short 1972; Marmontel 1988; Perry 1953; Short 1966). Recent studies of elephants have indicated that the unusually low progesterone concentrations were actually indicative of another progestin metabolite being biosynthesized and secreted by the elephant CL. It was discovered that two 5α-reduced metabolites, 5α-pregnane-3,20-dione (5α-DHP) and 5α-pregnane-3-ol-20-one (5α-P-3-OH), are the major circulating progestins (Heistermann et al. 1997; Hodges et al. 1997; Hodges et al. 1994). A correlation between progesterone and 5α-reduced progestins indicated that the pattern and length of the estrous cycle was similar to that previously outline by progesterone, however, concentrations of the 5α-reduced progestins were several fold higher.

The formation of multiple CL, both ovulated and unovulated (or luteinized), begs the question for both elephants and manatees of whether they are monovular or polyovular. The fact that both species generally have only one calf would suggest that they are monovular. However, the numerous CL with stigmata, which are scars that indicate the rupturing event of ovulation, would suggest that both species are polyovular. To date the question has not been satisfactorily answered (Hodges 1998). However, in horses, another species that possesses accessory CL, pregnancy may continue to parturition without the accessory CL and the accessory CL may actually be the secondary result of excess chorionic gonadotrophic activity (Allen et al., 1987; Urwin and Allen, 1982).

When an elephant is pregnant, gestation will last approximately 22 months (Flower 1943; Krishne Gowda 1969; Lang 1967; Moss 1983). Generally a single calf is born. Twinning has been reported, but is rare (Hundley 1927; Laws 1969). An elephant calf is generally weaned at 2-4 years of age at the birth of the subsequent calf, with the youngest age to survive without milk at ~24 months. However, calves may suckle for an extended period, as long as 8 years, depending upon the mother's tolerance of nursing (Lee & Moss 1986). A calving interval ranging from 3–13 years has been recorded, and variation in environmental factors are an important influence (Laws 1969; Shoshani & Eisenberg 1982). The elephant sex ratio of male to female calves born is generally close to 1:1. This changes as the animals mature, due to increased male calf metabolic needs, dispersion of males at puberty, and the greater selective pressures on males due to sexual dimorphism, as well as artificial influences such as poaching of large males with tusks (Katugaha et al. 1999; Lee & Moss 1986).

Seasonality

As mentioned above, the identification of seasonal hormonal fluctuations in the Florida manatee may determine reproductively sensitive periods of the year. Periods when reproduction is suppressed may highlight factors that represent costs to manatee energetics such as limits in food availability or extreme temperatures. Intervals of increased reproductive activity would allow managers to focus fieldwork identifying the reproductive rate or growth potential of the population. This section reviews factors that can influence seasonality in a number of species and the degree to which various species are affected by seasonal cues.

General mammalian patterns

Many species, including whales, dolphins, dugongs, pinnipeds and horses have reproductively active and inactive seasons within a year (Boyd et al. 1999; Daels & Hughes 1993; Heinsohn 1972; Kasuya et al. 1974; Mackintosh 1965; Marsh 1988; Marsh 1995; Marsh et al. 1984c; McBride & Kritzler 1964; Yoshioka et al. 1986). The active season, which includes periods of breeding and/or parturition, is often expressed during the most energetically beneficial times of year (e.g., increased food availability) (Bronson 1989; MacDonald 1984; Vaughan 1986). Ultimate factors, which are important in the long-term or evolutionary sense, and proximate factors, that have an immediate impact on the initiation or cessation of reproductive activity both play important roles in the types of breeding patterns exhibited by various species. Examples of ultimate and proximate factors include: food availability, rainfall, temperature, competition and predation (Bronson 1989). The context in which these factors occur will determine the classification of a factor. An example of seasonal hormonal fluctuations is well characterized by the horse (*Equus caballus*) (see Figure **1-5)**. The ultimate factor affecting seasonality in the horse is photoperiod; however, proximate factors such as nutrition and climatic temperatures also influence reproductive patterns (Daels & Hughes 1993).

Studies in controlled settings have found that some daily and seasonal rhythms may persist without any changes in environmental cues, and therefore may be defined as circadian (daily) or circannual (annual) rhythms. Photoperiod is a strong influence on seasonality in many species and studies of circadian and circannual rhythms have worked towards identifying the physiological mechanisms that are involved in entraining animal's reproductive patterns to photoperiod or other environmental cues. Artificial manipulations of daylight cycles change circadian and circannual rhythms in some mammals, such as sheep (*Ovis aries*) and syrian hamsters (*Mesocricetus auratus*) (Bronson 1989; Martin et al. 1990). However, circannual rhythms are thought to be independent of circadian rhythms to some degree (Gwinner 1980). For example, while kept under constant environmental conditions (e.g. food, temperature, light:dark, 12:12), golden-mantled ground squirrels (*Spermophilus lateralis*) still will continue to hibernate once a year, and starlings (*Sturnus vulgaris*) still will molt and have seasonal gonadal changes (Gwinner 1980; Gwinner 1986; Pengelley & Fisher 1957; Pengelley & Fisher 1963).

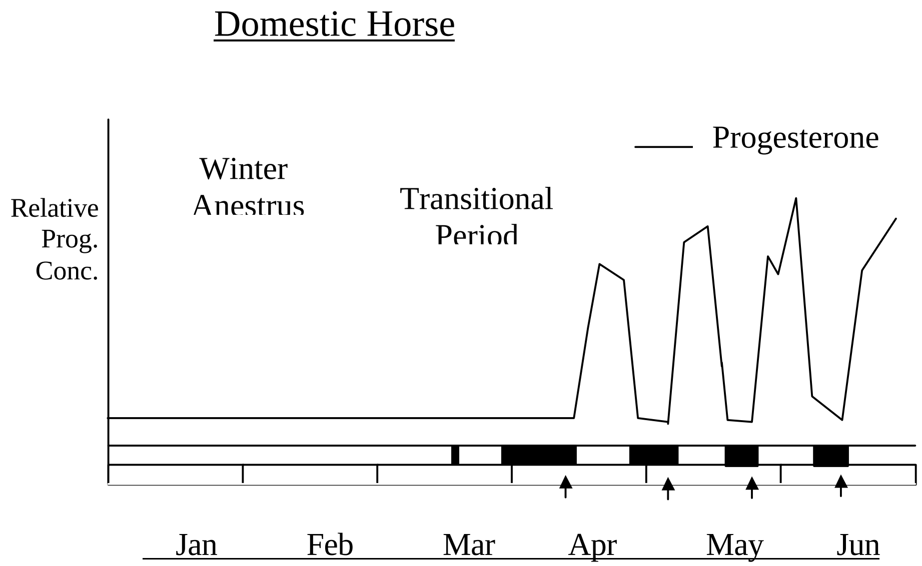


Figure **1-5.** Seasonal plasma progesterone concentrations in the mare. The dark bars represent estrus behavior. The arrows indicate the time of ovulation. Diagram developed from Daels (1993).

This suggests that the degree to which environmental factors impact seasonal behavior can vary greatly and depends upon the species being studied.

An interesting example of seasonal reproductive flexibility in relation to latitude and energetics involves deer of the genus *Odocoileus*, which is distributed from Brazil to Canada. In northern climates above 30º latitude the breeding season is relatively short, during the fall and early winter. In contrast, breeding in the Florida Everglades may occur sporadically throughout the year, with a peak of reproductive activity in September (Smith et al. 1996). In Venezuela, females may breed more than once a year and individuals within the population are asynchronous in their reproductive condition (Brokx 1972; Bronson 1989; Goss 1983; Lee 1970; Richter & Labisky 1985). With this information, it is important to take into consideration all of the factors, whether proximate or ultimate, that provide the most optimal timing of reproduction. Some species are hard wired to the extent of exhibiting seasonal changes without any alterations in the environment, whereas others are flexible enough to adapt reproductive patterns to complement environmental factors.

Seasonality in Sirenians

Factors such as photoperiod, water temperature, and food availability will probably be the most crucial for determining Florida manatee reproductive patterns. It is already known that the Amazonian manatee has a strong, seasonal breeding cycle due to the influence of rainfall on the growth of aquatic vegetation (Best 1982; Marmontel et al. 1992). The breeding patterns of the dugong are not so clearly defined. Mature male and female dugongs are not in breeding condition continuously throughout the year. The proportion of the population having active, rather than regressed or resting reproductive organs, appears to increase during the spring and beginning of summer. This suggests a diffusely seasonal breeding pattern. Dugong calving also suggests a diffusely seasonal pattern with an increase during the same time period as reproductive activity (Marsh et al. 1984a; Marsh et al. 1984b; Marsh et al. 1984c). Some evidence indicates that food availability may have been a crucial factor causing a drop in the number of female dugongs found pregnant from October 1976 – July 1977. This period was correlated with a die-back of seagrasses (Marsh 1995).

Winter months (December-February) are energetically stressful for Florida manatees, accounting for 10% of all deaths in northeastern Florida during 1986-92 and only 2-4% in other regions of Florida. This may result from long- or short-term exposure to low water temperatures (Ackerman et al. 1995). Manatees actively seek out warm water areas, such as natural warm springs, industrial warm water effluents or by migrating south (Hartman 1974; Hartman 1979; Powell & Waldron 1981; Rose & McCutcheon 1980; Shane 1983). In a cold environment, manatees have to choose between the risk of hypothermia or remaining in warm water effluents where food availability is often eliminated due to over-grazing. During these situations it may be beneficial for manatee survival if energy expenditures, such as those associated with reproductive activity, are decreased. Once temperatures become warmer in the spring and early summer, reproductive activity becomes more energetically feasible. In fact, peaks in breeding behavior and number of calves born during the spring and lulls in the winter have been suggested recently by several studies (Hernandez et al. 1995; Marmontel 1995; O'Shea & Hartley 1995; Rathbun et al. 1995; Reid et al. 1995).

Measurement of Hormones

Hormonal concentrations in animals are typically determined from plasma or serum samples. In the present study blood plasma was collected opportunistically. However, frequently repeated blood sampling is not practical with manatees for several reasons. There is a complex vasculature rather than a single vein accessible for sampling (Walsh & Bossart 1999) and it takes several individuals to restrain a manatee to draw blood. At the time of this study, captive manatees had not been trained to present a flipper for blood sampling as has been done for some cetaceans, therefore, blood sampling represented a stressful event for manatees. When working with an endangered species it would be particularly advantageous to develop a non-invasive procedure for monitoring endocrine function and thereby decrease any associated handling stress. Techniques utilizing feces are a rather recent development that allow us to study an animal's reproductive status with minimal disruptive interaction with the animal (Schaftenaar et al. 1992). Measurements of fecal steroid concentrations have previously been used successfully in studying several species (Lasley & Kirkpatrick 1991) including carnivores (Gross 1992; Jurke et al. 1997; Monfort et al. 1997), primates (Hodges et al. 1992; Wasser et al. 1988), and Asian elephants (Hoppen et al. 1992). However, one of the difficulties in utilizing fecals is the inability to measure protein hormones such as follicle stimulating hormone (FSH) and lutenizing hormone (LH), due to their breakdown in the gastrointestinal tract.

Captive Versus Wild Conditions

Caution must be applied in any study comparing animals housed in captivity with those living in their natural habitat. This is especially the case if the findings are gathered on a small number of captive individuals and will be generalized to the population as a whole, which lives predominantly in the wild. Captivity can greatly influence behavioral changes in various species (Carlstead 1996; Price 1984). For example, animals in captivity no longer have to forage for food and water, and most harsh weather conditions are controlled to some degree. There are no predators present to evade, thus less energy is expended on vigilantly watching for danger. However, movement is limited to the size of the enclosure and there is no escape from possible stressors such as humans and social interactions with conspecifics, other individuals of the same species. Animals are often housed in high densities which may or may not be representative of wild conditions. Close association with conspecifics may facilitate the spread of disease among the group, yet veterinary treatment may prolong an individual’s life well beyond its natural span in the wild. Reproduction in captivity is limited by the individuals placed in the same enclosure, as well as the physical, pheromonal and social cues that may be necessary to stimulate a species to breed. All of these factors may play a part in changing the behavior exhibited in captivity versus the wild and the effects will differ depending upon the species. The important role of the researcher is to take into consideration all of the information available on behavior in the wild and make careful comparisons to behaviors observed in captivity. In the case of Florida manatees it is important to note that they are not normally found in a social group or herd, unless it is a mating herd, and can be considered semi-social (Reynolds 1981). Currently, all adult captive manatees are housed in single sex groups to prevent breeding and the production of additional calves that would be raised in captivity. In the wild manatees spend a large portion of their day swimming as they forage for a variety of aquatic plants (Hartman 1979), whereas captivity limits both space and food by amount, quality and variety. Environmental factors such as water temperature and daylight fluctuations may be held close to constant depending upon the type of enclosure. These are some of the elements that affect manatee behavior in captivity and must be taken into consideration when evaluating the behavioral data collected.

CHAPTER 2

FECAL RADIOIMMUNOASSAY VALIDATION FOR THE FLORIDA MANATEE

Introduction

The present study of manatee reproductive endocrinology was conducted with the intention of providing detailed information on steroid hormone concentrations in living Florida manatees, whereas previous studies of reproduction concentrated on behavior and anatomy. The data generated from the technique described in this chapter provide information on basic reproductive patterns of potential estrous cycles and seasonality, as discussed in chapter three. This reproductive information may be used to identify sensitive time periods of breeding, and to refine population models that utilize information on the frequency of conception.

The majority of data collected for this study rely on a fecal radioimmunoassay (RIA) utilized to measure steroid hormone concentrations (17β–estradiol, progesterone and testosterone) from manatee fecal samples. These steroids were chosen because of their conserved expression across taxonomic groups and predominant roles as indicators of reproductive status. The most important benefit this technique provided was a non-invasive means of gathering physiological data from live animals, whether in captivity or the wild (Hodges 1986). Frequently repeated blood sampling was not practical with manatees for several reasons. There is a complex vasculature rather than a single vein accessible for sampling (Walsh & Bossart 1999) and it takes several individuals to restrain a manatee to draw blood, which is stressful to the animal. In contrast to plasma or urine samples, the fecal RIA provided the ability to perform collections of samples without significant restraint and without behavioral training for collection. At the time the study was conducted no training of manatees for collection of urine or blood samples had been undertaken. Techniques utilizing feces are a rather recent development that allow the study of an animal's reproductive status with minimal disruptive interaction with the animal (Schaftenaar et al. 1992). Due to species variation in hormonal metabolites, assays must be validated specifically for each species to be studied. Measurements of fecal steroid concentrations have been used successfully in studying the reproductive parameters of several species (Bamberg et al. 1991; Lasley & Kirkpatrick 1991) including carnivores (Gross 1992; Jurke et al. 1997; Monfort et al. 1997), herbivores (Desaulniers et al. 1989; Kirkpatrick et al. 1991; Kirkpatrick et al. 1990), primates (Heistermann et al. 1993; Hodges et al. 1992; Wasser et al. 1994; Wasser et al. 1991; Wasser et al. 1988; Wasser et al. 1993), and elephants (Fieb et al. 1999; Hoppen et al. 1992; Wasser et al. 1996), just to list a few. However, one of the difficulties in utilizing feces is the inability to measure protein hormones such as follicle stimulating hormone (FSH) and lutenizing hormone (LH), due to their breakdown in the gastrointestinal tract.

The purpose of the experiments included in this chapter was to validate the use of the fecal RIA as a technique to measure 17β–estradiol, progesterone and testosterone in both male and female Florida manatees. Experiment One measured the transit time of digesta, from ingestion to excretion, through the gastrointestinal tract of the manatee. Experiment Two looked at the possible loss or metabolism of steroids due to different means of handling the samples before being assayed. These first two preliminary studies were each conducted to aid in the use of a fecal marker (experiment one) and to identify variables that may affect apparent hormone concentration (experiment two). Experiment Three compared hormone concentrations from fecal samples to a set of manatee plasma samples and to reproductive tissues collected from necropsied animals, addressing the third objective of this dissertation. Some of the first objective is presented in Experiment Four, which measured differences between gender, location, age and individual manatees. A final section is devoted to Assay Trials and Tribulations encountered in developing this technique, that is located in the Appendix.

Materials and Methods

Subjects

The captive animals utilized in these experiments for the collection of fecal samples were held at SeaWorld Florida, Lowry Park Zoo in Tampa, Living Seas at Epcot, and Homosassa Springs State Wildlife Park, all in the state of Florida. A list of background information on these captive animals is presented in Table **3-1**. Visible scars and size can be used to distinguish individual manatees. The majority of fecal samples collected from wild manatees were from individuals found at Homosassa River and Crystal River. A small subset of these samples also included known individuals that had been rehabilitated in captivity and were subsequently released to the wild. Additional samples were collected from captive animals at

Miami Seaquarium and from wild animals in Sarasota Bay, Florida; however, we were not able to analyze these samples due to a lack of funds.

Animals were divided into six categories: adult males, juvenile males/calves, pregnant females, lactating females, cycling females and juvenile females/calves. Determination of these categories was based on sex, estimated age of the animal and visual assessment of lactation or pregnancy. Age estimates were based on total body length or life history reports. Three size classes were used, as defined by the Sirenia Project, Florida Caribbean Science Center, U.S. Geological Survey (U.S.G.S.), for their manatee photo-identification system. These classes were developed using data from Odell (1977), O'Shea and Reep (1990), and Marmontel (1993). Manatees having a body length less than 245 cm were considered to be calves up to 2+ years of age; those of 246-265 cm in body length were classified as subadults or juveniles, independent from their mother and non-reproductive; and those greater than 266 cm were assumed to be sexually mature adults. These parameters were reassessed if conflicting behavioral data were gathered (e.g. - a female shorter than 266 cm nursing a calf). In addition, wild and captive populations were distinguished. All collections from wild individuals were opportunistic, and as many collections as possible were made.

Fecal and reproductive tissue samples were collected from necropsied animals found throughout the coastal waters of Florida. All fecal and blood samples collected in this study were covered under Endangered Species Permit PRT-791721, issued to U.S.G.S.. Tissue samples were covered under the Dept. of Environmental Protection

(DEP) Endangered Species Permit PRT-773494. The University of Florida project approval number to utilize animal tissue was A164.

Year-long fecal collections were made from 12 captive adult females (5 at SeaWorld Florida and 7 at Homosassa Springs State Wildlife Park) and 14 captive males (9 at SeaWorld Florida, 3 at Epcot, and 2 at Lowry Park Zoo). Sixty-one winter and 41 non-winter fecal samples were collected from wild manatees. Seven male and 16 female reproductive tracts with fecals from necropsied manatees were collected. Six additional female reproductive tracts were collected without corresponding fecal samples. Thirty-three plasma samples were received from health related or re-tagging projects conducted by other individuals, 22 of which had corresponding fecal samples collected.

Fecal Collections

Fecal samples of approximately 5 g or more were collected weekly from particular individuals as consistently as possible for 1 year from Epcot (Aug 95-Nov 96) and Homosassa Springs (Jan 96-Dec 96), 17 months from SeaWorld Florida (Mar 96-Aug 97), and 6 months from Lowry Park Zoo (Aug 95 – Feb 96). Samples were collected 2 times per week from captive females and once per week from captive males using a hand held pool net. A fecal sample could often be seen as an identified manatee excreted it. The fecal could be attached to an animal for 5-10 minutes, but often was dropped within five minutes of the first visual sighting. The samples were stored in plastic bags and labeled with the name or identification number of the animal, its sex, the time and date. Consistent sampling from the same individual was important in order to detect trends. Colored corn was utilized when possible with captive manatees to increase the reliability of fecal identification from individuals and decrease collection time (See Experiment One for details). However, collections from the males housed at SeaWorld proved to be very difficult. At SeaWorld Florida the females are housed on exhibit to the public with viewing of the animals from above the water, as well as underwater viewing. However, the male manatees at SeaWorld are not on exhibit, but in an enclosure backstage with viewing available only above water. The priority at SeaWorld was to collect samples from females rather than males and glare from the sun, plus the design of the male enclosure made it difficult to see. Therefore, the majority of male fecal samples were collected from their enclosure as a group. Fecal collections from wild manatees did not provide repeated samples from individuals. Samples were stored on ice in the field, then frozen at -20 °C in the lab, 2-7 hours later, until they were utilized for assay analysis, approximately 2-3 years later.

Experiment One: Gut Transit Time Collections

The first preliminary gut transit study utilized one animal from Homosassa Springs, an adult female, who was fed red corn in gel cubes with monkey biscuit (Zupreem, http://www.zupreem.com/ or Purina/Mazuri, http://www.mazuri.com/) powder for taste, prepared as follows: five hundred milliliters of water were heated in a beaker until boiling. To this 25 g of gelatin (Sigma, http://www.sigma-aldrich.com) were added slowly and mixed for 5 minutes. It was then removed from the heat and 70 g of monkey biscuit powder were then added for flavor and stirred with a spoon. One hundred fifty grams of colored grits (Micro Tracers Inc., San Francisco, CA) were added and stirred again. The mixture was spooned into ice cube trays and refrigerated overnight. The gelatinized corn was fed, 1.4 kg per day, and fecal samples collected each day until corn was found in the feces. This delay was defined as transit time. Once corn was identified in the feces, feeding of the marker was stopped to measure the time necessary for the total amount of marker fed to pass through the gastrointestinal tract. This delay was defined as retention time.

The second preliminary gut transit study was conducted at Miami Seaquarium. Fecal samples were collected daily from four manatees, 2 females and 2 males. These manatees were already receiving the colored corn to mark their fecal samples for the reproduction study, so the color of the corn was changed to a new color. Two aspects of gut transit time were determined, as done similarly for the Homosassa female mentioned above. The first aspect was transit time from first feeding for corn to be transported through the gut to its first identification in the fecal samples. This measured the fastest rate of corn transfer through the gut. The second aspect was retention time for all the corn fed to clear the digestive tract. Feeding of the new color stopped, and the old color resumed, once the new color was identified in the fecal sample, and the time it took for the new color to no longer be found in the fecal samples was measured. This duration identified the slowest transfer of corn through the digestive tract, see timeline in Table **2-2** (all figures for this chapter are located at the end of the chapter). Measurement of the old color retention time when the animal was switched to the new color, and measurement of the old color transit time once the new color was terminated, allowed this study to be repeated for each animal. The manatees were fed 550 g of colored corn per day each morning. It was found that this smaller amount of 550 g was sufficient to identify the colored corn in fecals compared to the initial amount of 1.4 kg utilized in the first study at Homosassa Springs.

Experiment Two: Fecal Handling Collections

Experiment Two was conducted to identify and decrease possible variance in the data due to the handling of fecal samples in the field. Large samples were collected from 5 known captive female manatees at Homosassa Springs State Wildlife Park and subdivided to assess the influence of different factors. These factors included: normal, number of times subjected to freeze and thaw, length of time in water before collection, degree of water content (saturated or dry), and length of time at ambient temperature. The first category 'normal' is based on the standard procedure by which samples were collected, wherein the fecal was collected with a net directly from the animal, placed in a zip-lock bag, and put in a cooler on ice until it could be frozen upon return to the laboratory, 2-7 hours later. The other conditions represent variations from this standard means of collecting fecals. The dry condition was included to identify the effects of eliminating water content as a variable. The mean dry weight of 1 g wet weight fecals for each of the five females was 0.17 g ± .02 SD. A total of nine categories was assessed: normal, in water 30 min, in water 2 hrs, in air 30 min, in air 2 hrs, freeze immediately, freeze/thaw 3x, freeze/thaw 5x, and dry.

Testosterone concentrations were measured with the original fecal RIA protocol (see Appendix: Assay Trials & Tribulations) before use of the double antibody kits from ICN. Testosterone was chosen as the hormone to measure for two reasons. 1) At the time of the preliminary study, this was the only hormone assay that appeared to be working properly, reflecting biological concentrations similar to other mammals, with higher adult male concentrations than other groups, such as adult females or calves. 2) Enzymes utilized to cleave sulfide or glucuronide bonds from the basic hormone structure, thus aiding in antibody binding to the hormone, were not used in the testosterone assay. Metabolic activity often affects the side chains and their presence or absence can influence the antibody's ability to bind to the steroid in the assay. The change in binding capacity of the antibody would therefore produce apparent increases or decreases in hormone concentrations measured in the assay.

Data were normalized, setting the 'normal' condition for each female at 100%. Results from other handling conditions were represented as percent changes from the 'normal' 100%. Paired t-tests were used to identify any breakdown of hormone viability when subjected to these different categories.

Experiment Three: Plasma and Necropsy Collections

Plasma samples were collected by veterinarians during routine medical examinations or by individuals participating in the capture, tag and release program of wild manatees. A total of 33 plasma samples was analyzed for each of the three hormones. Twenty-two fecal samples were collected from the same individuals for which plasma samples were collected. Of these 22 fecal samples, 17 were collected on the same day as the plasma sample. The remaining 5 fecal samples were collected from a single female, Georgia, ranging from a week to 40 days after the plasma sample collection date. All plasma samples and matching fecal samples from the same individuals were assayed for each of the three hormones.

Tissue and fecal samples were collected from manatees that were brought into the Manatee Salvage Program, Florida Department of Environmental Protection (FLDEP) Marine Mammal Pathobiology Lab, in St. Petersburg, Florida (see Table **2-5**). An animal brought in for necropsy was judged for good condition (necropsied within 72 hours of death). From those animals in good condition, fecal samples were collected and treated as mentioned above for captive and wild animals. The reproductive tracts of males (testis, epididymis, and vas deferens) and females (ovary, uterine horn, uterus and cervix) were collected. The ovaries were dissected so that the length and width could be measured. Follicles and corpora lutea were counted and their width measured using calipers to the nearest 0.1 mm as outlined in the protocol utilized by Marsh et al. (1984) and Marmontel (1988). Tissue was stored in 10% buffered formalin. Individuals were assessed for reproductive state according to one of the six categories mentioned above (pregnant female, juvenile/calf female, cycling female, etc.). The phase of the cycling female was identified as luteal, with CL present, or follicular, with no CL present.

Radioimmunoassay

Manatee fecal samples were removed from the freezer and freeze dried in a lyophilizer (VirTis Co., Freezemobile 3, http://www.virtis.com/). The assays utilized a solubilization and extraction step with 5 ml 100% ethanol and 5 ml citrate buffer pH 3.7. A dried fecal sample of 0.25 g and 10 ml of solution were solubilized on a rotating mixer, at room temperature, overnight. This was centrifuged and 1 ml of the supernatant was decanted. For the progesterone and estradiol assay 50 µl of sulfatase and glucuronidase enzymes (Sigma Chemical Company, http://www.sigma-aldrich.com) were added to cleave side chains off the hormones being measured. Five milliliters of phosphate buffer solution (PBS) were mixed together with the enzymes, sulfatase 5,000 units type H-5: from helix pomatia and β-glucuronidase 50,000 units type H-5 from helix pomatia. This was incubated overnight at 4 °C. One milliliter of this solution was then extracted with 4 ml of ethyl ether, vortexed for one minute, the aqueous phase snap frozen in a bath of methanol and dry ice, the organic phase decanted and dried under air. This procedure was repeated for a double extraction.

The technique utilized to measure hormone concentrations from fecal and plasma samples in the Florida manatee was a double antibody ^{125}I radioimmunoassay. This was in a kit form and purchased from ICN Biomedicals, Inc. (http://www.icnbiomed.com/). The hormones measured were 17β–estradiol, progesterone and testosterone. The protocols for each of the three hormones provided with the kits were followed directly except for two aspects. First, a total counts control tube was used with only the ^{125}I radiolabeled hormone at the same amount as given to all other tubes in the assay; and secondly, an amount of sample, different than what they suggest, was added to the assay for each hormone. The amount of sample used for each hormone assay was determined by dilution curves and where the sample concentration fit on the standard curve. In general all of the assays utilized a standard curve which included the following tubes in duplicate: total counts (Tc), non-specific binding (NSB), baseline with no steroid (B0), plus 6 or 8 tubes with increasing concentrations of standard steroid. Once the standard or sample solutions were pipetted in their proper tubes, the radiolabel and first antibody were added. This would then be vortexed and incubated at 37°C for a specified time. The second antibody or precipitate was then added and eventually centrifuged for 20 min. The solution was decanted and the remaining pellet was counted for radiation levels. The following paragraphs will describe the details of each technique and the validating data for measuring 17β–estradiol, progesterone and testosterone concentrations from fecal and plasma samples. All samples were measured in duplicate. A summary of some stumbling blocks over come in working out this technique is included in the Appendix under Assay Trials & Tribulations.

17β–estradiol

The mean recovery of estradiol from the fecal samples was 41 ± 7.6% SD. The recoveries following extraction averaged 56 ± 5.0% SD. The estradiol assay utilized 450 μl of solubilized fecal sample solution and 150 μl for the plasma samples. The cross-reactivities of 17β–estradiol antiserum with other steroids were as follows: 20% for estrone, 1.5% for estriol, 0.68% for 17α–estradiol, and less than 0.01% for all other steroids examined. The minimum concentration detectable was 890 pg/g for fecal samples and 67 pg/ml for plasma samples. Internal standards were measured using concentrations of 0, 10, 30, 100, 300, 1000, and 3000 pg/ml of estradiol each with 100 μl of the solubilized fecal solution. The resulting linear curve was $y = -7.1771 + 0.83105x$ where x equals the log concentration and y equals the bound. This internal standard curve has a correlation coefficient of 0.99 with the standard curve. A dilution curve of the solubilized fecal solution utilized 50, 100, 200 and 500 μl. The dilution curve was compared to the standard curve and a test for homogeneity of the regression indicated the curves did not differ. The plasma internal standard curve utilized the same concentrations of estradiol as the fecal internal standards, however 150 μl of plasma was added to each concentration. The resulting linear curve was y = -79.778 + 1.1078x. This internal standard curve has a correlation coefficient of 0.86363 with the standard curve. A plasma dilution curve of 25, 50, 100, and 200 μl was compared to the standard curve. A test for homogeneity of the regression indicated the curves did not differ. The 17β–estradiol interassay and intra-assay coefficients of variation were 4.6% and 2.1%, respectively, for fecal and plasma samples together.

Progesterone

The progesterone assay employed fecal and plasma amounts of 200 μl and 300 μl, respectively. The recovery of added radiolabeled progesterone from fecal samples averaged 37 ± 12% SD and the extraction recoveries averaged 61 ± 8.1% SD. The minimum concentration of progesterone detectable was 4.7 ng/g from fecal samples and 0.08 ng/ml from plasma samples. Progesterone antiserum cross-reactivities with other steroids were as follows: 5.4% for 20α–dihydroprogesterone, 3.8% for desoxycorticosterone, less than 1.0% for corticosterone, 17α–hydroxyprogesterone, pregnenolone, androstenedione, and testosterone, and less that 0.01% for all other steroids examined. Progesterone internal standards (0, 0.2, 0.5, 2, 5, 10, 25, and 50 ng/ml) were added to 100 μl of solubilized fecal solution. The calculated linear curve was y = 254.31 + 0.939x and is parallel to the standard curve with a correlation coefficient of 0.99. The progesterone dilution curve (50, 100, 200, 500 µl) did not differ from the standard curve, as indicated by a test of homogeneity of variance. The plasma internal standard used the same concentrations of progesterone as for the fecal samples, however they were added to 300 µl of plasma. The curve generated the following linear equation: $y = 584.44 + 0.99255x$ and had a correlation coefficient of .99 with the standard curve. The dilution curve for the plasma samples (150, 300, 450, 600 µl) was found to be similar to the standard curve with a test of homogeneity of variance. Interassay and intra-assay coefficients of variation were measured for fecal and plasma samples together for progesterone: 18 and 2.1%, respectively.

Testosterone

Amounts of 25 µl for the fecal assay and 50 µl for the plasma assay were applied for measuring testosterone concentrations. The mean recovery of added radiolabeled testosterone to fecal samples was 43 ± 11% SD and 66 ± 11% SD for extracted recoveries. The minimum detectable concentration of testosterone from the solubilized fecal solution was averaged at 160 ng/g and 2 ng/ml from plasma samples. The identified cross-reactivities for the testosterone antiserum were as follows: 3.4% for 5α–dihydrotestosterone, 2.2% for 5α–androstane-3β, 17β–diol, 2.0% for 11-oxotestosterone, less than 1.0% for 6β–hydroxytestosterone, 5β–androstane–3β, 17β–diol, 5β–dihydrotestosterone, androstenedione, epiandrosterone, and less than 0.01% for all other steroids examined. The fecal testosterone internal standard (0, 0.1, 0.25, 0.5, 1, 2.5, 5, and 10 ng/ml) had a calculated linear curve of $y = 1673.6 + 1.5289x$ and a correlation coefficient of 0.99 with the standard curve. The dilution curve of solubilized fecal solution (50, 100, 200, and 500 µl) was found to be similar to the standard curve by a test of homogeneity of variance. The plasma internal standard utilized the same concentrations of testosterone as for the fecal samples and the calculated linear equation was $y = 189.16 + 0.78694$. The curve was found to be similar to the standard curve with a correlation coefficient of 0.99. A plasma dilution curve (25, 50, 100, and 200 µl) was tested for homogeneity and found to be similar to the internal standard. Interassay and intra-assay coefficients of variation were measured for fecal and plasma samples together for testosterone: 20 and 2.9, respectively.

Raw data from the gama counter (LKB-Wallac 1282 CompuGamma, LKB Wallac, http://www.wallac.fi/) was initially analyzed utilizing Beckman ImmunoFit EIA/RIA program, version 3.1 (Copyright ® 1989-1991, Beckman Instruments Inc., Microsoft Corp.). This program provided four statistical fits (logit-log fit, 4-parameter logistic curve fit, linear regression, or cubic spline curve fit) for the standard curve produced in each assay to adjust the initial raw data points to the standard curve. Only one statistical curve fit was used for all assays measuring one of the three hormones, which was dependent upon the consistency of the standard curves run for all assays. The best statistical fit for 17β–estradiol and testosterone was the cubic spline; the 4-parameter logistic curve best fit the standards for the progesterone assay.

The fecal steroid assay techniques were conducted in the United States Geological Survey's Biological Resources Division (USGS-BRD) Florida Caribbean Science Center (Gainesville, FL) in association with Dr. Tim Gross. These facilities provided all the permanent equipment necessary to carry out these procedures. This laboratory works under the radioactive materials license #09-25420-01 associated with the US Dept. of the Interior.

Analysis of Hormonal Parameters

Analysis of hormone concentrations between different groups of manatees based on location, sex and month utilized analysis of variance (ANOVA). Pair-wise contrasts were tested by confidence intervals using the least significant differences (LSD) value for the Tukey method. The SAS program, version 6.12, was used for its univariate plot and general linear model (GLM) procedure to conduct these analyses (SAS Institute Inc. 1989). The assumptions that need to be met for ANOVA are normality, constant variance and no correlation between observations. The appearance of non-normality can be caused by a lack of constant variance, otherwise referred to as hetroskedasity. Normality of the hormone concentration data was characterized by skewness, kurtosis, histograms, box plots, and a ShapiroWilk normality test. The data set did not appear to be distributed normally and thus was transformed to the natural log for analysis. Ideally, the values for skewness and kurtosis should be zero, and not greater than five. Additionally, if the data is symmetrical, implying that it is normally distributed, the mean should equal the median. The values for these characteristics of normality are shown in Table **2-1**. The normal text headers indicate values before log transformation, and the bold text headers indicate values after the data was log transformed. All of the female values for skewness and kurtosis were brought to values below 3.5 after log transformation. All of the mean and median values were also brought to values within one point of each other, after log transformation. Log transformation of the data provided the best improvement of the data towards normality; however, in all cases the ShapiroWilk normality test did not indicate the data were normally distributed. The reason the ShapiroWilk test did not indicate normality for the log transformed data is due to the large number of low concentration values. This indication of non-normality would be similarly indicated by other normality tests. Long periods of no estradiol or progesterone fluctuations are the cause for these low concentration values. Additionally, the low concentrations all have similar values because the minimum concentration detectable by the fecal RIA was calculated and set at a given value for each hormone assay, truncating the lowest concentrations. However, the remaining concentration values, above the low minimum values, are normally distributed and the ANOVA is flexible enough in its normality assumptions to accommodate for this. Another option would have been to run a non-parametric analysis, however the non-transformed data were still too non-normally distributed and the variance was not constant.

For the comparisons in Experiment Four, an ANOVA was run using the Proc GLM procedure in SAS. This analysis utilized the data transformed to the natural log as mentioned above. Pair-wise contrasts were tested for by confidence intervals using the least significant differences (LSD) value for the Tukey method.

The wild samples in Experiment Four, Figures **2-7** and **2-9** also include hormone concentrations from necropsied manatees for the testosterone and progesterone values. ANOVA and Tukey pair-wise contrasts indicated that male and female concentrations for testosterone and progesterone were similar between the wild and necropsy values (female testosterone p= 0.18, male testosterone p= 0.83, female progesterone p= 0.20, male progesterone p= 0.74). Estradiol concentrations between wild and necropsied manatees were statistically similar for males (p= 0.41), but differed statistically for females (p= 0.0072). Therefore, the wild female estradiol concentrations do not include values from necropsied manatees.

Results

Experiment One: Fecal Marker/Gut Transit Times

This was conducted as a pilot study to try to measure the transit time of digesta in the gastrointestinal tract and to improve the efficiency of collecting fecal samples from the captive manatees, by decreasing collection time and correctly identifying from which manatee a fecal originated. It took six days from first feeding for the corn to pass through the digestive tract of the Homosassa female. On the seventh day post-feeding, once feeding was stopped, no corn was identified in the feces collected. Utilizing the information from the Homosassa female improved identification of collections made at the Living Seas, Epcot for 1 year from 3 male manatees, Miami Seaquarium from 2 males and 2 females, and at SeaWorld Florida from 5 females and 3 males. On average 550 g per day was enough to mark feces from adult manatees. Utilization of the marker reduced misidentification of fecal samples and decreased the time interval spent waiting for an individual to defecate. Using colored corn made it possible to identify fecal samples from particular manatees by feeding each manatee a specified color. Although manatees are caprophagic, the amount of marker incidentally eaten from another manatee appeared to be minimal.

Samples were collected at Miami Seaquarium to measure gut transit times from 4 manatees, 2 males and 2 females. The duration in days for both gut transfer time aspects, transit and retention, from all 4 manatees are found in Table **2-2**. Table **2-3** also includes the lengths and weights of each manatee fed the colored corn. The mean number of days for corn to first be seen in the fecal sample after first feeding, or gut transit, was 7 days ± 0.37 SEM. The mean number of days for corn to leave the digestive tract once identified in the fecal sample, or gut retention, was 8 days ± 0.37 SEM. This data compares closely with the female at Homosassa Springs for which transit and retention times were initially measured as 6 and 7 days, respectively. There did not appear to be any increase in transit or retention with an increase in length or weight. No statistical analysis was conducted due to the small number of animals used in this preliminary study.

Experiment Two: Fecal Handling

This study was conducted to determine if different aspects of handling fecal samples in the field artificially changed the hormone concentrations measured (see Table **2-4**). A paired t-test analysis was conducted to determine if significant differences from the normal condition were associated with alternate handling procedures. None of these handling procedures produced results that were significantly different from the ‘normals’. However, the small sample size of only five individuals should be taken into consideration. The condition closest to a statistically significant value was the dry condition with $p = 0.10$.

Experiment Three: Fecal Comparisons with Plasma and Tissue Samples

Plasma and fecal

Each of the plasma samples with a matching fecal sample or samples were measured for 17β–estradiol, progesterone and testosterone. A comparison between the fecal and plasma samples is presented in Figure **2-1**. The samples are each identified by the manatee's name or identification number. The animals are grouped by gender and reproductive status. In general, the plasma sample concentrations are much lower than the fecal sample concentrations, as would be expected by the accumulation of steroids in the liver, then gall-bladder, and subsequent release into the duodenum (Honour 1984). There is great deal of variation in both the fecal and plasma sample progesterone concentrations, between individuals, and in relation to the different groups of reproductive status and gender. Elevated fecal hormone concentrations are not necessarily associated with elevated plasma hormone concentrations. Fecal estradiol concentrations are relatively low except for one high concentration measured in an adult male. In comparison to fecal estradiol, greater variation is present in the estradiol plasma sample concentrations. Measurements of testosterone in both plasma and fecal samples do appear to track each other in relation to differences in concentration, unlike estradiol and progesterone. Both plasma and fecal testosterone concentrations are low except for concentrations from adult male samples.

Figures **2-2** and **2-3** present the mean hormone concentrations for the different reproductive stages by gender for plasma and fecal samples. Testosterone measured in both plasma and fecal samples indicate higher concentrations in adult males compared to male calves and females. Plasma estradiol has variable concentrations that are similar across the reproductive groups in both males and females. The fecal sample estradiol concentrations indicate a few female adult and pregnant samples higher than the other reproductive groups except for one very high concentration in an adult male. The plasma progesterone concentrations between the reproductive groups are similar except for one sample from an adult female with a high concentration measured. The fecal progesterone concentrations across the reproductive groups have similar values with high variability. No clear biological characteristics can be distinguished between the reproductive groups when looking at the estradiol and progesterone measurements. In contrast, some of the adult male plasma and fecal samples had much higher testosterone concentrations in comparison to the other reproductive groups.

All plasma samples, including samples without matching fecal samples, were averaged and graphed to compare male and female hormone concentrations (see Figure **2-4)**. The symbols labeled F study and M study along the X-axis are the female and male values, respectively, from a previous study (Francis-Floyd et al. 1991) that measured progesterone and estradiol plasma concentrations from 4 manatees. These four subjects included 2 non-pregnant females (age 5.2 and 6.6 years), a pregnant female and a mature, adult male. The paper refers to the non-pregnant females as subadult and pre-pubertal; however, the more recent revised size/age class definitions for manatees indicates that manatees age 3 years or greater are reproductively mature. The female progesterone values from the Francis-Floyd et al. study (1991) fall well within the range of values measured in this study and the male progesterone concentrations from both studies are similar. However, both male and female estradiol values from the Francis-Floyd et al. study (1991) are much lower than the concentrations this study measured. In general, this study found the mean concentration of female plasma progesterone to be higher than male concentrations, although not statistically higher. Estradiol mean concentrations between male and female manatees in this study were similar. Differences between male and female plasma testosterone concentrations are easily identifiable with males having much higher concentrations.

In comparison to the plasma samples, fecal hormone concentrations shown in Figure **2-5** indicate a similar distinction between male and female testosterone concentrations, but a great deal of overlap in values between male and female progesterone and estradiol concentrations. The samples included in this graph, labeled ‘Female’ and ‘Male’, are all of the fecal samples that were measured for each of the three hormones. The similarity between males and females is more pronounced for progesterone than for estradiol where the range of values is much higher in males than females. Due to long periods of anestrus or lack of any apparent hormonal fluctuations, in some cases several months, found in the longitudinal fecal data (see figures **3-1** through **3-12**) an additional comparison labeled “Above 2STD” is included. This comparison contains mean values above two standard deviations from the yearly average of each of the 12 captive females. The idea is to compare female concentrations of estradiol and progesterone that would represent potential values of follicular and luteal active phases. Although the means for concentrations above two standard deviations in both estradiol and progesterone are higher than those including potentially non active phases under ‘Female’, there is still a great deal of overlap with the ‘Male’ values.

Fecal and necropsy tissue

A total of 22 female reproductive tracts was collected from necropsied manatees. Of the female reproductive tracts collected 16 had matching fecal samples collected and assayed for all three hormones. Table **2-4** contains the measurements taken from each of the female reproductive tracts, body length and hormone concentrations. Females are categorized as luteal when CL are present on the ovaries, follicular when no CL are present, and pregnant when a fetus or embryo is detected and the uterus is distended. The single lactating female was indicated as such on the necropsy report. All calves and juveniles measured were lacking CLs and only 4 out of 11 manatees in this category had any follicles larger than 2 mm. Figure **2-6** depicts the mean hormone concentrations of male and female manatees from different reproductive groups. Of the progesterone concentrations measured, pregnant females have the highest mean, but calves with no CL, a follicular female with no CL and the males have some values in the same range as the pregnant females. The highest estradiol concentrations were measured in pregnant females, a follicular female and a juvenile male. In comparison, the estradiol values were relatively low for adult males, female calves, a lactating female, and a luteal female. A single adult male had a particularly high testosterone value, and two other male values were slightly higher than those concentrations measured in female manatees.

Experiment Four: A Comparison of Gender, Location, Age and Individuals

Gender and location

Samples that were collected from captive and wild manatees, both male and female, at each of the locations are compared in figure **2-7**. When comparing males to females for a particular hormone, differences in scale are noted with an asterisk. There are two aspects of the six graphs that are particularly important to note: 1) the overall differences in hormone concentrations between males and females and 2) the pattern of variation between locations.

Significant differences were present when comparing the mean hormone concentrations by location, but the pattern of differences between locations was consistent across the three hormones. Within the female locations the order from highest concentration to lowest was SeaWorld (SWF), Wild, and Homosassa Springs (HS), with SeaWorld and Homosassa being significantly different from each other, but both had values that did not differ significantly from the Wild group, for all three hormones. The order of male hormone concentrations across locations was Epcot and SeaWorld with the highest means, followed by Lowry then Wild with the lowest mean concentrations. For the mean values of testosterone and progesterone Epcot and SeaWorld were statistically similar and both were significantly higher than Lowry and Wild. Lowry and Wild were similar in hormone concentrations. The mean estradiol concentrations for males indicated that Lowry, SeaWorld and Wild were statistically similar and Epcot was different from the three other locations.

Across all three hormones the trend was for male manatees to have higher concentrations compared to females. Male testosterone concentrations were more than an order of magnitude higher than female concentrations across all locations.

The difference between males and females was not as immense for progesterone concentrations across all locations. Male samples from the wild and Lowry had progesterone values in the same range as female values, however, progesterone concentrations from Epcot and SWF males were much higher than females and were significantly increased over the other male locations. Male samples assayed for estradiol concentrations from the Wild were within the same range as some female samples, however the other male groups were higher and Epcot was significantly higher.

Graphs shown in Figure **2-8** compare the three hormones for all male and female fecal samples assayed. These samples include captive, wild and necropsied animals. Across the three hormones males consistently have higher concentrations measured. Of the samples that were assayed for each of the three hormones, ratios of progesterone over testosterone, estradiol over testosterone and estradiol over progesterone were compared between males and females. Only a ratio of progesterone over testosterone indicates higher values for female manatees.

In Figure **2-8** Continued, the testosterone and progesterone over testosterone graphs are duplicated and include arbitrarily determined threshold values that could be used to test whether a fecal sample from an unknown manatee could correctly be identified as male or female. The testosterone threshold value of 818 ng/g delineates 98.5% of females below the threshold and 86.7% of males above the threshold. In the progesterone over testosterone a threshold value of 0.2 delineated 72.8% of females above the threshold and 88.8% males below the threshold. In both cases values below the threshold values have overlapping hormone concentrations between males and females.

Age

Comparisons between different reproductive stages and age groups were made using samples from wild and necropsy animals. Progesterone and testosterone values from both wild and necropsy animals were combined for analysis; however, the estradiol concentrations measured in wild and necropsy animals were statistically different (at p = 0.016), so only wild estradiol values are included in the analysis of age and reproductive status. Figure **2-9** presents the least square means (LSM) values and the ± standard error for the different age and reproductive groups measured for the three hormones. No statistical differences were found for testosterone and estradiol concentrations between the groups (p = 0.13 and p = 0.83, respectively). Female juveniles had the highest estradiol concentrations and were statistically different from calves and pregnant females (p = 0.017).

In addition to variance noted between locations, mentioned above, differences in mean hormone concentrations were also found between individuals. Figures **2-10**, **2-11**, and **2-12** represent female LS means per individual at Homosassa, SeaWorld, and males at Epcot and Lowry, respectively. Homosassa female estradiol concentrations appear to comprise two groups, with Amanda and Rosie having significantly higher concentrations than the other five females. This pattern, however, does not hold for progesterone concentrations, where Betsy has the highest values, Lorelei has the lowest, and the rest of the females are intermediate. Of the SeaWorld females, Charlotte and Rita have concentrations significantly higher than the other three females. Rita also has significantly increased progesterone concentrations along with Stubbie. Charlotte and Georgia have the lowest progesterone values. The testosterone LS means for each of the males at Epcot were statistically different, with the highest values found for Gene, next Hurricane, and then Chester. Both males at Lowry had statistically similar testosterone concentrations.

Discussion

Experiment One: Fecal Marker/Gut Transit Time

Experiment One was a preliminary examination to measure the gut transit time of the Florida manatee and determine the viability of using colored corn as a means to mark fecal samples, improving fecal identification and collection efficiency. Utilization of fecal markers has been well established in digestive studies looking at the passage rates of digesta and fecal composition (Warner, 1981; Van Soest, 1982). Both liquid and solid phase markers are available. There is special concern in feeding a fecal marker to an endangered species, therefore the marker selected for this study was colored corn. The corn is naturally digestible if it should be retained within the digestive tract and the dye is the same coloring provided for human consumption under the Food and Drug Administration. The corn is ground into small pieces and has the appearance of grits. The fecal marker was successful in identifying the manatee from which a fecal sample originated and was subsequently utilized in several facilities to collect samples.

Measurement of digesta transit time was done on a gross, per day basis. The results from the Homosassa female indicate a gut transit time of 6 days and gut retention time of 7 days. This is comparable to data collected from 4 Miami Seaquarium manatees that averaged a 7 day gut transit time and an 8 day gut retention time. In hours this would range from 144 to 192 hrs with a median value of 168 hr. Similar results were found for manatee gut transit time from Lomolino (1984) 6 days, and Best (1981) 5 days.

There did not appear to be any increase in transit or retention with an increase in length or weight. These data suggest that the size of the animal does not play an important role in the time required for digesta to traverse the gastrointestinal tract of manatees; however, a more refined measurement of time, such as hours, may provide greater detail. Other factors such as diet and fiber content also may be more important. These factors were not included in the preliminary study because the manatees were allowed free choice of the foods made available to them, which included iceberg and romaine lettuce, sweet potatoes, carrots, apples, bananas, and Purina ® monkey chow. The data does indicate that if fecal and plasma samples were collected at the same time from a given manatee, the fecal sample would represent hormone concentrations several days behind that of the plasma sample.

In comparison to other mammalian transit times, the manatee has an unusually long retention time. The elephant has a mean transit time between 21 and 46 hours (Rees 1982; Warner 1981). Horses, which are similar to manatees in utilizing hindgut fermentation, have a mean gut transit time ranging from 28 to 38 hours depending upon the diet fed. Ruminants such as cattle (*Bos taurus*) or buffalo

(*Bubalus bubalis*) have means that range 68.8 ± 28.2 hrs SD and 94.8 ± 3.3 hrs SD, respectively. In fact, in the comparative review conducted by Warner (1981) the only species that appear to come within the same range of manatees are the koala (*Phascolarctos cinereus*) and sloths (the three-toed sloth, *Bradypus tridactylus*, and the two-toed sloth, *Choleopus didactylus*).

In relation to the Florida manatee's gastrointestinal tract function and structure, this long gut transit time allows manatees to be extremely efficient in their digestion and absorption of plant material. Manatees have an immense large intestine and cecum, where the majority of cellulolysis (83%) occurs (Reynolds & Rommel 1996). The size and length of the hindgut, as well as ridges (mainly in the colon) that lie perpendicular to the passage of food also point to the slow rate of travel for digesta. Manatees are comparable in their efficiency at digesting cellulose with ruminants, such as sheep and cow, but are considerably more efficient than another hindgut herbivore, the horse (Burn 1986; Reynolds & Rommel 1996).

This long gut transit time in manatees suggests a considerable time delay in the hormonal values measured from fecal samples, compared to plasma samples, which represent an immediate reflection of biological state. To make a comparison, elephants, another hindgut herbivore, have a gut transit time of 1-2 days and the time difference between serum and fecal values was 2 days (Rees 1982; Warner 1981; Wasser et al. 1996). Horses have a gut transit time between 1-2 days and have a time delay between fecal and serum samples of 20-26 hours (Palme et al. 1996; Warner 1981). The time delay in manatees will be dependent on the transit time from the bile duct just past the duodenal ampulla where the steroids enter the digestive tract from the liver, to the rectum (Reynolds & Krause 1982; Reynolds & Rommel 1996). Because manatees are hindgut fermenting herbivores, this is where the majority of digestion occurs, as mentioned above, and thus the slowest area for passage of digesta (Burn 1986; Reynolds & Rommel 1996). This may mean that a time difference ranging 5 days to a week may separate values measured from manatee plasma and fecal samples. The peak excretion time in hours, of radiolabeled steroids administered to several species, is compared by Schwarzenberger et al. (1996).

Experiment Two: Fecal Handling

The results of Experiment Two imply that no serious degradation or metabolism occurred during the handling of fecal samples in the field until they were frozen and subsequently assayed. As mentioned in the methods, measuring testosterone concentrations was the best option at the time the study was conducted. However, including measurements of estradiol and progesterone concentrations would have provided a more complete data set.

Ideally, in addition to the Handling Experiment, a study administering radiolabeled estradiol, progesterone and testosterone should have been done to determine the specific metabolites excreted, as well as the proportion of metabolites excreted in feces versus urine. Working with an endangered species has provided limitations in the types of invasive studies that could be conducted. However, since the beginning of this study several papers have been published utilizing the infusion of radiolabeled steroids on endangered or threatened species such as the African elephant (Wasser et al. 1996), Sumatran rhinoceros (*Dicerorhinus sumatrensis*) (Heistermann et al. 1998), white rhinoceros (*Ceratotherium simum*) (Hindle &

Hodges 1990), and African wild dog (*Lycaon pictus*) (Monfort et al. 1997). These endangered species are in addition to the many domestic or non-threatened exotic species studied, including the domestic cat (*Felis catus*) (Brown et al. 1994; Shille 1990), baboon (*Papio cynocephalus*) (Wasser et al. 1994), slow loris (*Nycticebus coucang*) (Perez et al. 1988), cotton-top tamarin (*Saguinus oedipus*) (Ziegler et al. 1989), Siberian polecat (*Mustela eversmanni*), North American river otter (*Lutra canadensis*) (Gross 1992), sheep, horse and pig (*Sus scrofa*) (Palme et al. 1996), to list just a few. Recent studies reviewing the data of fecal metabolites excreted across species have shown that the majority of steroid metabolites are unconjugated. Estrogens are principally excreted as estrone and/or 17α– or 17β–estradiol. The majority of fecal progestins are excreted not as progesterone, but as 5α– or 5β–reduced pregnanediones and hydroxylated pregnanes (Schwarzenberger et al. 1996).

The next possible step to take, barring the injection of radiolabeled steroids, would be to utilize High Pressure Liquid Chromatography (HPLC) to identify metabolites that are subsequently measured for their immunoreactivity in an assay such as an enzyme immunoassay (EIA) or RIA. This was done for manatees, however the sheet with identified peaks indicated by known eluted metabolites from the HPLC was lost. Without the key, the assayed metabolites can not be identified. However, the estrogen RIA did measure a single distinct peak shared by each of the three females studied. The progesterone RIA measured a single peak shared by two of the three females sampled, as well as 2 peaks from one female and a single peak from another female not shared among the other females sampled. In total the progesterone RIA measured 4 peaks between aliquots 65-80. The HPLC column used was a Beckman (http://www.beckman.com/) ultrasphere ODS (C18) 4.6 mm X 25 cm, 5 µm particle size. The mobile phase was 60% methanol and 40% distilled water. Twenty microliters of the solubilized fecal solution were measured from each of three female manatees. The flow was 1 ml/min at room temperature with 30 sec fractions. The HPLC system used was a Beckman System Gold with software, pump module 126, and UV detector module 168. The RIA technique utilized to assay the aliquots from the HPLC was the older technique mentioned in Assay Trials & Tribulations (see Appendix.)

Experiment Three: Fecal Comparisons with Plasma and Tissue Samples

Comparisons of steroid concentrations between plasma and fecal samples in Experiment Three indicate that adult male manatees have higher concentrations of testosterone than females or immature males, and that these higher levels are similarly expressed in both sampling methods, feces and plasma. Estradiol and progesterone concentrations, however, indicate much more variation. The fact that higher estradiol or progesterone plasma concentrations are not similarly indicated by higher fecal concentrations and vice versa in Figure **2-1** is partially explained by the results of Experiment One. Time delay due to gut transit of the fecal hormones may be the cause of discrepancies in estradiol and progesterone between fecal and plasma concentrations. Female fluctuations in estradiol and progesterone may highlight this time difference in concentrations by 2 days (as in elephants, Wasser et al. 1996) or longer. However, this does not explain the variation in male estradiol and progesterone concentrations. Differences between individuals may be another important factor contributing to the variation.

Unlike testosterone, little biological distinction can be made between the different reproductive groups utilizing estradiol or progesterone concentrations from either plasma or fecal samples. A small number of animals and a subjective means of determining an adult female's reproductive state (i.e. pregnant or cycling) from her appearance may contribute to the inability of plasma samples to distinguish different reproductive states in Figure **2-2**. Plasma samples comparing male versus female progesterone concentrations in Figure **2-4** do reflect a trend of higher female values. In addition, the female estradiol plasma concentrations in relation to males are higher than the fecal estradiol concentrations.

Unfortunately, knowing the physical reproductive state of the animal from their reproductive tracts does not improve the ability to identify different reproductive stages from hormone concentrations. The testosterone concentrations measured from necropsied manatees shown in Figure **2-6** are similar to the other reproductive groups except for one very high male value. The estradiol concentrations for the females may indicate a trend for pregnant and follicular animals to have higher values.

The difficulties of identifying different reproductive groups from fecal progesterone concentrations may be related to other predominant types of metabolites excreted, as mentioned above (5α– or 5β–reduced pregnanediones and hydroxylated pregnanes). Progesterone may not be the most appropriate metabolite to measure. The fluctuations that naturally occur with estradiol and progesterone in females may contribute to the inability to distinguish between males and females. However, the mean concentration above 2 STD representing active luteal or follicular phases in figure **2-5** still do not indicate sample values that much greater than in males. It may be that male manatees do express relatively high concentrations of fecal estradiol and/or progesterone. High amounts of estradiol have been measured in mature stallions and boars (Bamberg et al. 1986; Palme 1994; Palme & Möstl 1993; Raeside 1978/1979; Schwarzenberger et al. 1996; Velle 1966). In fact, stallions have a daily output of estrogens that are several fold higher than non-pregnant mares.

Ultimately, Experiment Three was not designed to collect serial fecal and plasma samples that would be most appropriate to resolve some of the discrepancies between plasma and fecal sample values. Plasma samples were only collected opportunistically and individuals were sampled cross-sectionally. Neither was this study intended to collect numerous reproductive tracts to review manatee reproductive anatomy. The overall goal of this research was as a longitudinal study of fecal hormone concentrations measured from identified individuals. Longitudinal fecal collections would allow for a qualitative description of hormonal fluctuations within an individual that would indicate estrous cycles and seasonal patterns. Although it is not known whether the most appropriate fecal metabolites for the Florida manatees are being measured, the hormone concentrations measured may still provide meaningful fluctuations relative to an individual's estrous cycle and seasonal activity levels. This has been demonstrated before in elephants. Elephant progesterone concentrations correctly identified the length of the elephant estrous cycle as ~15 weeks, whereas 5α–reduced metabolites, 5α–pregnane-3,20-dione (5α–DHP) and 5α–pregnane-3-ol-20-one (5α–P-3-OH), are actually the major circulating progestins (Brannian et al. 1988; Heistermann et al. 1997; Hess et al. 1983; Hodges et al. 1997; Hodges et al. 1994; Plotka et al. 1988).

Experiment Four: A Comparison of Gender, Location, Age and Individuals

In Experiment Four it was not unexpected to find that captive manatees have different mean hormone concentrations between facilities and that captive animals averaged higher concentrations than wild manatees (see Figure **2-7**). Variables such as diet and possible environmental stressors can profoundly affect hormone concentrations. In general, depending upon how well a species reacts to captive environments, regular availability of nutritious food, types of food, veterinary care, and elimination of predatory and other natural threats of the animal's well being can allow reproduction to occur at a much younger age and more frequently than in the wild. It was anticipated that Homosassa Springs, in comparison to the other captive facilities, would have lower mean hormone concentrations due to hay in the animals' diet. This diet adds considerable bulk of undigested hay fibers to fecal mass and directly affects the assay because this technique measures hormones on a per gram basis.

Across all three hormones the trend was for male manatees to have higher concentrations. This is unusual for estradiol and progesterone concentrations in comparison to other mammalian hormone patterns. The expectation would be for adult female estradiol and progesterone concentrations to be higher in comparison to males. A possible explanation, as mentioned above, would be that male manatees do produce higher fecal concentrations of sex steroids, this may be normal or artificially induced by a captive environment. Other explanations for high male hormone concentrations could be that something is artificially increasing the measurements of male estradiol and progesterone such as cross-reactivity of antibodies with androgen metabolites not previously tested, or it is possible progesterone and estradiol metabolites are not the most appropriate for monitoring the adult female manatee reproductive cycle.

The data from Figure **2-8** indicate that most males may be distinguished from females by their testosterone concentrations and females may be separated from the remaining males utilizing the progesterone/testosterone ratio. In the future, if another progestin is discovered to be more appropriate, the larger value will only enhance the separation of the male ratio from the female ratio. However, the current technique is not refined enough to distinguish between different ages or reproductive groups, as highlighted by Figure **2-9** and the studies of plasma samples and fecal samples from necropsied animals.

Differences between individual mean hormone concentrations across the period of a year or more are denoted in Figures **2-10**, **2-11**, and **2-12**. The variation between mean values may be reflective of reproductively active versus inactive periods. As seen in Figures **3-1** through **3-12** certain animals displayed long periods with no hormonal fluctuations or concentrations below detection levels (i.e. Stubbie and Lorelei), in comparison to others with fluctuations throughout the sampling period (Rosie and Amanda). An additional factor that may contribute to the variance between individuals is differences in steroid recovery. As mentioned in Assay Trials & Tribulations (see Appendix) steroid recovery within an individual was found to be consistent, but not between individuals. Ideally, measurements of steroid recoveries would have been made and calculated to normalize the variance between animals, but the cost was prohibitive. This variance should be taken into consideration when referring to manatees as a group, but should not interfere with the analysis of longitudinal data from a single manatee.

Conclusions

This fecal RIA technique currently can not distinguish clearly between different reproductive groups (i.e. adult vs. calves, pregnant vs. non-pregnant), with the use of either plasma or tissue samples. Further refinement of the RIA will be necessary to correctly identify the excreted metabolites and establish the parameters defining reproductive groups and mature versus immature manatees. As mentioned above, 17β–estradiol is the predominant metabolite excreted in other species suggesting that this metabolite may be an important indicator for manatees. Progesterone may not be the major fecal metabolite, as reflected by other species, but as in the elephant, may still indicate important aspects of female reproductive function. Use of high-pressure liquid chromatography (HPLC) should be a simple means of identifying the major metabolites present in feces and urine, if the utilization of radiolabeled steroids is not feasible.

Corroboration with a greater number of plasma or urine samples now that manatees are being trained for collections, collected more frequently than once or twice a week, and from animals with known reproductive status will be key components of future research. An intensive period of daily plasma (or as frequently as possible) or urine samples in conjunction with fecal samples will be necessary to identify the lag time between current hormones in the blood stream and steroids excreted in feces.

Currently this technique has been properly validated in the lab and should be sufficient in describing qualitative changes found within an individual manatee, to document hormonal fluctuations related to the estrous cycle and seasonal changes. Data related to groups of manatees will reflect variation between individuals but large hormone fluctuations may be identified.

Table **2-1** Values of normality characteristics, before and after log transformation of fecal hormone concentrations.

	E-F	**E-F**	E-M	**E-M**	P-F	**P-F**	P-M	**P-M**	T-F	**T-F**	T-M	**T-M**
Skewness	8.87	1.21	3.38	-.24	4.32	-.77	.63	-1.82	10.47	-1.98	.73	-2.56
Kurtosis	90.28	.88	14.15	-1.24	27.28	-.28	.57	2.20	132.63	3.23	.14	8.29
Mean	19220.36	7.44	50742.74	9.34	230.24	4.21	452.45	5.17	276.42	4.88	17855.99	9.15
Median	444.44	6.10	20142.77	9.91	122.12	4.80	448.40	6.11	208.84	5.34	16399.81	9.71
Shapiro Wilk P	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001

The headings across the top refer to estradiol for females (E-F), estradiol for males (E-M), progesterone for females (P-F), progesterone for males (P-M), testosterone for females (T-F), and testosterone for males (T-M). The normal text heading indicates values before transformation and the bold headings indicate values after log transformation.

Table **2-2** Gut transit and retention time of colored corn fed to adult manatees.

Manatee	GUT TRANSIT TIME TIME (days)		GUT RETENTION TIME TIME (days)	
	NEW COLOR	OLD COLOR	OLD COLOR	NEW COLOR
Newton (MS-Tm-9305)	7	7	6	8
Phoenix (MS-Tm-9304)	9	8	8	10
Romeo (MS-Tm-5701)	6	6	8	8
Juliet (MS-Tm-5801)	6	7	8	8
Average	7.0 days		8.0 days	

TIME LINE: → OLD COLOR (fed prior to study to mark fecals) → NEW COLOR (fed for Experiment One) → OLD COLOR (fed to resume marking fecals as prior to study)

Transit times (in days) it takes the fecal marker to get from first ingestion, to first be seen in the feces. Retention times (in days) it takes the fecal marker from first visible traces in feces until last visible traces in feces.

Table **2-3** Lengths and weights of gut transit time manatees.

MANATEE	LENGTH (cm)	WEIGHT (kg)
Newton (male)	N/A	409
Phoenix (female)	300	909
Romeo (male)	325	818
Juliet (female)	326	1136

Table **2-4** Handling study normalized hormone concentrations.

MANATEE	NORMAL	WATER 30min	WATER 2hrs	AIR 30min	AIR 2hrs	FREEZE IMMEDIATE	FREEZE/ THAW 3x	FREEZE/ THAW 5x	DRY
Ariel HS-8602	100.00	67.00	.	88.00	88.00	72.00	92.00	.	130.00
Star HS-8701	100.00	216.00	231.00	247.00	238.00	205.00	193.00	.	435.00
Amanda HS-8601	100.00	126.00	94.00	121.00	130.00	145.00	114.00	.	183.00
Betsy HS-9002	100.00	88.00	95.00	104.00	86.00	88.00	174.00	97.00	140.00
Rachel HS-9005	100.00	101.00	97.00	75.00	101.00	.	100.00	83.00	203.00

MEAN VALUES	100.00	119.60	129.25	127.00	128.60	127.50	134.60	90.00	218.20
STANDARD DEVIATION	0.0	57.98	67.84	69.26	63.63	60.42	45.82	9.90	124.87

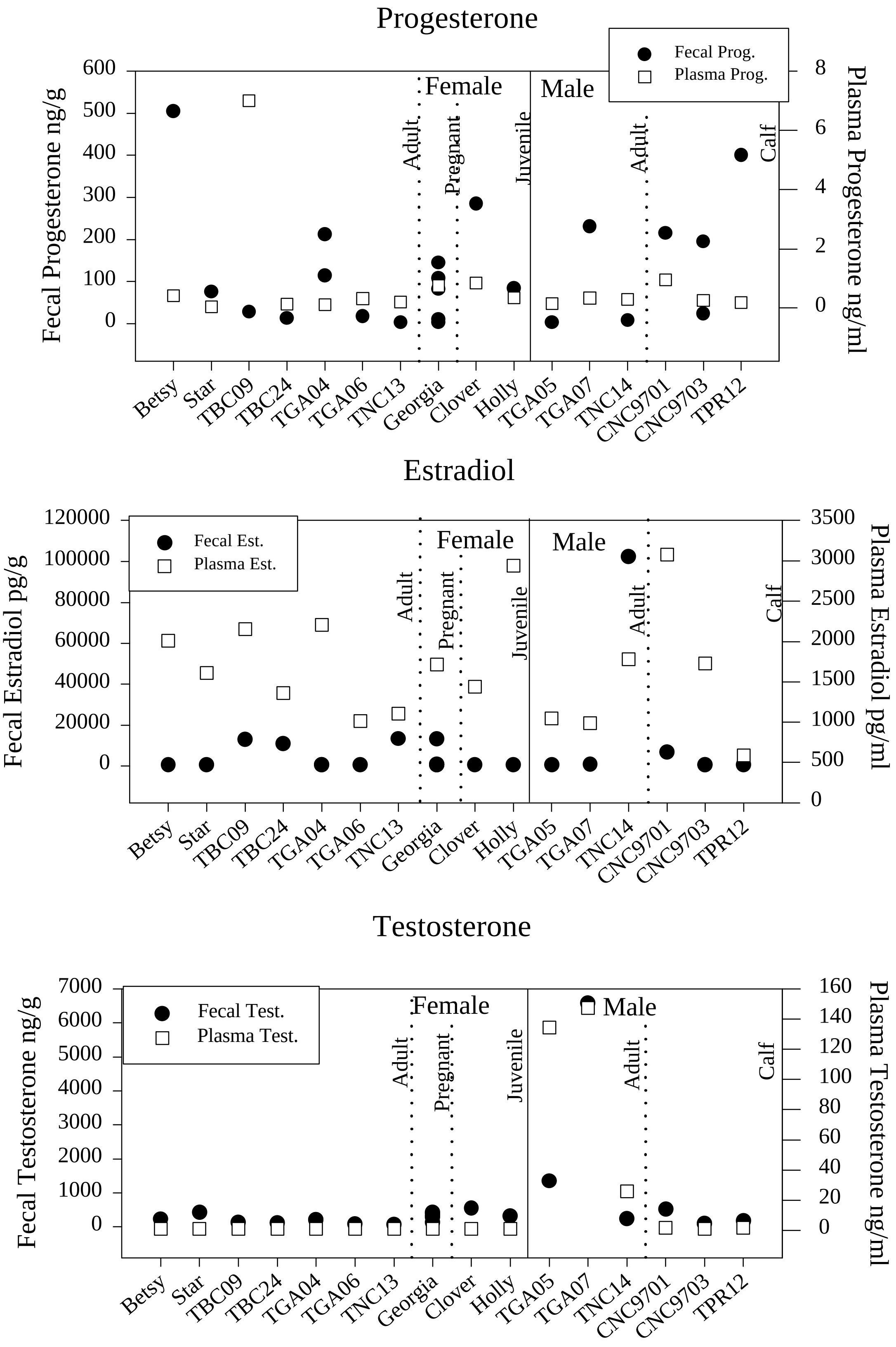


Figure **2-1** Matching fecal and plasma concentrations of progesterone, estradiol, and testosterone for individual manatees.

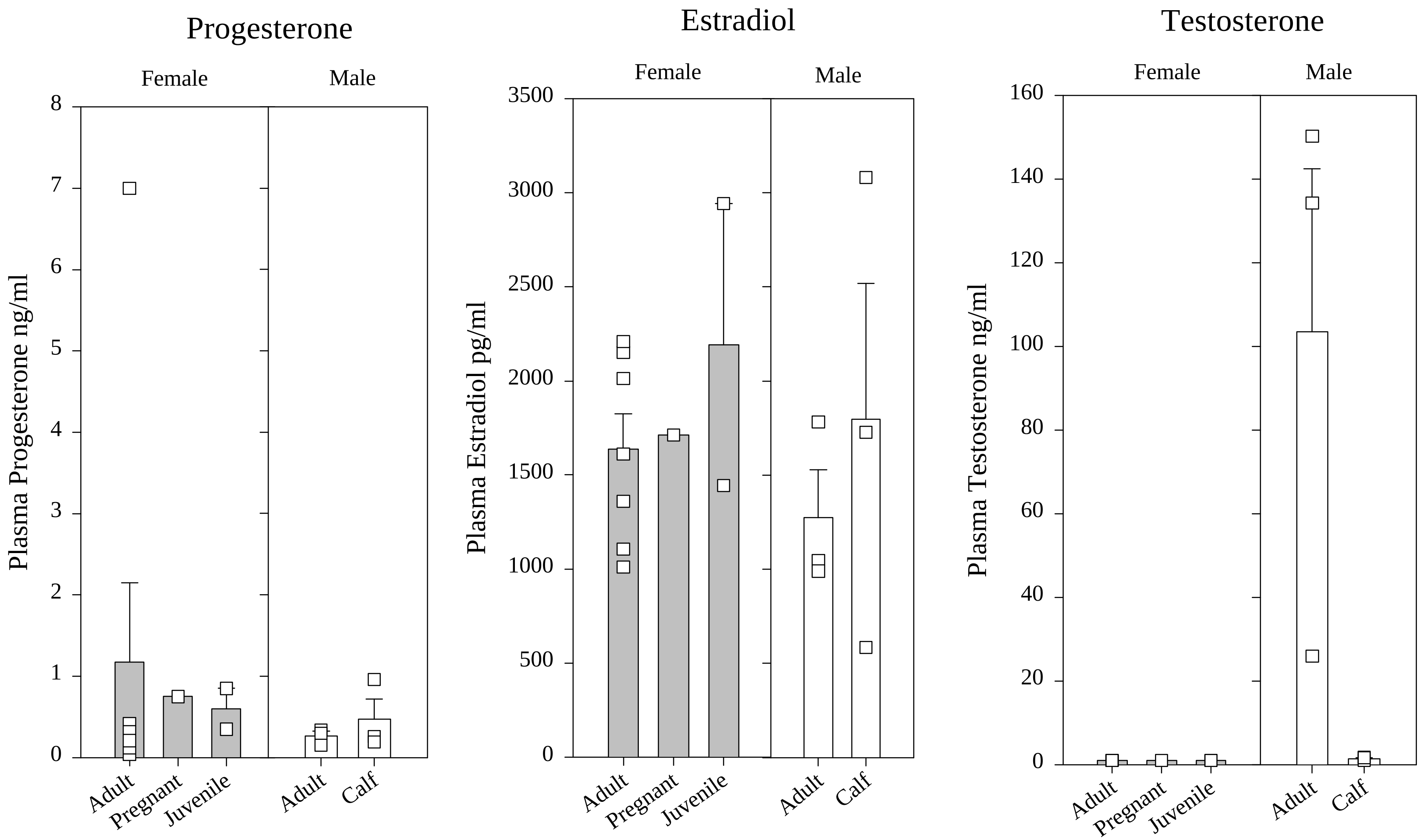


Figure **2-2** Mean plasma concentrations of progesterone, estradiol and testosterone that have matching fecal samples, grouped by reproductive state. The bars indicate mean values ± SEM and the squares indicate individual animal values. The number of individuals in each group are as follows: Adult female = 7, Pregnant = 1, Juvenile = 2, Adult male = 3, and Calf = 3.

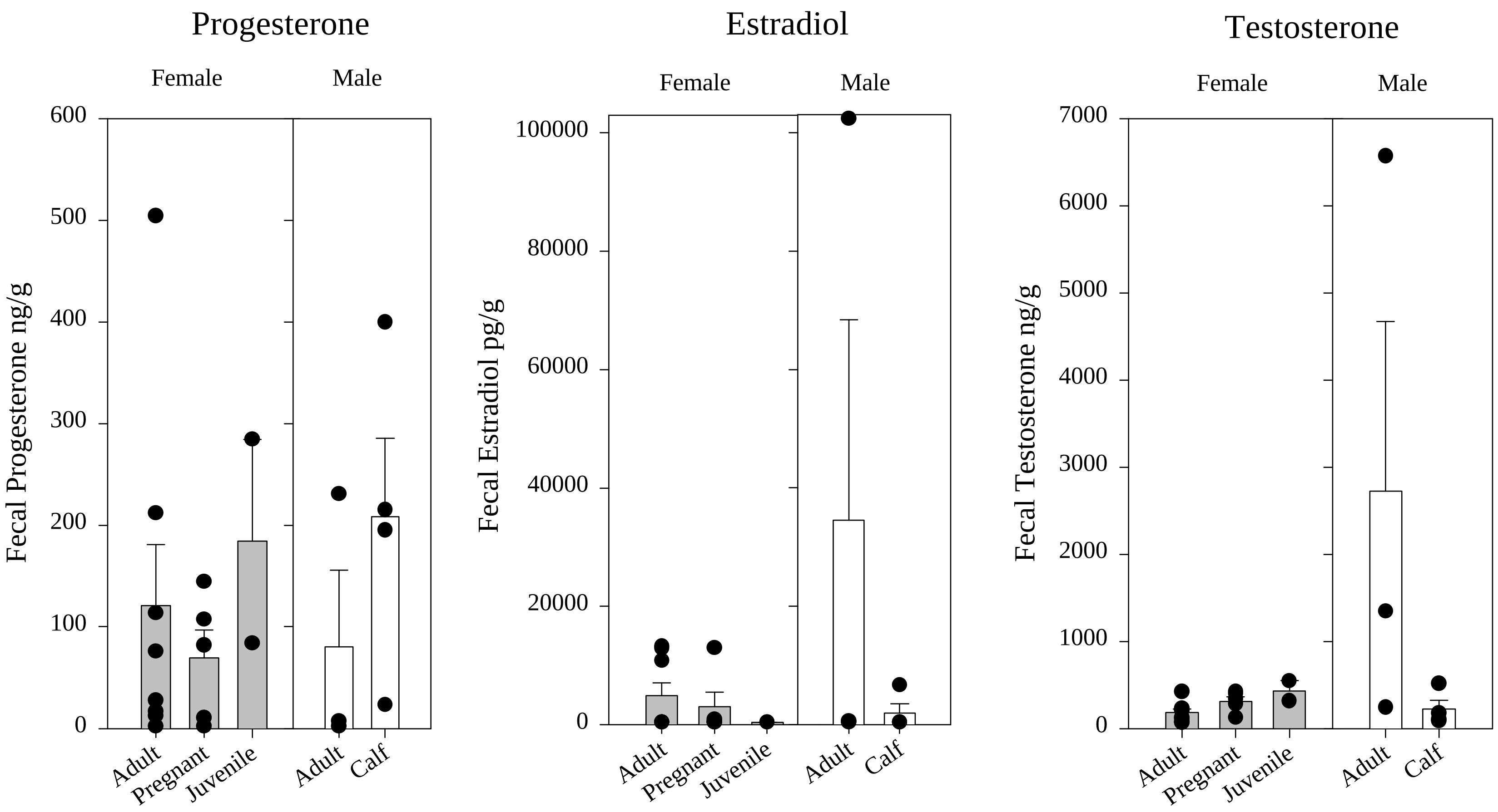


Figure **2-3** Mean fecal concentrations of progesterone, estradiol and testosterone that have matching plasma samples, grouped by reproductive state. The bars indicate mean values ± SEM and the circles indicate individual animal values. The number of individuals in each group are as follows: Adult female = 8, Pregnant = 5, Juvenile = 2, Adult male = 3, and Calf = 4.

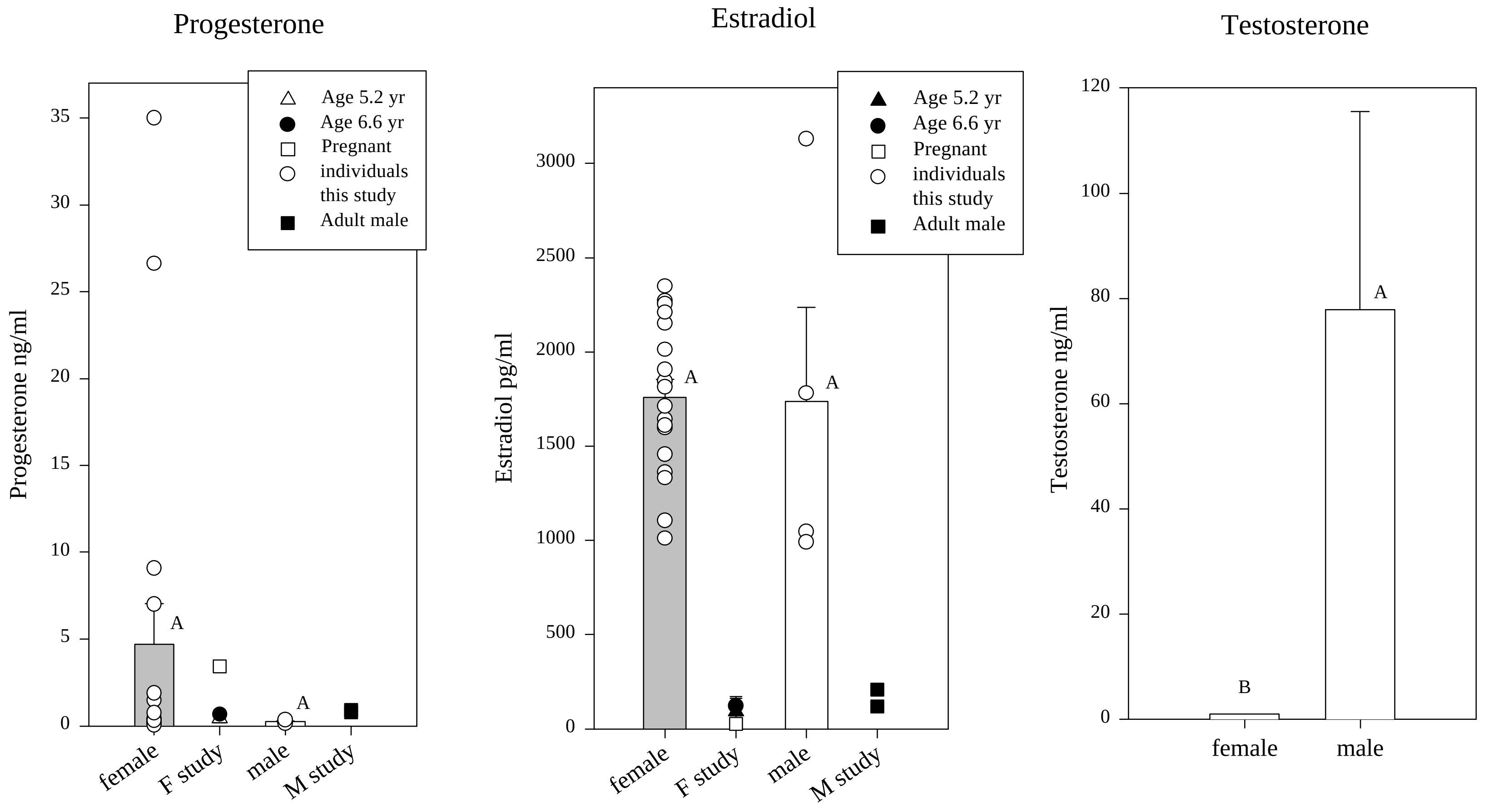


Figure **2-4** A comparison between male and female plasma concentrations of progesterone, estradiol, and testosterone. The bars with ± SEM represent serum concentrations comparing male and female manatees from the current study where the female n = 18 and the male n = 4. The unfilled circles are individual values from this study. Bars with the same letters are statistically similar and bars with different letters are statistically different at the 0.05 significance level. The shapes labeled by F study and M study indicate female and male concentrations measured in a previous study by Francis-Floyd et al. (1991). The error bars for the females aged 5.2 and 6.6 years represent 95% confidence interval.

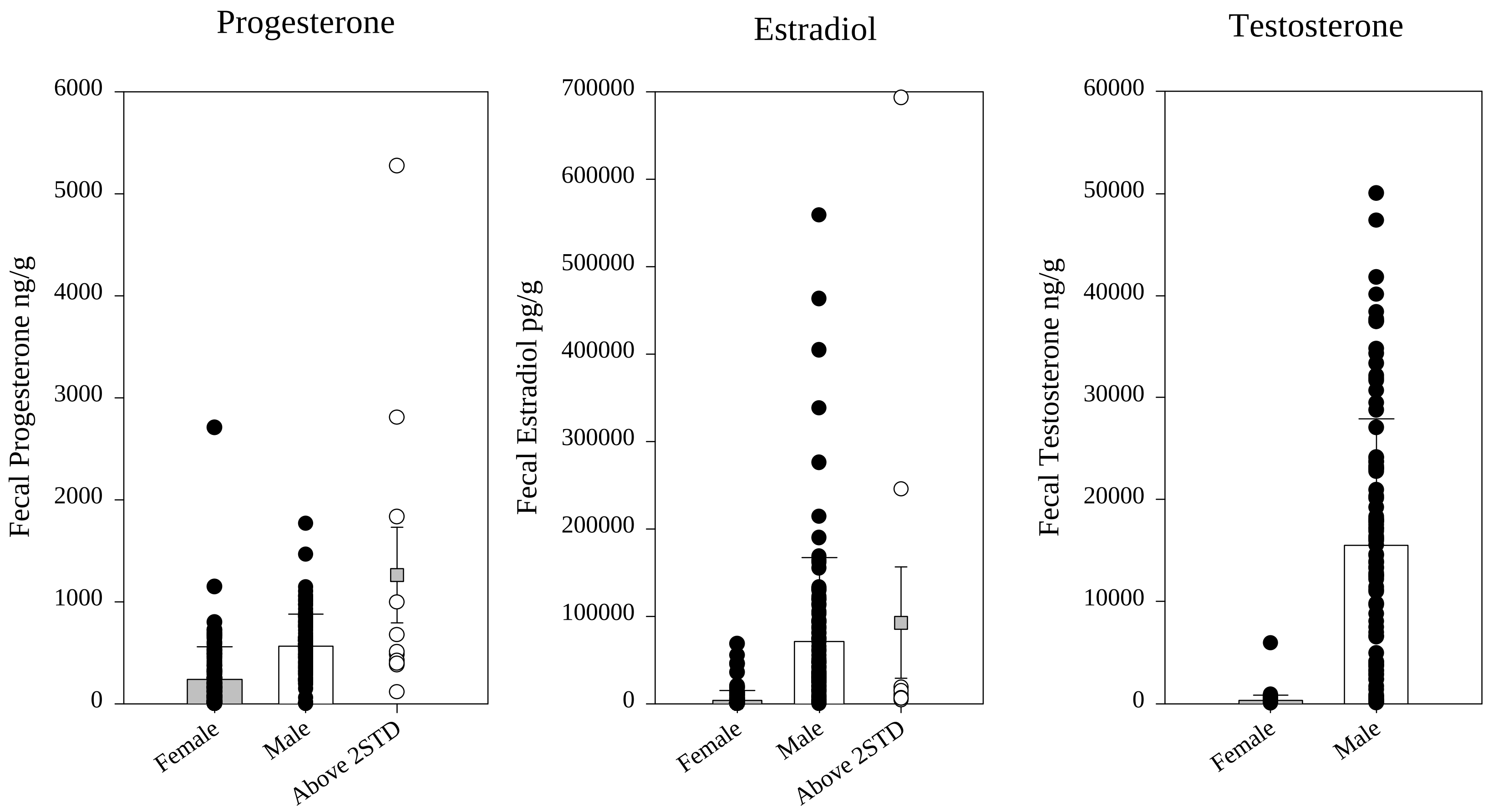


Figure **2-5** Comparison between male and female fecal concentrations of progesterone, estradiol and testosterone. The circles represent individual values that conctribute to the mean. The bars are mean values ± SEM for male and female samples measured for all three hormones. The square is the mean value ± SEM of concentrations 2STD above each captive manatee's individual mean of all samples collected, as indicated by unfilled circles. The Female n = 123, the Male n = 96 and the Above 2STD n = 12.

Table **2-5** Necropsied female manatee measurements of reproductive tracts, body length and hormone concentrations.

ID/Name	MSW 96219	MSW 96160	MSW 9644	Adair SWF-8638B	MSW 96177	MSW 96171	N95-612 SWF TM 9513-B	MSW 96173
Uterine Body Length cm	14.5	22.0	16.1	X	4.8	4.9	X	21.8
Uterine Horn A Length cm	32.5	32.5	23.4	X	14.1	12.1	X	25.3
Uterine Horn B Length cm	17.6	30.0	20.0	X	12.7	12.2	X	25.8
Ovary A Length cm	15.1	13.5	14.2	10.4	10.3	6.6	X	X
Ovary A Width cm	14.2	9.8	7.0	9.3	3.6	4.6	X	X
Ovary B Length cm	13.0	12.5	10.5	12.5	5.6	6.6	X	X
Ovary B Width cm	12.0	10.7	8.8	7.3	3.3	4.8	X	X
# Follicles > 2mm	38	22	1	19	0	0	X	X
Largest follicle mm	19.1	6.0	6.5	17.5	X	X	X	X
# CL > 2mm	14	0	3	17	0	0	X	X
Largest CL mm	9.2	X	6.3	6.5	X	X	X	X
Body length cm	297	320	285	X	224	215	233	274
Comments	Adult Luteal phase	Adult Follicular dissected prior to measurement	Adult luteal	Adult luteal no uterus only ovaries	Lg calf	Lg. calf	Lg. calf Cut into several pieces before measurements	Adult Lactating No ovaries
Hormone values	No		No	No				
Progesterone ng/g		474.43			55.97	156.03	380.72	252.09
Estradiol pg/g		22363.29			572.91	444.44	444.44	8317.88
Testosterone ng/g		279.77			102.78	95.50	307.07	183.21

Table **2-5** Continued

ID/Name	MSW 9608	MSE 9713	MSW 96244	MSE 9723	MSW 96161	MSW 9609	MSW 9714	MSW 96245
Uterine Body Length cm	4.9	12.6	11.8	4.2	6.3	6.6	14.5	22.7
Uterine Horn A Length cm	10.4	15.4	10.8	17.5	7.0	9.7	19.6	33.7
Uterine Horn B Length cm	10.7	11.9	13.0	17.9	6.1	10.2	23.5	33.6
Ovary A Length cm	5.8	8.8	9.3	6.9	7.3	4.7	11.2	14.1
Ovary A Width cm	6.2	6.5	6.6	6.0	2.7	3.6	10.0	13.8
Ovary B Length cm	6.9	8.0	8.9	7.7	X	X	10.0	11.3
Ovary B Width cm	7.1	4.2	5.9	6.9	X	X	5.3	11.0
# Follicles > 2mm	0	0	33	45	0	0	23	0
Largest follicle mm	X	X	8.9	9.5	X	X	10.4	X
# CL > 2mm	0	0	0	0	0	0	24	52
Largest CL mm	X	X	X	X	X	X	9.1	6.5
Body length cm	170	232	198	241	211	216	292	364
Comments	calf	Lg. calf	calf	Lg. Calf	Lg. calf Cut into several pieces before measure-ments. Missing one ovary. Juv. or young adult	Lg. calf One ovary missing. Surface of ovary is degraded	Adult Luteal	Adult Luteal phase
Hormone values		No					No	
Progesterone ng/g	516.08		332.88	263.77	493.96	2.34		26.55
Estradiol pg/g	3285.74		9925.19	4753.98	444.44	444.44		452.96
Testosterone ng/g	312.63		139.50	143.20	95.38	141.09		184.58

Table **2-5** Continued

ID/Name	MSW 96221	MSW 9742	MSW 9734	MEC 9723	MEC 9625	MEC 9715
Uterine Body Length cm	25.6	23.2	20.2	10.5	5.4	6.8
Uterine Horn A Length cm	44.0	36.2	38.8	24.0	17.1	13.4
Uterine Horn B Length cm	33.8	20.9	35.7	21.6	13.9	12.2
Ovary A Length cm	17.4	10.8	15.1	10.7	6.6	9.4
Ovary A Width cm	11.9	8.6	12.3	14.0	10.2	9.9
Ovary B Length cm	13.8	13.1	X	9.4	7.8	9.5
Ovary B Width cm	8.8	8.4	X	8.5	5.7	7.1
# Follicles > 2mm	91	84	20	48	9	15
Largest follicle mm	10.6	8.5	11.6	11.3	9.5	11.7
# CL > 2mm	55	28	29	9	0	0
Largest CL mm	8.6	9.8	10.0	4.6	X	X
Body length cm	338	274	280	285	232	247
Comments	Adult Pregnant	Adult Pregnant With placenta	Adult, Pregnant. Ovary B has been cut, follicles and CL only counted from ovary A	Adult. Luteal Uterus has been cut before measure-ments	Lg calf Many hemorrhagic structures	Juv. Many hemorrhagic structures
Hormone values				No		
Progesterone ng/g	689.52	330.93	490.38		189.58	272.52
Estradiol pg/g	55489.40	18917.92	20498.36		2427.56	6780.11
Testosterone ng/g	106.96	80.00	80.00		145.23	149.94

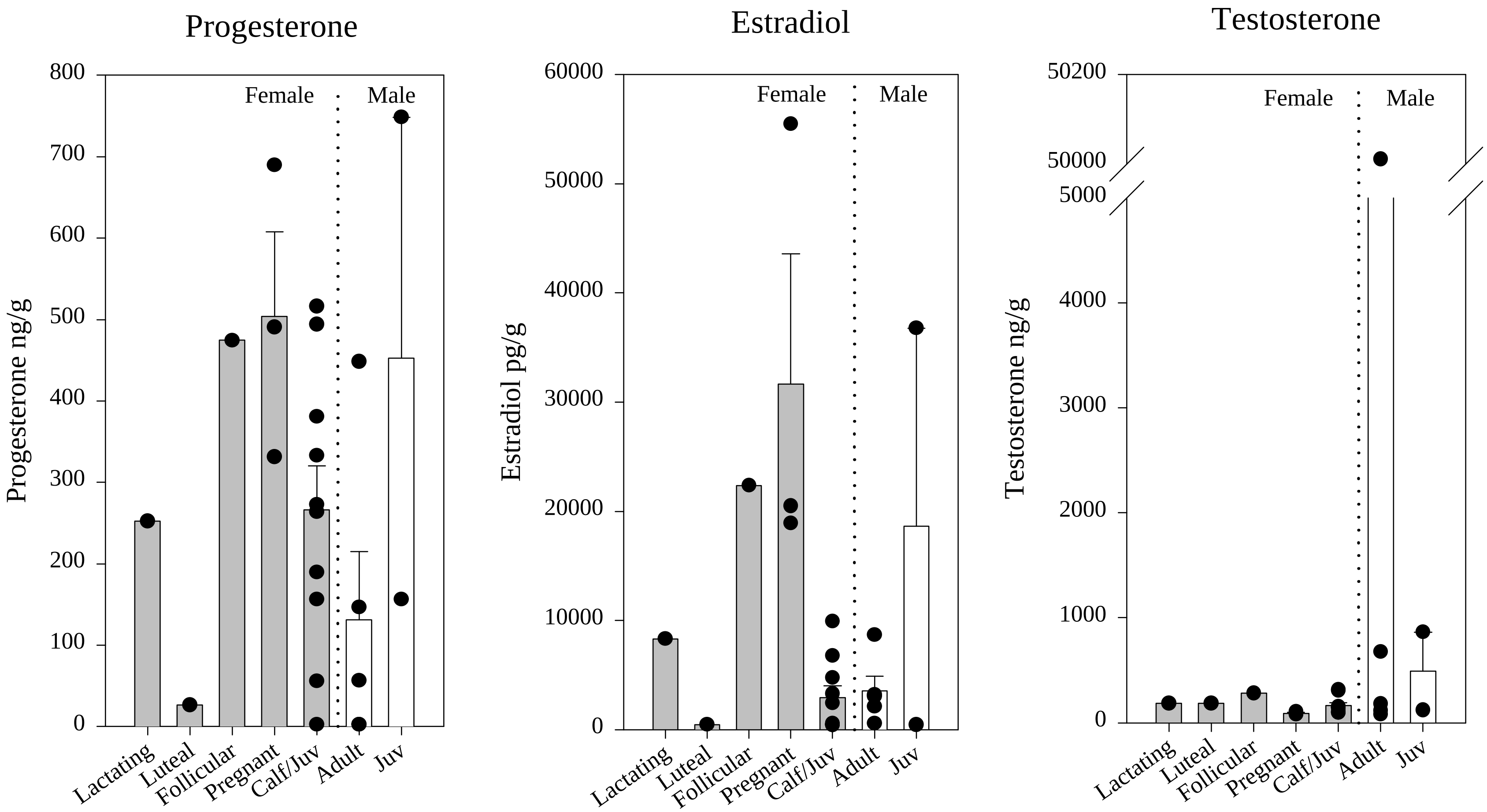


Figure **2-6** Fecal hormone concentration from necropsied animals. The gray bars are females and the white bars are males, indicating mean values ± SEM. The circles indicate individual animal values. The number of individuals in each group are as follows: Lactating n = 1, Luteal n = 1, Follicular n = 1, Pregnant n = 3, Calf/Juv n = 10, Adult n = 5, and Juv n = 2.

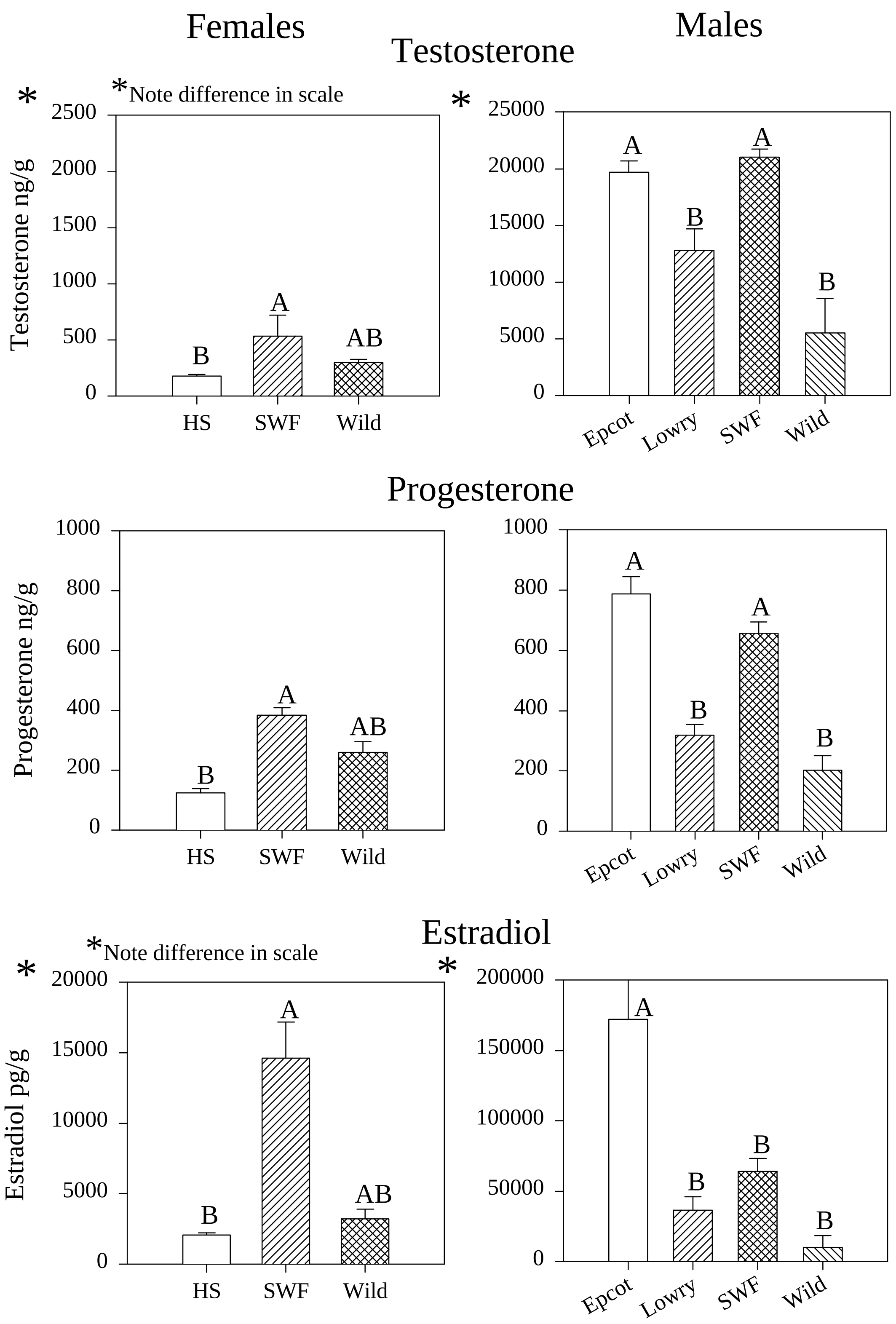


Figure **2-7** Male and female fecal concentrations of testosterone, progesterone and estradiol, grouped by each location and gender. The bars indicate mean ± SEM Bars with the same letters are statistically similar and bars with different letters are statistically different, at the 0.05 level of significance.

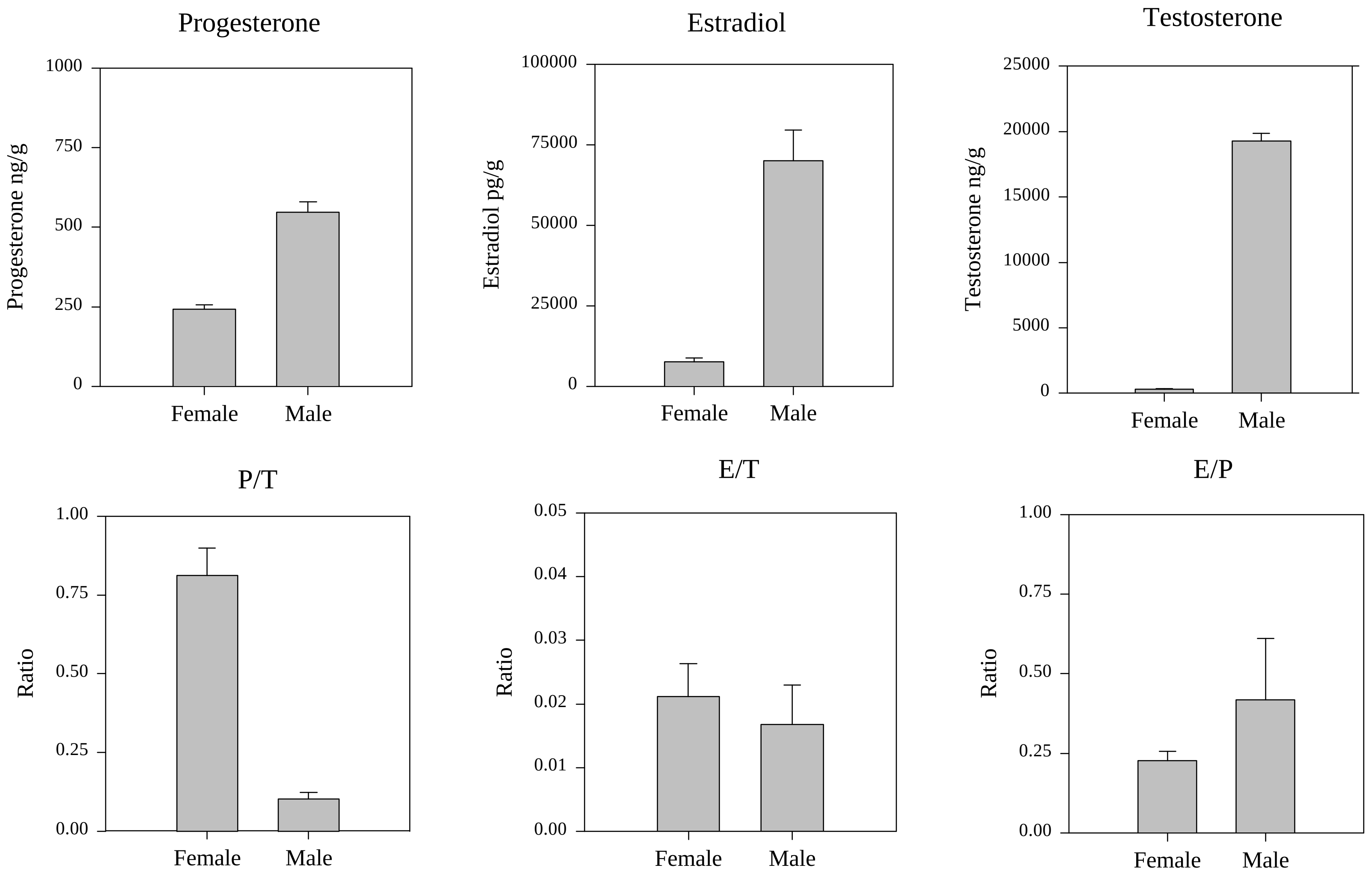


Figure **2-8** Female and male fecal hormone comparisons of Progesterone(P), Estradiol (E) and Testosterone (T), plus ratios of P/T, E/T and E/P. The bars represent the mean ± SEM.

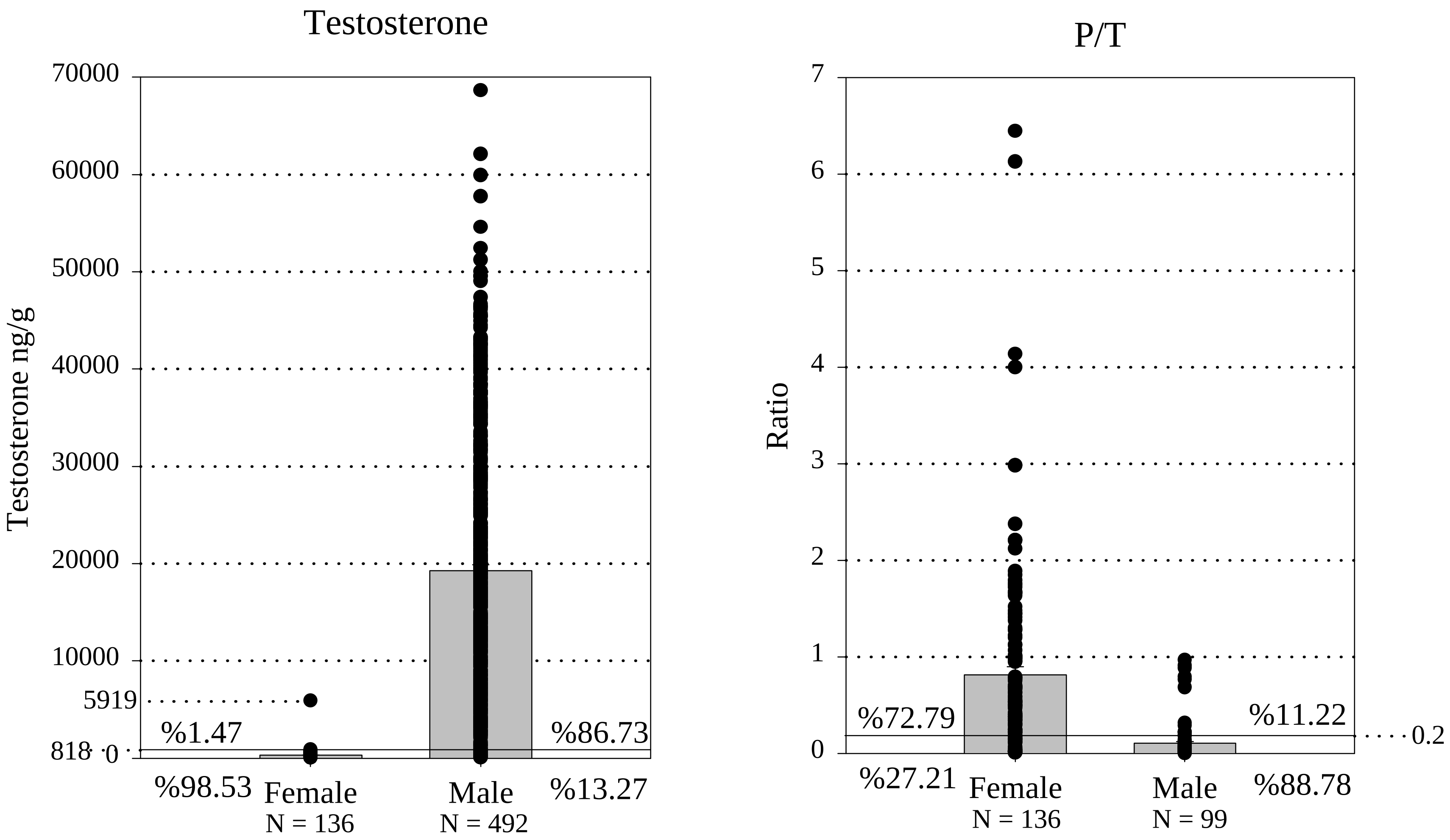
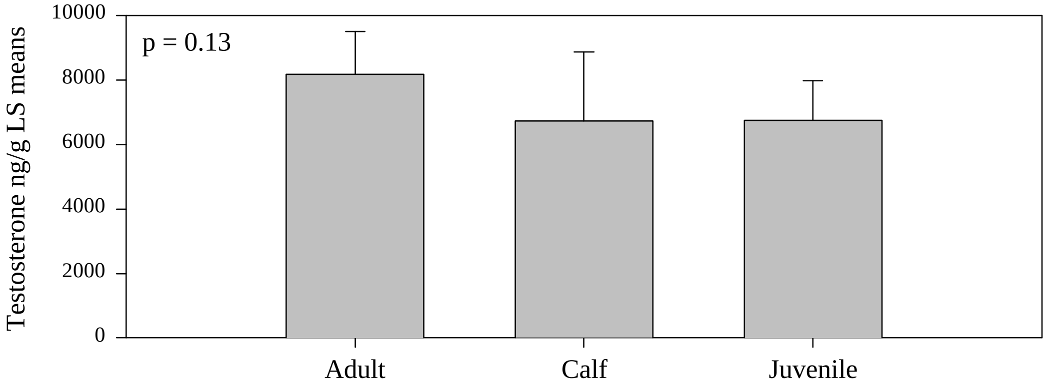
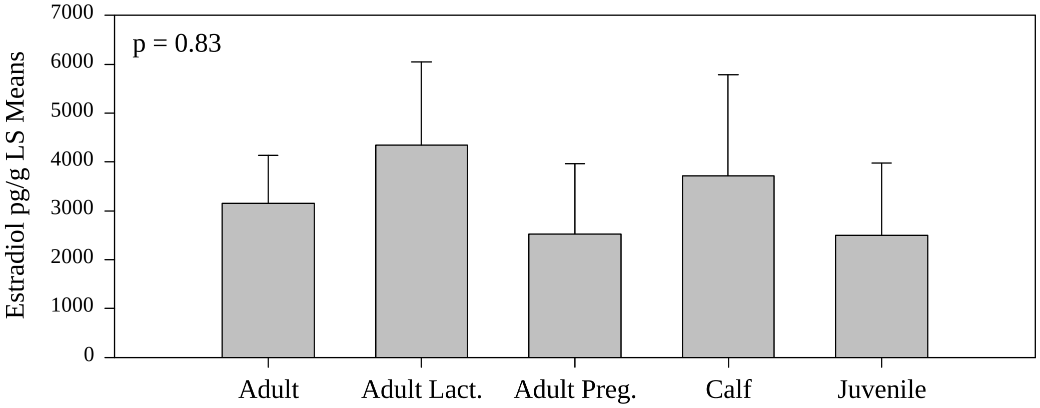


Figure **2-8** Continued. The testosterone graph includes an arbitrarily determined threshold value at 818 ng/g, where %98.53 of females are below the threshold and %86.73 of males are above the threshold. The progesterone/testosterone graph has an arbitrarily determined threshold value at 0.2, where %72.79 of females are above the threshold and %88.78 of males are below the threshold. The bars indicate the mean ± SEM and the circles represent the individual values that make up the mean.

Wild Male Testosterone



Wild Female Estradiol



Wild Female Progesterone

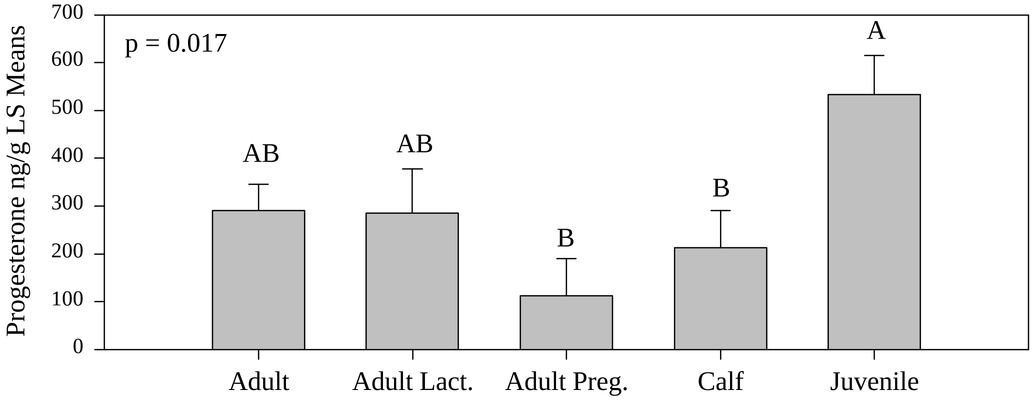
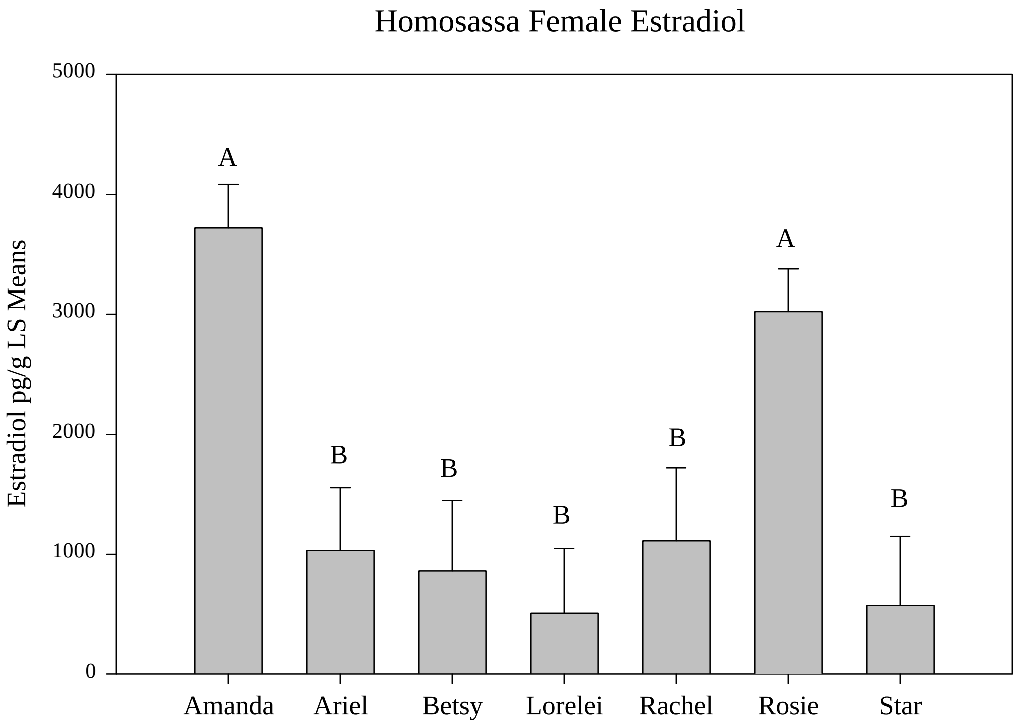


Figure **2-9** Wild male and female hormone concentrations grouped by age and reproductive status. The bars indicate mean and standard error. Bars with the same letters are statistically similar, and bars with different letters are statistically different, at the 0.05 level of significance. Overall significance from the ANOVA is indicated in the top left-hand corner.



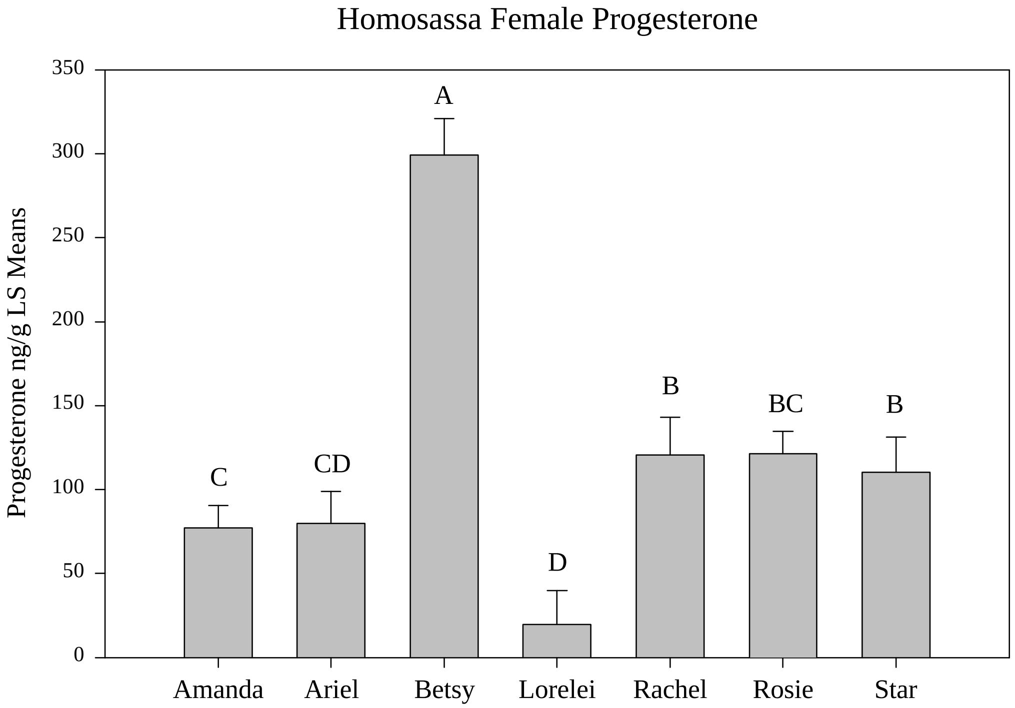
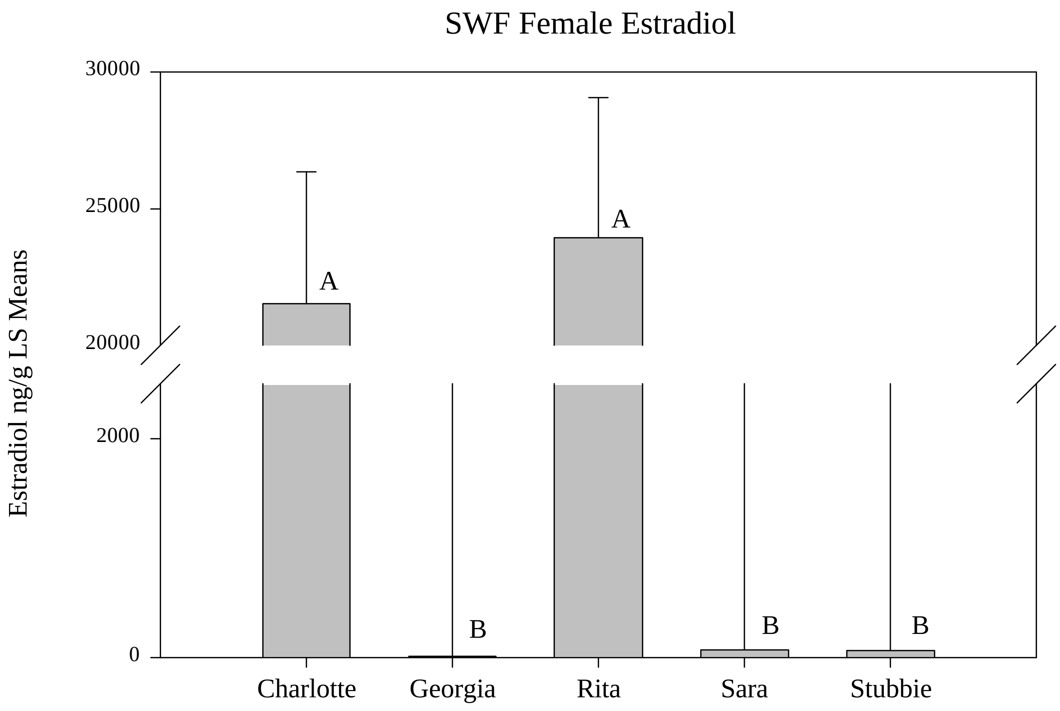


Figure **2-10** Homosassa mean concentrations of estradiol and progesterone per individual female animals. The bars indicate mean and standard error. Bars with the same letters are statistically similar, and bars with different letters are statistically different, at the 0.05 level of significance.



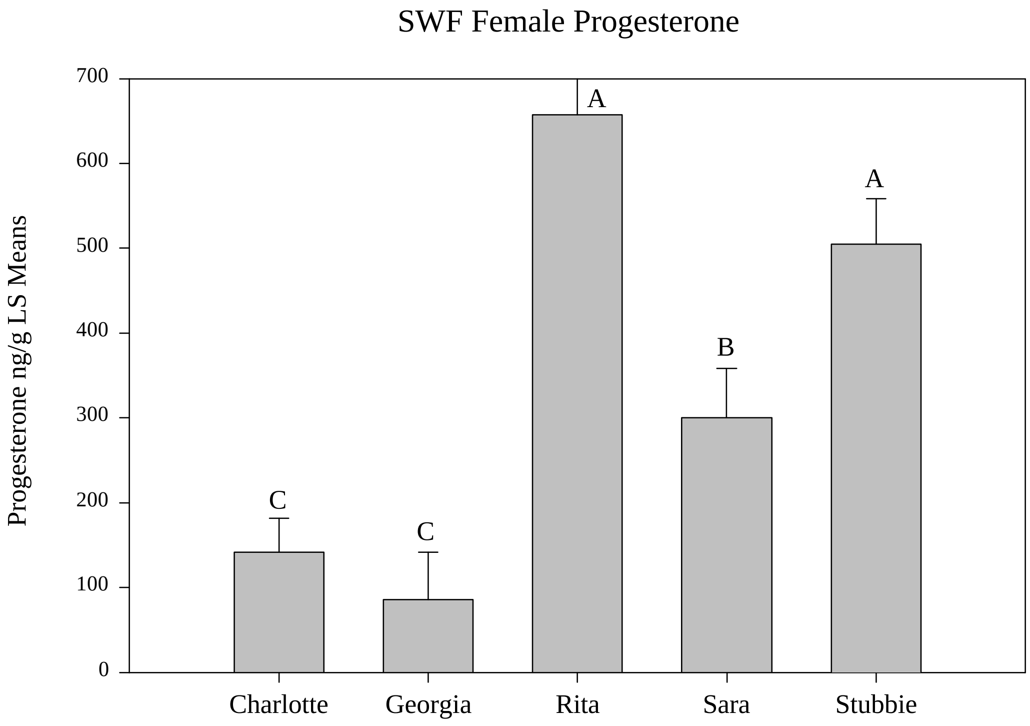


Figure **2-11** SeaWorld mean concentrations of estradiol and progesterone per individual animals. The bars indicate mean and standard error. Bars with the same letters are statistically similar, and bars with different letters are statistically different at the 0.05 level of significance.

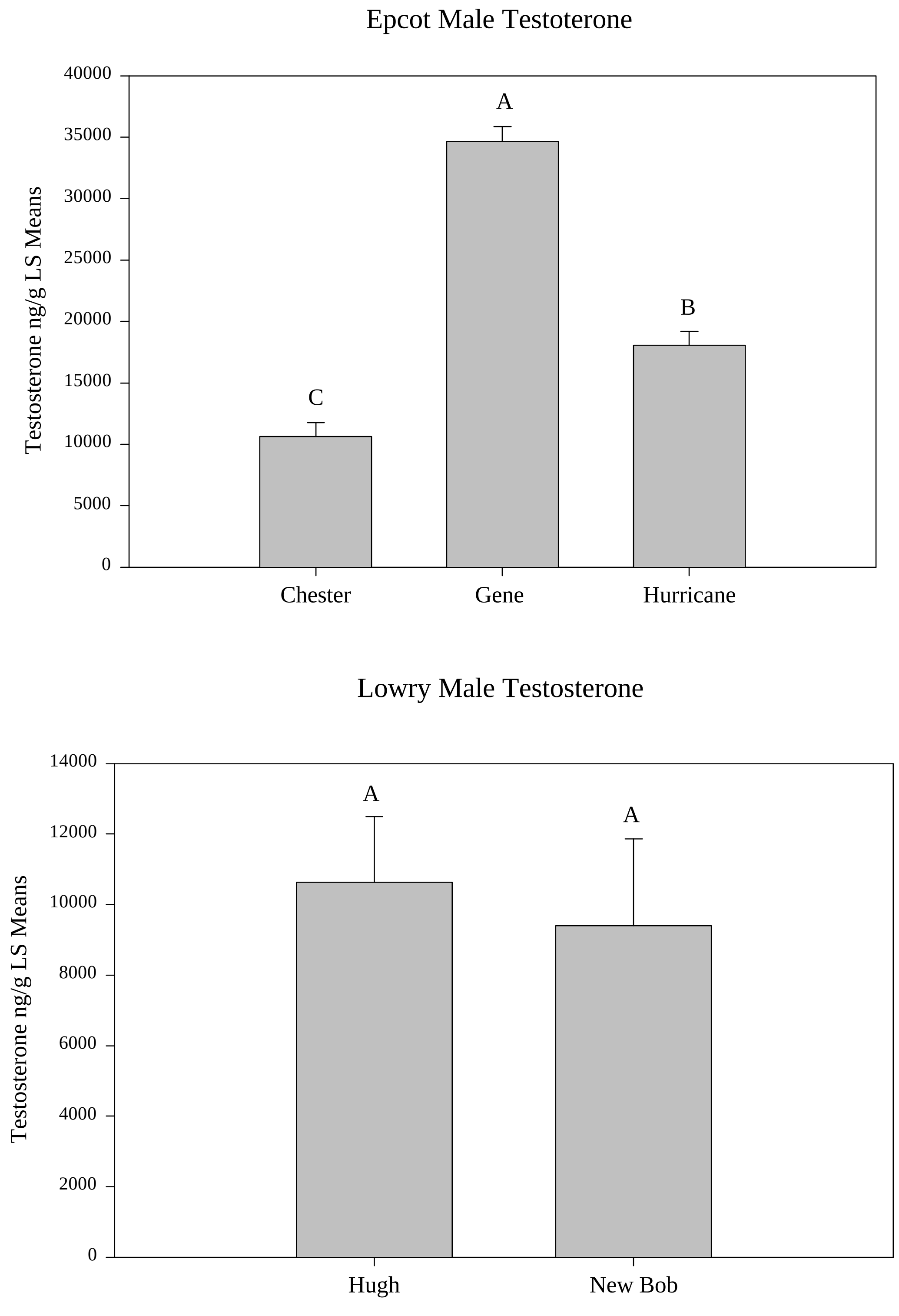


Figure **2-12** Epcot and Lowry mean concentrations of testosterone per individual animals. The bars indicate mean and standard error. Bars with the same letters are statistically similar, and bars with different letters are statistically different, at the 0.05 level of significance.

CHAPTER 3
SEASONAL AND ESTROUS PATTERNS OF THE FLORIDA MANATEE

Introduction

The Florida manatees is a semi-social species, interacting with each other without forming long term bonds, except in the case of a mother and her calf (Hartman 1979; Reynolds 1981). A calf may remain with its mother for 1-2 years and the calving interval is approximately 2.5-3 years (Hartman 1979; Reid et al. 1995). Manatees reach sexual maturity at approximately 2-5 years of age (Marmontel 1995; Odell et al. 1995; Rathbun et al. 1995). Once a female becomes sexually mature and comes into estrus, it is generally thought that manatees form a mating herd or herd of consorting males. However, it has not yet been verified that the female in any such aggregate is in estrus, and copulation has rarely been observed (Rathbun et al. 1995). The mating herd is certainly the most visible breeding behavior manatees exhibit, but a more subtle breeding scenario noted from field observations, may include a single male diligently shadowing a female until she becomes receptive (personal communication, R. K. Bonde, U.S.G.S., 2000). The relative frequency of these contrasting behaviors is unknown. The mating herd consists of one focal female being pursued by several males. The individual male members participating in the herd are transitory, try relentlessly to hold on to her, and roll over in attempts to gain access to her ventrum (Bengtson 1981). A major difficulty in consistently identifying the exact composition of these herds derives from the hazardous nature of swimming among the manatees to identify the sex of individuals from their ventral side, from otherwise indistinguishable individuals. A focal female may be pursued for 2-4 weeks (Hartman 1979; Rathbun et al. 1995). However, physiological estrus may not necessarily be indicative of this entire period of pursuit, but instead last only a brief period during the whole mating herd scenario. The majority of the 2-4 weeks of male pursuit may characterize behavioral estrus on the part of the female, the establishment of dominance among males, or relate to a strategy of sperm competition, with males breeding as frequently as possible while she is receptive (Gomendio et al. 1998). Female manatees exhibit promiscuous breeding behavior, mating with several males in the herd (sensu Wilson 1975; Wittenberger 1978). This as a breeding strategy may more specifically be described as “scramble competition polygyny” (Alcock 1983). This reproductive strategy is also described for the humpback whale (*Megaptera novaeangliae*) (Tyack & Whitehead 1982). In manatees, there appears to be a peak of reproductive behavior occurring in April-May (Rathbun et al. 1995). Gestation length is estimated at 12-14 months (Odell et al. 1995; Rathbun et al. 1995; Reid et al. 1995).

Daniel Hartman (1979) conducted the first major comprehensive study of manatee behavior and indicated that manatee breeding appeared to occur throughout the year without strong seasonal trends, yet he did note some evidence suggesting an increase in the natality of calves during the spring. Since then many studies have provided further evidence of seasonal peaks and lulls in various different aspects of reproduction. These aspects include changes in male and female reproductive anatomy, periods of increased calf mortality and field observations of mating herds, pregnancy, and lactation (Hernandez et al. 1995; Marmontel 1995; Odell et al. 1981; O'Shea et al. 1985; O'Shea & Hartley 1995; O'Shea & Langtimm 1995; Rathbun et al. 1995). Hernandez et al. (1995) suggested that male manatees may have a suppression of reproductive activity during colder months of the year, indicating a diffusely seasonal reproductive pattern. A diffuse breeding pattern can be described by a species that breeds throughout the year, but peaks and lulls in reproductive activity may occur during energy rich or poor periods in the environment. The fact that fewer mating herds are seen during the winter months, when individuals are in closer proximity to each other as they congregate in warm water refuges, further supports the hypothesis that reproductive behavior is suppressed during the winter. The present study adds another aspect of observation, which has not yet been utilized in previous studies: the repeated, longitudinal measurement of hormone concentrations in living manatees. To date, the majority of information gathered on manatee reproduction has focused on anatomical studies of necropsied animals and observations of reproductive activities, such as breeding, parturition, and lactation. This is the first long-term comprehensive study focused on measuring reproductive endocrinology in live Florida manatees. Prior to this study little was known of hormonal parameters involved in the female manatee estrous cycle. By addressing these questions a better understanding of the reproductive biology of manatees, and the relationship between physiology and behavior will be gained.

As mentioned in Chapter Two, significant differences in overall hormone concentration means were found between individuals and locations; thus leading to this chapter which begins with Experiment Five. Experiment Five is a presentation of the hormonal data collected from the twelve individual captive female manatees. Possible patterns of manatee estrous cyclicity, including information on individual hormone patterns, mean cycle fluctuations, and frequency are also discussed. The seasonality data includes information on monthly and weekly mean concentrations per location in Experiment Six. Seasonal data per month from individual manatees are also presented. These experiments address objectives 1a and 1b, plus the second hypothesis of this dissertation.

Methods

Experiment Five: Fecal Collections for Estrous Cycle Data

Data for estrous cycle patterns utilized fecal samples collected from 12 captive female manatees, 7 housed at Homosassa Springs State Wildlife Park and 5 housed at SeaWorld Florida. Collections at Homosassa lasted from Jan. – Dec. 1996 and collections at SeaWorld were from Mar. 1996 – Aug. 1997. Samples were collected twice a week from female manatees. However, due to cost, only four females, two from Homosassa (Amanda and Rosie), and two from SeaWorld (Charlotte and Rita), had all of the samples that were collected also assayed. For the remaining 8 females one sample per seven day period was assayed. Of the samples collected from SeaWorld, samples between May 22 – June 19, 1996 were collected from the females on a daily basis.

Experiment Six: Fecal Collections for Seasonality Data

Seasonality data included samples collected from the 12 captive female manatees mentioned above, as well as samples from a total of 14 captive males, 2 males at Lowry Park Zoo, 3 males at the Living Seas, Epcot and 9 males at SeaWorld. Samples from the males at SeaWorld were collected as a group, but the other male samples were collected from individual animals. Additionally, samples were collected from wild manatees, mostly from Crystal and Homosassa Rivers, but also including necropsy animals, see Subjects under Materials and Methods in Chapter Two.

All female samples were assayed utilizing a fecal radioimmunoassay (RIA) to measure estradiol and progesterone, and all male samples were assayed for testosterone. The methods for fecal collection and RIA are discussed more thoroughly in Chapter Two, under Fecal Collections and Radioimmunoassay. All raw data values for fecal RIA steroid hormone concentrations are included in Appendix, Hormone Concentrations.

Analysis

Hormone concentrations from each female were normalized to allow for direct comparisons between females on the same scale. This did not change the pattern of hormone fluctuations, only the range of values in which the concentrations were expressed. For each female, as seen in Figures **3-1** through **3-12** (all figures for this chapter are found at the end of the chapter) the mean, one standard deviation (1 STD) and two standard deviations (2 STD) from the mean were calculated. All of the concentrations below the mean for a particular female were averaged and that value was set at 0%. Similarly all of the concentrations above 2 STD were averaged and that value was set at 100%. All of the values for a given female were then calculated as percent values in relation to the 0% and 100% numbers. Unlike the raw data, the normalized data was normally distributed and did not need to be transformed to the log value before analysis. This normalization was done for each female because, as seen in Figures **3-1** through **3-12**, the means differed between animals.

Analysis of variance (ANOVA) was used to analyze the normalized least square (LS) mean monthly hormone concentrations per location in Experiment Six. Pair-wise contrasts were tested by confidence intervals using the least significant differences (LSD) value for the Tukey method. Data are considered statistically different when $p < 0.05$. Some data for Experiment Six were not normalized, but the same ANOVA and Tukey method were used to determine statistical differences between months (SAS Institute Inc. 1989).

Results

Experiment Five: Individual Hormone Profiles and Estrous Patterns

Individual hormone profiles

Background information on each of the captive manatees from which fecal samples were collected is available in Table **3-1**. Graphs of weekly estradiol and progesterone concentrations are presented for twelve captive females (see Figures **3-1** through **3-12**). For each female the first graph depicts both estradiol and progesterone on the same graph. The second and third graphs have estradiol and progesterone separated and the horizontal lines indicate the mean hormone concentration, 1 standard deviation (1 STD) and 2 standard deviations (2 STD) from the mean for all of the samples collected from that individual. Figures **3-1** though **3-7** include the females from Homosassa: Amanda, Ariel, Betsy, Lorelei, Rachel, Rosie, and Star. The remaining Figures **3-8** through **3-12** are females from SeaWorld: Charlotte, Georgia, Rita, Sara, and Stubbie. The graphs from Amanda (**3-1**), Rosie (**3-6**), Charlotte (**3-8**) and Rita (**3-10**) represent weekly mean concentrations and allow for direct comparison with the graphs from the other 8 females. There was a great deal of variation from one female to another and from one location to another. The range of hormone concentrations differed between animals. Some of this variation was reflected in Chapter Two, Experiment Four. Some manatees had fluctuations throughout the majority of the collection period (i.e. Amanda and Rosie), however for most animals there were several months in which there was little or no hormone fluctuations in either estradiol or progesterone concentrations.

Figures **3-13** through **3-16** depict the twice per week samples assayed for Amanda, Rosie, Charlotte and Rita, respectively. Daily samples were collected to address questions regarding the ability of a once or twice a week sampling frequency to detect brief peaks of estradiol concentrations. Unfortunately, no estradiol peaks were measured during this month of daily collections in either of the two females. There was also very little change in the progesterone concentrations. However, these data do confirm that long periods of hormonal inactivity do occur.

Estrous patterns

To determine the type of estrous patterns that manatees express as indicated by the present data, peaks of estradiol were identified and graphed out for seven sampling days. The estradiol peaks chosen were defined as the highest concentration at or above one standard deviation of an individual's mean. The peak began and ended with concentrations that fell at or below an individual's mean preceding and following the peak. Therefore, if several consecutive samples had values above the mean, a peak could potentially last several weeks. Figures in **3-17** through **3-27** begin with a graph of each female's normalized estradiol and progesterone concentration throughout the sampling period. As mentioned above, normalizing the data does not change the pattern of fluctuations, only the scale of the values, so that all of the females have a similar range from which to make comparisons. Numbers indicate the estradiol peaks above 1 STD. Peaks on the first sampling day or within 3 or 4 sampling days of the end of the study are not used because the whole estrous pattern would not be present. Underneath this first graph are multiple graphs highlighting each individual estradiol peak, one sampling day prior to the peak and five sampling days following the peak, as well as the concurrent progesterone concentrations. Graphs for Lorelei were not presented because estradiol values from all of her samples were below the minimum detectable concentration for this fecal RIA.

The estradiol peak data from Figures **3-17** through **3-27** indicate a wide variety of hormonal patterns. The majority of estradiol peaks lasted for one sampling day and a second estradiol peak would often be included in the following five sampling days. A total of 34 estradiol peaks was graphed from 11 of the 12 captive females. Of the 34 estradiol peaks, almost half (15) were followed by progesterone concentrations that did not rise above 40% of an animals total range of progesterone concentrations (40% is set as an arbitrary threshold). From the remaining 19 estradiol peak graphs, 6 had progesterone peaks above 40% for only one sampling day. Thirteen of the estradiol peaks were followed by two or more sampling days of progesterone peaks above 40%, 11 of which were consecutive sampling days. Seventeen of the 34 estradiol peaks were followed by another estradiol peak above 40% of an animal's total range of estradiol within the 5 sampling days of the first estradiol peak. These data suggest that about one third of the estradiol peaks are followed by increases of progesterone lasting two or more weeks and that half of the estradiol peaks are followed by another estradiol peak within 42 days.

To identify fluctuations reflective of an estrous pattern comparable to other mammalian species, an estrous pattern was defined as an increase in estradiol followed by an increase in progesterone. For this purpose, one of the two hormone increases had to have a peak near or above 2 STD of an individual's mean. Peak progesterone concentrations had to have more than one consecutive value above an animal's mean. These data are presented in Figures **3-28** through **3-35**. In these figures the first graph depicts the normalized hormone concentrations for a female's entire sampling period, with the estrous cycle patterns indicated by the shaded areas. The mean estrous pattern including standard error bars for a female is presented as the second graph below the first. Each of the estrous cycle patterns are normalized relative to the time line, with the estradiol peak placed at day zero. The graphs depict day -7 prior to the estradiol peak and 42 days following the estradiol peak. Only 8 females out of the 12 had hormone fluctuations that fit the defined criteria of an estrous pattern. The progesterone concentrations from the Homosassa females all decreased at day 28, while the SeaWorld female progesterone values appeared to decrease at either day 35 or 42. The mean estrous cycle pattern values for a given location and for all females together are presented in Figure **3-36**. There appears to be a range between day 28 and day 42 over which progesterone decreases and the estradiol begins to increase, although an estrous cycle pattern for a given female was not always followed subsequently by another estrous cycle pattern. For comparison, Figure **3-37** presents the same mean estrous cycle pattern values using the raw data, rather than normalized data. The patterns appear similar, but the standard error bars indicate more variance than with normalized data.

The number of days between peaks of both progesterone and estradiol were calculated and the frequency of these values graphed in Figures **3-38** (peaks above the individual's mean), **3-39** (peaks above 1 STD), and **3-40** (peaks above 2 STD). The number of days that occurred between peaks most frequently is highlighted in the upper right hand corner of the graph. Twenty-eight days is the most frequent interval between peaks indicated in the progesterone peaks above the mean and 1 STD for Homosassa (HS) and SeaWorld (SWF), as well as estradiol for HS above the mean and 1 STD. The most frequent number of days between peaks of estradiol above the mean and 1 STD for SWF is 21 days. It is interesting to note that of the different values for numbers between progesterone peaks from HS above 2 STD indicated in Figure **3-40**, the mean integer between the values is 27 days.

Experiment Six: Seasonality

Seasonality at different locations

To identify seasonal fluctuations in hormone concentrations, monthly means were graphed for all of samples collected from wild manatees, as well as male and female captive manatees. Data in Figure **3-41** present samples from wild manatees, most collected at Homosassa and Crystal Rivers, but also necropsy animals. Unfortunately, all of the months are not represented. Collections from wild manatees were done on an opportunistic basis only and samples could not be repeatedly collected from the same individuals. Without repeated sampling the wild data could not be normalized, so the LS means are reflective of the raw data and any variation present between individuals. No strong seasonal trends were indicated in the wild values. Only testosterone concentrations reflected any statistical significance between the monthly means, indicated by a large increase in July.

Monthly estradiol and progesterone concentrations assayed from Homosassa and SeaWorld females are presented in Figures **3-42** and **3-43**, respectively. The data for these captive manatees are normalized. The Homosassa progesterone concentrations indicate that statistically higher values are present during the fall (October, September) and the spring (February, March). Although the Homosassa estradiol means were not statistically different between months, the values do reflect a pattern resembling the progesterone concentrations. The fall increase in hormone concentrations from Homosassa is not reflected in the data from the SeaWorld females. Rather, both estradiol and progesterone values in the spring (April) have the highest mean concentrations. The lowest mean concentrations for both estradiol and progesterone at SeaWorld are during the fall and winter months.

Testosterone concentrations measured in captive male manatees are presented in Figure **3-44**. Data from Epcot males indicates February and April are statistically higher than July. Although all of the months are not represented in the data from the two males at Lowry, a fall peak in September is significantly higher than the other months, except for October. The males at SeaWorld had samples with high testosterone concentrations in March that were statistically greater than values in November, January, and February.

Weekly mean concentrations of estradiol and progesterone from both Homosassa and SeaWorld were graphed in Figures **3-45** and **3-46** to highlight some of the variation indicated by the standard error of the monthly means. There is some difference in the graphing of monthly and weekly means from the SeaWorld females. Monthly SeaWorld means included the values from 1996 and 1997 together. The weekly means are in chronological order with 1996 and 1997 separated. Note the long period of almost no estradiol activity from about May 1996 to February 1997.

The frequency of estradiol and progesterone peaks present in a given week for females at Homosassa and SeaWorld is presented in Figures **3-47** and **3-48**, respectively. Of the Homosassa females, months with the most numerous peaks of both estradiol and progesterone combined, across all levels (mean, 1 STD and 2 STD) are August and September, although February and March were close behind, especially for peaks above the mean. Across all levels, both estradiol and progesterone peaks in March, in 1996 and 1997, at SeaWorld are most numerous.

Seasonality in individual manatees

Monthly means of estradiol and progesterone concentrations for twelve captive females and testosterone for five captive males were graphed (see Figures **3-49** through **3-58**). These data represent the raw hormone concentrations and are not normalized, as in the previous graphs. Of the seven female manatees housed at

Homosassa Springs all months, for all seven females were statistically similar when measuring estradiol (Figures **3-49** and **3-50**). The p value from the ANOVA is presented in the top corner of each graph. There is no p value for Lorelei because all of her estradiol values were below the detectable concentrations of the assay. Progesterone concentrations for four of the Homosassa females (Figures **3-51** and **3-52**) were statistically similar for all of the months. The manatees with statistically different months were Amanda with September and October having higher concentrations than May and July, Ariel with November statistically higher than May, and Star with October having higher concentrations than July. The monthly mean estradiol concentrations for three of the five females at SeaWorld (Figures **3-53** and **3-54**) were statistically similar for the duration of the study. Of the manatees with statistically different months, Charlotte had estradiol concentrations in February, March, April and May that were statistically higher than October. For Rita, the mean for April was statistically higher than those of August, October, November, and December. Charlotte and Rita were also the only SeaWorld females with statistically different monthly mean progesterone concentrations (Figures **3-55** and **3-56**). Charlotte's concentrations during March and April were higher than in June, and Rita's concentrations in April were higher than January. Testosterone concentrations were measured from three males at Epcot and two males at Lowry, Figures **3-57** and **3-58** respectively. Chester was the only male at Epcot with monthly testosterone means that differed statistically. Samples from March had higher concentrations than July, August, October and December. December was also statistically lower than all other months. Both males at Lowry had monthly means of testosterone concentrations that were statistically different, however samples from New Bob were only collected from August through December and samples from Hugh were collected from August through February. Testosterone concentrations measured from New Bob during September were statistically higher than December. September testosterone concentrations from Hugh were higher than August, December, January and February.

Discussion

Experiment Five: Individual Hormone Profiles and Estrous Patterns

Individual hormone profiles

When comparing the hormone concentrations from Experiment Five in Figures **3-1** though **3-16**, for each female with their background information in Table **3-1**, there do not appear to be any striking patterns. For example, two older animals, Amanda (>27 yr) and Rosie (28-29 yr), have regular fluctuations throughout the collection period at Homosassa. However, Ariel (22-23 yr) has several months between April and July with no fluctuations in either estradiol or progesterone, and Lorelei (20-21 yr) has no estradiol fluctuations at all and very low progesterone values. These four older animals at Homosassa are also the same individuals that have reared calves in the past, compared to the other females, so reproductive experience does not necessarily impart a particular type of overall hormone pattern. Some of the older animals at Homosassa and SeaWorld have larger ranges of estradiol concentrations, but often these higher concentrations are only supported by one or two peaks. Other factors such as individual ‘personalities’, how they interact with the other animals in the enclosure, and the fact that there are no males present, may play important roles effecting reproduction and may confound trends in relation to age and previous reproductive experience.

The month of daily sample collections conducted at SeaWorld does not indicate whether once or twice a week collections are frequent enough to identify brief estradiol peaks, due to the lack of any estradiol fluctuations in either of the females tested. A more complete picture of hormone fluctuations within an individual could be documented by a three to six month period of daily collections beginning in February or March. The data does corroborate long periods of no hormonal fluctuations in estradiol or progesterone concentrations.

A possible reason for captive female manatees to have long periods of no hormone fluctuations may be related to suppression of reproductive activity induced by factors related to social interactions. Studies of other mammals where suppression of reproductive function occurs in conspecifics include yellow baboons, hoary marmots (Wasser & Barash 1983) lions, wolves and rabbits (Bronson 1989). However, these are all highly social species with complex hierarchies developed between individuals in a group. Although manatees are not strongly social animals, reproduction is a period where social interactions are necessary, even if they are transitory. In such transitory situations, manatees might form loose orders of hierarchy. In a captive situation, manatees interact with the same individuals of the same gender over extended periods of time and a loose hierarchy could become more established. In general, reproductive suppression affects less dominant animals, having their reproduction suppressed via various influences, behaviorally, by pheromones, or limited access to food, by the more dominant animals in their group.

A periodic suppression of hormonal fluctuations indicated by the captive female manatees, also might be reflective of housing them in single sex groups. Reproductive stimulation or priming has been well described in mice, where the presence of a male may accelerate the induction of puberty or the estrous cycle in females. The mechanism of this action is generally via pheromones, but may use other cues and has been described in many other species of rodents, sheep, pigs and deer (Bronson 1989). It is possible that some behavioral or chemical interaction with male manatees is necessary for females to have normal and/or continuous estrous cycles. This effect could easily be tested by housing a male and female in an enclosure, separating them only by bars so that visual, auditory, and possible chemical cues could still be detected by the female.

Estrous patterns

The mean Florida manatee estrous cycle pattern indicated by the data for this study is presented in Figures **3-36** and **3-37**. The estrous peak is represented by a single sampling day from once a week samples. Progesterone concentrations increase on day 14 and decrease between day 28 and 42. Similar patterns are represented by raw and normalized hormone concentrations, however there is more variance present with the raw data. Across peaks above the mean, 1 STD and 2 STD for individual animals, the number of days most frequently found to be between peaks of both estradiol and progesterone was 28, except for SeaWorld, estradiol at 21days. The next most frequent values for days between peaks were 21, 30, 35 and an interval of 28, 56.

An estrous cycle for manatees that lasts between 28 and 42 days would be slightly longer compared to other herbivores such at cattle, with a mean estrous cycle length of 21 days (Peters & Ball 1995), and horses, with an estrous cycle ranging 19 to 22 days (Daels & Hughes 1993). In comparison to an elephant, this possible manatee estrous cycle is not even half the time of an elephant's approximate 100 day cycle.

Experiment Six: Seasonality

Seasonality at different locations

The captive group seasonal data presented indicate that captive manatees have slightly increased hormone concentrations either in the spring or fall. Unfortunately, samples collected from wild manatees do not provide much information. Wild testosterone concentrations indicate only one significantly higher month in July, a non-significant trend in estradiol concentrations indicating a peak in April, possibly December, and a non-significant peak of wild progesterone concentrations occurs in December. The Florida manatee is not a strong seasonal breeder and individuals may breed throughout most of the year (Hartman 1979). It is possible that biannual peaks in reproduction may occur relative to favorable environmental factors, such as growth of sea grass beds, and availability of fresh water. Studies of other tropical species have noted bimodal reproductive patterns in relation to rainfall and plant growth, such as giraffe in Cameroon, water buffalo in northern Australia (Bronson 1989), and elephants in Uganda (Buss 1990). Another possibility is that manatees are similar to dugongs with a diffusely seasonal breeding period (Marsh et al. 1984a; Marsh et al. 1984b; Marsh et al. 1984c). It may be that the slight seasonal peaks in hormone concentrations of captive animals are coincident with more than one animal having a reproductive peak at the same time period. Social factors among animals may influence the endocrine system of individuals in many ways, to stimulate the coordination of estrous cycles or the suppression of them, as mentioned above. It is possible that being artificially housed long term, in close proximity to other manatees of the same sex, which does not normally occur in the wild except during winter congregations in warm water refuges, may stimulate some females at a given location to have synchronized hormone peaks. Although, estrus synchronization is obviously not a strong influence since all of the females at a location do not have simultaneous hormone peaks. Ultimately, it may be a combination of the factors mentioned above that influence manatees and these factors may play different roles depending upon the individual.

Conclusions

There is a great deal of variation of hormone concentrations between individuals and many females have long periods without any fluctuations of either estradiol or progesterone concentrations. Some periods of hormone inactivity may be due to reproductive suppression by more dominant animals or the absence of male priming in an all-female environment. The data from Experiment Five would indicate that manatee estrous cycles at 28 – 42 days are much shorter in length compared to elephant estrous cycles of approximately 100 days, based on elephant progesterone concentrations. Seasonal data indicates that captive manatees may have slight hormonal peak during the spring and/or fall.

Table **3-1** Background information of captive manatees.

Location	Name/ ID	Sex	Age During Study	Reason for Captivity	Reproduced Successfully	Other Comments
Epcot	Chester LS-Tm-0191	Male	4-5	Captive born	No	DOB 9/13/91
Epcot	Hurricane LZP-1004321	Male	12-13	Captive born	No	DOB 11/23/83
Epcot	Gene LZP-100378	Male	20-21	Rescued as a lg. calf	Yes	208 cm at rescue on 2/16/77
Sea World	Charlotte SWF-Tm-8528B	Female	11-12	Orphaned calf	Yes	112 cm at rescue on 6/17/85
Sea World	Georgia SWF-Tm-9117B	Female	4-5	Orphaned calf	Yes, only after study	127 cm at rescue on 9/18/91
Sea World	Rita SWF-Tm-8233B	Female	17-18	Rescued as a Juvenile	Yes	249cm at rescue on 4/12/82
Sea World	Sara SWF-Tm-8687B	Female	9-10	Orphaned calf	No	136 cm at rescue on 10/14/86
Sea World	Stubbie SWF-Tm-9535CB	Female	4-5	Rescued as a young adult	Not in captivity	
Homosassa	Amanda HS-8601	Female	>27	Rescued as an adult	Yes	Rescued 12/73
Homosassa	Ariel HS-8602	Female	22-23	Rescued as a calf with mother	Yes	Rescued 12/73
Homosassa	Betsy HS-9002	Female	5-6	Captive born	No	DOB 10/19/90
Homosassa	Lorelei HS-8695	Female	20-21	Captive born	Yes	DOB 5/3/75
Homosassa	Rachel HS-9005	Female	6-7	Rescued as a calf	No	
Homosassa	Rosie M86252	Female	28-29	Rescued as a lg. calf	Yes	213 cm at rescue on 9/68
Homosassa	Star HS-8701	Female	8-9	Captive born	No	DOB 5/26/87
Lowry	New Bob LZP-100518	Male	2-3	Orphaned calf	No	Rescued on 1/3/93
Lowry	Hugh LZP-100414	Male	11	Captive born		DOB 6/28/84
Sea World	Group*	9 males	Range 2-7	6 orphaned 3 captive born	No	

*Group includes: Webster/SWF-Tm-9121B, Slip/SWF-Tm-9122CB, Doc/HS 9201, Spike/SWF-Tm-9114B, Mo/SWF-Tm-9417B, Little Joe/SWF-Tm-8911B, Dakota/SWF-Tm-9305B, Brian/SWF-Tm-9324B, and Hunter/SWF-Tm-9503B.

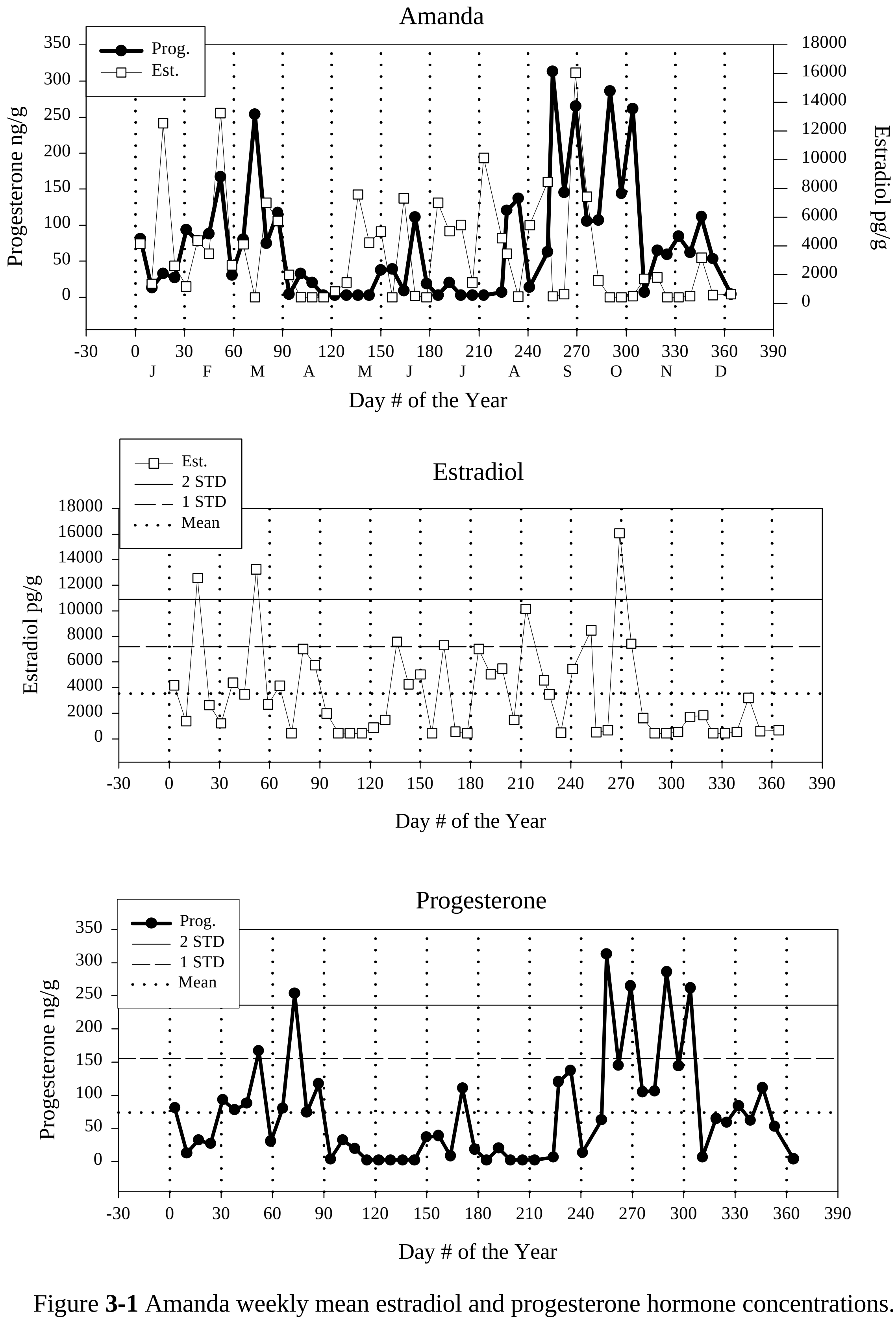


Figure **3-1** Amanda weekly mean estradiol and progesterone hormone concentrations.

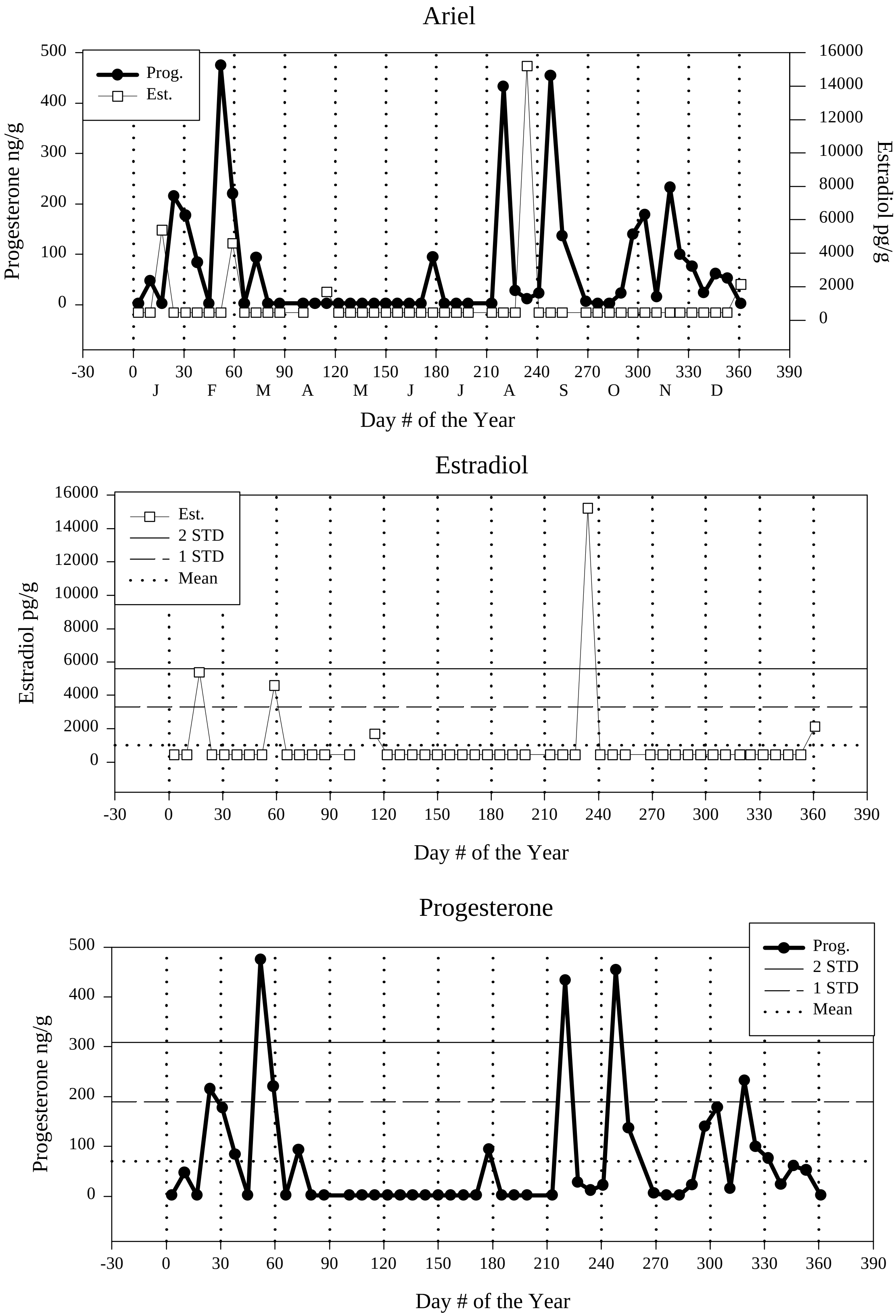


Figure **3-2** Ariel estradiol and progesterone hormone concentrations.

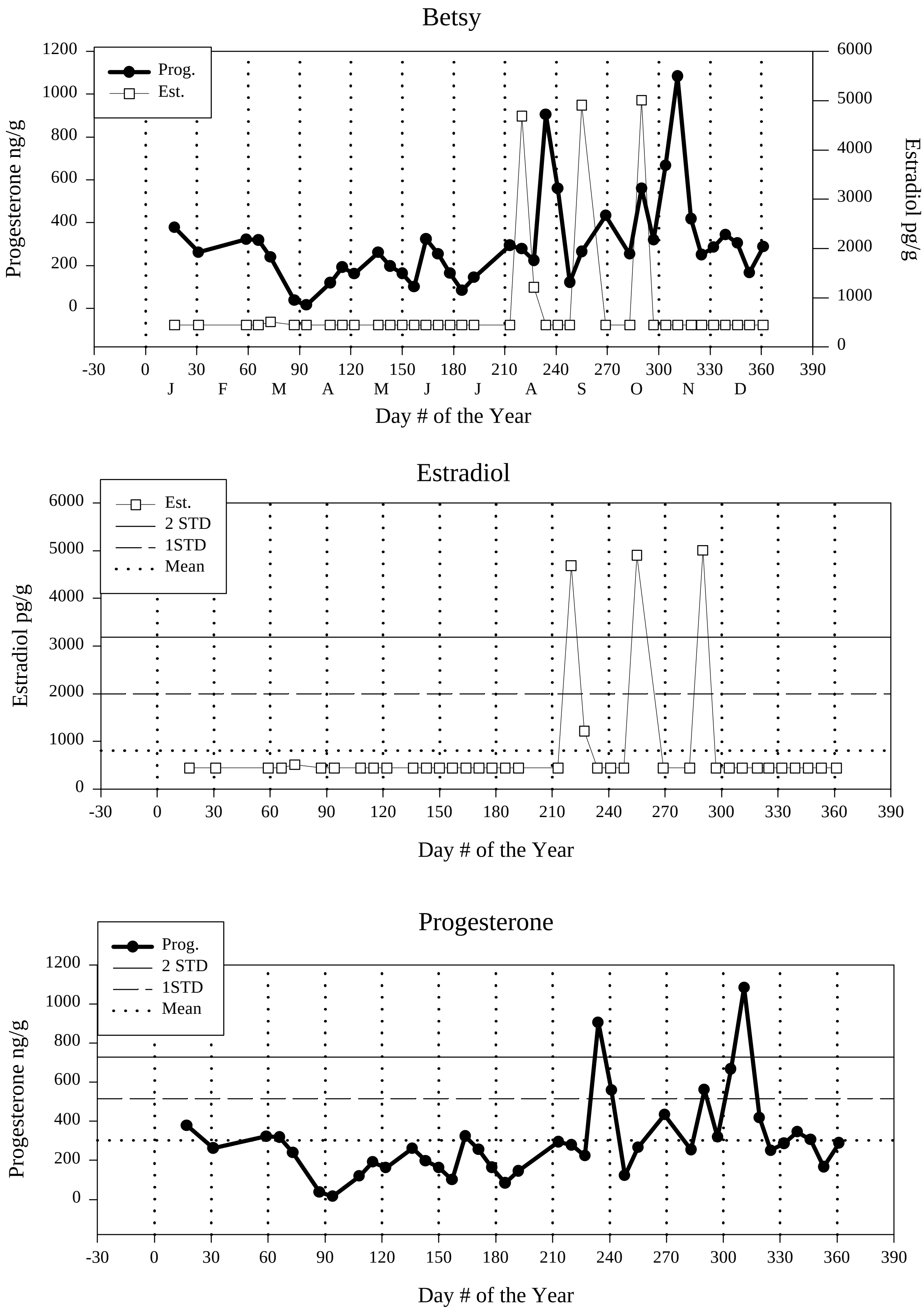


Figure **3-3** Betsy estradiol and progesterone hormone concentrations.

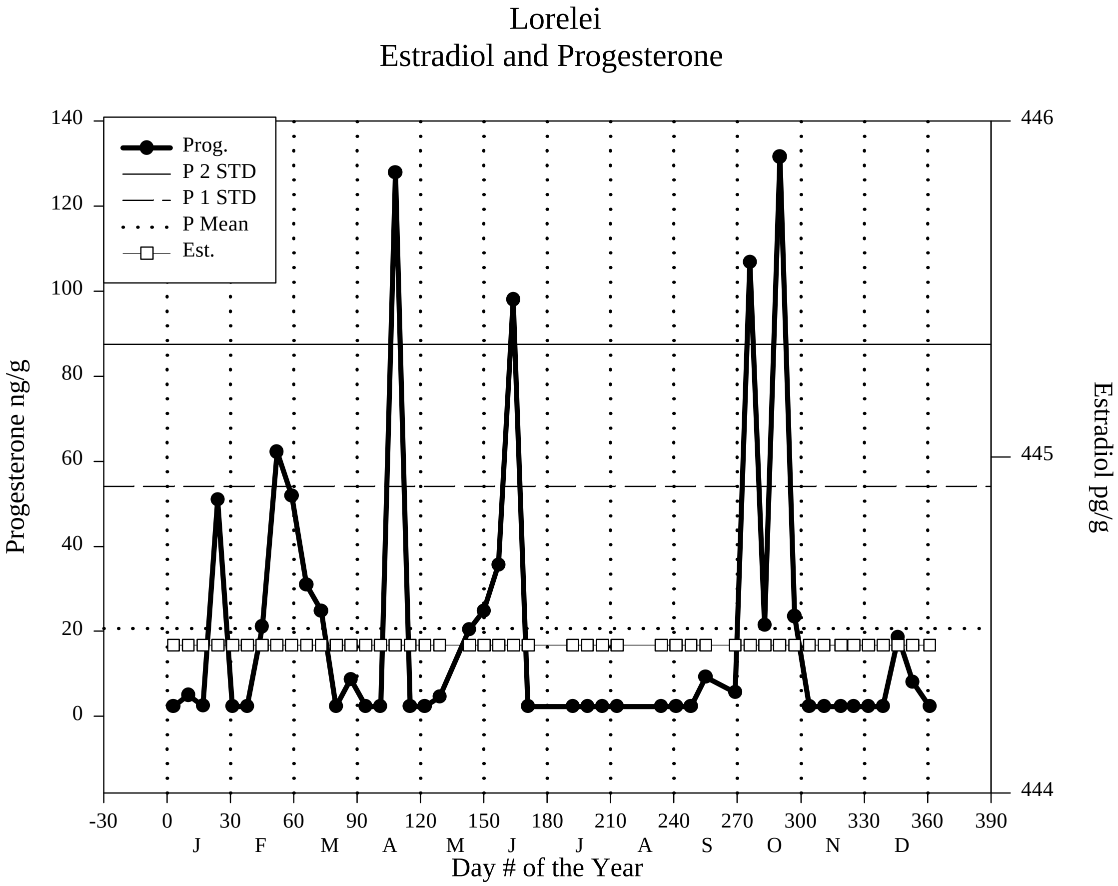


Figure **3-4** Lorelei estradiol and progesterone hormone concentrations.

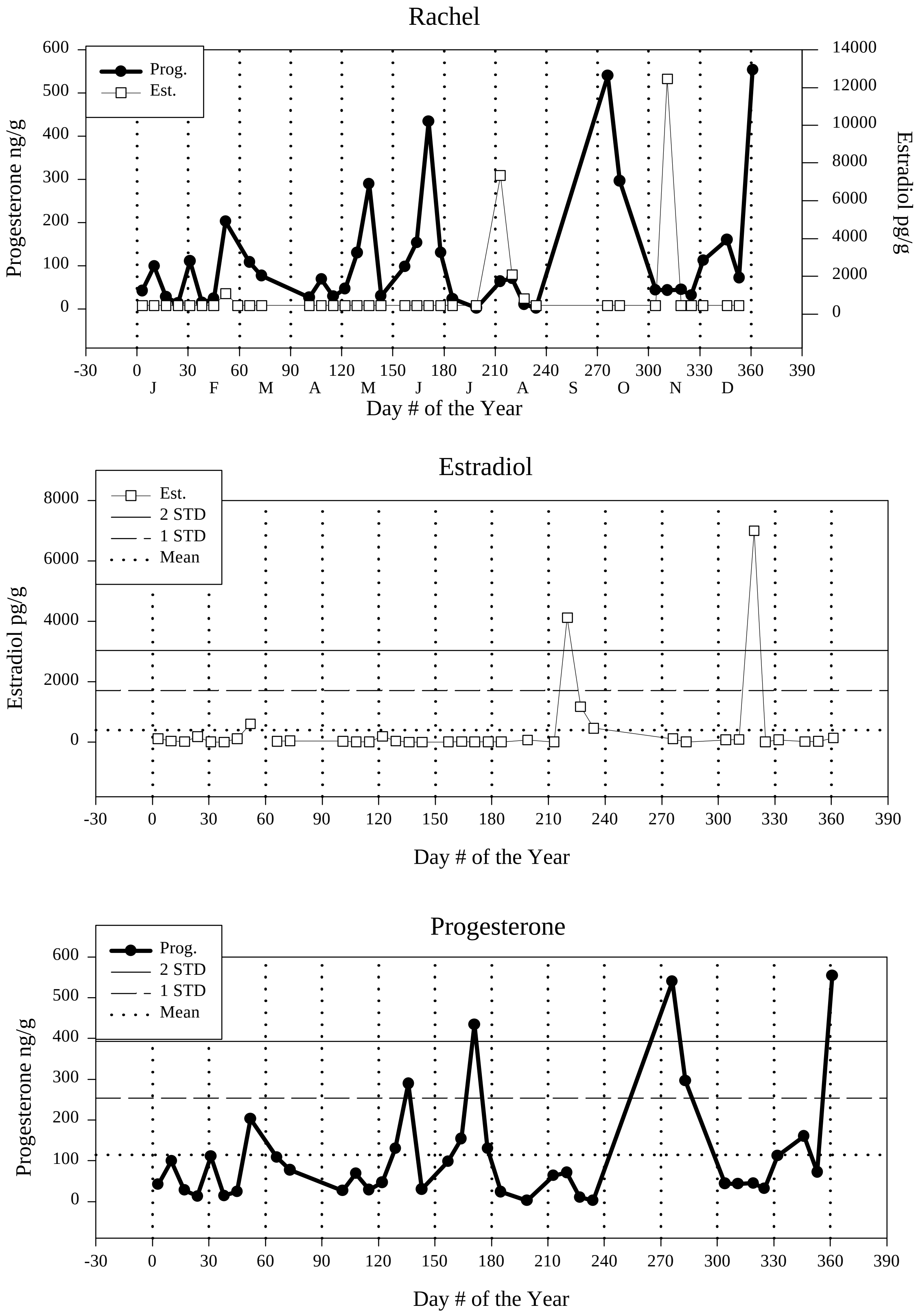


Figure **3-5** Rachel estradiol and progesterone hormone concentrations.

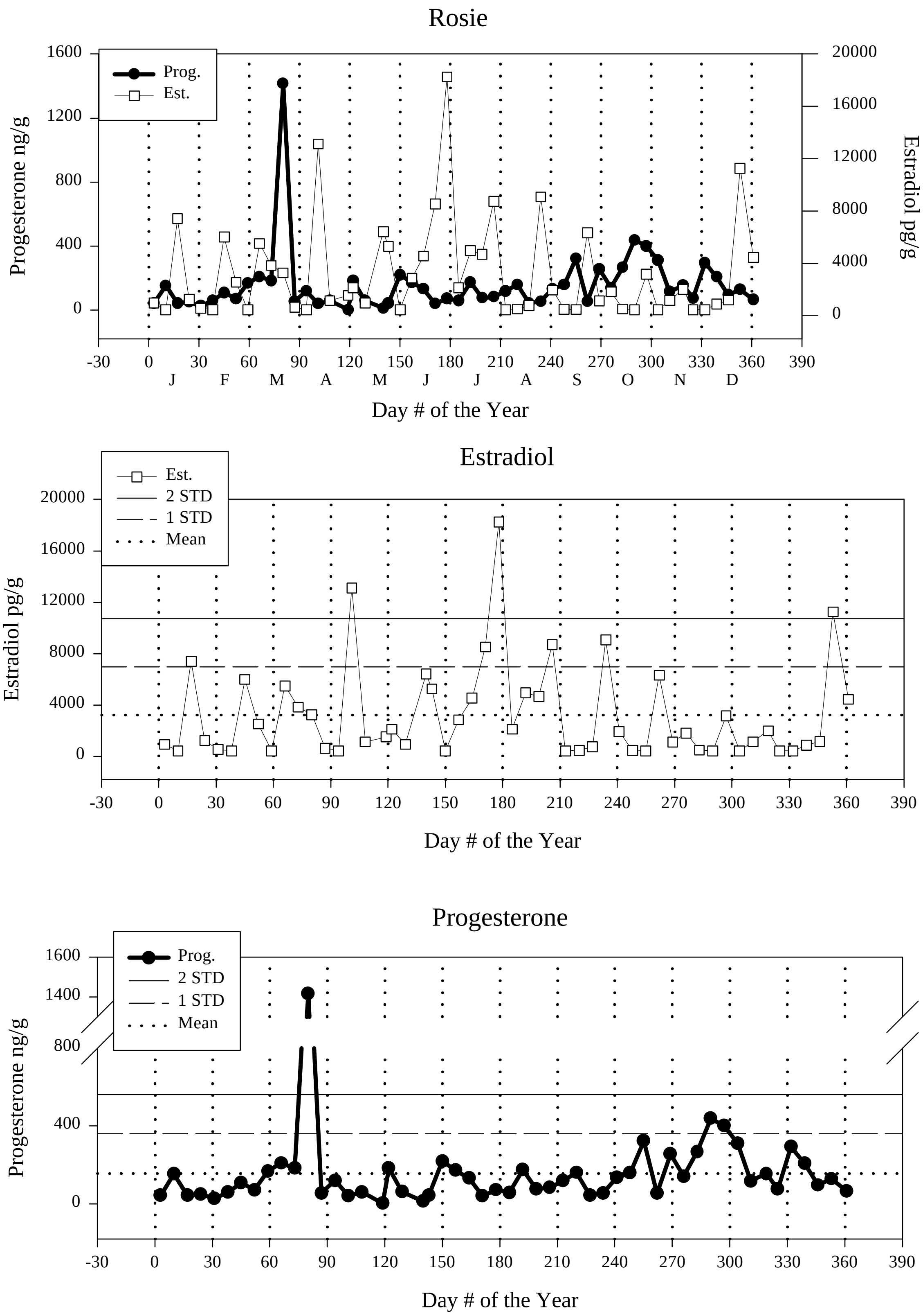


Figure **3-6** Rosie estradiol and progesterone hormone concentrations.

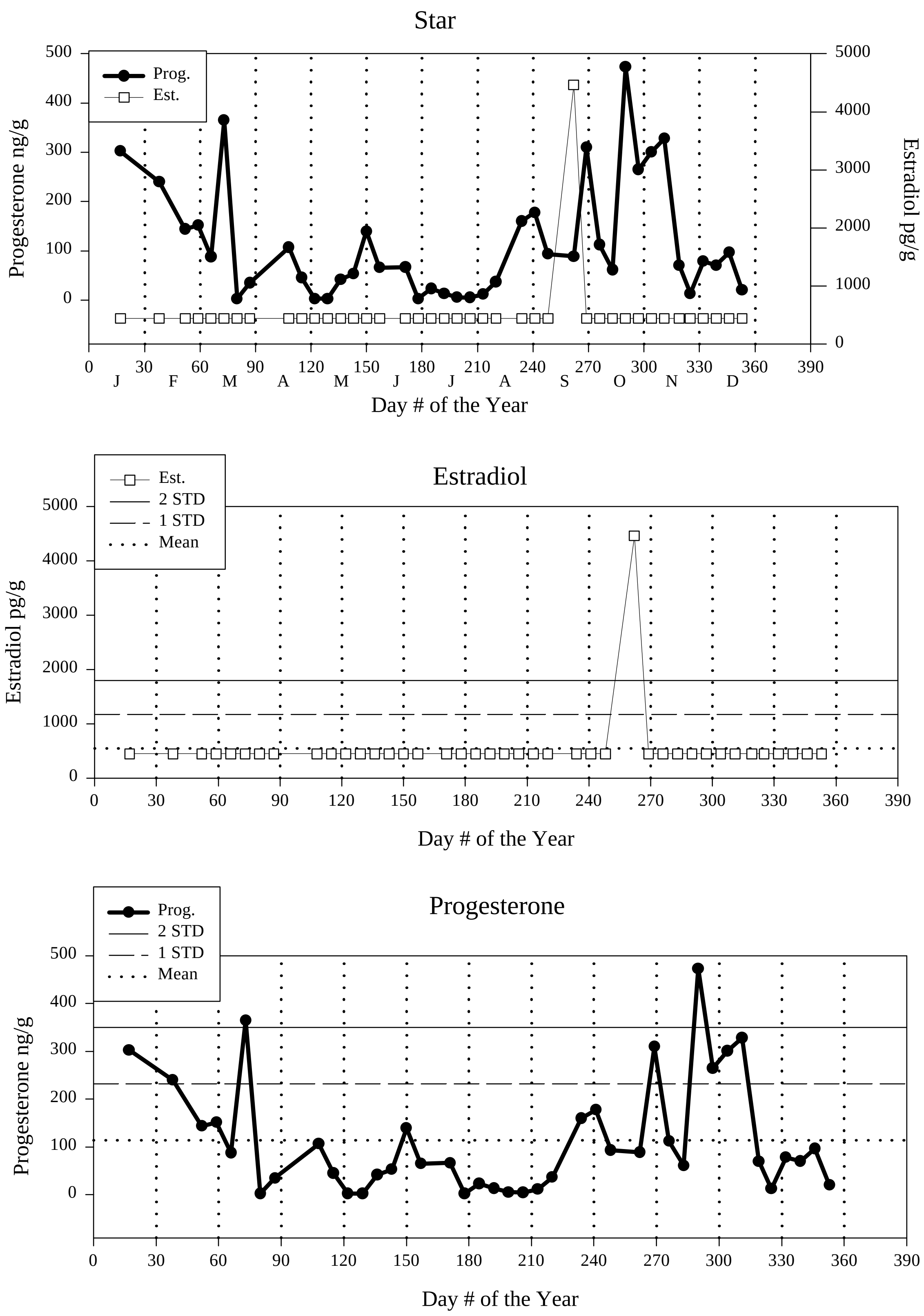


Figure **3-7** Star estradiol and progesterone hormone concentrations.

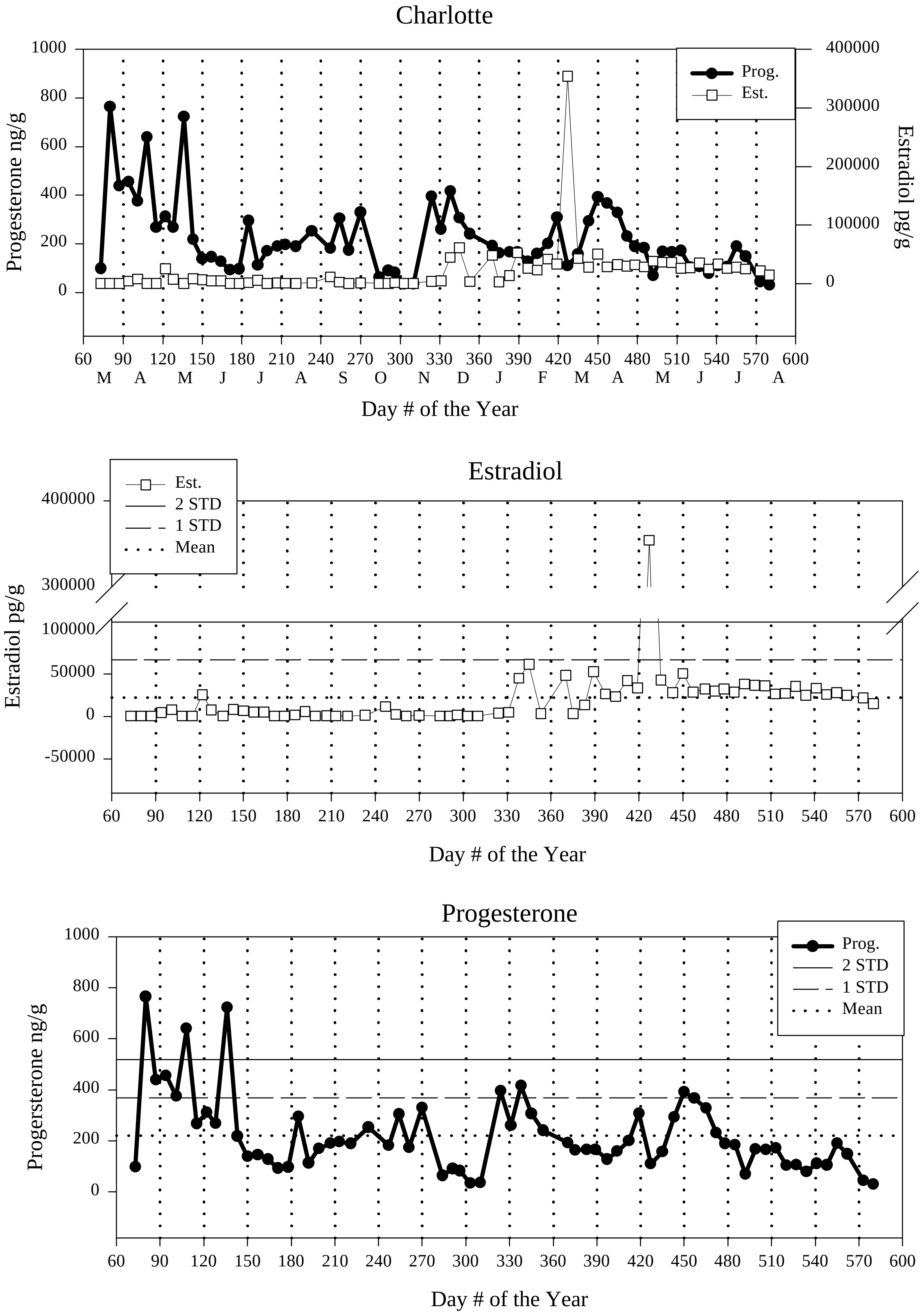


Figure **3-8** Charlotte estradiol and progesterone hormone concentrations.

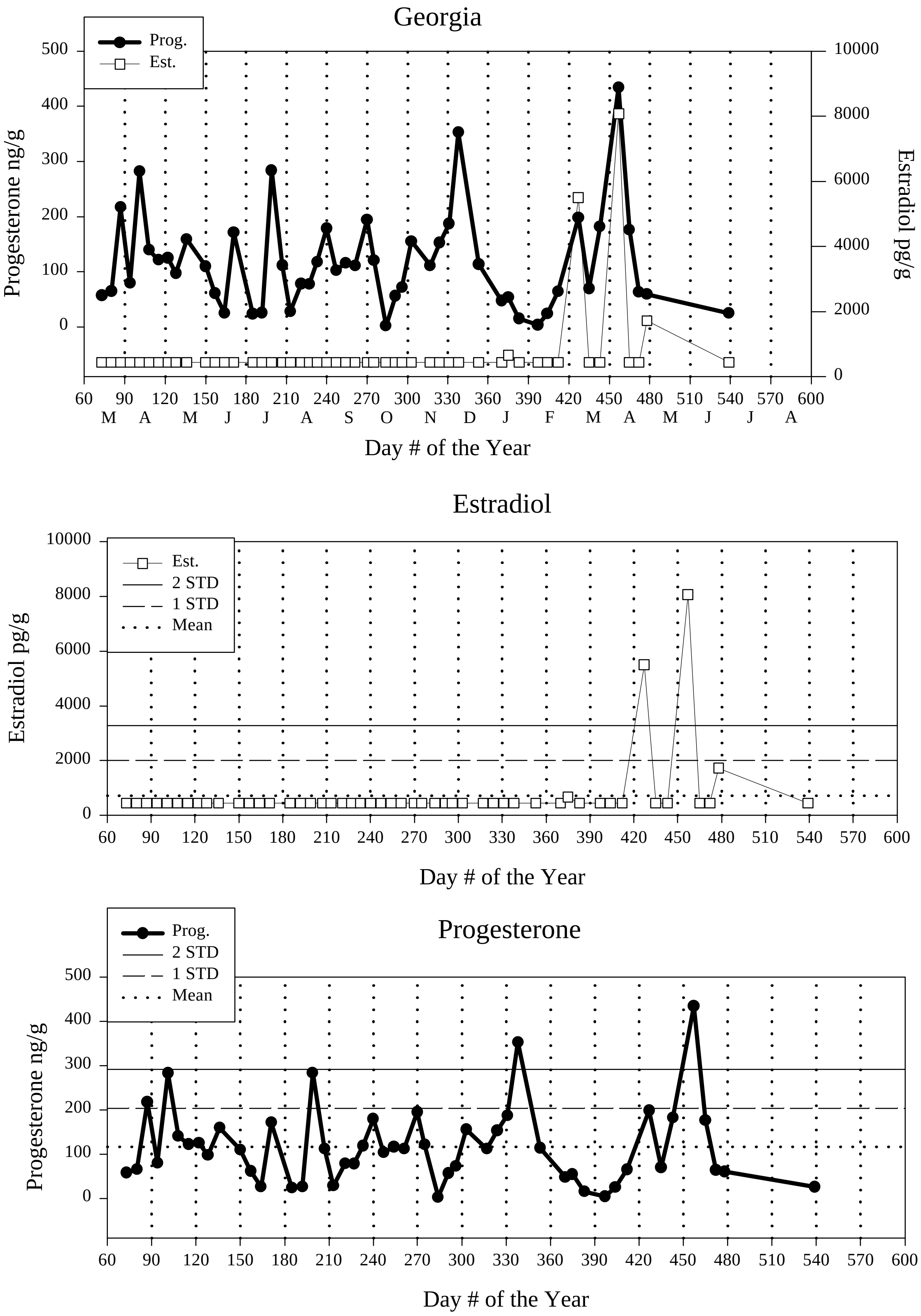


Figure **3-9** Georgia estradiol and progesterone hormone concentrations.

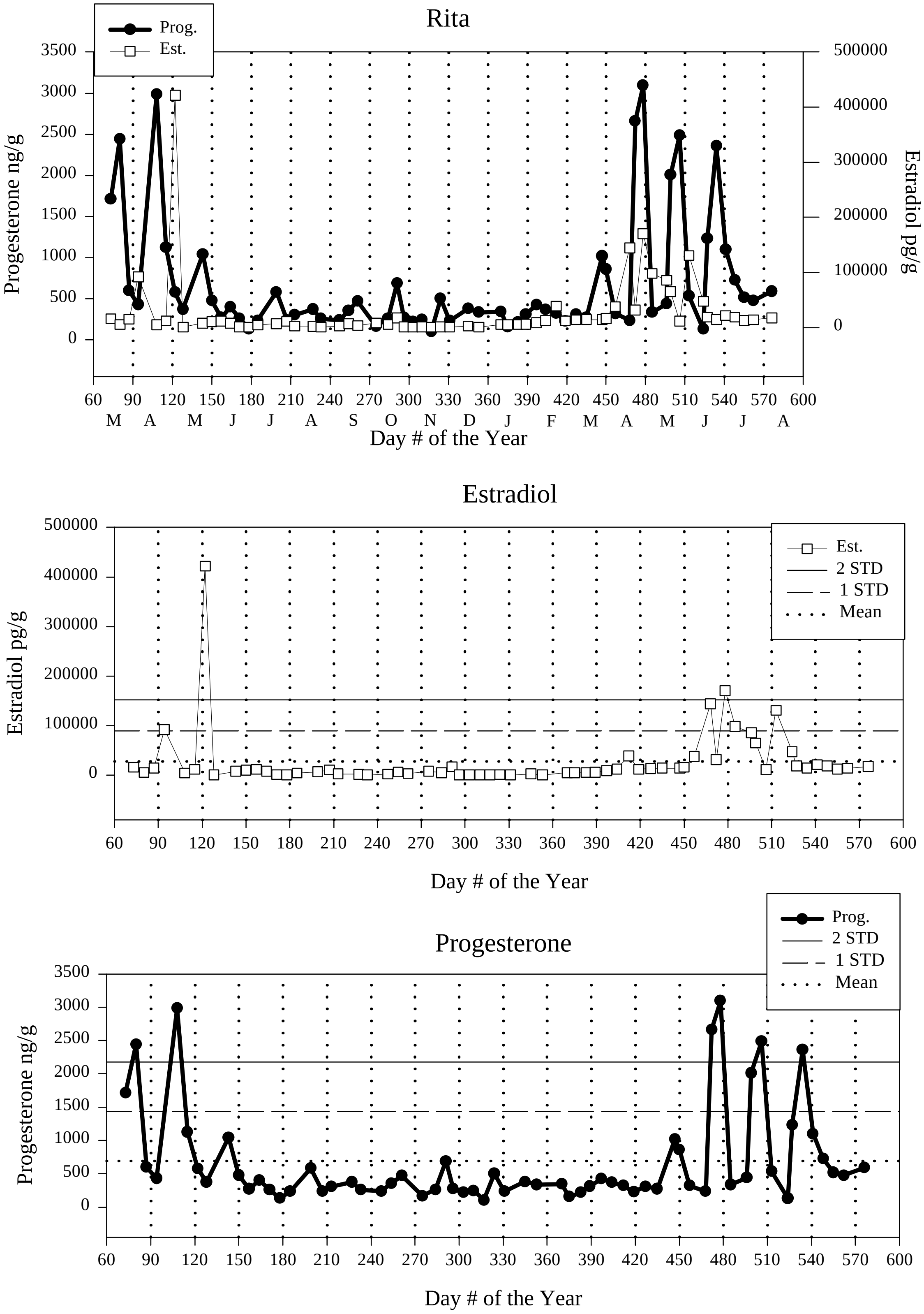


Figure **3-10** Rita estradiol and progesterone hormone concentrations.

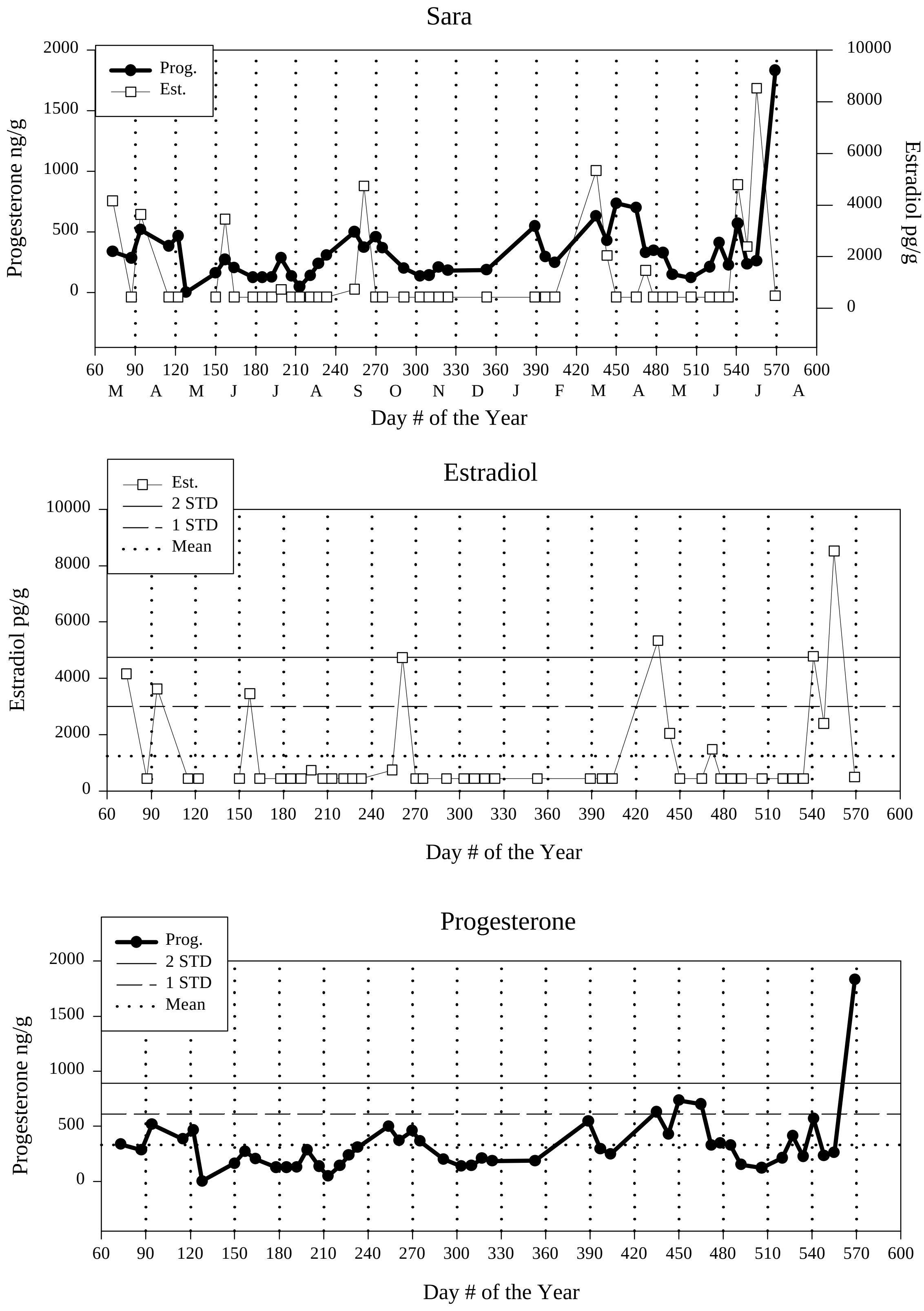


Figure **3-11** Sara estradiol and progesterone hormone concentrations.

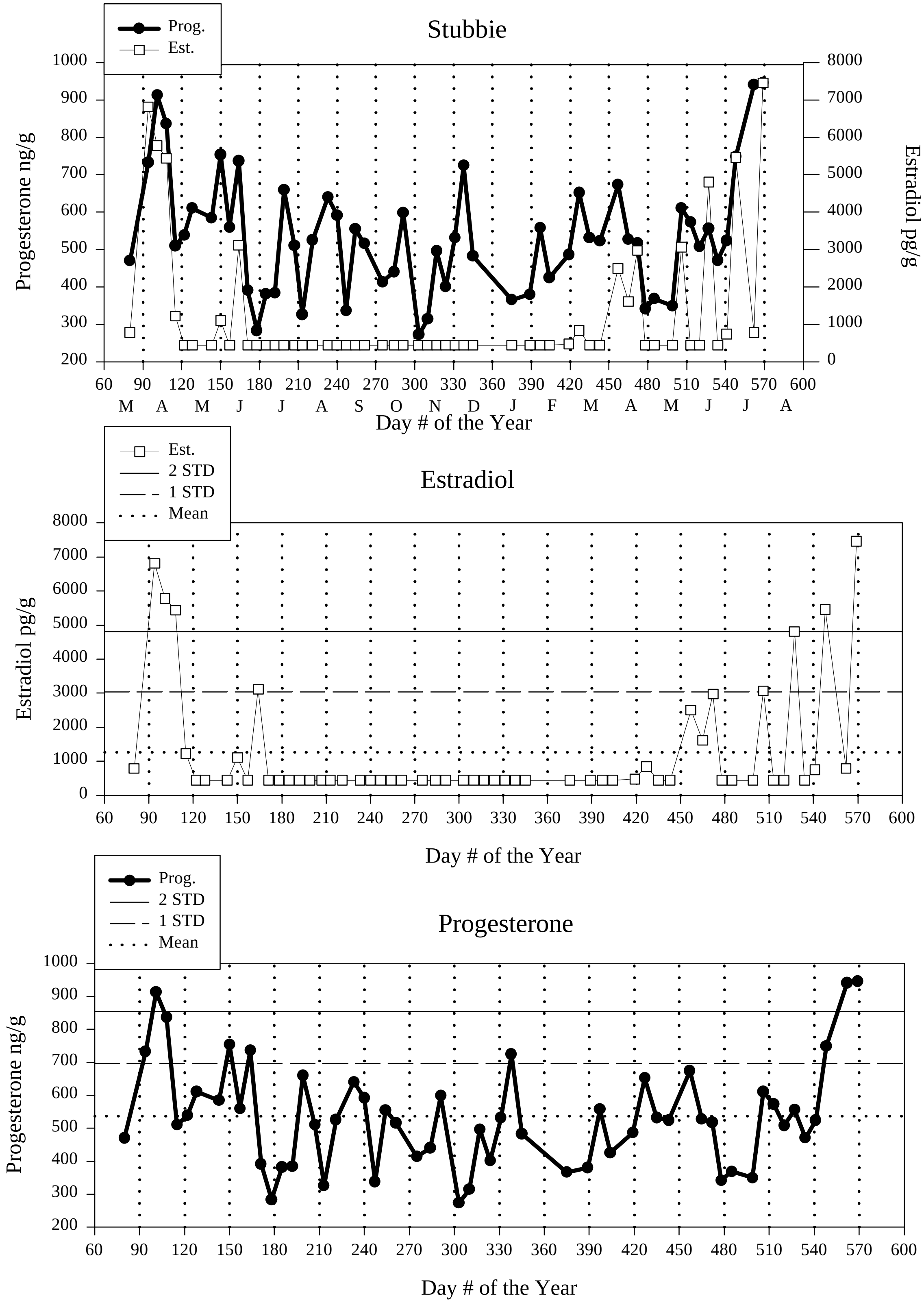


Figure **3-12** Stubbie estradiol and progesterone hormone concentrations.

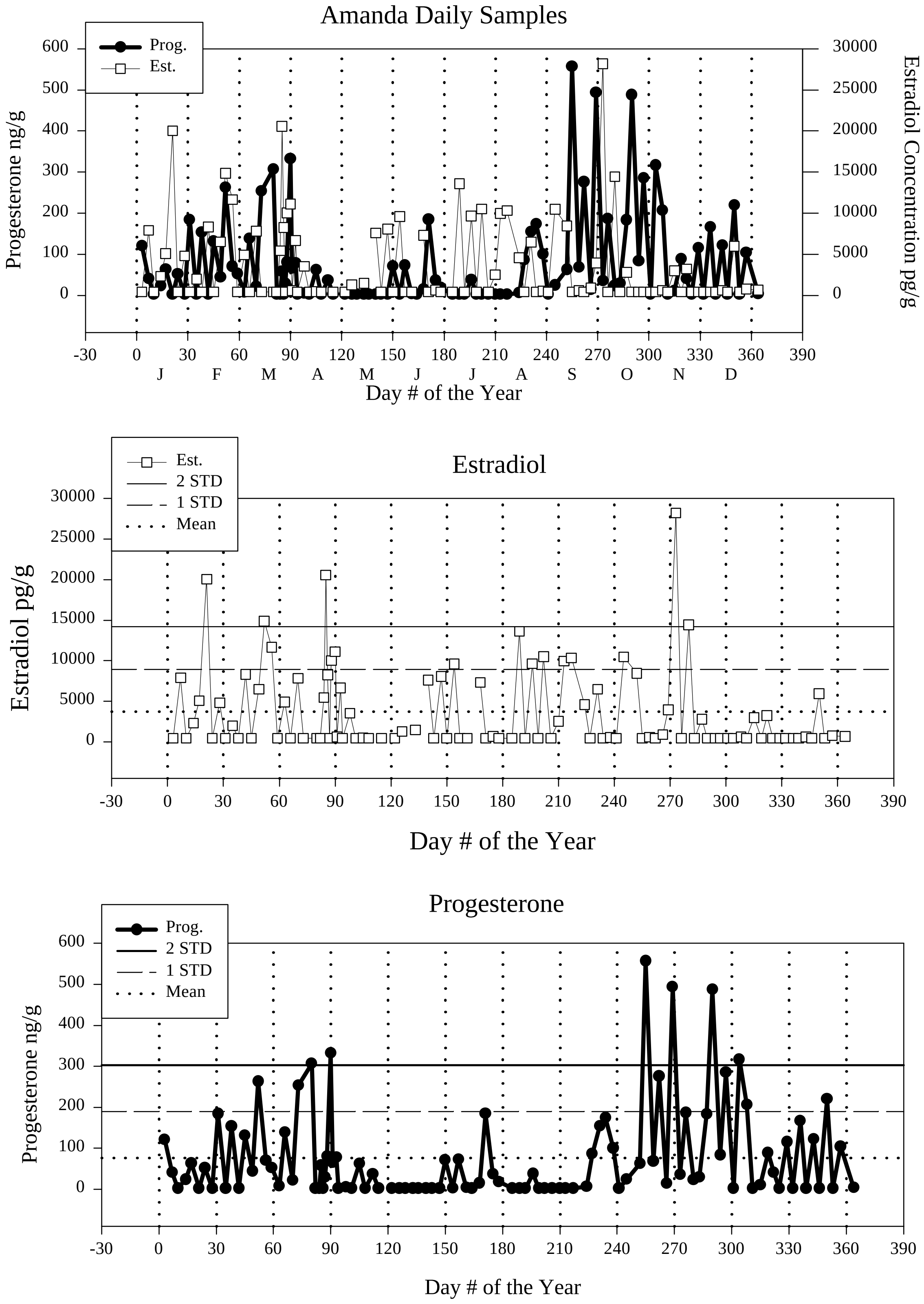
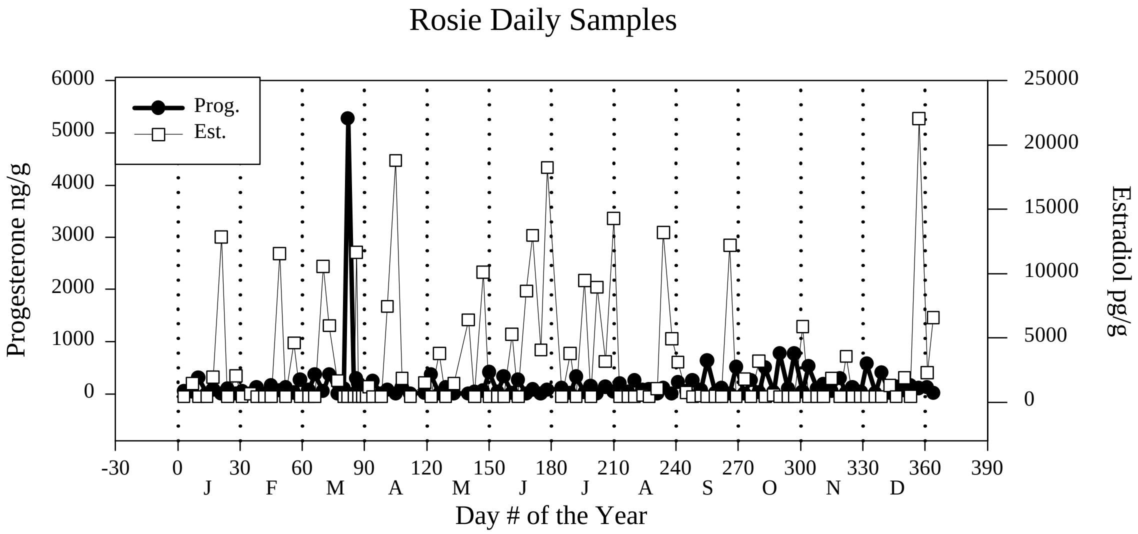
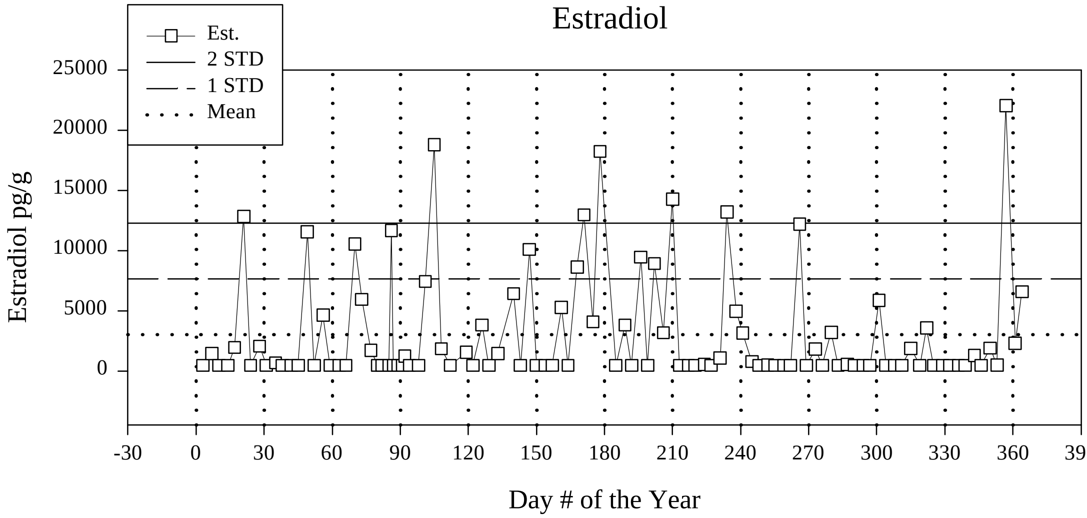


Figure **3-13** Amanda daily hormone concentrations of estradiol and progesterone.





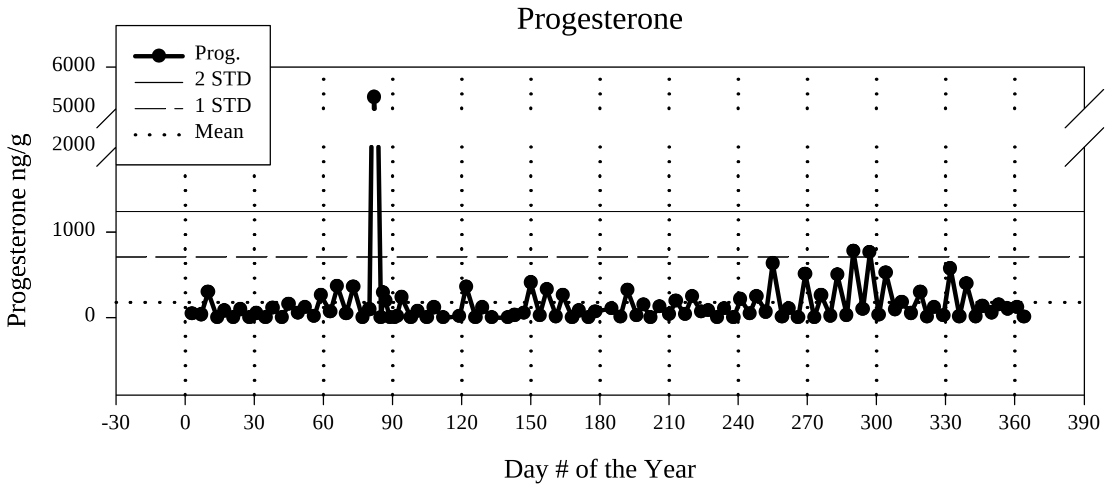


Figure **3-14** Rosie daily hormone concentrations of estradiol and progesterone.

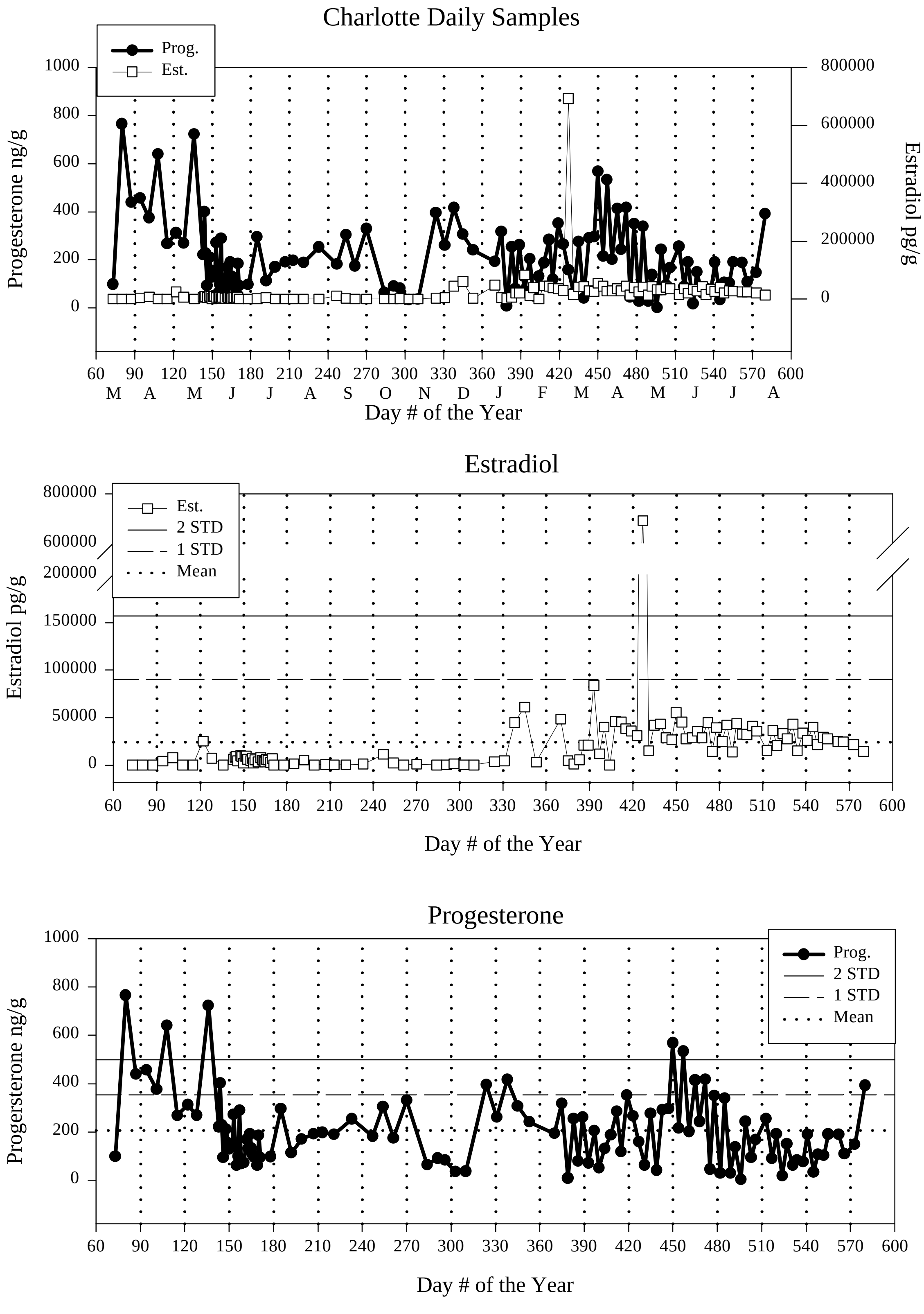


Figure **3-15** Charlotte daily hormone concentrations of estradiol and progesterone.

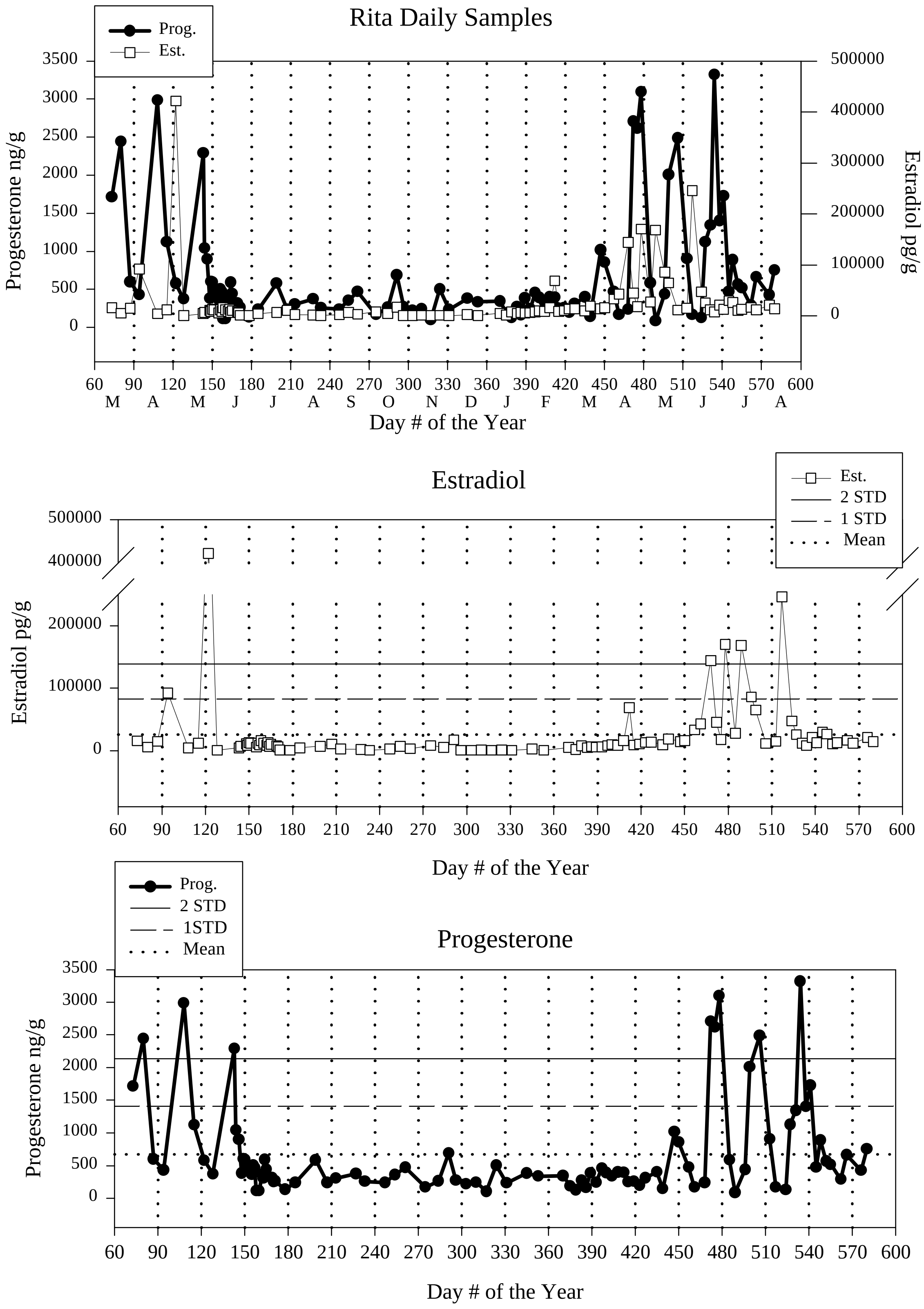


Figure **3-16** Rita daily hormone concentrations of estradiol and progesterone.

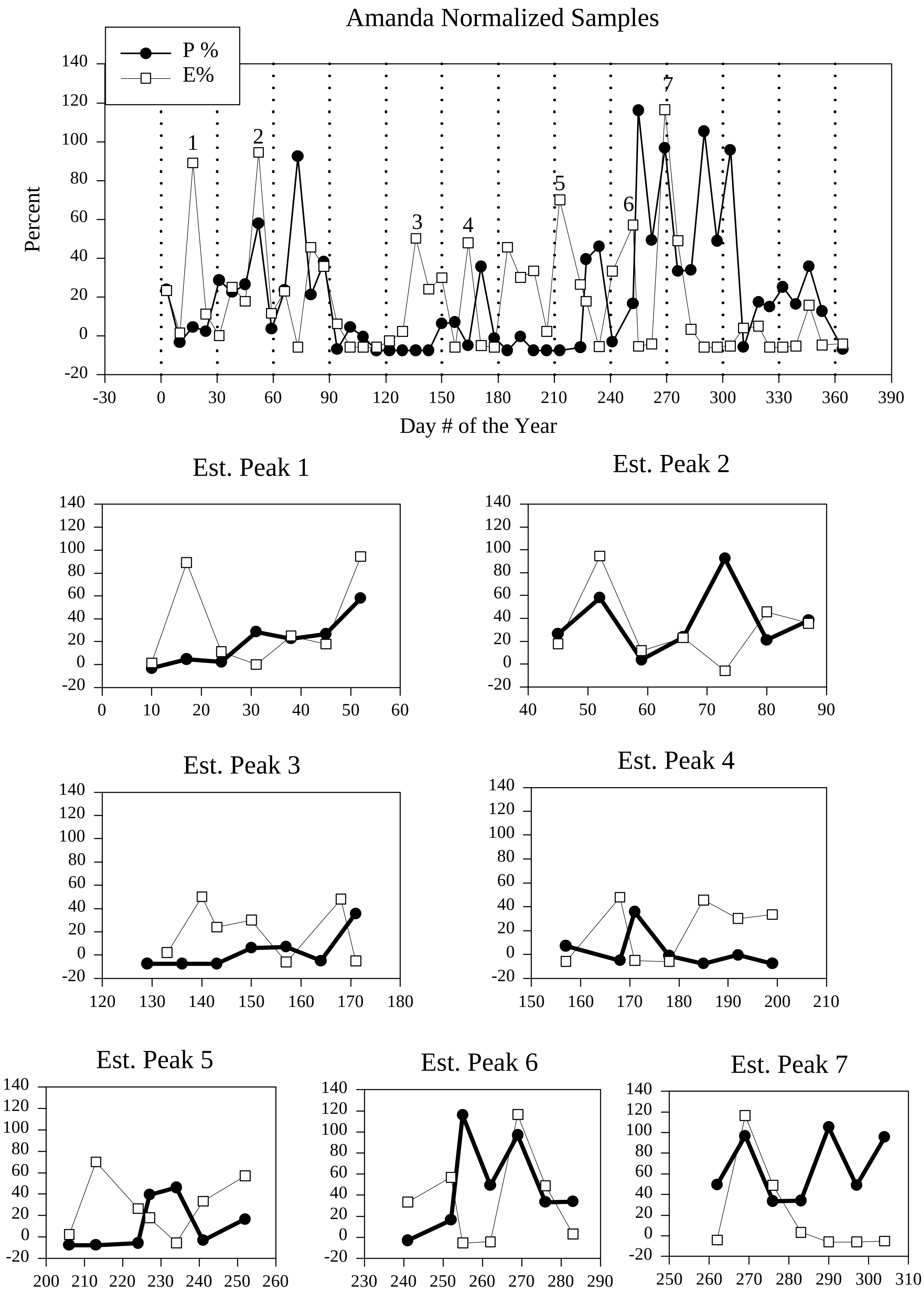
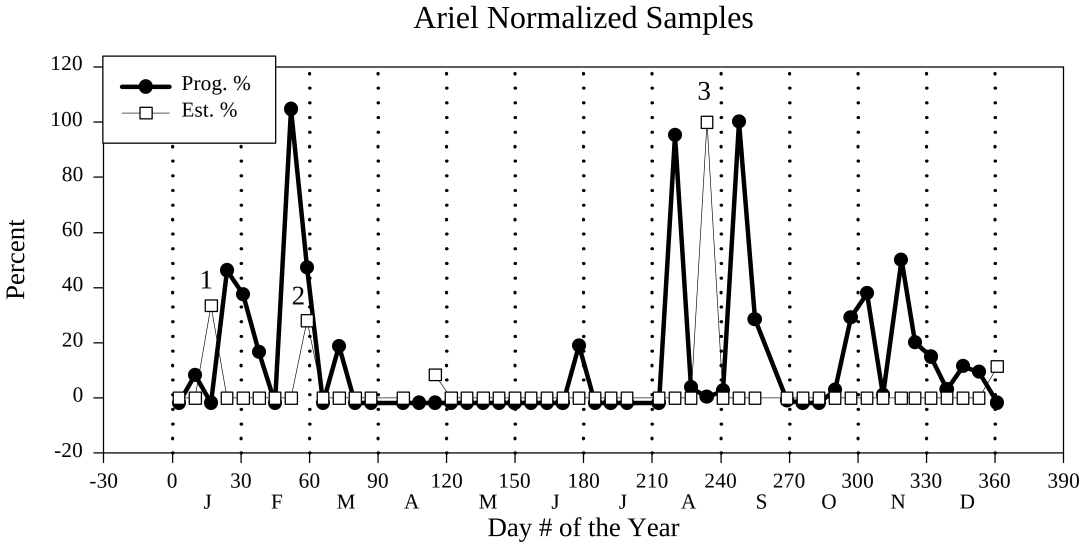
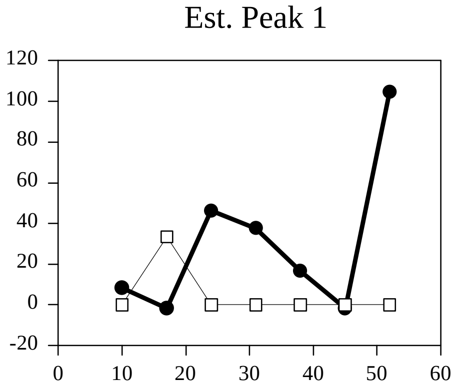
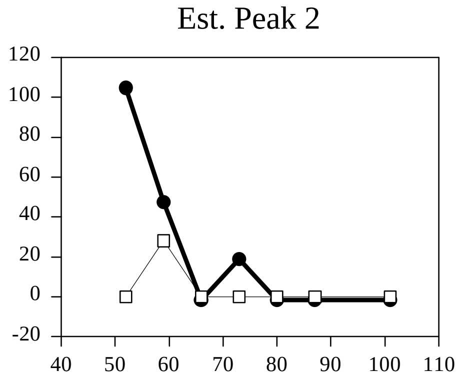


Figure **3-17** Amanda normalized estradiol and progesterone concentrations, indicating estradiol peaks above 1STD. Percent indicates the normalized value for estradiol and progesterone concentrations, see Analysis.







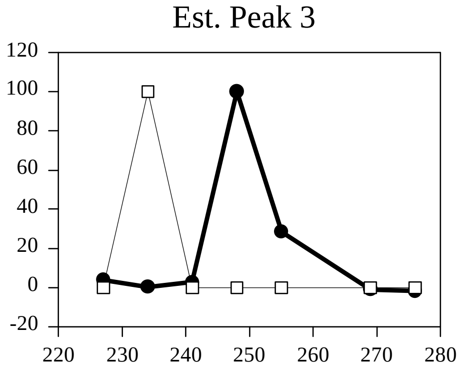
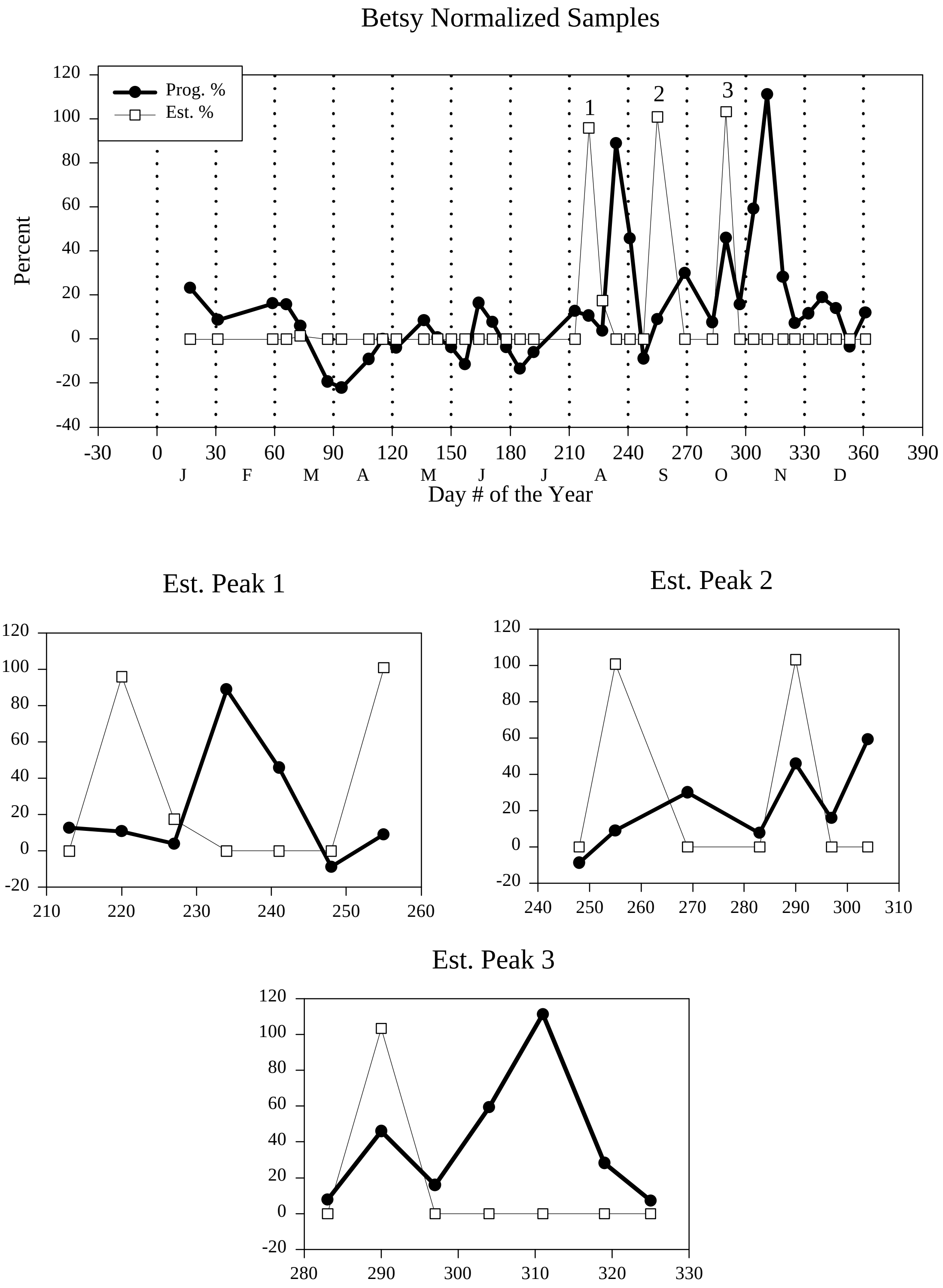


Figure **3-18** Ariel normalized estradiol and progesterone concentrations, indicating estradiol peaks above 1 STD. Percent indicates the normalized value for estradiol and progesterone concentrations, see Analysis.



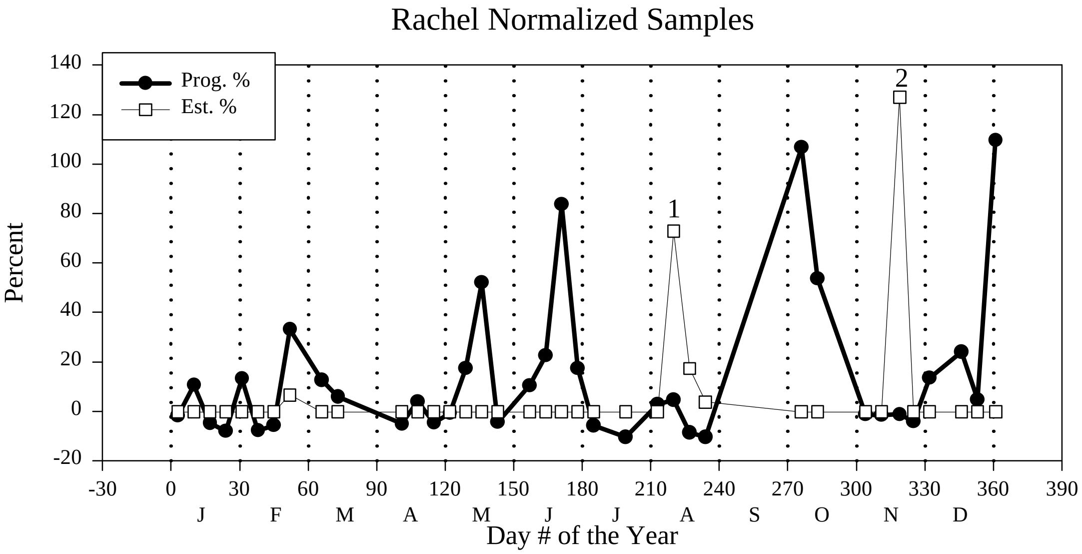
Betsy Normalized Samples

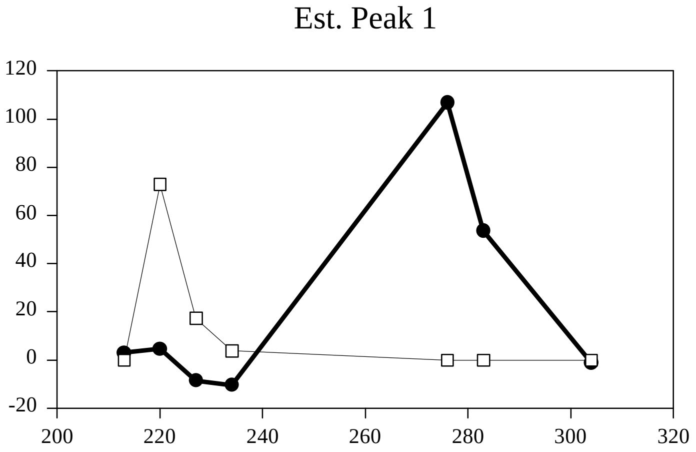
Est. Peak 1

Est. Peak 2

Est. Peak 3

Figure **3-19** Betsy normalized estradiol and progesterone concentrations, indicating estradiol peaks above 1 STD. Percent indicates the normalized value for estradiol and progesterone concentrations, see Analysis.





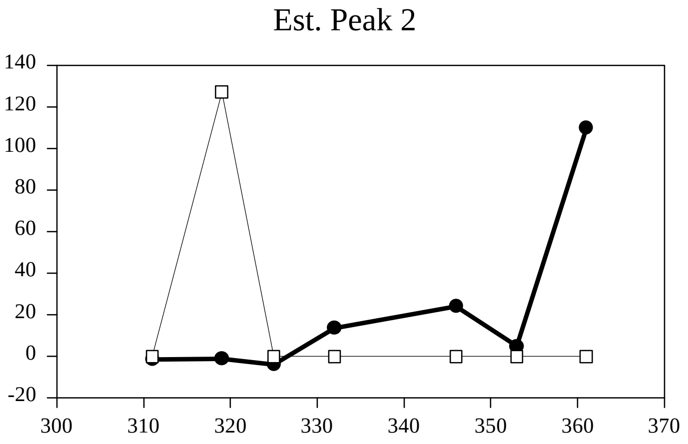


Figure **3-20** Rachel normalized estradiol and progesterone concentrations, indicating estradiol peaks above 1 STD. Percent indicates the normalized value for estradiol and progesterone concentrations, see Analysis.

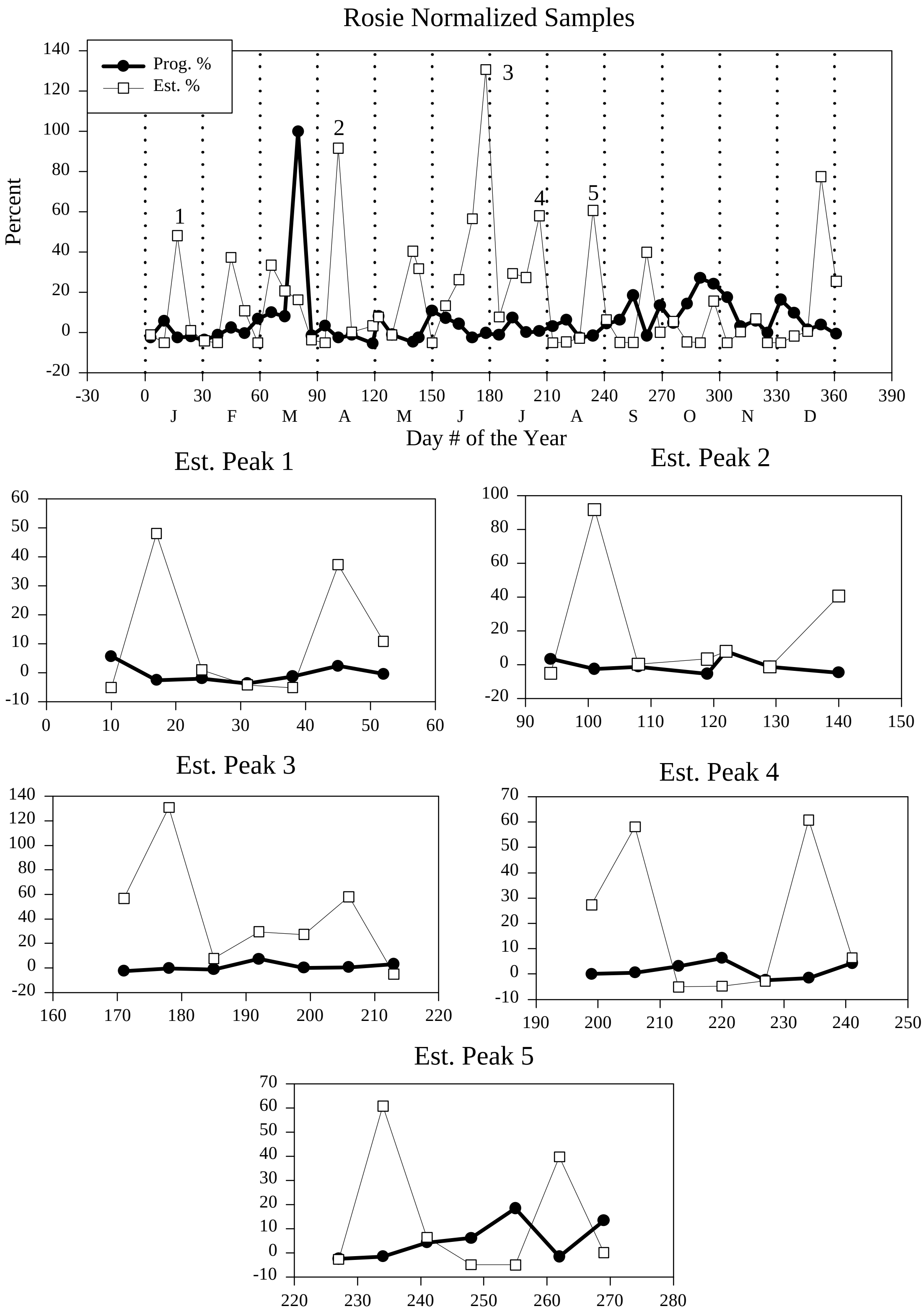
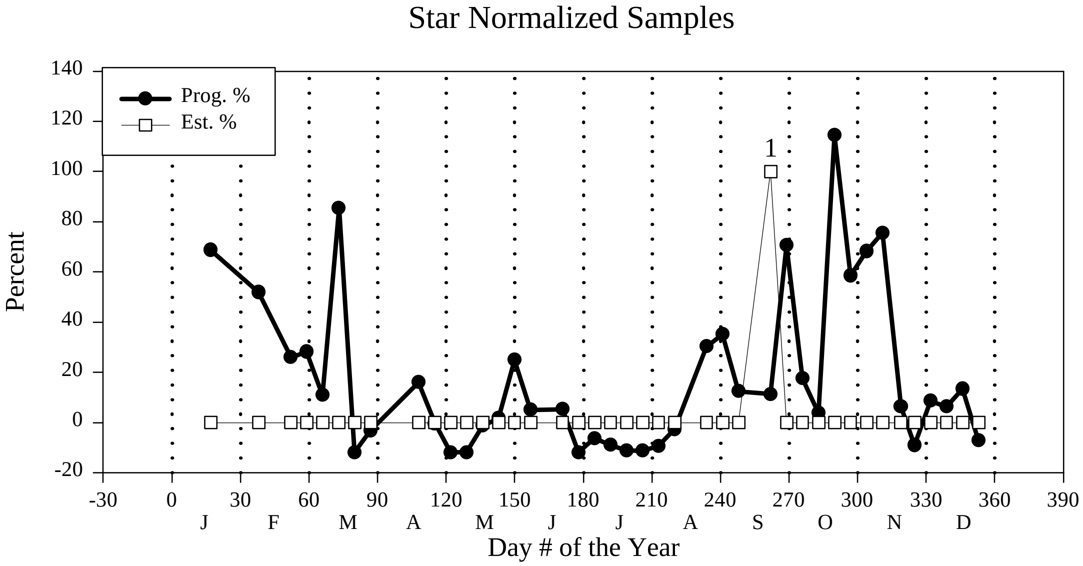


Figure **3-21** Rosie normalized estradiol and progesterone concentrations, indicating estradiol peaks above 1 STD. Percent indicates the normalized value for estradiol and progesterone concentrations, see Analysis.



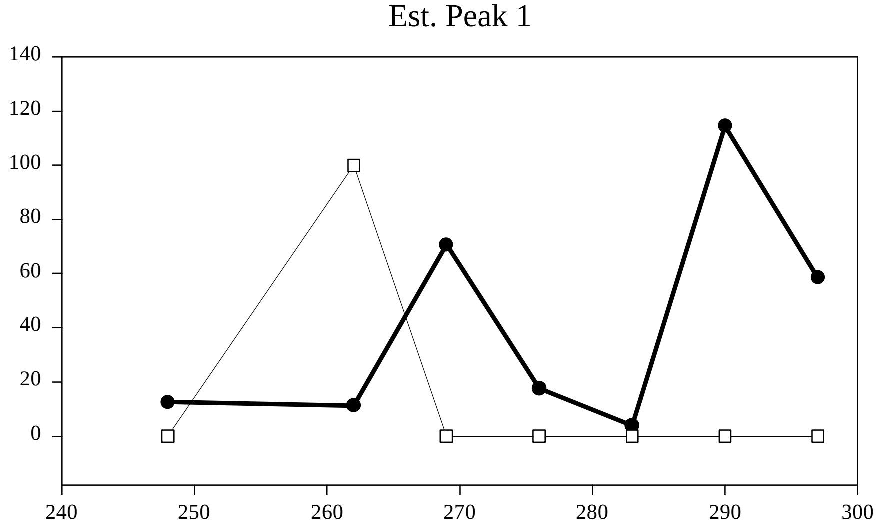
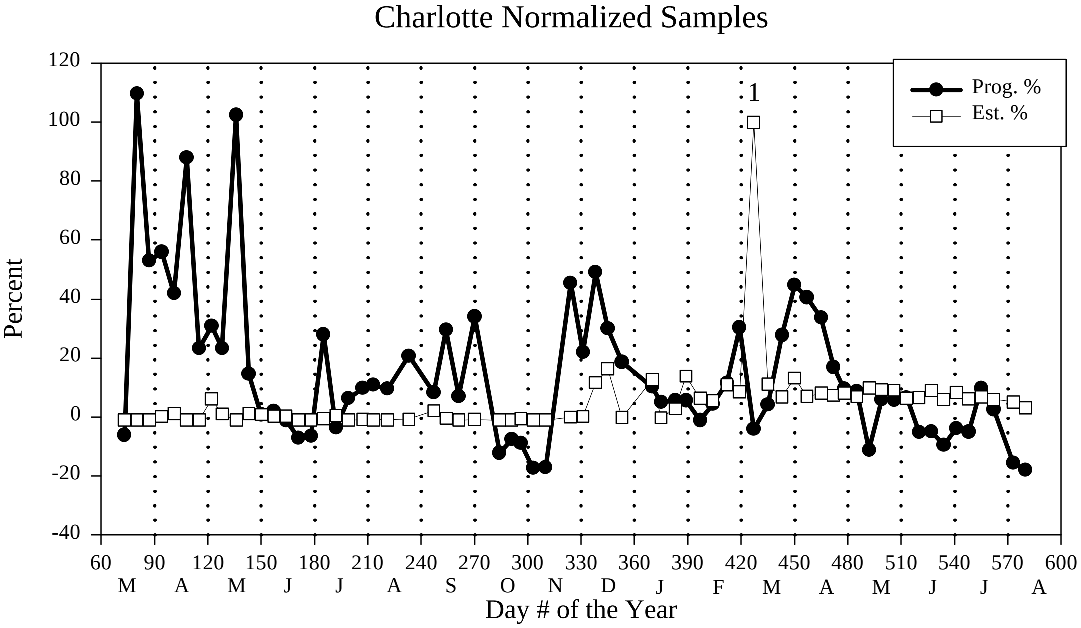


Figure **3-22** Star normalized estradiol and progesterone concentrations, indicating estradiol peaks above 1 STD. Percent indicates the normalized value for estradiol and progesterone concentrations, see Analysis.



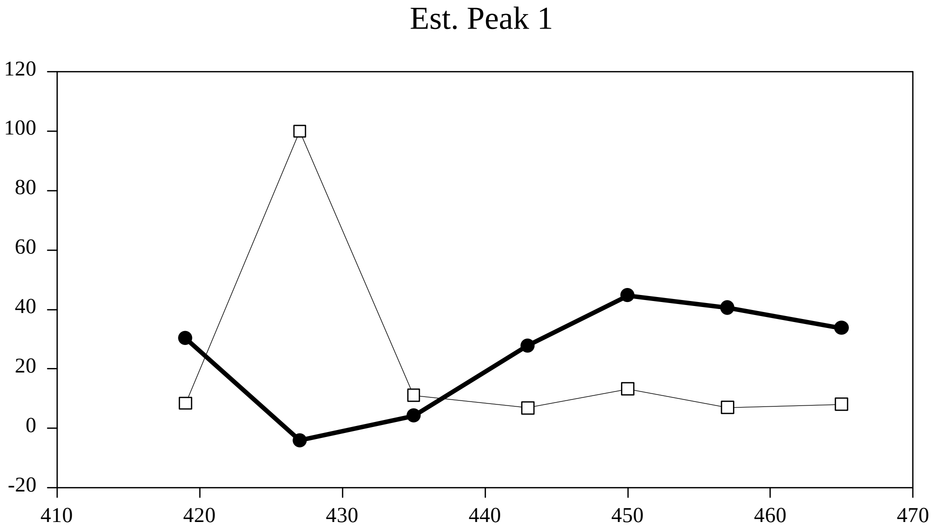
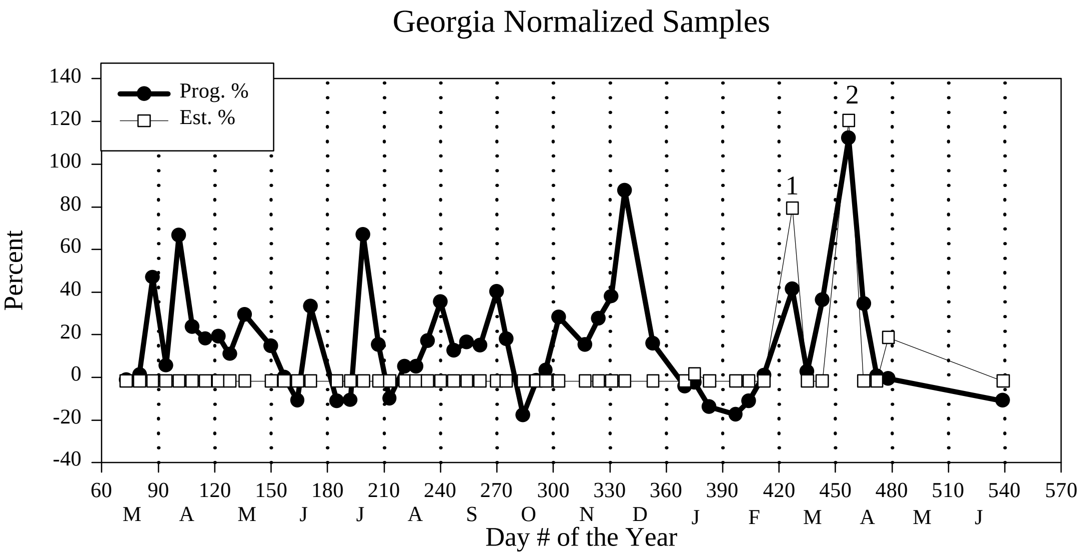
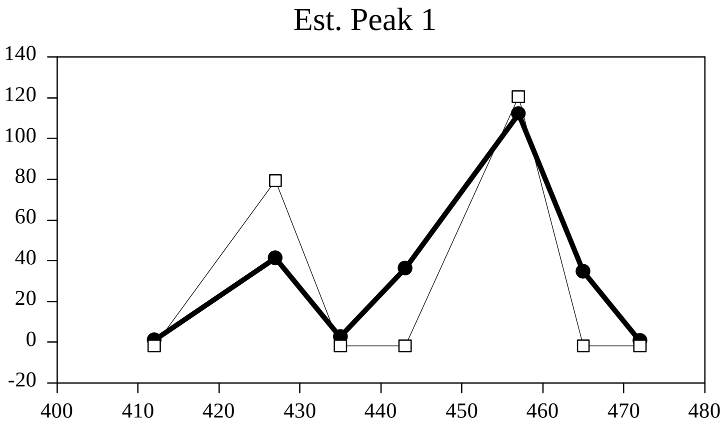


Figure **3-23** Charlotte normalized estradiol and progesterone concentrations, indicating estradiol peaks above 1 STD. Percent indicates the normalized value for estradiol and progesterone concentrations, see Analysis.





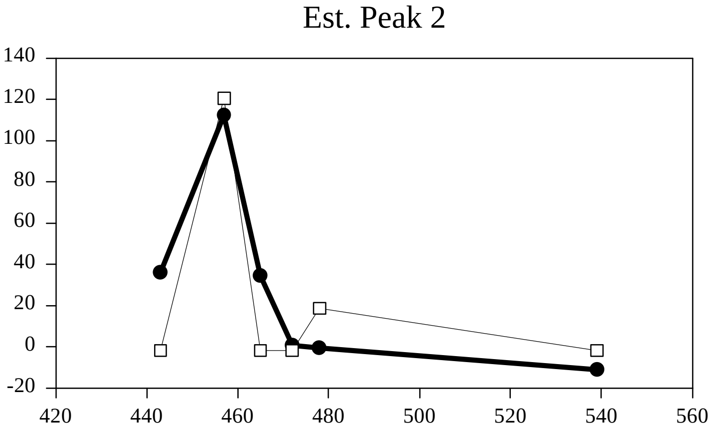
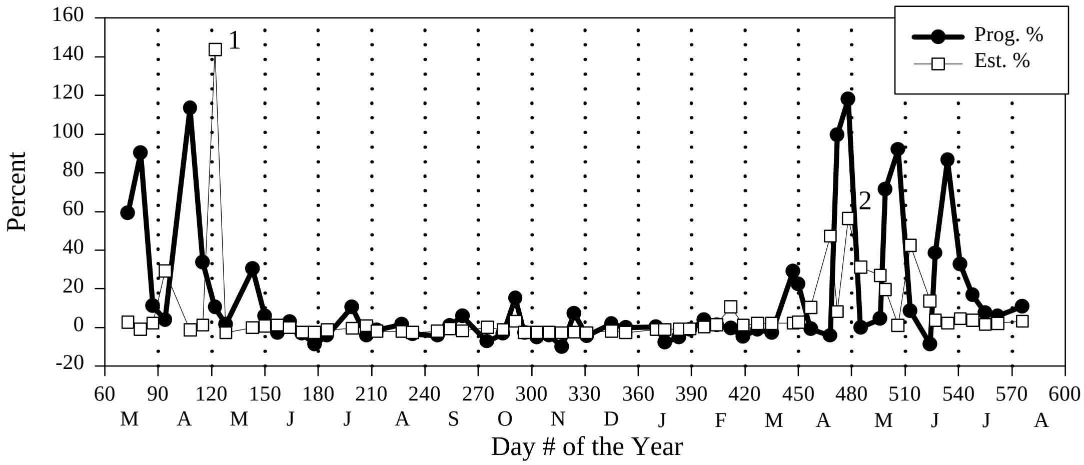
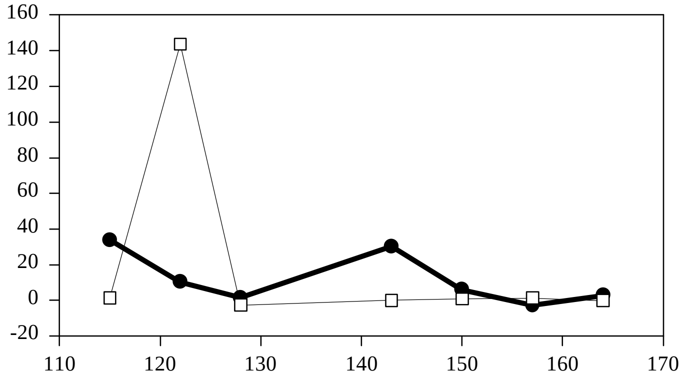


Figure **3-24** Georgia normalized estradiol and progesterone concentrations, indicating estradiol peaks above 1 STD. Percent indicates the normalized value for estradiol and progesterone concentrations, see Analysis.

Rita Normalized Samples



Est. Peak 1



Est. Peak 2

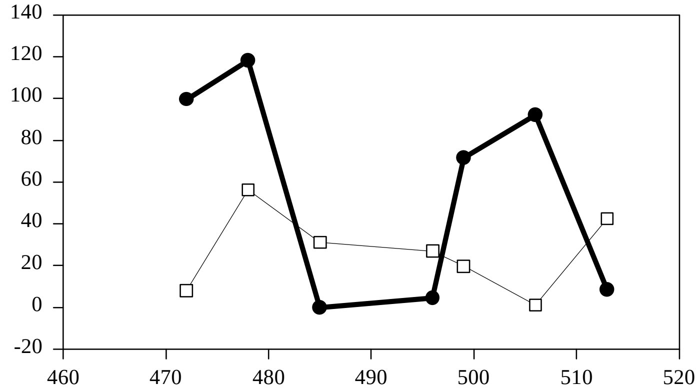


Figure **3-25** Rita normalized estradiol and progesterone concentrations, indicating estradiol peaks above 1 STD. Percent indicates the normalized value for estradiol and progesterone concentrations, see Analysis.

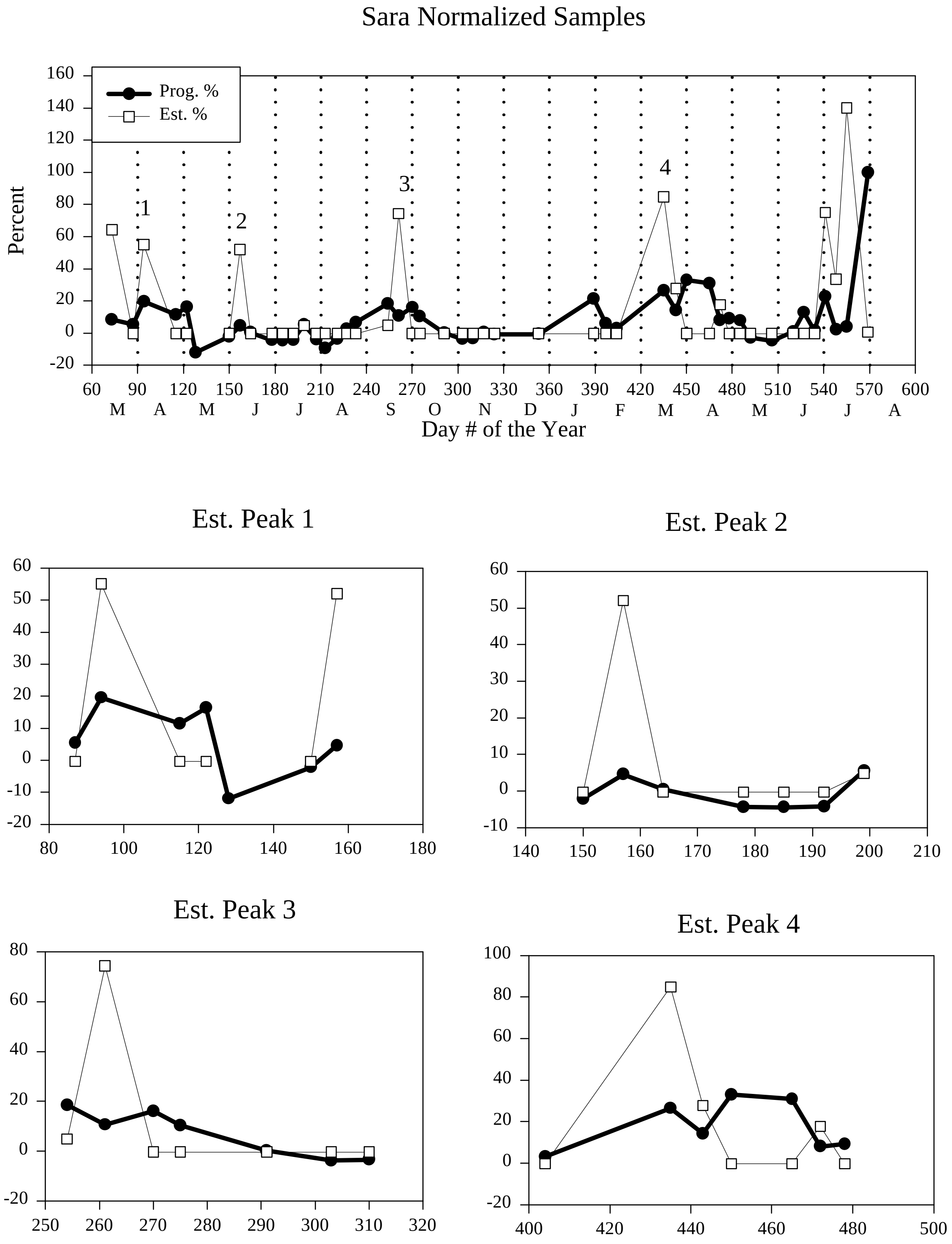
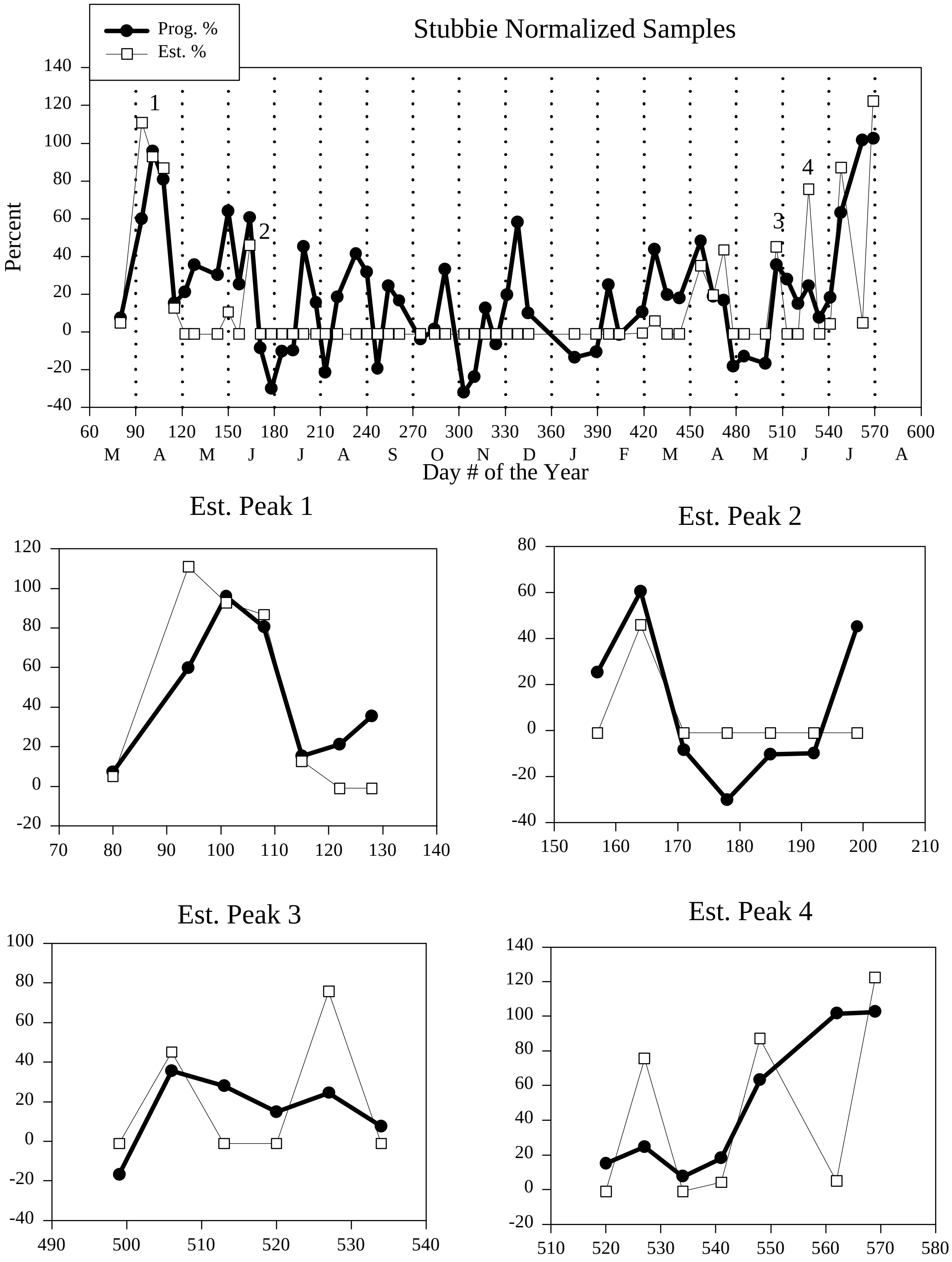


Figure **3-26** Sara normalized estradiol and progesterone concentrations, indicating estradiol peaks above 1 STD. Percent indicates the normalized value for estradiol and progesterone concentrations, see Analysis.


Stubbie Normalized Samples

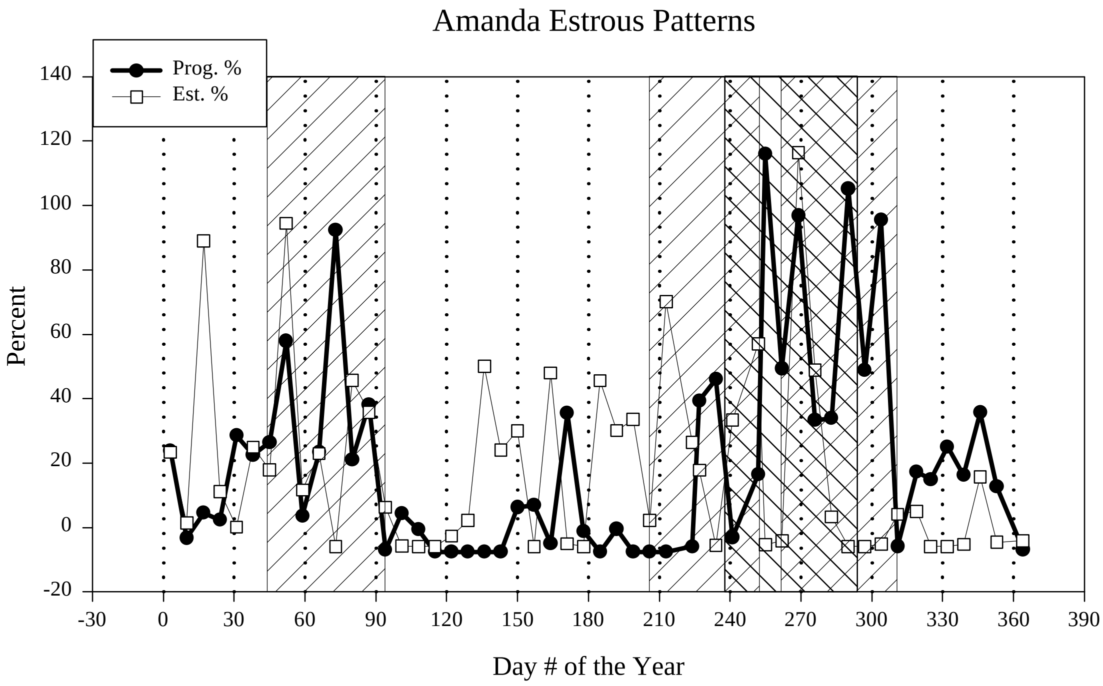
Est. Peak 1

Est. Peak 2

Est. Peak 3

Est. Peak 4

Figure **3-27** Stubbie normalized estradiol and progesterone concentrations, indicating estradiol peaks above 1 STD. Percent indicates the normalized value for estradiol and progesterone concentrations, see Analysis.



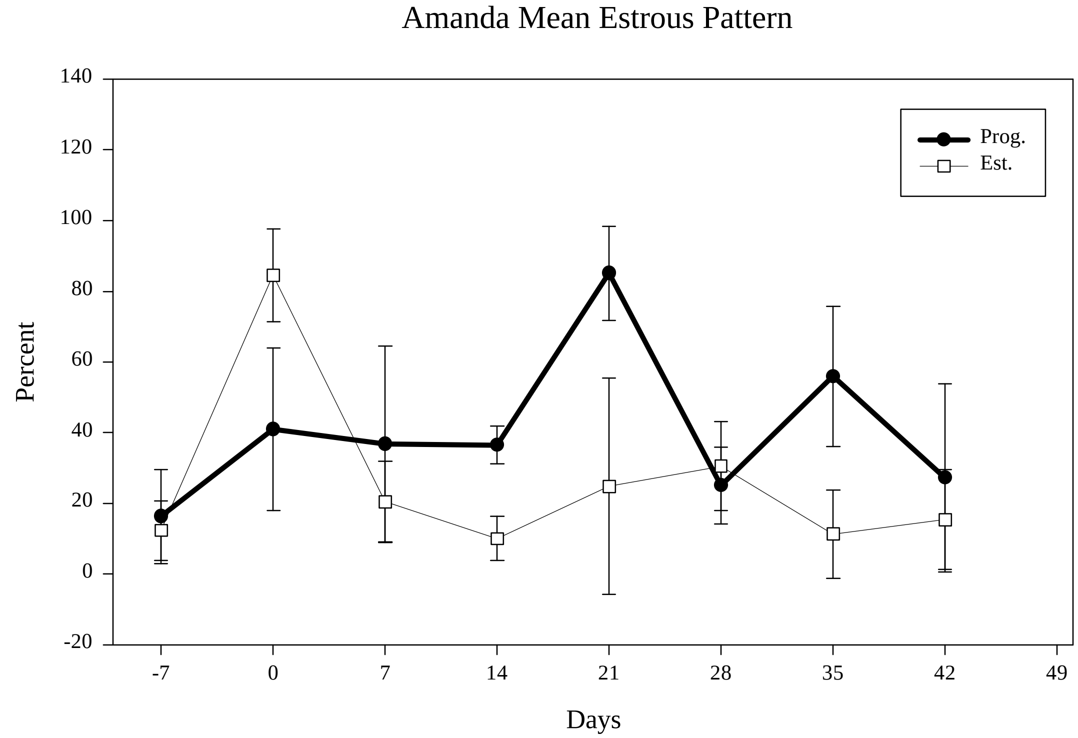
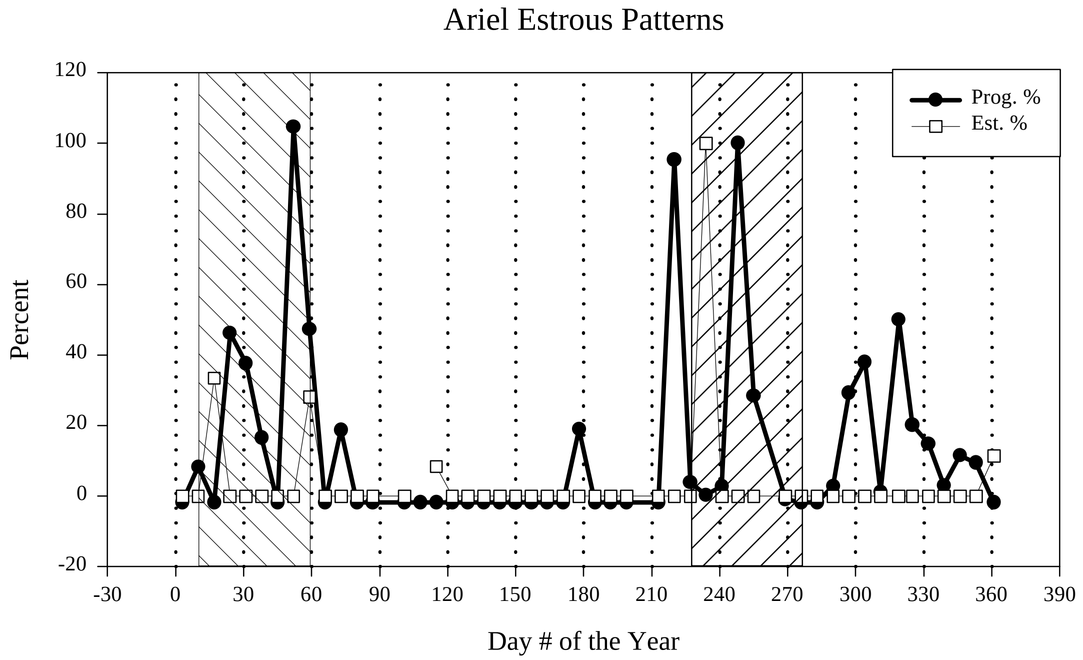


Figure **3-28** Amanda mean estrous cycle patterns. Percent indicates the normalized value for estradiol and progesterone concentrations, see Analysis. The shaded areas in the top graph identify estrous cycle patterns. The bottom graph represents the mean estrous cycle pattern ± SEM of the above shaded areas.



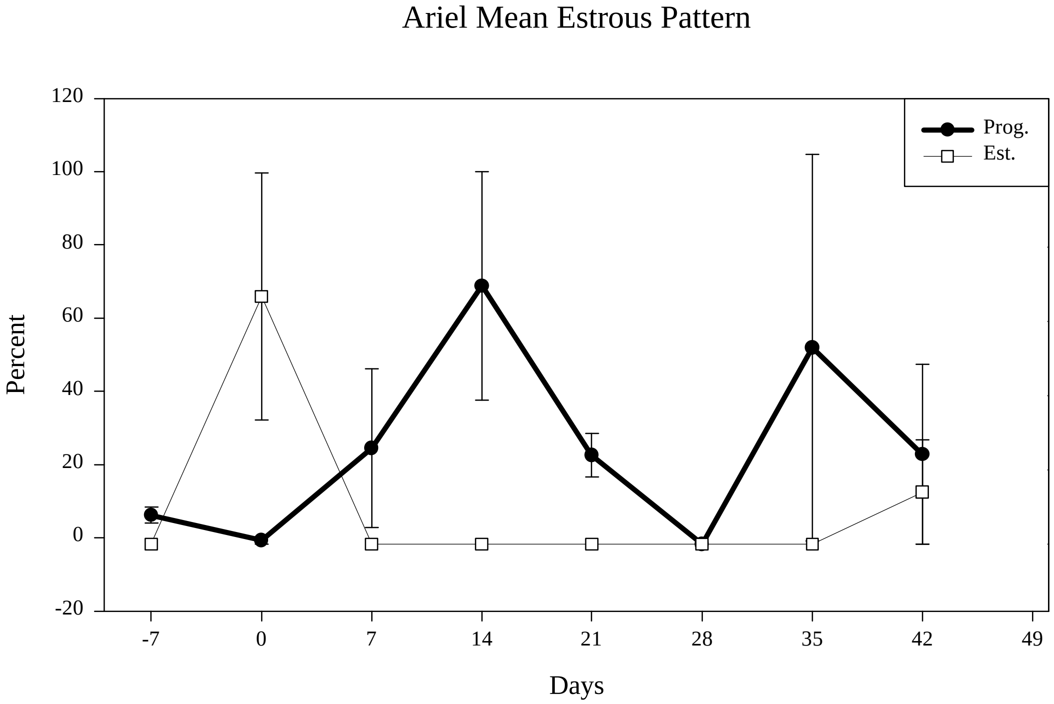


Figure **3-29** Ariel mean estrous cycle patterns. Percent indicates the normalized value for estradiol and progesterone concentrations, see Analysis. The shaded areas in the top graph identify estrous cycle patterns. The bottom graph represents the mean estrous cycle pattern ± SEM of the above shaded areas.

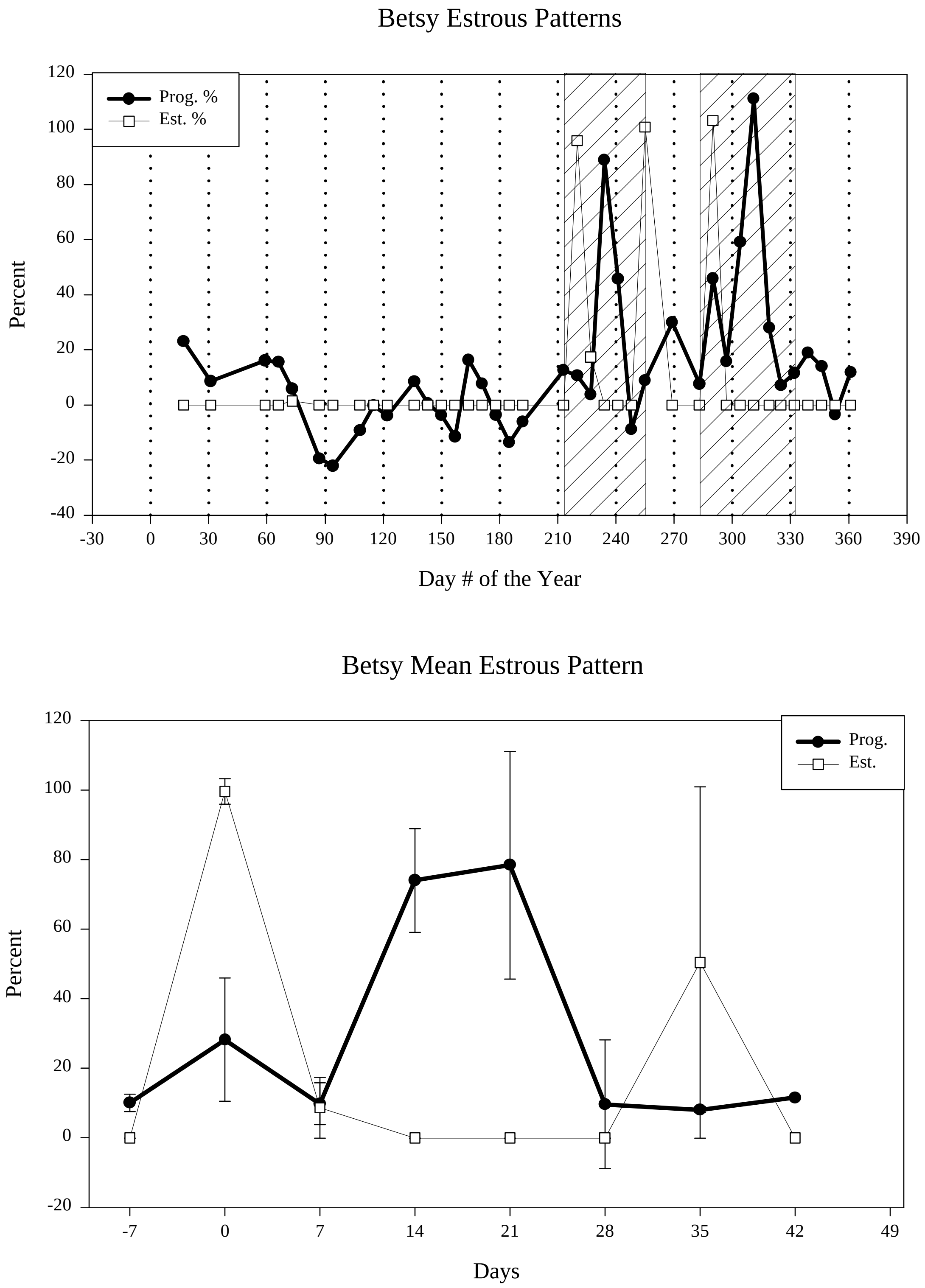
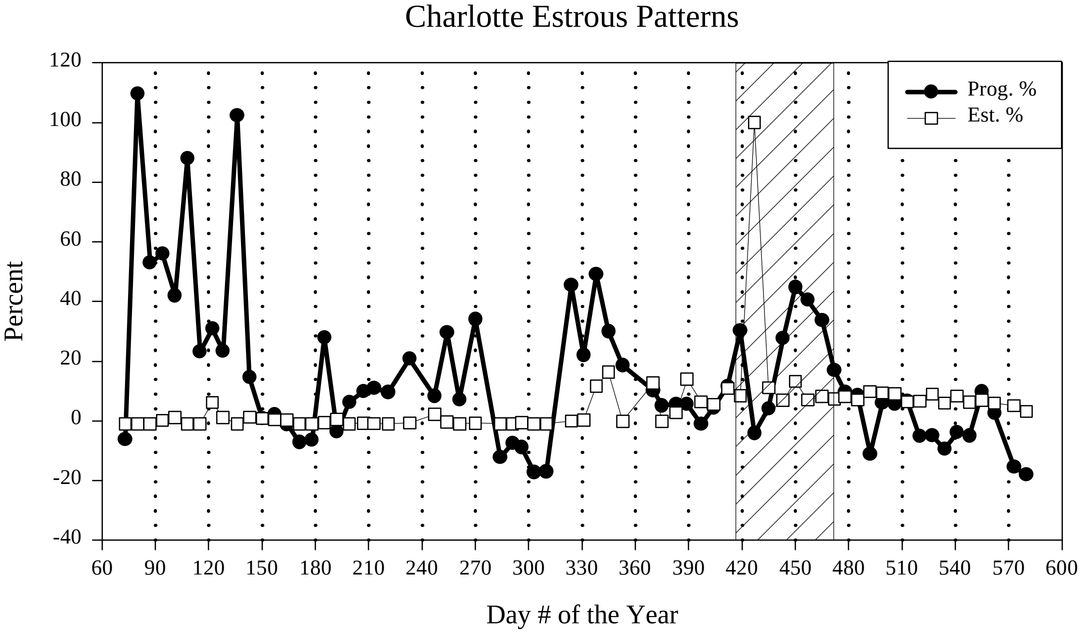


Figure **3-30** Betsy mean estrous cycle patterns. Percent indicates the normalized value for estradiol and progesterone concentrations, see Analysis. The shaded areas in the top graph identify estrous cycle patterns. The bottom graph represents the mean estrous cycle pattern ± SEM of the above shaded areas.



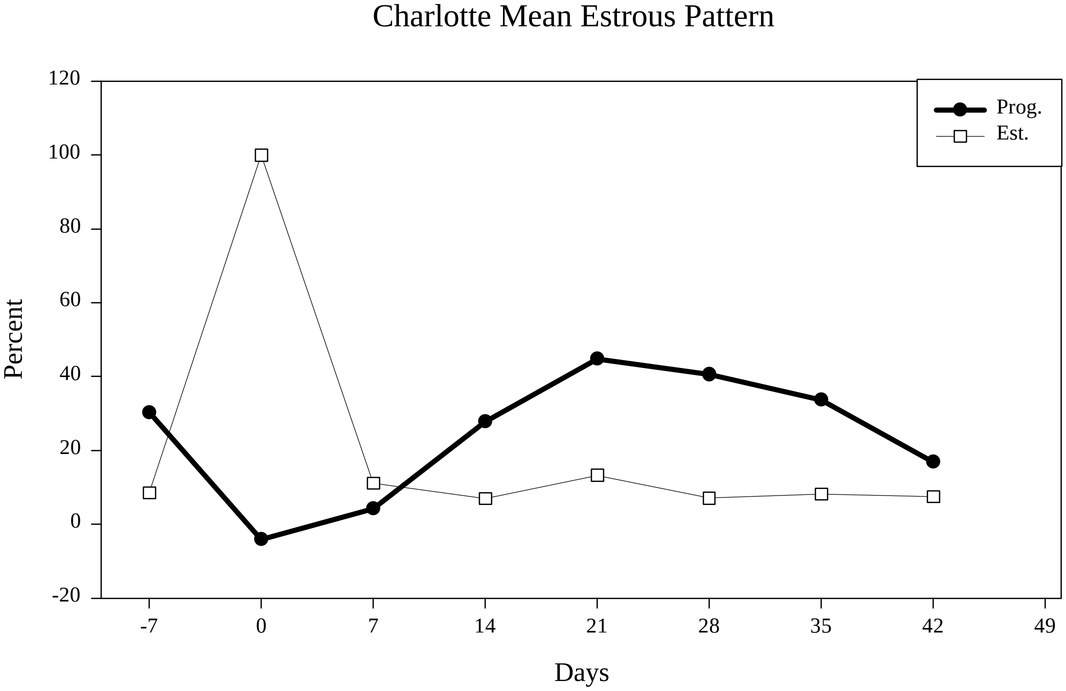
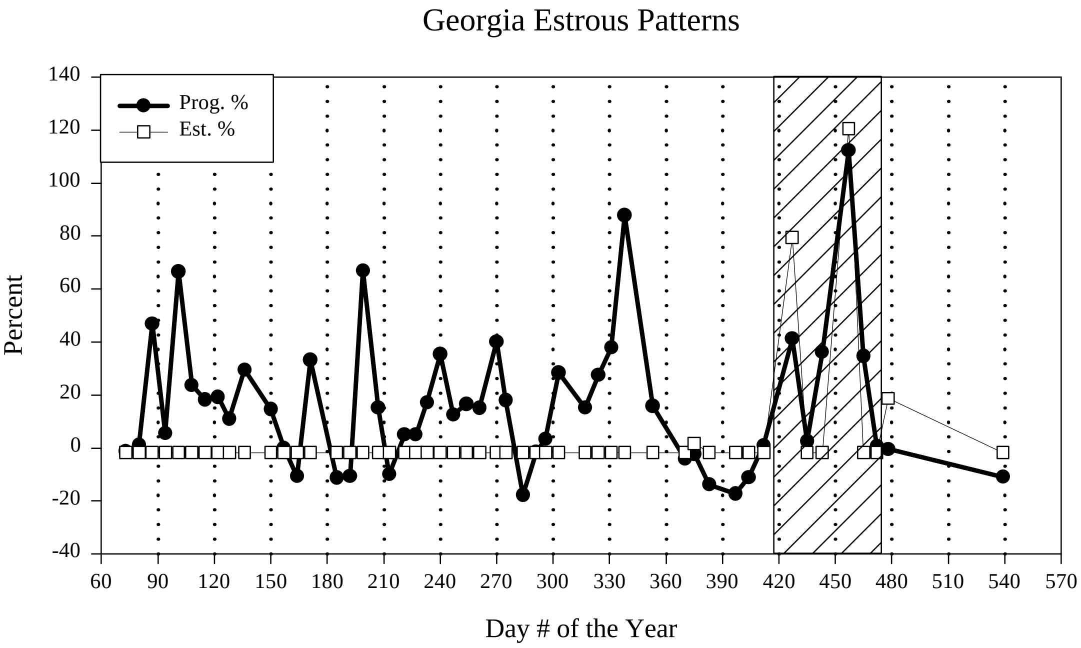


Figure **3-31** Charlotte mean estrous cycle patterns. Percent indicates the normalized value for estradiol and progesterone concentrations, see Analysis. The shaded areas in the top graph identify estrous cycle patterns. The bottom graph represents the mean estrous cycle pattern of the above shaded areas.



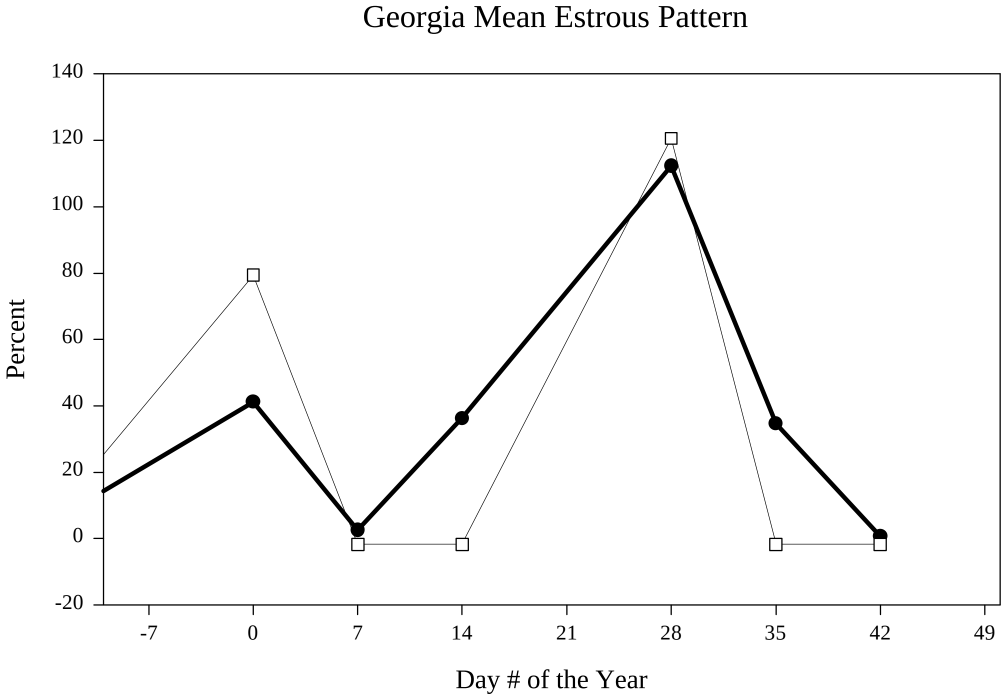
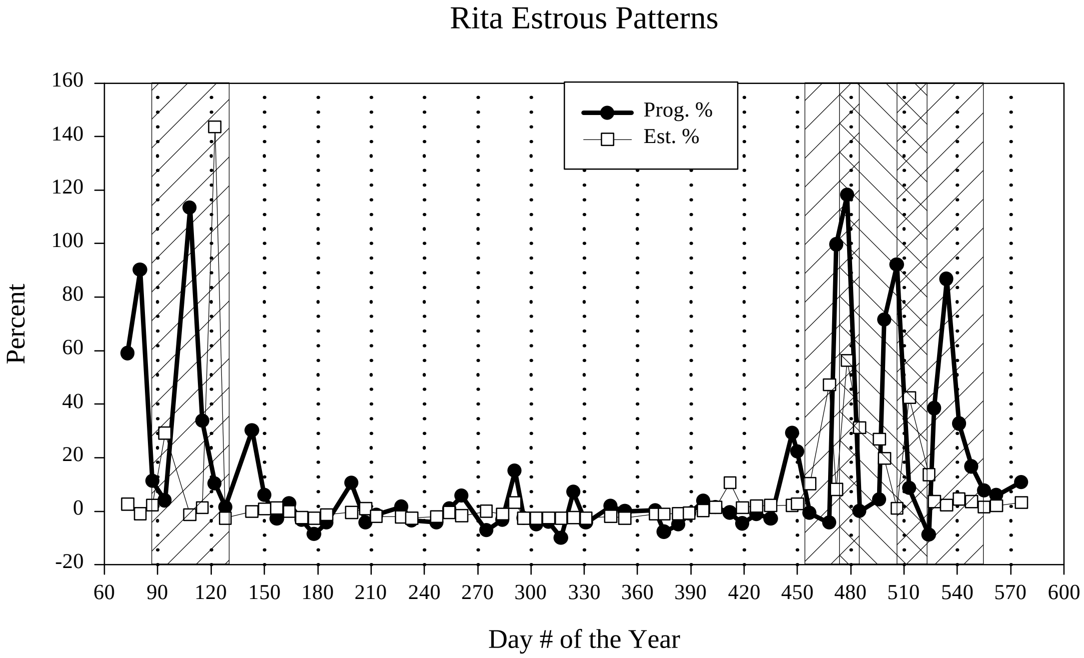


Figure **3-32** Georgia mean estrous cycle pattern. Percent indicates the normalized value for estradiol and progesterone concentrations, see Analysis. The shaded areas in the top graph identify estrous cycle patterns. The bottom graph represents the mean estrous cycle pattern of the above shaded areas.



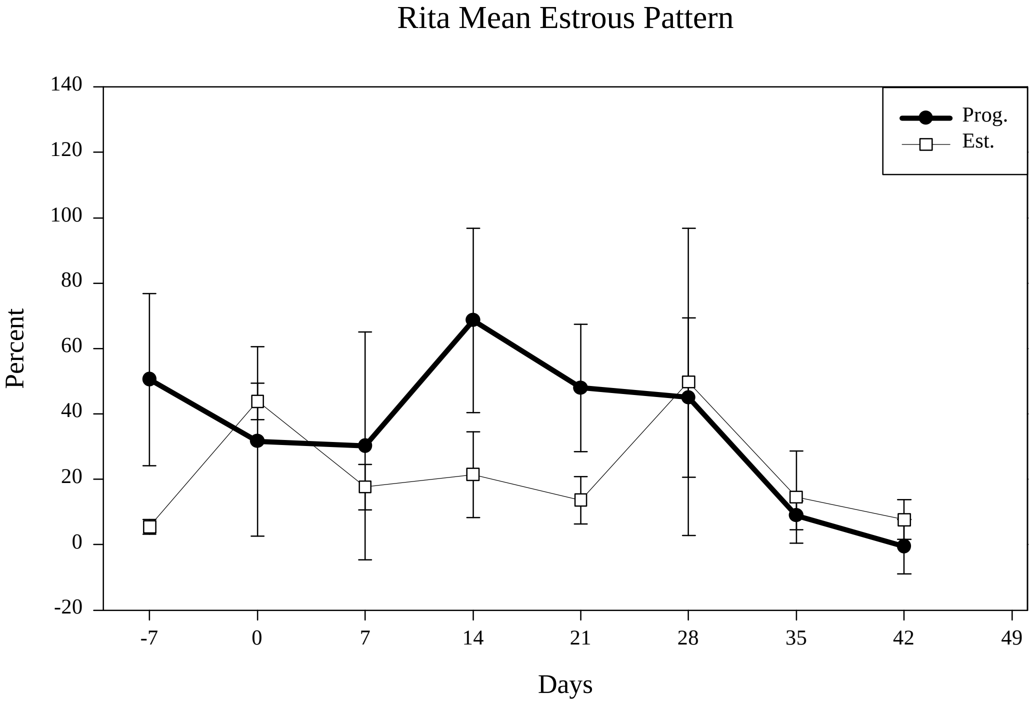
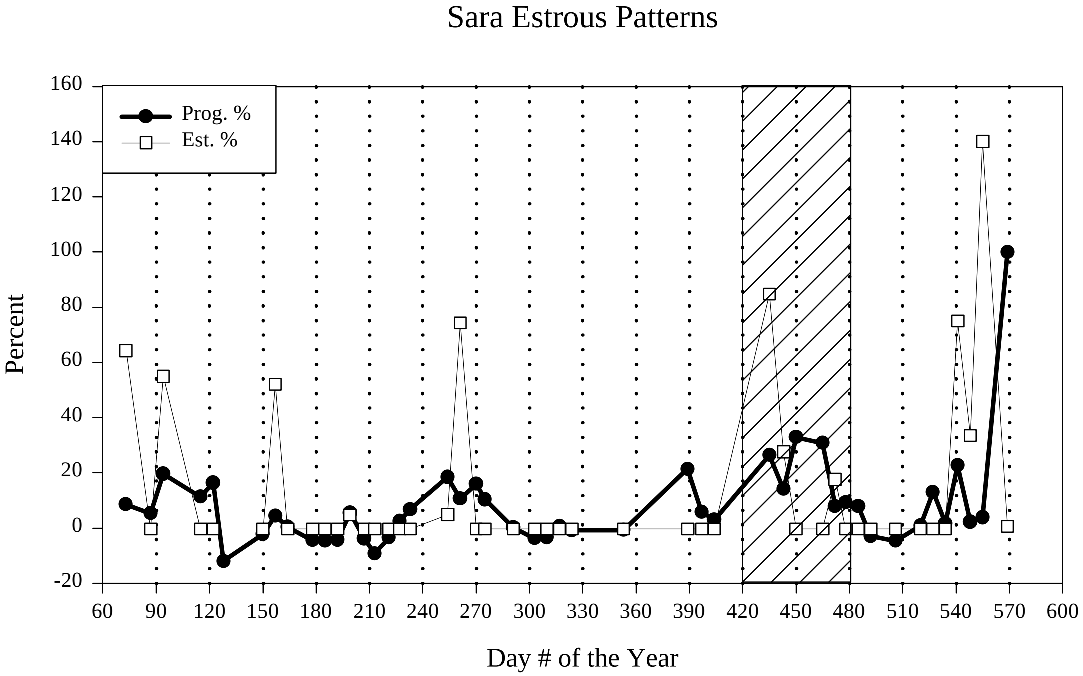


Figure **3-33** Rita mean estrous cycle pattern. Percent indicates the normalized value for estradiol and progesterone concentrations, see Analysis. The shaded areas in the top graph identify estrous cycle patterns. The bottom graph represents the mean estrous cycle pattern ± SEM of the above shaded areas.



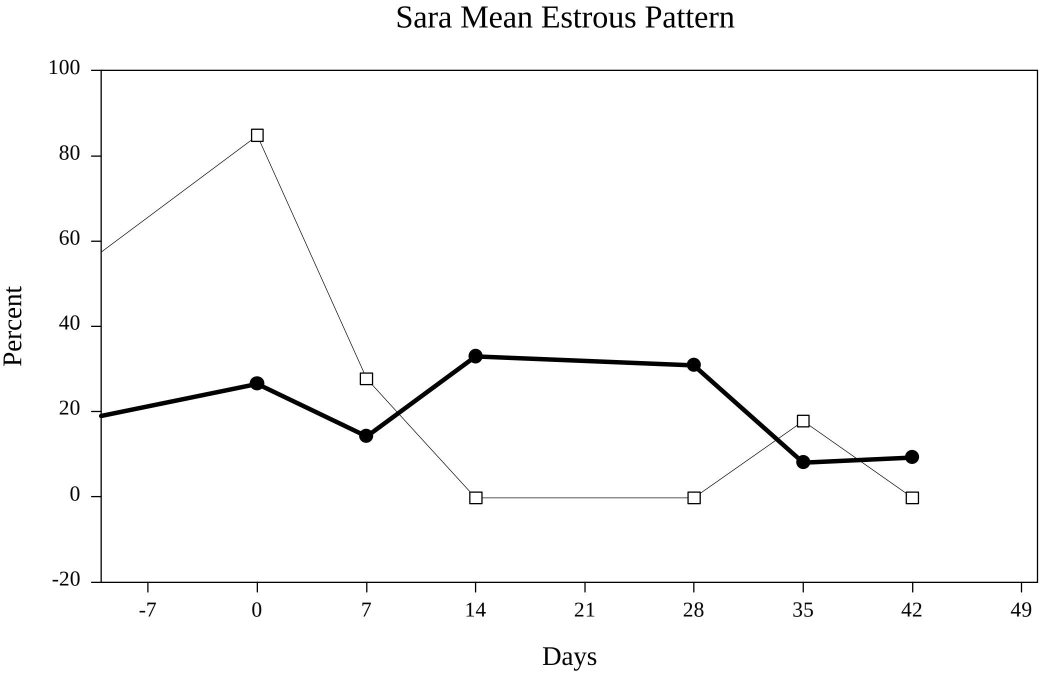


Figure **3-34** Sara mean estrous cycle pattern. Percent indicates the normalized value for estradiol and progesterone concentrations, see Analysis. The shaded areas in the top graph identify estrous cycle patterns. The bottom graph represents the mean estrous cycle pattern of the above shaded areas.

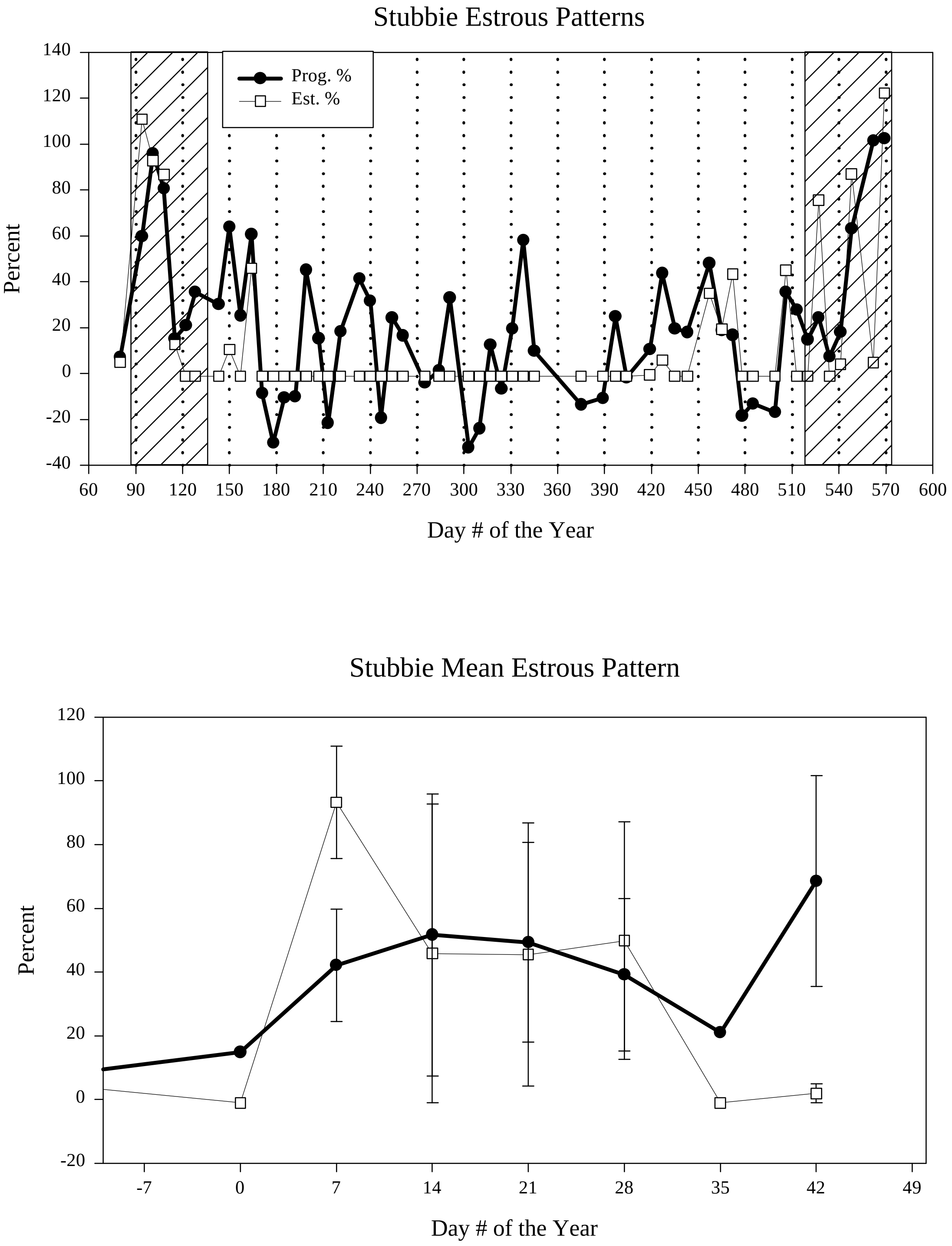


Figure **3-35** Stubbie mean estrous cycle pattern. Percent indicates the normalized value for estradiol and progesterone concentrations, see Analysis. The shaded areas in the top graph identify estrous cycle patterns. The bottom graph represents the mean estrous cycle pattern ± SEM of the above shaded areas.

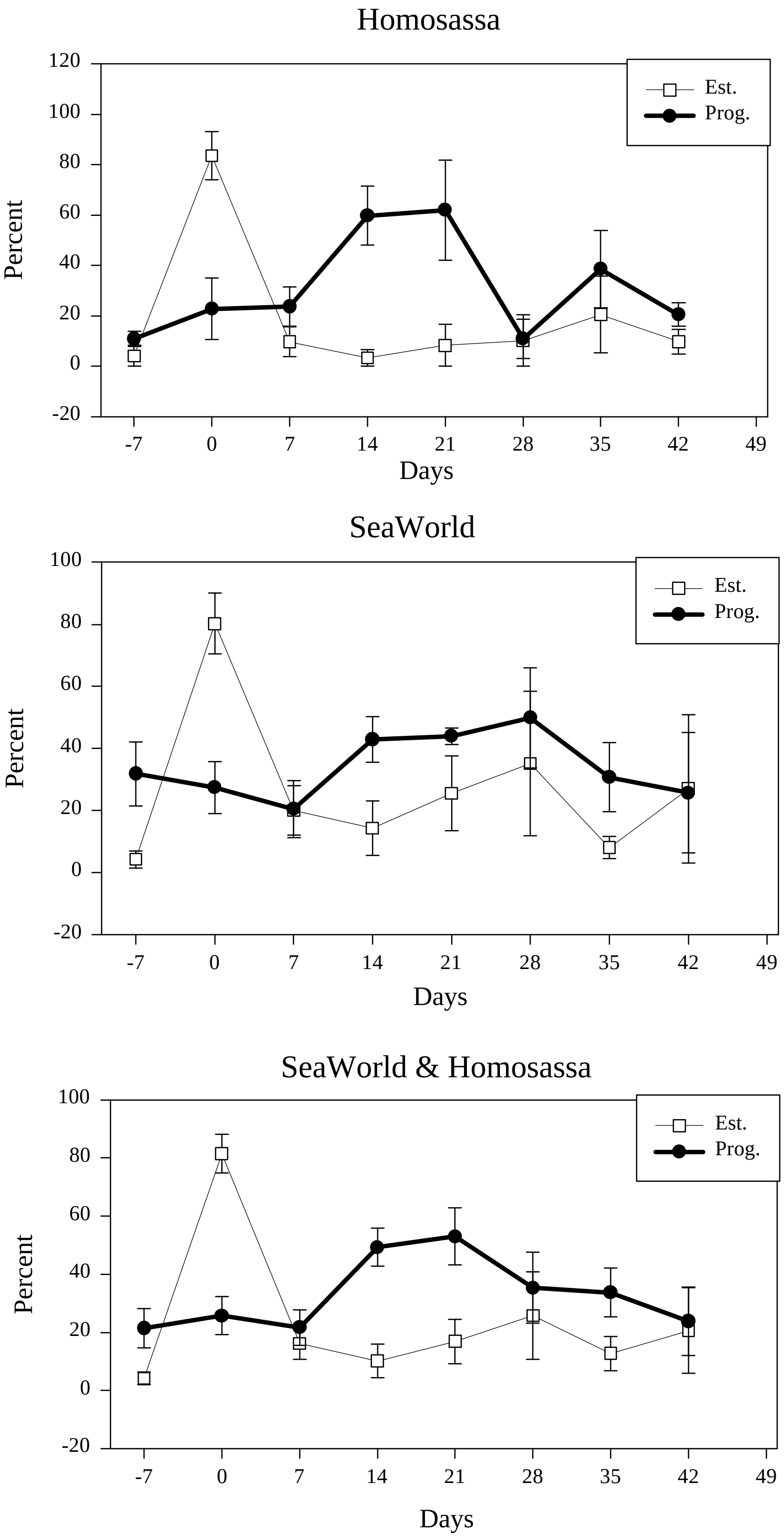


Figure **3-36** SeaWorld and Homosassa separate and combined mean estrous cycle patterns ± SEM. The Homosassa mean consists of 8 patterns, from 3 manatees (Amanda 4, Ariel 2, and Betsy 2). The SeaWorld mean consists of 9 patterns, from 5 animals (Charlotte 1, Georgia 1, Rita 4, Sara 1, and Stubbie 2).

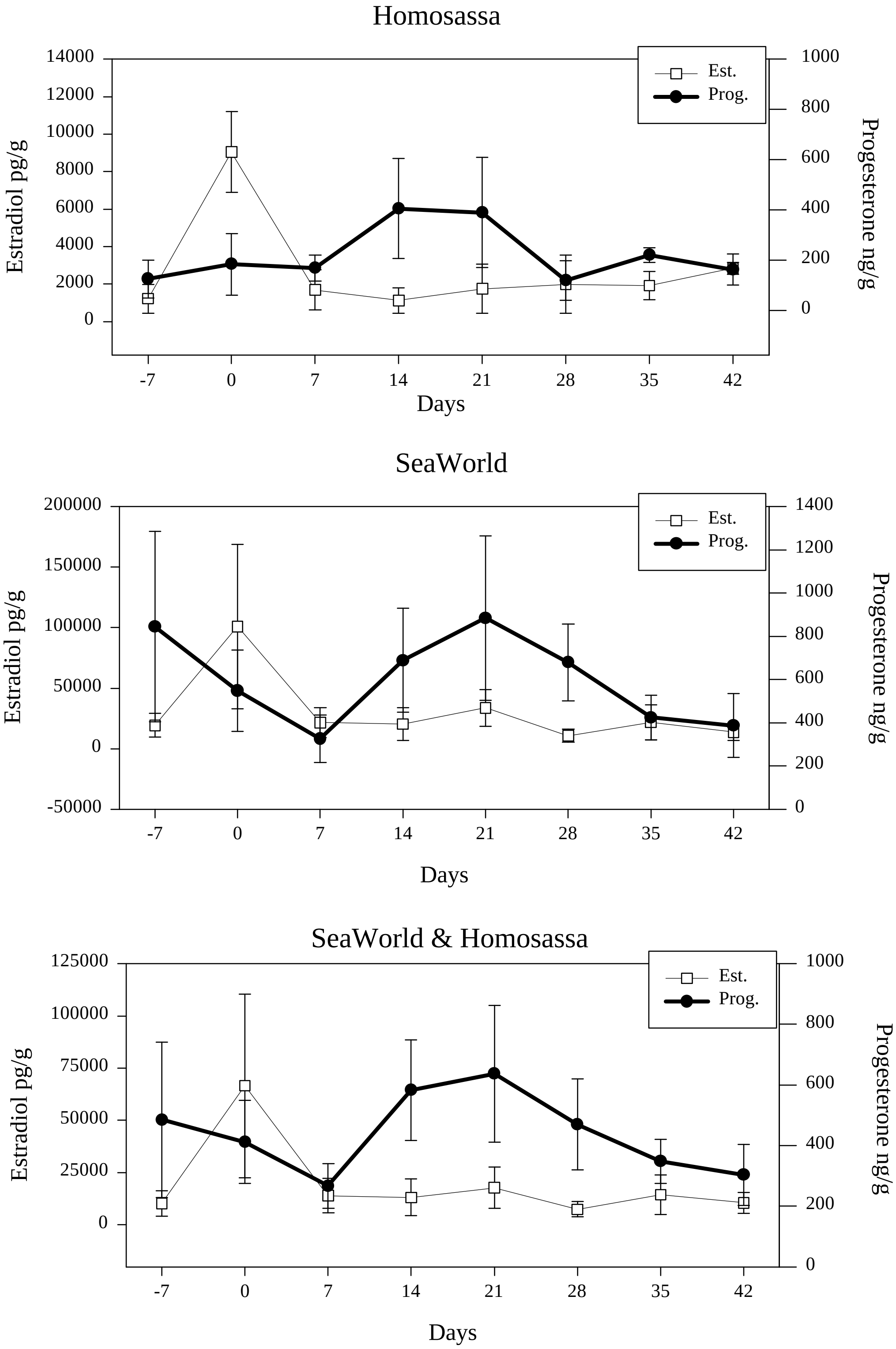


Figure **3-37** Non-normalized SeaWorld and Homosassa separate and combined mean estrous cycle patterns ± SEM. The Homosassa mean consists of 8 patterns, from 3 manatees (Amanda 4, Ariel 2, and Betsy 2). The SeaWorld mean consists of 9 patterns, from 5 animals (Charlotte 1, Georgia 1, Rita 4, Sara 1, and Stubbie 2).

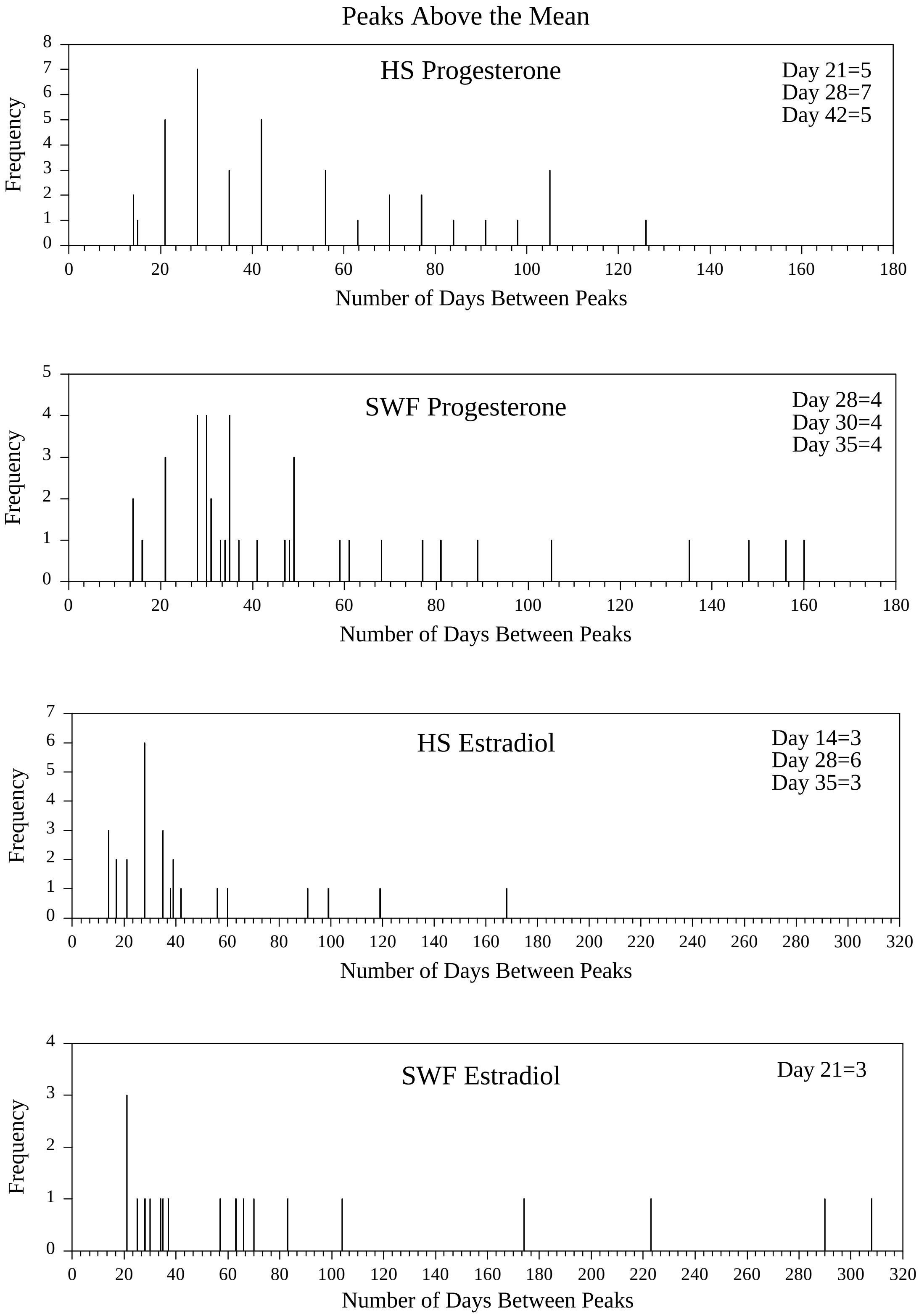


Figure **3-38** The number of days between peaks above the mean for each female at Homosassa and SeaWorld, with the frequency of the time periods presented.

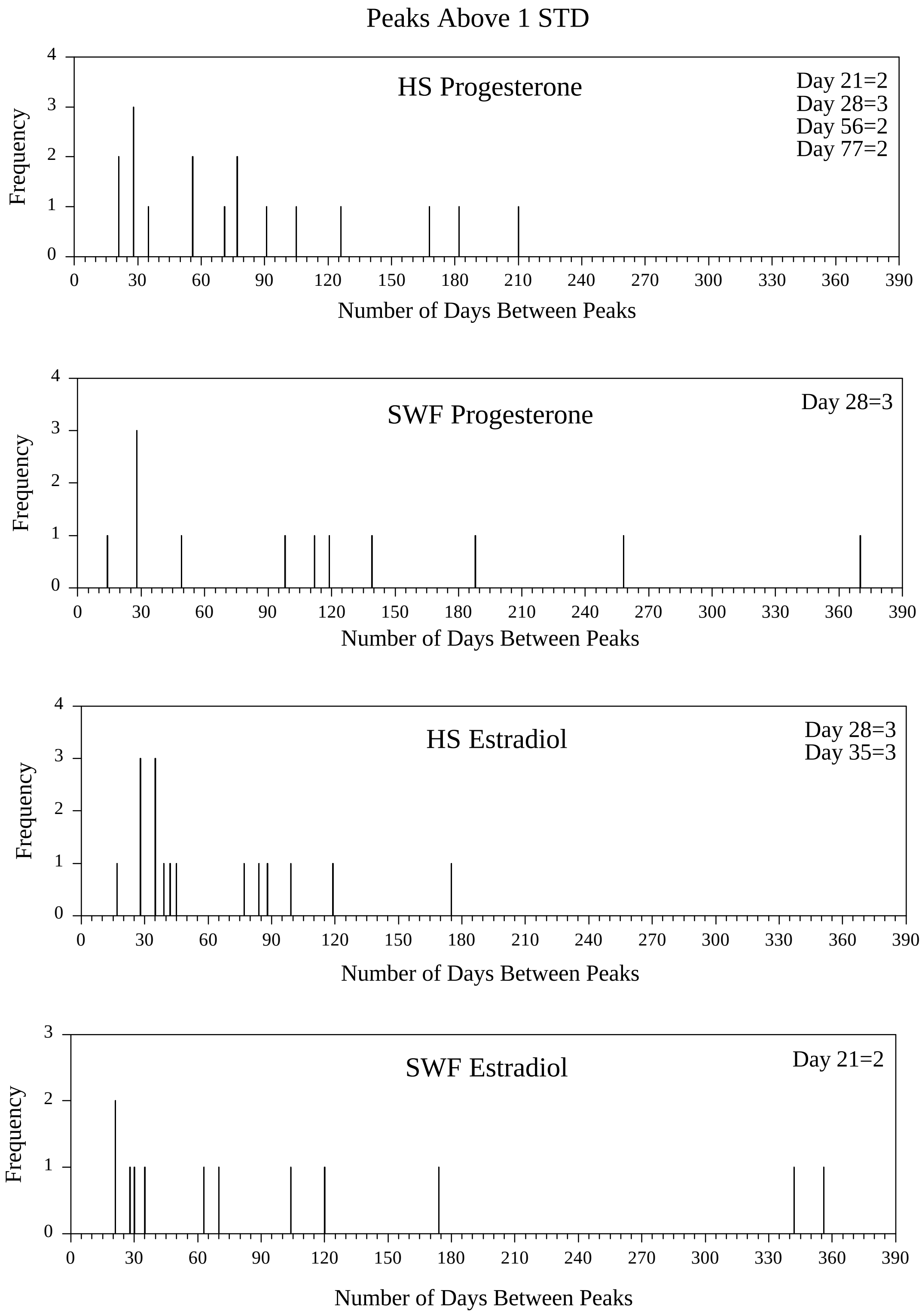


Figure **3-39** The number of days between peaks above 1 STD for each female at Homosassa and SeaWorld, with the frequency of the time periods presented.

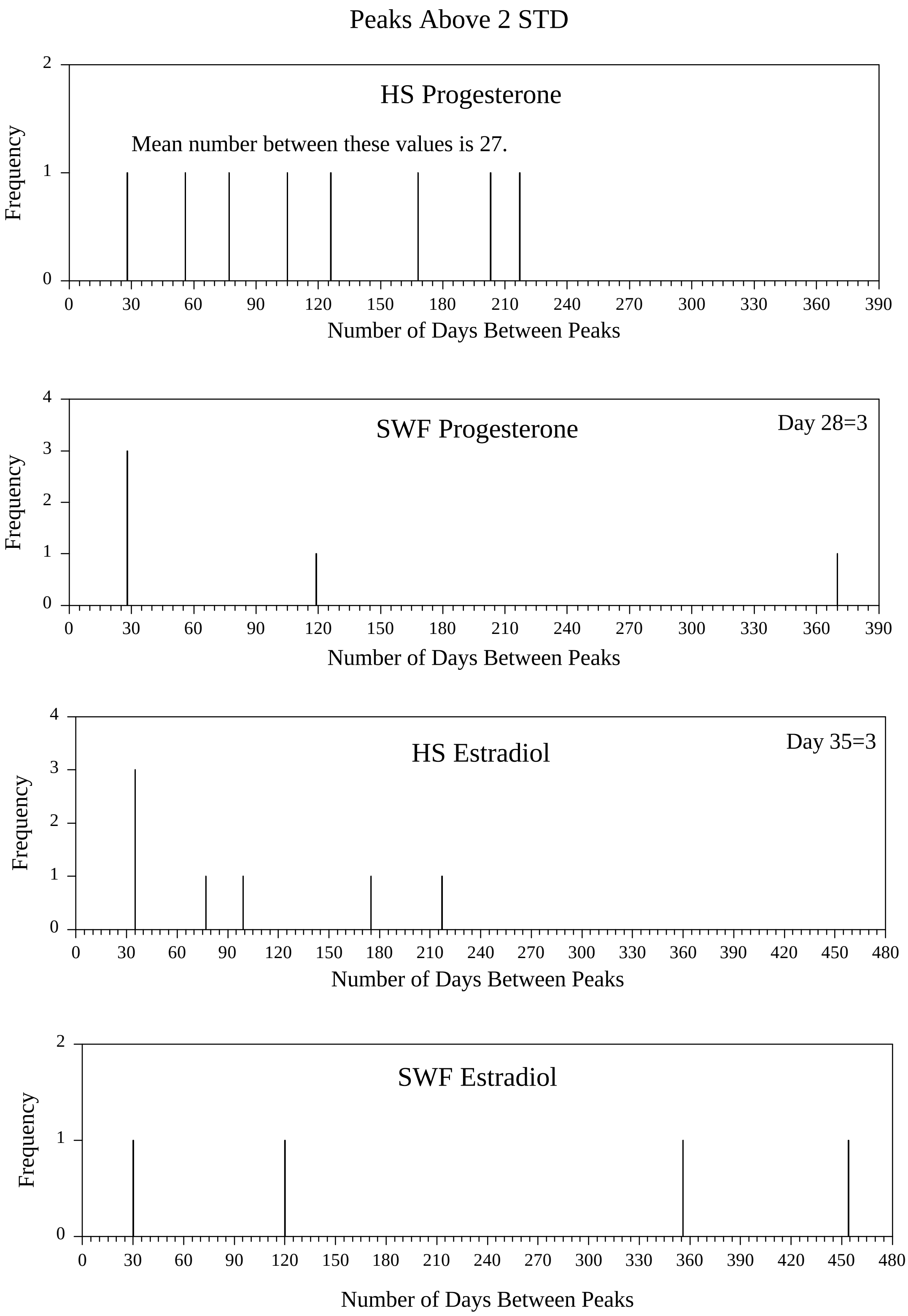
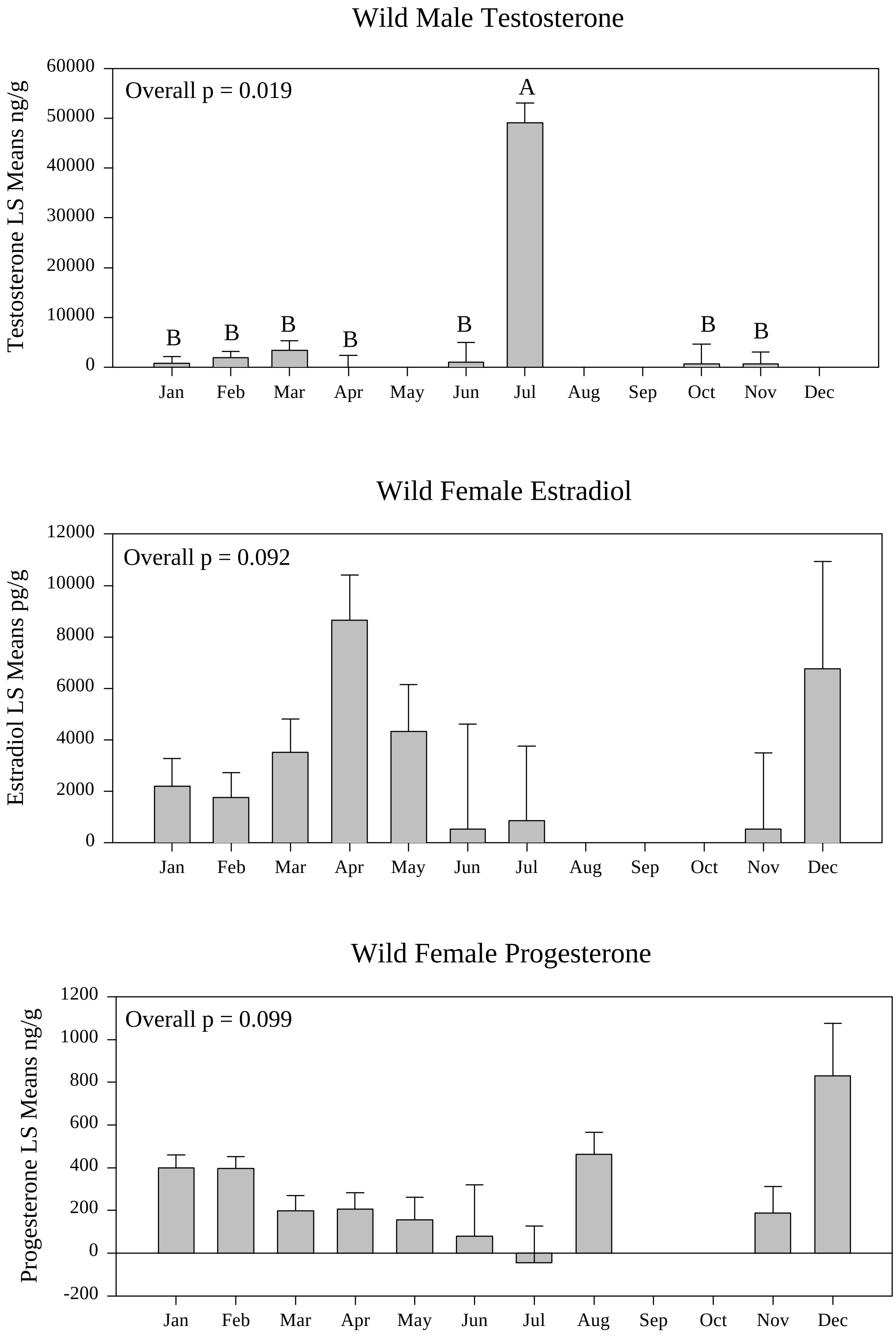


Figure **3-40** The number of days between peaks above 2 STD for each female at Homosassa and SeaWorld, with the frequency of the time periods presented.



Wild Male Testosterone

Wild Female Estradiol

Wild Female Progesterone

Figure **3-41** Wild male testosterone and female estradiol and progesterone mean monthly concentrations ± SEM. Months without bars are months when no samples were collected. Overall significance from the ANOVA is indicated in the top left-hand corner. Bars with different letters are statistically different and those with the same letters are statistically similar, at the 0.05 significance level.

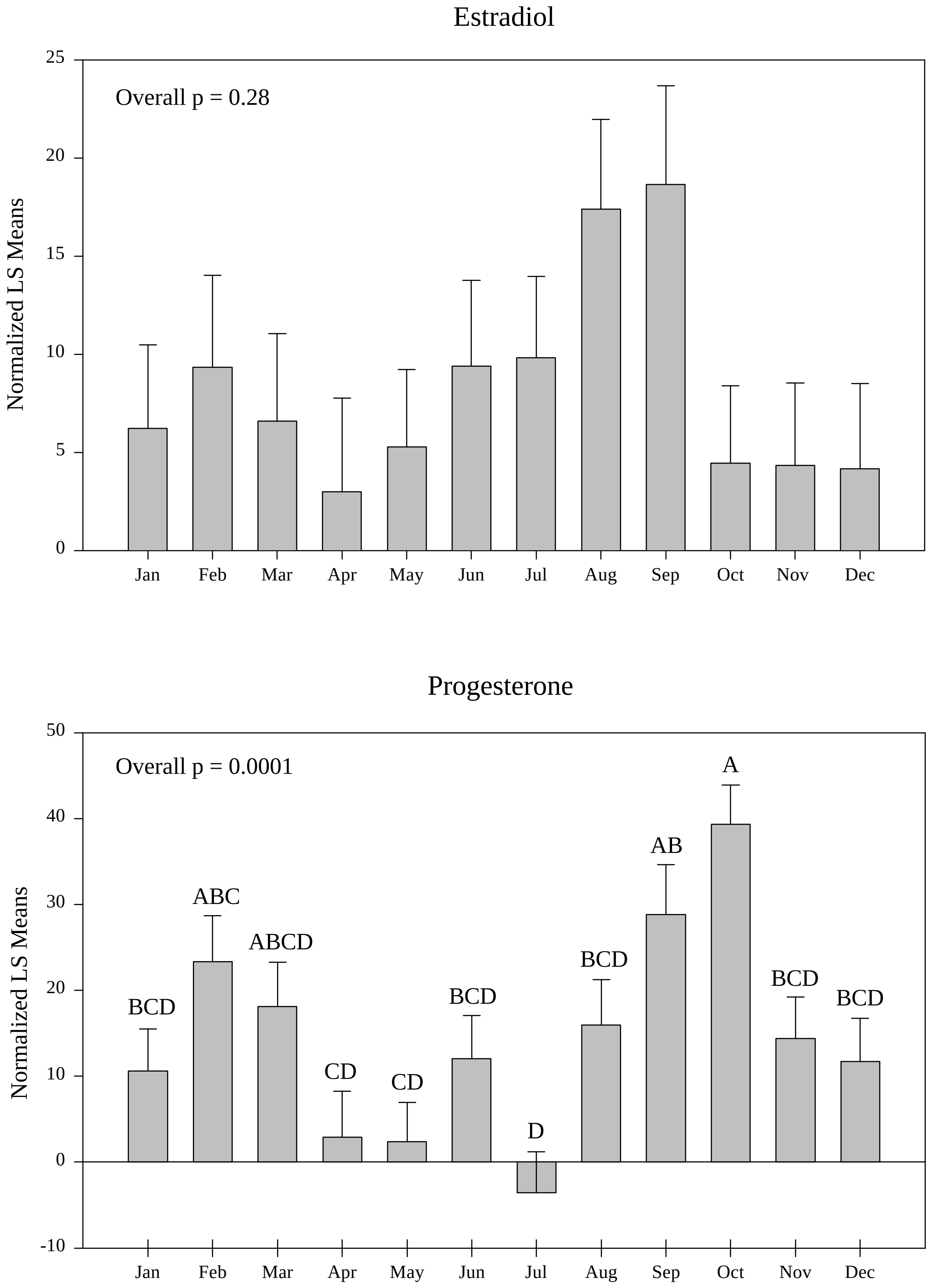


Figure **3-42** Homosassa female normalized estradiol and progesterone monthly LS means. Overall significance from the ANOVA is indicated in the top left-hand corner. Bars with different letters are statistically different and those with the same letters are statistically similar, at the 0.05 significance level.

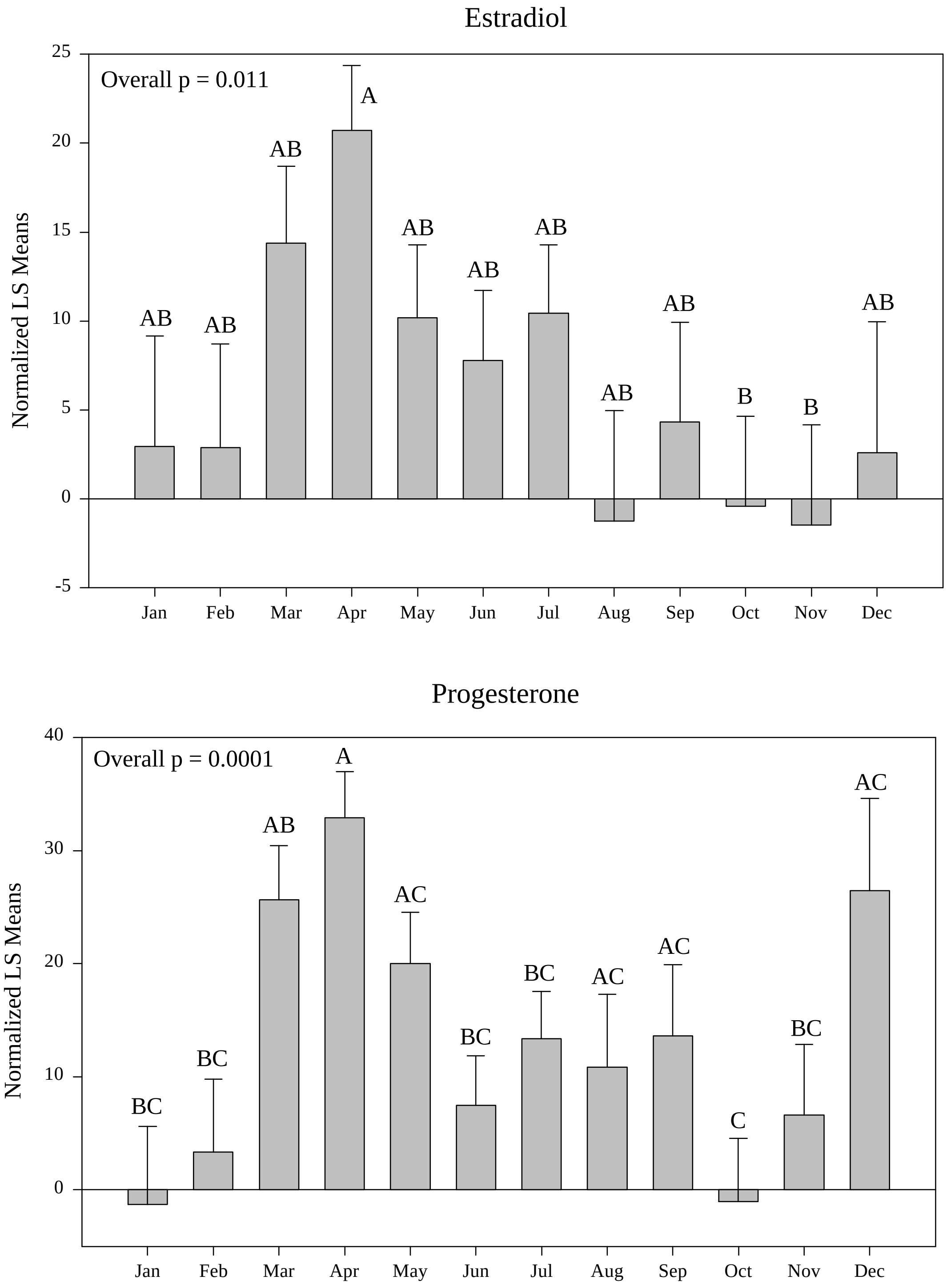


Figure **3-43** SeaWorld female normalized estradiol and progesterone monthly, LS means. Overall significance from the ANOVA is indicated in the top left-hand corner. Bars with different letters are statistically different and those with the same letters are statistically similar, at the 0.05 significance level.

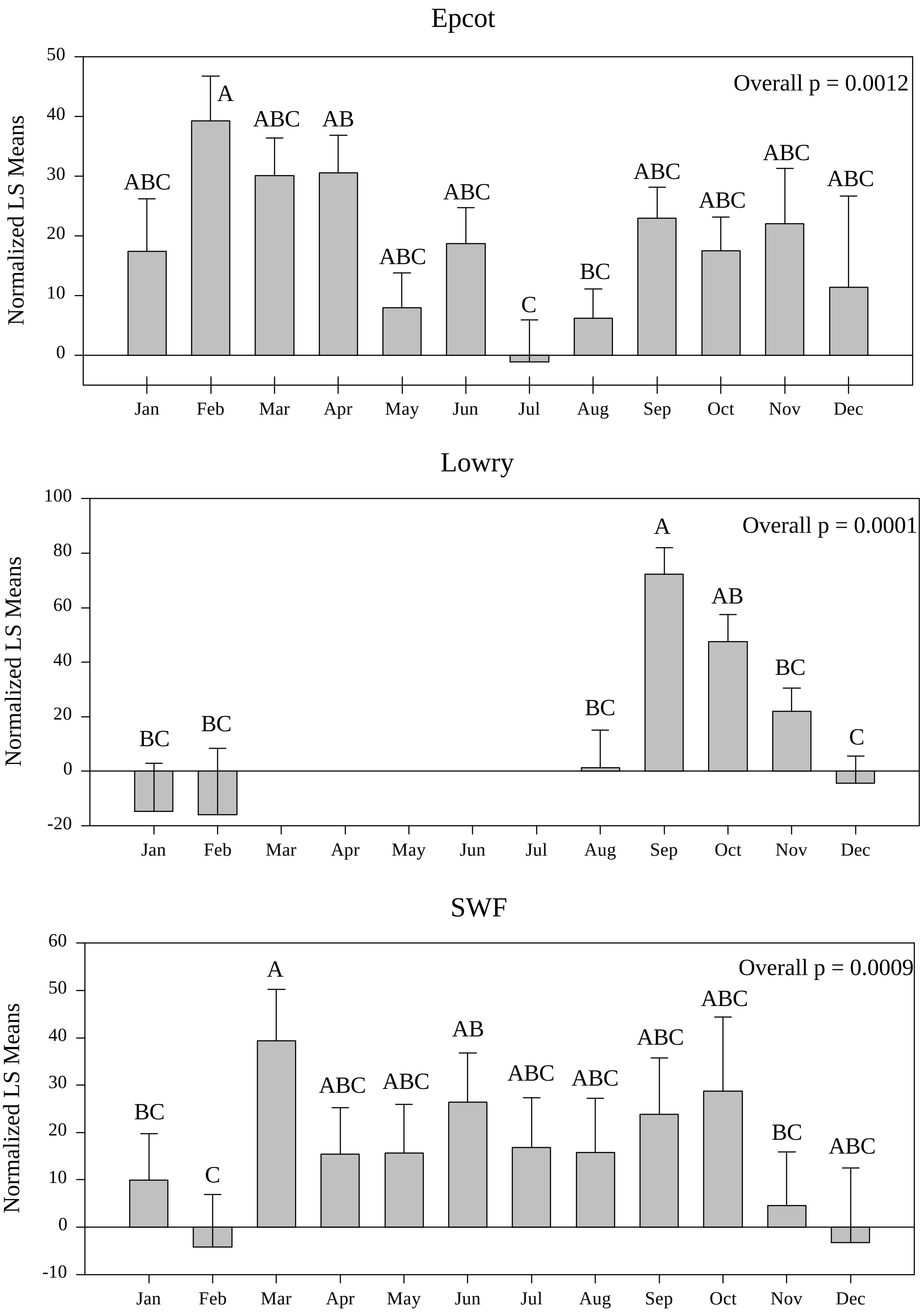
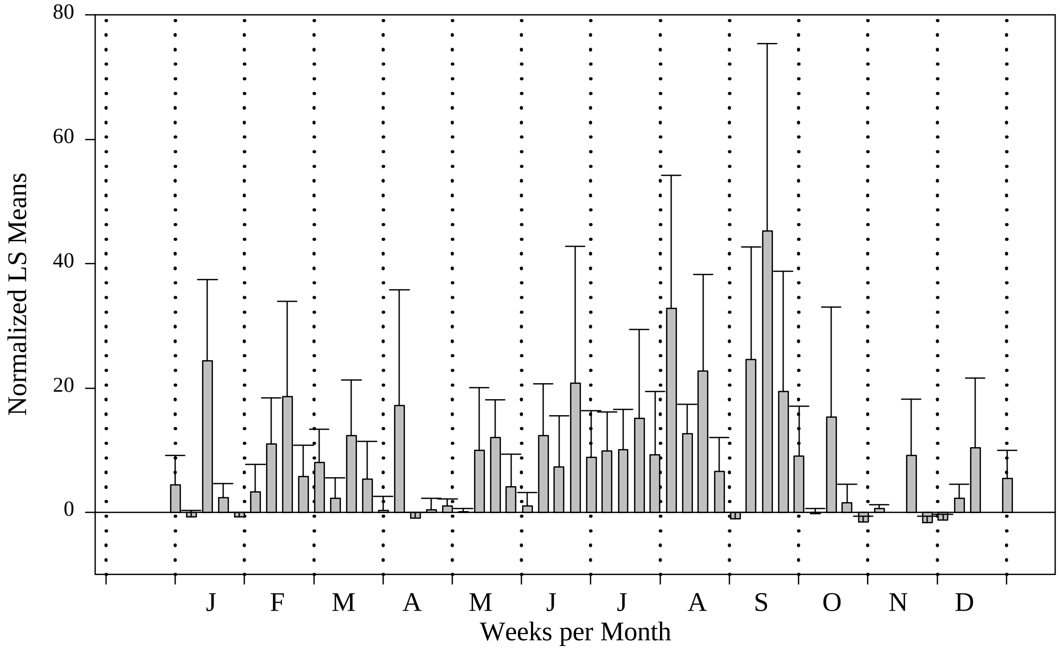


Figure **3-44** Epcot, Lowry and SeaWorld male normalized testosterone monthly LS means. Months without bars are months when no samples were collected. Overall significance from the ANOVA is indicated in the top right-hand corner. Bars with different letters are statistically different and those with the same letters are statistically similar, at the 0.05 significance level.


Estradiol

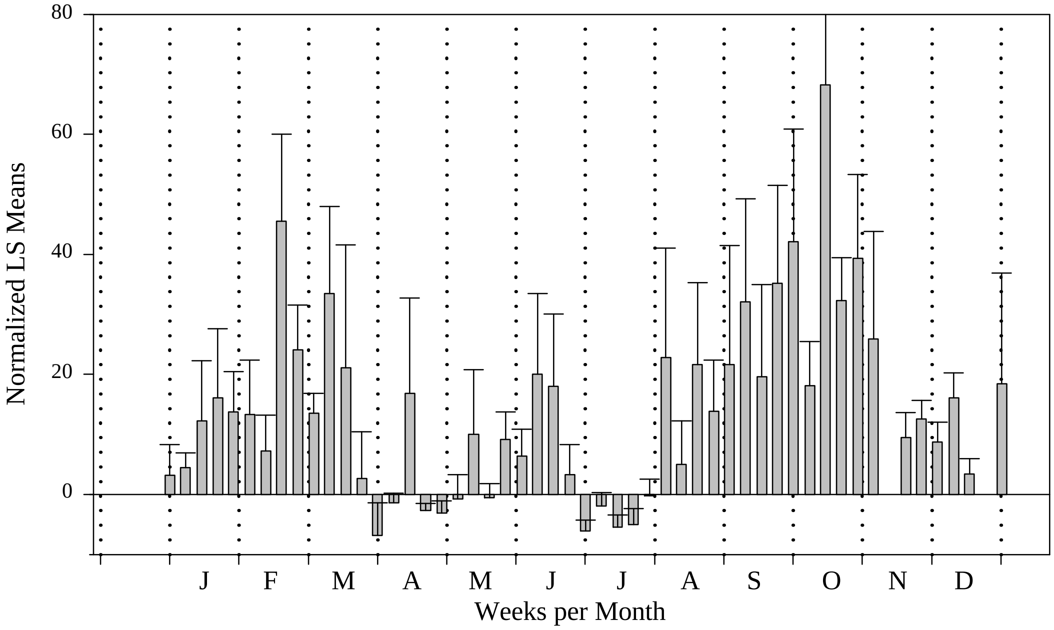
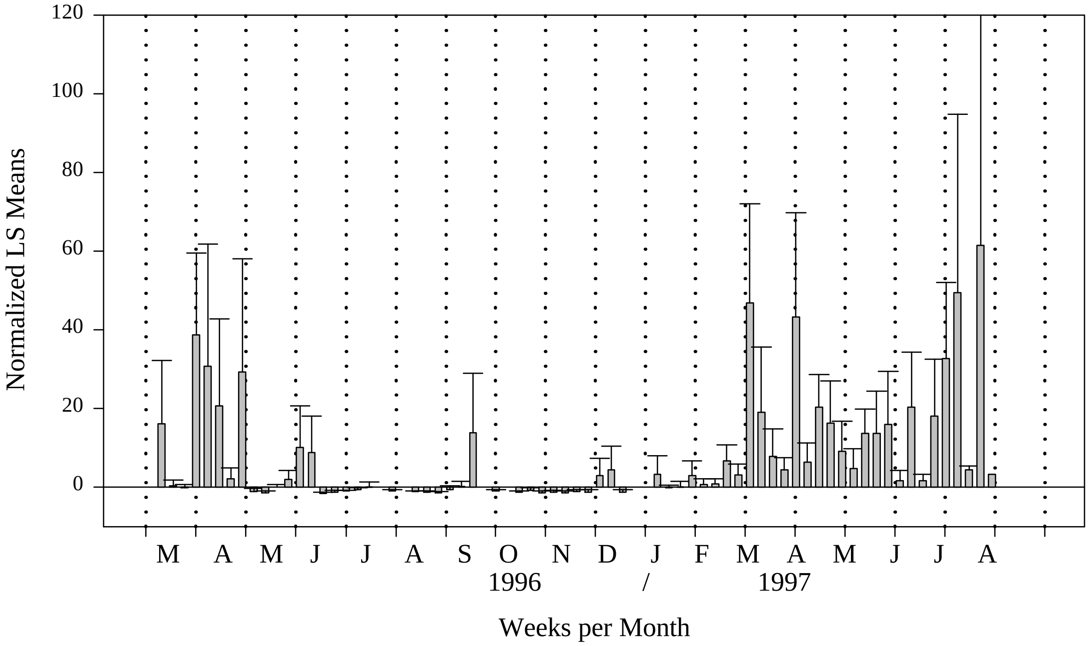
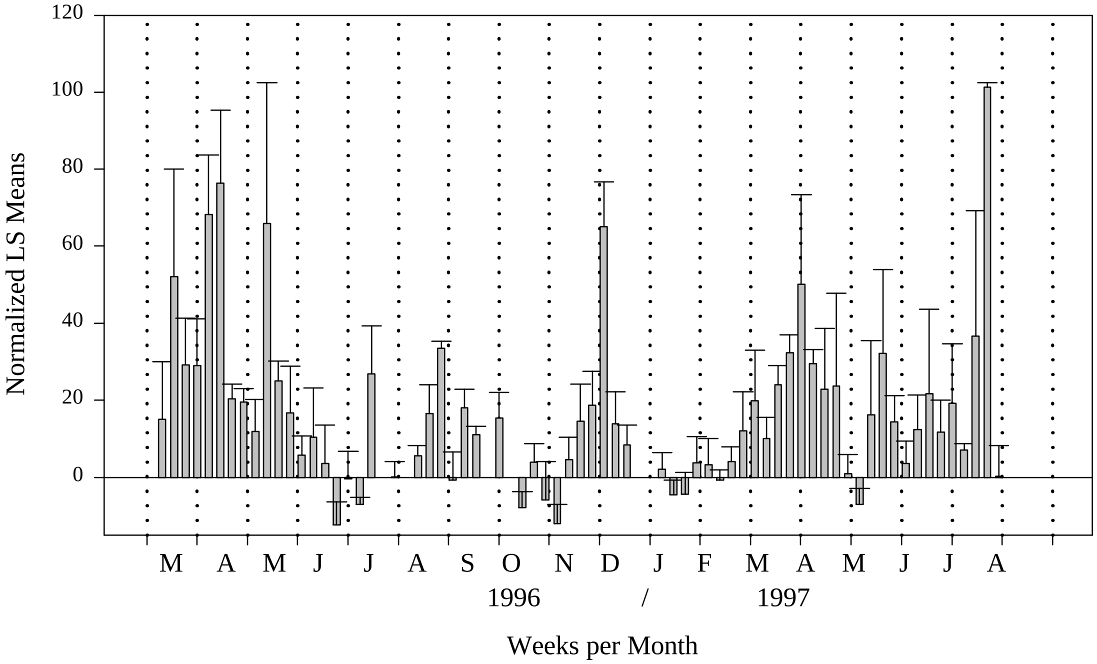

Progesterone

Figure **3-45** Homosassa normalized weekly mean ± SEM estradiol and progesterone concentrations.



Estradiol



Progesterone

Figure **3-46** SeaWorld normalized weekly mean ± SEM estradiol and progesterone concentrations.

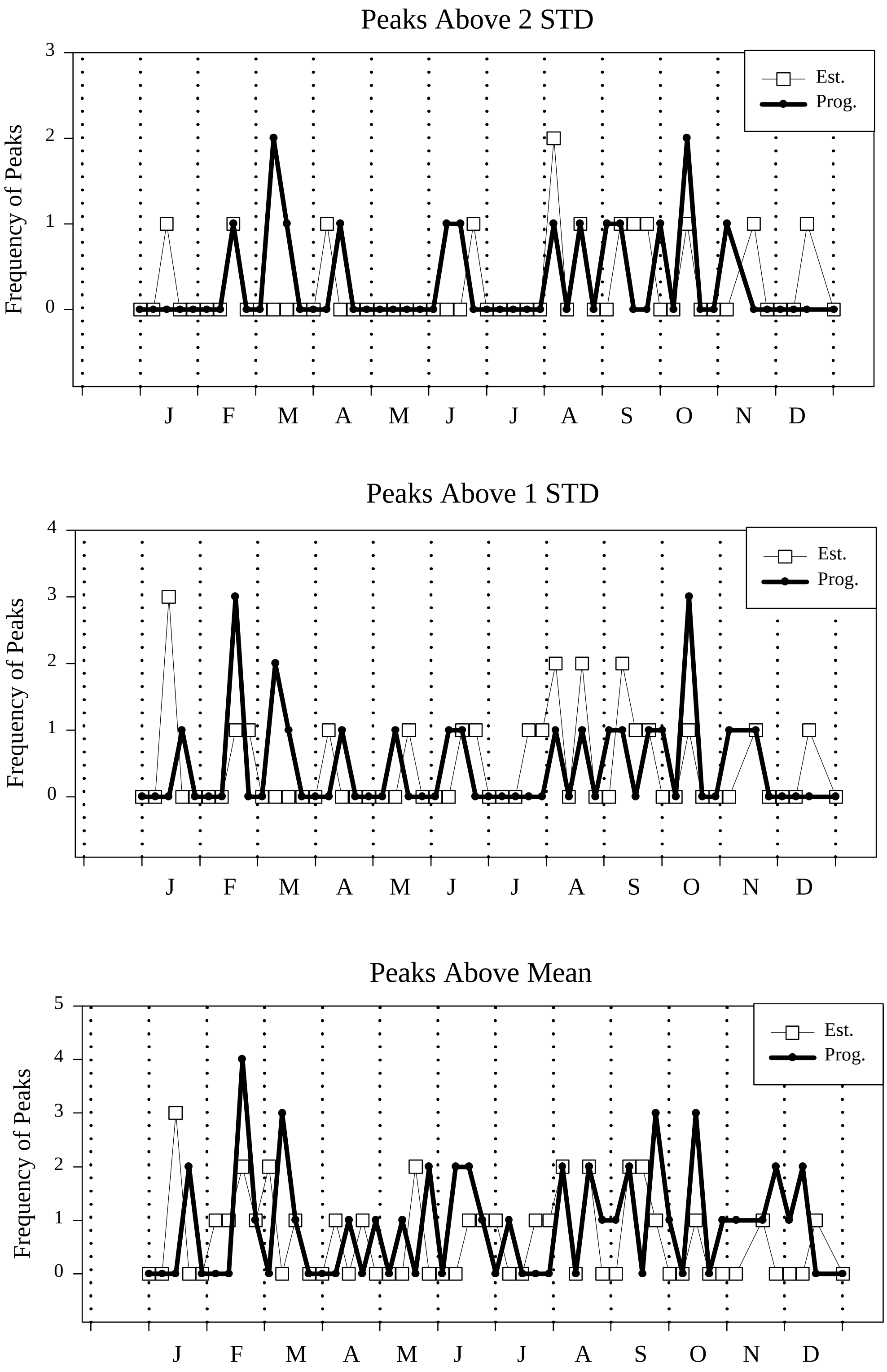
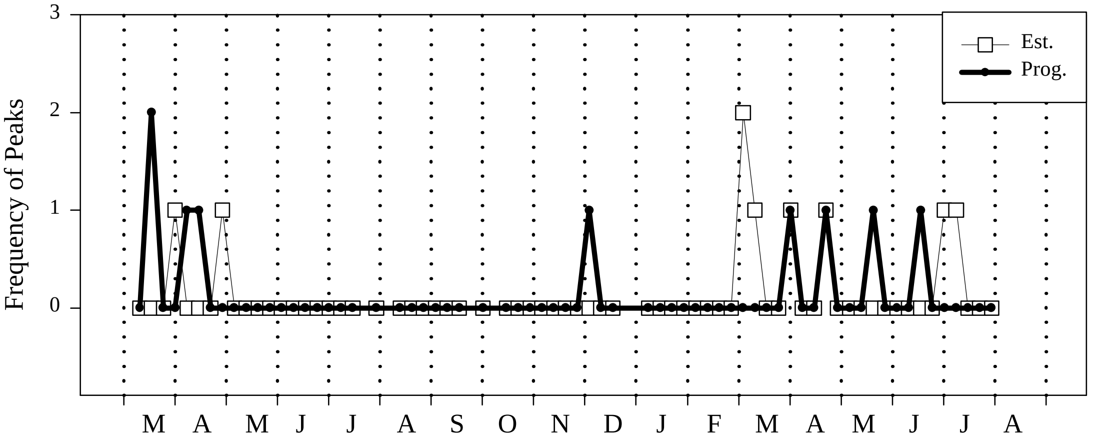
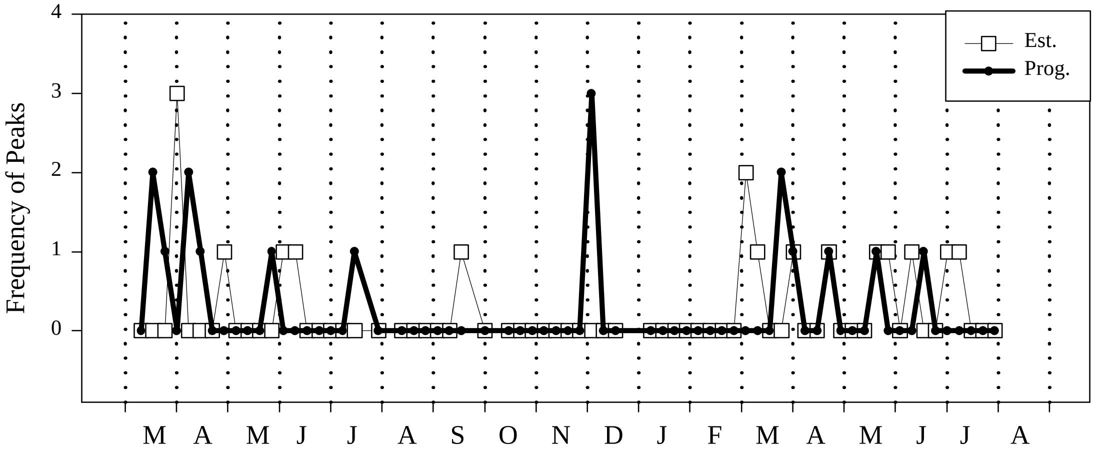


Figure **3-47** Homosassa estradiol and progesterone frequency of peaks above the mean, 1 STD and 2 STD per month.

Peaks Above 2STD



Peaks Above 1STD



Peaks Above Mean

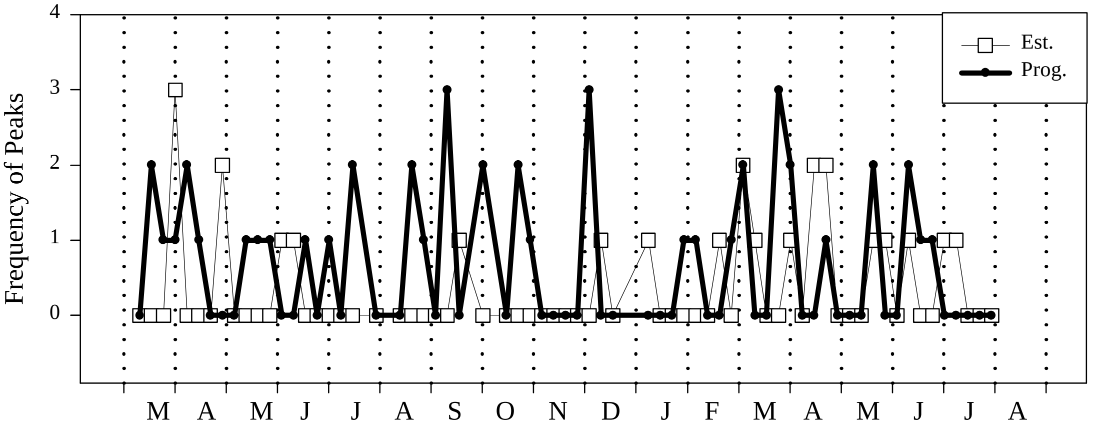


Figure **3-48** SeaWorld estradiol and progesterone frequency of peaks above the mean, 1 STD and 2 STD per month.

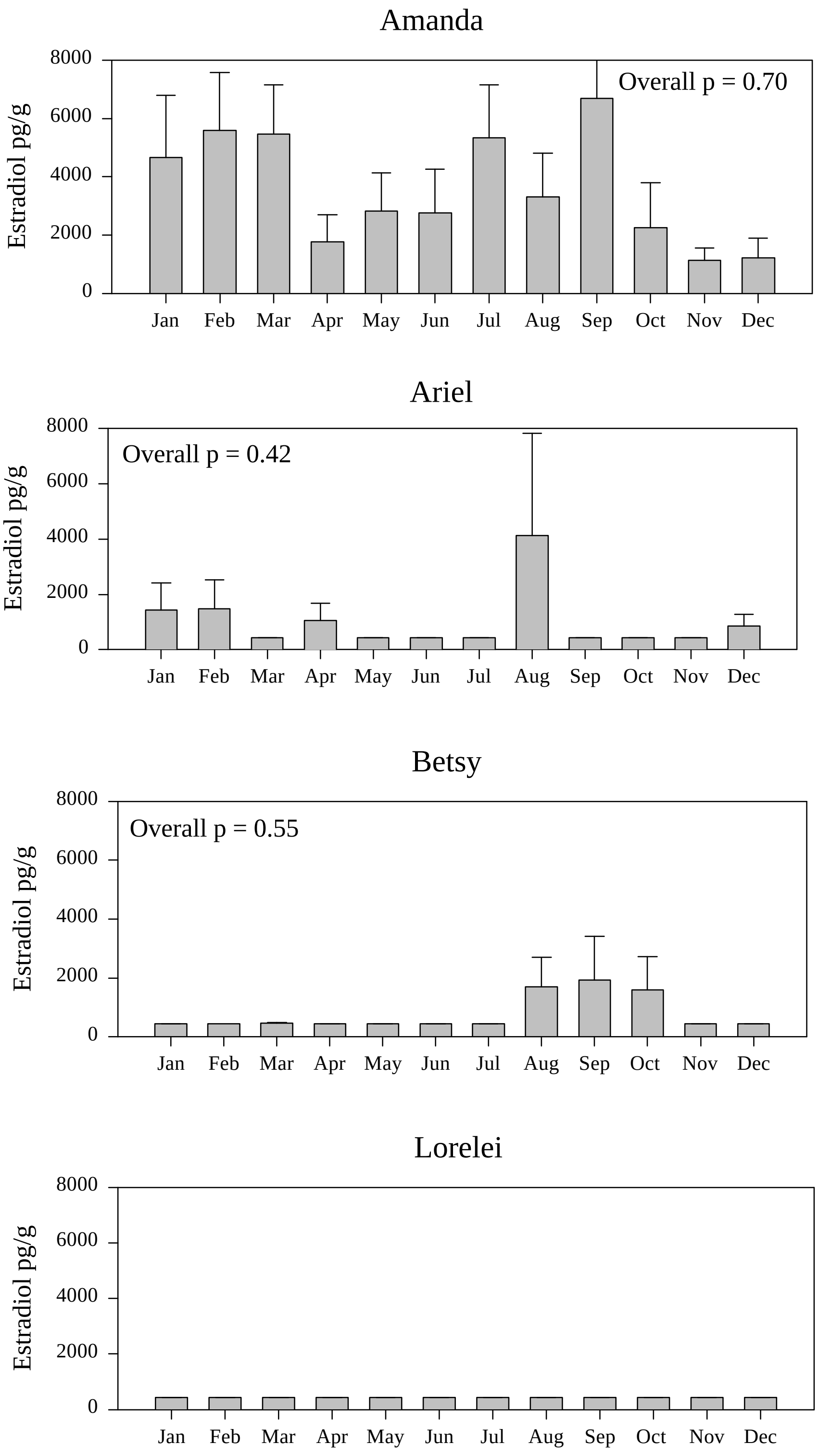


Figure **3-49** Individual Homosassa female estradiol concentrations by month, Amanda, Ariel, Betsy, and Lorelei. Overall significance from the ANOVA is indicated in the top left-hand corner. Bars with different letters are statistically different and those with the same letters are statistically similar, at the 0.05 significance level.

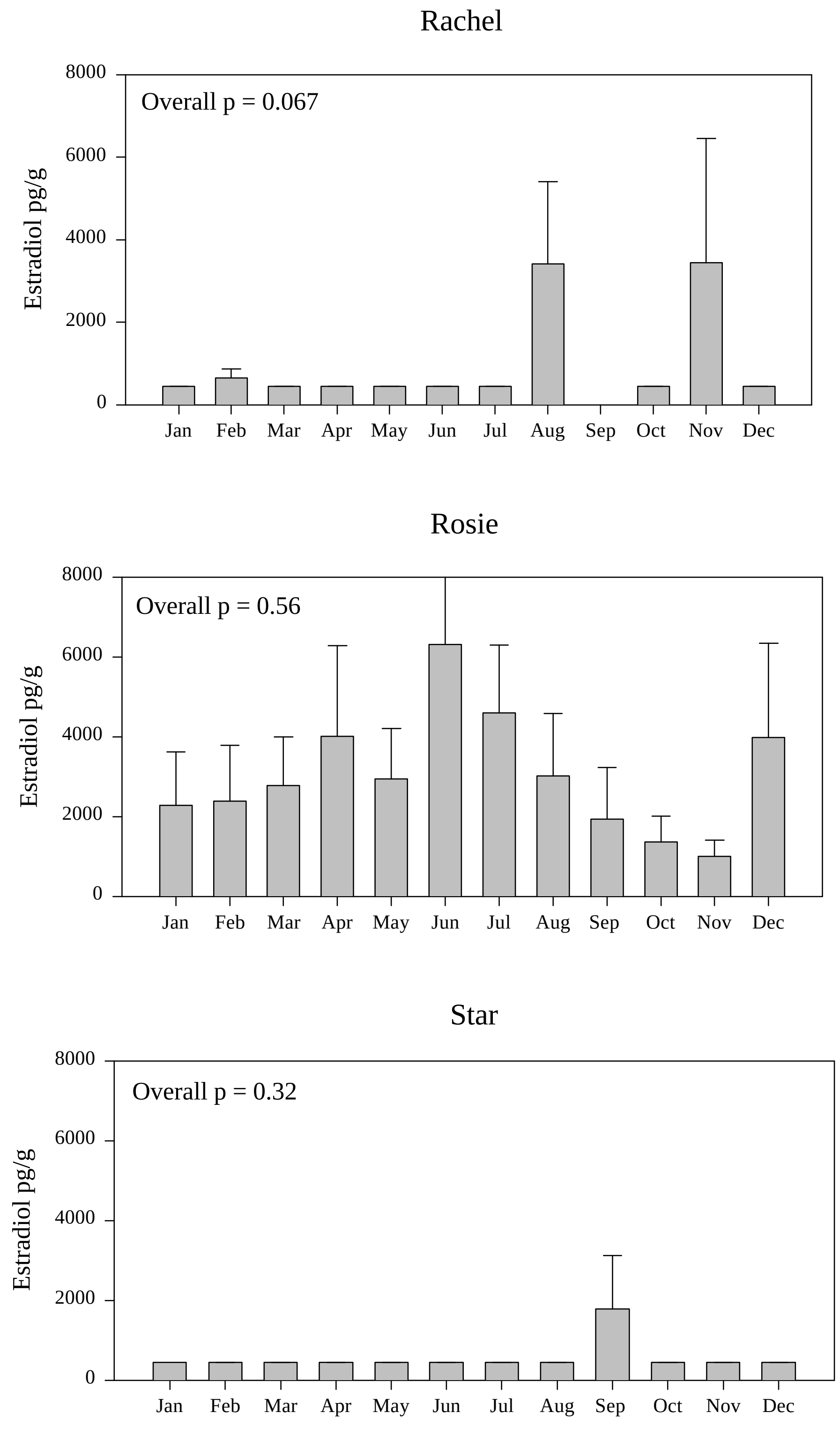


Figure **3-50** Individual Homosassa female estradiol concentrations by month, Rachel, Rosie, and Star. Overall significance from the ANOVA is indicated in the top left-hand corner. Bars with different letters are statistically different and those with the same letters are statistically similar, at the 0.05 significance level.

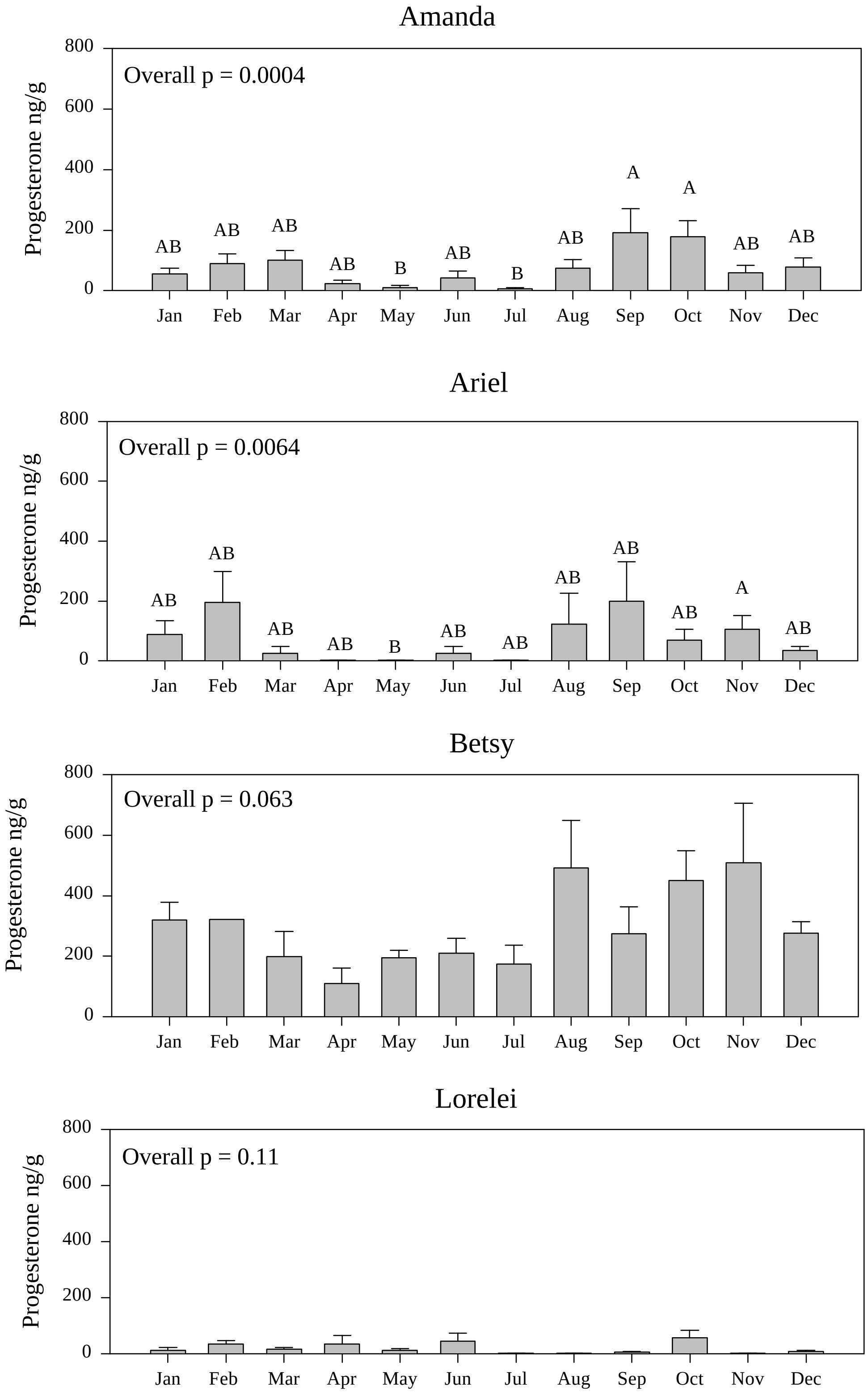


Figure **3-51** Individual Homosassa female progesterone concentrations by month, Amanda, Ariel, Betsy, and Lorelei. Overall significance from the ANOVA is indicated in the top left-hand corner. Bars with different letters are statistically different and those with the same letters are statistically similar, at the 0.05 significance level.

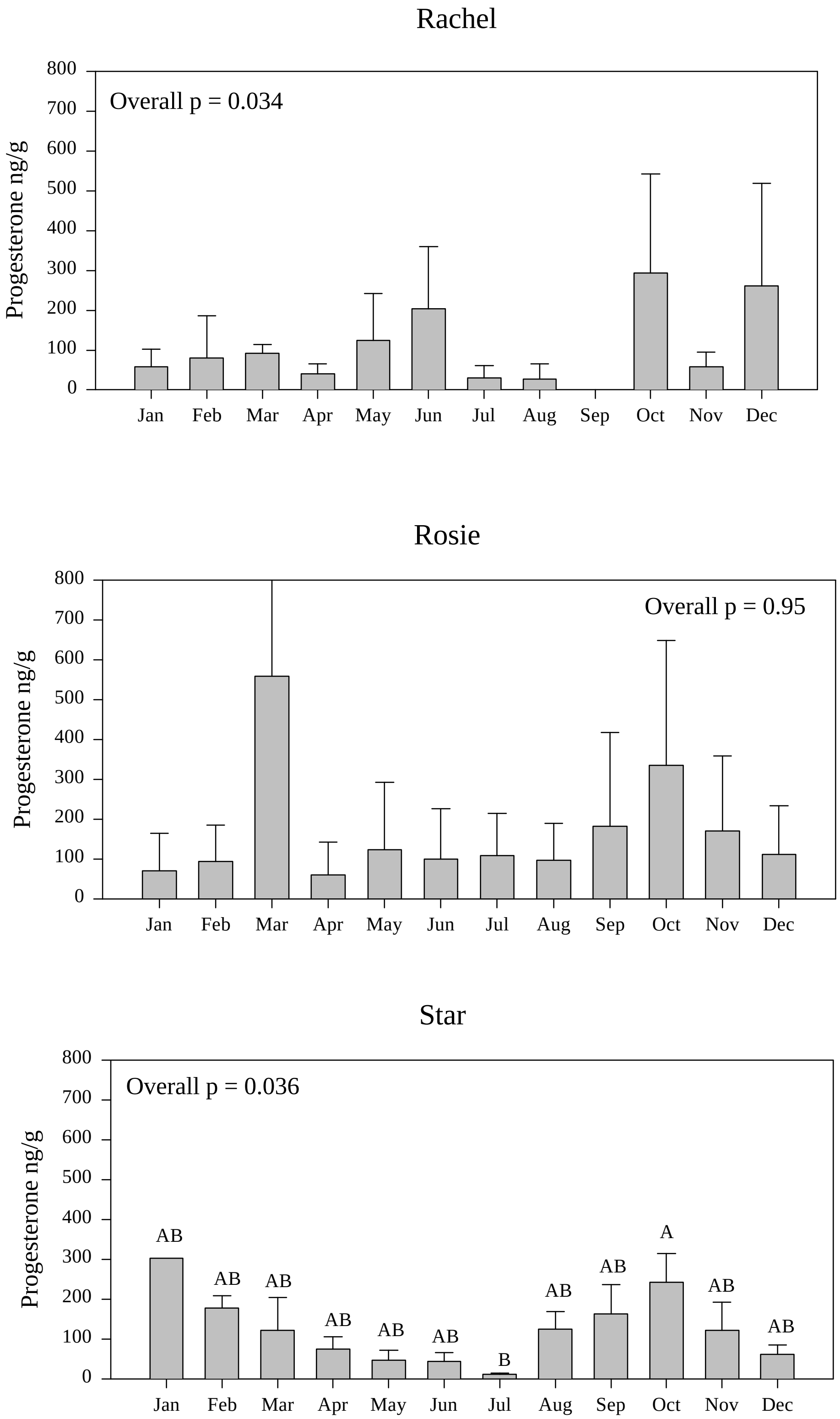


Figure **3-52** Individual Homosassa female progesterone concentrations by month, Rachel, Rosie, and Star. Overall significance from the ANOVA is indicated in the top corner. Bars with different letters are statistically different and those with the same letters are statistically similar, at the 0.05 significance level.

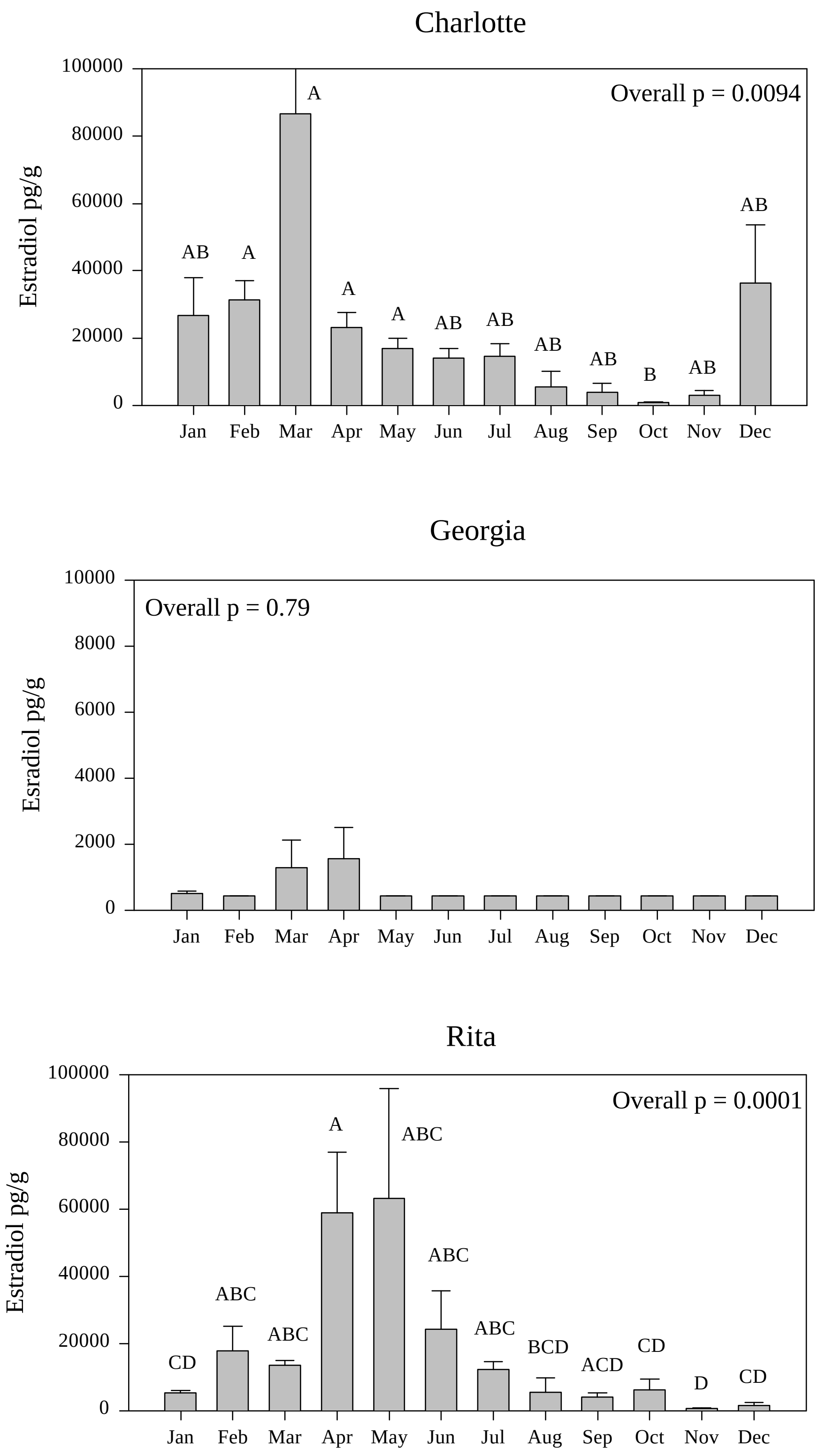
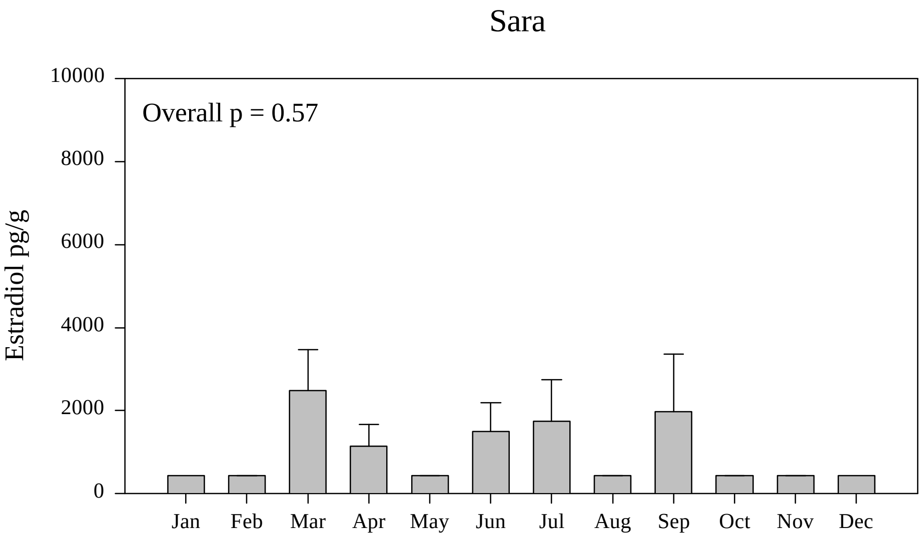


Figure **3-53** Individual SeaWorld female estradiol concentrations by month, Charlotte, Georgia, and Rita. Overall significance from the ANOVA is indicated in the top corner. Bars with different letters are statistically different and those with the same letters are statistically similar, at the 0.05 significance level.



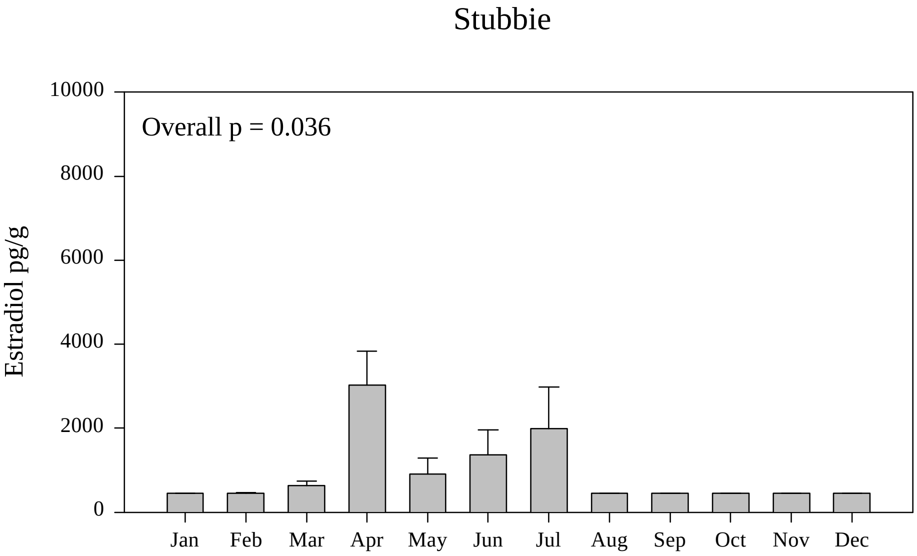


Figure **3-54** Individual SeaWorld female estradiol concentrations by month, Sara and Stubbie. Overall significance from the ANOVA is indicated in the top corner. Bars with different letters are statistically different and those with the same letters are statistically similar, at the 0.05 significance level.

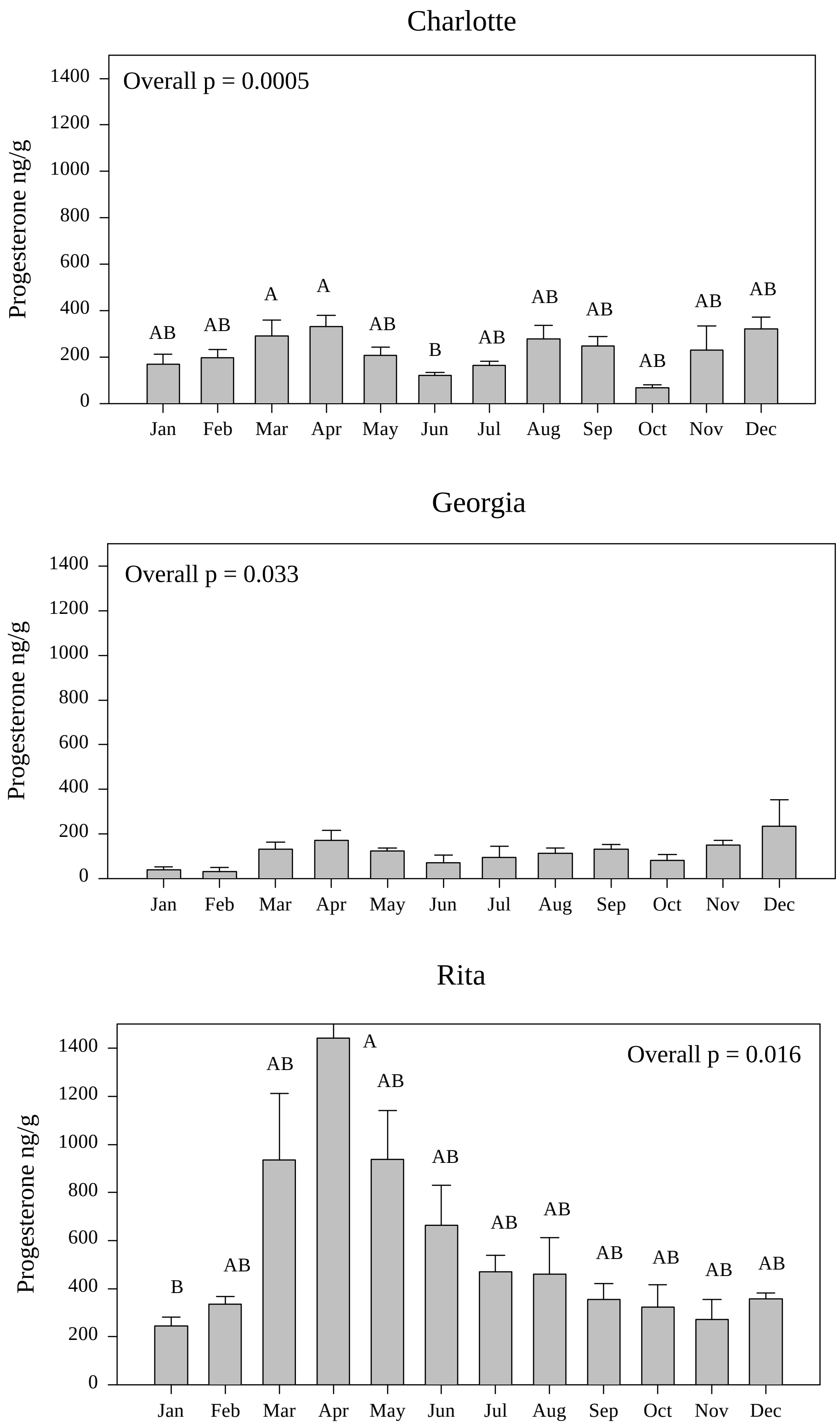


Figure **3-55** Individual SeaWorld female progesterone concentrations by month, Charlotte, Georgia, and Rita. Overall significance from the ANOVA is indicated in the top corner. Bars with different letters are statistically different and those with the same letters are statistically similar, at the 0.05 significance level.

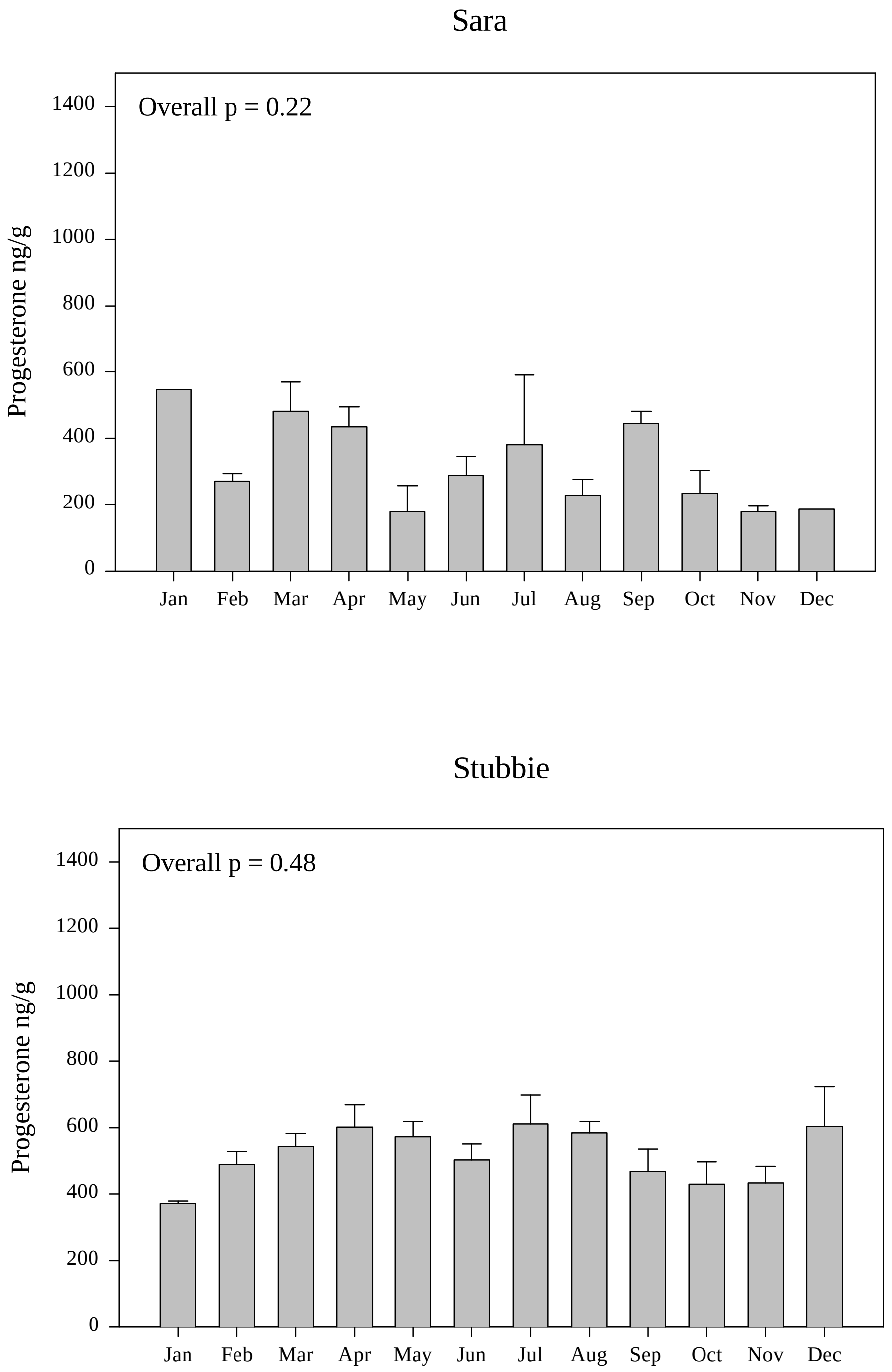
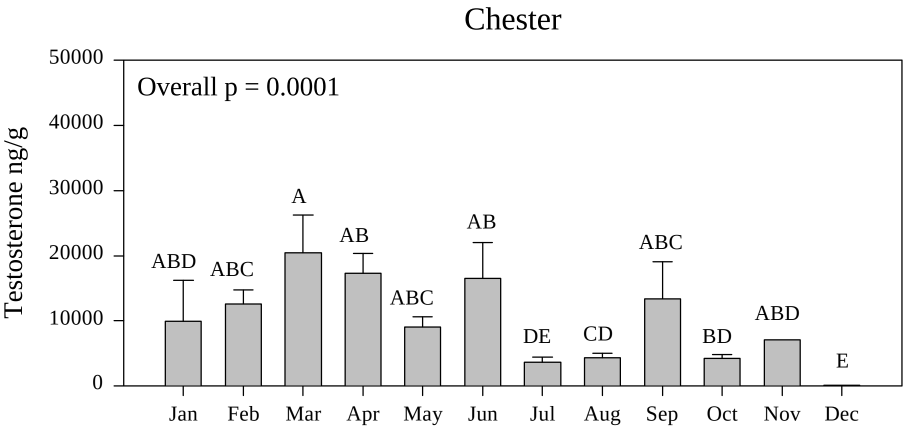
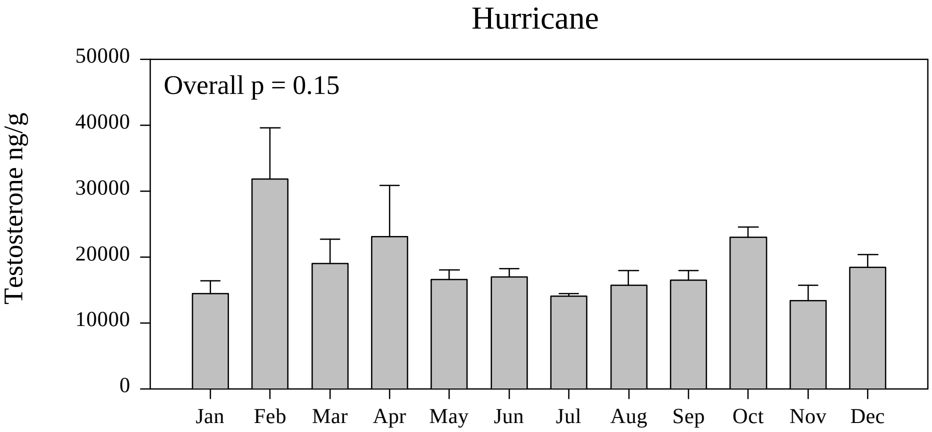


Figure **3-56** Individual SeaWorld female progesterone concentrations by month, Sara and Stubbie. Overall significance from the ANOVA is indicated in the top left-hand corner. Bars with different letters are statistically different and those with the same letters are statistically similar, at the 0.05 significance level.





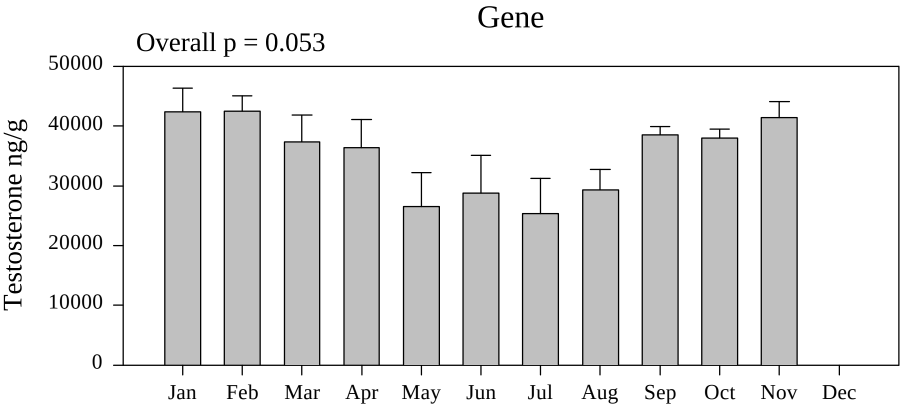


Figure **3-57** Individual Epcot male testosterone concentrations by month, Chester, Hurricane, and Gene. Overall significance from the ANOVA is indicated in the top corner. Bars with different letters are statistically different and those with the same letters are statistically similar, at the 0.05 significance level.

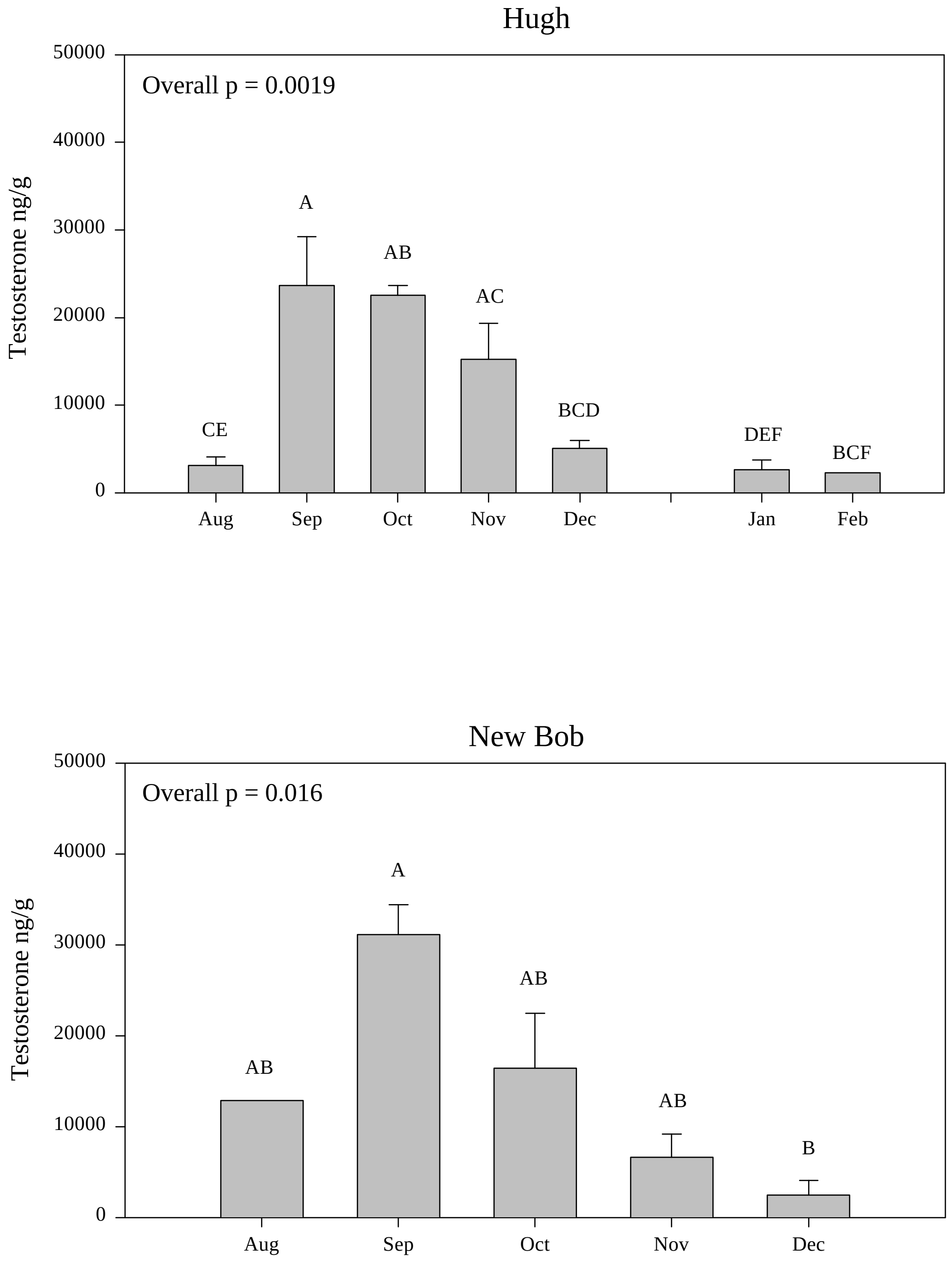


Figure **3-58** Individual Lowry male testosterone concentrations by month, Hugh and New Bob. Overall significance from the ANOVA is indicated in the top left-hand corner. Bars with different letters are statistically different and those with the same letters are statistically similar, at the 0.05 significance level.

CHAPTER 4
MANATEE REPRODUCTIVE BEHAVIOR

Introduction

In studying patterns of Florida manatee reproduction, trends in the reproduction of other mammals may provide insight. The breeding systems of mammalian species generally fall into four categories: monogamous, polygynous, polyandrous and promiscuous. Monogamy occurs when individuals of a species mate exclusively with one individual of the opposite sex over a major portion of the species' reproductive life span (Kleiman 1977). This mating system is very common in birds, but includes only 3% of mammalian species. The majority of mammals express polygynous breeding systems, involving males that breed with several females within a single breeding season. Polygynous males generally defend a group of females from mating with rival males and are not involved in parental care. The counter breeding system to polygyny would be polyandry, when females mate with several males. Only a few mammals, such as the African wild dog (*Lycaon pictus*), and gray wolf (*Canis lupus*), have been shown to exhibit polyandry (Berger & Stevens 1996; Eisenberg 1981). Finally, a promiscuous breeding system would be described by a lack of any long-term interaction or bonding between the breeding pair, as characterized for manatees in Chapter One (Berger & Stevens 1996).

Behavior and cues related to the estrous cycle have been studied in many species. Behavioral estrus refers to the time period when a female is most likely to be receptive to and mate with a male. The duration of behavioral estrus varies widely among species, ranging from a few hours in the rat (Feder 1981) to as long as 6 days in clouded leopards (*Neofelis nebulosa*) (Yamada & Durrant 1989). The types of behaviors or cues expressed by females that are related to estrus also reflect a great deal of species variation. Sows will stand or assume a mating stance when pressure is applied to the lumbar region and their vulva will swell and turn reddish due to increased blood flow (Bearden & Fuquay 1992). Cows will stand to be mounted by other females (Peters & Ball 1995). In many ungulates, females exhibit increased tolerance to a male's close presence or physical contact (Leuthold 1977). Females may run from the male, but not run so far as to escape from him entirely, which is referred to as driving (Eisenberg 1981). Various means of communication between the male and female may be observed, including visual displays, auditory signals and chemical communication (scent-marking), and nasal contact to glandular areas (Estep & Dewsbury 1996). As mentioned previously, a male elephant will often 'test' a female by placing his trunk on the female's vulva or on her urine on the ground and then putting his trunk in his mouth (Eisenberg et al. 1971; Jainudeen et al. 1971). This is reflective of a flehmen response, an important means of chemical communication between male and female elephants, indicating a female's reproductive state (Rasmussen et al. 1993; Rasmussen et al. 1996). A study of wild African elephants suggested 5 types of behaviors that indicated a female's receptivity to breeding: wariness, the estrus walk, the chase, mounting and consort behavior (Moss 1983). Identifying similar behaviors and cues in Florida manatees may provide further insight and corroboration of reproductive patterns with hormone concentrations.

This chapter will describe behavioral data collected from captive female manatees over a period of several months. In Experiment Seven, behavioral data were statistically correlated with hormone concentrations measured by a fecal RIA, to identify behaviors that could be related to and occur during certain reproductive states related to estrus. Data in this chapter address the second objective of this dissertation, to correlate measured hormone concentrations with the behavior of female manatees observed in captivity. Additionally, a final section will discuss general behavioral observations of individual manatees, outside of the time points collected on the ethogram, and changes in the captive situations which may explain some of the overall trends in hormone fluctuations for particular individuals.

Methods

Experiment Seven: Behavioral Data Collection

Behaviors were recorded from captive female manatees at Homosassa Springs State Wildlife Park (n = 7) and SeaWorld Florida (n = 5) during each visit made for fecal collections. For further information on the animals, fecal collections and measurement of steroid hormones see Subjects, Fecal Collections and Radioimmunoassay in Chapter Two. Behavioral sheets were also filled out at Miami Seaquarium by animal care staff throughout the year that fecal collections were made there. The frequency and reliability of behavioral data collected at Miami Seaquarium was dependent upon animal care staff availability. The chart filled out at all three facilities identified the frequency of defined behaviors and observations. Selection of these behaviors was based on preliminary qualitative observations of manatee behavior made prior to the present study. Behaviors included on the ethogram are defined below:

Vulva swelling - Swelling of the vulva area is categorized as either a 0, 1 or 2. A “0” rating indicates that the area is flat or indented in comparison to the rest of the ventral side. A “1” rating describes slight to total swelling of the vulva area. A “2” rating marks swelling that includes surrounding areas in addition to the vulva area. The vulva area is defined by a region of rough or folded skin surrounding the vulva slit. The area is oval in shape and approximately 15 cm long and 8 cm wide in adult animals.

Swimming – Animal is moving forward either from movement of its tail or front pectoral flippers.

Circling – Animal is pivoting in the water by using the left or right pectoral flipper.

Barrel Rolls – Animal is swimming and begins to roll either its left or right side down so that its ventral side eventually faces the surface of the water. This roll continues until the dorsal side is facing the surface again.

Laps – Animal is swimming in a stereotypical pattern that generally forms a large circle.

Diving – Animal is swimming down toward the bottom of the enclosure.

Resting – Animal is not moving.

Floating – Animal is at the surface with its dorsal side up.

On Back – Animal has its ventral side facing the surface of the water for seconds or minutes. This is not included in the Barrel Rolls.

Social Interaction – Animal is touching another individual with apparent manipulation of some kind.

Other Interaction – Animal is in physical contact with some object and is manipulating it in some manner.

Vocalizing – An animal can be heard squeaking (making high-pitched noises). Often it is difficult to determine which animal is vocalizing, but it can be visualized when the observer simultaneously sees the animal wrinkle its nose at a fold posterior to its nostrils.

Eating – Animal is ingesting food.

Eat Fecal – Number of times coprophagia is observed.

Other – Any behavior which does not fit the other descriptions.

Out of View – Location or identification of the animal cannot be ascertained due to poor visibility. Low light levels may cause this poor visibility, reflection on the surface of the water, or clouding of the water.

A time schedule was followed for all of the above observations to help minimize any bias in observations made (Martin & Bateson 1986). Point observations were conducted at 30 minute intervals. Time points differed between locations in order to work around the schedules of staff members. Homosassa time points for behavioral observations were: 7:00 am, 7:30, 8:00, 8:30, 11:30, 12:00, 12:30, 1:00 pm. SeaWorld time points were: 9:00 am, 9:30, 10:00, 10:30, 11:00, 11:30, 12:00, 12:30 pm. As mentioned above, behavioral data collected from Miami

Seaquarium was dependent upon staff availability and occurred between 10:00 am and 6:00 pm at 30 minute increments as frequently as possible. Video and 35 mm cameras were utilized when possible to document and characterize behavioral categories described on the behavioral data sheet. Environmental factors were also recorded, including ambient air temperature. Water temperatures were available from the staff at Homosassa Springs State Wildlife Park and SeaWorld Florida.

In addition to the above mentioned behaviors, behaviors that were marked on the ethogram as either *Social interaction*, *Other interaction* and *Other* were further characterized or described in the margins as comments. After reviewing the comments once all of the behavioral data were collected, a second list of behaviors was created, as below:

Social interaction

On top – Animal is over another manatee, generally with its ventrum down.

Under – Animal is under another manatee, generally with its ventrum up.

Nose to nose – Animal is touching its nose to the nose of another manatee.

Bubbles – Animal will release air from its nose while under water.

Holding – Animal is using flippers to hold on to another manatee’s body, flipper or tail.

Being held – Animal is being held by another manatee’s flippers.

Pushing – Animal is bumping or shoving into another manatee to move them out of the animal’s path or to get at an object (e.g. fecal or food).

Being pushed – Animal is being bumped or shoved by another manatee.

Mouthing (social) – Animal is using its lips to interact, sense, or stimulate another animal.

Mouthing a/g area – Animal is mouthing the anal/genital area of another manatee.

Allowed mouthing of a/g area – Animal is allowing mouthing of its anal/genital area from another manatee, and did not move away.

Rejected mouthing of a/g area – Animal is not allowing mouthing of its anal/genital area from another manatee, and moved away.

Association – Animal is swimming along side or resting unusually close to another manatee.

Female mounting – A situation where one manatee is on her back holding on and being held by another manatee who on top of the first manatee.

Other interaction

Staff – Animal is interacting with staff, cleaning or treating animals or cleaning the enclosure.

Mouthing (object) – Animal is using its lips to interact, sense, explore or search for an object.

Stretching – Animal is seen stretching as illustrated by Hartman (1979).

Interacting w/ object – Animal is interacting with an object such as pvc pipes, a toy, rope, the wall of the enclosure, a branch etc...

Rubbing or scratching – Animal is moving its body along the side of the enclosure or against an object.

Other

Somersaults – Animal is swimming in a pattern with its belly at the surface, then down to the bottom of enclosure with belly on bottom, up along side of enclosure, and again belly up at surface.

Tail up – Manatee is in a vertical position with its tail extended up above the water surface.

Point observations of behaviors were marked on the ethogram as a check next to the behavior or behaviors that best described the actions of the manatee at that point in time. The number of times a behavior was observed in a given day was totaled. These raw numbers are available in the Appendix, see Behavior Data.

Analysis

Behavioral data collected from Homosassa and SeaWorld, but not Miami Seaquarium, were included in the analysis described below. Behavioral and fecal data from Miami Seaquarium were not collected with enough regularity and consistency to be included. Behavioral data was analyzed twice, once with all behaviors individually, and secondly with behaviors grouped into seven categories, which are defined as follows: *Active* = *Swimming*, C*ircling*, *Barrel rolls*, *Laps*, *Diving*, and *Somersaults*. *Inactive* = *Resting* and *Floating*. *Possible chemical communication* = *Mouthing* (social), *Mouthing a/g*, *Allowed mouthing a/g*, *Rejected mouthing a/g*, *Mouthing* (object), *Rubbing*, and *Eat fecal*. *Social interaction* = *On back*, *On top*, *Under*, *Nose to nose*, *Holding*, *Being held*, *Pushing*, *Being pushed*, *Female mounting*, and *Association*. *Captive related* = *Staff* and *Interacting w/ object*. *Maintenance* = *Eating* and *Stretching*. *Other communication* = *Vocalization*, *Bubbles*, and *Tail up*. An estradiol over progesterone log(E/P) ratio from fecal steroid hormones was used to correlate with the behavioral data. This ratio was used, rather than estradiol and progesterone concentrations independently, because no single behavior was significantly correlated with hormones individually. In light of the data presented in Chapter Two, Experiment One indicating that manatees may have a particularly long gut transit and retention time, the hormone data was shifted a week back. It is assumed that this will allow the concentrations of fecal steroids to be aligned with the behavioral data. In addition to the log(E/P) ratio, the *Minimum* and *Maximum daily ambient temperatures* for both Homosassa and Orlando were included in the analysis to determine correlations among factors. The *Vulva swelling* data were analyzed using the correlation matrix test with log(E/P) independently because it was collected as rank data rather than counts, as the rest of the behaviors. A final analysis was conducted to include the hormone concentrations and behaviors on the days they were actually collected, rather than shift the hormones back a week, to identify possible differences the time delay may have in relation to manatee behaviors.

The SAS program, version 6.12 (SAS Institute Inc. 1989), was used to analyze the behavioral data with four different tests, a stepwise regression, correlation matrix, principal components analysis and a cluster analysis. The stepwise regression was performed using PROC REG to add or remove variables from a model to describe or take into account the variation in the log(E/P) data. PROC CORR calculated correlations among all possible variable combinations. PROC PRINCOMP was used to perform a principal components analysis, which is a multivariate technique used to look for patterns among variables. PROC VARCLUS was utilized to perform cluster analysis, which arranges the data hierarchically. The centroid statement was used in the cluster analysis because it is more robust for data with outliers (SAS Institute Inc. 1989).

Results

Experiment Seven: Behavioral Data

Only the correlation analysis revealed any statistically significant relationships. The stepwise regression, principal components analysis and cluster analysis did not find any statistically significant correlations or trends between the hormones, shifted back a week, and the behavior, either grouped or ungrouped behaviors. Analysis of grouped behaviors with the correlation matrix indicated significant positive correlations of log(E/P) ratio, shifted a week back, with *Social interaction* (p = 0.029). Information from the correlation matrix of ungrouped behaviors indicate that *On back* (p = 0.007), *On top* (p = 0.006), and *Female mounting* (p = 0.049) may be important factors contributing to the positive correlation of *Social interaction* and log(E/P). A significant negative correlation was calculated between log(E/P) and *Possible chemical communication* (p = 0.0005) and with *Maintenance* (p = 0.005). From the ungrouped data *Mouthing* (object) (p = 0.0001), *Eat fecal* (p = 0.042) and *Eating* (p = 0.003) were also negatively correlated with log(E/P). Most of the grouped behaviors were either negatively or not correlated with the other grouped behaviors. There were two exceptions, *Maintenance* was positively correlated with *Possible chemical communication* (p = 0.0001) and *Social interaction* was positively correlated with *Captive related* (p = 0.019). Only one grouped behavior, *Other communication*, was not significantly related to any of the other factors. The *Maximum daily ambient temperature* was positively correlated with log(E/P) (p = .003). In relation to the other behaviors, *Minimum daily ambient temperature* was positively correlated with *Inactive* (p = 0.001) and *Captive related* (p = 0.0005); and negatively correlated with *Possible chemical communication* (p = 0.003) and *Maintenance* (p = 0.0001). The correlation analysis of *Vulva swelling* with log(E/P) was positively correlated at a significance of p = 0.0001.

There was very little difference when the behaviors were correlated with the hormone concentrations that were not shifted back seven days. The only difference from the grouped behaviors was that *Inactive* became positively correlated with log(E/P) (p = 0.026). Of the individual behaviors, *Circling* and *Eat fecal* were no longer correlated with log(E/P).

General Observations of Individual Manatees

Of the behavioral data collected outside the ethogram time points at Homosassa Springs, Lorelei appeared to exhibit unusual behavior in relation to the other females, which may be reflective of hormone fluctuations measured from her samples. For a majority of the observations collected during warm months, from approximately June – September, Lorelei was swimming *Laps* in a large bend down stream from the spring-head. In fact, there were many days that Lorelei refrained from eating and continued to swim *Laps* when food was put in the enclosure. This seemed unusual because all manatees would usually stop all other activities at the sound of lettuce hitting the water. Onset of these *Laps* appeared to coincide with the addition of several female calves from SeaWorld to the enclosure at Homosassa.

Perhaps this behavior Lorelei exhibited was reflective of some type of stress and might explain why no estradiol fluctuations were measured from any of her samples.

Two females at SeaWorld exhibited behaviors that may indicate some influence of hormone fluctuations. As indicated in Table **3-1**, Sara is a female brought to captivity as a calf, was 9-10 years of age at the time data were collected, and had not had a calf in the past. However, it was confirmed that Sara spontaneously had begun to lactate and calves in the enclosure were nursing from her. Sara nursed the younger manatees in the enclosure periodically throughout the time observations were collected. The second female, Charlotte, had successfully reared a calf in captivity and was 11-12 years of age at the time data were collected. From the beginning of data collection, until mid October, a male calf named Mo was on exhibit with the females. By October, Mo was nearing sexual maturity and old enough to risk impregnating the females, so he was moved to the male enclosure off exhibit. Before Mo was moved, there were many attempts at intromission observed between Mo and Charlotte. Charlotte was the only female to periodically respond to Mo's attempts at mating by rolling on her back passively. However, no peaks of estradiol were measured from Charlotte until about a month after Mo moved. In fact, estradiol concentrations indicated increased fluctuations and higher overall concentrations once Mo had left. The estrous patterns of both Sara and Charlotte may have been influenced by these specific social interactions mentioned.

Discussion

Experiment Seven: Behavioral Data

It should be reiterated that three of the four statistical analyses utilized to identify correlations between behaviors and hormone fluctuations, shifted back a week, calculated no statistically significant trends. Information that is provided by the correlation matrix might only be indicative of slight trends between hormone fluctuations and behavior.

Data from the correlation matrix indicated both positive and negative correlations with the log(E/P) ratio. A positive correlation would indicate that as estradiol increased and/or progesterone decreased, so do *Social interactions* (*On back*, *On top* and *Female mounting*). This might suggest that while captive female manatees are active, during periods of increased estradiol or low progesterone concentrations, they tend to spend their time interacting with other manatees, positioning themselves above, below, or mounting another animal. This is the first time that *Female mounting* has been documented in manatees (see Figures **4-1** and **4-2**) and it appears to be similar to female cattle mounting each other when one of the two are in estrus. During estrus a cow will stand to be mounted by a bull or another cow. Cows that mount other females do so when they are one or two days from standing estrus themselves. It has been suggested that females may mount other cows, thus attracting the attention of bulls to the estrus cow (Peters & Ball 1995). However, in the case of female Florida manatees, this behavior may not have been observed to date in the wild, because it could be a result of captive housing of female manatees in single sex groups. *Female mounting* was observed at both Homosassa and SeaWorld with a variety of females involved at any given time. Typically the

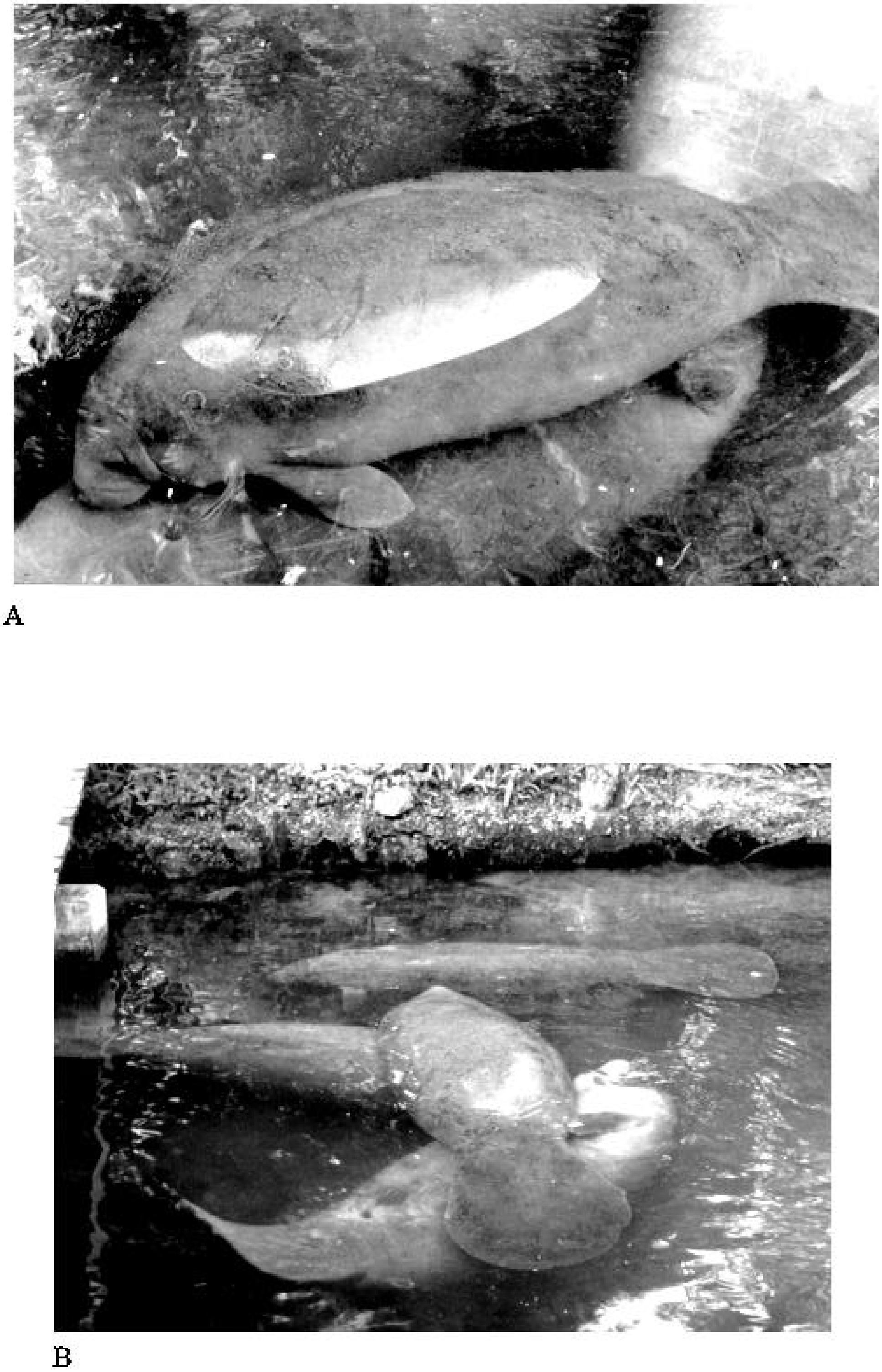


Figure **4-1** Female mounting at Homosassa Springs State Wildlife Park. A) involves two females and a third on her back in the upper right-hand corner, B) shows four manatees in a group, two on their back, one on top and a fourth circling the group. The females most frequently involved in female mounting were Betsy, Rachel and Star.

Figure **4-2** Female mounting behavior at Homosassa Springs involving two manatees, with a third on her back next to them, during the summer of 1996..

same individual would remain on top or on bottom within the day the behavior was observed. In some cases two animals would be involved; however, as many as four or five could participate forming a mass of manatees holding on to each other.

The correlation analysis indicated that warmer temperatures were associated with higher estradiol and/or lower progesterone concentrations, *Inactive behaviors* and interactions with *Captive related* behaviors. The higher log(E/P) ratio may be reflective of more reproductive activity during warmer months of the year. Increases in *Maintenance* and *Possible chemical communication* behaviors were correlated with cooler temperatures. It is not unusual for animals to eat more when temperatures decline. Perhaps *Eat fecal*, a component of *Chemical communication* which was negatively correlated with both *Maximum* (p = 0.009) and *Minimum* (p = 0.009) *daily ambient temperatures*, was related to gaining access to undigested nutrients (Hartman 1979). This coprophagic behavior is often described in other hindgut fermenting species such as rabbits and elephants (Schmidt-Nielsen 1991; Sikes 1971).

The correlation analysis of *Vulva swelling* indicates that there is a positive correlation (p = .0001) with increased estradiol and/or decreased progesterone concentrations. This would suggest that *Vulva swelling* may be a good visual indicator of a female's estrus state.

The fact that shifting hormone data back a week or not, changed very little of the correlation analysis suggests that the behaviors are relatively broad and are not tightly correlated with hormone concentrations from sample to sample.

General Observations of Individual Manatees

As exemplified by observations made on three captive female manatees (Lorelei, Sara and Charlotte), social interactions with other animals and possible stressors in their enclosure could have impacts on hormonal fluctuations measured. Various types of stress have been shown to suppress reproductive function, especially in females (Carlstead 1996; Moberg 1985). Stereotypical behaviors, as in the example of Lorelei's *Laps*, have often been suggestive of a captive animal's reaction to some kind of stressor, however what causes the behavioral reaction and how the physiology and psychology of an animal may be affected are very complex subjects.

Currently, no information is available on manatee hormonal parameters during lactation. Marmontel (1995) indicates from anatomical studies that ovulation is suppressed during lactation, but Rathbun et al. (1995) noted overlapping of gestation and lactation from animals observed in the wild. Spontaneous or induced lactation, without artificial influence has been described in other species such as dolphin (*Tursiops*) and humans (Auerbach 1981; Ridgway et al. 1995). This brings into question the estrous patterns Sara may have expressed and what other hormonal factors may have lead to this spontaneous lactation.

In the case of Charlotte's interaction with Mo, it is unclear why Mo's presence might have suppressed her estradiol concentrations. It is possible that Charlotte's actions were reflective of more maternal behaviors and tolerance of a calf's 'play' behavior, rather than an indication of her readiness to breed.

Conclusions

Only one of four statistical techniques applied, correlation analysis, indicated any statistically significant correlations between hormone fluctuations and behaviors shifted back of week. The correlation analysis suggested that *Female mounting* and

Vulva swellings may be associated with increased estradiol and/or low progesterone concentrations. The log(E/P) ratio was also correlated with warmer temperatures and may be an indicator of increased reproductive activity. Cooler temperatures were correlated with eating and coprophagy (*Eat fecal*), which may indicate greater nutritional needs. The fact that shifting the days back a week or not caused little change in the correlations suggests that the behaviors are not tightly correlated with sample to sample hormone fluctuations.

Behavior from three individual female manatees suggests that environmental conditions and social interactions may influence hormone concentrations.

CHAPTER 5
DISCUSSION

Introduction

What is the probability of a female manatee in estrous mating with a male? How often does a female need to mate before conception occurs? Is there any female choice involved in determining which male will father a calf? These are questions that future studies, beyond the scope of this dissertation, will be able to answer by building on the data provided by this study. For example, knowing when there are seasonal peaks and lulls in hormone activity will allow future studies of reproduction to focus their energies during periods of hormonal peaks. Future experiments utilizing fecal radioimmunoassays (RIA) will be able to choose better antibodies that cross-react with other progestins such as 5α- and 5β-progestins and know that a time delay as long as a week may separate values from fecal and plasma samples. The present study is a first attempt to measure fecal hormone concentrations in living manatees and to determine some of the physiological parameters involved in seasonal and estrous patterns. It has been said that a good study raises more questions than it answers, and it would appear there is no shortage of questions.

This final chapter will begin with information on elephant reproduction, how they might be used as a model for manatee reproductive patterns, and what this model might predict for manatees. The major points of data presented in Chapters Two through Four will be presented and a section, Results of the Elephant Model, will review how well the elephant model agrees with manatee data presented in Chapters Two through Four. A manatee model and the type of breeding system this author would hypothesize from the given data will then be discussed. A final section will provide future directions and studies needed to continue the pursuit of learning about and protecting this species to ensure their survival.

Elephants as a Model for Manatee Reproduction

In choosing a model species to understand reproductive patterns in manatees, information on general reproductive trends helped to narrow the number of mammals from which to pick. For example, manatees are *K*-selected herbivores that live in stable environments with either constant or predictable seasonal fluctuations. They have long lives, large body size, a proportionally smaller allocation of energy to reproduction, and a small number of larger offspring, with a greater amount of investment into the survivorship of those offspring. Breeding activity is often delayed beyond sexual maturity due to competition with conspecifics (Begon et al. 1990).

Of the *K*-selected herbivores, elephants were chosen as a model for manatee reproduction because of several similarities between the two species. To begin with, manatees and elephants are linked evolutionarily and have many unique remnant characteristics still in common, which include pachyostotic bones, a prehensile lip and a tooth replacement system that moves teeth forward from the rear in a conveyer belt fashion (Caldwell & Caldwell 1985; Husar 1977; Laursen & Bekoff 1978; Shoshani & Eisenberg 1982). Reproductively, both manatees and elephants are not strong seasonal breeders and appear to rely on proximate factors that directly influence energy availability more heavily than ultimate factors like photoperiod, thus lending a degree of flexibility to the timing of estrus (Boyd et al. 1999; Sikes 1971). Several studies have indicated rainfall as an important proximate factor correlated with breeding and calving among African elephants (Hanks 1969; Jachmann 1980; Smith & Buss 1973). Laws (1969) has also indicated that increased population densities, another proximate factor, can limit reproduction in elephants by increasing the calving interval. Behaviorally, female elephants are polyandrous while they are receptive to males and the intensity of sexual activity is periodic, as with manatees (Buss 1990; Buss & Smith 1966; Hartman 1979; Short 1966).

Anatomically, female elephants and manatees have a similar deciduate placentation and bicornuate uterine structure (Cooper et al. 1964; Perry 1974; Shoshani & Eisenberg 1982; Wislocki 1935). They both have ovaries that lie near the kidneys as well as mammary glands that are axillary in location (Laursen & Bekoff 1978; Marmontel 1988; Perry 1953; Sikes 1971). A rare characteristic of mammalian reproduction that both manatees and elephants also share is the development of multiple accessory corpora lutea (CL), from both ovulated and unovulated follicles, the function of which is not well understood (Hanks & Short 1972; Marmontel 1988; Perry 1953; Short 1966).

What is known of the elephant estrous cycle is that initial studies of elephant behavior, hormonal estrogens and estrogen-driven characteristics (such as vaginal cytology) suggested an estrous cycle length of approximately 3-4 weeks (Eisenberg et al. 1971; Jainudeen et al. 1971; Ramsay et al. 1981; Watson & D'Souza 1975). Estrus was defined as the period a female would stand to be mounted by a male and tended to last 4 days. Male behavioral cues such as urine testing or a flehmen response could help to detect the onset of estrus. Ramsay et al. (1981) found a correlation between behavior and concentrations of estrone and estradiol, and confirmed previous indications of a 3-week cyclical pattern. However, vaginal cytology and mucous smears did not correlate well with behavior and the onset of estrus. Chappel (1979) measured LH and found serum estradiol peaked just prior to LH peaks with an interval of 18 days, almost 3 weeks, between LH peaks. The estradiol peaks correlated well with estrous behavior, willingness to mate. Data from Hess (1983) similarly found mean estradiol peaks to occur at approximately 28-42 day intervals.

Contrary to the information provided by estradiol and estrogen related characteristics indicating a 3-4 week cycle, elephant progesterone concentrations suggest a much longer estrous cycle of 14-16 weeks, with a luteal phase of ~10 weeks and an interluteal phase of ~4-5 weeks (Brannian et al. 1988; Hess et al. 1983; Plotka et al. 1988). This longer estrous cycle was subsequently supported by measurements of testosterone (Taya et al. 1991), FSH and inhibin (Brown 1991). To reconcile the differences between the estrogen and progesterone data sets, Plotka et al. (1988) proposed a model of follicular waves concurrent with the 3-4 week estrogen cycle which eventually would culminate into an ovulatory event that produced a functional CL and the 10 week luteal phase. This 3-4 week estrogen cycle during the interluteal phase was subsequently supported by measurements of LH peaks ~3 weeks apart with the second peak classified as an ovulatory peak which initiated the 10 week luteal phase (Kapustin et al. 1996). However, the data from Brown et al. (1991) would not support a continuation of the 3-4 week estrogen cycle to produce waves of follicles during the 10-week luteal phase. It has been suggested that the first LH peak (anovulatory), following a luteal phase, might be necessary to initiate various cues to communicate to males over great distances that a female will soon be ready for possible conception at the second LH peak (ovulatory) (Kapustin et al. 1996). This would improve the probability of a dominant male being present to mate with the receptive female. A recent model incorporating the hormonal data has been proposed by Hodges (1998) and is represented graphically in Figure **1-4**.

Using elephants as a model for manatee reproduction would suggest that female manatees have some system for communicating to males that estrus is approaching and males must be able to find her in time for conception to occur. The female manatee will mate with several males and there must be some means of female choice and/or dominance among the males to determine which male will father the calf. If conception does not occur during this ovulatory period, it will be another 100 days or so before the next ovulatory event. Female manatees are able to breed throughout the year, but some may be influenced to limit breeding during energetically restrictive times of the year (winter months), or stimulated to breed during energetically beneficial periods (spring through fall).

From the elephant data mentioned above, this study hypothesized that:

1) Female manatees have a reproductive cycle similar to that of elephants, with low hormonal concentrations and very long luteal phases (10 week periods of increased progesterone concentrations) between follicular phases and estrus.

2) Male manatees show seasonal fluctuations, having higher testosterone concentrations that correspond to active spermatogenesis in warmer months. Female manatees also show seasonal fluctuations, with increased reproductive hormone concentrations from spring to fall.

3) There are differences between captive and wild manatees with regard to seasonal reproductive activity. Proximate factors such as cold water temperatures and food availability in the winter are important factors.

Review of Data

This section will review the important concepts and data presented in Chapters Two through Four.

Chapter Two

Experiment One (Fecal Marker/Gut Transit Time) indicates that manatees have a gut transit time of 6-7 days and gut retention time of 7-8 days. In hours, this would range from 144 to 192 hrs with a median value of 168 hr. This time delay has important implications for Experiment Three (Fecal Comparisons with Plasma and Tissue Samples). It suggests that a conspicuous time delay exists between steroid concentrations excreted in fecal samples, and the condition of reproductive tissues and steroids present in plasma samples, both of which represent the current reproductive status of an animal. In fact, this delay may be as long as 5 days to a week, in comparison to other species that have delays of two days or less (Warner 1981). This delay would be an important factor contributing to the inability of hormone concentrations from a single point collection of fecal and matching plasma or reproductive tissues to reflect similar data regarding the animal's reproductive state.

Experiment Two (Fecal Handling) suggested that the metabolites measured were not affected by collection conditions in the field. However, determining if the metabolites measured are the most appropriate for defining manatee reproductive parameters is a question highlighted by the data from Experiments Three and Four (A Comparison of Gender, Location, Age and Individuals). Reproductive groups such as pregnant vs. non-pregnant, and adult vs. calf were not distinguishable across individuals with the current fecal RIA. However, testosterone and progesterone concentrations could possibly be utilized to distinguish the gender of adult manatees, despite the high estradiol concentrations measured from male manatees. It may be that male manatees naturally do produce high concentrations of estradiol relative to females, as seen in the boar and stallion (Bamberg et al. 1986; Palme 1994; Palme & Möstl 1993; Raeside 1978/1979; Schwarzenberger et al. 1996; Velle 1966). However, artificial influences such as cross-reactivity of the antibody with androgens or affects of captivity still need to be ruled out. Recent studies reviewing the data on fecal metabolites excreted across species have shown that the majority of estrogens are principally excreted as estrone and/or 17α– or 17β–estradiol. In many species the majority of fecal progestins are excreted not as progesterone, but as 5α– or 5β–reduced pregnanediones and hydroxylated pregnanes (Schwarzenberger et al. 1996). Although it is not know whether the most appropriate fecal metabolites for the Florida manatees are being measured, the hormone concentrations that are measured may still provide meaningful fluctuations relative to an individual’s estrous cycle and seasonal activity levels. This has been demonstrated before in elephants. Elephant progesterone concentrations correctly identified the length of the elephant estrous cycle as ~15 weeks, even though 5α–reduced metabolites, 5α–pregnane-3,20-dione (5α–DHP) and 5α–pregnane-3-ol-20-one (5α–P-3-OH), are actually the major circulating progestins (Brannian et al. 1988; Heistermann et al. 1997; Hess et al. 1983; Hodges et al. 1997; Hodges et al. 1994; Plotka et al. 1988). Additionally, manatee recoveries were found to be consistent within an animal, decreasing the variability between the samples for that individual, compared to between-animal variation. This would allow important qualitative data to be generated by tracking hormone fluctuations with several samples from a single manatee.

Experiment Four identified variation between mean hormone concentrations from all manatees at a given location, which was to some degree expected. Additionally, this variation between locations was similar across the three hormones relative to each location. This would indicate that housing conditions at a given location did not differentially influence estradiol, progesterone or testosterone measurement. Variation between mean individual hormone concentrations across the three hormones was presented and these values did vary depending upon the hormone measured. These variations in individual mean hormone concentrations relative to other manatees may be reflective of differences in steroid recovery and the extent to which an individual was reproductively active. Reasons why some manatees would not be as reproductively active as others will be discussed below.

Currently the fecal RIA technique used for this study has been properly validated in the lab and should be sufficient in describing qualitative changes found within an individual manatee to document hormonal fluctuations related to the estrous cycle and seasonal changes. Data related to groups of manatees will reflect variation between individuals but large hormone fluctuations may be identified.

Chapter Three

Experiment Five (Individual Hormone Profiles and Estrous Patterns) reveals that there is a great deal of variation of hormonal patterns between individuals and many females have long periods without any fluctuations of either estradiol or progesterone concentrations. Information on each animal's natural history does not provide all of the necessary factors that can influence hormone fluctuations. Some periods of hormone inactivity may be due to reproductive suppression by more dominant animals or the absence of male priming in an all-female environment. Social influences such as reproductive suppression and the priming affect can profoundly impact the estrous cycle of females, which is the function of careful timing and coordination between several different hormones and organs (Bronson 1989; Wasser & Barash 1983). Of course, the fact that these animals are in a captive setting is always and underlining influence.

A possible mean manatee estrous cycle pattern is presented that lasts between 28 and 42 days. This cycle would be slightly longer compared to other herbivores such as cattle, with a mean estrous cycle length of 21 days (Peters & Ball 1995), and horses, with an estrous cycle ranging 19 to 22 days (Daels & Hughes 1993). In comparison to an elephant, this possible manatee estrous cycle is not even half the time of an elephant’s approximate 100 day cycle (Brannian et al. 1988; Hess et al. 1983; Plotka et al. 1988).

Experiment Six (Seasonality) highlights the fact that Florida manatees are not strong seasonal breeders, but slight seasonal peaks appear to occur during the spring and/or fall. Differences in seasonal peaks between locations may be indicative of some degree of female synchrony. Of course, these data are based on captive manatees where food and water temperature are held relatively constant compared to wild animals. Unfortunately, the seasonal data from wild manatees was insufficient in number of samples and months collected to derive any significant conclusion about seasonal fluctuations. This prevents any comparisons between wild and captive groups in regards to seasonal patterns.

Seasonal data from individual manatees reflects some of the variation between individuals identified in Experiment Four with overall mean concentrations for an animal and Experiment Five with the longitudinal data presented per sample.

Chapter Four

In Experiment Seven (Behavioral Data) only one of four statistical techniques applied, indicated any statistically significant correlations between hormone fluctuations shifted back a week, and behaviors. The correlation analysis suggested that *Female mounting* and *Vulva swellings* may be associated with increased estradiol and/or low progesterone concentrations. The log(E/P) ratio was also positively correlated with warmer temperatures and may be an indicator of increased reproductive activity. Cooler temperatures were correlated with *Eating* and coprophagy (*Eat fecal*), which may indicate greater nutritional needs. The fact that shifting the days back a week or not caused little change in the correlations suggests that the behaviors are not tightly correlated with sample to sample hormone fluctuations.

Behavior from three individual female manatees suggests that environmental conditions and social interactions may influence hormone concentrations.

Results of Elephant Model

Experiment One indicates that the gut transit and retention times of manatees, 6-8 days, is much longer than that for elephants, ~ 2 days (Rees 1982; Warner 1981). Additionally, the time delay between fecal steroid hormone concentrations and the concentrations in plasma or the state of reproductive tissues in manatees would be much longer than in elephants. This is reflective of the extremely long and efficient digestive tract of manatees.

Different reproductive groups such as pregnant versus non-pregnant and adult versus calf were not distinguishable with the hormone concentrations measured in manatees. In comparison to manatees, elephant progesterone concentrations could be used to identify different reproductive groups, such as before and after puberty, however there is considerable overlap between pregnant and non-pregnant elephants (McNeilly et al. 1983). One of the reasons manatee reproductive groups may not be distinguishable is that progesterone is not the most appropriate metabolite to measure. This is supported by reviews of fecal metabolites excreted by other species (Schwarzenberger et al. 1996) and is similar to elephants (Wasser et al. 1996). However, the gender of manatees may be identified utilizing concentrations of testosterone and progesterone. With regard to the unusually high estradiol concentrations in male manatees as compared to female manatees the author was unable to find any references for male elephant estradiol concentrations for comparison.

This study is not meant to be quantitative in its measurement of steroid hormone concentrations due to the variability between individuals. However, the mean female manatee plasma concentrations of progesterone (4.7 ng/ml ± 7.09, standard error of the mean (SEM)) and estradiol (1737 pg/ml ± 498 SEM) as seen in Figure **2-4**, are twice as high or more in comparison to elephant serum concentrations (Chappel & Schmidt 1979; Hess et al. 1983; Kapustin et al. 1996; Plotka et al. 1975; Plotka et al. 1988; Taya et al. 1991). In contrast, mean female manatee fecal progesterone (237 ng/g ± 28.7 SEM) and estradiol (4190 pg/g ± 959 SEM) concentrations seen in Figure **2-5** are lower than those measured for elephants (Wasser et al. 1996). These lower values for manatees may be due to differences in antibody used and the amount of steroid recovered. Female manatee fecal progesterone concentrations appear to be comparable to elephant fecal progesterone concentrations measured by Fieβ (1999), but elephant fecal estradiol concentrations are still much higher than that for manatees. In general, manatee hormones differ compared to elephant concentrations depending upon the use of plasma (higher) or fecal (lower) samples.

Female elephant hormone profiles have similar non-reproductive periods as indicated in some of the female manatee hormone profiles. However, understanding the causes behind these periods of hormone inactivity is still being studied in elephants (Brown 1999). Female elephants are able to detect and track the reproductive state of other elephants, both male and female. Synchrony of births and preovulatory periods within a population of female elephants have been observed, however it is unclear if reproductive priming or suppression occur (Rasmussen & Schulte 1998). One study noted subordinate female elephants giving birth after dominant females (Dublin 1983) and in general dominant females do have greater access to food and water compared to subordinates who must wait their turn, perhaps energetics and nutrition play a role. Elephants can certainly be affected reproductively by stress as indicated by the behavior of populations that were poached. Poaching caused enough stress to the elephants in Ruaha that either females were not successfully bearing calves or the calves were not able to survive the first couple years of life (Barnes & Kapela 1991). The sensitivity of elephant reproduction to social interactions is still being studied but may remain an important model for manatees.

As mentioned above, the proposed manatee estrous cycle of 28-42 days is not quite half of the 100 day estrous cycle of elephants based upon the progesterone data (Brannian et al. 1988; Hess et al. 1983; Plotka et al. 1988). The frequency of peaks and estrous patterns from the current study certainly appear to support this; however, this should not be considered a conclusionary statement. The manatee estradiol peaks may be analogous to the 3-4 week fluctuations in estradiol and other estrogen related characteristics measured in elephants (Chappel & Schmidt 1979; Eisenberg et al. 1971; Hess et al. 1983; Jainudeen et al. 1971; Ramsay et al. 1981; Watson & D'Souza 1975). Additionally, the progesterone data may not be providing the most complete pattern. As mentioned in Experiment Five, estradiol peaks from Figures **3-17** through **3-27** were utilized to create a mean manatee estrous pattern. The estradiol peaks chosen were defined as the highest concentration at or above one standard deviation of an individual's mean. Only about one third of the 34 estradiol peaks were followed by increases of progesterone lasting two or more weeks. Half of the estradiol peaks were not included in the mean estrous pattern because they were followed by progesterone concentrations that did not rise above 40% of an animal's total range of progesterone concentrations. If one takes a step back and views the progesterone data across the different females, some females (Amanda, Ariel, Georgia and Rita) appear to have clusters of progesterone peaks or increases in concentrations that are between two and three months in length. It is possible that the long intervals between progesterone clusters contain several estradiol peaks analogous to the two LH and estrogen peaks found during the interluteal phase of the elephant estrous cycle (Hodges 1998; Kapustin et al. 1996). Perhaps some periods of inactivity were the result of estradiol peaks missed due to the frequency of collections at only once or twice a week. With the data collected thus far, an elephant model for the estrous cycles of manatees should not yet be ruled out.

Some insight may be gained by looking in closer detail to two elephant studies that measured fecal estrogens and progestins similarly to the present study by Fieβ (1999) and Wasser (1996). Both studies collected samples on a weekly basis over an extended period of time. Figure 4 of Wasser (1996) has graphs of four cycling adult female African elephants. By estimating the mean hormone values and using the same criteria for identifying peaks, as done in the current manatee study, the approximate time between peaks of estrogens and progestins can be measured. The mean number of days between peaks of estrogens for elephant A is estimated at 63 days ± 7.0 SEM, elephant B 46 days ± 14 SEM, elephant C 53 days ± 31 SEM, and elephant D 29 days ± 4.6 SEM. The estimated mean number of days between progestin peaks for elephant A is 81 days ± 3.5 SEM, elephant B 84 days (only two peaks), elephant C 98 days (only two peaks), and elephant D 40 days ± 15 SEM. The estrogens data from elephants B and D, plus the progestins data from elephant D are similar to the values calculated for manatees in this study. In Figure 1 graph D from Fieβ (1999) progesterone was measured weekly for 92 consecutive weeks in a cycling female elephant. Repeating this exercise, the mean value for the profile can be estimated at .25 μg/g, then for the first 12 weeks progesterone concentrations remain below the mean value. Beyond the first 12 weeks the mean number of days between progesterone peaks is estimated at 52 days ± 5.5 SEM. With peaks defined similarly as in this manatee study, data from the two elephant studies indicate some elephants have peak frequencies almost half that of the 100 day elephant cycle. This suggests that determining the proper base line is key in deciding what is or is not a peak. This manatee study utilized the mean value for each individual as a base line due to the variability between individuals. Future studies should make efforts to establish true hormone base line values by correlating hormone fluctuations with known reproductive events, via breeding animals or ultrasound to identify ovarian structures.

The manatee seasonal data suggest slight, but significant peaks during the spring and/or fall. Of course, the majority of hormonal data were collected from captive animals. Unfortunately, little significant hormonal data was collected from wild animals so comparisons between wild and captive manatees are not possible. Some speculation on patterns in wild animals would support biannual peaks, if the first peak were associated with new growth of aquatic plants after the cold winter months; and if a second peak of renewed or more nutritious plant growth resulted from nutrients washed down from rains that begin with hurricane season. Biannual reproductive patterns have been described for elephants in Uganda (Buss 1990). However, field data collected on Florida manatees currently suggest only a spring peak of reproductive behavior and calves born (Marmontel 1995; Rathbun et al. 1995). Animals in captivity with food and water temperature held constant should have reduced seasonal fluctuations compared to their wild counterparts, unless the captive animals have become synchronized hormonally to some degree or are responsive to photoperiod. The pattern of seasonal reproduction, influenced by proximate factors such as water temperatures and food availability would be consistent with an elephant model.

Behaviorally, female manatees and elephants do share some characteristics related to estrus. Female elephant behaviors related to estrus include wariness, the estrus walk, the chase, mounting and consort behavior. Female elephants will mate with several males and some female choice is evident by preferential consorts with large, older males in musth (Moss 1983). By comparison, female manatees in the wild may exhibit the chase or driving during the mating herd. Hartman (1979) noted that the “the urgency of male courtship within an estrous herd waned when the cow was not in motion – when feeding or bottom-resting…bulls only resumed their sexual overtures when the cow was active again.” A type of consort behavior may also be exhibited, as suggested by Bob Bonde (personal communication, U.S.G.S., 2000) from field observations, with a single male shadowing a female. In captivity, manatee estrus may be associated with female mounting, however this behavior is similar to estrus behavior in cattle rather than elephants (Peters & Ball 1995).

In addressing the hypotheses proposed for this study, the data would suggest the following : the first hypothesis would reject the length of the manatee estrous cycle as similar in length to the elephant estrous cycle, with similarly low hormone concentrations. The second hypothesis would be supported, reiterating that the peaks are slight, but significant, and that there is variation present between individuals. The current data would not be able to address the third hypothesis, leaving it to be answered by future studies. With the data currently collected, an elephant model still appears to be a plausible starting point from which to pose hypotheses.

Manatee Model

Utilizing data available from the literature and the current study, the author would hypothesize the following as a manatee model: Manatees evolved in the tropics where photoperiod is relatively constant throughout the year and is not available as an ultimate seasonal cue. Under these constant photoperiod conditions manatees may be asynchronous breeders and more responsive to proximate factors that may affect reproduction, such as rainfall, water temperature, food availability, and hurricanes. In Florida, with energetic costs such as seasonal low water temperatures and limited food availability, manatees have suppressed reproduction during colder months and peaks of reproductive activity in the spring and fall. This seasonal pattern would be more diffuse in southern parts of Florida. Responding to proximate factors allows manatees to have greater reproductive flexibility with changes between years, such as a mild winter. If Steller's sea cow were still extant, we would probably see that these sirenians were highly seasonal breeders. The extreme weather conditions would dictate that Steller's sea cow rely heavily on ultimate factors to predict the beginning of a short breeding season. This example of reproductive flexibility is similar to the deer of the genus *Odocoileus*, ranging from Brazil to Canada, as mentioned in Chapter One. Florida manatees appear to be in the process of adaptation, utilizing proximate factors to regulate reproduction and learning what ultimate factors can predict the proximate factors, such as photoperiod. Seasonal differences between captive and wild animals should be more apparent in northern parts of Florida.

The author would further hypothesize that estradiol peaks occur approximately 28-42 day apart. A number of estradiol peaks will occur before a luteal phase is initiated, as indicated by only one third of estradiol peaks followed by increases of progesterone lasting two or more weeks. During the interluteal phase, female manatees communicate to males across some distance using chemical or behavioral cues. These cues allow males time to find the female and determine some hierarchy or female choice in who will father the calf. Sperm competition may play an important role in the paternal selection process, due to the promiscuous breeding system. Mouthing behaviors were not statistically correlated with hormone concentrations in this study, but they are probably an important means of detecting chemical communication between animals. The presence of a mature male might stimulate the initiation of an ovulatory estrogen peak. The close association of a mature female could inhibit an ovulatory estrogen peak.

In relation to the technique, the author would hypothesize that a significant time delay of 5-7 days will separate hormone fluctuations between plasma and fecal samples. The major fecal progestin will be similar to some other species, with 5α– or 5β–reduced pregnanediones and hydroxylated pregnanes. Male manatees do have estradiol concentrations comparable to females, but not as a result of captive housing. Whether the high estradiol concentrations are a result of cross-reactivity by the antibody, a naturally occurring phenomenon, or some other factor will require further testing.

Future Research

Further studies will be needed to continue this research and answer the questions regarding manatee reproduction that this dissertation leaves undone. The use of HPLC or cold steroids will be necessary to identify the major metabolites in fecal, urine and serum samples. Variation in the recovery rates of fecal steroids between individual manatees will need to be identified and corrected by changing the technique or adjusting the values through calculations. Correlation with a greater number of serum and/or urine samples, with matching fecal samples, collected more frequently than once or twice a week, from the same animal will be key components of future research. An intensive period of daily serum (or as frequently as possible) and/or urine samples in conjunction with fecal samples will be necessary to identify the lag time between current hormones in the blood stream and steroids excreted in feces. Repeated weekly fecal collections from a small number of wild animals will be necessary to make comparisons between wild and captive animals. In addition to steroid hormones, future studies should measure LH and FSH. Other techniques such as vaginal smears, and ultrasound can be used to try to identify structural changes on the ovaries and in the epithelium of the uterus and vagina. Behaviorally, determining the establishment of hierarchies within a group of captive animals may be important in interpreting patterns of hormonal fluctuations.

There are numerous exciting projects that still need to be accomplished to provide a more complete picture of manatee reproduction. The next most important project would be to have a small number of manatee pairs bred in captivity. However, this should not be done unless intensive monitoring of as many aspects of reproduction as possible were planned. To compare the data from captive manatees, a study to monitor a small number of tagged wild females throughout estrus, gestation, and lactation should be conducted. A study to look at physiological and behavioral characteristics in captive males may provide information on the establishment of hierarchies. This study of males could include semen production, testosterone concentrations and a behavioral ethogram to compare between males in a group. These studies mentioned are just a few of the possibilities for future studies of manatee reproductive endocrinology and behavior. There is so much more to be done.

APPENDIX A
ASSAY TRIALS & TRIBULATIONS

The protocol mentioned in Chapter Two was not the initial assay technique utilized to measure the steroid hormone concentrations in the Florida manatee. The initial assay was validated by the author, with wet weight fecal samples collected from zoo staff in previous years before this current study. The protocol developed for this initial assay was modified from the outline provided by Zettner (1973) and specific assays previously developed by Gross (1992). The assays utilized a solubilization and extraction step with either 100% ethanol (5 ml) and citrate buffer (5 ml) or 100% ethanol alone (10 ml). A fecal sample of 0.5g and 10ml of solution was solubilized overnight at room temperature. This was centrifuged and 1ml of the supernatant was decanted in duplicate. For the progesterone and estrogens assay 50 µl of a sulfatase and glucuronidase enzyme were added to cleave side chains off the hormones being measured. This was incubated overnight at 4°C. This solution was then extracted twice with ethyl ether, and dried under air. Antibody developed by Gross (personal communication, U.S.G.S., 1999) and ^{3}H radiolabeled steroids were then added to permit competition between radiolabeled hormone and native hormone for the antibody. This mixture was allowed to reach equilibrium overnight. Free hormone was separated from bound using a charcoal dextran solution and centrifugation. This sample was then put in the scintillation counter in order to quantify the amount of bound hormone that is radiolabeled. Controls utilized in these assays included duplicate sample tubes and standard hormone samples that were placed at the beginning and end of each assay.

The fecal RIA technique was re-validated to address some adjustments made to improve the original assay and some problems identified in previous analyses. One identified problem was high variation within sample duplicates. Changes made to the assay technique that at the time appeared to improve steroid measurement included: 1) drying samples to eliminate water content as a variable to steroid concentration, rather than wet fecal samples and; 2) the use of 90% ethanol/10% citrate buffer for a solubilization solution rather than the previous 50% ethanol/50% citrate buffer.

In re-validating the original fecal RIA there were difficulties in recovering the steroids from the dried fecal samples. Previous studies have indicated that lyophilizing samples decreased variance in hormone concentrations due to water content (Hodges 1986), but it is possible that drying the samples liberated an unknown binder. Male and female pools of wet fecal samples were made. Radiolabeled steroid was added to the pools for each of the 3 hormones measured. Samples were then dried. Only 10% of the radiolabeled steroids were recovered. Previous recoveries with wet weight samples had been: estradiol 36.9%, progesterone 71%, and testosterone 77.6%. Only 10% of the radiolabeled steroid were lost in the lyophilizer, to dry the samples. Therefore, eighty percent of the steroids were not being recovered.

Several different types of solubilization solutions found to be successful in other cited protocols were attempted, to try to improve the recovery of steroid from the fecal samples (Bamberg et al. 1991; Kirkpatrick et al. 1990; Risler et al. 1987). A 0.5 g of dried fecal sample was weighed out. The radiolabeled steroid and solubilization solution was then added and mixed over night. Four hundred microliters of the solubilized fecal solution were measured in scintillation fluid. The solubilization solutions tried are as follows: old method again with 50/50 ethanol and citrate buffer, 100% citrate buffer, 100% ethanol, addition of detergent to 50/50 ethanol and citrate, 50/50 mix of methanol and petroleum ether, 100% methanol, 100% petroleum ether, and a mix of chloroform with sodium hydroxide. The differences among the three hormones, estrogens, progesterone, and testosterone were also measured. Additionally, comparisons were made among the different animal groups: captive, wild, SeaWorld, Homosassa. We compared mixing overnight versus vortexing for 30 minutes. We also tried to re-hydrate the samples with water, sonicate and then add the solubilization solution.

It was finally discovered that the scintillation fluid used, ScintiVerse Cocktail (Fisher Scientific, http://www3.fishersci.com/) reacted with our organic solutions. Normally, in the full assay procedure the steroids were in an aqueous solution when added to the scintillation fluid. In contrast, to measure recoveries an abbreviated technique was followed that only involved the initial solubilization step in the assay. Once the scintillation fluid was changed to ScintiLene Cocktail (Fisher Scientific, http://www3.fishersci.com/), much higher recoveries were measured with our pooled fecal samples.

With the new scintillation fluid several solutions were re-examined with the pooled fecal samples. The best recovery was with the original solution of 50/50 ethanol and citrate buffer: estrogens 55%, progesterone 46%, testosterone 64%. Counts were further improved with a dry weight of 0.25 g rather than 0.5 g.

The next step was to check on variation of steroid recovery between fecal samples from different individuals rather than pooled fecal samples. A great deal of variation between different individuals was discovered, as much as a 2 to 3 fold difference in some cases. In addition, the recoveries after extraction indicated that extraction was not aiding in recovery at all. However, the data did indicate that within an individual the recovery of steroids was relatively constant.

A new protocol utilizing a step to heat the samples was tried (Wasser et al. 1991). Different variations of this protocol were also used. A different method for measuring recoveries was tried by adding a known amount of non-radiolabeled steroid and then going through all of the steps of the assay. A majority of the steroid added was still not recovered.

In another attempt to try more solubilization solutions that might improve recoveries, various pH levels, salt concentrations, chloroform, acetone and xylene were utilized. It was discovered that a pH of 3.7 for the citrate buffer did improve recoveries by approximately 20%. The utilization of the pH 3.7 citrate buffer had to be tested not only for direct recovery of steroids from the solubilization solution, but also from the extraction procedure. The extraction step did aid in the recovery of steroids with the 3.7 pH citrate buffer by about 10%. The use of enzymes to improve recovery of free steroids from the conjugated form was also tested to see if it improved recovery. It was also found to improve recovery at this stage by about 10%. Unfortunately the results from the parallelism test did not show any consistency of recovery when compared to a standard steroid curve, a curve with the solubilized solution from the fecal sample, and a curve with a charcoal stripped solution from the fecal sample.

The next step to try to improve steroid recovery from the manatee fecal samples was to use Sep-packs, which are a type of chromatography column, to separate the steroids from whatever may be binding to them in the solubilization solution (Axelson &

Sahlberg 1983; Vanluchene et al. 1983). The Sep-packs were wet with methanol and the solubilized fecal solution then was added. Methanol was used to elute the steroid. When comparing steroid concentrations with a blank citrate buffer/ethanol solution, citrate buffer/ethanol and fecal sample, and citrate buffer/ethanol with the fecal steroid stripped with charcoal, differences in concentrations were measured. Results from running a dilution curve (e.g. 1.0ml, 0.8, 0.6, 0.4, 0.2, 0.0 solubilized fecal solution) with the Sep-packs were ambiguous. An internal standard validation, where an incremental range of standard steroid concentrations was added to the solubilized fecal solution, should ideally exhibit a curve parallel to the standard curve, without solubilized fecal solution. However, the internal standard curve using the Sep-packs was flat except for the highest standard steroid concentration. These results indicate that the unknown binder was binding to the Sep-pack in a similar manner as the steroids. Several different options were discussed to continue working on the Sep-packs, but it was finally decided to try two kinds of kits for hormone RIA analysis available from ICN Biomedicals, Inc. The first kit was a coat-a-count tube kit, with the antibody coated on the inside of the tube to which you add your fecal sample solution. The second kit was a double antibody kit. Both kits utilized ^{125}I radiolabeled steroids which requires a gamma counter rather than the scintillation counter used with the tritium to measure the level of radiation in the samples.

The first trials with the coat-a-count kit indicated that it probably could not work around the unknown binder. The double antibody kit was tried and the results were promising. Dilution curves for estradiol appeared to be similar to the standard curve. Double antibody kits for all three hormones (17β-estradiol, progesterone, and testosterone) were ordered. Dilution curves and internal standards were run. The results indicated that both curves were similar to the standard curves for all three hormones and that the assay was working. The next step was to solubilize samples from individuals of different groups (e.g. female adult, female pregnant, female lactating, calves, and male adult) to see if the technique could identify biologically relevant differences between the animals. The testosterone assay clearly identified males with higher concentrations of testosterone than the other groups of animals. However, the progesterone and estradiol assays were not reflective of other mammals and identified the males with the highest concentrations. As before, enzymes were added to cleave the side chains and provide unconjugated steroids for the assay to measure. The results still did not indicate that the pregnant females should have the highest progesterone concentrations.

17α–hydorxyprogesterone kits were utilized to try to resolve the problem, but were not successful. It is possible that some androgen metabolites may be cross-reacting with the progesterone antibody.

APPENDIX B
HORMONE CONCENTRATIONS

Key Sex:	Age:	Location:
F = Female	A=Adult	HS=Homosassa
M=Male	J=Juvenile	SWF=SeaWorld
	C=Calf	Wildwp=Wild with plasma
	AP=Pregnant	
	AL=Lactating	

ID	Date	Month	Sex	Age	Prog	Est	Test	Day	Location	Sample	E/P	P/T
Ariel	1/3/96	Jan	F	A	2.34	444.44	127.83	3	HS	rectal	0.19	0.02
Ariel	1/10/96	Jan	F	A	47.25	444.44	.	10	HS	rectal	0.01	.
Ariel	1/17/96	Jan	F	A	2.34	5387.73	.	17	HS	rectal	2.30	.
Ariel	1/24/96	Jan	F	A	215.45	444.44	.	24	HS	rectal	0.00	.
Ariel	1/31/96	Jan	F	A	177.21	444.44	.	31	HS	rectal	0.00	.
Ariel	2/7/96	Feb	F	A	83.73	444.44	207.73	38	HS	rectal	0.01	0.40
Ariel	2/14/96	Feb	F	A	2.34	444.44	.	45	HS	rectal	0.19	.
Ariel	2/21/96	Feb	F	A	475.08	444.44	.	52	HS	rectal	0.00	.
Ariel	2/28/96	Feb	F	A	220.39	4589.61	.	59	HS	rectal	0.02	.
Ariel	3/6/96	Mar	F	A	2.34	444.44	.	66	HS	rectal	0.19	.
Ariel	3/13/96	Mar	F	A	93.59	444.44	.	73	HS	rectal	0.00	.
Ariel	3/20/96	Mar	F	A	2.34	444.44	.	80	HS	rectal	0.19	.
Ariel	3/27/96	Mar	F	A	2.34	444.44	.	87	HS	rectal	0.19	.
Ariel	4/10/96	Apr	F	A	2.34	444.44	.	101	HS	rectal	0.19	.
Ariel	4/17/96	Apr	F	A	2.34	.	.	108	HS	rectal	.	.
Ariel	4/24/96	Apr	F	A	2.34	1687.91	.	115	HS	rectal	0.72	.
Ariel	5/1/96	May	F	A	2.34	444.44	.	122	HS	rectal	0.19	.
Ariel	5/8/96	May	F	A	2.34	444.44	.	129	HS	rectal	0.19	.
Ariel	5/15/96	May	F	A	2.34	444.44	.	136	HS	rectal	0.19	.
Ariel	5/22/96	May	F	A	2.34	444.44	169.97	143	HS	rectal	0.19	0.01
Ariel	5/29/96	May	F	A	2.34	444.44	.	150	HS	rectal	0.19	.
Ariel	6/5/96	Jun	F	A	2.34	444.44	.	157	HS	rectal	0.19	.
Ariel	6/12/96	Jun	F	A	2.34	444.44	.	164	HS	rectal	0.19	.
Ariel	6/19/96	Jun	F	A	2.34	444.44	.	171	HS	rectal	0.19	.
Ariel	6/26/96	Jun	F	A	94.46	444.44	312.15	178	HS	rectal	0.00	0.30
Ariel	7/3/96	Jul	F	A	2.34	444.44	.	185	HS	rectal	0.19	.
Ariel	7/10/96	Jul	F	A	2.34	444.44	.	192	HS	rectal	0.19	.
Ariel	7/17/96	Jul	F	A	2.34	444.44	.	199	HS	rectal	0.19	.
Ariel	7/31/96	Jul	F	A	2.34	444.44	118.99	213	HS	rectal	0.19	0.02
Ariel	8/7/96	Aug	F	A	433.43	444.44	.	220	HS	rectal	0.00	.
Ariel	8/14/96	Aug	F	A	27.63	444.44	.	227	HS	rectal	0.02	.

ID	Date	Month	Sex	Age	Prog	Est	Test	Day	Location	Sample	E/P	P/T
Ariel	8/21/96	Aug	F	A	11.80	15211.78	.	234	HS	rectal	1.29	.
Ariel	8/28/96	Aug	F	A	22.38	444.44	.	241	HS	rectal	0.02	.
Ariel	9/4/96	Sep	F	A	454.58	444.44	.	248	HS	rectal	0.00	.
Ariel	9/11/96	Sep	F	A	136.80	444.44	.	255	HS	rectal	0.00	.
Ariel	9/25/96	Sep	F	A	6.20	444.44	.	269	HS	rectal	0.07	.
Ariel	10/2/96	Oct	F	A	2.34	444.44	.	276	HS	rectal	0.19	.
Ariel	10/9/96	Oct	F	A	2.34	444.44	.	283	HS	rectal	0.19	.
Ariel	10/16/96	Oct	F	A	23.09	444.44	.	290	HS	rectal	0.02	.
Ariel	10/23/96	Oct	F	A	140.02	444.44	.	297	HS	rectal	0.00	.
Ariel	10/30/96	Oct	F	A	178.77	444.44	.	304	HS	rectal	0.00	.
Ariel	11/6/96	Nov	F	A	15.32	444.44	.	311	HS	rectal	0.03	.
Ariel	11/14/96	Nov	F	A	232.63	444.44	.	319	HS	rectal	0.00	.
Ariel	11/20/96	Nov	F	A	99.80	444.44	.	325	HS	rectal	0.00	.
Ariel	11/27/96	Nov	F	A	76.24	444.44	.	332	HS	rectal	0.01	.
Ariel	12/4/96	Dec	F	A	23.75	444.44	.	339	HS	rectal	0.02	.
Ariel	12/11/96	Dec	F	A	61.34	444.44	.	346	HS	rectal	0.01	.
Ariel	12/18/96	Dec	F	A	52.29	444.44	152.98	353	HS	rectal	0.01	0.34
Ariel	12/26/96	Dec	F	A	2.34	2128.86	.	361	HS	rectal	0.91	.
Ariel	11/20/97	Nov	F	A	557.08	444.44	.	308	HS	rectal	0.00	.
Amanda	1/3/96	Jan	F	A	121.11	444.44	305.14	3	HS	rectal	0.00	0.40
Amanda	1/10/96	Jan	F	A	2.34	444.44	.	10	HS	rectal	0.19	.
Amanda	1/17/96	Jan	F	A	63.10	5087.45	.	17	HS	rectal	0.08	.
Amanda	1/24/96	Jan	F	A	51.90	444.44	.	24	HS	rectal	0.01	.
Amanda	1/31/96	Jan	F	A	184.08	444.44	.	31	HS	rectal	0.00	.
Amanda	2/7/96	Feb	F	A	153.52	444.44	312.63	38	HS	rectal	0.00	0.49
Amanda	2/14/96	Feb	F	A	131.40	444.44	.	45	HS	rectal	0.00	.
Amanda	2/21/96	Feb	F	A	263.15	14856.18	.	52	HS	rectal	0.06	.
Amanda	2/28/96	Feb	F	A	52.91	444.44	.	59	HS	rectal	0.01	.
Amanda	3/6/96	Mar	F	A	138.72	444.44	.	66	HS	rectal	0.00	.
Amanda	3/13/96	Mar	F	A	253.49	444.44	.	73	HS	rectal	0.00	.
Amanda	3/20/96	Mar	F	A	306.75	444.44	.	80	HS	rectal	0.00	.
Amanda	3/27/96	Mar	F	A	29.49	444.44	.	87	HS	rectal	0.02	.
Amanda	4/3/96	Apr	F	A	2.34	444.44	.	94	HS	rectal	0.19	.
Amanda	4/10/96	Apr	F	A	2.34	444.44	.	101	HS	rectal	0.19	.
Amanda	4/17/96	Apr	F	A	2.34	444.44	.	108	HS	rectal	0.19	.
Amanda	4/24/96	Apr	F	A	2.34	444.44	.	115	HS	rectal	0.19	.
Amanda	5/1/96	May	F	A	2.34	444.44	.	122	HS	rectal	0.19	.
Amanda	5/8/96	May	F	A	2.34	.	.	129	HS	rectal	.	.
Amanda	5/15/96	May	F	A	2.34	.	.	136	HS	rectal	.	.
Amanda	5/22/96	May	F	A	2.34	444.44	130.97	143	HS	rectal	0.19	0.02
Amanda	5/29/96	May	F	A	71.43	444.44	.	150	HS	rectal	0.01	.
Amanda	6/5/96	Jun	F	A	73.25	444.44	.	157	HS	rectal	0.01	.
Amanda	6/12/96	Jun	F	A	2.34	.	.	164	HS	rectal	.	.
Amanda	6/19/96	Jun	F	A	184.50	444.44	.	171	HS	rectal	0.00	.
Amanda	6/26/96	Jun	F	A	18.48	444.44	279.05	178	HS	rectal	0.02	0.07
Amanda	7/3/96	Jul	F	A	2.34	444.44	.	185	HS	rectal	0.19	.
Amanda	7/10/96	Jul	F	A	2.34	444.44	.	192	HS	rectal	0.19	.
Amanda	7/17/96	Jul	F	A	2.34	444.44	.	199	HS	rectal	0.19	.

ID	Date	Month	Sex	Age	Prog	Est	Test	Day	Location	Sample	E/P	P/T
Amanda	7/24/96	Jul	F	A	2.34	444.44	.	206	HS	rectal	0.19	.
Amanda	7/31/96	Jul	F	A	2.34	9971.02	462.18	213	HS	rectal	4.26	0.01
Amanda	8/14/96	Aug	F	A	86.36	444.44	.	227	HS	rectal	0.01	.
Amanda	8/21/96	Aug	F	A	174.19	444.44	.	234	HS	rectal	0.00	.
Amanda	8/28/96	Aug	F	A	2.34	444.44	.	241	HS	rectal	0.19	.
Amanda	9/11/96	Sep	F	A	557.08	444.44	.	255	HS	rectal	0.00	.
Amanda	9/18/96	Sep	F	A	275.78	444.44	.	262	HS	rectal	0.00	.
Amanda	9/25/96	Sep	F	A	493.63	3951.11	.	269	HS	rectal	0.01	.
Amanda	10/2/96	Oct	F	A	186.78	444.44	.	276	HS	rectal	0.00	.
Amanda	10/9/96	Oct	F	A	29.73	444.44	.	283	HS	rectal	0.01	.
Amanda	10/16/96	Oct	F	A	487.77	444.44	.	290	HS	rectal	0.00	.
Amanda	10/23/96	Oct	F	A	285.60	444.44	.	297	HS	rectal	0.00	.
Amanda	10/30/96	Oct	F	A	316.65	444.44	.	304	HS	rectal	0.00	.
Amanda	11/6/96	Nov	F	A	2.34	444.44	.	311	HS	rectal	0.19	.
Amanda	11/14/96	Nov	F	A	88.93	444.44	.	319	HS	rectal	0.00	.
Amanda	11/20/96	Nov	F	A	2.34	444.44	.	325	HS	rectal	0.19	.
Amanda	11/27/96	Nov	F	A	2.34	444.44	.	332	HS	rectal	0.19	.
Amanda	12/4/96	Dec	F	A	2.34	444.44	.	339	HS	rectal	0.19	.
Amanda	12/11/96	Dec	F	A	2.34	444.44	.	346	HS	rectal	0.19	.
Amanda	12/18/96	Dec	F	A	2.34	444.44	274.46	353	HS	rectal	0.19	0.01
Amanda	1/7/96	Jan	F	A	41.03	7908.54	.	7	HS	rectal	0.19	.
Amanda	1/14/96	Jan	F	A	23.77	2313.77	.	14	HS	rectal	0.10	.
Amanda	1/21/96	Jan	F	A	2.34	20040.03	.	21	HS	rectal	8.56	.
Amanda	1/28/96	Jan	F	A	2.34	4802.97	.	28	HS	rectal	2.05	.
Amanda	2/4/96	Feb	F	A	2.34	1975.56	.	35	HS	rectal	0.84	.
Amanda	2/11/96	Feb	F	A	2.34	8324.20	.	42	HS	rectal	3.56	.
Amanda	2/18/96	Feb	F	A	44.32	6509.85	.	49	HS	rectal	0.15	.
Amanda	2/25/96	Feb	F	A	70.58	11652.62	.	56	HS	rectal	0.17	.
Amanda	3/3/96	Mar	F	A	8.05	4921.50	.	63	HS	rectal	0.61	.
Amanda	3/10/96	Mar	F	A	21.84	7823.20	.	70	HS	rectal	0.36	.
Amanda	3/22/96	Mar	F	A	2.34	444.44	.	82	HS	rectal	0.19	.
Amanda	3/24/96	Mar	F	A	2.34	5444.63	.	84	HS	rectal	2.33	.
Amanda	3/25/96	Mar	F	A	58.08	20545.78	.	85	HS	rectal	0.35	.
Amanda	3/26/96	Mar	F	A	2.34	8259.40	.	86	HS	rectal	3.53	.
Amanda	3/28/96	Mar	F	A	80.70	10024.76	.	88	HS	rectal	0.12	.
Amanda	3/30/96	Mar	F	A	332.23	11123.17	.	90	HS	rectal	0.03	.
Amanda	3/31/96	Mar	F	A	65.93	589.66	.	91	HS	rectal	0.01	.
Amanda	4/2/96	Apr	F	A	78.29	6653.67	.	93	HS	rectal	0.08	.
Amanda	4/7/96	Apr	F	A	5.31	3538.61	.	98	HS	rectal	0.67	.
Amanda	4/14/96	Apr	F	A	62.41	467.18	.	105	HS	rectal	0.01	.
Amanda	4/21/96	Apr	F	A	37.42	.	.	112	HS	rectal	.	.
Amanda	4/28/96	Apr	F	A	.	.	.	119	HS	rectal	.	.
Amanda	5/5/96	May	F	A	2.34	1276.68	.	126	HS	rectal	0.55	.
Amanda	5/12/96	May	F	A	2.34	1478.66	.	133	HS	rectal	0.63	.
Amanda	5/19/96	May	F	A	2.34	7597.20	.	140	HS	rectal	3.25	.
Amanda	5/26/96	May	F	A	2.34	8079.23	.	147	HS	rectal	3.45	.
Amanda	6/2/96	Jun	F	A	2.79	9609.10	.	154	HS	rectal	3.45	.
Amanda	6/9/96	Jun	F	A	4.62	444.44	.	161	HS	rectal	0.10	.

ID	Date	Month	Sex	Age	Prog	Est	Test	Day	Location	Sample	E/P	P/T
Amanda	6/16/96	Jun	F	A	15.16	7326.94	.	168	HS	rectal	0.48	.
Amanda	6/23/96	Jun	F	A	37.10	668.69	.	175	HS	rectal	0.02	.
Amanda	7/7/96	Jul	F	A	2.34	13604.46	.	189	HS	rectal	5.81	.
Amanda	7/14/96	Jul	F	A	38.07	9640.71	.	196	HS	rectal	0.25	.
Amanda	7/20/96	Jul	F	A	2.34	10506.79	.	202	HS	rectal	4.49	.
Amanda	7/28/96	Jul	F	A	2.34	2512.91	.	210	HS	rectal	1.07	.
Amanda	8/4/96	Aug	F	A	2.34	10326.62	.	217	HS	rectal	4.41	.
Amanda	8/11/96	Aug	F	A	6.53	4575.39	.	224	HS	rectal	0.70	.
Amanda	8/18/96	Aug	F	A	154.47	6497.21	.	231	HS	rectal	0.04	.
Amanda	8/25/96	Aug	F	A	100.13	533.72	.	238	HS	rectal	0.01	.
Amanda	9/1/96	Sep	F	A	24.81	10464.12	.	245	HS	rectal	0.42	.
Amanda	9/8/96	Sep	F	A	62.87	8475.92	.	252	HS	rectal	0.13	.
Amanda	9/15/96	Sep	F	A	68.59	577.65	.	259	HS	rectal	0.01	.
Amanda	9/22/96	Sep	F	A	14.83	896.74	.	266	HS	rectal	0.06	.
Amanda	9/29/96	Sep	F	A	35.79	28179.32	.	273	HS	rectal	0.79	.
Amanda	10/6/96	Oct	F	A	23.45	14442.10	.	280	HS	rectal	0.62	.
Amanda	10/13/96	Oct	F	A	183.40	2805.29	.	287	HS	rectal	0.02	.
Amanda	10/20/96	Oct	F	A	83.79	444.44	.	294	HS	rectal	0.01	.
Amanda	10/27/96	Oct	F	A	2.34	444.44	.	301	HS	rectal	0.19	.
Amanda	11/3/96	Nov	F	A	206.53	619.69	.	308	HS	rectal	0.00	.
Amanda	11/10/96	Nov	F	A	11.02	3001.26	.	315	HS	rectal	0.27	.
Amanda	11/17/96	Nov	F	A	40.64	3224.11	.	322	HS	rectal	0.08	.
Amanda	11/24/96	Nov	F	A	115.61	444.44	.	329	HS	rectal	0.00	.
Amanda	12/1/96	Dec	F	A	166.57	444.44	.	336	HS	rectal	0.00	.
Amanda	12/8/96	Dec	F	A	122.25	614.32	.	343	HS	rectal	0.01	.
Amanda	12/15/96	Dec	F	A	220.13	5969.34	.	350	HS	rectal	0.03	.
Amanda	12/22/96	Dec	F	A	104.06	765.88	.	357	HS	rectal	0.01	.
Amanda	12/29/96	Dec	F	A	4.05	669.16	.	364	HS	rectal	0.17	.
Betsy	1/17/96	Jan	F	A	378.11	444.44	337.27	17	HS	rectal	0.00	1.12
Betsy	1/31/96	Jan	F	A	261.88	444.44	.	31	HS	rectal	0.00	.
Betsy	2/28/96	Feb	F	A	322.05	444.44	247.64	59	HS	rectal	0.00	1.30
Betsy	3/6/96	Mar	F	A	317.72	444.44	.	66	HS	rectal	0.00	.
Betsy	3/13/96	Mar	F	A	239.62	512.38	.	73	HS	rectal	0.00	.
Betsy	3/27/96	Mar	F	A	37.26	444.44	.	87	HS	rectal	0.01	.
Betsy	4/3/96	Apr	F	A	15.47	444.44	.	94	HS	rectal	0.03	.
Betsy	4/17/96	Apr	F	A	119.26	444.44	.	108	HS	rectal	0.00	.
Betsy	4/24/96	Apr	F	A	191.69	444.44	.	115	HS	rectal	0.00	.
Betsy	5/1/96	May	F	A	161.43	444.44	.	122	HS	rectal	0.00	.
Betsy	5/15/96	May	F	A	261.04	444.44	.	136	HS	rectal	0.00	.
Betsy	5/22/96	May	F	A	197.00	444.44	111.91	143	HS	rectal	0.00	1.76
Betsy	5/29/96	May	F	A	162.80	444.44	.	150	HS	rectal	0.00	.
Betsy	6/5/96	Jun	F	A	100.48	444.44	.	157	HS	rectal	0.00	.
Betsy	6/12/96	Jun	F	A	323.09	444.44	.	164	HS	rectal	0.00	.
Betsy	6/19/96	Jun	F	A	254.30	444.44	.	171	HS	rectal	0.00	.
Betsy	6/26/96	Jun	F	A	163.68	444.44	166.78	178	HS	rectal	0.00	0.98
Betsy	7/3/96	Jul	F	A	83.66	444.44	.	185	HS	rectal	0.01	.
Betsy	7/10/96	Jul	F	A	144.35	444.44	.	192	HS	rectal	0.00	.
Betsy	7/31/96	Jul	F	A	293.90	444.44	203.11	213	HS	rectal	0.00	1.45

ID	Date	Month	Sex	Age	Prog	Est	Test	Day	Location	Sample	E/P	P/T
Betsy	8/7/96	Aug	F	A	277.76	4684.44	.	220	HS	rectal	0.02	.
Betsy	8/14/96	Aug	F	A	223.16	1214.73	.	227	HS	rectal	0.01	.
Betsy	8/21/96	Aug	F	A	905.26	444.44	.	234	HS	rectal	0.00	.
Betsy	8/28/96	Aug	F	A	559.04	444.44	.	241	HS	rectal	0.00	.
Betsy	9/4/96	Sep	F	A	121.50	444.44	.	248	HS	rectal	0.00	.
Betsy	9/11/96	Sep	F	A	264.68	4904.12	.	255	HS	rectal	0.02	.
Betsy	9/25/96	Sep	F	A	433.11	444.44	.	269	HS	rectal	0.00	.
Betsy	10/9/96	Oct	F	A	253.81	444.44	.	283	HS	rectal	0.00	.
Betsy	10/16/96	Oct	F	A	560.34	5008.43	.	290	HS	rectal	0.01	.
Betsy	10/23/96	Oct	F	A	319.25	444.44	.	297	HS	rectal	0.00	.
Betsy	10/30/96	Oct	F	A	666.42	444.44	.	304	HS	rectal	0.00	.
Betsy	11/6/96	Nov	F	A	1082.93	444.44	.	311	HS	rectal	0.00	.
Betsy	11/14/96	Nov	F	A	417.81	444.44	.	319	HS	rectal	0.00	.
Betsy	11/20/96	Nov	F	A	250.43	444.44	.	325	HS	rectal	0.00	.
Betsy	11/27/96	Nov	F	A	285.44	444.44	.	332	HS	rectal	0.00	.
Betsy	12/4/96	Dec	F	A	344.60	444.44	.	339	HS	rectal	0.00	.
Betsy	12/11/96	Dec	F	A	304.70	444.44	.	346	HS	rectal	0.00	.
Betsy	12/18/96	Dec	F	A	165.69	444.44	165.59	353	HS	rectal	0.00	1.00
Betsy	12/26/96	Dec	F	A	288.14	444.44	.	361	HS	rectal	0.00	.
Lorelei	1/3/96	Jan	F	A	2.34	444.44	106.64	3	HS	rectal	0.19	0.02
Lorelei	1/10/96	Jan	F	A	5.02	444.44	.	10	HS	rectal	0.09	.
Lorelei	1/17/96	Jan	F	A	2.47	444.44	.	17	HS	rectal	0.18	.
Lorelei	1/24/96	Jan	F	A	51.02	444.44	.	24	HS	rectal	0.01	.
Lorelei	1/31/96	Jan	F	A	2.34	444.44	.	31	HS	rectal	0.19	.
Lorelei	2/7/96	Feb	F	A	2.34	444.44	137.83	38	HS	rectal	0.19	0.02
Lorelei	2/14/96	Feb	F	A	21.09	444.44	.	45	HS	rectal	0.02	.
Lorelei	2/21/96	Feb	F	A	62.18	444.44	.	52	HS	rectal	0.01	.
Lorelei	2/28/96	Feb	F	A	51.87	444.44	.	59	HS	rectal	0.01	.
Lorelei	3/6/96	Mar	F	A	30.95	444.44	.	66	HS	rectal	0.01	.
Lorelei	3/13/96	Mar	F	A	24.82	444.44	.	73	HS	rectal	0.02	.
Lorelei	3/20/96	Mar	F	A	2.34	444.44	.	80	HS	rectal	0.19	.
Lorelei	3/27/96	Mar	F	A	8.69	444.44	.	87	HS	rectal	0.05	.
Lorelei	4/3/96	Apr	F	A	2.34	444.44	.	94	HS	rectal	0.19	.
Lorelei	4/10/96	Apr	F	A	2.34	444.44	.	101	HS	rectal	0.19	.
Lorelei	4/17/96	Apr	F	A	127.85	444.44	.	108	HS	rectal	0.00	.
Lorelei	4/24/96	Apr	F	A	2.34	444.44	.	115	HS	rectal	0.19	.
Lorelei	5/1/96	May	F	A	2.34	444.44	.	122	HS	rectal	0.19	.
Lorelei	5/8/96	May	F	A	4.59	444.44	.	129	HS	rectal	0.10	.
Lorelei	5/22/96	May	F	A	20.40	444.44	171.20	143	HS	rectal	0.02	0.12
Lorelei	5/29/96	May	F	A	24.80	444.44	.	150	HS	rectal	0.02	.
Lorelei	6/5/96	Jun	F	A	35.66	444.44	.	157	HS	rectal	0.01	.
Lorelei	6/12/96	Jun	F	A	98.01	444.44	.	164	HS	rectal	0.00	.
Lorelei	6/19/96	Jun	F	A	2.34	444.44	90.58	171	HS	rectal	0.19	0.03
Lorelei	7/10/96	Jul	F	A	2.34	444.44	.	192	HS	rectal	0.19	.
Lorelei	7/17/96	Jul	F	A	2.34	444.44	.	199	HS	rectal	0.19	.
Lorelei	7/24/96	Jul	F	A	2.34	444.44	.	206	HS	rectal	0.19	.
Lorelei	7/31/96	Jul	F	A	2.34	444.44	131.62	213	HS	rectal	0.19	0.02
Lorelei	8/21/96	Aug	F	A	2.34	444.44	.	234	HS	rectal	0.19	.

ID	Date	Month	Sex	Age	Prog	Est	Test	Day	Location	Sample	E/P	P/T
Lorelei	8/28/96	Aug	F	A	2.34	444.44	.	241	HS	rectal	0.19	.
Lorelei	9/4/96	Sep	F	A	2.34	444.44	.	248	HS	rectal	0.19	.
Lorelei	9/11/96	Sep	F	A	9.24	444.44	.	255	HS	rectal	0.05	.
Lorelei	9/25/96	Sep	F	A	5.69	444.44	.	269	HS	rectal	0.08	.
Lorelei	10/2/96	Oct	F	A	106.83	444.44	.	276	HS	rectal	0.00	.
Lorelei	10/9/96	Oct	F	A	21.42	444.44	.	283	HS	rectal	0.02	.
Lorelei	10/16/96	Oct	F	A	131.59	444.44	.	290	HS	rectal	0.00	.
Lorelei	10/23/96	Oct	F	A	23.50	444.44	.	297	HS	rectal	0.02	.
Lorelei	10/30/96	Oct	F	A	2.34	444.44	.	304	HS	rectal	0.19	.
Lorelei	11/6/96	Nov	F	A	2.34	444.44	.	311	HS	rectal	0.19	.
Lorelei	11/14/96	Nov	F	A	2.34	444.44	.	319	HS	rectal	0.19	.
Lorelei	11/20/96	Nov	F	A	2.34	444.44	.	325	HS	rectal	0.19	.
Lorelei	11/27/96	Nov	F	A	2.34	444.44	.	332	HS	rectal	0.19	.
Lorelei	12/4/96	Dec	F	A	2.34	444.44	.	339	HS	rectal	0.19	.
Lorelei	12/11/96	Dec	F	A	18.59	444.44	.	346	HS	rectal	0.02	.
Lorelei	12/18/96	Dec	F	A	8.07	444.44	201.83	353	HS	rectal	0.06	0.04
Lorelei	12/26/96	Dec	F	A	2.34	444.44	.	361	HS	rectal	0.19	.
Rachel	1/3/96	Jan	F	A	42.14	444.44	80.00	3	HS	rectal	0.01	0.53
Rachel	1/10/96	Jan	F	A	99.28	444.44	.	10	HS	rectal	0.00	.
Rachel	1/17/96	Jan	F	A	28.24	444.44	.	17	HS	rectal	0.02	.
Rachel	1/24/96	Jan	F	A	13.24	444.44	.	24	HS	rectal	0.03	.
Rachel	1/31/96	Jan	F	A	110.83	444.44	.	31	HS	rectal	0.00	.
Rachel	2/7/96	Feb	F	A	14.39	444.44	81.08	38	HS	rectal	0.03	0.18
Rachel	2/14/96	Feb	F	A	24.36	444.44	.	45	HS	rectal	0.02	.
Rachel	2/21/96	Feb	F	A	202.66	1082.45	.	52	HS	rectal	0.01	.
Rachel	2/28/96	Feb	F	A	.	.	.	59	HS	rectal	.	.
Rachel	3/6/96	Mar	F	A	108.13	444.44	.	66	HS	rectal	0.00	.
Rachel	3/13/96	Mar	F	A	77.02	444.44	.	73	HS	rectal	0.01	.
Rachel	4/10/96	Apr	F	A	26.73	444.44	.	101	HS	rectal	0.02	.
Rachel	4/17/96	Apr	F	A	68.69	444.44	.	108	HS	rectal	0.01	.
Rachel	4/24/96	Apr	F	A	28.98	444.44	.	115	HS	rectal	0.02	.
Rachel	5/1/96	May	F	A	46.66	444.44	.	122	HS	rectal	0.01	.
Rachel	5/8/96	May	F	A	130.09	444.44	.	129	HS	rectal	0.00	.
Rachel	5/15/96	May	F	A	289.35	444.44	.	136	HS	rectal	0.00	.
Rachel	5/22/96	May	F	A	30.09	444.44	80.00	143	HS	rectal	0.01	0.38
Rachel	6/5/96	Jun	F	A	98.08	444.44	.	157	HS	rectal	0.00	.
Rachel	6/12/96	Jun	F	A	153.65	444.44	.	164	HS	rectal	0.00	.
Rachel	6/19/96	Jun	F	A	434.41	444.44	.	171	HS	rectal	0.00	.
Rachel	6/26/96	Jun	F	A	130.23	444.44	245.22	178	HS	rectal	0.00	0.53
Rachel	7/3/96	Jul	F	A	23.67	444.44	.	185	HS	rectal	0.02	.
Rachel	7/17/96	Jul	F	A	2.34	444.44	.	199	HS	rectal	0.19	.
Rachel	7/31/96	Jul	F	A	63.78	444.44	259.24	213	HS	rectal	0.01	0.25
Rachel	8/7/96	Aug	F	A	71.10	7336.42	.	220	HS	rectal	0.10	.
Rachel	8/14/96	Aug	F	A	10.59	2089.35	.	227	HS	rectal	0.20	.
Rachel	8/21/96	Aug	F	A	2.34	818.51	.	234	HS	rectal	0.35	.
Rachel	10/2/96	Oct	F	A	540.16	444.44	.	276	HS	rectal	0.00	.
Rachel	10/9/96	Oct	F	A	296.18	444.44	.	283	HS	rectal	0.00	.
Rachel	10/30/96	Oct	F	A	44.35	444.44	.	304	HS	rectal	0.01	.

ID	Date	Month	Sex	Age	Prog	Est	Test	Day	Location	Sample	E/P	P/T
Rachel	11/6/96	Nov	F	A	43.12	444.44	.	311	HS	rectal	0.01	.
Rachel	11/14/96	Nov	F	A	44.84	12452.32	.	319	HS	rectal	0.28	.
Rachel	11/20/96	Nov	F	A	31.51	444.44	.	325	HS	rectal	0.01	.
Rachel	11/27/96	Nov	F	A	112.10	444.44	.	332	HS	rectal	0.00	.
Rachel	12/11/96	Dec	F	A	160.19	444.44	.	346	HS	rectal	0.00	.
Rachel	12/18/96	Dec	F	A	72.11	444.44	250.06	353	HS	rectal	0.01	0.29
Rachel	12/26/96	Dec	F	A	553.83	444.44	.	361	HS	rectal	0.00	.
Rosie	1/3/96	Jan	F	A	50.60	444.44	148.22	3	HS	rectal	0.01	0.34
Rosie	1/10/96	Jan	F	A	304.02	444.44	.	10	HS	rectal	0.00	.
Rosie	1/17/96	Jan	F	A	80.96	1948.69	.	17	HS	rectal	0.02	.
Rosie	1/24/96	Jan	F	A	97.59	444.44	.	24	HS	rectal	0.00	.
Rosie	1/31/96	Jan	F	A	52.03	444.44	.	31	HS	rectal	0.01	.
Rosie	2/7/96	Feb	F	A	116.59	444.44	122.93	38	HS	rectal	0.00	0.95
Rosie	2/14/96	Feb	F	A	159.74	444.44	.	45	HS	rectal	0.00	.
Rosie	2/21/96	Feb	F	A	123.13	444.44	.	52	HS	rectal	0.00	.
Rosie	2/28/96	Feb	F	A	264.68	444.44	.	59	HS	rectal	0.00	.
Rosie	3/6/96	Mar	F	A	369.00	444.44	.	66	HS	rectal	0.00	.
Rosie	3/13/96	Mar	F	A	364.45	5966.18	.	73	HS	rectal	0.02	.
Rosie	3/20/96	Mar	F	A	97.13	444.44	.	80	HS	rectal	0.00	.
Rosie	3/27/96	Mar	F	A	195.40	444.44	.	87	HS	rectal	0.00	.
Rosie	4/3/96	Apr	F	A	237.67	444.44	.	94	HS	rectal	0.00	.
Rosie	4/10/96	Apr	F	A	78.06	7440.73	.	101	HS	rectal	0.10	.
Rosie	4/17/96	Apr	F	A	118.71	1839.64	.	108	HS	rectal	0.02	.
Rosie	5/1/96	May	F	A	364.45	444.44	.	122	HS	rectal	0.00	.
Rosie	5/8/96	May	F	A	120.11	444.44	.	129	HS	rectal	0.00	.
Rosie	5/22/96	May	F	A	30.39	444.44	80.00	143	HS	rectal	0.01	0.38
Rosie	5/29/96	May	F	A	411.63	444.44	.	150	HS	rectal	0.00	.
Rosie	6/5/96	Jun	F	A	330.93	444.44	.	157	HS	rectal	0.00	.
Rosie	6/12/96	Jun	F	A	263.51	444.44	.	164	HS	rectal	0.00	.
Rosie	6/19/96	Jun	F	A	80.89	12980.19	.	171	HS	rectal	0.16	.
Rosie	6/26/96	Jun	F	A	72.40	18254.13	212.51	178	HS	rectal	0.25	0.34
Rosie	7/3/96	Jul	F	A	108.26	444.44	.	185	HS	rectal	0.00	.
Rosie	7/10/96	Jul	F	A	322.73	444.44	.	192	HS	rectal	0.00	.
Rosie	7/17/96	Jul	F	A	151.64	444.44	.	199	HS	rectal	0.00	.
Rosie	7/24/96	Jul	F	A	129.09	3171.95	.	206	HS	rectal	0.02	.
Rosie	7/31/96	Jul	F	A	195.31	444.44	113.58	213	HS	rectal	0.00	1.72
Rosie	8/7/96	Aug	F	A	249.78	444.44	.	220	HS	rectal	0.00	.
Rosie	8/14/96	Aug	F	A	84.31	444.44	.	227	HS	rectal	0.01	.
Rosie	8/21/96	Aug	F	A	108.29	13214.09	.	234	HS	rectal	0.12	.
Rosie	8/28/96	Aug	F	A	216.62	3127.70	.	241	HS	rectal	0.01	.
Rosie	9/4/96	Sep	F	A	249.61	444.44	.	248	HS	rectal	0.00	.
Rosie	9/11/96	Sep	F	A	634.20	444.44	.	255	HS	rectal	0.00	.
Rosie	9/18/96	Sep	F	A	106.54	444.44	.	262	HS	rectal	0.00	.
Rosie	9/25/96	Sep	F	A	509.25	444.44	.	269	HS	rectal	0.00	.
Rosie	10/2/96	Oct	F	A	260.25	444.44	.	276	HS	rectal	0.00	.
Rosie	10/9/96	Oct	F	A	505.67	444.44	.	283	HS	rectal	0.00	.
Rosie	10/16/96	Oct	F	A	777.71	444.44	.	290	HS	rectal	0.00	.
Rosie	10/23/96	Oct	F	A	765.99	444.44	.	297	HS	rectal	0.00	.

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Rosie	10/30/96	Oct	F	A	524.22	444.44	.	304	HS	rectal	0.00	.
Rosie	11/6/96	Nov	F	A	182.97	444.44	.	311	HS	rectal	0.00	.
Rosie	11/14/96	Nov	F	A	298.52	444.44	.	319	HS	rectal	0.00	.
Rosie	11/20/96	Nov	F	A	121.99	444.44	.	325	HS	rectal	0.00	.
Rosie	11/27/96	Nov	F	A	575.63	444.44	.	332	HS	rectal	0.00	.
Rosie	12/4/96	Dec	F	A	399.59	444.44	.	339	HS	rectal	0.00	.
Rosie	12/11/96	Dec	F	A	134.10	444.44	.	346	HS	rectal	0.00	.
Rosie	12/18/96	Dec	F	A	152.87	475.71	217.49	353	HS	rectal	0.00	0.70
Rosie	12/26/96	Dec	F	A	122.77	2299.55	.	361	HS	rectal	0.02	.
Rosie	1/7/96	Jan	F	A	35.27	1456.54	.	7	HS	rectal	0.04	.
Rosie	1/14/96	Jan	F	A	2.34	444.44	.	14	HS	rectal	0.19	.
Rosie	1/21/96	Jan	F	A	4.93	12867.98	.	21	HS	rectal	2.61	.
Rosie	1/28/96	Jan	F	A	2.34	2043.51	.	28	HS	rectal	0.87	.
Rosie	2/4/96	Feb	F	A	2.34	673.43	.	35	HS	rectal	0.29	.
Rosie	2/11/96	Feb	F	A	2.34	444.44	.	42	HS	rectal	0.19	.
Rosie	2/18/96	Feb	F	A	56.81	11562.53	.	49	HS	rectal	0.20	.
Rosie	2/25/96	Feb	F	A	19.70	4619.64	.	56	HS	rectal	0.23	.
Rosie	3/3/96	Mar	F	A	71.07	444.44	.	63	HS	rectal	0.01	.
Rosie	3/10/96	Mar	F	A	49.07	10562.11	.	70	HS	rectal	0.22	.
Rosie	3/17/96	Mar	F	A	2.34	1686.33	.	77	HS	rectal	0.72	.
Rosie	3/22/96	Mar	F	A	5271.48	444.44	.	82	HS	rectal	0.00	.
Rosie	3/25/96	Mar	F	A	2.34	444.44	.	85	HS	rectal	0.19	.
Rosie	3/26/96	Mar	F	A	294.68	11668.42	.	86	HS	rectal	0.04	.
Rosie	3/29/96	Mar	F	A	2.79	444.44	.	89	HS	rectal	0.16	.
Rosie	3/31/96	Mar	F	A	2.34	444.44	.	91	HS	rectal	0.19	.
Rosie	4/1/96	Apr	F	A	20.51	1215.84	.	92	HS	rectal	0.06	.
Rosie	4/7/96	Apr	F	A	2.34	444.44	.	98	HS	rectal	0.19	.
Rosie	4/14/96	Apr	F	A	4.35	18807.29	.	105	HS	rectal	4.33	.
Rosie	4/21/96	Apr	F	A	2.34	444.44	.	112	HS	rectal	0.19	.
Rosie	4/28/96	Apr	F	A	16.01	1532.71	.	119	HS	rectal	0.10	.
Rosie	5/5/96	May	F	A	2.34	3804.13	.	126	HS	rectal	1.63	.
Rosie	5/12/96	May	F	A	2.34	1445.00	.	133	HS	rectal	0.62	.
Rosie	5/19/96	May	F	A	2.34	6418.18	.	140	HS	rectal	2.74	.
Rosie	5/26/96	May	F	A	55.71	10102.20	.	147	HS	rectal	0.18	.
Rosie	6/2/96	Jun	F	A	28.44	444.44	.	154	HS	rectal	0.02	.
Rosie	6/9/96	Jun	F	A	14.47	5278.68	.	161	HS	rectal	0.36	.
Rosie	6/16/96	Jun	F	A	2.34	8651.35	.	168	HS	rectal	3.70	.
Rosie	6/23/96	Jun	F	A	2.34	4068.06	.	175	HS	rectal	1.74	.
Rosie	7/7/96	Jul	F	A	9.11	3808.87	.	189	HS	rectal	0.42	.
Rosie	7/14/96	Jul	F	A	25.66	9476.34	.	196	HS	rectal	0.37	.
Rosie	7/20/96	Jul	F	A	2.34	8938.99	.	202	HS	rectal	3.82	.
Rosie	7/28/96	Jul	F	A	38.43	14279.31	.	210	HS	rectal	0.37	.
Rosie	8/4/96	Aug	F	A	41.33	444.44	.	217	HS	rectal	0.01	.
Rosie	8/11/96	Aug	F	A	71.16	525.66	.	224	HS	rectal	0.01	.
Rosie	8/18/96	Aug	F	A	2.34	1058.27	.	231	HS	rectal	0.45	.
Rosie	8/25/96	Aug	F	A	2.34	4937.31	.	238	HS	rectal	2.11	.
Rosie	9/1/96	Sep	F	A	50.93	764.14	.	245	HS	rectal	0.02	.
Rosie	9/8/96	Sep	F	A	67.62	490.73	.	252	HS	rectal	0.01	.

ID	Date	Month	Sex	Age	Prog	Est	Test	Day	Location	Sample	E/P	P/T
Rosie	9/15/96	Sep	F	A	12.42	454.22	.	259	HS	rectal	0.04	.
Rosie	9/22/96	Sep	F	A	2.34	12213.67	.	266	HS	rectal	5.22	.
Rosie	9/29/96	Sep	F	A	2.34	1801.71	.	273	HS	rectal	0.77	.
Rosie	10/6/96	Oct	F	A	21.81	3205.14	.	280	HS	rectal	0.15	.
Rosie	10/13/96	Oct	F	A	30.30	542.25	.	287	HS	rectal	0.02	.
Rosie	10/20/96	Oct	F	A	99.21	444.44	.	294	HS	rectal	0.00	.
Rosie	10/27/96	Oct	F	A	34.20	5871.35	.	301	HS	rectal	0.17	.
Rosie	11/3/96	Nov	F	A	97.98	444.44	.	308	HS	rectal	0.00	.
Rosie	11/10/96	Nov	F	A	51.67	1852.28	.	315	HS	rectal	0.04	.
Rosie	11/17/96	Nov	F	A	11.67	3568.64	.	322	HS	rectal	0.31	.
Rosie	11/24/96	Nov	F	A	28.14	444.44	.	329	HS	rectal	0.02	.
Rosie	12/1/96	Dec	F	A	12.84	444.44	.	336	HS	rectal	0.03	.
Rosie	12/8/96	Dec	F	A	14.92	1300.71	.	343	HS	rectal	0.09	.
Rosie	12/15/96	Dec	F	A	59.19	1907.60	.	350	HS	rectal	0.03	.
Rosie	12/22/96	Dec	F	A	103.70	22047.20	.	357	HS	rectal	0.21	.
Rosie	12/29/96	Dec	F	A	9.63	6585.71	.	364	HS	rectal	0.68	.
Star	1/17/96	Jan	F	A	302.59	444.44	.	17	HS	rectal	0.00	.
Star	2/7/96	Feb	F	A	240.05	444.44	170.23	38	HS	rectal	0.00	1.41
Star	2/21/96	Feb	F	A	143.76	444.44	.	52	HS	rectal	0.00	.
Star	2/28/96	Feb	F	A	151.67	444.44	.	59	HS	rectal	0.00	.
Star	3/6/96	Mar	F	A	87.60	444.44	.	66	HS	rectal	0.01	.
Star	3/13/96	Mar	F	A	365.10	444.44	.	73	HS	rectal	0.00	.
Star	3/20/96	Mar	F	A	2.34	444.44	.	80	HS	rectal	0.19	.
Star	3/27/96	Mar	F	A	34.79	444.44	.	87	HS	rectal	0.01	.
Star	4/17/96	Apr	F	A	106.57	444.44	.	108	HS	rectal	0.00	.
Star	4/24/96	Apr	F	A	45.00	444.44	.	115	HS	rectal	0.01	.
Star	5/1/96	May	F	A	2.34	444.44	.	122	HS	rectal	0.19	.
Star	5/8/96	May	F	A	2.34	444.44	.	129	HS	rectal	0.19	.
Star	5/15/96	May	F	A	41.68	444.44	.	136	HS	rectal	0.01	.
Star	5/22/96	May	F	A	53.20	444.44	126.65	143	HS	rectal	0.01	0.42
Star	5/29/96	May	F	A	139.56	444.44	.	150	HS	rectal	0.00	.
Star	6/5/96	Jun	F	A	65.41	444.44	.	157	HS	rectal	0.01	.
Star	6/19/96	Jun	F	A	66.48	444.44	.	171	HS	rectal	0.01	.
Star	6/26/96	Jun	F	A	2.34	444.44	135.30	178	HS	rectal	0.19	0.02
Star	7/3/96	Jul	F	A	23.02	444.44	.	185	HS	rectal	0.02	.
Star	7/10/96	Jul	F	A	13.03	444.44	.	192	HS	rectal	0.03	.
Star	7/17/96	Jul	F	A	5.21	444.44	.	199	HS	rectal	0.09	.
Star	7/24/96	Jul	F	A	4.60	444.44	.	206	HS	rectal	0.10	.
Star	7/31/96	Jul	F	A	11.55	444.44	80.00	213	HS	rectal	0.04	0.14
Star	8/7/96	Aug	F	A	36.71	444.44	.	220	HS	rectal	0.01	.
Star	8/21/96	Aug	F	A	159.64	444.44	.	234	HS	rectal	0.00	.
Star	8/28/96	Aug	F	A	177.47	444.44	.	241	HS	rectal	0.00	.
Star	9/4/96	Sep	F	A	93.29	444.44	.	248	HS	rectal	0.00	.
Star	9/18/96	Sep	F	A	88.57	4466.34	.	262	HS	rectal	0.05	.
Star	9/25/96	Sep	F	A	309.88	444.44	.	269	HS	rectal	0.00	.
Star	10/2/96	Oct	F	A	112.04	444.44	.	276	HS	rectal	0.00	.
Star	10/9/96	Oct	F	A	61.08	444.44	.	283	HS	rectal	0.01	.
Star	10/16/96	Oct	F	A	473.13	444.44	.	290	HS	rectal	0.00	.

ID	Date	Month	Sex	Age	Prog	Est	Test	Day	Location	Sample	E/P	P/T
Star	10/23/96	Oct	F	A	264.75	444.44	.	297	HS	rectal	0.00	.
Star	10/30/96	Oct	F	A	300.67	444.44	.	304	HS	rectal	0.00	.
Star	11/6/96	Nov	F	A	328.00	444.44	.	311	HS	rectal	0.00	.
Star	11/14/96	Nov	F	A	69.96	444.44	.	319	HS	rectal	0.01	.
Star	11/20/96	Nov	F	A	12.90	444.44	.	325	HS	rectal	0.03	.
Star	11/27/96	Nov	F	A	78.55	444.44	.	332	HS	rectal	0.01	.
Star	12/4/96	Dec	F	A	70.29	444.44	93.38	339	HS	rectal	0.01	0.75
Star	12/11/96	Dec	F	A	96.58	444.44	.	346	HS	rectal	0.00	.
Star	12/18/96	Dec	F	A	19.99	444.44	82.72	353	HS	rectal	0.02	0.24
Char	3/13/96	Mar	F	A	98.47	444.44	.	73	SWF	rectal	0.00	.
Char	3/20/96	Mar	F	A	765.02	444.44	.	80	SWF	rectal	0.00	.
Char	3/27/96	Mar	F	A	438.96	444.44	.	87	SWF	rectal	0.00	.
Char	4/3/96	Apr	F	A	456.21	4510.59	.	94	SWF	rectal	0.01	.
Char	4/10/96	Apr	F	A	375.51	7930.67	.	101	SWF	rectal	0.02	.
Char	4/17/96	Apr	F	A	640.06	444.44	.	108	SWF	rectal	0.00	.
Char	4/24/96	Apr	F	A	267.74	444.44	.	115	SWF	rectal	0.00	.
Char	5/1/96	May	F	A	311.96	25492.57	.	122	SWF	rectal	0.08	.
Char	5/7/96	May	F	A	268.55	7622.48	.	128	SWF	rectal	0.03	.
Char	5/15/96	May	F	A	723.04	444.44	304.42	136	SWF	rectal	0.00	2.38
Char	5/22/96	May	F	A	220.75	6342.32	.	143	SWF	rectal	0.03	.
Char	5/29/96	May	F	A	127.39	2179.43	.	150	SWF	rectal	0.02	.
Char	6/5/96	Jun	F	A	289.31	2558.74	.	157	SWF	rectal	0.01	.
Char	6/12/96	Jun	F	A	189.90	4388.89	.	164	SWF	rectal	0.02	.
Char	6/19/96	Jun	F	A	92.87	444.44	.	171	SWF	rectal	0.00	.
Char	6/26/96	Jun	F	A	96.81	444.44	.	178	SWF	rectal	0.00	.
Char	7/3/96	Jul	F	A	294.98	1670.53	.	185	SWF	rectal	0.01	.
Char	7/10/96	Jul	F	A	113.17	5578.97	.	192	SWF	rectal	0.05	.
Char	7/17/96	Jul	F	A	170.25	444.44	.	199	SWF	rectal	0.00	.
Char	7/25/96	Jul	F	A	190.55	983.19	.	207	SWF	rectal	0.01	.
Char	7/31/96	Jul	F	A	196.64	584.29	.	213	SWF	rectal	0.00	.
Char	8/8/96	Aug	F	A	189.25	511.91	.	221	SWF	rectal	0.00	.
Char	8/20/96	Aug	F	A	253.36	1306.55	378.35	233	SWF	rectal	0.01	0.67
Char	9/3/96	Sep	F	A	181.80	11535.66	.	247	SWF	rectal	0.06	.
Char	9/10/96	Sep	F	A	304.51	2463.91	.	254	SWF	rectal	0.01	.
Char	9/17/96	Sep	F	A	174.67	444.44	.	261	SWF	rectal	0.00	.
Char	9/26/96	Sep	F	A	329.63	1171.74	.	270	SWF	rectal	0.00	.
Char	10/10/96	Oct	F	A	63.84	444.44	.	284	SWF	rectal	0.01	.
Char	10/17/96	Oct	F	A	90.33	506.69	.	291	SWF	rectal	0.01	.
Char	10/22/96	Oct	F	A	82.75	1741.65	.	296	SWF	rectal	0.02	.
Char	10/29/96	Oct	F	A	34.46	492.94	.	303	SWF	rectal	0.01	.
Char	11/5/96	Nov	F	A	35.92	444.44	.	310	SWF	rectal	0.01	.
Char	11/19/96	Nov	F	A	395.69	3897.38	.	324	SWF	rectal	0.01	.
Char	11/26/96	Nov	F	A	260.65	4749.24	.	331	SWF	rectal	0.02	.
Char	12/3/96	Dec	F	A	416.51	44837.20	.	338	SWF	rectal	0.11	.
Char	12/10/96	Dec	F	A	306.62	61131.58	.	345	SWF	rectal	0.20	.
Char	12/18/96	Dec	F	A	240.86	3393.21	138.17	353	SWF	rectal	0.01	1.74
Char	1/5/97	Jan	F	A	192.67	48329.99	.	370	SWF	rectal	0.25	.
Char	1/10/97	Jan	F	A	318.14	4987.88	220.65	375	SWF	rectal	0.02	1.44

ID	Date	Month	Sex	Age	Prog	Est	Test	Day	Location	Sample	E/P	P/T
Char	1/18/97	Jan	F	A	253.71	5831.84	.	383	SWF	rectal	0.02	.
Char	1/24/97	Jan	F	A	261.52	21209.56	.	389	SWF	rectal	0.08	.
Char	2/1/97	Feb	F	A	204.77	12235.80	.	397	SWF	rectal	0.06	.
Char	2/8/97	Feb	F	A	130.97	444.44	.	404	SWF	rectal	0.00	.
Char	2/16/97	Feb	F	A	283.72	45801.28	5919.20	412	SWF	rectal	0.16	0.05
Char	2/23/97	Feb	F	A	351.76	35970.91	.	419	SWF	rectal	0.10	.
Char	3/3/97	Mar	F	A	158.60	693024.82	.	427	SWF	rectal	4.37	.
Char	3/11/97	Mar	F	A	275.71	42229.47	.	435	SWF	rectal	0.15	.
Char	3/19/97	Mar	F	A	291.33	28953.74	.	443	SWF	rectal	0.10	.
Char	3/26/97	Mar	F	A	567.82	55283.94	.	450	SWF	rectal	0.10	.
Char	4/2/97	Apr	F	A	533.33	27863.23	.	457	SWF	rectal	0.05	.
Char	4/10/97	Apr	F	A	413.58	35765.45	526.20	465	SWF	rectal	0.09	0.79
Char	4/17/97	Apr	F	A	417.49	44868.81	.	472	SWF	rectal	0.11	.
Char	4/23/97	Apr	F	A	350.13	39574.32	.	478	SWF	rectal	0.11	.
Char	4/30/97	Apr	F	A	338.74	42513.95	.	485	SWF	rectal	0.13	.
Char	5/7/97	May	F	A	137.64	43920.55	.	492	SWF	rectal	0.32	.
Char	5/14/97	May	F	A	242.49	32177.85	.	499	SWF	rectal	0.13	.
Char	5/21/97	May	F	A	166.57	35812.87	.	506	SWF	rectal	0.21	.
Char	5/28/97	May	F	A	254.82	15804.44	.	513	SWF	rectal	0.06	.
Char	6/4/97	Jun	F	A	191.56	20830.26	.	520	SWF	rectal	0.11	.
Char	6/11/97	Jun	F	A	149.52	27800.01	.	527	SWF	rectal	0.19	.
Char	6/18/97	Jun	F	A	82.03	15502.58	.	534	SWF	rectal	0.19	.
Char	6/25/97	Jun	F	A	189.87	26330.20	.	541	SWF	rectal	0.14	.
Char	7/2/97	Jul	F	A	106.99	21810.13	.	548	SWF	rectal	0.20	.
Char	7/9/97	Jul	F	A	190.07	27894.84	.	555	SWF	rectal	0.15	.
Char	7/16/97	Jul	F	A	188.83	24939.41	.	562	SWF	rectal	0.13	.
Char	5/23/96	May	F	A	400.89	8600.78	.	144	SWF	rectal	0.02	.
Char	5/24/96	May	F	A	227.52	9305.66	.	145	SWF	rectal	0.04	.
Char	5/25/96	May	F	A	93.29	4900.96	.	146	SWF	rectal	0.05	.
Char	5/27/96	May	F	A	210.18	10325.04	.	148	SWF	rectal	0.05	.
Char	5/28/96	May	F	A	155.18	9345.17	.	149	SWF	rectal	0.06	.
Char	5/30/96	May	F	A	134.65	9417.87	.	151	SWF	rectal	0.07	.
Char	5/31/96	May	F	A	139.56	9643.87	.	152	SWF	rectal	0.07	.
Char	6/1/96	Jun	F	A	271.12	6252.24	.	153	SWF	rectal	0.02	.
Char	6/3/96	Jun	F	A	61.60	5055.84	.	155	SWF	rectal	0.08	.
Char	6/4/96	Jun	F	A	97.46	7486.56	.	156	SWF	rectal	0.08	.
Char	6/6/96	Jun	F	A	67.52	5936.15	.	158	SWF	rectal	0.09	.
Char	6/8/96	Jun	F	A	71.98	3548.10	.	160	SWF	rectal	0.05	.
Char	6/10/96	Jun	F	A	168.65	7940.15	.	162	SWF	rectal	0.05	.
Char	6/11/96	Jun	F	A	130.88	5604.26	.	163	SWF	rectal	0.04	.
Char	6/13/96	Jun	F	A	131.88	3552.84	.	165	SWF	rectal	0.03	.
Char	6/14/96	Jun	F	A	103.38	6438.73	.	166	SWF	rectal	0.06	.
Char	6/15/96	Jun	F	A	93.06	5662.73	.	167	SWF	rectal	0.06	.
Char	6/17/96	Jun	F	A	60.52	3042.36	.	169	SWF	rectal	0.05	.
Char	6/18/96	Jun	F	A	184.79	6900.22	.	170	SWF	rectal	0.04	.
Char	1/14/97	Jan	F	A	7.82	1351.44	.	379	SWF	rectal	0.17	.
Char	1/21/97	Jan	F	A	79.17	21209.56	.	386	SWF	rectal	0.27	.
Char	1/28/97	Jan	F	A	70.90	84127.05	.	393	SWF	rectal	1.19	.

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Char	2/4/97	Feb	F	A	50.18	40206.50	.	400	SWF	rectal	0.80	.
Char	2/12/97	Feb	F	A	187.43	46085.76	.	408	SWF	rectal	0.25	.
Char	2/19/97	Feb	F	A	118.22	38515.43	.	415	SWF	rectal	0.33	.
Char	2/27/97	Feb	F	A	264.81	31197.97	.	423	SWF	rectal	0.12	.
Char	3/7/97	Mar	F	A	62.02	15581.60	.	431	SWF	rectal	0.25	.
Char	3/15/97	Mar	F	A	40.32	43493.83	.	439	SWF	rectal	1.08	.
Char	3/23/97	Mar	F	A	295.92	27009.79	.	447	SWF	rectal	0.09	.
Char	3/30/97	Mar	F	A	215.48	45485.19	.	454	SWF	rectal	0.21	.
Char	4/6/97	Apr	F	A	201.29	29222.41	.	461	SWF	rectal	0.15	.
Char	4/13/97	Apr	F	A	242.42	28953.74	.	468	SWF	rectal	0.12	.
Char	4/20/97	Apr	F	A	44.71	14791.38	.	475	SWF	rectal	0.33	.
Char	4/27/97	Apr	F	A	28.20	25018.43	.	482	SWF	rectal	0.89	.
Char	5/4/97	May	F	A	28.63	14095.98	.	489	SWF	rectal	0.49	.
Char	5/11/97	May	F	A	2.34	32699.39	.	496	SWF	rectal	13.97	.
Char	5/18/97	May	F	A	94.07	41249.60	.	503	SWF	rectal	0.44	.
Char	6/1/97	Jun	F	A	89.00	36618.89	.	517	SWF	rectal	0.41	.
Char	6/8/97	Jun	F	A	17.73	33141.92	.	524	SWF	rectal	1.87	.
Char	6/15/97	Jun	F	A	62.25	43035.50	.	531	SWF	rectal	0.69	.
Char	6/22/97	Jun	F	A	76.60	34074.38	.	538	SWF	rectal	0.44	.
Char	6/29/97	Jun	F	A	33.35	40064.26	.	545	SWF	rectal	1.20	.
Char	7/6/97	Jul	F	A	103.09	29585.92	.	552	SWF	rectal	0.29	.
Char	7/20/97	Jul	F	A	108.65	24765.56	.	566	SWF	rectal	0.23	.
Char	7/27/97	Jul	F	A	147.70	21794.33	.	573	SWF	rectal	0.15	.
Char	8/3/97	Aug	F	A	391.78	14778.73	.	580	SWF	rectal	0.04	.
Georgia	3/13/96	Mar	F	A	57.47	444.44	.	73	SWF	rectal	0.01	.
Georgia	3/20/96	Mar	F	A	64.98	444.44	.	80	SWF	rectal	0.01	.
Georgia	3/27/96	Mar	F	A	217.11	444.44	.	87	SWF	rectal	0.00	.
Georgia	4/3/96	Apr	F	A	79.79	444.44	.	94	SWF	rectal	0.01	.
Georgia	4/10/96	Apr	F	A	282.38	444.44	.	101	SWF	rectal	0.00	.
Georgia	4/17/96	Apr	F	A	139.89	444.44	.	108	SWF	rectal	0.00	.
Georgia	4/24/96	Apr	F	A	121.60	444.44	.	115	SWF	rectal	0.00	.
Georgia	5/1/96	May	F	A	125.02	444.44	.	122	SWF	rectal	0.00	.
Georgia	5/7/96	May	F	A	97.55	444.44	.	128	SWF	rectal	0.00	.
Georgia	5/15/96	May	F	A	159.22	444.44	254.89	136	SWF	rectal	0.00	0.62
Georgia	5/29/96	May	F	A	109.76	444.44	.	150	SWF	rectal	0.00	.
Georgia	6/5/96	Jun	F	A	61.14	444.44	.	157	SWF	rectal	0.01	.
Georgia	6/12/96	Jun	F	A	25.70	444.44	.	164	SWF	rectal	0.02	.
Georgia	6/19/96	Jun	F	A	171.45	444.44	.	171	SWF	rectal	0.00	.
Georgia	7/3/96	Jul	F	A	23.92	444.44	.	185	SWF	rectal	0.02	.
Georgia	7/10/96	Jul	F	A	25.85	444.44	.	192	SWF	rectal	0.02	.
Georgia	7/17/96	Jul	F	A	283.78	444.44	.	199	SWF	rectal	0.00	.
Georgia	7/25/96	Jul	F	A	111.94	444.44	.	207	SWF	rectal	0.00	.
Georgia	7/31/96	Jul	F	A	28.14	444.44	.	213	SWF	rectal	0.02	.
Georgia	8/8/96	Aug	F	A	78.26	444.44	.	221	SWF	rectal	0.01	.
Georgia	8/14/96	Aug	F	A	77.87	444.44	.	227	SWF	rectal	0.01	.
Georgia	8/20/96	Aug	F	A	118.25	444.44	399.12	233	SWF	rectal	0.00	0.30
Georgia	8/27/96	Aug	F	A	178.74	444.44	.	240	SWF	rectal	0.00	.
Georgia	9/3/96	Sep	F	A	103.12	444.44	.	247	SWF	rectal	0.00	.

ID	Date	Month	Sex	Age	Prog	Est	Test	Day	Location	Sample	E/P	P/T
Georgia	9/10/96	Sep	F	A	116.17	444.44	.	254	SWF	rectal	0.00	.
Georgia	9/17/96	Sep	F	A	111.48	444.44	.	261	SWF	rectal	0.00	.
Georgia	9/26/96	Sep	F	A	194.62	444.44	.	270	SWF	rectal	0.00	.
Georgia	10/1/96	Oct	F	A	121.08	444.44	.	275	SWF	rectal	0.00	.
Georgia	10/10/96	Oct	F	A	2.34	444.44	.	284	SWF	rectal	0.19	.
Georgia	10/17/96	Oct	F	A	56.29	444.44	.	291	SWF	rectal	0.01	.
Georgia	10/22/96	Oct	F	A	72.27	444.44	.	296	SWF	rectal	0.01	.
Georgia	10/29/96	Oct	F	A	155.38	444.44	.	303	SWF	rectal	0.00	.
Georgia	11/12/96	Nov	F	A	111.55	444.44	.	317	SWF	rectal	0.00	.
Georgia	11/19/96	Nov	F	A	152.81	444.44	.	324	SWF	rectal	0.00	.
Georgia	11/26/96	Nov	F	A	187.17	444.44	.	331	SWF	rectal	0.00	.
Georgia	12/3/96	Dec	F	A	352.73	444.44	.	338	SWF	rectal	0.00	.
Georgia	12/18/96	Dec	F	A	113.69	444.44	171.58	353	SWF	rectal	0.00	0.66
Georgia	1/5/97	Jan	F	A	47.80	444.44	.	370	SWF	rectal	0.01	.
Georgia	1/10/97	Jan	F	A	53.66	660.31	237.59	375	SWF	rectal	0.01	0.23
Georgia	1/18/97	Jan	F	A	15.28	444.44	.	383	SWF	rectal	0.03	.
Georgia	2/1/97	Feb	F	A	3.75	444.44	.	397	SWF	rectal	0.12	.
Georgia	2/8/97	Feb	F	A	24.39	444.44	.	404	SWF	rectal	0.02	.
Georgia	2/16/97	Feb	F	A	64.62	444.44	391.63	412	SWF	rectal	0.01	0.17
Georgia	3/3/97	Mar	F	A	198.33	5504.69	.	427	SWF	rectal	0.03	.
Georgia	3/11/97	Mar	F	A	69.73	444.44	.	435	SWF	rectal	0.01	.
Georgia	3/19/97	Mar	F	A	181.67	444.44	.	443	SWF	rectal	0.00	.
Georgia	4/2/97	Apr	F	A	434.08	8072.91	.	457	SWF	rectal	0.02	.
Georgia	4/10/97	Apr	F	A	176.33	444.44	349.35	465	SWF	rectal	0.00	0.50
Georgia	4/17/97	Apr	F	A	63.55	444.44	.	472	SWF	rectal	0.01	.
Georgia	4/23/97	Apr	F	A	59.74	1722.68	.	478	SWF	rectal	0.03	.
Georgia	6/23/97	Jun	F	A	25.08	444.44	.	539	SWF	rectal	0.02	.
Rita	3/13/96	Mar	F	A	1713.56	15744.39	.	73	SWF	rectal	0.01	.
Rita	3/20/96	Mar	F	A	2442.45	5364.03	.	80	SWF	rectal	0.00	.
Rita	3/27/96	Mar	F	A	598.09	14720.26	.	87	SWF	rectal	0.02	.
Rita	4/3/96	Apr	F	A	429.53	92124.10	.	94	SWF	rectal	0.21	.
Rita	4/17/96	Apr	F	A	2985.55	4369.93	.	108	SWF	rectal	0.00	.
Rita	4/24/96	Apr	F	A	1123.61	11832.79	.	115	SWF	rectal	0.01	.
Rita	5/1/96	May	F	A	577.59	421820.58	.	122	SWF	rectal	0.73	.
Rita	5/7/96	May	F	A	372.58	444.44	252.47	128	SWF	rectal	0.00	1.48
Rita	5/22/96	May	F	A	2289.84	4527.97	.	143	SWF	rectal	0.00	.
Rita	5/29/96	May	F	A	592.88	12529.76	.	150	SWF	rectal	0.02	.
Rita	6/5/96	Jun	F	A	468.58	8978.50	.	157	SWF	rectal	0.02	.
Rita	6/12/96	Jun	F	A	590.93	6562.00	.	164	SWF	rectal	0.01	.
Rita	6/19/96	Jun	F	A	261.10	1124.96	.	171	SWF	rectal	0.00	.
Rita	6/26/96	Jun	F	A	134.16	488.67	.	178	SWF	rectal	0.00	.
Rita	7/3/96	Jul	F	A	236.79	4279.84	.	185	SWF	rectal	0.02	.
Rita	7/17/96	Jul	F	A	582.14	6857.55	.	199	SWF	rectal	0.01	.
Rita	7/25/96	Jul	F	A	238.55	10698.03	.	207	SWF	rectal	0.04	.
Rita	7/31/96	Jul	F	A	305.52	2376.99	.	213	SWF	rectal	0.01	.
Rita	8/14/96	Aug	F	A	373.56	1928.14	.	227	SWF	rectal	0.01	.
Rita	8/20/96	Aug	F	A	256.97	587.61	532.73	233	SWF	rectal	0.00	0.48
Rita	9/3/96	Sep	F	A	238.58	2309.03	.	247	SWF	rectal	0.01	.

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Rita	9/10/96	Sep	F	A	356.64	6729.53	.	254	SWF	rectal	0.02	.
Rita	9/17/96	Sep	F	A	471.50	3239.91	.	261	SWF	rectal	0.01	.
Rita	10/1/96	Oct	F	A	167.71	8030.24	.	275	SWF	rectal	0.05	.
Rita	10/10/96	Oct	F	A	261.46	5040.04	.	284	SWF	rectal	0.02	.
Rita	10/17/96	Oct	F	A	688.87	17242.65	.	291	SWF	rectal	0.03	.
Rita	10/22/96	Oct	F	A	274.57	661.42	.	296	SWF	rectal	0.00	.
Rita	10/29/96	Oct	F	A	220.46	607.68	.	303	SWF	rectal	0.00	.
Rita	11/5/96	Nov	F	A	245.42	807.13	.	310	SWF	rectal	0.00	.
Rita	11/12/96	Nov	F	A	103.28	444.44	.	317	SWF	rectal	0.00	.
Rita	11/19/96	Nov	F	A	502.09	1204.14	.	324	SWF	rectal	0.00	.
Rita	11/26/96	Nov	F	A	235.52	444.44	.	331	SWF	rectal	0.00	.
Rita	12/10/96	Dec	F	A	381.69	2479.72	.	345	SWF	rectal	0.01	.
Rita	12/18/96	Dec	F	A	335.49	618.90	262.14	353	SWF	rectal	0.00	1.28
Rita	1/5/97	Jan	F	A	344.27	4997.36	.	370	SWF	rectal	0.01	.
Rita	1/10/97	Jan	F	A	184.83	1872.83	292.09	375	SWF	rectal	0.01	0.63
Rita	1/18/97	Jan	F	A	274.93	4605.41	.	383	SWF	rectal	0.02	.
Rita	1/24/97	Jan	F	A	384.62	5669.05	.	389	SWF	rectal	0.01	.
Rita	2/1/97	Feb	F	A	460.12	7854.81	.	397	SWF	rectal	0.02	.
Rita	2/8/97	Feb	F	A	338.09	8572.33	.	404	SWF	rectal	0.03	.
Rita	2/16/97	Feb	F	A	392.76	68591.28	741.95	412	SWF	rectal	0.17	0.53
Rita	2/23/97	Feb	F	A	256.38	10606.36	.	419	SWF	rectal	0.04	.
Rita	3/3/97	Mar	F	A	309.75	13737.22	.	427	SWF	rectal	0.04	.
Rita	3/11/97	Mar	F	A	400.24	9511.11	.	435	SWF	rectal	0.02	.
Rita	3/26/97	Mar	F	A	858.08	16088.92	.	450	SWF	rectal	0.02	.
Rita	4/2/97	Apr	F	A	472.16	33015.48	.	457	SWF	rectal	0.07	.
Rita	4/17/97	Apr	F	A	2707.65	44963.64	908.17	472	SWF	rectal	0.02	2.98
Rita	4/23/97	Apr	F	A	3095.53	170213.85	.	478	SWF	rectal	0.05	.
Rita	4/30/97	Apr	F	A	586.37	27515.54	.	485	SWF	rectal	0.05	.
Rita	5/14/97	May	F	A	2007.39	64798.22	.	499	SWF	rectal	0.03	.
Rita	5/21/97	May	F	A	2486.38	11317.56	.	506	SWF	rectal	0.00	.
Rita	5/28/97	May	F	A	904.29	14737.64	.	513	SWF	rectal	0.02	.
Rita	6/11/97	Jun	F	A	1125.56	25508.37	.	527	SWF	rectal	0.02	.
Rita	6/18/97	Jun	F	A	3319.08	7989.15	.	534	SWF	rectal	0.00	.
Rita	6/25/97	Jun	F	A	1726.25	12757.35	.	541	SWF	rectal	0.01	.
Rita	7/2/97	Jul	F	A	886.39	26567.27	.	548	SWF	rectal	0.03	.
Rita	7/9/97	Jul	F	A	516.41	12521.86	.	555	SWF	rectal	0.02	.
Rita	7/16/97	Jul	F	A	289.44	16468.23	.	562	SWF	rectal	0.06	.
Rita	7/30/97	Jul	F	A	427.25	20988.30	.	576	SWF	rectal	0.05	.
Rita	5/23/96	May	F	A	1040.63	6830.68	.	144	SWF	rectal	0.01	.
Rita	5/25/96	May	F	A	898.43	.	.	146	SWF	rectal	.	.
Rita	5/27/96	May	F	A	381.04	11061.53	.	148	SWF	rectal	0.03	.
Rita	5/28/96	May	F	A	604.92	8722.47	.	149	SWF	rectal	0.01	.
Rita	5/30/96	May	F	A	447.75	11870.72	.	151	SWF	rectal	0.03	.
Rita	6/3/96	Jun	F	A	364.77	5714.89	.	155	SWF	rectal	0.02	.
Rita	6/4/96	Jun	F	A	502.74	11568.85	.	156	SWF	rectal	0.02	.
Rita	6/6/96	Jun	F	A	113.63	16167.95	.	158	SWF	rectal	0.14	.
Rita	6/8/96	Jun	F	A	113.79	11652.62	.	160	SWF	rectal	0.10	.
Rita	6/10/96	Jun	F	A	361.52	8510.69	.	162	SWF	rectal	0.02	.

ID	Date	Month	Sex	Age	Prog	Est	Test	Day	Location	Sample	E/P	P/T
Rita	6/11/96	Jun	F	A	303.57	12871.14	.	163	SWF	rectal	0.04	.
Rita	6/13/96	Jun	F	A	444.50	10242.86	.	165	SWF	rectal	0.02	.
Rita	6/17/96	Jun	F	A	317.04	8120.32	.	169	SWF	rectal	0.03	.
Rita	6/18/96	Jun	F	A	253.97	6155.83	.	170	SWF	rectal	0.02	.
Rita	1/14/97	Jan	F	A	128.18	7756.82	.	379	SWF	rectal	0.06	.
Rita	1/21/97	Jan	F	A	161.53	6384.99	.	386	SWF	rectal	0.04	.
Rita	1/28/97	Jan	F	A	241.22	6256.98	.	393	SWF	rectal	0.03	.
Rita	2/4/97	Feb	F	A	391.78	9702.35	.	400	SWF	rectal	0.02	.
Rita	2/12/97	Feb	F	A	398.94	16041.51	.	408	SWF	rectal	0.04	.
Rita	2/19/97	Feb	F	A	253.00	8874.19	.	415	SWF	rectal	0.04	.
Rita	2/27/97	Feb	F	A	199.50	13130.33	.	423	SWF	rectal	0.07	.
Rita	3/15/97	Mar	F	A	144.54	18728.26	.	439	SWF	rectal	0.13	.
Rita	3/23/97	Mar	F	A	1017.20	14328.31	.	447	SWF	rectal	0.01	.
Rita	4/6/97	Apr	F	A	169.37	42640.39	.	461	SWF	rectal	0.25	.
Rita	4/13/97	Apr	F	A	236.70	144183.93	.	468	SWF	rectal	0.61	.
Rita	4/20/97	Apr	F	A	2616.22	17748.39	.	475	SWF	rectal	0.01	.
Rita	5/4/97	May	F	A	85.16	168317.32	.	489	SWF	rectal	1.98	.
Rita	5/11/97	May	F	A	438.96	85596.86	.	496	SWF	rectal	0.19	.
Rita	6/1/97	Jun	F	A	168.10	246075.18	.	517	SWF	rectal	1.46	.
Rita	6/8/97	Jun	F	A	130.49	47381.72	.	524	SWF	rectal	0.36	.
Rita	6/15/97	Jun	F	A	1342.60	11673.16	.	531	SWF	rectal	0.01	.
Rita	6/22/97	Jun	F	A	1402.15	21256.98	.	538	SWF	rectal	0.02	.
Rita	6/29/97	Jun	F	A	472.16	29838.79	.	545	SWF	rectal	0.06	.
Rita	7/6/97	Jul	F	A	565.55	10634.81	.	552	SWF	rectal	0.02	.
Rita	7/20/97	Jul	F	A	662.19	11682.64	.	566	SWF	rectal	0.02	.
Rita	8/3/97	Aug	F	A	753.95	14067.53	.	580	SWF	rectal	0.02	.
Sara	3/13/96	Mar	F	A	337.77	4164.47	.	73	SWF	rectal	0.01	.
Sara	3/27/96	Mar	F	A	284.99	444.44	.	87	SWF	rectal	0.00	.
Sara	4/3/96	Apr	F	A	518.04	3633.44	.	94	SWF	rectal	0.01	.
Sara	4/24/96	Apr	F	A	383.65	444.44	.	115	SWF	rectal	0.00	.
Sara	5/1/96	May	F	A	465.32	444.44	.	122	SWF	rectal	0.00	.
Sara	5/7/96	May	F	A	2.34	.	.	128	SWF	rectal	.	.
Sara	5/29/96	May	F	A	162.28	444.44	323.74	150	SWF	rectal	0.00	0.50
Sara	6/5/96	Jun	F	A	271.81	3458.01	.	157	SWF	rectal	0.01	.
Sara	6/12/96	Jun	F	A	204.71	444.44	.	164	SWF	rectal	0.00	.
Sara	6/26/96	Jun	F	A	125.77	444.44	.	178	SWF	rectal	0.00	.
Sara	7/3/96	Jul	F	A	125.25	444.44	.	185	SWF	rectal	0.00	.
Sara	7/10/96	Jul	F	A	127.69	444.44	.	192	SWF	rectal	0.00	.
Sara	7/17/96	Jul	F	A	287.33	736.65	.	199	SWF	rectal	0.00	.
Sara	7/25/96	Jul	F	A	135.63	444.44	.	207	SWF	rectal	0.00	.
Sara	7/31/96	Jul	F	A	48.19	444.44	.	213	SWF	rectal	0.01	.
Sara	8/8/97	Aug	F	A	140.83	444.44	.	221	SWF	rectal	0.00	.
Sara	8/14/96	Aug	F	A	237.90	444.44	.	227	SWF	rectal	0.00	.
Sara	8/20/96	Aug	F	A	308.38	444.44	308.76	233	SWF	rectal	0.00	1.00
Sara	9/10/96	Sep	F	A	500.14	744.71	.	254	SWF	rectal	0.00	.
Sara	9/17/96	Sep	F	A	372.58	4742.91	.	261	SWF	rectal	0.01	.
Sara	9/26/96	Sep	F	A	460.12	444.44	.	270	SWF	rectal	0.00	.
Sara	10/1/96	Oct	F	A	366.73	444.44	.	275	SWF	rectal	0.00	.

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Sara	10/17/96	Oct	F	A	201.55	444.44	.	291	SWF	rectal	0.00	.
Sara	10/29/96	Oct	F	A	137.58	444.44	.	303	SWF	rectal	0.00	.
Sara	11/5/96	Nov	F	A	142.79	444.44	.	310	SWF	rectal	0.00	.
Sara	11/12/96	Nov	F	A	208.78	444.44	.	317	SWF	rectal	0.00	.
Sara	11/19/96	Nov	F	A	184.11	444.44	.	324	SWF	rectal	0.00	.
Sara	12/18/96	Dec	F	A	187.53	444.44	274.70	353	SWF	rectal	0.00	0.68
Sara	1/24/97	Jan	F	A	547.00	444.44	330.03	389	SWF	rectal	0.00	1.66
Sara	2/1/97	Feb	F	A	294.62	444.44	.	397	SWF	rectal	0.00	.
Sara	2/8/97	Feb	F	A	247.76	444.44	418.45	404	SWF	rectal	0.00	0.59
Sara	3/11/97	Mar	F	A	630.30	5340.32	.	435	SWF	rectal	0.01	.
Sara	3/19/97	Mar	F	A	429.20	2053.00	.	443	SWF	rectal	0.00	.
Sara	3/26/97	Mar	F	A	735.08	444.44	.	450	SWF	rectal	0.00	.
Sara	4/10/97	Apr	F	A	701.24	444.44	585.88	465	SWF	rectal	0.00	1.20
Sara	4/17/97	Apr	F	A	328.00	1482.30	.	472	SWF	rectal	0.00	.
Sara	4/23/97	Apr	F	A	348.50	444.44	.	478	SWF	rectal	0.00	.
Sara	4/30/97	Apr	F	A	327.35	444.44	.	485	SWF	rectal	0.00	.
Sara	5/7/97	May	F	A	150.82	444.44	.	492	SWF	rectal	0.00	.
Sara	5/21/97	May	F	A	121.21	444.44	.	506	SWF	rectal	0.00	.
Sara	6/4/97	Jun	F	A	211.28	444.44	.	520	SWF	rectal	0.00	.
Sara	6/11/97	Jun	F	A	411.31	444.44	.	527	SWF	rectal	0.00	.
Sara	6/18/97	Jun	F	A	226.09	444.44	.	534	SWF	rectal	0.00	.
Sara	6/25/97	Jun	F	A	569.12	4785.59	.	541	SWF	rectal	0.01	.
Sara	7/2/97	Jul	F	A	233.96	2395.95	.	548	SWF	rectal	0.01	.
Sara	7/9/97	Jul	F	A	261.00	8524.92	.	555	SWF	rectal	0.03	.
Sara	7/23/97	Jul	F	A	1831.03	498.79	.	569	SWF	rectal	0.00	.
Stubbie	3/20/96	Mar	F	A	469.88	788.01	.	80	SWF	rectal	0.00	.
Stubbie	4/3/96	Apr	F	A	732.15	6811.71	.	94	SWF	rectal	0.01	.
Stubbie	4/10/96	Apr	F	A	912.42	5782.85	.	101	SWF	rectal	0.01	.
Stubbie	4/17/96	Apr	F	A	836.28	5436.73	.	108	SWF	rectal	0.01	.
Stubbie	4/24/96	Apr	F	A	509.90	1226.27	.	115	SWF	rectal	0.00	.
Stubbie	5/1/96	May	F	A	538.54	444.44	.	122	SWF	rectal	0.00	.
Stubbie	5/7/96	May	F	A	610.78	444.44	.	128	SWF	rectal	0.00	.
Stubbie	5/22/96	May	F	A	584.42	444.44	352.49	143	SWF	rectal	0.00	1.66
Stubbie	5/29/96	May	F	A	753.30	1105.05	.	150	SWF	rectal	0.00	.
Stubbie	6/5/96	Jun	F	A	559.69	444.44	.	157	SWF	rectal	0.00	.
Stubbie	6/12/96	Jun	F	A	736.38	3116.64	.	164	SWF	rectal	0.00	.
Stubbie	6/19/96	Jun	F	A	390.81	444.44	.	171	SWF	rectal	0.00	.
Stubbie	6/26/96	Jun	F	A	283.07	444.44	.	178	SWF	rectal	0.00	.
Stubbie	7/3/96	Jul	F	A	381.37	444.44	.	185	SWF	rectal	0.00	.
Stubbie	7/10/96	Jul	F	A	383.97	444.44	.	192	SWF	rectal	0.00	.
Stubbie	7/17/96	Jul	F	A	659.26	444.44	.	199	SWF	rectal	0.00	.
Stubbie	7/25/96	Jul	F	A	510.23	444.44	.	207	SWF	rectal	0.00	.
Stubbie	7/31/96	Jul	F	A	326.05	444.44	.	213	SWF	rectal	0.00	.
Stubbie	8/8/96	Aug	F	A	525.20	444.44	.	221	SWF	rectal	0.00	.
Stubbie	8/20/96	Aug	F	A	640.06	444.44	357.33	233	SWF	rectal	0.00	1.79
Stubbie	8/27/96	Aug	F	A	591.58	444.44	.	240	SWF	rectal	0.00	.
Stubbie	9/3/96	Sep	F	A	337.11	444.44	.	247	SWF	rectal	0.00	.
Stubbie	9/10/96	Sep	F	A	554.81	444.44	.	254	SWF	rectal	0.00	.

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Stubbie	9/17/96	Sep	F	A	516.08	444.44	.	261	SWF	rectal	0.00	.
Stubbie	10/1/96	Oct	F	A	413.58	444.44	.	275	SWF	rectal	0.00	.
Stubbie	10/10/96	Oct	F	A	440.27	444.44	.	284	SWF	rectal	0.00	.
Stubbie	10/17/96	Oct	F	A	598.41	444.44	.	291	SWF	rectal	0.00	.
Stubbie	10/29/96	Oct	F	A	272.78	444.44	.	303	SWF	rectal	0.00	.
Stubbie	11/5/96	Nov	F	A	314.14	444.44	.	310	SWF	rectal	0.00	.
Stubbie	11/12/96	Nov	F	A	496.24	444.44	.	317	SWF	rectal	0.00	.
Stubbie	11/19/96	Nov	F	A	400.89	444.44	.	324	SWF	rectal	0.00	.
Stubbie	11/26/96	Nov	F	A	531.38	444.44	.	331	SWF	rectal	0.00	.
Stubbie	12/3/96	Dec	F	A	724.34	444.44	.	338	SWF	rectal	0.00	.
Stubbie	12/10/96	Dec	F	A	482.57	444.44	120.63	345	SWF	rectal	0.00	4.00
Stubbie	1/10/97	Jan	F	A	366.08	444.44	172.74	375	SWF	rectal	0.00	2.12
Stubbie	1/24/97	Jan	F	A	380.07	444.44	.	389	SWF	rectal	0.00	.
Stubbie	2/1/97	Feb	F	A	557.74	444.44	.	397	SWF	rectal	0.00	.
Stubbie	2/8/97	Feb	F	A	425.30	444.44	.	404	SWF	rectal	0.00	.
Stubbie	2/23/97	Feb	F	A	486.15	476.03	263.34	419	SWF	rectal	0.00	1.85
Stubbie	3/3/97	Mar	F	A	651.78	842.53	.	427	SWF	rectal	0.00	.
Stubbie	3/11/97	Mar	F	A	531.70	444.44	.	435	SWF	rectal	0.00	.
Stubbie	3/19/97	Mar	F	A	523.24	444.44	.	443	SWF	rectal	0.00	.
Stubbie	4/2/97	Apr	F	A	673.58	2497.10	.	457	SWF	rectal	0.00	.
Stubbie	4/10/97	Apr	F	A	527.47	1612.05	176.88	465	SWF	rectal	0.00	2.98
Stubbie	4/17/97	Apr	F	A	517.39	2975.98	.	472	SWF	rectal	0.01	.
Stubbie	4/23/97	Apr	F	A	341.67	444.44	.	478	SWF	rectal	0.00	.
Stubbie	4/30/97	Apr	F	A	368.35	444.44	.	485	SWF	rectal	0.00	.
Stubbie	5/14/97	May	F	A	349.48	444.44	.	499	SWF	rectal	0.00	.
Stubbie	5/21/97	May	F	A	610.78	3069.22	.	506	SWF	rectal	0.01	.
Stubbie	5/28/97	May	F	A	572.70	444.44	.	513	SWF	rectal	0.00	.
Stubbie	6/4/97	Jun	F	A	507.62	444.44	.	520	SWF	rectal	0.00	.
Stubbie	6/11/97	Jun	F	A	555.78	4806.13	.	527	SWF	rectal	0.01	.
Stubbie	6/18/97	Jun	F	A	470.85	444.44	.	534	SWF	rectal	0.00	.
Stubbie	6/25/97	Jun	F	A	523.57	744.07	.	541	SWF	rectal	0.00	.
Stubbie	7/2/97	Jul	F	A	748.75	5457.27	.	548	SWF	rectal	0.01	.
Stubbie	7/16/97	Jul	F	A	940.73	785.16	.	562	SWF	rectal	0.00	.
Stubbie	7/23/97	Jul	F	A	945.29	7456.54	.	569	SWF	rectal	0.01	.
Wild1	12/13/94	Dec	F	AP	654.70	6054.68	392.60	.	Wild	rectal	.	1.67
Wild2	1/31/95	Jan	M	J	768.92	4554.84	7598.32	.	Wild	rectal	.	0.10
Wild3	1/31/95	Jan	M	A	313.65	444.44	459.28	.	Wild	rectal	.	0.68
Wild4	1/31/95	Jan	F	A	1145.41	444.44	684.94	.	Wild	rectal	.	1.67
Wild5	1/31/95	Jan	M	A	621.51	444.44	683.73	.	Wild	rectal	.	0.91
Wild6	1/31/95	Jan	F	J	475.73	444.44	422.80	.	Wild	rectal	.	1.13
Wild7	1/31/95	Jan	F	J	410.65	973.08	524.76	.	Wild	rectal	.	0.78
Wild8	1/31/95	Jan	F	J	557.08	444.44	446.24	.	Wild	rectal	.	1.25
Wild9	1/31/95	Jan	F	.	191.66	444.44	918.08	.	Wild	rectal	.	0.21
Wild10	1/31/95	Jan	M	J	856.45	2083.03	1692.17	.	Wild	rectal	.	0.51
Wild11	1/31/95	Jan	F	A	464.67	444.44	681.55	.	Wild	rectal	.	0.68
Wild12	1/31/95	Jan	M	.	448.40	617.48	816.12	.	Wild	rectal	.	0.55
Wild13	2/14/95	Feb	F	AL	206.34	961.07	356.84	.	Wild	rectal	.	0.58
Wild14	2/14/95	Feb	M	A	479.64	1254.71	20105.95	.	Wild	rectal	.	0.02

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Wild15	2/15/95	Feb	F	J	914.05	7145.19	427.39	.	Wild	rectal	.	2.14
Wild16	2/21/95	Feb	M	.	280.79	444.44	1635.15	.	Wild	rectal	.	0.17
Wild17	2/21/95	Feb	F	A	676.83	1074.07	691.22	.	Wild	rectal	.	0.98
Wild18	2/21/95	Feb	M	J	99.70	748.02	244.02	.	Wild	rectal	.	0.41
Wild19	2/21/95	Feb	F	AP	126.03	444.44	400.57	.	Wild	rectal	.	0.31
Wild20	2/21/95	Feb	F	AL	453.61	444.44	372.06	.	Wild	rectal	.	1.22
Wild21	2/23/95	Feb	F	A	665.44	5904.54	624.54	.	Wild	rectal	.	1.07
Wild22	2/23/95	Feb	F	A	601.66	444.44	318.91	.	Wild	rectal	.	1.89
Wild23	2/23/95	Feb	M	J	105.46	4807.71	251.51	.	Wild	rectal	.	0.42
Wild25	1/23/96	Jan	F	AL	307.83	460.38	320.12	.	Wild	rectal	.	0.96
Wild28	1/23/96	Jan	F	A	720.44	600.41	440.68	.	Wild	rectal	.	1.63
Wild29	1/23/96	Jan	F	AL	26.07	17369.08	173.98	.	Wild	rectal	.	0.15
Wild30	1/23/96	Jan	M	C	131.46	2378.57	179.24	.	Wild	rectal	.	0.73
Wild31	1/23/96	Jan	M	A	239.36	444.44	247.16	.	Wild	rectal	.	0.97
Wild32	1/23/96	Jan	F	.	117.60	444.44	194.58	.	Wild	rectal	.	0.60
Wild33	1/23/96	Jan	F	.	465.32	574.49	694.12	.	Wild	rectal	.	0.67
Wild34	1/23/96	Jan	F	AP	200.09	444.44	210.26	.	Wild	rectal	.	0.95
Wild35	1/23/96	Jan	F	J	940.41	1335.16	561.48	.	Wild	rectal	.	1.67
Wild36	1/23/96	Jan	M	A	193.35	7380.67	243.29	.	Wild	rectal	.	0.79
Wild37	1/23/96	Jan	M	J	186.65	1540.46	231.50	.	Wild	rectal	.	0.81
Wild38	1/23/96	Jan	F	C	397.96	6110.00	399.12	.	Wild	rectal	.	1.00
Wild39	1/23/96	Jan	F	C	227.36	1297.07	188.45	.	Wild	rectal	.	1.21
Wild40	1/23/96	Jan	M	J	930.32	895.48	726.97	.	Wild	rectal	.	1.28
Wild41	1/23/96	Jan	M	A	292.24	444.44	381.24	.	Wild	rectal	.	0.77
Wild42	1/23/96	Jan	F	C	273.66	713.10	264.31	.	Wild	rectal	.	1.04
Wild43	1/23/96	Jan	F	AL	144.61	444.44	185.50	.	Wild	rectal	.	0.78
Wild44	2/11/97	Feb	F	J	756.56	1937.62	709.34	.	Wild	rectal	.	1.07
Wild45	2/11/97	Feb	F	C	292.14	1357.29	231.53	.	Wild	rectal	.	1.26
Wild46	2/11/97	Feb	M	A	3.96	444.44	185.33	.	Wild	rectal	.	0.02
Wild47	2/11/97	Feb	F	A	74.06	444.44	149.96	.	Wild	rectal	.	0.49
Wild48	2/11/97	Feb	M	J	115.39	444.44	600.62	.	Wild	rectal	.	0.19
Wild49	2/11/97	Feb	M	J	762.09	444.44	669.47	.	Wild	rectal	.	1.14
Wild51	2/11/97	Feb	F	A	2.34	444.44	199.10	.	Wild	rectal	.	0.01
Wild52	2/11/97	Feb	M	J	104.75	2740.49	790.52	.	Wild	rectal	.	0.13
Wild53	2/11/97	Feb	F	J	1119.38	444.44	978.72	.	Wild	rectal	.	1.14
Wild54	2/11/97	Feb	M	C	834.00	2075.12	1294.73	.	Wild	rectal	.	0.64
Wild55	2/11/97	Feb	F	J	549.93	444.44	644.35	.	Wild	rectal	.	0.85
Wild56	2/11/97	Feb	F	AL	798.21	1223.42	808.88	.	Wild	rectal	.	0.99
Wild57	2/6/98	Feb	M	J	74.61	937.05	420.38	.	Wild	rectal	.	0.18
Wild58	2/6/98	Feb	F	A	199.01	714.83	288.71	.	Wild	rectal	.	0.69
Wild59	2/6/98	Feb	F	A	154.92	444.44	277.36	.	Wild	rectal	.	0.56
Wild60	2/9/98	Feb	F	A	440.92	444.44	345.25	.	Wild	rectal	.	1.28
Wild61	2/13/98	Feb	F	A	164.46	3047.10	407.82	.	Wild	rectal	.	0.40
Wild62	2/13/98	Feb	F	AP	2.34	5070.07	206.79	.	Wild	rectal	.	0.01
Wild63	3/3/98	Mar	F	AP	220.07	444.44	469.91	.	Wild	rectal	.	0.47
Wild64	3/3/98	Mar	F	AP	29.66	4671.79	233.17	.	Wild	rectal	.	0.13
Wild65	3/3/98	Mar	F	AL	247.99	444.44	357.57	.	Wild	rectal	.	0.69
Wild66	3/3/98	Mar	F	J	323.22	6628.38	382.94	.	Wild	rectal	.	0.84

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Wild67	3/4/98	Mar	F	A	16.54	1716.36	113.41	.	Wild	rectal	.	0.15
Wild68	3/4/98	Mar	M	A	399.27	3141.92	4923.81	.	Wild	rectal	.	0.08
Wild69	3/13/98	Mar	F	C	154.47	4730.27	290.89	.	Wild	rectal	.	0.53
Wild70	4/1/98	Apr	M	C	399.92	444.44	174.60	.	Wild	rectal	.	2.29
Wild71	3/6/97	Mar	F	A	253.84	8804.66	167.14	.	Wild	rectal	.	1.52
Wild72	3/6/97	Mar	M	A	2.34	2808.45	7467.86	.	Wild	rectal	.	0.00
Wild73	3/6/97	Mar	F	AL	533.01	6372.35	670.44	.	Wild	rectal	.	0.80
Wild74	4/24/97	Apr	F	J	284.50	444.44	546.74	.	Wild	rectal	.	0.52
Wild75	4/24/97	Apr	F	A	504.37	444.44	228.75	.	Wild	rectal	.	2.20
Wild76	11/10/97	Nov	M	C	23.31	444.44	88.67	.	Wild	rectal	.	0.26
Wild77	11/10/97	Nov	F	A	211.87	444.44	208.84	.	Wild	rectal	.	1.01
Wild78	.	.	M	C	215.02	6720.05	514.12	.	Wild	rectal	.	0.42
Wild79	.	.	M	C	243.76	16262.77	733.74	.	Wild	rectal	.	0.33
Wild80	3/17/97	Mar	M	A	2.34	444.44	1346.92	.	Wild	rectal	.	0.00
Wild81	3/17/97	Mar	F	A	16.72	444.44	80.00	.	Wild	rectal	.	0.21
Wild82	3/17/97	Mar	M	A	230.81	631.70	6571.52	.	Wild	rectal	.	0.04
Wild83	4/20/95	Apr	F	A	27.65	12965.96	126.38	.	Wild	rectal	.	0.22
Wild84	4/21/95	Apr	F	A	12.66	10837.11	113.00	.	Wild	rectal	.	0.11
Wild85	2/3/97	Feb	F	AP	140.77	444.44	183.40	.	Wild	rectal	.	0.77
Wild86	3/11/96	Mar	F	AP	2.34	444.44	97.97	.	Wild	rectal	.	0.02
Wild87	10/29/96	Oct	M	J	15.31	5703.82	211.13	.	Wild	rectal	.	0.07
Wild88	6/5/98	Jun	M	J	403.82	35370.34	524.03	.	Wild	rectal	.	0.77
Wild89	4/20/99	Apr	F	A	2.34	13245.70	80.00	.	Wild	rectal	.	0.03
Wild90	1/17/98	Jan	M	A	7.51	102396.99	241.84	.	Wild	rectal	.	0.03
Wild91	6/6/97	Jun	.	.	2.34	32572.96	83.21	.	Wild	rectal	.	0.03
Wild92	5/13/98	May	F	A	2.34	855.81	125.25	.	Wild	rectal	.	0.02
Wild93	5/25/98	May	F	A	107.41	444.44	280.74	.	Wild	rectal	.	0.38
Wild94	6/15/98	Jun	F	A	82.03	444.44	338.48	.	Wild	rectal	.	0.24
Wild95	5/18/98	May	F	A	10.36	13022.86	420.38	.	Wild	rectal	.	0.02
Wild96	11/10/97	Nov	M	C	195.08	444.44	106.45	.	Wild	rectal	.	1.83
Wild97	7/9/98	Jul	F	A	75.79	444.44	421.59	.	Wild	rectal	.	0.18
Wild98	7/9/98	Jul	F	J	83.95	444.44	317.46	.	Wild	rectal	.	0.26
Wild99	5/23/98	May	F	A	144.41	444.44	398.88	.	Wild	rectal	.	0.36
Wild100	5/5/98	May	F	AP	2.34	444.44	150.73	.	Wild	rectal	.	0.02
Wild101	4/24/98	Apr	F	AP	2.34	12126.75	131.65	.	Wild	rectal	.	0.02
Wild102	11/10/97	Nov	F	A	113.56	444.44	210.70	.	Wild	rectal	.	0.54
Wild103	3/25/97	Mar	M	J	2.34	10674.32	129.64	.	Wild	rectal	.	0.02
Wild104	6/9/98	Jun	.	.	252.05	725.74	302.00	.	Wild	rectal	.	0.83
Wild105	11/3/98	Nov	M	J	91.83	444.44	387.04	.	Wild	rectal	.	0.24
Wild106	5/6/99	May	F	A	518.36	9645.45	460.49	.	Wild	rectal	.	1.13
N95612	8/11/95	Aug	F	C	380.72	444.44	307.07	.	Necropsy	rectal	.	1.24
N95612	8/11/95	Aug	F	C	415.54	444.44	216.98	.	Necropsy	lgint	.	1.92
N95612	8/11/95	Aug	F	C	534.96	444.44	543.12	.	Necropsy	caecum	.	0.98
MEC9625	4/23/96	Apr	F	C	189.58	2427.56	145.23	.	Necropsy	rectal	.	1.31
MEC9715	3/18/97	Mar	F	J	272.52	6780.11	149.94	.	Necropsy	rectal	.	1.82
MNE9711	7/17/97	Jul	M	A	448.40	8689.28	50011.20	.	Necropsy	rectal	.	0.01
MSE9723	8/25/97	Aug	F	C	263.77	4753.98	143.20	.	Necropsy	rectal	.	1.84
MSW96160	4/11/96	Apr	F	A	474.43	22363.29	279.77	.	Necropsy	smint	.	1.70

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MSW96160	4/11/96	Apr	F	A	29.65	444.44	85.77	.	Necropsy	lgint	.	0.35
MSW96160	4/11/96	Apr	F	A	499.81	11954.48	221.60	.	Necropsy	stomach	.	2.26
MSW96161	4/11/96	Apr	F	C	256.32	3660.31	225.61	.	Necropsy	stomach	.	1.14
MSW96161	4/11/96	Apr	F	C	149.55	444.44	90.46	.	Necropsy	lgint	.	1.65
MSW96161	4/11/96	Apr	F	C	112.20	1523.55	98.57	.	Necropsy	duod	.	1.14
MSW96161	4/11/96	Apr	F	C	264.26	13710.35	229.28	.	Necropsy	smint	.	1.15
MSW96161	4/11/96	Apr	F	C	2.34	19486.88	115.77	.	Necropsy	caecum	.	0.02
MSW96161	4/11/96	Apr	F	C	493.96	444.44	95.38	.	Necropsy	rectal	.	5.18
MSW96170	4/16/96	Apr	M	J	86.49	444.44	80.00	.	Necropsy	lgint	.	1.08
MSW96170	4/16/96	Apr	M	J	156.32	444.44	118.14	.	Necropsy	rectal	.	1.32
MSW96170	4/16/96	Apr	M	J	2.34	2383.31	80.00	.	Necropsy	smint	.	0.03
MSW96171	4/16/96	Apr	F	C	151.47	1170.79	150.54	.	Necropsy	stomach	.	1.01
MSW96171	4/16/96	Apr	F	C	2.34	11605.20	102.92	.	Necropsy	caecum	.	0.02
MSW96171	4/16/96	Apr	F	C	2.34	5956.69	151.39	.	Necropsy	smint	.	0.02
MSW96171	4/16/96	Apr	F	C	2.34	2490.78	96.01	.	Necropsy	lgint	.	0.02
MSW96171	4/16/96	Apr	F	C	156.03	444.44	95.50	.	Necropsy	rectal	.	1.63
MSW96173	4/16/96	Apr	F	AL	252.09	8317.88	183.21	.	Necropsy	rectal	.	1.38
MSW96176	4/22/96	Apr	M	A	2.34	582.55	80.00	.	Necropsy	rectal	.	0.03
MSW96177	8/21/96	Aug	F	C	55.97	572.91	102.78	.	Necropsy	rectal	.	0.54
MSW9734	8/6/97	Aug	F	AP	490.38	20498.36	80.00	.	Necropsy	rectal	.	6.13
MSW9742	8/26/97	Aug	F	AP	330.93	18917.92	80.00	.	Necropsy	rectal	.	4.14
SWF9534	2/12/96	Feb	M	A	146.66	3168.79	674.55	.	Necropsy	rectal	.	0.22
MEC9610	2/15/96	Feb	M	A	56.62	2122.54	179.56	.	Necropsy	rectal	.	0.32
MEC9610	2/15/96	Feb	M	A	2.34	3045.52	114.62	.	Necropsy	rectal	.	0.02
MEC9612	2/19/96	Feb	M	J	748.42	36776.94	863.48	.	Necropsy	rectal	.	0.87
MSW9608	1/16/96	Jan	F	C	516.08	3285.74	312.63	.	Necropsy	rectal	.	1.65
MSW9609	1/16/96	Jan	F	C	2.34	444.44	141.09	.	Necropsy	rectal	.	0.02
MSW96221	8/27/96	Aug	F	A	689.52	55489.40	106.96	.	Necropsy	rectal	.	6.45
MSW96244	11/20/96	Nov	F	C	332.88	9925.19	139.50	.	Necropsy	rectal	.	2.39
MSW96245	11/22/96	Nov	F	A	26.55	452.96	184.58	.	Necropsy	rectal	.	0.14
MSW96160	4/11/96	Apr	F	A	2.34	16973.97	113.99	.	Necropsy	caecum	.	0.02
TPR12	4/1/98	Apr	M	C	0.19	585.13	1.65	.	Wild	plasma	.	0.11
CPR9801	4/5/98	Apr	M	C	0.55	1018.67	1.00	.	Wild	plasma	.	0.55
TBC09	4/21/95	Apr	F	A	7.00	2152.00	1.00	.	Wild	plasma	.	7.00
calf	4/21/95	Apr	.	C	0.36	1366.67	56.56	.	Wild	plasma	.	0.01
calf	4/21/95	Apr	.	C	0.50	1422.67	59.68	.	Wild	plasma	.	0.01
TBC24	4/21/95	Apr	F	A	0.13	1360.00	1.00	.	Wild	plasma	.	0.13
TBC23	3/8/97	Mar	F	A	9.08	2271.33	1.00	.	Wild	plasma	.	9.08
TM8638	1/22/97	Jan	F	A	1.47	1844.00	1.00	.	Wild	plasma	.	1.47
TM9604	1/22/97	Jan	F	C	0.22	1469.33	1.00	.	Wild	plasma	.	0.22
TM9117	4/17/97	Apr	F	A	0.41	1597.33	1.00	.	Wild	plasma	.	0.41
TTB60	6/5/97	Jun	F	A	1.88	2254.67	1.00	.	Wild	plasma	.	1.88
SWF9808	1/9/98	Jan	M	J	0.60	1780.00	1.00	.	Wild	plasma	.	0.60
Rachel	12/8/97	Dec	F	A	26.62	2349.33	1.00	.	Wild	plasma	.	26.62
Clover	4/24/97	Apr	F	J	0.85	1444.00	1.00	.	Wild	plasma	.	0.85
Betsy	4/24/97	Apr	F	A	0.42	2012.67	1.00	.	Wild	plasma	.	0.42
CNC9701	3/6/97	Mar	M	C	0.96	3081.33	1.76	.	Wild	plasma	.	0.55
TNC13	3/6/97	Mar	F	A	35.00	1456.00	1.00	.	Wild	plasma	.	35.00

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TNC14	1/17/98	Jan	M	A	0.30	1782.67	25.92	.	Wild	plasma	.	0.01
TNC15	3/6/97	Mar	F	A	0.29	1907.33	1.00	.	Wild	plasma	.	0.29
CNC9702	11/10/97	Nov	M	C	1.48	1945.33	1.00	.	Wild	plasma	.	1.48
CNC9703	11/10/97	Nov	M	C	0.26	1728.67	1.00	.	Wild	plasma	.	0.26
TGA04	11/10/97	Nov	F	A	0.12	2210.67	1.00	.	Wild	plasma	.	0.12
TNC03	3/8/97	Mar	F	A	0.28	1814.67	1.00	.	Wild	plasma	.	0.28
TNC13	4/20/99	Apr	F	A	0.21	1104.67	1.00	.	Wild	plasma	.	0.21
TNC14	3/23/98	Mar	M	A	0.18	3130.00	1.00	.	Wild	plasma	.	0.18
TBS02	5/5/98	May	F	AP	0.75	1713.33	1.00	.	Wild	plasma	.	0.75
Ariel	11/20/97	Nov	F	A	0.21	1330.67	1.00	.	Wild	plasma	.	0.21
Holly	7/9/98	Jul	F	J	0.35	2942.67	1.00	.	Wild	plasma	.	0.35
Betsy	7/9/98	Jul	F	A	0.11	1643.33	1.00	.	Wild	plasma	.	0.11
Star	7/9/98	Jul	F	A	0.04	1611.33	1.00	.	Wild	plasma	.	0.04
TGA05	3/17/97	Mar	M	A	0.15	1046.67	134.36	.	Wild	plasma	.	0.00
TGA06	3/17/97	Mar	F	A	0.32	1011.33	1.00	.	Wild	plasma	.	0.32
TGA07	3/17/97	Mar	M	A	0.34	990.00	150.26	.	Wild	plasma	.	0.00
TBC09	4/20/95	Apr	F	A	27.65	12965.96	126.38	.	Wildwp	rectal	.	0.22
TBC24	4/21/95	Apr	F	A	12.66	10837.11	113.00	.	Wildwp	rectal	.	0.11
TGA06	3/17/97	Mar	F	A	16.72	444.44	77.12	.	Wildwp	rectal	.	0.22
Clover	4/24/97	Apr	F	J	284.50	444.44	546.74	.	Wildwp	rectal	.	0.52
Betsy	4/24/97	Apr	F	A	504.37	444.44	228.75	.	Wildwp	rectal	.	2.20
TGA04	11/10/97	Nov	F	A	211.87	444.44	208.84	.	Wildwp	rectal	.	1.01
TGA04	11/10/97	Nov	F	A	113.56	444.44	210.70	.	Wildwp	rectal	.	0.54
Holly	7/9/98	Jul	F	J	83.95	444.44	317.46	.	Wildwp	rectal	.	0.26
Star	7/9/98	Jul	F	A	75.79	444.44	421.59	.	Wildwp	rectal	.	0.18
TNC13	4/20/99	Apr	F	A	2.34	13245.70	69.15	.	Wildwp	rectal	.	0.03
TGA05	3/17/97	Mar	M	A	2.34	444.44	1346.92	.	Wildwp	rectal	.	0.00
TGA07	3/17/97	Mar	M	A	230.81	631.70	6571.52	.	Wildwp	rectal	.	0.04
CNC9703	11/10/97	Nov	M	C	23.31	444.44	88.67	.	Wildwp	rectal	.	0.26
CNC9703	11/10/97	Nov	M	C	195.08	444.44	106.45	.	Wildwp	rectal	.	1.83
TNC14	1/17/98	Jan	M	A	7.51	102396.99	241.84	.	Wildwp	rectal	.	0.03
TPR12	4/4/98	Apr	M	C	399.92	444.44	174.60	.	Wildwp	rectal	.	2.29
CNC9701	3/6/97	Mar	M	C	215.02	6720.05	514.12	.	Wildwp	rectal	.	0.42
Georgia	5/13/98	May	F	AP	2.34	855.81	125.25	.	Wildwp	rectal	.	0.02
Georgia	5/25/98	May	F	AP	107.41	444.44	280.74	.	Wildwp	rectal	.	0.38
Georgia	6/15/98	Jun	F	AP	82.03	444.44	338.48	.	Wildwp	rectal	.	0.24
Georgia	5/18/98	May	F	AP	10.36	13022.86	420.38	.	Wildwp	rectal	.	0.02
Georgia	5/23/98	May	F	AP	144.41	444.44	398.88	.	Wildwp	rectal	.	0.36
Chester	7/1/92	Jul	M	A	.	.	931.85	.	Epcot	rectal	.	.
Chester	7/6/92	Jul	M	A	.	.	770.70	.	Epcot	rectal	.	.
Chester	7/9/92	Jul	M	A	.	.	119.95	.	Epcot	rectal	.	.
Chester	7/19/92	Jul	M	A	.	.	965.19	.	Epcot	rectal	.	.
Chester	8/12/92	Aug	M	A	.	.	570.18	.	Epcot	rectal	.	.
Chester	8/17/92	Aug	M	A	.	.	306.83	.	Epcot	rectal	.	.
Chester	12/9/92	Dec	M	A	.	.	134.31	.	Epcot	rectal	.	.
Chester	8/20/95	Aug	M	A	.	.	6834.86	232	Epcot	rectal	.	.
Chester	8/21/95	Aug	M	A	.	.	6571.52	233	Epcot	rectal	.	.
Chester	8/22/95	Aug	M	A	.	.	4551.74	234	Epcot	rectal	.	.

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Chester	8/24/95	Aug	M	A	.	.	3807.62	236	Epcot	rectal	.	.
Chester	8/26/95	Aug	M	A	.	.	5677.60	238	Epcot	rectal	.	.
Chester	8/28/95	Aug	M	A	.	.	6042.42	240	Epcot	rectal	.	.
Chester	8/30/95	Aug	M	A	359.24	46970.80	2913.70	242	Epcot	rectal	.	0.12
Chester	9/2/95	Sep	M	A	.	.	41313.60	245	Epcot	rectal	.	.
Chester	9/6/95	Sep	M	A	.	.	7992.13	249	Epcot	rectal	.	.
Chester	9/13/95	Sep	M	A	.	.	3457.30	256	Epcot	rectal	.	.
Chester	10/5/95	Oct	M	A	.	.	4730.53	278	Epcot	rectal	.	.
Chester	10/7/95	Oct	M	A	475.08	19771.36	3930.83	280	Epcot	rectal	.	0.12
Chester	10/9/95	Oct	M	A	.	.	3541.86	282	Epcot	rectal	.	.
Chester	10/10/95	Oct	M	A	.	.	5948.19	283	Epcot	rectal	.	.
Chester	10/11/95	Oct	M	A	.	.	5530.22	284	Epcot	rectal	.	.
Chester	10/14/95	Oct	M	A	.	.	3239.86	287	Epcot	rectal	.	.
Chester	10/23/95	Oct	M	A	.	.	1205.83	296	Epcot	rectal	.	.
Chester	10/25/95	Oct	M	A	.	.	2763.90	298	Epcot	rectal	.	.
Chester	10/31/95	Oct	M	A	.	.	4237.66	304	Epcot	rectal	.	.
Chester	11/4/95	Nov	M	A	.	.	7105.46	308	Epcot	rectal	.	.
Chester	1/20/96	Jan	M	A	645.92	133168.24	3604.67	385	Epcot	rectal	.	0.18
Chester	1/27/96	Jan	M	A	.	.	16213.78	392	Epcot	rectal	.	.
Chester	2/6/96	Feb	M	A	926.41	94621.20	14512.91	402	Epcot	rectal	.	0.06
Chester	2/8/96	Feb	M	A	.	.	6692.32	404	Epcot	rectal	.	.
Chester	2/9/96	Feb	M	A	.	.	16576.18	405	Epcot	rectal	.	.
Chester	2/17/96	Feb	M	A	654.70	122421.21	12551.12	413	Epcot	rectal	.	0.05
Chester	3/7/96	Mar	M	A	.	.	49528.00	432	Epcot	rectal	.	.
Chester	3/9/96	Mar	M	A	.	.	14109.44	434	Epcot	rectal	.	.
Chester	3/12/96	Mar	M	A	.	.	15078.26	437	Epcot	rectal	.	.
Chester	3/15/96	Mar	M	A	.	.	12650.18	440	Epcot	rectal	.	.
Chester	3/16/96	Mar	M	A	.	.	16788.78	441	Epcot	rectal	.	.
Chester	3/20/96	Mar	M	A	.	.	14409.02	445	Epcot	rectal	.	.
Chester	4/3/96	Apr	M	A	.	.	28750.40	459	Epcot	rectal	.	.
Chester	4/5/96	Apr	M	A	.	.	10055.39	461	Epcot	rectal	.	.
Chester	4/6/96	Apr	M	A	.	.	19400.48	462	Epcot	rectal	.	.
Chester	4/17/96	Apr	M	A	779.01	558687.06	9775.14	473	Epcot	rectal	.	0.08
Chester	4/18/96	Apr	M	A	.	.	22683.82	474	Epcot	rectal	.	.
Chester	4/27/96	Apr	M	A	.	.	13048.82	483	Epcot	rectal	.	.
Chester	5/9/96	May	M	A	.	.	8443.92	495	Epcot	rectal	.	.
Chester	5/14/96	May	M	A	.	.	5967.52	500	Epcot	rectal	.	.
Chester	5/16/96	May	M	A	.	.	7334.98	502	Epcot	rectal	.	.
Chester	5/17/96	May	M	A	.	.	18450.99	503	Epcot	rectal	.	.
Chester	5/21/96	May	M	A	.	.	4312.56	507	Epcot	rectal	.	.
Chester	5/22/96	May	M	A	.	.	5919.20	508	Epcot	rectal	.	.
Chester	5/23/96	May	M	A	.	.	5549.55	509	Epcot	rectal	.	.
Chester	5/28/96	May	M	A	.	.	12546.29	514	Epcot	rectal	.	.
Chester	5/29/96	May	M	A	.	.	12952.18	515	Epcot	rectal	.	.
Chester	6/1/96	Jun	M	A	.	.	9424.82	518	Epcot	rectal	.	.
Chester	6/5/96	Jun	M	A	.	.	17557.07	522	Epcot	rectal	.	.
Chester	6/10/96	Jun	M	A	.	.	14805.25	527	Epcot	rectal	.	.
Chester	6/12/96	Jun	M	A	.	.	12667.09	529	Epcot	rectal	.	.

ID	Date	Month	Sex	Age	Prog	Est	Test	Day	Location	Sample	E/P	P/T
Chester	6/20/96	Jun	M	A	.	.	9419.98	537	Epcot	rectal	.	.
Chester	6/21/96	Jun	M	A	.	.	59916.80	538	Epcot	rectal	.	.
Chester	6/25/96	Jun	M	A	.	.	7202.10	542	Epcot	rectal	.	.
Chester	6/26/96	Jun	M	A	.	.	5863.63	543	Epcot	rectal	.	.
Chester	6/28/96	Jun	M	A	.	.	11575.06	545	Epcot	rectal	.	.
Chester	7/5/96	Jul	M	A	.	.	7610.40	552	Epcot	rectal	.	.
Chester	7/9/96	Jul	M	A	.	.	6827.62	556	Epcot	rectal	.	.
Chester	7/10/96	Jul	M	A	.	.	5010.78	557	Epcot	rectal	.	.
Chester	7/20/96	Jul	M	A	.	.	3563.60	567	Epcot	rectal	.	.
Chester	7/26/96	Jul	M	A	.	.	3375.15	573	Epcot	rectal	.	.
Chester	7/29/96	Jul	M	A	.	.	6554.61	576	Epcot	rectal	.	.
Chester	7/31/96	Jul	M	A	.	.	4597.65	578	Epcot	rectal	.	.
Chester	8/16/96	Aug	M	A	.	.	4984.21	594	Epcot	rectal	.	.
Chester	8/22/96	Aug	M	A	.	.	3730.30	600	Epcot	rectal	.	.
Chester	8/29/96	Aug	M	A	.	.	6421.73	607	Epcot	rectal	.	.
Chester	9/1/96	Sep	M	A	.	.	9697.82	610	Epcot	rectal	.	.
Chester	9/5/96	Sep	M	A	.	.	10412.96	614	Epcot	rectal	.	.
Chester	9/12/96	Sep	M	A	.	.	7298.74	621	Epcot	rectal	.	.
Chester	10/17/96	Oct	M	A	.	.	7499.26	656	Epcot	rectal	.	.
Hurr	11/10/92	Nov	M	A	.	.	13159.95	.	Epcot	rectal	.	.
Hurr	11/18/92	Nov	M	A	.	.	2442.58	.	Epcot	rectal	.	.
Hurr	11/25/92	Nov	M	A	.	.	15783.73	.	Epcot	rectal	.	.
Hurr	12/2/92	Dec	M	A	.	.	19279.68	.	Epcot	rectal	.	.
Hurr	12/9/92	Dec	M	A	.	.	25609.60	.	Epcot	rectal	.	.
Hurr	8/19/95	Aug	M	A	.	.	13285.58	231	Epcot	rectal	.	.
Hurr	8/22/95	Aug	M	A	.	.	11848.06	234	Epcot	rectal	.	.
Hurr	8/27/95	Aug	M	A	.	.	17950.88	239	Epcot	rectal	.	.
Hurr	9/2/95	Sep	M	A	.	.	19192.70	245	Epcot	rectal	.	.
Hurr	9/6/95	Sep	M	A	.	.	15539.71	249	Epcot	rectal	.	.
Hurr	9/11/95	Sep	M	A	.	.	15786.14	254	Epcot	rectal	.	.
Hurr	9/13/95	Sep	M	A	863.61	119655.44	20939.47	256	Epcot	rectal	.	0.04
Hurr	9/18/95	Sep	M	A	.	.	16010.83	261	Epcot	rectal	.	.
Hurr	9/23/95	Sep	M	A	.	.	23582.58	266	Epcot	rectal	.	.
Hurr	10/8/95	Oct	M	A	.	.	26576.00	281	Epcot	rectal	.	.
Hurr	10/11/95	Oct	M	A	.	.	21427.50	284	Epcot	rectal	.	.
Hurr	10/19/95	Oct	M	A	618.59	59693.38	17960.54	292	Epcot	rectal	.	0.03
Hurr	10/22/95	Oct	M	A	.	.	23628.48	295	Epcot	rectal	.	.
Hurr	10/28/95	Oct	M	A	.	.	25609.60	301	Epcot	rectal	.	.
Hurr	11/4/95	Nov	M	A	.	.	8144.34	308	Epcot	rectal	.	.
Hurr	11/14/95	Nov	M	A	.	.	19122.64	318	Epcot	rectal	.	.
Hurr	11/25/95	Nov	M	A	.	.	16556.85	329	Epcot	rectal	.	.
Hurr	12/6/95	Dec	M	A	1020.78	404435.69	16211.36	340	Epcot	rectal	.	0.06
Hurr	12/11/95	Dec	M	A	.	.	14843.90	345	Epcot	rectal	.	.
Hurr	12/16/95	Dec	M	A	.	.	16317.66	350	Epcot	rectal	.	.
Hurr	1/1/96	Jan	M	A	620.86	189653.31	20304.06	366	Epcot	rectal	.	0.03
Hurr	1/10/96	Jan	M	A	.	.	13246.93	375	Epcot	rectal	.	.
Hurr	1/11/96	Jan	M	A	.	.	13447.46	376	Epcot	rectal	.	.
Hurr	1/20/96	Jan	M	A	.	.	8842.56	385	Epcot	rectal	.	.

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Hurr	1/26/96	Jan	M	A	.	.	16631.74	391	Epcot	rectal	.	.
Hurr	2/5/96	Feb	M	A	.	.	39622.40	401	Epcot	rectal	.	.
Hurr	2/9/96	Feb	M	A	972.95	55062.68	24080.27	405	Epcot	rectal	.	0.04
Hurr	3/5/96	Mar	M	A	.	.	17076.29	430	Epcot	rectal	.	.
Hurr	3/14/96	Mar	M	A	.	.	29958.40	439	Epcot	rectal	.	.
Hurr	3/19/96	Mar	M	A	.	.	14679.62	444	Epcot	rectal	.	.
Hurr	3/20/96	Mar	M	A	.	.	14520.16	445	Epcot	rectal	.	.
Hurr	4/5/96	Apr	M	A	.	.	19750.80	461	Epcot	rectal	.	.
Hurr	4/6/96	Apr	M	A	.	.	20709.95	462	Epcot	rectal	.	.
Hurr	4/9/96	Apr	M	A	.	.	68614.40	465	Epcot	rectal	.	.
Hurr	4/10/96	Apr	M	A	.	.	15544.54	466	Epcot	rectal	.	.
Hurr	4/12/96	Apr	M	A	.	.	17387.95	468	Epcot	rectal	.	.
Hurr	4/23/96	Apr	M	A	.	.	9729.23	479	Epcot	rectal	.	.
Hurr	4/30/96	Apr	M	A	.	.	10031.23	486	Epcot	rectal	.	.
Hurr	5/1/96	May	M	A	717.18	155041.58	17856.66	487	Epcot	rectal	.	0.04
Hurr	5/10/96	May	M	A	.	.	21079.60	496	Epcot	rectal	.	.
Hurr	5/16/96	May	M	A	.	.	17429.02	502	Epcot	rectal	.	.
Hurr	5/17/96	May	M	A	.	.	17235.74	503	Epcot	rectal	.	.
Hurr	5/21/96	May	M	A	.	.	10405.71	507	Epcot	rectal	.	.
Hurr	5/22/96	May	M	A	.	.	15740.24	508	Epcot	rectal	.	.
Hurr	6/1/96	Jun	M	A	.	.	14051.46	518	Epcot	rectal	.	.
Hurr	6/13/96	Jun	M	A	.	.	12884.53	530	Epcot	rectal	.	.
Hurr	6/17/96	Jun	M	A	.	.	16153.38	534	Epcot	rectal	.	.
Hurr	6/18/96	Jun	M	A	.	.	19874.02	535	Epcot	rectal	.	.
Hurr	6/26/96	Jun	M	A	.	.	20809.01	543	Epcot	rectal	.	.
Hurr	6/29/96	Jun	M	A	.	.	18132.08	546	Epcot	rectal	.	.
Hurr	7/29/96	Jul	M	A	.	.	14423.52	576	Epcot	rectal	.	.
Hurr	7/31/96	Jul	M	A	.	.	13788.11	578	Epcot	rectal	.	.
Hurr	8/1/96	Aug	M	A	.	.	8997.18	579	Epcot	rectal	.	.
Hurr	8/3/96	Aug	M	A	.	.	13892.00	581	Epcot	rectal	.	.
Hurr	8/9/96	Aug	M	A	.	.	22012.18	587	Epcot	rectal	.	.
Hurr	8/16/96	Aug	M	A	.	.	11067.70	594	Epcot	rectal	.	.
Hurr	8/21/96	Aug	M	A	.	.	12828.96	599	Epcot	rectal	.	.
Hurr	8/22/96	Aug	M	A	.	.	14375.20	600	Epcot	rectal	.	.
Hurr	8/29/96	Aug	M	A	.	.	11594.38	607	Epcot	rectal	.	.
Hurr	8/30/96	Aug	M	A	.	.	35515.20	608	Epcot	rectal	.	.
Hurr	9/1/96	Sep	M	A	.	.	17107.70	610	Epcot	rectal	.	.
Hurr	9/4/96	Sep	M	A	.	.	11654.78	613	Epcot	rectal	.	.
Hurr	9/7/96	Sep	M	A	.	.	8535.73	616	Epcot	rectal	.	.
Hurr	11/13/96	Nov	M	A	.	.	18815.81	683	Epcot	rectal	.	.
Monroe	1/24/97	Jan	M	A	239.85	7156.25	272.04	24	SWF	rectal	.	0.88
Spike	4/10/97	Apr	M	A	.	.	17387.95	100	SWF	rectal	.	.
Slip	4/2/97	Apr	M	A	.	.	22671.74	92	SWF	rectal	.	.
Slip	4/13/97	Apr	M	A	.	.	25126.40	103	SWF	rectal	.	.
Slip	4/20/97	Apr	M	A	.	.	62091.20	110	SWF	rectal	.	.
Slip	4/27/97	Apr	M	A	.	.	22490.54	117	SWF	rectal	.	.
Slip	5/7/97	May	M	A	639.41	34090.18	22973.74	127	SWF	rectal	.	0.03
Slip	5/11/97	May	M	A	.	.	31408.00	131	SWF	rectal	.	.

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Slip	5/21/97	May	M	A	.	.	25368.00	141	SWF	rectal	.	.
Slip	6/4/97	Jun	M	A	.	.	23109.04	155	SWF	rectal	.	.
Slip	6/22/97	Jun	M	A	.	.	21451.66	173	SWF	rectal	.	.
Slip	6/25/97	Jun	M	A	.	.	27300.80	176	SWF	rectal	.	.
Slip	7/16/97	Jul	M	A	1050.39	32810.02	18306.03	197	SWF	rectal	.	0.06
Slip	7/23/97	Jul	M	A	.	.	15858.62	204	SWF	rectal	.	.
Vail	3/11/97	Mar	M	A	543.09	19644.92	27059.20	70	SWF	rectal	.	0.02
Vail	3/19/97	Mar	M	A	.	.	23263.66	78	SWF	rectal	.	.
Vail	3/26/97	Mar	M	A	612.40	30929.29	22990.66	85	SWF	rectal	.	0.03
Vail	4/20/97	Apr	M	A	.	.	23396.54	110	SWF	rectal	.	.
Vail	5/4/97	May	M	A	.	.	30683.20	124	SWF	rectal	.	.
Vail	5/7/97	May	M	A	766.97	30549.99	24150.34	127	SWF	rectal	.	0.03
Vail	5/11/97	May	M	A	.	.	19168.54	131	SWF	rectal	.	.
Vail	5/18/97	May	M	A	.	.	21468.58	138	SWF	rectal	.	.
Vail	5/21/97	May	M	A	.	.	13271.09	141	SWF	rectal	.	.
Vail	6/1/97	Jun	M	A	.	.	19729.06	152	SWF	rectal	.	.
Vail	6/8/97	Jun	M	A	.	.	19825.70	159	SWF	rectal	.	.
Vail	6/11/97	Jun	M	A	.	.	11529.15	162	SWF	rectal	.	.
Vail	6/15/97	Jun	M	A	.	.	13416.05	166	SWF	rectal	.	.
Vail	6/25/97	Jun	M	A	.	.	25609.60	176	SWF	rectal	.	.
Vail	6/29/97	Jun	M	A	.	.	18975.26	180	SWF	rectal	.	.
Vail	7/9/97	Jul	M	A	.	.	25126.40	190	SWF	rectal	.	.
Vail	7/16/97	Jul	M	A	.	.	17269.57	197	SWF	rectal	.	.
Vail	7/27/97	Jul	M	A	342.65	3314.19	16095.39	208	SWF	rectal	.	0.02
Vail	7/30/97	Jul	M	A	.	.	8571.97	211	SWF	rectal	.	.
MSWF	11/5/96	Nov	M	A	349.15	14432.62	8050.11	310	SWF	rectal	.	0.04
MSWF	11/5/96	Nov	M	A	.	.	12195.97	310	SWF	rectal	.	.
MSWF	11/5/96	Nov	M	A	.	.	8997.18	310	SWF	rectal	.	.
MSWF	11/5/96	Nov	M	A	.	.	11031.46	310	SWF	rectal	.	.
MSWF	11/12/96	Nov	M	A	456.54	9304.08	12563.20	317	SWF	rectal	.	0.04
MSWF	11/12/96	Nov	M	A	.	.	13406.38	317	SWF	rectal	.	.
MSWF	11/12/96	Nov	M	A	.	.	8538.14	317	SWF	rectal	.	.
MSWF	11/12/96	Nov	M	A	.	.	10028.82	317	SWF	rectal	.	.
MSWF	11/26/96	Nov	M	A	556.76	73348.42	11432.51	331	SWF	rectal	.	0.05
MSWF	11/26/96	Nov	M	A	.	.	11790.08	331	SWF	rectal	.	.
MSWF	12/10/96	Dec	M	A	642.67	33868.92	22715.23	345	SWF	rectal	.	0.03
MSWF	12/18/96	Dec	M	A	369.98	275945.57	1668.97	353	SWF	rectal	.	0.22
MSWF	12/18/96	Dec	M	A	.	.	17982.29	353	SWF	rectal	.	.
MSWF	1/5/97	Jan	M	A	685.94	46970.80	16878.18	5	SWF	rectal	.	0.04
MSWF	1/5/97	Jan	M	A	655.68	48772.51	28750.40	5	SWF	rectal	.	0.02
MSWF	1/5/97	Jan	M	A	.	.	17206.75	5	SWF	rectal	.	.
MSWF	1/5/97	Jan	M	A	.	.	16943.41	5	SWF	rectal	.	.
MSWF	1/14/97	Jan	M	A	517.71	46670.52	17895.31	14	SWF	rectal	.	0.03
MSWF	1/14/97	Jan	M	A	640.39	61653.13	17516.00	14	SWF	rectal	.	0.04
MSWF	1/14/97	Jan	M	A	.	.	18579.04	14	SWF	rectal	.	.
MSWF	1/14/97	Jan	M	A	.	.	13998.30	14	SWF	rectal	.	.
MSWF	1/21/97	Jan	M	A	796.25	79923.07	16399.81	21	SWF	rectal	.	0.05
MSWF	1/21/97	Jan	M	A	751.35	163892.07	17177.76	21	SWF	rectal	.	0.04

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MSWF	1/21/97	Jan	M	A	554.48	113997.45	15539.71	21	SWF	rectal	.	0.04
MSWF	1/21/97	Jan	M	A	.	.	16629.33	21	SWF	rectal	.	.
MSWF	1/24/97	Jan	M	A	401.87	30328.73	12761.31	24	SWF	rectal	.	0.03
MSWF	1/24/97	Jan	M	A	581.49	338215.08	11113.60	24	SWF	rectal	.	0.05
MSWF	1/24/97	Jan	M	A	614.36	42355.91	2768.74	24	SWF	rectal	.	0.22
MSWF	1/28/97	Jan	M	A	500.14	70266.55	13348.40	28	SWF	rectal	.	0.04
MSWF	1/28/97	Jan	M	A	621.51	30360.33	15916.61	28	SWF	rectal	.	0.04
MSWF	1/28/97	Jan	M	A	.	.	18542.80	28	SWF	rectal	.	.
MSWF	2/1/97	Feb	M	A	525.20	112590.85	3735.14	32	SWF	rectal	.	0.14
MSWF	2/1/97	Feb	M	A	585.39	168475.36	23725.12	32	SWF	rectal	.	0.02
MSWF	2/4/97	Feb	M	A	801.79	93198.80	17805.92	35	SWF	rectal	.	0.05
MSWF	2/4/97	Feb	M	A	616.63	85786.52	17112.53	35	SWF	rectal	.	0.04
MSWF	2/8/97	Feb	M	A	580.84	65240.74	13894.42	39	SWF	rectal	.	0.04
MSWF	2/8/97	Feb	M	A	457.51	93056.56	2398.36	39	SWF	rectal	.	0.19
MSWF	2/12/97	Feb	M	A	749.40	42197.86	13239.68	43	SWF	rectal	.	0.06
MSWF	2/12/97	Feb	M	A	570.10	14728.16	8786.99	43	SWF	rectal	.	0.06
MSWF	2/16/97	Feb	M	A	606.87	132093.53	6972.58	47	SWF	rectal	.	0.09
MSWF	2/16/97	Feb	M	A	324.42	35433.56	6525.62	47	SWF	rectal	.	0.05
MSWF	3/19/97	Mar	M	A	968.07	95142.75	37448.00	78	SWF	rectal	.	0.03
MSWF	3/19/97	Mar	M	A	.	.	32132.80	78	SWF	rectal	.	.
MSWF	3/19/97	Mar	M	A	.	.	26092.80	78	SWF	rectal	.	.
MSWF	3/19/97	Mar	M	A	.	.	16822.61	78	SWF	rectal	.	.
MSWF	3/23/97	Mar	M	A	581.82	28716.67	23246.75	82	SWF	rectal	.	0.03
MSWF	3/23/97	Mar	M	A	.	.	35998.40	82	SWF	rectal	.	.
MSWF	3/23/97	Mar	M	A	.	.	23087.30	82	SWF	rectal	.	.
MSWF	3/23/97	Mar	M	A	.	.	29233.60	82	SWF	rectal	.	.
MSWF	3/26/97	Mar	M	A	848.97	88109.77	23140.45	85	SWF	rectal	.	0.04
MSWF	3/26/97	Mar	M	A	.	.	22188.54	85	SWF	rectal	.	.
MSWF	3/26/97	Mar	M	A	.	.	19487.46	85	SWF	rectal	.	.
MSWF	4/6/97	Apr	M	A	.	.	5240.30	96	SWF	rectal	.	.
MSWF	4/6/97	Apr	M	A	.	.	24884.80	96	SWF	rectal	.	.
MSWF	4/6/97	Apr	M	A	.	.	16646.24	96	SWF	rectal	.	.
MSWF	4/10/97	Apr	M	A	.	.	7690.13	100	SWF	rectal	.	.
MSWF	4/10/97	Apr	M	A	.	.	26817.60	100	SWF	rectal	.	.
MSWF	4/10/97	Apr	M	A	.	.	8166.08	100	SWF	rectal	.	.
MSWF	4/13/97	Apr	M	A	.	.	11331.04	103	SWF	rectal	.	.
MSWF	4/13/97	Apr	M	A	.	.	19069.49	103	SWF	rectal	.	.
MSWF	4/13/97	Apr	M	A	.	.	17008.64	103	SWF	rectal	.	.
MSWF	4/17/97	Apr	M	A	.	.	12012.35	107	SWF	rectal	.	.
MSWF	4/20/97	Apr	M	A	.	.	5460.16	110	SWF	rectal	.	.
MSWF	4/20/97	Apr	M	A	.	.	57742.40	110	SWF	rectal	.	.
MSWF	4/23/97	Apr	M	A	.	.	5428.75	113	SWF	rectal	.	.
MSWF	4/23/97	Apr	M	A	.	.	25126.40	113	SWF	rectal	.	.
MSWF	4/23/97	Apr	M	A	.	.	25609.60	113	SWF	rectal	.	.
MSWF	4/27/97	Apr	M	A	.	.	5022.86	117	SWF	rectal	.	.
MSWF	4/27/97	Apr	M	A	.	.	24082.69	117	SWF	rectal	.	.
MSWF	4/30/97	Apr	M	A	.	.	13991.06	120	SWF	rectal	.	.
MSWF	4/30/97	Apr	M	A	.	.	20371.71	120	SWF	rectal	.	.

ID	Date	Month	Sex	Age	Prog	Est	Test	Day	Location	Sample	E/P	P/T
MSWF	4/30/97	Apr	M	A	.	.	45662.40	120	SWF	rectal	.	.
MSWF	4/30/97	Apr	M	A	.	.	12647.76	120	SWF	rectal	.	.
MSWF	5/4/97	May	M	A	.	.	17518.42	124	SWF	rectal	.	.
MSWF	5/4/97	May	M	A	.	.	20840.42	124	SWF	rectal	.	.
MSWF	5/4/97	May	M	A	.	.	18832.72	124	SWF	rectal	.	.
MSWF	5/7/97	May	M	A	.	.	8045.28	127	SWF	rectal	.	.
MSWF	5/7/97	May	M	A	.	.	24884.80	127	SWF	rectal	.	.
MSWF	5/7/97	May	M	A	.	.	25368.00	127	SWF	rectal	.	.
MSWF	5/11/97	May	M	A	540.49	161521.41	12147.65	131	SWF	rectal	.	0.04
MSWF	5/11/97	May	M	A	.	.	12191.14	131	SWF	rectal	.	.
MSWF	5/14/97	May	M	A	.	.	37448.00	134	SWF	rectal	.	.
MSWF	5/14/97	May	M	A	.	.	18897.95	134	SWF	rectal	.	.
MSWF	5/14/97	May	M	A	.	.	18479.98	134	SWF	rectal	.	.
MSWF	5/18/97	May	M	A	552.53	25129.06	14607.14	138	SWF	rectal	.	0.04
MSWF	5/18/97	May	M	A	.	.	35273.60	138	SWF	rectal	.	.
MSWF	5/18/97	May	M	A	.	.	17448.35	138	SWF	rectal	.	.
MSWF	5/21/97	May	M	A	762.41	12087.24	19231.36	141	SWF	rectal	.	0.04
MSWF	5/21/97	May	M	A	.	.	17204.34	141	SWF	rectal	.	.
MSWF	5/28/97	May	M	A	.	.	11459.09	148	SWF	rectal	.	.
MSWF	5/28/97	May	M	A	.	.	23449.70	148	SWF	rectal	.	.
MSWF	6/1/97	Jun	M	A	.	.	10886.50	152	SWF	rectal	.	.
MSWF	6/1/97	Jun	M	A	.	.	44454.40	152	SWF	rectal	.	.
MSWF	6/1/97	Jun	M	A	.	.	36723.20	152	SWF	rectal	.	.
MSWF	6/4/97	Jun	M	A	.	.	12058.26	155	SWF	rectal	.	.
MSWF	6/4/97	Jun	M	A	.	.	54601.60	155	SWF	rectal	.	.
MSWF	6/8/97	Jun	M	A	.	.	44212.80	159	SWF	rectal	.	.
MSWF	6/11/97	Jun	M	A	.	.	20738.94	162	SWF	rectal	.	.
MSWF	6/11/97	Jun	M	A	.	.	14230.24	162	SWF	rectal	.	.
MSWF	6/15/97	Jun	M	A	.	.	19724.22	166	SWF	rectal	.	.
MSWF	6/15/97	Jun	M	A	.	.	16796.03	166	SWF	rectal	.	.
MSWF	6/18/97	Jun	M	A	.	.	13940.32	169	SWF	rectal	.	.
MSWF	6/18/97	Jun	M	A	.	.	32132.80	169	SWF	rectal	.	.
MSWF	6/22/97	Jun	M	A	.	.	26092.80	173	SWF	rectal	.	.
MSWF	6/22/97	Jun	M	A	.	.	16119.55	173	SWF	rectal	.	.
MSWF	6/29/97	Jun	M	A	.	.	51219.20	180	SWF	rectal	.	.
MSWF	6/29/97	Jun	M	A	.	.	20395.87	180	SWF	rectal	.	.
MSWF	7/2/97	Jul	M	A	.	.	14766.59	183	SWF	rectal	.	.
MSWF	7/2/97	Jul	M	A	.	.	28992.00	183	SWF	rectal	.	.
MSWF	7/2/97	Jul	M	A	.	.	29958.40	183	SWF	rectal	.	.
MSWF	7/6/97	Jul	M	A	638.43	25255.50	10946.90	187	SWF	rectal	.	0.06
MSWF	7/6/97	Jul	M	A	.	.	13232.43	187	SWF	rectal	.	.
MSWF	7/6/97	Jul	M	A	.	.	12906.27	187	SWF	rectal	.	.
MSWF	7/13/97	Jul	M	A	1002.56	20514.17	37448.00	194	SWF	rectal	.	0.03
MSWF	7/16/97	Jul	M	A	.	.	52427.20	197	SWF	rectal	.	.
MSWF	7/16/97	Jul	M	A	.	.	19144.38	197	SWF	rectal	.	.
MSWF	7/16/97	Jul	M	A	.	.	8518.82	197	SWF	rectal	.	.
MSWF	7/20/97	Jul	M	A	1766.92	74976.28	40105.60	201	SWF	rectal	.	0.04
MSWF	7/20/97	Jul	M	A	.	.	5385.26	201	SWF	rectal	.	.

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MSWF	7/20/97	Jul	M	A	.	.	20661.63	201	SWF	rectal	.	.
MSWF	7/23/97	Jul	M	A	.	.	38897.60	204	SWF	rectal	.	.
MSWF	7/23/97	Jul	M	A	.	.	2597.20	204	SWF	rectal	.	.
MSWF	7/23/97	Jul	M	A	.	.	14389.70	204	SWF	rectal	.	.
MSWF	7/30/97	Jul	M	A	.	.	20579.49	211	SWF	rectal	.	.
MSWF	7/30/97	Jul	M	A	.	.	23739.62	211	SWF	rectal	.	.
MSWF	7/30/97	Jul	M	A	.	.	35998.40	211	SWF	rectal	.	.
MSWF	8/3/97	Aug	M	A	.	.	26334.40	215	SWF	rectal	.	.
MSWF	8/12/97	Aug	M	A	.	.	17762.43	224	SWF	rectal	.	.
MSWF	8/12/97	Aug	M	A	.	.	16566.51	224	SWF	rectal	.	.
MSWF	8/12/97	Aug	M	A	.	.	21335.70	224	SWF	rectal	.	.
MSWF	8/18/97	Aug	M	A	.	.	40347.20	230	SWF	rectal	.	.
MSWF	8/18/97	Aug	M	A	.	.	22681.41	230	SWF	rectal	.	.
MSWF	8/20/97	Aug	M	A	.	.	3826.94	232	SWF	rectal	.	.
MSWF	8/24/97	Aug	M	A	.	.	12360.26	236	SWF	rectal	.	.
MSWF	8/24/97	Aug	M	A	.	.	26576.00	236	SWF	rectal	.	.
MSWF	8/25/97	Aug	M	A	.	.	11459.09	237	SWF	rectal	.	.
MSWF	8/26/97	Aug	M	A	.	.	41313.60	238	SWF	rectal	.	.
MSWF	8/26/97	Aug	M	A	.	.	16805.70	238	SWF	rectal	.	.
MSWF	8/27/97	Aug	M	A	.	.	3517.70	239	SWF	rectal	.	.
Vail	8/28/97	Aug	M	A	.	.	13435.38	240	SWF	rectal	.	.
MSWF	8/28/97	Aug	M	A	.	.	13532.02	240	SWF	rectal	.	.
MSWF	8/31/97	Aug	M	A	.	.	46628.80	243	SWF	rectal	.	.
MSWF	9/17/97	Sep	M	A	1144.76	26962.38	31649.60	244	SWF	rectal	.	0.04
MSWF	9/21/97	Sep	M	A	1099.20	28890.52	29475.20	248	SWF	rectal	.	0.04
MSWF	9/21/97	Sep	M	A	.	.	21746.42	248	SWF	rectal	.	.
MSWF	9/21/97	Sep	M	A	.	.	10014.32	248	SWF	rectal	.	.
Hunter	9/23/97	Sep	M	A	815.45	35891.89	33340.80	250	SWF	rectal	.	0.02
MSWF	9/23/97	Sep	M	A	482.24	14865.66	12382.00	250	SWF	rectal	.	0.04
MSWF	9/23/97	Sep	M	A	.	.	16085.73	250	SWF	rectal	.	.
MSWF	9/23/97	Sep	M	A	.	.	40830.40	250	SWF	rectal	.	.
MSWF	9/30/97	Sep	M	A	569.78	36034.13	9666.42	257	SWF	rectal	.	0.06
MSWF	9/30/97	Sep	M	A	.	.	44937.60	257	SWF	rectal	.	.
MSWF	10/8/97	Oct	M	A	.	.	16716.30	265	SWF	rectal	.	.
MSWF	10/19/97	Oct	M	A	.	.	28750.40	276	SWF	rectal	.	.
MSWF	10/19/97	Oct	M	A	.	.	39864.00	276	SWF	rectal	.	.
MSWF	10/19/97	Oct	M	A	.	.	21823.73	276	SWF	rectal	.	.
MSWF	10/26/97	Oct	M	A	.	.	22094.32	283	SWF	rectal	.	.
MSWF	11/4/97	Nov	M	A	314.08	24591.71	3235.02	292	SWF	rectal	.	0.10
MSWF	11/2/97	Nov	M	A	.	.	33582.40	290	SWF	rectal	.	.
MSWF	11/2/97	Nov	M	A	.	.	28267.20	290	SWF	rectal	.	.
MSWF	11/2/97	Nov	M	A	.	.	26576.00	290	SWF	rectal	.	.
MSWF	11/2/97	Nov	M	A	.	.	25126.40	290	SWF	rectal	.	.
MSWF	11/9/97	Nov	M	A	1056.25	17037.19	34790.40	297	SWF	rectal	.	0.03
MSWF	11/9/97	Nov	M	A	.	.	30441.60	297	SWF	rectal	.	.
MSWF	12/10/96	Dec	M	A	.	.	26092.80	345	SWF	rectal	.	.
MSWF	12/18/96	Dec	M	A	.	.	2713.17	353	SWF	rectal	.	.
MSWF	1/5/97	Jan	M	A	.	.	28508.80	5	SWF	rectal	.	.

ID	Date	Month	Sex	Age	Prog	Est	Test	Day	Location	Sample	E/P	P/T
MSWF	1/5/97	Jan	M	A	.	.	21287.38	5	SWF	rectal	.	.
MSWF	1/14/97	Jan	M	A	.	.	24160.00	14	SWF	rectal	.	.
MSWF	1/14/97	Jan	M	A	.	.	24048.86	14	SWF	rectal	.	.
MSWF	1/14/97	Jan	M	A	.	.	23700.96	14	SWF	rectal	.	.
MSWF	1/14/97	Jan	M	A	.	.	21925.20	14	SWF	rectal	.	.
MSWF	1/21/97	Jan	M	A	.	.	27784.00	21	SWF	rectal	.	.
MSWF	1/21/97	Jan	M	A	.	.	25368.00	21	SWF	rectal	.	.
MSWF	1/21/97	Jan	M	A	.	.	25851.20	21	SWF	rectal	.	.
MSWF	1/21/97	Jan	M	A	.	.	20381.38	21	SWF	rectal	.	.
MSWF	1/24/97	Jan	M	A	.	.	15786.14	24	SWF	rectal	.	.
MSWF	1/24/97	Jan	M	A	.	.	19997.23	24	SWF	rectal	.	.
MSWF	1/24/97	Jan	M	A	.	.	4875.49	24	SWF	rectal	.	.
MSWF	1/28/97	Jan	M	A	.	.	23270.91	28	SWF	rectal	.	.
MSWF	1/28/97	Jan	M	A	.	.	28992.00	28	SWF	rectal	.	.
MSWF	1/28/97	Jan	M	A	.	.	23089.71	28	SWF	rectal	.	.
MSWF	2/1/97	Feb	M	A	.	.	6598.10	32	SWF	rectal	.	.
MSWF	2/1/97	Feb	M	A	.	.	29716.80	32	SWF	rectal	.	.
MSWF	2/4/97	Feb	M	A	.	.	29958.40	35	SWF	rectal	.	.
MSWF	2/4/97	Feb	M	A	.	.	22270.69	35	SWF	rectal	.	.
MSWF	2/8/97	Feb	M	A	.	.	19347.33	39	SWF	rectal	.	.
MSWF	2/8/97	Feb	M	A	.	.	4061.30	39	SWF	rectal	.	.
MSWF	2/12/97	Feb	M	A	.	.	20504.59	43	SWF	rectal	.	.
MSWF	2/12/97	Feb	M	A	.	.	12526.96	43	SWF	rectal	.	.
MSWF	2/16/97	Feb	M	A	.	.	8127.42	47	SWF	rectal	.	.
MSWF	2/16/97	Feb	M	A	.	.	10743.95	47	SWF	rectal	.	.
MSWF	3/23/97	Mar	M	A	.	.	28025.60	82	SWF	rectal	.	.
MSWF	3/23/97	Mar	M	A	.	.	49528.00	82	SWF	rectal	.	.
MSWF	3/23/97	Mar	M	A	.	.	40588.80	82	SWF	rectal	.	.
MSWF	3/23/97	Mar	M	A	.	.	35032.00	82	SWF	rectal	.	.
MSWF	3/26/97	Mar	M	A	.	.	32132.80	85	SWF	rectal	.	.
MSWF	3/26/97	Mar	M	A	.	.	36240.00	85	SWF	rectal	.	.
MSWF	3/26/97	Mar	M	A	.	.	28992.00	85	SWF	rectal	.	.
MSWF	4/6/97	Apr	M	A	.	.	13027.07	96	SWF	rectal	.	.
MSWF	4/6/97	Apr	M	A	.	.	38172.80	96	SWF	rectal	.	.
MSWF	4/6/97	Apr	M	A	.	.	26576.00	96	SWF	rectal	.	.
NewBob	8/15/95	Aug	M	A	.	.	12862.78	227	Lowry	rectal	.	.
NewBob	9/11/95	Sep	M	A	579.54	51143.18	37689.60	254	Lowry	rectal	.	0.02
NewBob	9/21/95	Sep	M	A	.	.	27300.80	264	Lowry	rectal	.	.
NewBob	9/25/95	Sep	M	A	.	.	28508.80	268	Lowry	rectal	.	.
NewBob	10/4/95	Oct	M	A	413.58	74581.17	32132.80	277	Lowry	rectal	.	0.01
NewBob	10/12/95	Oct	M	A	.	.	19654.16	285	Lowry	rectal	.	.
NewBob	10/18/95	Oct	M	A	.	.	6240.53	291	Lowry	rectal	.	.
NewBob	10/23/95	Oct	M	A	.	.	7837.50	296	Lowry	rectal	.	.
NewBob	11/1/95	Nov	M	A	383.97	24828.78	13790.53	305	Lowry	rectal	.	0.03
NewBob	11/8/95	Nov	M	A	.	.	6462.80	312	Lowry	rectal	.	.
NewBob	11/24/95	Nov	M	A	.	.	3167.38	328	Lowry	rectal	.	.
NewBob	11/30/95	Nov	M	A	.	.	3242.27	334	Lowry	rectal	.	.
NewBob	12/12/95	Dec	M	A	438.96	26156.35	4102.37	346	Lowry	rectal	.	0.11

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NewBob	2/3/96	Dec	M	A	244.60	1695.82	850.92	34	Lowry	rectal	.	0.29
Hugh	11/10/92	Nov	M	A	.	.	22918.18	315	Lowry	rectal	.	.
Hugh	11/18/92	Nov	M	A	.	.	15665.34	323	Lowry	rectal	.	.
Hugh	12/1/92	Dec	M	A	.	.	3826.94	336	Lowry	rectal	.	.
Hugh	12/8/92	Dec	M	A	.	.	7105.46	343	Lowry	rectal	.	.
Hugh	8/7/95	Aug	M	A	.	.	2104.58	219	Lowry	rectal	.	.
Hugh	8/16/95	Aug	M	A	220.95	5590.03	4090.29	228	Lowry	rectal	.	0.05
Hugh	9/14/95	Sep	M	A	.	.	18552.46	257	Lowry	rectal	.	.
Hugh	9/21/95	Sep	M	A	294.84	105589.48	18066.85	264	Lowry	rectal	.	0.02
Hugh	9/26/95	Sep	M	A	.	.	29233.60	269	Lowry	rectal	.	.
Hugh	10/18/95	Oct	M	A	.	.	21350.19	291	Lowry	rectal	.	.
Hugh	10/23/95	Oct	M	A	280.04	39795.59	23703.38	296	Lowry	rectal	.	0.01
Hugh	11/1/95	Nov	M	A	.	.	18547.63	305	Lowry	rectal	.	.
Hugh	11/30/95	Nov	M	A	.	.	3901.84	334	Lowry	rectal	.	.
Hugh	12/6/95	Dec	M	A	227.32	35070.06	3179.46	340	Lowry	rectal	.	0.07
Hugh	12/13/95	Dec	M	A	.	.	6177.71	347	Lowry	rectal	.	.
Hugh	1/24/96	Jan	M	A	195.76	23643.45	3764.13	24	Lowry	rectal	.	0.05
Hugh	1/31/96	Jan	M	A	.	.	1521.84	31	Lowry	rectal	.	.
Hugh	2/3/96	Feb	M	A	218.12	14949.42	2319.36	34	Lowry	rectal	.	0.09
Gene	8/19/95	Aug	M	A	615.33	213834.11	30683.20	231	Epcot	rectal	.	0.02
Gene	8/21/95	Aug	M	A	.	.	30924.80	233	Epcot	rectal	.	.
Gene	8/22/95	Aug	M	A	.	.	25609.60	234	Epcot	rectal	.	.
Gene	9/3/95	Sep	M	A	.	.	38414.40	246	Epcot	rectal	.	.
Gene	9/4/95	Sep	M	A	.	.	43004.80	247	Epcot	rectal	.	.
Gene	9/6/95	Sep	M	A	.	.	42280.00	249	Epcot	rectal	.	.
Gene	9/11/95	Sep	M	A	.	.	42521.60	254	Epcot	rectal	.	.
Gene	9/13/95	Sep	M	A	.	.	43004.80	256	Epcot	rectal	.	.
Gene	9/20/95	Sep	M	A	.	.	34548.80	263	Epcot	rectal	.	.
Gene	9/22/95	Sep	M	A	888.02	118659.76	41796.80	265	Epcot	rectal	.	0.02
Gene	10/7/95	Oct	M	A	.	.	38414.40	280	Epcot	rectal	.	.
Gene	10/11/95	Oct	M	A	.	.	41072.00	284	Epcot	rectal	.	.
Gene	10/14/95	Oct	M	A	.	.	38414.40	287	Epcot	rectal	.	.
Gene	10/22/95	Oct	M	A	.	.	42038.40	295	Epcot	rectal	.	.
Gene	10/30/95	Oct	M	A	.	.	31649.60	303	Epcot	rectal	.	.
Gene	10/31/95	Oct	M	A	.	.	36240.00	304	Epcot	rectal	.	.
Gene	11/7/95	Nov	M	A	.	.	42521.60	311	Epcot	rectal	.	.
Gene	11/11/95	Nov	M	A	.	.	36240.00	315	Epcot	rectal	.	.
Gene	11/13/95	Nov	M	A	.	.	45420.80	317	Epcot	rectal	.	.
Gene	1/1/96	Jan	M	A	858.41	81392.88	38414.40	1	Epcot	rectal	.	0.02
Gene	1/13/96	Jan	M	A	.	.	46387.20	13	Epcot	rectal	.	.
Gene	2/6/96	Feb	M	A	1463.00	129232.93	47353.60	37	Epcot	rectal	.	0.03
Gene	2/10/96	Feb	M	A	.	.	46387.20	41	Epcot	rectal	.	.
Gene	2/13/96	Feb	M	A	.	.	45420.80	44	Epcot	rectal	.	.
Gene	2/14/96	Feb	M	A	.	.	46145.60	45	Epcot	rectal	.	.
Gene	2/24/96	Feb	M	A	.	.	37689.60	55	Epcot	rectal	.	.
Gene	2/27/96	Feb	M	A	868.82	130149.59	31891.20	58	Epcot	rectal	.	0.03
Gene	3/1/96	Mar	M	A	.	.	23599.49	61	Epcot	rectal	.	.
Gene	3/7/96	Mar	M	A	.	.	43246.40	67	Epcot	rectal	.	.

ID	Date	Month	Sex	Age	Prog	Est	Test	Day	Location	Sample	E/P	P/T
Gene	3/9/96	Mar	M	A	.	.	49044.80	69	Epcot	rectal	.	.
Gene	3/11/96	Mar	M	A	.	.	42763.20	71	Epcot	rectal	.	.
Gene	3/22/96	Mar	M	A	.	.	17315.47	82	Epcot	rectal	.	.
Gene	3/26/96	Mar	M	A	.	.	42521.60	86	Epcot	rectal	.	.
Gene	3/27/96	Mar	M	A	.	.	43246.40	87	Epcot	rectal	.	.
Gene	4/3/96	Apr	M	A	.	.	23196.02	94	Epcot	rectal	.	.
Gene	4/4/96	Apr	M	A	.	.	37689.60	95	Epcot	rectal	.	.
Gene	4/26/96	Apr	M	A	.	.	45420.80	117	Epcot	rectal	.	.
Gene	4/30/96	Apr	M	A	.	.	39139.20	121	Epcot	rectal	.	.
Gene	5/16/96	May	M	A	.	.	36481.60	137	Epcot	rectal	.	.
Gene	5/22/96	May	M	A	.	.	7699.79	143	Epcot	rectal	.	.
Gene	5/28/96	May	M	A	.	.	35273.60	149	Epcot	rectal	.	.
Gene	5/30/96	May	M	A	839.86	463386.26	34307.20	151	Epcot	rectal	.	0.02
Gene	5/31/96	May	M	A	.	.	18929.36	152	Epcot	rectal	.	.
Gene	6/4/96	Jun	M	A	.	.	33099.20	156	Epcot	rectal	.	.
Gene	6/11/96	Jun	M	A	.	.	35032.00	163	Epcot	rectal	.	.
Gene	6/21/96	Jun	M	A	.	.	36964.80	173	Epcot	rectal	.	.
Gene	6/27/96	Jun	M	A	.	.	9874.19	179	Epcot	rectal	.	.
Gene	7/10/96	Jul	M	A	.	.	32616.00	192	Epcot	rectal	.	.
Gene	7/13/96	Jul	M	A	.	.	11509.82	195	Epcot	rectal	.	.
Gene	7/21/96	Jul	M	A	.	.	10255.92	203	Epcot	rectal	.	.
Gene	7/26/96	Jul	M	A	.	.	35756.80	208	Epcot	rectal	.	.
Gene	7/31/96	Jul	M	A	.	.	36481.60	213	Epcot	rectal	.	.
Gene	8/9/96	Aug	M	A	.	.	41555.20	222	Epcot	rectal	.	.
Gene	8/22/96	Aug	M	A	.	.	34307.20	235	Epcot	rectal	.	.
Gene	8/29/96	Aug	M	A	.	.	29716.80	242	Epcot	rectal	.	.
Gene	8/30/96	Aug	M	A	.	.	12145.23	243	Epcot	rectal	.	.
Gene	9/3/96	Sep	M	A	.	.	32374.40	247	Epcot	rectal	.	.
Gene	9/6/96	Sep	M	A	.	.	33099.20	250	Epcot	rectal	.	.
Gene	9/21/96	Sep	M	A	.	.	34307.20	265	Epcot	rectal	.	.

APPENDIX C
BEHAVIOR DATA

Key

Brolls=Barrel rolls
SocInt=Social Interaction
OthInt=Other Interaction
Vocal=Vocalizations
OutoView=Out of View
Eatfec=Eat Fecal

NtoN=Nose to Nose
Bheld=Being Held
Bpushed=Being Pushed
MouthAG=Mouthing A/G
AlMoutAG=Allow Mouthing A/G
FM=Female Mounting

RejMouth=Reject Mouthing
Assoc=Association
Mouth2=Mouthing object
IntwObj=Interation with Object
Ssaults=Sumersaults
TempMax=Maximum Temperature
TempMin=Minimum Temperature

	Loc	Name	Date	Prog	Est	log(e/p)	Active	Inactive	Social	Misc.	Month	Swimming
1	HS	Amanda	5/19/96	2.34	7597.20	3.51	28.57	57.14	14.29	0.00	May	2
2	HS	Amanda	5/22/96	2.34	444.44	2.28	20.00	20.00	10.00	50.00	May	2
3	HS	Amanda	5/26/96	2.34	8079.23	3.54	33.33	44.44	0.00	22.22	May	3
4	HS	Amanda	5/29/96	71.43	444.44	0.79	40.00	33.33	0.00	26.67	May	6
5	HS	Amanda	6/2/96	2.79	9609.10	3.54	44.44	44.44	11.11	0.00	Jun	1
6	HS	Amanda	6/5/96	73.25	444.44	0.78	14.29	14.29	0.00	71.43	Jun	0
7	HS	Amanda	6/9/96	4.62	444.44	1.98	37.50	25.00	0.00	37.50	Jun	1
8	HS	Amanda	6/12/96	2.34	.	#VALUE!	37.50	37.50	0.00	25.00	Jun	3
9	HS	Amanda	6/16/96	15.16	7326.94	2.68	55.56	33.33	0.00	11.11	Jun	4
10	HS	Amanda	6/19/96	184.50	444.44	0.38	11.11	77.78	11.11	0.00	Jun	1
11	HS	Amanda	6/23/96	37.10	668.69	1.26	25.00	41.67	8.33	25.00	Jun	3
12	HS	Amanda	6/26/96	18.48	444.44	1.38	37.50	62.50	0.00	0.00	Jun	3
13	HS	Amanda	6/30/96	.	.	#VALUE!	30.00	30.00	20.00	20.00	Jun	3
14	HS	Amanda	7/3/96	2.34	444.44	2.28	33.33	33.33	0.00	33.33	Jul	2
15	HS	Amanda	7/7/96	2.34	13604.46	3.76	0.00	77.78	0.00	22.22	Jul	0
16	HS	Amanda	7/10/96	2.34	444.44	2.28	50.00	12.50	0.00	37.50	Jul	2
17	HS	Amanda	7/14/96	38.07	9640.71	2.40	0.00	90.00	0.00	10.00	Jul	0
18	HS	Amanda	7/17/96	2.34	444.44	2.28	40.00	30.00	0.00	30.00	Jul	4
19	HS	Amanda	7/21/96	2.34	10506.79	3.65	25.00	25.00	37.50	12.50	Jul	2
20	HS	Amanda	7/23/96	.	.	#VALUE!	42.86	28.57	0.00	28.57	Jul	3
21	HS	Amanda	7/24/96	2.34	444.44	2.28	22.22	0.00	33.33	44.44	Jul	1
22	HS	Amanda	7/28/96	2.34	2512.91	3.03	10.00	40.00	30.00	20.00	Jul	1
23	HS	Amanda	7/31/96	2.34	9971.02	3.63	25.00	62.50	12.50	0.00	Jul	2
24	HS	Amanda	8/4/96	2.34	10326.62	3.64	71.43	14.29	7.14	7.14	Aug	5
25	HS	Amanda	8/7/96	.	.	#VALUE!	9.09	63.64	0.00	27.27	Aug	1
26	HS	Amanda	8/11/96	6.53	4575.39	2.85	22.22	44.44	0.00	33.33	Aug	1
27	HS	Amanda	8/14/96	86.36	444.44	0.71	50.00	50.00	0.00	0.00	Aug	4
28	HS	Amanda	8/18/96	154.47	6497.21	1.62	18.18	54.55	9.09	18.18	Aug	2
29	HS	Amanda	8/21/96	174.19	444.44	0.41	12.50	62.50	0.00	25.00	Aug	1
30	HS	Amanda	8/25/96	100.13	533.72	0.73	40.00	40.00	20.00	0.00	Aug	2

	Loc	Name	Date	Prog	Est	log(e/p)	Active	Inactive	Social	Misc.	Month	Swimming
31	HS	Amanda	8/28/96	2.34	444.44	2.28	0.00	50.00	0.00	50.00	Aug	0
32	HS	Amanda	9/1/96	24.81	10464.12	2.63	76.92	23.08	0.00	0.00	Sep	5
33	HS	Amanda	9/4/96	.	.	#VALUE!	37.50	12.50	0.00	50.00	Sep	3
34	HS	Amanda	9/8/96	62.87	8475.92	2.13	30.00	70.00	0.00	0.00	Sep	3
35	HS	Amanda	9/11/96	557.08	444.44	-0.10	33.33	33.33	0.00	33.33	Sep	3
36	HS	Amanda	9/15/96	68.59	577.65	0.93	46.15	46.15	0.00	7.69	Sep	3
37	HS	Amanda	9/18/96	275.78	444.44	0.21	0.00	50.00	0.00	50.00	Sep	0
38	HS	Amanda	9/22/96	14.83	896.74	1.78	83.33	16.67	0.00	0.00	Sep	6
39	HS	Amanda	9/25/96	493.63	3951.11	0.90	63.64	18.18	18.18	0.00	Sep	6
40	HS	Amanda	9/29/96	35.79	28179.32	2.90	83.33	8.33	0.00	8.33	Sep	6
41	HS	Amanda	10/2/96	186.78	444.44	0.38	88.89	11.11	0.00	0.00	Oct	5
42	HS	Amanda	10/6/96	23.45	14442.10	2.79	37.50	50.00	0.00	12.50	Oct	3
43	HS	Amanda	10/9/96	29.73	444.44	1.17	33.33	0.00	0.00	66.67	Oct	2
44	HS	Amanda	10/13/96	183.40	2805.29	1.18	27.27	54.55	0.00	18.18	Oct	3
45	HS	Amanda	10/16/96	487.77	444.44	-0.04	50.00	25.00	0.00	25.00	Oct	4
46	HS	Amanda	10/20/96	83.79	444.44	0.72	42.86	28.57	14.29	14.29	Oct	2
47	HS	Amanda	10/27/96	2.34	444.44	2.28	60.00	20.00	0.00	20.00	Oct	4
48	HS	Amanda	10/30/96	316.65	444.44	0.15	37.50	37.50	0.00	25.00	Oct	0
49	HS	Amanda	11/3/96	206.53	619.69	0.48	12.50	37.50	37.50	12.50	Nov	1
50	HS	Amanda	11/6/96	2.34	444.44	2.28	37.50	37.50	0.00	25.00	Nov	2
51	HS	Amanda	11/10/96	11.02	3001.26	2.43	0.00	80.00	20.00	0.00	Nov	0
52	HS	Amanda	11/14/96	88.93	444.44	0.70	12.50	50.00	0.00	37.50	Nov	1
53	HS	Amanda	11/17/96	40.64	3224.11	1.90	20.00	50.00	10.00	20.00	Nov	2
54	HS	Amanda	11/20/96	2.34	444.44	2.28	12.50	75.00	0.00	12.50	Nov	1
55	HS	Amanda	11/24/96	115.61	444.44	0.58	36.36	18.18	18.18	27.27	Nov	4
56	HS	Amanda	11/27/96	2.34	444.44	2.28	37.50	50.00	0.00	12.50	Nov	3
57	HS	Amanda	12/1/96	166.57	444.44	0.43	36.36	27.27	18.18	18.18	Dec	3
58	HS	Amanda	12/4/96	2.34	444.44	2.28	11.11	77.78	0.00	11.11	Dec	1
59	HS	Amanda	12/8/96	122.25	614.32	0.70	57.14	35.71	7.14	0.00	Dec	5
60	HS	Amanda	12/11/96	2.34	444.44	2.28	12.50	62.50	0.00	25.00	Dec	1
61	HS	Amanda	12/15/96	220.13	5969.34	1.43	18.18	81.82	0.00	0.00	Dec	2
62	HS	Amanda	12/18/96	2.34	444.44	2.28	0.00	75.00	0.00	25.00	Dec	0
63	HS	Amanda	12/22/96	104.06	765.88	0.87	36.36	45.45	9.09	9.09	Dec	3
64	HS	Amanda	12/26/96	.	.	#VALUE!	50.00	37.50	12.50	0.00	Dec	4
65	HS	Amanda	12/29/96	4.05	669.16	2.22	20.00	30.00	10.00	40.00	Dec	2
66	HS	Ariel	5/19/96	.	.	#VALUE!	33.33	50.00	0.00	16.67	May	1
67	HS	Ariel	5/22/96	2.34	444.44	2.28	12.50	37.50	0.00	50.00	May	0
68	HS	Ariel	5/26/96	.	.	#VALUE!	44.44	33.33	0.00	22.22	May	4
69	HS	Ariel	5/29/96	2.34	444.44	2.28	30.00	30.00	0.00	40.00	May	3
70	HS	Ariel	6/2/96	.	.	#VALUE!	18.18	18.18	27.27	36.36	Jun	2
71	HS	Ariel	6/5/96	2.34	444.44	2.28	50.00	0.00	0.00	50.00	Jun	3
72	HS	Ariel	6/9/96	.	.	#VALUE!	18.18	27.27	0.00	54.55	Jun	2
73	HS	Ariel	6/12/96	2.34	444.44	2.28	33.33	22.22	0.00	44.44	Jun	2
74	HS	Ariel	6/16/96	.	.	#VALUE!	50.00	37.50	0.00	12.50	Jun	4
75	HS	Ariel	6/19/96	2.34	444.44	2.28	18.18	54.55	9.09	18.18	Jun	2
76	HS	Ariel	6/23/96	.	.	#VALUE!	11.11	66.67	0.00	22.22	Jun	1
77	HS	Ariel	6/26/96	94.46	444.44	0.67	25.00	25.00	12.50	37.50	Jun	1
78	HS	Ariel	6/30/96	.	.	#VALUE!	18.18	27.27	36.36	18.18	Jun	2

	Loc	Name	Date	Prog	Est	log(e/p)	Active	Inactive	Social	Misc.	Month	Swimming
79	HS	Ariel	7/3/96	2.34	444.44	2.28	25.00	25.00	0.00	50.00	Jul	2
80	HS	Ariel	7/7/96	.	.	#VALUE!	12.50	37.50	12.50	37.50	Jul	1
81	HS	Ariel	7/10/96	2.34	444.44	2.28	33.33	0.00	25.00	41.67	Jul	4
82	HS	Ariel	7/14/96	.	.	#VALUE!	22.22	22.22	33.33	22.22	Jul	2
83	HS	Ariel	7/17/96	2.34	444.44	2.28	44.44	22.22	0.00	33.33	Jul	4
84	HS	Ariel	7/21/96	.	.	#VALUE!	16.67	33.33	8.33	41.67	Jul	2
85	HS	Ariel	7/23/96	.	.	#VALUE!	44.44	11.11	0.00	44.44	Jul	4
86	HS	Ariel	7/24/96	.	.	#VALUE!	11.11	11.11	33.33	44.44	Jul	0
87	HS	Ariel	7/28/96	.	.	#VALUE!	10.00	60.00	20.00	10.00	Jul	1
88	HS	Ariel	7/31/96	2.34	444.44	2.28	41.67	50.00	8.33	0.00	Jul	5
89	HS	Ariel	8/4/96	.	.	#VALUE!	12.50	87.50	0.00	0.00	Aug	0
90	HS	Ariel	8/7/96	433.43	444.44	0.01	50.00	25.00	0.00	25.00	Aug	4
91	HS	Ariel	8/11/96	.	.	#VALUE!	11.11	22.22	11.11	55.56	Aug	1
92	HS	Ariel	8/14/96	27.63	444.44	1.21	57.14	28.57	0.00	14.29	Aug	4
93	HS	Ariel	8/18/96	.	.	#VALUE!	0.00	62.50	12.50	25.00	Aug	0
94	HS	Ariel	8/21/96	11.80	15211.78	3.11	22.22	55.56	0.00	22.22	Aug	2
95	HS	Ariel	8/25/96	.	.	#VALUE!	16.67	50.00	25.00	8.33	Aug	2
96	HS	Ariel	8/28/96	22.38	444.44	1.30	0.00	50.00	0.00	50.00	Aug	0
97	HS	Ariel	9/1/96	.	.	#VALUE!	37.50	50.00	0.00	12.50	Sep	2
98	HS	Ariel	9/4/96	454.58	444.44	-0.01	30.00	50.00	0.00	20.00	Sep	3
99	HS	Ariel	9/8/96	.	.	#VALUE!	40.00	50.00	0.00	10.00	Sep	3
100	HS	Ariel	9/11/96	136.80	444.44	0.51	50.00	50.00	0.00	0.00	Sep	4
101	HS	Ariel	9/15/96	.	.	#VALUE!	36.36	45.45	18.18	0.00	Sep	3
102	HS	Ariel	9/18/96	.	.	#VALUE!	12.50	37.50	0.00	50.00	Sep	1
103	HS	Ariel	9/22/96	.	.	#VALUE!	11.11	55.56	22.22	11.11	Sep	1
104	HS	Ariel	9/25/96	6.20	444.44	1.86	25.00	25.00	0.00	50.00	Sep	2
105	HS	Ariel	9/29/96	.	.	#VALUE!	22.22	55.56	0.00	22.22	Sep	2
106	HS	Ariel	10/2/96	2.34	444.44	2.28	14.29	42.86	0.00	42.86	Oct	1
107	HS	Ariel	10/6/96	.	.	#VALUE!	0.00	75.00	0.00	25.00	Oct	0
108	HS	Ariel	10/9/96	2.34	444.44	2.28	14.29	0.00	0.00	85.71	Oct	1
109	HS	Ariel	10/13/96	.	.	#VALUE!	50.00	37.50	0.00	12.50	Oct	4
110	HS	Ariel	10/16/96	23.09	444.44	1.28	25.00	62.50	0.00	12.50	Oct	2
111	HS	Ariel	10/20/96	.	.	#VALUE!	28.57	42.86	14.29	14.29	Oct	2
112	HS	Ariel	10/27/96	.	.	#VALUE!	25.00	50.00	0.00	25.00	Oct	2
113	HS	Ariel	10/30/96	178.77	444.44	0.40	37.50	37.50	0.00	25.00	Oct	3
114	HS	Ariel	11/3/96	.	.	#VALUE!	16.67	25.00	41.67	16.67	Nov	2
115	HS	Ariel	11/6/96	15.32	444.44	1.46	25.00	62.50	0.00	12.50	Nov	2
116	HS	Ariel	11/10/96	.	.	#VALUE!	45.45	45.45	9.09	0.00	Nov	3
117	HS	Ariel	11/14/96	232.63	444.44	0.28	22.22	44.44	0.00	33.33	Nov	2
118	HS	Ariel	11/17/96	.	.	#VALUE!	22.22	44.44	11.11	22.22	Nov	2
119	HS	Ariel	11/20/96	99.80	444.44	0.65	25.00	50.00	0.00	25.00	Nov	2
120	HS	Ariel	11/24/96	.	.	#VALUE!	12.50	37.50	12.50	37.50	Nov	1
121	HS	Ariel	11/27/96	76.24	444.44	0.77	12.50	75.00	0.00	12.50	Nov	1
122	HS	Ariel	12/1/96	.	.	#VALUE!	8.33	50.00	33.33	8.33	Dec	1
123	HS	Ariel	12/4/96	23.75	444.44	1.27	55.56	33.33	0.00	11.11	Dec	5
124	HS	Ariel	12/8/96	.	.	#VALUE!	45.45	36.36	0.00	18.18	Dec	3
125	HS	Ariel	12/11/96	61.34	444.44	0.86	22.22	33.33	11.11	33.33	Dec	1
126	HS	Ariel	12/15/96	.	.	#VALUE!	26.67	40.00	13.33	20.00	Dec	4

	Loc	Name	Date	Prog	Est	log(e/p)	Active	Inactive	Social	Misc.	Month	Swimming
127	HS	Ariel	12/18/96	52.29	444.44	0.93	25.00	50.00	0.00	25.00	Dec	2
128	HS	Ariel	12/22/96	.	.	#VALUE!	16.67	58.33	16.67	8.33	Dec	1
129	HS	Ariel	12/26/96	2.34	2128.86	2.96	0.00	12.50	12.50	75.00	Dec	0
130	HS	Ariel	12/29/96	.	.	#VALUE!	27.27	27.27	9.09	36.36	Dec	3
131	HS	Betsy	5/19/96	.	.	#VALUE!	25.00	37.50	25.00	12.50	May	2
132	HS	Betsy	5/22/96	197.00	444.44	0.35	45.45	27.27	0.00	27.27	May	4
133	HS	Betsy	5/26/96	.	.	#VALUE!	30.00	20.00	20.00	30.00	May	3
134	HS	Betsy	5/29/96	162.80	444.44	0.44	63.64	0.00	0.00	36.36	May	6
135	HS	Betsy	6/2/96	.	.	#VALUE!	23.08	38.46	23.08	15.38	Jun	3
136	HS	Betsy	6/5/96	100.48	444.44	0.65	27.27	18.18	9.09	45.45	Jun	2
137	HS	Betsy	6/9/96	.	.	#VALUE!	10.00	20.00	10.00	60.00	Jun	1
138	HS	Betsy	6/12/96	323.09	444.44	0.14	44.44	0.00	11.11	44.44	Jun	3
139	HS	Betsy	6/16/96	.	.	#VALUE!	15.38	15.38	15.38	53.85	Jun	2
140	HS	Betsy	6/19/96	254.30	444.44	0.24	55.56	33.33	0.00	11.11	Jun	3
141	HS	Betsy	6/23/96	.	.	#VALUE!	12.50	25.00	37.50	25.00	Jun	1
142	HS	Betsy	6/26/96	163.68	444.44	0.43	44.44	0.00	44.44	11.11	Jun	2
143	HS	Betsy	6/30/96	.	.	#VALUE!	22.22	11.11	55.56	11.11	Jun	2
144	HS	Betsy	7/3/96	83.66	444.44	0.73	12.50	37.50	12.50	37.50	Jul	1
145	HS	Betsy	7/7/96	.	.	#VALUE!	23.08	38.46	0.00	38.46	Jul	2
146	HS	Betsy	7/10/96	144.35	444.44	0.49	25.00	8.33	25.00	41.67	Jul	3
147	HS	Betsy	7/14/96	.	.	#VALUE!	0.00	50.00	30.00	20.00	Jul	0
148	HS	Betsy	7/17/96	.	.	#VALUE!	50.00	25.00	0.00	25.00	Jul	4
149	HS	Betsy	7/21/96	.	.	#VALUE!	20.00	10.00	60.00	10.00	Jul	2
150	HS	Betsy	7/23/96	.	.	#VALUE!	50.00	16.67	0.00	33.33	Jul	3
151	HS	Betsy	7/24/96	.	.	#VALUE!	30.00	0.00	30.00	40.00	Jul	2
152	HS	Betsy	7/28/96	.	.	#VALUE!	22.22	33.33	44.44	0.00	Jul	2
153	HS	Betsy	7/31/96	293.90	444.44	0.18	36.36	18.18	27.27	18.18	Jul	3
154	HS	Betsy	8/4/96	.	.	#VALUE!	25.00	50.00	12.50	12.50	Aug	2
155	HS	Betsy	8/7/96	277.76	4684.44	1.23	30.00	20.00	20.00	30.00	Aug	1
156	HS	Betsy	8/11/96	.	.	#VALUE!	0.00	66.67	0.00	33.33	Aug	0
157	HS	Betsy	8/14/96	223.16	1214.73	0.74	25.00	62.50	0.00	12.50	Aug	2
158	HS	Betsy	8/18/96	.	.	#VALUE!	0.00	60.00	10.00	30.00	Aug	0
159	HS	Betsy	8/21/96	905.26	444.44	-0.31	12.50	62.50	0.00	25.00	Aug	1
160	HS	Betsy	8/25/96	.	.	#VALUE!	40.00	60.00	0.00	0.00	Aug	3
161	HS	Betsy	8/28/96	559.04	444.44	-0.10	25.00	25.00	0.00	50.00	Aug	1
162	HS	Betsy	9/1/96	.	.	#VALUE!	25.00	50.00	0.00	25.00	Sep	2
163	HS	Betsy	9/4/96	121.50	444.44	0.56	20.00	40.00	0.00	40.00	Sep	2
164	HS	Betsy	9/8/96	.	.	#VALUE!	20.00	30.00	20.00	30.00	Sep	2
165	HS	Betsy	9/11/96	264.68	4904.12	1.27	50.00	25.00	0.00	25.00	Sep	4
166	HS	Betsy	9/15/96	.	.	#VALUE!	33.33	55.56	11.11	0.00	Sep	3
167	HS	Betsy	9/18/96	.	.	#VALUE!	14.29	42.86	0.00	42.86	Sep	1
168	HS	Betsy	9/22/96	.	.	#VALUE!	25.00	33.33	25.00	16.67	Sep	2
169	HS	Betsy	9/25/96	433.11	444.44	0.01	37.50	25.00	0.00	37.50	Sep	3
170	HS	Betsy	9/29/96	.	.	#VALUE!	57.14	28.57	0.00	14.29	Sep	4
171	HS	Betsy	10/2/96	.	.	#VALUE!	14.29	57.14	14.29	14.29	Oct	1
172	HS	Betsy	10/6/96	.	.	#VALUE!	37.50	37.50	0.00	25.00	Oct	3
173	HS	Betsy	10/9/96	253.81	444.44	0.24	42.86	42.86	0.00	14.29	Oct	3
174	HS	Betsy	10/13/96	.	.	#VALUE!	22.22	66.67	0.00	11.11	Oct	2

	Loc	Name	Date	Prog	Est	log(e/p)	Active	Inactive	Social	Misc.	Month	Swimming
175	HS	Betsy	10/16/96	560.34	5008.43	0.95	37.50	37.50	0.00	25.00	Oct	3
176	HS	Betsy	10/20/96	.	.	#VALUE!	22.22	44.44	11.11	22.22	Oct	2
177	HS	Betsy	10/27/96	.	.	#VALUE!	25.00	50.00	0.00	25.00	Oct	2
178	HS	Betsy	10/30/96	666.42	444.44	-0.18	37.50	25.00	12.50	25.00	Oct	3
179	HS	Betsy	11/3/96	.	.	#VALUE!	10.00	70.00	20.00	0.00	Nov	1
180	HS	Betsy	11/6/96	1082.93	444.44	-0.39	50.00	0.00	0.00	50.00	Nov	4
181	HS	Betsy	11/10/96	.	.	#VALUE!	18.18	54.55	27.27	0.00	Nov	2
182	HS	Betsy	11/14/96	417.81	444.44	0.03	0.00	63.64	27.27	9.09	Nov	0
183	HS	Betsy	11/17/96	.	.	#VALUE!	0.00	58.33	16.67	25.00	Nov	0
184	HS	Betsy	11/20/96	250.43	444.44	0.25	37.50	37.50	0.00	25.00	Nov	3
185	HS	Betsy	11/24/96	.	.	#VALUE!	40.00	20.00	0.00	40.00	Nov	3
186	HS	Betsy	11/27/96	285.44	444.44	0.19	50.00	37.50	0.00	12.50	Nov	4
187	HS	Betsy	12/1/96	.	.	#VALUE!	8.33	41.67	33.33	16.67	Dec	1
188	HS	Betsy	12/4/96	344.60	444.44	0.11	22.22	55.56	0.00	22.22	Dec	2
189	HS	Betsy	12/8/96	.	.	#VALUE!	41.67	25.00	25.00	8.33	Dec	4
190	HS	Betsy	12/11/96	304.70	444.44	0.16	33.33	33.33	0.00	33.33	Dec	3
191	HS	Betsy	12/15/96	.	.	#VALUE!	18.18	72.73	0.00	9.09	Dec	2
192	HS	Betsy	12/18/96	165.69	444.44	0.43	42.86	14.29	0.00	42.86	Dec	3
193	HS	Betsy	12/22/96	.	.	#VALUE!	26.67	33.33	20.00	20.00	Dec	3
194	HS	Betsy	12/26/96	288.14	444.44	0.19	0.00	57.14	14.29	28.57	Dec	0
195	HS	Betsy	12/29/96	.	.	#VALUE!	11.11	33.33	11.11	44.44	Dec	1
196	SWF	Char	6/26/96	96.81	444.44	0.66	25.00	37.50	12.50	25.00	Jun	2
197	SWF	Char	7/10/96	113.17	5578.97	1.69	20.00	20.00	20.00	40.00	Jul	2
198	SWF	Char	7/17/96	170.25	444.44	0.42	27.27	27.27	9.09	36.36	Jul	2
199	SWF	Char	7/25/96	190.55	983.19	0.71	9.09	72.73	9.09	9.09	Jul	1
200	SWF	Char	7/31/96	196.64	584.29	0.47	16.67	50.00	16.67	16.67	Jul	1
201	SWF	Char	8/8/96	189.25	511.91	0.43	6.67	66.67	6.67	20.00	Aug	1
202	SWF	Char	8/14/96	.	.	#VALUE!	33.33	33.33	11.11	22.22	Aug	2
203	SWF	Char	8/20/96	253.36	1306.55	0.71	8.33	33.33	33.33	25.00	Aug	1
204	SWF	Char	8/27/96	.	.	#VALUE!	54.55	18.18	18.18	9.09	Aug	5
205	SWF	Char	9/3/96	181.80	11535.66	1.80	50.00	0.00	30.00	20.00	Sep	5
206	SWF	Char	9/10/96	304.51	2463.91	0.91	27.27	9.09	27.27	36.36	Sep	2
207	SWF	Char	9/17/96	174.67	444.44	0.41	18.18	0.00	54.55	27.27	Sep	1
208	SWF	Char	9/26/96	329.63	1171.74	0.55	8.33	41.67	8.33	41.67	Sep	1
209	SWF	Char	10/1/96	.	.	#VALUE!	33.33	44.44	0.00	22.22	Oct	3
210	SWF	Char	10/10/96	63.84	444.44	0.84	16.67	16.67	25.00	41.67	Oct	1
211	SWF	Char	10/17/96	90.33	506.69	0.75	0.00	44.44	11.11	44.44	Oct	0
212	SWF	Char	10/22/96	82.75	1741.65	1.32	7.69	53.85	15.38	23.08	Oct	1
213	SWF	Char	10/29/96	34.46	492.94	1.16	18.18	9.09	18.18	54.55	Oct	1
214	SWF	Char	11/5/96	35.92	444.44	1.09	33.33	22.22	11.11	33.33	Nov	3
215	SWF	Char	11/12/96	.	.	#VALUE!	8.33	33.33	16.67	41.67	Nov	1
216	SWF	Char	11/19/96	395.69	3897.38	0.99	37.50	25.00	12.50	25.00	Nov	3
217	SWF	Char	11/25/96	260.65	4749.24	1.26	8.33	33.33	16.67	41.67	Nov	1
218	SWF	Char	12/3/96	416.51	44837.20	2.03	33.33	25.00	0.00	41.67	Dec	4
219	SWF	Char	12/10/96	306.62	61131.58	2.30	45.45	27.27	9.09	18.18	Dec	4
220	SWF	Char	12/18/96	240.86	3393.21	1.15	28.57	14.29	14.29	42.86	Dec	4
221	SWF	Char	1/5/97	192.67	48329.99	2.40	7.69	38.46	7.69	46.15	Jan	1
222	SWF	Char	1/10/97	318.14	4987.88	1.20	33.33	33.33	0.00	33.33	Jan	3

	Loc	Name	Date	Prog	Est	log(e/p)	Active	Inactive	Social	Misc.	Month	Swimming
223	SWF	Char	1/14/97	7.82	1351.44	2.24	12.50	25.00	6.25	56.25	Jan	2
224	SWF	Char	1/18/97	253.71	5831.84	1.36	7.69	23.08	15.38	53.85	Jan	1
225	SWF	Char	1/21/97	79.17	21209.56	2.43	7.69	46.15	7.69	38.46	Jan	1
226	SWF	Char	1/24/97	261.52	21209.56	1.91	7.69	46.15	15.38	30.77	Jan	1
227	SWF	Char	1/28/97	70.90	84127.05	3.07	11.11	55.56	0.00	33.33	Jan	1
228	SWF	Char	2/1/97	204.77	12235.80	1.78	38.46	0.00	7.69	53.85	Feb	5
229	SWF	Char	2/4/97	50.18	40206.50	2.90	9.09	45.45	9.09	36.36	Feb	1
230	SWF	Char	2/8/97	130.97	444.44	0.53	10.00	40.00	10.00	40.00	Feb	1
231	SWF	Char	2/12/97	187.43	46085.76	2.39	41.67	33.33	0.00	25.00	Feb	5
232	SWF	Char	2/16/97	283.72	45801.28	2.21	9.09	36.36	18.18	36.36	Feb	1
233	SWF	Char	2/19/97	118.22	38515.43	2.51	40.00	30.00	10.00	20.00	Feb	4
234	SWF	Char	2/23/97	351.76	35970.91	2.01	28.57	42.86	14.29	14.29	Feb	2
235	SWF	Char	2/27/97	264.81	31197.97	2.07	25.00	75.00	0.00	0.00	Feb	2
236	SWF	Char	3/3/97	158.60	693024.82	3.64	30.00	30.00	20.00	20.00	Mar	3
237	SWF	Char	3/7/97	62.02	15581.60	2.40	20.00	30.00	10.00	40.00	Mar	2
238	SWF	Char	3/11/97	275.71	42229.47	2.19	7.14	14.29	35.71	42.86	Mar	1
239	SWF	Char	3/15/97	40.32	43493.83	3.03	15.38	30.77	38.46	15.38	Mar	2
240	SWF	Char	3/19/97	291.33	28953.74	2.00	20.00	40.00	10.00	30.00	Mar	2
241	SWF	Char	3/23/97	295.92	27009.79	1.96	0.00	15.38	46.15	38.46	Mar	0
242	SWF	Char	3/26/97	567.82	55283.94	1.99	18.18	54.55	0.00	27.27	Mar	2
243	SWF	Char	3/30/97	215.48	45485.19	2.32	0.00	45.45	36.36	18.18	Mar	0
244	SWF	Char	4/2/97	533.33	27863.23	1.72	0.00	83.33	8.33	8.33	Apr	0
245	SWF	Char	4/6/97	201.29	29222.41	2.16	0.00	9.09	54.55	36.36	Apr	0
246	SWF	Char	4/10/97	413.58	35765.45	1.94	16.67	58.33	8.33	16.67	Apr	2
247	SWF	Char	4/13/97	242.42	28953.74	2.08	0.00	20.00	40.00	40.00	Apr	0
248	SWF	Char	4/17/97	417.49	44868.81	2.03	0.00	57.14	28.57	14.29	Apr	0
249	SWF	Char	4/20/97	44.71	14791.38	2.52	16.67	58.33	8.33	16.67	Apr	2
250	SWF	Char	4/23/97	350.13	39574.32	2.05	18.18	27.27	27.27	27.27	Apr	2
251	SWF	Char	4/27/97	28.20	25018.43	2.95	15.38	38.46	23.08	23.08	Apr	2
252	SWF	Char	4/30/97	338.74	42513.95	2.10	20.00	50.00	10.00	20.00	Apr	2
253	SWF	Char	5/4/97	28.63	14095.98	2.69	9.09	54.55	27.27	9.09	May	1
254	SWF	Char	5/7/97	137.64	43920.55	2.50	25.00	68.75	6.25	0.00	May	2
255	SWF	Char	5/11/97	2.34	32699.39	4.15	0.00	37.50	25.00	37.50	May	0
256	SWF	Char	5/14/97	242.49	32177.85	2.12	6.67	80.00	0.00	13.33	May	1
257	SWF	Char	5/18/97	94.07	41249.60	2.64	0.00	50.00	25.00	25.00	May	0
258	SWF	Char	5/21/97	166.57	35812.87	2.33	25.00	37.50	25.00	12.50	May	2
259	SWF	Char	5/28/97	254.82	15804.44	1.79	33.33	55.56	11.11	0.00	May	3
260	SWF	Char	6/1/97	89.00	36618.89	2.61	16.67	58.33	8.33	16.67	Jun	2
261	SWF	Char	6/4/97	191.56	20830.26	2.04	6.25	37.50	25.00	31.25	Jun	1
262	SWF	Char	6/8/97	17.73	33141.92	3.27	45.45	27.27	18.18	9.09	Jun	5
263	SWF	Char	6/15/97	62.25	43035.50	2.84	14.29	50.00	21.43	14.29	Jun	2
264	SWF	Char	6/18/97	82.03	15502.58	2.28	10.00	90.00	0.00	0.00	Jun	1
265	SWF	Char	6/22/97	76.60	34074.38	2.65	0.00	72.73	0.00	27.27	Jun	0
266	SWF	Char	6/25/97	189.87	26330.20	2.14	8.33	58.33	0.00	33.33	Jun	1
267	SWF	Char	6/29/97	33.35	40064.26	3.08	25.00	41.67	8.33	25.00	Jun	2
268	SWF	Char	7/2/97	106.99	21810.13	2.31	7.14	71.43	7.14	14.29	Jul	1
269	SWF	Char	7/6/97	103.09	29585.92	2.46	15.38	7.69	38.46	38.46	Jul	2
270	SWF	Char	7/9/97	190.07	27894.84	2.17	20.00	10.00	30.00	40.00	Jul	2

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271	SWF	Char	7/13/97	.	.	#VALUE!	20.00	60.00	20.00	0.00	Jul	2
272	SWF	Char	7/16/97	188.83	24939.41	2.12	9.09	54.55	27.27	9.09	Jul	1
273	SWF	Char	7/20/97	108.65	24765.56	2.36	0.00	66.67	6.67	26.67	Jul	0
274	SWF	Char	7/23/97	.	.	#VALUE!	14.29	71.43	14.29	0.00	Jul	2
275	SWF	Char	7/27/97	147.70	21794.33	2.17	8.33	58.33	25.00	8.33	Jul	1
276	SWF	Char	7/30/97	.	.	#VALUE!	9.09	54.55	9.09	27.27	Jul	1
277	SWF	Char	8/3/97	391.78	14778.73	1.58	10.00	20.00	20.00	50.00	Aug	1
278	SWF	Char	8/11/97	.	.	#VALUE!	13.33	73.33	6.67	6.67	Aug	1
279	SWF	Georgia	6/26/96	.	.	#VALUE!	55.56	11.11	0.00	33.33	Jun	2
280	SWF	Georgia	7/10/96	25.85	444.44	1.24	21.43	14.29	21.43	42.86	Jul	3
281	SWF	Georgia	7/17/96	283.78	444.44	0.19	11.11	11.11	33.33	44.44	Jul	1
282	SWF	Georgia	7/25/96	111.94	444.44	0.60	7.14	64.29	14.29	14.29	Jul	1
283	SWF	Georgia	7/31/96	28.14	444.44	1.20	8.33	66.67	0.00	25.00	Jul	1
284	SWF	Georgia	8/8/96	78.26	444.44	0.75	13.33	46.67	13.33	26.67	Aug	2
285	SWF	Georgia	8/14/96	77.87	444.44	0.76	30.00	0.00	20.00	50.00	Aug	2
286	SWF	Georgia	8/20/96	118.25	444.44	0.58	16.67	33.33	25.00	25.00	Aug	1
287	SWF	Georgia	8/27/96	178.74	444.44	0.40	46.67	13.33	20.00	20.00	Aug	5
288	SWF	Georgia	9/3/96	103.12	444.44	0.63	23.08	23.08	15.38	38.46	Sep	3
289	SWF	Georgia	9/10/96	116.17	444.44	0.58	23.08	38.46	15.38	23.08	Sep	2
290	SWF	Georgia	9/17/96	111.48	444.44	0.60	33.33	16.67	33.33	16.67	Sep	3
291	SWF	Georgia	9/26/96	194.62	444.44	0.36	20.00	50.00	10.00	20.00	Sep	2
292	SWF	Georgia	10/1/96	121.08	444.44	0.56	33.33	33.33	8.33	25.00	Oct	3
293	SWF	Georgia	10/10/96	2.34	444.44	2.28	9.09	27.27	27.27	36.36	Oct	1
294	SWF	Georgia	10/17/96	56.29	444.44	0.90	25.00	33.33	16.67	25.00	Oct	2
295	SWF	Georgia	10/22/96	72.27	444.44	0.79	21.05	21.05	5.26	52.63	Oct	3
296	SWF	Georgia	10/29/96	155.38	444.44	0.46	9.09	9.09	27.27	54.55	Oct	1
297	SWF	Georgia	11/5/96	.	.	#VALUE!	50.00	25.00	12.50	12.50	Nov	4
298	SWF	Georgia	11/12/96	111.55	444.44	0.60	31.25	6.25	6.25	56.25	Nov	3
299	SWF	Georgia	11/19/96	152.81	444.44	0.46	50.00	8.33	8.33	33.33	Nov	4
300	SWF	Georgia	11/25/96	187.17	444.44	0.38	18.18	18.18	18.18	45.45	Nov	2
301	SWF	Georgia	12/3/96	352.73	444.44	0.10	27.27	18.18	18.18	36.36	Dec	3
302	SWF	Georgia	12/10/96	.	.	#VALUE!	15.38	30.77	15.38	38.46	Dec	2
303	SWF	Georgia	12/18/96	113.69	444.44	0.59	38.46	23.08	0.00	38.46	Dec	4
304	SWF	Georgia	1/5/97	47.80	444.44	0.97	14.29	42.86	0.00	42.86	Jan	2
305	SWF	Georgia	1/10/97	53.66	660.31	1.09	28.57	28.57	14.29	28.57	Jan	3
306	SWF	Georgia	1/14/97	.	.	#VALUE!	45.45	18.18	9.09	27.27	Jan	4
307	SWF	Georgia	1/18/97	15.28	444.44	1.46	31.25	0.00	12.50	56.25	Jan	5
308	SWF	Georgia	1/21/97	.	.	#VALUE!	16.67	58.33	8.33	16.67	Jan	2
309	SWF	Georgia	1/24/97	.	.	#VALUE!	46.15	7.69	0.00	46.15	Jan	5
310	SWF	Georgia	1/28/97	.	.	#VALUE!	38.46	23.08	7.69	30.77	Jan	4
311	SWF	Georgia	2/1/97	3.75	444.44	2.07	20.00	20.00	0.00	60.00	Feb	2
312	SWF	Georgia	2/4/97	.	.	#VALUE!	36.36	36.36	9.09	18.18	Feb	3
313	SWF	Georgia	2/8/97	24.39	444.44	1.26	23.08	23.08	15.38	38.46	Feb	3
314	SWF	Georgia	2/12/97	.	.	#VALUE!	16.67	41.67	8.33	33.33	Feb	2
315	SWF	Georgia	2/16/97	64.62	444.44	0.84	45.45	0.00	27.27	27.27	Feb	4
316	SWF	Georgia	2/19/97	.	.	#VALUE!	18.18	18.18	45.45	18.18	Feb	2
317	SWF	Georgia	2/23/97	.	.	#VALUE!	28.57	71.43	0.00	0.00	Feb	2
318	SWF	Georgia	2/27/97	.	.	#VALUE!	55.56	22.22	11.11	11.11	Feb	4

	Loc	Name	Date	Prog	Est	log(e/p)	Active	Inactive	Social	Misc.	Month	Swimming
319	SWF	Georgia	3/3/97	198.33	5504.69	1.44	46.67	0.00	0.00	53.33	Mar	7
320	SWF	Georgia	3/7/97	.	.	#VALUE!	0.00	33.33	11.11	55.56	Mar	0
321	SWF	Georgia	3/11/97	69.73	444.44	0.80	33.33	11.11	44.44	11.11	Mar	3
322	SWF	Georgia	3/15/97	.	.	#VALUE!	14.29	35.71	14.29	35.71	Mar	2
323	SWF	Georgia	3/19/97	181.67	444.44	0.39	22.22	44.44	11.11	22.22	Mar	2
324	SWF	Georgia	3/23/97	.	.	#VALUE!	22.22	11.11	55.56	11.11	Mar	2
325	SWF	Georgia	3/26/97	.	.	#VALUE!	40.00	20.00	10.00	30.00	Mar	4
326	SWF	Georgia	3/30/97	.	.	#VALUE!	22.22	44.44	33.33	0.00	Mar	2
327	SWF	Georgia	4/2/97	434.08	8072.91	1.27	44.44	33.33	11.11	11.11	Apr	3
328	SWF	Georgia	4/6/97	.	.	#VALUE!	25.00	25.00	50.00	0.00	Apr	2
329	SWF	Georgia	4/10/97	176.33	444.44	0.40	30.00	40.00	20.00	10.00	Apr	3
330	SWF	Georgia	4/13/97	.	.	#VALUE!	0.00	25.00	75.00	0.00	Apr	0
331	HS	Lorelei	5/19/96	.	.	#VALUE!	25.00	37.50	25.00	12.50	May	2
332	HS	Lorelei	5/22/96	20.40	444.44	1.34	22.22	22.22	0.00	55.56	May	1
333	HS	Lorelei	5/26/96	.	.	#VALUE!	40.00	50.00	10.00	0.00	May	2
334	HS	Lorelei	5/29/96	24.80	444.44	1.25	50.00	40.00	0.00	10.00	May	5
335	HS	Lorelei	6/2/96	.	.	#VALUE!	44.44	44.44	0.00	11.11	Jun	3
336	HS	Lorelei	6/5/96	35.66	444.44	1.10	57.14	14.29	0.00	28.57	Jun	4
337	HS	Lorelei	6/9/96	.	.	#VALUE!	12.50	50.00	12.50	25.00	Jun	1
338	HS	Lorelei	6/12/96	98.01	444.44	0.66	66.67	0.00	22.22	11.11	Jun	5
339	HS	Lorelei	6/16/96	.	.	#VALUE!	58.33	16.67	0.00	25.00	Jun	1
340	HS	Lorelei	6/19/96	2.34	444.44	2.28	37.50	50.00	0.00	12.50	Jun	2
341	HS	Lorelei	6/23/96	.	.	#VALUE!	30.00	0.00	30.00	40.00	Jun	3
342	HS	Lorelei	6/26/96	.	.	#VALUE!	100.00	0.00	0.00	0.00	Jun	2
343	HS	Lorelei	6/30/96	.	.	#VALUE!	100.00	0.00	0.00	0.00	Jun	0
344	HS	Lorelei	7/3/96	.	.	#VALUE!	100.00	0.00	0.00	0.00	Jul	0
345	HS	Lorelei	7/7/96	.	.	#VALUE!	100.00	0.00	0.00	0.00	Jul	0
346	HS	Lorelei	7/10/96	2.34	444.44	2.28	55.56	22.22	0.00	22.22	Jul	1
347	HS	Lorelei	7/14/96	.	.	#VALUE!	55.56	0.00	33.33	11.11	Jul	0
348	HS	Lorelei	7/17/96	2.34	444.44	2.28	88.89	0.00	0.00	11.11	Jul	1
349	HS	Lorelei	7/21/96	.	.	#VALUE!	100.00	0.00	0.00	0.00	Jul	1
350	HS	Lorelei	7/23/96	.	.	#VALUE!	100.00	0.00	0.00	0.00	Jul	4
351	HS	Lorelei	7/24/96	2.34	444.44	2.28	77.78	11.11	0.00	11.11	Jul	2
352	HS	Lorelei	7/28/96	.	.	#VALUE!	77.78	22.22	0.00	0.00	Jul	2
353	HS	Lorelei	7/31/96	2.34	444.44	2.28	77.78	11.11	0.00	11.11	Jul	5
354	HS	Lorelei	8/4/96	.	.	#VALUE!	75.00	12.50	12.50	0.00	Aug	0
355	HS	Lorelei	8/7/96	.	.	#VALUE!	100.00	0.00	0.00	0.00	Aug	0
356	HS	Lorelei	8/11/96	.	.	#VALUE!	33.33	22.22	11.11	33.33	Aug	2
357	HS	Lorelei	8/14/96	.	.	#VALUE!	75.00	12.50	0.00	12.50	Aug	1
358	HS	Lorelei	8/18/96	.	.	#VALUE!	40.00	20.00	20.00	20.00	Aug	1
359	HS	Lorelei	8/21/96	2.34	444.44	2.28	100.00	0.00	0.00	0.00	Aug	0
360	HS	Lorelei	8/25/96	.	.	#VALUE!	60.00	0.00	40.00	0.00	Aug	2
361	HS	Lorelei	8/28/96	2.34	444.44	2.28	75.00	0.00	0.00	25.00	Aug	0
362	HS	Lorelei	9/1/96	.	.	#VALUE!	100.00	0.00	0.00	0.00	Sep	1
363	HS	Lorelei	9/4/96	2.34	444.44	2.28	75.00	0.00	0.00	25.00	Sep	0
364	HS	Lorelei	9/8/96	.	.	#VALUE!	55.56	0.00	11.11	33.33	Sep	0
365	HS	Lorelei	9/11/96	9.24	444.44	1.68	75.00	12.50	0.00	12.50	Sep	6
366	HS	Lorelei	9/15/96	.	.	#VALUE!	88.89	0.00	0.00	11.11	Sep	1

	Loc	Name	Date	Prog	Est	log(e/p)	Active	Inactive	Social	Misc.	Month	Swimming
367	HS	Lorelei	9/18/96	.	.	#VALUE!	57.14	0.00	0.00	42.86	Sep	0
368	HS	Lorelei	9/22/96	.	.	#VALUE!	100.00	0.00	0.00	0.00	Sep	2
369	HS	Lorelei	9/25/96	5.69	444.44	1.89	66.67	33.33	0.00	0.00	Sep	4
370	HS	Lorelei	9/29/96	.	.	#VALUE!	33.33	33.33	0.00	33.33	Sep	3
371	HS	Lorelei	10/2/96	106.83	444.44	0.62	71.43	0.00	0.00	28.57	Oct	1
372	HS	Lorelei	10/6/96	.	.	#VALUE!	71.43	0.00	0.00	28.57	Oct	2
373	HS	Lorelei	10/9/96	21.42	444.44	1.32	62.50	12.50	0.00	25.00	Oct	5
374	HS	Lorelei	10/13/96	.	.	#VALUE!	60.00	30.00	0.00	10.00	Oct	4
375	HS	Lorelei	10/16/96	131.59	444.44	0.53	75.00	0.00	0.00	25.00	Oct	6
376	HS	Lorelei	10/20/96	.	.	#VALUE!	30.00	30.00	20.00	20.00	Oct	2
377	HS	Lorelei	10/27/96	.	.	#VALUE!	42.86	42.86	0.00	14.29	Oct	3
378	HS	Lorelei	10/30/96	2.34	444.44	2.28	37.50	37.50	12.50	12.50	Oct	3
379	HS	Lorelei	11/3/96	.	.	#VALUE!	25.00	12.50	50.00	12.50	Nov	2
380	HS	Lorelei	11/6/96	2.34	444.44	2.28	50.00	37.50	0.00	12.50	Nov	4
381	HS	Lorelei	11/10/96	.	.	#VALUE!	44.44	33.33	11.11	11.11	Nov	4
382	HS	Lorelei	11/14/96	2.34	444.44	2.28	30.00	30.00	10.00	30.00	Nov	3
383	HS	Lorelei	11/17/96	.	.	#VALUE!	30.00	30.00	20.00	20.00	Nov	3
384	HS	Lorelei	11/20/96	2.34	444.44	2.28	37.50	37.50	0.00	25.00	Nov	3
385	HS	Lorelei	11/24/96	.	.	#VALUE!	8.33	25.00	41.67	25.00	Nov	1
386	HS	Lorelei	11/27/96	2.34	444.44	2.28	37.50	37.50	0.00	25.00	Nov	3
387	HS	Lorelei	12/1/96	.	.	#VALUE!	25.00	25.00	33.33	16.67	Dec	3
388	HS	Lorelei	12/4/96	2.34	444.44	2.28	77.78	0.00	0.00	22.22	Dec	7
389	HS	Lorelei	12/8/96	.	.	#VALUE!	22.22	44.44	11.11	22.22	Dec	2
390	HS	Lorelei	12/11/96	18.59	444.44	1.38	37.50	12.50	12.50	37.50	Dec	3
391	HS	Lorelei	12/15/96	.	.	#VALUE!	30.00	30.00	20.00	20.00	Dec	3
392	HS	Lorelei	12/18/96	8.07	444.44	1.74	14.29	28.57	28.57	28.57	Dec	1
393	HS	Lorelei	12/22/96	.	.	#VALUE!	27.27	36.36	9.09	27.27	Dec	3
394	HS	Lorelei	12/26/96	2.34	444.44	2.28	42.86	0.00	14.29	42.86	Dec	3
395	HS	Lorelei	12/29/96	.	.	#VALUE!	10.00	40.00	10.00	40.00	Dec	1
396	HS	Rachel	5/19/96	.	.	#VALUE!	11.11	55.56	22.22	11.11	May	0
397	HS	Rachel	5/22/96	30.09	444.44	1.17	40.00	20.00	0.00	40.00	May	3
398	HS	Rachel	5/26/96	.	.	#VALUE!	10.00	50.00	20.00	20.00	May	1
399	HS	Rachel	5/29/96	.	.	#VALUE!	45.45	18.18	0.00	36.36	May	5
400	HS	Rachel	6/2/96	.	.	#VALUE!	11.11	33.33	11.11	44.44	Jun	1
401	HS	Rachel	6/5/96	98.08	444.44	0.66	28.57	28.57	0.00	42.86	Jun	2
402	HS	Rachel	6/9/96	.	.	#VALUE!	22.22	44.44	0.00	33.33	Jun	2
403	HS	Rachel	6/12/96	153.65	444.44	0.46	14.29	42.86	0.00	42.86	Jun	1
404	HS	Rachel	6/16/96	.	.	#VALUE!	12.50	50.00	0.00	37.50	Jun	1
405	HS	Rachel	6/19/96	434.41	444.44	0.01	0.00	71.43	0.00	28.57	Jun	0
406	HS	Rachel	6/23/96	.	.	#VALUE!	12.50	12.50	37.50	37.50	Jun	1
407	HS	Rachel	6/26/96	130.23	444.44	0.53	40.00	20.00	30.00	10.00	Jun	3
408	HS	Rachel	6/30/96	.	.	#VALUE!	22.22	22.22	44.44	11.11	Jun	2
409	HS	Rachel	7/3/96	23.67	444.44	1.27	22.22	33.33	11.11	33.33	Jul	2
410	HS	Rachel	7/7/96	.	.	#VALUE!	12.50	37.50	25.00	25.00	Jul	1
411	HS	Rachel	7/10/96	.	.	#VALUE!	45.45	0.00	27.27	27.27	Jul	5
412	HS	Rachel	7/14/96	.	.	#VALUE!	20.00	30.00	30.00	20.00	Jul	2
413	HS	Rachel	7/17/96	2.34	444.44	2.28	44.44	22.22	0.00	33.33	Jul	4
414	HS	Rachel	7/21/96	.	.	#VALUE!	25.00	25.00	37.50	12.50	Jul	2

	Loc	Name	Date	Prog	Est	log(e/p)	Active	Inactive	Social	Misc.	Month	Swimming
415	HS	Rachel	7/23/96	.	.	#VALUE!	42.86	0.00	0.00	57.14	Jul	3
416	HS	Rachel	7/24/96	.	.	#VALUE!	30.00	20.00	20.00	30.00	Jul	3
417	HS	Rachel	7/28/96	.	.	#VALUE!	25.00	37.50	37.50	0.00	Jul	2
418	HS	Rachel	7/31/96	63.78	444.44	0.84	30.00	30.00	20.00	20.00	Jul	3
419	HS	Rachel	8/4/96	.	.	#VALUE!	11.11	77.78	0.00	11.11	Aug	0
420	HS	Rachel	8/7/96	71.10	7336.42	2.01	11.11	44.44	11.11	33.33	Aug	1
421	HS	Rachel	8/11/96	.	.	#VALUE!	12.50	37.50	0.00	50.00	Aug	1
422	HS	Rachel	8/14/96	10.59	2089.35	2.30	55.56	22.22	0.00	22.22	Aug	5
423	HS	Rachel	8/18/96	.	.	#VALUE!	20.00	50.00	10.00	20.00	Aug	2
424	HS	Rachel	8/21/96	2.34	818.51	2.54	25.00	50.00	0.00	25.00	Aug	2
425	HS	Rachel	8/25/96	.	.	#VALUE!	14.29	57.14	14.29	14.29	Aug	1
426	HS	Rachel	8/28/96	.	.	#VALUE!	0.00	25.00	0.00	75.00	Aug	0
427	HS	Rachel	9/1/96	.	.	#VALUE!	11.11	55.56	11.11	22.22	Sep	1
428	HS	Rachel	9/4/96	.	.	#VALUE!	11.11	22.22	0.00	66.67	Sep	1
429	HS	Rachel	9/8/96	.	.	#VALUE!	18.18	36.36	18.18	27.27	Sep	2
430	HS	Rachel	9/11/96	.	.	#VALUE!	75.00	0.00	0.00	25.00	Sep	6
431	HS	Rachel	9/15/96	.	.	#VALUE!	55.56	0.00	0.00	44.44	Sep	5
432	HS	Rachel	9/18/96	.	.	#VALUE!	14.29	14.29	0.00	71.43	Sep	1
433	HS	Rachel	9/22/96	.	.	#VALUE!	41.67	0.00	16.67	41.67	Sep	5
434	HS	Rachel	9/25/96	.	.	#VALUE!	50.00	25.00	0.00	25.00	Sep	4
435	HS	Rachel	9/29/96	.	.	#VALUE!	33.33	22.22	11.11	33.33	Sep	3
436	HS	Rachel	10/2/96	540.16	444.44	-0.08	0.00	28.57	57.14	14.29	Oct	0
437	HS	Rachel	10/6/96	.	.	#VALUE!	16.67	16.67	0.00	66.67	Oct	1
438	HS	Rachel	10/9/96	296.18	444.44	0.18	37.50	12.50	0.00	50.00	Oct	3
439	HS	Rachel	10/13/96	.	.	#VALUE!	30.00	30.00	20.00	20.00	Oct	3
440	HS	Rachel	10/16/96	.	.	#VALUE!	75.00	0.00	0.00	25.00	Oct	6
441	HS	Rachel	10/20/96	.	.	#VALUE!	33.33	22.22	11.11	33.33	Oct	3
442	HS	Rachel	10/27/96	.	.	#VALUE!	28.57	28.57	0.00	42.86	Oct	2
443	HS	Rachel	10/30/96	44.35	444.44	1.00	12.50	37.50	0.00	50.00	Oct	1
444	HS	Rachel	11/3/96	.	.	#VALUE!	0.00	40.00	40.00	20.00	Nov	0
445	HS	Rachel	11/6/96	43.12	444.44	1.01	44.44	33.33	0.00	22.22	Nov	4
446	HS	Rachel	11/10/96	.	.	#VALUE!	44.44	44.44	0.00	11.11	Nov	4
447	HS	Rachel	11/14/96	44.84	12452.32	2.44	25.00	37.50	12.50	25.00	Nov	2
448	HS	Rachel	11/17/96	.	.	#VALUE!	0.00	50.00	41.67	8.33	Nov	0
449	HS	Rachel	11/20/96	31.51	444.44	1.15	37.50	37.50	0.00	25.00	Nov	3
450	HS	Rachel	11/24/96	.	.	#VALUE!	10.00	30.00	10.00	50.00	Nov	1
451	HS	Rachel	11/27/96	112.10	444.44	0.60	25.00	50.00	0.00	25.00	Nov	2
452	HS	Rachel	12/1/96	.	.	#VALUE!	20.00	30.00	10.00	40.00	Dec	2
453	HS	Rachel	12/4/96	.	.	#VALUE!	11.11	44.44	0.00	44.44	Dec	1
454	HS	Rachel	12/8/96	.	.	#VALUE!	33.33	33.33	0.00	33.33	Dec	3
455	HS	Rachel	12/11/96	160.19	444.44	0.44	28.57	42.86	0.00	28.57	Dec	2
456	HS	Rachel	12/15/96	.	.	#VALUE!	18.18	36.36	27.27	18.18	Dec	2
457	HS	Rachel	12/18/96	72.11	444.44	0.79	25.00	25.00	12.50	37.50	Dec	2
458	HS	Rachel	12/22/96	.	.	#VALUE!	9.09	27.27	36.36	27.27	Dec	1
459	HS	Rachel	12/26/96	553.83	444.44	-0.10	28.57	28.57	14.29	28.57	Dec	2
460	HS	Rachel	12/29/96	.	.	#VALUE!	11.11	11.11	22.22	55.56	Dec	1
461	SWF	Rita	6/26/96	134.16	488.67	0.56	33.33	11.11	33.33	22.22	Jun	1
462	SWF	Rita	7/10/96	.	.	#VALUE!	50.00	20.00	10.00	20.00	Jul	5

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463	SWF	Rita	7/17/96	582.14	6857.55	1.07	27.27	18.18	18.18	36.36	Jul	3
464	SWF	Rita	7/25/96	238.55	10698.03	1.65	11.11	77.78	0.00	11.11	Jul	1
465	SWF	Rita	7/31/96	305.52	2376.99	0.89	9.09	45.45	9.09	36.36	Jul	1
466	SWF	Rita	8/8/96	.	.	#VALUE!	20.00	30.00	10.00	40.00	Aug	2
467	SWF	Rita	8/14/96	373.56	1928.14	0.71	27.27	18.18	9.09	45.45	Aug	3
468	SWF	Rita	8/20/96	256.97	587.61	0.36	22.22	22.22	33.33	22.22	Aug	2
469	SWF	Rita	8/27/96	.	.	#VALUE!	44.44	33.33	11.11	11.11	Aug	4
470	SWF	Rita	9/3/96	238.58	2309.03	0.99	50.00	20.00	20.00	10.00	Sep	5
471	SWF	Rita	9/10/96	356.64	6729.53	1.28	20.00	40.00	0.00	40.00	Sep	2
472	SWF	Rita	9/17/96	471.50	3239.91	0.84	18.18	18.18	27.27	36.36	Sep	2
473	SWF	Rita	9/26/96	.	.	#VALUE!	25.00	50.00	0.00	25.00	Sep	2
474	SWF	Rita	10/1/96	167.71	8030.24	1.68	22.22	33.33	0.00	44.44	Oct	2
475	SWF	Rita	10/10/96	261.46	5040.04	1.29	16.67	25.00	8.33	50.00	Oct	2
476	SWF	Rita	10/17/96	688.87	17242.65	1.40	27.27	27.27	27.27	18.18	Oct	3
477	SWF	Rita	10/22/96	274.57	661.42	0.38	7.14	42.86	7.14	42.86	Oct	1
478	SWF	Rita	10/29/96	220.46	607.68	0.44	16.67	16.67	8.33	58.33	Oct	2
479	SWF	Rita	11/5/96	245.42	807.13	0.52	33.33	8.33	16.67	41.67	Nov	4
480	SWF	Rita	11/12/96	103.28	444.44	0.63	33.33	25.00	0.00	41.67	Nov	3
481	SWF	Rita	11/19/96	502.09	1204.14	0.38	41.67	25.00	0.00	33.33	Nov	5
482	SWF	Rita	11/25/96	235.52	444.44	0.28	66.67	0.00	11.11	22.22	Nov	6
483	SWF	Rita	12/3/96	.	.	#VALUE!	36.36	18.18	27.27	18.18	Dec	4
484	SWF	Rita	12/10/96	381.69	2479.72	0.81	60.00	20.00	10.00	10.00	Dec	6
485	SWF	Rita	12/18/96	335.49	618.90	0.27	15.38	30.77	7.69	46.15	Dec	2
486	SWF	Rita	1/5/97	344.27	4997.36	1.16	30.77	30.77	7.69	30.77	Jan	4
487	SWF	Rita	1/10/97	184.83	1872.83	1.01	21.43	35.71	7.14	35.71	Jan	2
488	SWF	Rita	1/14/97	128.18	7756.82	1.78	30.77	30.77	7.69	30.77	Jan	4
489	SWF	Rita	1/18/97	274.93	4605.41	1.22	37.50	50.00	0.00	12.50	Jan	3
490	SWF	Rita	1/21/97	161.53	6384.99	1.60	40.00	40.00	0.00	20.00	Jan	4
491	SWF	Rita	1/24/97	384.62	5669.05	1.17	0.00	54.55	9.09	36.36	Jan	0
492	SWF	Rita	1/28/97	241.22	6256.98	1.41	25.00	41.67	0.00	33.33	Jan	2
493	SWF	Rita	2/1/97	460.12	7854.81	1.23	40.00	20.00	0.00	40.00	Feb	4
494	SWF	Rita	2/4/97	391.78	9702.35	1.39	22.22	16.67	11.11	50.00	Feb	4
495	SWF	Rita	2/8/97	338.09	8572.33	1.40	20.00	60.00	0.00	20.00	Feb	2
496	SWF	Rita	2/12/97	398.94	16041.51	1.60	40.00	40.00	0.00	20.00	Feb	4
497	SWF	Rita	2/16/97	392.76	68591.28	2.24	18.18	54.55	0.00	27.27	Feb	2
498	SWF	Rita	2/19/97	253.00	8874.19	1.55	22.22	44.44	11.11	22.22	Feb	2
499	SWF	Rita	2/23/97	256.38	10606.36	1.62	16.67	66.67	0.00	16.67	Feb	1
500	SWF	Rita	2/27/97	199.50	13130.33	1.82	30.00	40.00	10.00	20.00	Feb	3
501	SWF	Rita	3/3/97	309.75	13737.22	1.65	75.00	12.50	0.00	12.50	Mar	6
502	SWF	Rita	3/7/97	.	.	#VALUE!	22.22	44.44	0.00	33.33	Mar	2
503	SWF	Rita	3/11/97	400.24	9511.11	1.38	33.33	66.67	0.00	0.00	Mar	3
504	SWF	Rita	3/15/97	144.54	18728.26	2.11	25.00	41.67	8.33	25.00	Mar	3
505	SWF	Rita	3/19/97	.	.	#VALUE!	62.50	12.50	0.00	25.00	Mar	5
506	SWF	Rita	3/23/97	1017.20	14328.31	1.15	33.33	55.56	0.00	11.11	Mar	3
507	SWF	Rita	3/26/97	858.08	16088.92	1.27	50.00	8.33	8.33	33.33	Mar	6
508	SWF	Rita	3/30/97	.	.	#VALUE!	22.22	77.78	0.00	0.00	Mar	2
509	SWF	Rita	4/2/97	472.16	33015.48	1.84	30.00	70.00	0.00	0.00	Apr	3
510	SWF	Rita	4/6/97	169.37	42640.39	2.40	16.67	16.67	33.33	33.33	Apr	2

	Loc	Name	Date	Prog	Est	log(e/p)	Active	Inactive	Social	Misc.	Month	Swimming
511	SWF	Rita	4/10/97	.	.	#VALUE!	18.18	45.45	27.27	9.09	Apr	2
512	SWF	Rita	4/13/97	236.70	144183.93	2.78	20.00	50.00	10.00	20.00	Apr	2
513	SWF	Rita	4/17/97	2707.65	44963.64	1.22	16.67	83.33	0.00	0.00	Apr	1
514	SWF	Rita	4/20/97	2616.22	17748.39	0.83	20.00	70.00	0.00	10.00	Apr	2
515	SWF	Rita	4/23/97	3095.53	170213.85	1.74	54.55	27.27	9.09	9.09	Apr	5
516	SWF	Rita	4/27/97	.	.	#VALUE!	20.00	50.00	0.00	30.00	Apr	2
517	SWF	Rita	4/30/97	586.37	27515.54	1.67	27.27	45.45	18.18	9.09	Apr	3
518	SWF	Rita	5/4/97	85.16	168317.32	3.30	22.22	44.44	22.22	11.11	May	2
519	SWF	Rita	5/7/97	.	.	#VALUE!	45.45	45.45	0.00	9.09	May	4
520	SWF	Rita	5/11/97	438.96	85596.86	2.29	33.33	50.00	16.67	0.00	May	2
521	SWF	Rita	5/14/97	2007.39	64798.22	1.51	16.67	66.67	0.00	16.67	May	2
522	SWF	Rita	5/18/97	.	.	#VALUE!	14.29	85.71	0.00	0.00	May	1
523	SWF	Rita	5/21/97	2486.38	11317.56	0.66	12.50	62.50	12.50	12.50	May	1
524	SWF	Rita	5/28/97	904.29	14737.64	1.21	9.09	90.91	0.00	0.00	May	1
525	SWF	Rita	6/1/97	168.10	246075.18	3.17	44.44	33.33	11.11	11.11	Jun	4
526	SWF	Rita	6/4/97	.	.	#VALUE!	27.27	9.09	13.64	50.00	Jun	5
527	SWF	Rita	6/8/97	130.49	47381.72	2.56	40.00	50.00	0.00	10.00	Jun	4
528	SWF	Rita	6/15/97	1342.60	11673.16	0.94	27.27	63.64	9.09	0.00	Jun	3
529	SWF	Rita	6/18/97	3319.08	7989.15	0.38	0.00	88.89	11.11	0.00	Jun	0
530	SWF	Rita	6/22/97	1402.15	21256.98	1.18	11.11	77.78	0.00	11.11	Jun	1
531	SWF	Rita	6/25/97	1726.25	12757.35	0.87	62.50	25.00	0.00	12.50	Jun	5
532	SWF	Rita	6/29/97	472.16	29838.79	1.80	10.00	60.00	0.00	30.00	Jun	1
533	SWF	Rita	7/2/97	886.39	26567.27	1.48	22.22	55.56	11.11	11.11	Jul	2
534	SWF	Rita	7/6/97	565.55	10634.81	1.27	14.29	50.00	28.57	7.14	Jul	2
535	SWF	Rita	7/9/97	516.41	12521.86	1.38	37.50	25.00	0.00	37.50	Jul	3
536	SWF	Rita	7/13/97	.	.	#VALUE!	11.11	66.67	22.22	0.00	Jul	1
537	SWF	Rita	7/16/97	289.44	16468.23	1.76	33.33	55.56	11.11	0.00	Jul	3
538	SWF	Rita	7/20/97	662.19	11682.64	1.25	18.18	63.64	9.09	9.09	Jul	2
539	SWF	Rita	7/23/97	.	.	#VALUE!	41.67	41.67	8.33	8.33	Jul	5
540	SWF	Rita	7/27/97	.	.	#VALUE!	30.00	50.00	10.00	10.00	Jul	3
541	SWF	Rita	7/30/97	427.25	20988.30	1.69	10.00	50.00	10.00	30.00	Jul	1
542	SWF	Rita	8/3/97	753.95	14067.53	1.27	40.00	40.00	10.00	10.00	Aug	4
543	SWF	Rita	8/11/97	.	.	#VALUE!	55.56	33.33	11.11	0.00	Aug	5
544	HS	Rosie	5/19/96	2.34	6418.18	3.44	28.57	71.43	0.00	0.00	May	1
545	HS	Rosie	5/22/96	30.39	444.44	1.17	66.67	22.22	0.00	11.11	May	4
546	HS	Rosie	5/26/96	55.71	10102.20	2.26	50.00	50.00	0.00	0.00	May	2
547	HS	Rosie	5/29/96	411.63	444.44	0.03	63.64	9.09	0.00	27.27	May	6
548	HS	Rosie	6/2/96	28.44	444.44	1.19	66.67	22.22	0.00	11.11	Jun	3
549	HS	Rosie	6/5/96	330.93	444.44	0.13	28.57	0.00	0.00	71.43	Jun	2
550	HS	Rosie	6/9/96	14.47	5278.68	2.56	62.50	25.00	0.00	12.50	Jun	3
551	HS	Rosie	6/12/96	263.51	444.44	0.23	77.78	0.00	0.00	22.22	Jun	7
552	HS	Rosie	6/16/96	2.34	8651.35	3.57	36.36	18.18	9.09	36.36	Jun	4
553	HS	Rosie	6/19/96	80.89	12980.19	2.21	55.56	33.33	0.00	11.11	Jun	3
554	HS	Rosie	6/23/96	2.34	4068.06	3.24	44.44	22.22	11.11	22.22	Jun	4
555	HS	Rosie	6/26/96	72.40	18254.13	2.40	36.36	9.09	36.36	18.18	Jun	3
556	HS	Rosie	6/30/96	.	.	#VALUE!	30.00	20.00	20.00	30.00	Jun	2
557	HS	Rosie	7/3/96	108.26	444.44	0.61	88.89	0.00	0.00	11.11	Jul	7
558	HS	Rosie	7/7/96	9.11	3808.87	2.62	62.50	37.50	0.00	0.00	Jul	5

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559 HS	Rosie	7/10/96	322.73	444.44	0.14	42.86	28.57	0.00	28.57	Jul	3
560 HS	Rosie	7/14/96	25.66	9476.34	2.57	50.00	12.50	25.00	12.50	Jul	4
561 HS	Rosie	7/17/96	151.64	444.44	0.47	66.67	11.11	0.00	22.22	Jul	6
562 HS	Rosie	7/21/96	2.34	8938.99	3.58	10.00	70.00	0.00	20.00	Jul	1
563 HS	Rosie	7/23/96	.	.	#VALUE!	50.00	25.00	0.00	25.00	Jul	4
564 HS	Rosie	7/24/96	129.09	3171.95	1.39	62.50	12.50	12.50	12.50	Jul	5
565 HS	Rosie	7/28/96	38.43	14279.31	2.57	37.50	50.00	0.00	12.50	Jul	3
566 HS	Rosie	7/31/96	195.31	444.44	0.36	62.50	25.00	0.00	12.50	Jul	5
567 HS	Rosie	8/4/96	41.33	444.44	1.03	44.44	55.56	0.00	0.00	Aug	3
568 HS	Rosie	8/7/96	249.78	444.44	0.25	33.33	55.56	0.00	11.11	Aug	3
569 HS	Rosie	8/11/96	71.16	525.66	0.87	12.50	50.00	0.00	37.50	Aug	1
570 HS	Rosie	8/14/96	84.31	444.44	0.72	75.00	0.00	0.00	25.00	Aug	6
571 HS	Rosie	8/18/96	2.34	1058.27	2.66	63.64	0.00	9.09	27.27	Aug	5
572 HS	Rosie	8/21/96	108.29	13214.09	2.09	37.50	62.50	0.00	0.00	Aug	3
573 HS	Rosie	8/25/96	2.34	4937.31	3.32	0.00	77.78	11.11	11.11	Aug	0
574 HS	Rosie	8/28/96	216.62	3127.70	1.16	25.00	0.00	0.00	75.00	Aug	1
575 HS	Rosie	9/1/96	50.93	764.14	1.18	44.44	44.44	0.00	11.11	Sep	3
576 HS	Rosie	9/4/96	249.61	444.44	0.25	75.00	0.00	0.00	25.00	Sep	6
577 HS	Rosie	9/8/96	67.62	490.73	0.86	61.54	30.77	7.69	0.00	Sep	5
578 HS	Rosie	9/11/96	634.20	444.44	-0.15	100.00	0.00	0.00	0.00	Sep	8
579 HS	Rosie	9/15/96	12.42	454.22	1.56	100.00	0.00	0.00	0.00	Sep	8
580 HS	Rosie	9/18/96	106.54	444.44	0.62	71.43	14.29	0.00	14.29	Sep	5
581 HS	Rosie	9/22/96	2.34	12213.67	3.72	70.00	20.00	0.00	10.00	Sep	4
582 HS	Rosie	9/25/96	509.25	444.44	-0.06	50.00	12.50	0.00	37.50	Sep	4
583 HS	Rosie	9/29/96	2.34	1801.71	2.89	81.82	0.00	0.00	18.18	Sep	5
584 HS	Rosie	10/2/96	260.25	444.44	0.23	42.86	57.14	0.00	0.00	Oct	3
585 HS	Rosie	10/6/96	21.81	3205.14	2.17	71.43	0.00	0.00	28.57	Oct	4
586 HS	Rosie	10/9/96	505.67	444.44	-0.06	14.29	42.86	0.00	42.86	Oct	1
587 HS	Rosie	10/13/96	30.30	542.25	1.25	0.00	90.00	0.00	10.00	Oct	0
588 HS	Rosie	10/16/96	777.71	444.44	-0.24	62.50	25.00	0.00	12.50	Oct	5
589 HS	Rosie	10/20/96	99.21	444.44	0.65	90.91	0.00	9.09	0.00	Oct	6
590 HS	Rosie	10/27/96	34.20	5871.35	2.23	62.50	25.00	0.00	12.50	Oct	5
591 HS	Rosie	10/30/96	524.22	444.44	-0.07	37.50	37.50	0.00	25.00	Oct	3
592 HS	Rosie	11/3/96	97.98	444.44	0.66	0.00	50.00	37.50	12.50	Nov	0
593 HS	Rosie	11/6/96	182.97	444.44	0.39	62.50	25.00	0.00	12.50	Nov	5
594 HS	Rosie	11/10/96	51.67	1852.28	1.55	76.92	15.38	7.69	0.00	Nov	6
595 HS	Rosie	11/14/96	298.52	444.44	0.17	41.67	25.00	8.33	25.00	Nov	2
596 HS	Rosie	11/17/96	11.67	3568.64	2.49	80.00	10.00	0.00	10.00	Nov	5
597 HS	Rosie	11/20/96	121.99	444.44	0.56	37.50	62.50	0.00	0.00	Nov	3
598 HS	Rosie	11/24/96	28.14	444.44	1.20	33.33	44.44	0.00	22.22	Nov	3
599 HS	Rosie	11/27/96	575.63	444.44	-0.11	62.50	0.00	0.00	37.50	Nov	5
600 HS	Rosie	12/1/96	12.84	444.44	1.54	93.33	6.67	0.00	0.00	Dec	7
601 HS	Rosie	12/4/96	399.59	444.44	0.05	50.00	37.50	0.00	12.50	Dec	4
602 HS	Rosie	12/8/96	14.92	1300.71	1.94	33.33	44.44	0.00	22.22	Dec	2
603 HS	Rosie	12/11/96	134.10	444.44	0.52	25.00	37.50	0.00	37.50	Dec	2
604 HS	Rosie	12/15/96	59.19	1907.60	1.51	81.82	18.18	0.00	0.00	Dec	6
605 HS	Rosie	12/18/96	152.87	475.71	0.49	28.57	14.29	0.00	57.14	Dec	2
606 HS	Rosie	12/22/96	103.70	22047.20	2.33	100.00	0.00	0.00	0.00	Dec	8

	Loc	Name	Date	Prog	Est	log(e/p)	Active	Inactive	Social	Misc.	Month	Swimming
607	HS	Rosie	12/26/96	122.77	2299.55	1.27	28.57	28.57	14.29	28.57	Dec	2
608	HS	Rosie	12/29/96	9.63	6585.71	2.84	14.29	57.14	0.00	28.57	Dec	1
609	SWF	Sara	6/26/96	125.77	444.44	0.55	33.33	0.00	8.33	58.33	Jun	4
610	SWF	Sara	7/10/96	127.69	444.44	0.54	18.18	36.36	9.09	36.36	Jul	1
611	SWF	Sara	7/17/96	287.33	736.65	0.41	0.00	33.33	33.33	33.33	Jul	0
612	SWF	Sara	7/25/96	135.63	444.44	0.52	30.77	30.77	15.38	23.08	Jul	3
613	SWF	Sara	7/31/96	48.19	444.44	0.96	12.50	37.50	25.00	25.00	Jul	1
614	SWF	Sara	8/8/96	140.83	444.44	0.50	10.00	50.00	10.00	30.00	Aug	1
615	SWF	Sara	8/14/96	237.90	444.44	0.27	12.50	37.50	0.00	50.00	Aug	1
616	SWF	Sara	8/20/96	308.38	444.44	0.16	20.00	40.00	10.00	30.00	Aug	2
617	SWF	Sara	8/27/96	.	.	#VALUE!	18.18	27.27	9.09	45.45	Aug	2
618	SWF	Sara	9/3/96	.	.	#VALUE!	33.33	22.22	22.22	22.22	Sep	3
619	SWF	Sara	9/10/96	500.14	744.71	0.17	33.33	11.11	22.22	33.33	Sep	3
620	SWF	Sara	9/17/96	372.58	4742.91	1.10	0.00	0.00	70.00	30.00	Sep	0
621	SWF	Sara	9/26/96	460.12	444.44	-0.02	22.22	33.33	11.11	33.33	Sep	2
622	SWF	Sara	10/1/96	366.73	444.44	0.08	27.27	27.27	0.00	45.45	Oct	3
623	SWF	Sara	10/10/96	.	.	#VALUE!	21.43	14.29	14.29	50.00	Oct	2
624	SWF	Sara	10/17/96	201.55	444.44	0.34	30.00	40.00	0.00	30.00	Oct	3
625	SWF	Sara	10/22/96	.	.	#VALUE!	14.29	42.86	0.00	42.86	Oct	2
626	SWF	Sara	10/29/96	137.58	444.44	0.51	12.50	0.00	12.50	75.00	Oct	1
627	SWF	Sara	11/5/96	142.79	444.44	0.49	30.00	20.00	10.00	40.00	Nov	3
628	SWF	Sara	11/12/96	208.78	444.44	0.33	22.22	22.22	22.22	33.33	Nov	1
629	SWF	Sara	11/19/96	184.11	444.44	0.38	30.00	20.00	0.00	50.00	Nov	2
630	SWF	Sara	11/25/96	.	.	#VALUE!	14.29	28.57	7.14	50.00	Nov	2
631	SWF	Sara	12/3/96	.	.	#VALUE!	22.22	11.11	22.22	44.44	Dec	2
632	SWF	Sara	12/10/96	.	.	#VALUE!	10.00	50.00	10.00	30.00	Dec	1
633	SWF	Sara	12/18/96	187.53	444.44	0.37	30.77	15.38	7.69	46.15	Dec	4
634	SWF	Sara	1/5/97	.	.	#VALUE!	0.00	64.29	0.00	35.71	Jan	0
635	SWF	Sara	1/10/97	.	.	#VALUE!	15.38	38.46	7.69	38.46	Jan	2
636	SWF	Sara	1/14/97	.	.	#VALUE!	38.46	23.08	7.69	30.77	Jan	3
637	SWF	Sara	1/18/97	.	.	#VALUE!	0.00	46.15	15.38	38.46	Jan	0
638	SWF	Sara	1/21/97	.	.	#VALUE!	0.00	71.43	0.00	28.57	Jan	0
639	SWF	Sara	1/24/97	547.00	444.44	-0.09	46.15	15.38	7.69	30.77	Jan	5
640	SWF	Sara	1/28/97	.	.	#VALUE!	18.18	36.36	9.09	36.36	Jan	2
641	SWF	Sara	2/1/97	294.62	444.44	0.18	41.67	33.33	0.00	25.00	Feb	3
642	SWF	Sara	2/4/97	.	.	#VALUE!	11.11	55.56	0.00	33.33	Feb	1
643	SWF	Sara	2/8/97	247.76	444.44	0.25	16.67	41.67	8.33	33.33	Feb	2
644	SWF	Sara	2/12/97	.	.	#VALUE!	40.00	30.00	0.00	30.00	Feb	3
645	SWF	Sara	2/16/97	.	.	#VALUE!	16.67	50.00	0.00	33.33	Feb	2
646	SWF	Sara	2/19/97	.	.	#VALUE!	22.22	44.44	11.11	22.22	Feb	2
647	SWF	Sara	2/23/97	.	.	#VALUE!	16.67	66.67	0.00	16.67	Feb	1
648	SWF	Sara	2/27/97	.	.	#VALUE!	36.36	45.45	9.09	9.09	Feb	3
649	SWF	Sara	3/3/97	.	.	#VALUE!	25.00	33.33	16.67	25.00	Mar	3
650	SWF	Sara	3/7/97	.	.	#VALUE!	27.27	18.18	9.09	45.45	Mar	3
651	SWF	Sara	3/11/97	630.30	5340.32	0.93	20.00	40.00	20.00	20.00	Mar	2
652	SWF	Sara	3/15/97	.	.	#VALUE!	8.33	50.00	16.67	25.00	Mar	1
653	SWF	Sara	3/19/97	429.20	2053.00	0.68	22.22	44.44	11.11	22.22	Mar	2
654	SWF	Sara	3/23/97	.	.	#VALUE!	37.50	25.00	37.50	0.00	Mar	3

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655	SWF	Sara	3/26/97	735.08	444.44	-0.22	15.38	30.77	7.69	46.15	Mar	2
656	SWF	Sara	3/30/97	.	.	#VALUE!	16.67	33.33	25.00	25.00	Mar	2
657	SWF	Sara	4/2/97	.	.	#VALUE!	53.85	15.38	0.00	30.77	Apr	6
658	SWF	Sara	4/6/97	.	.	#VALUE!	12.50	37.50	37.50	12.50	Apr	1
659	SWF	Sara	4/10/97	701.24	444.44	-0.20	40.00	50.00	0.00	10.00	Apr	3
660	SWF	Sara	4/13/97	.	.	#VALUE!	10.00	40.00	50.00	0.00	Apr	1
661	SWF	Sara	4/17/97	328.00	1482.30	0.66	28.57	57.14	0.00	14.29	Apr	2
662	SWF	Sara	4/20/97	.	.	#VALUE!	44.44	22.22	11.11	22.22	Apr	4
663	SWF	Sara	4/23/97	348.50	444.44	0.11	50.00	0.00	10.00	40.00	Apr	5
664	SWF	Sara	4/27/97	.	.	#VALUE!	30.00	30.00	10.00	30.00	Apr	3
665	SWF	Sara	4/30/97	327.35	444.44	0.13	20.00	50.00	10.00	20.00	Apr	2
666	SWF	Sara	5/4/97	.	.	#VALUE!	33.33	8.33	16.67	41.67	May	4
667	SWF	Sara	5/7/97	150.82	444.44	0.47	23.08	46.15	7.69	23.08	May	3
668	SWF	Sara	5/11/97	.	.	#VALUE!	16.67	66.67	0.00	16.67	May	1
669	SWF	Sara	5/14/97	.	.	#VALUE!	10.00	50.00	10.00	30.00	May	1
670	SWF	Sara	5/18/97	.	.	#VALUE!	54.55	9.09	18.18	18.18	May	6
671	SWF	Sara	5/21/97	121.21	444.44	0.56	36.36	18.18	18.18	27.27	May	4
672	SWF	Sara	5/28/97	.	.	#VALUE!	37.50	6.25	18.75	37.50	May	6
673	SWF	Sara	6/1/97	.	.	#VALUE!	16.67	41.67	8.33	33.33	Jun	2
674	SWF	Sara	6/4/97	211.28	444.44	0.32	6.67	20.00	6.67	66.67	Jun	1
675	SWF	Sara	6/8/97	.	.	#VALUE!	55.56	0.00	11.11	33.33	Jun	5
676	SWF	Sara	6/15/97	.	.	#VALUE!	53.85	15.38	7.69	23.08	Jun	6
677	SWF	Sara	6/18/97	226.09	444.44	0.29	35.71	14.29	0.00	50.00	Jun	5
678	SWF	Sara	6/22/97	.	.	#VALUE!	30.77	38.46	0.00	30.77	Jun	4
679	SWF	Sara	6/25/97	569.12	4785.59	0.92	33.33	20.00	26.67	20.00	Jun	5
680	SWF	Sara	6/29/97	.	.	#VALUE!	33.33	25.00	0.00	41.67	Jun	4
681	SWF	Sara	7/2/97	233.96	2395.95	1.01	38.46	7.69	7.69	46.15	Jul	5
682	SWF	Sara	7/6/97	.	.	#VALUE!	33.33	8.33	33.33	25.00	Jul	4
683	SWF	Sara	7/9/97	261.00	8524.92	1.51	23.08	30.77	23.08	23.08	Jul	2
684	SWF	Sara	7/13/97	.	.	#VALUE!	30.00	60.00	10.00	0.00	Jul	2
685	SWF	Sara	7/16/97	.	.	#VALUE!	33.33	33.33	33.33	0.00	Jul	3
686	SWF	Sara	7/20/97	.	.	#VALUE!	18.18	45.45	18.18	18.18	Jul	1
687	SWF	Sara	7/23/97	1831.03	498.79	-0.56	53.85	0.00	7.69	38.46	Jul	7
688	SWF	Sara	7/27/97	.	.	#VALUE!	10.00	70.00	10.00	10.00	Jul	1
689	SWF	Sara	7/30/97	.	.	#VALUE!	33.33	41.67	8.33	16.67	Jul	3
690	SWF	Sara	8/3/97	.	.	#VALUE!	10.00	30.00	30.00	30.00	Aug	1
691	SWF	Sara	8/11/97	.	.	#VALUE!	38.46	23.08	7.69	30.77	Aug	5
692	HS	Star	5/19/96	.	.	#VALUE!	25.00	12.50	37.50	25.00	May	2
693	HS	Star	5/22/96	53.20	444.44	0.92	10.00	50.00	0.00	10.00	May	0
694	HS	Star	5/26/96	.	.	#VALUE!	20.00	50.00	20.00	0.00	May	2
695	HS	Star	5/29/96	139.56	444.44	0.50	30.00	30.00	0.00	0.00	May	3
696	HS	Star	6/2/96	.	.	#VALUE!	12.50	62.50	12.50	0.00	Jun	0
697	HS	Star	6/5/96	65.41	444.44	0.83	25.00	12.50	0.00	25.00	Jun	2
698	HS	Star	6/9/96	.	.	#VALUE!	22.22	22.22	0.00	44.44	Jun	2
699	HS	Star	6/12/96	.	.	#VALUE!	11.11	11.11	11.11	33.33	Jun	1
700	HS	Star	6/16/96	.	.	#VALUE!	11.11	33.33	11.11	22.22	Jun	1
701	HS	Star	6/19/96	66.48	444.44	0.83	12.50	75.00	0.00	0.00	Jun	1
702	HS	Star	6/23/96	.	.	#VALUE!	16.67	16.67	41.67	16.67	Jun	2

	Loc	Name	Date	Prog	Est	log(e/p)	Active	Inactive	Social	Misc.	Month	Swimming
703	HS	Star	6/26/96	2.34	444.44	2.28	27.27	0.00	45.45	18.18	Jun	1
704	HS	Star	6/30/96	.	.	#VALUE!	18.18	9.09	18.18	36.36	Jun	2
705	HS	Star	7/3/96	23.02	444.44	1.29	22.22	22.22	22.22	11.11	Jul	2
706	HS	Star	7/7/96	.	.	#VALUE!	8.33	50.00	8.33	25.00	Jul	1
707	HS	Star	7/10/96	13.03	444.44	1.53	36.36	9.09	9.09	9.09	Jul	4
708	HS	Star	7/14/96	.	.	#VALUE!	27.27	18.18	27.27	18.18	Jul	3
709	HS	Star	7/17/96	5.21	444.44	1.93	12.50	62.50	0.00	0.00	Jul	1
710	HS	Star	7/21/96	.	.	#VALUE!	11.11	0.00	66.67	22.22	Jul	1
711	HS	Star	7/23/96	.	.	#VALUE!	42.86	42.86	0.00	0.00	Jul	3
712	HS	Star	7/24/96	4.60	444.44	1.98	62.50	12.50	25.00	0.00	Jul	4
713	HS	Star	7/28/96	.	.	#VALUE!	18.18	18.18	45.45	18.18	Jul	2
714	HS	Star	7/31/96	11.55	444.44	1.59	50.00	20.00	20.00	10.00	Jul	4
715	HS	Star	8/4/96	.	.	#VALUE!	0.00	61.54	15.38	23.08	Aug	0
716	HS	Star	8/7/96	36.71	444.44	1.08	44.44	44.44	11.11	0.00	Aug	3
717	HS	Star	8/11/96	.	.	#VALUE!	11.11	22.22	11.11	22.22	Aug	1
718	HS	Star	8/14/96	.	.	#VALUE!	22.22	44.44	0.00	22.22	Aug	2
719	HS	Star	8/18/96	.	.	#VALUE!	9.09	45.45	18.18	9.09	Aug	1
720	HS	Star	8/21/96	159.64	444.44	0.44	22.22	55.56	0.00	0.00	Aug	2
721	HS	Star	8/25/96	.	.	#VALUE!	12.50	62.50	25.00	0.00	Aug	1
722	HS	Star	8/28/96	177.47	444.44	0.40	25.00	50.00	0.00	0.00	Aug	1
723	HS	Star	9/1/96	.	.	#VALUE!	50.00	50.00	0.00	0.00	Sep	4
724	HS	Star	9/4/96	93.29	444.44	0.68	33.33	33.33	0.00	11.11	Sep	3
725	HS	Star	9/8/96	.	.	#VALUE!	18.18	63.64	0.00	18.18	Sep	2
726	HS	Star	9/11/96	.	.	#VALUE!	62.50	12.50	0.00	25.00	Sep	5
727	HS	Star	9/15/96	.	.	#VALUE!	10.00	70.00	0.00	10.00	Sep	1
728	HS	Star	9/18/96	88.57	4466.34	1.70	0.00	57.14	0.00	28.57	Sep	0
729	HS	Star	9/22/96	.	.	#VALUE!	7.69	46.15	30.77	7.69	Sep	1
730	HS	Star	9/25/96	309.88	444.44	0.16	25.00	50.00	0.00	25.00	Sep	2
731	HS	Star	9/29/96	.	.	#VALUE!	9.09	63.64	9.09	0.00	Sep	1
732	HS	Star	10/2/96	112.04	444.44	0.60	28.57	28.57	28.57	14.29	Oct	2
733	HS	Star	10/6/96	.	.	#VALUE!	25.00	50.00	0.00	0.00	Oct	2
734	HS	Star	10/9/96	61.08	444.44	0.86	28.57	42.86	0.00	14.29	Oct	2
735	HS	Star	10/13/96	.	.	#VALUE!	11.11	66.67	0.00	11.11	Oct	1
736	HS	Star	10/16/96	473.13	444.44	-0.03	25.00	50.00	0.00	12.50	Oct	2
737	HS	Star	10/20/96	.	.	#VALUE!	30.00	20.00	30.00	0.00	Oct	2
738	HS	Star	10/27/96	.	.	#VALUE!	37.50	37.50	0.00	0.00	Oct	3
739	HS	Star	10/30/96	300.67	444.44	0.17	25.00	25.00	25.00	0.00	Oct	2
740	HS	Star	11/3/96	.	.	#VALUE!	20.00	30.00	30.00	10.00	Nov	2
741	HS	Star	11/6/96	328.00	444.44	0.13	50.00	12.50	0.00	25.00	Nov	4
742	HS	Star	11/10/96	.	.	#VALUE!	45.45	45.45	9.09	0.00	Nov	4
743	HS	Star	11/14/96	69.96	444.44	0.80	27.27	36.36	9.09	9.09	Nov	2
744	HS	Star	11/17/96	.	.	#VALUE!	20.00	30.00	40.00	0.00	Nov	2
745	HS	Star	11/20/96	12.90	444.44	1.54	28.57	42.86	0.00	0.00	Nov	2
746	HS	Star	11/24/96	.	.	#VALUE!	12.50	37.50	0.00	37.50	Nov	1
747	HS	Star	11/27/96	78.55	444.44	0.75	37.50	50.00	0.00	0.00	Nov	3
748	HS	Star	12/1/96	.	.	#VALUE!	30.00	30.00	10.00	30.00	Dec	3
749	HS	Star	12/4/96	70.29	444.44	0.80	50.00	25.00	0.00	0.00	Dec	4
750	HS	Star	12/8/96	.	.	#VALUE!	25.00	41.67	16.67	0.00	Dec	2

	Loc	Name	Date	Prog	Est	log(e/p)	Active	Inactive	Social	Misc.	Month	Swimming
751	HS	Star	12/11/96	96.58	444.44	0.66	50.00	25.00	0.00	25.00	Dec	4
752	HS	Star	12/15/96	.	.	#VALUE!	25.00	50.00	16.67	8.33	Dec	3
753	HS	Star	12/18/96	19.99	444.44	1.35	28.57	28.57	14.29	14.29	Dec	2
754	HS	Star	12/22/96	.	.	#VALUE!	27.27	36.36	27.27	0.00	Dec	3
755	HS	Star	12/26/96	.	.	#VALUE!	25.00	37.50	12.50	0.00	Dec	2
756	HS	Star	12/29/96	.	.	#VALUE!	11.11	22.22	11.11	22.22	Dec	1
757	SWF	Stubbie	6/26/96	283.07	444.44	0.20	0.00	44.44	33.33	22.22	Jun	0
758	SWF	Stubbie	7/10/96	383.97	444.44	0.06	20.00	20.00	30.00	30.00	Jul	2
759	SWF	Stubbie	7/17/96	659.26	444.44	-0.17	0.00	40.00	20.00	40.00	Jul	0
760	SWF	Stubbie	7/25/96	510.23	444.44	-0.06	0.00	46.67	13.33	40.00	Jul	0
761	SWF	Stubbie	7/31/96	326.05	444.44	0.13	25.00	33.33	8.33	33.33	Jul	2
762	SWF	Stubbie	8/8/96	525.20	444.44	-0.07	0.00	54.55	9.09	36.36	Aug	0
763	SWF	Stubbie	8/14/96	.	.	#VALUE!	44.44	22.22	11.11	22.22	Aug	4
764	SWF	Stubbie	8/20/96	640.06	444.44	-0.16	12.50	75.00	12.50	0.00	Aug	1
765	SWF	Stubbie	8/27/96	591.58	444.44	-0.12	45.45	9.09	18.18	27.27	Aug	5
766	SWF	Stubbie	9/3/96	337.11	444.44	0.12	33.33	33.33	11.11	22.22	Sep	2
767	SWF	Stubbie	9/10/96	554.81	444.44	-0.10	27.27	27.27	18.18	27.27	Sep	3
768	SWF	Stubbie	9/17/96	516.08	444.44	-0.06	15.38	30.77	38.46	15.38	Sep	1
769	SWF	Stubbie	9/26/96	.	.	#VALUE!	30.00	40.00	0.00	30.00	Sep	2
770	SWF	Stubbie	10/1/96	413.58	444.44	0.03	16.67	50.00	0.00	33.33	Oct	1
771	SWF	Stubbie	10/10/96	440.27	444.44	0.00	25.00	58.33	0.00	16.67	Oct	2
772	SWF	Stubbie	10/17/96	598.41	444.44	-0.13	44.44	33.33	22.22	0.00	Oct	3
773	SWF	Stubbie	10/22/96	.	.	#VALUE!	18.18	45.45	27.27	9.09	Oct	2
774	SWF	Stubbie	10/29/96	272.78	444.44	0.21	20.00	20.00	10.00	50.00	Oct	2
775	SWF	Stubbie	11/5/96	314.14	444.44	0.15	0.00	50.00	20.00	30.00	Nov	0
776	SWF	Stubbie	11/12/96	496.24	444.44	-0.05	8.33	33.33	16.67	41.67	Nov	1
777	SWF	Stubbie	11/19/96	400.89	444.44	0.04	53.85	23.08	0.00	23.08	Nov	5
778	SWF	Stubbie	11/25/96	531.38	444.44	-0.08	10.00	50.00	10.00	30.00	Nov	1
779	SWF	Stubbie	12/3/96	724.34	444.44	-0.21	0.00	33.33	8.33	58.33	Dec	0
780	SWF	Stubbie	12/10/96	482.57	444.44	-0.04	9.09	72.73	0.00	18.18	Dec	1
781	SWF	Stubbie	12/18/96	.	.	#VALUE!	20.00	40.00	10.00	30.00	Dec	2
782	SWF	Stubbie	1/5/97	.	.	#VALUE!	18.18	36.36	9.09	36.36	Jan	2
783	SWF	Stubbie	1/10/97	366.08	444.44	0.08	30.00	30.00	20.00	20.00	Jan	3
784	SWF	Stubbie	1/14/97	.	.	#VALUE!	46.15	7.69	7.69	38.46	Jan	4
785	SWF	Stubbie	1/18/97	.	.	#VALUE!	0.00	75.00	0.00	25.00	Jan	0
786	SWF	Stubbie	1/21/97	.	.	#VALUE!	30.77	23.08	15.38	30.77	Jan	3
787	SWF	Stubbie	1/24/97	380.07	444.44	0.07	25.00	41.67	8.33	25.00	Jan	3
788	SWF	Stubbie	1/28/97	.	.	#VALUE!	11.11	33.33	11.11	44.44	Jan	1
789	SWF	Stubbie	2/1/97	557.74	444.44	-0.10	10.00	20.00	0.00	70.00	Feb	1
790	SWF	Stubbie	2/4/97	.	.	#VALUE!	12.50	37.50	25.00	25.00	Feb	1
791	SWF	Stubbie	2/8/97	425.30	444.44	0.02	22.22	55.56	0.00	22.22	Feb	2
792	SWF	Stubbie	2/12/97	.	.	#VALUE!	20.00	40.00	20.00	20.00	Feb	1
793	SWF	Stubbie	2/16/97	.	.	#VALUE!	44.44	0.00	44.44	11.11	Feb	4
794	SWF	Stubbie	2/19/97	.	.	#VALUE!	18.18	36.36	18.18	27.27	Feb	1
795	SWF	Stubbie	2/23/97	486.15	476.03	-0.01	0.00	42.86	14.29	42.86	Feb	0
796	SWF	Stubbie	2/27/97	.	.	#VALUE!	14.29	71.43	14.29	0.00	Feb	1
797	SWF	Stubbie	3/3/97	651.78	842.53	0.11	40.00	40.00	0.00	20.00	Mar	4
798	SWF	Stubbie	3/7/97	.	.	#VALUE!	18.18	36.36	0.00	45.45	Mar	2

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799	SWF	Stubbie	3/11/97	531.70	444.44	-0.08	44.44	33.33	22.22	0.00	Mar	4
800	SWF	Stubbie	3/15/97	.	.	#VALUE!	35.71	28.57	21.43	14.29	Mar	4
801	SWF	Stubbie	3/19/97	523.24	444.44	-0.07	20.00	40.00	10.00	30.00	Mar	2
802	SWF	Stubbie	3/23/97	.	.	#VALUE!	8.33	33.33	33.33	25.00	Mar	1
803	SWF	Stubbie	3/26/97	.	.	#VALUE!	10.00	30.00	30.00	30.00	Mar	1
804	SWF	Stubbie	3/30/97	.	.	#VALUE!	18.18	36.36	18.18	27.27	Mar	2
805	SWF	Stubbie	4/2/97	673.58	2497.10	0.57	22.22	66.67	11.11	0.00	Apr	1
806	SWF	Stubbie	4/6/97	.	.	#VALUE!	0.00	80.00	0.00	20.00	Apr	0
807	SWF	Stubbie	4/10/97	527.47	1612.05	0.49	12.50	31.25	18.75	37.50	Apr	2
808	SWF	Stubbie	4/13/97	.	.	#VALUE!	0.00	42.86	42.86	14.29	Apr	0
809	SWF	Stubbie	4/17/97	517.39	2975.98	0.76	0.00	12.50	62.50	25.00	Apr	0
810	SWF	Stubbie	4/20/97	.	.	#VALUE!	20.00	40.00	0.00	40.00	Apr	2
811	SWF	Stubbie	4/23/97	341.67	444.44	0.11	22.22	33.33	33.33	11.11	Apr	2
812	SWF	Stubbie	4/27/97	.	.	#VALUE!	30.77	23.08	15.38	30.77	Apr	2
813	SWF	Stubbie	4/30/97	368.35	444.44	0.08	16.67	33.33	33.33	16.67	Apr	2
814	SWF	Stubbie	5/4/97	.	.	#VALUE!	20.00	30.00	40.00	10.00	May	2
815	SWF	Stubbie	5/7/97	.	.	#VALUE!	20.00	60.00	10.00	10.00	May	2
816	SWF	Stubbie	5/11/97	.	.	#VALUE!	42.86	14.29	14.29	28.57	May	2
817	SWF	Stubbie	5/14/97	349.48	444.44	0.10	16.67	41.67	25.00	16.67	May	1
818	SWF	Stubbie	5/18/97	.	.	#VALUE!	11.11	44.44	33.33	11.11	May	1
819	SWF	Stubbie	5/21/97	610.78	3069.22	0.70	10.00	60.00	20.00	10.00	May	1
820	SWF	Stubbie	5/28/97	572.70	444.44	-0.11	16.67	41.67	25.00	16.67	May	2
821	SWF	Stubbie	6/1/97	.	.	#VALUE!	27.27	27.27	36.36	9.09	Jun	3
822	SWF	Stubbie	6/4/97	507.62	444.44	-0.06	38.46	23.08	15.38	23.08	Jun	4
823	SWF	Stubbie	6/8/97	.	.	#VALUE!	25.00	50.00	12.50	12.50	Jun	2
824	SWF	Stubbie	6/15/97	.	.	#VALUE!	30.00	60.00	10.00	0.00	Jun	3
825	SWF	Stubbie	6/18/97	470.85	444.44	-0.03	0.00	100.00	0.00	0.00	Jun	0
826	SWF	Stubbie	6/22/97	.	.	#VALUE!	30.00	70.00	0.00	0.00	Jun	2
827	SWF	Stubbie	6/25/97	523.57	744.07	0.15	18.18	54.55	18.18	9.09	Jun	2
828	SWF	Stubbie	6/29/97	.	.	#VALUE!	0.00	81.82	0.00	18.18	Jun	0
829	SWF	Stubbie	7/2/97	748.75	5457.27	0.86	20.00	40.00	20.00	20.00	Jul	2
830	SWF	Stubbie	7/6/97	.	.	#VALUE!	18.18	72.73	9.09	0.00	Jul	2
831	SWF	Stubbie	7/9/97	.	.	#VALUE!	18.18	27.27	36.36	18.18	Jul	2
832	SWF	Stubbie	7/13/97	.	.	#VALUE!	0.00	55.56	11.11	33.33	Jul	0
833	SWF	Stubbie	7/16/97	940.73	785.16	-0.08	7.69	53.85	30.77	7.69	Jul	1
834	SWF	Stubbie	7/20/97	.	.	#VALUE!	33.33	40.00	13.33	13.33	Jul	3
835	SWF	Stubbie	7/23/97	945.29	7456.54	0.90	36.36	45.45	18.18	0.00	Jul	3
836	SWF	Stubbie	7/27/97	.	.	#VALUE!	0.00	63.64	27.27	9.09	Jul	0
837	SWF	Stubbie	7/30/97	.	.	#VALUE!	33.33	25.00	16.67	25.00	Jul	3
838	SWF	Stubbie	8/3/97	.	.	#VALUE!	12.50	25.00	37.50	25.00	Aug	1
839	SWF	Stubbie	8/11/97	.	.	#VALUE!	10.00	60.00	30.00	0.00	Aug	1

	Circling	Brolls	Laps	Diving	Resting	Float	SocInt	OthInt	Eating	Vocal	OnBack	OutoView	Eatfec	Other
1	0	0	0	0	4	0	0	1	0	0	0	0	0	0
2	0	0	0	0	1	1	0	1	4	0	0	1	0	0
3	0	0	0	0	2	2	0	0	1	0	0	1	0	0
4	0	0	0	0	5	0	0	0	4	0	0	0	0	0
5	0	2	0	1	2	2	1	0	0	0	0	0	0	0
6	0	1	0	0	1	0	0	0	3	0	0	2	0	0
7	0	1	0	1	1	1	0	0	1	0	0	2	0	0
8	0	0	0	0	2	1	0	0	1	0	1	0	0	0
9	0	1	0	0	2	1	0	0	1	0	0	0	0	0
10	0	0	0	0	6	1	1	0	0	0	0	0	0	0
11	0	0	0	0	2	3	0	1	3	0	0	0	0	0
12	0	0	0	0	5	0	0	0	0	0	0	0	0	0
13	0	0	0	0	1	2	1	1	1	1	0	0	0	0
14	0	1	0	0	3	0	0	0	2	0	0	1	0	0
15	0	0	0	0	4	3	0	0	1	0	0	0	0	1
16	0	2	0	0	1	0	0	0	0	0	0	3	0	0
17	0	0	0	0	6	3	0	0	1	0	0	0	0	0
18	0	0	0	0	3	0	0	0	3	0	0	0	0	0
19	0	0	0	0	1	1	2	1	1	0	0	0	0	0
20	0	0	0	0	1	1	0	0	2	0	0	0	0	0
21	0	1	0	0	0	0	3	0	4	0	0	0	0	0
22	0	0	0	0	3	1	3	0	2	0	0	0	0	0
23	0	0	0	0	5	0	1	0	0	0	0	0	0	0
24	0	5	0	0	1	1	1	0	0	0	1	0	0	0
25	0	0	0	0	5	2	0	0	0	0	3	0	0	0
26	0	1	0	0	4	0	0	0	2	0	0	1	0	0
27	0	0	0	0	4	0	0	0	0	0	0	0	0	0
28	0	0	0	0	3	3	0	1	2	0	0	0	0	0
29	0	0	0	0	4	1	0	0	2	0	0	0	0	0
30	1	1	0	0	3	1	0	2	0	0	0	0	0	0
31	0	0	0	0	0	2	0	0	1	0	0	1	0	0
32	0	5	0	0	1	2	0	0	0	0	0	0	0	0
33	0	0	0	0	1	0	0	0	4	0	0	0	0	0
34	0	0	0	0	4	3	0	0	0	0	0	0	0	0
35	0	0	0	0	0	3	0	0	1	0	0	2	0	0
36	0	3	0	0	3	3	0	0	1	0	0	0	0	0
37	0	0	0	0	2	2	0	0	1	0	0	3	0	0
38	0	4	0	0	0	2	0	0	0	0	0	0	0	0
39	0	1	0	0	2	0	0	2	0	0	0	0	0	0
40	0	4	0	0	1	0	0	0	0	0	0	1	0	0
41	0	3	0	0	1	0	0	0	0	0	0	0	0	0
42	0	0	0	0	2	2	0	0	0	0	0	1	0	0
43	0	0	0	0	0	0	0	0	1	0	0	3	0	0
44	0	0	0	0	2	4	0	0	2	0	0	0	0	0
45	0	0	0	0	2	0	0	0	1	0	0	1	0	0
46	0	1	0	0	1	1	1	0	1	0	0	0	0	0
47	0	2	0	0	2	0	0	0	2	0	0	0	0	0
48	0	3	0	0	3	0	0	0	2	0	0	0	0	0

	Circling	Brolls	Laps	Diving	Resting	Float	SocInt	OthInt	Eating	Vocal	OnBack	OutoView	Eatfec	Other
49	0	0	0	0	0	3	1	2	1	0	0	0	0	0
50	0	1	0	0	3	0	0	0	2	0	0	0	0	0
51	0	0	0	0	3	5	1	1	0	0	0	0	0	0
52	0	0	0	0	2	2	0	0	3	0	0	0	0	0
53	0	0	0	0	2	3	0	1	2	0	0	0	0	0
54	0	0	0	0	4	2	0	0	1	0	0	0	0	0
55	0	0	0	0	1	1	1	1	1	0	1	1	0	0
56	0	0	0	0	1	3	0	0	1	0	0	0	0	0
57	0	1	0	0	1	2	2	0	1	0	0	1	0	0
58	0	0	0	0	1	6	0	0	1	0	0	0	0	0
59	0	3	0	0	2	3	1	0	0	0	0	0	0	0
60	0	0	0	0	3	2	0	0	1	0	0	1	0	0
61	0	0	0	0	5	4	0	0	0	0	0	0	0	0
62	0	0	0	0	1	5	0	0	1	0	0	1	0	0
63	0	0	0	1	0	5	1	0	1	0	0	0	0	0
64	0	0	0	0	0	3	0	1	0	0	0	0	0	0
65	0	0	0	0	2	1	1	0	2	0	0	2	0	0
66	0	0	0	1	3	0	0	0	0	0	0	1	0	0
67	0	1	0	0	3	0	0	0	2	0	0	2	0	0
68	0	0	0	0	2	1	0	0	1	0	1	0	0	0
69	0	0	0	0	3	0	0	0	4	0	0	0	0	0
70	0	0	0	0	0	2	3	0	4	0	0	0	0	0
71	0	1	0	0	0	0	0	0	4	0	0	0	0	0
72	0	0	0	0	2	1	0	0	2	0	0	2	2	0
73	0	0	0	1	2	0	0	0	2	0	1	0	1	0
74	0	0	0	0	2	1	0	0	1	0	0	0	0	0
75	0	0	0	0	6	0	1	0	0	0	0	0	2	0
76	0	0	0	0	5	1	0	0	2	0	0	0	0	0
77	0	1	0	0	2	0	1	0	2	0	0	1	0	0
78	0	0	0	0	3	0	2	2	1	0	1	0	0	0
79	0	0	0	0	2	0	0	0	3	0	0	1	0	0
80	0	0	0	0	2	1	1	0	2	0	0	1	0	0
81	0	0	0	0	0	0	3	0	3	0	2	0	0	0
82	0	0	0	0	1	1	3	0	2	0	0	0	0	0
83	0	0	0	0	2	0	0	0	2	0	0	1	0	0
84	0	0	0	0	2	2	1	0	2	0	2	0	0	1
85	0	0	0	0	1	0	0	0	2	1	0	0	1	0
86	0	1	0	0	0	1	3	0	4	0	0	0	0	0
87	0	0	0	0	5	1	1	1	1	0	0	0	0	0
88	0	0	0	0	6	0	0	1	0	0	0	0	0	0
89	0	0	0	1	6	1	0	0	0	0	0	0	0	0
90	0	0	0	0	1	1	0	0	2	0	0	0	0	0
91	0	0	0	0	2	0	0	1	2	0	0	3	0	0
92	0	0	0	0	2	0	0	0	1	0	0	0	0	0
93	0	0	0	0	4	1	0	1	2	0	0	0	0	0
94	0	0	0	0	2	3	0	0	2	0	0	0	0	0
95	0	0	0	0	5	1	0	3	1	0	0	0	0	0
96	0	0	0	0	1	1	0	0	1	0	0	1	0	0

	Circling	Brolls	Laps	Diving	Resting	Float	SocInt	OthInt	Eating	Vocal	OnBack	OutoView	Eatfec	Other
97	0	0	0	1	4	0	0	0	0	0	0	1	0	0
98	0	0	0	0	3	2	0	0	2	0	0	0	0	0
99	0	0	0	1	4	1	0	0	1	0	0	0	0	0
100	0	0	0	0	0	4	0	0	0	0	0	0	0	0
101	0	0	0	1	5	0	1	1	0	0	0	0	0	0
102	0	0	0	0	3	0	0	0	2	0	0	2	0	0
103	0	0	0	0	4	1	1	1	0	0	0	1	0	0
104	0	0	0	0	1	1	0	0	1	0	0	3	0	0
105	0	0	0	0	3	2	0	0	0	0	0	2	0	0
106	0	0	0	0	2	1	0	0	0	0	0	3	0	0
107	0	0	0	0	3	3	0	0	2	0	0	0	0	0
108	0	0	0	0	0	0	0	0	2	0	0	4	0	0
109	0	0	0	0	1	2	0	0	1	0	0	0	0	0
110	0	0	0	0	4	1	0	0	1	0	0	0	0	0
111	0	0	0	0	1	2	1	0	1	0	0	0	0	0
112	0	0	0	0	3	1	0	0	1	0	0	1	0	0
113	0	0	0	0	3	0	0	0	1	0	0	1	0	0
114	0	0	0	0	0	3	2	3	0	0	2	0	0	0
115	0	0	0	0	4	1	0	0	1	0	0	0	0	0
116	0	0	0	2	3	2	0	1	0	0	0	0	0	0
117	0	0	0	0	1	3	0	0	3	0	0	0	0	0
118	0	0	0	0	2	2	0	1	2	0	0	0	0	0
119	0	0	0	0	4	0	0	0	1	0	0	0	1	0
120	0	0	0	0	3	0	1	0	2	0	0	1	0	0
121	0	0	0	0	3	3	0	0	1	0	0	0	0	0
122	0	0	0	0	2	4	2	2	1	0	0	0	0	0
123	0	0	0	0	2	1	0	0	0	0	0	0	1	0
124	0	2	0	0	2	2	0	0	1	0	0	1	0	0
125	0	1	0	0	2	1	1	0	1	0	1	1	0	0
126	0	0	0	0	2	4	1	1	0	1	2	0	0	0
127	0	0	0	0	3	1	0	0	1	0	0	0	1	0
128	0	0	0	1	2	5	2	0	1	0	0	0	0	0
129	0	0	0	0	0	1	0	1	4	0	0	2	0	0
130	0	0	0	0	1	2	1	0	2	0	0	2	0	0
131	0	0	0	0	3	0	1	1	0	0	0	0	1	0
132	0	0	0	1	2	1	0	0	1	0	1	0	1	0
133	0	0	0	0	2	0	2	0	2	0	0	0	1	0
134	0	1	0	0	0	0	0	0	3	0	0	0	1	0
135	0	0	0	0	1	4	1	2	1	0	0	0	1	0
136	0	1	0	0	2	0	0	1	2	0	0	0	3	0
137	0	0	0	0	1	1	0	1	1	0	0	3	2	0
138	0	0	0	1	0	0	0	1	3	0	0	0	1	0
139	0	0	0	0	2	0	2	0	1	0	0	1	4	1
140	0	2	0	0	3	0	0	0	1	0	0	0	0	0
141	0	0	0	0	2	0	3	0	1	0	0	1	0	0
142	0	2	0	0	0	0	4	0	1	0	0	0	0	0
143	0	0	0	0	1	0	4	1	0	0	1	0	0	0
144	0	0	0	0	3	0	1	0	0	0	0	3	0	0

	Circling	Brolls	Laps	Diving	Resting	Float	SocInt	OthInt	Eating	Vocal	OnBack	OutoView	Eatfec	Other
145	0	0	0	1	3	2	0	0	1	0	1	0	1	2
146	0	0	0	0	1	0	3	0	1	0	2	2	0	0
147	0	0	0	0	4	1	3	0	1	0	1	0	0	0
148	0	0	0	0	2	0	0	0	1	0	0	1	0	0
149	0	0	0	0	1	0	4	2	1	0	0	0	0	0
150	0	0	0	0	0	1	0	0	1	0	0	1	0	0
151	0	1	0	0	0	0	3	0	4	0	0	0	0	0
152	0	0	0	0	3	0	4	0	0	0	0	0	0	0
153	0	1	0	0	2	0	3	0	2	0	0	0	0	0
154	0	0	0	0	3	1	1	0	1	0	0	0	0	0
155	0	0	0	2	1	1	2	0	2	0	1	0	0	0
156	0	0	0	0	5	1	0	0	2	0	0	1	0	0
157	0	0	0	0	5	0	0	0	0	0	0	1	0	0
158	0	0	0	0	3	3	0	1	2	0	0	0	0	1
159	0	0	0	0	1	4	0	0	2	0	0	0	0	0
160	0	1	0	0	3	3	0	0	0	0	0	0	0	0
161	0	0	0	0	0	1	0	0	1	0	0	1	0	0
162	0	0	0	0	2	2	0	0	0	0	0	2	0	0
163	0	0	0	0	2	2	0	0	3	0	0	1	0	0
164	0	0	0	0	3	0	1	1	1	0	0	1	0	1
165	0	0	0	0	0	2	0	0	0	0	0	2	0	0
166	0	0	0	0	1	4	1	0	0	0	0	0	0	0
167	0	0	0	0	1	2	0	0	1	0	0	2	0	0
168	0	0	0	1	0	4	3	0	0	0	0	2	0	0
169	0	0	0	0	2	0	0	0	0	0	0	3	0	0
170	0	0	0	0	1	1	0	0	1	0	0	0	0	0
171	0	0	0	0	2	2	0	1	1	0	0	0	0	0
172	0	0	0	0	2	1	0	0	1	0	0	1	0	0
173	0	0	0	0	3	0	0	0	1	0	0	0	0	0
174	0	0	0	0	2	4	0	0	1	0	0	0	0	0
175	0	0	0	0	2	1	0	0	1	0	0	1	0	0
176	0	0	0	0	1	3	1	0	2	0	0	0	0	0
177	0	0	0	0	3	1	0	0	1	0	0	1	0	0
178	0	0	0	0	1	1	0	1	2	0	0	0	0	0
179	0	0	0	0	3	4	0	2	0	0	0	0	0	0
180	0	0	0	0	0	0	0	0	2	0	0	2	0	0
181	0	0	0	0	2	4	1	2	0	0	0	0	0	0
182	0	0	0	0	3	4	0	3	1	0	0	0	0	0
183	0	0	0	0	2	5	0	2	2	0	0	1	0	0
184	0	0	0	0	2	1	0	0	1	0	0	1	0	0
185	0	0	0	1	1	1	0	0	2	0	0	2	0	0
186	0	0	0	0	0	3	0	0	0	0	0	1	0	0
187	0	0	0	0	2	3	2	2	0	0	0	1	1	0
188	0	0	0	0	3	2	0	0	1	0	0	0	1	0
189	0	0	0	1	1	2	3	0	0	0	0	0	1	0
190	0	0	0	0	2	1	0	0	1	0	0	1	1	0
191	0	0	0	0	2	6	0	0	0	0	0	0	1	0
192	0	0	0	0	0	1	0	0	1	0	0	2	0	0

	Circling	Brolls	Laps	Diving	Resting	Float	SocInt	OthInt	Eating	Vocal	OnBack	OutoView	Eatfec	Other
193	0	0	0	1	2	3	3	0	0	0	1	0	2	0
194	0	0	0	0	1	3	0	1	1	0	0	1	0	0
195	0	0	0	0	1	2	1	0	1	0	0	3	0	0
196	0	0	0	0	2	1	0	1	1	0	0	1	0	0
197	0	0	0	0	1	1	1	1	3	0	0	0	1	0
198	0	0	0	1	2	1	0	1	4	0	0	0	0	0
199	0	0	0	0	5	3	0	1	1	0	0	0	0	0
200	0	0	0	1	4	2	1	1	2	0	0	0	0	0
201	0	0	0	0	4	6	0	1	3	0	0	0	0	0
202	0	0	0	1	1	2	1	0	2	0	0	0	0	0
203	0	0	0	0	1	3	2	2	2	0	0	0	1	0
204	0	0	0	1	1	1	1	1	0	0	1	0	0	0
205	0	0	0	0	0	0	1	2	1	0	0	0	1	0
206	0	0	0	1	0	1	2	1	4	0	0	0	0	0
207	0	0	0	1	0	0	0	6	2	0	1	0	0	0
208	0	0	0	0	3	2	1	0	3	0	0	0	2	0
209	0	0	0	0	2	2	0	0	2	0	0	0	0	0
210	0	0	0	1	0	2	3	0	3	0	0	0	2	0
211	0	0	0	0	3	1	1	0	1	0	0	0	2	1
212	0	0	0	0	4	3	2	0	2	0	0	0	1	0
213	0	0	0	1	0	1	0	2	2	0	0	0	4	0
214	0	0	0	0	1	1	0	1	2	0	0	0	1	0
215	0	0	0	0	2	2	1	1	3	0	0	0	2	0
216	0	0	0	0	1	1	1	0	2	0	0	0	0	0
217	0	0	0	0	1	3	0	2	4	0	0	0	1	0
218	0	0	0	0	1	2	0	0	2	0	0	0	3	0
219	0	0	0	1	2	1	0	1	1	0	0	0	1	0
220	0	0	0	0	1	1	2	0	3	0	0	0	3	0
221	0	0	0	0	2	3	1	0	3	0	0	0	3	0
222	0	0	0	1	3	1	0	0	0	0	0	0	4	0
223	0	0	0	0	0	4	0	1	5	0	0	0	4	0
224	0	0	0	0	2	1	1	1	2	0	0	0	5	0
225	0	0	0	0	2	4	1	0	2	0	0	0	3	0
226	0	0	0	0	2	4	2	0	3	0	0	0	1	0
227	0	0	0	0	3	2	0	0	3	0	0	0	0	0
228	0	0	0	0	0	0	0	1	0	0	0	0	7	0
229	0	0	0	0	2	3	0	1	3	0	0	0	1	0
230	0	0	0	0	4	0	0	1	2	0	1	0	1	0
231	0	0	0	0	2	2	0	0	1	0	0	0	2	0
232	0	0	0	0	2	2	1	1	3	0	0	0	1	0
233	0	0	0	0	2	1	1	0	2	0	0	0	0	0
234	0	0	0	0	2	1	1	0	0	0	0	0	1	0
235	0	0	0	0	3	3	0	0	0	0	0	0	0	0
236	0	0	0	0	1	2	0	2	1	0	0	0	1	0
237	0	0	0	0	1	2	1	0	4	0	0	0	0	0
238	0	0	0	0	0	2	4	1	2	0	4	0	0	0
239	0	0	0	0	1	3	3	2	0	0	1	0	1	0
240	0	0	0	0	1	3	1	0	2	0	0	0	1	0

	Circling	Brolls	Laps	Diving	Resting	Float	SocInt	OthInt	Eating	Vocal	OnBack	OutoView	Eatfec	Other
241	0	0	0	0	0	2	4	2	1	0	4	0	0	0
242	0	0	0	0	1	5	0	0	2	0	0	0	1	0
243	0	0	0	0	2	3	3	1	0	0	2	0	0	0
244	0	0	0	0	4	6	0	1	0	0	0	0	1	0
245	0	0	0	0	0	1	5	1	1	0	3	0	0	0
246	0	0	0	0	2	5	1	0	1	0	0	0	1	0
247	0	0	0	0	0	3	5	1	1	0	5	0	0	0
248	0	0	0	0	1	3	0	2	0	0	0	0	0	1
249	0	0	0	0	3	4	0	1	1	0	0	0	1	0
250	0	0	0	0	1	2	1	2	2	0	0	0	0	1
251	0	0	0	0	2	3	1	2	2	0	0	0	1	0
252	0	0	0	0	2	3	0	1	1	0	0	0	1	0
253	0	0	0	0	2	4	3	0	1	0	0	0	0	0
254	0	0	0	2	5	6	1	0	0	0	0	0	0	0
255	0	0	0	0	3	0	0	2	0	0	0	0	3	0
256	0	0	0	0	5	7	0	0	2	0	0	0	0	0
257	0	0	0	0	2	4	3	0	0	0	3	0	0	0
258	0	0	0	0	2	1	1	1	1	0	0	0	0	0
259	0	0	0	0	3	2	0	1	0	0	0	0	0	0
260	0	0	0	0	3	4	0	1	1	0	0	0	1	0
261	0	0	0	0	2	4	4	0	2	0	1	0	2	0
262	0	0	0	0	1	2	2	0	1	0	0	0	0	0
263	0	0	0	0	2	5	2	1	0	0	2	0	0	0
264	0	0	0	0	5	4	0	0	0	0	0	0	0	0
265	0	0	0	0	3	5	0	0	0	0	1	0	2	0
266	0	0	0	0	4	3	0	0	2	0	0	0	2	0
267	0	0	0	1	3	2	1	0	2	0	1	0	0	0
268	0	0	0	0	5	5	0	1	2	0	0	0	0	0
269	0	0	0	0	0	1	4	1	0	0	5	0	0	0
270	0	0	0	0	0	1	2	1	2	0	2	0	0	0
271	0	0	0	0	3	3	1	1	0	0	0	0	0	0
272	0	0	0	0	3	3	0	3	0	0	0	0	1	0
273	0	0	0	0	4	6	1	0	3	0	0	0	1	0
274	0	0	0	0	4	6	0	2	0	0	0	0	0	0
275	0	0	0	0	3	4	1	2	1	0	0	0	0	0
276	0	0	0	0	1	5	0	1	3	0	0	0	0	0
277	0	0	0	0	0	2	2	0	4	0	1	0	0	0
278	0	0	0	1	5	6	0	1	0	0	0	0	1	0
279	0	0	0	3	0	1	0	0	1	0	0	0	2	0
280	0	0	0	0	1	1	1	2	3	0	0	0	3	0
281	0	0	0	0	0	1	0	3	4	0	0	0	0	0
282	0	0	0	0	5	4	1	1	1	0	0	0	1	0
283	0	0	0	0	4	4	0	0	2	0	0	0	1	0
284	0	0	0	0	3	4	0	2	4	0	0	0	0	0
285	0	0	0	1	0	0	0	2	3	0	0	0	2	0
286	0	0	0	1	1	3	1	2	2	0	0	0	1	0
287	0	0	0	2	0	2	2	1	2	0	0	0	1	0
288	0	0	0	0	1	2	1	1	4	0	0	0	1	0

	Circling	Brolls	Laps	Diving	Resting	Float	SocInt	OthInt	Eating	Vocal	OnBack	OutoView	Eatfec	Other
289	0	0	0	1	3	2	0	2	3	0	0	0	0	0
290	0	0	0	1	0	2	1	3	2	0	0	0	0	0
291	0	0	0	0	3	2	1	0	2	0	0	0	0	0
292	0	0	0	1	2	2	0	1	3	0	0	0	0	0
293	0	0	0	0	0	3	2	1	4	0	0	0	0	0
294	0	0	0	1	2	2	2	0	1	0	0	0	1	1
295	0	0	0	1	1	3	1	0	2	0	1	0	5	2
296	0	0	0	0	0	1	1	2	5	0	0	0	1	0
297	0	0	0	0	1	1	0	1	1	0	0	0	0	0
298	0	0	0	2	1	0	0	1	3	0	0	0	5	1
299	0	0	0	2	0	1	1	0	3	0	0	0	1	0
300	0	0	0	0	2	0	0	2	3	0	0	0	2	0
301	0	0	0	0	1	1	1	1	3	0	0	0	1	0
302	0	0	0	0	2	2	0	2	3	0	0	0	2	0
303	0	0	0	1	3	0	0	0	2	0	0	0	1	2
304	0	0	0	0	2	4	0	0	4	0	0	0	2	0
305	0	0	0	1	2	2	1	1	1	0	0	0	3	0
306	0	0	0	1	1	1	0	1	3	0	0	0	0	0
307	0	0	0	0	0	0	1	1	1	0	4	0	3	1
308	0	0	0	0	3	4	1	0	2	0	0	0	0	0
309	0	0	0	1	1	0	0	0	2	0	1	0	0	3
310	0	0	0	1	2	1	0	1	2	0	1	0	0	1
311	0	0	0	0	1	1	0	0	3	0	0	0	2	1
312	0	0	0	1	3	1	0	1	2	0	0	0	0	0
313	0	0	0	0	2	1	0	2	3	0	1	0	0	1
314	0	0	0	0	4	1	0	1	2	0	0	0	1	1
315	0	0	0	1	0	0	0	3	2	0	0	0	1	0
316	0	0	0	0	0	2	0	5	2	0	0	0	0	0
317	0	0	0	0	3	2	0	0	0	0	0	0	0	0
318	0	0	0	1	2	0	0	1	1	0	0	0	0	0
319	0	0	0	0	0	0	0	0	1	0	1	0	0	6
320	0	0	0	0	2	1	0	1	4	0	0	0	1	0
321	0	0	0	0	0	1	4	0	1	0	0	0	0	0
322	0	0	0	0	1	4	0	2	3	0	2	0	0	0
323	0	0	0	0	3	1	0	1	2	0	0	0	0	0
324	0	0	0	0	0	1	4	1	1	0	0	0	0	0
325	0	0	0	0	1	1	0	1	3	0	0	0	0	0
326	0	0	0	0	3	1	3	0	0	0	0	0	0	0
327	0	0	0	1	3	0	0	1	0	0	0	0	1	0
328	0	0	0	0	0	2	3	1	0	0	0	0	0	0
329	0	0	0	0	3	1	1	1	1	0	0	0	0	0
330	0	0	0	0	1	1	4	2	0	0	0	0	0	0
331	0	0	0	0	3	0	0	2	0	0	0	1	0	0
332	0	1	0	0	1	1	0	0	1	1	0	3	0	0
333	0	2	0	0	4	1	1	0	0	0	0	0	0	0
334	0	0	0	0	2	2	0	0	1	0	0	0	0	0
335	1	0	0	0	1	3	0	0	1	0	0	0	0	0
336	0	0	0	0	1	0	0	0	2	0	0	0	0	0

	Circling	Brolls	Laps	Diving	Resting	Float	SocInt	OthInt	Eating	Vocal	OnBack	OutoView	Eatfec	Other
337	0	0	0	0	3	1	1	0	1	0	0	1	0	0
338	0	0	1	0	0	0	0	2	1	0	0	0	0	0
339	3	3	0	0	2	0	0	0	1	0	0	1	0	1
340	0	1	0	0	4	0	0	0	1	0	0	0	0	0
341	0	0	0	0	0	0	3	0	3	0	0	0	1	0
342	0	6	6	0	0	0	0	0	0	0	0	0	0	0
343	0	0	8	0	0	0	0	0	0	0	0	0	0	0
344	0	0	8	0	0	0	0	0	0	0	0	0	0	0
345	0	0	8	0	0	0	0	0	0	0	0	0	0	0
346	0	0	4	0	2	0	0	0	1	0	0	1	0	0
347	0	1	4	0	0	0	2	1	0	0	1	0	0	0
348	0	1	6	0	0	0	0	0	1	0	0	0	0	0
349	0	0	7	0	0	0	0	0	0	0	0	0	0	0
350	0	0	3	0	0	0	0	0	0	0	0	0	0	0
351	0	0	5	0	1	0	0	0	1	0	0	0	0	0
352	0	0	5	0	1	1	0	0	0	0	0	0	0	0
353	0	0	2	0	1	0	0	0	1	0	0	0	0	0
354	0	1	5	0	1	0	1	0	0	0	0	0	0	0
355	0	0	8	0	0	0	0	0	0	0	0	0	0	0
356	0	0	1	0	2	0	0	1	2	0	1	0	0	0
357	0	0	5	0	1	0	0	0	1	0	0	0	0	0
358	0	0	3	0	0	2	1	1	2	0	0	0	0	0
359	0	0	8	0	0	0	0	0	0	0	0	0	0	0
360	0	0	4	0	0	0	1	3	0	0	0	0	0	0
361	0	0	3	0	0	0	0	0	1	0	0	0	0	0
362	0	1	6	0	0	0	0	0	0	0	0	0	0	0
363	0	0	6	0	0	0	0	0	1	0	0	1	0	0
364	0	0	5	0	0	0	0	1	0	0	0	2	0	1
365	0	0	0	0	0	1	0	0	0	0	0	1	0	0
366	0	0	7	0	0	0	0	0	0	1	0	0	0	0
367	0	0	4	0	0	0	0	0	1	0	0	2	0	0
368	0	0	5	0	0	0	0	0	0	0	0	0	0	0
369	0	0	0	0	2	0	0	0	0	0	0	0	0	0
370	0	0	0	0	3	0	0	0	2	1	0	0	0	0
371	0	0	4	0	0	0	0	0	0	0	0	2	0	0
372	0	0	3	0	0	0	0	0	0	0	0	2	0	0
373	0	0	0	0	1	0	0	0	2	0	0	0	0	0
374	0	0	2	0	1	2	0	0	1	0	0	0	0	0
375	0	0	0	0	0	0	0	0	1	0	0	1	0	0
376	0	0	1	0	1	2	2	0	2	0	0	0	0	0
377	0	0	0	0	2	1	0	0	0	0	0	1	0	0
378	0	0	0	0	3	0	0	1	1	0	0	0	0	0
379	0	0	0	0	0	1	0	4	1	0	0	0	0	0
380	0	0	0	0	3	0	0	0	1	0	0	0	0	0
381	0	0	0	0	1	2	1	0	1	0	0	0	0	0
382	0	0	0	0	2	1	0	1	3	0	0	0	0	0
383	0	0	0	0	1	2	1	1	1	0	0	1	0	0
384	0	0	0	0	3	0	0	0	1	0	0	1	0	0

	Circling	Brolls	Laps	Diving	Resting	Float	SocInt	OthInt	Eating	Vocal	OnBack	OutoView	Eatfec	Other
385	0	0	0	0	0	3	3	2	1	0	1	1	0	0
386	0	0	0	0	2	1	0	0	2	0	0	0	0	0
387	0	0	0	0	0	3	1	3	1	0	1	0	0	0
388	0	0	0	0	0	0	0	0	0	0	0	1	1	0
389	0	0	0	0	2	2	0	1	1	0	1	0	0	0
390	0	0	0	0	1	0	1	0	2	0	0	1	0	0
391	0	0	0	0	1	2	1	1	2	0	0	0	0	0
392	0	0	0	0	2	0	2	0	1	0	0	1	0	0
393	0	0	0	0	1	3	1	0	1	0	0	0	2	0
394	0	0	0	0	0	0	0	1	2	0	0	1	0	0
395	0	0	0	0	1	3	1	0	2	0	0	2	0	0
396	0	1	0	0	4	1	1	1	1	0	0	0	0	0
397	0	1	0	0	2	0	0	0	3	1	0	0	0	0
398	0	0	0	0	4	1	2	0	2	0	0	0	0	0
399	0	0	0	0	2	0	0	0	4	0	0	0	0	0
400	0	0	0	0	2	1	1	0	4	0	0	0	0	0
401	0	0	0	0	2	0	0	0	3	0	0	0	0	0
402	0	0	0	0	3	1	0	0	1	0	0	2	0	0
403	0	0	0	0	3	0	0	0	3	0	0	0	0	0
404	0	0	0	0	4	0	0	0	2	0	0	1	0	0
405	0	0	0	0	5	0	0	0	2	0	0	0	0	0
406	0	0	0	0	1	0	3	0	3	0	0	0	0	0
407	0	1	0	0	2	0	2	1	0	0	0	1	0	0
408	0	0	0	0	2	0	3	1	1	0	0	0	0	0
409	0	0	0	0	3	0	1	0	3	0	0	0	0	0
410	0	0	0	0	3	0	0	2	2	0	0	0	0	0
411	0	0	0	0	0	0	3	0	3	0	0	0	0	0
412	0	0	0	0	2	1	3	0	2	0	0	0	0	0
413	0	0	0	0	2	0	0	0	2	0	0	1	0	0
414	0	0	0	0	2	0	3	0	1	0	0	0	0	0
415	0	0	0	0	0	0	0	0	2	0	0	2	0	0
416	0	0	0	0	2	0	2	0	3	0	0	0	0	0
417	0	0	0	0	3	0	3	0	0	0	0	0	0	0
418	0	0	0	0	3	0	2	0	2	0	0	0	0	0
419	0	0	0	1	5	2	0	0	0	0	0	1	0	0
420	0	0	0	0	2	2	0	1	1	0	1	1	0	0
421	0	0	0	0	3	0	0	0	2	0	0	2	0	0
422	0	0	0	0	2	0	0	0	1	0	0	1	0	0
423	0	0	0	0	3	2	0	1	2	0	0	0	0	0
424	0	0	0	0	2	2	0	0	2	0	0	0	0	0
425	0	0	0	0	4	0	0	1	1	0	0	0	0	0
426	0	0	0	0	1	0	0	0	1	0	0	2	0	0
427	0	0	0	0	3	2	0	1	0	0	0	2	0	0
428	0	0	0	0	1	1	0	0	3	0	0	3	0	0
429	0	0	0	0	3	1	1	1	1	0	0	1	0	1
430	0	0	0	0	0	0	0	0	0	0	0	2	0	0
431	0	0	0	0	0	0	0	0	3	0	0	1	0	0
432	0	0	0	0	1	0	0	0	2	0	0	3	0	0

	Circling	Brolls	Laps	Diving	Resting	Float	SocInt	OthInt	Eating	Vocal	OnBack	OutoView	Eatfec	Other
433	0	0	0	0	0	0	2	0	4	0	0	1	0	0
434	0	0	0	0	2	0	0	0	2	0	0	0	0	0
435	0	0	0	0	0	2	0	1	2	0	0	1	0	0
436	0	0	0	0	2	0	0	4	0	0	0	1	0	0
437	0	0	0	0	1	0	0	0	2	0	0	2	0	0
438	0	0	0	0	1	0	0	0	1	0	0	3	0	0
439	0	0	0	0	1	2	0	2	2	0	0	0	0	0
440	0	0	0	0	0	0	0	0	1	0	0	1	0	0
441	0	0	0	0	1	1	0	1	3	0	0	0	0	0
442	0	0	0	0	2	0	0	0	0	0	0	3	0	0
443	0	0	0	0	1	2	0	0	3	0	0	1	0	0
444	0	0	0	0	0	4	2	2	1	0	1	0	0	0
445	0	0	0	0	3	0	0	0	1	0	0	0	1	0
446	0	0	0	0	1	3	0	0	0	0	0	1	0	0
447	0	0	0	0	3	0	0	1	2	0	0	0	0	0
448	0	0	0	0	0	6	1	4	1	0	0	0	0	0
449	0	0	0	0	3	0	0	0	1	0	0	1	0	0
450	0	0	0	0	1	2	0	1	1	0	0	3	1	0
451	0	0	0	0	3	1	0	0	1	0	0	1	0	0
452	0	0	0	0	2	1	1	0	2	0	0	2	0	0
453	0	0	0	0	3	1	0	0	0	0	0	3	1	0
454	0	0	0	0	3	0	0	0	3	0	0	0	0	0
455	0	0	0	0	3	0	0	0	0	0	0	2	0	0
456	0	0	0	0	1	3	0	3	0	0	2	0	0	0
457	0	0	0	0	1	1	1	0	0	0	1	2	0	0
458	0	0	0	0	1	2	4	0	1	1	0	0	1	0
459	0	0	0	0	2	0	0	1	1	0	0	1	0	0
460	0	0	0	0	1	0	1	1	3	0	0	2	0	0
461	0	0	0	2	1	0	0	3	1	0	1	0	0	0
462	0	0	0	0	2	0	1	0	2	0	0	0	0	0
463	0	0	0	0	0	2	2	0	3	0	0	0	1	0
464	0	0	0	0	5	2	0	0	1	0	0	0	0	0
465	0	0	0	0	5	0	1	0	2	0	0	0	2	0
466	0	0	0	0	1	2	0	1	3	0	0	0	1	0
467	0	0	0	0	1	1	0	1	2	0	0	0	3	0
468	0	0	0	0	1	1	0	3	2	0	0	0	0	0
469	0	0	0	0	3	0	0	1	1	0	0	0	0	0
470	0	0	0	0	2	0	1	1	1	0	0	0	0	0
471	0	0	0	0	3	1	0	0	4	0	0	0	0	0
472	0	0	0	0	1	1	0	3	1	0	3	0	0	0
473	0	0	0	0	3	1	0	0	2	0	0	0	0	0
474	0	0	0	0	1	2	0	0	4	0	0	0	0	0
475	0	0	0	0	1	2	1	0	3	0	0	0	3	0
476	0	0	0	0	1	2	3	0	0	0	0	0	2	0
477	0	0	0	0	2	4	1	0	3	0	0	0	3	0
478	0	0	0	0	1	1	1	0	4	0	0	0	3	0
479	0	0	0	0	0	1	1	1	2	0	0	0	3	0
480	0	0	0	1	2	1	0	0	2	0	0	0	3	0

	Circling	Brolls	Laps	Diving	Resting	Float	SocInt	OthInt	Eating	Vocal	OnBack	OutoView	Eatfec	Other
481	0	0	0	0	0	3	0	0	3	0	0	0	0	1
482	0	0	0	0	0	0	1	0	2	0	0	0	0	0
483	0	0	0	0	1	1	3	0	2	0	0	0	0	0
484	0	0	0	0	0	2	1	0	1	0	0	0	0	0
485	0	0	0	0	0	4	1	0	3	0	0	0	3	0
486	0	0	0	0	1	3	0	1	3	0	0	0	1	0
487	0	0	0	1	0	5	1	0	1	0	0	0	4	0
488	0	0	0	0	0	4	0	1	4	0	0	0	0	0
489	0	0	0	0	3	1	0	0	1	0	0	0	0	0
490	0	0	0	0	2	2	0	0	2	0	0	0	0	0
491	0	0	0	0	2	4	1	0	3	0	0	0	1	0
492	0	0	0	1	2	3	0	0	3	0	0	0	1	0
493	0	0	0	0	0	2	0	0	2	0	0	0	2	0
494	0	0	0	0	0	3	2	0	3	0	0	0	6	0
495	0	0	0	0	3	3	0	0	1	0	0	0	1	0
496	0	0	0	0	3	1	0	0	2	0	0	0	0	0
497	0	0	0	0	2	4	0	0	3	0	0	0	0	0
498	0	0	0	0	2	2	1	0	2	0	0	0	0	0
499	0	0	0	0	1	3	0	0	1	0	0	0	0	0
500	0	0	0	0	2	2	0	1	1	0	0	0	1	0
501	0	0	0	0	1	0	0	0	1	0	0	0	0	0
502	0	0	0	0	2	2	0	0	3	0	0	0	0	0
503	0	0	0	0	4	2	0	0	0	0	0	0	0	0
504	0	0	0	0	0	5	0	1	3	0	0	0	0	0
505	0	0	0	0	0	1	0	0	2	0	0	0	0	0
506	0	0	0	0	3	2	0	0	1	0	0	0	0	0
507	0	0	0	0	0	1	1	0	4	0	0	0	0	0
508	0	0	0	0	5	2	0	0	0	0	0	0	0	0
509	0	0	0	0	3	4	0	0	0	0	0	0	0	0
510	0	0	0	0	1	1	3	1	1	0	3	0	0	0
511	0	0	0	0	1	4	1	2	1	0	0	0	0	0
512	0	0	0	0	1	4	1	0	1	0	1	0	0	0
513	0	0	0	0	2	3	0	0	0	0	0	0	0	0
514	0	0	0	0	3	4	0	0	1	0	0	0	0	0
515	0	0	0	1	2	1	1	0	1	0	0	0	0	0
516	0	0	0	0	3	2	0	0	2	0	0	0	1	0
517	0	0	0	0	2	3	0	2	1	0	0	0	0	0
518	0	0	0	0	1	3	0	2	1	0	0	0	0	0
519	0	0	0	1	3	2	0	0	1	0	0	0	0	0
520	0	0	0	0	2	1	0	1	0	0	0	0	0	0
521	0	0	0	0	4	4	0	0	2	0	0	0	0	0
522	0	0	0	0	3	3	0	0	0	0	0	0	0	0
523	0	0	0	0	3	2	0	1	1	0	0	0	0	0
524	0	0	0	0	4	6	0	0	0	0	0	0	0	0
525	0	0	0	0	1	2	0	1	1	0	0	0	0	0
526	0	0	0	1	0	2	3	0	1	0	0	0	10	0
527	0	0	0	0	2	3	0	0	1	0	0	0	0	0
528	0	0	0	0	4	3	1	0	0	0	0	0	0	0

	Circling	Brolls	Laps	Diving	Resting	Float	SocInt	OthInt	Eating	Vocal	OnBack	OutoView	Eatfec	Other
529	0	0	0	0	6	2	1	0	0	0	0	0	0	0
530	0	0	0	0	5	2	0	0	1	0	0	0	0	0
531	0	0	0	0	0	2	0	0	1	0	0	0	0	0
532	0	0	0	0	4	2	0	0	3	0	0	0	0	0
533	0	0	0	0	5	0	0	1	1	0	0	0	0	0
534	0	0	0	0	2	5	0	4	0	0	0	0	1	0
535	0	0	0	0	0	2	0	0	3	0	0	0	0	0
536	0	0	0	0	4	2	1	1	0	0	0	0	0	0
537	0	0	0	0	3	2	1	0	0	0	0	0	0	0
538	0	0	0	0	4	3	0	1	1	0	0	0	0	0
539	0	0	0	0	3	2	1	0	1	0	0	0	0	0
540	0	0	0	0	3	2	0	1	1	0	0	0	0	0
541	0	0	0	0	2	3	0	1	3	0	0	0	0	0
542	0	0	0	0	2	2	0	1	1	0	0	0	0	0
543	0	0	0	0	2	1	0	1	0	0	0	0	0	0
544	1	0	0	0	5	0	0	0	0	0	0	0	0	0
545	1	1	0	0	2	0	0	0	1	0	0	0	0	0
546	2	1	0	0	4	1	0	0	0	0	0	0	0	0
547	1	0	0	0	1	0	0	0	3	0	0	0	0	0
548	1	2	0	0	2	0	0	0	1	0	0	0	0	0
549	0	0	0	0	0	0	0	0	3	0	0	2	0	0
550	0	2	0	0	2	0	0	0	1	0	0	0	0	0
551	0	0	0	0	0	0	0	0	2	0	0	0	0	0
552	0	0	0	0	2	0	0	1	2	0	0	1	0	1
553	0	1	1	0	3	0	0	0	1	0	0	0	0	0
554	0	0	0	0	2	0	1	0	2	0	0	0	0	0
555	0	1	0	0	1	0	4	0	1	0	1	0	0	0
556	1	0	0	0	2	0	2	0	1	0	1	0	0	1
557	0	1	0	0	0	0	0	0	1	0	0	0	0	0
558	0	0	0	0	3	0	0	0	0	0	0	0	0	0
559	0	0	0	0	2	0	0	0	1	0	0	1	0	0
560	0	0	0	0	1	0	2	0	1	0	0	0	0	0
561	0	0	0	0	1	0	0	0	2	0	0	0	0	0
562	0	0	0	0	4	3	0	0	1	0	1	0	0	0
563	0	0	0	0	2	0	0	0	2	0	0	0	0	0
564	0	0	0	0	1	0	1	0	1	0	0	0	0	0
565	0	0	0	0	2	2	0	0	1	0	0	0	0	0
566	0	0	0	0	2	0	0	0	1	0	0	0	0	0
567	1	0	0	0	4	1	0	0	0	0	0	0	0	0
568	0	0	0	0	4	1	0	0	1	0	0	0	0	0
569	0	0	0	0	4	0	0	0	2	0	0	1	0	0
570	0	0	0	0	0	0	0	0	0	0	0	2	0	0
571	1	1	0	0	0	0	0	1	2	0	1	0	0	0
572	0	0	0	0	5	0	0	0	0	0	0	0	0	0
573	0	0	0	0	6	1	1	0	1	0	0	0	0	0
574	0	0	0	0	0	0	0	0	1	0	0	2	0	0
575	1	0	0	0	4	0	0	0	0	0	0	1	0	0
576	0	0	0	0	0	0	0	0	2	0	0	0	0	0

	Circling	Brolls	Laps	Diving	Resting	Float	SocInt	OthInt	Eating	Vocal	OnBack	OutoView	Eatfec	Other
577	1	2	0	0	1	3	1	0	0	0	0	0	0	0
578	0	0	0	0	0	0	0	0	0	0	0	0	0	0
579	2	1	0	0	0	0	0	0	0	0	0	0	0	0
580	0	0	0	0	1	0	0	0	1	0	0	0	0	0
581	2	1	0	0	2	0	0	0	0	0	0	1	0	0
582	0	0	0	0	1	0	0	0	0	0	0	3	0	0
583	0	4	0	0	0	0	0	0	0	0	0	2	0	0
584	0	0	0	0	4	0	0	0	0	0	0	0	0	0
585	1	0	0	0	0	0	0	0	2	0	0	0	0	0
586	0	0	0	0	3	0	0	0	1	0	0	2	0	0
587	0	0	0	0	5	4	0	0	1	0	0	0	0	0
588	0	0	0	0	2	0	0	0	1	0	0	0	0	0
589	1	3	0	0	0	0	1	0	0	0	0	0	0	0
590	0	0	0	0	2	0	0	0	1	0	0	0	0	0
591	0	0	0	0	3	0	0	0	2	0	0	0	0	0
592	0	0	0	0	4	0	1	2	1	0	0	0	0	0
593	0	0	0	0	2	0	0	0	1	0	0	0	0	0
594	2	2	0	0	0	2	1	0	0	0	0	0	0	0
595	2	1	0	0	0	3	0	1	3	0	0	0	0	0
596	1	2	0	0	0	1	0	0	1	0	0	0	0	0
597	0	0	0	0	5	0	0	0	0	0	0	0	0	0
598	0	0	0	0	2	2	0	0	1	0	0	1	.	0
599	0	0	0	0	0	0	0	0	0	0	0	3	0	0
600	5	2	0	0	0	1	0	0	0	0	0	0	0	0
601	0	0	0	0	0	3	0	0	1	0	0	0	0	0
602	0	1	0	0	3	1	0	0	2	0	0	0	0	0
603	0	0	0	0	1	2	0	0	2	0	0	1	0	0
604	2	1	0	0	1	1	0	0	0	0	0	0	0	0
605	0	0	0	0	0	1	0	0	1	0	0	3	0	0
606	4	1	0	0	0	0	0	0	0	0	0	0	0	0
607	0	0	0	0	0	2	0	1	2	0	0	0	0	0
608	0	0	0	0	4	0	0	0	2	0	0	0	0	0
609	0	0	0	0	0	0	0	1	3	0	0	0	0	4
610	0	0	0	1	1	3	1	0	4	0	0	0	0	0
611	0	0	0	0	0	3	1	2	3	0	0	0	0	0
612	0	0	0	1	2	2	0	2	1	0	0	0	2	0
613	0	0	0	0	3	0	2	0	2	0	0	0	0	0
614	0	0	0	0	3	2	1	0	3	0	0	0	0	0
615	0	0	0	0	2	1	0	0	4	0	0	0	0	0
616	0	0	0	0	3	1	0	1	3	0	0	0	0	0
617	0	0	0	0	1	2	0	1	5	0	0	0	0	0
618	0	0	0	0	1	1	0	2	2	0	0	0	0	0
619	0	0	0	0	0	1	2	0	3	0	0	0	0	0
620	0	0	0	0	0	0	0	7	3	0	0	0	0	0
621	0	0	0	0	2	1	1	0	3	0	0	0	0	0
622	0	0	0	0	2	1	0	0	5	0	0	0	0	0
623	0	0	0	1	1	1	2	0	2	0	1	0	4	0
624	0	0	0	0	2	2	0	0	2	0	0	0	0	1

	Circling	Brolls	Laps	Diving	Resting	Float	SocInt	OthInt	Eating	Vocal	OnBack	OutoView	Eatfec	Other
625	0	0	0	0	3	3	0	0	3	0	1	0	1	1
626	0	0	0	0	0	0	0	1	6	0	0	0	0	0
627	0	0	0	0	1	1	0	1	3	0	0	0	1	0
628	0	0	0	1	2	0	0	2	3	0	0	0	0	0
629	0	0	0	1	0	2	0	0	5	0	0	0	0	0
630	0	0	0	0	1	3	1	0	4	0	0	0	3	0
631	0	0	0	0	1	0	2	0	3	0	0	0	1	0
632	0	0	0	0	3	2	0	1	2	0	0	0	1	0
633	0	0	0	0	0	2	0	1	4	0	0	0	2	0
634	0	0	0	0	2	7	0	0	4	0	0	0	1	0
635	0	0	0	0	2	3	0	1	2	0	0	0	2	1
636	0	0	1	1	0	3	0	1	4	0	0	0	0	0
637	0	0	0	0	2	4	1	1	3	0	0	0	2	0
638	0	0	0	0	1	4	0	0	1	0	0	0	1	0
639	0	0	0	1	1	1	1	0	3	0	0	0	1	0
640	0	0	0	0	2	2	0	1	3	0	0	0	1	0
641	0	0	0	2	2	2	0	0	2	0	0	0	1	0
642	0	0	0	0	1	4	0	0	3	0	0	0	0	0
643	0	0	0	0	1	4	1	0	2	0	0	0	2	0
644	0	0	0	1	2	1	0	0	3	0	0	0	0	0
645	0	0	0	0	3	3	0	0	3	0	0	0	0	1
646	0	0	0	0	2	2	0	1	2	0	0	0	0	0
647	0	0	0	0	0	4	0	0	1	0	0	0	0	0
648	0	0	0	1	4	1	1	0	1	0	0	0	0	0
649	0	0	0	0	0	4	0	2	1	0	0	0	1	1
650	0	0	0	0	0	2	1	0	4	0	0	0	0	1
651	0	0	0	0	2	2	1	1	2	0	0	0	0	0
652	0	0	0	0	0	6	1	1	3	0	0	0	0	0
653	0	0	0	0	1	3	1	0	2	0	0	0	0	0
654	0	0	0	0	1	1	0	3	0	0	0	0	0	0
655	0	0	0	0	0	4	0	1	4	0	0	0	1	1
656	0	0	0	0	1	3	3	0	1	0	0	0	0	2
657	0	0	0	1	1	1	0	0	0	0	0	0	0	4
658	0	0	0	0	1	2	1	2	0	0	1	0	0	0
659	0	0	0	1	2	3	0	0	1	0	0	0	0	0
660	0	0	0	0	3	1	1	4	0	0	0	0	0	0
661	0	0	0	0	2	2	0	0	0	0	0	0	0	1
662	0	0	0	0	2	0	1	0	0	0	0	0	1	1
663	0	0	0	0	0	0	0	1	3	0	0	0	0	1
664	0	0	0	0	3	0	0	1	1	0	0	0	2	0
665	0	0	0	0	3	2	0	1	2	0	0	0	0	0
666	0	0	0	0	0	1	1	1	2	0	0	0	0	3
667	0	0	0	0	3	3	1	0	2	0	0	0	0	1
668	0	0	0	0	2	2	0	0	0	0	0	0	1	0
669	0	0	0	0	4	1	0	1	3	0	0	0	0	0
670	0	0	0	0	0	1	0	2	0	0	0	0	0	2
671	0	0	0	0	1	1	0	2	1	0	0	0	0	2
672	0	0	0	0	0	1	3	0	0	0	0	0	4	2

	Circling	Brolls	Laps	Diving	Resting	Float	SocInt	OthInt	Eating	Vocal	OnBack	OutoView	Eatfec	Other
673	0	0	0	0	2	3	0	1	1	0	0	0	3	0
674	0	0	0	0	1	2	1	0	2	0	0	0	8	0
675	0	0	0	0	0	0	0	1	1	0	0	0	0	2
676	0	0	0	1	0	2	1	0	1	0	0	0	0	2
677	0	0	0	0	0	2	0	0	0	0	0	0	2	5
678	0	0	0	0	3	2	0	0	0	0	0	0	1	3
679	0	0	0	0	0	3	1	3	1	0	0	0	1	1
680	0	0	0	0	2	1	0	0	2	0	0	0	0	3
681	0	0	0	0	0	1	0	1	3	0	0	0	0	3
682	0	0	0	0	0	1	4	0	0	0	1	0	0	2
683	0	0	0	1	0	4	1	2	2	0	0	0	0	1
684	0	0	0	1	4	2	0	1	0	0	0	0	0	0
685	0	0	0	1	2	2	2	2	0	0	0	0	0	0
686	0	0	0	1	3	2	0	2	2	0	0	0	0	0
687	0	0	0	0	0	0	0	1	0	0	0	0	0	5
688	0	0	0	0	5	2	0	1	1	0	0	0	0	0
689	0	0	0	1	2	3	0	1	2	0	0	0	0	0
690	0	0	0	0	1	2	0	3	2	0	0	0	0	1
691	0	0	0	0	1	2	0	1	0	0	0	0	0	4
692	0	0	0	0	1	0	2	1	0	0	1	1	0	0
693	0	1	0	0	4	1	0	0	3	0	1	0	0	0
694	0	0	0	0	4	1	2	0	1	0	0	0	0	0
695	0	0	0	0	3	0	0	0	4	0	0	0	0	0
696	0	1	0	0	1	4	1	0	1	0	0	0	0	0
697	0	0	0	0	1	0	0	0	3	0	0	1	1	0
698	0	0	0	0	1	1	0	0	1	0	1	3	0	0
699	0	0	0	0	0	1	0	1	3	0	0	2	1	0
700	0	0	0	0	2	1	1	0	2	0	2	0	0	0
701	0	0	0	0	4	2	0	0	1	0	0	0	0	0
702	0	0	0	0	1	1	3	2	1	0	1	1	0	0
703	0	2	0	0	0	0	5	0	1	0	2	0	0	0
704	0	0	0	0	1	0	2	0	2	1	2	0	0	1
705	0	0	0	0	1	1	2	0	2	0	1	0	0	0
706	0	0	0	0	3	3	1	0	1	0	1	0	0	2
707	0	0	0	0	0	1	1	0	4	0	1	0	0	0
708	0	0	0	0	2	0	3	0	1	0	2	0	0	0
709	0	0	0	0	5	0	0	0	2	0	0	0	0	0
710	0	0	0	0	0	0	4	2	0	0	2	0	0	0
711	0	0	0	0	3	0	0	0	1	0	0	0	0	0
712	0	1	0	0	1	0	2	0	0	0	0	0	0	0
713	0	0	0	0	2	0	5	0	0	0	2	0	0	0
714	0	1	0	0	2	0	2	0	0	0	1	0	0	0
715	0	0	0	0	4	4	1	1	0	0	0	0	2	1
716	0	0	0	1	3	1	1	0	0	0	0	0	0	0
717	0	0	0	0	2	0	1	0	3	0	0	2	0	0
718	0	0	0	0	4	0	0	0	1	0	0	2	0	0
719	0	0	0	0	3	2	0	2	2	0	0	0	0	1
720	0	0	0	0	2	3	0	0	2	0	0	0	0	0

	Circling	Brolls	Laps	Diving	Resting	Float	SocInt	OthInt	Eating	Vocal	OnBack	OutoView	Eatfec	Other
721	0	0	0	0	2	3	1	1	0	0	0	0	0	0
722	0	0	0	0	1	1	0	0	1	0	0	0	0	0
723	0	0	0	0	3	1	0	0	0	0	0	0	0	0
724	0	0	0	0	2	1	0	0	2	0	0	1	0	0
725	0	0	0	0	2	5	0	0	0	0	0	1	0	1
726	0	0	0	0	0	1	0	0	0	0	0	2	0	0
727	0	0	0	0	4	3	0	0	1	0	0	1	0	0
728	0	0	0	0	1	3	0	0	1	0	0	2	0	0
729	0	0	0	0	1	5	2	2	1	0	0	1	0	0
730	0	0	0	0	3	1	0	0	0	0	0	2	0	0
731	0	0	0	0	3	4	0	1	2	0	0	0	0	0
732	0	0	0	0	2	0	0	2	0	0	1	0	0	0
733	0	0	0	0	1	3	0	0	2	0	0	0	0	0
734	0	0	0	0	2	1	0	0	1	0	0	1	0	0
735	0	0	0	0	3	3	0	0	1	0	1	0	0	0
736	0	0	0	0	3	1	0	0	1	0	0	1	0	0
737	0	0	0	1	0	2	2	1	2	0	0	0	0	0
738	0	0	0	0	3	0	0	0	2	0	0	0	0	0
739	0	0	0	0	2	0	0	2	2	0	0	0	0	0
740	0	0	0	0	0	3	1	2	1	0	1	0	0	0
741	0	0	0	0	0	1	0	0	1	0	0	2	0	0
742	0	0	0	1	2	3	0	1	0	0	0	0	0	0
743	0	0	0	1	1	3	0	1	2	0	0	0	1	0
744	0	0	0	0	1	2	0	4	1	0	0	0	0	0
745	0	0	0	0	1	2	0	0	2	0	0	0	0	0
746	0	0	0	0	0	3	0	0	1	0	0	3	0	0
747	0	0	0	0	3	1	0	0	1	0	0	0	0	0
748	0	0	0	0	1	2	1	0	0	0	0	1	2	0
749	0	0	0	0	0	2	0	0	2	0	0	0	0	0
750	0	0	0	1	3	2	1	1	2	0	0	0	0	0
751	0	0	0	0	1	1	0	0	0	0	0	2	0	0
752	0	0	0	0	2	4	0	2	0	0	0	0	1	0
753	0	0	0	0	2	0	1	0	1	0	0	1	0	0
754	0	0	0	0	0	4	2	1	1	0	0	0	0	0
755	0	0	0	0	3	0	0	1	2	0	0	0	0	0
756	0	0	0	0	0	2	1	0	3	0	0	2	0	0
757	0	0	0	0	4	0	1	2	1	0	1	0	0	0
758	0	0	0	0	1	1	1	2	3	0	0	0	0	0
759	0	0	0	0	2	2	0	2	3	0	0	0	1	0
760	0	0	0	0	5	2	0	2	1	0	0	0	5	0
761	0	0	0	1	3	1	0	1	2	0	0	0	2	0
762	0	0	0	0	4	2	0	1	3	0	1	0	0	0
763	0	0	0	0	2	0	0	1	2	0	0	0	0	0
764	0	0	0	0	6	0	0	1	0	0	0	0	0	0
765	0	0	0	0	1	0	1	1	1	0	0	0	2	0
766	0	0	0	1	3	0	0	1	1	0	0	0	1	0
767	0	0	0	0	2	1	0	2	3	0	0	0	0	0
768	0	0	0	1	0	4	1	4	1	0	0	0	1	0

	Circling	Brolls	Laps	Diving	Resting	Float	SocInt	OthInt	Eating	Vocal	OnBack	OutoView	Eatfec	Other
769	0	0	0	1	3	1	0	0	2	0	0	0	1	0
770	0	0	0	1	2	4	0	0	4	0	0	0	0	0
771	0	0	0	1	4	3	0	0	2	0	0	0	0	0
772	0	0	0	1	2	1	0	2	0	0	0	0	0	0
773	0	0	0	0	3	2	1	2	1	0	0	0	0	0
774	0	0	0	0	1	1	0	1	4	0	0	0	1	0
775	0	0	0	0	3	2	0	2	3	0	0	0	0	0
776	0	0	0	0	2	2	0	2	3	0	0	0	2	0
777	0	0	0	2	1	2	0	0	2	0	0	0	1	0
778	0	0	0	0	3	2	1	0	3	0	0	0	0	0
779	0	0	0	0	1	3	0	1	5	0	0	0	2	0
780	0	0	0	0	4	4	0	0	1	0	0	0	1	0
781	0	0	0	0	3	1	0	1	3	0	0	0	0	0
782	0	0	0	0	2	2	0	1	2	0	0	0	2	0
783	0	0	0	0	1	2	0	2	1	0	0	0	1	0
784	0	0	0	2	0	1	1	0	4	0	0	0	1	0
785	0	0	0	0	6	0	0	0	2	0	0	0	0	0
786	0	0	0	1	2	1	0	2	2	0	0	0	2	0
787	0	0	0	0	3	2	0	1	3	0	0	0	0	0
788	0	0	0	0	3	0	0	1	3	0	0	0	1	0
789	0	0	0	0	2	0	0	0	3	0	0	0	4	0
790	0	0	0	0	3	0	0	2	2	0	0	0	0	0
791	0	0	0	0	4	1	0	0	2	0	0	0	0	0
792	0	0	0	1	2	2	0	2	2	0	0	0	0	0
793	0	0	0	0	0	0	0	4	1	0	0	0	0	0
794	0	0	0	1	2	2	0	2	3	0	0	0	0	0
795	0	0	0	0	2	1	1	0	1	0	2	0	0	0
796	0	0	0	0	5	0	0	1	0	0	0	0	0	0
797	0	0	0	0	3	1	0	0	1	0	0	0	1	0
798	0	0	0	0	2	2	0	0	4	0	0	0	1	0
799	0	0	0	0	3	0	1	1	0	0	0	0	0	0
800	0	0	0	1	1	3	1	2	2	0	0	0	0	0
801	0	0	0	0	3	1	0	1	2	0	0	0	1	0
802	0	0	0	0	2	2	1	3	2	0	0	0	1	0
803	0	0	0	0	1	2	0	3	2	0	0	0	1	0
804	0	0	0	0	3	1	1	1	2	0	0	0	1	0
805	0	0	0	1	5	1	1	0	0	0	0	0	0	0
806	0	0	0	0	5	3	0	0	2	0	0	0	0	0
807	0	0	0	0	2	3	2	1	1	0	0	0	5	0
808	0	0	0	0	1	5	0	6	1	0	0	0	1	0
809	0	0	0	0	1	0	0	5	0	0	0	0	2	0
810	0	0	0	1	4	2	0	0	1	0	0	0	5	0
811	0	0	0	0	2	1	3	0	1	0	0	0	0	0
812	0	0	0	2	1	2	0	2	2	0	0	0	2	0
813	0	0	0	0	3	1	0	4	0	0	0	0	2	0
814	0	0	0	0	1	2	1	3	1	0	0	0	0	0
815	0	0	0	0	5	1	0	1	0	0	0	0	1	0
816	0	0	0	1	1	0	0	1	0	0	0	0	2	0

	Circling	Brolls	Laps	Diving	Resting	Float	SocInt	OthInt	Eating	Vocal	OnBack	OutoView	Eatfec	Other
817	0	0	0	1	2	3	0	3	2	0	0	0	0	0
818	0	0	0	0	3	1	2	1	0	0	0	0	1	0
819	0	0	0	0	4	2	0	2	1	0	0	0	0	0
820	0	0	0	0	4	1	2	1	0	0	1	0	1	0
821	0	0	0	0	2	1	0	4	1	0	0	0	0	0
822	0	0	0	1	2	1	2	0	2	0	0	0	1	0
823	0	0	0	0	2	2	0	1	1	0	0	0	0	0
824	0	0	0	0	3	3	1	0	0	0	0	0	0	0
825	0	0	0	0	6	2	0	0	0	0	0	0	0	0
826	0	0	0	1	5	2	0	0	0	0	0	0	0	0
827	0	0	0	0	2	4	1	1	1	0	0	0	0	0
828	0	0	0	0	6	3	0	0	2	0	0	0	0	0
829	0	0	0	0	3	1	0	2	2	0	0	0	0	0
830	0	0	0	0	5	3	0	1	0	0	0	0	0	0
831	0	0	0	0	0	3	1	3	2	0	0	0	0	0
832	0	0	0	0	2	3	0	1	0	0	0	0	3	0
833	0	0	0	0	2	5	2	2	0	0	0	0	1	0
834	0	0	0	2	3	3	0	2	2	0	0	0	0	0
835	0	0	0	1	4	1	0	2	0	0	0	0	0	0
836	0	0	0	0	1	6	1	2	1	0	0	0	0	0
837	0	0	0	1	2	1	0	2	3	0	0	0	0	0
838	0	0	0	0	1	1	0	3	2	0	0	0	0	0
839	0	0	0	0	4	2	0	3	0	0	0	0	0	0

	OnTop	Under	NtoN	Holding	BHeld	Pushing	BPushed	Mouthing	MouthAG	AlMoutAG	FM	RejMouth
1	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	1	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0
21	0	0	0	0	0	0	0	0	0	0	0	0
22	0	0	0	0	0	0	0	1	0	0	0	0
23	1	0	0	0	0	0	0	0	0	0	0	0
24	0	0	0	1	0	0	0	0	0	0	0	0
25	0	0	0	0	0	0	0	0	0	0	0	0
26	0	0	0	0	0	0	0	0	0	0	0	0
27	0	0	0	0	0	0	0	0	0	0	0	0
28	0	0	0	0	0	0	0	0	0	0	0	0
29	0	0	0	0	0	0	0	0	0	0	0	0
30	0	0	0	0	0	0	0	0	0	0	0	0
31	0	0	0	0	0	0	0	0	0	0	0	0
32	0	0	0	0	0	0	0	0	0	0	0	0
33	0	0	0	0	0	0	0	0	0	0	0	0
34	0	0	0	0	0	0	0	0	0	0	0	0
35	0	0	0	0	0	0	0	0	0	0	0	0
36	0	0	0	0	0	0	0	0	0	0	0	0
37	0	0	0	0	0	0	0	0	0	0	0	0
38	0	0	0	0	0	0	0	0	0	0	0	0
39	0	0	0	0	0	0	0	0	0	0	0	0
40	0	0	0	0	0	0	0	0	0	0	0	0
41	0	0	0	0	0	0	0	0	0	0	0	0
42	0	0	0	0	0	0	0	0	0	0	0	0
43	0	0	0	0	0	0	0	0	0	0	0	0
44	0	0	0	0	0	0	0	0	0	0	0	0
45	0	0	0	0	0	0	0	0	0	0	0	0
46	0	0	1	0	0	0	0	0	0	0	0	0
47	0	0	0	0	0	0	0	0	0	0	0	0
48	0	0	0	0	0	0	0	0	0	0	0	0

	OnTop	Under	NtoN	Holding	BHeld	Pushing	BPushed	Mouthing	MouthAG	AlMoutAG	FM	RejMouth
49	0	0	0	0	0	0	0	0	0	0	0	0
50	0	0	0	0	0	0	0	0	0	0	0	0
51	0	0	0	0	0	0	0	1	0	0	0	0
52	0	0	0	0	0	0	0	0	0	0	0	0
53	0	0	0	0	0	0	0	0	0	0	0	0
54	0	0	0	0	0	0	0	0	0	0	0	0
55	0	0	0	0	0	0	0	0	0	0	0	0
56	0	0	0	0	0	0	0	0	0	0	0	0
57	0	0	0	0	0	0	0	0	0	0	0	0
58	0	0	0	0	0	0	0	0	0	0	0	0
59	0	0	1	0	0	0	0	0	0	0	0	0
60	0	0	0	0	0	0	0	0	0	0	0	0
61	0	0	0	0	0	0	0	0	0	0	0	0
62	0	0	0	0	0	0	0	0	0	0	0	0
63	0	0	0	0	0	0	0	0	0	0	0	1
64	0	0	0	0	0	0	0	0	0	0	0	0
65	0	0	0	0	0	0	0	0	0	0	0	0
66	0	0	0	0	0	0	0	0	0	0	0	0
67	0	0	0	0	0	0	0	0	0	0	0	0
68	0	0	0	0	0	0	0	0	0	0	0	0
69	0	0	0	0	0	0	0	0	0	0	0	0
70	0	0	1	1	0	1	0	0	0	0	0	0
71	0	0	0	0	0	0	0	0	0	0	0	0
72	0	0	0	0	0	0	0	0	0	0	0	0
73	0	0	0	0	0	0	0	0	0	0	0	0
74	0	0	0	0	0	0	0	0	0	0	0	0
75	0	0	0	0	0	0	0	0	0	0	0	0
76	0	0	0	0	0	0	0	0	0	0	0	0
77	0	0	0	0	0	0	0	0	0	0	1	0
78	0	0	0	0	0	0	0	0	0	0	0	0
79	0	0	0	0	0	0	0	0	0	0	0	0
80	0	0	0	0	0	1	0	0	0	0	0	0
81	0	0	0	0	0	0	0	0	0	0	0	0
82	1	0	0	0	0	0	0	0	0	0	0	0
83	0	0	0	0	0	0	0	0	0	0	0	0
84	0	0	0	0	0	0	0	1	0	0	0	0
85	0	0	0	0	0	0	0	0	0	0	0	0
86	0	0	0	0	0	0	0	0	0	0	0	0
87	0	0	0	0	0	0	0	0	0	0	0	0
88	0	0	0	0	0	0	0	0	0	0	0	0
89	0	0	0	0	0	0	0	0	0	0	0	0
90	0	0	0	0	0	0	0	0	0	0	0	0
91	0	0	0	0	0	0	0	0	0	0	0	0
92	0	0	0	0	0	0	0	0	0	0	0	0
93	0	0	0	0	0	0	0	0	0	0	0	0
94	0	0	0	0	0	0	0	0	0	0	0	0
95	0	0	0	0	0	0	0	0	0	0	0	0
96	0	0	0	0	0	0	0	0	0	0	0	0

	OnTop	Under	NtoN	Holding	BHeld	Pushing	BPushed	Mouthing	MouthAG	AlMoutAG	FM	RejMouth
97	0	0	0	0	0	0	0	0	0	0	0	0
98	0	0	0	0	0	0	0	0	0	0	0	0
99	0	0	0	0	0	0	0	0	0	0	0	0
100	0	0	0	0	0	0	0	0	0	0	0	0
101	0	0	0	0	0	0	0	0	0	0	0	0
102	0	0	0	0	0	0	0	0	0	0	0	0
103	0	0	0	0	0	0	0	0	0	0	0	0
104	0	0	0	0	0	0	0	0	0	0	0	0
105	0	0	0	0	0	0	0	0	0	0	0	0
106	0	0	0	0	0	0	0	0	0	0	0	0
107	0	0	0	0	0	0	0	0	0	0	0	0
108	0	0	0	0	0	0	0	0	0	0	0	0
109	0	0	0	0	0	0	0	0	0	0	0	0
110	0	0	0	0	0	0	0	0	0	0	0	0
111	0	0	0	0	0	1	0	0	0	0	0	0
112	0	0	0	0	0	0	0	0	0	0	0	0
113	0	0	0	0	0	0	0	0	0	0	0	0
114	0	0	1	0	0	0	0	0	0	0	0	0
115	0	0	0	0	0	0	0	0	0	0	0	0
116	0	0	0	0	0	0	0	0	0	0	0	0
117	0	0	0	0	0	0	0	0	0	0	0	0
118	0	0	0	0	0	0	0	0	0	0	0	0
119	0	0	0	0	0	0	0	0	0	0	0	0
120	0	0	0	0	0	0	0	0	0	0	1	0
121	0	0	0	0	0	0	0	0	0	0	0	0
122	0	0	1	0	0	0	0	0	0	0	0	0
123	0	0	0	0	0	0	0	0	0	0	0	0
124	0	0	0	0	0	0	0	0	0	0	0	0
125	0	0	0	0	0	0	0	0	0	0	1	0
126	0	0	0	0	0	0	0	0	0	1	0	0
127	0	0	0	0	0	0	0	0	0	0	0	0
128	0	0	0	0	0	0	0	0	1	0	0	0
129	0	0	0	0	0	0	0	0	0	0	0	0
130	0	0	0	0	0	0	0	0	0	0	0	0
131	0	0	0	0	0	0	0	0	0	0	0	0
132	0	0	0	0	0	0	0	0	0	0	0	0
133	0	0	0	0	0	0	0	0	0	0	0	0
134	0	0	0	0	0	0	0	0	0	0	0	0
135	0	0	0	0	0	1	0	0	0	0	0	0
136	0	0	0	0	0	0	0	0	0	0	0	0
137	0	0	0	0	0	0	0	0	0	0	0	0
138	0	0	0	0	0	0	0	0	0	0	0	0
139	0	0	0	0	0	0	0	1	0	0	0	0
140	0	0	0	0	0	0	0	0	0	0	0	0
141	0	0	0	0	0	0	0	2	0	0	1	0
142	0	0	0	0	0	0	0	1	0	0	0	0
143	0	0	0	0	0	0	0	0	1	0	0	0
144	0	0	0	0	0	0	0	1	0	0	0	0

	OnTop	Under	NtoN	Holding	BHeld	Pushing	BPushed	Mouthing	MouthAG	AlMoutAG	FM	RejMouth
145	0	0	0	0	0	0	0	0	0	0	0	0
146	0	0	0	0	0	0	0	0	0	0	0	0
147	0	0	0	0	0	0	0	0	0	0	0	0
148	0	0	0	0	0	0	0	0	0	0	0	0
149	0	0	0	0	0	0	0	1	0	0	0	0
150	0	0	0	0	0	0	0	0	0	0	0	0
151	0	0	0	0	0	0	0	0	0	0	0	0
152	1	0	0	0	0	0	0	0	0	0	1	0
153	1	0	0	0	0	0	0	0	0	0	1	0
154	0	0	0	0	0	0	0	0	0	0	0	0
155	0	0	0	0	0	0	0	1	0	0	0	0
156	0	0	0	0	0	0	0	0	0	0	0	0
157	0	0	0	0	0	0	0	0	0	0	0	0
158	0	0	0	0	0	0	0	0	0	0	0	0
159	0	0	0	0	0	0	0	0	0	0	0	0
160	0	0	0	0	0	0	0	0	0	0	0	0
161	0	0	0	0	0	0	0	0	0	0	0	0
162	0	0	0	0	0	0	0	0	0	0	0	0
163	0	0	0	0	0	0	0	0	0	0	0	0
164	0	0	0	0	0	0	0	1	0	0	0	0
165	0	0	0	0	0	0	0	0	0	0	0	0
166	0	0	0	0	0	0	0	0	0	0	0	0
167	0	0	0	0	0	0	0	0	0	0	0	0
168	0	0	0	0	0	0	1	0	0	0	0	0
169	0	0	0	0	0	0	0	0	0	0	0	0
170	0	0	0	0	0	0	0	0	0	0	0	0
171	0	0	0	0	0	0	0	0	0	0	0	0
172	0	0	0	0	0	0	0	0	0	0	0	0
173	0	0	0	0	0	0	0	0	0	0	0	0
174	0	0	0	0	0	0	0	0	0	0	0	0
175	0	0	0	0	0	0	0	0	0	0	0	0
176	0	0	0	0	0	0	0	0	0	0	0	0
177	0	0	0	0	0	0	0	0	0	0	0	0
178	0	0	0	0	0	0	0	0	0	0	0	0
179	0	0	0	0	0	0	0	0	0	0	0	0
180	0	0	0	0	0	0	0	0	0	0	0	0
181	0	0	0	0	0	0	0	0	0	0	0	0
182	0	0	0	0	0	0	0	0	0	0	0	0
183	0	0	0	0	0	0	0	0	0	0	0	0
184	0	0	0	0	0	0	0	0	0	0	0	0
185	0	0	0	0	0	0	0	0	0	0	0	0
186	0	0	0	0	0	0	0	0	0	0	0	0
187	0	0	1	0	0	0	0	0	0	0	0	0
188	0	0	0	0	0	0	0	0	0	0	0	0
189	0	1	1	0	0	0	0	0	0	0	0	0
190	0	0	0	0	0	0	0	0	0	0	0	0
191	0	0	0	0	0	0	0	0	0	0	0	0
192	0	0	0	0	0	0	0	0	0	0	0	0

	OnTop	Under	NtoN	Holding	BHeld	Pushing	BPushed	Mouthing	MouthAG	AlMoutAG	FM	RejMouth
193	0	0	1	0	0	2	0	0	0	0	0	0
194	0	0	0	0	0	0	0	0	0	0	0	0
195	0	0	0	0	0	0	0	0	0	0	0	0
196	0	0	0	0	0	0	0	0	0	0	0	0
197	0	0	0	0	0	0	0	0	1	0	0	0
198	0	0	0	0	0	0	0	0	0	0	0	0
199	0	0	0	0	0	0	0	0	0	0	0	0
200	0	0	0	0	0	0	0	0	0	0	0	0
201	0	0	0	0	0	0	0	0	0	0	0	0
202	0	0	0	0	0	0	0	0	0	0	0	0
203	0	0	0	0	0	0	0	0	0	0	0	2
204	0	0	0	0	0	0	0	0	0	0	0	0
205	0	0	0	0	0	0	0	0	0	0	0	0
206	0	0	0	0	2	0	0	0	0	0	0	0
207	0	0	0	0	0	0	0	0	0	0	0	0
208	0	0	1	0	0	0	0	0	0	0	0	0
209	0	0	0	0	0	0	0	0	0	0	0	0
210	0	0	0	0	0	0	0	0	0	2	0	1
211	1	0	0	0	0	0	0	0	0	0	0	0
212	0	0	1	0	0	0	1	0	0	0	0	0
213	0	0	0	0	0	0	0	0	0	0	0	0
214	0	0	0	0	0	0	0	0	0	0	0	0
215	0	0	1	0	0	0	0	0	0	0	0	0
216	0	0	0	0	0	0	0	0	0	0	0	0
217	0	0	0	0	0	0	0	0	0	0	0	0
218	0	0	0	0	0	0	0	0	0	0	0	0
219	0	0	0	0	0	0	0	0	0	0	0	0
220	0	0	0	0	0	0	0	0	0	1	0	0
221	0	0	0	0	0	0	1	0	0	0	0	0
222	0	0	0	0	0	0	0	0	0	0	0	0
223	0	0	0	0	0	0	0	0	0	0	0	0
224	0	0	0	0	0	0	0	0	1	0	0	0
225	0	0	0	0	0	0	0	0	0	0	0	0
226	0	0	1	0	0	1	0	0	0	0	0	0
227	0	0	0	0	0	0	0	0	0	0	0	0
228	0	0	0	0	0	0	0	0	0	0	0	0
229	0	0	0	0	0	0	0	0	0	0	0	0
230	0	0	0	0	0	0	0	0	0	0	0	0
231	0	0	0	0	0	0	0	0	0	0	0	0
232	0	0	0	0	0	0	0	0	0	0	0	0
233	0	0	0	0	0	0	0	0	0	0	0	0
234	1	0	0	0	0	0	0	0	0	0	0	0
235	0	0	0	0	0	0	0	0	0	0	0	0
236	0	0	0	0	0	0	0	0	0	0	0	0
237	0	0	0	0	0	0	0	1	0	0	0	0
238	0	0	0	1	0	0	0	0	0	0	3	0
239	0	0	0	0	1	0	0	0	0	0	1	0
240	0	0	0	0	0	0	0	0	0	0	0	0

	OnTop	Under	NtoN	Holding	BHeld	Pushing	BPushed	Mouthing	MouthAG	AlMoutAG	FM	RejMouth
241	0	0	0	0	0	0	0	0	0	0	4	0
242	0	0	0	0	0	0	0	0	0	0	0	0
243	0	0	0	0	0	2	0	0	0	0	0	0
244	0	0	0	0	0	0	0	0	0	0	0	0
245	0	0	0	0	0	0	0	0	0	0	0	0
246	0	1	0	0	0	0	0	0	0	0	0	0
247	0	0	0	0	0	0	0	0	0	0	5	0
248	0	0	0	0	0	0	0	0	0	0	0	0
249	0	0	0	0	0	0	0	0	0	0	0	0
250	0	0	0	0	0	0	0	0	0	0	0	0
251	0	0	0	0	0	0	0	0	0	0	0	0
252	0	0	0	0	0	0	0	0	0	0	0	0
253	1	0	1	0	0	1	0	0	0	0	0	0
254	0	0	0	0	0	0	0	0	0	0	0	0
255	0	0	0	0	0	0	0	0	0	0	0	0
256	0	0	0	0	0	0	0	0	0	0	0	0
257	0	0	0	0	0	0	0	0	0	0	3	0
258	0	0	0	0	0	0	0	1	0	0	0	0
259	0	0	0	0	0	0	0	0	0	0	0	0
260	0	0	0	0	0	0	0	0	0	0	0	0
261	0	0	0	0	0	0	1	0	0	1	1	0
262	0	0	0	0	0	0	0	0	0	0	1	0
263	0	0	0	0	0	0	0	0	0	0	1	0
264	0	0	0	0	0	0	0	0	0	0	0	0
265	0	0	0	0	0	0	0	0	0	0	0	0
266	0	0	0	0	0	0	0	0	0	0	0	0
267	1	0	0	0	0	0	0	0	0	0	0	0
268	0	0	0	0	0	0	0	0	0	0	0	0
269	0	0	0	0	0	0	0	0	0	0	4	0
270	0	0	0	0	0	0	0	0	0	0	2	0
271	0	0	0	0	0	0	0	0	0	0	0	0
272	0	0	0	0	0	0	0	0	0	0	0	0
273	0	0	0	0	1	0	0	0	0	0	0	0
274	0	0	0	0	0	0	0	0	0	0	0	0
275	0	0	0	0	1	0	0	0	0	0	0	0
276	0	0	0	0	0	0	0	0	0	0	0	0
277	0	0	0	2	0	0	0	0	0	0	0	0
278	0	0	0	0	0	0	0	0	0	0	0	0
279	0	0	0	0	0	0	0	0	0	0	0	0
280	0	0	0	0	0	0	0	0	0	0	0	0
281	0	0	0	0	0	0	0	0	0	0	0	0
282	0	0	0	0	0	0	0	0	0	0	0	0
283	0	0	0	0	0	0	0	0	0	0	0	0
284	0	0	0	0	0	0	0	0	0	0	0	0
285	0	0	0	0	0	0	0	0	0	0	0	0
286	0	0	0	0	0	0	0	0	0	0	0	0
287	0	0	0	0	0	1	0	0	0	0	0	0
288	0	0	0	0	0	0	0	0	0	0	0	0

	OnTop	Under	NtoN	Holding	BHeld	Pushing	BPushed	Mouthing	MouthAG	AlMoutAG	FM	RejMouth
289	0	0	0	0	0	0	0	0	0	0	0	0
290	0	0	1	0	0	0	0	0	0	0	0	0
291	0	0	1	0	0	0	0	0	0	0	0	0
292	0	0	0	0	0	0	0	0	0	0	0	0
293	0	0	0	0	0	0	1	0	0	0	0	0
294	0	0	0	0	0	0	0	0	1	0	0	0
295	0	0	1	0	0	0	0	0	0	0	0	0
296	0	0	0	0	0	0	0	0	0	1	0	0
297	0	0	0	0	0	0	0	0	0	0	0	0
298	0	0	0	0	0	0	0	0	0	0	0	0
299	0	0	0	0	0	0	0	0	0	0	0	0
300	0	0	0	0	0	0	0	0	0	0	0	0
301	0	0	0	0	0	0	0	1	0	0	0	0
302	0	0	0	0	0	0	0	0	0	0	0	0
303	0	0	0	0	0	0	0	0	0	0	0	0
304	0	0	0	0	0	0	0	0	0	0	0	0
305	0	0	0	0	0	0	0	0	0	0	0	0
306	0	0	0	0	0	0	0	0	0	0	0	0
307	0	0	0	0	0	0	0	0	1	0	0	0
308	1	0	0	0	0	0	0	0	0	0	0	0
309	0	0	0	0	0	0	0	0	0	0	0	0
310	0	0	0	0	0	0	0	0	0	0	0	0
311	0	0	0	0	0	0	0	0	0	0	0	0
312	0	0	0	0	0	0	0	0	0	0	0	0
313	0	0	0	0	0	0	0	0	0	0	0	0
314	0	0	0	0	0	0	0	0	0	0	0	0
315	0	0	0	0	0	0	0	0	0	0	0	0
316	0	0	0	0	0	0	0	0	0	0	0	0
317	0	0	0	0	0	0	0	0	0	0	0	0
318	0	0	0	0	0	0	0	0	0	0	0	0
319	0	0	0	0	0	0	0	0	0	0	0	0
320	0	0	0	0	0	0	0	0	0	0	0	0
321	0	0	0	0	0	0	0	0	0	0	3	0
322	0	0	0	0	0	0	0	0	0	0	0	0
323	0	0	0	0	0	0	0	0	0	0	0	0
324	0	0	0	0	0	0	0	0	0	0	4	0
325	0	0	0	0	0	0	0	0	0	0	0	0
326	0	0	0	0	0	0	1	0	0	0	1	0
327	0	0	0	0	0	0	0	0	0	0	0	0
328	1	1	0	0	0	0	0	0	0	0	1	0
329	0	0	0	0	0	0	1	0	0	0	0	0
330	0	0	0	0	0	0	0	0	0	0	3	0
331	0	0	0	0	0	0	0	0	0	0	0	0
332	0	0	0	0	0	0	0	0	0	0	0	0
333	0	1	0	0	0	0	0	0	0	0	0	0
334	0	0	0	0	0	0	0	0	0	0	0	0
335	0	0	0	0	0	0	0	0	0	0	0	0
336	0	0	0	0	0	0	0	0	0	0	0	0

	OnTop	Under	NtoN	Holding	BHeld	Pushing	BPushed	Mouthing	MouthAG	AlMoutAG	FM	RejMouth
337	0	0	0	0	0	0	0	1	0	0	0	0
338	0	0	0	0	0	0	0	0	0	0	0	0
339	0	0	0	0	0	0	0	0	0	0	0	0
340	0	0	0	0	0	0	0	0	0	0	0	0
341	0	0	0	0	0	0	0	2	0	0	0	0
342	0	0	0	0	0	0	0	0	0	0	0	0
343	0	0	0	0	0	0	0	0	0	0	0	0
344	0	0	0	0	0	0	0	0	0	0	0	0
345	0	0	0	0	0	0	0	0	0	0	0	0
346	0	0	0	0	0	0	0	0	0	0	0	0
347	0	0	0	0	0	0	0	0	0	0	0	0
348	0	0	0	0	0	0	0	0	0	0	0	0
349	0	0	0	0	0	0	0	0	0	0	0	0
350	0	0	0	0	0	0	0	0	0	0	0	0
351	0	0	0	0	0	0	0	0	0	0	0	0
352	0	0	0	0	0	0	0	0	0	0	0	0
353	0	0	0	0	0	0	0	0	0	0	0	0
354	0	0	0	0	0	0	0	0	0	0	0	0
355	0	0	0	0	0	0	0	0	0	0	0	0
356	0	0	0	0	0	0	0	0	0	0	0	0
357	0	0	0	0	0	0	0	0	0	0	0	0
358	0	0	0	0	0	0	0	0	0	0	0	0
359	0	0	0	0	0	0	0	0	0	0	0	0
360	0	0	1	0	0	0	0	0	0	0	0	0
361	0	0	0	0	0	0	0	0	0	0	0	0
362	0	0	0	0	0	0	0	0	0	0	0	0
363	0	0	0	0	0	0	0	0	0	0	0	0
364	0	0	0	0	0	0	0	0	0	0	0	0
365	0	0	0	0	0	0	0	0	0	0	0	0
366	0	0	0	0	0	0	0	0	0	0	0	0
367	0	0	0	0	0	0	0	0	0	0	0	0
368	0	0	0	0	0	0	0	0	0	0	0	0
369	0	0	0	0	0	0	0	0	0	0	0	0
370	0	0	0	0	0	0	0	0	0	0	0	0
371	0	0	0	0	0	0	0	0	0	0	0	0
372	0	0	0	0	0	0	0	0	0	0	0	0
373	0	0	0	0	0	0	0	0	0	0	0	0
374	0	0	0	0	0	0	0	0	0	0	0	0
375	0	0	0	0	0	0	0	0	0	0	0	0
376	0	0	0	0	0	0	0	0	0	0	0	0
377	0	0	0	0	0	0	0	0	0	0	0	0
378	0	0	0	0	0	0	0	0	0	0	0	0
379	0	0	0	0	0	0	0	0	0	0	0	0
380	0	0	0	0	0	0	0	0	0	0	0	0
381	0	0	0	0	0	0	0	0	0	0	0	0
382	0	0	0	0	0	0	0	0	0	0	0	0
383	0	0	0	0	0	0	0	0	0	0	0	0
384	0	0	0	0	0	0	0	0	0	0	0	0

	OnTop	Under	NtoN	Holding	BHeld	Pushing	BPushed	Mouthing	MouthAG	AlMoutAG	FM	RejMouth
385	0	0	0	0	0	1	0	0	0	0	1	0
386	0	0	0	0	0	0	0	0	0	0	0	0
387	0	0	0	0	0	0	1	0	0	0	0	0
388	0	0	0	0	0	0	0	0	0	0	0	0
389	0	0	0	0	0	0	0	0	0	0	0	0
390	0	0	0	0	0	0	0	0	0	0	1	0
391	0	0	0	0	0	0	0	0	1	0	0	0
392	0	0	0	0	0	0	0	0	0	0	2	0
393	0	0	0	0	0	1	0	0	0	0	0	0
394	0	0	0	0	0	0	0	0	0	0	0	0
395	0	0	0	0	0	0	0	0	0	0	0	0
396	0	0	0	0	0	0	0	0	0	0	0	0
397	0	0	0	0	0	0	0	0	0	0	0	0
398	0	0	0	0	0	0	0	0	0	0	1	0
399	0	0	0	0	0	0	0	0	0	0	0	0
400	0	0	1	0	0	0	0	0	0	0	0	0
401	0	0	0	0	0	0	0	0	0	0	0	0
402	0	0	0	0	0	0	0	0	0	0	0	0
403	0	0	0	0	0	0	0	0	0	0	0	0
404	0	0	0	0	0	0	0	0	0	0	0	0
405	0	0	0	0	0	0	0	0	0	0	0	0
406	0	0	0	0	0	0	0	1	0	0	1	0
407	0	0	0	0	0	0	0	0	0	0	2	0
408	0	0	0	0	0	0	0	0	0	0	2	0
409	0	0	0	0	0	0	0	1	0	0	0	0
410	0	0	0	0	0	0	0	0	0	0	0	0
411	0	0	0	0	0	0	0	1	1	0	0	0
412	0	0	0	1	0	0	0	0	0	0	0	0
413	0	0	0	0	0	0	0	0	0	0	0	0
414	0	2	0	0	0	0	0	0	0	0	0	0
415	0	0	0	0	0	0	0	0	0	0	0	0
416	0	0	0	0	0	0	0	0	0	0	0	0
417	0	0	0	0	0	0	0	0	0	0	0	0
418	0	0	0	0	0	0	0	0	0	0	1	0
419	0	0	0	0	0	0	0	0	0	0	0	0
420	0	0	0	0	0	0	0	0	0	0	0	0
421	0	0	0	0	0	0	0	0	0	0	0	0
422	0	0	0	0	0	0	0	0	0	0	0	0
423	0	0	0	0	0	0	0	0	0	0	0	0
424	0	0	0	0	0	0	0	0	0	0	0	0
425	0	0	0	0	0	0	0	0	0	0	0	0
426	0	0	0	0	0	0	0	0	0	0	0	0
427	0	0	0	0	0	0	0	0	0	0	0	0
428	0	0	0	0	0	0	0	0	0	0	0	0
429	0	0	0	0	0	0	0	0	0	0	0	0
430	0	0	0	0	0	0	0	0	0	0	0	0
431	0	0	0	0	0	0	0	0	0	0	0	0
432	0	0	0	0	0	0	0	0	0	0	0	0

	OnTop	Under	NtoN	Holding	BHeld	Pushing	BPushed	Mouthing	MouthAG	AlMoutAG	FM	RejMouth
433	0	0	0	0	0	1	0	0	0	0	0	0
434	0	0	0	0	0	0	0	0	0	0	0	0
435	0	0	0	0	0	0	0	0	0	0	0	0
436	0	0	0	0	0	0	0	0	0	0	0	0
437	0	0	0	0	0	0	0	0	0	0	0	0
438	0	0	0	0	0	0	0	0	0	0	0	0
439	0	0	0	0	0	0	0	0	0	0	0	0
440	0	0	0	0	0	0	0	0	0	0	0	0
441	0	0	0	0	0	0	0	0	0	0	0	0
442	0	0	0	0	0	0	0	0	0	0	0	0
443	0	0	0	0	0	0	0	0	0	0	0	0
444	0	0	0	0	0	0	0	0	0	0	0	0
445	0	0	0	0	0	0	0	0	0	0	0	0
446	0	0	0	0	0	0	0	0	0	0	0	0
447	0	0	0	0	0	0	0	0	0	0	0	0
448	0	0	0	0	0	0	0	0	0	0	0	0
449	0	0	0	0	0	0	0	0	0	0	0	0
450	0	0	0	0	0	0	0	0	0	0	0	0
451	0	0	0	0	0	0	0	0	0	0	0	0
452	0	0	0	0	0	0	0	0	0	0	0	0
453	0	0	0	0	0	0	0	0	0	0	0	0
454	0	0	0	0	0	0	0	0	0	0	0	0
455	0	0	0	0	0	0	0	0	0	0	0	0
456	0	0	0	0	0	0	0	0	0	0	0	0
457	0	0	0	0	0	0	0	0	0	0	1	0
458	0	0	0	0	0	1	0	0	3	0	0	0
459	0	0	0	0	0	0	0	0	0	0	0	0
460	0	0	0	0	0	0	0	0	0	0	0	0
461	0	0	0	0	0	0	0	0	0	0	0	0
462	0	0	0	0	0	1	0	0	0	0	0	0
463	0	0	0	0	0	0	0	2	0	0	0	0
464	0	0	0	0	0	0	0	0	0	0	0	0
465	0	0	0	1	0	0	0	0	0	0	0	0
466	0	0	0	0	0	0	0	0	0	0	0	0
467	0	0	0	0	0	0	0	0	0	0	0	0
468	0	0	0	0	0	0	0	0	0	0	0	0
469	0	0	0	0	0	0	0	0	0	0	0	0
470	0	0	0	0	0	1	0	0	0	0	0	0
471	0	0	0	0	0	0	0	0	0	0	0	0
472	0	0	0	0	0	0	0	0	0	0	0	0
473	0	0	0	0	0	0	0	0	0	0	0	0
474	0	0	0	0	0	0	0	0	0	0	0	0
475	0	0	0	0	0	0	0	0	1	0	0	0
476	0	0	1	0	0	1	0	0	0	0	0	0
477	0	0	0	0	0	0	0	1	0	0	0	0
478	0	0	0	0	0	0	0	0	1	0	0	0
479	0	0	0	0	0	0	0	0	1	0	0	0
480	0	0	0	0	0	0	0	0	0	0	0	0

	OnTop	Under	NtoN	Holding	BHeld	Pushing	BPushed	Mouthing	MouthAG	AlMoutAG	FM	RejMouth
481	0	0	0	0	0	0	0	0	0	0	0	0
482	0	0	0	0	0	0	0	0	0	0	0	0
483	0	0	0	0	0	1	0	0	0	0	0	0
484	0	0	0	0	0	0	0	0	0	0	0	0
485	0	0	0	0	0	0	0	0	1	0	0	0
486	0	0	0	0	0	0	0	0	0	0	0	0
487	0	0	0	0	0	1	0	0	0	0	0	0
488	0	0	0	0	0	0	0	0	0	0	0	0
489	0	0	0	0	0	0	0	0	0	0	0	0
490	0	0	0	0	0	0	0	0	0	0	0	0
491	0	0	1	0	0	0	0	0	0	0	0	0
492	0	0	0	0	0	0	0	0	0	0	0	0
493	0	0	0	0	0	0	0	0	0	0	0	0
494	0	0	0	0	0	2	0	0	0	0	0	0
495	0	0	0	0	0	0	0	0	0	0	0	0
496	0	0	0	0	0	0	0	0	0	0	0	0
497	0	0	0	0	0	0	0	0	0	0	0	0
498	0	0	0	0	0	1	0	0	0	0	0	0
499	0	0	0	0	0	0	0	0	0	0	0	0
500	0	0	0	0	0	0	0	0	0	0	0	0
501	0	0	0	0	0	0	0	0	0	0	0	0
502	0	0	0	0	0	0	0	0	0	0	0	0
503	0	0	0	0	0	0	0	0	0	0	0	0
504	0	0	0	0	0	0	0	0	0	0	0	0
505	0	0	0	0	0	0	0	0	0	0	0	0
506	0	0	0	0	0	0	0	0	0	0	0	0
507	0	0	0	0	0	0	0	0	0	0	0	0
508	0	0	0	0	0	0	0	0	0	0	0	0
509	0	0	0	0	0	0	0	0	0	0	0	0
510	0	2	0	0	0	0	0	0	0	0	1	0
511	0	0	0	0	0	0	0	1	0	0	0	0
512	0	0	0	0	0	0	0	0	0	0	0	0
513	0	0	0	0	0	0	0	0	0	0	0	0
514	0	0	0	0	0	0	0	0	0	0	0	0
515	0	0	0	0	0	1	0	0	0	0	0	0
516	0	0	0	0	0	0	0	0	0	0	0	0
517	0	0	0	0	0	0	0	0	0	0	0	0
518	0	0	0	0	0	0	0	0	0	0	0	0
519	0	0	0	0	0	0	0	0	0	0	0	0
520	0	0	0	0	0	0	0	0	0	0	0	0
521	0	0	0	0	0	0	0	0	0	0	0	0
522	0	0	0	0	0	0	0	0	0	0	0	0
523	0	0	0	0	0	0	0	0	0	0	0	0
524	0	0	0	0	0	0	0	0	0	0	0	0
525	0	0	0	0	0	0	0	0	0	0	0	0
526	0	0	0	0	0	2	0	0	0	0	0	0
527	0	0	0	0	0	0	0	0	0	0	0	0
528	0	0	0	0	0	0	0	0	0	0	0	0

	OnTop	Under	NtoN	Holding	BHeld	Pushing	BPushed	Mouthing	MouthAG	AlMoutAG	FM	RejMouth
529	0	0	0	0	0	0	0	0	0	0	0	0
530	0	0	0	0	0	0	0	0	0	0	0	0
531	0	0	0	0	0	0	0	0	0	0	0	0
532	0	0	0	0	0	0	0	0	0	0	0	0
533	0	0	0	0	0	0	0	0	0	0	0	0
534	0	0	0	0	0	0	0	0	0	0	0	0
535	0	0	0	0	0	0	0	0	0	0	0	0
536	0	0	1	0	0	0	0	0	0	0	0	0
537	0	0	1	0	0	0	0	0	0	0	0	0
538	0	0	0	0	0	0	0	0	0	0	0	0
539	0	0	0	0	0	0	0	0	0	0	0	0
540	0	0	0	0	0	0	0	0	0	0	0	0
541	0	0	0	0	0	0	0	0	0	0	0	0
542	0	0	0	0	0	0	0	0	0	0	0	0
543	0	0	0	0	0	0	0	0	0	0	0	0
544	0	0	0	0	0	0	0	0	0	0	0	0
545	0	0	0	0	0	0	0	0	0	0	0	0
546	0	0	0	0	0	0	0	0	0	0	0	0
547	0	0	0	0	0	0	0	0	0	0	0	0
548	0	0	0	0	0	0	0	0	0	0	0	0
549	0	0	0	0	0	0	0	0	0	0	0	0
550	0	0	0	0	0	0	0	0	0	0	0	0
551	0	0	0	0	0	0	0	0	0	0	0	0
552	0	0	0	0	0	0	0	0	0	0	0	0
553	0	0	0	0	0	0	0	0	0	0	0	0
554	0	0	0	0	0	0	0	0	0	0	0	0
555	0	0	0	0	0	0	0	0	0	0	1	0
556	0	0	0	0	0	0	0	0	0	0	0	0
557	0	0	0	0	0	0	0	0	0	0	0	0
558	0	0	0	0	0	0	0	0	0	0	0	0
559	0	0	0	0	0	0	0	0	0	0	0	0
560	0	0	0	0	0	0	1	0	0	0	0	0
561	0	0	0	0	0	0	0	0	0	0	0	0
562	0	0	0	0	0	0	0	0	0	0	0	0
563	0	0	0	0	0	0	0	0	0	0	0	0
564	0	0	0	0	0	0	0	0	0	0	0	0
565	0	0	0	0	0	0	0	0	0	0	0	0
566	0	0	0	0	0	0	0	0	0	0	0	0
567	0	0	0	0	0	0	0	0	0	0	0	0
568	0	0	0	0	0	0	0	0	0	0	0	0
569	0	0	0	0	0	0	0	0	0	0	0	0
570	0	0	0	0	0	0	0	0	0	0	0	0
571	0	0	0	0	0	0	0	0	0	0	0	0
572	0	0	0	0	0	0	0	0	0	0	0	0
573	0	0	0	0	0	0	0	0	0	0	0	0
574	0	0	0	0	0	0	0	0	0	0	0	0
575	0	0	0	0	0	0	0	0	0	0	0	0
576	0	0	0	0	0	0	0	0	0	0	0	0

	OnTop	Under	NtoN	Holding	BHeld	Pushing	BPushed	Mouthing	MouthAG	AlMoutAG	FM	RejMouth
577	0	0	1	0	0	0	0	0	0	0	0	0
578	0	0	0	0	0	0	0	0	0	0	0	0
579	0	0	0	0	0	0	0	0	0	0	0	0
580	0	0	0	0	0	0	0	0	0	0	0	0
581	0	0	0	0	0	0	0	0	0	0	0	0
582	0	0	0	0	0	0	0	0	0	0	0	0
583	0	0	0	0	0	0	0	0	0	0	0	0
584	0	0	0	0	0	0	0	0	0	0	0	0
585	0	0	0	0	0	0	0	0	0	0	0	0
586	0	0	0	0	0	0	0	0	0	0	0	0
587	0	0	0	0	0	0	0	0	0	0	0	0
588	0	0	0	0	0	0	0	0	0	0	0	0
589	0	0	0	0	0	0	0	0	0	0	0	0
590	0	0	0	0	0	0	0	0	0	0	0	0
591	0	0	0	0	0	0	0	0	0	0	0	0
592	0	0	0	0	0	0	0	0	0	0	0	0
593	0	0	0	0	0	0	0	0	0	0	0	0
594	0	0	0	0	0	0	0	0	0	0	0	0
595	0	0	0	0	0	0	0	0	0	0	0	0
596	0	0	0	0	0	0	0	0	0	0	0	0
597	0	0	0	0	0	0	0	0	0	0	0	0
598	0	0	0	0	0	0	0	0	0	0	0	0
599	0	0	0	0	0	0	0	0	0	0	0	0
600	0	0	0	0	0	0	0	0	0	0	0	0
601	0	0	0	0	0	0	0	0	0	0	0	0
602	0	0	0	0	0	0	0	0	0	0	0	0
603	0	0	0	0	0	0	0	0	0	0	0	0
604	0	0	0	0	0	0	0	0	0	0	0	0
605	0	0	0	0	0	0	0	0	0	0	0	0
606	0	0	0	0	0	0	0	0	0	0	0	0
607	0	0	0	0	0	0	0	0	0	0	0	0
608	0	0	0	0	0	0	0	0	0	0	0	0
609	0	0	0	0	0	0	0	0	0	0	0	0
610	0	0	0	0	0	0	0	0	0	1	0	0
611	0	0	0	0	0	0	0	0	0	0	0	0
612	0	0	0	0	0	0	0	0	0	0	0	0
613	0	0	0	0	0	0	0	0	0	0	0	0
614	0	0	0	0	0	0	0	0	0	0	0	0
615	0	0	0	0	0	0	0	0	0	0	0	0
616	0	0	0	0	0	0	0	0	0	0	0	0
617	0	0	0	0	0	0	0	0	0	0	0	0
618	0	0	0	0	0	0	0	0	0	0	0	0
619	0	0	0	0	0	0	0	0	0	0	0	0
620	0	0	0	0	0	0	0	0	0	0	0	0
621	0	0	0	0	0	0	0	0	0	0	0	0
622	0	0	0	0	0	0	0	0	0	0	0	0
623	0	0	0	0	0	0	0	0	0	1	1	0
624	0	0	0	0	0	0	0	0	0	0	0	0

	OnTop	Under	NtoN	Holding	BHeld	Pushing	BPushed	Mouthing	MouthAG	AlMoutAG	FM	RejMouth
625	0	0	0	0	0	0	0	0	0	0	0	0
626	0	0	0	0	0	0	0	0	0	0	0	0
627	0	0	0	0	0	0	0	0	0	0	0	0
628	0	0	0	0	0	0	0	0	0	0	0	0
629	0	0	0	0	0	0	0	0	0	0	0	0
630	0	0	0	0	0	0	0	0	0	0	0	0
631	0	0	0	0	0	1	0	0	0	0	0	0
632	0	0	0	0	0	0	0	0	0	0	0	0
633	0	0	0	0	0	0	0	0	0	0	0	0
634	0	0	0	0	0	0	0	0	0	0	0	0
635	0	0	0	0	0	0	0	0	0	0	0	0
636	0	0	0	0	0	0	0	0	0	0	0	0
637	0	0	0	0	0	0	0	0	0	1	0	0
638	0	0	0	0	0	0	0	0	0	0	0	0
639	0	0	1	0	0	0	0	0	0	0	0	0
640	0	0	0	0	0	0	0	0	0	0	0	0
641	0	0	0	0	0	0	0	0	0	0	0	0
642	0	0	0	0	0	0	0	0	0	0	0	0
643	0	0	1	0	0	0	0	0	0	0	0	0
644	0	0	0	0	0	0	0	0	0	0	0	0
645	0	0	0	0	0	0	0	0	0	0	0	0
646	0	0	0	0	0	0	0	0	0	0	0	0
647	0	0	0	0	0	0	0	0	0	0	0	0
648	0	0	1	0	0	0	0	0	0	0	0	0
649	0	0	0	0	0	0	0	0	0	0	0	0
650	0	0	0	0	0	0	0	0	0	0	0	0
651	0	0	0	0	0	0	0	0	0	0	0	0
652	0	0	0	1	0	0	0	0	0	0	0	0
653	0	0	0	0	0	1	0	0	0	0	0	0
654	0	0	0	0	0	0	0	0	0	0	0	0
655	0	0	0	0	0	0	0	0	0	0	0	0
656	0	0	0	0	1	1	0	0	0	0	0	0
657	0	0	0	0	0	0	0	0	0	0	0	0
658	0	0	0	0	0	0	1	0	0	0	0	0
659	0	0	0	0	0	0	0	0	0	0	0	0
660	0	0	0	0	0	0	0	0	0	0	0	0
661	0	0	0	0	0	0	0	0	0	0	0	0
662	0	0	0	0	0	0	0	0	0	0	0	0
663	0	0	0	0	0	0	0	0	0	0	0	0
664	0	0	0	0	0	0	0	0	0	0	0	0
665	0	0	0	0	0	0	0	0	0	0	0	0
666	0	1	0	0	0	0	0	0	0	0	0	0
667	0	0	0	0	0	0	0	0	0	0	0	0
668	0	0	0	0	0	0	0	0	0	0	0	0
669	0	0	0	0	0	0	0	0	0	0	0	0
670	0	0	0	0	0	0	0	0	0	0	0	0
671	0	0	0	0	0	0	0	0	0	0	0	0
672	0	0	0	1	0	0	0	0	1	0	0	0

	OnTop	Under	NtoN	Holding	BHeld	Pushing	BPushed	Mouthing	MouthAG	AlMoutAG	FM	RejMouth
673	0	0	0	0	0	0	0	0	0	0	0	0
674	0	0	0	0	0	0	0	0	1	0	0	0
675	0	0	0	0	0	0	0	0	0	0	0	0
676	0	0	0	0	0	0	0	0	0	0	0	0
677	0	0	0	0	0	0	0	0	0	0	0	0
678	0	0	0	0	0	0	0	0	0	0	0	0
679	0	0	0	1	0	0	0	0	0	0	0	0
680	0	0	0	0	0	0	0	0	0	0	0	0
681	0	0	0	0	0	0	0	0	0	0	0	0
682	0	0	0	0	0	0	0	0	0	0	4	0
683	0	0	0	0	0	1	0	0	0	0	0	0
684	0	0	0	0	0	0	0	0	0	0	0	0
685	0	0	0	0	1	1	0	0	0	0	0	0
686	0	0	0	0	0	0	0	0	0	0	0	0
687	0	0	0	0	0	0	0	0	0	0	0	0
688	0	0	0	0	0	0	0	0	0	0	0	0
689	0	0	0	0	0	0	0	0	0	0	0	0
690	0	0	0	0	0	0	0	0	0	0	0	0
691	0	0	0	0	0	0	0	0	0	0	0	0
692	0	0	0	0	0	0	0	0	0	0	0	0
693	0	0	0	0	0	0	0	0	0	0	0	0
694	0	0	0	0	0	0	0	0	0	0	0	0
695	0	0	0	0	0	0	0	0	0	0	0	0
696	0	0	0	0	0	0	0	0	0	0	0	0
697	0	0	0	0	0	0	0	0	0	0	0	0
698	0	0	0	0	0	0	0	0	0	0	0	0
699	0	0	0	0	0	0	0	0	0	0	0	0
700	0	0	1	0	0	0	0	0	0	0	0	0
701	0	0	0	0	0	0	0	0	0	0	0	0
702	0	0	0	0	0	0	0	1	0	0	1	0
703	0	0	0	0	0	0	0	2	0	0	3	0
704	0	0	0	0	0	0	0	0	0	0	1	0
705	0	0	0	0	0	0	0	1	0	0	0	0
706	0	0	0	0	0	0	0	0	0	0	0	0
707	0	0	0	0	0	0	0	0	0	0	0	0
708	0	0	0	1	1	0	0	0	0	0	0	0
709	0	0	0	0	0	0	0	0	0	0	0	0
710	0	0	0	0	0	0	0	0	0	0	2	0
711	0	0	0	0	0	0	0	0	0	0	0	0
712	0	0	0	0	0	0	0	0	0	0	0	0
713	0	1	0	0	0	0	0	0	0	0	0	0
714	1	1	0	0	0	0	0	0	0	0	0	0
715	0	0	0	0	1	0	0	0	0	0	0	0
716	0	0	0	0	0	0	0	0	0	0	0	0
717	0	0	0	0	0	0	0	0	0	0	0	0
718	0	0	0	0	0	0	0	0	0	0	0	0
719	0	0	0	0	0	0	0	0	0	0	0	0
720	0	0	0	0	0	0	0	0	0	0	0	0

	OnTop	Under	NtoN	Holding	BHeld	Pushing	BPushed	Mouthing	MouthAG	AlMoutAG	FM	RejMouth
721	0	0	1	0	0	0	0	0	0	0	0	0
722	0	0	0	0	0	0	0	0	0	0	0	0
723	0	0	0	0	0	0	0	0	0	0	0	0
724	0	0	0	0	0	0	0	0	0	0	0	0
725	0	0	0	0	0	0	0	0	0	0	0	0
726	0	0	0	0	0	0	0	0	0	0	0	0
727	0	0	0	0	0	0	0	0	0	0	0	0
728	0	0	0	0	0	0	0	0	0	0	0	0
729	0	0	2	0	0	0	0	0	0	0	0	0
730	0	0	0	0	0	0	0	0	0	0	0	0
731	0	0	0	0	0	0	0	0	0	0	0	0
732	0	0	0	0	0	0	0	0	0	0	0	0
733	0	0	0	0	0	0	0	0	0	0	0	0
734	0	0	0	0	0	0	0	0	0	0	0	0
735	0	0	0	0	0	0	0	0	0	0	0	0
736	0	0	0	0	0	0	0	0	0	0	0	0
737	0	0	0	0	0	0	0	0	0	0	0	0
738	0	0	0	0	0	0	0	0	0	0	0	0
739	0	0	0	0	0	0	0	0	0	0	0	0
740	0	0	0	0	0	0	0	0	0	0	0	0
741	0	0	0	0	0	0	0	0	0	0	0	0
742	0	0	0	0	0	0	0	0	0	0	0	0
743	0	0	0	0	0	0	0	0	0	0	0	0
744	0	0	0	0	0	0	0	0	0	0	0	0
745	0	0	0	0	0	0	0	0	0	0	0	0
746	0	0	0	0	0	0	0	0	0	0	0	0
747	0	0	0	0	0	0	0	0	0	0	0	0
748	0	0	0	0	0	0	0	0	0	0	0	0
749	0	0	0	0	0	0	0	0	0	0	0	0
750	0	0	0	0	0	0	0	0	0	0	0	0
751	0	0	0	0	0	0	0	0	0	0	0	0
752	0	0	0	0	0	0	0	0	0	0	0	0
753	0	0	0	0	0	0	0	0	0	0	1	0
754	0	0	1	0	0	0	0	0	0	0	0	1
755	0	0	0	0	0	0	0	0	0	0	0	0
756	0	0	0	0	0	0	0	0	0	0	0	0
757	0	0	0	0	0	0	0	0	0	0	0	0
758	0	0	0	0	0	1	0	0	0	0	0	0
759	0	0	0	0	0	0	0	0	0	0	0	0
760	0	0	0	0	0	0	0	0	0	0	0	0
761	0	0	0	0	0	0	0	0	0	0	0	0
762	0	0	0	0	0	0	0	0	0	0	0	0
763	0	0	0	0	0	0	0	0	0	0	0	0
764	0	0	0	0	0	0	0	0	0	0	0	0
765	0	0	0	0	0	0	1	0	0	0	0	0
766	0	0	0	0	0	0	0	0	0	0	0	0
767	0	0	0	0	0	0	0	0	0	0	0	0
768	0	0	1	0	0	0	0	0	0	0	0	0

	OnTop	Under	NtoN	Holding	BHeld	Pushing	BPushed	Mouthing	MouthAG	AlMoutAG	FM	RejMouth
769	0	0	0	0	0	0	0	0	0	0	0	0
770	0	0	0	0	0	0	0	0	0	0	0	0
771	0	0	0	0	0	0	0	0	0	0	0	0
772	0	0	0	0	0	0	0	0	0	0	0	0
773	0	0	0	0	0	0	0	0	0	0	0	0
774	0	0	0	0	0	0	0	0	0	0	0	0
775	0	0	0	0	0	0	0	0	0	0	0	0
776	0	0	0	0	0	0	0	0	0	0	0	0
777	0	0	0	0	0	0	0	0	0	0	0	0
778	0	0	0	0	0	0	0	0	0	0	0	0
779	0	0	0	0	0	0	0	0	0	0	0	0
780	0	0	0	0	0	0	0	0	0	0	0	0
781	0	0	0	0	0	0	0	0	0	0	0	0
782	0	0	0	0	0	0	0	0	0	0	0	0
783	0	0	0	0	0	0	0	0	0	0	0	0
784	0	0	0	0	0	1	0	0	0	0	0	0
785	0	0	0	0	0	0	0	0	0	0	0	0
786	0	0	0	0	0	0	0	0	0	0	0	0
787	0	0	0	0	0	0	0	0	0	0	0	0
788	0	0	0	0	0	0	0	0	0	0	0	0
789	0	0	0	0	0	0	0	0	0	0	0	0
790	0	0	0	0	0	0	0	0	0	0	0	0
791	0	0	0	0	0	0	0	0	0	0	0	0
792	0	0	0	0	0	0	0	0	0	0	0	0
793	0	0	0	0	0	0	0	0	0	0	0	0
794	0	0	0	0	0	0	0	0	0	0	0	0
795	0	0	0	1	0	0	0	0	0	0	0	0
796	0	0	0	0	0	0	0	0	0	0	0	0
797	0	0	0	0	0	0	0	0	0	0	0	0
798	0	0	0	0	0	0	0	0	0	0	0	0
799	0	0	0	0	0	0	0	0	0	0	1	0
800	0	0	0	1	0	0	0	0	0	0	0	0
801	0	0	0	0	0	0	0	0	0	0	0	0
802	0	0	0	0	0	0	0	0	0	0	1	0
803	0	0	0	0	0	0	0	0	0	0	0	0
804	0	1	0	0	0	0	0	0	0	0	0	0
805	0	0	0	1	0	0	0	0	0	0	0	0
806	0	0	0	0	0	0	0	0	0	0	0	0
807	0	0	0	2	0	0	0	0	0	0	0	0
808	0	0	0	0	0	0	0	0	0	0	0	0
809	0	0	0	0	0	0	0	0	0	0	0	0
810	0	0	0	0	0	0	0	0	0	0	0	0
811	0	0	0	0	0	1	0	0	0	0	0	0
812	0	0	0	0	0	0	0	0	0	0	0	0
813	0	0	0	0	0	0	0	0	0	0	0	0
814	0	0	0	1	0	0	0	0	0	0	0	0
815	0	0	0	0	0	0	0	0	0	0	0	0
816	0	0	0	0	0	0	0	0	0	0	0	0

	OnTop	Under	NtoN	Holding	BHeld	Pushing	BPushed	Mouthing	MouthAG	AlMoutAG	FM	RejMouth
817	0	0	0	0	0	0	0	0	0	0	0	0
818	0	0	0	0	0	0	0	0	0	0	2	0
819	0	0	0	0	0	0	0	0	0	0	0	0
820	0	0	1	0	0	1	0	0	0	0	0	0
821	0	0	0	0	0	0	0	0	0	0	0	0
822	0	0	0	0	0	1	0	0	0	0	1	0
823	0	0	0	0	0	0	0	0	0	0	0	0
824	0	0	0	0	0	0	0	1	0	0	0	0
825	0	0	0	0	0	0	0	0	0	0	0	0
826	0	0	0	0	0	0	0	0	0	0	0	0
827	0	0	0	0	1	0	0	0	0	0	0	0
828	0	0	0	0	0	0	0	0	0	0	0	0
829	0	0	0	0	0	0	0	0	0	0	0	0
830	0	0	0	0	0	0	0	0	0	0	0	0
831	0	0	0	0	0	1	0	0	0	0	0	0
832	0	0	0	0	0	0	0	0	0	0	0	0
833	0	0	1	1	0	0	0	0	0	0	0	0
834	0	0	0	0	0	0	0	0	0	0	0	0
835	0	0	0	0	0	0	0	0	0	0	0	0
836	0	0	1	0	0	0	0	0	0	0	0	0
837	0	0	0	0	0	0	0	0	0	0	0	0
838	0	0	0	0	0	0	0	0	0	0	0	0
839	0	0	0	0	0	0	0	0	0	0	0	0

	Assoc	Staff	Mouth2	Stretch	IntwObj	Rubbing	Bubbles	Ssaults	Tailup	Vulva	TempMax	TempMin
1	0	0	1	0	0	0	0	0	0	0	82	60
2	0	1	0	0	0	0	0	0	0	1	87	63
3	0	0	0	0	0	0	0	0	0	1	88	70
4	0	0	0	0	0	0	0	0	0	2	75	42
5	0	0	0	0	0	0	0	0	0	1	89	69
6	0	0	0	0	0	0	0	0	0	1	82	59
7	0	0	0	0	0	0	0	0	0	2	83	71
8	0	0	0	0	0	0	0	0	0	1	73	66
9	0	0	0	0	0	0	0	0	0	2	71	43
10	0	0	0	0	0	0	0	0	0	1	76	53
11	0	0	1	0	0	0	0	0	0	1	78	52
12	0	0	0	0	0	0	0	0	0	2	78	54
13	0	0	0	1	0	0	0	0	0	1	78	50
14	0	0	0	0	0	0	0	0	0	1	84	49
15	0	0	0	0	0	0	0	0	0	2	88	45
16	0	0	0	0	0	0	0	0	0	2	87	61
17	0	0	0	0	0	0	0	0	0	1	83	47
18	0	0	0	0	0	0	0	0	0	2	70	35
19	1	0	0	0	1	0	0	0	0	1	78	36
20	0	0	0	0	0	0	0	0	0	2	78	45
21	0	0	0	0	0	0	0	0	0	2	57	39
22	0	0	0	0	0	0	0	0	0	2	69	51
23	0	0	0	0	0	0	0	0	0	2	80	57
24	0	0	0	0	0	0	0	0	0	2	68	41
25	0	0	0	0	0	0	0	0	0	2	65	39
26	0	0	0	0	0	0	0	0	0	1	89	64
27	0	0	0	0	0	0	0	0	0	2	76	70
28	0	1	0	0	0	0	0	0	0	2	94	70
29	0	0	0	0	0	0	0	0	0	1	89	68
30	0	0	0	0	0	0	1	0	0	1	94	70
31	0	0	0	0	0	0	0	0	0	2	87	67
32	0	0	0	0	0	0	0	0	0	2	89	70
33	0	0	0	0	0	0	0	0	0	2	82	62
34	0	0	0	0	0	0	0	0	0	2	89	80
35	0	0	0	0	0	0	0	0	0	2	92	72
36	0	0	0	0	0	0	0	0	0	1	91	68
37	0	0	0	0	0	0	0	0	0	2	87	64
38	0	0	0	0	0	0	0	0	0	1	91	71
39	0	0	0	0	0	0	2	0	0	1	81	72
40	0	0	0	0	0	0	0	0	0	1	92	71
41	0	0	0	0	0	0	0	0	0	2	92	71
42	0	0	0	0	0	0	0	0	0	2	93	69
43	0	0	0	0	0	0	0	0	0	2	90	71
44	0	0	0	0	0	0	0	0	0	1	92	70
45	0	0	0	0	0	0	0	0	0	2	96	68
46	0	0	0	0	0	0	0	0	0	1	89	70
47	0	0	0	0	0	0	0	0	0	2	86	70
48	0	0	0	0	0	0	0	0	0	1	89	71

	Assoc	Staff	Mouth2	Stretch	IntwObj	Rubbing	Bubbles	Ssaults	Tailup	Vulva	TempMax	TempMin
49	0	1	0	0	1	0	0	0	0	1	92	73
50	0	0	0	0	0	0	0	0	0	2	89	72
51	0	0	1	0	0	0	0	0	0	1	91	68
52	0	0	0	0	0	0	0	0	0	1	91	72
53	0	0	0	0	1	0	0	0	0	1	92	67
54	0	0	0	0	0	0	0	0	0	2	88	67
55	0	0	0	0	1	0	0	0	0	.	89	71
56	0	0	0	0	0	0	0	0	0	2	93	70
57	1	0	0	0	0	0	0	0	0	1	91	70
58	0	0	0	0	0	0	0	0	0	2	88	70
59	0	0	0	0	0	0	0	0	0	1	90	68
60	0	0	0	0	0	0	0	0	0	2	88	70
61	0	0	0	0	0	0	0	0	0	1	85	69
62	0	0	0	0	0	0	0	0	0	2	89	61
63	0	0	0	0	0	0	0	0	0	1	90	61
64	0	1	0	0	0	0	0	0	0	1	91	70
65	0	0	0	0	0	0	0	0	0	1	87	69
66	0	0	0	0	0	0	0	0	0	1	82	60
67	0	0	0	0	0	0	0	0	0	2	87	63
68	0	0	0	0	0	0	0	0	0	2	88	70
69	0	0	0	0	0	0	0	0	0	2	75	42
70	0	0	0	0	0	0	0	0	0	2	89	69
71	0	0	0	0	0	0	0	0	0	2	82	59
72	0	0	0	0	0	0	0	0	0	2	83	71
73	0	0	0	0	0	0	0	0	0	2	73	66
74	0	0	0	0	0	0	0	0	0	2	71	43
75	1	0	0	0	0	0	0	0	0	2	76	53
76	0	0	0	0	0	0	0	0	0	2	78	52
77	0	0	0	0	0	0	0	0	0	2	78	54
78	0	0	0	1	1	0	0	0	0	2	78	50
79	0	0	0	0	0	0	0	0	0	2	84	49
80	0	0	0	0	0	0	0	0	0	2	88	45
81	0	0	0	0	0	0	0	0	0	2	87	61
82	0	0	0	0	0	0	0	0	0	2	83	47
83	0	0	0	0	0	0	0	0	0	2	70	35
84	0	0	0	0	0	0	0	0	1	.	78	36
85	0	0	0	0	0	0	0	0	0	2	78	45
86	0	0	0	0	0	0	0	0	0	2	57	39
87	1	0	0	0	0	0	1	0	0	2	69	51
88	0	0	0	0	0	0	1	0	0	2	80	57
89	0	0	0	0	0	0	0	0	0	2	68	41
90	0	0	0	0	0	0	0	0	0	2	65	39
91	0	0	0	0	0	0	1	0	0	1	89	64
92	0	0	0	0	0	0	0	0	0	2	76	70
93	0	1	0	0	0	0	0	0	0	2	94	70
94	0	0	0	0	0	0	0	0	0	2	89	68
95	0	0	0	0	0	0	3	0	0	2	94	70
96	0	0	0	0	0	0	0	0	0	2	87	67

	Assoc	Staff	Mouth2	Stretch	IntwObj	Rubbing	Bubbles	Ssaults	Tailup	Vulva	TempMax	TempMin
97	0	0	0	0	0	0	0	0	0	2	89	70
98	0	0	0	0	0	0	0	0	0	2	82	62
99	0	0	0	0	0	0	0	0	0	2	89	80
100	0	0	0	0	0	0	0	0	0	2	92	72
101	1	0	0	0	0	0	1	0	0	.	91	68
102	0	0	0	0	0	0	0	0	0	2	87	64
103	0	0	0	0	0	0	0	0	0	2	91	71
104	0	0	0	0	0	0	0	0	0	2	81	72
105	0	0	0	0	0	0	0	0	0	1	92	71
106	0	0	0	0	0	0	0	0	0	2	92	71
107	0	0	0	0	0	0	0	0	0	2	93	69
108	0	0	0	0	0	0	0	0	0	2	90	71
109	0	0	0	0	0	0	0	0	0	2	92	70
110	0	0	0	0	0	0	0	0	0	2	96	68
111	0	0	0	0	0	0	0	0	0	2	89	70
112	0	0	0	0	0	0	0	0	0	2	86	70
113	0	0	0	0	0	0	0	0	0	2	89	71
114	0	1	1	0	1	0	0	0	0	2	92	73
115	0	0	0	0	0	0	0	0	0	2	89	72
116	0	0	0	0	1	0	0	0	0	2	91	68
117	0	0	0	0	0	0	0	0	0	2	91	72
118	0	0	1	0	0	0	0	0	0	1	92	67
119	0	0	0	0	0	0	0	0	0	2	88	67
120	0	0	0	0	0	0	0	0	0	.	89	71
121	0	0	0	0	0	0	0	0	0	2	93	70
122	0	0	0	0	1	0	0	0	0	2	91	70
123	0	0	0	0	0	0	0	0	0	2	88	70
124	0	0	0	0	0	0	0	0	0	2	90	68
125	0	0	0	0	0	0	0	0	0	2	88	70
126	0	0	0	1	0	0	0	0	0	1	85	69
127	0	0	0	0	0	0	0	0	0	2	89	61
128	1	0	0	0	0	0	0	0	0	1	90	61
129	0	1	0	0	0	0	0	0	0	2	91	70
130	0	0	0	0	0	0	0	0	0	2	87	69
131	0	0	0	1	0	0	0	0	0	0	82	60
132	0	0	0	0	0	0	0	0	0	1	87	63
133	0	0	0	0	0	0	0	0	0	0	88	70
134	0	0	0	0	0	0	0	0	0	0	75	42
135	0	0	0	0	0	0	1	0	0	.	89	69
136	0	0	0	0	0	0	1	0	0	0	82	59
137	0	0	0	1	0	0	0	0	0	0	83	71
138	0	1	0	0	0	0	0	0	0	0	73	66
139	1	0	0	0	0	0	0	0	0	0	71	43
140	0	0	0	0	0	0	0	0	0	0	76	53
141	0	0	0	0	0	0	0	0	0	0	78	52
142	1	0	0	0	0	0	0	0	0	0	78	54
143	1	1	0	0	0	0	0	0	0	.	78	50
144	0	0	0	0	0	0	0	0	0	1	84	49

	Assoc	Staff	Mouth2	Stretch	IntwObj	Rubbing	Bubbles	Ssaults	Tailup	Vulva	TempMax	TempMin
145	0	0	0	0	0	0	0	0	1	0	88	45
146	0	0	0	0	0	0	0	0	0	1	87	61
147	1	0	0	0	0	0	0	0	0	0	83	47
148	0	0	0	0	0	0	0	0	0	1	70	35
149	2	0	0	0	2	0	0	0	0	1	78	36
150	0	0	0	0	0	0	0	0	0	1	78	45
151	0	0	0	0	0	0	0	0	0	2	57	39
152	0	0	0	0	0	0	0	0	0	1	69	51
153	0	0	0	0	0	0	0	0	0	2	80	57
154	1	0	0	0	0	0	0	0	0	1	68	41
155	1	0	0	0	0	0	0	0	0	1	65	39
156	0	0	0	0	0	0	0	0	0	1	89	64
157	0	0	0	0	0	0	0	0	0	1	76	70
158	0	1	0	0	0	0	0	0	0	0	94	70
159	0	0	0	0	0	0	0	0	0	0	89	68
160	0	0	0	0	0	0	0	0	0	0	94	70
161	0	0	0	0	0	0	0	0	0	0	87	67
162	0	0	0	0	0	0	0	0	0	1	89	70
163	0	0	0	0	0	0	0	0	0	1	82	62
164	0	0	0	0	1	0	0	0	0	1	89	80
165	0	0	0	0	0	0	0	0	0	1	92	72
166	0	0	0	0	0	0	0	0	0	1	91	68
167	0	0	0	0	0	0	0	0	0	1	87	64
168	0	0	0	0	0	0	0	0	0	1	91	71
169	0	0	0	0	0	0	0	0	0	1	81	72
170	0	0	0	0	0	0	0	0	0	1	92	71
171	0	0	0	0	0	0	0	0	0	1	92	71
172	0	0	0	0	0	0	0	0	0	1	93	69
173	0	0	0	0	0	0	0	0	0	1	90	71
174	0	0	0	0	0	0	0	0	0	1	92	70
175	0	0	0	0	0	0	0	0	0	1	96	68
176	0	0	0	0	0	0	0	0	0	1	89	70
177	0	0	0	0	0	0	0	0	0	1	86	70
178	0	0	0	0	0	0	0	0	0	1	89	71
179	0	1	0	0	1	0	0	0	0	1	92	73
180	0	0	0	0	0	0	0	0	0	1	89	72
181	1	0	1	0	1	0	0	0	0	1	91	68
182	0	0	0	0	2	0	0	0	0	1	91	72
183	0	0	2	0	0	0	0	0	0	1	92	67
184	0	0	0	0	0	0	0	0	0	1	88	67
185	0	0	0	0	0	0	0	0	0	.	89	71
186	0	0	0	0	0	0	0	0	0	1	93	70
187	1	0	0	0	1	0	0	0	0	1	91	70
188	0	0	0	0	0	0	0	0	0	1	88	70
189	1	0	0	0	0	0	0	0	0	1	90	68
190	0	0	0	0	0	0	0	0	0	1	88	70
191	0	0	0	0	0	0	0	0	0	0	85	69
192	0	0	0	0	0	0	0	0	0	1	89	61

	Assoc	Staff	Mouth2	Stretch	IntwObj	Rubbing	Bubbles	Ssaults	Tailup	Vulva	TempMax	TempMin
193	0	0	0	0	0	0	0	0	0	0	90	61
194	0	1	0	0	0	0	0	0	0	1	91	70
195	0	0	0	0	0	0	0	0	0	0	87	69
196	0	0	0	0	1	0	0	0	0	.	59	49
197	0	1	0	0	0	0	0	0	0	1	67	54
198	0	0	0	0	0	0	0	0	0	1	48	32
199	0	0	1	0	0	0	0	0	0	1	72	37
200	0	0	1	0	0	0	0	0	0	1	82	52
201	0	0	1	0	0	0	0	0	0	1	81	52
202	0	0	0	0	0	0	0	0	0	1	82	58
203	0	1	0	0	0	0	0	0	0	1	85	75
204	0	0	0	0	1	0	0	0	0	1	79	60
205	0	0	2	0	0	0	0	0	0	1	85	71
206	0	0	1	0	0	0	0	0	0	1	83	56
207	0	0	0	0	6	0	0	0	0	.	86	64
208	0	0	0	0	0	0	0	0	0	1	72	50
209	0	0	0	0	0	0	0	0	0	1	80	56
210	0	0	0	0	0	0	0	0	0	1	83	60
211	0	0	0	0	0	0	0	0	0	1	87	64
212	0	0	0	0	0	0	0	0	0	1	70	37
213	0	0	1	0	0	0	0	0	0	2	77	54
214	0	0	1	0	0	0	0	0	0	1	73	51
215	0	0	1	0	0	0	0	0	0	1	72	35
216	0	0	0	0	0	0	0	0	0	1	75	44
217	0	1	1	0	0	0	0	0	0	1	66	55
218	0	0	0	0	0	0	0	0	0	2	82	63
219	0	0	1	0	0	0	0	0	0	1	76	59
220	1	0	0	0	0	0	0	0	0	1	87	63
221	0	0	0	0	0	0	0	0	0	1	81	51
222	0	0	0	0	0	0	0	0	0	1	82	59
223	0	0	0	0	1	0	0	0	0	1	86	60
224	0	1	0	0	0	0	0	0	0	1	80	62
225	1	0	0	0	0	0	0	0	0	2	83	59
226	0	0	0	0	0	0	0	0	0	2	81	63
227	0	0	0	0	0	0	0	0	0	2	85	63
228	0	0	0	0	0	0	0	0	0	2	87	65
229	0	0	1	0	0	0	0	0	0	2	86	61
230	0	0	1	0	0	0	0	0	0	2	79	51
231	0	0	0	0	0	0	0	0	0	2	82	60
232	1	0	1	0	0	0	0	0	0	2	86	67
233	1	0	0	0	0	0	0	0	0	2	80	62
234	0	0	0	0	0	0	0	0	0	2	77	53
235	0	0	0	0	0	0	0	0	0	2	81	51
236	0	0	1	0	1	0	0	0	0	2	80	60
237	0	0	0	0	0	0	0	0	0	2	91	70
238	0	1	0	0	0	0	0	0	0	2	81	57
239	1	1	0	0	0	0	0	0	0	2	87	59
240	1	0	0	0	0	0	0	0	0	2	81	64

	Assoc	Staff	Mouth2	Stretch	IntwObj	Rubbing	Bubbles	Ssaults	Tailup	Vulva	TempMax	TempMin
241	0	0	0	0	2	0	0	0	0	2	86	61
242	0	0	0	0	0	0	0	0	0	2	88	65
243	1	0	0	0	0	0	0	0	0	2	93	71
244	0	1	0	0	0	0	0	0	0	2	85	69
245	0	0	0	0	0	0	0	0	0	2	83	62
246	0	0	0	0	0	0	0	0	0	2	87	59
247	0	0	0	0	1	0	0	0	0	2	83	69
248	0	1	0	1	0	0	0	0	0	2	90	72
249	0	0	0	0	1	0	0	0	0	2	94	73
250	1	1	1	0	0	0	0	0	0	2	91	72
251	0	2	0	0	0	0	0	0	0	2	91	74
252	0	1	0	0	0	0	0	0	0	2	96	78
253	0	0	0	0	0	0	0	0	0	2	93	72
254	1	0	0	0	0	0	0	0	0	2	87	69
255	0	0	0	0	0	0	0	0	0	2	85	67
256	0	0	0	0	0	0	0	0	0	2	93	72
257	0	0	0	0	0	0	0	0	0	1	91	73
258	0	1	0	0	0	0	0	0	0	2	92	71
259	0	0	0	0	0	0	0	0	0	2	91	76
260	0	1	0	0	0	0	0	0	0	2	95	76
261	1	0	0	0	0	0	0	0	0	2	91	72
262	0	0	0	0	0	0	0	0	0	2	91	75
263	0	0	1	0	0	0	0	0	0	2	94	73
264	0	0	0	0	0	0	0	0	0	2	91	73
265	0	0	0	0	0	0	0	0	0	2	93	73
266	0	0	0	0	0	0	0	0	0	2	94	74
267	0	0	0	0	0	0	0	0	0	2	87	71
268	0	0	1	0	0	0	0	0	0	2	92	72
269	0	1	0	0	0	0	0	0	0	2	91	74
270	0	0	1	0	0	0	0	0	0	2	89	72
271	1	1	0	0	0	0	0	0	0	2	89	75
272	0	1	1	0	0	0	0	0	0	2	91	71
273	0	0	0	0	0	0	0	0	0	2	92	73
274	0	0	0	0	2	0	0	0	0	2	89	73
275	0	1	0	1	0	0	0	0	0	2	88	72
276	0	0	1	0	0	0	0	0	0	2	92	75
277	0	0	0	0	0	0	0	0	0	2	88	69
278	0	0	1	0	0	0	0	0	0	2	94	71
279	0	0	0	0	0	0	0	0	0	0	59	49
280	0	1	1	0	0	0	0	0	0	0	67	54
281	0	2	0	0	1	0	0	0	0	0	48	32
282	0	0	1	0	0	0	0	0	0	0	72	37
283	0	0	0	0	0	0	0	0	0	0	82	52
284	0	0	1	0	1	0	0	0	0	.	81	52
285	0	0	1	0	1	0	0	0	0	1	82	58
286	0	1	1	0	0	0	0	0	0	0	85	75
287	1	0	0	1	0	0	0	0	0	1	79	60
288	1	0	1	0	0	0	0	0	0	0	85	71

	Assoc	Staff	Mouth2	Stretch	IntwObj	Rubbing	Bubbles	Ssaults	Tailup	Vulva	TempMax	TempMin
289	0	1	1	0	0	0	0	0	0	1	83	56
290	0	0	1	0	2	0	0	0	0	1	86	64
291	0	0	0	0	0	0	0	0	0	1	72	50
292	0	0	1	0	0	0	0	0	0	1	80	56
293	0	0	1	0	0	0	0	0	0	2	83	60
294	1	0	0	0	0	0	0	1	0	2	87	64
295	0	0	0	0	0	0	0	2	0	1	70	37
296	0	0	2	0	0	0	0	0	0	1	77	54
297	0	0	1	0	0	0	0	0	0	1	73	51
298	0	0	1	0	0	0	0	1	0	0	72	35
299	0	0	0	0	0	0	0	0	0	0	75	44
300	0	1	1	0	0	0	0	0	0	1	66	55
301	0	0	0	0	1	0	0	0	0	0	82	63
302	0	1	1	0	0	0	0	0	0	0	76	59
303	0	0	0	0	0	0	0	0	0	0	87	63
304	0	0	0	0	0	0	0	0	0	1	81	51
305	1	0	0	1	0	0	0	0	0	1	82	59
306	0	1	0	0	0	0	0	0	0	1	86	60
307	0	1	0	0	0	0	0	1	0	1	80	62
308	0	0	0	0	0	0	0	0	0	1	83	59
309	0	0	0	0	0	0	0	3	0	1	81	63
310	0	0	1	0	0	0	0	1	0	1	85	63
311	0	0	0	0	0	0	0	0	0	1	87	65
312	0	1	0	0	0	0	0	0	0	1	86	61
313	0	0	2	0	0	0	0	0	0	1	79	51
314	0	1	0	0	0	0	0	0	0	.	82	60
315	0	0	3	0	0	0	0	0	0	1	86	67
316	0	1	4	0	0	0	0	0	0	1	77	53
317	0	0	0	0	0	0	0	0	0	1	87	59
318	0	0	1	0	0	0	0	0	0	1	96	78
319	0	0	0	0	0	0	0	6	0	1	93	72
320	0	0	1	0	0	0	0	0	0	1	91	76
321	1	0	0	0	0	0	0	0	0	.	94	73
322	0	1	0	0	0	1	0	0	0	1	94	74
323	0	0	1	0	0	0	0	0	0	.	89	72
324	0	1	0	0	0	0	0	0	0	1	89	75
325	0	0	1	0	0	0	0	0	0	1	91	71
326	0	0	0	0	0	0	0	0	0	1	89	73
327	0	0	1	0	0	0	0	0	0	1	88	72
328	0	0	0	0	1	0	0	0	0	.	92	75
329	0	0	1	0	0	0	0	0	0	1	88	69
330	1	0	1	0	1	0	0	0	0	.	94	71
331	0	0	1	0	1	0	0	0	0	0	82	60
332	0	0	0	0	0	0	0	0	0	1	87	63
333	0	0	0	0	0	0	0	0	0	1	88	70
334	0	0	0	0	0	0	0	0	0	1	75	42
335	0	0	0	0	0	0	0	0	0	0	89	69
336	0	0	0	0	0	0	0	0	0	1	82	59

	Assoc	Staff	Mouth2	Stretch	IntwObj	Rubbing	Bubbles	Ssaults	Tailup	Vulva	TempMax	TempMin
337	0	0	0	0	0	0	0	0	0	0	83	71
338	0	1	0	0	0	0	0	0	0	1	73	66
339	0	0	0	0	0	0	0	0	0	0	71	43
340	0	0	0	0	0	0	0	0	0	1	76	53
341	0	0	0	0	0	0	0	0	0	1	78	52
342	0	0	0	0	0	0	0	0	0	.	78	54
343	0	0	0	0	0	0	0	0	0	0	78	50
344	0	0	0	0	0	0	0	0	0	.	84	49
345	0	0	0	0	0	0	0	0	0	0	88	45
346	0	0	0	0	0	0	0	0	0	0	87	61
347	1	0	0	0	0	0	0	0	0	0	83	47
348	0	0	0	0	0	0	0	0	0	.	70	35
349	0	0	0	0	0	0	0	0	0	0	78	36
350	0	0	0	0	0	0	0	0	0	1	78	45
351	0	0	0	0	0	0	0	0	0	0	57	39
352	0	0	0	0	0	0	0	0	0	0	69	51
353	0	0	0	0	0	0	0	0	0	0	80	57
354	0	0	0	0	0	0	0	0	0	0	68	41
355	0	0	0	0	0	0	0	0	0	0	65	39
356	0	0	0	0	1	0	0	0	0	0	89	64
357	0	0	0	0	0	0	0	0	0	1	76	70
358	0	1	0	0	0	0	0	0	0	0	94	70
359	0	0	0	0	0	0	0	0	0	.	89	68
360	0	0	0	0	0	3	0	0	0	0	94	70
361	0	0	0	0	0	0	0	0	0	0	87	67
362	0	0	0	0	0	0	0	0	0	1	89	70
363	0	0	0	0	0	0	0	0	0	0	82	62
364	0	0	0	0	0	1	0	0	0	.	89	80
365	0	0	0	0	0	0	0	0	0	1	92	72
366	0	0	0	0	0	0	0	0	0	1	91	68
367	0	0	0	0	0	0	0	0	0	1	87	64
368	0	0	0	0	0	0	0	0	0	.	91	71
369	0	0	0	0	0	0	0	0	0	1	81	72
370	0	0	0	0	0	0	0	0	0	1	92	71
371	0	0	0	0	0	0	0	0	0	1	92	71
372	0	0	0	0	0	0	0	0	0	0	93	69
373	0	0	0	0	0	0	0	0	0	0	90	71
374	0	0	0	0	0	0	0	0	0	1	92	70
375	0	0	0	0	0	0	0	0	0	1	96	68
376	0	0	0	0	0	0	0	0	0	0	89	70
377	0	0	0	0	0	0	0	0	0	1	86	70
378	0	0	0	0	0	0	0	0	0	1	89	71
379	0	2	0	0	2	0	0	0	0	0	92	73
380	0	0	0	0	0	0	0	0	0	1	89	72
381	0	0	0	0	0	0	0	0	0	0	91	68
382	0	0	0	0	1	0	0	0	0	0	91	72
383	0	0	0	0	1	0	0	0	0	0	92	67
384	0	0	0	0	0	0	0	0	0	1	88	67

	Assoc	Staff	Mouth2	Stretch	IntwObj	Rubbing	Bubbles	Ssaults	Tailup	Vulva	TempMax	TempMin
385	0	0	0	0	2	0	0	0	0	.	89	71
386	0	0	0	0	0	0	0	0	0	1	93	70
387	0	0	0	0	3	0	0	0	0	0	91	70
388	0	0	0	0	0	0	0	0	0	1	88	70
389	0	0	0	0	1	0	0	0	0	1	90	68
390	0	0	0	0	0	0	0	0	0	1	88	70
391	0	0	1	0	0	0	0	0	0	0	85	69
392	0	0	0	0	0	0	0	0	0	1	89	61
393	0	0	0	0	0	0	0	0	0	0	90	61
394	0	1	0	0	0	0	0	0	0	1	91	70
395	0	0	0	0	0	0	0	0	0	1	87	69
396	0	0	0	1	0	0	0	0	0	1	82	60
397	0	0	0	0	0	0	0	0	0	1	87	63
398	0	0	0	0	0	0	0	0	0	1	88	70
399	0	0	0	0	0	0	0	0	0	1	75	42
400	0	0	0	0	0	0	0	0	0	1	89	69
401	0	0	0	0	0	0	0	0	0	1	82	59
402	0	0	0	0	0	0	0	0	0	1	83	71
403	0	0	0	0	0	0	0	0	0	1	73	66
404	0	0	0	0	0	0	0	0	0	1	71	43
405	0	0	0	0	0	0	0	0	0	0	76	53
406	0	0	0	0	0	0	0	0	0	1	78	52
407	0	0	1	0	0	0	0	0	0	1	78	54
408	0	1	0	0	0	0	0	0	0	0	78	50
409	0	0	0	0	0	0	0	0	0	1	84	49
410	0	0	1	0	1	0	0	0	0	.	88	45
411	0	0	0	0	0	0	0	0	0	1	87	61
412	0	0	0	0	0	0	0	0	0	1	83	47
413	0	0	0	0	0	0	0	0	0	1	70	35
414	1	0	0	0	0	0	0	0	0	.	78	36
415	0	0	0	0	0	0	0	0	0	1	78	45
416	0	0	0	0	0	0	0	0	0	1	57	39
417	0	0	0	0	0	0	0	0	0	1	69	51
418	0	0	0	0	0	0	0	0	0	2	80	57
419	0	0	0	0	0	0	0	0	0	1	68	41
420	0	0	0	1	0	0	0	0	0	1	65	39
421	0	0	0	0	0	0	0	0	0	1	89	64
422	0	0	0	0	0	0	0	0	0	2	76	70
423	0	1	0	0	0	0	0	0	0	1	94	70
424	0	0	0	0	0	0	0	0	0	0	89	68
425	0	0	0	0	1	0	0	0	0	1	94	70
426	0	0	0	0	0	0	0	0	0	1	87	67
427	0	0	0	0	0	0	1	0	0	.	89	70
428	0	0	0	0	0	0	0	0	0	1	82	62
429	1	0	0	0	0	0	0	0	0	1	89	80
430	0	0	0	0	0	0	0	0	0	1	92	72
431	0	0	0	0	0	0	0	0	0	1	91	68
432	0	0	0	0	0	0	0	0	0	0	87	64

	Assoc	Staff	Mouth2	Stretch	IntwObj	Rubbing	Bubbles	Ssaults	Tailup	Vulva	TempMax	TempMin
433	0	0	0	0	0	0	0	0	0	1	91	71
434	0	0	0	0	0	0	0	0	0	1	81	72
435	0	0	0	0	0	0	0	0	0	1	92	71
436	0	0	0	0	0	0	0	0	0	1	92	71
437	0	0	0	0	0	0	0	0	0	0	93	69
438	0	0	0	0	0	0	0	0	0	1	90	71
439	0	2	0	0	0	0	0	0	0	1	92	70
440	0	0	0	0	0	0	0	0	0	1	96	68
441	0	0	0	0	0	0	0	0	0	1	89	70
442	0	0	0	0	0	0	0	0	0	0	86	70
443	0	0	0	0	0	0	0	0	0	1	89	71
444	0	1	0	0	1	0	0	0	0	1	92	73
445	0	0	0	0	0	0	0	0	0	1	89	72
446	0	0	0	0	0	0	0	0	0	1	91	68
447	0	0	0	0	1	0	0	0	0	.	91	72
448	0	0	1	0	3	0	0	0	0	1	92	67
449	0	0	0	0	0	0	0	0	0	1	88	67
450	0	0	1	0	0	0	0	0	0	.	89	71
451	0	0	0	0	0	0	0	0	0	1	93	70
452	1	0	0	0	0	0	0	0	0	1	91	70
453	0	0	0	0	0	0	0	0	0	1	88	70
454	0	0	0	0	0	0	0	0	0	1	90	68
455	0	0	0	0	0	0	0	0	0	1	88	70
456	0	0	2	0	1	0	0	0	0	1	85	69
457	0	0	0	0	0	0	0	0	0	1	89	61
458	0	0	0	0	0	0	0	0	0	0	90	61
459	0	1	0	0	0	0	0	0	0	0	91	70
460	0	0	0	0	1	0	0	0	0	0	87	69
461	0	0	0	0	3	0	0	0	0	1	59	49
462	0	0	0	0	0	0	0	0	0	1	67	54
463	0	0	0	0	0	0	0	0	0	1	48	32
464	0	0	0	0	0	0	0	0	0	1	72	37
465	0	0	0	0	0	0	0	0	0	1	82	52
466	0	0	1	0	0	0	0	0	0	1	81	52
467	0	0	1	0	0	0	0	0	0	1	82	58
468	0	1	2	0	0	0	0	0	0	1	85	75
469	0	0	1	0	0	0	0	0	0	1	79	60
470	0	0	1	0	0	0	0	0	0	1	85	71
471	0	0	0	0	0	0	0	0	0	1	83	56
472	0	0	0	0	3	0	0	0	0	1	86	64
473	0	0	0	0	0	0	0	0	0	1	72	50
474	0	0	0	0	0	0	0	0	0	1	80	56
475	0	0	0	0	0	0	0	0	0	1	83	60
476	1	0	0	0	0	0	0	0	0	1	87	64
477	0	0	0	0	0	0	0	0	0	1	70	37
478	0	0	0	0	0	0	0	0	0	1	77	54
479	0	1	0	0	0	0	0	0	0	1	73	51
480	0	0	0	0	0	0	0	0	0	1	72	35

	Assoc	Staff	Mouth2	Stretch	IntwObj	Rubbing	Bubbles	Ssaults	Tailup	Vulva	TempMax	TempMin
481	0	0	0	0	0	0	0	0	0	1	75	44
482	1	0	0	0	0	0	0	0	0	1	66	55
483	2	0	0	0	0	0	0	0	0	0	82	63
484	1	0	0	0	0	0	0	0	0	0	76	59
485	0	0	0	0	0	0	0	0	0	1	87	63
486	0	0	1	0	0	0	0	0	0	1	81	51
487	0	0	0	0	0	0	0	0	0	1	82	59
488	0	0	1	0	0	0	0	0	0	1	86	60
489	0	0	0	0	0	0	0	0	0	1	80	62
490	0	0	0	0	0	0	0	0	0	1	83	59
491	0	0	0	0	0	0	0	0	0	1	81	63
492	0	0	0	0	0	0	0	0	0	1	85	63
493	0	0	0	0	0	0	0	0	0	1	87	65
494	0	0	0	0	0	0	0	0	0	1	86	61
495	0	0	0	0	0	0	0	0	0	1	79	51
496	0	0	0	0	0	0	0	0	0	1	82	60
497	0	0	0	0	0	0	0	0	0	1	86	67
498	0	0	0	0	0	0	0	0	0	1	80	62
499	0	0	0	0	0	0	0	0	0	1	77	53
500	0	1	0	0	0	0	0	0	0	1	81	51
501	0	0	0	0	0	0	0	0	0	1	80	60
502	0	0	0	0	0	0	0	0	0	1	91	70
503	0	0	0	0	0	0	0	0	0	1	81	57
504	0	1	0	0	0	0	0	0	0	1	87	59
505	0	0	0	0	0	0	0	0	0	1	81	64
506	0	0	0	0	0	0	0	0	0	1	86	61
507	1	0	0	0	0	0	0	0	0	1	88	65
508	0	0	0	0	0	0	0	0	0	1	93	71
509	0	0	0	0	0	0	0	0	0	1	85	69
510	0	0	0	0	1	0	0	0	0	1	83	62
511	0	1	1	0	0	0	0	0	0	1	87	59
512	1	0	0	0	0	0	0	0	0	1	83	69
513	0	0	0	0	0	0	0	0	0	1	90	72
514	0	0	0	0	0	0	0	0	0	1	94	73
515	0	0	0	0	0	0	0	0	0	1	91	72
516	0	0	0	0	0	0	0	0	0	1	91	74
517	0	1	1	0	0	0	0	0	0	1	96	78
518	0	0	1	0	1	0	0	0	0	1	93	72
519	0	0	0	0	0	0	0	0	0	1	87	69
520	0	1	0	0	0	0	0	0	0	.	85	67
521	0	0	0	0	0	0	0	0	0	1	93	72
522	0	0	0	0	0	0	0	0	0	1	91	73
523	0	1	0	0	0	0	0	0	0	1	92	71
524	0	0	0	0	0	0	0	0	0	.	91	76
525	0	1	0	0	0	0	0	0	0	1	95	76
526	1	0	0	0	0	0	0	0	0	1	91	72
527	0	0	0	0	0	0	0	0	0	1	91	75
528	1	0	0	0	0	0	0	0	0	1	94	73

	Assoc	Staff	Mouth2	Stretch	IntwObj	Rubbing	Bubbles	Ssaults	Tailup	Vulva	TempMax	TempMin
529	1	0	0	0	0	0	0	0	0	1	91	73
530	0	0	0	0	0	0	0	0	0	1	93	73
531	0	0	0	0	0	0	0	0	0	.	94	74
532	0	0	0	0	0	0	0	0	0	1	87	71
533	0	0	1	0	0	0	0	0	0	1	92	72
534	0	2	2	0	0	0	0	0	0	1	91	74
535	0	0	0	0	0	0	0	0	0	1	89	72
536	0	1	0	0	0	0	0	0	0	1	89	75
537	0	0	0	0	0	0	0	0	0	.	91	71
538	0	1	0	0	0	0	0	0	0	1	92	73
539	1	0	0	0	0	0	0	0	0	1	89	73
540	0	1	0	0	0	0	0	0	0	1	88	72
541	0	0	1	0	0	0	0	0	0	1	92	75
542	0	0	0	1	0	0	0	0	0	1	88	69
543	0	1	0	0	0	0	0	0	0	1	94	71
544	0	0	0	0	0	0	0	0	0	2	82	60
545	0	0	0	0	0	0	0	0	0	2	87	63
546	0	0	0	0	0	0	0	0	0	2	88	70
547	0	0	0	0	0	0	0	0	0	2	75	42
548	0	0	0	0	0	0	0	0	0	2	89	69
549	0	0	0	0	0	0	0	0	0	2	82	59
550	0	0	0	0	0	0	0	0	0	2	83	71
551	0	0	0	0	0	0	0	0	0	2	73	66
552	0	0	0	1	0	0	0	0	0	2	71	43
553	0	0	0	0	0	0	0	0	0	2	76	53
554	0	0	0	0	0	0	0	0	0	2	78	52
555	0	0	0	0	0	0	0	0	0	2	78	54
556	0	0	0	0	0	0	0	0	0	2	78	50
557	0	0	0	0	0	0	0	0	0	1	84	49
558	0	0	0	0	0	0	0	0	0	1	88	45
559	0	0	0	0	0	0	0	0	0	2	87	61
560	0	0	0	0	0	0	0	0	0	1	83	47
561	0	0	0	0	0	0	0	0	0	2	70	35
562	0	0	0	0	0	0	0	0	0	1	78	36
563	0	0	0	0	0	0	0	0	0	2	78	45
564	0	0	0	0	0	0	0	0	0	2	57	39
565	0	0	0	0	0	0	0	0	0	1	69	51
566	0	0	0	0	0	0	0	0	0	2	80	57
567	0	0	0	0	0	0	0	0	0	2	68	41
568	0	0	0	0	0	0	0	0	0	1	65	39
569	0	0	0	0	0	0	0	0	0	1	89	64
570	0	0	0	0	0	0	0	0	0	2	76	70
571	0	1	0	0	0	0	0	0	0	.	94	70
572	0	0	0	0	0	0	0	0	0	.	89	68
573	0	0	0	0	0	0	0	0	0	2	94	70
574	0	0	0	0	0	0	0	0	0	2	87	67
575	0	0	0	0	0	0	0	0	0	2	89	70
576	0	0	0	0	0	0	0	0	0	2	82	62

	Assoc	Staff	Mouth2	Stretch	IntwObj	Rubbing	Bubbles	Ssaults	Tailup	Vulva	TempMax	TempMin
577	0	0	0	0	0	0	0	0	0	1	89	80
578	0	0	0	0	0	0	0	0	0	2	92	72
579	0	0	0	0	0	0	0	0	0	.	91	68
580	0	0	0	0	0	0	0	0	0	2	87	64
581	0	0	0	0	0	0	0	0	0	2	91	71
582	0	0	0	0	0	0	0	0	0	2	81	72
583	0	0	0	0	0	0	0	0	0	.	92	71
584	0	0	0	0	0	0	0	0	0	2	92	71
585	0	0	0	0	0	0	0	0	0	2	93	69
586	0	0	0	0	0	0	0	0	0	2	90	71
587	0	0	0	0	0	0	0	0	0	2	92	70
588	0	0	0	0	0	0	0	0	0	2	96	68
589	0	0	0	0	0	0	0	0	0	2	89	70
590	0	0	0	0	0	0	0	0	0	2	86	70
591	0	0	0	0	0	0	0	0	0	2	89	71
592	0	1	0	0	1	0	0	0	0	2	92	73
593	0	0	0	0	0	0	0	0	0	2	89	72
594	0	0	0	0	0	0	0	0	0	.	91	68
595	0	0	0	0	1	0	0	0	0	1	91	72
596	0	0	0	0	0	0	0	0	0	1	92	67
597	0	0	0	0	0	0	0	0	0	2	88	67
598	0	0	0	0	0	0	0	0	0	.	89	71
599	0	0	0	0	0	0	0	0	0	2	93	70
600	0	0	0	0	0	0	0	0	0	1	91	70
601	0	0	0	0	0	0	0	0	0	2	88	70
602	0	0	0	0	0	0	0	0	0	2	90	68
603	0	0	0	0	0	0	0	0	0	2	88	70
604	0	0	0	0	0	0	0	0	0	2	85	69
605	0	0	0	0	0	0	0	0	0	2	89	61
606	0	0	0	0	0	0	0	0	0	2	90	61
607	0	1	0	0	0	0	0	0	0	0	91	70
608	0	0	0	0	0	0	0	0	0	1	87	69
609	0	0	0	0	1	0	0	4	0	1	59	49
610	0	0	0	0	0	0	0	0	0	1	67	54
611	0	0	2	0	0	0	0	0	0	.	48	32
612	0	0	2	0	0	0	0	0	0	1	72	37
613	1	0	0	0	0	0	0	0	0	1	82	52
614	0	0	0	0	0	0	0	0	0	1	81	52
615	0	0	0	0	0	0	0	0	0	1	82	58
616	0	1	0	0	0	0	0	0	0	.	85	75
617	0	0	0	0	1	0	0	0	0	1	79	60
618	0	0	2	0	0	0	0	0	0	.	85	71
619	1	0	0	0	0	0	0	0	0	.	83	56
620	0	0	0	0	7	0	0	0	0	1	86	64
621	1	0	0	0	0	0	0	0	0	1	72	50
622	0	0	0	0	0	0	0	0	0	1	80	56
623	0	0	0	0	0	0	0	0	0	1	83	60
624	0	0	0	0	0	0	0	0	0	1	87	64

	Assoc	Staff	Mouth2	Stretch	IntwObj	Rubbing	Bubbles	Ssaults	Tailup	Vulva	TempMax	TempMin
625	0	0	0	0	0	0	0	1	0	1	70	37
626	0	0	1	0	0	0	0	0	0	.	77	54
627	0	0	1	0	0	0	0	0	0	1	73	51
628	0	0	2	0	0	0	0	0	0	1	72	35
629	0	0	0	0	0	0	0	0	0	1	75	44
630	1	0	0	0	0	0	0	0	0	1	66	55
631	1	0	0	0	0	0	0	0	0	1	82	63
632	0	1	0	0	0	0	0	0	0	1	76	59
633	0	0	1	0	0	0	0	0	0	1	87	63
634	0	0	0	0	0	0	0	0	0	1	81	51
635	0	0	0	0	1	0	0	1	0	1	82	59
636	0	0	1	0	0	0	0	0	0	1	86	60
637	0	1	0	0	0	0	0	0	0	1	80	62
638	0	0	0	0	0	0	0	0	0	1	83	59
639	0	0	0	0	0	0	0	0	0	1	81	63
640	0	0	1	0	0	0	0	0	0	1	85	63
641	0	0	0	0	0	0	0	0	0	1	87	65
642	0	0	0	0	0	0	0	0	0	1	86	61
643	0	0	0	0	0	0	0	0	0	2	79	51
644	0	0	0	0	0	0	0	0	0	2	82	60
645	0	0	0	0	0	0	0	0	0	2	86	67
646	0	1	0	0	0	0	0	0	0	.	80	62
647	0	0	0	0	0	0	0	0	0	1	77	53
648	0	0	0	0	0	0	0	0	0	1	81	51
649	0	0	1	1	0	0	0	1	0	1	80	60
650	0	0	0	0	0	0	0	1	0	1	91	70
651	1	0	1	0	0	0	0	0	0	1	81	57
652	0	1	0	0	0	0	0	0	0	2	87	59
653	0	0	0	0	0	0	0	0	0	1	81	64
654	0	0	1	0	2	0	0	0	0	.	86	61
655	0	0	1	0	0	0	0	1	0	1	88	65
656	1	0	0	0	0	0	0	1	0	2	93	71
657	0	0	0	0	0	0	0	4	0	2	85	69
658	0	0	1	0	1	0	0	0	0	2	83	62
659	0	0	0	0	0	0	0	0	0	1	87	59
660	1	0	2	0	2	0	0	0	0	1	83	69
661	0	0	0	0	0	0	0	1	0	1	90	72
662	1	0	0	0	0	0	0	1	0	2	94	73
663	0	0	0	0	1	0	0	1	0	1	91	72
664	0	0	1	0	0	0	0	0	0	2	91	74
665	0	0	1	0	0	0	0	0	0	2	96	78
666	0	0	1	0	0	0	0	3	0	2	93	72
667	1	0	0	0	0	0	0	1	0	2	87	69
668	0	0	0	0	0	0	0	0	0	.	85	67
669	0	0	0	0	0	0	1	0	0	2	93	72
670	0	0	2	0	0	0	0	2	0	2	91	73
671	0	1	1	0	0	0	0	2	0	2	92	71
672	0	0	0	0	0	0	0	2	0	2	91	76

	Assoc	Staff	Mouth2	Stretch	IntwObj	Rubbing	Bubbles	Ssaults	Tailup	Vulva	TempMax	TempMin
673	0	1	0	0	0	0	0	0	0	.	95	76
674	0	0	0	0	0	0	0	0	0	2	91	72
675	0	0	1	0	0	0	0	2	0	2	91	75
676	1	0	0	0	0	0	0	2	0	2	94	73
677	0	0	0	0	0	0	0	5	0	2	91	73
678	0	0	0	0	0	0	0	3	0	2	93	73
679	0	0	1	1	0	0	0	1	0	2	94	74
680	0	0	0	0	0	0	0	3	0	2	87	71
681	0	0	1	0	0	0	0	3	0	2	92	72
682	0	0	0	0	0	0	0	2	0	2	91	74
683	0	0	1	0	1	0	0	1	0	2	89	72
684	0	1	0	0	0	0	0	0	0	2	89	75
685	0	0	2	0	0	0	0	0	0	2	91	71
686	0	1	1	0	0	0	0	0	0	2	92	73
687	0	0	1	0	0	0	0	5	0	2	89	73
688	0	0	1	0	0	0	0	0	0	2	88	72
689	0	0	1	0	0	0	0	0	0	2	92	75
690	0	0	2	0	1	0	0	0	0	2	88	69
691	0	1	0	0	0	0	0	4	0	2	94	71
692	0	0	1	0	0	0	0	0	0	1	82	60
693	0	0	0	0	0	0	0	0	0	2	87	63
694	0	0	0	0	0	0	0	0	0	2	88	70
695	0	0	0	0	0	0	0	0	0	2	75	42
696	1	0	0	0	0	0	0	0	0	2	89	69
697	0	0	0	0	0	0	0	0	0	2	82	59
698	0	0	0	0	0	0	0	0	0	2	83	71
699	0	1	0	0	0	0	0	0	0	2	73	66
700	0	0	0	0	0	0	0	0	0	2	71	43
701	0	0	0	0	0	0	0	0	0	2	76	53
702	0	0	2	0	0	0	0	0	0	2	78	52
703	0	0	0	0	0	0	0	0	0	2	78	54
704	0	0	0	0	0	0	0	0	0	2	78	50
705	0	0	0	0	0	0	0	0	0	2	84	49
706	1	0	0	0	0	0	0	0	0	2	88	45
707	0	0	0	0	0	0	0	0	0	2	87	61
708	0	0	0	0	0	0	0	0	0	2	83	47
709	0	0	0	0	0	0	0	0	0	2	70	35
710	0	0	0	0	0	2	0	0	0	2	78	36
711	0	0	0	0	0	0	0	0	0	2	78	45
712	0	0	0	0	0	0	0	0	0	2	57	39
713	1	0	0	0	0	0	0	0	0	2	69	51
714	0	0	0	0	0	0	0	0	0	2	80	57
715	0	0	0	0	0	0	0	0	1	2	68	41
716	1	0	0	0	0	0	0	0	0	2	65	39
717	1	0	0	0	0	0	0	0	0	2	89	64
718	0	0	0	0	0	0	0	0	0	2	76	70
719	0	2	0	0	0	0	0	0	0	2	94	70
720	0	0	0	0	0	0	0	0	0	2	89	68

	Assoc	Staff	Mouth2	Stretch	IntwObj	Rubbing	Bubbles	Ssaults	Tailup	Vulva	TempMax	TempMin
721	0	0	0	0	0	0	1	0	0	2	94	70
722	0	0	0	0	0	0	0	0	0	2	87	67
723	0	0	0	0	0	0	0	0	0	2	89	70
724	0	0	0	0	0	0	0	0	0	2	82	62
725	0	0	0	0	0	0	0	0	0	2	89	80
726	0	0	0	0	0	0	0	0	0	2	92	72
727	0	0	0	0	0	0	0	0	0	2	91	68
728	0	0	0	0	0	0	0	0	0	2	87	64
729	0	0	0	0	0	0	2	0	0	2	91	71
730	0	0	0	0	0	0	0	0	0	2	81	72
731	0	0	0	0	0	1	0	0	0	2	92	71
732	0	0	0	0	0	0	0	0	0	2	92	71
733	0	0	0	0	0	0	0	0	0	2	93	69
734	0	0	0	0	0	0	0	0	0	2	90	71
735	0	0	0	0	0	0	0	0	0	2	92	70
736	0	0	0	0	0	0	0	0	0	2	96	68
737	0	0	0	1	0	0	0	0	0	2	89	70
738	0	0	0	0	0	0	0	0	0	2	86	70
739	0	0	0	0	0	0	0	0	0	2	89	71
740	1	1	0	0	0	0	1	0	0	1	92	73
741	0	0	0	0	0	0	0	0	0	2	89	72
742	0	0	0	0	1	0	0	0	0	2	91	68
743	0	0	0	1	0	0	0	0	0	2	91	72
744	0	0	1	0	1	0	0	0	0	2	92	67
745	0	0	0	0	0	0	0	0	0	2	88	67
746	0	0	0	0	0	0	0	0	0	.	89	71
747	0	0	0	0	0	0	0	0	0	2	93	70
748	1	0	0	0	0	0	0	0	0	2	91	70
749	0	0	0	0	0	0	0	0	0	2	88	70
750	1	0	0	1	0	0	0	0	0	2	90	68
751	0	0	0	0	0	0	0	0	0	2	88	70
752	0	0	0	1	1	0	0	0	0	2	85	69
753	0	0	0	0	0	0	0	0	0	2	89	61
754	0	0	0	0	1	0	0	0	0	2	90	61
755	0	1	0	0	0	0	0	0	0	2	91	70
756	0	0	0	0	0	0	0	0	0	2	87	69
757	0	0	0	0	2	0	0	0	0	0	59	49
758	0	0	2	0	0	0	0	0	0	0	67	54
759	0	0	2	0	0	0	0	0	0	0	48	32
760	0	0	2	0	0	0	0	0	0	0	72	37
761	0	0	1	0	0	0	0	0	0	0	82	52
762	0	0	0	1	0	0	0	0	0	0	81	52
763	0	0	1	0	0	0	0	0	0	0	82	58
764	0	1	0	0	0	0	0	0	0	0	85	75
765	0	0	1	0	0	0	0	0	0	0	79	60
766	0	0	1	0	0	0	0	0	0	0	85	71
767	0	0	2	0	0	0	0	0	0	0	83	56
768	0	0	2	0	1	0	0	0	0	0	86	64

	Assoc	Staff	Mouth2	Stretch	IntwObj	Rubbing	Bubbles	Ssaults	Tailup	Vulva	TempMax	TempMin
769	0	0	0	0	0	0	0	0	0	0	72	50
770	0	0	0	0	0	0	0	0	0	0	80	56
771	0	0	0	0	0	0	0	0	0	0	83	60
772	0	1	1	0	0	0	0	0	0	0	87	64
773	1	0	2	0	0	0	0	0	0	0	70	37
774	0	0	1	0	0	0	0	0	0	0	77	54
775	0	1	1	0	0	0	0	0	0	0	73	51
776	0	0	2	0	0	0	0	0	0	.	72	35
777	0	0	0	0	0	0	0	0	0	0	75	44
778	1	0	0	0	0	0	0	0	0	0	66	55
779	0	0	0	0	1	0	0	0	0	0	82	63
780	0	0	0	0	0	0	0	0	0	0	76	59
781	0	0	1	0	0	0	0	0	0	0	87	63
782	0	0	1	0	0	0	0	0	0	0	81	51
783	0	0	1	0	1	0	0	0	0	0	82	59
784	0	0	0	0	0	0	0	0	0	0	86	60
785	0	0	0	0	0	0	0	0	0	0	80	62
786	0	0	2	0	0	0	0	0	0	0	83	59
787	0	0	0	0	1	0	0	0	0	0	81	63
788	0	0	0	0	1	0	0	0	0	0	85	63
789	0	0	0	0	0	0	0	0	0	0	87	65
790	0	0	1	0	1	0	0	0	0	0	86	61
791	0	0	0	0	0	0	0	0	0	0	79	51
792	0	1	1	0	0	0	0	0	0	0	82	60
793	0	0	4	0	0	0	0	0	0	0	86	67
794	0	0	2	0	0	0	0	0	0	0	80	62
795	0	0	0	0	0	0	0	0	0	0	77	53
796	0	0	1	0	0	0	0	0	0	0	81	51
797	0	0	0	0	0	0	0	0	0	0	80	60
798	0	0	0	0	0	0	0	0	0	0	91	70
799	0	0	1	0	0	0	0	0	0	0	81	57
800	0	0	2	0	0	0	0	0	0	0	87	59
801	0	0	1	0	0	0	0	0	0	0	81	64
802	0	0	1	0	2	0	0	0	0	0	86	61
803	0	0	3	0	0	0	0	0	0	0	88	65
804	0	0	0	0	1	0	0	0	0	0	93	71
805	0	0	0	0	0	0	0	0	0	0	85	69
806	0	0	0	0	0	0	0	0	0	0	83	62
807	0	0	1	0	0	0	0	0	0	0	87	59
808	0	0	0	1	5	0	0	0	0	0	83	69
809	0	0	0	1	4	0	0	0	0	.	90	72
810	0	0	0	0	0	0	0	0	0	0	94	73
811	2	0	0	0	0	0	0	0	0	0	91	72
812	0	0	1	0	1	0	0	0	0	.	91	74
813	0	0	4	0	0	0	0	0	0	0	96	78
814	0	1	2	0	0	0	0	0	0	0	93	72
815	0	0	1	0	0	0	0	0	0	0	87	69
816	0	0	0	0	1	0	0	0	0	.	85	67

	Assoc	Staff	Mouth2	Stretch	IntwObj	Rubbing	Bubbles	Ssaults	Tailup	Vulva	TempMax	TempMin
817	0	0	2	0	1	0	0	0	0	0	93	72
818	0	0	1	0	0	0	0	0	0	0	91	73
819	0	1	1	0	0	0	0	0	0	0	92	71
820	0	0	0	1	0	0	0	0	0	0	91	76
821	0	1	2	0	1	0	0	0	0	0	95	76
822	0	0	0	0	0	0	0	0	0	0	91	72
823	0	0	0	0	0	0	1	0	0	0	91	75
824	0	0	0	0	0	0	0	0	0	0	94	73
825	0	0	0	0	0	0	0	0	0	2	91	73
826	0	0	0	0	0	0	0	0	0	0	93	73
827	0	1	0	0	0	0	0	0	0	0	94	74
828	0	0	0	0	0	0	0	0	0	0	87	71
829	0	0	2	0	0	0	0	0	0	0	92	72
830	0	0	1	0	0	0	0	0	0	0	91	74
831	0	0	1	0	1	0	1	0	0	0	89	72
832	0	1	0	0	0	0	0	0	0	.	89	75
833	0		1	0	0	0	1	0	0	.	91	71
834	0	1	1	0	0	0	0	0	0	0	92	73
835	0		2	0	0	0	0	0	0	0	89	73
836	0	1	1	0	0	0	0	0	0	0	88	72
837	0	0	2	0	0	0	0	0	0	0	92	75
838	0	0	0	0	2	1	0	0	0	0	88	69
839	0	0	3	0	0	0	0	0	0	0	94	71

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BIOGRAPHICAL SKETCH

Iskande Lieve Vandevelde Larkin was born in Tampa, Florida, December 16, 1969. She received a Bachelor of Science degree from Florida State University, Department of Psychology, Neuroscience, in 1991. Her original intent in moving to Gainesville was to attend the College of Veterinary Medicine as a veterinary student, but she was lured towards graduate school working as a technician in Dr. Roger Reep's lab. Questions of how female manatees communicated their estrous state to males across various distances in an aquatic environment began her journey and she settled on her work to study the reproductive endocrinology of manatee estrous cycles. This study is only the beginning and she hopes to continue studying manatees and other endangered species that need as much help as we can provide to continue their survival into the future.