

6: Animal Biology

6.01 Participation of chemical signals in the behavior of *Crotalus durissus terrificus* (Serpentes, Viperidae)

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Introduction: Pheromones are substances involved in chemical communication among animals of the same species and allow mutual and sexual recognition of individuals causing physiological and / or behavioral changes in animals that are in the range of the secretor. In snakes, the chemical communication participates in intra- and interspecific social interactions, being mediated by secretions (pheromones) from the skin and cloacal glands (present in all snakes). The functions of cloacal gland secretion seem to vary among different species, including alarm signals, sexual attraction, defense and aggression. Through the tongue flicking, the odoriferous molecules (chemical signals) are taken to the vomeronasal organ, located in the serpent's mouth on the palate. **Objectives:** This paper attempts to show if the cloacal gland secretion causes change in frequency of tongue flicking in *Crotalus durissus terrificus*. **Methods:** Eleven adult specimens of *C. d. terrificus* were used (six males and five females), all of them living more than four years in captivity. During the experiment, the animals were kept in individual wooden boxes with water "ad libitum" and were fed once a month. The stimuli were presented on a ball of cotton impregnated with cloacal gland secretion. The number of times that the snakes flicked their tongues in the first 60 s from the first tongue flick was measured. Three measurements were made, first when the box was opened (BO), second with cotton without the secretion (CWS) and third with cotton impregnated with the secretion (CIS). The cloacal gland secretion was obtained with the animal anesthetized in CO₂, by mild pressure at the base of the serpent's tail, where the glands are located. The experiments were performed in the mating season (autumn) and outside mating season (spring). To compare the results in and between the seasons we used the Mann-Whitney test with the tongue flicking differences between CWS-BO and CIS-CWS. **Results and Discussion:** In the spring, despite the increased number of tongue flicking, the difference between CWS-BO (range = -8 to 12 and average = 2.1) and CIS-CWS (r = -8 to 14 and avg = 2.9) was not significant (p = 0.07). When we did the same analysis in the mating season (autumn) the snakes showed a significant increase (p < 0.0001) between CWS-BO (r = -5 to 9 and avg = 1.1) and CIS-CWS (r = -3 to 9 and avg = 3.3). In the comparison of CIS-CWS between reproductive and non-reproductive seasons, there was no significant difference (p = 0.29). In both seasons, the presence of cloacal gland secretion induced an increase in the frequency of tongue flicking, indicating that this substance may have a role in communication between rattlesnakes; however, it is during the mating season that this increase becomes more effective, showing a possible influence on reproductive behavior. The fact that there was no increase between seasons may be due to a difference between the temperatures, where the average was 2°C below in autumn. More studies of how this secretion can change the behavior of males and females, and between seasons, are in progress.

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6.02 Comparative analysis of *Culex quinquefasciatus* infected and non-infected by *Wolbachia pipientis*

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Introduction: *Wolbachia* are endosymbiotic alpha-proteobacteria harbored by terrestrial arthropods and filarial nematodes, where they are maternally transmitted through egg cytoplasm. These bacteria are capable of manipulating host reproduction yielding feminization, parthenogenesis, male killing, sperm-egg incompatibility and alteration of reproductive fitness. Effects of infection may be either advantageous or disadvantageous to the host depending on the type of interaction. *Culex quinquefasciatus* is a cosmopolite mosquito whose biting activity can disturb, cause allergies or transmit etiological agents of filariases and encephalitis. **Objectives:** In order to determine the existence of reproductive manipulation in *Culex quinquefasciatus* mosquitoes influenced by the presence of *Wolbachia* (B strain), an infected population was treated with antibiotic to obtain a colony free of *Wolbachia* infection. **Methods:** The naturally infected individuals were taken from a laboratory colony founded in 1995 with mosquitoes from Rio Pinheiros, São Paulo city. From that infected colony, 400 individuals were treated with tetracycline antibiotic to totally remove *Wolbachia* infection, yielding then a non-infected colony. Both colonies were compared regarding reproductive fitness and ovary morphology. **Results and Discussion:** The infected colony produced less eggs and with lower viability. Ovary morphology indicated that oocytes of infected mosquitoes attain maturity earlier. Crossing between infected males with non-infected females yielded non-viable eggs. Results indicate a lower reproductive fitness for infected mosquitoes, suggesting the influence of *Wolbachia* on reproductive traits. Results are also suggestive of the presence of cytoplasmic incompatibility phenomenon. The continuation of the present study will help us gain a better understanding of the genetic-physiological effects of *Wolbachia* on *Culex quinquefasciatus*.

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6.03 Hematological values of *Crotalus durissus* (Serpentes, Viperidae) under different handling conditions at Instituto Butantan

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Introduction: The poisonous snakes in the Laboratório de Herpetologia of the Instituto Butantan are bred in a closed system (intensive handling-IH) or in an external snake farm (semi-intensive handling -SIH). Hematological information is used to detect conditions that affect the organism as a whole, aiding in the elucidation of diseases, guiding the treatment to be instituted and permitting the establishment of a more accurate prognosis. **Objectives:** To determine whether the type of handling, intensive or semi-intensive, alters the hematological response in rattle snakes (*Crotalus durissus*). The animals maintained under these two forms of handling were observed for nine months. **Methods:** Seventeen *C. durissus* adults (both male and female) with at least three years in captivity were used in the period extending from April 2007 to January 2008. Initially, all the animals were under an intensive regime and were afterward divided into two groups. One group was transferred to the external snake farm (10m x 5m x 1.7m), where the floor was partly earthen and the other part was cemented. There was a water tank and six shelters measuring 1m x 0.70m x 0.5m each; with two internal heaters in two of the shelters. The other group continued to be maintained under intensive handling at the animal house (individualized in wooden boxes measuring 50cm x 40cm x 24 cm, and lined with corrugated cardboard and *ad libitum* water). Once a month, the animals were submitted to poison extraction, and in the following week, they were fed mice or rats in a proportion of 10 to 20% of their weights. Each month, blood samples were collected from all animals of both groups for hematological tests. **Results and Discussion:** A seasonal variation in some hematological parameters was observed in both groups. From April to September, the total red blood cell count similarly decreased in both groups (April=594x10³ cells/mm³; September= 423x10³ cells/mm³). However, in November, the red blood cell count increased in the animals in SIH (586 x10³ cells/mm³), while the increase only occurred in January for the snakes in IH (565x10³ cells/mm³). The white blood cells count did not vary seasonally in the SIH (6800 cells/mm³), while in the IH group, there was a variation throughout the months, with the least numbers in June (3055 cells/mm³) and the highest in November (8722 cells/mm³). In both handlings, heterophilia was observed at the end of October and beginning of summer although the animals were in good health. The rattlesnakes presented few statistical differences in the different types of handling. Although the increase in the number of circulating heterophils is interpreted as an inflammatory response, in our study the results presented can have a seasonal physiological significance. The variation of the red blood cell counts during the months indicates a positive seasonal effect where exposure to light can be a positive synergistic factor. Perhaps the light that penetrated the room through the window of the IH was sufficient to maintain the seasonal hematological pattern similar to that of the SIH.

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6.04 Relationship between temperature and prey size in the digestion of *Crotalus durissus collilineatus* Amaral, 1926

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Introduction: Ectothermic organisms regulate their body temperature through the heat gained and lost to the environment. Several environmental factors affect the digestion of these animals, including temperature, and then many amphibians and reptiles, including snakes, look for a warmer place after eating to optimize the process of digestion. **Objectives:** To check whether temperature and mass intake during feeding has any influence on the transit time of the ingested content. **Methods:** Ten specimens of *Crotalus durissus collilineatus* born in captivity (six females and four males) were used. The total length (TL) of the smaller specimen was 53 cm, while the TL of the larger one 74.5cm (average= 66.95 cm). The weight of the rattlesnakes used varied from 84 g to 202 g (average= 158.3g). The snakes were allocated in black acrylic boxes, inside a laboratory incubator with improved temperature control; a pump provided air supply and a fluorescent lamp connected to a timer provided a cycle of 12h light and 12h dark. In the first experiment (to determine the influence of temperature) snakes ingested mice (20% of their mass) at 30, 25 and 20°C and in the second experiment (at 25°C) the mice composed 10% and 20% of the snake's mass. A necklace with a small plastic ball was tied to the mice (a different color for each temperature) according to the temperature it would be ingested by the snake. **Results and Discussion:** In the first experiment, the average transit time (ATT) of the ingested content at 30°C was 14.7 days (standard deviation (sd) = 3.8), at 25°C the ATT was 31.4 days (sd= 8.9), and at 20°C the ATT was 42.1 days (sd= 9.7) (ANOVA p = 0.05). In the second experiment, the ATT of the snakes that ingested 10% and 20% of their mass was 89 days and 31 days, respectively. One snake did not expel the plastic ball, although it has defecated. The necropsy of this animal showed that it was healthy, without gastrointestinal obstruction, despite the ball's retention. The temperature acted in a manner inversely proportional to the transit time; at higher temperatures the transit time was lower. The mass also influenced the transit time. The snakes that were fed mice half of their mass took three times longer to defecate. This study confirms through experiments that the temperature and mass of the prey ingested by *Crotalus* influence the transit time of prey in the digestive tract, without differences between males and females.

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6.05 Incorporation of the herpetofauna specimens collected by the scientist Denise Maria Peccinini-Seale (Instituto de Biociências, Universidade de São Paulo) in the collection of the Instituto Butantan

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Introduction: Zoological collections are important material for scientific research. For this material to be maintained, updated and made available, we need the constant addition of new specimens, from various species and locations. The "Coleção Herpetológica Alphonse Richard Hoge," Instituto Butantan (IBut), has about 80,000 specimens of snakes from different regions of the world, with emphasis on neotropical fauna. Recently included is the "Coleção Referência," consisting mostly of specimens of Lacertilia, Chelonia, Crocodylia and Amphibia. The Coleção Referência was formed in order to assist in the identification of specimens coming from the reception of animals, Laboratório de Herpetologia (IBut), researchers and collections of the Institution. The material received is sorted and sent to the Coleção Referência, among other destinations of the Institute, and after scientific use, is returned to the collection. Besides to domestic destinations, the specimens are also sent to other institutions, through design and request. Dr. Denise Maria Peccinini-Seale, faculty researcher of the IB-USP, received several specimens from the receiving office, collected specimens in many scientific expeditions, including the Project Biota, and obtained specimens from scientific expeditions of colleagues for cytogenetics studies, especially with the group Lacertilia. **Objectives:** After the death of this scientist, the vast material maintained in her laboratory research was sent to the Instituto Butantan for scientific use, to be incorporated into the collection. **Methods:** With a list provided by one of her students and collaboration, specimens were screened and identified and place in four boxes with miscellaneous supplies received during May-June 2009. Due to poor conditions of fixation, the majority of specimens, originally maintained in formaldehyde solution, were rehydrated, preserved in 70% alcohol and transferred to new containers with new solutions, which hindered the identification. As the information recorded, such as local, collector and date of collection were obtained when transcribed. **Results and Discussion:** After preliminary screening and identification, specimens were identified belonging to the class Reptilia, Amphibia, Osteichthyes, Arachnida and Diplopoda, and eggs not identified. The specimens were listed to record the receipt. Of 651 specimens examined, there were 475 specimens of reptiles (470 lizards and five snakes), 168 amphibians, seven arthropods and a fish bone, and twelve eggs, two skins and four tails. Among the specimens that contained label with locality data, included were 21 cities in São Paulo, six of Pará, two of Bahia, two in Minas Gerais, one of Pernambuco and another of Amapá, collected during the last three decades. It was possible to identify the specimens and the origins for the implementation of cataloging, and the incorporation of specimens in the collection, a process that is still in progress. This material is of great value since many specimens were used for completion of course work, theses and dissertations of scientific publications, collected here to validate the specimen.

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6.06 Diagnosis and geographic distribution of species *Eunectes murinus* Linnaeus, 1758 (Serpentes, Boidae) based on specimens deposited in Coleção Herpetologica "Alphonse Richard Hoge" - Instituto Butantan
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Introduction: Snakes can vary in size, from the smallest feeding on invertebrates and being up to ten centimeters in length to the largest carnivorous constrictor being up to ten meters long with a varied diet. In the family Boidae Gray, 1825, are found the largest non-venomous snakes of the New World, boas, pythons and anacondas. The snakes of the genus *Eunectes* (sucuri) have a head covered by small scales, nostrils and eyes with vertical pupil, teeth aglyph. They are semi-aquatic and are found in watercourses, shores of rivers and flooded environments following the major river basins. This practice encourages the search for their prey, ranging from fish, birds, turtles, crocodiles and mammals of small to medium size, where they subdue their prey by constriction. The species *E. murinus* is known by the size and strength of body, the olive-green color, black spots and head with after-ocular bands, an orange one bordered by two black bands. **Objectives:** The aim of this study was to diagnose the species and examine the geographic distribution in São Paulo State. **Methodology:** For the survey of morphometric characters (standard color and design, biometrics) and meristics (pholidosis), 59 specimens were analyzed in 38 districts in the state, in Herpetology Collection "Alphonse Richard Hoge" – Butantan Institute, in order to observe and see whether or not there is a regular pattern for the species. In the analysis of master of color and design, biometrics of snout vent-length (SVL) and pholidosis, we used the statistical evaluation, Student's t-test. For the length of the side lines of the head, biometrics of tail length, distance between eyes and the eye to the nostril, the statistical test used was ANOVA of covariance between the sexes. The tests were applied to determine variation according to sex or to meet a standard for species. **Results and Discussion:** The specimens collected showed differences in some characters, while not significant in the number of scales and spots. The morphological characteristics about the spots varied as the number and color throughout the body, which does not explain a standard or not in this case for the specimens of the population sampled, suggesting a possible variation and ability to hide in the habitat where they live. With regard to the pattern of bands behind the black eyes, in some specimens the left top row shows larger sizes in length to the right, suggesting individuality in the population sampled. Males and females showed no sexual dimorphism in any of the characters sampled, except for the length of the tail, which is greater in males, due to the presence of hemipenis and retractor muscle. There was a regular pattern in the morphometric and meristic characters for the species studied. Regarding geographical distribution, the sampled localities indicated that the following for the species, the major river basins in the north, northwest and west of the São Paulo State.

6.07 Are female reproductive strategies conservative or derived in the *Bothrops atrox* group? A preliminary analysis with new data about the *Bothrops leucurus* female reproductive cycle

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Introduction: *Bothrops leucurus* is a large pitviper which inhabits the Atlantic Forest remnants in the coastal region of northeastern Brazil and the State of Espírito Santo. It also occurs in disturbed areas, such as grasslands and coconut plantations. *B. leucurus* belongs to the *atrox* species group, a monophyletic assemblage that also includes *B. atrox* and *B. moojeni*. **Objectives:** The aim of this work was to present new data about female reproductive cycle of *B. leucurus* and compare it to that of *B. atrox* and *B. moojeni*. **Methods:** A total of 98 adult females of *Bothrops leucurus* preserved at “Coleção Herpetológica Alphonse Richard Hoge” at the Instituto Butantan (IB) were macroscopically analyzed in regard to their genital tracts. The following data were recorded for each dissected specimen: (1) snout-vent length (SVL), (2) diameter of the largest ovarian follicle in the right ovary, (3) presence and number of embryos in the oviducts, and (4) occurrence of uterine muscular twisting (UMT) in the posterior region of the uterus. Data on the period of birth of the newborns were obtained from records in captivity at IB and anecdotal data available in the literature. **Results and Discussion:** Secondary vitellogenic follicles were found from April (autumn) to October (spring). Females simultaneously showing UMT and secondary vitellogenic follicles were found in May (autumn) and September (winter). Embryos were found in the oviducts from September (end of the winter) to December (summer). The number of embryos in the oviducts ranged from three to 29 (mean 11.8 ± 7.64 , $N = 10$). The occurrence of UMT and secondary vitellogenic follicles in May corroborates the hypothesis that mating occurs during the autumn and that females store sperm in the UMT during the winter in the genus *Bothrops*. The occurrence of embryos in the oviducts during September shows that ovulation can occur during late winter and not only during the spring as proposed for the genus *Bothrops*. Only individuals from Bahia ovulated at the end of winter. As ovulation occurs during the spring in the population from Espírito Santo, the earlier timing of ovulation may be due to hot climatic conditions during the winter in the Northeast region of Brazil. Birth records for *B. leucurus* in captivity are only available from the beginning of the summer (December) until the beginning of the autumn (April). Ovulation occurs in July in *B. moojeni* from cerrado regions, which also have very warm conditions during the winter. *B. atrox* females ovulate in April (beginning of the dry season), much earlier than *B. moojeni* and *B. leucurus*. As a consequence, *B. atrox* parturition also starts earlier, in August, and occurs until February. This may be due to Amazon region climatic conditions where the temperature is high throughout the year. Although some reproductive strategies, such as mating during the autumn and sperm storage by means of a UMT, are highly conserved, other reproductive events, such as ovulation and the timing of parturition, can be influenced by climate conditions in the species of the *atrox* group.

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6.08 What factors influence incubation time of snake eggs? Testing hypotheses on a tropical snake with labile egg retention

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Introduction: For oviparous reptiles, developmental phase inside the egg is likely to be one of the most vulnerable periods of their life cycle. Therefore, the time that eggs remain in nests may determine successful hatching. The rationale is that the longer the time in the nest, the longer is the probability of egg mortality due to predation, parasitism, mechanical injuries or inclement weather. But, what factors are able to influence the duration of incubation of reptile eggs and how do they interact with this variable? Temperature during embryogenesis is the most invoked factor influencing incubation time in reptiles. For other animals, mainly birds and invertebrates, other features such as initial egg size and egg mass also exert influence on this variable, but they are poorly studied in reptiles. Moreover, for squamate reptiles the degree of embryonic development at oviposition was never tested as a factor influencing incubation time. **Objectives:** Herein we investigated the influence of four potential factors likely to affect incubation time in reptiles: (1) incubation temperature, (2) embryonic stage at oviposition, (3) initial egg size, and (4) initial egg mass. As experimental model, we used eggs of the false-coral snake *Oxyrhopus guibei*. **Methods:** Eggs of 17 clutches of *Oxyrhopus guibei* were incubated in the laboratory. All eggs were measured and weighed soon after oviposition. One egg per clutch was dissected and embryos were collected for determination of developmental stage following standardized criteria for reptiles. The remaining eggs were housed in plastic containers with moistened vermiculite and submitted to two thermal treatments with different temperatures. High Treatment (HT) had a mean temperature of 28 ± 2 °C, whereas Low Treatment (LT) had a mean temperature of 24 ± 2 °C. At hatching, incubation time was recorded. **Results and Discussion:** In *O. guibei*, incubation period was influenced by temperature, stage at oviposition, but not by initial egg size and egg mass. Incubation time decreased significantly as stage at oviposition increased and this occurred at both temperatures. Incubation time at HT was nearly 40 days shorter than LT, although this decrease did not occur at equal proportions. This decrease obviously reflects higher embryonic metabolic rates at higher temperatures. Lastly, there were no significant correlations between initial egg size or egg mass and incubation time in either thermal treatment. Despite that these two last factors did not affect incubation time in *O. guibei*, we cannot discard this possibility occurring at the interspecific level. However, additional data for other reptiles are needed before we can generalize these results.

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6.09 Egg retention and the evolution of viviparity in tropical snakes

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Introduction: The evolution of reptilian viviparity involves a set of complex events and the interaction of several factors along evolutionary time. The most accepted scenario on the evolution of viviparity in squamates suggests a gradual and progressive increase in the amount of intrauterine embryonic development before egg-laying. It is largely widespread that in oviparous squamates egg-laying typically occurs when embryos are at developmental stage 30, and the majority of species oviposits at stages 26-33. Few species oviposit soon after ovulation or retain eggs to later developmental stages. However, these observations are based mostly on egg retention in lizards of temperate zones. Therefore, we need additional data on snakes to generalize the phenomenon of egg-retention in Squamata. **Objectives:** This work addressed the following questions: (1) What is the degree of embryonic development at oviposition in tropical snakes? (2) Does embryonic stage at oviposition differ between Xenodontinae and Dipsadinae snakes? (3) Does the habit of a given species exert influence on stages at oviposition? **Methods:** For investigating stage at oviposition we used eggs of several gravid snake species donated to Instituto Butantan between 2006 and 2008. One egg by clutch was dissected at the time of oviposition and embryos were collected. We examined stages of embryonic development at oviposition from 83 eggs of 22 species from Brazil. For comparison with lizards and thus providing insights into squamates in general, we staged embryos following criteria of Dufaure and Hubert for the lizard *Lacerta vivipara*. **Results and Discussion:** Sampled snake species laid eggs with embryos between stages 26 and 34, which represents a considerable degree of intrauterine embryonic development. Egg-laying occurred with embryos at the end of organogenesis (stage 26) and the beginning of late growth (to stage 34). This pattern is similar to that seen in lizards and suggests a high degree of conservatism in the duration of intrauterine embryonic development in Squamata. A few species retain eggs until late development, which suggests that a high degree of egg-retention may result in problems for the embryos, the mothers or both. Physiological, morphological, ecological and phylogenetic constraints may be acting on the limit of egg-retention. Stage at oviposition did not differ according the habit of a given species. Xenodontine snakes lay eggs with embryos at more advanced stages than do dipsadine. This fact may explain why viviparity evolved in the xenodontine and did not in dipsadine snakes. Therefore, this work brings the phenomenon of egg-retention to tropical snakes and strengthens the idea of intermediate stages between typical oviparity and viviparity so that this evolutionary transition occurs. This was the first extensive work on egg-retention comprising different groups of tropical snakes. Further studies should focus on morphological and physiological features in both oviparous and viviparous species and on embryonic responses to extended egg-retention and incubation conditions to provide important insights into the evolution of egg-retention and viviparity in squamate reptiles.

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6.10 Management and rehabilitation of lizards and turtles, wild and exotic, in the snake receiving annex - Casa Vital Brazil, Herpetology Laboratory, Instituto Butantan
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Introduction: The office for receiving snakes of the Laboratório de Herpetologia, IBu, has received for over a century wild and exotic herpetological fauna from collections, inventory and rescues of fauna, donations and owners of animals of different origins. Over the years, several species were received, in most cases, snakes, and lizards, amphisbaenas, turtles, crocodilians and amphibians, primarily due to the pet market, apprehensions of the IBAMA, including overcrowding in zoos and breeding facilities. The reception selects and sends out all received specimens, subjected to various procedures, requiring security and training of officials and technical staff. **Objectives:** To keep and to rehabilitate specimens of lizards and turtles from exceeding the serpents received and to promote new educational activities and handling of these species. **Methods:** Due to the increase in turtles and lizards in the receiving office, a project was designed in 2006 to revitalize the old serpentarium, currently disabled. This project has an area designed to house the animal for forty days and to manage these species with the aim of further exhibition of the animals for public visitation. In 2007, the changes were made in the courtyard outside the Casa Vital Brazil, to protect the species received. The infrastructure necessary for the initiation of activities was financed by funds from research projects in collaboration with other researchers of the institution. This allocated space in the Casa Vital Brazil, where the species are maintained in a healthy state, is semi-open with a forty-day site for rehabilitation of the specimens coming debilitated. **Results and Discussion:** The healthful specimens are lodged in enclosures, where they are fed with varied diet. Debilitated specimens are given special care in separate enclosures with heating and forced feeding. Specimens are observed daily with regard to development, behavior and daily mortality rate. In the case of death, if necessary, the animals are submitted to necropsy and remitted to the Reference Collection, annex to the main collection. Currently, 84 individuals are kept, 20 lizards, 64 turtles, juveniles and adults, 67 wild and 17 exotic, the following species: *Iguana iguana* (8), *Tupinambis meriane* (11), *Tropidurus gr. torquatus* (1), *Apalone* sp. (1), *Hydromedusa tectifera* (3), *Geockelone carbonaria* (21), *Geockelone denticulata* (1), *Trachemys scripta elegans* (14), *Trachemys dorbigny* (14), *Trachemys* sp. (4), *Phrynops geoffroanus* (1), *Phrynops vanderhaegei*. After more than two years of management of species and maintenance of enclosures, we see different reproductive behavior, mating and copulation in *Geochelone* and of posture, feeding behavior, food and territorial dispute in *Tupinambis*, among others. This is necessary to reactivate the old serpentarium to shelter the species that are well adapted and in good health, disseminating research activities in the management of reptiles, in addition to snakes, in the Laboratório de Herpetologia. Thus, we intend to increase the educational activities and public visitation at the Instituto Butantan.

6.11 Evaluation of seasonality and composition of the group of *Tomodon dorsatus* in São Paulo State, Brazil

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Introduction: Despite the great diversity and endemism of snakes in Brazil, it is difficult to find data on ecology and natural history for most species, even the most common and widely distributed. In the region of São Paulo state, it is the case of the "sword-snake" - *Tomodon dorsatus* belonging to the Colubridae family. This snake is found in central-southern Brazil, inhabiting regions of humid tropical forest, including riparian forests in open formations, and can still be found in disturbed areas. **Objectives:** To investigate using data collection and donation, the seasonal abundance of individuals of different ages of *Tomodon dorsatus* in the state of São Paulo. **Methods:** We used records of the specimens that came from the reception of the Institute Butantan, São Paulo, between January 2006 and December 2008 to obtain data on the group composition (adult or offspring). The pattern of seasonal activity and recruitment were inferred from the total number of specimens and offspring, respectively, brought each month to the Laboratory of Herpetology of Institute Butantan. **Results and Discussion:** During the study, a set of 589 individuals of this species belonging to the state of São Paulo were received. In terms of season, this species was collected mainly in the hot and dry period, in the months from October to December, the average of the highest number of catches of this species was recorded in November (N = 32.0), October (N = 25.0) and December (N = 25.0), and the lowest one in June (N = 4.3) and May (N = 9). In relation to the group composition, it was observed that in a set of 589 specimens, 514 were adults and 75 were offspring, the average of the highest number of adults were recorded in November (N = 30.0) and December (N = 23.3), and the offspring were in August (N = 9.0) and September (N = 6.0). This study demonstrates the presence of the species throughout the year, showing there is a significant difference ($p < 0.05$) in the number of adults collected in the dry season (June to September) and rainy season (October to May). These data differ from a previous study addressing the seasonality in areas of the Atlantic Forest in São Paulo State, which did not show significant differences in the number of individuals collected at each of the seasons. Tolerance to climatic conditions, food availability, reproductive cycle and phylogenetic constraints are considered the main factors responsible for the observed patterns in snakes. Other factors should also be considered to explain the differences in activity patterns of *Tomodon dorsatus*, since this species is malacophagous. During the study, the Institute Butantan received a larger number of animals in adulthood, the highest number of offspring arrived in August and September, confirming the data in the literature for recruitment at the end of the dry season and at the beginning of the rainy season.

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6.12 Morphological variability in urban populations of the mosquito *Aedes scapularis* (Diptera; Culicidae)

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Introduction: The mosquito *Aedes scapularis* is a culicid of public health interest, since it has vectorial competence for several arboviruses and filarias. It is widely distributed in the Americas and is capable of living in urban and suburban environments. In the state of São Paulo it was incriminated to transmit the Rocio virus in the 1970s. This species is suspected to be a species complex, and knowledge of it lacks populational characterization to elucidate this conjecture. Wing morphometrics is a useful tool for populational and cryptic species characterization. Such approach should be employed to investigate this biological problem of *Ae. scapularis*. **Objectives:** To investigate possible wing variation among three urban populations of *Ae. scapularis*. **Method:** Adults of *Ae. scapularis* were collected in three localities in the state of São Paulo: a) Parque Ecológico do Tietê (PET); b) Butantã (BUT); c) Pariquera-Açu (PAR). Sampling site PET is 15 km away from BUT, and both of them are situated respectively at the east and west sides of São Paulo city, whereas PAR is 200 km away from São Paulo city. Mosquitoes were fixed in 70% alcohol, and the wings were mounted and coverslipped for digital photography. In wing images, positional coordinates of 18 landmarks were taken. From coordinates matrix, shape variables were computed and then used to compare the three populational samples, using principal components analysis and discriminant analysis. Softwares used were TPS pack (J. Rohlf) and BAC (J.P. Dujardin). **Results and Discussion:** Principal component analysis showed that wing shape is slightly distinct among the three populations, but it is not possible to diagnose them with 100% accuracy. Discriminant analysis revealed that Mahalanobis distances are lower between samples from São Paulo city (PET, BUT) than they are between PAR and the other samples. Results indicate that *Ae. scapularis* showed regional wing differentiation, which may be a result of microevolutionary processes. Data are also suggestive of a direct correlation between geographic distance and wing dissimilarity. The tool “Geometric morphometrics” appears to be promising for morphological characterization of variability in mosquitoes and may help in evolutionary studies of Culicidae of medical interest.

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6.13 Case report: observation of depraved appetite in *Hydrodynastes gigas* (Serpentes, Colobridae, Xenodontidae) in the exhibition of the Museu Biológico – Instituto Butantan

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Introduction: The genus *Hydrodynastes* is positioned within the subfamily Xenodontinae. The snakes are large, reaching up to 2.50 m in length, and have semi-aquatic habits. *Hydrodynastes gigas* species is distributed in Suriname, French Guiana, Venezuela, Peru, eastern Bolivia, southern Paraguay, northern Argentina and northern, southern and central Brazil. *H. gigas* feed on fish, amphibians, snakes, birds and mammals. **Objective:** To report on deviant eating behavior in *H. gigas* when submitted to living in the Biological Museum. **Methods:** A male specimen of *H. gigas*, from Ilha Solteira, state of São Paulo entered the Quarantine of the Biological Museum on July 25, 2006 and transferred to be exposed to the institution after a routine protocol on December 13, 2006. On exposure, food was offered twice and comprised *Lithobates catesbeiana* species of amphibians and the fish *Xiphophorus maculatus*, alternating with rodents (*Mus musculus*). However, by direct observation it was possible to establish a differential feeding behavior in *H. gigas*. **Results and Discussion:** The specimen was fed for the two years and nine months, with a mixture of 51% fish and amphibians and 8% to 41% rodents. There was a depraved appetite of *H. gigas* in captivity, with the intake once of *Sphagnum sp.* (moss) used to compose the substrate, and the ingestion of a pasty consistency of their feces deposited on dry land area of the enclosure was noted, both in first half the month of February 2009. In early March, foraging was seen by the snake enclosure, entering a pool of water and ingesting, for the second time, their feces. Little is available in the literature on the natural history of *H. gigas* and information is based on captive animals, including maintenance, food and reproduction. Species with wide geographical distribution may have differences in feeding habits, being mainly related to the different availability of prey in each region. Cases of coprophagia in reptiles are rare, and there are few reports. Coprophagia in reptiles is observed in species of lizards *Iguana iguana*, in which the pups eat the feces of young adults to obtain the bacterial flora of microorganisms, this fact is due to the young in their diet cannot digest and absorb all the nutrients needed for their development. In the genus *Geochelone*, young adults have an omnivorous diet, but reports indicate that people can feed on their own feces or that of other animals. Cases of coprophagia and depraved appetite are not common in the literature, the described case of specimens of *H. gigas* may be due to stress of captivity, curiosity or even nutritional deficiency. For captive reptiles while offering favorable environmental conditions, the behavior of the animal is not always what is expected, resulting in a shift in behavior or nutritional syndrome, so it is appropriate to report the event, as happened in a confined environment, where reptiles, especially snakes, are more susceptible to environmental conditions imposed by captivity.

6.14 Use of silver sulfadiazine 1% for *Varanaus griseus* in wound healing – a case report

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Introduction: The lizard (desert monitor) *Varanaus griseus* is a species of monitor originally from North Africa and Western Asia. Its diet includes small mammals, birds, eggs and insects, and it will even tackle challenging prey such as hedgehogs, tortoises and venomous snakes. The use of ointment-based healing of 1% silver sulfadiazine has been reported in traumatic injury in *Varanus griseus*, with the presence of blood, edema and difficulty of healing. **Objectives:** The aim of this study was to determine the use of silver sulphadiazine in the process of healing in reptiles. **Methods:** The exotic lizard, *Varanaus griseus*, which belongs to the collection of the Biological Museum of the Instituto Butantan, showed laceration in the ventral region and cranial to the cloaca. The injury swollen with bleeding was caused by friction inside of enclosure that had stones. The wound affected the skin and subcutaneous tissue. The first recommended treatment was based on the use of hydrogen peroxide and nitrofurazone ointment (Furacin), lasting for four months without resolution of the problem. Thus, the wound was again evaluated and it was decided to use 1% silver sulfadiazine ointment twice a week. **Results and Discussion:** During a period of 6 months, the used of silver sulfadiazine resulted in complete healing and restoration of epithelial tissue. The ointment is a soft white cream, soluble in water, with a broad spectrum of antimicrobial agent, which acts as a bactericide in a variety of Gram-positive and Gram-negative bacteria and some fungal species. According to the manufacturer, this product is indicated for the treatment of wounds with great potential for sepsis, burns, varicose ulcers, infected surgical wounds and decubitus scabs. It is also an excellent topical medication used for tegumentary disorders, such as lacerations and bites by prey. Recent studies have shown that silver sulfadiazine is one of rare antibiotics used topically that does not prevent the proliferation of keratinocytes, while the majority of agents (neomycin and nitrofurazone) hinder the healing process. In reptiles, the use of 1% silver sulfadiazine showed good results as a bactericidal and healing of open wounds, showing it unnecessary to use other therapeutic measures in the healing process.

6.15 Ultrasonographic evaluation of the reproductive status of captive *Eunectes murinus* (Linnaeus, 1758)

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Introduction: *Eunectes murinus* has several regional names, but the most known are “sucuri” and anaconda. They are snakes of semi-aquatic habit, live along the banks of rivers following large river basins of tropical America. Considered the largest snakes in South America, it can reach 12 meters in length. These snakes are viviparous and complete the embryonic development in the uterus during pregnancy. As the physical examination is limited in reptiles, it has a complicated semiological process of internal organs. Ultrasonography is an easy method of assessment of organs and increases visibility causing minimal discomfort to animals because it is not an invasive procedure, principally the reproductive system. **Objectives:** The objective of this study was to check the reproductive system of captive anacondas through of use ultrasound. **Methods:** The two largest *E. murinus* studied live in the Biologic Museum of Institute Butantan with two other small snakes of the same species (a male and a female). In the period 2006 to 2009, six ultrasound examinations were performed, with portable ultrasound, to observe the reproductive system of two big female anacondas. Ultrasound examination was carried out in the following periods: December 2006 (summer), February 2007 (summer), June 2007 (winter), March 2008 (summer-autumn), December 2008 (summer) and April 2009 (autumn). **Results and Discussion:** We observed that in both females analyzed follicles decreased in size over the reproductive season. *E. murinus* number 4365 of ± 4 meters showed follicles of 2.7-3.7 cm (December 2006), 2.4-3.0 cm (February 2007), 2.1 cm (June 2007), 1.0-1.2 cm (March 2008), 2.5 cm (December 2008) and 1.1-1.2 cm (April 2009). *E. murinus* number 4389 of ± 3 meters showed follicles of 1.6 cm (December 2006), 1.2 cm (February 2007) and 1.9 cm (June 2007). According to the literature, anacondas have seasonal reproduction. Copulation occurs at the end of autumn and start of winter. In the nature reproductive aggregations occur simultaneously with vitellogenesis in spring. Pregnancy is in summer and birth occurs in the dry season (autumn - winter). The female sexual maturity occurs when they reach an average size of 3.5 meters length. Analyzing the size of follicles (vitellogenic process) in certain specific seasons, we may conclude the presence of seasonality in the reproductive process of the anacondas.

6.16 Egg sacs of *Peucetia rubrolineata* (Oxyopidae) and *Lycosa erythrognatha* (Lycosidae) predated by Mantispidae (Neuroptera, Insecta)

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Introduction: The interaction between spiders and mantispids is well documented in the literature, but little is known about the Brazilian species. Among the few reports, there are records of interaction between mantispids and *Trechalea* sp, *Trechalea manauensis* (Trechaleidae), *Parawixia bistrata* (Araneidae) and *Psecas chapoda* (Salticidae). **Objectives:** To report records of significant ecological relationship between two types of predators, spiders and mantispids, which can help the better understanding of the complexity of the invertebrate interactions. **Methods:** Six egg sacs of *Peucetia rubrolineata* collected at Salto-SP and six egg sacs of *Lycosa erythrognatha* from the reception of the Laboratory of Arthropods of the Butantan Institute were kept under laboratory conditions until eclosion of spider nymphs. The egg sacs were observed regularly and at eclosion the occurrence of spiderlings and/or parasites was recorded. **Results and Discussion:** One egg sac of *P. rubrolineata* collected in October 2008 were predated by two mantispids, one of them identified as a female of *Zeugomantispa virescens* (Rambur, 1842). From one egg sac of *L. erythrognatha* collected in June 2009, emerged two mantispids: a female of *Dicromantispa gracilis* (Erichson, 1839) and a male of *Zeugomantispa virescens*. The predators left the egg sacs through a circular opening and made the last molt outside egg sacs, which were totally destroyed. This is the first record of two species of mantispid infesting one single egg sac. Until now, the only record of interaction between two species of Mantispidae and one spider species were described for spiders carrying two different larvae, but not inside the egg sac. Species of the subfamily Mantispininae are specialized predators of spider eggs and the first-instar mantispids use two strategies to locate spider eggs: Larvae can burrow directly through the silk of egg sacs they find, or they can board and be carried by female spiders prior to sac production, entering the sac as it is being constructed. Both *P. rubrolineata* and *L. erythrognatha* exhibit parental care with the eggs and, in this case, the damage to the spider is not limited to loss of eggs, because during the development of the neuropteran, the spider continues providing care, ensuring the safe development of the predator. Of the few records of mantispids that predate spider eggs in Brazil, are two of *D. gracilis*, and two of *Z. virescens*, suggesting that these may be the main species in this type of interaction.

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6.17 Behavioral characters in Mygalomorphae phylogeny

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Introduction: Mygalomorph spiders are famous due their large size, being commonly found as pets. The phylogenetic relationships among their families are not clearly determined. The number of available characters for phylogenetic analysis is limited due to their morphological homogeneity. Little research has focused on Mygalomorphae's natural history, making the understanding of their evolutionary history difficult. Recently, behavioral characters have been used in phylogenetic analysis. Our research introduces behavioral characters to determine the phylogenetic relationships among these spiders. **Objectives:** The main goal was to understand the evolutionary history of the group, including behavioral characters in their phylogenetic analysis. We also wanted to test the validity of using the structure of end-products (webs) resulting from behaviors in these kinds of analysis. **Methods:** As a result of an extensive review of the literature, 8 web characters were delineated in mygalomorphs. The characters were incorporated in a morphological matrix and a total evidence analysis was performed. **Results and Discussion:** The resulting tree was better resolved than the strictly morphological one. Web related characters show a clear evolutionary sign, and some of them evolved in a correlated fashion. Burrow construction is an ancestral feature of spiders and appears correlated with silk-lining behavior. Coyle's hypothesis that sheet webs derived from silk lines is not supported by our analysis. Contrary to some authors' suggestions, in our study the end-products proved to be a reliable source of characters for phylogenetic reconstructions, besides making it possible to better understand the evolution of the behaviors that gave rise to them. From these results, we suggest that not only behavior, but also the structures resulting from it, are a good source of data for phylogenetic analysis.

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6.18 Residual yolk in neonates of snakes *Bothrops jararaca*
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Introduction: Higher vertebrates expedite the growth of their offspring by providing post-natal parental care, especially by feeding the young. Parental care is uncommon among reptiles, the females contribute to their newborn offspring's nutritional status by depositing yolk in the egg. The portion of yolk that remains unutilized at the time of hatching (referred to as "residual yolk") is drawn into the body of the hatching before it emerges from the egg. There are few data available from residual yolk in snake hatchlings. This study was undertaken to determine whether maternal size, clutch and egg size, and breeding timing have any influence on residual yolk mass of hatchlings in *B. jararaca*. **Methods:** Gravid females of *B. jararaca* (N=13) were used. The maternal SVL (cm), mass (g), mass of clutch (g), mass of eggs (mg), and total number of eggs were recorded. The clutches were categorized as early, mid and late depending on stage of development. At hatching, the sex, body mass (mg), SVL (cm), amount of residual yolk (mg) and fat mass (mg) were recorded. **Results and Discussion:** The residual yolk was observed in only one female with embryos (N=22) at more advanced stages of development without the presence of egg yolk (embryos: SVL= 25.3 ± 0.6 ; mass= 11.2 ± 0.6 ; fat mass = 0.59 ± 0.1 ; residual yolk = 1.48 ± 0.2). These animals were compared with other embryos without residual yolk (N= 10) but large amount of yolk in the egg (embryos: SVL= 19.1 ± 0.9 ; mass = 5.4 ± 0.5 ; fat mass = 0.23 ± 0.1 , yolk egg = 2.6 ± 0.7). Preliminary analyses demonstrated that offspring sex had no effect on the quantity of residual yolk ($t= 0.41$, $P=0.34$, 1.52 ± 0.26 and 1.42 ± 0.32 for males and females, respectively). In relation to the fat and weight of mother, it was observed that fat in the early and late embryonic development was 0.8%, in the mid the percentage of fat increase to 3.5%. The relationships of the quantity of yolk eggs with weight of embryos were observed in the early with 66.0%, and more advanced stages was lower, 25.0%. In relation to the weight of the embryo, there was an inverse relationship, with early representing 20.0% and the end reaching 65.0% of their weight. The amount of residual yolk removed was an average of 13.3% in relation to embryo mass and 5.26% in relation to fat. In the embryos where stage of development was lower (N=10), there was no presence of residual yolk, only the yolk egg (50.2%) and fat (4.2%). No significant correlation was observed between egg mass and quantity of residual yolk, SVL embryos and residual yolk, and in relation to the size of the egg yolk and residual yolk, there was also no observed difference. The residual yolk may act as a 'plug' to prevent infection penetrating through the umbilical opening into the hatchling's peritoneal cavity. Residual yolk may enhance survival rather than growth and crucial to first days until the offspring find natural food sources. The residual yolk in *B. jararaca* was present only in embryos ready for birth, but was not detected in others with embryonic development in less advanced stages, beneficial for immediate post-hatchling activity and survival. The amount of residual yolk removed *B. jararaca* was averaged, 13.3% of hatchling mass. This study revealed that there is no relationship between residual yolk mass and egg mass embryo, embryo SVL and size of the egg yolk.

6.19 Recovery of toad (*Rhinella icterica*) parotoid macroglands after mechanical compression

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Introduction: Toads have a pair of parotoid macroglands in the post-orbital region, which are responsible for venom secretion for passive defense against predators. These macroglands are composed of juxtaposed alveoli, each one filled with a large syncytial granular gland with a thick epithelial duct forming a plug. When the toad is bitten by a predator, the venom is expelled from the parotoid in the form of jets inside its mouth, causing serious pharmacological effects. After venom expulsion, the empty secretory syncytia collapse inside the alveoli and the connective tissue around it is expanded, replacing the volume primarily occupied by the venom. The process of alveoli recovery, through gradual venom refilling is not known, both from the morphological and physiological viewpoint. **Objectives:** The aim of this work was to carry out a morphophysiological study of the parotoid alveoli recovery in *Rhinella icterica* after mechanical compression, simulating a predator bite. We followed the main morphological alterations during the process of glandular recovery. **Methods:** Specimens of *R. icterica* had both parotoids manually compressed. The animals were sacrificed and the parotoids were dissected in successive 5-day intervals, initiating with 2 h until the 40th day. Control specimens did not have their parotoids compressed. All the parotoids were fixed in Bouin fixative and were processed for histology in paraffin. The sections were stained with HE and Mallory's trichrome. **Results and Discussion:** The results indicated that even after an intense manual compression is applied, many alveoli remain full. The alveoli effectively affected by compression are observed with their syncytia totally collapsed, and with an extensive hemorrhagic area around them. From the 5th day, many cells are seen infiltrated in the connective tissue, mainly around the hemorrhagic areas. The syncytia already show signs of recovery, showing conspicuous nuclei with large nucleoli. From the 15th day, secretion is already present inside the recovered syncytia, although in small volumes when compared with the intact syncytia. The hemorrhagic areas are less extensive. On the 30th day, the recovered syncytia are filled with larger secretion volumes and there are still small numbers of infiltrated cells within the connective tissue. On the 40th day, syncytia in final recovery steps are observed together with others which remained in the initial steps described above. Even after an intense manual compression is applied, it seems that there are a number of alveoli that remain intact. This seems to be an important fact for toad survival, since after an attack the animal does not release all its venom stock from the parotoids, remaining protected in the case of new attacks. The presence of hemorrhage and the large amounts of inflammatory infiltrate around the syncytia in the first recovery stages indicate that the glandular tissue, as well as the connective tissue around it, suffer a serious injury when compressed. The recovery process is demonstrated by the gradual refilling of the compressed alveoli; the total process must last more than 40 days. Some alveoli, probably the ones which suffer the worst injuries, do not seem to recover and thus will not return to a functional state.

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6.20 Reproductive ecology of a fossorial snake (*Phalotris lativittatus*) from Brazilian Cerrado

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Introduction: *Phalotris lativittatus* is a rare, fossorial medium-sized snake distributed endemically in Cerrado vegetation areas of São Paulo State. Data on feeding habits are unknown, but like congeners, it is likely that diet may comprise other elongated fossorial vertebrates. Reproductive data are also unknown for the species and are, in general, lacking for all Elapomorphini snakes. This is due in part to the fossorial habits of the group, which makes observations difficult. **Objectives:** This work aimed to study several aspects of the reproduction of *P. lativittatus*. **Methods:** Dissections of 42 preserved specimens (28 females and 14 males) together with captive observations on egg-laying provided information on several reproductive aspects such as: size at sexual maturity, sexual dimorphism, reproductive cycles, clutch size, oviposition, hatching time, hatchling size. **Results and Discussion:** Males attain sexual maturity at about 409 mm snout-vent length (SVL) and females at 510 mm SVL. Mature females are larger than males, but with smaller tails. Although both testis volume and width of the deferent duct have showed higher values during the rainy season than in dry season, they did not differ statistically. Detailed histological surveys of testes and deferent ducts may help to elucidate reproductive cycle of males. The female reproductive cycle is seasonal, with vitellogenesis occurring in the rainy season (from spring to summer). Egg-laying was observed in early summer and hatchings occurred from late summer to mid-fall. Fecundity is low (mean = 4.5 eggs) but relative clutch mass appears to be high. This feature in fossorial snakes appears to be recurrent and may represent a strategy of maximizing the reproductive output minimizing the costs associated with locomotion of gravid females inside underground tunnels. Hatchling size averaged 234.3 mm and is similar to that of preserved immature specimens examined (mean = 280.3 mm).

6.21 Molecular phylogeny of *Bothrops neuwiedi* group based on cytochrome-*b* and ND4 mitochondrial genes

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Introduction: The genus *Bothrops*, widely distributed in Central and South America, comprises about 42 species arranged in several groups: *alternatus*, *atrox*, *jararaca*, *jararacussu*, *lanceolatus*, *pictus*, *taeniatus* and *neuwiedi*. Previously, four species had been recognized in the *neuwiedi* group: *B. neuwiedi*, *B. andianus*, *B. erythromelas* and *B. iglesiassi*, with *B. neuwiedi* composed of twelve subspecies - the *neuwiedi* complex. After a taxonomic review based on morphological traits, seven full species were recognized: *B. neuwiedi*, *B. diporus*, *B. lutzi*, *B. mattogrossensis*, *B. pauloensis*, *B. pubescens* and *B. marmoratus*. Nowadays, the *neuwiedi* group is composed of nine species, if we consider *B. andianus* and *B. erythromelas* within the group. The monophyly of *neuwiedi* has been supported by molecular data, although the studies always show insufficient sampling, and in some cases *B. andianus* is included in the analysis solely based on hemipenial morphology. Recently, a new classification was proposed, in which *Bothrops* is split into five genera, with *jararaca* and *neuwiedi* groups synonymized to *Bothropoides*. This phylogenetic study did not include all the species of *neuwiedi*, and the combined data (molecular + morphologic, except for *B. andianus* and *B. mattogrossensis*) recovered *B. neuwiedi*, *B. diporus*, *B. pauloensis* and *B. erythromelas* as a clade, but also recovered *B. andianus* and *B. mattogrossensis* out of the *neuwiedi* group. **Objectives:** In our study the aim was to investigate phylogenetic relationships of *B. neuwiedi* group based on mitochondrial DNA sequences of cytochrome-*b* and NADH dehydrogenase subunit 4 (ND4) genes. **Methods:** We used 378 bp of the cytochrome-*b* and 744 bp of ND4 from 111 individuals sampled from 78 localities of 14 states of Brazil, covering a wide distribution and eight species (*B. andianus* was not included). Sequences were edited/aligned with CodonCode Aligner and phylogenies were reconstructed using TNT1.1 for Maximum Parsimony (MP), and Mr. Bayes 3.1.2 with GTR+I+G substitution model for Bayesian inference (MB). Each mitochondrial gene was analyzed either separately or combined with 1122 bp. **Results and Discussion:** Our results recovered *neuwiedi* group as a well supported clade both in MP and MB; *jararaca* was the sister group of *neuwiedi*. Within *neuwiedi*, *erythromelas*, *pubescens*, *diporus* and *lutzi*, these were always recovered as monophyletic taxa, unlike with other groups (e.g., *pauloensis*, *neuwiedi*, *mattogrossensis*, *marmoratus*) that appeared polyphyletic. Reconstructed phylogeny of mitochondrial DNA evinces remarkable geographical congruence and reveals similar topologies of the trees both in MP and MB. However, topologies are only partially congruent with the current taxonomy which is based on morphological traits. Perfect agreement in terms of monophyly is observed in *B. erythromelas*, *B. lutzi*, *B. pubescens* and *B. diporus*. The non-monophyletic status of some species could be the result of recent differentiations of *neuwiedi* group, in which groups that are geographically distant are cohesive and well defined, and, on the opposite side, sympatric groups, not reproductively isolated, show introgression events.

6.22 Feeding preference and tactics of subjugation of prey by *Erythrolamprus aesculapii* in captivity

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Introduction: Ophiophagy is a habit found in several species, among them is *E. aesculapii*, an opistoglyphous colubrid snake. This species feeds on other colubrid snakes. In this work, we examined if *E. aesculapii* shows preference for specific colubrid snakes, and the differences in the way of subjugation of prey, according to their potential capacity to cause injury to the predator. **Methods:** *E. aesculapii* kept in captivity were fed five species of colubrid snakes. Analyzed items: number of ingested prey; preference for some species; site of the bite; way of ingestion; tactics used to subdue prey (live prey; use of body loops; biting/poisoning). Newborns of *B. jararaca* were also offered (N=5) to determine if *E. aesculapii* would demonstrate interest for poisonous snakes. **Results and Discussion:** A total of 75 experiments were carried out (52% ♂, 48% ♀). Of that total, 70.7% of the prey were ingested. Males ingested made up 82.1%, females 58.3%. Most snakes started the ingestion from the tail of prey. Two species (*O. guibei* and *L. miliaris*) had 100% of acceptance as food. The others: *P. Patagoniensis* 52.6%, *S. mikanii* 69.7% and *T. dorsatus* 57.1%. *E. aesculapii* did not show a pattern when the prey was subdued, biting any part of the body. After the first bite, we observed different tactics in subjugation: aglyphous and non aggressive prey (*O. guibei*, *L. miliaris* and *S. mikanii*) were simply bitten and ingested alive. The opistoglyphous (*P. patagoniensis*, *T. dorsatus*) started to protect themselves as soon as they were caught, biting *E. aesculapii* whose took body handles trying to immobilize the head of colubrids, moving the prey to the side of their mouths, trying to bite them with their differentiated tooth to inoculate the poison. *E. aesculapii* did not show interest in *B. jararaca* as food in any of the attempts. The species preferred by *E. aesculapii* showed a non aggressive behavior. *E. aesculapii* bites the prey in any part of body and the most of ingestions starts at the tail, and subdued as rested as active prey, using smell to find them. Aglyphous prey tried to escape while they were swallowed, but in any moment they struggled or tried to bite, not causing a great energy expense by the predator for subjugation; differently of the opistoglyphous prey. These prey are considered non poisonous, but they have the Duvernoy's gland and produce a secretion of variable intensity, being potentially capable of causing injuries. They offered resistance during subjugation, biting strongly and struggling a lot, forcing *E. aesculapii* to use the body to immobilize them and bite to inject poison. That tactics showed efficiency, in some cases the prey seemed to be softened, struggling and biting less than before, making the ingestion easy. Although they received a lot of bites (obviously some poison) *E. aesculapii* did not show any poisoning symptom. In spite of *B. jararaca* having approximately the same weight as the colubrids used as prey to *E. aesculapii*, they showed no interest but seemed to take care, which strike a lot when predators get closer. Some specimens of *E. aesculapii* were bitten by *B. jararaca*, but they did not show reaction. We do not know if the quantity of poison injected by the newborns would be enough to induce some reaction. This work is in progress, other species are being offered as food, and other parameters will be analyzed.

6.23 Diet and feeding behavior of *Tupinambis merianae* (“teiú”) kept captive at the serpent receiving annex, outdoor courtyard of Casa Vital Brazil, Herpetology Laboratory, Instituto Butantan

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Introduction: Popularly known as “teiús”, *Tupinambis* sp of Teiidae’s family, they are the biggest lizards in the New World, and can reach approximately 140 cm of snout vent-length. They are characterized by their long and pointed heads, strong jaws with small teeth, pink bifida and long tongue. In general, their color is dark black with white or yellow spots and white ventral region. They are distributed throughout South America, living in almost all the Brazilian territory, in the coast areas of Guiana, Venezuela, Colombia, Argentina, Paraguay and Uruguay. They are all terrestrial, living in the clearings and on the edges of forests near anthropic environments. “Teiús” are usually seen during the summer – because in the winter they keep burrowed and inactive. They are omnivores and eat vegetable material, mollusks, arthropods, small vertebrates and invertebrates, meat and eggs. **Objectives:** The aim of this work was to evaluate the preference and the feeding behavior of the *Tupinambis merianae*, kept captive while analyzed, relating feeding behavior variations to the seasons of the year, limitation of area, offers and food preferences during the daylight among cubs and adults. **Methodology:** This work was produced at the Annex of the Reception, External Courtyard of Casa Vital Brazil, Laboratório de Herpetologia from January 2008 until July 2009. The animals kept at that place commonly arrive at the Reception donated by the population or through apprehensions by the governmental body. A sorting is made and then the animals are sent to the Courtyard and for days, when they are examined by the veterinarian in charge and then are micro chipped. Eleven individuals were kept inside boxes lined with cardboard, supplied with water, one individual was kept free in the Courtyard, and all of them were observed. All observed specimens had a record of their routine and diet that contains data of start at the place, food items offered and consumed and other observations. For each day of the week a diversified diet was defined containing fruits, vegetables, arthropods, quail eggs, and newborn and adult mice. In the days that the animals were kept in the den - due to a strong cold - no food was offered to them, only to those that kept active. **Results and Discussion:** Beyond the animal management routine, it was observed that the diet preference of the analyzed adult specimens was for meat, especially mice (5 or 10 grams) and newborn ones preferred by the juveniles. More often the cubs accepted – more than adults - different food items, eating occasionally fruits, invertebrates and eggs. The juveniles ate more quantity than adults, according to their sizes and especially on cold and rainy days. The analysis revealed that the *Tupinambis merianae* stay almost inactive during the winter. However, it was noted that the juveniles, because of their phase of growth and for having an accelerated metabolism, eat more often according to the offer. During the warmest seasons they stayed very active, keeping their diet preference for endothermic prey. In captivity, their places are restricted and there is no need to hunt for food. This prioritizes the preference for live foods that stimulate at a higher level, the chemical sensitivity of the individuals.

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6.24 Redescription and new distribution records of *Acanthoscurria paulensis* Mello-Leitão 1923 (Araneae: Mygalomorphae, Theraphosidae)

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Introduction: Mello-Leitão in 1923, described nine species of the genus *Acanthoscurria* Ausserer from Brazil. However, the majority of the descriptions are based on characters such as: coloration pattern and eye arrangement currently considered of small taxonomic importance. Several holotypes cannot be located and are considered lost, as in the case for the male holotype of *Acanthoscurria paulensis* based on a male from Pirassununga, São Paulo, Brazil. **Objectives:** To re-describe *A. paulensis* based on a male from the type locality and describe the female, for the first time. **Methods:** The examined material is deposited in the collection of the Instituto Butantan, São Paulo, Brazil. Female epigynum was dissected and cleared in lactic acid for observation of internal structures. The drawings were made on a Leica MZ 12.5, with a camera lucida. **Results and Discussion:** The study of the specimens deposited in the Instituto Butantan enabled us to establish the synonymies of *Acanthoscurria atrox* Vellard and *Acanthoscurria guaxupe* Piza with *A. paulensis*. The descriptions of *A. paulensis* and *A. atrox* are both detailed and agree in general aspect, color and measurements. Mainly the morphology of the male palpal bulb, of great taxonomic importance, showing a long embolus ending in a shelf due to two well-developed keels, is the same and allowed us to confirm that *A. atrox* is a junior synonym of *A. paulensis*. The specimens examined from the two type localities, Pirassununga, São Paulo and Campo Grande, Mato Grosso do Sul, Brazil corroborate the synonymy. The comparison between the holotype of *A. guaxupe* and the *A. paulensis* specimens confirmed the synonymy of the latter with *A. paulensis*. The characters cited by the author: number of spines on tibial apophysis, varying between 8-14 and the relation of measurements of carapace and tibia/patella of leg I or IV, cannot be considered distinguishable characters, as confirmed by Schiapelli & Gerschman de Pikelin. The distribution range of *A. paulensis* is increased to include the states of Mato Grosso, Goiás, Minas Gerais, Mato Grosso do Sul, Espírito Santo, Paraná and Rio Grande do Sul.

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6.25 Working memory in web-building spider

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Introduction: Different from insects, spiders have a highly condensed nervous system in two compact ganglia. One of them is the brain. Spiders' CNS apparently contains 30,000 neurons. Cursorial spiders have more neurons, about 100,000. Spiders can show "intricate" activities such as planning more effective ways to catch prey, and can memorize information about previously captured prey and details about prey size. **Objectives:** The aim of this work was to investigate the existence of predatory memory in Orbiculariae spiders. This group is known as web builders. We also investigated the evolution of memory traces in a comparative analysis. **Methods:** We studied 5 species that represent four families from the Orbiculariae group. It is divided into three guilds (1) orb-web, (2) wandering sheet and (3) space web. In our first test, we offered each spider a first prey (p1) and after the capture of this prey item we offered a second one (p2); while spiders captured p2 we removed p1. In a second test, we attracted the spider to the periphery of the web right after it captured p1, and then removed p1 while it was distracted, outside of the hub. During this displacement we removed p1 from web. The memory improved in this predatory context is the working memory and reference memory. Working memory in animals is defined as a memory for training and specific events, whereas reference memory is related to a general context of the environment, in this case, the web. **Results and Discussion:** In the first experiment, all spiders but *Zosis geniculata* (Uloboridae) searched for the removed prey when p2 was offered: the spiders walked around the web and pulled web strands for several minutes. In the second experiment, all spiders searched for the removed p1, and searching behavior was more intense in this second experiment. We do not interpret the absence of searching in *Zosis* (experiment one) as an absence of working memory in this spider, since it shows working memory in the second experiment. Instead, we suggest that *Zosis* has a different organization of the memory system, that it does not recall memories (of p1, exp1) while it has an adequate stimulus (p2) in its chelicerae. Searching time (exp.1) decreases from the basal to the more derived spider families. This could be possibly explained by cost reduction associated with the reduction of searching behavior. Nevertheless, searching times in the second experiment increased from basal to derived spiders. This could be explained by changes in search image usage. The use of search images for relevant aspects of prey features imply more organized neuronal nets, suggesting that these spiders have a more complex nervous system.

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6.26 Prevalence of *Hepatozoon* sp. (Apicomplexa, Hepatozoidae) in boas (*Boa constrictor*) donated to the Instituto Butantan

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Introduction: The genus *Hepatozoon* is the most common group of intracellular protozoa found in snakes. It is a blood parasite transmitted to vertebrates through the ingestion of an infected invertebrate (definitive host) or through the ingestion of an infected intermediate host. In reptiles, the gametocytes infect red blood cells. The main invertebrate vectors of *Hepatozoon* sp are mosquitoes, flies, triatomides, lice, fleas, ticks and mites. The *Hepatozoon* sp infecting reptiles are apparently well-adapted, causing little or no disease in their natural hosts, but can be very important in the ecology of the species. **Objectives:** To determine the percentage of boas (*Boa constrictor*) donated to Instituto Butantan infected with *Hepatozoon* sp and their respective parasitemia. **Methods:** In 2008 and 2009, blood samples were collected with needles and disposable syringes by caudal vein puncture, and blood smears were prepared on slides for microscopy, air-dried and then stained with May-Grünwald-Giemsa modified by Rosenfeld. Interpretation of the slides was done using a light microscope with a magnification of 100X and the parasitemia was analyzed using a magnification of 1000X. **Results and Discussion:** Thirteen snakes were initially examined, of which four animals (30.77%) were found to have infection with *Hepatozoon* sp. The parasitemia was determined by counting approximately 700 cells (red blood cells), and detecting the presence of gametocytes. Parasitemia varied from 0.14% to 1.69%. The gametocytes found did not displace the nucleus of the red blood cell. The percentage of infected animals is in accordance with the results obtained by other authors who reported infection with *Hepatozoon* sp in recently captured snakes with a 38.9% positivity for *B. c. amarali*. A study analyzing 906 recently captured snakes donated to CEVAP – UNESP, Botucatu, reported that the species with the most significant infection rates were: *Bothrops jararaca* (21.8%), *B. c. amarali* (19.1%) and *Crotalus durissus* (15.8%). Contrary to earlier studies, displacement of the red blood cell nucleus by the gametocyte was not observed in our study, probably because it was a different species of *Hepatozoon*. The prevalence study of this parasite is important since information on this parasitosis is scarce and it is necessary to know the health status of the animals that arrive in captivity.

6.27 Snakes from Vale do Paraíba region (São Paulo State, Brazil)

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Introdução: The Paraíba Valley (PV) “Vale do Paraíba” is a natural west-east “corridor” situated between the Serra do Mar and Serra da Mantiqueira in the southeastern Brazil. This São Paulo State region has 34 municipalities with a wide range of anthropization beginning in colonial times, although important natural remnant areas still exist. The altitude of these municipalities range from 454 to 2000 meters, and at least five native forest types can be found: ombrophylous dense forest, semideciduous seasonal forest, ombrophylous mixed forest, riparian forest and cerrado. **Objectives:** The snakes from PV region were surveyed largely on the basis of Instituto Butantan (IB) and Universidade de Taubaté records, scientific literature, and fieldwork. **Methods:** The snake records from Instituto Butantan were reviewed as well as from the Herpetological Collection “Alphonse Richard Hoge” (IBSP) between 1988-2008. Fieldwork has been performed since 2007 in some remnants of Mata Atlântica by opportunistic sightings. **Results and Discussion:** A total of 7,640 snakes were recorded. The fauna as listed consists of 66 species; family Anomalepidae: *Liotyphlops beui*; family Boidae: *Boa constrictor amarali*, *Boa c. constrictor* (introduced), *Epicrates cenchria*; family Colubridae: *Apostolepis assimilis*, *Atractus pantostictus*, *A. reticulatus*, *A. serranus*, *A. zebrinus*, *Boiruna maculata*, *Chironius bicarinatus*, *C. exoletus*, *C. flavolineatus*, *C. quadricarinatus*, *C. plumbea*, *C. quimi*, *C. rustica*, *E. cephalostriata*, *E. melanostigma*, *E. undulata*, *Elapomorphus quinquelineatus*, *Erythrolamprus aesculapii*, *Helicops modestus*, *Liophis almadensis*, *L. atraventer*, *L. jaegeri*, *L. lineatus*, *L. meridionalis*, *L. miliaris*, *L. poecilogyrus*, *L. typhlus*, *Mastigodryas bifossatus*, *Oxyrhopus clathratus*, *O. guibei*, *O. rhombifer* (doubtful), *Philodryas aestiva*, *P. olfersii*, *P. patagoniensis*, *Pseudoboa serrana*, *Sibynomorphus mikanii*, *S. neuwiedii*, *Simophis rhinosthoma*, *Spilotes pullatus*, *Taeniophalus affinis*, *T. occipitalis*, *Tantilla melanocephala*, *Thamnodynastes hipoconia*, *T. nattereri*, *T. strigatus*, *Tomodon dorsatus*, *Tropidodryas serra*, *T. striaticeps*, *Uromacerina ricardinii*, *Xenodon merremii*, *X. neuwiedii*; Family Elapidae: *Micrurus corallinus*, *M. decoratus*, *M. frontalis*, *M. lemniscatus*; Family Viperidae: *Bothrops alternatus*, *B. fonsecai*, *B. jararaca*, *B. jararacussu*, *B. neuwiedi*, *B. pauloensis* and *Crotalus durissus*. Not surprisingly, the municipalities closer to IB sent the largest number of snakes: Santa Isabel n=1101 (14.4%), Jacareí n=800 (10.5%). Surprisingly, São José do Barreiro, one of the most distant municipality from IB sent n= 758 (9.9%). The most representative species were *Crotalus durissus* (40.7%), *Bothrops jararaca* (21.5%), *Sibynomorphus neuwiedii* (7.3%) and *Oxyrhopus guibei* (6.1%) corresponding to 75.6% of the total. Species of open areas (*Xenodon merremii*, *Mastigodryas bifossatus* and *Simophis rhinosthoma*) were drastically reduced. The PV is a wide region with several different ecosystem remnants. The result of secular history of devastation can be testified by satellite images, showing a predominant clearing mosaic. On the other hand, important preserved remnants (federal and state parks, research stations, or even private areas) still exist. The importance of these remnants can be stressed by new recently described species, although protected areas in open formations are mandatory.

6.28 Comparative skin morphology of the dart-poison frog *Ameerega picta* and the frog *Leptodactylus lineatus*, regarding the elucidation of a possible relation of mimetism

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Introduction: Amphibian skin has many vital functions, such as respiration, communication and defense. Two types of glands are associated with these functions: mucous and granular (venom) glands. Their morphological structure and the composition of their secretions vary broadly between species. Highly toxic secretions are often associated with conspicuous skin color patterns, which are recognized and avoided by predators. This is the case of many frogs from the family Dendrobatidae, including *Ameerega picta*. The skin color pattern of this species is quite similar to that of *Leptodactylus lineatus*, which presumably acquire protection against predation through mimicry. **Objectives:** We aimed to compare morphological aspects of the skin of these two species, emphasizing the cutaneous glands. **Methods:** Skin fragments from the head, dorsum, abdomen and limbs were removed and embedded in paraffin and historesin. For histological study, fragments embedded in paraffin were stained with hematoxylin-eosin and those embedded in historesin with toluidine blue-fuchsin. For histochemical characterization of the skin, we applied bromophenol blue for proteins, PAS for polysaccharides, alcian blue pH 2.5, for acid polysaccharides and von Kossa technique for calcium detection. **Results and Discussion:** In both species, epidermis is composed of 3-4 cell layers, the outermost *stratum corneum* formed by flattened cells. The dermis is composed of the *stratum spongiosum*, where chromatophores, vessels and glands occupy the loose connective tissue, and the *stratum compactum*, where parallel-arranged collagen fibers compose a dense connective tissue. A layer of subcutaneous tissue rich in vessels internally coats the skin. A calcified layer is observed among the *strata* of the dermis. *A. picta* possesses a single type of granular gland, elliptical in shape, whose alveolus is filled with irregular secretory granules, non-protein, containing carbohydrates. *L. lineatus* shows spherical granular glands of two types, the first possessing spherical protein granules and the second containing granules of heterogeneous shape and size with non-protein content, containing carbohydrates. *A. picta* shows two types of mucous glands which differ in diameter and lumen size, possessing secretory cells whose granules are composed of carbohydrates. *L. lineatus* has a single type of mucous gland, characterized by a broad lumen and secretory cells containing carbohydrates. The glandular profiles of these species differ greatly. Although it is assumed that *L. lineatus* is non-toxic or, at least, less toxic than *A. picta*, this species has a large number of granular glands of two kinds, which may produce dissimilar secretions. On the other hand, included in a group of venomous frogs, *A. picta* possesses only one type of granular gland, suggesting a less diversified chemical defense system for protection against predation. Considering this species, this presumable incoherence may indicate that, regarding cutaneous glands and secretions, the investment in chemical defense would be more qualitative than quantitative in dendrobatid frogs.

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6.29 Influence of methodology in the rearing of *Grammostola mollicoma* (Theraphosidae, Mygalomorphae) in captivity

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Introduction: Mygalomorph spiders are important in population control of insects and small vertebrates, and they can also be useful as bioindicators of population diversity. *Grammostola mollicoma*'s distribution range reaches southern Brazil, Uruguay, Paraguay and Argentina. Studies concerning the biology and behavior of this genus are scarce.

Objectives: The aim of this study was to follow the development of two *Grammostola mollicoma* groups kept in different vivariums, considering the advantages and disadvantages of the employed methods. **Methods:** After spending two years in captivity, a female, from Rio Grande do Sul, Brazil, produced an egg case in December 2008. After three months, 262 spiderlings hatched and were divided in two groups. One of them, containing 112 specimens, was kept in individual polypropylene pots of 10 x 6 cm; the other group containing 150 specimens was subdivided in 10 vivariums of 26 x 17 x 14 or 40 x 27 x 13/3 with egg carton substrate, each containing 15 spiders. Their diet consisted in *Tenebrio molitor* larvae and young *Gryllus* sp. offered twice a week. Their development was evaluated by measuring their weight every 30 days and their exuviae size. **Results and Discussion:** To date, the specimens kept in individual vivariums showed a uniform growth, while those kept in the common vivariums showed an unequal growth pattern. We also observed that the spiders in the common vivariums did not show territoriality although cannibalism did occur. The individual vivariums provide a safer environment for the spiders to grow in, while the common vivariums provide a more real environment, close to their natural habitat, since it enables competition.

6.30 Relative litter size in *Bothropoides (Bothrops) jararaca* (Serpentes, Viperidae)

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Introduction: The litter and newborn sizes are important factors that can increase chances of parental gene perpetuation. However, due to a series of costs that are always linked to reproduction, a high maternal reproductive investment may sometimes be prohibitive to snakes. The relationship between litter and newborn sizes, and the correlation between female's size and the number of newborns per litter are known for many species and seem to be related to different habits, phylogeny and reproductive strategies. The determination of the maternal factors that can influence the litter and newborn sizes are important for the knowledge of the reproductive biology of snakes. **Objectives:** This study aimed to determine the correlations between female and litter size, and between litter size and newborn size in *Bothropoides (Bothrops) jararaca*. **Methods:** During this study, data of 70 pregnant snakes from various districts of the State of São Paulo and Santa Catarina were collected. The snakes were weighed and had their length measured before and after parturition. After birth, the litters were counted, sexed and had their weight and length measured. The relationships between female size and parental effort were then established and analyzed by linear regression. **Results and Discussion:** As previously described, the number of newborns per litter exerts a low influence on the newborn size ($p < 0.05$, $R^2 = 0.15$). Female length also does not show a great correlation with litter size ($p < 0.05$, $R^2 = 0.12$), and unlike previous data for other species, the mother's size does not seem to negatively influence the relative body mass invested on litters. The parental effort in *B. jararaca* is higher than many other viviparous snakes. This fact can be explained at least partly to their secretive habits and low energy consumption, which would allow this species, as well as the other snakes of the genus, to have a large reproductive investment, without excessively decreasing their survival ability.

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6.31 Preferred temperature in *Bothrops moojeni* (Serpentes: Viperidae)

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Introduction: The study of preferred temperatures is essential to understand the snake's thermal biology. Although some studies have been reported, most of them focused on temperate and diurnal species. Thus, little is known about the tropical and sub-tropical nocturnal species. **Objectives:** The purpose of this study was to determine the preferred thermal range of the nocturnal snake *Bothrops moojeni*. **Methods:** In this experiment, 29 specimens of *Bothrops moojeni* were used. The animals were placed individually in a thermal arena and video-monitored for 120 h. The Tset interval was defined as the temperature range reached between the first and third quartile of the temperatures found during the period the experiment. The *t* test was used to compare thermal ranges between day and night and between sexes. For all statistical tests, the level of significance was set at $p < 0.05$. **Results and Discussion:** The results showed that the preferred thermal range of *B. moojeni* changes depending on the photoperiod (20.93°C to 22.20°C in daytime and 22.81°C to 24.42°C in nighttime), being similar to other crotalinae snakes. No significant difference was detected between male and female thermal ranges. Just like most other crotalinae, *B. moojeni* is considered mainly a nocturnal, low activity and ambush snake, which probably exerts a great influence on the temperatures searched by these animals. The search for lower temperatures during the day suggests that energy economy may play an important role in the ecology of *B. moojeni*. Moreover, higher temperatures during activity seem to increase the chances of success in prey capture and defensive ability in these animals.

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6.32 Does the reproductive season of *Crotalus durissus* (Serpentes, Viperidae) impose differential reproductive costs between males and females?

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Introduction: Reproduction is energetically expensive for both sexes, but the magnitude of expenditure and its relationship to reproductive success differ fundamentally between males and females. Reproductive costs could take several forms in reptiles, but two major categories may be distinguished: costs associated with survival and costs associated with fecundity. The costs associated with survival are those that affect the likelihood of survival of reproductive individuals. The costs associated with fecundity influence the energy available for the future reproductive event. *Crotalus durissus* shows a seasonal reproductive cycle. The deposition of yolk in the ovarian follicles and mating occur during the autumn, the storage of sperm in the female reproductive tract during the winter, the end of deposition of yolk in the ovarian follicles and fertilization during the spring and finally, parturition in the summer. Males show intraspecific competition during ritual combat. They fight to access receptive females, which release particles of pheromones (vitellogenin) in the air. The inference of reproductive costs associated with survival can be achieved through surveys of mortality rates between males and females. These deaths may be caused by natural predators, trampling by humans or sighting. **Objectives:** The aim of this study was to evaluate the costs associated with reproductive survival between males and females of *Crotalus durissus* by means of a seasonal evaluation of the data of snakes arrival at Instituto Butantan (IB) (= abundance). **Methods:** The sexual dimorphism of the tail was used to determine the sex of *Crotalus durissus* adults individuals received during the years 2007 and 2008 at IB. The number of specimens received during each season was recorded to analyze possible differences in the activity patterns between males and females in relation to this species' reproductive cycle. The X^2 significance test was applied to evaluate differences between the number of males and females in all seasons. **Results and Discussion:** A total of 1,357 specimens were received. The X^2 test showed a marked difference in the autumn. However, during the winter, the difference in the abundance rates between males and females was not significant. The results show that the male reproductive strategies during the autumn increase the rate of sighting due to a prolonged search for females, fighting and mating. The greater number of females during spring and summer may be related to the vitellogenic process and pregnancy, factors that increase body mass and the rate of thermoregulation, thus making them less able to escape from predators and consequently, more sighted. During the winter, the results can be attributed to lower temperatures during this season which force males and females to stay in shelters in order to reduce travel expenditure as they are ectotherms. These data confirm the hypothesis that *Crotalus durissus* reproductive strategies impose differential survival costs for males and females, as reflected by differences on their abundance rates, characterized by strong seasonality of reproductive events.

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6.33 Infection of *Aedes aegypti* (Diptera: Culicidae) with avian malaria parasite *Plasmodium gallinaceum*: evaluation of its effect on wing shape

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Introduction: The family Culicidae includes mosquito species of epidemiological importance, some of them being vectors of etiological agents of zoonoses. Among such pathogens, protozoans of the genus *Plasmodium* are recognizably relevant to public health. Parasites may be capable of producing physiological, genetic and morphological and changes in their hosts. The detection of morphological changes in a mosquito species caused by infection with a parasite, may be helpful in the diagnosis of infected mosquitoes. **Objectives:** The present study aimed to evaluate possible effects of the infection by *Plasmodium gallinaceum* on wing shape of the host *Aedes aegypti*. **Methods:** Infected and non-infected individuals from parental and F1 generations were compared between them. Samples used consisted of 110 infected and 127 non-infected specimens. Mosquitoes were colonized under standard conditions from April to May, 2009. Wing shape was used as the comparative biological parameter, assessed through geometric morphometrics. *Aedes aegypti* female wings were mounted in a slide-coverslip and digitally photographed. Positional coordinates of each of the 18 anatomic points were taken. From these data, discriminant analyses and determination of Mahalanobis distances were computed using TpsDig V.1.40 software, and principal component analysis was performed using PADwin Version 89. Graphs and histograms were designed to depict the biological features analyzed: wing shape and bilateral wing asymmetry. **Results and Discussion:** Wing shape was similar in either infected or non-infected samples. Moreover, bilateral asymmetry was present in similar intensities in both samples. Principal components as well as canonical variables of the two samples overlapped in all graphical outputs, hindering attempts to distinguish infected from non-infected mosquitoes. Phenograms of Mahalanobis distances split infected and non-infected samples, whereas parental and F1 generations were clustered. Apparently, it is not possible to diagnose *Plasmodium*-infected *Aedes aegypti* individuals based on wing shape patterns. The present data suggest that these pathogens do not interfere with wing shape determination, at least when only two generations are analyzed. Thus, the influence of other pathogens on wing shape of culicids needs to be investigated.

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