

**II SEMINÁRIO CIENTÍFICO DO
PROGRAMA DE PÓS-GRADUAÇÃO EM
BIODIVERSIDADE E EVOLUÇÃO:
AMAZÔNIA, PRESENTE!**

NOVEMBER 9-12, 2020



**Fabián García
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II SEMINÁRIO CIENTÍFICO DO PROGRAMA DE PÓS-GRADUAÇÃO EM BIODIVERSIDADE E EVOLUÇÃO: AMAZÔNIA, PRESENTE!

BOOK OF ABSTRACTS

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Zoolea lobipes Olivier, 1792 from Tomé-Açu, Pará. By César Favacho

THE EVENT

The Postgraduate Program in Biodiversity and Evolution - PPGBE, the first Postgraduate course designed and coordinated exclusively by the Museu Paraense Emilio Goeldi (MPEG) and instituted in 2015, was due to two main reasons: 1) growth, improvement and internationalization the staff of researchers and lines of research in the Biodiversity area of the institution; and 2) The need to promote the training of human resources with an integrated vision and focused on evolutionary and ecological processes. In its five years of existence, the program has already trained 22 masters and 8 doctors, who today occupy important positions in environmental management, in secondary and higher education. The program has attended post-doctoral internships, mostly young researchers, thus contributing to the flow of high-level professionals in the region, creating opportunities for fixing human resources in local institutions.

The program of the 1st Scientific Seminar of PPGBE, held in 2019, brought together 23 presentations. In this second edition, also bilingual, 31 students will present their graduate projects, representing 14 doctoral students and 17 master's students, which represents a growth in this graduate program. In addition to the presentations of the program's students, we will have a cycle of lectures, with the participation of post-doctoral students, graduates and guest researchers. We will have public classes for 2020 graduates and photography and scientific illustration contests with the participation of the public.

This II Scientific Seminar of the PPGBE, in an “online” version was fully organized by the students and represents a moment of integration between egressed students, students and teachers. In addition to the individual opportunity for each student to present individual dissertation and thesis plans, this is an opportunity for integration between science and society, revealing comprehensively to the student community and society in general, how science is developed at the Goeldi Museum and how the integration of research in systematics, molecular phylogeny and evolutionary ecology can contribute to the conservation of biodiversity and the sustainable development of the Amazon.

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STUDENTS ORAL PRESENTATIONS



Synergistic effects of climate and landscape change on the conservation of Amazonia lizards

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The main causes for the current biodiversity decline worldwide are global warming and natural habitat loss and fragmentation. Here, we propose an analysis of the synergistic effects of these two factors in 63 species of Amazonian lizards. We predicted that the potential climatic niche of species would be significantly impacted by different deforestation scenarios and resultant landscape structure and considered that forest-dwelling species would be especially susceptible to deforestation scenarios. We also pointed species threatened by both drivers and suggest important areas for their future conservation. Considering our results, most species will face future reductions in suitable areas for their occupancy accordingly to five different patterns, two of which representing significant risks for 15 species. Some of these species are already dealing with the loss and fragmentation of their current suitable areas, whereas the other will suffer a considerable area reduction related to future range shifts. We emphasize the importance of protected areas (PAs), especially the indigenous lands and the need for planning combined strategies that involve the maintenance of PAs and possible implementation of ecological corridors among them. Finally, we highlight eight species of thermoconformator lizards that constitute present and future conservation concerns related to the joint effects of climate change and the habitat loss and should be carefully evaluated in extinction risk assessments.

Keywords: Deforestation, Extinction threshold, Fragmented landscape, Species Distribution Models

Effects of the impact caused by the construction of the Tucuruí Hydroelectric Power Plant on Cichlid (Cichliformes) communities in the Amazon

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The Amazon rainforest has been subjected to countless human activities that mainly cause deforestation and loss of biodiversity. Of these anthropic impacts, hydroelectric projects stand out, as they have infrastructure that causes major changes in the environment. In which, the Tucuruí Hydroelectric Plant (UHT), being one of the largest hydroelectric plants in Brazil, is extremely affected by these anthropic impacts. UHT is located on the Tocantins River, which is considered impacted not only by dams but also by land uses present in the region. Since the construction of hydroelectric plants directly impacts the fish community through the construction of dams and lakes, totally modifying the aquatic ecosystem, the ichthyofauna ends up being the biggest affected by such changes. In the case of ichthyofauna, the Cichlidae family stands out for its rapid adaptive radiation that facilitates the observation of changes resulting from the evolution and adaptation of species to the new environmental conditions generated by the anthropic impact of the hydroelectric plant. For the evaluation of such parameters, ecomorphology is a very effective tool, as it relates to the use of ecological resources with phenotypic characteristics of a given taxon. Therefore, the objective of the present study will be to determine, what is the effect of the impact caused by the construction of UHT in the ecomorphology of Cichlids in the Amazon. The study area is located in the city of Tucuruí, about 300 km south of Belém. Initially, three sampling points will be defined, one downstream of the dam, one within the dammed area, and one upstream of the UHT dam. . Field collections have been carried out since 2018, and collections will be carried out in the coming years. Six species of Cichlids sampled in the three treatments with the greatest potential to respond to the impact of UHT were selected. For data collection, the specimens will be photographed and measurements made using the geometric morphometry method according to the literature. For data analysis, we will calculate slopes from linear measurements within groups of species and test the significance using an ANOVA, we will also correct allometric effects using linear regression and the residues will be subjected to Welch t-tests of two samples. . To visualize the data, we will perform a principal component analysis (PCA) on the Procrustes residues corrected by allometry.

Keywords: Geometric morphometry, ecomorphology, Environmental impact analysis, Ecology of freshwater fish.

Funding: CAPES

Long-Term Ecological Projects - The impact of artificial drought on the Amazon rainforest

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The climate changes of the last decades are impacting biodiversity. One example of these climate changes occurs in the process called “El Nino”, which results in an increase in the temperature of the waters of the Pacific Ocean, resulting in a reduction in precipitation in the Amazon biome. With the scenario of increased climate change, what would happen if the reduction in rainfall became permanent in the Amazon biome? What are the impacts of this reduction on physical and biotic processes? In order to understand and monitor these impacts, an experiment was created in 2001 in the Amazon a research project that simulate the water reduction denominated “Study of the Drought of the Forest” (ESECAFLO). The ESECAFLO project is located in the dense forest (upland forests), at the Research Base of the Museu Paraense Emílio Goeldi, the Ferreira Penna Scientific Station, located in the Caxiuanã National Forest. The monitoring studies started in 2001 and have continues until today. The physical structure of ESECAFLO is represented by two plots of 1 hectare size. One denominated the control and the other experimental, where the exclusion of precipitation is around by 50%, using a structure composed of 6,000 plastic panels. The most important results of the Project are: (1) Tree mortality after long-term drought only begins after 3-4 years of drought and reaches a maximum of 10 years, resulting in a loss of 40% of the initial biomass; (2) Vegetative and reproductive productions (leaves, flowers and fruits) declines in the short term, but then recovers strongly after 10 years of drought; (3) There is a significant change in the life forms of understory plants, with the typical species of the upland forest represented by trees and herbaceous plants, replaced by groups more tolerant to drought, such as palms and lianas; (4) There is a drastic population collapse of the typical species of understory plant species, with drastic population reductions; (5) There is a reduction in species richness and a major change in the composition of ant species, between the control and experimental plots; (6). The number of individual and species in tree recruitment is decreasing in the experimental plot compared to control. In addition, species composition is being modified and species that are tolerant to prolonged drought are colonizing the experimental plot. In conclusion, the artificial drought induced by ESECAFLO Project, corroborate some of the climatic models that predict that the reduction of rainfall in the Amazon biome will transform the structure and composition of forest species, modifying it into another type of vegetation, with less biomass and biodiversity.

Keywords: biodiversity, monitoring, climate change

Funding: CNPq, FAPESPA

Taxonomic revision and phylogenetic analysis of the genus *Megistopoda* Macquart, 1852 (Diptera: Streblidae)

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Flies of the Streblidae (bat flies) family are obligate blood-feeding ectoparasites of bats, occurring in all biogeographic regions. Bat flies have a wide morphological variation and they can be apterous, brachypterous or macropterous. Streblidae has 299 described species and 34 genera classified in five subfamilies: Brachytarsinae, Ascodipterinae, Trichobinae, Streblinae and Nycterophiliinae, the two formers are restricted to the Old World and the remaining occurs only in the Americas. The genus *Megistopoda* Macquart is composed of small brachypterous species (male 1.84-1.98 mm/female 1.76-2.09mm), mainly characterized in having narrow wings with 4 to 6 veins, thorax laterally compressed with dorsal surface strongly convex and with a straight and developed median suture, indistinct at lateral margins. Currently, the genus has two valid species, *M. aranea* (Coquillet, 1899) and *M. proxima* (Séguy, 1926), mainly associated with bats of the genera *Artibeus* and *Sturnira*. Although it is a few species genus, experts agree that the genus is problematic and the species desperately need critical review, since they seem a species complex. A recent review of genus *Noctiliostrebla*, that belongs to the same subfamily of *Megistopoda*, demonstrated that combination of molecular data with morphological data results in stronger and more resolved phylogenetic hypotheses, which are useful in species delimitation. Thus, the main goal of the present project is to make taxonomy revision and phylogenetic analysis of *Megistopoda* genus. The specific objectives are: 1) To provide an identification key for all valid species; 2) To redescribe all valid species; 3) To describe the new species; 4) To present phylogenetic hypotheses for the species based on combined morphological and molecular data set. The specimens will be obtained through loans from several national and overseas collections. Phylogenetic analysis will be made using the Maximum Likelihood method. For the construction of the morphological character matrix, the Mesquite 3.61 program will be used. For the molecular data, four markers will be used, one nuclear (CPS of the CAD gene), and three mitochondrials (12S rDNA, COI and cytB). The alignment will be made in the MAFFT software and the sequences will be edited in the Bioedit software. The morphological and molecular characters will be concatenated in the SequenceMatrix software. For selection of the best-fit partitioning schemes and models will be used the PartitionFinder software and the trees will be rooted the FigTree software.

Keywords: Bat flies, host, parasites, New World.

Taxonomic revision of the subgenera *Tidops* Chamberlin 1915 and *Newportides* Chamberlin 1921 (Scolopendromorpha: Scolopocryptopidae: Newportiinae: Newportia)

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The Class Chilopoda is divided into five orders: Scutigleromorpha, Lithobiomorpha, Craterostigmomorpha, Scolopendromorpha, and Geophilomorpha, occurring in almost all continents, except Antarctica. The Order Scolopendromorpha harbors the most aggressive and voracious centipedes, reaching a body length of 30 cm. The Order comprises an estimated diversity of 700 to 800 species. Scolopendromorpha comprehends five families. However, only the families Cryptopidae Kohlrausch, 1881, Scolopendridae Leach, 1814 and Scolopocryptopidae Pocock, 1896 are distributed in South America. The family Scolopocryptopidae is currently subdivided into three Subfamilies: Newportiinae Pocock 1895, Scolopocryptopinae, and Kethopinae Shelley 2002, being Kethopinae exclusively Nearctic. The major morphological characters of the Scolopocryptopidae is the absence of body blurs and the presence of 23 body segments. The Newportiinae embody a single genus, *Newportia* Gervais, 1847, composed by five subgenera. The project focus two of these subgenera, *Tidops* Chamberlin, 1915 (at least four species), and *Newportides* Chamberlin, 1921 (at least three species). Although there is a large distribution of *Newportia* in the neotropical region, there is a lack of investigation on its taxonomy and bioecological aspects. Therefore, this work aims to improve the knowledge of the subgenera *Tidops* and *Newportides*, through a morphology-based revision. The examined specimens belongs mainly to the myriapod collection of the Museu Paraense Emílio Goeldi (MPEG). Also, specimens from the scientific collections of Instituto Nacional de Pesquisas da Amazônia (INPA) and Instituto Butantan (IBSP) will be borrowed. Individuals under analysis are immersed in ethanol 70%. Specimen visualization will be performed with Leica MZ16 stereomicroscopes. The illustrations and the automontage images will be obtained in a stereomicroscope M205A, attached to a digital camera Leica MC170 HD.

Keywords: Centipedes, Myriapoda, Chilopoda

Funding: CAPES

Taxonomy of termitophilous Staphylinidae (Coleoptera) from the Brazilian Amazon

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Termite nests, provide environmentally stable environments that are protected by the host colony. The benefit of termite colonies has resulted in infiltration from a variety of vertebrate and invertebrate guests. Some of them utilize termite nests as temporary refuges, but many species are obligatory members of termite colony, which are known as termitophilous. One of the most numerous termitophilous group are the rove beetles (Staphylinidae), a family with 32 subfamilies and more than 63,000 described species, representing one of the largest families in Metazoa. Staphylinidae is cosmopolitan, occurring in almost every habitat apart from glaciers and occupying several microhabitats. Termitophilous behavior evolved multiple times in many lineages of five subfamilies of rove beetles: Osoriinae, Scaphidiinae, Tachyporinae, Pselaphinae and Aleocharinae, all recorded from Brazil. The Brazilian Amazon is the region that harbors one of the largest termite faunas, but the termitophilous rove beetle fauna remains poorly studied and many species remains undescribed. Until now, only about five species and four genera have been recorded from this region, but this value surely is underestimated. This is mainly due the absence of field work directed to obtaining specimens with cryptic habits or in specific substrates, such as termite nests. Due to that, termitophilous Staphylinidae are rare or absent in the principal collections of the Brazilian Amazon. Therefore, the present work aims to carry out a large taxonomic study on the species of termitophilous Staphylinidae from the Brazilian Amazon. The specimens will be collected in many forested and non-forested areas in the Brazilian Amazon. Termites nests will be open using picks and shovels. A first cut will be made on the upper base of nests (surface level) pulling out the aerial part of the structure that will be stored in large plastic bags. Pieces of the nests will be sorted on white trays and fine-hair paint brushes will be used to pick up the beetles and termites, and both will be killed and stored in 70% ethyl alcohol. Beetle specimens will be identified to species level with identification keys and by comparison with identified specimens in entomological collections. Specimens will be analyzed with stereomicroscopes, light microscopes and scanning electron microscopes. They will be deposited in the large Brazilian entomological collections, mainly that of the Museu Paraense Emílio Goeldi (MPEG).

Keywords: Rove beetles, Termitophilous, Termites, Termitaria, Amazon

Funding: Programa “Tatiana de Carvalho” de pesquisa e conservação da biodiversidade da Amazônia/Greenpeace Brasil.

The influence of natural and experimental factors on the structure and floristic of natural plant regeneration in dryland and flooded forests in eastern Amazonia

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The general objective of the thesis is to test the differences in the species composition of the natural regeneration community in relation to artificial drought, distance, topography and physical-chemical composition of the soil. The thesis was structured in 3 chapters: In the 1, the structure and floristic comparison of natural regeneration in a dry land forest is made in the Seca Floresta experiment (ESECAFLOR) that simulates a water reduction in the understory. In the 2, the structure and floristics of the natural regeneration of the terra firma forest are compared in 3 areas in two topographic conditions (plateaus and shoals) and in the 3, the structure and floristics of the natural regeneration between two flooded forests (igapós and floodplains) are compared.) over a distance of 30 km. All 3 experiments were carried out at the Ferreira Penna Scientific Station, located in the Caxiuanã National Forest. Data collection was performed using 2m x 2m plots. In chapter 1, the number of species varied from 129 in the control plot to 86 in the experimental plot, while the total number of individuals ranged from 660 in the control plot and 356 in the experimental plot. The tree, palm and herbaceous life forms had a reduction in the density of individuals, varying from -13% to -79%, between the control and experimental plots. The only form of life that had an increase in density in the experimental plot was the lianas with 14%. There was a significant difference in species composition between the control and experimental plots. In chapter 2, in the three inventoried areas, the soil moisture was significantly higher in the shallows compared to the plateaus. 214 species were identified, 165 in the plateaus and 58 in the shallows. The number of species and the density of individuals was significantly lower in the shallows compared to the plateaus. There was a clear separation of species composition between the 3 plateau and shallow areas analyzed in this study. In chapter 3, the number of species varied from 66 in the igapó and 49 in the várzea, while the total number of individuals varied from 782 in the igapó and 772 in the várzea. There was no significant difference in species richness and number of individuals between the two forests. There was a clear separation of species composition between the two types of flooded forests. There is no significant relationship of species similarity in relation to the distance of the plots in the igapó and várzea forests.

Keywords: water exclusion, floodplain, igapó, similarity, Caxiuanã

Funding: Coordenação de Aperfeiçoamento de Pessoal de Nível Superior/Programa Ecológicos de Longa Duração (PELD) – Floresta Nacional de Caxiuanã

Study of aspects and results of the process of updating the priority areas for conservation of the Tapajós River basin

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The selection of a network of protected areas should be developed from a systematic planning approach that analyzes their goals, location, design and include a representative portion of targets biodiversity and ecosystem and evolutionary processes. However, research indicates that, despite efforts to find the best conservation proposals, the conservation plans does not always produce results consistent with those needed for long term biodiversity conservation. Therefore, this research analyzed aspects of data quality and decisions made in the systematic planning approach for the conservation of the region of the Tapajós River basin. Firstly, we analyzed the present representativeness (included in indigenous lands, integral protection conservation unit and sustainable use conservation unit), achieved for species of amphibian (11), lizards (13), birds (21) and mammals (14), in two scenarios (protected in 2017; solution of the Brazilian updated map of priority areas (2018)), aiming at a protection target of 30% of the distribution area of each species within the basin. Then, we analyzed the representativeness achieved for the protection of birds and mammals hunted for meat in a scenario in which only strictly protected areas are included as protected. The analysis was performed based on the database produced for the updating of the priority areas map and using ArcGIS 9.3. The representativeness provided by the current protected areas partially met the goal of protecting of the distribution area of target species for the Tapajós River basin (10 of 11 amphibians; 20 of 21 birds; 9 of 13 lizards and 11 of 14 mammals). The protection solution resulting from the updated priority areas for the entire biome map was not efficient at the basin scale, because the set of selected areas will not be able to provide a substantial increase in the protection of these targets at the regional level. In addition, a large proportion of protected areas in the Tapajós River basin belong to some type of Sustainable Use protected area. If, on the one hand, the creation of these protected areas facilitates the implementation and management, on the other hand their potential of to conserve species, especially those of commercial value or interest for human use, is reduced. This reduced potential was seen in the present results, where hunted species of birds (8) and mammals (9) remain partially unprotected because in some areas hunting is allowed.

Keywords: decisions, species, protected area

Funding: CAPES

Composition and distribution of epiphyte bryophytes in areas adjacent to Amazonian savannas

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Epiphyte bryophytes present high biodiversity in tropical rainforests due to elevated humidity, but they are also present in open vegetation types, such as savanna. Recent study in savanna patches intermingled in the Amazonian forest revealed different species composition, and it is believed that the difference could be associated to adjacent forests. The species community of bryophytes may vary over height zones due to micro-environmental changes, and in Amazonian rainforest few studies investigated bryophytes in canopy of trees, but results showed that species restricted to high canopy could also be present in lower open vegetation. For this reason, studies on epiphyte communities in vertical distribution are necessary. This study aims to investigate the influence of epiphytic bryophyte community from adjacent areas in the bryophyte flora of savanna patches, analyzing species richness and composition. The study will be carried out in areas of Terra Firme forest adjacent to Amazonian savanna vegetation located in Cachoeira do Arari and Maracanã, Pará. In the surrounding forest of a recently studied savanna vegetation, five host trees will be selected in an area from the edged to the interior of the forest (0-100m) and another five host trees within the forest (>100m). The host trees will be stratified in six height zones: tree base (Z1), lower trunk (Z2), upper trunk (Z3), inner canopy (Z4), middle canopy (Z5), and outer canopy (Z6). For the collection of samples, 10 x 10 cm plots will be delimited in each height zone, being stored in properly identified paper bags, in addition to values of temperature, brightness and humidity. The specimens will be taken to the laboratory where they will be identified under a microscope with the support of specific literature. In this study, it is expected that the adjacent forests influence the savanna bryophyte community, contributing to the heterogeneity of the community presented by these patches. It is also expected variations in the vertical distribution of the bryophytes and that the canopy composition, since this stratum is more exposed to light, will resemble the one of the neighbor savanna vegetation.

Keywords: Canopy, bryophyte flora, vertical gradient, ecology

Fruit-feeding butterflies as indicators of natural regeneration after burning

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Habitat can be affected in several ways. Natural disturbances such as storms, floods, droughts and interspecific interactions, events linked to clearing openings, burning and other anthropic disturbances. Some studies indicate butterflies as ideal models for studying present and future impacts. Gurupi's REBIO has been monitored in relation to fruit-feeding butterflies since 2013. In 2015 the Reserve was affected by a large fire that affected about 30% of its area. The aim of this study is to use fruit-feeding butterflies as indicators of natural regeneration after burning, to identify and analyze the interactions between caterpillars of fruit-feeding butterflies and host plants in burned and unburned areas. In the samplings in the years 2013 and 2014, traps containing fermented banana baits were used, arranged in two trails of 5km (north and south of Rebio), every 500m two traps, one in the understory and another in the canopy, totaling 10 sampling points, on each trail with 20 traps, for five days. We used plots of 50 x 20m to measure the vegetation variables in each sampling point and the post-burn were collected between August and November 2019, in forest areas that were burned and in preserved areas of fire (control), always in the understory, in trails of 2km, with a distance of 500m, four sampling units were inserted, in each unit four traps with a distance of 50m were inserted, totaling 16 sampling points, two trails in an unburned area and one in a burned area (north region) and the reverse in the southern region, totaling 96 traps in six tracks, during six consecutive days on each expedition and collection of caterpillars through active search, lasting 20 min on each plot on each day of collection. In the data set prior to the fire event, 62 species of fruit-feeding butterflies were recorded, out of a total of 378 individuals. The most abundant species was *Colobura dirce dirce* (Linnaeus, 1758). This species has high heterogeneity of habitat, using from primary forests to areas with human occupation, is present throughout the year. The second most abundant *Morpho helenor theodorus* (Fruhstorfer, 1907) has similar ecological characteristics. The sub-family Satyrinae was the most abundant and with the highest species richness. Therefore, the Gurupi's REBIO must be protected from threats and restored where necessary to ensure the continuity of the forest and the greater conservation potential of the species.

Keyword: Nymphalidae, effects of fire, anthropic disturbances

Funding: Conselho Nacional de Desenvolvimento Científico e Tecnológico (CNPq), Instituto Chico Mendes de Conservação da Biodiversidade (ICMBio)

Taxonomic study of Milichiidae (Insecta: Diptera) from Brazilian Amazon

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Milichiidae is a family of Acalyptrate Diptera that occurs in all biogeographic regions and has about 426 described species and 20 genera, of which only 34 species and seven genera have been recorded for Brazil. This is one of the most common fly families in Brazil, and these flies are abundant in various environments, including urban ones. The biology of the group is diverse and many necrophagous species are important in the decomposition of organic matter, aiding in the recycling of nutrients. Adults of some species visit flowers and are important pollinators. The flies of this family have a uniform external appearance, since most have the same coloration pattern. Thus, identification is based primarily on male genitalia. Despite this, few works contain illustrations or photographs on male genitalia for milichiid species accompanied by keys for identification. However, there is still no key to the genera and species that occur in Brazil. In addition, some species occurring in Brazil are still not well characterized since their original descriptions are short and without informative images. Therefore, the identification of genera and species occurring in Brazil is still a slow and difficult task, especially for students and non-specialist researchers, which may lead to errors in identification. In this way, this project aims to produce a species-level taxonomic revision of the Brazilian Amazon Milichiidae. Specimens from the most important Brazilian Amazon entomological collections will be analyzed (INPA, MPEG). Until now, two new genera have been found, each one with one species. One of that seems to be widely distributed in the Brazilian Amazon and is associated with carton nests of *Azteca* ants. In addition, there are three new species of *Milichiella*, one new species of *Paramyia*, and one new species of *Neophyllomyza*, which represents the first occurrence of this genus from South America. Most of analyzed specimens of *Neophyllomyza* were collected visiting extrafloral nectaries on leaves of *Solanum stramonifolium* (Solanaceae) in the research campus of MPEG. The genus *Costalima* was recorded for the first time from Amazon, since it is known only from type-locality in Minas Gerais. Larvae e pupae of this genus were found in nests of *Crematogaster* ants in Caxiuanã (PA) and will be described for the first time.

Keywords: Acalyptratae, Invertebrates, Insects, Fly, Ant.

Funding: Programa “Tatiana de Carvalho” de pesquisa e conservação da biodiversidade da Amazônia/Greenpeace Brasil.

Drosophila of the *tripunctata* group using how resource fallen flowers of Lecythidaceae species

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The *tripunctata* group is inserted in the sub-genus *Drosophila* Sturtevant, 1942 and has four subgroups (subgroups I,II,III e IV). The determination of species in this group presents difficulties because of the high interspecific crypticity. Another barrier found for this group of *Drosophila* is the recognition of couples of the same species, because in some cases sexual dimorphism. Also, for some clades there is no complete separation between species, and hybridization may occur in nature. The species in this group are distributed in tropical regions, being found in environments with more preserved forests. Their food preference is for yeast and bacteria found in decaying fruits and flowers. Many species in this group are not captured by traditional methods of collecting drosophilids (fruit baits) because have specific substrate use, such as the species that reproduce in flowers fallen on the ground. Decaying flowers of Lecythidaceae are attractive how fooding and breeding place. More than 85% of visiting insects of this resource belong to *tripunctata* group. The aim of study is characterize the relationship between the species of the *tripunctata* group and the use of the flowers of the Lecythidaceae fallen on the soil, and define the relationship between these species and the other species of the group. We focused on trees of the Lecythidaceae, representing all genera of this family present in the study area. The collection was made with entomological net on the flowers exposed in the soil, in August 2019 and from January to March 2020 in Caxiuanã National Forest. In this last collection period, an experiment was carried out in the field to identify drosophilids emergencies from species of Lecythidaceae trees. Each specimen was individualized for morphological evaluation. Specimens of similar morphology were recorded as same morphospecies and samples from each group will be submitted to molecular analysis (cox2 e ddc). All males who were sent for molecular analysis had their genitals removed, and couples were photographed, and at least one specimen of each morphotype was kept in the Museu Paraense Emílio Goeldi. Were collected more of two thousand specimens of *tripunctata* group and obtained more of three hundred emergencies of this group in the experiment. It were found, so far, eight morphospecies. The continuity of the study will is describe new species and position them phylogenetically within existing subgroups or propose new arrangements if necessary.

Keywords: crypticity, Caxiuanã, phylogenetic, barcoding, biodiversity.

Funding: CAPES e BRC Brasil-Noruega e Monitoramento de biodiversidade com metabarcoding

Taxonomic revision and biogeographic modeling of the spider genus *Falconina* Brignoli, 1985 (Araneae: Corinnidae)

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Taxonomic revisions greatly improve our knowledge of animal biodiversity. Spiders represent one of the most diversified groups of Arthropoda, with plenty of knowledge gaps in the number of species in the Neotropical region. Corinnidae is a relatively well-known family of sac spiders, with numerous species morphologically resembling ants. The genus *Falconina* Brignoli, 1985 currently includes four valid species: *F. melloi* (Schenkel, 1953), the type species, distributed in Venezuela and northern Colombia; *F. gracilis* (Keyserling, 1981) from Argentina, Brazil, Paraguay and south-western USA (possibly introduced); *F. albomaculosa* (Schmidt, 1971) endemic to Ecuador; and *F. crassipalpis* (Checkering, 1937), described from Panama and subsequently recorded in Cuba. In addition, there are many unidentified specimens of *Falconina* deposited in various museum collections, which represent several undescribed species, with Andean and Amazonian distribution. The main goal of this dissertation project is to perform a taxonomic revision of *Falconina*, including redescription of problematic species and description of new species, as well as to model their distribution. We will examine specimens previously requested on loan to MPEG by ABB, deposited in the California Academy of Sciences (CAS), American Museum of Natural History (AMNH), Natural History Museum (NHM) and Museu Nacional, Universidade Federal do Rio de Janeiro (MNRJ). Additional material from Universidade de Brasília (UnB), Universidad Federal de Piauí (UFPI) and Museu de Zoologia, Universidade de São Paulo (MZUSP), Instituto de Ciências Naturales, Universidad Nacional de Colombia (ICN), Museo Javeriano de Historia Natural (MPUJ) and Museo de Entomología de la Universidad del Valle (MUSENUV) will also be obtained. The taxonomic study of the material will be performed by means of a traditional morphological analysis (examination of body parts under dissecting microscope), SEM, and multifocal microscopic photography. Distributional maps will be produced in ArcGis and will be modelled using algorithms MaxEnt and AUC, as well as climate variables from WorldClim. Our study aims to generate a much more comprehensive taxonomic and biogeographic knowledge of the genus *Falconina*. The taxonomic identity of *F. gracilis* will be clarified, alongside its peculiar disjunct distribution. At least 9 species new to science will be described and illustrated.

Keywords: Biological collections, geographic distribution, morphology, neotropical biodiversity

Funding: Programa “Tatiana de Carvalho” de pesquisa e conservação da biodiversidade da Amazônia/Greenpeace Brasil.

Phylogeography and taxonomic revision of *Micrurus ibiboboca* Merrem, 1820 (Serpentes, Elapidae)

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Micrurus Wagler (1824) currently comprises about 85 taxa present from the southeastern United States to southern South America. Based on the color pattern, tail length and hemipenian morphology, four groups of species of this genus are recognized. *Micrurus ibiboboca* belongs to the group that presents triad coloration, short hemipenis and bilobate. This species, described at the mouth of the Belmonte River, Bahia, Brazil, may be characterized by the presence of the anterior region of the white muzzle, which extends from the anterior frontal edge, preocularly and supraocularly (dorsally) to the first three supralabial regions. This species has a problematic and confusing taxonomic history. It was described as *Elaps ibiboboca* and *Elaps marcgravii*, both based on the same type material, causing uncertainties about their type locality. *Micrurus ibiboboca* is present along the Brazilian coast, from the state of Maranhão to Rio de Janeiro, occupying areas of Atlantic Forest and Caatinga. Given their large distribution and the large number of morpho-types recognized based on staining pattern and morphological characters, we hypothesized that there may be other unrecognized and described evolutionary units. Using specimens and tissue samples deposited in scientific collections, this thesis aims to propose a phylogeographic hypothesis for *Micrurus ibiboboca*, identifying potential cryptic lineages and testing the hypothesis of group diversification. In addition to phylogeographic analysis using mitochondrial and nuclear genes, morphological analysis will involve meristic, morphometric characters and pattern of design and color, hemipenis and skull.

Keywords: Coral snakes, Morphology, Biogeography

Funding: CAPES, PROTAX-II

Phylogeography of anacondas (*Eunectes*: Boidae)

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Snakes of the genus *Eunectes* are commonly known as “anacondas” and have attracted popular attention due their large size. They were iconized in popular culture as giant snakes eating huge prey, including humans. However, there is little scientific consensus on their evolutionary history and inter and intra-specific relationships. Phylogenetic studies with boids and related families have provided evidence on the fragmentation of the Gondwanian supercontinent and investigations with intra and interspecific approaches may provide evidence on recent geological patterns and processes in South America. *Eunectes* exhibit aquatic habit and their origin dates from the Neogene period, when the large river drainage basins of northern South America assumed their current configuration. Investigations have shown that populations of *E. murinus* (Linnaeus 1758) could exhibit differences throughout their distribution (from north South America to south Brazil), representing different evolutionary units. Since different pools of genes result from different evolutionary histories, elucidating the phylogeographic pattern of these snakes will help us to understand evolutionary process in South America as well can provide new evidences of hydrogeographic paleocenarians. Once the recognition of evolutionary units is fundamental for conservation, our project look to infer the phylogeographic history of *E. murinus*. Genetic samples of *Eunectes* will be obtained from scientific collections. The genes will be extracted and amplified by PCRs, and then sequenced. We will determine the number of polymorphic sites, number of haplotypes, haplotypic and nucleotide diversity through the analysis of molecular variance. We will analyze the level of influence of geographical distance on genetic diversity, genetic and geographic distances, comparing individuals point by point using the Mantel test. We will define populations based on well-sustained branches resulting from Bayesian inference trees and on the results obtained by Bayesian cluster analysis. We will also build the haplotype networks in order to determine the number of unique and shared haplotypes based on the likelihood method. The demographic history of each population will be investigated using the coalescent multilocus method. To estimate the time of divergence between the main *Eunectes* lineages and to relate them to geological events, a species tree will be estimated with the populations established from the phylogenetic inferences.

Keywords: Biogeography, Neogene, Paleohydrographic scenario, Molecular phylogeography, snakes.

Funding: CNPq

Morphological variability of *Tayassu pecari* (Artiodactyla, Tayassuidae) from the Xingu-Iriri Interfluvium

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Tayassuidae is the only Suiforme's family in the New World, being one of the first immigrant mammals during the Great American Biotic Interchange (GABI). It includes three species: *Dicotyles tajacu* Linnaeus, 1758, *Tayassu pecari* (Link, 1795) and *Catagonus wagneri* (Rusconi, 1930). Tayassuids are susceptible to intense selective forces resulting from climate variability, availability of food resources, anthropic impacts from hunting and habitat loss, or even competition with each other due to their ecological similarities and extensive area of sympatry. Such threats can cause different responses of the organisms in relation to the new environment conditions, being able to influence on the selective pressures that shape the life history of the populations, since these organisms evolve according to environmental factors that shape ecological preferences and demands over a sufficient evolutionary period, that allows genotypic and phenotypic adaptations that favor and increase species fitness. These adaptations refer to properties of living beings that make them able to survive and reproduce in nature, making these variations have high adaptive value. Morphological variation can occur in intraspecific and interspecific levels: e.g., significant differences in mandibular skull dimensions found between *D. tajacu* populations from rainforests and drier environments and adaptations in the mandible-skull morphology observed between *D. tajacu* and *T. pecari* due to particular eating habits and biomechanical or phylogenetic constraints. The study area "Terra do Meio" is located on the Xingu River and Iriri interfluvium, in the state of Pará, and is composed of a mosaic of Conservation Units and Indigenous Lands that form a continuum of protected areas that create the Biodiversity Corridor of Xingu Basin. Although it includes several protected areas, it is under numerous threats, such as deforestation, burning, road construction, agriculture and logging. To understand the morphology of *Tayassu pecari* in the Xingu-Iriri interfluvium and compare with populations from other localities based on literature, will be used geometric and linear morphometry, and qualitative analyses of 186 skulls of adult specimens present in the Mammalian Collection of the Museu Paraense Emílio Goeldi (MPEG). Also, seek to understand the diet of these specimens through the analysis of diet-related patterns through tooth microwear, using a scanning electron microscope.

Keywords: Tayassuidae, linear morphometry, tooth microwear.

Funding: CAPES

Taxonomic turnover and functional homogenization of rotifer communities in an Amazonian river

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Patterns of beta plankton diversity in rivers have been mainly determined by hydrological factors, altering the dispersion and composition of species and traits. In this study we evaluated the temporal variation of β taxonomic and β functional diversity and its partitions (turnover and nesting) in the rotifer community in an Eastern Amazon river, we also evaluated the importance of temporal, environmental, and seasonal dissimilarities with rotifers. We tested five hypotheses: β Taxonomic diversity is positively related to β functional; β taxonomic and β functional diversity are higher in the rainy season; the turnover component is responsible for changes in the beta diversity of the rotifer community; β functional and β taxonomic diversity are positively correlated with environmental dissimilarity and/or temporal dissimilarity. The rotifers were sampled in the Guamá River monthly between October 2017 and June 2019. The functional characteristics used were biomass, feeding mode, feeding habits, predator escape, and habitat. Our results demonstrated functional characteristics predominance of herbivorous, pelagic, filter, exhaust with thorn and sweet species. We verified taxonomic turnover and functional nestedness over time, and that the supereutrophic condition of the river may have contributed to functional homogenization. There were no seasonal differences in β taxonomic and β functional diversity, probably due the low environmental dissimilarity. We point out that temporal studies should evaluate both taxonomic and functional aspects of communities, mainly because the effect of environmental changes may be more noticeable at the functional level of communities.

Keywords: beta diversity, environmental heterogeneity, functional characteristic, plankton, lotic environment

Funding: CAPES

Guilds of arboreal ants in post-mining forest restoration areas

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Ants (Hymenoptera: Formicidae) play an important role in the flow of energy, biomass and evolution of plants and animals, being considered fundamental organisms in the study of degraded environments or in processes of ecosystem restoration. Guild classifications are often used as a tool to understand community structure and in analysis of environmental management. Our study aim to describe guild structure of arboreal ants in post-mining areas. More specifically, the study will compare guild classification of arboreal ants between reference forests and forest under ecological restoration. We selected 14 areas: (seven *terra firme* forest areas and seven natural regeneration areas implemented in 2014). In total, seven collection campaigns were carried out between January 2019 and January 2020 in the municipality of Paragominas, located in the northeast of the state of Pará, within the limits of the bauxite ore extraction areas of the mining company Hydro-Alunorte. In each area, ants were sampled by the arboreal arthropods collector method (an entomological umbrella beating modified to sample higher trees) along a 250 m long transect. The classification of arboreal ants into guilds will be based on ecological, morphological (size and shape), and life history variables (colony size, number of queens, behavior).

Keywords: Ecology of Communities, Bauxite, Forest Restoration, Mining

Funding: FAPESP

Temporal dynamics in bee-plant interaction networks in post-mining regeneration areas

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Ecological communities are dynamic, with an abundance of species and their interactions varying in space and time, affecting plants and animals at different scales, changing their development and behavior in the environment in which they live. Human activity has degraded ecosystems and ecological restoration plays a fundamental role in recovering the functions and biodiversity of degraded ecosystems. Thus, the bee community stands out as the main agent group of the ecosystem pollination service, responding differently to changes that occur in the environment in which they are, due to temperature variation, the availability of resources and the degree of loss of water. vegetable cover. In addition, plant communities vary less on time scales, especially if the species are evergreen, however, flower production from entire communities can vary substantially, due to changes in the local climate. Thus, we intend to evaluate the presence of plants and bees, highlighting differences in the availability of floral resources and directly reflecting on the structure of interaction networks. By characterizing the dynamics of interactions, we can analyze the spatio-temporal variation in the networks, the centrality of plants and bees over time according to the characteristics of the area and the temporal changes in the network structure that can reduce the robustness of the community and the loss of species. The collection is carried out in the municipality of Paragominas in plots of 250m x 4m, monthly, for the identification of pollen grains, the Erdtman methodology will be used, differentiating the pollen grains and qualitative and quantitative interaction matrices will be built for the networks, in which the structures formed will be calculated using nesting metrics, specialization index, modularity and centrality, using the bipartite package in software R. Currently 81 species of bees and 46 species of plants have been counted.

Keywords: Interactions, Hymenoptera, Paragominas.

Funding: HYDRO/MPEG/FADESP/Projeto Interações Ecológicas

Evolution of anatomical characters in Arthrostylidiinae (Poaceae, Bambusoideae, Bambuseae)

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The tribe Bambuseae (Poaceae: Bambusoideae), or woody bamboos, is composed of bamboo species with culms strongly lignified. Woody bamboos are of significant importance due to their economic, ecological and cultural applicability. In the New World, Bambuseae is divided into three subtribes: Arthrostylidiinae, Chusqueinae and Guaduinae, and comprises 345 species within 21 genera. Due to the long flowering cycles that can last up to 120 years, woody bamboo specimens in herbaria usually do not have reproductive structures. For this reason, vegetative characters are commonly used in the taxonomy and identification of species, including those of anatomical nature. Anatomical investigations aiming to seek for alternative characters for the taxonomy of bamboos have increased in recent years. However, most of these studies have focused on the foliage leaf blade anatomy, whereas little attention has been directed to other vegetative structures, such as pseudopetiole, leaf sheath, culms and culm leaves. In this context, we characterize the anatomical and micromorphological structure of vegetative organs (foliage leaf blade, leaf sheath, pseudopetioles, culm, culm leaf blade and culm sheath) of species belonging to Neotropical bamboos subtribes, with emphasis on the Arthrostylidiinae. We aim to contribute to the taxonomy and better understanding of the evolution of anatomical characters in the Neotropical bamboo clades. So far, anatomy of the culm of species of Bambuseae (with emphasis on the Arthrostylidiinae) was analyzed; as well as investigations on the leaf blade, which has been increasingly important in the group systematics. Anatomy of pseudopetiole, leaf sheath and leaf culms, in the light of the taxonomy of the group, also reveals new insights for the understanding of the evolution of Neotropical bamboos.

Keywords: Plant anatomy, bamboos, taxonomy

Funding: CAPES

Bryophytes in Amazonian savannas: composition, formation and relation between disjunct communities in the eastern Amazon

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Savannas in the Brazilian Amazon have different climatic types, edaphic conditions, relief and different distribution patterns. Several hypotheses have been pointed out as driving the diversification of Neotropical savannas and biodiversity in this region. The vascular plant communities of savanna are strongly related to environmental variables, especially with soil conditions, seasonality, and fire. The aim of this study was to investigate the richness and composition of bryophytes in savannas in the eastern Amazon and to evaluate the factors (biotic and/or abiotic) and ecological aspects related to the formation of communities formed in this region. The results were achieved with the help of biostatistics tools, ordination analysis, and Functional Diversity. The thesis is divided into three chapters. The first deals with the evaluation of the richness, composition and similarity of bryophyte flora from five savanna areas in the eastern Amazon. In total, 22 species of mosses and 22 species of liverworts were registered, with a marked floristic difference between the areas. Through this study, one species was reported for the first time in the state of Pará, five in Amapá, and one in the North. In this chapter, it was pointed out that the communities of bryophytes present the composition possibly related to local factors and to the influences of the sets of phytophysiognomies of the Amazonian environment in which each savanna is located. The second chapter aimed to investigate the relationship between phytophysiognomies and abiotic conditions in the assembly of bryophyte communities in savannas in the eastern Amazon and to evaluate the ecological aspects of the formed communities. Through eight species selected for being present in at least four areas, a significant relationship was observed between them and the abiotic variables (temperature, humidity, and precipitation). The FEve values indicated the hypothesis of convergence of the functional characteristics resulting from the environmental filtering process on these communities. The third chapter deals with the description of a new species. This study confirmed that the structure of each savanna and the respective abiotic conditions act as filters in the selection of species that are inserted in the communities formed locally. In addition, it contributed to the expansion of knowledge about bryophytes in neotropical savannas, as well as confirmed the biological importance of these areas.

Keywords: Bryophyta, Marchantiophyta, Amazonian savanna, environmental filters, functional diversity

Taxonomic study of a group of species of *Polybia* (*Myrapetra*) White, 1841 (Hymenoptera, Vespidae)

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Polybia is a genus of social wasps (Vespidae) distributed in all biogeographic regions that is most species-rich in tropical America. This genus comprises 78 described species classified in 11 subgenera. Despite it is a relatively well-studied genus, there are many species groups poorly known with badly characterized species. In addition, since the last revisional study about *Polybia* published in 1978, few taxonomic studies about its species have been published. *Myrapetra* is the largest subgenus of *Polybia* and, in order to facilitate taxonomic studies, some of its species has been classified in informal groups of species, such as the *Polybia occidentalis* species-group, that comprises 12 species. However, a set of species of this group differ remarkably from the type species morphologically and in habitat preference. It covers the following species: *P. parvulina*, *P. flavifrons* (subspecies: *P. f. flavifrons*, *P. f. barbatula*, and *P. f. hecuba*), *P. scrobalis* (subspecies: *P. s. pronotalis*, *P. s. scrobalis* and *P. s. surinama*), *P. diguetana*, *P. belemensis* (subspecies: *P. b. belemensis* and *P. b. brevitarsus*), *P. dimorpha*, and *P. platycephala* (subspecies: *P. p. platycephala* and *P. p. sylvestris*). In the collection of the Museu Paraense Emílio Goeldi there are several species of this group of species that do not match well any known species, suggesting that they are undescribed or/and that the interspecific limits are not well established. In addition, four of these species has morphologically distinct disjunct populations that have been classified as subspecies, but no taxonomic studies have been conducted to evaluate the status of them. Therefore, the objectives of this project are: 1) To provide a taxonomic review of an group of species of the subgenus *Myrapetra*, 2) To redescribe all the seven described species of this group; 3) To describe the possible new species; 4) To evaluate the subspecies status; 5) To provide useful taxonomic tools, such as imagens of diagnostic features and a key to all valid species; 6) To provide new information about nest. The revision will be based on specimens from national and oversea entomological collections. The morphological analyses will be done with stereomicroscope and scanning electron microscope.

Keywords: Aculeta, Insecta, Taxonomy, Vespoidea, Wasps

Taxonomic and functional responses of the bryophyte flora in different types of land-use

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Changes in the pattern of land-use represent a threat to biodiversity in terrestrial ecosystems. Anthropogenic areas are generally warmer and drier than natural areas, which constitute environmental filters in the establishment of biological communities such as bryophytes. This study aimed to identify floristic (structural and taxonomic) and functional responses of the bryophyte flora, as well as favorable climatic conditions for the establishment of bryophytes in different types of land-use. The work will be conducted in the Northeast of Pará in areas of natural forest, secondary vegetation, monoculture and agroforestry. The biological material for floristic and functional aspects will be collected in 20 parcels (10 x 10 m; 100 m²), five in each type of land-use. during the identification of the taxa, there will be the analysis of ten functional attributes that are related to the capture and flow and / or retention of water, protection against ultraviolet radiation and reproductive success. Five phorophytes will be selected with distance of 20 m between them in each type of land-use to predict the climatic niche of epiphytic bryophytes. A datalogger will be installed to monitor microclimate variables (temperature and humidity) for a period of 12 months in central phorophytes. The bryophytes epiphytes will be identified in three subsamples (40 cm²) delimited at 1.50 m from the base of each phorophyte. With the execution of this project, it is expected to contribute to the floristic, functional and climatic niche knowledge to clarify how changes in the land-use pattern and climate changes can affect the bryophyte flora.

Keywords: Bryophytes, floristics, functional diversity, climatic niche.

Funding: CNPq

Floristic composition of the regeneration of a stretch of savanna in the Eastern Amazon

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The savannas are Amazonian and represent an ecological potential for use in several aspects, especially for traditional communities, however, they are suffering forest, environmental and human losses. The objective of the research was to know the floristic composition of the natural regeneration of a stretch of Amazonian savanna in the state of Pará. The study was carried out in the savanna of Itapuá, municipality of Vigia de Nazaré, Pará with 93 km from the city of Belém. Data collection occurred monthly from September 2019 to August 2020 in 1 x 1m subplots randomly allocated corresponding to 480 subplots and a total of 480 m². In each subplot, all species with height ≤ 1 m were identified and quantified. The botanical identification in loco was carried out by a parobotanic from the Museu Paraense Emilio Goeldi (MPEG). The organization of the families was in accordance with APG IV and characterized in family, genera, species and way of life and calculated the arithmetic mean and standard deviation for families and life forms with the aid of the Bioestat 5.0 Program, 36 families, 73 genera and 99 species were registered, Fabaceae (14), Poaceae (13), Cyperaceae (9), Myrtaceae (7) and Dilleniaceae (6) were representative in number of *Paspalum* registered the largest number of species (5) followed by *Chamaecrista*, *Myrcia* and *Scleria* (4) and *Axonopus*, *Borreria*, *Byrsonima*, *Davilla*, *Dolioscarpus*, *Eriosema*, *Eugenia*, *Miconia*, *Ouratea*, *Polygala* and *Rhynchospora* (2). Dominant life form was Herb with 40 species, Shrub (21) and Tree (20). It was concluded that the Itapuá savanna presented a richness of 99 species in comparison to other Amazonian savannas distributed in the Fabaceae, Poaceae and Cyperaceae families. *Paspalum* with the largest number of species together with others characterized the herbaceous form as the dominant one. This was the first record of regenerating species and their life forms in an Amazonian savanna. Based on this knowledge, other initiatives should be sought for other savanna patches in order to show the importance of conserving these environments, which lately has been undergoing extensive degradation in the Amazon.

Keywords: conservation, lower stratum, way of life

Funding: CNPq/Caracterização dos Fatores Ambientais que Interferem na Conservação das Comunidades Vegetais dos Cerrados do Norte e Nordeste do Brasil

Effects of açai (*Euterpe oleracea* Mart.) management on the mechanisms of regeneration in a floodplain forest of the amazon estuary

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Tropical forests are responsible for maintaining biodiversity, providing ecosystem services, and sustaining the livelihoods of millions of people. However, the provision of these ecosystem services has been threatened, as the regeneration capacity of forests after disturbances has been reduced. In this project we tested the following hypothesis: the intensification of the açai management alters the natural regeneration of plant communities, interfering with the mechanisms of regeneration. This interference is expressed by the impoverishment of taxonomic and functional compositions of the woody species found in the seed rain and soil seed bank. The study was carried out in the Combu Island, Brazil. Twenty plots were selected containing different intensities of açai management (0-675 açai clumps per hectare). In each plot, all woody plants with a breast circumference ≥ 15 cm were measured, their heights inferred and identified. The seed rain and soil seed bank were collected every two months from 2019 to 2020. All seeds were identified, quantified, and had dispersion syndrome, form life, mass and size obtained/measured. In each plot, measures of topography, flood, and soil fertility were also obtained. In relation to seed rain and soil seed bank, respectively, 3071 and 846 seeds and 18 and 22 species were collected. The dominant species in the seed rain were *Euterpe oleracea* Mart., *Viola surinamensis* Rottb., and *Hura crepitans* L., and in the soil seed bank were *Euterpe oleracea* Mart., *Symphonia globulifera* Lf., and *Pterocarpus santalinoides* L'Hér. *Euterpe oleracea* and *Hura crepitans* were indicators species of high açai management, while *Sarcaulus brasiliensis* Eyma and *Socratea exorrhiza* H.Wendl. were indicators species of low açai management. In the seed rain, the mass (g) ranges from 0.01 (*Spondias mombin* Jacq.) to 27.99 (*Carapa guianensis* Aubl.) and the seed size (mm) from 1.58 (*Spondias mombin*) to 51.48 (*Carapa guianensis*). In the soil seed bank, the variation in mass (g) ranges was from 1.82 (*Astrocaryum murumuru* Mart.) to 54.70 (*Socratea exorrhiza*) and the size (mm) from 3.24 (*Euterpe oleracea*) to 47.59 (*Carapa guianensis*). In both mechanisms of regeneration, the predominant seed dispersal syndrome was zoochoric followed by hydrochoric. The relationship between the predictor variables (i.e. açai management, flood, and soil attributes) and the response variables (i.e. taxonomic and functional composition) will be tested through Generalized Linear Models.

Keywords: Chronic anthropogenic disturbance. Non-timber forest products. Seed Rain. Soil seed bank.

Funding: Fundo Brasileiro para a Biodiversidade (FUNBIO) e Instituto Humanize.

Amazon estuary and hidden fauna: Systematic "tralhoto" *Anableps Scopoli, 1777* (Cyprinodontiformes: Anablepidae) based on morphological and molecular markers

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The *Anableps* genus, known as "tralhotos", comprises a group of fish that stand out, especially, by the peculiarity of the presence of high eyes and divided to allow focus images simultaneously below and above the water line. In Maranhão coast it was highlight the ecological role of the species *Anableps anableps*, characterized as an estuarine resident species (extremely vulnerable environments to anthropogenic pressure) marked the region. Only three valid species of *Anableps* are known: *A. dowei* (Gill), *A. anableps* (Linnaeus) and *A. microlepis* (Müller and Troschel), but, only two are found in the Amazon (*A. anableps* and *A. microlepis*). However, preliminary analyzes indicate that populations of some coastal rivers in northern Brazil (state of Amapá) are morphologically different and may represent different species. *Anableps* is a group, in its entirety, little studied, with great potential for the existence of cryptic species of restricted distribution, never studied, deeply, in taxonomic and phylogenetic terms. This work aims to: (1) delimit how many species of *Anableps*; (2) describe potential new species; (3) map the distributions of species; check the divergence time of the strains and study the diversity of haplotypes. For this, specimens were collected (License for the collection of zoological material: 73113), in the municipalities of Mazagão and Cutias (Amapá). Later, it will be made in other regions where the species are distributed. Samples from the Museu Goeldi collection and other institutes will also be used for analysis. The material will be analyzed in its morphology (internal-external) with meristic, morphometric and anatomical data, as well as, through molecular analyzes based on molecular markers (RAG1, CytB, COI). It is expected to present information on the real diversity of the group, revealing the existence of genetically divergent populations or even species not described, as expected for the population of *Anableps* in the Amapá River. It is assumed that in the analysis of haplotypes it will be revealed that populations that migrate may be isolated from those fixed in estuaries or rivers and that the diversity of haplotypes in river populations should be less.

Keywords: cryptic-species, taxonomic and phylogenetic studies.

Funding: Greenpeace Brasil/Programa "Tatiana de Carvalho" de pesquisa e conservação da biodiversidade da Amazônia.

DNA Barcoding Technique Applied to The Identification and Conservation Of New Rate Of Ictiofauna Rapture Of Amazon Rivers Races Near Hydroelectric

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Gene conservation is a new approach to the study of biodiversity and uses molecular analyzes to elucidate aspects of the relevant species for management and maintenance purposes. That said, the object of this proposal is to use the method code of DNA bar - "Barcode", using sequences of the COI gene to conduct an inventory of the diversity of the fish fauna of rapids Amazon river, one of the still poorly known habitats and many still new to science. The major factor of threat to Amazonian fish is the modification of the fluvial environment imposed by the construction of dams for power generation, modifying the rapids habitat. In this sense, this study seeks to discover the true diversity of Amazonian rheophilic fish, based on collections made through the project "Fish rheophilic, Natural Heritage and Endangered unknown" FDD 24-2019, whose main objective is the preservation of the fauna. Based on the "barcodes" seek shall be a quick identification and accurate how many rheophilics species exist, and that will serve as a basis for the description of new taxa, as well as to protect these habitats that are home to more than 90% of species of fish Threatened Extinction of the Brazilian Amazon. General objective is to detect new rate of the fish fauna by BOLD technique and assist in the conservation thereof. Specific objectives are extracted DNA and the sequence of the gene found COI rate; and assess how many rate occur in rheophilic environments of the Amazonian rivers. The methodology will be used to sample tissue specimens and five hundred thousand individuals that are extracted using Qiagen DNA extraction kit Blood & Tissue. The DNA for all stages will be obtained using this methodology. The samples are amplified with the primers for sequencing the genes cytochrome oxidase I - IOC (commonly defined as standard for barcodes animals) and the mitochondrial DNA control region to assist in studies of population genetics species. Barcodes The data generated will then be compared with data available in the Platform "bold" Barcode of Life Data System, and the new rate will then be revealed and counted, and then will be described with the help of experts. Justified this work because of the great biodiversity of the Amazon basin is being threatened by the deep impact caused by human activities, and that, despite this, the genetic Knowledge rheophilics species remains scarce. Therefore, the expected results will be based on the sequences obtained from the DNA barcode of various species that will contribute positively in the BOLD database, assisting in identifying and reducing the knowledge gap on the genetic diversity and species conservation. And possibly generate important new insights into the diversity of life and the rules of molecular evolution.

Keywords: genetic conservation, threatened fish, genetic diversity

Taxonomic revision of the Neotropical genus *Diaphorostylus* Kertész, 1908 (Diptera: Stratiomyidae: Clitellariinae)

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Stratiomyidae, or soldier flies, is one of the most diverse family of flies with about 2.840 described species and 367 genera. More than a third of Stratiomyidae species, about 1.000, occurs in the Neotropical region. This diversity, however, must be much greater, since the taxonomic knowledge of the family at the generic and specific level is still very limited. For Brazil, 345 species, 107 genera and 11 of the 12 subfamilies are known, but there are several gaps in family knowledge, especially for the Amazon. One of the least studied subfamilies is Clitellariinae, which currently comprises 127 species in 21 genera for the Neotropical region. Of this total, the genus *Cyphomyia* Wiedemann, 1819 corresponds to 73 of these species. In addition to *Cyphomyia*, with 19 species, the Amazon region has only *Diaphorostylus* Kertész, 1908 *Ditylometopa* Kertész, 1923 and *Euryneura* Schiner, 1868. Another eight genera occur in Brazil, but there are still not published records of their species for the Amazon. Therefore, further studies of the subfamily in the region are lacking. *Diaphorostylus* is one of those genera with a few studies. They are small stratiomyids (3–6 mm), mainly characterized by the presence of a metallic, coppery body, brown-stained wings and a projected face. The genus is exclusively neotropical, with four species, but with only *D. nasica* (Williston, 1888) for Brazil. Material examined from the Stratiomyidae collection of the Museu Paraense Emílio Goeldi (MPEG) and other collections has already indicated the presence of other species for the Amazon. However, there are no keys or photographs to identify these species. In this context, this project intends to advance the study of the biodiversity of *Diaphorostylus* in the Amazon region, with the preparation of a taxonomic revision of the genus. The biological material includes those from the MPEG, MZUSP, INPA and LMED collections.. The publication of this review will provide updated descriptions of all species, high quality photographs and illustrations, an identification key and a map with the updated distribution. Despite being a small genus, at least two new species have already been detected. A broad view of Neotropical Clitellariinae should result in the publication of new records of other genera and species for the Amazon region.

Keywords: Arthropoda, Insecta, Brachycera, Soldier flies Taxonomy

Funding: CAPES

Conservation status of frugivorous butterflies in the Brazilian Amazon

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A study carried out in several forests in the world, shows that the Amazon is subject to the highest absolute forest loss rates on the planet. And this is worrying, since the fragmentation of the forest can lead to the extinction of many species, such as frugivorous butterflies. Considering the threatening factors to the conservation of butterflies. The research asks: How are the frugivorous butterfly species geographically distributed in the Brazilian Amazon? How are the interaction networks between butterflies and their host plants structured? To what extent is host dependency a vulnerability factor for Amazonian butterflies? What species of butterflies are vulnerable in the Brazilian Amazon? The justification for the work was based on previous research (Lopes, 2015) where vulnerability to extinction and the conservation status of frugivorous butterflies in the endemic area of Belém were assessed, and 26 species were detected with some degree of threat. If this is the situation of the AEB, something not hugely different can be expected for the other areas of the Amazon. Therefore, this work has the general objective to organize a large database for all Brazilian Amazon to describing the guild of frugivorous butterflies and identifying the conservation status of species. The study will consist of the analysis of the material deposited in the collections and the analysis of the material from the previous standardized collections or carried out during the research period. Complementary information from the literature will also be added to the database. As preliminary results, national databases were consulted, literature reviews and collections made. A python script was developed to convert and plot many coordinates of various formats in a single format. It was created due to the difficulty of not having tools available for this need. So far, based on the data obtained, 23,421 individuals have been registered, distributed in 175 species, belonging to 4 subfamilies; Biblidinae, Charaxinae, Nymphalinae and Satyrinae. The subfamily Satyrinae showed the greatest wealth. The most abundant species were *Tigridia acesa* (Linnaeus, 1758) with 4,284 individuals (19% of the total registered) followed by *Taygetis cleopatra* C. Felder & Felder, with 2,473 individuals (11% of the total registered), the data were collected in 82 municipalities covering all nine states of the Brazilian Amazon.

Keywords: Amazon, areas of endemism, Butterflies survey, conservation.

Funding: CNPq and Mineradora Hydro/Projeto BRC.

Sensitivity analysis of fruit-feeding butterflies (Lepidoptera) protocol of the Monitora Program (ICMBIO) regarding environmental integrity in Conservation Units in the Amazon

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The creation of protected areas (CU) was the main strategies adopted worldwide for the conservation of biodiversity. But to find out if these areas are actually fulfilling their role in conservation, it is necessary to monitor the integrity of biodiversity through space and time. ICMBio instituted in 2017 the Monitor Program - National Biodiversity Monitoring Program. The Terrestrial subprogram has been developed as a Monitora Program pilot since 2014 and in order to implement monitoring in CU's of fruit-feeding butterflies. The protocol is done in three modules, that can be applied in accord of situation for each Conservation unit (CU) and all data contribute for composition of the one big databases. The research has as main objective to evaluate the sensitivity of the ICMBIO protocol applied to the indication of forest integrity from the estimates of the effect of different scales of spatial and temporal heterogeneity on the butterfly guild in CU's in the Amazon. This evaluation will produce information that will allow the analysis of the space-time variations in Lepidoptera communities. This information may be useful for local management of the CU's in addition to fostering the debate about the effectiveness of the Monitora Program and the functioning of the federal CU's system in the conservation of biodiversity. In addition to analyzing the database for all Amazonian sites, we will accompany the monitoring of CU, during the years 2021 to 2022, realizing all three protocols modules. The collections will be made in three CU's: Riozinho do Anfrísio Extractive Reserve, Terra do Meio Ecological Station and Serra do Pardo National Park. Two campaigns will be established per year and data collection will follow the methodology of the Monitora program, which defines procedures in three modules. module 1 provides for the identification of specimens in the field up to the taxonomic level of the tribe, with the support of identification guides, followed by marking and release; module 2 adds to the procedures in module 1, obtaining photos of all specimens for later identification. module 3 includes the collection of specimens, for refinement in taxonomic identification. In this project the obtention of data regarding the application of each of the three modules and the results analyzed independently. With the inclusion of analysis in routines in the programming environment of the program R 3.3.0 (R development Core Team).

Keywords: Biodiversity Conservation, Conservation Unit, Lepidoptera, Monitoring

Drosophilidae (Diptera) as an indicator in areas of post-mining regeneration in the municipality of Paragominas, Pará

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Many impacts are related to land use, such as logging, burning, mining, etc. This set of activities can result in habitat loss, species isolation and loss of biodiversity. Mining activities have a significant impact on nature, an example being the suppression of forest areas for the extraction of minerals, such as bauxite found in the subsoil. According to the legislation, this type of activity requires a degraded area recovery plan (PRAD), which aims to mitigate the impacts caused by the project. One way to assess the recovery of these areas is the use of bioindicators. Drosophilidae (Diptera) flies are easily collected and can respond quickly to environmental changes, so they can be used as good bioindicator. Thus, this study aimed to evaluate the recovery process of degraded areas, using drosophilids as indicators of this recovery, analyzing the similarity between the different recovery areas and the remaining forest neighboring the exploration area. The study is being performed at Hydro Mineração Paragominas S.A., in the municipality of Paragominas – PA. Fifteen study sites were selected, composed of 5 in forest areas, 5 in recovery areas by the natural regeneration conduction method and 5 in recovery areas by the nucleation method, both with 5 years of establishment. At each of these sites only 1 transect of 250m was established. To capture the drosophilids, we used two different methods: traps with banana bait fermented and malaise traps. In banana traps we use a model build by Martins et al, 2008. We expose for 48h in 100g portions of banana. Five traps were placed per site along the transect, 50m apart, and one malaise trap in the center of each transect. The malaises were exposed for 10 days. ANOSIM (Vegan package from the R) was used to calculate the similarity between areas. It was observed that the Nucleation sites had more species sampled with 26, Natural Regeneration and Forest, 16 species sampled each. Through the ANOSIM for banana traps, Natural Regeneration are 25% similar to Forest areas, while Nucleation share 22% of this similarity. For Malaise traps, Nucleation is 18.8% similar with Forest and Natural Regeneration 14.3% similar. However, banana bait traps, despite not showing significant differences between PRADS ($P=0.200$), show differences between Forest x Nucleation ($P=0.011$) and Forest x Natural Regeneration ($P=0.009$). For malaise traps, there are no significant differences for areas ($P=0.880$). More time-tracking data is needed to identify any trends along the forest's recovery path.

Keywords: Bioindicators, Composition, Drosophilids.

**THESIS AND DISSERTATIONS PUBLIC
ORAL PRESENTATIONS**



Comparative phylogeography of two closely related Amazonian gladiator frogs (*Boana boans* and *Boana wavrini*)

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Rivers may act in multiple manners in the diversification of terrestrial taxa. They can be effective vicariant barriers to gene flow, but may also act as secondary barriers impeding gene flow though not being the major factor generating diversification. Moreover, rivers may only reduce gene flow but not impede it completely. On the other hand, for taxa with life cycles associated to river channels or floodplains, rivers may actually act as facilitators of gene flow. We aimed to study the role of major Amazonian rivers in the diversification of two tree frog taxa (*Boana boans* and *Boana wavrini*) that are closely related to rivers, at least in part of their life cycle. We obtained genetic data from two mitochondrial (COI and 16S) and two nuclear genes (POMC e RAG) from samples distributed across the Amazonia and coveting the distribution of two widespread and closely related amphibian species. We conducted phylogeographic and population genetic differentiation analyses within both species, from a database with a total of 184 specimens. *Boana boans* and *B. wavrini* were recovered as monophyletic within the *B. semilineata* group, but their kinship relationships remain contentious. Population analyzes indicated that little genetic structure appears to be present, but very recent population expansions were recovered for both taxa. The average genetic distance between the two species studied is low, despite the large estimated time since the diversification of its last common ancestor (at least about 10 million years). This study suggests that the main rivers in the Amazonia do not seem to act as barriers to the gene flow for neither the species of floodplains nor the species of terra-firme, both of which exhibit low degrees of genetic structuring. In fact, we hypothesize that rivers act as a facilitator for gene flow in these species. This may be due the fact that species have life cycles closely associated with rivers and wetlands, and their aquatic phases (tadpole) are contributing to dispersion over long distances.

Keywords: Amazonia, rivers functionality, genetic structuring, terra-firme, floodplains.

Funding: CAPES

Paleodistribution and diversification of the *Herpsilochmus rufimarginatus*

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Herpsilochmus rufimarginatus is widely distributed in Amazonia and the Atlantic Forest. Four subspecific taxa are currently recognized: *H. r. rufimarginatus*, *H. r. frater*, *H. r. scapularis* and *H. r. exiguus*. Using populations of these forest-dwelling birds as the study model, in addition to understanding how diversification occurred in this polytypic species and establishing the geographic limits between populations. As such, the aim of this study was to test the connection between Amazonia (AM) and the Northeastern Atlantic Forest (AF) and the taxonomic review of the complex. We used these occurrence point, environmental and biological data in order to understand the issues proposed in this study. Models were constructed based on the distribution of the occurrence points of the species and environmental variables. The models were calibrated in an accessible area (M) and projected for the present and past: Younger Dryas Stadial (YDS), Heinrich Stadial 1 (HS1), last Glacial Maximum (LGM), Last Interglacial Period (LIG) and Marine Isotope Stage 19 (MIS19). The points in AM and the AF were separated to conduct overlay analysis and environmental niche divergence occupied between the populations. The species distribution models, overlay test and niche divergence were carried out using kuenm and Humboldt packages. A species tree was constructed in Beast 2.0 in order to estimate the divergence time between the populations. The models were able to reconstruct areas under adequate environmental conditions in YDS and HS1, and in the other periods, the corridor was no longer continuous. The corridor extended from the Guiana Shield along the coast to the coast of Rio Grande do Norte. The separation time between the populations shows that the separation coincide with the period closest to the connection of the corridor. As such, our environmental data and the separation time between populations, indicate that this corridor experienced periods of reconnection in the past. The environmental niches occupied between the populations are not equivalent and the niches seem to be conserved, even the populations occupying different geographic areas. Our data show that the complex consists of three species: *H. rufimarginatus*, *H. frater* and *Herpsilochmus* sp. nov., the last occurring in the Endemic Area of Belem and the Endemic Center of Pernambuco. *Herpsilochmus* sp. nov. differs from other populations in the color of the abdomen (female), morphology, vocalization and genetically.

Keywords: Amazonia, Atlantic Forest, connection, new species.

Funding: CAPES

Taxonomic revision of the neotropical spider genus *Erendira* Bonaldo, 2000 (Araneae, Corinnidae)

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Erendira Bonaldo, 2000 is one of the Corinninae genera that appears to have a restricted distribution, with species known only from Central America and Northwestern South America, mainly in Venezuela. The analyzed material comes from the following Scientific Collections: American Museum of Natural History, New York (AMNH), Museo del Instituto de Zoología Agrícola “Francisco Fernández Yépez”, Caracas (MIZA), Museu de Zoologia da USP, São Paulo (MZUSP), Museo da Universidade Central da Venezuela, Caracas (MUCV); Private Collection of Gonzalez Sponga, Caracas (CPGS). The specimens were observed in a Leica MZ16 and M205A stereomicroscope to identify, choose new species holotypes, measure, and obtain photographs. The descriptions of the new species were made based on the chosen holotype and present: standard material; location type; diagnosis; etymology; coloring of the carapace, abdomen and legs; spinulation of femurs, patella, tibia and metatarsus; total length, measurements of all articles in legs I, II, III and IV, height of the cephalothorax; description of genitalia, geographical distribution and material examined. The drawings of the males were made in the ventral and retrolateral views and the females in the ventral and dorsal views. This work presents the taxonomic revision of the genus, bringing a dichotomous key for the identification of all known species, with modern documentation of diagnostic characters, re-diagnosis of the genus and the species already described. Due to the increase in taxonomic information derived from the discovery of eight new species, a supplement to the original description of the genus is also presented. New diagnoses are presented for *E. pallidoguttata* (Simon, 1897), *E. atrox* (Caporiacco, 1955) and *E. subsignata* (Simon, 1897), as well as the redescription of *Erendira pictitorax* from the examination of the respective holotype. *Erendira luteomaculata* was considered a *species inquirenda* due to the fact that the epigynum of the holotype is lost. The following new species are proposed six from Venezuela, one from Costa Rica and one from Colombia. With that, the known diversity of the genus adds up to 13 species and the known distribution is increased to Colombia and Costa Rica.

Keywords. Dionycha, Taxonomy, Central America, Venezuela New species.

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Osteology and taxonomy of the species complex *Atherinella brasiliensis* (Quoy & Gaimard, 1825) from the South Atlantic

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The name *Atherinella brasiliensis* (Quoy & Gaimard, 1825) refers to an estuarine bony fishes with one of the widest distributions on the Atlantic coast of South America, occurring from Venezuela to the south of Brazil. They are characterized by silvery strips on the flanks and a reddish caudal fin, forming shoals during flood tides in estuary holes and eventually on beaches. Past taxonomic studies have analyzed few specimens of *A. brasiliensis*, commonly not understanding the type locality, in addition to not providing a detailed investigation of the variability and stability of phenotypic characters in different populations. After character analysis of the external and internal anatomy of *A. brasiliensis*, the data exposed here indicate the existence of a cryptic diversity allocated under the same specific entity. In order to fill the gap in taxonomic knowledge, the first chapter of the thesis presents a detailed and illustrated osteological description of the topotypes of *A. brasiliensis*, allowing for proposition of diagnoses for the type species and three more new species, which are the focus of the second chapter.

Keywords: Silverside fish, Osteology, Compared anatomy, Taxonomy

Phylogeography of the diving lizard *Uranoscodon superciliosus* (Linnaeus, 1758) (Squamata, Tropiduridae)

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Studies have confirmed the Amazon River and its tributaries as main drivers for this diversification for species from “terra firme” forest, such as *Kentropyx calcarata* and *Plica umbra*, but commonly considered facilitators for gene flow for species that occupies seasonally flooded areas. *Uranoscodon superciliosus* is related to watercourses and widely distributed throughout the Amazonia. With an integrative approach, combining molecular data of mitochondrial (mitochondrial: 12S, 16S and ND4) and nuclear genes (RAG1, PRLR and KIF24) of 150 tissue samples, linear morphometric and scales count of 182 specimens, and hemipenes morphology, we investigated the phylogeography of *U. superciliosus*, obtained data for geographic structure and divergence times between lineages. The dataset of each gene were concatenated and a Calibrated Bayesian Tree inferred phylogenetic relations and divergence time. For morphology, two Discriminant Function Analysis (DFA) were performed to check the congruence between the groups previously defined in the phylogenetic results. Five strong supported lineages were found in the molecular analysis, but in the morphology only the DFA with the measurements showed a significant result separating two lineages, with the meristic, hemipenis and color patterns showing very conservative among lineages. The divergence time suggest that the Amazon River and four tributaries had a main role in the diversification of these lineages. *U. superciliosus* exhibit a pattern of diversification similar to what is observed for “terra firme” forest species, what brings a new and different vision for floodplain species.

Keywords: Floodplain, Tropiduridae, Linear Morphometry

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Phylogeography of the species *Rhinophylla pumilio* Peters, 1865 (Mammalia, Chiroptera, Phyllostomidae)

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Among mammalian orders, Chiroptera is the second most diverse in that area, representing approximately 21% of the currently known mammal species. Recent molecular research has been recognizing taxa that have remained hidden under traditional taxonomy due to morphological convergence or diversification. Yet, the number of recognized bat species is still expanding with the identification of numerous cryptic taxa and validation of new species. Studies combining different lines of evidence, as morphometry and molecular approaches, have been playing an important role in addressing knowledge gaps about Neotropical bat diversity. Within the Phyllostomidae family, *Rhinophylla pumilio* has a disjunct distribution, occurring both in the Amazon and Atlantic Forests. Although both populations are recognized as the same species, different karyotypes have been recovered across the species distribution, suggesting this species might have cryptic diversity. This study aims to broaden the current knowledge about *R. pumilio*, identifying geographic patterns of morphological and molecular variation in their populations. In fact, our results point to an overall morphological and morphometric homogeneity, contrasting with phylogenetic analyses showing two well supported groups, from the Amazon and Atlantic Forests respectively, supporting the hypothesis that *R. pumilio* as currently defined is a cryptic species. Moreover, within the Amazon forest, our analyses recovered four other distinct lineages, which might represent intraspecific variation.

Keywords: Population genetics, morphology, morphometry, taxonomy; Neotropical diversity

Phylogeography of *Siphlophis compressus* (Daudin, 1803) (Dipsadidae: Xenodontinae: Pseudoboini)

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The historical connections between Amazon Forest and Atlantic Rain Forest have been investigated through the studies of species which inhabit both biomes. *Siphlophis compressus* is distributed along the Amazon and the Atlantic Rain Forest, different from the remaining species of the genus, which are either restricted to the Amazon or to the Atlantic Rain Forest. Here we investigated and estimated the genetic variability among populations and the historical connections and species interchange among Atlantic Rain Forest and Amazon Forest. We also inferred phylogenetic relationships and estimated the divergence time within *Siphlophis* species, with emphasis on *S. compressus*. Under a framework based on seven molecular loci, we recovered a new topology for *Siphlophis* species, with three monophyletic clades for the genus: an older clade composed solely of *S. pulcher*, and two sister groups, with the first consisting of *S. worontzowi*, *S. cervinus* and *S. ayauma*, and the second consisting of *S. longicaudatus* and *S. compressus*. We also recovered three monophyletic clades within *S. compressus*: an Atlantic Rain Forest lineage and two Amazonian lineages: an older one (1.3 Myr) and a more recent one (0.7 Myr), which includes an Atlantic Rain Forest individual. The divergence time for these populations date back to Early and Middle Pleistocene, respectively. Moreover, our results suggest a northern connection route between the Amazon and the Atlantic Forest, supported mainly by the sister group status between the most recent Amazon population and the Atlantic rainforest population, observed in the phylogenetic and population structure analysis, and by the placement of a Northern Atlantic Rain Forest individual into the most recent Amazon population. This provides new information about the demographical history of *S. compressus*.

Keywords: Amazonia-Atlantic Forest connection, forest refugia, South America.

Funding: CAPES



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