Jan 1st, 12:00 AM

19. Zoology

University of Central Oklahoma

Abstracts from the 2014 Oklahoma Research Day

Held at the University of Central Oklahoma

05. Mathematics and Science

19. Zoology

05.19.01 Anatomical and Morphometric Variations in the Arterial System of the Domestic Cat

Victor, Gonzalez Betancourt , Anna Smith, Robert Cramer, Sue Ball

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Domestic cats are among the most widely used model organisms in comparative or mammalian anatomy courses, as well as in experimental research of both human and veterinary medicine. Understanding and documenting anatomical variations in these animals are therefore relevant. Based on the study of 56 preserved specimens, we report the anatomical architecture and frequency of occurrence of variations in the branching pattern of the brachiocephalic artery and the origin of the internal iliac arteries. We observed three distinct arrangements in the branching pattern of the brachiocephalic artery and noted that the portion of the abdominal aorta, between the external and internal iliac arteries, varied greatly among specimens. However, the frequency of occurrence of each variation type of the brachiocephalic artery was independent of the cat's gender and body size. Similarly, the length of the segment of the abdominal aorta, between the external and internal iliac arteries, was not significantly correlated with its width, nor with body size or gender. Such phenotypic variations might be associated with differences in breed or geographic origin. To our knowledge, this study is the first to report and quantify the occurrence of such variations in North American cats. Given the anatomical similarity between the cat and other felids, the results of this study can be applied to other species, including endangered species.

05.19.02 Defensive Coloration in Long-nosed Snakes

Anjeela, Shrestha , Aaron Place

Other

Mimicry is a defensive mechanism in which one organism resembles another as a form of protection. The model organism may be present in the same region as the mimic or live elsewhere. The northwest region of Oklahoma lacks a venomous coral snake. However, this region is home to the long-nosed snake (Rhinocheilus lecontei) which is a purported mimic of the western coral snake (Micruroides euryxanthus). We investigated the mimetic coloration of the long-nosed snake in northwest Oklahoma. Our purpose was to see if the color pattern of the long-nosed snake protects them from being depredated by birds and mammals. Predation occurred more often on brown snake models than on the long-nosed snake models. We discuss possible mechanisms for maintenance of the dorsal pigmentation pattern in long-nosed snakes.

05.19.03 Modelling the Potential Distribution of Henslow's Sparrow (Ammodramus Henslowii) by the 2050s and 2080s Using Maxent

Katrina, Hucks , Chris Butler

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Henslow's Sparrow is a declining North American grassland bird. Increasing temperatures, frequent fires, and habitat loss may hasten the decline. Henslow's Sparrow utilizes different geographic areas for breeding and wintering, so it is important to explore how these areas may be affected by a warming climate. We used Maxent, a maximum entropy approach, to predict the potential future distribution of Henslow's Sparrow under various climate change scenarios. An initial model was used to identify the most important ecogeographical variables for the species' distribution. We then used two IPCC 4 climate change scenarios to project the range into the 2050s and 2080s. We found that a combination of temperature seasonality, maximum temperature of the warmest month, mean temperature of the warmest quarter, annual precipitation, and elevation were the most important variables for the distribution of Henslow's Sparrow. Marginal declines were observed in all areas for the 2050s, except the A2 2050s winter scenario in which highly suitable area increased with increased amplitude of warming. Models from the 2080s predicted shifts in suitable breeding areas and additional highly suitable areas in the wintering range. Because there were relatively few changes in the potential distribution of Henslow's Sparrow, it may be a robust species that is unlikely to be strongly affected by climate change in the future. We suggest that management efforts should foc

05.19.04 Effects of Climate Change on Niche Apportionment Models

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The organization of communities has long been of interest to ecologists. Recently, several competing niche apportionment models have been proposed. These models suggest that the relative abundance of species present in an area depends upon both the amount of resources and how many resources each species can control. These studies implicitly assume that communities are static. However, ongoing climate change may cause communities to change as well. This study will examine the effects of climate change on the Random Fraction, MacArthur Fraction and Dominance Preemption niche apportionment models in the prairies of the United States and Canada. Breeding Bird Surveys and Christmas Bird Counts from 1966 to the present will be used to create niche apportionment models. Trends in community composition along a latitudinal gradient will be assessed, as the latitudinal gradient will serve as a proxy for increasing temperatures.

05.19.05 Operant Conditioning in Anolis Lizards: Initial Shaping Procedure

Zoe, Austin

Oklahoma State University

Ectothermic vertebrates are becoming more commonly utilized subjects for learning and behavioral plasticity experiments. This study tests the learning potential of Anolis carolinensis and A. sagrei in an operant conditioning paradigm. A chamber was created with two removable compartments which through the select use of reward were reduced in size from 5x5x5cm to 2x2x5cm. The compartments were baited with a live food reward, either wax worms, Galleria mellonella, or meal worms, Tenebrio molitor. When the compartments had been reduced to 2x2x5cm, the food reward was phased out and an infrared (IR) proximity detector and a colored LED light, a discriminative stimulus, was added to each compartment. The lizards crawl into the compartment, triggering the IR proximity detector and activating an interface which records the time stamp of the IR detector activation and triggers a live insect food hopper within the operant chamber. None of the 15 A. sagrei would perform the required task to retrieve the food reward. Within A. carolinensis, wild caught females more readily performed the novel task when compared to both lab reared males and females, both in terms of latency to respond and number of rewards received.

05.19.06 Macroinvertebrate Assemblages And Water Quality Analysis Of Spring Systems Associated With The Pontotoc Ridge Nature Preserve, Oklahoma

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Pontotoc Ridge Nature Preserve is located in southeastern Pontotoc County, Oklahoma. The preserve consists of 2,900 acres of assorted vegetation and has several springs that drain from the Arbuckle-Simpson Aquifer. Three springs, two located within the Nature Preserve and one on adjacent property, were investigated during this study. Aquatic macroinvertebrates and physiochemical data were collected on a seasonal basis beginning January 2011 and ending January 2012. Physiochemical data collected were within the standards that support aquatic life. A total of 127,049 individuals, representing 115 taxa, were collected during this study. Non-hexapods were the dominant groups of macroinvertebrates, while hexapods were more diverse in terms of taxa. Smith Spring had the highest species richness, followed by Canyon Spring, with Cave Spring being the lowest. Cave Spring was also the least populated, followed by Smith Spring, with Canyon Spring being the most populated. The April 2011 collection contained both the largest number of individuals, 34,368, as well as the highest number of taxa, 74. Similarities for combined collections between springs were fairly similar, with average values never below 0.425. Similarities between upper and lower collection sites were less, with average values no greater than 0.349. Species diversity values were generally below 2.0, with the averages being no greater than 1.785.

05.19.07 An Assessment of the Native Fishes of the Lower Pecos River, Texas

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Southeastern Oklahoma State University

The Pecos River has numerous impacts that have negatively affected the native fish community. However, the downstream-most 90 km, commonly referred to as the Lower Pecos River (LPR), is a spring-fed and canyon-bound section that appears relatively pristine. We conducted three sampling expeditions that consisted of week-long float trips during 2011-2013, seining systematically along the way. Our objectives were to (1) contribute data to an assessment of a larger section of the Pecos River, (2) provide an assessment of the current fish community in the LPR, and (3) provide a preliminary assessment of fish-habitat relations that may help explain the composition of the current fish community in the LPR. We made approximately 100 seine hauls at 23 sites and collected over 13,500 fish representing 22 species. We captured only two species that we believe to be introduced. At least six species of cyprinids that had been historically captured were absent from our samples. A qualitative assessment of reproductive guilds suggests that the absent cyprinid species are those that are characterized by buoyant and semi-buoyant eggs and broadcast spawning, while those cyprinids that utilize various other reproductive strategies remain present. Restricted flow and habitat fragmentation in the form of river sections that experience dewatering and altered water chemistry appear to be the greatest negative impacts on the native fish fauna of the Lower Pecos River.

05.19.08 Competitive Dominance in Five Dove Species

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Oklahoma has only one native dove species, the Mourning Dove (Zenaida macroura). Mourning Doves are declining, possibly due to competition from two introduced dove species, the Rock Pigeon (Columba livia) and the Eurasian Collared-Dove (Streptopelia decaocto), as well as from two species expanding north, the White-winged Dove (Z. asiatica) and the Inca Dove (Columbina inca). The goal of this project is to examine competitive dominance among these five dove species at bird feeders in Oklahoma. Data collection began in late January and preliminary data suggest that the Mourning Doves is less aggressive than Rock Pigeons and Eurasian Collared-Doves.