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19. Zoology

Northeastern State University

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Abstracts from the 2015 Oklahoma Research Day

Held at Northeastern State University

05. Mathematics and Science

19. Zoology

05.19.01 Nest structure and placement of Orchard oriole (*Icterus spurius*) nests in tallgrass prairie

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We studied the structure and placement of Orchard oriole (*Icterus spurius*) nests in upland tallgrass prairie at the Tallgrass Prairie Preserve in Osage County, Oklahoma. Nests were generally located in woody thickets of sumac, plum, or buttonbush near water at heights varying from 111 to 205cm. Nest mass (gm) after drying decreased with placement height. The average length of randomly extracted fibers from nests varied from 8.6 to over 21cm. Larger nests contained longer fibers, indicating that orioles use longer fibers when building at lower locations with more attachment points to build larger nests.

05.19.02 Do Tail Displays by Juvenile Collared Lizards Function to Distract Prey?

Cody,Braun *University of Central Oklahoma*

Troy,Baird *University of Central Oklahoma*

Sit-and-wait predators use stealth to approach their prey close enough to strike. Some snakes give conspicuous tail displays that divert the attention of prey away from the predator's head. Our preliminary field observations on foraging collared lizards suggested that they may give tail displays when stalking arthropod prey. We conducted field trials involving introduction of tethered grasshoppers to free-ranging juvenile collared lizards to test the hypothesis that tail displays function to distract prey. Juvenile collared lizards performed two types of tail displays while stalking prey. Curl displays involved holding the tail in a stiff arch with the distal end pointed anteriorly. Sinusoidal displays involved deliberate lateral undulation as the tail was raised. Lizards performed tail displays more frequently, and for a greater proportion of trials when they were stalking prey than when not stalking prey. Moreover, the proportion of time spent displaying before their first strikes on tethered prey was twice that after the element of surprise was lost following the first strike. Our results support the hypothesis that tail displays given while stalking distract prey allowing juvenile collared lizards to approach more closely before striking. To our knowledge, our data are the first evidence that lizards give displays that function to distract their prey.

05.19.03 Skull Morphometrics as an indicator of Bite Performance in Testudines

Jennifer, Mattson *East Central University*

Kenneth, Andrews *East Central University*

From an evolutionary perspective, differences in bite performance of turtles has been observed and is generally correlated with body size. Empirical findings show that bite force changes in proportion to the lengths of the carapace and also the size of the skull including the structure of the jaw. Variables such as head height have been found to be associated with increased bite force. To test these hypotheses, measurements were taken of nine species of turtles and compared with previous data. The species examined are: *Chelydra serpentina*, *Chrysemys picta*, *Graptemys kohni*, *Graptemys p. oachitensis*, *Kinosternon flavescens*, *Kinosternon subrubrum*, *Sternotherus carinatus*, *Sternotherus odoratus*, and *Trachemys scripta elegans*. Measurements were taken (using calipers) of the carapace length, carapace width, head length, head width, head height, and lower jaw length. These measurements were recorded in millimeters on a data spreadsheet. Graphs of each measurement were then created within each species and observed for consistent patterns on each graph. With the exception of hatchlings, results are consistent with the previous data (Herrel, et al., 2002) and support the initial hypothesis that bite performance in certain species of turtles has changed to allow consumption of different food groups. Future studies should exclude the data from hatchlings or perhaps isolate them into their own graph as their measurements tend to obscure the data from the larger specimens measurements.

05.19.04 Flamingos and Climate Change: A Tale of Two Species

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Huyen, Tran *University of Central Oklahoma*

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From 1850 to 2010 the average temperature globally rose by approximately 1°C. This change in temperature has modified the distribution, phenology and interactions of numerous organisms. However, the potential effects of climate change on many species are not well understood. For example, there have been no studies about how climate change may affect the distribution of flamingoes. For our project, we investigated how climate change may affect the distribution of American Flamingoes (*Phoenicopterus ruber*) and Chilean Flamingoes (*P. chilensis*). American Flamingoes breed in the Caribbean and northern South America. Chilean Flamingoes breed near the central Pacific coast of South America. We downloaded location data for these two species from ORNIS and eBird. We then used Maxent models to analyze at their current distribution and to determine which ecogeographical variables affected their range. The Maxent models showed good agreement with the current ranges of the Chilean and American Flamingoes. Under the various climate change scenarios examined, American Flamingoes were forecast to expand north into Florida by the 2070s. In contrast, a slight decline in the extent of the range of the Chilean Flamingo is predicted. These models show that tropical species may vary in their response to climate change.

05.19.05 Variation in the Vascular Canals of the Testudine Carapace in Relation to Scute Nutrient Requirements.

Catherine, Phipps *East Central University*

Kenneth, Andrews *East Central University*

The scutes are plates of keratinous material that are an outer cover of the carapace of a testudine and are continuously growing and regenerating to provide protection. Since scutes lack vascularization, there is little known of the origin of nutrients required to subsidize their growth. It is assumed that the vascular canals of the carapace provide these nutrients to the scutes. The purpose of this study was to analyze the carapacial ultrastructure of testudines to quantitatively determine vascular canal numbers on the surface of the carapace. An increase in the vascular canals would theoretically increase supply of oxygen and nutrients to the outer scute layer for growth. Using imaging software (Photoshop), area analyses were conducted on scanning electron microscopy images of carapacial tissue to determine the ratio of solid bone to vascular canals. These ratios were then analyzed with emphasis on their respective species habitats to allow for a comparison among different species. The overall ratios of the canals were not only different among and between species but the individual sizes of the canals varied greatly between different taxa. There was a direct correlation between the aquatic tendencies of the species and the number of the vascular canals. More "primitive" species possessed larger and less well defined canals compared to more "modern" species.

05.19.06 The effects of climate change on Arctic and Antarctic Terns

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Since the early 20th century, the global temperature has risen 0.8°C. During the same time period, Alaska and Western Canada have warmed by 3-4°C. This is resulted in changes in community composition and distribution in the Arctic. However, temperatures in the Antarctic have only risen by approximately 1.4 °C. This suggests that climate change may affect arctic and Antarctic species at different rates. For this study, we examined the potential change in distribution of the Arctic (*Sterna paradisaea*) and Antarctic (*S. vittata*) Terns. We downloaded location data from Maxent and eBird and current bioclimatic variables from Worldclim. We then created Maxent models to examine the current distribution of these two species. We found that Antarctic Terns were only moderately affected by climate change, with a slight reduction in their range. In contrast, we found that the distribution of the Arctic Tern showed a substantial decrease. We suggest that the effects of climate change during the 21st century will be more pronounced in the Arctic than in the Antarctic.

05.19.07 Aggressive behavior between forager nestmates and non-nestmates of the sweat bee *Halictus scabiosae* (Rossie) in Turkey (Hymenoptera: Halictidae)

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Bees of the family Halictidae, commonly known as sweat bees, are unique because of their plastic social behavior. Even within the same population, females in some nests are entirely solitary while in others they live in groups and are completely social. Additionally, depending on the region and development of the colony, movement of foragers among nests are also possible. We studied behavioral interactions between forager nestmates and non-nestmates of the sweat bee *Halictus scabiosae* (Rossie), a common species in the campus of the Uludag University in Bursa, Turkey. We experimentally paired social females from the same nest ($n = 8$ trials) and females from different nests ($n = 9$ trials) within a circle-tube and video recorded their behavior in the dark. We recorded the frequency of 10 behavioral patterns during 20 min per trial ($n = 5.3$ hours total). Aggressive behaviors were significantly more common between nestmates than between non-nestmates. However, cooperative and avoidance behaviors were significantly higher between non-nestmates than between nest-mates. Our behavioral observations support recent molecular studies in other European populations of *H. scabiosae* that show that nest switches among foragers are common and suggest that nests of this species in Turkey may also include a mixture of related and unrelated workers.

05.19.08 Effects of Large-Scale Fire on Nesting of Scissor-tailed Flycatchers in the Wichita Mountains

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Scissor-tailed Flycatchers are conspicuous Nearctic-Neotropical migratory birds of the southern Great Plains. Often considered savannah specialists, they nest in a variety of open habitats. We searched for nesting Scissor-tailed Flycatchers at the Wichita Mountains Wildlife Refuge in Comanche County, Oklahoma from April through July during the years of 2008 - 2014. All nests had their location recorded with a handheld GPS, and were checked every 2-3 days to monitor their status. In 2011, fires burned a significant portion of both grasslands and oak woodlands on the refuge. We used ArcGIS to compare the abundance, distribution, and density of Scissor-tailed Flycatchers before and after these fires. Scissor-tailed Flycatchers expanded their distribution and increased abundance and density in years after wide-spread fires. Increases are likely due to a decrease in tree density in woodlands and a decrease in grass/forb height in grasslands. Frequency of nest success also increased after fires, likely due to a decrease in predator cover and a decrease in predator abundance.

05.19.09 A Statistical Study of Deer Density in Sequoyah State Park, OK From 1989 Through the Present

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Monitoring and controlling deer density is important for maintaining healthy herds. Sequoyah State Park in Cherokee county, OK, houses a nature center which monitors the habitat of 10 km² of wildlife, including a white-tailed deer (*Odocoileus virginianus*) population at or above carrying capacity. The park has been monitoring deer density using bi-annual 'deer drives' with Northeastern State University from 1989 through the present. These 'deer drives' have allowed park biologists to reduce parasitic diseases and tick population through relocation and controlled harvest of the white-tailed deer. Until now, these decisions have been based on the raw data, which demonstrates that the herd density is decreasing at 0.75 deer/km² each year. We aim to determine the major factors attributed to predicting fall white-tailed deer density. We hypothesize that the fall density indicates the parks' carrying capacity and is dependent upon fawn recruitment to the herd. Further, through analysis of the factors that affect fawn recruitment, we will be able to account for a significant amount of the variation in herd density each year. This will be accomplished using statistical inquiry to analyze the effects of both county and park hunting harvest, the Palmer Drought Severity Index (PDSI), lake elevation/flooding, area of controlled burns, number of park visitors, and disease prevalence among harvested deer.

05.19.10 Indigenous Peoples and Bees

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Besides being the most important pollinators of wild and cultivated plants, bees are also deeply ingrained in the cultural history of many societies. Archaeological and anthropological records indicate that bees were, and remain, an integral part of the traditional knowledge of many indigenous peoples around the world, including that of ancient civilizations such as the Egyptian and Maya. Here we summarize the ethnobiological studies on native bees worldwide. The information available on the nomenclature, classification, and use of native bees demonstrate the importance of incorporating traditional or indigenous knowledge in scientific studies of bee diversity.