CPSM Program

17 October 2020

Overview

The 2020 Central Plains Society of Mammalogists Meeting will be held on 17 October 2020 through Zoom. We have set of exciting talks and posters by students covering shrews, rodents, and carnivores.

Schedule

Time	Activity
9:00-9:15	Announcements
9:15-10:15	Oral Presentations
10:15-10:30	Break
10:30-10:45	Posters Lightening Talks
10:45-11:00	Pop-in Posters
11:15-12:00	Members Meeting

Presentations

Time	**Presenting Author**	**Title**
9:15am	Addison G. Allen	Competition and vegetation influences on the spatial and temporal abundance of small mammals during fire succession
9:30am	Tommy Galfano	A Rangewide Phylogenetic Assessment of the Least Shrew (*Cryptotis parvus*) and the Impact on its Conservation Status in Eastern New Mexico
9:45am	Michael Rohde	Use of soapweed yucca (*Yucca glauca*) by rodents and other vertebrates in western Nebraska
10:00am	Benjamin J. Wiens	Multilocus perspective reveals connections between island biogeography and evolutionary dynamics of endangered shrew
Time	**Presenting Author**	Title
10:30am	Courtney N. Dotterweich	Denning chronology of American black bears (*Ursus americanus*) in southeastern Oklahoma
10:35am	Nathan J. Proudman	Interspecific niche partitioning between two sympatric mesocarnivores: how bobcats (*Lynx rufus*) and coyotes (*Canis latrans*) coexist in Oklahoma.
10:45am	Kenneth Shimer	Comparing detection methods of coyotes (*Canis latrans*) using camera trap and acoustic data in two native rangeland sites

Abstracts - Oral Presentations

Competition and vegetation influences on the spatial and temporal abundance of small mammals during fire succession

Addison G. Allen* (MS Student), Zachary P. Roehrs, R. Scott Seville, and Hayley C. Lanier

Department of Biology and Sam Noble Oklahoma Museum of Natural History, University of Oklahoma (AGA, HCL); School of Math and Sciences, Laramie County Community College (ZPR); Department of Zoology and Physiology, University of Wyoming at Casper (RSS)

As fires become more frequent, understanding the mechanisms shaping biotic responses may help us predict how ecosystem functions will be impacted. In western North America, fire succession in mammal communities is marked by a transition between a few dominant species: southern red-backed voles (*Myodes gapperi*) dominate old-growth forests but are largely replaced by North American deermice (*Peromyscus maniculatus*) immediately after a fire. These abundance shifts have been observed in multiple studies, but the mechanisms that mediate these shifts are unclear. We hypothesized the observed post-fire increase in deermice is due to competitive release from voles, which often fare poorly in post-fire environments. We collected small mammal and vegetation data on 4 sampling grids just south of Yellowstone, contrasting data before and after a 2016 fire that swept across our study sites. Here we compared our observed captures in 2014, 2015, 2017, and 2018 with a randomized, simulated matrix to test whether deermouse and vole captures were aggregated or segregated among the grids' trap stations by year. To simultaneously evaluate the role of putative competitor abundance and microhabitat in explaining deermouse or vole abundance, we used the simultaneous autoregressive (SAR) model, which accounts for structural spatial autocorrelation. Our results indicate deermice and voles are spatially and temporally segregated, and competitor abundance explains more variation than microhabitat. This suggests mutual competitive pressure between the species and provides important insights into small mammal turnover in different stages of fire succession.

A Rangewide Phylogenetic Assessment of the Least Shrew (*Cryptotis parvus*) and the Impact on its Conservation Status in Eastern New Mexico

Tommy M. Galfano* (MS Student) and Andrew G. Hope

Division of Biology, Kansas State University (TMG, AGH)

Least shrews (*Cryptotis parvus*) are widespread across much of eastern North America but are locally rare. At the western periphery of their range, earliest records of least shrews in New Mexico (NM) dating back only to the 1960's are still not recognized on present-day range maps. Least shrews are currently listed as threatened in NM. They have been labeled at-risk due to their association with declining wetland and mesic meadow habitats through eastern NM, but little is known about population diversity or stability. It has been hypothesized that least shrew populations in New Mexico represent two unique taxa, comprised of distinct northern and southern lineages, based on morphology and allozyme data, and associated with Tucumcari and Pecos river basins respectively. The southern

lineage is hypothesized to be a relictual population of *C. p. berlandieri*, a sub-species distributed southward through Mexico. To test this, we performed a rangewide phylogeographic study, using mitochondrial (Cyt-b) and nuclear (ddRadSeq) data from 85 shrews sampled across their range, to assess systematic relationships and investigate genetic diversity of NM populations compared with other putative sub-species. Preliminary results from Cyt-b data indicate that populations from Florida constitute a highly distinct clade. *Cryptotis p. berlandieri* specimens from southern Texas and Mexico are also highly divergent, but do not include samples from NM. However, Pecos populations appear distinct from others within NM. These preliminary genetic results indicate a complex evolutionary history, and likely warrants both taxonomic revision, and recognition of Evolutionarily Significant Units of conservation concern.

Use of soapweed yucca (*Yucca glauca*) by rodents and other vertebrates in western Nebraska

Michael Rohde* (Undergraduate Student), Keith Geluso, Carter Kruse, and Mary Harner

Department of Biology, University of Nebraska-Kearney (MR, KG, CK, MH)

Although grasses dominate the Great Plains of North America, soapweed yucca (*Yucca glauca*) is a conspicuous and common shrub, characterized by tall woody flower stalks, large flowers, and seed pods, and dense masses of ground-level evergreen leaves. These plant structures can provide a variety of resources or functions to animals. We examined three groups of vertebrates, mainly mammals, that interacted with Y. glauca and the functions this plant provided for organisms in western Nebraska, through a combination of small-mammal trapping and direct observations. We captured more rodents in areas with yuccas compared to areas without yuccas. Deer mice (*Peromyscus maniculatus*) showed the greatest difference in relative abundance, with about 6 times as many individuals in areas with yuccas compared to areas without yuccas. Upon release, a majority of deer mice (94%) ran from trap sites to yucca cover, as did most other species. Ord's kangaroo rats (*Dipodomys ordii*) also were captured more frequently in areas with yuccas. Species richness of small mammals did not differ in areas with and without yuccas. Our findings demonstrate some of the ecological functions of yuccas and a variety of vertebrate species using this shrub in grassland ecosystems. Soapweed yucca is considered a weed in some regions of the Great Plains. On ranches where American bison (*Bos bison*) have been reintroduced, bison consume and actively remove yuccas, especially during winter grazing, and large, multi-headed, aboveground yucca complexes are less common. Our study assists in understanding the role of this native shrub in managed grassland systems.

Multilocus perspective reveals connections between island biogeography and evolutionary dynamics of endangered shrew

Benjamin J. Wiens* (MS Student), Fraser Combe, and Andrew G. Hope

Division of Biology, Kansas State University (BJW, FC, AGH)

The Bering Sea region has a history of dramatic climate change through the late Quaternary. In addition to warming and cooling patterns, islands have formed and

disappeared with changing ocean levels. St. Paul Island is located in this region and has variously been connected to the mainland through time. The Pribilof Island shrew (*Sorex pribilofensis*) is endemic to St. Paul Island, which was last isolated from mainland Alaska at the onset of the Holocene (11 kya). I hypothesize that small-island isolation has led to relatively rapid divergence and speciation of this endangered shrew from mainland sister species, as well as to decreased genetic diversity. To test this, I worked in collaboration with the native Aleut community of St. Paul to collect, process, and archive 50 *S. pribilofensis* specimens. Including multiple outgroup taxa, I have put together a genetic dataset of mitochondrial DNA and 20 microsatellite loci. Initial results indicate strong divergence of *S. pribilofensis* from mainland shrews. Bayesian phylogenetic analysis shows that *S. pribilofensis* is the first to diverge from the rest of the Beringian clade, and population structure analyses consistently group *S. pribilofensis* separately from the rest of the Beringian clade. Population genetic statistics for *Sorex* species show virtually no variability across multiple loci within *S. pribilofensis*, evidence of genomic flatlining. These results further our understanding of species divergence in response to dramatic environmental change, and highlight the conservation concerns of an endangered species with little ability to adapt to new environments, endemic to a rapidly changing island system.

Abstracts - Poster Presentations

Denning chronology of American black bears (*Ursus americanus*) in southeastern Oklahoma

Courtney N. Dotterweich* (PhD Student), W. Sue Fairbanks, and Sara Lyda

Department of Natural Resource Ecology and Management, Oklahoma State University (CND, WSF, SL)

Winter denning of American black bears (*Ursus americanus*) in an essential component of their ecology and must be considered for effective management of the species. Using denning data from 2014 - 2020, black bear denning chronology for bears in southeastern Oklahoma was estimated. GPS collar data (n = 44) was utilized to locate dens and identify den entrance and emergence dates, as well as total denning duration for each collared bear. Denning duration was typically shortest for adult male bears ($\bar{x}$ = 102 days), followed by females with yearling offspring ($\bar{x}$ = 114.2 days), solitary females ($\bar{x}$ = 135.5 days), and parturient females ($\bar{x}$ = 156.5 days). The general trend of denning chronology for black bears in southeast Oklahoma was similar to other black bear populations throughout the southeastern United States, however, there was variability within each sex-class. While individual characteristics have a strong influence on denning chronology, additional research into the cues that initiate denning entrance and emergence may further assist in understanding factors that influence variation in bear denning ecology.

Interspecific niche partitioning between two sympatric mesocarnivores: how bobcats (*Lynx rufus*) and coyotes (*Canis latrans*) coexist in Oklahoma.

Nathan J. Proudman* (PhD Student), Jerrod Davis, Victoria L. Jackson, Michelle L. Haynie, and W. Sue Fairbanks

Oklahoma State University (NJD, WSF); Oklahoma Department of Wildlife Conservation (JD); University of Central Oklahoma (VLJ, MLH)

Bobcats and coyotes coexist sympatrically in Oklahoma, yet the degree of competitive exclusion and the modalities of niche partitioning between these mesocarnivores, is still widely debated and poorly understood. Bobcats have shown surprising resilience to the ever-increasing pressures exerted upon them by human activity, but overharvest, habitat fragmentation and reductions in their major sources of prey can negatively impact bobcat populations. Coyotes have dramatically increased their range over the past century and are seemingly less impacted by anthropogenic activity. Understanding how these two species coexist in different ecoregions of Oklahoma, can not only aid management of both species in the state, but also may be useful in areas where coyotes have recently colonized. Using a combination of camera trapping, scat collection, and small-mammal trapping, the interspecific niche partitioning between bobcats and coyotes in differing ecoregions of Oklahoma is being explored in relation to habitat and prey availability in these regions. Initial results from camera trap data show considerable overlap in activity periods between bobcats and coyotes, whilst bobcats were fairly asynchronous with their rabbit (*Sylvilagus* spp.) and rodent (excludes *Sciurus* spp.) prey. This asynchrony was exaggerated in our eastern Oklahoma study site, in which both mesocarnivores were more diurnal than expected. Analyses are ongoing and fieldwork will continue until 2022.

Comparing Detection Methods of Coyotes (*Canis latrans*) Using Camera Trap and Acoustic Data in Two Native Rangeland Sites

Kenneth Shimer* (MS Student), Victoria L. Jackson

University of Central Oklahoma (KS, VLJ)

Acoustics offer a newer form of detection that increases the detection range beyond that of traditional camera trapping such as the ability to generate multiple different species accounts and detect forms of disturbance and behavior all within the soundscape. We will be looking specifically at coyotes (*Canis latrans*) using a combination of acoustic and camera trapping to model occupancy of two different patches of rangeland in southcentral Oklahoma. The main objective is to determine if it offers a higher detection for occupancy modeling than traditional camera trapping. We will also be looking at ways to lower processing time though use of commercially available programs and code modification of a program designed for northern bobwhites (*Colinus virginianus*). We will determine factors affecting detection in acoustics such as weather or road proximity. For each program, we will access the performance. We will use PRESNCE to conduct occupancy models from detection histories from both acoustic and camera trap data. The results of this project can be used by the Noble Foundation to understand coyote presence on their properties and formulation future survey protocols.