

BASELINE DISTRIBUTION AND POPULATION STATUS SURVEYS FOR TIGER BEETLES (COLEOPTERA: CARABIDAE: CICINELLINAE)

Project Summary

Tiger beetles are important bio-indicators in terrestrial and riparian systems. We propose a statewide population status survey of tiger beetles in Arkansas. Survey techniques will include aerial netting, pitfall trapping, and larval “fishing”. Tiger beetles will be identified and species and habitats of concern will be determined. Conservation and management practices will be recommended.

Project Leader

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Project Budget

Total amount requested (65%) = \$26,600

Total match provided by TTU (35%) = \$14,336

Total project cost = \$40,936

PROJECT STATEMENT

Need

The 2016 State Wildlife Grant Request for Proposals (SWG-RFP) listed tiger beetles as funding priorities, because of a need for baseline distribution and population status surveys. To date, few studies have explicitly examined tiger beetle populations and diversity in Arkansas. One study (Graves and Pearson 1973) identified 31 species of tiger beetles in Arkansas, Louisiana and Mississippi, and suggested that there may be up to 35 species in the region. Substantial anthropogenic activities have transformed many once-rural regions of Arkansas into urban center, compromising and degrading potential tiger beetle habitat in the process, thus it is important to determine the extent to which previously known species exist and to identify any imperiled or threatened species. Finally, tiger beetles have been shown to be excellent indicators of ecosystem health, so their presence may be useful in assessing the efficacy of restoration efforts.

Purpose & Objectives

The purpose of this study is to survey for and identify tiger beetle species and assemblages in Arkansas. Our objectives are to identify what species exist in the state, prioritize habitats that have diverse tiger beetle fauna, characterize habitat requirements, and identify threats and mechanisms for conservation.

Location

This study will take place across the state of Arkansas. We will stratify our sampling to include all ecoregions, but will specifically target those habitat types that Graves and Pearson (1973) identified as optimal. In addition, we will pay extra attention to riparian habitats, lakeshores, and sandy soils, as beetles are known to occur there. We will primarily sample public land, but will opportunistically sample private land as well.

Approach

Survey sites will be stratified across all Arkansas ecoregions; however, we will focus our efforts on habitats that were identified by Graves and Pearson (1973) as optimal. In addition, we will prioritize sampling of riparian habitats, lakeshores, and sandy soils. Survey sites will be selected based on accessibility, permission from landowners, and presence of beetles (e.g., when tiger beetles are found, additional efforts will be made at these sites).

Survey techniques will include aerial netting, pitfall trapping, hand sampling (e.g., flipping rocks and boards), nighttime light sampling, and larval “fishing”. Aerial netting, nighttime light sampling, and hand collecting will be conducted opportunistically in riparian areas or areas where tiger beetles are readily sighted. Larval “fishing”, a method where a blade of grass is used to extract a larva from its burrow, will also be done opportunistically—This method will allow us to non-destructively sample (and if necessary, re-sample) larvae. Pitfall trap arrays (5 traps, 1 m apart) will be placed in habitats that are known to support tiger beetles. Pitfall traps will be 4-8 cm in diameter, filled with a non-

toxic preservative solution. They will be checked and emptied weekly for four weeks in Summer 2017.

All collected specimens will be preserved (first in ethanol, then on pins) and identified to the lowest taxonomic resolution possible. Voucher specimens will be deposited in the University of Arkansas Watson Museum of Entomology. Necessary permits will be obtained prior to collection. Results from this study will include an updated tiger beetle fauna of Arkansas checklist that can be distributed to interested parties (e.g., entomologists, naturalists, and interested public), descriptions of habitats for tiger beetles, and recommendations for management and prioritization of habitat for tiger beetle conservation.

Expected Results & Benefits

We expect that this study will increase our knowledge of tiger beetle distribution, diversity, and habitat utilization. This study will provide recommendations to conserve and preserve beetle populations and habitats.

Budget

Item	Year 1		Year 2	
	<i>TTU</i>	<i>SWG</i>	<i>TTU</i>	<i>SWG</i>
Salary	\$6,666	\$20,000	\$0	\$0
Travel	\$0	\$2,500	\$0	\$0
Supplies	\$1,000	\$500	\$0	\$0
Indirect Costs	\$6,670	\$4,600	\$0	\$0
Totals	\$14,336	\$26,600	\$0	\$0

We request \$20,000 in salary for Britt Smith. He will focus 100% of his time on specimen collection, prep, identification, and data analysis. We also request \$2,500 for travel to and from study sites. We request \$500 for supplies to collect and prepare beetle specimens. Finally, we request \$4,600 (20%) in indirect costs. As match, we provide \$6,666 in salary for Robin Verble-Pearson. She will focus 100% of her matched time on this project. In addition, we provide \$1,000 in existing supplies (collecting materials, preparation materials). Finally, we provide \$6,670 (29%) in deferred indirect costs.

Qualifications

Robin Verble-Pearson, Ph.D.

Robin Verble-Pearson is the Director of the Center for Fire Ecology and an Assistant Professor of Fire Ecology at Texas Tech University in Lubbock, Texas. She received her M.S. in Entomology (2008) at the University of Arkansas and a Ph.D. in Applied Biology at the University of Arkansas at Little Rock (2012). She has 6+ years of experience working in Arkansas ecosystems. Her thesis and dissertation work focused on the fire ecology of forest ants in the Ozark Ecoregion of Arkansas. In addition, she has previously worked in collaboration with The Nature Conservancy-Arkansas Field Office to evaluate tree morticulture to promote woodpecker use of habitats. She has also participated in several

prescribed burns in a variety of Arkansas ecosystems, including tallgrass prairies, oak woodlands and savannas, and pine forests. She is also currently working with the Valles Caldera National Trust in New Mexico to survey insects after a catastrophic wildfire and in the Texas Panhandle to assess the effects of prescribed burning on grassland insects.

Britt Smith

Britt Smith completed an M.S. in Natural Resources Management from Oklahoma State University and a B.S. in Biology from the University of Missouri Kansas State. He is currently pursuing a Ph.D. in Natural Resources Management at Texas Tech University. He has previously worked for the Wisconsin Department of Natural Resources. His current projects involve surveying beetle populations in fire-disturbed Texas rangelands.