

*** ABBOTT NATURE PHOTOGRAPHY

Karnes County, Texas which includes Kenedy and Karnes City where our study sites are located.

Introduction

- Declines in Texas horned lizard populations are thought to be due in part to a decline in their staple food source, the harvester ant (*Pogonomyrmex* spp.). • However, there are very few dietary
- studies of this species
- Preliminary research in two small Texas towns using scat indicates they eat mainly termites, beetles, and ants other than harvester ants. Difficult to identify non-harvester ants from fecal remains. • Developed a genetic marker to identify ant species in the degraded DNA extracted from horned lizard scat.

Methods

- Morphological sorting of insect pieces from horned lizard scat samples
- We used bait and pitfall traps in the summer of 2016 to catch a variety of ground-dwelling insects in Karnes County.
- DNA was extracted from collected ant, termite, and other insect specimens.
- Using polymerase chain reaction (PCR), we amplified the DNA using primers specific to a portion of the cytochrome oxidase I (Cox I) mitochondrial gene.
- PCR products were then sequenced using Sanger sequencing on an ABI Genetic Sequencer and results were used to identify species through BOLD (Barcode of Life Database).
- All sequences matching to ant species were aligned and additional sequences of known ant species found in Karnes County were added from GenBank.
- Primers created via Primer3 for a 146 basepair (bp) region of Cox 1.



Texas horned lizard scat

DNA Barcoding Ant Species for Texas Horned Lizard (Phrynosoma cornutum) Diet Analysis

Kaitlyn Upton, Rachel Alenius, and Dean Williams

Department of Biology, Texas Christian University

Results

Pheidole sitiens, Harvard Entomology

Consensus neighbor-joining tree for ant species in Karnes, Texas from a 560 bp sequence of the Cox I gene and Kimura-2 parameter distances. Bootstrap values >50 are labeled. Branch length is not proportional to amount of genetic variation. * - sequences from this study (n = 44), 31 additional sequences from GenBank

- 20 ant species identified in Kenedy and Karnes City.
- Created degenerate primers to amplify a 146 bp region in the sequences used in the neighbor-joining tree.
- 18 of 20 species were still distinguishable using this 146 bp region.

A24: Dhaidala divarainilaaa
A34. Frieidole diversipilosa
^A80: Pheidole diversipilosa^
A39: Pheidole diversibilosa
Pheidole diversipilosa
Disidale esiste
Eneidole sciara
Pheidole sciophila
Pheidole hvatti
A26: Dhaidala dantata
ASS. Prieloole deritata
A37: Pheidole dentata
Pheidole sitiens
A46: Dhaidala citiane
A40. Frieldole sidens
A47: Pheidole sitiens
A10 [,] Pheidole sitiens
A41: Phoidolo citione
^A44: Pheidole sitiens^
A45: Pheidole sitiens
A9. Phaidala sitians
Prieloole dentata
Pheidole titanis
Pheidole obscurithoray
*A 40. Dissidate astas
A42. Prieldole pelol
Pheidole pelor
A31: Solenopsis
A1: Solonopoio invisto
 ŽT. Solenohaia invicta
"A2: Solenopsis invicta"
Pheidole floridana
Pheidole tenicono
Disidala abaval
Eneidole absurda
Pheidole pilifera artemisia
 Pheidole seney
Dhaidala haalitaa
Eneidole noplitica
Pheidole xerophila
A38: Formicidae
A40: Formioidae
A40. Formicidae
Pheidole constipata
Pheidole metallescens
A74: Cuphomyrmov rimocue
Ar4. Cypholityjinex innosus
Cyphomyrmex rimosus
Monomorium pharaonis
Monomorium evaneum
*A04. Manager a Suger
"AZ1: Wonomorium"
A13: Monomorium
A14: Monomorium
A7: Monomorium
A7. Monomonium
A8: Monomorium
A64 ⁻ Hymenoptera
A58: Hypopopera
^74. Ibumana antana
Ari. Hymenoptera
Cyphomyrmex wheeleri
A72: Cámponotus savi
Componetus covi
Camponotus sayi
Camponotus nearcticus
Camponotus pennsvlvanicus
 Camponotus americanus
 *A2C: Naivamentanta amin's
Azo. Newamyrmex swainsonii"
^A65: Pogonomyrmex barbatus*
Pogonomyrmex barbatus
A76: Dogonomurmov barbatue
Aro. r ogonomymiek barbatus
Hogonomyrmex parbatus
A15: Nylanderia vividula
 Nylanderia vividula
 A4C: Notasalasia vividule
Alo: Mylanderia vividula:
A27: Nylanderia vividula*
 Nylanderia terricola
 A60: Brachumurmau
"Ago, plachymynnex
A25: Dorymyrmex flavus*
A4: Dorvínvímex flavus
 A3: Donumurmay
Ab. Dorymyrijiex
Dorymyrmex bicolor
A48: Formicidae
 A48: Formicidae
A48: Formicidae *A49: Formicidae*
A48: Formicidae *A49: Formicidae* *A51: Formicidae*
A48: Formicidae *A49: Formicidae* *A51: Formicidae* *A53: Formicidae*
 A48: Formicidae *A49: Formicidae* *A51: Formicidae* *A53: Formicidae*
A48: Formicidae *A49: Formicidae* *A51: Formicidae* *A53: Formicidae* *A53: Formicidae*

This small 146 bp region will allow us to amplify and sequence the degraded DNA extracted from horned lizard fecal pellets and will help us identify ant species that horned lizards have eaten.



Texas horned lizard caught in Karnes County

KU received a SERC grant and an Honors College grant.

Special thanks to: Dr. Dean Williams, Rachel Alenius, and Dr. Matt Hale







Conclusion



Texas horned lizard caught in Karnes County

Future Research

- Use this marker to determine what ant species in samples from 2016
- Create similar markers that are termite and beetle specific

Funding & Acknowledgements



