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Survey of Rodents within Arkansas Game and Fish Commission Wildlife Management Areas

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Survey of Rodents within Arkansas Game and Fish Commission Wildlife Management Areas

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Running Title: Survey of Rodents within AGFC Wildlife Management Areas

Although rodents are a commonly studied group of animals, the distribution and natural history of many species within Arkansas is still not well understood or documented. Thus, we conducted this survey of rodents across Wildlife Management Areas (WMA) in Arkansas to augment current literature with new distribution records and provide notes on the natural history of rodents from Arkansas. Portions of this study (shrews) have previously been published (Pfau *et al.* 2011). Additionally, we augment recent ectoparasite records (e.g. McAllister *et al.* 2013; Tumilson *et al.* 2015) for rodents.

We collected rodents from 15 Arkansas Game and Fish Commission (AGFC) WMAs (Appendix 1). Rodents were trapped from the WMAs during three 4-night sessions from July-September in 2002 and three 3-night sessions from July-September in 2003 and 2004, using Victor® mouse traps. Five 150 m transects were set up in different habitat types on each WMA with 2 traps placed at each of 15 stations, spaced 10 m apart along the transect. All collected specimens were identified by either whole body or skulls using the keys in Sealander and Heidt (1990) and dissected to determine sex and reproductive condition. Additionally, the hair and skin of rodents were examined for ectoparasites. Ectoparasite specimens were collected and placed in vials containing 70% (v/v) ethanol. Chiggers and other mites were cleared in lactophenol, slide-mounted in Hoyer's medium (Walters and Krantz 2009), and identified using Whitaker (1982). Sucking lice were identified in ethanol using Kim *et al.* (1986). Voucher specimens of hosts are deposited in the mammal collection at Henderson State University (HSU), Arkadelphia, Arkansas. Ectoparasites are deposited in the Entomology Collection in the Department of Biology at Georgia Southern University, Statesboro, Georgia.

A total of 97 rodents was collected and identified representing 10 species (Table 1). Of note, several specimens of *Peromyscus* spp. were not identified to species due to similarities in morphological characters, requiring examination of cleaned skulls, so have been excluded from the annotated list. Seven species of rodents harbored ectoparasites. We report 2 new county records, reproductive data, and ectoparasite data below.

Microtus ochrogaster (prairie vole). — Occurs across the northern tier of counties and along the Gulf Coastal Plain with a southernmost location of Arkansas County (Sealander and Heidt 1990). A single non-reproductive female was collected from Big Lake WMA.

Microtus pinetorum (woodland vole). — Occurs throughout the state (Sealander and Heidt 1990). A single adult male was collected from Camp Robinson WMA. *Androlaelaps fahrenheitsi* was collected from this individual. This mite has been previously collected from this host in other states (Whitaker *et al.* 2007).

Mus musculus (house mouse) — Occurs statewide (Sealander and Heidt 1990), usually in close association with humans. Single pregnant females were collected from both Big Lake WMA on 16 October 2002 and Holland Bottom WMA on 21 September 2004, each of which had 5 embryos.

Ochrotomys nuttalli (golden mouse). — Occurs throughout the state (Sealander and Heidt 1990). A single adult male was collected from Sulphur River WMA. This species prefers dense forested understory typical of bottomland hardwoods near riparian areas.

Oryzomys texensis (marsh rice rat). — Occurs throughout most of the state except the north central

portion (Sealander and Heidt 1990). A total of 6 marsh rice rats were collected from 3 WMAs (3 from Camp Robinson; 1 from Hurricane Lake; and 2 from Holland Bottoms). The 3 individuals from Camp Robinson represent a new county record for Faulkner County for this species (Sealander and Heidt 1990). Additionally, a single female collected on 21 Aug 2003 from Camp Robinson contained 3 embryos.

Peromyscus attwateri (Texas mouse). — Distribution is restricted to the Interior Highlands (Sealander and Heidt 1990). Four individuals (three from Gulf Mountain WMA and one from Petit Jean WMA) were collected. One of the individuals was doubly infested with a single male flea *Orchopeas leucopus* and a single female mite *Androlaelaps fahrenholzi*. Both of these ectoparasite species have been collected previously from *P. attwateri* (Tumilson *et al.* 2015). Additionally, the *P. attwateri* from Gulf Mountain WMA represent a new county record for Van Buren County (Sealander and Heidt 1990). Recently, Connior *et al.* (2013) reported this species from adjacent Searcy County.

Peromyscus gossypinus (cotton mouse). — Occurs throughout most of the state except the western half of the Springfield and Salem Plateaus (Sealander and Heidt 1990). A single adult male collected from Grandview Prairie was infested with a single female mite *Androlaelaps fahrenholzi*. This mite has been previously collected from this host in other states (Whitaker *et al.* 2007).

Peromyscus leucopus (white-footed mouse). — Occurs throughout the state (Sealander and Heidt 1990). A total of 22 individuals (4 from Camp Robinson; 2 from Cedar Creek; 3 from Grandview Prairie; 3 from Harold Alexander; 1 from Henry Gray/Hurricane Lake; 1 from Madison County; and 8 from Petit Jean River). A single pregnant female collected on 24 July 2002 from Petit Jean River WMA contained 3 embryos. Additionally, 1 adult male was infested with 4 female laelapid mites *Echinonyssus utahensis*. This mite has been previously collected from this host in other states (Whitaker *et al.* 2007).

Table 1: Number and location of rodents collected from Arkansas Wildlife Management Areas

Species	Location														
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
<i>Microtus ochrogaster</i>		1													
<i>Microtus pinetorum</i>			1												
<i>Mus musculus</i>		1									1				
<i>Ochrotomys nuttalli</i>															1
<i>Oryzomys texensis</i>			3							1	2				
<i>Peromyscus attwateri</i>								3						1	
<i>Peromys gossypinus</i>							1								
<i>Peromyscus leucopus</i>			4	2			3		3	1			1	8	
<i>Peromyscus maniculatus</i>			5				4	1	3					1	
<i>Reithrodontomys fulvescens</i>	2		2	2		1	5	1		1		1		4	2
<i>Reithrodontomys humulis</i>							9								
<i>Sigmodon hispidus</i>					5				6			1		3	

*Note: (1) Bell Slough; (2) Big Lake; (3) Camp Robinson; (4) Cedar Creek; (5) Choctaw Island; (6) Ed Gordon; (7) Grandview Prairie; (8) Gulf Mountain; (9) Harold Alexander; (10) Henry Gray Hurricane Lake; (11) Holland Bottoms; (12) Hope Upland; (13) Madison County; (14) Petit Jean; (15) Sulphur River

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Peromyscus maniculatus (deer mouse). — Occurs throughout most of the state except the West Gulf Coastal Plain (Sealander and Heidt 1990). A total of 14 individuals (five from Camp Robison; four from Grandview Prairie; one from Gulf Mountain; three from Harold Alexander; and one from Petit Jean River). Two males from Camp Robinson were each infested with a single female mite *Androlaelaps fahrenheitsi*. This mite has been previously collected from this host in other states (Whitaker *et al.* 2007).

Reithrodontomys fulvescens (fulvous harvest mouse). — Occurs throughout the state (Sealander and Heidt 1990). A total of 21 individuals were collected (2 from Bell Slough; 2 from Camp Robinson; 2 from Cedar Creek; 1 from Ed Gordon; 5 from Grandview Prairie; 1 from Gulf Mountain; 1 from Henry Gray/Hurricane Lake; 1 from Hope Upland; 4 from Petit Jean River; and 2 from Sulphur River). These included 3 pregnant females were collected (one from Bell Slough and two from Grandview Prairie). The female collected on 11 September 2002 from Bell Slough contained 5 embryos and the 2 from Grandview Prairie each contained 3 embryos and were collected on 7 August 2002 and 9 August 2003.

Reithrodontomys humulis (eastern harvest mouse).— Though rarely obtained during surveys, this mouse is known to occur in the upper portion of the Mississippi Alluvial Plain as far south as Lee County and the southwestern portion of the state (Sealander and Heidt 1990). A total of 9 individuals was collected from Grandview Prairie. A single pregnant female collected on 10 August 2002 contained 3 embryos and a single adult male was infested with a single female mite *Androlaelaps fahrenheitsi*, which is a new host record.

Sigmodon hispidus (hispid cotton rat). — Occurs throughout the state (Sealander and Heidt 1990). A total of 15 cotton rats was collected from 4 WMAs (5 from Choctaw Island; 6 from Harold Alexander; 1 from Hope Upland; 3 from Petit Jean River). Two females were pregnant; 1 from Choctaw Island collected on 11 June 2003 had 1 embryo and 1 from Hope Upland collected on 23 July 2003 had 3 embryos. Two individuals (male from Choctaw Island and female from Harold Alexander) were each infested with a single female mite *Androlaelaps fahrenheitsi*. Additionally, 1 adult male from Petit Jean River was infested by a single female sucking louse *Hoplopleura hirsuta*. These ectoparasites have been collected from this host in other states (Kim *et al.* 1986; Whitaker *et al.* 2007).

In conclusion, we record 10 species of rodents across 15 WMA's within Arkansas, with Camp Robinson, Grandview Prairie, and Petit Jean River having the highest species diversity of 5 species. Additionally, we collected 4 species of ectoparasites from rodents in Arkansas, with *R. humulis* being a new host record for *Androlaelaps fahrenheitsi*. Of note, we provide the first record of reproduction for *R. humulis* within the state of Arkansas.

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Appendix 1: Wildlife Management Areas (WMA) surveyed for rodents across Arkansas

WMA	County	Primary Habitat Type	Size (Hectares)
Bell Slough	Faulkner	upland pine-hardwood forests, bottomland hardwood forest, and cypress-tupelo lakes and sloughs	826
Big Lake	Mississippi	bottomland hardwoods	4,856
Camp Robinson	Faulkner	grasslands, oak savanna, upland oak/hickory forest, bottomland hardwood forests	1,630
Cedar Creek	Scott	old fields with non-native grasses and dense shrub/scrub	42
Choctaw Island	Desha	Bottomland hardwoods	3,359
Ed Gordon	Conway	herbaceous wetland waterfowl habitat, bottomland hardwoods and swamps	3,553
Grandview Prairie	Hempstead	native grasslands	1,977
Gulf Mountain	Van Buren	upland hardwoods	5,666
Harold Alexander	Sharp	oak-hickory forest interspersed with eastern red cedar glades	5,441
Henry Gray/Hurricane Lake	White	Bottomland hardwoods	6,880
Holland Bottoms	Lonoke, Pulaski	Bottomland hardwoods	2,249
Hope Upland	Hempstead	upland mixed pine and hardwood forests	856
Madison County	Madison	upland hardwoods	5,846
Petit Jean River	Yell	upland and bottomland hardwoods, pine stands, savannas and upland fields	6,305
Sulphur River	Miller	Bottomland hardwoods	7,347