

# New County Records of Oklahoma Mammals Based on Remains Identified in Owl Pellets

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**Examination and identification of small mammal remains found in 5,969 owl pellets collected from various locations across Oklahoma provides 28 new county records for 15 species and three genera. These new county records increase our understanding of small mammal distributions in Oklahoma. © 2006 Oklahoma Academy of Science.**

## INTRODUCTION

Our current understanding of small mammal distributions in Oklahoma is based on museum specimens collected sporadically over a period of approximately 100 years (Caire et al 1989). Many museum holdings resulted from trapping surveys, scavenging of road-killed individuals, and owl pellet collections. Although these methods have provided information about what species might be present in an area, species with low abundance, narrow habitat preferences, cyclic population dynamics, or seasonal changes in activity might have been missed in some areas. In addition, some regions of the state have been rarely sampled. The distributions of mammal species occurring in Oklahoma were summarized by Caire et al in 1989. However, gaps in the distributional information available at that time for many species were apparent because some regions of the state had been poorly sampled. Since Caire et al (1989), several studies (Choate 1989; Dalquest 1990; Girard et al 1990; Gettinger 1991; Clark and Tumilson 1992; Smith 1992, 1996; Stangl and Carr 1997; Stangl et al 1992, 2004; McCaffery et al 2002; Wallace

and Stangl 2003; Braun and Revelez 2005) have added new county records of various species of mammals in Oklahoma and expanded our understanding of the distribution of mammals across the state. Braun and Revelez (2005) suggested that there are still incomplete distributional records for several species.

In 1999, a large owl pellet collection (over 70,000 pellets) was donated to the University of Central Oklahoma by Paul W. Wilson. It is generally accepted among mammalogists that owls are more efficient at capturing some small mammals (e.g., shrews) than researchers using traps (Schowalter et al 2002). Identification of mammalian prey items in this collection of pellets yielded new county records of mammals in Oklahoma.

## METHODS

From 1976 to 1999, Paul W. Wilson collected over 70,000 owl pellets from 53 counties in Oklahoma. The pellets were recovered from near the following owl nesting or roosting sites: *Bubo virginianus* (Great Horned Owl), *Tyto alba* (Barn Owl), *Strix varia* (Barred Owl), *Asio otus* (Long-eared Owl), and *Asio flammeus* (Short-eared Owl). All pellets per each visit to a site were treated as a single

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collection. Initially, Wilson identified prey species using skull keys adapted from Hall and Kelson (1959) and Hall (1981). Identifications were subsequently verified by the late Everett Grisgby of Northeastern Oklahoma State University, Tahlequah, as well as by comparisons with reference specimens in the University of Kansas Natural History Museum and Biodiversity Center, Lawrence, Kansas. All the owl pellets are housed in the University of Central Oklahoma Collection of Vertebrates (UCOCV). The list of mammals Wilson identified and the provenience of the pellets were compared to reported mammal distributions (Stangl and Dalquest 1986; Caire et al 1989; Choate 1989; Dalquest 1990; Girard et al 1990; Gettinger 1991; Clark and Tumilson 1992; Smith 1992, 1996; Stangl and Carr 1997; Stangl et al 1992, 2004; McCaffery et al 2002; Wallace and Stangl 2003; Braun and Revelez 2005) and any collection of pellets representing a new county record was reexamined. The mammal species identifications were reconfirmed by McDonald and Caire through comparisons with reference specimens in the University of Central Oklahoma Collection of Vertebrates.

Of the 5,969 owl pellets reexamined because they contained possible mammal county range extensions, 5,373 were from Barn Owls, 545 were from Great Horned Owls, 50 from Short-eared Owls, and one was from a Barred Owl.

Because owls forage some distance away from their nests, we used the average estimated size of the mean home range (276.5 ha) for Barn Owls in Texas (Byrd 1982; 355 ha) and western Nebraska (Gubanyi 1989; 198 ha) to confirm that the pellets examined contained mammalian prey taken by the owl in the county where the pellets were collected and not from an adjacent county.

The acronym and associated number (e.g., UCOCV 4082) in the species accounts represent the University of Central Oklahoma Collection of Vertebrates (Hafner et al 1997) accession number for the particular collection of owl pellets which contain the voucher specimens for the new county re-

ords. All the counties listed in the species accounts represent new county records for that particular species. The species accounts are arranged according to Wilson & Reeder (2005).

## RESULTS AND DISCUSSION

### Species Accounts

#### Order Insectivora (Insectivores)

##### Family Soricidae (shrews)

*Blarina hylophaga* (Elliot's short-tailed shrew) has been documented throughout the eastern one-fourth of the state (Caire et al 1989). Stangl et al (1992) and Stangl and Carr (1997) provided two new county records, Grady and Okmulgee respectively, in south central and northeast Oklahoma. Braun and Revelez (2005) reported the occurrence of this shrew in Major County. Provided here are seven new county records including the first record for Oklahoma's most northeastern county, Ottawa, and a new record from southern Oklahoma in Jefferson County. *Material examined:* Alfalfa County (UCOCV 4082); Custer County (UCOCV 4063, 4077); Dewey County (UCOCV 4059); Garfield County (UCOCV 4102); Jefferson County (UCOCV 4067); Nowata County (UCOCV 4084); Ottawa County (UCOCV 4057).

*Cryptotis parva* (least shrew) is known to occur over most of Oklahoma (Caire et al 1989). Stangl et al (1992) and Wallace and Stangl (2003) listed specimens for Cotton, Greer, Stephens and Tillman counties filling in some of the distribution gaps along the Red River. Dalquest et al (1990) reported the northwestern most record in Texas County. Reported here are 10 new county records. *Material examined:* Alfalfa County (UCOCV 4082); Beckham County (UCOCV 4058, 4070); Blaine County (UCOCV 4068); Ellis County (UCOCV 4069); Garfield County (UCOCV 4087); Major County (UCOCV 4104); Mayes County (UCOCV 4089); Nowata County (UCOCV 4084); Washington County (UCOCV 4085); Washita County (UCOCV 4090).

**Family Talpidae (moles)**

*Scalopus aquaticus* (eastern mole) is found throughout the state (Caire et al 1989). Dalquest (1990) provided evidence of moles in Cimarron County, verifying the species in the panhandle region. Braun and Revelez (2005) listed new records for Delaware, Kiowa, and Roger Mills counties. Two new county records are provided here. *Material examined*: Alfalfa County (UCOCV 4074, 4081); Tillman County (UCOCV 4099).

**Order Rodentia (Rodents)****Family Heteromyidae (heteromyids)**

*Chaetodipus hispidus* (hispid pocket mouse) is known for most of Oklahoma (Caire et al 1989). Braun and Revelez (2005) reported that county distributional gaps existed in southeastern and northeastern portions of the state. Presented here is one new county record. *Material examined*: Garfield County (UCOCV 4087).

*Perognathus* sp. can be found in the western half of Oklahoma (Caire et al 1989). *Perognathus flavus* (silky pocket mouse) and *P. merriami* (Merriam's pocket mouse) have been difficult species to resolve taxonomically. Caire et al (1989) followed Wilson (1973) who synonymized them. A recent multivariate analysis of specimens of *P. flavus* and *P. merriami* suggested that the two should be recognized as distinct species (Brant and Lee 2006). They provide a summary of the taxonomic history of these two species. The distribution and taxonomic status of these two forms in Oklahoma remains unclear. The identification of which species is present in the owl pelts is very difficult to determine. Likewise, based on partial skull fragments, *P. flavescens* is difficult to separate from the above mentioned two species. We take a conservative approach and report the pellet remains as *Perognathus* sp. Recent investigations have provided records of *P. flavus* for some western-most counties (Braun and Revelez 2005). Stangl et al (1992) reported *P. flavus* from Cotton County, which is the southeastern most county record for the state. Provided here are two county records

for the genus. *Material examined*: Alfalfa County (UCOCV 4082); Kiowa (UCOCV 4065).

**Family Cricetidae (new world mice, rats and voles)**

*Microtus ochrogaster* (prairie vole) records of occurrence are scattered across the northwest, north central and northeast portions of the state Caire et al (1989). Recent accounts have presented records for Cimarron County in the panhandle (McCaffery et al 2002), and in Caddo (Smith 1992), Comanche (Choate 1989) and Washita (Clark and Tumilson 1992) counties in southwest Oklahoma. Stangl et al (2004) listed a specimen from Beaver County. Smith (1996) reported a lower jaw of a *Microtus* from Kiowa County but was hesitant to relegate it to either *M. ochrogaster* or *M. pinetorum*. We provide 16 new county records. *Material examined*: Alfalfa County (UCOCV 4074, 4082); Blaine County (UCOCV 4068, 4073); Custer County (UCOCV 4062); Dewey County (UCOCV 4059); Ellis County (UCOCV 4069); Garfield County (UCOCV 4087); Grady County (UCOCV 4105); Greer County (UCOCV 4109); Harmon County (UCOCV 4095, 4100); Harper County (UCOCV 4108); Jackson County (UCOCV 4106); Jefferson County (UCOCV 4101); Kay County (UCOCV 4075); Major County (UCOCV 4104); Ottawa County (UCOCV 4056); Tillman County (UCOCV 4103).

*Microtus pinetorum* (woodland vole) is well represented across much of the eastern half of Oklahoma (Caire et al 1989). Stangl et al (1992) verified its occurrence in Love and Murray counties. Clark and Tumilson (1992) listed Washita County records. Braun and Revelez (2005) reported specimens from Major and Kiowa counties. Seven new county records were documented from the owl pellets. *Material examined*: Alfalfa County (UCOCV 4074); Custer County (UCOCV 4062); Dewey County (UCOCV 4059); Garfield County (UCOCV 4087); Kay County (UCOCV 4075); Mayes County (UCOCV 4089); Ottawa County (UCOCV 4057).

*Neotoma floridana* (eastern woodrat) is documented as occurring across the eastern two-thirds of Oklahoma (Caire et al 1989). Clark and Tumilson (1992) and Stangl et al (1992) listed records from Washita and Kiowa counties, respectively. Braun and Revelez (2005) reported new county records for Garvin, Seminole, and Craig counties. Presented here is one new county record. *Material examined*: Alfalfa County (UCOCV 4081).

*Neotoma micropus* (southern plains woodrat) occurs across the western one-third of Oklahoma (Caire et al 1989). Braun and Revelez (2005) listed an Ellis County record. Provided here are three new county records. *Material examined*: Caddo (UCOCV 4061); Dewey County (UCOCV 4080); Grady County (UCOCV 4105).

*Oryzomys palustris* (marsh rice rat) was reported from six southeastern counties, Bryan, Haskell, Marshall, McCurtain, Pittsburg and Pushmataha by Caire et al (1989). More recent reports confirm its occurrence in Carter, Coal, and Mayes counties (Gettinger 1991), as well as Choctaw and Okmulgee counties (Braun and Revelez 2005). Provided here is one additional county record for northeastern Oklahoma. *Material examined*: Wagoner County (UCOCV 4086).

*Reithrodontomys fulvescens* (fulvous harvest mouse) is well documented across Oklahoma, except for the northwestern one-fourth of the state and the panhandle (Caire et al 1989). Stangl et al (1992) listed south central records including Grady and Love counties, and extended the southwestern range to include Greer, Kiowa, and Cotton counties. Wallace and Stangl (2003) reported a specimen from Jackson County. Clark and Tumilson (1992) provided records from Washita County. Braun and Revelez (2005) listed a northwestern range extension including Custer and Beckham counties. Provided here are two new records for northeastern Oklahoma. *Material examined*: Ottawa County (UCOCV 4057); Washington County (UCOCV 4085).

*Reithrodontomys montanus* (plains harvest mouse) is common across Oklahoma (Caire et al 1989). Several investigators have reported new county records including Texas County (Dalquest et al 1990), Greer County (Stangl et al 1992), and Caddo County (Stangl et al 1992 and Smith 1992). Braun and Revelez (2005) provided a northeastern range extension in Ottawa County, as well records for Grant and Kay counties. The western harvest mouse (*R. megalotis*) can be difficult to separate from the plains harvest mouse. However, based on our interpretations (e.g., rostrum shorter and broader in *R. megalotis*), and comparison with museum specimens, the remains in the owl pellets were *R. montanus*. Provided here are five new county records. *Material examined*: Beckham County (UCOCV 4070); Craig County (UCOCV 4076); Jefferson County (UCOCV 4067); Kiowa County (UCOCV 4065); Washington County (UCOCV 4078).

*Baiomys taylori* (northern pygmy mouse) is a sub-tropical grassland species thought to be expanding its range northward (Caire et al 1989). Only two verified occurrences have been listed for the state. Stangl and Dalquest (1986) reported the species in Cotton County, and Caire (1991) collected specimens in Harmon County. Provided here are three new county records. *Material examined*: Greer County (UCOCV 4109); Jefferson County (UCOCV 4098); Tillman County (UCOCV 4103).

*Onychomys leucogaster* (northern grasshopper mouse) is known to occur over most of the western half of Oklahoma (Caire et al 1989). Provided here are four additional county records. *Material examined*: Beckham County (UCOCV 4070); Cotton County (UCOCV 4094); Jefferson County (UCOCV 4097); Kiowa County (UCOCV 4107).

#### **Family Muridae (old world mice, rats, and relatives)**

*Rattus norvegicus* (Norway rat) is likely to be found in proximity to most cities and towns of Oklahoma and feral populations are uncommon (Caire et al 1989). Girard et

al (1990) suggested that a few highly localized populations probably exist in southwestern regions of the state. Provided here is one new county record. *Material examined*: Washita County (UCOCV 4092).

*Rattus rattus* (roof rat) is known to occur in proximity to towns and cities but because *Rattus* is an exotic introduction, relatively few voucher specimens have been kept (Caire et al 1989). Thus, the statewide distribution is poorly documented and occurrences in only 10 counties have been reported. The majority are from across the southern edge of the state. Girard et al (1990) provided records for Cotton, Tillman, and Kiowa counties. Provided here are two new county records. *Material examined*: Beckham County (UCOCV 4058); Grady County (UCOCV 4105).

*Rattus sp.* (rat) skull fragments in some owl pellets were difficult to reliably relegate to a particular species of *Rattus*. These fragments are reported here as five new county records for the genus. *Material examined*: Blaine County (UCOCV 4073); Harmon County (UCOCV 4072); Jefferson County (UCOCV 4097); Ottawa County (UCOCV 4057); Roger Mills County (UCOCV 4071).

## Order Lagomorpha (Lagomorphs)

### Family Leporidae (hares and rabbits)

*Sylvilagus sp.* (cottontail) bone fragments in some of the owl pellets were not clearly identifiable to a species of cottontail in Oklahoma. The fragments do represent one new county record for the genus. *Material examined*: Beckham County (UCOCV 4070).

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## REFERENCES

- Brant JG, Lee Jr. TE. 2006. Morphological analysis of *Perognathus flavus* and *P. merriami* (Rodentia: Heteromyidae). *Southw Nat* 51:79-86.
- Braun JK, Revelez MA. 2005. Distributional records and comments on Oklahoma mammals. *Tex J Sci* 57:3-24.
- Byrd CL. 1982. Home range, habitat and prey utilization of the barn owl in south Texas [MSc thesis]. Kingsville (TX): Texas A & I University. 64 p. Available from: Texas A & I University Library.
- Caire W. 1991. A breeding population of the northern pygmy mouse, *Baiomys taylori*, in southwest Oklahoma. *Southw Nat* 36:364-365.
- Caire W, Tyler JD, Glass BP, Mares MA. 1989. Mammals of Oklahoma. Norman (OK): University of Oklahoma Press. 567 p.
- Choate LL. 1989. Natural history of a relic population of the prairie vole, *Microtus ochrogaster*, in southwestern Oklahoma. *Occas Pap Tex Tech Univ* 129:1-20.
- Clark BK, Tumilson R. 1992. New records of mammals from Washita County, Oklahoma. *Proc Okla Acad Sci* 72:37-38.
- Dalquest WW, Stangl FB, Jones Jr. JK. 1990. Mammalian zoogeography of a Rocky Mountain-Great Plains interface in New Mexico, Oklahoma, and Texas. *Spec Publ Texas Tech Univ* 34:1-78.
- Gettinger D. 1991. New distributional records for the rice rat (*Oryzomys palustris*) in Oklahoma. *Proc Okla Acad Sci* 71:53-54.
- Girard B, Paul V, Tyler JD. 1990. The status of *Rattus rattus* and *Rattus norvegicus* in southwestern Oklahoma. *Proc Okla Acad Sci* 70:43-44.
- Gubanyi JA. 1989. Habitat use and diet analysis of breeding common barn-owls in western Nebraska [MSc thesis]. Lincoln (NE): University of Nebraska. 86 p. Available from: University Nebraska Library.
- Hafner MS, Gannon WL, Salazar-Bravo J, Alvarez-Castaneda ST. 1997. Mammal collections in the western hemisphere. Lawrence (KS): Allen Press. 93 p.
- Hall RE, Kelson KR. 1959. The Mammals of North America. 1<sup>st</sup> ed. New York (NY): Ronald Press Co. v 1: 1-546+1-79 p and v 2: 547-1083+1-79 p.
- Hall, ER. 1981. The Mammals of North America. 2<sup>nd</sup> ed. New York (NY) John Wiley & Sons. v 1: 1-600+1-90 p and v 2: 601-1181+1-90 p.
- McCaffery RE, Wallace MC, Kamler JF, Ray JD. 2002. Noteworthy distributional records of the prairie vole in the Texas and Oklahoma panhandles. *Southw Nat* 48:717-719.
- Schowalter DB, Engley L, Digby R. 2002. Records of Alberta small mammals through analysis of Great Horned Owl pellets. *Blue Jay* 60:153-169.
- Smith KS. 1992. The prairie vole, *Microtus ochrogaster*, in Caddo County, Oklahoma. *Tex J Sci* 42:116-117.
- Smith KS. 1996. A new microtine (*Microtus*) record for Kiowa County, Oklahoma. *Proc Okla Acad Sci* 76:97-98.
- Stangl FB, Carr CB. 1997. Status of *Blarina hylophaga* (Insectivore: Soricidae) in north Texas and southern Oklahoma. *Tex J Sci* 49:159-162.
- Stangl FB, Dalquest WW. 1986. Two noteworthy records of Oklahoma mammals. *Southw Nat* 31:123-124.
- Stangl FB, Dalquest WW, Baker RJ. 1992. Mammals of southwestern Oklahoma. *Occas Pap Tex Tech Univ* 151:1-47.

- Stangl FB, Goetze JR, Spradling KD. 2004. Historical zoogeography and taxonomic status of the prairie vole (*Microtus ochrogaster*) from the southern plains of Texas and Oklahoma. Occas Pap Tex Tech Univ 235:1-11.
- Wallace DB, Stangl FB. 2003. Records for seven species of mammals from Jackson County, Oklahoma. Proc Okla Acad Sci 83:87-88.
- Wilson DE. 1973. The systematic status of *Perognathus merriami* Allen. Proc Biol Soc Wash 86:175-191.
- Wilson DE, Reeder DM. 2005. Mammal species of the world. 3<sup>rd</sup> ed. Baltimore (MD): Johns Hopkins University Press. v 1: 1 - 743 p and v 2: 744 - 2,142 p.

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