Journal of the Arkansas Academy of Science

Volume 64 Article 20

2010

Distribution of the Southeastern Shrew (Sorex longirostris longirostris) in Arkansas

G. A. Mikel
University of Arkansas at Little Rock

Gary A. Heidt
University of Arkansas at Little Rock

David W. Clark
University of Arkansas at Little Rock, dwclark@ualr.edu

Distribution of the Southeastern Shrew (*Sorex longirostris longirostris*) in Arkansas

G.A. Mikel, G.A. Heidt, and D.W. Clark[1]

Biology Department, University of Arkansas at Little Rock, Little Rock, AR 72204

[1]Correspondence: dwclark@ualr.edu

Abstract

The southeastern shrew (*Sorex longirostris longirostris*) is considered uncommon and, due to a lack of knowledge, a Species of Greatest Conservation Need in Arkansas. Also, eastern Arkansas may represent a gap in the species' distribution. Therefore, we evaluated persistence at previous capture sites, surveyed additional counties, quantified microhabitat at our capture locations, and compiled occurrences. Since Sealander and Heidt's (1990) *Arkansas Mammals* detailed its occurrence, additional captures by Huston and Nelson (1994), Showen (2006), and this study document new counties (Pope and Searcy) and a new ecoregion (Arkansas Valley). Number of specimens in Arkansas has increased to 17 in 11 counties within the Ozark Highlands, Boston Mountains, Ouachita Mountains, and Arkansas Valley Ecoregions. Our efforts to assess a potential distribution gap within the Mississippi Alluvial Plain produced only specimens of other shrew species; therefore, possible factors affecting connectivity across the Mississippi Alluvial Plain and river basin are discussed. Given sparse records in Arkansas, uncommon and Species of Greatest Conservation Need designations are warranted for the southeastern shrew.

Introduction

Sorex longirostris longirostris (southeastern shrew) is uncommon and, due to a lack of knowledge, a Species of Greatest Conservation Need in Arkansas (Anderson 2006). Information is especially lacking west of the Mississippi River (French 1980) and twenty years have passed since *Arkansas Mammals* (Sealander and Heidt 1990) summarized occurrences.

Native to the southeastern United States (French 1980), *S. l. longirostris* reaches its western limit in Arkansas, Missouri and eastern Oklahoma (Sealander 1960, 1977, 1981, Brown 1961, Graham 1976, Taylor and Wilkinson 1988, Garland and Heidt 1989). However, captures in Arkansas have been confined to the Ouachita and Boston Mountains and Ozark Highlands of western and northern Arkansas (Sealander and Heidt 1990, Woods et al. 2004). While many have hypothesized occurrence (Sealander 1960, 1977, French 1980, Garland and Heidt 1989, Heidt et al. 1996), there are no records from the Mississippi Alluvial Plain of eastern Arkansas, creating a gap in the species' recorded distribution (Figure 1 Inset). We evaluated persistence at previous capture sites, surveyed additional counties including the upper Mississippi Alluvial Plain, and compiled occurrences.

Methods

From March 2007 to August 2009 we operated pitfalls, small folding aluminum (SFA) Sherman traps, large folding aluminum (LFA) Sherman traps, and snap-traps. Pitfalls (1L plastic buckets) were placed 3-7m apart in series with 15cm aluminum roof flashing as drift-fencing or set in grids, along deadfall or under low level vegetation without fencing. Sherman and snap-traps were baited with combinations of peanut butter, rolled oats, crushed dry cat food and minced sardines. Traps were checked daily. Capture and handling conformed to appropriate guidelines (Gannon and Sikes 2007, University of Arkansas at Little Rock [UALR] IACUC # R-07-04). Microhabitat variables (Dueser and Shugart Jr. 1978), including volume and decay stage (1-4) of coarse woody debris (CWD; Cromer et al. 2007), were quantified within a 10m x 10m plot centered on capture locations. Specimens were deposited in the UALR Vertebrate Museum.

Results

Capture efforts resulted in 17,983 trapnights at 329 locations with 2 captures and a new county record (Searcy County) for *S. l. longirostris* (Figure 1). These specimens were 2 non-lactating adult females with no embryos trapped in an SFA Sherman baited with peanut butter and dry cat food and an LFA baited with peanut butter and rolled oats. Efforts at previous capture sites (4472 [25%] trapnights) resulted in 10 *Blarina spp.*, whereas efforts in the upper Mississippi Alluvial Plain (3640 [20%] trapnights) resulted in 8 *Blarina carolinensis* and 5 *Cryototis parva*.

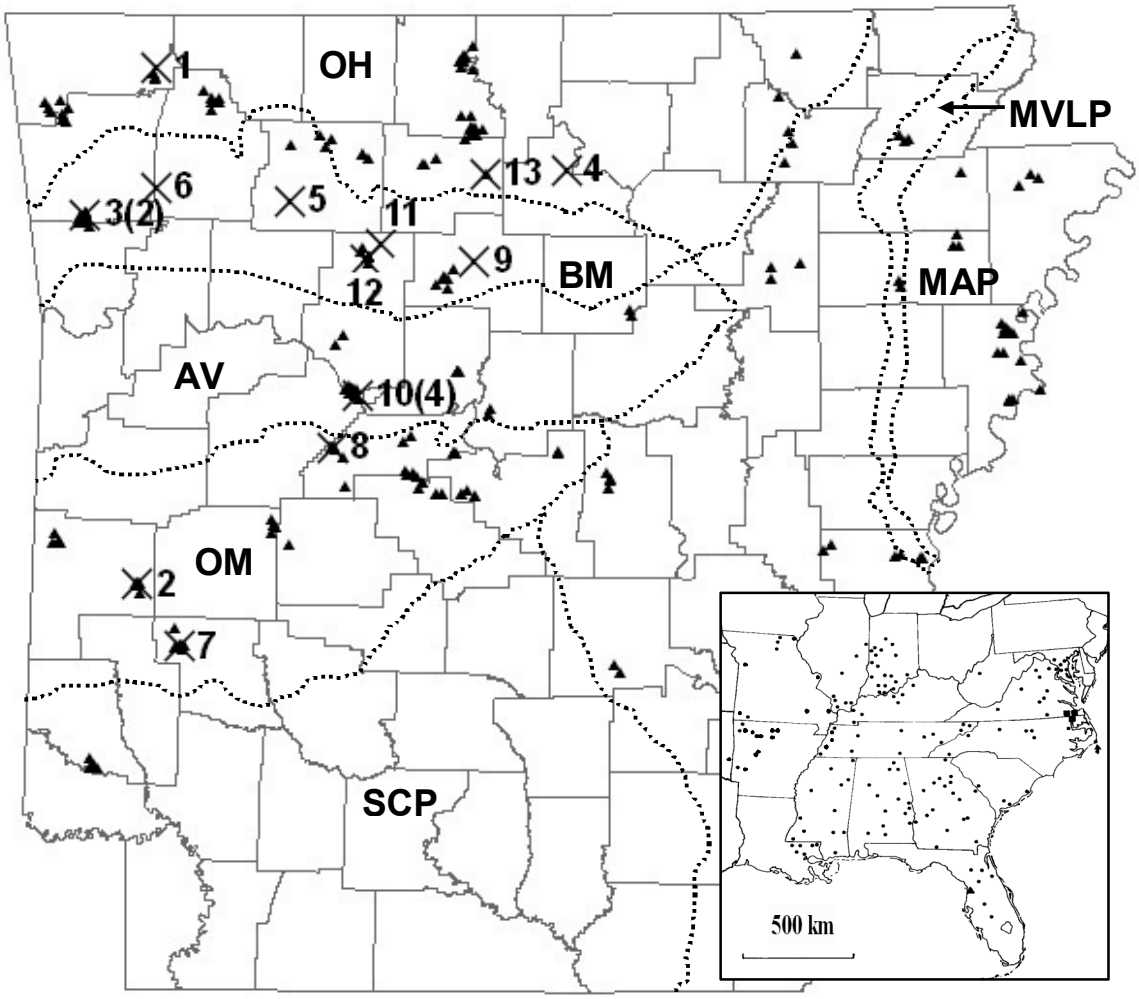

Figure 1: *Sorex longirostris longirostris* in Arkansas (numbered Xs correspond to references below) and trapping locations (triangles) for this study. Parenthetical numbers indicate multiple specimens from a location. Ecoregions (Woods et al. 2004) are delineated by dashed lines (OH: Ozark Highlands, BM: Boston Mountains, AV: Arkansas Valley, OM: Ouachita Mountains, SCP: South Central Plains, MVLP: Mississippi Valley Loess Plains, MAP: Mississippi Alluvial Plain). Inset (redrawn and updated from French 1980) depicts species geographic distribution. 1) Sealander JA 1960; 2) Graham GL 1976; 3) Sealander JA 1977; 4) Sealander JA 1981; 5) Sealander JA and GA Heidt 1990; 6) Sealander JA and GA Heidt 1990; 7) Garland DA and GA Heidt 1989; 8) Garland DA and GA Heidt 1989; 9) Garland DA and GA Heidt 1989 (inadvertently omitted in Sealander JA and GA Heidt 1990); 10) Huston RM and TA Nelson 1994; 11) Showen LL 2006; 12) Present study (UALRVC5733); 13) Present study (UALRVC5734)

Specimen UALRVC5733 (Pope County) occurred in a pecan (*Carya*)-oak (*Quercus*)-pine (*Pinus*) overstory valley with low-level blueberry (*Vaccinium*), elm (*Ulmus*), grape (*Vitis*), sweetgum (*Liquidamber*), catbrier (*Smilax*), honeysuckle (*Lonicera*), and sassafras (*Sassafras*), 35m from water. Specimen UALRVC5734 (Searcy County) occurred in an oak-hickory (*Carya*) overstory ridge with oak seedlings, 150m from water. At the 2 *S. l. longirostris* capture sites, mean CWD volume was 26984.90cm^3 (13cm x 200cm log equivalent) and CWD decomposition scored 2.75 (2.5-3.0). Mean leaf litter depth was 2.55cm (2.5-2.6cm) with 97.68% (99.55-95.8%) coverage.

Discussion

The southeastern shrew can be found in early successional to mature second-growth forest and from dry upland hardwoods and grass fields to hardwood forests near small streams and bordering swamps, marshes, or rivers (Hamilton and Whitaker 1979, French 1980, Caldwell and Bryon 1982, Elliot and Root 2006). Foraging most often occurs under leaf

litter (French 1980) that, with intermediately decayed CWD, provides cover for *S. l. longirostris* and habitat for invertebrate prey. The species is also associated with a heavy ground cover of grasses, sedges, rushes, blackberry and, honeysuckle (French 1980, Webster et al. 1985). For Arkansas, previous captures are described to be in overstory maple, hickory and oak with low-level blackberry, witch-hazel, sumac, sassafras, redbud, honeysuckle and overstory species seedlings (Graham 1976, Sealander 1977, Garland and Heidt 1989). Habitat for our specimens is consistent with previous Arkansas captures, although additional captures with quantified microhabitat characteristics are necessary to suggest a preferred type in Arkansas.

Studies carried out elsewhere in their distribution have suggested that *S. l. longirostris* can be rare (Lowery 1974, Brown 1978). Furthermore, when allopatric, *Sorex cinereus* and *S. l. fisheri* occur in mesic lowlands and river floodplains, whereas *S. l. longirostris* occurs in xeric upland forests and outside floodplain boundaries (Gentry et al. 1971, French 1984, Rose et al. 1987, Parmley and Harley 1995, Ford et al. 2001). Although *S. l. longirostris* occurs on the upland Bluff Hills of the Mississippi Valley Loess Plains on the east side of the Mississippi River in Tennessee (Heidt et al. 1996, Tennessee Wildlife Resources Agency 2005), the west side of the river in Arkansas is the more mesic lowland Mississippi Alluvial Plain. For Arkansas, this suggests the possibility of an uncommon occurrence of *S. l. longirostris* in more mesic areas such as the Mississippi Alluvial Plain where we only captured *B. carolinensis* and *C. parva*.

Management that develops and maintains forest openings creating diversity of habitats and microhabitats would have a positive effect on *S. l. longirostris*. We suggest subsequent shrew collection efforts use a high density of traps that remain operational for as long as possible. Pitfalls without fencing, making use of naturally occurring CWD and vines, are more time-efficient and potentially more effective where fencing can not be made flush with or buried into a rocky substrate. Sherman traps, when set sensitively, can capture small shrews and should be employed. In addition, solicitations for owl roosts and captures by domestic cats should be sought. Future studies could examine this potentially disjunct population using genetic sequencing and shrewd analyses of population dynamics.

Acknowledgments

We thank the Arkansas Game and Fish Commission and the United States Fish and Wildlife Service for the State Wildlife Grant that funded this study, as well as many federal, state, and private land managers/owners for access. We also thank S.A. Baird, W.H. Baltosser, and R.S. Sikes for their contributions and 3 anonymous reviewers for comments

Literature Cited

Anderson JE, **editor**. 2006. Arkansas Wildlife Action Plan. Little Rock (AR): Arkansas Game and Fish Commission. 2028 p.

Brown LN. 1961. *Sorex longirostris* in southwestern Missouri. Journal of Mammalogy 42(4):527.

Brown LN. 1978. Southeastern shrew. *In*: Layne JN, editor. Rare and endangered biota of Florida: mammals. Gainesville (FL): University Press Florida. 1:1-52.

Caldwell RS and **H Bryon**. 1982. Notes on distribution and habitats of *Sorex* and *Microsorex* (Insectivora: Soricidae) in Kentucky. Brimleyana 8:91-100.

Cromer RB, **CA Gresham**, **M Goddard**, **JD Landham** and **HG Hanlin**. 2007. Associations between two bottomland hardwood forest shrew species and hurricane generated woody debris. Southeastern Naturalist 6(2):235-46.

Dueser RD and **HH Shugart**, **Jr**. 1978. Microhabitats in a forest-floor small mammal fauna. Ecology 59(1):89-98.

Elliot AG and **BG Root**. 2006. Small mammal responses to silvicultural and precipitation-related disturbance in northeastern Missouri riparian forests. Wildlife Society Bulletin 34(2):485-501.

French TW. 1980. *Sorex longirostris*. Mammalian Species 143:1-3.

French TW. 1984. Dietary overlap of *Sorex longirostris* and *S. cinereus* in hardwood floodplain habitats in Vigo County, Indiana. American Midland Naturalist 111(1):41-6.

Ford WM, **MA Menzel**, **TS McCay** and **J Laerm**. 2001. Contiguous allopatry of the masked shrew and southeastern shrew in the southern Appalachians: segregation along an elevational and habitat gradient. The Journal of the Elisha Mitchell Scientific Society 117(1):20-8.

Gannon WL and **RS Sikes**. 2007 Guidelines of the American Society of Mammalogist for the use of wild mammals in research. Journal of Mammalogy 88(3): 809-23.

Garland DA and **GA Heidt**. 1989. Distribution and status of shrews in Arkansas. Proceedings Arkansas Academy of Science 43:35-8.

Gentry JB, **FB Golley** and **MH Smith**. 1971. Yearly fluctuations in small mammal populations in a southeastern United States hardwood forest. Acta Theriologica 15:179-190.

Graham GL. 1976. A western extension of the southeastern shrew, *Sorex longirostris* (Soricidae). Southwestern Naturalist 21(3):105.

Hamilton WJ, **Jr**. and **JO Whitaker**, **Jr**. 1979. Mammals of the Eastern United States, 2nd ed. Ithaca (NY): Cornell University Press. 346 p.

Heidt GA, **DA Elrod** and **VR McDaniel**. 1996. Biogeography of Arkansas mammals with notes on species of questionable status. Proceedings Arkansas Academy of Science 50:60-5.

Huston RM and **TA Nelson**. 1994. Barn owl (*Tyto alba*) food habits in west central Arkansas. Proceedings Arkansas Academy of Science 48:73-4.

Lowery GH, **Jr**. 1974. The mammals of Louisiana and its adjacent waters. Baton Rouge (LA): Louisiana State University Press. 565 p.

Parmley D and **D Harley**. 1995. The relative seasonal abundance of shrews in two central Georgia deciduous woodlots. Georgia Journal of Science 53:83-8.

Rose RK, **RK Everton** and **TM Padgett**. 1987. Distribution and current status of the threatened Dismal Swamp southeastern shrew, *Sorex longirostris fisheri*. Virginia Journal of Science 38(4):358-63.

Sealander JA. 1960. Some noteworthy records of Arkansas mammals. Journal of Mammalogy 41(4):525-6.

Sealander JA. 1977. New marginal records for the eastern harvest mouse and southeastern shrew in Arkansas. The Southwestern Naturalist 22(1):148-9.

Sealander JA. 1981. Albino least shrews (*Cryptotis parva*) and a new locality record for the southeastern shrew (*Sorex longirostris*) from Arkansas. The Southwestern Naturalist 26(1):70.

Sealander JA and **GA Heidt**. 1990. Arkansas mammals. Their natural history, classification, and distribution. Fayetteville (AR): The University of Arkansas Press. 308 p.

Showen LL. 2006. Effects of oak woodland restoration on small mammals in the Ozark National Forest [thesis]. State University (AR): Arkansas Tech University. 83 p.

Taylor CL and **RF Wilkinson**, **Jr**. 1988. First record of *Sorex longirostris* (Soricidae) in Oklahoma. The Southwestern Naturalist 33(2):248.

Tennessee Wildlife Resources Agency (TWRA). 2005. Tennessee's comprehensive wildlife conservation strategy. Nashville (TN): TWRA.

Webster WD, **JF Parnell** and **WC Biggs**, **Jr**. 1985. Mammals of the Carolinas, Virginia, and Maryland. Chapel Hill (NC): University of North Carolina Press. 255 p.

Woods AJ, **TL Foti**, **SS Chapman**, **JM Omernik**, **JA Wise**, **EO Murray**, **WL Prior**, **JB Pagan**, **Jr**., **JA Comstock**, and **M Radford**. 2004. Ecoregions of Arkansas (color poster with map, descriptive text, summary tables, and photographs). Reston (VA): United States Geological Survey.