

**First Records of the Smoky Shrew, *Sorex fumeus*, and Pygmy Shrew,
Microsorex hoyi, from Indiana**

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Introduction

Sorex fumeus Miller is a wide-ranging species occurring from southeastern Canada through the northeastern United States as far south as the mountains of Georgia and west across two-thirds of Kentucky (Caldwell and Bryan, in prep; Hall, 1981). *Microsorex hoyi* (Baird) ranges from Alaska throughout Canada and the northern tier of the United States, and generally overlaps the range of *S. fumeus* in the eastern United States (Diersing, 1980). Apparent isolated populations have been reported from southern Illinois (Diersing, 1980) and western Kentucky (Caldwell and Bryan, in prep). However, neither species was previously known from Indiana, although we have suspected for some time that *Microsorex hoyi* occurred there. Caldwell and Bryan (in prep) recently took both of these species just to the south of Indiana in Breckinridge County, Kentucky.

Microsorex hoyi was previously taken in the Western Coal Field and Dripping Springs Escarpment of Kentucky (Caldwell and Bryan, in press). The former is of Pennsylvanian sandstone, the latter of Mississippian limestone (McFarland, 1943). The Coal Field is the Kentucky section of the much larger Eastern Interior Basin, which occurs in portions of Illinois, Indiana, and Kentucky. The interior region of the basin is bounded by the Pottsville Escarpment in Kentucky. The Pottsville and Dripping Springs Escarpments continue north into Indiana as the Crawford Uplands and Mitchell Plain respectively (Malott, 1922). It was because of this continuous nature of the physiographic-ecological region that trapping was carried out in southern Indiana.

The main purpose of this paper is to report the occurrence of these species in Indiana.

Methods and Materials

Twenty-four pitfall traps (sunken cans) were set in Harrison-Crawford State Forest, Harrison County, Indiana, on 1 May, and twelve additional ones were set in Crawford County on 22 August 1981.

Cans were sunk at the bases of rotting stumps, against large boulders and rockfaces, and near fallen logs, usually flush against natural barriers. Snap-traps were also used, and these were set along similar objects.

Results and Discussion

On 31 May 1981, the pitfalls in Harrison County were checked. Traps contain-

ed one Pygmy Shrew, *Microsorex hoyi* (ISU 5408), and ten Smoky Shrews, *Sorex fumeus* (ISU 5409-5418). These are the first records of these species in Indiana. Standard measurements for the Pygmy Shrew were 74 mm total length, 24 mm tail length, and 8 mm hind foot. The average measurements for the ten Smoky Shrews were 104.4 mm, 40.9 mm, and 12.7 mm. An additional Pygmy Shrew, but no Smoky Shrew, was taken on 8 September 1981 at the Crawford County site. This site was at the mouth of the Stinking Fork of the Blue River.

Habitat. The forests at both sites were mesic to dry-mesic north-facing upland situations. Canopy dominants included sugar maple (*Acer saccharum*), American beech (*Fagus grandifolia*), northern red oak (*Quercus rubra*), white ash (*Fraxinus americana*) and white oak (*Q. alba*).

Microsorex hoyi has been taken in a variety of habitats in Kentucky including mesic to dry situations and upland to low areas along streams (Caldwell and Bryan, in prep). *Sorex fumeus* is most often found in mature mesic forests with deep organic litter (Hamilton, 1940). This is the situation at the Harrison County site. The average basal area estimate for 7 stations along the trap line at Harrison County was 31 m²/ha. Mammal burrows in the humus and upper soils were numerous.

Species Associates. *Blarina brevicauda*, *Cryptotis parva*, *Microtus pinetorum*, and *Peromyscus leucopus* were also taken, the last species usually when the pitfalls were filled with water. *Cryptotis parva* was taken with *M. hoyi* at the Crawford County site. In upland situations in western Kentucky, Caldwell and Bryan (in prep) have captured *S. longirostris* in association with *S. fumeus* and *M. hoyi*, and it likely occurs at the southern Indiana sites.

Taxonomy of Microsorex. Long (1972) recognized two species of *Microsorex*: *M. hoyi*, a northern animal occurring west of the St. Lawrence River, and *M. thompsoni*, occurring in the nothereastern United States and south to Georgia. Long believed the eastern *M. thompsoni* contained two subspecies, the nominate form and *M. t. winnemana*. Diersing (1980) has recently revised the pygmy shrews. He has relegated *Microsorex* to subgeneric status under the Holarctic genus *Sorex*. It was viewed as containing one species, *Sorex hoyi*, with five subspecies. Hamilton and Whitaker (1979) and Hall (1981) treat pygmy shrews as genus *Microsorex*, and we follow this taxonomic assignment.

Table 1 shows selected measurements of *M. hoyi* from Kentucky, Indiana, and southern Illinois, but unfortunately there are few specimens from the western part of the range.

TABLE 1. Means \pm 1 SD of selected external and cranial measurements in mm from southern Illinois, western Kentucky-Indiana, and eastern Kentucky.

n =	Illinois 1	West KY-IN \pm 1 SD 9	East KY \pm 1 SD 12
Total Length	—	67.83 \pm 3.19 (6)	74.60 \pm 2.88 (5)
Body Length*	—	44.83 \pm 2.64 (6)	49.60 \pm 1.95 (5)
Tail Length	—	23.25 \pm 1.28 (8)	26.33 \pm 1.94 (9)
Maxillary Breadth	3.9	3.80 \pm 0.07 (9)	3.82 \pm 0.11 (12)
Molariform Tooth Row Length	3.3	3.15 \pm 0.05 (9)	3.19 \pm 0.10 (12)
Unicuspid Tooth Row Length	1.5	1.3 \pm 0.09 (9)	1.37 \pm 0.12 (12)
Condylobasal Length	12.7	12.7 \pm 0.15 (9)	12.89 \pm 0.23 (10)
Relative Condylobasal Length	—	0.19 \pm 0.01 (6)	0.17 \pm 0.01 (4)

*In Diersing 1980, the column labeled as total length is actually body length, so this variable is included for comparison. (n = total number of specimens examined from each area.)

Mean values for body length, tail length, and condylobasal length of the eastern Kentucky individuals are very close to the measurements of *M. hoyi winnemana* given by Diersing (1980). These are respectively 50.3 vs. 50.6, 26.8 vs. 27.4, and 12.9 vs. 12.9 mm. Based on these measurements the eastern Kentucky population appears to be assignable to *winnemana*. The western Kentucky-Indiana measurements do not appear to fit any of the subspecies listed by Diersing (1980), but are just slightly lower than for the southern Illinois specimens. This perhaps suggests a north-south cline through Illinois with specimens reaching their minimum size at the southern terminus of their range in western Kentucky.

Diersing (1980) does not believe the southern Illinois population is in contact with the northern Illinois population. He suggests the prairie peninsula may act as an isolating mechanism, but additional field work is needed. If intervening populations are found and a cline does exist, it would seem to indicate only one variable subspecies, *M. h. hoyi*, in the eastern United States. If no intervening populations are found, then the western Kentucky-Indiana populations are probably isolated from *M. h. hoyi* and *M. h. winnemana* and should receive subspecific status. This problem is currently under investigation by Caldwell and Smith.

Data are now being collected on distribution, food habits, ectoparasites, and reproduction of these species in Indiana.

Literature Cited

1. CALDWELL, R. S., and BRYAN, H., in press. Notes on distribution and habitats of *Sorex* and *Microsorex* in Kentucky (Insectivora: Soricidae). Brimleyana No. 8.
2. DIERSING, V. E. 1980. Systematics and evolution of the pygmy shrews (subgenus *Microsorex*) of North America. *J. Mamm.* 61: 76-101.
3. HALL, E. R. 1981. The mammals of North America. John Wiley and Sons, New York.
4. HAMILTON, W. J., JR. 1940. The biology of the Smoky Shrew (*Sorex fumeus fumeus* Miller). *Zoologica* 25: 473-492.
5. HAMILTON, W. J., JR. and J. O. WHITAKER, JR. 1979. Mammals of the eastern United States. Cornell University Press, Ithaca, New York.
6. MALOTT, C. A. 1922. The Physiography of Indiana. In: Handbook of Indiana Geology. Department of Conservation. Division of Geology. Publ. No. 21.
7. MCFARLAN, A. C. 1943. Geology of Kentucky. Waverly Press, Baltimore, Maryland.