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A New Shrew (*Sorex*) from Florida

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A collection of mammals made at Homosassa Springs, Citrus County, Florida, by William J. Schaldach, Jr., and Paul S. Chapin contains a series of *Sorex longirostris* which I believe merits description as a new subspecies. I would like to express my gratitude to Dr. Harold E. Anthony and Mr. George G. Goodwin for permission to undertake this description, and to the following persons for loans of comparative material: Dr. W. Wedgewood Bowen, Dartmouth College Museum; Dr. William H. Burt, University of Michigan; Dr. Charles O. Handley, United States National Museum; Dr. James N. Layne, University of Florida; and especially to Dr. Harley B. Sherman of DeLand, Florida, for specimens in his private collection and for his help in locating additional specimens of this little-collected species. Abbreviations used in this paper are as follow:

A.M.N.H., the American Museum of Natural History
D.C.M., Dartmouth College Museum
H.B.S., collection of H. B. Sherman
U.F., University of Florida
U.M., University of Michigan
U.S.N.M., United States National Museum

METHODS

Cranial measurements were taken as described by Jackson (1928), except that maxillary breadth was omitted, because breakage of the maxillary processes during cleaning or subsequent handling renders

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this measurement of questionable value. In its place width across (the metastyles of) M^2-M^2 has been used. All cranial measurements expressed in this paper are the averages of three measurements made from several hours to several days apart. As a convenient means of grouping skulls I have adopted the age groups outlined by Rudd (1955). These do not fit perfectly the material at hand, and are not intended as indicators of the absolute ages set up by Rudd for *Sorex* of California, but are used only as a device for grouping like stages in development. Differences in cleaning technique make it inadvisable to use the development of cranial sutures as a criterion here, and tooth wear alone has been utilized in the grouping of skulls. Body measurements are those made by the collectors. No attempt has been made to treat the sexes separately, not only because of the paucity of available specimens, but also because the sex of only two of the eight shrews referable to *longirostris* is known.

Trying to describe colors by means of Ridgway's "Color standards and color nomenclature" (1912) is at times almost futile. A substantial improvement over this work now exists in the "Atlas de los colores" of C. and J. Villalobos (1947), which contains about five times as many color samples, arranged in a better format than that of Ridgway. In the hope that the "Atlas" will eventually gain acceptance as a new standard for color designation, I have incorporated its system into the description below. Ridgway designations are also included, because most workers at the present time will have readier access to this older work. The Ridgway notations, however, are far from exact for the most part and must be considered as approximations only.

Ridgway colors were determined in the following manner. The study skin was placed partly over the color sample to be compared, and the two were examined under low ($13\times$) magnification, with the use of a binocular microscope. To minimize sheen from the glossy pelage the specimen was held with its head towards the observer, illumination from a white fluorescent lamp striking the study skin from the rear. The microscope was thrown out of focus, which caused the color plate and pelage to appear at textureless patches of contiguous colors. Even with this technique no precise match could be found for the color of the upper parts. Needless to say, gross examination was even less satisfactory, and the Ridgway notations were all made under the microscope.

To obtain the Villalobos designation the specimen was oriented to the observer and light as described above but was viewed without the microscope, through the perforation in the color sample.

***Sorex longirostris eionis*, new subspecies**

HOLOTYPE: A.M.N.H. No. 163855, male, age group 2— (young adult), skin and skull; collected at Homosassa Springs, Citrus County, Florida, February 14, 1951, by William J. Schaldach, Jr., and Paul S. Chapin. The name *eionis* is from the Greek ἑῖων, "shore," in allusion to the coastal position of the type locality.

RANGE: Known only from the type locality.

MEASUREMENTS (IN MM.) OF HOLOTYPE: Total length, 93; tail vertebrae, 32; hind foot, 11; ear, 7. Cranial measurements: Condylbasal length, 15.4; palatal length, 6.1; interorbital breadth, 3.4; breadth of braincase, 8.0; length of maxillary tooth row, 5.4; width across M^2 – M^2 , 4.0.

COLOR: As in *longirostris*, a very dark chestnut color dorsally, becoming lighter and richer on the sides. Under parts clay color; when viewed with the belly hairs reflecting highlights the appearance is silvery, the true color being largely obscured. The bases of the hairs are slate gray. Tail bicolored, but not sharply so, colored like back above, and lighter underneath.

Villalobos: Upper parts OOS-2-3° at middorsal line, grading to OOS-5-4° on sides. Under parts OOS-8-3°, becoming just noticeably more saturated pectorally. Tail OOS-3-4° above and OOS-13-4° below.

Ridgway: Upper parts approximately Prout's Brown, but darker along the middorsal line, approaching Bister on sides. Under parts Drab, slightly more saturated pectorally.

GENERAL DESCRIPTION

Intermediate in size between *fisheri* and *longirostris*. Similar to *longirostris*, but with larger head-and-body measurement. In actual length, the tail vertebrae fall within the same range as those of *longirostris*, which makes the tail relatively shorter. Skull larger than in *longirostris*, with the same general proportions, although there is a slight tendency towards decrease of the length of the maxillary tooth row as compared to the palatal length.

MEASUREMENTS: The extremes of 10 specimens of *S. l. eionis* from Homosassa Springs are as follows; means are given in parentheses: Total length, 91–100 (96); tail vertebrae, 29–34 (32); hind foot, 11–12 (11). Skull: Condylbasal length, 15.0–15.6 (15.3); palatal length, 6.0–6.3 (6.2); interorbital breadth, 3.3–3.6 (3.4); breadth of braincase, 7.4–8.0 (7.8); length of maxillary tooth row, 5.4–5.6 (5.5); width across M^2 – M^2 , 3.9–4.3 (4.1). Measurements and proportions of all specimens examined

TABLE 1
CRANIAL AND BODY MEASUREMENTS (IN MILLIMETERS) OF *Sorex longirostris* FROM SOUTHEASTERN UNITED STATES

| Subspecies | Sex | Age Group | Total Length | Tail | Condylor-basal Length | Palatal Length | Inter-orbital Breadth | Maxillary Length | Width Across M ² -M ² | Cranial Breadth |
|--------------------------------------|-----|-----------|--------------|------|-----------------------|----------------|-----------------------|------------------|---|-----------------|
| <i>S. l. eionis</i> , new subspecies | | | | | | | | | | |
| A.M.N.H. No. 163852 | ♂ | 2— | 94 | 32 | 15.03 | 6.05 | 3.51 | 5.53 | 4.18 | 7.44 |
| A.M.N.H. No. 163853 | ♀ | 2— | 95 | 31 | — | 6.21 | 3.34 | 5.49 | 3.93 | — |
| A.M.N.H. No. 163854 | ♂ | 1+ | 96 | 29 | 15.38 | 6.20 | 3.48 | 5.59 | 4.06 | 7.98 |
| A.M.N.H. No. 163855 (type) | ♂ | 2— | 93 | 32 | 15.30 | 6.06 | 3.35 | 5.37 | 4.05 | 8.00 |
| A.M.N.H. No. 163856 | ♂ | 2 | 98 | 33 | 15.17 | 6.13 | 3.55 | 5.46 | 4.23 | 7.95 |
| A.M.N.H. No. 163857 | ♂ | 2/2+ | 100 | 32 | — | 6.31 | 3.38 | 5.54 | 4.29 | — |
| A.M.N.H. No. 163858 | ♀ | 1+ | 96 | 34 | — | — | — | 5.52 | 4.02 | — |
| A.M.N.H. No. 163859 | ♀ | 1 | 99 | 34 | 15.58 | 6.29 | 3.29 | 5.63 | 3.95 | 7.88 |
| A.M.N.H. No. 163860 | ♂ | 1 | 98 | 30 | — | 5.98 | — | 5.42 | 4.31 | — |
| D.C.M. No. 52-23-1894 | ♂ | 1 | 91 | 32 | 15.12 | 6.09 | 3.62 | 5.50 | 4.23 | — |
| Mean | | | 96.0 | 31.9 | 15.26 | 6.15 | 3.44 | 5.50 | 4.12 | — |
| 2 S.E. | | | 1.8 | | 0.16 | 0.08 | | 0.05 | | |
| Intermediate form | | | | | | | | | | |
| U.F. No. 2617 | — | 2— | 83 | 35 | 15.53 | 6.42 | 3.50 | 5.82 | 4.02 | 7.73 |

TABLE 1—(Continued)

| Subspecies | Sex | Age Group | Total Length | Tail | Condylol-basal Length | Palatal Length | Inter-orbital Breadth | Maxillary Length | Width Across M ² -M ² | Cranial Breadth |
|---------------------------|-----|-----------|--------------|------|-----------------------|----------------|-----------------------|------------------|---|-----------------|
| <i>S. l. longirostris</i> | | | | | | | | | | |
| U.S.N.M. No. 38425 | — | 2 | — | — | 14.31 | 5.73 | 3.23 | 5.28 | 3.88 | 7.29 |
| U.S.N.M. No. 159415 | — | 2 | — | — | 13.85 | 5.67 | 3.05 | 5.27 | 3.96 | 7.21 |
| U.S.N.M. No. 285815 | ♂ | 1+ / 2— | 89 | 34 | 14.71 | 6.03 | 3.31 | 5.43 | 4.00 | 7.65 |
| U.S.N.M. No. 210542 | — | 1+ | — | — | — | 5.65 | 3.28 | 5.06 | 3.78 | — |
| U.M. No. 79789 | — | 1 | 86 | 35 | 14.95 | 5.97 | 3.34 | 5.48 | 4.00 | 7.72 |
| H.B.S. No. 223 | — | — | 80 | 29 | — | — | — | — | — | — |
| H.B.S. No. 2621 | — | 2— | 87 | 30 | 14.66 | 5.88 | 3.35 | 5.26 | 3.92 | 7.35 |
| A.M.N.H. No. 143190 | ♂ | — | 88 | 31 | — | — | — | — | — | — |
| Mean | | | 85 | | 14.50 | 5.82 | | 5.30 | 3.92 | |
| 2 S.E. | | | 3.2 | | 0.38 | 0.13 | | 0.12 | | |

are presented in tables 1 and 2. The values for two standard errors are given for all means of measurements for which the *t* values indicate a level of significance of 1 per cent or less.

TABLE 2
CRANIAL AND BODY RATIOS OF *Sorex longirostris* FROM SOUTHEASTERN UNITED STATES

| Subspecies | Sex | Age Group | Tail Length/ Total Length | Maxillary Length/ Palatal Length |
|--------------------------------------|-----|-----------|------------------------------|-------------------------------------|
| <i>S. l. eionis</i> , new subspecies | | | | |
| A.M.N.H. No. 163852 | ♂ | 2— | 34% | 91.4% |
| A.M.N.H. No. 163853 | ♀ | 2— | 32.6 | 88.4 |
| A.M.N.H. No. 163854 | ♂ | 1+ | 30.2 | 90.1 |
| A.M.N.H. No. 163855 (type) | ♂ | 2— | 34.4 | 88.6 |
| A.M.N.H. No. 163856 | ♂ | 2 | 33.6 | 89.0 |
| A.M.N.H. No. 163857 | ♂ | 2/2+ | 32.0 | 87.7 |
| A.M.N.H. No. 163858 | ♀ | 1+ | 35.4 | — |
| A.M.N.H. No. 163859 | ♀ | 1 | 34.3 | 89.5 |
| A.M.N.H. No. 163860 | ♂ | 1 | 30.6 | 90.6 |
| D.C.M. 52-23-1894 | ♂ | 1 | 35.2 | 90.3 |
| Mean | | | 33.2 | 89.5 |
| 2 S.E. | | | 1.1 | 0.7 |
| <i>Intermediate form</i> | | | | |
| U.F. No. 2617 | — | 2— | 42.2 | 90.6 |
| <i>S. l. longirostris</i> | | | | |
| U.S.N.M. No. 38425 | — | 2 | — | 92.1 |
| U.S.N.M. No. 159415 | — | 2 | — | 92.9 |
| U.S.N.M. No. 285815 | ♂ | 1+/2— | 38.2 | 90.0 |
| U.S.N.M. No. 210542 | — | 1+ | — | 89.6 |
| U.M. No. 79789 | — | 1 | 40.7 | 91.8 |
| H.B.S. No. 223 | — | — | 36.2 | — |
| H.B.S. No. 2621 | — | 2— | 34.5 | 89.4 |
| A.M.N.H. No. 143190 | ♂ | — | 35.2 | — |
| Mean | | | 37.4 | 90.9 |
| 2 S. E. | | | 2.4 | 3.2 |

COLOR RANGE: The series, taken between February 10 and February 18, does not differ noticeably from *longirostris* collected in fall and spring. The variation of color within the series of *eionis* is noted in table 3.

TABLE 3
VILLALOBOS COLOR DESIGNATIONS FOR *Sorex longirostris eionis*,
NEW SUBSPECIES^a

| Museum No. | Upper Parts | Side | Under Parts |
|----------------------------|-------------------|--------------|----------------|
| A.M.N.H. No. 163852 | OOS-3-2° | OOS-(6/7)-3° | OOS-10-3° |
| A.M.N.H. No. 163853 | OOS-3-2° | OOS-5-4° | OOS-(10/11)-2° |
| A.M.N.H. No. 163854 | OOS-1-4° | OOS-3-2° | OOS-9-2° |
| A.M.N.H. No. 163855 (type) | OOS-2-3° | OOS-5-4° | OOS-8-3° |
| A.M.N.H. No. 163856 | OOS-3-4° | SO-5-2° | OOS-10-2° |
| A.M.N.H. No. 163857 | OOS-(2/3)-(3°/2°) | OOS-4-4° | OOS-9-2° |
| A.M.N.H. No. 163858 | OOS-2-3° | OOS-5-4° | OOS-8-2° |
| A.M.N.H. No. 163859 | OOS-3-4° | OOS-5-4° | OOS-10-2° |
| A.M.N.H. No. 163860 | OOS-3-2° | OOS-7-3° | OOS-9-2° |

^a D.C.M. No. 52-23-1894 not available for comparison.

DISCUSSION

A single specimen from Welaka, Putnam County, Florida, appears to represent an intermediate between *longirostris* and *eionis*. Its body measurements are those of *longirostris*, while in cranial measurements it resembles *eionis*. In tables 1 and 2 it has therefore been placed between the two and is omitted in comparisons between the two forms. The shrew collected by J. E. Hill in Polk County, Florida (A.M.N.H. No. 143190), represents the southernmost record for the species, a fact that renders it all the more lamentable that, while the skin and axial skeleton have been well preserved, the skull has been lost. The body measurements as recorded, however, make it advisable to consider this specimen as *longirostris*. The implication, consequently, is that *eionis* is restricted to the west coast of Florida or perhaps to the Homosassa region alone.

Through Dr. Sherman, another specimen, a partly mummified animal, has been received from its collector, R. F. Harlow. Not enough of the skull remains for use in comparison, but the animal deserves mention as it extends the known range of the species slightly to the east in the state. The locality of this shrew (A.M.N.H. No. 165679) is DeLand, Volusia County, Florida.

Schaldach's description of the habitat and mammalian associates of *eionis* is as follows: "The collecting site was situated within the confines of the Fish Bowl tourist area, at the source of the [Homosassa]

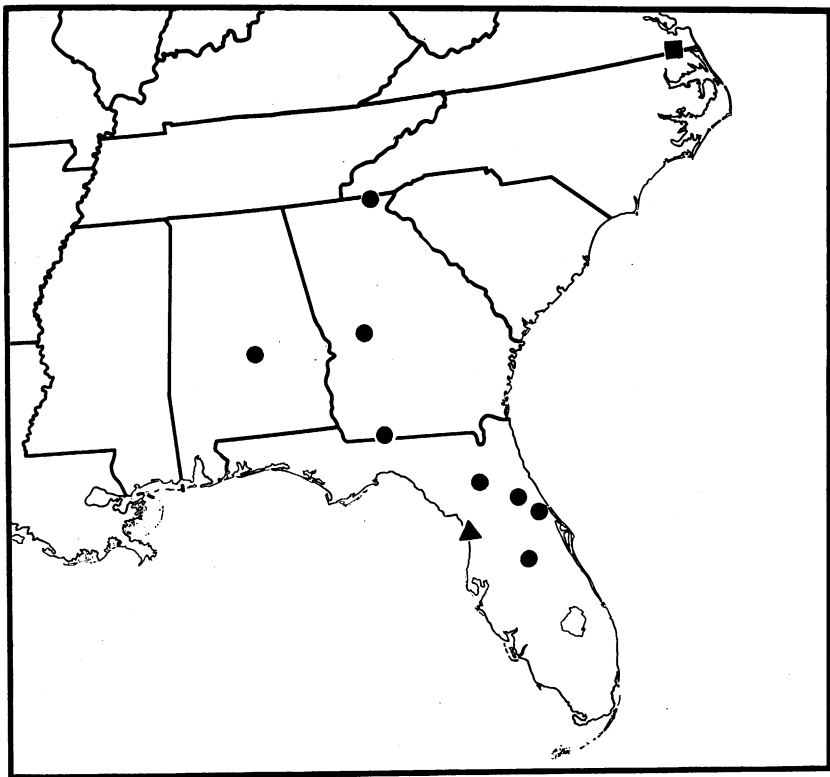


FIG. 1. Map of southeastern United States, showing the localities represented by *Sorex longirostris* treated in this paper. *Sorex l. longirostris* is indicated by circles, *eionis* by a triangle, and *fisheri* by a square.

river. Traps were set in a typical Bayhead Swamp ecological area located at the east end of the circle trail which leads from the Fish Bowl headquarters. The shrews were all trapped in sub-surface runways in the leaf mold of the forest floor. The same runways yielded *Blarina*, *Peromyscus nuttalli* and *P. gossypinus*. The area is a forest stand of hydrophytic trees—cypress, bay, gum, water tupelo, etc.—with little undergrowth except for tangles of greenbriers. However, the floor is well covered with leaves, fallen branches, tree trunks and stumps, offering very good small mammal cover. There was little or no understorey of palmetto in the area of the trapline, although further away, on slightly higher ground, the palmetto became very dense.”

SPECIMENS EXAMINED

- S. l. eionis*: Florida: Citrus County, Homosassa Springs, 10, A.M.N.H., D.C.M.
S. l. longirostris: Alabama: Autauga County, Autaugaville, 1, U.S.N.M. Georgia: Grady County, Beachton, 1, U.S.N.M.; Taylor County, Butler, 1, U.S.N.M.; Towns County, Young Harris, 1, U.S.N.M. Florida: Alachua County, Gainesville, 3, H.B.S., U.M.; Polk County, Davenport, 1, A.M.N.H.; Putnam County, Welaka, 1, U.F.; Volusia County, Deland, 1, A.M.N.H.
S. l. fisheri: Virginia: Dismal Swamp, Lake Drummond, 5, U.S.N.M.

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