MAMMALIAN SPECIES No. 249, pp. 1–3, 3 figs.

# Syntheosciurus brochus.

By Nancy M. Wells and Jacalyn Giacalone

Published 13 December 1985 by The American Society of Mammalogists

## *Syntheosciurus* Bangs, 1902

*Syntheosciurus* Bangs, 1902:25. Type species *Syntheosciurus brochus* Bangs.
*Synthetosciurus* Elliot, 1904:91. Renaming of *Syntheosciurus*.

**CONTEXT AND CONTENT.** Order Rodentia, Suborder Sciurognathi, Infraorder Sciuromorpha, Family Sciuridae, Subfamily Sciurinae (Carleton, 1984; McLaughlin, 1984). The genus contains one species, *Syntheosciurus brochus*.

## *Syntheosciurus brochus* Bangs, 1902

### Mountain Squirrel

*Syntheosciurus brochus* Bangs, 1902:25. Type locality "Boquete, 7,000 ft.," Chiriquí, Panamá; fixed by Enders (1953) as 8 mi N Boquete.
*Sciurus poasensis* Goodwin, 1943:1. Type locality "Volcano Poas, altitude 6700 feet, Province Alajuela, Costa Rica."

**CONTEXT AND CONTENT.** Context same as for genus. Two subspecies currently are recognized (Hall, 1981).

*S. b. brochus* Bangs, 1902:25, see above.
*S. b. poasensis* (Goodwin, 1943:1), see above.

**DIAGNOSIS.** *Syntheosciurus brochus* (Fig. 1) is "a rather small, dark colored squirrel, intermediate in size between *Microsciurus alfari* and *Sciurus deppei*" (Goodwin, 1943:1). The pelage is soft and woolly, with thick underfur. The round, bushy tail is equal to or shorter than the combined length of head and body. Ears are short (16 mm), barely standing above the fur, and are densely furred inside and out. Vibrissae are short, 40 mm (Bangs, 1902; Goodwin, 1943).

**GENERAL CHARACTERS.** General coloration of upperparts is dark reddish olive, ranging from olivaceous in *S. b. brochus* to cinnamon buff and black in *S. b. poasensis*. The tail color is similar to that of the back but the tips of the hairs are slightly more reddish. Orbital ring and sides of nose and chin range from olive in *S. b. brochus* to rich cinnamon buff in *S. b. poasensis*. Underparts of *S. b. brochus* are strongly suffused with orange rufous, and the inguinal region of *S. b. poasensis* is bright ochraceous tawny (Bangs, 1902; Goodwin, 1943). Colors of upper and lower parts blend. The underfur is dark gray. There are no postauricular patches (Goodwin, 1943). No information is available on seasonal changes in pelage.

The dental formula is i 1/1, c 0/0, p 2/1, m 3/3, total 22. Molar teeth are relatively large and resemble those of *Microsciurus*. The small, peg-like P3 reaches the crown of P4 (Bangs, 1902; Goodwin, 1946; Howell, 1938). The slender upper incisors extend forward. The anterior surface of the incisors is smooth, and the upper incisors may possess a well-marked central groove (Goodwin, 1943, 1946; Moore, 1959).

The skull of *Syntheosciurus* (Fig. 2) resembles that of *Microsciurus*, but the cranium is more highly arched and the anterior margin of the frontals is swollen. The postorbital processes are thin and the audital bullae small (Howell, 1938). "Premaxillaries abruptly tapered anteriorly; nasals long and slender, terminating posteriorly on a line with the posterior border of the premaxillaries and constricted near base, their posterior border only slightly emarginate. Posterior palatine foramina well behind a line across the middle of second molars; posterior border of palate broad, evenly rounded and without central process; spheno-palatine foramina very large" (Goodwin, 1943:1).

Sexual dimorphism is not evident. Average external measurements (in mm) and extremes (in parentheses) for two *S. b. brochus* and two *S. b. poasensis* (Hall, 1981) are: total length, 301 (273 to 320); length of tail, 139 (120 to 150); length of hindfoot, 44 (41 to 46).

Skull measurements (in mm) for the type of *S. b. brochus* (Bangs, 1902) are: basal length, 35.6; occipitonasal length, 44.0; zygomatic width, 25.2; interorbital width, 12.6; palatal length, to palatal notch, 20.0, to end of pterygoid, 27.4; length of nasals, 13.0; width of nasals, 5.8; length of upper cheekteeth, 7.6; length of mandible, 27.0.

Skull measurements (in mm) for the type specimen of *S. b. poasensis* (Goodwin, 1943) are: condylobasal length, 38.7; palatal length, 20.6; length of nasals, 12.7; zygomatic width, 24.8; interorbital width, 12.4; width of palate across M2, 10.1; length of upper cheekteeth, 7.4.

The baculum of *S. brochus* has not been described.

**DISTRIBUTION.** *Syntheosciurus* is known only from four localities in Costa Rica and Panamá (Fig. 3). Bangs (1902) described the type locality for *S. b. brochus* as Boquete on Volcán de Chiriquí, Panamá. However, Enders (1953, 1980) clarified that the type (MCZ 10402), paratype (MCZ 10403), and five animals collected later (ANSP 19841, 20751, 20752, 20753, 20754) actually came from Cylindro, Panamá (8°10′N, 82°5′W) on the Atlantic slope of the Cordillera in Bocas del Toro Province at an elevation of 2,135 m. This location is 13 km N of Boquete. In 1977, another specimen (USNM 545120) of *S. b. brochus* was shot 6 km N of Cerro Pittier in Costa Rica at an elevation of 2,135 m (Enders, 1980). This is 50 km W of Cylindro and about 10 km NW of Cerro Eschandi in Panamá.

The type specimen of *S. b. poasensis* (AMNH 131723) was collected in 1938 at Volcán Poás, Alajuela Province, Costa Rica, at an elevation of 2,040 m (Goodwin, 1943). In 1966, a second specimen (KU 112029), provisionally referred to *poasensis*, was collected on the north slope of Cerro Pando, Bocas del Toro Province, Panamá, at an elevation of 1,920 m (Heaney and Hoffman, 1978). They noted (p. 855) that it "may represent an intergrade between the two named taxa . . . ."

There is no fossil record for *Syntheosciurus*.

**ONTOGENY AND REPRODUCTION.** A nursing female was taken on 30 April 1901 in the province of Chiriquí, Panamá (Bangs, 1902). A female collected on 25 July 1941 in Bocas del Toro Province, Panamá, was not lactating, although she was living with an adult male and four or five young in a hollow tree (Enders, 1980).

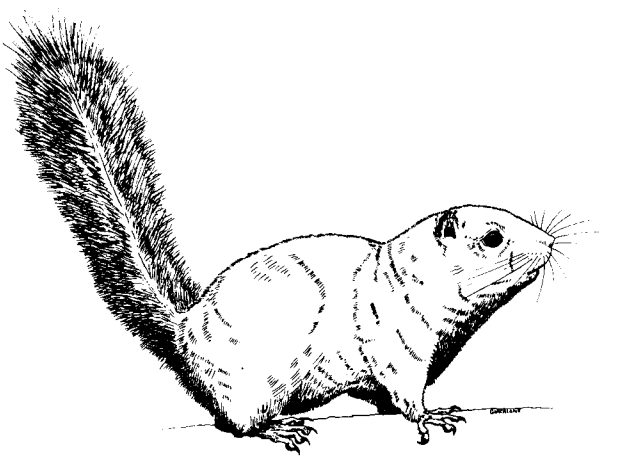

FIG. 1. An adult *Syntheosciurus brochus brochus* from Volcán Poás, Costa Rica (illustration prepared by Jacalyn Giacalone).

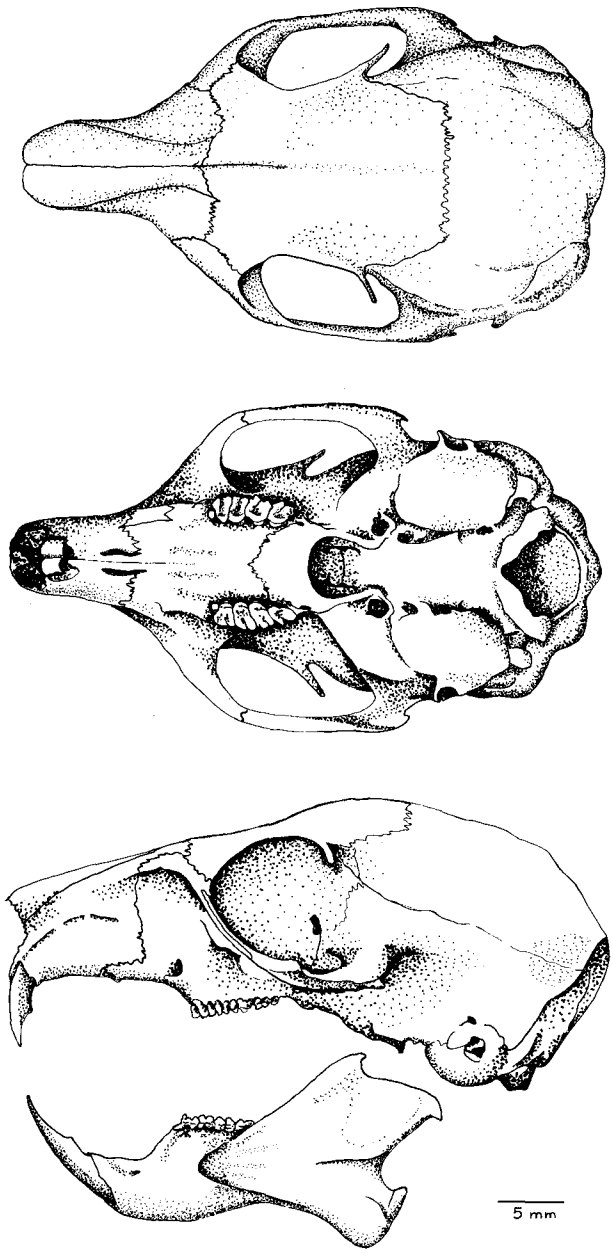


FIG. 2. Dorsal, ventral, and lateral view of cranium and lateral view of mandible of *Syntheosciurus brochus brochus* from Volcán Poás, Costa Rica. (AMNH 131723; illustration prepared by Jacalyn Giacalone.)

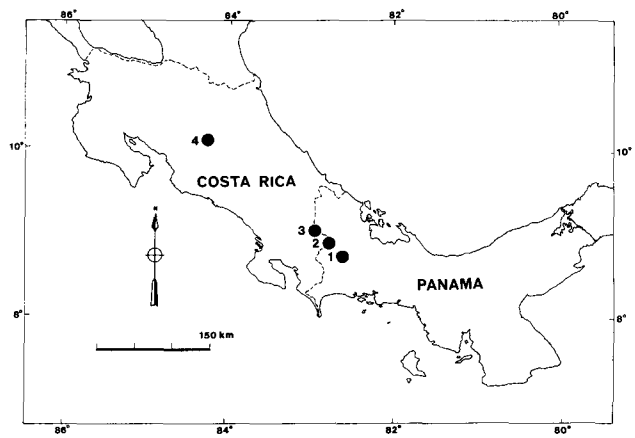


FIG. 3. Distribution of *Syntheosciurus brochus* (map prepared by D. C. L. Gosling). Locations are: 1, Cylindro, Panamá (*S. b. brochus*); 2, Cerro Pando, Panamá (*S. b. poasensis*); 3, Cerro Pittier, Costa Rica (*S. b. brochus*); 4, Volcán Poás, Costa Rica (*S. b. poasensis*).

**ECOLOGY AND BEHAVIOR.** Habitat occupied by *S. b. poasensis* from Cerro Pando was described as "undisturbed montane cloud forest of evergreen broad-leafed trees with a broken canopy at about 20 m, and an understory of palms and tree ferns"; ground cover included "ferns and small herbaceous plants over a thick layer of humus and leaf litter" (Heaney and Hoffmann, 1978: 855). The specific habitat at the type locality of this subspecies was not described. However, Volcán Poás supports areas revegetating from volcanic activity, stunted forest surrounding the volcano crater, cloud forest of *Clusia-Didymopanax-Weinmannia* associations, and cloud forest of *Quercus-Podocarpus* associations (Macey, 1975). The specimens of *S. b. brochus* observed at Cylindro were in an area of "palms with scattered, stunted *Ficus*, and a few small tree ferns" (Enders, 1980:726). No information is available on food habits.

Squirrels at Cylindro (Enders, 1980) were crepuscular and apparently lived as a group in a large, solitary tree of 79 cm diameter at breast height. They foraged in the underbrush, in the forest litter, and on the ground. Squirrels were never seen to forage alone. When disturbed they either retreated to the nest tree or escaped into a brush pile formed by a fallen tree. Driven from the brush pile, they sought refuge in a nearby rock outcrop. The squirrels did not climb the trunk of the nest tree but used a slender tree trunk, 15 to 20 cm in diameter, that leaned against the nest tree. Because they are secretive, they are seemingly difficult to hunt (Bangs, 1902; Enders, 1980).

Other squirrel species potentially sympatric with *S. brochus* include *Sciurus granatensis*, *S. variegatoides*, *S. deppei*, and *Microsciurus alfari*.

**REMARKS.** The absence of grooved incisors distinguished *S. b. poasensis* from *S. b. brochus* (Goodwin, 1943) and, together with rostral proportions, was the basis for identifying the specimen (skull only) from Cerro Pando, Panamá (Heaney and Hoffmann, 1978). However, presence of grooved incisors is a variable character; in a series of four collected from a family group at Cylindro, three had grooved incisors and one did not (Enders, 1980). The present subspecific designations (Hall, 1981) are distributionally improbable (Fig. 3) and should be reviewed; the species may prove to be monotypic.

Elliott (1904) renamed the genus *Synthetosciurus* to conform with the correct Greek spelling, *συνθετοσ-σχιουροζ*. However, Bangs's (1902) original spelling retained priority.

## LITERATURE CITED

BANGS, O. 1902. Chiriquí Mammalia. Bull. Mus. Comp. Zool., 39:17–51.

CARLETON, M. D. 1984. Introduction to rodents. Pp. 255–265, *in* Orders and families of Recent mammals of the world (S. Anderson and J. K. Jones, Jr., eds.). John Wiley and Sons, New York, 686 pp.

ELLIOT, D. C. 1904. The land and sea mammals of Middle America and the West Indies. Field Columbian Mus., Zool. Ser., 4(1):1–439 + xlix.

ENDERS, R. K. 1953. The type locality of *Syntheosciurus brochus*. J. Mamm., 34:509.

———. 1980. Observations of *Syntheosciurus*: taxonomy and behavior. J. Mamm., 61:725–727.

GOODWIN, G. G. 1943. Two new squirrels from Costa Rica. Amer. Mus. Novitates, 1218:1–2.

———. 1946. Mammals of Costa Rica. Bull. Amer. Mus. Nat. Hist., 87:275–473.

HALL, E. R. 1981. The mammals of North America. Second ed. John Wiley and Sons, New York, 1:1–600 + *90*.

HEANEY, L. R., AND R. S. HOFFMANN. 1978. A second specimen of the Neotropical montane squirrel, *Syntheosciurus poasensis*. J. Mamm., 59:854–855.

HOWELL, A. H. 1938. Revision of the North American ground squirrels with a classification of the North American Sciuridae. N. Amer. Fauna, 56:1–226.

MACEY, A. 1975. The vegetation of Volcán Poás National Park, Costa Rica. Rev. Biol. Trop., 23:239–255.

MCLAUGHLIN, C. A. 1984. Protrogomorph, sciuromorph, castorimorph, myomorph (geomyoid, anomaluroid, pedetoid, and ctenodactyloid) rodents. Pp. 267–288, *in* Orders and families of Recent mammals of the world (S. Anderson and J. K. Jones, Jr., eds.). John Wiley and Sons, New York, 686 pp.

MOORE, J. C. 1959. Relationships among the living squirrels of the Sciurinae. Bull. Amer. Mus. Nat. Hist., 118:153–206.

Editors of this account were B. J. VERTS and J. KNOX JONES, JR. Managing Editor was TIMOTHY E. LAWLOR.

N. M. WELLS, SCHOOL OF NATURAL RESOURCES AND MUSEUM OF ZOOLOGY, UNIVERSITY OF MICHIGAN, ANN ARBOR 48109, AND J. GIACALONE, DEPARTMENT OF BIOLOGY, UPSALA COLLEGE, EAST ORANGE, NEW JERSEY 07019.