MAMMALIAN SPECIES No. 201, pp. 1–5, 7 figs.

Geocapromys brownii.

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Published 8 April 1983 by The American Society of Mammalogists

Geocapromys Chapman, 1901

Geocapromys Chapman, 1901:314. Type species *Capromys brownii* Fischer. Originally a subgenus of *Capromys*.
Synodontomys Allen, 1917:5. Type species *C. columbianus* Chapman.

CONTEXT AND CONTENT. Order Rodentia, Suborder Hystricognathi, Superfamily Octodontoidea, Family Capromyidae, including the genera *Capromys*, *Geocapromys*, *Hexolobodon*, *Plagiodontia*, and *Isolobodon*. It is not desirable at this time to divide the Capromyidae into subfamilies. The genus *Geocapromys* includes four extinct and two living species (Fig. 1). Three extinct species, *G. columbianus*, *G. pleistocenicus*, and *G. megas*, are known from fossil deposits in Cuba, whereas *G. thoracatus* has become extinct on Little Swan Island only within the last 30 years. The two living species are *G. ingrahami* from East Plana Cay in the southern Bahamas and *G. brownii*.

Geocapromys brownii (Fischer, 1830)

Jamaican Hutia

Capromys brownii Fischer, 1830:589. Type locality "Jamaica" by original designation.
Capromys brachyurus Hill, *in* Gosse, 1851:471. Type locality [John Crow Mountains, Portland Parish,] "Jamaica," by original designation.
Capromys (*Geocapromys*) *brownii* Chapman, 1901:320.
Geocapromys brownii Allen, 1917:8. First use of present name combination.

CONTEXT AND CONTENT. Context in generic account above. No subspecies are currently recognized in *Geocapromys brownii*.

DIAGNOSIS. Within *Geocapromys*, *G. brownii* differs from the two other recent species, *G. thoracatus* and *G. ingrahami* in: 1) larger size; 2) darker coloration; 3) much shorter tail (shorter than hindfoot, rather than equal to or longer than hindfoot); 4) relatively smaller ears; 5) strong sagittal crest and weak temporal crests; 6) anterior inflation and posterior constriction of frontals; 7) enlarged jugal fossa and prominent jugal spine; 8) anteriorly broadened zygomatic arches; 9) and deeply-pigmented yellow-orange incisors. The species of *Geocapromys* are morphologically distinct and should be recognized as a separate genus, differing from all remaining species of *Capromys* (*sensu stricto*) in: 1) shorter tail, less than 25% of total length; 2) shorter, finer fur; 3) reduced first digit on forefoot; 4) tendency toward anterior convergence of toothrows resulting in contact between bases of alveoli of right and left P4 (see Miller, 1929, pl. 1, Fig. 1A); 5) location of posterior end of root capsule dorsal and lateral to anterior half of outer border of alveolus of P4, instead of anterior to P4; 6) broad, vertically- or posteriorly-oriented superior zygomatic root of maxilla; 7) labial inclination of occlusal surface of cheekteeth: 8) and presence of a small third re-entrant angle on anterolingual surface of P4 (anteroflexid).

GENERAL CHARACTERS. *Geocapromys brownii* is about the size of a cottontail rabbit, but more heavily built. Adults weigh 1,000 to 2,000 g. Jamaican hutias have a compact appearance because of their relatively large head and short ears, neck, legs, and tail (Fig. 2). Upperparts are dark reddish-brown to blackish-brown, underparts are uniform dusky brown. The fur is dense and coarse, generally about 20 to 25 mm long and with a few longer hairs interspersed. Each hair is blackish and has a ring of bright bay or golden brown near the tip, imparting a brindled appearance to the pelage. The feet are clothed in short and stiff blackish hair, the soles are black and roughened with rasp-like warts. The pollex is a rudimentary tubercle but has a blunt nail; the hallux is set far back and separable from the other toes (Fig. 3). The ears are small with a dense covering of short, fine hairs (Fig. 4). In addition, there are two tufts of longer hairs on the inner dorsal margin of the ear, one above and behind the external meatus and one directly posterior to the meatus on the ventrolateral margin. The tail is short, stiff, and tapers abruptly (Fig. 5). It is scaly and has thick, short, bristly fur which is black on upper surface of tail and grayish-brown below. The tail averages more than 20 mm shorter than the length of the hindfoot, whereas in *G. thoracatus* the tail and hindfoot are approximately equal in length and in *G. ingrahami* the tail is considerably longer than the hindfoot. The difference in tail length between these three species appears to be correlated with the number of caudal vertebrae: *G. brownii* averages only 15 caudals, *G. thoracatus* has 17, and *G. ingrahami* has 19.

The cranium of *Geocapromys brownii* is considerably larger than the crania of the two other recent species (Fig. 6). Cranial measurements average 15–20% larger than the next largest species, with almost no overlap. The frontals are noticeably inflated medial and anterior to the orbits and form a prominent convexity in the dorsal profile of the skull. Posteriorly, in the region of the frontoparietal suture, the frontals are strongly constricted. Coupling these two features, the frontals are considerably broader anterior to the supraorbital processes than posterior to them, in contrast to other species in the genus. Most individuals of this species have a moderate to strongly-developed sagittal crest formed by the convergence of weak temporal crests. The lambdoidal crests and paroccipital processes are also well developed. The zygomatic arches are broad anteriorly, positioned deep below the orbits, and have a large lateral jugal fossa and prominent jugal spine. The superior zygomatic root of the maxilla is broad and inclined posteriorly. The auditory bullae are not inflated and the internal nares are not constricted. The upper toothrows show a tendency toward anterior convergence, although not to the degree seen in other species of *Geocapromys*. The mandible is robust and has a deep symphysis (Fig. 7). The masseteric crest is well developed, originating opposite the first

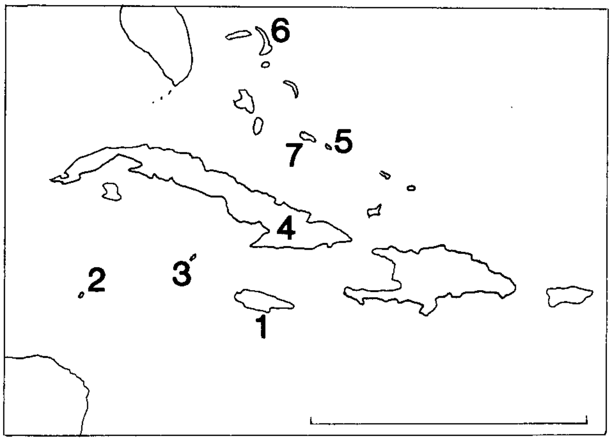

FIGURE 1. Map of part of the Caribbean area, showing the distributions of the genus *Geocapromys*: 1, *Geocapromys brownii* on Jamaica; 2, *Geocapromys thoracatus* on Little Swan Island; 3, Cayman Brac, location of unidentified specimens of *Geocapromys*; 4, Cuba, location of three extinct species of *Geocapromys*; 5, *G. ingrahami ingrahami* on East Plana Cay; 6, *G. i. abaconis*, now extinct on Great Abaco; 7, *G. i. irrectus*, now extinct on Crooked Island. The scale represents 1,000 km.

FIGURE 2. Jamaican hutia photographed by H. E. Anthony in 1919 in Jamaica.

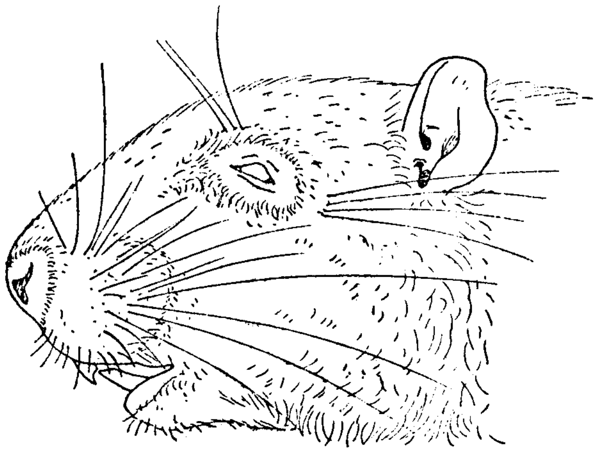

FIGURE 4. Drawing of head, showing long vibrissae and short ears (Pocock, 1926).

molar, curving laterally, and ending posteriorly in the prominent spinous angular process. The coronoid process is triangular with the tip curved posteriorly. The articular surface of the condyloid process is elongated anteroposteriorly and the postcondyloid process is strong.

The dental formula is i 1/1, c 0/0, p 1/1, m 3/3. The incisors are robust, strongly curved (recumbent), and are a deep yellow-orange color. The upper and lower molars are essentially square in occlusal outline, whereas the fourth premolars are slightly longer than wide. The occlusal surface of the cheekteeth is almost perfectly flat. The entire upper toothrow is inclined labially at a 30° angle, whereas the lowers are inclined lingually at the same angle (Woods and Howland, 1979). The cheekteeth are hypsodont, rootless, and evergrowing. The individual teeth are characterized by two labial and one lingual re-entrant enamel folds in the uppers (Fig. 6) and one labial and two lingual folds in the lowers (Fig. 7), except for P4 which has a third small anterolingual re-entrant. Cement is present on that part of the tooth crowns not enclosed by the continuous enamel band, whereas the region within the enamel bands consists entirely of dentine.

Means and extremes (in parentheses) for external and cranial measurements (in mm) of adult non-captive specimens of *Geocapromys brownii* (n = 12 for external measurements, 19 for cranial measurements) are as follows: length of head and body, 410 (372 to 448); length of tail, 48 (40 to 64); length of hindfoot, 70 (60 to 78); length of ear, 20 (19 to 21); greatest length of skull, 81.1 (75.1 to 87.0); condylobasal length, 75.3 (68.9 to 81.6); zygomatic breadth, 43.7 (39.1 to 48.4); interorbital breadth, 23.9 (20.5 to 26.1); mastoid breadth, 29.5 (27.2 to 30.9); length of upper diastema, 19.6 (17.9 to 21.6); alveolar length of upper toothrow, 19.3 (18.0 to 20.3); greatest length of mandible, 55.8 (50.7 to 59.8); length of mandibular symphysis, 22.1 (19.5 to 24.9); length of lower diastema, 13.7 (12.6 to 16.0); alveolar length of lower toothrow, 19.1 (17.5 to 21.0).

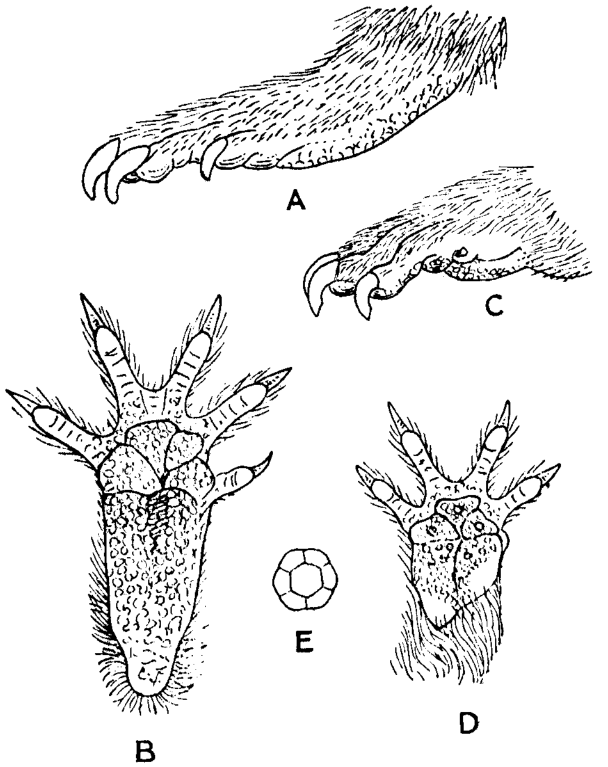

FIGURE 3. Drawings of feet of *Geocapromys brownii* from Pocock (1926) showing: A, right hindfoot from inside; B, same from below; C, right forefoot from inner side; D, same from below; E, enlarged view of central area of lobes of plantar pad.

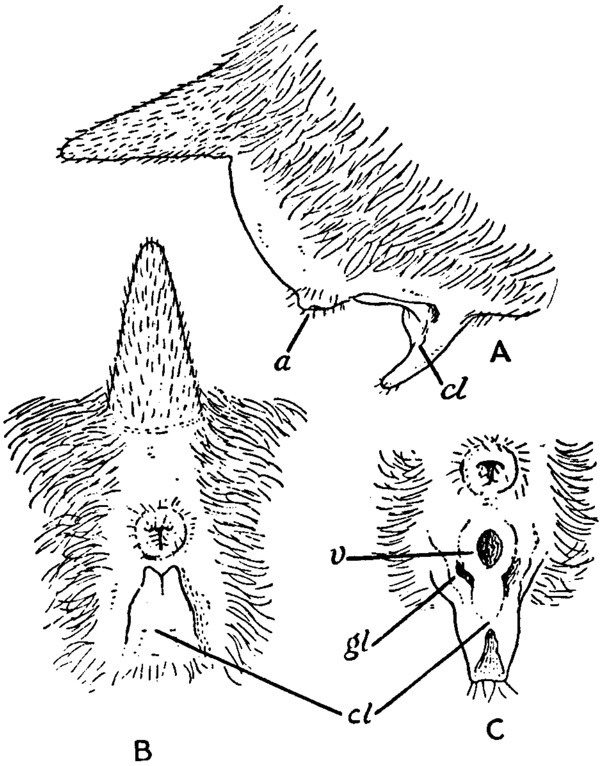

FIGURE 5. Drawings of tail and anogenital area of a female *Geocapromys brownii* (Pocock, 1926) showing: A, area in side view; B, same from below with clitoris bent back over vulva; C, same with clitoris extended. Abbreviations are: a, anus; cl, clitoris; gl, glandular pit; v, vulva.

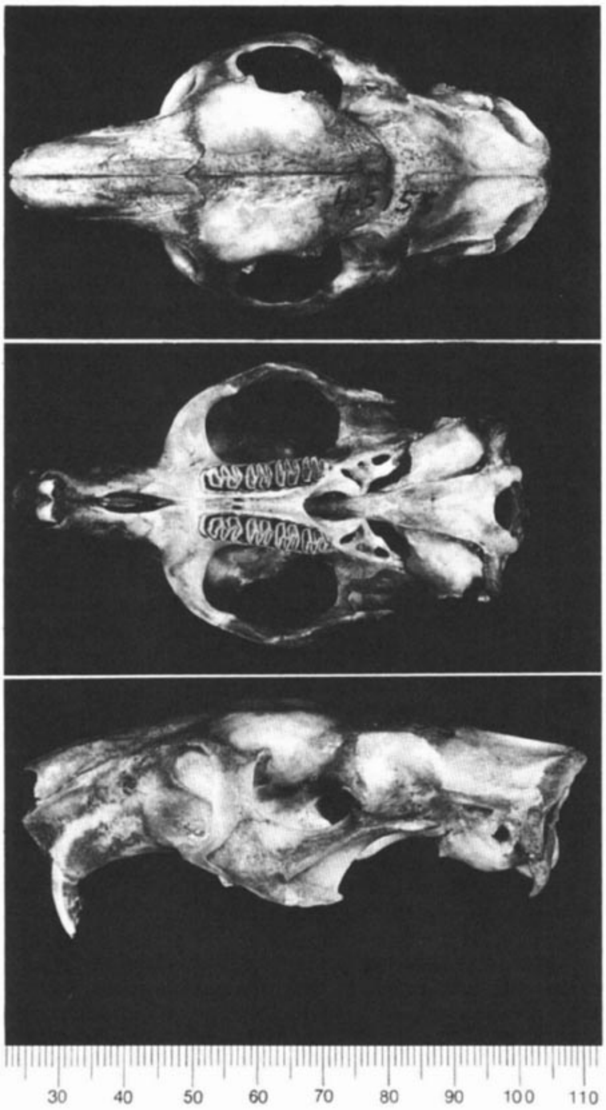

FIGURE 6. Dorsal, ventral, and lateral views of an adult male skull of *Geocapromys brownii* from the John Crow Mountains, Portland Parish, Jamaica (AMNH 45155). Scale shows millimeters for lateral view. Scales slightly different for other views.

DISTRIBUTION. *Geocapromys brownii* occurs only in Jamaica where it is still relatively widely distributed in the more remote hills and mountainous regions. Jamaican hutias are known from the John Crow and Blue Mountains of Portland and St. Thomas Parishes in the east; through the Red Hills of St. Catherine Parish from Crofts Hill and Mount Diablo to, and including, the Hellshire Hills in the south; and as far west as the Harris Savannah and the Brazilletto Mountains in Clarendon Parish. Their continued survival has also recently been confirmed in parts of the Cockpit Country of St. James, Trelawny, and St. Elizabeth Parishes in the northwest region of the island (Clough, 1976; Oliver, 1976, 1977, pers. observ.). Museum specimens of *G. brownii* are known from Cuna Cuna Pass in St. Thomas Parish (AMNH, MCZ, USNM), the John Crow Mountains in Portland Parish (AMNH, BMNH, MCZ), Worthy Park in St. Catherine Parish (UF), and Freemans Hall in Trelawny Parish (BMNH).

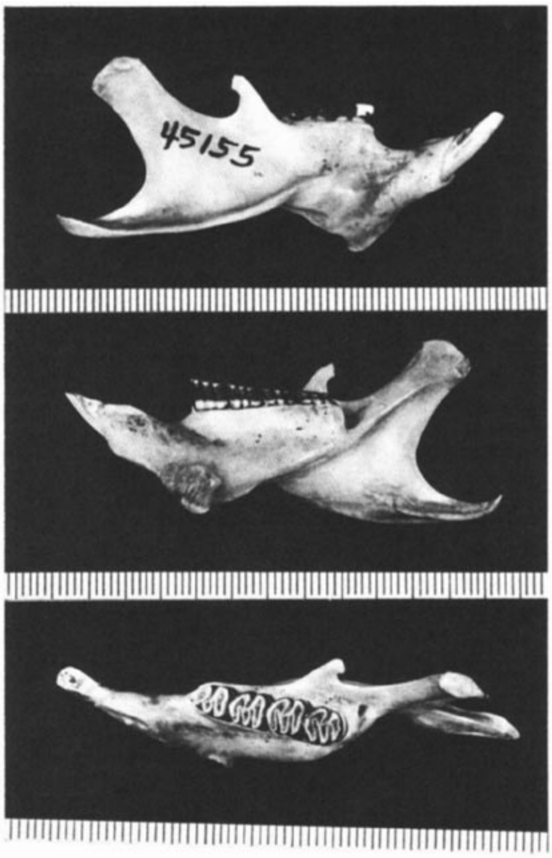

FIGURE 7. Lateral, medial, and occlusal views of mandible of specimen shown in Fig. 6. Scales show millimeters.

FOSSIL RECORD. *Geocapromys brownii* has been reported in the literature from only two fossil sites in Jamaica: Wallingford Cave, Balaclava, St. Elizabeth Parish (Koopman and Williams, 1951), and Portland Cave, Clarendon Parish (Williams, 1952). However, a large amount of fossil material is present in the Vertebrate Paleontology collection of the Florida State Museum which greatly extends the fossil distribution of this species. Additional localities for fossil *G. brownii* include: Dairy Cave (near Discovery Bay), Green Grotto Caves (2 mi W Runaway Bay), and Mosely Hall Cave (near Guys Hall), St. Ann Parish; Swansea Cave (near Worthy Park) and Coco Ree Cave (NW Lluidas Vale), St. Catherine Parish; and Knockalva Cave (near Knockalva), Westmoreland Parish. In addition, there are fossils of *G. brownii* in the USNM from Quickstep Cave (4 mi NNW Quickstep), Trelawny Parish.

Geocapromys brownii has also been reported from a number of Amerindian kitchen midden sites in Jamaica (Duerden, 1897; Miller, 1916; Wing, 1972). Remains of *G. brownii* in kitchen middens indicate that the animals occurred over most of the island in pre-Columbian times and were a favored food item (Mittermeier, 1972). Specific localities for archeological sites where *G. brownii* has been reported include: Long Mountain Site (3 mi E Kingston) and Norbrook Site (6 mi N Kingston), St. Andrew Parish; Rio Nuevo Site (near Rio Nuevo), St. Mary Parish; Retreat Site (between Browns Town and Stewart Town) and Bengal Site (near Rio Bueno), St. Ann Parish; White Marl Site (also known as Marl Hill Site, 5 mi NE Spanish Town), St. Catherine Parish; Salt River, Clarendon Parish and Wales Site (5 mi S Falmouth), Stewart Castle (E Falmouth), and Long Mile Cave (Windsor), Trelawny Parish.

Miller (1916) reported the presence of two species of *Capromys* (=*Geocapromys*) from an archeological site near Salt River, Clarendon Parish, Jamaica. Miller's material consisted of two edentulous mandibles and four femora representing two individuals of widely disparate size. He referred the larger of the two individuals to *G. brownii*; he was unable to distinguish the smaller animal from the Swan Island Hutia, *G. thoracatus*. Based on Miller's description of the smaller individual (femora lacking epiphyses, third lower molar reduced) and an examination of his specimens by one of us (GSM), we conclude that this animal is a juvenile *G. brownii*. Koopman and Williams (1951) also doubted Miller's suggestion that there were two species of *Geocapromys* on Jamaica, noting that in their large series of fossil mandibles, the differences between the larger and smaller mandibles were clearly ontogenetic. Examination and measurement of fossil *G. brownii* specimens from throughout Jamaica reveal no significant differences between the recent and fossil populations. No radiocarbon dates are available for Jamaican fossil vertebrate sites; however, based on dates from other islands in the Greater Antilles, there is no reason to suspect that any Jamaican fossil sites predate the late Pleistocene and most are probably less than 20,000 years BP in age.

FORM AND FUNCTION. Facial vibrissae (Fig. 4) consist of mystacial, genal, and superciliary tufts. There are no interramal vibrissae. The rhinarium is not clearly defined. There is no true philtrum on the upper lip, though short hairs diverge from the midline. The feet are shown in Fig. 2. The tail and anogenital region of a female are shown in Fig. 4 (Pocock, 1926). A well-developed baculum is present in males. Skull and teeth are shown in Figs. 6 and 7. The teats are situated about midway up on each side of the thorax, two on each side (Gosse, 1851, and specimens in the American Museum of Natural History).

ONTOGENY AND REPRODUCTION. Little is known of ontogeny or reproduction in the wild. In captivity, *G. brownii* bears one or two, rarely three, young at a time (Oliver, 1976). Triplets have been recorded in only 3 of 47 parturitions at the Jersey Wildlife Preservation Trust, the average litter size being 1.49. The gestation period is approximately 123 days with an average interbirth interval of 168 days ($n = 27$). The earliest primiparous birth recorded was at the age of one year; males probably reach sexual maturity at a somewhat older age. In captivity, breeding has occurred throughout the year. Most females bear an average of 2 litters per year based on interbirth intervals. The young are extremely precocial at birth. They are capable of most adult locomotor activities and eat solid foods within about 30 h post-partum (E. R. Greenbaum, pers. comm.). From interviews with hunters who regularly catch hutias in the wild state, one of us (WLRO) concluded that the above observations of litter size and non-seasonal breeding are also supported by direct observations in the wild.

ECOLOGY AND BEHAVIOR. Jamaican hutias now seem to be restricted to areas of exposed limestone with an abundance of natural crevices and tunnels. They emerge at night to forage over a wide area on exposed roots, bark, shoots, fruits, and foliage of a large variety of plant species. In captivity Jamaican hutias drink frequently, in contrast to captive *Capromys pilorides* from Cuba and *Plagiodontia aedium* from Hispaniola, which have rarely been observed to drink.

Geocapromys brownii is reported to be almost exclusively nocturnal and has seldom been observed in the wild state except when dug from holes or captured in traps. The secretive nature of Jamaican hutias has been incorrectly confused with extreme rarity. In fact hutias leave abundant physical evidence of recent activity, including discernable trails, forage damage to fruits, bark and foliage, scent-marks (perineal drag) and, most commonly, accumulated fecal material which is most easily found in the vicinity of occupied holes.

Observations in captivity, supported by observation of captured animals in the wild, indicate that hutias normally live in social family groups of two to six individuals, though as many as eight or even ten have been reported on occasions. Evidence from capture records suggests that the largest families live in the largest, or the most inaccessible, systems of holes and crevices in rocks. Smaller families, pairs and single individuals apparently inhabit smaller or more accessible holes. This has given rise to reports that most hutias live and travel singly or in pairs. Most hutias are captured from the most accessible holes. In fact, it is more probable that these represent socially displaced individuals or nuclear families re-colonizing areas previously hunted-out.

Observations on captive animals indicate that Jamaican hutias do not build nests, nor do they normally take bedding material into their nest boxes. When material is placed into their nest boxes they do not try to incorporate it into their living area or actively remove it from the cavity. Inside the cavity the family or social groups spend the daylight hours resting in close contact. They habitually use the same nest box.

Contact behavior and other socially-cohesive behavior, such as play and mutual grooming, are pronounced. Almost continuous soft vocalizations during non-contact behavior phases (e.g., foraging) presumably also serve to maintain group cohesion.

Locomotion is characterized by a semi-plantigrade waddling gait, though these animals can run surprisingly fast when startled. Hutias can also jump and climb with remarkable proficiency, climbing even in flimsy branches using their incisors for grip and leverage.

GENETICS. The Jamaican hutia has one of the highest number of chromosomes reported for a mammal: $2n = 88$, $FN = 136$ (George and Weir, 1972). The 88 chromosomes are mostly microchromosomes, each of which is less than 2% of the total length of haploid chromosomes. The largest two chromosomes are subacrocentric and constitute 8% and 7%, respectively, of the total; the third largest is acrocentric and about 6% of total. Other smaller chromosomes are mostly acrocentric or subacrocentric, only 13 pairs being metacentric or submetacentric. The X chromosome is a large acrocentric and the Y is a metacentric microchromosome. *Geocapromys* is part of the "octocap" series that includes other capromyids as well as octodontids, ctenomyids, echimyids and *Myocastor.* The main feature of this group is the "octodontid marker chromosome," which is small and bears a satellite at the end of the short arm (George and Weir, 1974). Capromyids, however, fit least well of all the members of this group and remain difficult to associate with any group or with each other. This is a further indication that Capromyids may be part of a very ancient and distinct invasion into the Antilles from an early echimyid ancestor (Woods, 1982).

REMARKS. In the most recent summaries of West Indian mammals (Hall, 1981; Varona, 1974) *Geocapromys* has been treated as a subgenus of *Capromys* and, therefore, given equivalent taxonomic rank to the three subgenera *Capromys*, *Mysateles*, and *Mesocapromys.* However, all species in the latter three subgenera of *Capromys* are more closely related to one another than they are to any species of *Geocapromys.* An analysis of blood proteins indicates that *Geocapromys brownii* and *G. ingrahami* are very distinct from *Capromys pilorides* and should be separate at the generic level (Woods, 1982).

Geocapromys thoracatus from Little Swan Island is usually considered a subspecies of *G. brownii* (Hall, 1981; Mohr, 1939; True, 1888; Varona, 1974). However, a number of authors have regarded it as a distinct species (Chapman, 1901; Lawrence, 1934; Miller, 1929). Based on a review of the species, one of us (GSM) found a number of characters that distinguished *G. thoracatus* from *G. brownii* and *G. ingrahami* and he regarded it as a distinct species, closely related to and probably derived from the Jamaican hutia.

The name *Geocapromys* is derived from the Greek roots *geo* (earth), *capro* (wild boar), and *mys* (mouse), referring to the more terrestrial habits of the species in this genus when compared to *Capromys.* The comparison of *Capromys* to a wild boar is apparently in reference to alleged resemblance in general appearance, color and stiffness of hair, and gait when running. *Geocapromys brownii* was named in honor of Patrick Browne, author of "The Civil and Natural History of Jamaica with complete Linnaean indices" in 1789.

Hutias are totally protected in Jamaica under the terms of the Wild Life Protection Act (1945), but the act is poorly enforced. In many areas hutias, which are locally known as Indian conies or mountain rabbits, are still hunted widely for food using traps or dogs. In some areas hunting is still quite severe and this, coupled with the increasing demand for agricultural land, will certainly result in the elimination of this species from many of the areas where it still survives. Nevertheless, the hutia is not currently regarded as endangered and the proposed National Parks for the John Crow and Blue Mountains, the Cockpit Country, and the western side of the Hellshire Hills, will benefit its long-term survival prospects.

Jamaica issued a set of four stamps in 1981 to promote conservation of the hutia.

Abbreviations used in text are: American Museum of Natural History (AMNH), British Museum (Natural History) (BMNH), Florida State Museum (UF), Museum of Comparative Zoology (MCZ). We thank M. K. Langworthy for helpful comments on the manuscript and D. McDilda for taking the photographs in Figs. 6 and 7.

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