

Galictis vittata. By Eric Yensen and Teresa Tarifa

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***Galictis* Bell, 1826**

Viverra: Schreber, 1776:pl. 124; 1777:418, 447. Type species *Viverra vittata*; part; not Linnaeus, 1758.

Mustela: Molina, 1782:291, 292. Type species *Mustela cuja*; part; not Linnaeus, 1758.

Grison: Oken, 1816:1000. Not available (Opinion 417, International Commission on Zoological Nomenclature 1956).

Gulo: Desmarest, 1820:174. Type species *Viverra vittata*; part; not Pallas, 1780.

Ursus: Thunberg, 1820:401. Type species *Ursus brasiliensis*; part; not Linnaeus, 1758.

Lutra: Traill, 1821:437. Type species *Viverra vittata*; part; not Linnaeus, 1758.

Galictis: Bell, 1826:552. Type species *Viverra vittata* Schreber.

Grisonia: Gray, 1865:122. Type species *Viverra vittata* Schreber. *Grisonia* Gray, 1825:339 and *Grisonia* Fischer, 1829:154 are nomina nuda.

Grison: Allen, 1902:377. Type species *Viverra vittata* Schreber.

Grisonella: Thomas, 1912:46. Type species *Mustela cuja* Molina.

CONTEXT AND CONTENT. Order Carnivora, suborder Caniformia, superfamily Canoidea, family Mustelidae, subfamily Mustelinae (Wozencraft 1989a, 1989b, 1993), tribe Galictini (Baskin 1998). Four generic synonyms (*Eira* H. Smith, *Eraria* Sund., *Galidictes* Hodgson, and *Huro* I. Geoff.) lacked sufficient information for verification (Gray 1865). *Galictis* and relatives also have been placed in subfamily Grisoninae (Pocock 1921) or Galictinae (Anderson 1989; Reig 1956). Two species, *G. vittata* and *G. cuja*, are recognized (Wozencraft 1993), although some (Redford and Eisenberg 1992) add a 3rd species, *G. allamandi*. *G. cuja* is placed in genus or subgenus *Grisonella* by some authors (Osgood 1943; Thomas 1912).

***Galictis vittata* (Schreber, 1776)**

Greater Grison

Viverra vittata: Schreber, 1776:pl. 124, text 1777:418, 447 (dates fixed by Sherborn 1891). Type locality “Surinam.”

Mustela gujanensis: Bechstein, 1800:361. Type locality “nördlich Südamerika,” northern South America.

Mustela vittata: Bechstein, 1800:690. Name combination.

Gulo vittatus: Desmarest, 1820:175. Name combination.

Ursus brasiliensis: Thunberg, 1820:400. Type locality “Brasilia Americes meridionalis,” Brazil, South America, restricted by Lönnberg (1921:19) to “probably from Rio de Janeiro, but in any case from southern Brazil.”

Lutra vittata: Traill, 1821:437. Name combination.

Galictis vittata: Bell, 1826:552. First use of present name combination.

Galictis allamandi: Bell, 1837:47. Type locality given as “Surinam” by Bell (1841:203).

Galictis crassidens: Nehring, 1885:168. Type locality “Provinz Minas Geraes,” Minas Gerais Province, Brazil.

Galictis canaster: Nelson, 1901:129. Type locality “Tunkas, northern Yucatan, Mexico.”

Galictis andina: Thomas, 1903:462. Type locality “Pozuzo [Huánuco Department], Peru.”

CONTEXT AND CONTENT. Context as above. Four subspecies are recognized (Cabrera 1958):

G. v. andina: Thomas, 1903:462, see above.

G. v. brasiliensis: (Thunberg, 1820:401), see above (*allamandi* Bell and *crassidens* Nehring are synonyms).

G. v. canaster: Nelson, 1901:129, see above.

G. v. vittata (Schreber, 1776:447), see above (*allamandi* Bell and *gujanensis* Bechstein are synonyms).

DIAGNOSIS. Greater grisons resemble large weasels and are recognized by their short legs, slender body, and grayish dorsum separated from black underparts by a narrow, light-colored, diagonal stripe on head and shoulders. *G. vittata* is consistently larger than the similar *G. cuja*. *G. vittata* also differs by having a distinct metaconid on m1 (absent in *G. cuja*), a proportionally shorter tail (ca. 30%; range, 26–37% of head and body length) than *G. cuja* (ca. 40%; range, 34–45%), and fewer tail vertebrae (<19 versus >19). Difference in number of tail vertebrae is based on small sample sizes; dental characters may be more reliable (Cabrera 1958). Both species vary geographically in size and dorsal color, but tips of dorsal guard hairs are generally white to gray in *G. vittata* and buffy to yellowish in *G. cuja* (Redford and Eisenberg 1992; our observations).

Patagonian weasel, *Lyncodon patagonicus*, is similar to *G. vittata*, but top of head is white or creamy, long white hairs on dorsum, throat and sides are dark brown rather than black (Redford and Eisenberg 1992), feet are webbed only a short distance beyond the plantar pads, and P2 and p2 are missing (Pocock 1921); geographic ranges probably do not overlap. *Mustela frenata* is much smaller with a brown dorsum and a light belly. *Eira barbara* has a solid, dark-colored body with a lighter head (except in Panama); longer legs; and a long (>50% length of head and body), bushy tail (Eisenberg and Redford 1999). Baculum of *E. barbara* is longer (75–83 mm) with a horseshoe-shaped distal end (Mondolfi 1987). Neotropical skunks have much longer legs, longer and bushier tails, and black backs with white markings (Reid 1997).

GENERAL CHARACTERISTICS. *Galictis vittata* (Fig. 1) has a long, thin body with narrow chest, short legs, short bushy tail, and long neck (Bisbal E. 1986; Dalquest and Roberts 1951). Head is small and flat with short, broad, rounded ears. Iris is dark brown or black (Bell 1841) with a bright blue reflection at night (Kaufmann and Kaufmann 1965). Manus has a thick pad under each toe, trid metatarsal tubercle, and naked sole. Tail has long, lax hairs (Bell 1841) arranged in 2 lateral ranks and appressed posteriorly to vertebrae. Hairs can be erected to point straight out to the sides (Kaufmann and Kaufmann 1965). Legs are stout with 5 toes on each foot. Toes are webbed for ca. three-quarters of their length (Kaufmann and Kaufmann 1965) and equipped with bluish pearl-colored claws that are strong, short, curved, and pointed (Bell



FIG. 1. *Galictis vittata*, Parque de las Leyendas Zoo, Lima, Peru. Photograph by Eric Yensen.

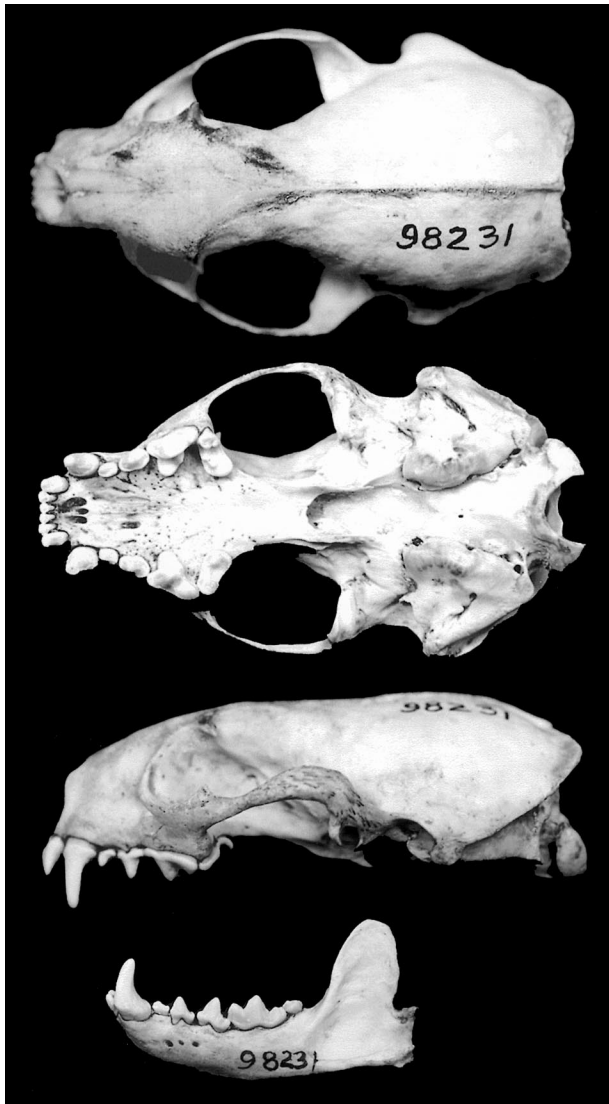


FIG. 2. Dorsal, ventral, and lateral views of cranium and lateral view of mandible of adult male *Galictis vittata* (Field Museum of Natural History 98231), Yarincocha, Loreto Department, Peru. Condylbasal length of skull is 97.9 mm.

1841; Dalquest and Roberts 1951). Vibrissae are black (Mendez 1970).

Top of head, back, sides, and tail are grizzled grayish "salt and pepper" due to black guard hairs with white tips. Face, throat, belly, and legs are usually solid black but sometimes grizzled. A diagonal white or cream, narrow stripe runs from forehead to shoulder and separates dorsal gray from ventral black. Dorsal and ventral colors are usually clearly demarcated, but this is variable. Fur is coarse (Dalquest and Roberts 1951), but undercoat is soft and short (Bell 1841).

Skull (Fig. 2) is strong, massive, and low with a broad, rounded "v"-shaped braincase (Goodwin 1969) and a short rostrum (Nehring 1886). Dorsal profile of skull is relatively flat, postorbital processes are short and pointed, zygomatic arches are strongly developed, and bullae are flattened (Goodwin 1969). Palate is broad compared with length of head and extends posteriorly to a point about even with widest part of zygomatic arch. Teeth are large and strong. M1 is transverse, about twice as wide as long, and with a lobe-shaped cingulum (Goodwin 1969; Langguth and Anderson 1980). A distinct metaconid is present on m1, and a larger cingulum is found on inner side of P3. Tail has 17–18 vertebrae (Husson 1978). Sexes are similar, but females are smaller, more slender, and lighter (Dalquest and Roberts 1951; Leopold 1959).

Dorsum of *G. v. vittata* is dark brown or yellow-gray with white- or yellow-tipped hairs, whereas dorsum is purer gray in *G.*

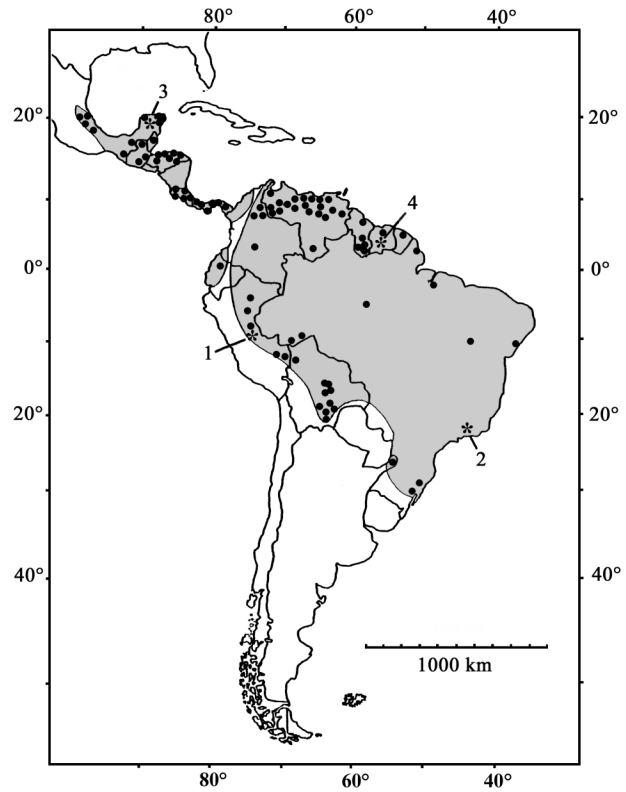


FIG. 3. Distribution of *Galictis vittata* in Central and South America based on localities in Anderson (1997), Bisbal (1989), Eisenberg and Redford (1999), Krumbiegel (1942), Leopold (1959), Lönnberg (1921), Marineros and Martínez Gallegos (1998), Massoia et al. (1985), McCarthy et al. (1991), and Redford and Eisenberg (1992) and specimens in American Museum of Natural History, Field Museum of Natural History, Museu Goeldi, and National Museum of Natural History. Type localities are indicated with an asterisk: 1, *G. v. andina*; 2, *G. v. brasiliensis*; 3, *G. v. canaster*; and 4, *G. v. vittata*. The type locality of *G. v. vittata* is Surinam; thus, location of the triangle in Surinam is arbitrary. Subspecies limits are not known.

v. canaster due to light gray undercoat and guard hairs with light gray basal half; broad, black subterminal bands; and small white tips (Nelson 1901). *G. v. andinum* has a dull yellowish stripe on head, and tips of dorsal hairs are yellowish, whereas they are off-white in *G. v. brasiliensis* (Krumbiegel 1942; Thomas 1903). In specimens we have observed, these differences are subtle but clearly present.

Published measurements are for small sample sizes (Anderson 1997; Goodwin 1946; Husson 1978; Ihering 1910; Krumbiegel 1942; Mares et al. 1989; McCarthy et al. 1991; Nehring 1886) or ranges of external measurements of unknown sample sizes (Eisenberg 1989; Hall 1981; Herter 1975). We supplement these with measurements of specimens in the American Museum of Natural History, Field Museum of Natural History, National Museum of Natural History, and Museu Goeldi. External measurements were recorded from specimen tags; cranial measurements follow Cockrum (1955). Nearly equal numbers of males and females were available for most measurements; only specimens with teeth fully erupted were measured. Measurements (in mm) were mean \pm SD (range, *n*): total length, 676.2 ± 46.9 (600–760, 19); length of tail, 157.4 ± 15.2 (135–195, 19); length of head and body, 518.8 ± 40.2 (450–600, 19); length of hind foot, 82.8 ± 8.8 (66–97, 18); length of ear, 25.8 ± 3.5 (20–32, 11); basilar length of Hensel, 80.15 ± 5.25 (71.5–96.5, 27); condylobasilar length, 88.17 ± 4.72 (80.3–97.9, 35); palatilar length, 41.88 ± 2.68 (38.0–45.5, 20); post-palatilar length, 39.29 ± 1.84 (37.1–42.8, 13); length of maxillary toothrow, 28.04 ± 3.13 (23.1–32.5, 28); zygomatic breadth, 50.98 ± 3.21 (45.4–56.2, 32); mastoid breadth, 47.87 ± 2.86 (42.9–54.4, 30); squamosal breadth, 40.79 ± 1.85 (37.8–43.0, 14); postorbital breadth, 19.79 ± 1.22 (17.8–22.2, 32); least interorbital breadth,

20.41 ± 1.51 (16.5–23.2, 34); postdental breadth, 11.04 ± 0.71 (9.7–11.9, 14); width across upper canines, 20.04 ± 1.52 (17.1–23.3, 36); maximum breadth of toothrow, 30.15 ± 1.69 (28.1–33.2, 14); length of auditory bulla, 23.49 ± 0.96 (21.4–25.2, 14); width of auditory bulla, 11.19 ± 1.81 (8.1–13.4, 14); and angular length of mandible, 53.43 ± 2.76 (47.1–59.2, 28). Arita et al. (1990) used 2,910 g as an average body mass, but sample size was not indicated. In our sample of 6, mean adult mass was 2,348 g ± 933 SD (range, 1,475–3,800). Captive individuals can weigh up to 4,000 g (Dalquest and Roberts 1951; Kaufmann and Kaufmann 1965).

DISTRIBUTION. *Galictis vittata* occurs at lower elevations from Mexico south throughout Central America into South America as far south as Bolivia, northern Argentina, and Santa Catarina, Brazil (Fig. 3; Anderson 1997; Avila-Pires 1999; Baker 1974; Bisbal 1989; Borrero 1967; Cabrera 1958; Cunha Vieira 1955; Hall 1981; Husson 1978; Krumbiegel 1942; Leopold 1959; Marineros and Martínez Gallegos 1998; Massoia et al. 1985; McCarthy et al. 1991; Pacheco et al. 1995; Timm et al. 1989). The geographic range of *G. vittata* was estimated at 13,083,600 km² (Arita et al. 1990). Because few precise specimen records exist (Husson 1978; Marineros and Martínez Gallegos 1998; McCarthy et al. 1991; Reid 1997; Tate 1939; our observations), the documented distribution has large gaps, and subspecies boundaries cannot be delimited. *G. v. andina* occurs in Peru and Bolivia, *G. v. brasiliensis* in south-eastern Brazil, *G. v. canaster* in Central America, and *G. v. vittata* in northern South America (Cabrera 1958).

FOSSIL RECORD. Blancan land-mammal age *Trigonictis* differs little from modern *Galictis* (Ray et al. 1981) and has 2 species, a larger *Trigonictis macrodon* and a smaller *T. cookii*. *Smithosinus bowleri* was closely related to *Trigonictis* and is possibly only a subgenus of the latter. At Hagerman, Idaho, time and size (length of P4 and mandible depth below M1) of *T. cookii* are positively correlated, suggesting that it became larger and evolved into *T. macrodon* as a chronospecies (Galbreath 1972; Gustafson 1978—as *T. idahoensis*); however, they coexisted in several local faunas (Ray et al. 1981). *T. macrodon* is known from Maryland, North Carolina, Florida, Nebraska, Kansas, Idaho, and Washington (Bjork 1970; Gustafson 1978; Ray et al. 1981; Skinner and Hibbard 1972).

Trigonictis is either ancestral to (Kurtén and Anderson 1980) or congeneric with (Reig 1957) *Galictis*. *T. macrodon* may have been the ancestor of *G. vittata*, whereas *T. cookii* was more likely the ancestor of *G. cuja* (Kurtén and Anderson 1980). However, the limb bones of *Trigonictis* are not as robust as those of *Galictis*, the M1 of *Trigonictis* is more similar to that of *Eira*, and *Trigonictis* is about equally similar to *Eira* and *Galictis* (Ray et al. 1981).

Galictis appeared in South America in the Marplatian land-mammal age, Vorohuean subage (formerly Uquian land-mammal age—Webb 1985) and has been present through the Marplatian, Ensenadan, Lujanian, and Recent land-mammal ages (2.5 million years ago to present—Cione and Tonni 1995; Marshall et al. 1984). Three members of subgenus *Galictis* are known as fossils. *G. sorgentinii* occurred in the early Pleistocene of Argentina (Reig 1957), and *G. sanandresensis* was described from the San Andrés Formation, Argentina, near where *G. sorgentinii* was found (F. J. Prevosti, in litt.). *G. vittata* also is known as a fossil (Mones 1986). *G. intermedius* from Pleistocene deposits in Minas Gerais, Brazil (Lund 1950; Winge 1941), is probably not distinct from *G. vittata* (Paula Couto 1979). A fossil subspecies, *G. allamandi* (= *vittata*) *fossilis* Nehring, is known from Brazil (Mones 1986). Other fossil *Galictis* in South America include *G. hennigi* (subgenus *Grisonella*, Argentina—Mones 1986), *G. cuja* (Yensen and Tarifa 2003), and an unidentified *Galictis* mandible (Bolivia—Werdelin 1991). *G. major* and *G. robusta* are *nomen nudum* (Mones 1986).

FORM AND FUNCTION. Locomotion is plantigrade (Bell 1841; Ihering 1910). The calcaneum has a well-developed trochlear process and sustentaculum, with a posterior articular surface forming a smooth curve and a large medial articular surface. A shelf occurs between medial articular surface and distal end of calcaneum, a raised area occurs on mediadorsal edge of the cuboid surface, and a massive trochlear process usually reaches the distal end of the calcaneum and is seldom grooved. Calcanea of *G. vittata* and *G. cuja* differ mainly in size (Stains 1976).

Greater grison tracks record 5 toes with short, narrow claws

on both front and hind feet. However, thumb is small and may not be visible if tracks are shallow. Interdigital webbing is noticeable if tracks are on a soft substrate. Forefeet are slightly larger (5–6 cm long, 3–4 cm wide) than hind feet. The 4 pads at the base of toes are clearly demarcated, trapezoidal in shape, and nearly touching. Toe marks are elongated ovals and well separated. Tracks frequently are partially or completely superimposed when the animal is trotting and separated from those of the opposite side by 10–20 cm. Feces are variable but generally 5–10 cm long, cylindrical, and slightly lobed (Aranda 2000; Aranda S. 1981).

Mass of the brain averaged 24.3 g (Gittleman 1986). The simple stomach has a long, cylindrical, curved pylorus. A caecum is lacking (Bell 1841). Two captive greater grisons drank 350–750 ml water/24 h (Dalquest and Roberts 1951).

Anal secretions are produced by a large, round gland on either side of anus. Anal glands are covered by muscle, open through a round duct within an anal orifice (Bell 1841), and produce a musky, clear or yellow (Dalquest and Roberts 1951) or greenish yellow (Kaufmann and Kaufmann 1965), oily liquid. Although disagreeable, it is not as unpleasant as that of many mustelids (Bell 1841; Mendez 1970) and has a unique smell (Dalquest and Roberts 1951). Anal glands are active only when the animal is very excited (Herter 1975). Alarmed grisons “snort,” jump back, erect the hair on the tail, and emit musk from anal glands (Kaufmann and Kaufmann 1965). They can squirt musk at specific targets (Dalquest and Roberts 1951).

Baculum of *G. vittata* ($n = 5$ adults from Venezuela) is 54.6–56.9 mm long, 4.3–5.2 mm wide at proximal base, and 2.2–3.1 mm wide at distal end. The expanded tip is 6.2–7.5 mm long, 6.2–7.4 mm wide, and deflected downward at ca. 40°. Shaft is swollen at base and becomes progressively thinner toward apex and may be straight, curve down, or curve to 1 side. In cross section, it is triangular near base, becoming more rounded ventrally toward the distal end (Mondolfi 1987). Dorsal surface of tip is slightly concave, and ventral surface is flat. A pair of dorsal posteriorly directed knobs occurs near the neck of the shaft. A description of *G. vittata* bacula (Didier 1947) refers to specimens now considered *G. cuja* (Mondolfi 1987). A testicle of a male from Honduras was 22 mm long (McCarthy et al. 1991).

Greater grisons may depend more on olfaction than vision. Three grisons passed within 1.5 m of a stationary researcher without reacting; however, when downwind, they detected the observer from 20 m and fled (Sunquist et al. 1989). Maximum longevity in captivity is 10 years and 6 months, but the animal was still alive when the article was written (Jones 1982). Dental formula is $i\ 3/3, c\ 1/1, p\ 3/3, m\ 1/2$, total 34 (Borrero 1967; Hall 1981; Husson 1978; Mendez 1970).

ONTOGENY AND REPRODUCTION. Gestation is 39 days (Eisenberg and Redford 1999; Hernández Huerta 1992) or “around 40 days” (Aranda 2000:125). One to 4 young (Aranda 2000; Cabrera and Yepes 1940) are born in October (Cabrera and Yepes 1940); March, August, or September (Leopold 1959); May or June; or in autumn (Kaufmann and Kaufmann 1965). A neonate female with umbilical cord still attached weighed <50 g. Her eyes were still closed, and although the hair was short, its color pattern was evident. This individual was adopted and raised by a house cat (*Felis catus*). Eyes opened after 2 weeks, and by 3 weeks she could eat meat. Full growth was reached by 4 months (Dalquest and Roberts 1951). Testes of 3 males reared in captivity descended at ca. 4 months of age (Kaufmann and Kaufmann 1965). Anal scent glands were large and active, and captive greater grisons sprayed house cats and chickens when frightened. After 4 months, no odors were detected (Dalquest and Roberts 1951).

ECOLOGY. Greater grisons occur in virgin and secondary low-elevation rainforests, premontane forests, upland monte alto forests, tropical dry forests, closed deciduous forests, cerrado, yungas woodlands, shrub woodlands, chaco, palm savanna, secondary growth, open fields, plantations, and partially flooded rice fields adjacent to a ranch (Anderson 1997; Bisbal 1989; Goodwin 1946; Handley 1976; Hice 2001; Janson and Emmons 1990; Leopold 1959; Mendez 1970; Redford and da Fonseca 1986; Rumíz et al. 1998; Sanderson 1949; Timm et al. 1989). They are often found near rivers, streams, and wetlands (Aranda 2000; Leopold 1959; Sunquist et al. 1989), from sea level to 1,500 m elevation but mostly below 500 m (Tate 1939; Timm et al. 1989). However, on

the east slopes of the Andes Mountains in Bolivia they range to >2,000 m elevation (Rumíz et al. 1998). In Venezuela, they occurred in 8 of 15 life zones (Bisbal 1989).

Galictis vittata has a low density throughout its range (Arita et al. 1990). *G. v. canaster* is uncommon and rare (Timm et al. 1989), rarely encountered in the field (Reid 1997), and only a few specimens are known from scattered localities (Marineros and Martínez Gallegos 1998; McCarthy et al. 1991). Although *G. vittata* was considered common in virgin forests in Surinam (Sanderson 1949), only 4 specimens are known from this country (Husson 1978). *G. vittata* was considered rare (encountered only a few times per year) at Cocha Cashu, Peru (Janson and Emmons 1990). It has a localized and very sparse distribution in Venezuela (Bisbal 1989; Mondolfi 1987).

Population densities were estimated at 1–2.4 individuals/km² (Eisenberg et al. 1979), but radiotracking data suggested much lower densities. Home range of a radiocollared female was >415 ha. The animal traveled >1 km (straight line, 953 ± 172 m; *n* = 16) between consecutive daily rest sites and moved 2–3 km/24-h period (Sunquist et al. 1989).

Diets of *G. vittata* are poorly known, but they eat mostly small mammals and birds and sometimes attack domestic chickens in rural areas (Ferrioli Filho and Barretto 1969). In Venezuela, 7 stomachs contained remains of diurnal rodents (7 *Sigmodon alstoni*), a lizard (*Ameiva ameiva*), a dove (*Zenaida auriculata*), and an eel-like fish (*Synbranchus?*—Sunquist et al. 1989). Two other stomachs contained an opossum (*Didelphis marsupialis*), an unidentified rodent, a lizard (*A. ameiva*), and an amphibian (*Colestethus auriculata*—Bisbal E. 1986). In Para, Brazil, a greater grison carried a large toad (*Bufo marinus*) in its mouth, apparently unaffected by the toad's toxic skin glands (Cintra 1988).

In Panama at 0815 h, a greater grison pursued an agouti (*Dasyprocta punctata*). Neither was running at top speed (Kays 1996). A greater grison also attacked an agouti in a river at midday (Kays 1996). A greater grison ate a piranha-like characin fish in Peru (D. Brooks, in litt.). A female with radiocollar (*n* = 72 locations) spent 27.8% of her time in open habitats, but 69.2% of the prey came from there; the remaining 72.2% of her time was spent in closed woodlands and forests, where she obtained 27.8% of her prey (*n* = 7 prey items—Sunquist et al. 1989).

In northeastern Brazil, greater grisons are major predators of rock cavies or mocos (*Kerodon rupestris*) that they attack in their burrows; mocos sometimes are able to escape by climbing tall rocks or trees. Two male and 2 female greater grisons were seen chasing a moco. When collected, their stomachs contained meat and hair of other mocos and another species of cavy, *Galea spixii* (Moojen 1943).

Captive animals eat a variety of live vertebrates, invertebrates, and plant foods (Dalquest and Roberts 1951; Ewer 1973). They adapt to eating fruit and table scraps, but meat is especially preferred (Borrero 1967). One captive female was fond of eggs, reptiles, and frogs (Bell 1826, 1841). A tame greater grison attacked several animals it encountered: cockroaches, grasshoppers, a tarantula, a toad (*B. marinus*), and a spiny rat (*Proechimys semispinosus*—Kaufmann and Kaufmann 1965).

In Venezuela, ectoparasites reported from greater grisons include *Amblyomma auricularium* (Acarina), *Pulex simulans* (Siphonaptera), and *Rhopalopsyllus a. australis* (Siphonaptera—Guerro 1985). Records of 11 *G. vittata* infected by giant kidney worms (Nematoda: *Diectophyme renale*) in southern Brazil may actually pertain to *G. cuja* (Barros et al. 1990). *G. vittata* is susceptible to canine distemper (Keymer and Epps 1969). During an outbreak in a zoo, 3 individuals were infected and died in <5 days after onset of anorexia despite receiving 3 prior inoculations of inactivated distemper vaccine at 2-week intervals (Sedgwick and Young 1968). Histopathological analysis of 3 unvaccinated *G. vittata* killed in another zoo distemper outbreak showed vacuolar degeneration; necrosis of kidney tubular cells, gastric mucosa, hepatocytes, and gallbladder epithelium; hemorrhage of adrenal medulla; pneumonia; congestion; and other damage (Rego et al. 1997).

G. v. brasiliensis may be a vector of Chagas disease. *Trypanosoma cruzi* was recovered from a greater grison in São Paulo State, Brazil, and injected into 30 white mice (*Mus musculus*). Twenty-nine of 30 mice developed counts >5,000 (range, 2,695–15,260) parasites/mm³ in blood, and 25 of 30 died within 49 days (Barretto and Albuquerque 1971). The disease was >10 times more

virulent than that in a similar experiment with *G. cuja* (Ferrioli Filho and Barretto 1969).

Dens are in caves between rocks, in tree holes, or among tree roots (Aranda 2000; Aranda S. 1981). Greater grisons also take shelter in abandoned armadillo burrows (Eisenberg and Redford 1999; Reid 1997).

BEHAVIOR. Greater grisons are primarily diurnal (Dalquest and Roberts 1951; Kaufmann and Kaufmann 1965) but are also active at night (Mendez 1970; Sunquist et al. 1989). The activity of a captive male from Ecuador was nearly 100% diurnal, with a rest period of several hours at midday (Kavanau 1971; Kavanau and Ramos 1975). It was uninhibited by low light levels, indicating that vision is versatile, and best adapted for daylight but also well suited for dim light. Three captive greater grisons in Panama were very active in early morning and late afternoon and rested 4–5 h at midday (Kaufmann and Kaufmann 1965). *G. vittata* foraged during the day at Cocha Cashu, Peru (Janson and Emmons 1990). However, a radiocollared individual in Venezuela was active for 10–12 h/day, mostly at night (77.1% night; *n* = 140 locations for 28 days). All sightings (*n* = 25) were in the daytime (0600–1125 h—Sunquist et al. 1989).

Greater grisons move rapidly in a weaving or zigzag pattern, deviating from side to side from the line of travel by 1 or 2 m (Sunquist et al. 1989). They run in short bounds with their backs arched, frequently pause for an instant, extend their necks and heads high, look around while sniffing the air using the long neck to see above grass, and often bob the head and peer about (Kaufmann and Kaufmann 1965; Sunquist et al. 1989). Three captive grisons did not gallop even at top speed. When investigating unfamiliar objects, they may inch slowly forward with the belly on the ground, pushing themselves along with their outstretched hind legs, giving themselves a snakelike appearance (Kaufmann and Kaufmann 1965).

Galictis vittata is primarily terrestrial (Janson and Emmons 1990), as are captive greater grisons (Kaufmann and Kaufmann 1965). However, 2 grisons in Venezuela climbed a meter into a tree that leaned at 45°, sniffed the trunk, and descended head first. On another occasion, a female and a young grison climbed 2 m into a palm tree parasitized by a strangler fig while an adult male waited below with his belly against the trunk looking upward. The 2 scratched around in the fig, knocking down wood and debris, which were examined by the male (Sunquist et al. 1989).

Captive grisons followed walls rather than crossing open floors and investigated any burrows encountered (Dalquest and Roberts 1951; Kaufmann and Kaufmann 1965). One individual explored abandoned agouti (*Dasyprocta*) burrows and often slept in them during the middle of the day (Kaufmann and Kaufmann 1965).

Greater grisons are excellent swimmers, and in captivity, they swam on their backs, sides, or bellies, often playing underwater for >30 s (Dalquest and Roberts 1951). A wild greater grison in Peru was a strong swimmer (D. Brooks, in litt.). However, captive greater grisons waded frequently but avoided deep water and did not swim. They often splashed water out of pans (Kaufmann and Kaufmann 1965).

Greater grisons are often kept in captivity to control rodents (Herter 1975). Individuals raised in captivity become tame and affectionate (Bell 1841; Borrero 1967; Dalquest and Roberts 1951; Herter 1975; Kaufmann and Kaufmann 1965), although older animals may not tame (Kaufmann and Kaufmann 1965).

Captive greater grisons urinated and defecated in the same place and could not be trained to defecate elsewhere (Kaufmann and Kaufmann 1965). They backed into a corner, held their tails up out of the way, and arched the posterior 3rd of the body (Dalquest and Roberts 1951). They bobbed their tails up and down both while defecating and urinating. Sometimes they lightly brushed the base of the tail over the feces and dragged the anus over the ground. They were careful to avoid stepping on older feces (Kaufmann and Kaufmann 1965).

Social grooming has not occurred in captivity (Dalquest and Roberts 1951; Kaufmann and Kaufmann 1965), although captives scratched themselves with their hind feet. Scent marking is done by passing musk to the midline of the tail and then brushing the tail against familiar objects (Dalquest and Roberts 1951).

They hunt alone, in pairs (Bisbal E. 1986; Leopold 1959), or in small family groups. An adult female traveled in association with

a nearly grown male and a three-fourths grown female (Sunquist et al. 1989). Several individuals often play together (Herter 1975).

Food is frequently carried to a refuge to be eaten. Greater grisons use their forepaws to hold food but do not manipulate it (Kaufmann and Kaufmann 1965).

In distress or other uncomfortable situations, juveniles give a nasal “anh-anh” vocalization. In aggressive situations, greater grisons make “motor-like” sounds that increase in pitch and volume with the intensity of the situation, becoming a series of short barks at high intensity, then a single, sharp, high-pitched bark, and finally a loud scream with mouth open and teeth bared. Tail is held in a stiff “S” curve. Submissive posture is with the entire ventral surface, including chin, pressed to the ground (Kaufmann and Kaufmann 1965). Captive greater grisons also “squeal” when playing or fighting (Dalquest and Roberts 1951). While being fondled, a captive female greater grison vocalized with “purs” of 20–30 short “chirrs” audible for a distance of ca. 60 cm. While moving about, a captive male made panting sounds consisting of 30–50 metallic, clicking gasps audible ca. 3 m away (Dalquest and Roberts 1951).

GENETICS. *Galictis vittata* has a diploid number of 38 chromosomes (FN = 70), with 30 metacentric or submetacentric and 6 acrocentric or subacrocentric autosomes together with a medium-sized, metacentric X and a submetacentric Y (Fredga 1966; Wurster and Benirschke 1968). Immunoelectrophoretic analyses of serum proteins of 14 mustelids (Ledoux and Kenyon 1975) indicated that *G. vittata* was closer to *M. vison* than *E. barbara* (*G. cuja* was not included in this analysis). A *Gulo*–*Martes*–*Eira*–*Galictis*–*Lyncodon* clade was recognized within Mustelinae (Wozencraft 1989a), but a cladistic analysis of cranial features indicated that *Galictis* and *Lyncodon* were not close and that *Eira* was not a member of the Galictine lineage. Exact positions of *Galictis* and *Mustela* were not resolved (Bryant et al. 1993).

CONSERVATION STATUS. *Galictis v. canaster*, the Central American subspecies, was considered possibly threatened by the International Union for Conservation of Nature (IUCN 1996; Schreiber et al. 1989) but was omitted from the most recent red list (Hilton-Taylor 2000). In Mexico, where it lives only in biological reserves, it is considered endangered (Ceballos and Navarro L. 1991). In Costa Rica, it is considered endangered (Timm et al. 1989) and is listed on CITES Appendix III (Fuller et al. 1987). In Belize it is protected by the Wildlife Protection Act, and in Nicaragua it is protected from hunting by Acuerdo No. 2 of 1983 (Fuller et al. 1987). Both *G. v. canaster* and *G. v. vittata* occur in Colombia, and both have been protected (as *G. vittata* only) by Resolution 848 since 1973 (Fuller et al. 1987).

The 3 more southern subspecies, *G. v. andina*, *G. v. brazilensis*, and *G. v. vittata*, are not listed by IUCN or national red lists (e.g., da Fonseca et al. 1994; Rodríguez and Rojas-Suárez 1996) but are nevertheless protected in some countries. In Bolivia, all faunas, including *G. vittata*, have been protected from hunting, harassment, and removal from the wild since 1990 by Decreto Supremo de Veda General Indefinida 22641 (Tarifa 1996). *G. vittata* is of indeterminate status in Peru (Fuller et al. 1987). In Argentina, *G. vittata* is considered “data deficient” (Díaz and Ojeda 2000).

Galictis vittata responds both negatively and positively to deforestation, logging, oil wells, and road building. Hunting and dam construction had slight negative effects in Venezuela (Bisbal 1993). *G. vittata* occurred in medium (860 ha) and large (36,000 ha) fragments in Brazilian Atlantic forests but was absent from small (60–80 ha) plots (da Fonseca and Robinson 1990).

Live *G. vittata* sold for £1 5s to £1 15s in western Europe in 1896–1908 (Flower 1908), although it was not offered frequently. The fur has no commercial value, but a few skins, taxidermy mounts, and live animals are sold as decorations or pets (5 from Iquitos, Peru, in 1964—Grimwood 1969).

REMARKS. Confusion over the type specimens of *V. vittata* and *G. allamandi* (paintings by different artists of the same animal—Husson 1978; but Bell [1837] also refers to a specimen of *G. allamandi*) led some (Ihering 1910; Krumbiegel 1942; Nehring 1886) to use *G. allamandi* for the larger species and *G. vittata* for the smaller (Husson 1978). The modern classification synonymizes *G. allamandi* under *G. vittata* and treats the smaller forms as *G. cuja* (Cabrera 1958; Wozencraft 1993). For this reason, some literature on *G. vittata* actually refers to *G. cuja* (Didier 1947), especially in their area of sympatry in Brazil.

The generic name *Galictis* apparently comes from the Latin word *gale* meaning weasel or cat and the Greek *iktidos* meaning weasel (Jaeger 1966). The specific epithet *vittata* is Latin for bound with a ribbon (Jaeger 1966), a reference to the light diagonal stripe on the head and shoulders of the animal. Allamand invented the common name grison in 1771 on receipt of a specimen from Surinam, which eventually became the type of Schreber's *V. vittata*. Not having a name to call the species, he modified the name on the shipping list, the Dutch graauwe Wezel (gray-haired weasel, translated into French as belette grise), to grison (Husson 1978).

Common names include grison (English and German), hurón, huroncito (Spanish), and furão (Portuguese—Ihering 1910). Local names include aracambé (Brazil—Becker and Dalponte 1991), comadreja de agua (Colombia—Borrero 1967), dyaguapé (Argentina—Massoia et al. 1985), melero chico (Bolivia—Townsend and Wallace 2001), furão grande (Brazil—Cunha Vieira 1955), furax (Brazil—Cabrera and Yepes 1940), grisón (México—Leopold 1959), hurón grande (Argentina—Díaz and Ojeda 2000), lobo de gallinero, tigrillo rosillo (Panama—Mendez 1970), mapuro (Colombia—Rodríguez-Mahecha et al. 1995), rey de las ardillas (México—Nelson 1901), tejón (Costa Rica—Timm et al. 1989), waiti-ai-ra (Surinam—Sanderson 1949), and weti-aira (Surinam—Husson 1978). Méndez (1970), Rodríguez-Mahecha et al. (1995), and Townsend and Wallace (2001) reported additional common names.

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