**Spalacopus Wagler, 1832**

*Spalacopus Wagler, 1832:1219. Type species *S. poepigii* Wagler, 1832.*

*Poephagomys* Cuvier, 1834:323. Type species *P. ater* Cuvier, 1834.

*Psammoryctes* Poeppig, 1835f:252. Type species *P. noctivagus* Poeppig, 1835f.


**Spalacopus cyanus** (Molina, 1782)  
*Cururo*

*Mus cyanus* Molina, 1782:300. Type locality “Valparaíso,” Chile by subsequent selection (Osgood, 1943:114).

*Spalacopus poepigii* Wagler, 1832:1219. Type locality “foot of the Andes” in central Chile (erroneously fixed at coastal Quintero by Thomas, 1925).

*Poephagomys* ater Cuvier, 1834:323. Type locality “Coquimbo,” Chile.

*Psammoryctes noctivagus* Poeppig, 1835f:166. Type locality “sand dunes near Concón,” Valparaíso, Chile (not from coast of northern Chile as in Osgood 1943:114).

*Spalacopus tabanus* Thomas, 1925:585. Type locality unknown, but in southern Chile.

*Spalacopus cyanus* Osgood, 1943:114. First use of current name combination and spelling.

**CONTEXT AND CONTENT.** Three subspecies currently are recognized (Tamayo and Frossinetti, 1980; Contreras et al., 1987).

*S. c. cyanus* (Molina, 1782), see above (ater Cuvier and noctivagus Poeppig are synonyms).

*S. c. poepigii* Wagler, 1832, see above (tabanus Thomas is a synonym).

*S. c. maulinus* Osgood, 1943:115. Type locality Quirihue, Nuble, Chile.

**DIAGNOSIS.** *Spalacopus cyanus* is a burrowing rodent of moderate size, with a mass of \(<140 \text{ g}\), a short tail (41 mm), short ears (10 mm), and black in color (Fig. 1). Of all octodontids species, only *Aconaemys* is moderate sized with a short tail, but it is brownish and has larger ears. Chilean species of the fossorial genus *Ctenomys* (Ctenomyidae) are larger than 140 g and are brown in color. Upper incisors of *Spalacopus* are long and protrude forward; all other octodontids have orthodont or opisthodont incisors. Grinding teeth are quadrate with a single deep indentation on lingual and labial sides, separated in the middle by a slight space; in *Aconaemys* indentations meet in the middle.

**GENERAL CHARACTERS.** Adults range in mass from 80 to 120 g; those from low altitudes are smaller and show more sexual dimorphism than do those from high Andean localities (Contreras, 1986). Mean measurements (in mm, ranges in parenthesis) for males and females respectively, for *S. c. cyanus* (n = 74 and 72) are as follows: total length, 176 (155–205), 170 (142–204); length of tail, 41 (31–50), 39 (28–49); length of hindfoot, 28 (21–33), 28 (23–31); length of ear, 10 (8–12), 10 (8–12); mass (in g), 81 (53–105), 75 (43–119). The same measurements for *S. c. poepigii* (n = 30 and 29) are as follows: total length, 188 (162–224), 190 (160–225); length of tail, 47 (39–55), 48 (39–57); length of hindfoot, 30 (27–34), 30 (24–37); length of ear, 11 (10–12), 11 (8–12); mass, 105 (68–151), 97 (60–163). Body measurements for *S. c. maulinus* (n = 10 and 10) are the following: total length, 172 (140–196), 167 (160–176); length of tail, 39 (30–45), 38 (35–45); length of hindfoot, 28 (26–34), 26 (25–28); length of ear , 10 (9–11), 11 (9–12); mass, 87 (64–130), 84 (71–102). The pelage is black, dense, and short (12 mm). Some specimens have white patches, especially in the ventral region. Eyes are small, usually 5.5 mm in diameter. The forefoot are strong, with long claws. The dental formula is i 1/1, c 0/0, p 1/1, m 3/3, total 20. The incisors are long and very procumbent with a Thomas angle (a measure of the degree of procumbency of upper incisors—Thomas, 1919) of 117°, similar to the 120° of *Heterocephalus* (Reig and Quintana, 1992). The alveoli of the upper incisors are large, extending to the second M1, a condition typical of tooth-diggers (Lessa and Thaleker, 1989). As extensions of upper and lower lips are almost fused behind the I1, the mouth can be closed while digging with the teeth. The molariform teeth grow continuously and exhibit single indentations in the lingual and labial surfaces that produce a figure-eight shape typical of most octodontids (Fig. 2—Mann, 1978; Osgood, 1943).

**DISTRIBUTION.** The cururo occurs in Chile, in coastal regions from Caldera (27°03’S) to Quirihue (36°17’S), in the Andes up to 3,500 m, from Alicalhue (32°19’S) to Los Cipreses (34°01’S), and at scattered localities on the slopes of the intervening Intermediate Depression (Fig. 3—Contreras et al., 1987). *S. c. maulinus* is found in Cauquenes and Quirihue, Nuble Province (the two most southern localities in Fig. 3). *S. c. cyanus* occurs in central Chile, from Caldera (27°SR to Curicó (35°SR, and from sea level to 1,000 m altitude; and *S. c. poepigii* occurs in the Andes of central Chile, at elevations of 1,500–3,400 m above sea level. There are gaps in the known geographic distribution of *Spalacopus cyanus*, especially between 34° and 36°, probably because of the lack of sampling effort rather than absence of the species.

**FOSSIL RECORD.** There is no fossil record of *Spalacopus*. Reig (1970) referred fossils of the fossorial octodontoids *Eucelophorus*, *Actenomys*, and *Xenospondylus* from Argentina to *Ctenomys* (Ctenomyidae, sensu Woods, 1982), rejecting a close relationship with *S. cyanus*. Reig (1970) suggested *S. cyanus* originated prior to (and independent of) *Ctenomys*. Contreras et al. (1987) suggested *Spalacopus* speciated in situ during the Pleistocene. The only known fossil record consists of Late Pleistocene remains found in archaeological excavations in Tugua-Tugua, Region VI (R. Feito, in litt.).

**FORM AND FUNCTION.** Fossorial adaptations of *S. cyanus*...
are evident from its small thickest body, short tail, short ears, small dorsally situated eyes, short limbs, wide feet, and long claws. These features yield a Fossorial Index of 5.1, similar to that of Ctenomys hartii (Pearson, 1984). The skull is robust, short, wide, and flat, with highly procumbent upper incisors (Fig. 2). The nasal region is short. In contrast to Ctenomys, the auditory bullae of Spalacopus are small. The angular process of the mandible is large, as are the masseter muscles. As in Octodon and Aeonaemys, the incus and malleus are not fused (Wood and Patterson, 1959). The thibia and fibula are fused proximally (Landry, 1957). A well-developed deltoid crest of the humerus permits powerful movements of the forelimbs. The clavicle is wide distally and narrow and thin proximally. The femur has an enlarged third trochanter, as in Octodon degus (Mann, 1940). Lateral views of skull, mandible, and pelvis, and anterior and lateral views of humerus, femur, and tibia of S. cyanus are depicted in Reig and Quintana (1992) as part of a comparison with fossil ctenomyine Eucelophorus.

The stomach of Spalacopus cyanus is simple, with a large fundus and a small and simple cecum. The simplicity of the digestive system reflects a diet low in cellulose and easily digested (Mann, 1940). The seminal vesicles are large and the testes are abdominal throughout the year. At the bottom of the intromittent sac of the glans penis there is a variable number of horny spicules that are smaller than in other octodontids (Contreras et al., 1993; Spotorno, 1979). The uterus is bicorneate. Females have two pairs of abdominal and one pair of inguinal nipples (Mann, 1944, 1978).

Cururos are good thermoregulators between 2 and 30°C and maintain a body temperature of 36.5°C. Animals from the coast have a basal metabolic rate of 0.745 ml O₂ g⁻¹ h⁻¹, whereas those from the Andes have a rate of 0.956 ml O₂ g⁻¹ h⁻¹ (Contreras, 1986). These values are 83% and 74% lower, respectively, than expected based on body mass. Minimal thermal conductance is the same for individuals from both populations, representing ca. 85% of that expected based on mass. These values are in agreement with typical bioenergetic patterns of subterranean mammals (Contreras and McNab, 1990).

Kidneys of S. c. poepigii from the coast in north central Chile have a relative medullar thickness value of 4.9, and a percentage medullar thickness of 63.9%. These values are significantly lower than those from the Andes (S. c. poepigii), with 6.0 and 68.4
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respectively—reflecting a longer renal papilla in S. c. poepigiti (Cortés, 1985).

ONTOGENY AND REPRODUCTION. Gay (1847) and Molina (1782) stated that Spalacopus cyanus reproduces twice a year, with litters of up to six individuals. Examination of 75 animals, however, indicates an average litter size of 2.2 (range, 1–3—Lagos et al., 1989). According to Housse (1953), neonates are black and naked and open their eyes 10–12 days after birth. Our observations of two captive litters revealed they are hairless and open their eyes at birth. Unda et al. (1980) found corpora lutea and germinative lines in all months sampled. They proposed the existence of a re-

productive period from June to March in coastal populations and a shorter period in Andean populations. A female to female ratio of 1:0.88 was found for 224 specimens captured in various localities over the past 10 years (Lagos et al., 1989).

ECOLOGY. Habitats occupied by S. cyanus range from alpine grasslands in the Andes to arid savannas in the Intermediate Depression and stabilized sand dunes and sandy grasslands on the coast. Shrub cover is <60%, with an herb stratum that contains geophytes and hemicyrptophytes (Contreras et al., 1987).

Cururos maintain and expand an extensive system of tunnels ranging from 5 to 7 cm in diameter. The majority of these tunnels lie 10–12 cm below the surface and are used for feeding. These tunnels have numerous lateral tunnels opening to the surface. They are used for depositing soil on the surface, thereby forming conspicuous heaps, and also for feeding on vegetation around tunnel openings. Tunnels undergo constant modification. A 2nd type of tunnel is found 40–60 cm below ground surface. These are shorter than feeding tunnels but are used for longer periods. Within these deep tunnels usually there is a nest chamber and a bolt hole (Reig, 1970; Torres-Mura, 1990). Nests are 20 cm in diameter, lined with grasses, and kept free of feces; however, they often also serve as houses for staphilinid coleopterans and isopods (Torres-Mura, 1990). Harvesting of geophytes through tunneling appears to be the primary mode of foraging throughout the year, as suggested by the volume of soil deposited in surface heaps. In arid

mediterranean habitats of Chile, the monthly rate of mound production by one colony was variable, with an average of 64 ± 23 (mean ± SD) heaps/month (range, 9–110). However, the volume of soil deposited on the surface was less variable and unrelated to precipitation. The cumulative volume of soil deposited on the surface was equal to 2.5 m³/year and the total soil mass equal to 3.22 metric tons/year, at a bulk density of 1.31 g/cm for mined soil. The surface area directly covered by heaps was 92.4 m²/year. At a density of 3 colonies/ha, this would equal about 10 tons/ha (Contreras et al., 1993).

While S. cyanus is a nocturnal species, it is diurnal, according to Ipinza et al. (1971) considered it to be diurnal. Surface soil deposition and captures in traps only occur during the daytime, although continuous measurements of metabolic rate indicate no circadian or photoperiodic rhythm, a pattern typical of other subterranean mammals (Contreras, 1986).

According to Ipinza et al. (1971), the cururo is strictly herbivorous, feeding on tubers of irideceae (e.g., Libertia, Siyrsichium, Alophia). However, Reig (1970) reported that the cururo on the coastal dunes feeds exclusively on huilis (Leucocorineae truxides), consuming the stalk and underground tubers. Bulbs of Rodophyta were found in recent excavations of seven gallery systems in coastal dunes (Torres-Mura, 1990). Feeding usually takes place under
ground, with occasional feeding on aerial herbs around open tunnels at distances no greater than the animal’s body length. Unlike some Ctenomy, they do not venture away from the entrance of their tunnels (Pearson et al., 1968). Many authors (Gay, 1847; Gignoux, 1945; Housse, 1953; Ipinza et al., 1971; Mann, 1944, 1978; Molina, 1978; Reed, 1982) state that this species stores geophytes underground and uses them as food reserves, especially in regions where covered by snow during winter. However, no substantiating data were included in any of these reports.

Predators of the cururo include snakes, buzzards (Buteo), Harris’ hawks (Parabuteo unicinctus), American kestrels (Falco sparverius), great horned owls (Bubo virginianus), gray foxes (Pseudalopex griseus), gray cats (Leptailurus felis coloro)—Housse, 1953, 1978. Quantitative analysis of food habits for 10 common species of predators in central Chile indicated low predation pressure on the cururo (Jaskie et al., 1981).

The nematode Graphidoides yanesi specifically parasitizes the intestines of Spalacopus (Babero and Cattan, 1980). Similarly, the flea Ectinosurus coecyi (Simphonaptera) is a specific parasite of S. cyanus, whereas the species of Ectinosurus parasitize Octodon degus and other rodents (J. C. Boucournou, in litt.).

Cururos cause damage in agricultural areas by burrowing and by consuming potatoes and other crops. Trenches and mounds of earth from which the crop has been harvested are typically left behind. The crop damage caused by S. cyanus has been estimated to be up to 20% in some areas. In general, the damage is more severe in areas with high population densities of cururos. In areas with high cururo densities, the crop damage can be as high as 50%. The damage is typically caused by the animals burrowing under the surface of the soil, creating holes and tunnels. The holes and tunnels can also be a hazard to humans, as they can be a source of accidents and injuries.

BEHAVIOR. Spalacopus cyanus lives in colonies of as many as 75 individuals, consisting of a family group of one to several pairs and their young; however, they often also serve as houses for staphilinid coleopterans and isopods (Torres-Mura, 1990). Harvesting of geophytes through tunneling appears to be the primary mode of foraging throughout the year, as suggested by the volume of soil deposited in surface heaps. The cururo is a diurnal species, and it is known to be diurnal. Surface soil deposition and captures in traps only occur during the daytime, although continuous measurements of metabolic rate indicate no circadian or photoperiodic rhythm, a pattern typical of other subterranean mammals (Contreras, 1986).

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glans penis (Contreras et al., 1993) demonstrate similarities be-
tween octodontid taxa inhabiting the southwestern Andes (Acon-
emys, Octodon, Spalacopus) and suggest close evolutionary re-
lations among them, possibly as a result of isolation and radia-
on on the Chilean side.

**CONSERVATION STATUS.** In the Red List of Chilean Ter-
restrial Vertebrates, S. c. maullini was qualified as “Endangered” (CONAF, 1993). Since the description of this subspecies by Osgood (1943), the only reports on its biology are those by Reise and Ga-
llardo (1986a, 1986b).

**REMARKS.** The generic name Spalacopus is derived from the greek spalax meaning a mole and the greek pous (Jaeger, 1978) meaning a foot, in reference to adaptations of its feet for a fossorial life style. The specific name cyanus is derived from the greek ky-
nanos meaning a dark blue, although it refers to the cururo’s shiny black pelage (Jaeger, 1978). The subspecies name poepiggi is a patronymic of German naturalist Eduard Poepiggi and maullini to the Maule region, although at present the type locality of this subspecies is in the Rible region.

The name cururo seems to have a double meaning. It is an orn-
omatopoeia of the most characteristic vocalization of the species and also is similar to the mapuche or a racismian (mapudungun) word curi or curu, meaning black. The name cuyu also is used in the southern end of its distribution and relates to the word cuyu, meaning charcoal. According to Molina (1762), the name guaque would apply to cururos, but this may be a mistake or confusion. Guaque is the common name of the bulbs of dioecious cururos store in certain regions and that peasants obtain for food by digging out cururo galleries.

The best method to trap cururos alive is by use of thin wire snares placed at the entrance of their burrows. Snares must be checked frequently to avoid injuries. This work was supported by grants FONDECYT Chile 90/376, DIULS 120-3-35, and Dirección de Bibliotecas, Archivos y Museos 9215.

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