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Rhyncholestes rapanurus. By Bruce D. Patterson and Milton H. Gallardo

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**Rhyncholestes Osgood, 1924**

*Rhyncholestes* Osgood, 1924:166. Type species *Rhyncholestes rapanurus* Osgood, 1924, by original designation.


**Rhyncholestes rapanurus Osgood, 1924**

Chilean Shrew-opossum

*Rhyncholestes rapanurus* Osgood, 1924:170. Type locality at mouth of Río Inio, south end of Chiloé Island, Prov. Chiloé, Chile.

**CONTEXT AND CONTENT.** Context same as in generic summary. Both the genus and species are monotypic.

**DIAGNOSIS.** Inasmuch as the genus is monotypic, the diagnosis applies to both genus and species. Skull (Fig. 1) narrow and elongated, the ratio of zygomatic breadth to cranial length is only 42% (Osgood, 1924); second, third, and fourth upper incisors bifid and subequal, with a broad leading blade and a blunt, curved posterior cusp; canine single-rooted and canniform in male, but double-rooted and premolariform in female; posterior palatal vacuities without median bony partition; antorbital vacuities as in *Caenolestes*; median lower incisor highly procumbent, projecting from alveolus a distance equal to 1/4 to 1/3. Skeletal characters as in *Caenolestes*, except humerus relatively shorter, with deltoid ridge extending half its length; metapodials relatively short; 22 (in contrast to 27 in *Caenolestes*) caudal vertebrae (Osgood, 1924). Pelage silky and uniform, without counter-shading (Fig. 2); no external pouch or marsupium; upper and lower lips bearing “loose, flabby lateral flaps of skin” possibly diagnostic of the family (Pine et al., 1979:343, fig. 3); tail seasonally incrassated with fat (Fig. 4).

**GENERAL CHARACTERS.** *Rhyncholestes* is a mouse-sized opossum of uniform dark grayish brown coloration. The ear pinnae are short and rounded, and the tail is dark, not furred for most of its length. Upper and lower lip-flaps on a greatly elongated head are the most salient external characters. The sexes are similar except dentally; males have a conical, single-rooted upper canine like that of *Caenolestes*, whereas females have a premolariform, double-rooted canine resembling *Lestoros* (Osgood, 1924). Both sexes have distinctly bifid upper incisors, unique among living marsupials.

External and cranial measurements of adult male and female specimens from Isla Chiloé and an adult male specimen from the Chilean mainland, respectively, were provided by Osgood (1924: 170 [emended in his 1943 account] and 1943:52–53) as follows: total length, 204, 175, 215; length of tail vertebrae, 78, 65, 87; length of hind foot, 21, 19.5, 23.5; ear from notch, 11, 11, (no data); diameter of tail at base, 7, 7, (no data); greatest length of skull, 34, 30.3, 34.8; basal length, 23.3, 29.6, 34.8; zygomatic breadth, 14.7, 12.5, 15; mastoid breadth, 11.1, 10.2, 11.8; length of nasals, 18, 15.8, 19.1; greatest breadth of nasals, 3, 2, 3.7; least interorbital breadth, 6.9, 7, 6.8; length of palate from gnathion, 20.3, 17.5, 20.7; length of anterior palatal foramina, 8.7, 7.3, 7.9; length of palatal vacuities, 6, 3.8, 6.6; front of upper canine to back of last molar, 13.4, 11.9, 13.4; combined length of four upper molars, 5.4, 5.2, 5.5; combined length of three lateral incisors, 3.9, 3.5, 3.8; length of bone of mandible from condyle, 20, 18, 21.5; exposed length of median lower incisor, 6.8, 6.1, 6.8.

**DISTRIBUTION.** The Chilean shrew-opossum has a narrow distribution, apparently restricted to temperate rain forests in southern Chile and probably adjacent Argentina (Fig. 5; Patterson, in press). The elevational range of records is from sea level (on Isla Chiloé) to 1,135 m (in Osorno Province). Localities are (from south to north)–CHILE: CHILOÉ PROVINCE: Chiloé Island: Mouth of Río Inio, 43°21' S, 74°07' W (type locality); Puerto Carmen, 43°08' S, 73°43' W; 15 km SW Quellón, near mouth of Río Yalidda, Cacao, 42°38' S, 74°07' W; Fundo El Venado, 5 km W Palomar (by road); LLANQUIHUÉ PROVINCE: south side, Lago Chapo, 41°26' S, 72°35' W; Peulla, 41°06' S, 72°02' W; Refugio, Volcan Osorno, 1,000 m. OSORNO PROVINCE: Valle de La Picada, 42°5–1,135 m, 41°02' S, 72°30' W; Parque Nacional de Puyehue, 40°39' S, 72°19' W; Maicolpu, 40°33' S, 73°46' W. Despite collecting efforts, the species has not been recorded from islands south of Chiloé (that is, the Guatacas and Chonos), thus indicating its probable absence there. However, only modest collections have been made in mainland Chile between Puerto Montt and Puerto Aisén, and the species may range more widely than is currently known.

**FOSSIL RECORD.** Caenolestids have an excellent fossil record that extends to the earliest Eocene (Casamayor) of Patagonia (Marshall, 1980). By the early Oligocene, three subfamilies were represented: the prototypical Caenolestinae and the more advanced Paleothentinae and Abderitinae. Living caenolestids are all allocated to the most primitive known tribe, the Caenolestini, that...
also contains the Desadan (Oligocene) genus Pseudechirodon and the Santacrucian (Miocene) form Stilotherium. The three living genera of this tribe are known only from Recent specimens (Marshall, 1980). The enigmatic relationships of caenolestids with other marsupials have been discussed and debated since the group's discovery, but recently by Marshall (1980), Pascual and Herrera (1975, 1979), and Reig (1955). Clemens and Marshall (1976) concluded that Caenolestidae bear no special relationship to Polydolopidae, that had been included within the Caenolestoidea, and allocated them to separate superfamilies.

**FORM AND FUNCTION.** Virtually nothing has been written on the form and function of Rhycholestes since Osgood's (1924) comments in the generic description. However, the family's peculiar combination of polyprotodont and diprotodont characters sparked a number of character analyses (for example, Broom, 1911; Osgood, 1921; Thomas, 1895), some of which are relevant to Rhycholestes. Caenolestines exhibit antorial vacuities, bounded by the nasal, frontal, and maxillary bones and opening into a sinus between the naso-orbital and maxillary bones (Marshall, 1980). These vacuities are not associated with superficial glands (Osgood, 1921). The functional significance of the "gill-like" lower incisors is unclear, although Kirsch (1977) suggested they may be used in raptorial-like fashion to dispatch vertebrate prey. Such trophic habits are not suggested by the few available studies of diet in Caenolestes (Barkley and Whittaker, 1984; Osgood, 1921), that indicate chiefly insectivorous food habits. Miller and Rottman (1977) proposed that Rhycholestes may use their highly procumbent incisors to probe small crevices in search of insects. A. K. Lee and P. Temple-Smith observed that Rhycholestes use the incisors to pull at tissue held in the mouth; food is ingested at the corners of the mouth where it is cut and crushed by the cheekteeth. The lip flaps of caenolestids (Fig. 3) also are of undocumented functional significance. They are purported to hold food (Gregory, 1925, convey food inward (Lönnberg, 1921), eject undesirable parts (Kirsch, 1977; Osgood, 1921), or prevent sensory vibrissae and fur from becoming clogged with blood (Kirsch and Waller, 1979).

Studies of the brains of caenolestids show extensive development of the olfactory bulbs and of the higher rhinencephalic centers, but only a "shallow cap" of neopallium on the cerebral hemispheres (Herrick, 1921; Obenchain, 1925). Like didelphids, but unlike phalangeroids (Marshall, 1980), the caenolestids Caenolestes and Lesteros lack a fasciculus albiens connecting pallial structures of the two cerebral hemispheres (Obenchain, 1925). Locomotion in the caenolestids is typically symmetrical, but at higher speeds may include bounding, with fore and hind legs used together (Kirsch and Waller, 1979). Neither Caenolestes nor Lesteros have been observed to use ricochetal progression. In all taxa, the tail is used as a balancing organ, and shows no signs of dorsal or ventral prehensility (cf. Lönnberg, 1921; Thomas, 1895). Relative to other caenolestids, Rhycholestes has a shorter tail with fewer caudal vertebrae, so that it may be less agile. Seasonally, Rhycholestes is known to store fat in its tail (Fig. 4), a trait that distinguishes it from other caenolestids but that it shares with other austral marsupials, including Leptodelphys, Dromiciops, and Marsupista of Australia, and several South American forms. Osgood's male specimen of Rhycholestes, captured 19 January 1923, had a tail 7 mm across at the base, whereas Sanborn's specimen, captured earlier in the summer (1 December 1939), was not incrassated with fat (Osgood, 1945). Caudal fat storage has been correlated with extended torpor in several small mammals inhabiting temperate regions (Morton, 1980).

**ONTOGENY AND REPRODUCTION.** On the basis of a single female specimen, Osgood (1924) claimed that Rhycholestes possesses five mammae, the fifth in a median position slightly anterior to the others; both Caenolestes and Lesteros have two pairs of mammae (Osgood, 1924; Collins, 1973). Osgood's observation has been echoed, but not confirmed, in subsequent studies. Basing observations on several lactating females, B. D. Patterson, P. L. Merson, and B. K. Lang determined that there were seven teats, the five described by Osgood plus an anterior pair. Despite Tomes' (1860) initial allusion to a pouch in juvenile Caenolestes, there is no trace of a marsupium in Rhycholestes or in other caenolestids (Kirsch and Waller, 1979; Osgood, 1921). Capture of a female caenolestid with young attached to the teats has never been reported; thus, they may utilize a nest, at least during the reproductive season. Maternity nests of these or other American marsupials currently are unknown. Based upon a consistently complete pattern of teat development in lactating females, Kirsch and Waller (1979:394) concluded that litter size in Caenolestes may be "as great or greater than the capacity of the mother to suckle."

Mesorve et al. (1982) reported that "reproductively active" female Rhycholestes were captured only in summer at La Picada, Osorno Province; none of three females trapped the following May showed perforate vaginas or signs of pregnancy or lactation. Conversely, males were reported to be reproductively active throughout the year. However, reproductive activity in males was assessed by position of the testes, as in rodent; scrotal anatomy in these marsupials apparently precludes an abdominal condition. Most species of small mammals in south temperate rainforest habitats exhibit seasonal patterns of reproductive activity, being generally limited to October–May, and greatest in November–December (Mesorve et al., 1982; Pearson, 1983).

The reproductive anatomy of male Caenolestes is noteworthy in the extraordinary size of the prostate and Cowper's glands, the deeply cleft glans penis, and the apparent absence of the levator penis muscle (Osgood, 1921; cf. Fig. 4). Spermatozoa of Caenolestes represent one of three types found in American marsupials, being "very rectilinear in shape with a niche on one side from which the mid-piece arises" (Biggers and De Lormer, 1965:403). Like other American forms, but unlike Australasian taxa, spermatozoa of Caenolestes pair in the epididymis. Rhycholestes is presumably similar in these regards.

**ECOLOGY.** Rhycholestes appears to be restricted to temperate rain forest habitats. Osgood (1924:172) noted that "The [type] locality was in heavy temperate forests near the mouth of the
Rio Inio at the extreme southern end of Chiloé Island. Here it was only after much trapping that the first specimen, the female, was taken.” In his field notes for 14 January 1923, he wrote “Set more traps last night in Caenolestes territory but had a poor catch. The one specimen was caught in a dry runway under a log at edge of bamboo thicket.” The following day he observed, “Mouse traps in the woods which I baited with bacon and meat failed to get more Caenolestes, but caught a couple of the short-tailed shrew-mice ... [Geoxus validissimus] showing their preference for that kind of bait” (Patterson, 1983:11). Ogill (late 1943/53) recorded Rhyncholestes from 900 m elevation near Refugio de La Picada, “under deep growth in a cool and very moist location.” Pine et al. (1979:345) reported a specimen taken near the type locality (at 15 km SW Quellón near mouth of Rio Tallec, <30 m) that was “trapped on top of a log in a dense and humid Valdivian forest adjacent to a recently logged area.”

Meserve et al. (1982) reported capturing 11 Rhyncholestes at La Picada in forests dominated by coihue (Nothofagus dombeyi). These forests included other emergents such as Eucryphia cordifolia, Calendula paniculata, and Laurelia philippiana, and understory trees, such as Lomatia ferruginea, Drimys winteri, Weinmannia trichosperma, and Amomyrtus lunu; however, bamboo (Chusquea cf. montana) is a minor floristic component. Shrubby and herbaceous plants in this habitat include Gaultheria phillyreifolia, Gunnera sp., Amomyrtus meli, Berberis pearsii, Griselinia racemosa, and Plantago sp. (Meserve et al., 1982:315). This vegetation is classified as the “Coihue-Ulmo” subassociation of the Andean Valdivian forest, distributed between 100 and 850 m elevation. Even within this habitat, all individual Rhyncholestes were “live-trapped near burrow entrances at the base of trees or under fallen logs in dense forest” (Meserve et al., 1982:316). In more extensive work at La Picada, involving an elevational transect of habitats from the foot of the forest to tree-line (425 to 1,135 m), B. D. Patterson, P. L. Meserve, and B. K. Lang captured Rhyncholestes in habitats throughout the sampled ecological range that included portions of “Valdivian,” “North Patagonian,” and “Subantarctic” rain forest associations (Patterson, 1985; terminology of Heusser, 1974). Specimens were taken most frequently on the ground, alongside logs, and in dense cover; fewer were taken in drier microhabitats.

On Isla Chiloé, Ogill (1943) and colleagues took Rhyncholestes in association with the mammals Histiotus montanus, Oryzomys longicaudatus, Geoxus validissimus, Akodon olivaceus, A. sanborni, Auliscus microps, and Irenomys tarsalis (Ogill, 1943). During extensive trapping in Valle de La Picada, Rhyncholestes was recorded with these same terrestrial species plus Dromiciops australis and Akodon longipiliis (Patterson, 1985). Literature records additionally document the presence of the histrionicogn Rodent Acoenaemus fuscus in nearby habitats (Pearson, 1984).

Conventionally, Rhyncholestes is considered to be scarce because it is so poorly represented in collections (for example, Miller et al., 1983; Tamayo and Frassinetti, 1980). Miller and Rottmann (1977:10) proclaimed it to be “el mamífero más raro de Chile.” Yet available data are not unanimous on this point. Meserve et al. (1982:316) suggested that its “apparent rarity might be an artifact of a highly localized distribution (most examples are from near La Picada) and specialized habitat requirements ...” However, the species is now known to occupy a large range of microhabitats. Recent trapping records also suggest that there is temporal variation in the abundance of shrew-opossums. Sunbored but a single Rhyncholestes near the Refugio de La Picada in 1939 (Ogill, 1943), despite attempts to obtain additional specimens, and no subsequent collections were reported from this area until Gallardo’s (1978) rediscovery of the species. However, in late summer, February–March 1984, Rhyncholestes was more abundant in Valle de La Picada than three sympatric species of sigmodontine rodents (that is, Irenomys tarsalis, Geoxus validissimus, and Auliscus microps; Patterson, 1985).

Unpublished analyses of stomach contents suggest that, although insectivorous, Rhyncholestes also consumes significant amounts of plant material (including fungi) and seeds and noninsect animal material, especially earthworms, Lumbricidae.

**BEHAVIOR.** Meserve et al. (1982) interpreted low recapture frequencies as evidence that Rhyncholestes may become “trap-shy” after initial capture. Eleven of their 12 captures of this species occurred over-night, suggesting it is principally nocturnal. In four successive nights at El Venado, Chiloé, M. H. Gallardo captured an
adult male, adult female, and two juveniles in a single trap set under the seaweed. The trap was not baited between captures. At Puerto Carmés, Chiloé, he collected three animals in the same Sherman trap during successive nights. Whether these capture records signify family groups (with possible ecological or social significance) or instead are merely coincidental remains conjectural.

GENETICS. The standard karyotype of *Rhyncholestes* was reported (Gallardo and Patterson, in press) as a diploid number of 14, apparently primitive for the Marsupialia (Hayman et al., 1971; Reig et al., 1977). Arterial length ratios (long arm/short arm) for the chromosome complement of *Rhyncholestes* were included with the original report, and vary from 1.39 to 1.53 for the six pairs of biarmed autosomes; the sex chromosomes are acrocentric. Like those of other caenolestids, the chromosomes of *Rhyncholestes* exhibit acrocentric regions (Gallardo and Patterson, in press; Hayman et al., 1971; Hayman and Martin, 1974).

REMARKS. The family-group name Caenolestidae is based upon the Greek roots *kaenos*, “new,” *rems*, and *lester*, “a robber, pirate,” the latter having long been connected to ancient, predaceous fossil marsupials. *Caenolestes* Thomas, 1895 replaced the more descriptive *Hyracodon* Tomes, 1863, which is a junior homonym meaning “shrew-tooth” (Thomas, 1895). The prefix of the generic name of the Chilean *shrew-opossum* is based on the Greek root *rhynchos*, “snout.” The specific epithet is derived from the Greek root, “raphanos,” meaning “cabbage, radish,” an apparent reference to the incrassated tail. The Spanish vernacular name *comadrejita trompuda* is derived from the diminutive of *comadreja*, meaning weasel, and *trompa*, meaning snout.

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LITERATURE CITED


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