CHACO NAKED-TAILED ARMADILLO

Cabasssous chacoensis Wetzel, 1980

FIGURE 1 - Adult, Central Chaco, Departamento Boquerón (Thomas & Sabine Vinke).

TAXONOMY: Class Mammalia; Subclass Theria; Infraclass Eutheria; Order Cingulata; Family Dasypodidae; Subfamily Tolypeutinae; Tribe Priodontini (Myers et al 2006). The genus *Cabassous* was defined by McMurtie in 1831 and contains four species, three of which are present in Paraguay. The genus was reviewed by Wetzel (1980). This species is monotypic (González 2001). The species name *chacoensis* refers to the Gran Chaco the eco-region to which this species is confined. Formerly placed in the Euphractinae, Möller-Krull et al (2007) provided DNA evidence that demonstrated their position within the Tolypeutinae. Synonyms adapted from Gardner (2007):
Xenurus gymnurus Lahille 1899:204 Not *Tatus gymnurus* Olfers (1818).
Cabassous loricatus Yepes 1935:441 In part. Not *Cabassous loricatus* (JA Wagner 1855)
Cabassous loricatus Cabrera 1959:219. In part. Not *Cabassous loricatus* (JA Wagner 1855)

Cabassous loricatus Moeller 1968:420. In part. Not *Cabassous loricatus* (JA Wagner 1855)
Cabassous chacoensis Wetzel 1980:335 Type locality "5-7km W of Est. Juan de Zalazar, Departamento Presidente Hayes, Paraguay"

ENGLISH COMMON NAMES: Chaco Naked-tailed Armadillo, Chacoan Naked-tailed Armadillo (Redford & Eisenberg 1992, Wilson & Cole 2000, Canevari & Vaccaro 2007, Gardner 2007), Chacoan Naked-tail Armadillo (Merritt 2008).

SPANISH COMMON NAMES: Cabasú chico (Canevari & Vaccaro 2007), Tatu de rabo molle (González 2001, Canevari & Vaccaro 2007), Cabasú chaqueño (Nellar et al 2008), Quirquincho blanco (Nellar et al 2008), Pichiciego grande (Nellar et al 2008), Tatú-piche (Nellar et al 2008).

GUARANÍ COMMON NAMES: Tatu ai menore (sic) (Redford & Eisenberg 1992).

DESCRIPTION: *Cabassous* armadillos have a short, broad snout and small eyes. The cephalic shield has an average of 38.7 scutes (range 34-42). Dorsal plates are arranged in transverse rows along the body and there are 12 movable bands. The third movable band has a mean of 28.3 scutes (range 27-30) and the fourth a mean of 26.7 scutes (range 25-29). There are very few, isolated scales on the cheek. Scutes of the movable bands are poorly differentiated from the rest of the dorsal scutes and are of a similar size and shape. The scapular and pelvic shields extend almost to the base of the limbs. First and second complete rows of scutes on the scapular shield wider than they are long. The first complete band of the scapular shield has a mean of 17.3 scutes (range 16-19) and the last a mean of 25.3 scutes (range 23-27). The first complete band of the pelvic shield has a mean of 25 scutes (range 24-26) and the last a mean of 6 scutes (range 5-7). Colour ranges from brown to dark brown, somewhat yellower laterally. There are no hairs present on the dorsal surface, though the lateral hairs may be fairly long. Ventrally greyish almost naked and only sparsely haired. The tail is fairly long and slender and lacks scales. This species is best identified by its short ears, well-separated from each other but not extending beyond the first complete band of the scapular shield when laid backwards. The pinna has a characteristically fleshy anterior edge. Both feet have five pale claws, those of the forefeet being particularly long, especially the central (third) one which is greatly elongated and sickle-shaped. (Wetzel 1980).

SKELETAL CHARACTERISTICS: Rostrum short but skull proportionately broader than that of *C.tatouay*. Mandible narrow and distinctly curved on the dorso-ventral and medio-alteral axes. Condyloid process of mandible only slightly higher than coronoid process. Tympanic rings present rather than bullae. *Ratio of palatal length to maxillary tooth row* 1.62. *Ratio of rostral length to postrostral length* 0.8. *Condylonasal length* 69.8mm (+/-1.3); *Rostral length* 30.7mm (+/-0.8); *Palatal length* 41mm (+/-1.2); *Postrostral length* 38.9mm (+/-0.9); *Palatal width* 10.3mm (+/-0-9); *Anterior rostral width* 11.1mm (+/-0.9); *Interlacrimal width* 29.1mm (+/-1); *Interorbital width* 21.1mm (+/-0.9); *Zygomatic width* 40.1mm (+/-2.4); *Mastoidal width* 33.3mm (+/-1.6); *Cranial height* 29.9mm (+/-1.6). (Wetzel 1980).

Vizcaino et al (1999) give the following ulnar dimensions (n=1): Ulnar Length 48.6mm; Olecranon Length 27.1mm. The trend towards fossoriality is correlated with relative development of the olecranon process, and the ratio of the ulnar length to olecranon length is the Index of Fossorial Ability. An IFE above 0.70 is considered indicative of a highly fossorial species and one below 0.55 of a cursorial species. This species has an IFE of 1.26.

DENTAL CHARACTERISTICS: Teeth are peg-like. Dental formula 8/8=32. There are no teeth present in the premaxillary bone. Mandibular (lower) tooth row distinctly curved. Uniquely in this genus the anterior and posterior teeth are wider than they are long (they are constricted anteroposteriorly). *Upper Tooth Row Length* 25.2mm (+/-0.5); *Lower Tooth Row Length* 23.7mm (+/-0.7). *Dimensions of Maxillary (Upper) Teeth (Length x Width): 4th*=2.6 (+/-0.2) x 3.4 (+/-0.12), *5th*=2.7 (+/-0.16) x 3.6 (+/-0.2), *6th*=2.5 (+/-0.28) x 3.6 (+/-0.38), *7th*=2.4 (+/-0.28) x 3.2 (+/-0.16); *Dimensions of Mandibular (Lower) Teeth (Length x Width): 5th*=2.6 (+/-0.38) x 3.2 (+/-0.15), *6th*=2.6 (+/-0.16) x 3.3 (+/-0.26), *7th*=2.4 (+/-0.19) x 3 (+/-0.33). (Wetzel 1980).

GENETIC CHARACTERISTICS: No information.

TRACKS AND SIGNS: This species walks supported by the claws of the forefeet while the entire sole of the hindfoot comes into contact with the substrate.

EXTERNAL MEASUREMENTS: The smaller of the "naked-tailed armadillos" in Paraguay and indeed the smallest member of the genus. The following measurements were given by Wetzel (1980) taken from two specimens: **HB:** 30.3cm (30-30.6cm); **TA:** 9.3cm (9-9.6cm); **FT:** 6.1cm; **EA:** 1.45cm (1.4-1.5cm).

SIMILAR SPECIES: *Cabassous* armadillos are essentially smaller versions of *Priodontes maximus*, but size alone immediately rules out confusion with that species - no other armadillo even approaches *Priodontes* in size. They can be further identified by the lack of armoured plates on the tail (the tail is "naked") and the greatly enlarged claw on the forefeet. Highly-fossorial in behaviour these armadillos dig to escape danger - they do not try to run away. As a result of these distinctive features in Paraguay this species is only likely to be confused with the cogeneric *Cabassous tatouay* and *unicinctus*. They are both larger species (*tatouay* is approximately 50% larger than this species) with much longer ears that lack a fleshy expansion on the anterior margins. The long funnel-shaped ears of *C.tatouay* extend well above the top of the head (reaching beyond the first complete row of scapular scutes when laid backwards) and are quite different in length and form to the extremely short ears of this species. This species confined to the Chaco and *C.tatouay* and *unicinctus* have only recorded in eastern Paraguay. Note that this species has consistently smaller scale counts and cranial measurements than both for all standard measurements used in the description. Cranially the curved mandible and anteroposteriorly constricted maxillary teeth are diagnostic of this species.

DISTRIBUTION: A restricted range species and Chaco endemic confined to western Paraguay and a small area of adjacent northern Argentina. In Argentina the species has been confirmed in Provincias Santiago del Estero, Formosa, Santa Fé, La Rioja, San Luis and Tucumán, with unconfirmed reports from Provincias Chaco, Cordoba and Salta (Morando & Polop 1997, Nellar et al 2008, Monguillot & Miatello 2009).

The species may occur in southwestern Bolivia and Matto Grosso do Sul, but its presence has not been confirmed in either of these countries. A specimen MACN4388 from Buenos Aires Zoo with supposed provenance "Brasil, Matto Grosso" was listed by Yepes (1935) as *Cabassous loricatus* but is actually this species and is the only evidence of its occurrence in that country. However Gardner (2007) suspected that the record was in error.

Abba & Vizcaíno (2008) list 3 specimens from Paraguay in the Museo de La Plata without precise locality data (MLP843 carapace, 1915; MLP16.IX.35.86 carapace, approx 1900; MLP16.IX.35.85 skull, approx 1900).

Three Paraguayan specimens were examined by Wetzel (1980) MZ1600 with no locality data other than "Paraguay Chaco", USNM 531004 from Filadelfia, Departamento Boquerón and the type specimen CONN 16892 from 5-7km W of Estancia Juan de Zalazar, Departamento Presidente Hayes. The range of the species in Paraguay may be greater than is currently known, this being a secretive, largely subterranean species that is naturally rare and infrequently encountered owing to the isolated and inhospitable nature of its habitat. A crudely stuffed specimen is on display in the Museo Jakob Unger, Filadelfia, Departamento Boquerón which lacks locality data but was presumably collected in the area (see FPMAM915PH above).

HABITAT: Endemic to xeric habitats of the Dry Chaco. The type specimen was taken in an area of thorn forest and mixed grasses. Merritt (2008) notes that the habitat in the central Paraguayan Chaco is open thorn forest or thorn scrub with porous, nonclay soil. He reports just two observations in 20 years of periodic fieldwork in the area around Fortín Toledo, Departamento Boquerón. Given the subterranean nature of this species behaviour it requires soft sandy soils for burrowing and coupled with the presumably specialised diet, it is very locally distributed. The species is most commonly observed prior to thunderstorms when they emerge from their burrows (T & S Vinke in litt.)

Nellar et al (2008) reported that specimens from Provincia San Luis, Argentina were taken in large fields vegetated with chaco forest of quebracho-blanco *Aspidosperma quebracho-blanco* and algarrobo *Prosopis*

flexuosa that was "more or less" intact. The species was most frequently observed in open areas, though this may be related to the difficulties of seeing the animal in denser vegetation.

ALIMENTATION: No specific information is available on feeding behaviour of this species but it may be supposed to be myrmecophagous as are other members of the genus, using the long claws of the forefeet to break into ant nests and termite mounds. An individual photographed by Monguillot & Miatello (2009) was covered in ants, suggesting that it had just been feeding in an anthill.

Nellar et al (2008) fed a captive individual on meat and "vegetable remains" from their food, but it died suddenly after 40 days of captivity. They noted the animals "remarkable ability to detect water".

REPRODUCTIVE BIOLOGY: A single young is born (Adamoli et al 2001, Canevari & Vaccaro 2007).

GENERAL BEHAVIOUR: Almost nothing is known of the behaviour of this species other than the fact that it is highly fossorial and rarely observed. Monguillot & Miatello (2009) saw a specimen walking during the day (10-12h) in PN Tamalpaya, Provincia La Rioja, Argentina, while a captive specimen in Argentina was primarily diurnal in its habits (Nellar et al 2008).

Physiology Cetica et al (2005) described the morphology of the female reproductive tract and found it to have ovoid, elongate ovaries with longitudinally polarised cortex and medulla, and several oocytes in each follicle. The uterus is pyramid-shaped and bicornuate, and the uterine cervix is long as in all armadillos. A urogenital sinus is present instead of a true vagina. The authors recognised three morphological groups amongst the Dasypodids studied, with *Cabassous* armadillos forming a group with *Chaetophractus, Chlamyphorus* and *Zaedyus*.

Adamoli et al (2001) described the morphology of the placenta, it being pear-shaped, filling three-quarters of the uterine surface and homogeneously villosus across the maternal face but smooth on the fetal face where the umbilical cords inserted. No trace of a yolk sac was present. Histological analysis revealed it to be a hemochorial type placenta.

VOCALISATIONS: Handled males may give a pig-like grunting noise, but females are generally silent (Canevari & Vaccaro 2007), though Nellar et al (2008) reported similar noises from a female specimen that they kept in captivity.

HUMAN IMPACT: This rarely recorded species probably passes undetected over most of its range, an area with a low human population. In the Argentine Chaco it made up <1% of the diet of local people and was consumed a mean of 0.2 days per year (+/-0.01) (Altrichter 2006).

CONSERVATION STATUS: The Chaco Naked-tailed Armadillo is considered Near Threatened by the IUCN (Abba & Superina 2010), see http://www.iucnredlist.org/details/3413 for their latest assessment of the species. The species is not listed by CITES. The population may have declined by as much as 25% over the last 10 years as a result of increased human activity in the species range and is on the verge of being considered vulnerable (Abba & Superina 2010). The last conservation assessment of the species in Paraguay considered it Least Concern (Morales 2007), but Smith (in press) recommends that the species be considered vulnerable at the national level under IUCN criteria B2ab(iii) C2a(i).

In Paraguay the area of occupancy documented by specimens is relatively small and the species may be assumed to be localised. The loose sandy soils that this species requires are also the most highly prized for agriculture in the Chaco (especially for peanuts, sorghum and sesame), though it is able to persist even in grazed areas if the correct soil type is available and even persists within the city of Filadelfia where sandy soils remain in their natural state. However the elimination of ant and termite populations in areas of anthropomorphic activity also directly affects the species. An alarming acceleration in the change in land use in the Chaco since 2010 has undoubtedly had a deleterious effect on this species. (T & S Vinke in litt.).

Adults may be mistaken for abandoned juvenile *Priodontes maximus* and may be taken into captivity in a misguided attempt to "raise them". They are then force fed milk and eventually die from the incorrect diet. (T & S Vinke in litt.).

The species is easily captured and likely hunted opportunistically by human populations, though its small size and subterranean behaviour means that it is not a species that is deliberately sought. The species undoubtedly suffers predation from domestic dogs. (Abba & Superina 2010).

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FIGURE 2 - Adult head detail, Central Chaco, Departamento Boquerón (Thomas & Sabine Vinke).

FIGURE 3 - (FPMAM82PH) **Chaco Naked-tailed Armadillo** *Cabassous chacoensis.* Juvenile lateral view. Fortín Toledo, Departamento Boquerón, August 2004. Photo Hugo del Castillo.

FIGURE 4 - (FPMAM81PH) **Chaco Naked-tailed Armadillo** *Cabassous chacoensis.* Juvenile dorsal view. Fortín Toledo, Departamento Boquerón, August 2004. Photo Hugo del Castillo.