

FIELD NOTE

Structural abnormalities in Paraguayan southern three-banded armadillos *Tolypeutes matacus* (Chlamyphoridae)

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Abstract Two structural abnormalities are reported in southern three-banded armadillos *Tolypeutes matacus* (Chlamyphoridae) from Paraguay. Additional reports of individuals with amputated legs are noted, and a potential explanation for the frequency of such occurrences associated with predation and their defensive behavior is hypothesized. This is the first documented report of a band anomaly for adults of this species.

Keywords: band anomaly, defensive behavior, Dry Chaco, missing limb

Anomalías estructurales en tatú bolita *Tolypeutes matacus* (Chlamyphoridae) de Paraguay

Resumen Se reportan dos anomalías estructurales en el tatú bolita *Tolypeutes matacus* (Chlamyphoridae) de Paraguay. Se reportan casos adicionales de individuos con extremidades amputadas y se plantea la hipótesis de una posible explicación para la frecuencia de tales sucesos asociados con la depredación y su comportamiento defensivo. También se documenta el primer reporte de una anomalía de bandas en adultos de esta especie.

Palabras clave: anomalía de banda, Chaco Seco, comportamiento defensivo, extremidad faltante

The southern three-banded armadillo *Tolypeutes matacus* (Desmarest, 1804) is distributed in the western Cerrado of Brazil, the Chaco of Bolivia and Paraguay, and in the Chaco and Monte of northern and central Argentina (Abba & Superina, 2010; Feijó *et al.*, 2015; Ferreiro *et al.*, 2022). In Paraguay it is confined to xeric forests and adjacent open areas west of the Paraguay River (Smith, 2012; Smith & Ríos, 2018). An opportunistic insectivore and omnivore, it forages by digging shallow, characteristically triangular holes with the large foreclaws and inserting the head in search of prey. Although the species is able to dig tunnels, it rarely does so in the Dry Chaco of Paraguay where the hard soils make it difficult, and ample protection can be found by seeking refuge in dense spiny tangles (Smith, 2007). The species is considered to be globally Near Threatened (Noss *et al.*, 2014) and nationally of

Least Concern (Abba *et al.*, 2017) but Smith (2012) had earlier expressed reasons to be concerned about Paraguayan populations of the species. This Field Note reports on some noteworthy abnormalities observed in this species.

BAND ANOMALY

On 15 March 2024 at Fortín Toledo, Boquerón department (22°19'60"S, 60°21'00"W), an individual was photographed (**FIG. 1**) showing a band anomaly resulting in bilateral asymmetry. Whilst the normal three movable bands were present on the right side of the body, the third band disappeared on the left side of the animal just past the vertebral midline, where the widened second band replaced it. This anomaly did not apparently cause any motility complications and the animal was adult, apparently

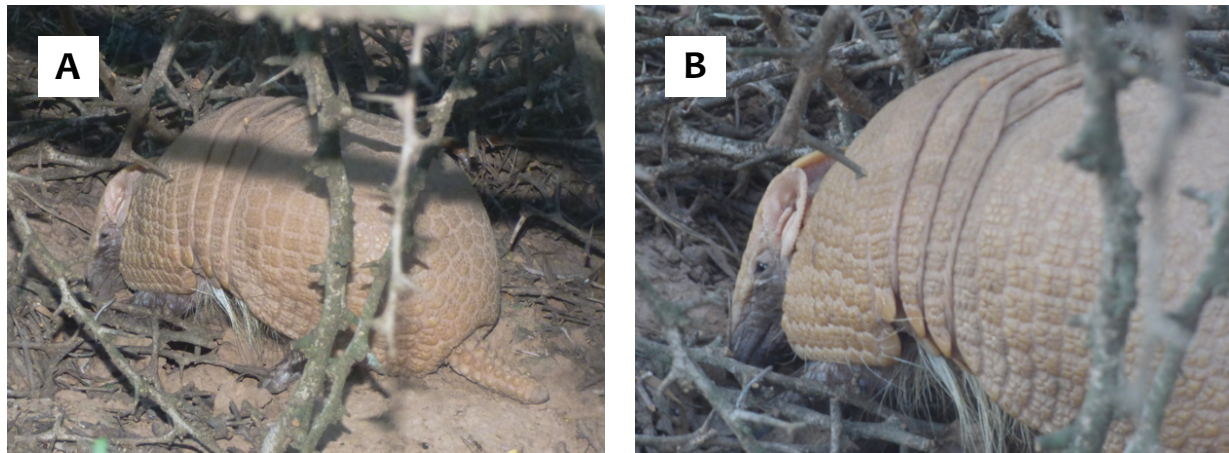


FIGURE 1. **A.** *Tolypeutes matacus* showing bilaterally asymmetric band anomaly, Fortín Toledo, Boquerón department, Paraguay, 15 March 2024; **B.** Close-up of band anomaly on same individual.

in good health, and able to move without difficulty. The individual was taking refuge in dense spiny vegetation during the early morning so that it was not possible to catch it for a closer examination.

Langmann (1929) described some records of carapace anomalies in South American Dasypodidae and Chlamyphoridae armadillos, and there are a few reports of band anomalies from the polyembryonic nine-banded armadillo *Dasypus novemcinctus* (Dasypodidae) in North America (Newman, 1915; Loughry *et al.*, 2002). For *T. matacus*, Langmann (1929) described a similar band anomaly to the one described here in a single embryo of this species, but the present record is the first from an adult animal. The cause of this mutation in *Tolypeutes*, which bears one, or rarely two offspring (Meritt, 1971; Adamoli *et al.*, 2001), cannot be determined with certainty, but seems likely to be either due to genetic mutation or epigenetic influences during development. However, it is worthy of note that in the polyembryonic species *D. novemcinctus*, where offspring are genetically identical, not all members of a litter show the phenotypic abnormality despite being genetic clones of each other (Loughry *et al.*, 2002).

MISSING LIMBS

There is one previous published report of a *T. matacus* lacking one of its limbs, from Parque Nacional Teniente Enciso, Boquerón department, Paraguay, on 12 February 2015 (Smith, 2015). However, since then the author has encountered five individuals at different localities across the Paraguayan Dry Chaco with fully healed missing limbs (FIG. 2), suggesting that this is not an uncommon condition. Though it is commonly known that the species rolls into a tight ball in order to protect itself

from predators, at least in the Paraguayan Chaco this is relatively infrequently the case and is usually only in response to extreme molestation. A far more common response from molested individuals, especially those turned on their sides or held manually, is for them to half close the carapace (as seen in FIG. 2). The animal will grunt quietly and defecate and urinate profusely as a preliminary defense, but if any attempt is made to touch the soft underbelly of the animal then it rapidly and forcefully closes the shell shut in the manner of a bear trap. The sharpened and thickened edges of the scapular and pelvic shields are thus capable of inflicting considerable damage to any flesh that it is able to trap in this manner, with the two edges coming together like the shearing blades of a pair of scissors. This is probably a far more common and effective first line of defense for dissuading potential predators by inflicting injury on their attackers, while the complete rolling into a ball (from which the animal must eventually emerge and thus become vulnerable again) may be employed only in most extreme circumstances. The loss of limbs by some armadillos can thus be explained by predation attempts in which the predator is able to gain a hold of a leg, and this may be sheared off either by the defensive action of the armadillo rapidly closing its shell, or following a struggle in which the predator is able to remove it. Previous published reports of other species of armadillos with missing limbs are rare and are again known only from the nine-banded armadillo (Loughry & McDonough, 2013).

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FIGURE 2. Male *Tolypeutes matacus* lacking its right hind leg, Fortín Toledo, Boquerón department, Paraguay, 19 March 2024.

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