

Absence of Rattle in the Mexican Dusky Rattlesnake (*Crotalus triseriatus*; Squamata: Viperidae)

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Rattlesnakes of the genera *Crotalus* and *Sistrurus* are characterized by a keratinized and segmented caudal appendage, commonly known as rattle, which arises from the distal portion of the tail and represents one of the most distinctive structures among new world viperids (Klauber 1972, Campbell and Lamar 2004, Meik and Schuett 2016). This structure is part of a specialized anatomical and behavioral system that includes the external rattle segments, the bony style, subepidermal connective tissues, specialized musculature, and the caudal vibration behavior associated with defensive contexts (Greene, 1988, Meik and Schuett 2016). During ontogeny, rattle segments are progressively added in association with ecdysis cycles; therefore, the number and integrity of segments may vary among individuals and throughout the life of a single specimen (Klauber 1972, Meik and Schuett 2016).

Although the rattle plays an important role as a warning signal against predators or potential threats, this structure may be partially or completely lost due to wear, failed predation attempts, or damage to the distal portion of the tail (Greene 1988, Rowe et al. 2002, Schuett et al. 2012). Rattle loss has been documented in some rattlesnake species and may have behavioral and ecological, particularly because the absence modify the expression of defensive behaviors typically associated with the group (Rowe et al. 2002, Meik and Schuett 2016).

Crotalus triseriatus is a species endemic to Mexico, distributed mainly in the highlands of the Trans-Mexican Volcanic Belt, where it inhabits Pinus-Abies forests, grasslands associated with these forests, and anthropized environments, generally at high elevations (Campbell and Lamar 2004, Mociño-Deloya et al. 2014). Here, we document the absence of a rattle in a wild individual of *Crotalus triseriatus* and provide photographic evidence of a caudal alteration that has been rarely reported for this species.

On 17 March 2021, at approximately 11:00 h, an adult individual of *Crotalus triseriatus* (Fig. 1) was observed in El Cerrillo Piedras Blancas, municipality of Toluca, Estado de México, Mexico (19°24'45.72"N, 99°41'39.12"W; WGS84). The individual was found



Fig. 1. Dorsal view of *Crotalus triseriatus* without rattle *ex situ*. Photograph by AGB.

active on black plastic sheeting over dry, cracked soil in an open disturbed environment associated with grassland and patches of agricultural land. During visual inspection of the specimen, the rattle was observed to be completely absent from the distal portion of the tail (Fig. 1).

The terminal caudal region lacked visible keratinized segments and any external structure corresponding to a functional rattle; additionally, the distal portion of the tail showed a scarred appearance (Figs. 2 and 3). No residual segments or clearly distinguishable remains of the caudal appendage were observed. The specimen was handled only with a snake hook for observation and photographic documentation, avoiding direct contact. The individual did not display defensive behavior or sudden movements. Based on the worn appearance of the skin and scales, as well as its poor condition, the snake appeared to be a very old individual and was likely near death. Although the exact cause of the rattlesnake's loss cannot be determined, habitat alteration may represent a relevant contextual factor, as human-modified environments can increase exposure to abrasive surfaces, debris, machinery, human persecution, or other sources of mechanical damage that can affect the distal portion of the tail.

The absence of the rattle observed in this individual of *Crotalus triseriatus* probably represents an acquired alteration of the distal portion of the tail; however, its origin cannot be determined with certainty based solely

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Fig. 2. Close-up of the caudal area of *Crotalus triseriatus*, Photo by AGB.

on the available photographic evidence. The rattle may have been completely lost due to wear, failed predation attempts, or injuries affecting the distal portion of the tail (Rowe et al. 2002, Schuett et al. 2012, Meik and Schuett 2016).

Although rattle loss has been documented in other species of *Crotalus* and *Sistrurus* (Rowe et al. 2002, Schuett et al. 2012), isolated observations in Mexican species remain important for expanding knowledge of external morphological variation and caudal alterations in wild populations.

In conclusion, this record provides photographic evidence of a wild individual of *Crotalus triseriatus* with complete absence of the rattle. Considering that *C. triseriatus* is a Mexican endemic species mainly associated with high-elevation environments of the Trans-Mexican Volcanic Belt, the documentation of this type of condition contributes to basic knowledge of its natural history and morphological variation (Campbell and Lamar 2004). Continued documentation of similar observations in natural populations is recommended, including detailed information on locality, elevation, habitat type, body condition, and characteristics of the caudal region, in order to evaluate whether these alterations correspond to isolated events or recurrent conditions in the species.

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Fig. 3. Close-up of the tail with absence of rattle in *Crotalus triseriatus*. Photograph by AGB.