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Body bending behaviour: more widespread than previously thought? New reports from two snake species of Northwest Ecuador

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Snake defensive behaviour is, in general, poorly understood, although several authors have reviewed the wide range of antipredator strategies employed (Greene 1988, 1997; and Lillywhite and Henderson, 1993). Body-bending behaviour is described as "a cryptic defensive behaviour in arboreal snakes" (Marques, Rodrigues and Sazima, 2006). It is believed to represent an adaptive primary defence mechanism (Edmunds, 1974) where the snake exhibits crypsis by imitating branches or vines, hence escaping potential predators. Body-bending in snakes has been described in only five species, all from the New World, and consisting of four neotropical (*Pseustes poecilonotus* and *sulphureus, Philodryas viridissimus*, and *Spilotes pullatus*) and one North American species (*Pantherophis spiloides)* (Beebee, 1946; and Abuys, 1986; referenced in Marques, Rodrigues and Sazima, 2006; Marques, Rodrigues and Sazima, 2006; and Doherty-Bone, 2009).

Prior to the current report, body-bending had not been documented on the Pacific versant (Western slope) of the Andes, nor in terrestrial snakes. We report the first observed occurrence of this behaviour in two species – the terrestrial *Coniophanes fissidens* and the semi-arboreal *Chironius monticola.* This brings the total number of species observed to exhibit this behaviour to seven, and broadens the known range of ecological niches in which bending is exhibited.

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The terrestrial genus *Coniophanes* (Xendontinae) consists of 14 species (Flores-Villela and Smith, 2009), with two species occurring in Ecuador: *fissidens* and *dromiciformis* (Pontificia Universidad Católica del Ecuador, 2010). *C. fissidens* is widespread and relatively well-studied comparative to many other neotropical snake species. A number of behaviours, including the secondary defence mechanism tail autotomy, have been documented in this species (Mendelson III, 1992).

On the 04th August 2008 at 10:00am, an individual of *Coniophanes fissidens* (Günther, 1858) of length approximately 1m, was observed lying across a path exhibiting body bending behaviour (Figures 1 and 2) in the Santa Lucía Cloudforest Reserve (Bosque Protector Santa Lucía), Pichincha, Ecuador (00.13972°N; 076.77870°W), at approximately 2000m/asl. Santa Lucía is a 730 ha reserve, comprising 80% primary forest and located within the southern section of the developing Chocó-Andean conservation corridor, on the Western slope of the Ecuadorean Andes.

The semi-arboreal genus *Chironius* consists of 13 species of colubrid snake (Dixon, Wiest and Cei, 1993; referenced in Rojas-Runjaic and Infante Rivero, 2006) with eight described from Ecuador: *monticola, carinatus, exoletus, fuscus, grandisquamis, multiventris, scurrulus and flavopictus* (Pontificia Universidad Católica del Ecuador, 2010) and at least one undescribed species (Otrega-Andrade et al, 2010). The natural history of the genus is poorly described.

On the 21st August 2008 at 11:00am, an individual of *Chironius monticola* (Roze, 1952) of total length 148.2 cm was also observed lying across a path in primary forest in the Santa Lucía Reserve (00.12690°N; 076.6132°W), at approximately 1,600 – 1,700m/asl. The live specimen was exhibiting body-bending behaviour. The authors were unable to photograph the behaviour when it occurred, and the snake did not exhibit it again following capture.

Body-bending in neotropical snakes thus appears to be more widespread than previously thought. Given the paucity of basic natural history data for many species,

Figure 1. Lateral view of *Coniophanes fissidens* exhibiting cryptic body bending.

Figure 2. Longitudinal view of *Coniophanes fissidens* exhibiting cryptic body bending.

we anticipate that more information on different species could reveal further occurrences.

Marques, Rodrigues and Sazima (2006) suggest that the behaviour of body bending evolved independently in the Xendontinae and Colubrinae as an adaptation to arboreality. The observations reported here however suggest that the adaptive value of body-bending extends beyond arboreal living.

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