

A failed swallowing attempt upon a Crab-Eating Fox (*Cerdocyon thous* Hamilton-Smith, 1839) by the Argentine Boa Constrictor (*Boa constrictor occidentalis* [Philippi, 1873])

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The Argentine Boa Constrictor is the southernmost subspecies of the *Boa constrictor* complex, inhabiting the semiarid plains of the Great Chaco region from Paraguay to central Argentina, and presumably, Bolivia (Di Cola et al., 2008; Waller et al., 2010). The confirmed diet of this ambush predator comprises small to medium sized mammals and birds (Sironi et al., 2000; Laspiur et al., 2010).

During a recent field trip to Northern Argentina, we were able to record a failed intake attempt by *B. c. occidentalis* upon a *Cerdocyon thous* (Crab-Eating Fox; Carnivora, Canidae). The observation site is located in the Dry Chaco eco-region, near Palma Chueca, La Union, Rivadavia Department, Salta Province, Argentina (24.06639° S, 63.29889° W, datum: WGS84; 220 m elev.), and corresponds to a *Ruprechtia triflora* (Polygonaceae) and *Ceiba choratii* (Bombacaceae) dominated shrubland that runs over an elevated dry levee among interconnected temporary ponds and creeks, tributaries of the Bermejito River.

On the 10th of April, 2011, at ca. 12:00 h, we heard the distress howls of a fox coming from the near shrublands. After a short walk, an adult *B. c. occidentalis* (total length ca. 2.5 m) was found just in the process of constricting an adult *C. thous*. Upon arrival the fox was still alive but no longer howling. The boa remained wrapped around its prey for at least 20 minutes when it finally raised the head and the team decided to leave the area to avoid disturbing the swallowing process (Figure 1). Returning to the site at ca. 1500 h showed that the snake had

abandoned the dead fox that rested completely stretched on the forest floor (Figure 2). The fox exhibited the hair of the head and neck wet and smoothed up to the level of the clavicles, as an evidence of a failed swallowing attempt. The female snake was found at one-meter distance resting coiled among the multiple trunks of a *Ruprechtia triflora* shrub with its mouth partially opened as a sign of the intake attempt.

Sironi et al. (2000) confirmed seven different mammals as part of the diet of this subspecies. Although they found no traces of any carnivore in gastrointestinal contents studied, they mentioned the related fox species *Lycolapex gymnocercus* as a probable prey, based on interviews to local inhabitants. The finding here reported actually confirms that *B. c. occidentalis* is able to prey on medium-sized carnivores. At the other hand, this case presents the paradoxical situation in which the boa was strong enough to subdue its prey but exhibited a morphological constraint to swallow it.

Most species of snake show ontogenetic shift in its diet: the larger the snake, the larger the individual prey that can be manipulated and swallowed (Mushinsky, 1987). For gape-limited predators the ability to ingest larger preys is of high adaptive value, and likely to influence the encounter rate of potential prey items and therefore presumably foraging success and fitness (Forsman and Lindell, 1993). Sironi et al. (2000) identified as the single main ontogenetic shift in the diet of large *B. c. occidentalis* from central Argentina the inclusion of the Vizcacha (*Lagostomus maximus*, Rodentia, Chinchillidae), mainly by large vitellogenic females. This big sized rodent (5 kg of average weight; Redford and Eisenberg, 1992) aggregates in communal dens also occupied by boas during the local winter. Waller et al. (in prep.) found that boas from Northern Argentina undergoing secondary vitellogenesis exhibited massive heads compared to same sized non-reproductive specimens, a temporary functional change that may be related to the seasonal consumption of *L. maximus*. Accordingly, reproductive success and

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Figure 1. The ca. 2.5 m female *Boa constrictor occidentalis* described herein subduing by constriction a Crab-Eating Fox.



Figure 2. After a failed intake attempt the abandoned fox lays stretched on the forest floor while the female boa rests coiled at the base of a *Ruprechtia triflora* tree (red arrow).

population structure in some boa populations might be highly influenced by their ability to subdue and ingest this large prey.

Many models of optimal foraging predict that a greater range of prey types should be taken when the overall food abundance is lower (Arnold, 1993). Since Vizcacha populations exhibit natural up and down abundance cycles, *B. c. occidentalis* populations are also expected to rely on the opportunistic capture of other large preys in order to reach the necessary body condition threshold for reproduction. Because the size of available prey items does not behave as a continuous variable, ontogenetic shift in diet is not expected to be gradual, but a leap from one prey size category to another. Moreover, snakes rarely ingest prey of the size that would be limited by its own morphology (Mushinsky, 1987); hard-to-eat items are unprofitable because ingestion is likely to be unsuccessful or costly (Arnold, 1993). “Knowing” when prey exceeds the size limit that can be handled successfully is, therefore, of high survival value (Mushinsky, 1987). The finding documented here may reflect a “sizing” failure when attempting to change to an upper category of prey. Although the snake was not weighted, its length and excellent body condition correspond roughly to a specimen of ca. 9 kg (Waller, unpubl. data). On the other hand, a Crab-Eating

fox, as documented in this case, could weight ca. 6 kg (Redford and Eisenberg, 1992), somewhat heavier than an average Vizcacha, and a disproportionately large mouthful bite for this boa.

References

- Arnold, S.J. (1993): Foraging theory and prey size - predator size relations in snakes. In *Snakes: Ecology and Behavior*, p. 87-115. Seigel, R.A. and Collins, J.T., Ed., McGraw Hill, New York.
- Di Cola, V., Cardozo, G., Lanfri, M., Scavuzzo, C.M., Chiaraviglio, M. (2008): Modelling the distribution of the Boid snakes: *Epicrates cenchria alvarezii* and *Boa constrictor occidentalis* in the Gran Chaco (South America). *Amphibia-Reptilia* **29**: 299-310.
- Forsman, A., Lindell, L.E. (1993): The advantage of a big head: swallowing performance in adders, *Vipera berus*. *Functional Ecology* **7**: 183-189.
- Laspiur, A., Acosta, J.C., Márquez, J., Blanco, G. (2010): *Boa constrictor occidentalis* (Argentine Boa). *Diet. Herpetol. Rev.* **41**(3): 361-362.
- Mushinsky, H.R. (1987): Foraging Ecology. In: *Snakes Ecology and Evolutionary Biology*, p. 302-334. Seigel, R.A., Collins, J.T. and Novak, S.S., Ed., McGraw-Hill Publishing Co., New York.
- Redford, K.H., Eisenberg, J.F. (1992): *Mammals of the Neotropics. The Southern Cone*. The University of Chicago Press, 430 pp.

- Sironi, M., Chiaraviglio, M., Cervantes, R., Bertona, M., Río, M. (2000): Dietary habits of *Boa constrictor occidentalis*, in the Cordoba Province, Argentina. *Amphibia-Reptilia* **21**: 226-232.
- Waller, T., Micucci, P., Barros, M., Draque, J., Estavillo, C. (2010): Conservación de la boa Ampalagua (*Boa constrictor occidentalis*) en la República Argentina. A 20 años de su inclusión en el Apéndice I de la CITES. CITES No. S-298 Project Final Report. Fundación Biodiversidad – Argentina, Buenos Aires, 77 pp.