

SUBMITTED: February 28, 2005

AUTHORS: Carlo UTZERI, Università "La Sapienza", Dipartimento di Biologia Animale e dell'Uomo, Viale dell'Università 32, I-00185 Roma RM, Italy; Damiano ANTONELLI, Strada dei Benedettini 10, I-05100 Terni TR, Italy; Claudio ANGELINI Università "La Sapienza", Dipartimento di Biologia Animale e dell'Uomo, Viale dell'Università 32, I-00185 Roma RM, Italy.

Report of molluscivory in *Atractus carrioni* PARKER, 1930

Atractus carrioni PARKER, 1930 is a neotropical snake endemic to the Loja Valley, southern Andes of Ecuador (SAVAGE 1960). The genus *Atractus* comprises fossorial and semifossorial snakes which primarily prey upon earthworms, although arthropod larvae, adult insects, acari, plant matter and snake scales have also been found in their digestive tracts (DUELLMAN 1978; HOOGMOED 1980; CUNHA & NASCIMENTO 1983; PEREZ-SANTOS & MORENO 1990; MARTINS & OLIVEIRA 1999; CISNEROS-HEREDIA unpublished). Since our knowledge on the ecology of most species of the genus is very poor information on the diet of *A. carrioni* and the first report of molluscivory for the genus are provided here.

Two adult male *A. carrioni* (deposited at the Fundación Herpetológica G. Orcés, FHGO) were collected 5 km east of the city of Loja, Loja Province (ca. 79°09'W, 03°59'S, 2300 m a.s.l.) on 01 May 1993 by J.-M. TOUZET. Analysis of their digestive tracts revealed the presence of terrestrial slugs (Mollusca, Pulmonata). Specimen FHGO 652 (snout-vent length [SVL] = 315 mm, tail length [TaL] = 45 mm) contained four slugs in the stomach and one partially-digested in the intestine, and specimen FHGO 650 (SVL = 325 mm, TaL = 50 mm) had two slugs in the stomach. The mean length of all seven slugs was 7.8 mm (range 6.5-9.5 mm), mean width was 3.3 mm (2.5-4.5 mm).

The genus *Atractus* is part of a clade of small semifossorial xenodontine snakes that feed on soft-bodied invertebrates ("goose-eaters"). This clade is divided into a lumbricophagous subclade that includes *Atractus* along with *Adelphicos*, *Chapinophis*, *Chersodromus*, *Geophis*, *Ninia*, and

Omoadiphas; and a molluscivorous subclade of *Dipsas*, *Sibon*, and *Sibynomorphus* (CADLE & GREENE 1993; CAMPBELL & SMITH 1998; FERNANDES 1995; KÖHLER et al. 2001). Species of the molluscivorous subclade have particular morphological adaptations for eating snails and slugs (PETERS 1960). *Atractus carrioni* does not seem to have any adaptation for slug predation, and predation upon unshelled mollusks is interpreted as opportunistic, and probably occurs in other lumbricophagous species especially when slugs are an abundant resource like in the habitat of *A. carrioni*. This opportunistic pattern is also seen in molluscivorous species, e.g. a specimen of *Dipsas elegans* BOULENGER, 1896 (*oreas* complex) collected at the Cumbaya Valley (next to the city of Quito, 2350 m a.s.l.) in 28 April 2004 regurgitated an earthworm 60 mm long.

ACKNOWLEDGMENTS: I am grateful to Jean-Marc TOUZET (Fundación Herpetológica G. Orcés) for the opportunity to study his specimens of *Atractus* and to Carlos MONTUFAR (Universidad San Francisco de Quito) for donating the specimen of *Dipsas elegans*; to Daniel PROAÑO, Ma. Olga BORJA and Pablo RIERA (Universidad San Francisco de Quito) for laboratory assistance; to Jonathan CAMPBELL, Walter SCHARGE (The University of Texas at Arlington), and Gunther KÖHLER (Forschungsinstitut und Naturmuseum Senckenberg, Frankfurt a. M.) for sharing literature. My gratitude to Maria Elena HEREDIA and Laura HEREDIA for financial and moral support. Universidad San Francisco de Quito provided institutional support.

REFERENCES: CADLE, J. E. & GREENE, H. W. (1993): Phylogenetic patterns, biogeography and the ecological structure of Neotropical snake assemblages; pp. 281-293. In: RICKLEFS, R. E. & SCHLUTER, D.: Species diversity in ecological communities: historical and geographical perspectives. Univ. Chicago Press, Chicago. CAMPBELL, J. A. & SMITH, E. N. (1998): A new genus and species of Colubrid snake from the Sierra de las Minas of Guatemala.- Herpetologica, Johnson City; 54(2): 207-220. CUNHA, O. R. DA & NASCIMENTO, F. P. DO. (1983): Ofidios da Amazônia XX.- As espécies de *Atractus* WAGLER, 1828, na Amazônia Oriental e Maranhão. (Emilia, Colubridae).- Boletim do Museo Paraense Opilio Goeldi, Belem; (123): 1-38. DUELLMAN, W. E. (1978): The biology of an Equatorial herpetofauna in Amazonian Ecuador.- Miscellaneous Publication, University of Kansas, Museum of Natural History, Lawrence; (65): 1-352. FERNANDES, R. (1995): Phylogeny of the dipsadine snakes. Unpubl. PhD Diss, University of Texas at Arlington; pp. 115. HOOGMOED, M. S. (1980): Revision of the genus *Atractus* in Surinam, with the resurrection of two species (Colubridae: Reptilia). Notes on the Herpetofauna of Surinam VII.- Zoologische Verhandlungen, Leiden; (175): 1-47. KÖHLER, G. & WILSON, L. D. & MCCRANIE, J. R. (2001): A new genus and species of colubrid snake from the Sierra de Omoa of north-

western Honduras.- *Senckenbergiana biologica*, Frankfurt am Main; 81(1/2): 269-276. MARTINS, M. & OLIVEIRA, E. (1999): Natural history of snakes in forests of the Manaus Region, Central Amazonia, Brazil.- *Herpetological Natural History*, Phoenix; 6 (2):78-150. PEREZ-SANTOS, C. & MORENO, A. (1990): Anotaciones biométricas y alimenticias de la serpiente neotropical *Atractus badius* (BOIE, 1827) (Serpentes, Colubridae) de la Colección del Museo Nacional de Ciencias Naturales de Madrid.- *Revista Española de Herpetología*, Madrid; 4: 9-15. PETERS, J. A. (1960): The snakes of the subfamily Dipsadinae.- *Miscellaneous Publications, Museum of Zoology, Univ. of Michigan, Ann Arbor*; (114): 1-224. SAVAGE, J. (1960): A revision of the Ecuadorian snakes of the colubrid genus *Atractus*.- *Miscellaneous Publications, Museum of Zoology, Univ. of Michigan, Ann Arbor*; (112): 1-86.

KEY WORDS: Reptilia, Squamata, Serpentes, Colubridae, *Atractus carriani*, diet, molluscivory, Ecuador

SUBMITTED: February 02, 2005

AUTHOR: Diego F. CISNEROS-HEREDIA, College of Biological and Environmental Sciences, Universidad San Francisco de Quito, Ave. Interoceánica y calle Diego de Robles, Campus Cumbayá, Edif. Maxwell. Casilla postal 17-12-841 Quito, Ecuador <diegofrancisco_cisneros@yahoo.com>.

Maximum size of the Spectacled Salamander, *Salamandrina perspicillata* (SAVI, 1821)

Salamandrina FITZINGER, 1826 is a genus endemic to Italy, discontinuously distributed from the northern Apennines (westernmost portion of Genoa province) to the tip of Calabria. The great majority of records is from the Tyrrhenian side, less records are from the Adriatic one (ZUFFI 1999). Until now *Salamandrina* was considered a monotypic genus with the sole species *S. terdigitata* (LACÉPÈDE, 1788). However, recent genetic studies indicate that the genus *Salamandrina* requires a split in two species named *S. terdigitata* (LACÉPÈDE, 1788) and *S. perspicillata* (SAVI, 1821) as suggest by MATTOCCIA et al. (2005) and NASCETTI et al. (in press). *Salamandrina terdigitata* lives in the southern portion of peninsular Italy while *S. perspicillata* occurs in the Central-Northern Italian Peninsula. The approximate borderline of these two specific entities passes through the Caserta province in the Campania region (ROMANO & MATTOCCIA unpublished). Distinguishing sexes in living animals is very difficult because this genus does not show clear dimorphism in this respect. However, males tend to be of smaller size and have different biometrical body

ratios than females (e.g., head length/snout-vent length, tail length/snout-vent length) as reported by VANNI (1980), ZUFFI (1999) and ANTONELLI (1999). Total length (TL; i.e. from the tip of the snout to the end of the tail) of the Spectacled Salamander is usually 8-10 cm (VANNI 1980; ZUFFI 1999; ANGELINI et al. 2001). Until 2001 the maximum TL recorded in males and females were 9.6 cm (ANTONELLI 1999) and 11.6 cm, respectively (ZAGAGLIONI 1978; VANNI 1980). Later, ANGELINI et al. (2001) reported a maximum TL of 12.3 cm recorded in two females from different populations of *S. perspicillata* in the Lepini Mountains (Central Italy).

In the beginning of April 2005 we counted 254 egg-laying females in one single breeding site. The spawning site was a pooling spring feeding livestock watering places at 1050 m a.s.l. in the southern Lepini Mountains (Latium, Central Italy). One hundred and fifty *S. perspicillata* were caught and measured for TL and snout-vent length (SVL) with dial calipers (TL: mean \pm SE = 10.57 \pm 0.02 cm; range 8.85-13.10). Among them were two females which surpassed the maximum length reported by previous studies (specimen A: TL = 12.8 cm, SVL = 4.6 cm, TL/SVL ratio = 2.78; specimen B: TL = 13.1 cm, SVL = 4.7 cm, TL/SVL ratio = 2.79). The size of the remaining specimens captured was equal to the previous maximum record (i.e. one specimen reached 12.3 cm) or smaller than 12.1 cm.

All animals were released at the place of capture just after the measuring. Student's t test indicated that female B was significantly larger than the others of the sample (one tailed t test; $df = 148$; $p < 0.001$). This specimen therefore can be considered an "outlier" and not representative of its population.

ANGELINI et al. (2001) reported that the averages of TL and SVL of the Lepini Mountain populations were larger than in salamanders from various other central northern Italian regions while biometrical data from southern Italy are not available. The averages of SVL and TL that we found were within the range reports for six Lepini populations, i.e. 3.54 - 4.21 cm and 9.01 - 10.61 cm, respectively (ANGELINI et al. 2001). These authors did not report the standard error or standard deviation of their mean