

Short Communications

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Combat behaviour in *Centrolene andinum* (RIVERO, 1968) (Anura: Centrolenidae)

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Abstract. We describe the fighting behaviour in *Centrolene andinum*. Males fight upside down, grasping one another venter-to-venter. This behaviour agrees with the prediction that all species in the genera *Centrolene* and *Cochranella* share a derived fighting behaviour, in contrast with the plesiomorphic, amplexus-like state of *Hyalinobatrachium*.

Keywords. Amphibia: Anura: Centrolenidae: *Centrolene andinum*; combat behaviour.

Behavioural characters have been proven useful in phylogenetic systematics (DE QUEIROZ & WIMBERG 1993). In the family Centrolenidae, recent studies have suggested that the character distribution of combat behaviour resolves the polytomy at the generic level (BOLÍVAR et al. 1999). However, combat behaviour has been observed only in eight of the 136 currently recognized species of Centrolenidae (Table 1); herein, we describe this behaviour in *Centrolene andinum* (RIVERO, 1968), a species that occurs in the Andes of Venezuela and Colombia (RUÍZ-CARRANZA & LYNCH 1995, BARRIO-AMORÓS 1998).

We observed the behaviour of *Centrolene andinum* during the nights of 20 July 2002 and 21 January 2004, in Quebrada Azul (08°41'13''N, 71°29'55''W; 1400 m), near La Azulita, Estado Mérida, Venezuela. On 20 July 2002, males were very abundant, calling from the side of fern and *Heliconia* leaves along the stream; three pairs of males were fighting in different but close locations. On 21 January 2004, we found an additional pair of males that were fighting (Fig. 1); during that night, we observed a total of nine males along ca. 100 m. The observed behaviour matches the description first provided by DUELLMAN & SAVITZKY (1976), in which males

fight dangling upside down while holding the vegetation by their hind legs, grasping one another venter-to-venter (Fig. 1). The frogs were collected and deposited at the Museo de Historia Natural La Salle, Caracas (MHNLS 16486-87).

BOLÍVAR et al. (1999) suggested that the venter-to-venter fighting behaviour is a derived character and supports the sister taxon relationship of *Centrolene* JIMÉNEZ DE LA ESPADA, 1872 and *Cochranella* TAYLOR, 1951. In contrast, fighting behaviour in the genus *Hyalinobatrachium* RUÍZ-CARRANZA & LYNCH, 1991 consists in an amplexus-like clasp between males, and has been hypothesized to be primitive (BOLÍVAR et al. 1999). Additional observations are needed to corroborate the predictions by BOLÍVAR et al. (1999) on the distribution of this character.

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Short Communications

Species	Combat behaviour in males	Reference
<i>Centrolene acanthidiocephalum</i> (RUIZ-CARRANZA & LYNCH, 1989)	Derived	RUIZ-CARRANZA (pers. comm. in: BOLÍVAR et al. 1999)
<i>Centrolene andinum</i>	Derived	This work
<i>Centrolene buckleyi</i> (BOULENGER, 1882)	Derived	BOLÍVAR et al. (1999)
<i>Centrolene prosoblepon</i> (BOETTGER, 1892)	Derived	JACOBSON (1985)
<i>Cochranella griffithsi</i> GOIN, 1961	Derived	DUELLMAN & SAVITZKY (1976)
<i>Cochranella ignota</i> RUIZ-CARRANZA & LYNCH, 1991	Derived	RESTREPO-TORO (1996)
<i>Hyalinobatrachium colymbiphllum</i> RUIZ-CARRANZA & LYNCH, 1991	Primitive	SAVAGE (2002)
<i>Hyalinobatrachium fleischmanni</i> (BOETTGER, 1893)	Primitive	MCDIARMID & ADLER (1974), GREER & WELLS (1980)
<i>Hyalinobatrachium valerioi</i> (DUNN, 1931)	Primitive	MCDIARMID & ADLER (1974)

Tab. 1. Centrolenid species coded for combat: derived = dangling by the feet and grappling venter-to-venter; primitive = axillary amplexus-like clasp.

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Fig. 1. Combat behaviour in males of *Centrolene andinum* (MHNLS 16486-87).

References

- BARRIO-AMORÓS, C.L. (1998): Sistemática y Biogeografía de los anfibios (Amphibia) de Venezuela. – Acta Biol. Venez., **18**: 1-93.
- BOLÍVAR, W., T. GRANT & L.A. OSORIO (1999): Combat behaviour in *Centrolene buckleyi* and other centrolenid frogs. – Alytes, **16**: 77-83.
- DE QUEIROZ, A. & P.H. WIMBERGER (1993): The usefulness of behaviour for phylogeny estimation: levels of homoplasy in behavioural and morphological characters. – Evolution, **47**: 46-60.
- DUELLMAN, W.E. & A.H. SAVITZKY (1976): Aggressive behaviour in a centrolenid frog, with comments on territoriality in anurans. – Herpetologica, **32**: 401-404.
- GREER, B.J. & K.D. WELLS (1980): Territorial and reproductive behaviour of the tropical American frog *Centrolenella fleischmanni*. – Herpetologica, **36**: 318-326.
- JACOBSON, S.K. (1985): Reproductive behaviour and male mating success in two species of glass frogs (Centrolenidae). – Herpetologica, **41**: 396-404.
- MCDIARMID, R.W. & K. ADLER (1974): Notes on territorial and vocal behaviour of Neotropical frogs of the genus *Centrolenella*. – Herpetologica, **30**: 75-78.
- RESTREPO-TORO, J.H. (1996): Ecología conductual de una rana arbórea Neotropical. – Licenciatura, Universidad del Valle, Cali.
- RUIZ-CARRANZA, P.M. & J.D. LYNCH (1995): Ranas

Centrolenidae de Colombia VII. Redescripción de *Centrolene andinum* (RIVERO, 1985). – *Lozania*, **64**: 1-12.

SAVAGE, J.M. (2002): The amphibians and reptiles of Costa Rica: a herpetofauna between two continents, between two Seas. – Chicago (The University of Chicago Press), 934 pp.

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Presence of *Agama weidholzi* WETTSTEIN, 1932 in The Gambia, West Africa

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Abstract. *Agama weidholzi* WETTSTEIN, 1932 is for the first time recorded for The Gambia. The new locality, Bwiam on the southern shore of the Gambia River, is the westernmost locality of the species' distribution area. *A. weidholzi* is one of the rare regional endemics of arid West Africa. The new record is based on an adult female collected in January (dry season), suggesting that former assumptions of a seasonal phenological displacement between age classes, or even an unianual life cycle, in this species are unlikely.

Key words. Reptilia: Squamata: Agamidae: *Agama weidholzi*; first record; The Gambia.

Agama weidholzi WETTSTEIN, 1932 is a tiny and rare lizard with scattered distribution in S and SE Senegal (WETTSTEIN 1932, GRANDISON 1968, 1969, JOGER 1979, 1981, 1982 JOGER & LAMBERT 2002), western Mali (GRANDISON 1969, JOGER 1979, 1981, JOGER & LAMBERT 1996, 1997), and Guinea-Bissao (MONARD 1940). The latter author included a juvenile specimen of this species in the type series of his *Agama boensis* MONARD, 1940, which is otherwise composed of specimens of *Agama sankaranica* CHABANAUD, 1918.

The occurrence of *A. weidholzi* in S and SE Senegal (Casamance and Niokolo-Koba region, at the upper course of the Gambia River, respectively) made the presence of this species also likely in The Gambia, par-

ticularly in its eastern part, but no finds had so far been reported for that country (HAKANSON 1981, GRUSCHWITZ et al., 1991). Only in



Fig. 1. Voucher specimen of *Agama weidholzi* (ZFMK 75001) from Bwiam, The Gambia.