

Defensive behavior in *Dipsas articulata* (COPE, 1868)

Snakes evolved a plethora of diverse antipredator mechanisms (LANCINI 1986; GREENE 1988). Typically, most snakes escape from threats fleeing. This behavior can be affected by body temperature, sex, reproductive condition, body size, ecdysis, resting posture as well as the intensity of stimuli (GIBBONS & DORCAS 2002; GLAUDAS et al. 2005). Some snakes do retract, coil, hiss and/or strike at threats when cornered, although many species are "cowards first, bluffers second and warriors last" (POPE 1958). A number of species developed elusive defensive behaviors such as cryptic and aposematic coloration to avoid detection (LA MARCA & SORIANO 2004; LANCINI 1986; LOTZKAT 2007). Some colubrid snakes adopt a defensive posture by inflating the anterior part of their bodies or opening their mouths in a threatening posture (GODLEY 1982; LA MARCA & SORIANO 2004; LOTZKAT 2007; NATERA-MUMAW et al. 2008). In arboreal snakes the body is sometimes laterally compressed and made rigid (GREENE 1979; MARQUES 1999). Some snakes also exhibit more unusual defence protocols such as musking from the vent or death feigning (immobilization reflex) to detract a predator's attention (USHAKOV 2007; MENDOZA 2009). A less documented defence behavior is 'balling', where a snake conceals its head among coils of its body from threat. The behavior is best known from the Royal or Ball Python *Python regius* (SHAW, 1802), from West Africa (BARKER & BAKER 2006). Balling behavior has also been reported for Boidae, Colubridae and Elapidae (BUSTARD 1969; MITCHELL 1978; ARNOLD & BENNETT 1984; MADSEN & UJVARI 2004). Even dangerously venomous species will resort to using balling rather than biting (MADSEN & UJVARI 2004).

In December 2004 we encountered an adult American Snail-eater *Dipsas articulata* (COPE, 1868) in an area of *Manicaria* palm swamp forest (MYERS 1990; SAVAGE 2002) at Cano Palma Biological Station near the Tortuguero National Park, Costa

Rica (Fig. 1). Upon capture to verify identification, the snake promptly but casually retracted into a ball, concealing its head (Fig. 2). It remained in this state motionless for several minutes. After placement in a vivarium the snake resumed a normal posture but continued to ball and also flattened its head and created neck coils when handled. To the best of our knowledge this is the first recorded case of balling defence behavior by *D. articulata*.

Defensive behavior has been recorded for *Dipsas albifrons* (SAUVAGE, 1884), *D. catesbyi* (SENTZEN, 1796), *D. indica* LAURENTI, 1768, *D. nicholsi* (DUNN, 1933), *D. oreas* (COPE, 1868), *D. pavonina* SCHLEGEL, 1837, *D. temporalis* (WERNER, 1909) and *D. viguieri* (BOCOURT, 1884) (PETERS 1960; CADLE & MYERS 2003; CADLE 2005). Only *D. nicholsi* has previously been reported to exhibit body coiling as a defensive trait. This differs from 'balling' as the coils are more uniform in shape (see MYERS & CADLE 2003). Snakes of the genus *Dipsas* are known for their docile response to threat and capture. *Dipsas oreas* exhibits a defensive posturing which is common among the Dipsadini (CADLE & MYERS 2003). It includes head triangulation, raising the anterior part of the body and bringing the head and neck back into an S-shaped loop. The posturing and head triangulation defences of *D. oreas*, and herein by *D. articulata*, resemble the defensive behaviors of some vipers (GREENE 1988) and thus are potentially a form of behavioral mimicry.

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Fig. 1: *Dipsas articulata* (COPE, 1868).



Fig. 2: *Dipsas articulata* (COPE, 1868) in 'balling' defence posture.

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