

Defensive behaviour by the African snakes *Amblyodipsas unicolor* and *Atractaspis andersonii*

BARRY HUGHES¹ & THOMAS KOWALSKI²

Author e-mails: ¹barry.hughes0007@gmail.com, ²geckowalski@googlemail.com

ABSTRACT - Coiling into a spiral as a way of concealing and protecting the head is described in species of two African snake genera – *Amblyodipsas* and *Atractaspis*, the latter otherwise known for a very different and distinctive ‘snout to ground’ avoidance behaviour. Spiralling and balling are considered in other snakes worldwide and the individualism of animal behaviour warned against. It is to be hoped that recognition of ‘spiralling’ as a distinctive form of ‘coiling’ or ‘balling’ behaviour will lead to more critical analysis of snake defensive behaviour.

INTRODUCTION

Carpenter & Ferguson (1977: 382) list 108 different snake behavioural postures from a survey of almost 1000 publications where they log four of these behaviours (their numbers 24, 39, 71, 95) as ‘balling’. Balling is usually only solicited when a snake is harassed and coils into a compact ball, often with its head at the centre, and this is interpreted as a defensive manoeuvre whereby its head is protected. Here (Fig. 1), I reproduce with permission from Prof. M.S. Kahn (2006) his Plate 126B of the common Indian wolf snake (*Lycodon a. aulicus*) displaying this defensive behaviour. When humans are under assault - as by police with batons, they will attempt to protect their heads by raising their arms - so balling by snakes may reflect a widespread reflex which the limbless snakes carry to perfection. Bustard (1961) provides an account of balling by the Pacific boa and a very informative early summary of this behaviour in other species, including the African ball python (*Python regius*) which gets its name from this habit. When in Ghana, where this diminutive and colourful python abounds, I used to carry a hatchling in my trouser pocket so as to demonstrate to fearful students how harmless some snakes could be.

Spiralling behaviour by *Amblyodipsas unicolor*

In Ghana, in September 1963, I was given a specimen of what Cansdale (1961: 41) refers to ambiguously as “The burrowing snake” (*A. unicolor*) but which Broadley (1971: 646) names the purple-glossed snake, by Mr Brian Harper, an engineer working on Ghana’s first motorway, from near a steelworks at the then new port at Tema (05°37’ N, 00°01’ E). When provoked, the behaviour of this specimen did not result in a ‘ball’ but in a spring-like orderly compaction with the head at the lowest point, not somewhere lost within a knotted ball or a coil in one plane (Fig. 2). This posture is usually maintained when the spiralled snake is gently inverted by human hand but when again upon the ground it would rapidly uncoil/recoil to place its head near the ground. If prodded it would repeat this behaviour, often incompletely: see later with *Atractaspis andersonii*. Similar behaviour would seem to be described for *Alluaudina bellyi* from Madagascar (Domergue 1984: 543) which, it is claimed, can maintain a similar defensive spiral for more than one hour!

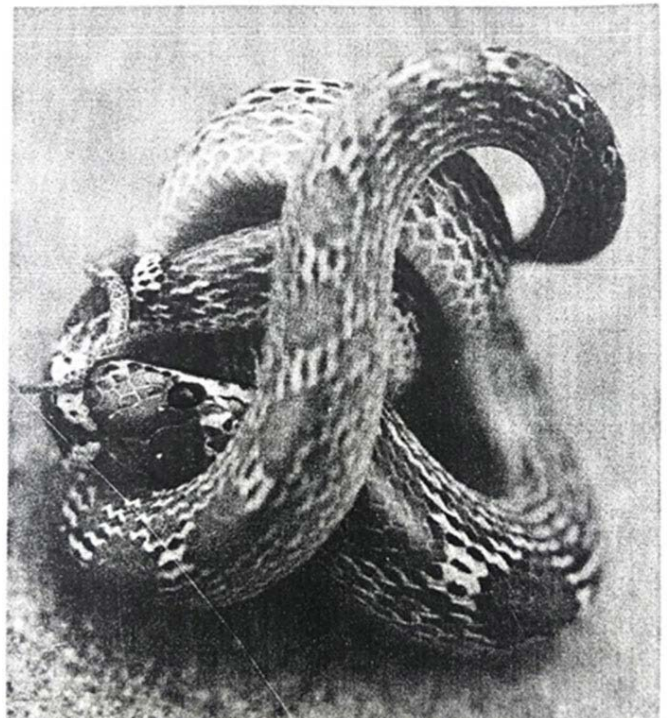


Figure 1. ‘Balling behaviour’ by *Lycodon aulicus*, Plate 126B in Kahn (2006: 198), with permission from Prof. M.S. Kahn

Defensive behaviour by *Atractaspis* spp

Several species have long been known to react to stimulus by arching the neck so as to bring the snout into contact with the ground as though about to try to burrow (Loveridge 1918: 318, 1923: 19, 1928: 1, the last quoted by Pitman 1938: 287, Cansdale 1961: 67, etc). Michele Menegon (in Spawls et al., 2018: 474) has a nice photograph of a stiletto snake (*Atractaspis bibronii*) in a ‘prepare to burrow’ stance, as Pitman (1928: 291) refers to it. Here Steve Spawls has provided a similar picture of an *Atractaspis aterrima* from Wa, Ghana doing the same thing (Fig. 3).

Stationed in the University of Ghana, on the Legon campus since 1960, I was familiar with the stiletto snake (*Atractaspis dahomeyensis*) and could distinguish it on sight from the

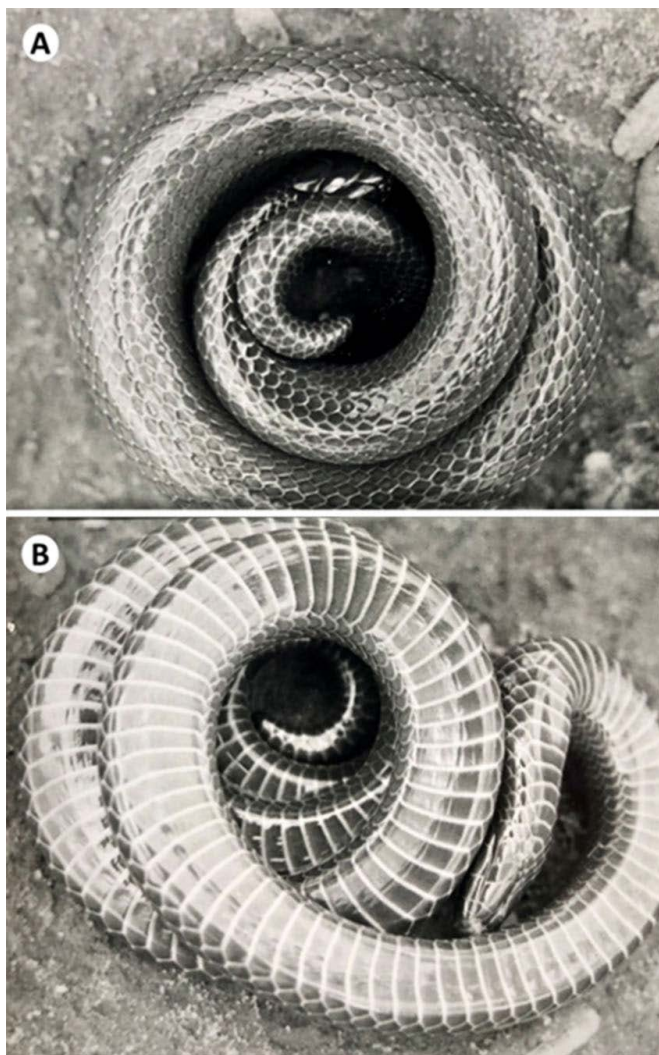


Figure 2. *Amblyodipsas unicolor* ‘spiralled’ specimen **A.** In dorsal view with the tail concealing the head, and **B.** When gently turned over; Ghanaian specimen which later escaped.



Figure 3. *Atractaspis aterrima* from Wa, Ghana displaying typical *Atractaspis* spp ‘arching’ of the anterior body with snout-to-ground; with thanks to Steven Spawls whose specimen (GS 337) later escaped

similar-looking ‘burrowing snake’ (*A. unicolor*) of Candale (1961: 41) because the latter has no more than 17 rows of body scales whereas the stiletto snake has at least 29. In 1963, I collected alive the first *A. aterrima* to be found at Legon but mistook it for Cansdale’s burrowing snake because it had no more than 23 rows of body scales. Provoking the newly acquired specimen and expecting to be rewarded with a display of spiralling behaviour I ended in hospital for a week with multiple bites on both hands, the result of picking up this unco-operative burrowing viper, as we then called stiletto snakes. A half century later this was a lesson without need of repetition!

Comparable spiralling behaviour by *Atractaspis andersonii*

By contrast Thomas Kowalski (in Grossmann et al., 2018: Abb. 5) and co-author of this account has produced a series of photographs of *A. andersonii* in a defensive spiral where the head is kept near the ground and the tail occupies the apex of the pyramid above it (Fig. 4). Furthermore, when gently inverted the snake will retain this position (Fig. 5) except to attempt to re-position the head out of sight (Fig. 6). If poked roughly, the spiralled snake will rapidly straighten out and as rapidly, recoil into a spiral. This seems to have taken place when the type specimen of *Atractaspis branchi* was collected and it appeared to “jump” when uncoiling and recoiling (Rödel et al., 2018: 114). These behaviours are unexpected from species of a genus of whom several members have long been known to react in a different way, itself thought to be distinctive.

DISCUSSION

The Concise Oxford Dictionary defines ‘coil’ as to ‘dispose in concentric rings’ and ‘spiral’ as ‘coiled’ whether remaining in the same plane like a watchspring or rising in a cone. The writer would here substitute ‘spiral’ from the dictionary definition of a conical coil and restrict coil to one plane (two dimensions) whereas a ‘spiral’ occupies two planes (or 3 dimensions) and it is with these restricted meanings that



Figure 4. *Atractaspis andersonii*, Abb. 5a by Thomas Kowalski (Grossmann et al., 2018: 9) from Oman, ‘spiralled’ position seen from above



Figure 5. *Atractaspis andersonii*, Abb. 5c by Thomas Kowalski (Grossmann et al., 2018: 9) when overturned.



Figure 6. *Atractaspis andersonii*, Abb. 5f by Thomas Kowalski (Grossmann et al., 2018: 9) when attempting to re-spiral.

these terms will be used here. Neither of these concepts can accommodate the posture adopted by a Zimbabwean slug eater (*Duberria lutrix rhodesiana*) as described by Taylor (1970: 18) with a diagrammatic sketch of a horizontally coiled body within which the snake has placed its head. This was a unique event where the subject did not survive attack from a crow and could not be elicited from other specimens of the same species. Balling and spiralling hide and protect the head: the distinction may be academic but both are defensive postures.

It should be noted that animals of both genera considered here spend most of their time in a burrow underground and come to the surface at night to feed, or to breathe when the ground is waterlogged. The behaviours described cannot be effected in underground burrows nor can contact with troublesome humans who produce the duress under which they exhibit this unusual defensive behaviour. The suddenness of spiralling and unspiralling produces uncertainty and

wariness in the observer and may be effective in warning off possible predators.

Another lesson to be learned is that behaviour observed many times by different observers with different species of *Atractaspis* does not mean that such snout to ground behaviour is universal to species of this genus. On the other hand, the second lesson is that whilst none of the second author's photographs show *A. andersonii* performing typical snout to ground behaviour, we do not know if it might not have done so on another occasion under different circumstances. Both of these reservations also apply to the *Amblyodipsas* and show how these casual observations may be misleading as to the kinds of behaviour to be associated with particular snake species. The taxonomy may be exact but individuals are not.

It is to be hoped that recognition of 'spiralling' as a distinctive form of 'coiling' or 'balling' behaviour will lead to more critical analysis of snake defensive behaviour by future observers.

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