AN UNUSUAL ESCAPE REACTION OBSERVED IN *SPHENOMORPHUS SABANUS* (REPTILIA: SCINCIDAE) IN INDONESIA, WITH TAXONOMIC COMMENTS

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ABSTRACT. - In this paper we report on the taxonomy and a so far unobserved behavioural trait in the scincid lizard, *Sphenomorphus sabanus*. An individual of this species attempted to evade detection on a branch by hanging upside-down, suspended by its hind-limbs, thus mimicking a dry twig. Comparisons to similar strategies in other lizard species are made. *Sphenomorphus sabanus* is recorded for the first time from West Kalimantan (Indonesian Borneo).

THE second author conducted a one-year field survey in West Kalimantan (Kalbar) in 1996/1997, investigating populations and ecological parameters of three giant reptile species harvested for the commercial skin trade (Riquier, 1998; Auliya & Abel, 1999, 2000a, 2000b; Auliya & Erdelen, 1999). The major study site was the small river island Sibau Pulau [0°52'N; 112°55'E], adjacent to the village Putussibau at the Kapuas river.

In addition to the daily field work routine of checking traps set to capture the Water Monitor (*Varanus salvator*) and the Reticulated Python (*Python reticulatus*), the herpetofaunal community of the study site was intensively examined.

Study area. – The general study area is characterised as a river-fed swamp forest, including scattered remnant primary forest and secondary forest patches with a more dense undergrowth. Additionally, a diverse range of plants are cultivated by the local human population, e.g. fruits are managed in traditional systems. Many trap sites were set in dark microhabitats, partly with an almost 100% canopy cover. Due to regular and heavy rainfall the area was subject to frequent flooding. On these occasions it was easy to detect animals surviving on tree stems, stumps, logs or snags with various hiding holes.

Several observations were made of the very shy diurnal scincid *Sphenomorphus sabanus*. It was commonly seen in the study area, mostly escaping into tree holes. Basking was never observed and neither was terrestrial behaviour, in contrast to Inger & Lian (1996). All specimens were found at more or less low height (less than 3 m), usually around the base of trunks, where more shelter is provided (e.g. buttresses, stilt roots).

Taxonomy. – In order to identify the lizards, four specimens were collected, and data on colour pattern, morphometry and pholidosis were recorded (Table 1). All individuals can be attributed to *Sphenomorphus sabanus* Inger, 1958 (Figure 1). This species is characterised by its slender phenotype, 7 supraoculars (including the scale which touches both parietal and frontoparietal), 15-16 supraciliaries, 18-22 subdigitals under toe IV, and 38-42 midbody scales. The vertical oval ear opening bears no lobules. The prefrontals are broadly pentagonal, in contact with each other, and about two-thirds the width of the frontonasal. The frontal is longer than its distance from the tip of the snout, and is in contact with the first three supraoculars. The parietals meet behind the interparietal, and supranasals are absent. There are 7 upper labials, of which the fourth to the sixth are below the

eye. Six infralabials are present, as well as three pairs of chin shields. The colour in life is quite distinct, and the typical orange flush on the flanks of males is well expressed. Preserved specimens are greyish-brown dorsally with indistinct darker patches. A dorsolateral black streak or row of black spots, as well as a black cervical spot, is absent. All four specimens possess distinct barred labials, the darker ones always wider than the lighter ones. The temporal region is mottled black, and the ventral surface is always cream-coloured.

The specimens could be distinguished from sympatric *Sphenomorphus* spp. by the following combination of characters: from *S. hallieri, S. alfredi, S. shelfordi, S. stellatus, S. tenuiculus* and *S. buttikoferi* by more than 4 supraoculars; from *S. maculicollus* by 7 instead of 8 supraoculars, as well as more midbody scale-rows (38-42 compared with 36), from *S. kinabaluensis* and *S. murudensis* by more midbody scale-rows (38-42 against 32-35 respectively 30-32), from *S. multisquamatus* by a lower number of midbody scale rows (38-42 against 42-49). Furthermore, the specimens differ from *S. haasi* by the lack of a dark dorsum with scattered, small and whitish spots, and from *S. cyanolaemus* by lacking the dark dorsolateral band, which begins behind the eye in the latter species.

According to a provisional checklist of Borneo and Palawan reptiles (Iskandar, unpublished), at least 16 species of *Sphenomorphus* are recognised. Major herpetofaunal surveys are still largely confined to Sarawak and Sabah, Malaysian Borneo (Das, 1995), thus documented records in Kalimantan are scarce. One example is *Sphenomorphus hallieri*, which was recorded from Putussibau by de Rooij in 1915 (Bacon, 1967). *Sphenomorphus sabanus* is therefore recorded herein for the first time from West Kalimantan.

Behavioural observations. – One individual was captured for the purpose of obtaining additional photographs. At night the specimen was positioned on a branch of a small Guava tree (*Psidium guajava*). This tree did not have any wooden structures providing sufficient shelter. In the spotlight of a torch, the animal attempted to escape by running away along the branch. Instead of letting itself drop to the ground as is typical for other tree-dwelling species (discussed below), the lizard tried to escape, by hanging itself in a 'hanging-head-over'-position, remaining attached to the branch only with its hind-leg claws. In this position it resembled a small dry branch (Fig. 2). After remaining motionless for several moments, the lizard fled along the branch.

This peculiar behaviour was also observed by several residents in West Kalimantan, including one of the second author's highly trained field assistants. In order to check and confirm this, photographs of Bornean scincids, agamids and monitor lizards were presented to these forest villagers, and all persons consistently selected scincids.

So far, similar postures have only been observed in Malagasy Leaf-tailed Geckos,

ZFMK-Catalogue-Number	No. Supra oculars	Parietals in contact with Supraoculars	No. Midbody-scales	No. Scales under Toe IV	SVL	TL
65782	7	yes	39	22 / 21	5.3	9.3 (R)
65783	7	yes	40	- / -	5.0	-
65784	7	yes	39	19 / 20	5.5	-
65785	7	yes	41	21 / 21	5.5	7.5 (R)

Table 1. Morphology and pholidosis of *Sphenomorphus sabanus* from West Kalimantan. SVL: Snout-vent length; TL: Tail length; R: regenerated tail. Measurements in cm.

Uroplatus phantasticus / ebenaui group, where a 'hanging-head-over-behaviour' has been described (Böhme & Henkel, 1995). Males cling with their hind-legs to a twig in a hanging position with their head pointing downward. In this position they 'display' their leaf-mimicking tails. The body might also resemble some leaf structure, though it is not obvious, whether this can be considered as a startle behaviour, or a natural resting position, as this observation was also made during the night.

A further example was observed in a *Cyrtodactylus* sp. (Malkmus, 1988). The gecko displayed an akinesis also clinging with its hind-claws to the bark of a tree trunk, in a more or less 'hanging-back-over'-position. Malkmus (l.c.) suggests that this posture could mimic that of a looper (Geometridae).

Reports of this escape mode in reptiles are scarce. Instead, many reptiles show distinct defensive or anti-predator strategies, e.g. snakes that display red tails like *Cylindrophis* spp. or *Maticora* spp. (= aposematic colouration), snakes that feign death (*Heterodon spp., Hemachatus haemachatus, Natrix* spp.), or crypsis displayed in a perfect evolved manner e.g. geckos within the genus *Rhacodactylus* spp., or African Twig Snakes (*Thelotornis* spp.). Some even react with a reflexive bleeding, a chemical anti-predator mechanism, known in iguanids in North America (*Phrynosoma* spp.). Also well known is the acoustic defensive mode demonstrated in *Crotalus* spp. and *Echis* spp. Some lizards are even armoured with spines or horns, e.g. *Moloch horridus* and *Phrynosoma cornutum*. Intimidation display is exemplified by *Chlamydosaurus kingii*. Some more heavy-bodied reptiles even drop from the canopy and riverine vegetation into the water, in order to escape from predators, e.g. *Iguana iguana, Hydrosaurus* spp. (Porter, 1972; Stiling, 1996).

Escape by means of running away is generally practised among all animals. Some exclusively arboreal reptiles even developed a gliding flight supported by skin appendages on body and limbs. These distinct morphologies may also contribute to a successful escaping behaviour from potential predators. Examples within the Sauria are represented by *Draco* spp. (Agamidae), *Ptychozoon* spp., *Cosymbotes* spp., *Uroplatus fimbriatus* (all Gekkonidae), and the African lacertid, *Holaspis guentheri* (e.g. Tweedie, 1949; Schiøtz & Volsøe, 1959; Tiwari, 1961; Klingel, 1965; Herrmann, 1986; Kiew, 1987).

Other reptiles for which 'flight' has been observed, include the agamids *Bronchocoela cristatella*, and *Calotes* spp., *Anolis* spp. (Iguanidae), some *Dendrelaphis* spp. (Colubridae), and the well-known tree snakes (*Chrysopelea* spp.) (e.g. Shelford, 1906; Hediger, 1932; Reid, 1958; Herrmann, 1986). The latter examples lack morphological adaptations for gliding flight. Instead, all are capable of flattening their bodies considerably, in order to increase the carrying surface during the 'flight', or when 'falling' from arboreal structures. This 'flight' behaviour is exclusively related to arboreal taxa. Herrmann (l.c.) and Lazell (1987) observed that 'gliding' flights were also practised, when individuals of *Ptychozoon kuhli* and *Draco* sp. were pursued. 'Flight' as an active response to predators in snakes is described by Ford & Burghardt (1993).

Apart from this escape behaviour, Hediger (1932) observed on several occasions that *'Dasia' smaragdina (=Lamprolepis smaragdinus)* dropped down from trees (approximate 15-20 m in height), and, after landing on partly rocky substrate without injuries, immediately ascended into the next tree. Hediger (l.c.) provides no indication whether this behaviour was related to an antipredator behaviour, or the lizards fell accidentally. According to Herrmann (1986), all taxa within the genus *Dasia* are capable of flattening their bodies, when falling from tree crowns.

This paper reports on a so far unobserved anti-predator behavioural trait in scincid lizards. Nothing is known about its evolutionary origin. The additional examples of survival strategies mentioned above, either accidental (falling) or intentional (escape), could have led to the observed behaviour in *Sphenomorphus sabanus*.

Figure 1. *Sphenomorphus sabanus*, Putussibau, West Kalimantan. Photograph by

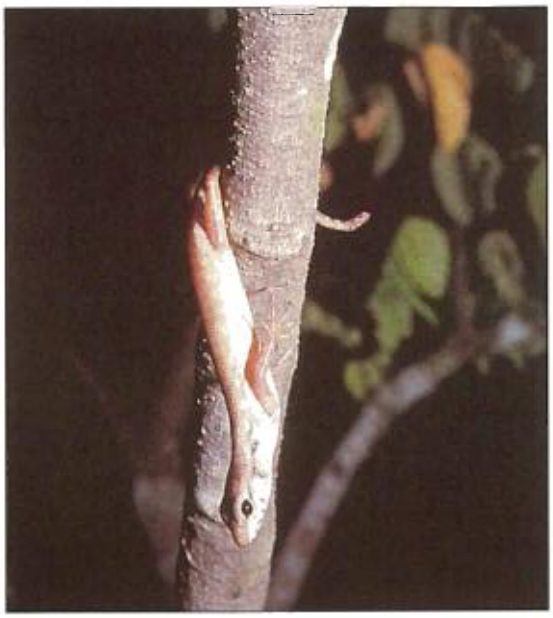

Figure 2. Escape reaction of *Sphenomorphus sabanus*. Photograph by

As many species in the genus *Sphenomorphus* are tree dwelling (pers. obs.), there are two possible explanations. First, as dropping to the ground is the commonly observed behaviour in many tree dwelling lizards, an escape strategy as described above could confuse flying predators such as birds who would not expect their prey remaining on the branch. Secondly, as also described in *Uroplatus*, it can be an effective escape strategy against other tree-dwelling predators, falling into a cryptic posture. Of course, more observations including experimental ones are required to substantiate and explain this extraordinary escape behaviour and its origin.

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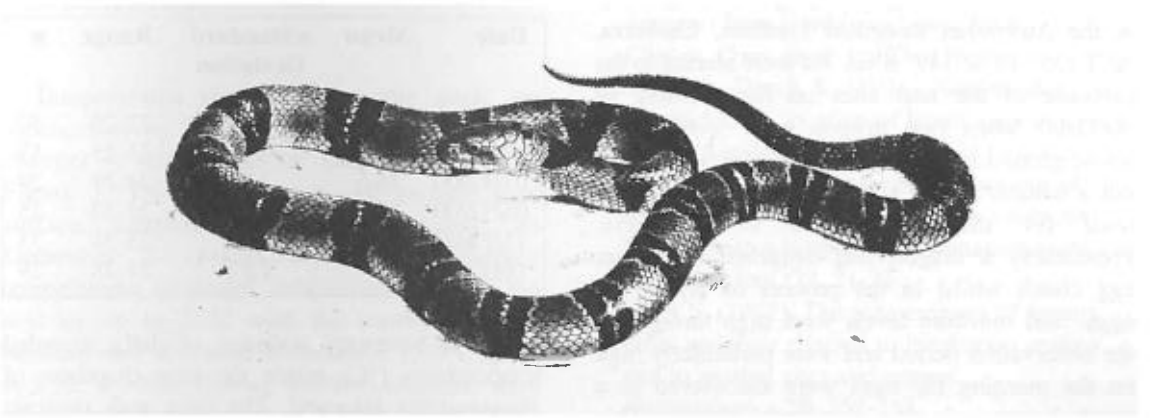

Annulated Water Cobra, *Boulengerina annulata*. Reproduced with permission of the Zoological Society of London from *Proceedings of the Zoological Society of London*, 1900.