Herpetology Notes, Volume 18: 1095–1099 (published online on 1 December 2025)

Egg predation of a rhacophorid foam-nest frog (*Chiromantis* cf. *rufescens*) by a colubrid tree snake (*Dipsadoboa* sp.) in Salonga National Park, Democratic Republic of the Congo

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African foam-nest frogs of the genus *Chiromantis* presently contain four species exclusive to sub-Saharan Africa. *Chiromantis* is the only genus of the predominantly Asian family Rhacophoridae present on the African continent (Frost, 2025). *Chiromantis rufescens* (Günther, 1869 "1868") is the most widespread of the four species (Channing and Rödel, 2019). Its range extends across the whole Guineo-Congolian forested region from Sierra Leone in West Africa across Central Africa to Uganda, including central Congo Basin and northwestern Angola (Channing and Rödel, 2019; Ernst et al., 2020; Badjedjea et al., 2022). Recent molecular investigation of this taxon revealed deep divergences in nuclear DNA forming three main evolutionary lineages, one from the northeastern and partially central Congolian forests, one from western Upper Guinea (west of the Sassandra River), and the third from eastern Upper Guinea and Lower Guinea (Leaché et al., 2019). The three lineages could eventually be distinguished as separate species as their divergences are dated to the Pliocene (Congolian lineage; sister to the eastern Upper Guinean–Lower Guinean lineage) or even Miocene (western Upper Guinea; sister to the two lineages). Since the type locality is "West Africa", the Congolian lineage is better to be named *C.* cf. *rufescens*, pending further taxonomic investigation (Badjedjea et al., 2022).

This arboreal species can often be seen in the Democratic Republic of the Congo (hereinafter as DRC) along roads and paths in lowland forests and humid wooded savannahs, near temporary or permanent pools, fishponds, and along watercourses, typically not in pristine but rather in disturbed forests (our pers. obs.). This frog is rarely seen deeper inside rain forests, where it can be found perched on branches or creepers around natural ponds and puddles, usually near forest clearings, uprooted trees, along forest streams, or above waterholes dug by artisanal miners in search of gold and diamonds (our pers. obs.). Females of this species (complex) grow to larger sizes (up to 60 mm snout-vent length) than males (up to 49 mm snout-vent length). Its colouration varies from a greenish brown to grey and uniform olive green in some individuals (Channing and Rödel, 2019; our pers. obs.).

To reproduce, *C.* cf. *rufescens* builds foam nests on leaves of various trees and shrubs, tree trunks, rocks, clay walls, branches, and creepers hanging above water bodies with stagnant water, in which the females lay their eggs. A pair, or sometimes one female and several males, create a foam nest by beating their hind legs against each other and using a glutinous substance produced by the female (Schiøtz, 1999). The nest may or may not incorporate leaves from the plant serving as support, alternatively they use a rock overhanging the water, or the walls of deep ruts dug by forestry machinery or miners (Amiet, 1991). It has been observed that some individuals, both males and females, sit around the nest being built without participating in its construction. The nests are often observed suspended at different heights. Most nests are observed between 0.5 and 5 m above the ground, but sometimes only a few centimetres above the ground or water surface, respectively, for example along roadsides. However, some nests can be observed more than 15 m above the water (our pers. obs.). Interestingly, Amiet (1991) reported maximum heights of only 2–3

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m for Cameroon. There was a report also from Salonga National Park of *Chiromantis* nests hanging from empty weaver bird nests built above water, presumably to increase the antipredation effect, perhaps by monkey predators (Kielgast and Lötters, 2009). *Chiromantis* cf. *rufescens* shares the immediate vicinity of waterholes and waterways with a variety of other amphibian and reptile species, including potential predators like tree snakes of the genus *Dipsadoboa* (Colubridae: Colubrinae).

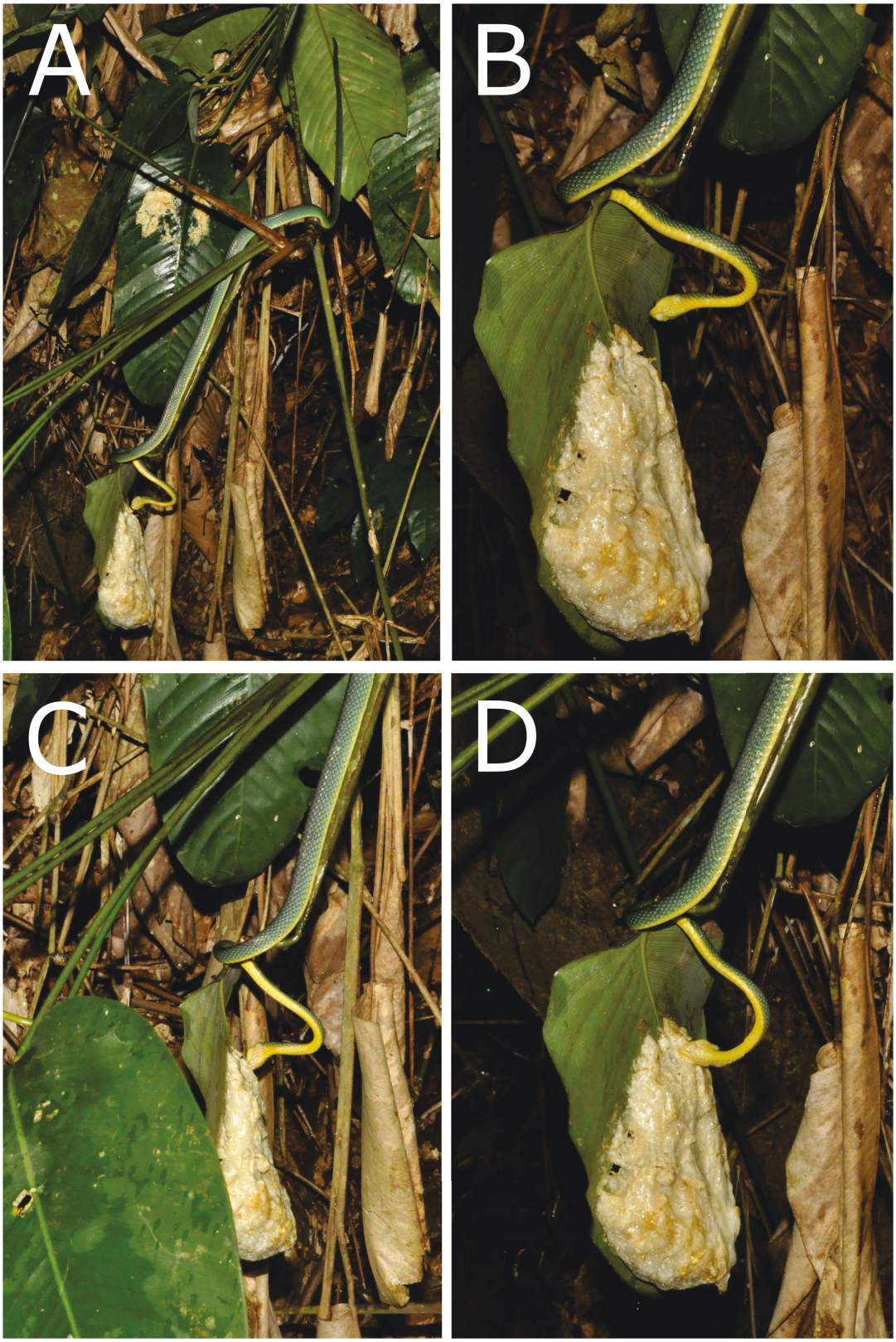
Most species of the genus *Dipsadoboa* feed on anurans, with some species feeding also on other small vertebrates such as lizards, small birds and their eggs (Rasmussen, 1996; Trape, 2023). Tree snakes of the genus *Dipsadoboa* are often found in the ecoregion of the Central Congolian Lowland Forests (Burgess et al., 2004) along forested watercourses or in degraded environments around swamps and fishponds searching for their amphibian prey. Therefore, *Dipsadoboa* are the far most frequently encountered snakes during amphibian surveys in Central African rain forests (our pers. obs.). Here, we report on the first observation of a predation of *Chiromantis* eggs by *Dipsadoboa* sp.

Our observation occurred during our inventory of herpetofauna of the North block of Salonga National Park, near the Institut Congolais pour la Conservation de la Nature (ICCN) Yokelelu station, which was conducted from March to April 2024. On the night of 10 April 2024 at 20:07 h, an adult male *Dipsadoboa* tree snake was observed consuming eggs from a foam nest of the tree frog *C.* cf. *rufescens* in the vicinity of a fishpond near the village of Botsima (Etang Isiaku: 01.2687°S, 022.0393°E, 375 m elevation). Approximately a dozen of *Chiromantis* individuals and several of their nests suspended from leaves of *Megaphrynium* plants (Marantaceae) were observed at the site that night. At the site in general, *Chiromantis* foam nests were located at various heights ranging from a few centimetres above water level up to ~12 m. In addition to the underside of *Megaphrynium* leaves, they were found hanging on tree branches, or trunks of trees fallen over the fishpond, but also on herbaceous vegetation emerging from the water. The male *Dipsadoboa* was observed approaching one foam nest overhanging the fishpond at approx. 6 m height (Fig. 1A) and inserting its head inside the foam and moving back and forth to eat the eggs (Figs. 1B–D). The observation lasted around ten minutes. The snake was photographed using a Nikon D90 camera. The individual was afterwards captured, euthanised, fixed, and catalogued, and it is presently stored in the collections of the Centre de Surveillance de la Biodiversité, Université de Kisangani, Kisangani, DRC (CSB:Herp:CD24-0576). Several other individuals of *Dipsadoboa* were also observed at the site, but egg predation was not observed in the other individuals.

The male *Dipsadoboa* predator measures 836 mm snout-vent length and 876 mm total length, as the tail is shortened by injury (40 mm, truncated tail length). Scalation: 16 scales at midbody, 221 ventrals, cloacal scale undivided, single subcaudals (15, but the tail is substantially shortened), 7 upper labials, 2 of which in wide contact with eye. The colouration (in life): dorsum greenish to brownish, venter yellow except for the rear part which is dirty yellow, underside of the tail greyish.

The colouration generally conforms to *Dipsadoboa weileri* (Lindholm, 1905), especially the darker underside of the tail, but probably the same snake species is named as *Dipsadoboa underwoodi* Rasmussen, 1993 in the book by Chippaux and Jackson (2019: Figure 13.26), photographed by Jos Kielgast in DRC, likely also in Salonga National Park. *Dipsadoboa underwoodi* is not formally known from DRC and is supposed to be smaller and slenderer, with the maximum size up to 610 mm (Trape, 2023). However, it does not necessarily mean that the species cannot be so far overlooked and may grow to a larger size in central DRC. On the other hand, Pauwels and Brecko (2020) hypothesised in their review of Chippaux and Jackson (2019)'s book that the photographed individual of "*D. underwoodi*" is probably *D. weileri*. We agree that our specimen also conforms more to *D. weileri* than to *D. underwoodi*. However, it has quite different colouration (greenish) and is slenderer than individuals of *D. weileri* we know from more northern and northeastern areas of DRC, Republic of the Congo, or Cameroon – in the latter country is the type locality of this species = surroundings of Bibundi (Lindholm, 1905). The scalation, e.g., the number of ventrals, indicates potential affinity to *D. viridis* (Peters, 1869) but the colouration does not fit (e.g., yellow underside of the body). Given the morphological differences between our specimen and the above discussed taxa, we cannot yet identify our specimen to a species and refer to it only as *Dipsadoboa* sp. "Salonga".

Few predators have been reported to feed on eggs in foam nests since the foam increases the protection of egg clutches. However, some other cases of vertebrate predation on eggs of African foam-nest frogs have been reported. Interestingly, in West Africa, clutches of eggs of *C. rufescens* have been observed to be


A
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C
D

Figure 1. *Dipsadoboa* sp. "Salonga" feeding on *Chiromantis* cf. *rufescens* eggs near Botsima village, near Yokelelu ICCN station, Salonga National Park (block North). (A) The snake approached the foam nest along the stem of a *Megaphrynium* leaf (Marantaceae), where the foam nest was located from the underside. (B–D) *Dipsadoboa* sp. searching the foam to feed on *Chiromantis* eggs. Photos by Gabriel Badjedjea.

consumed by two cercopithecid monkey species in Taï National Park, Côte d'Ivoire (Rödel et al., 2002). In Central Africa, similar observation has not yet been reported, although there is a great diversity of primate species in the immense lowland rain forests. However, predation on *C. rufescens* eggs or small tadpoles by the estrildid bird *Nigrita bicolor* (Hartlaub, 1844) was reported from Gabon and Cameroon (Brosset, 1976; Amiet 1989, 1991). Amiet (1989, 1991) mentioned that such predating behaviour, when the bird is unskilfully spraying white foam all around, was rare, even exceptional, in Cameroon. He speculated that this bird behaviour probably corresponded to a recently acquired feeding habit and that it had not yet spread. In East Africa, even another frog was reported to prey on eggs in foam nests of *Chiromantis xerampelina* Peters, 1854, specifically the leaf-folding frog *Afrixalus fornasini* (Bianconi, 1849) from the family Hyperoliidae. This *Afrixalus* species predated also on eggs of some *Hyperolius* species and even conspecifics of its own (Drewes and Altig, 1996).

At the site of our observation, another abundant scansorial vertebrate species was the hyperoliid frog *Cryptothylax greshoffii* (Schilthuis, 1889), which was previously reported to prey on another smaller hyperoliid, *Afrixalus osorioi* (Ferreira, 1906) (Badjedjea et al., 2023). The latter species was also recorded at the site of our presently reported observation. However, no predation of frog eggs was observed in neither of these two species at the site.

Anurans and lizards are listed as prey of *Dipsadoboa* tree snakes, however, for the species discussed here, it is mainly frogs (Rasmussen, 1996; Trape, 2023). To our knowledge, frog eggs have not specifically been listed as part of the *Dipsadoboa* diet. However, in addition to the above case of *Chiromantis* eggs, one of us has also observed predation on eggs of the arthroleptid frog *Cardioglossa leucomystax* (Boulenger, 1903), deposited in moist sandy soil, by *Dipsadoboa viridis* in the north-western Republic of the Congo (V. Gvoždík, unpublished pers. obs.). *Dipsadoboa viridis* is probably a close relative to the other two above discussed species, *D. underwoodi* and *D. weileri* (Rasmussen, 1993).

The vast lowland forests of the Congo Basin are one of the least explored terrestrial regions on Earth and our knowledge on the local species diversity and taxonomy is limited. This is related to our identification of the concerned species as "cf." and "sp.". That limited knowledge is mainly caused by difficult accessibility, and socioeconomic or even security situation in some parts of the region, which complicates research in the area and, thus, even less is known about species' ecology or behaviour. It is therefore likely that future research in the region will bring more information on food webs and prey preferences of certain amphibians and reptiles, like the one we report here. Future observations may also identify whether the reported predation of *C.* cf. *rufescens* eggs by *Dipsadoboa* sp. "Salonga" is rather unusual and opportunistic or a common behaviour for the species.

Acknowledgments. The field research in Salonga National Park was made possible by funding from the International Foundation for Science (IFS), Stockholm, Sweden (grant number D-6074-2), and the Czech Science Foundation (grant number 23-07331S). Research authorisation was provided by the Institut Congolais pour la Conservation de la Nature (ICCN), Kinshasa. We are grateful to Dr. Tadeáš Nečas (Institute of Vertebrate Biology of the Czech Academy of Sciences, Brno, Czech Republic) for his constructive comments and suggestions.

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Accepted by Werner Conradie