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Observation of an Uncommon Morph of *Grayia cf. ornata* (SQUAMATA: SERPENTES) in Kokolopori Nature Reserve in the Central Congo Forest Ecoregion, Democratic Republic of Congo

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ABSTRACT

A juvenile specimen of *Grayia ornata* was collected, exhibiting divergent morphological characteristics compared to adult specimens, suggesting a potential inversion of characters during the species' development. These characters may also indicate geographical and ecological variations that are being observed for the first time in a region that has received minimal study, the Kokolopori nature reserve. To definitively ascertain whether this phenomenon constitutes an inversion of neotenic characters during development or the presence of metapopulations of the same species or an undescribed sister species, further molecular analysis is necessary.

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Introduction

Very little is known about the morphological variations of snakes in Congolese forests, and even less about snakes in the Colubridae family, which are morphologically very diverse snakes. This is particularly true for the group of snakes from aquatic ecosystems such as the genera *Natriciteres* LOVERIDGE, 1953, *Natrix* LAURENTI, 1758, *Grayia* GÜNTHER, 1858 and *Helophis* de WITTE & LAURENT (1942), especially in the central Congolese forests, a forest refuge that has remained isolated from the rest of the Congo Basin, cut off by the Adamlia ridge of high relief that descends from Gabon to Mayombe in the Democratic Republic of Congo (Kadima & al., 2011; Lokasola, 2022). The little information we have on the morphological variations and morphology of this group and its variations can be found in the literature, among others, in the publication by Günther (1864) and that of Boulenger (1894). Specimens of the sister species *Grayia obscura* show some variation (Chaney & al., 2024) but the sample, even though large, is still not sufficient to cover the extent of all the possible variations that the two species of *Grayia* may have across possible populations scattered throughout its range, both morphologically and genetically.

We present here a specimen of *Grayia cf. ornata* collected in the Kokolopori Nature Reserve, in the Democratic Republic of Congo, with certain different morphological features, mainly on the colour, which suggest that *Grayia ornata* would be more of a species complex. Geographical and ecological differences between populations support this idea. Seen from this angle, the systematics of this snake would be far from perfectly mastered. This is the first time that a specimen of this snake has been presented in the central Congolese forests with diagnosis characters similar to *Grayia ornata* but not identical.

Grayia ornata has been collected by herpetologists in the central Congo basin (Wallach, 1980; Laurent, 1984). The herpetological studies available for the Kokolopori sector are the preliminary ones by Dr Arne Schiøtz (unpublished) and Lokasola (2022). The overall relief of the area is that of an alluvial peneplain, a characteristic geological feature of the floor of the central Congo basin (Kadima & al, 2011). Rainfall in the driest month exceeds 60 mm, characteristic of an equatorial Af-type climate.

It was on the evening of 08 September 2024 at 5.30am, at the end of a sunny day, that we collected the specimen to be reported by scooping it from the Loto stream (0.41696°N latitude and 22.97572°E longitude). The Loto stream is located in the Kokolopori Nature Reserve, a category 4 nature reserve according to the IUCN classification, which was established by the local Mongandu communities in 2004 for the protection of the great bonobo ape and for carbon sequestration. The biotope captured is an old secondary forest of *Uapaca guineensis* MÜLLER ARG. with an undergrowth of *Palisota hirsuta* THUNB. K. SCHUM. and *Palisota ambigua* (P. BEAUV.) C.B. CLARKE, straddling the stream. This is a relatively undisturbed low-altitude (500 m) landscape crossed by this clear-water stream running over a gravel and sand substrate.

We took measurements on the skull scutes, including the length and width of the head, the distance between the nostrils, the distance between the orbitals, the distance from the snout to the eye, and the distance from the snout to the corner of the mouth, then expressed them as a percentage of the length of the head before subjecting them to a Principal Components Analysis of the Morphological Distance (PCA), comparing these proportions with other known specimens in the literature. These ratios provide a powerful means of morphologically separating species. We proceeded in the same way for meristic parameters such as the

presence or absence of loreals, preoculars, postoculars, suboculars, the number of rows of ventrals, the number of rows of dorsals, the shape and number of subcaudals, the number of upper labials and the number of lower labials.



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The Kokolopori population does not recognise our specimen as a close cousin of *Grayia ornata*. This indicates that our *Grayia cf. ornata* is of rare or uncommon occurrence in the area. The specimen we collected was identified as a juvenile *Grayia ornata* whose colour could change with age, a snake of the Colubridae family. A juvenile *Grayia ornata* may have a dark belly in certain regions, a colour that lightens with age. This black colour can serve as camouflage in black peat. *Grayia ornata* has been reported in the Congo Basin from several localities and in numerous studies. Our observation is the first in the Maringa-Lopori landscape. It extends the range of the species by some 200km south of Lisala. We believe that any investigator interested in looking for this snake would be well advised to look for it in September during the rainy season.

As far as the taxonomy of our specimen is concerned, it appears to be a species closely related to *Grayia ornata*, but could just as well be an as yet undescribed species. The comparison between our specimen and the reference specimens in the genus *Grayia* is given in Table 1 below.

Tableau 1: Tableau de comparaison entre notre specimen, *Limnonaja chrysti* et *Naja annulata*

| | <i>Grayia ornata</i> | <i>Ourspecimen</i> | <i>Grayia smithii</i> | <i>Grayia caesar</i> | <i>Grayia tholloni</i> |
|---------------------------|----------------------|--------------------|-----------------------|---------------------------|------------------------|
| Snout-vent length (SVL) | 795 | 221 mm | - | - | - |
| Tail Length (TL) | 240 | 81 mm | - | - | - |
| Total length (TTL) | 935 | 302 mm | - | - | - |
| Supralabials (SL) | 8(4) | 7(3,4) | 7(4) | 8(4,5) | 8(4) |
| Infralabials (IL) | 10-12 | 8 | 11 | 10 | 10 |
| Supralabials touching eye | 4 | 3,4 | 4 | 4,5 | 4 |
| Temporals in rows | 2+3 | 2+3 | 2+3 | 2+3 | 2+3 |
| Dorsals formula | 17-17-17 | 15-16-14 | | 15-15-15 | 15-15-15 |
| Dorsals around midbody | 17-19 | 16 | | 15 | 15 |
| Ventrals | 144-161 | 144 rows | | 123-149 | <140 rows |
| Anal | Divided | Divided | | Entire ♂ Divided ♀ | Divided |
| Subcaudals | 2 rows 73-88 | 2 rows of 82 | | 142-162 2 rows females | 2 rows 100-135 |
| Frenals | long | long | Square | Court | long |
| TL/TTL | 0.256 | 0.268 | | - | - |
| Number of black rings | - | 36 | | - | - |
| Colour of the belly | Whitish | Black | Whitish | Whitish | Whitish |

Our specimen is distinguished from all *Grayia ornata* by the black colour of the belly and the reduced number of infralabial scales. In fact, it is closer to *Grayia ornata* in the divided presentation of the anal and subcaudals in two rows, the relative length of the tail, the number of subcaudals, and the number of ventral rows and the formula of the temporal scales. The number of rows of dorsal scales in the middle of the body, the formula of the rows of dorsal scales and the supralabial scales touching the eye may fall within the range of variation in the forms of *Grayia ornata*. It is clearly distinguished by the reduced number of infralabial scales ($7 < x < 10$), by the number of infralabial scales touching the eye and finally by the black colour of the belly. The hypothetical transformation from black to white of the ventral scales could be explained by the inversion of neotenic colours during development in the *Grayia* genus. The number and configuration of the infralabial scales opens up the possibility that the specimen we observed may belong to a metapopulation of the species *Grayia ornata* or to a related sister species that has not yet been described. More detailed morphological analyses with a larger sample and subsequent molecular analyses could resolve this question definitively.

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