

## A new lizard species for Gabon, *Ichnotropis bivittata* Bocage, 1866 (Squamata, Lacertidae)

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Gabon is one of the most preserved Central African countries concerning its forests. The herpetofauna of the country was recently assessed (Pauwels & Vande weghe, 2008). It comprised 121 reptile species among which 13 turtles and tortoises, three crocodiles, 32 lizards, three amphisbaenians, and 70 snakes. Several changes have occurred since that summary: one species occurring in Gabon, *Hemidactylus fasciatus* Gray, 1842, was recently attributed to a distinct new species, *Hemidactylus coalescens* Wagner, Leaché & Fujita, 2014 (see Wagner *et al.*, 2014); one new species was described and occurs in Gabon, *Agama lebretoni* Wagner, Barej & Schmitz, 2009 (see Wagner *et al.*, 2009); the amphisbaenid *Monopeltis schoutedeni* de Witte, 1933 was reported from Gabon (Pauwels *et al.*, 2010); and one additional snake species was reported for the country (*Thrasops jacksoni*; see Carlino & Pauwels, 2013). However some parts of the country were not completely covered during those surveys and this is particularly true for the south-eastern part called Batéké Plateaux which harbors some mixed savanna and forest habitats.

During a recent field trip to the extreme south-east of Gabon, in the Parc de Bakoumba-Lékédi (Batéké Plateaux), Haut-Ogooué Province, one of us (BLG)

collected three specimens of lizards in a savanna habitat (Figure 1). The animals were collected in June 2012 in micro-mammal traps during a teaching session directed by Jean-François Mboumba, under supervision of a research and teaching inter-universities collaboration between Université de Rennes 1 and Université des Sciences et Techniques de Masuku-Franceville (Gabon). The collect area is situated near the town of Bakoumba, about 110 km southeast of Franceville. Two of the three collected lizards belong to distinct species previously well-known from Gabon and widespread (Pauwels & Vande weghe 2008), but the third did not correspond to any known species for the country. We here identify that species which is new for the country.

Three specimens of lizards were collected and deposited at the Paris Natural History Museum collections. Two of them belong to previously well-known species from Gabon (Pauwels & Vande weghe 2008), respectively *Trachylepis affinis* (Gray, 1839) [MNHN-RA 2013.1029] and *Trachylepis maculilabris* (Gray, 1845) [MNHN-RA 2013.1030]. The third specimen [MNHN-RA 2013.1031], which is the smallest, belongs to an unknown species for the country that we here refer to *Ichnotropis bivittata* Bocage, 1866 (Figure 1).

We refer our specimen to the genus *Ichnotropis* Peters, 1854 because it shows normal head shields with a small occipital plate, smooth and imbricate cycloid ventral scales, a large anvil shaped subocular bordering the lips, a nostril pierced between an upper and a lower nasal and a smaller postnasal, a lower opaque eyelid with numerous scales in its middle, and no collar. A short fold is present in front of the arms and several mites are visible on both sides below axilla in mite pockets. Its back is covered with large lanceolate, strongly keeled and imbricate scales. Digits are feebly compressed, with sharply keeled lamellae inferiorly. Femoral pores are present. Tail is long and cylindrical with scales of the same size all around and all strongly keeled. Dorsal

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**Figure 1.** A: dorsal view of the three collected specimens freshly killed for preservation; from left to right respectively *Ichnotropis bivittata*, *Trachylepis maculilabris*, and *Trachylepis affinis*. B: ventral view of the three collected specimens freshly killed for preservation; from left to right respectively *T. affinis*, *T. maculilabris* (yellow venter), and *I. bivittata*.

scales are large, lanceolate and also strongly keeled, clearly distinct from the unkeeled ventral scales.

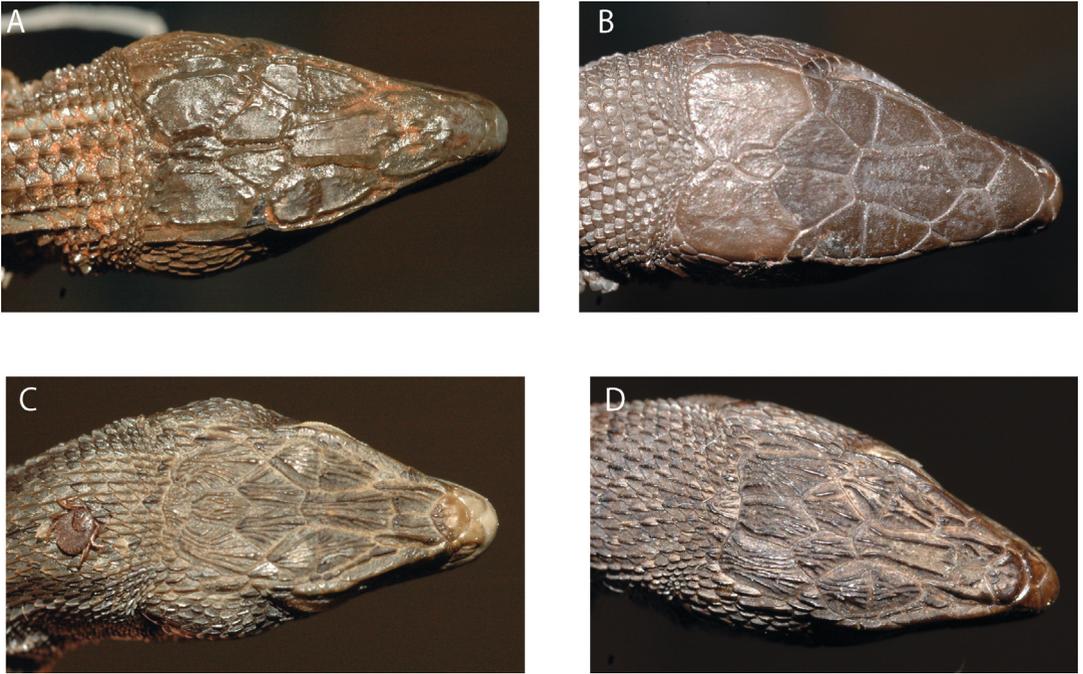
All those characteristics distinguish our specimen from *Adolfus africanus* and *Poromera fordi* (Table 1; Figures 2-5), two potential candidates.

Distinction of *I. bivittata* and *A. africanus* is evident. Differences between *Poromera fordi* and *Ichnotropis*

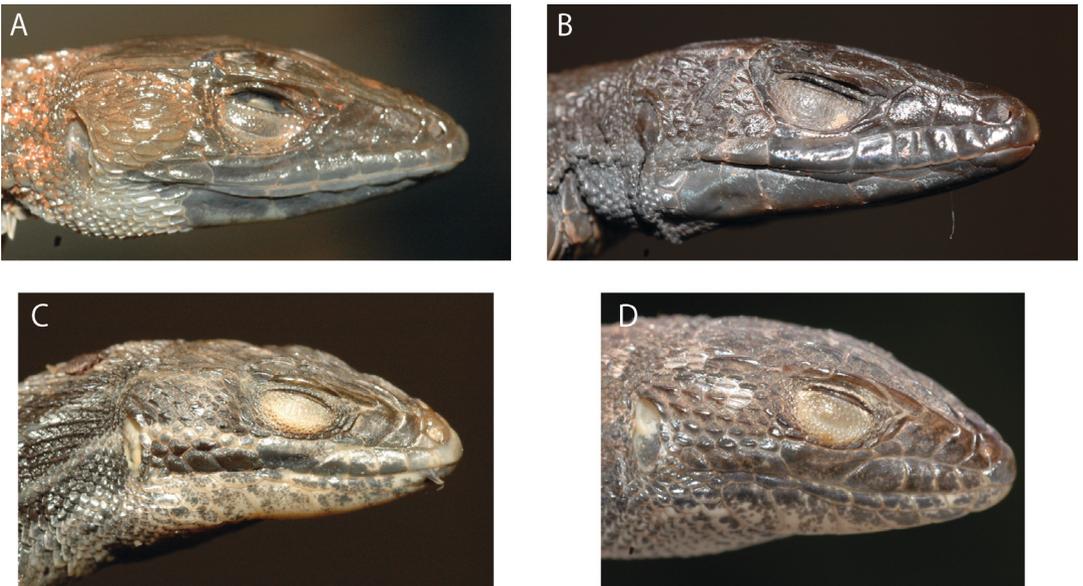
*bivittata* are numerous (e.g. presence or not of a collar) and concerned also postnasals. One small superior postnasal and a larger triangular inferior postnasal can be seen by *I. bivittata* but similar sized inferior and superior postnasals are present by *P. fordi* with some exceptions in that species [MNHN-RA 2005.0639] (Figure 3). Dorsal scale keels also forms continuous

**Table 1.** Morphological comparison of main scalation characters between MNHN-RA 2013.1031 and *Ichnotropis bivittata*, *Adolfus africanus* and *Poromera fordi*. Data after Boulenger (1920, 1921) and Marx (1956). FP: frontoparietal; IP: interparietal; SL: supralabial.

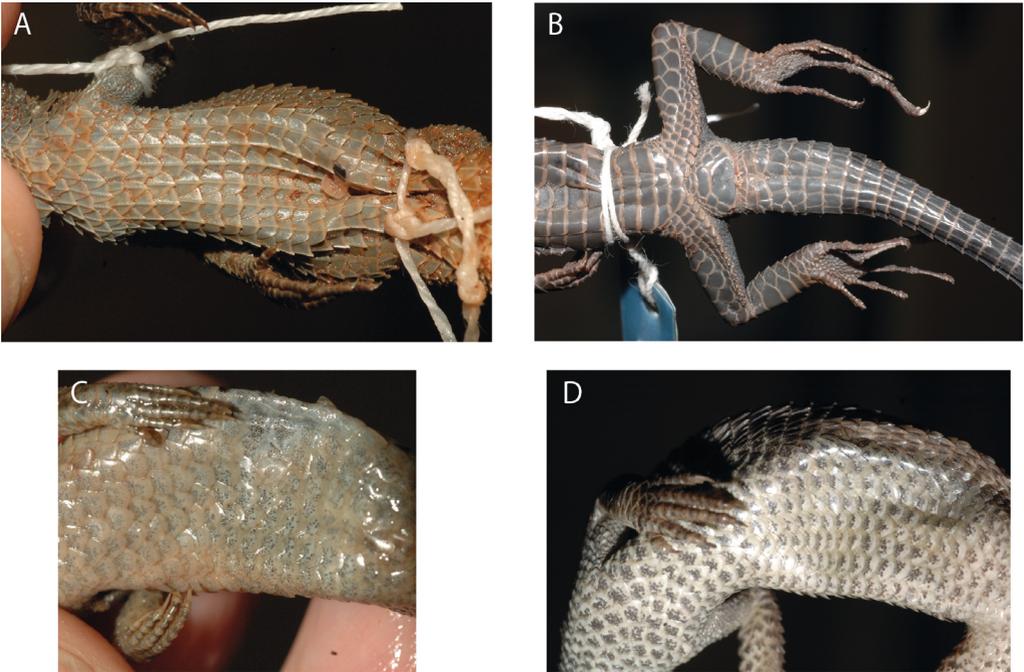
	MNHN-RA 2013.1031	<i>I. bivittata</i>	<i>P. fordi</i>	<i>A. africanus</i>
Enlarged dorsal row	no	no	no	no
Dorsal and lateral scales	similar	similar	lat. smaller	lat. smaller
Ventral scales/plates	smooth cycloid	smooth cycloid	keeled +++	smooth
Contact nostril with SL 1	no	no	yes	nearly contact
Subocular	anvil shaped	anvil shaped	rectangular	rectangular
Collar	no	no	yes (weak)	yes (strong)
Cephalic plates	ruguous	ruguous	ruguous	smooth
Dorso-lateral bands	no	often 4	2	2 anterior only
SL anterior to subocular	4	4 (3 to 5)	4 to 6	5 to 6
IP and FP fused	no	no	no	no
Postnasals	2	2	2	1
Pores	8	8 to 14	11 to 14	12 to 17
Ventral scales/plates	rounded	rounded	rounded mucronate	enlarged
Ventral keels	absent	absent	strong and linear	absent



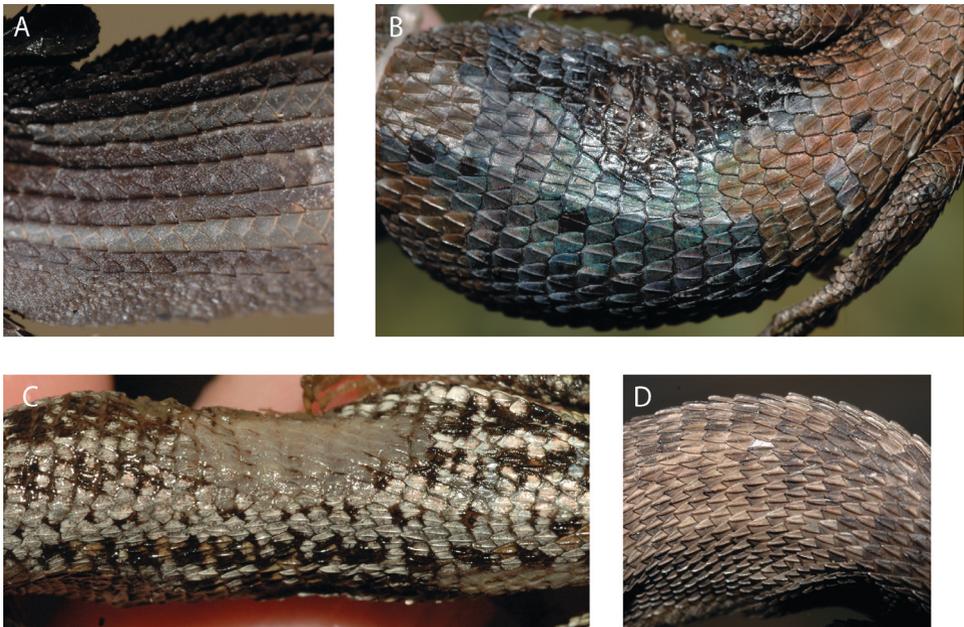
**Figure 2.** Upper head view showing head plate conformation and striations. A: *Poromera fordi*, MNHN-RA 2005.0638; B: *Adolfus africanus*, MNHN-RA 1996.7550; C: *Ichnotropis bivittata*, MNHN-RA 1997.3613; D: *Ichnotropis bivittata* from Gabon, MNHN-RA 2013.1031.



**Figure 3.** Lateral head view. A: *Poromera fordi*, MNHN-RA 2005.0638; B: *Adolfus africanus*, MNHN-RA 1996.7550; C: *Ichnotropis bivittata*, MNHN-RA 1997.3613; D: *Ichnotropis bivittata* from Gabon, MNHN-RA 2013.1031.



**Figure 4.** Ventral scales and plates. A: *Poromera fordi*, MNHN-RA 2005.0638; B: *Adolfus africanus*, MNHN-RA 1996.7550; C: *Ichnotropis bivittata*, MNHN-RA 1997.3615; D: *Ichnotropis bivittata* from Gabon, MNHN-RA 2013.1031.



**Figure 5.** Dorsal scales. A: *Poromera fordi*, MNHN-RA 2005.0639; B: *Adolfus africanus*, MNHN-RA 2005.0603; C: *Ichnotropis bivittata*, MNHN-RA 1376; D: *Ichnotropis bivittata* from Gabon, MNHN-RA 2013.1031.

linear ridges by *P. fordii* whereas they are more irregular and not continuous by *I. bivittata* (Figure 5).

In his *Monography of the Lacertidae*, Boulenger (1921) recognized six species in the genus *Ichnotropis*: *I. bivittata* Bocage, 1866, still valid with two recognized subspecies (*I. b. bivittata* Bocage, 1866 and *I. b. pallida* Laurent, 1964); *I. capensis* (A. Smith, 1838), still valid with two recognized subspecies (*I. c. capensis* (A. Smith, 1838) and *I. c. nigrescens* Laurent, 1952); *I. chapini* Schmidt, 1919, still valid and monotypic; *I. longipes* Boulenger, 1902, considered as a synonym of *I. capensis*; *I. squamulosa* Peters, 1854, recently placed in the genus *Meroles* Gray, 1838 by Engleder *et al.* (2013); and *I. tanganicana* Boulenger, 1917, still valid and monotypic. Two additional species were described after Boulenger's 1921 revision: *I. microlepidota* Marx, 1956, monotypic and endemic from Angola, and *I. grandiceps* Broadley, 1967, monotypic, from Botswana and Namibia. Thus six species are included in the genus *Ichnotropis* which is in need of a serious revision using molecular techniques and morphology (Engleder *et al.*, 2013).

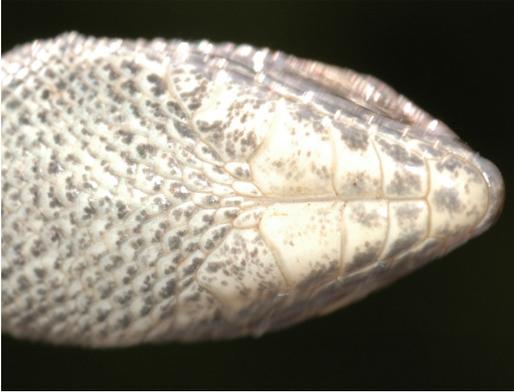
We refer our specimen to *I. bivittata* because it has a single frontonasal plate, a subocular bordering the mouth with its lower length about half of its upper length (anvil-shaped). An occipital plate is present. It shows about 34 scales around midbody and 8/8 right/left femoral pores. A single undivided anterior loreal is followed by a larger posterior loreal, about two times the size of the anterior. Prefrontal is in contact with the anterior of the two large supraoculars which are separated from the superciliaries by a row of small scales. 19/21 right/left lamellae under fourth toe. Hind limb reaches shoulder when extended. All these characters together only refer to *I. bivittata* and exclude all other known species in the genus (Boulenger, 1921; Marx, 1956; Broadley, 1967). Our specimen also differs from *I. microlepidota* from Angola by its lower number of scales around middle of body. *I. bivittata* is known from Angola (type locality), Democratic Republic of Congo, Zambia, Malawi and southern Tanzania. Its occurrence in Peoples Republic of Congo is realistic but does not seem to have been verified by a voucher; the country is however not very far from the collect area of the present specimen. The species was never reported previously from Gabon. Its occurrence in northern Mozambique is also possible but we have not found it in a recent field trip in an area along Tanzanian southern border. We have not seen Tanzanian specimens of *I. bivittata*. The species particularly seems to inhabit plateau areas in open savannas.

### Description of the specimen MNHN-RA 2013.1031

Female with a lacertiform habitus. Snout-vent length 53 mm; regenerated tail 79 mm, 1.49 times as long as head and body. Axilla groin distance 25.83 mm; snout to arm 20.67 mm; arm 6.67 mm; leg 8.48 mm; head length 13.43 mm; head breath 7.41 mm. **Body moderately depressed.** Head rather feebly depressed, 1.8 times as long as broad, its length 3.9 times in length to vent; snout pointed, as long as the postocular part of the head, with a sharp canthus and concave loreal region particularly for the posterior loreal; a rather deep concavity on the upper surface of the snout in the prefrontal and on the anterior frontal area, between two separated strong keels on prefrontal and frontal: an obtuse keel below the eye on the upper part of the subocular. Neck a little narrower than the head. The extended hind limb reaches the shoulder; digits feebly compressed.

Subocular bordering the mouth, anvil-shaped with its largest border dorsally; nostril between three nasal shields, an anterosuperior in large median contact with its symmetrical of opposite side, an inferior triangle-shaped in large contact with the first supralabial, the rostral and the anterior loreal, and a very small posterior nasal in contact with the single frontonasal and anterior loreal. **Nasals forming a suture behind the rostral.** Lower nasal broadly in contact with the rostral; postnasal small, between the upper and lower nasals; a single anterior loreal much shorter than the posterior loreal; on both sides, 4 upper labials anterior to the subocular, which is much narrower beneath than above, anvil-shaped, and borders the mouth. No enlarged upper temporal; temporal scales small, uniform, **strongly keeled**; a narrow tympanum, 2.28 mm high and 1.48 mm wide. Lower eyelid with a series of vertically enlarged scales in the middle.

Upper head shields strongly and coarsely striated and keeled; frontonasal single about 1.35 times broader than long; prefrontals wing-shaped, 2.10 times longer than broad, in contact with the anterior of the two large supraoculars on both sides, and forming an extensive median suture; frontal exactly of the same length than its distance from the end of the snout, 2.32 times as long as broad, nearly of equal width throughout but a little narrower behind than in front; frontal with one strong lateral ridge on each side all its length and a median ridge only visible anteriorly (shorter) and posteriorly (longer) but interrupted in its middle (a character typical of *I. bivittata* which allows distinction from *I. capensis* where frontal shows about 5-14 fine striations; fide Laurent, 1964); parietals 1.84 times as long as broad,



**Figure 6.** Chin-shields of *I. bivittata* (MNHN-RA 2013.1031) from Gabon.

nearly rounded behind; interparietal a little narrower than the frontoparietals, in contact with a shorter but large entire (not broken) occipital; occipital posterior border rounded projects beyond the parietals. Four supraoculars, the first and the fourth small; anterior large supraocular longer than its distance from the second loreal, second enlarged supraocular in contact with the parietal by a point; four superciliaries, first forming a very oblique suture with the second, first and second the longest and of same size; one single series of elongated small keeled scales between the supraoculars and the superciliaries on both sides.

Five pairs of chin-shields, the three anterior in contact in the middle (Figure 6); gular scales imbricate, passing gradually into the ventral scales, 10 in a straight median line, all without keels. Dorsal scales rhombic-mucronate, strongly keeled and imbricate, acutely pointed, smaller than the upper caudals and distinctly shorter than rounded ventral plates; lateral scales a little smaller than dorsal; ventral plates rounded but not hexagonal as indicated by Boulenger (1921), a little broader than long, in 30 transverse series between a midventral line from anterior to posterior members; 34 scales round the middle of the body. Preanal region covered with irregular scales among which the two scales just anterior to the ones bordering the cloaca are enlarged, the right about two times the size of the left one which it partially covers. Scales on arm nearly as large as dorsals, smooth, much smaller on tibia and strongly keeled. Subdigital lamellae pluricarinate, spinulose, 19/20 right/left under the fourth toe. Caudal scales strongly keeled, upper

slightly larger than dorsals, 28 in the fourth whorl behind the postanal granules.

Back uniform bronzed brown, with series of black irregular wavy cross-bars. No black and white streaks on each side of the head and neck. Possible female coloration, typical in our specimen, is composed of very indistinct markings reduced to more or less transversal series of darker wavy streaks mostly visible on the anterior part of the back (Figure 7). The lack of the typical dorsolateral two bands on each side in our specimen is certainly related to its subadult state and/or female sex (Figure 8); sex was determined by dissection.

Ventral scales are whitish in coloration (Figure 9) with their anterior half dark grey blue in color. That darker coloration is touching the anterior border of each ventral scale while the posterior border always bears a whitish



**Figure 7.** General dorsal view of *I. bivittata* (MNHN-RA 2013.1031) from Gabon.



**Figure 8.** The two typical dorsolateral white bands (MNHN-RA 1997.3615) are probably related to sex and adult state. Those white bands are totally absent in our Gabon specimen that has no lighter markings on back and flanks, probably because it is a subadult female.



**Figure 9.** General ventral view of *I. bivittata* (MNHN-RA 2013.1031) from Gabon.

semi-circular shaped uniform color. Dark coloration originated from juxtaposition of a large number of small dark circular spots (visible with binocular) at the anterior level of each ventral scale. Throat and ventral tail lighter with only weak grey-blue markings compared to the venter.

In fact our specimen is not the first mention of the species for Gabon but actually it is the first time the country is clearly indicated and demonstrated. Boulenger (1921) reported a specimen from MNHN-RA collections (no collection number indicated but in fact MNHN-RA 1892.0010) which he mentioned as “Congo français (Pobéguin)”. Pobéguin is not the collect location but refers to Charles-Henri-Olivier Pobéguin (1856-1951). He was a French official who spent several years in Gabon, part of the former Congo français, and provided Paris Natural History Museum with collections, mostly botanical specimens. He visited Ogooué valley and particularly the Batéké Plateaux which is covering part of actual Gabon but also Peoples Republic of Congo (former Congo Brazzaville). That specimen has no collect location but according to the places visited by Pobéguin, it is more likely that the specimen was collected in the same area than our more recent MNHN-RA 2013.1031 specimen, somewhere in the Batéké Plateaux area in southeastern Gabon.

As our recent specimen from Gabon has a different color pattern than all other specimens available in MNHN-RA collections, we first had some doubts about its specific attribution. That specimen does not hold the pair of light bands on each side of the neck which is visible on all our other specimens (see examined

material; Figure 8). The first of those bands began from below the eye and extend posteriorly through tympanum and above forelimbs and stopped around midbody or sometimes more posteriorly just before hind limbs; the second light band, finer, extends from above the eye, and sometimes stops at midbody but often stretches even on tail (Figure 8). Our Gabon specimen also differs from other examined specimens of the species in MNHN-RA collections by its stronger striations on head plates and scales, its posterior members extending further than in other specimens and reaching shoulder, its shorter digits, its ventral lighter coloration extending only on 9 scales whereas it extends on 11-12 scales ventrally by other specimens. The keels on the tail of our Gabon specimen are also much stronger than in other examined specimens. However, according to that other Batéké Plateaux specimen from Pobéguin, which obviously has the same collect location as our recent specimen, we consider that the observed differences are more likely related to sex and age of the examined specimens rather than distinct specific attribution. A sexual coloration dimorphism should exist by this species with rather uniform females and males with one pair of dorsolateral lighter bands on each head and neck sides. Nevertheless, additional specimens from Batéké Plateaux are still warranted and their comparison with DRC and Angola specimens should definitely assess the specific status of our Gabon specimen and demonstrate that hypothesized sexual coloration dimorphism.

**Examined MNHN-RA material** – *Adolfus africanus* – MNHN-RA 1996.7550 (Democratic Republic of Congo) – MNHN-RA 1997.2801 (Central African Republic, Grima, ECOFAC Project) – MNHN-RA 2005.0600-0601 (Cameroun, Bali Ngemba Forest Reserve, coll. CamHerp) – MNHN-RA 2005.0602-0603 (Cameroun, Ediango, Baniang-Mbo, coll. CamHerp). *Ichnotropis bivittata* – MNHN-RA 1376 (Angola; identified by G.A. Boulenger) – MNHN-RA 1892.0010 (Congo français [in fact Gabon], coll. Pobéguin; identified by G.A. Boulenger) – MNHN-RA 1997.3612-3615 (Democratic Republic of Congo, Kabinda). *Poromera fordii* – MNHN-RA 1896.0503-0504 (Syntypes of *Poromera haugi*; Popular Republic of Congo) – MNHN-RA 1901.0533-0534 (Gabon) – MNHN-RA 1966.0935-0936 (Popular Republic of Congo, Sibiti) – MNHN-RA 1973.1546 (Gabon, Mayika) – MNHN-RA 1995.9662-9667, 1997.3534-3535 (Central African Republic, SCAD) – MNHN-RA 2005.0638-0639 (Cameroun, Salapoumbé, south of Yokadoume, coll. CamHerp).

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