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The *Porphyronota* Burmeister, 1842 of Cameroon, with description of a new species (Coleoptera: Scarabaeidae, Cetoniinae, Diplognathini)

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Abstract
Recent collections from Cameroon have revealed the occurrence of a new species of *Porphyronota* Burmeister, 1842 from Adamaoua and the Centre regions, *P. antoinei* sp. nov. This is described herein, along with a review of the known species of the country. The rehabilitation of the specific status of *P. maculipennis* Moser, 1916 is confirmed, as this species is clearly separated from *P. hebraea* (Olivier, 1789) by a number of diagnostic characters already highlighted by other authors and is also known mainly from Cameroon thus far. The occurrence of *P. cinnamomea* (Afzelius, 1817) in northern Cameroon is reported for the first time, and it is proposed that *P. cinnamomea angolensis* Holm, 1990 be upgraded to species level, *P. angolensis* **stat. nov.**, as it is sufficiently different from the nominal form in the shape of its parameral apex and other key characters. The bioecology of the genus *Porphyronota* is discussed in the context of the prevailing habitat characteristics, the feeding and breeding patterns of the various taxa currently included in it. One group of species, previously constituting the obsolete genus *Poecilophila* Kolbe, 1893, lives in forest and open savanna habitats and its members breed within the soil or in rotten wood and feed on fruits, sap or flowers at the adult stage. A second group, probably composed of most if not all the other known species, lives in mountainous grassland habitats, undergoes period of dormancy underground and appears to depend on specific herbivore dung for larval growth.

Key words: Afrotropical Realm, West Africa, new species, montane habitats, regional endemics

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Introduction

The genus *Porphyronota* Burmeister, 1842 currently comprises 18 species and three subspecies (Holm & Marais 1992; Beinhundner 2017; Serrano et al. 2020; Krajcik 2024), all restricted to the African sub-Saharan region. As already pointed out by Holm (1990) in his revision of the genus (including the obsolete *Poecilophila* Kolbe, 1893), the species included in it are difficult to identify because of large intraspecific chromatic variations, which are often compounded by the occurrence of nigrito forms. The external morphological characters vary little from species to species and even less between male and female, to the point that sexes at time can only be taken apart through dissection.

To add to this, most known species seem to favour montane habitats with savannah or grassland vegetation and are typically fossorial, living for the most part underground even at the adult stage, undertaking only short flights after major rainfall events (Holm 1990; Perissinotto 2012). Thus, there is a high degree of local to regional endemism within the genus, and in many cases poor availability of specimens is a serious obstacle to the confident establishment of identity and the description of new taxa. The knowledge of immature stages is even worse, with only the third instar larva of *P. hebraea* (Olivier, 1789) described thus far (Donaldson 1987; Donaldson & van Tonder 1992).

For all these reasons, several new taxa have been erected only in fairly recent years (e.g. *P. spinata* Holm, 1990; *P. congoensis* Rigout & Allard, 1992; *P. desfontainei* Antoine, 1999; *P. chireyi* Antoine, 2004); while some existing ones have also been upgraded or rehabilitated from previous synonyms [e.g. *P. rougemonti* Holm, 1990; *P. tottenhami* Holm, 1990; *P. variegata* (Boheman, 1857)] (Antoine

2004; Perissinotto 2012). In this regard, the Cameroonian region has received unprecedented attention during the last two decades, with particular emphasis on the relatively unexplored Cameroon Volcanic Line and the poorly accessible northern provinces (Le Gall 2023). As a result of this work, a new species of *Porphyronota* has recently emerged, among several other new taxa, from material collected in these mountainous areas of the country. This is described herein, and with *P. desfontainei* Antoine, 1999 and *P. maculipennis* Moser, 1916 now brings to three the species currently known as endemic or quasi-endemic to Cameroon. This is a situation similar to that observed for the genus *Diphrontis* Gertaecker, 1883, in which five between species and subspecies are known to occur in Cameroon, with three actually endemic to that country (Beinhundner 2017).

Materials and Methods

Most of the material analysed in this work has only recently been obtained by Thierry Garnier (Montpellier, France) through his association with local field collectors. All specimens were examined directly and dissected when necessary. Types and other specimens used for comparison were provided by the curators or owners of the collections where they are currently reposited (see list below). Original collecting data accompanying each specimen were also obtained from key holders of material of interest.

Taxonomic as well as distribution and ecological data were obtained from key literature sources providing quality illustrations and collecting data, mainly Holm (1990), Rigout & Allard (1992), Sakai & Nagai (1998), Antoine (1999), Malec & Šípek (2016, 2017) and Beinhundner (2017). The citizen science platform "iNaturalist" (https://www.inaturalist.org) was also used to extract additional information from field observations, after appropriate verification and using only research grade identifications. For each taxon, data records are reported with the number of individuals and their respective sex, if verified. Otherwise, such details are omitted and only a generalized reference to an unspecified number (n) of individuals (inds) is given.

The specific terminology used by Krikken (1984) and Holm & Marais (1992) for the Cetoniinae morphology is followed in this study for the description of specimen characters. Photos of specimen dorsal, lateral and ventral habitus were taken with a Nikon CoolPix S9700 digital camera with macro setting or Canon EOS 550D, while photos of clypeal and pygidial surfaces as well as male genitalia were obtained using an OptikamB9 Digital Camera attached to a Kyowa SDZ-PL dissecting microscope and a Canon EOS 550D with MP-E65 mm lenses. In order to increase the clarity of resolution, the background, pin holes and other disruptive features were removed from each photo using Microsoft Word 2010 (Picture Tools). The Combine ZP Image Stacking Software by Alan Hadley (alan@micropics.org.uk) was used to obtain z-stacking composite images.

In the text, specimens size refers to measurements of total body length (TL), taken from the tip of the clypeus to the tip of the pygidium, and maximum body width (MW), taken at the widest point of the elytra. All measurements are expressed in millimetres and were taken with a Vernier calliper. Abbreviations of types are as follows: HT, Holotype; AT, Allotype; LT, Lectotype; PL(s), Paralectotype(s); PT(s), Paratype(s).

Institutes and collections are abbreviated as follows:

DCSF – Didier Camiade Private Collection, Sallespisse, France;
ETHZ – Entomologisches Institut, Zürich, Switzerland;
GBEG – Gerhard Beinhundner Private Collection, Euerbach, Germany;
GFGF – Gilles Flutsch Private Collection, Gometz-le-Chatel, France;
HECO – Hope Entomological Collection, Oxford, UK;
MDTF – Marc Desfontaine Private Collection, Toulon, France;
MRAC – Koninklijk Museum voor Midden Afrika, Tervuren, Belgium;
PLGF – Philippe Le Gall, Institute of Research for Development, Gif sur Yvette, France;
PLEB – Philippe Léonard Private Collection, Embourg, Belgium;
PMBC – Petr Malec Private Collection, Brno, Czech Republic;
RBINS – Institute Royal des Sciences Naturelle de Belgique, Bruxelles, Belgium;
RPTI – Renzo Perissinotto Research Material, Treviso, Italy;
SRSF – Sébastien Rojkoff Private Collection, Sourcieux-les-Mines, France;
TGMF – Thierry Garnier Private Collection, Montpellier, France;
ZMHB – Museum für Naturkunde der Humboldt Universität, Berlin, Germany.

Apart from the localities of historical type specimens, which are reported in their original integrity, countries in the data records are identified with their international ISO Alpha-3 codes (https://www.nationsonline.org/oneworld/country_code_list.htm, accessed on 10 Nov 2023) as follows: AGO, Angola; BDI, Burundi; BEN, Benin; BFA, Burkina Faso; CAF, Central African Republic; CIV, Côte d'Ivoire; CMR, Cameroon; COD, Congo (Kinshasa); COG, Congo (Brazzaville); ETH, Ethiopia; GHA, Ghana; GIN, Guinea; KEN, Kenya; NGA, Nigeria; SEN, Senegal; SLE, Sierra Leone; TGO, Togo; TZA, Tanzania; UGA, Uganda. Regions within Cameroon are listed with their ISO alpha-2 codes as follows: AD, Adamaoua; CE, Centre; ES, East; EN, Far North; LT, Littoral; NO, North; NW, North-West; SU, South; SW, South-West; OU, West.

Results and Taxonomy

***Porphyronota antoinei* sp. nov.**
(Figs 1, 2, 8)

Diagnosis. The new species is most closely related to the recently described *P. desfontainei* Antoine, 1999, from which it differs in the following characters. Firstly, the dorsal chromatic habitus of *P. antoinei* is extremely variable, with forms ranging from completely ochreous with black mottling (cf. HT, Fig. 1), to exhibiting a black elytron but an ochreous pronotum and scutellum, to forms completely black (Fig. 2). Conversely, the currently known habitus of *P. desfontainei* is rather constant, completely ochreous-orange with black mottling across the entire surface but particularly extensive on the pronotum (Fig. 3). Secondly, the elytral surface of *P. antoinei* is more globose than that of *P. desfontainei* and its costae are rather flat and not convex like in the latter species. On the ventral side, the mesosternal lobe is significantly narrower in *P. antoinei* than in *P. desfontainei*, and the metasternal lobe is far less densely scultured with round punctures in the former than in the latter species (Figs 1 B and 3 B). Finally, in dorsal view the dorsal lobes of the aedeagal parameres are markedly expanded in the apical third in *P. antoinei*, while they are most constrained in *P. desfontainei* (Figs 1 F and 3 F). The apical portions of the ventral lobes are also expanded and end with right angles in *P. antoinei*, while in *P. desfontainei* these remain subparallel to end in a rather smoothly rounded apex.

Description of holotype ♂
Size: TL = 15.8 mm; MW = 9.1 mm
Dorsum. Body shape moderately globose, with widest part posteriad of subhumeral arch; dark ochreous to testaceous, generally matt but feebly shiny on pronotal disc; densely black mottled on elytra, with fewer but larger maculae on the pronotal disc; with large and moderately dense round to horse-shoe punctures across entire surface; glabrous with scattered short setae only along margins (Fig. 1 A, C).

Head. Black with longitudinal dark ochreous band at centre, from vertex to frons but not reaching clypeal region; clypeal surface moderately concave with lateral and anterior margins steeply upturned, corners smoothly rounded; lateral margins parallel and anterior margin mildly sinuate; glabrous, with dense round to irregular punctuation across entire surface; antennal clubs dark ochreous, but pedicel and flagellum black to dark brown with few long testaceous setae (Fig. 1 A, C, D).

Pronotum. Dark ochreous with two sets of large black spots radiating in oblique direction from postero-central largest macula, also three lesser dark spots towards anterior edge of disc (Fig. 1 A); broadly octagonal in shape, with antero-lateral corners slightly narrower than postero-lateral ones; posterior margin markedly deflected at sides, but gently sinuate anteriad of scutellum; glabrous, with scattered short setae only on lateral margins and with large but moderately dense horse-shoe to round punctures across entire surface except discal centre.

Elytra. Dark ochreous with longitudinal lines of black spots positioned approximately along each costa and stria, largest along costae-striae 1-5 and absent on periscutellar and umbonal regions (Fig. 1 A, C); glabrous, with few short light setae scattered along lateral and posterior margins and declivities; with horse-shoe to round sculpture rather shallow, but equally distributed across entire surface.

Scutellum. Isoscelic triangular, with round apex and sinuate lateral margins bulging outwards at centre; dark ochreous with black to brown basal corners and apex, and large oblong black macula at centre; glabrous, with few shallow horse-shoe shaped to irregular punctures along basal and lateral margins; lateral grooves narrow and shallow (Fig. 1 A).

Pygidium. Testaceous, with black basal and apical regions; smoothly rounded at apex and elongate at base; with deep bilateral depressions on basal corners; with finely rugulose sculpture and sparse short, light setae throughout, becoming longer at apex (Fig. 1 E).

Legs. Black, with dark brown tarsal segments; protibia tridentate with mid tooth twice as large as first and third, and all teeth blunt and smoothly rounded; mesotibia with two unequal, sharp outer denticles, proximal barely half size of distal; metatibia with external line of six single, tiny denticles, including two apical bidentate pairs blunt with fossorial structure, and pair of longer spurs also rather blunt; both mesotibia and metatibia with inner margin lined with dense, long pale setae (Fig. 1 A-C).

Venter. Shiny, black with dark ochreous area restricted to antero-lateral portions of pro- and metasternum; mesosternal lobe short and smoothly rounded; metasternal lobe conical and elongate anteriourly, with concavity at centre and median sulcus wide and deep; punctures small and scattered, virtually absent on central areas of abdominal ventrites; short, light setae equally scattered across entire surface, becoming denser and longer on margins (Fig. 1 B).

Aedeagus. Dorsal lobes of parameres shorter and narrower than ventral lobes, moderately diverging at centre, expanded towards apical third, then converging to form pointed apical line connecting downwards with ventral lobes (Fig. 1 F-H); ventral lobes widely extended laterally, with constriction at centre, then expanding and tapering anteriourly to form blunt transverse apex in dorsal view (Fig. 1 F).

Derivatio nominis. This new species is dedicated to the late French entomologist Philippe Antoine (1940-2017), who has contributed enormously to the knowledge of the Cetoniinae fauna across the globe, and particularly to that of the Afrotropical Region.

Distribution. Most specimens currently known originate from the Wack area of the northern Adamaoua Region of Cameroon. One female has also been recorded in the Far

North Region, at Waza, and two specimens were also reportedly collected in the Centre Region, at Bafia and on Mt Nkolondom (Fig. 6).

Data records. Type series: HT♂, CMR-AD, Wack, Reg. Ngaoundéré, 05-2010 (TGMF); PTs: 1♀, idem, (TGMF); 1♀, ibidem, 09-2006 (RPTI); 1♀, ibidem, 10-2006, *Porpyronota deschambrei* m., Ph. Antoine det. 2009 (TGMF); 1♀, ibidem, 09-2005, *Porphyronota desfontainei* ?, Ph. Antoine det. 2009 (TGMF); 1♀, ibidem, Jun 2011 (PLGF); 1♀, CMR-AD, Reg. Ngaoundéré, (TGMF), 04.2016; 1♀, CMR-EN, Waza, Logune et Chari, Via Daniel Moore, 2009 (RPTI); ♂: CMR-CE, Mt. Nkolo, Reg. Yaounde, 10-12-2001 (TGMF). PTs: CMR-CE, 1♀, Bafia 600 (TGMF); 2♂, CMR-CE, Joko, Mittelkamerun, Le Moult vendit, (RBINS, SRSF); 1♂, CMR, Mbe [locality could be either in the AD or CE regions], XII-2000 (SRSF).

Remarks. One of the female type specimens carries a label with Antoine's identification as "*Porphyronota deschambrei*", probably indicating his recognition of this as a potentially new species. In confirmation of this, in a second female specimen there is a large label with the following Antoine's handwritten text "*Porphyronota sans doute nouveau, mais qui il seràit risqué de décrire sur une unique femelle ♀/♀ Diffère de P. desfontainei par – systeme de coloration – face dorsale mate – interstries impaire à peine ou pas du tout convexes*".

Specimens range in size between 15.8-18.8 mm (TL) and 9.1-10.5 mm (MW). As mentioned above, the dorsal chromatic variation in this species is rather extreme, from completely black to completely ochreous with black mottling, or even half black (elytra) and half ochreous (pronotum + scutellum), with the latter part either mottled or not (Fig. 2). Sexual differences are few and rather subtle, detectable only at the level of the protibia, which is slightly wider in female than in male, and on degree of convexity of the abdominal ventrites, generally more attenuated in the male.

Regarding period of adult activity, the specimens known so far have been found from April to December. It is thus possible that adults may emerge during the whole year, with peaks in flying activity probably following major rainfall events. The area of most current findings, Wack, is located in the north of the Adamaoua Plateau, at about 1200 m altitude, which is characterized by a typical Sudano-Guinean climate, with the dry season extending from November to March and the wet season from April to October (Atougour et al. 2019). Nothing is known about the ecology of this species, but it is possible that like other montane members of this genus it may utilize herbivore dung as a substrate for larval development (Holm 1990; Perissinotto 2012).

***Porphyronota desfontainei* Antoine, 1999**
(Figs 3, 6)

Porphyronota desfontainei Antoine, 1999: 4; Beinhundner 2017: 572; Krajčík 2024: 160.

Distribution. Initially described from the North-West Region of Cameroon (Antoine 1999), it has now been reported also from its South and West regions (Fig. 6).

Data records. Type series: HT♂+AT♀, CMR-NW, Xl-1998, Desfontaine leg. (MRAC); PTs: 1♂+1♀, ibidem Xll-1998, Desfontaine leg. (GBEG). Other records: 1♂, CMR-SU, Mvaa Extreme, Dec 1967 (TGMF); 1♀, CMR-OU, Plateau Kounden, Oct 1990 (TGMF); 1♂, CMR-NW, Oku Din, 1200 m, Nov 2009 (PLGF); 1♂+1♀, CMR-NW, Mt Oku Kilum, Ijim fst, Dec 2013 (PLGF).

Remarks. Antoine (1999) regarded this species as most closely resembling *P. cinnamomea* (Afzelius, 1817) and *P. nyassica* var. *imitatrix* Ondrej, 1919, differing from each of these mainly in its clypeal, mesosternal and aedeagal shapes. Specimens range in size from 14.3-16.3 mm (TL) to 8.5-9.2 (MW) (Antoine 1999; Beinhundner 2017). The dorsal habitus is rather constant in this species, changing only slightly in the density of black mottling, particularly on the pronotal disc, where the pattern can be more or less contiguous and include or not a medial elongate macula. The scutellum too generally exhibits a median, longitudinally elongate macula, but this is notably missing at least in one female specimen. No nigrito forms have been reported yet for this species.

Females analyzed in this study differ from their male counterparts by exhibiting a wider protibia, more convex abdominal ventrites and a tranversely elongate ochreous spot on the lateral margins of abdominal ventrites 2-6. Adult activity has so far been recorded from October to December, but it is most likely that it may actually extend to most of the year. The larval stages remain unknown.

***Porphyronota cinnamomea* (Afzelius, 1817)**
(Figs 4, 6)

Cetonia cinnamomea Afzelius, 1817: 48.

Diplognatha cinnamomea (Afzelius). Gory & Percheron 1833: 51, 126; Harold 1879: 78.

Diplognatha holoserica Bainbridge, 1842: 216; Schaum 1849: 285; Schenkling 1921: 345; Holm 1990: 123.

Porphyronota cinnamomea (Afzelius). Burmeister 1842: 623; Schenkling 1921: 350; Holm 1990: 123; Beinhundner 2017: 569; Krajčík 2024: 159.

Porphyronota cinnamomea f. *holosericea* (Bainbridge). Rigout & Allard 1992: 34.

Porphyronota cinnamomea var. *nigra* Kraatz. Moser 1908: 255.

Distribution. This species is known mainly from West Africa. Most available material originates from Bénin, Burkina Faso, Guinea, Ivory Coast, Sierra Leone and Togo

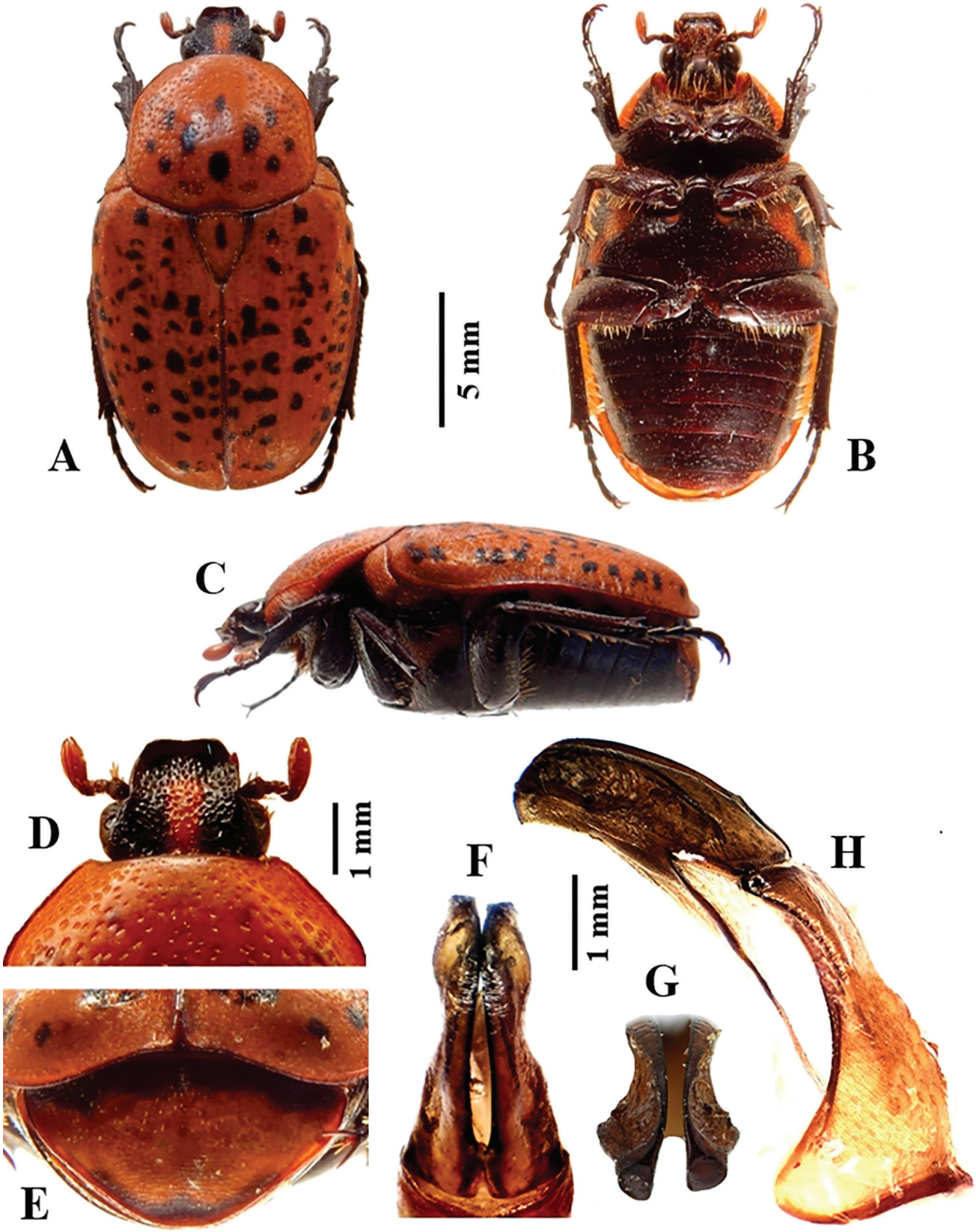

Fig. – 1 *Porphyronota antoinei* **sp. nov**., HT♂: dorsal habitus (**A**); ventral habitus (**B**); lateral habitus (**C**); clypeus (**D**); pygidium (**E**); parameres, dorsal view (**F**); parameres, frontal view (**G**); parameres, lateral view (**H**). Photos: Lynette Clennell.

Fig. – 2 *Porphyronota antoinei* **sp. nov**.: Alternative chromatic forms with various degrees of dark pigmentation. Photos: Lynette Clennell.

(Fig. 6). There is also a doubtful record of a female of this species from the Central African Republic. As the knowledge of this genus is still poor and several new species have only been recently described, most of the reports of *P. cinnamomea* from other countries such as the Congos, Uganda, Rwanda and Burundi (Holm 1990; Sakai & Nagai 1998; Beinhundner 2017) should be taken with caution, especially those with old citations. Although the species has been reported from Cameroon before (cf. De Lisle 1945; Sakai & Nagai 1998), only the most recent data reported here below have confirmed its presence in the country through adequate identification. As most of the historical specimens could not be accessed on this occasion, their identification remain doubtful, especially on the basis of the new species described herein from the same region.

Data records. Type series: *P. cinnamomea* – LT+PLT, Togo (ETHZ*)*; *P. holoserica* – HT, Sierra Leone, No. 825 (HECO). Other records: 1♀, BEN, Atlantique, Niaouli Attogon, XI-1996, P. Le Gall leg. (PLGF); 1♀, BEN, Borgou, Route Djougou W Parakou, VI-1996, P. Le Gall leg. (PLGF); 1 ind, BEN, Borgou, Wari Mapo, VI-2005, Dupont (J. Dalmon coll); 1♂, BEN, nord, IX-2009, T. Severin (SRSF); 2♀, BEN, Zou, Kilibo 20km S Tchaourou, XI-1995, P. Le Gall leg. (PLGF); 1♀, BFA, Bobo Dioulasso, Pérel, 8.1984, R. Lang (GBEG); 18 inds, CIV, Comoé, Oct 1998, Ph. Moretto leg. (RPTI, TGMF); 2 ind., ibidem, IX.1997, Ph. Moretto leg. (TGMF); 1♂, ibidem, 08.2002, Leg. P. Moretto (GBEG); 1♂, CIV, Ganse, 10.01.1993, Col. J. Rautenstrauch (GBEG); 2♂+16♀, ibidem, 1990, leg. W.D. Gaiser (GBEG); 54♂+84♀, CIV, Gansé Issia, Coll. Gaiser (GBEG); 1♀, CIV, Mankono (Bouche), 4.1978 (GBEG); 5♂+3♀, CIV, Foret de Banco, Coll. Gaiser (GBEG); 1♀, CIV, Alepe, leg. Gaiser (GBEG); 1♀, CIV, Lamto, 15-XI-1983, P. Le Gall leg. (PLGF); 3♂+5 inds, CIV, Dimbokro, Le Moult Vendit, I.G. 12595 [1 ind. det. cinnamomea Ruter G. 1962] (RBINS); 1♂+2♀, CIV, P.N. de la Comoe, X-1998, F. Rousset leg., Ex Coll. R. Alexis (RBINS); 3 inds, CIV, Sassandra, V-1999, F. Rousset leg. , Ex Coll. R. Alexis (RBINS); 2♂+4♀, CMR-EN, Mokolo, VII-2011, P. Le Gall leg. (PLGF); 1♂, CMR-EN, Rhumsiki, V-2011, P. Le Gall leg. (PLGF); 1♀, CMR-CE, Yoko, Samm. Colin (GBEG); n. inds, CMR-ES, Batouri (De Lisle 1945: 91); n. inds, CMR-CE, Bafia (De Lisle 1945: 91); 1♂, CMR-NO, Garoua, 1948, J. Cantaloube (Sakai & Nagai 1998: 333); 1♀, COG, Voka, 23.V.1977, G. Onore leg (Sakai & Nagai 1998: 333); 1♀, GIN [no locality], Ex collection Dr Vincent Allard, received from Christophe Allard 21.II.2015 (GBEG); 1♂, GIN {no locality], Ex coll Janson-coll Candèze (RBINS); 1 ind., GHA, Hohoe, 18 Aug 2019 8:19, Hannes Öhm (https://www.inaturalist. org/observations/65228418); 1♀, GIN, Kindia, 3-12.11.1962, Dr Šabacký leg. (PMBC); 2♂+1♀, 8-18.11.1963, Dr Šabacký leg. (PMBC, GBEG); 1♀, ibidem, 8-16.6.1964, Dr Šabacký leg. (PMBC); 1♂, SLE, Nimini Hills, 5 Km W Niaiama, 8.31.594N 11.06.863S, 637 m, 6-7.5.2013, P&B Malec leg. (PMBC); 1♀, SLE, 1975 [no locality], Ex collection Dr Vincent Allard, received from Christophe Allard 21.II.2015 (GBEG); 2♂+1♀, TGO, Badou, Dayes, X.1992, G. Goergen leg. (RPTI, TGMF); 1 ind., TGO, Kpalime, X.1992 (TGMF); 1 ind., TGO, Ahlon Forest, VI.2003 (TGMF); 1♀, TGO, Kouma Konda, 22.11.2011,

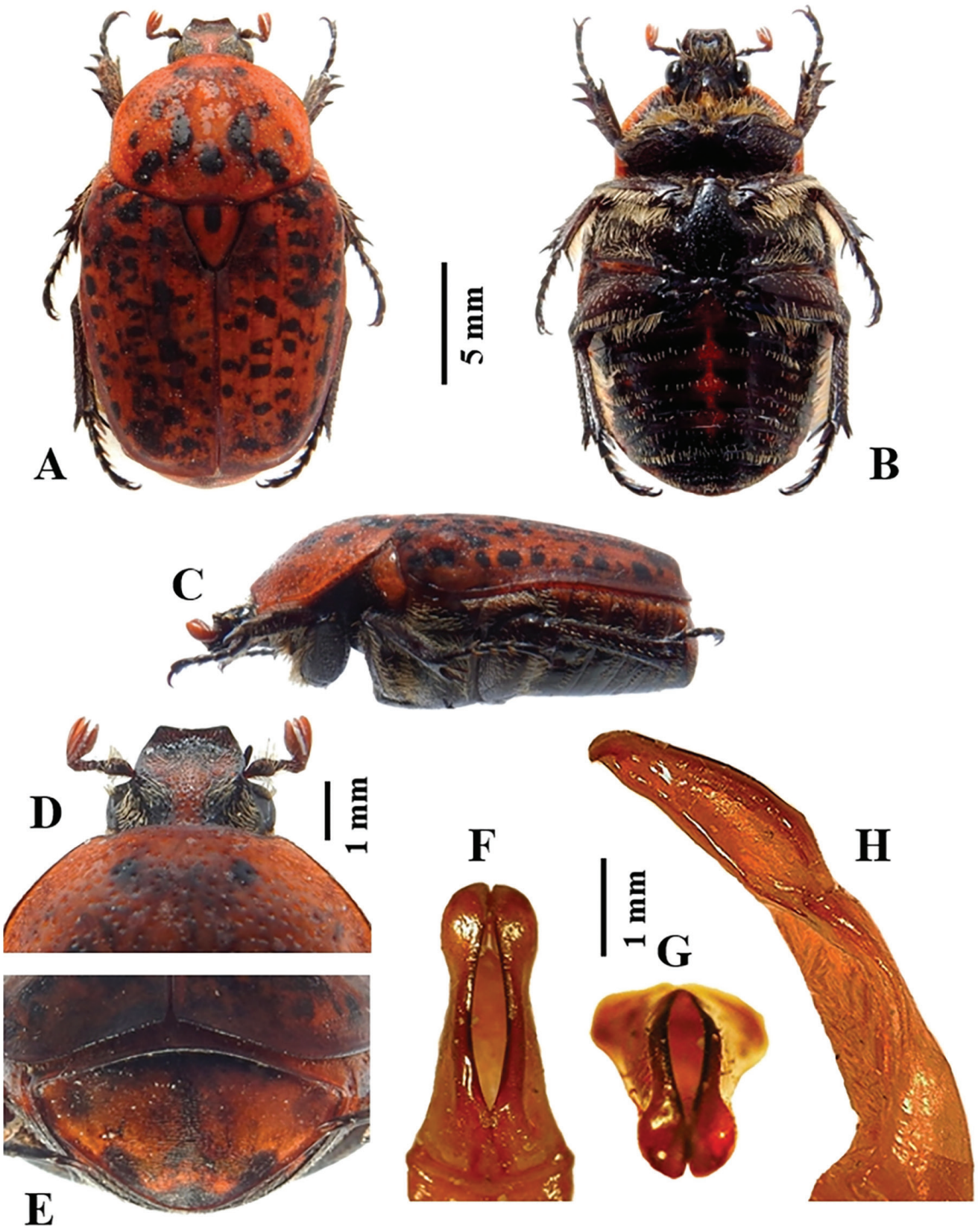

Fig. – 3 *Porphyronota desfontainei* Antoine, 1999, ♂: dorsal habitus **(A)**; ventral habitus **(B)**; lateral habitus **(C)**; clypeus **(D)**; pygidium **(E)**; parameres, dorsal view **(F)**; parameres, frontal view **(G)**; parameres, lateral view **(H)**. Photos: **A-E**, Lynette Clennell; **F-H**, Gerhard Beinhundner.

Local Collector (PMBC); 3♂+2♀, TGO, Dovota, 29.X.2014, leg. E. Pekele (GBEG); 1♀, TGO, Foret de Dametui, 10.1989 (GBEG); 1♀, TGO, Plateau de Dayes, 10.1989 (GBEG); 1 ind., ibidem, III-1996, Ex. Coll. A. Drumont & Coll. R. Alexis (RBINS); 1♀, TGO, [no locality], Ex collection Dr Vincent Allard, received from Christophe Allard 21.II.2015 (GBEG); 2 inds, TGO, Togoland, 1892-1893, L. Conradt leg. [1 ind. det. cinnamomea Moser 1908] (RBINS); 3 inds, TGO, Bismarckburg, 28/30-X-1892, L. Conradt leg. [1 ind. det. cinnamomea Moser 1908] (RBINS); 1♂, TGO, Région des plateaux, Danyi, G. Toussah leg., IV-2008 (SRSF); 1♂, ibidem, Kouma Apoti, G. Toussah leg., III-2008 (SRSF); 1♀, ibidem, Tové-Dzigbé, G. Toussah leg., V-2009 (SRSF); 1♀, TGO, ibidem, Tono, G. Toussah leg., IX-2011 (SRSF).

Remarks. Specimen size ranges from 12.1-18.3 mm (TL) to 7.2-10.9 mm (MW). The colour pattern varies little in ornamented ochraceous individuals, mainly in the size of the black maculae of the pronotal disc. However, predominantly to completely black forms are observed in the var. *holosericea* (cf. e.g. Beinhundner 2017), which apparently occurs across the entire range of distribution of the species, albeit with far less frequency than the nominal form. The period of adult activity recorded thus far is spread throughout the year, with apparent peaks in May-June and October-November. The immature stages are yet undescribed.

Holm (1990) described *Porphyronota cinnamomea angolensis* from Angola and Zambia. The misplaced HT specimen of this taxon has now been traced in the TMSA, and along with a small PT female (about 1 cm long) housed in the MRAC, has now been analysed in detail. As already illustrated in Holm (1990: 116, figs 59 vs 65) this taxon shows a substantial difference in the apical area of its parameres, by comparison with those of the nominal subspecies. In particular, the apex of *P. c. angolensis*, shows a lateral expansion both in its dorsal and ventral lobes; it also lacks the dark hook-like projection which is typical of *P. cinnamomea* s. str. This, combined with its remarkably disjunct distribution from that of the nominal "subspecies" and the other significant differences already highlighted by Holm himself, namely at the level of elytral-pronotal maculation, scutellar sculture, colour of the mesometasternal protrusion and presence of yellow spots on thoracic ventrites (Holm 1990: 123-124), makes the case for an upgrade of *P. angolensis* **stat. nov.** to species level.

***Porphyronota maculipennis* Moser, 1916**
(Figs 5, 6)
Porphyronota maculipennis Moser, 1916: 148; Schenkling 1921: 350; De Lisle 1945: 91; Beinhundner 2017: 575; Krajčík 2024: 160.

Poecilophila maculipennis (Moser). Rigout & Allard 1992: 33; Sakai & Nagai 1998: 332.

Porphyronota hebraea maculipennis Moser. Holm 1990: 119.

Distribution. Originally described from Yoko in central Cameroon, it is now known from most regions of the country, with isolated records reported from neighbouring Nigeria and the Central African Republic, but also from as far as Kenya and Uganda (Fig. 8).

Data records. Type series: HT, [Cameroon]: Kamerun, Yoko, 14.V.1910, Colin leg. (ZMHB). Other records: 1♂+1♀, CMR-AD, Ngaoundéré, 20.VIII.1967 (Sakai & Nagai 1998: 332); 1♀, ibidem, VI-2001 (SRSF); 2♂, ibidem, V/XI-2023 (SRSF); 1♂+2♀, ibidem, VII, 2007, Via D. Moore (RPTI); 1♂, ibidem, 06.2006, Via T. Garnier (RPTI); 1♀, ibidem, 7.1966, Ex collection Dr Vincent Allard, received from Christophe Allard 21.II.2015 (GBEG); 1♂+1♀, ibidem, 3.1967 (GBEG); 1♂, ibidem, 12.1980 (GBEG); 1♂, ibidem, 10.10.2007, P. Haller leg. (GBEG); 1♀, ibidem, VI.2011 (GBEG); 4 inds, ibidem, 20-08-1967 (TGMF); 1♂, CMR-CE, Sa'a Forest, 3.1995, Ex collection Dr Vincent Allard, received from Christophe Allard 21.II.2015 (GBEG); 1♂+2♀, ibidem, 3.1993, Ex collection Dr Vincent Allard, received from Christophe Allard 21.II.2015 (GBEG); n. inds, CMR-SU, Lolodorf (De Lisle 1945: 91); CMR-CE, 1♂, Yaoundé, IV-1985, Coll. V. Allard (RBINS); 1♂, CMR-NW, 11.1998, Leg. M. Desfontaine (GBEG); 1♀, CMR, Mlouti (DCSF); 1 CMR [No locality], II.1993, Ex collection Dr Vincent Allard, received from Christophe Allard 21.II.2015 (GBEG); 1♂+1♀, CMR-AD, Mt. Nganha, 50 km est de Ngaoundéré (DCSF); 2♂, CMR-AD, Wack, reg. Ngaoundéré (DCSF); 1 ind., ibidem, 05-2006 (TGMF); 1 ind., ibidem, 06-2015 (TGMF); 1♀, CMR-AD, Wack, 07°45'09''N 13°31'37''E, 590 m, V-2009 (PLGF); 1♀, CMR-AD, Meigdougou, 6°23'46''N 14°14'29''E, 1050 m (PLGF); 1♀, CMR-SW, Mamfe, XII.2011, Coll. A. Rautenstrauch (GBEG); 1♂, CMR-CE, V/2010 (PMBC); 1♂+1♀, CMR-CE, Nditam, 5°19'57''N 11°19'49''E, 670 m, IV/V-2019, E. Juhel leg. (PLGF); 1♂+1♀, ibidem, V-2020 (PLGF); 1 ind., CMR-CE, Yoko, 5°23'52''N 12°17'37''E, 710 m (PLGF); 9 inds, CMR-CE, Sengbe, 6°03'13''N 12°28'26''E, 800 m, 2024 ex-larva (PLGF, GFGF); 2♂+2♀, CMR-OU, Oku-Din, 6°18'02''N 10°30'58''E, 1200 m, V-2008 (PLGF); 2♂+2♀, ibidem, VI-2009 (PLGF); 1♂, CMR-ES, Meiganga, 06°32'44''N 14°16'07''E, 1060 m (PLGF); 1♀, CMR-OU, Bertoua Nord, 4°39'01''N 13°46'37''E, V-2010 (PLGF); 1♀, CMR-AD, Digou Mt Nganha, IV-2015 (PLGF); n inds, ibidem, IV/V-2017 to 2022 (PLGF); 2♂, CAF, PK 27, Nord Bangui (DCSF); 1♂, KEN, Kerio Valley, 8.1982, Ex collection Dr Vincent Allard, received from Christophe Allard 21.II.2015 (GBEG); 1♀, NGA, Kaduna, 6.1983 (GBEG); 1♀, UGA, Yumbe, Kei Mt, J.P. Lequeux leg., III-2010 (SRSF).

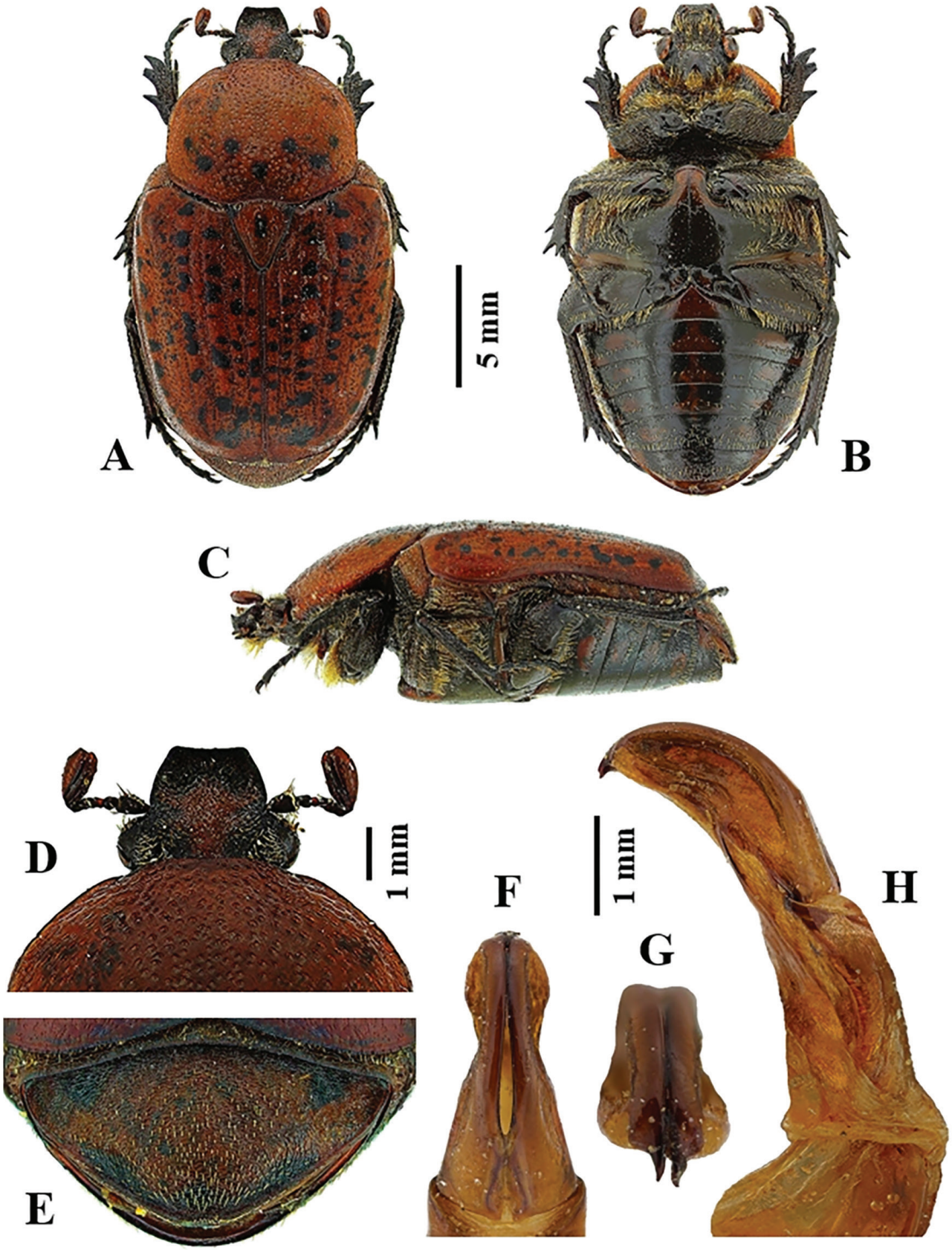

Fig. – 4 *Porphyronota cinnamomea* (Afzelius, 1817) ♂: dorsal habitus **(A)**; ventral habitus **(B)**; lateral habitus **(C)**; clypeus **(D)**; pygidium (**E)**; parameres, dorsal view **(F)**; parameres, frontal view **(G)**; parameres, lateral view **(H)**. Photos: Sèbastien Rojkoff.

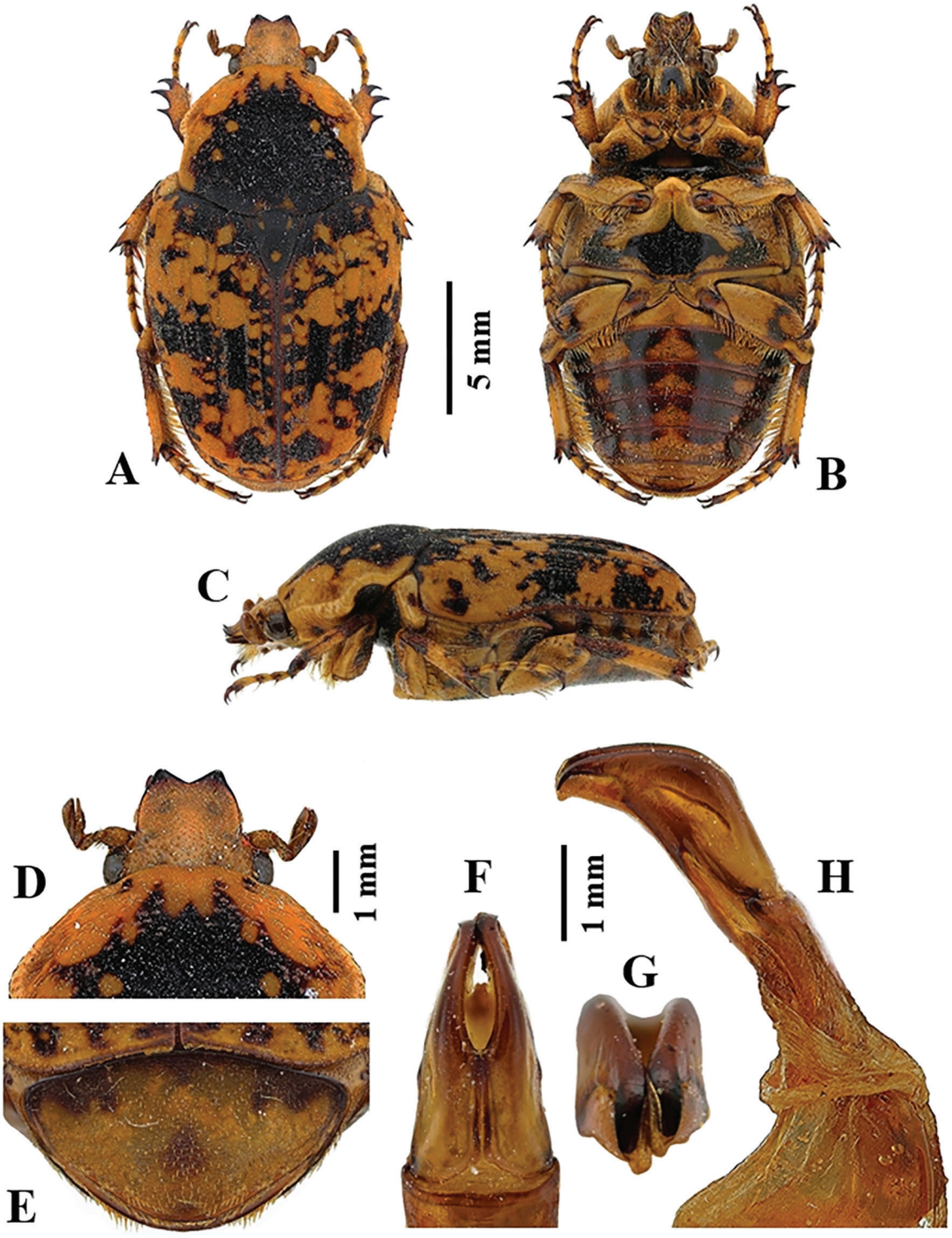

Fig. – 5 *Porphyronota maculipennis* Moser, 1916, ♂: dorsal habitus **(A)**; ventral habitus **(B)**; lateral habitus **(C)**; clypeus (**D)**; pygidium (E); parameres, dorsal view **(F)**; parameres, frontal view **(G)**; parameres, lateral view **(H)**. Photos: Sébastien Rojkoff.

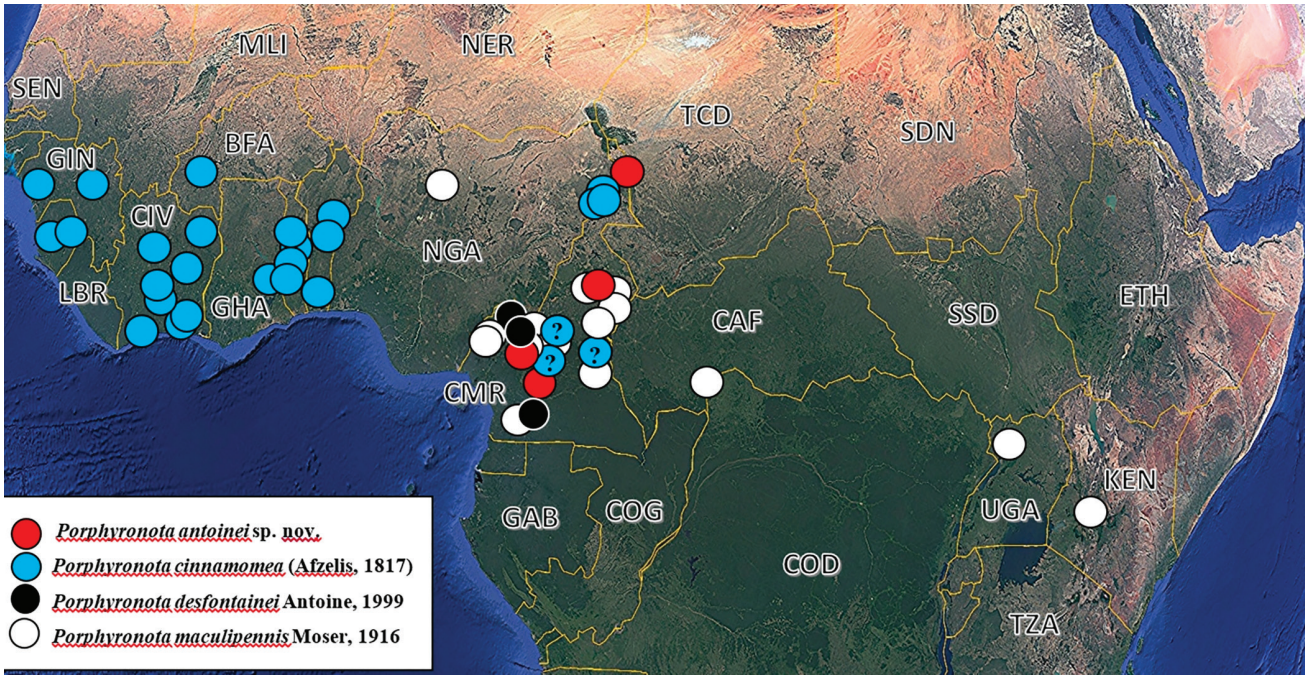

Fig. – 6 Known distribution range of *Porphyronota antoinei* **sp. nov**., *P. desfontainei* Antoine, 1999, *P. cinnamomea* (Afzelius, 1817) and *P. maculipennis* Moser, 1916 within Tropical Africa, with focus on Cameroon (Map: Google Earth Pro with image from Landsat/Copernicus 12/14/2015). AGO, Angola; BEN, Benin; BFA, Burkina Faso; CAF, Central African Republic; CIV, Côte d'Ivoire: CMR, Cameroon; COD, Congo (Kinshasa); COG, Congo (Brazzaville); ETH, Ethiopia; GAB, Gabon; GHA, Ghana; GIN, Guinea; KEN, Kenya; NGA, Nigeria; SDN, Sudan; SEN, Senegal; SLE, Sierra Leone; SSD, South Sudan; TCD, Chad; TGO, Togo; TZA, Tanzania; UGA, Uganda. Question mark (?) indicates uncertain record.

Remarks. Specimens range in size from 16.8-20.0 mm (TL) to 9.6-11.4 mm (MW) (Sakai & Nagai 1998; Beinhundner 2017). *Porphyronota maculipennis* needs to be rehabilitated as proper species as already suggested by Rigout & Allard (1992), Sakai & Nagai (1998) and Beinhundner (2017), rather than be relegated as a subspecies of *P. hebraea* (Olivier, 1789)(see Holm 1990: 119). These two taxa are rather distinct morphologically and biogeographically very disjunct. Not only is *P. maculipennis* characterized by much darker and zoned dorsal maculae as well as more concave lower pronotal sides than *P. hebraea*, but it also exhibits a more compressed mesosternal lobe and aedeagal parameres with dorsal lobes shorter than the ventral ones, by comparison with the latter species (cf. Rigout & Allard 1992: 90). There is also no substantiation to the statement reported in Holm (1990) that in Zaire (now Democratic Republic of Congo) "all intermediate forms between *P. hebraea* and *P. maculipennis* are found". Indeed, none of the other authors have ever included Congo-Kinshasa or Congo-Brazzaville as part of the distribution range of either species.

Porphyronota hebraea, possibly the most commonly recorded species of the genus, is widespread in southern and East Africa and, although this was not reported in the distribution range of either Holm (1990) or Beinhundner (2017), it actually extends as far north as Ethiopia, as recently confirmed by a series of specimens obtained from "Nazreth, Shoa" (*teste* Di Gennaro) and "Sidamo, Agere Mariam" (SRSF). This was actually mentioned already in the works of Péringuey (1907), Distant (1911) and Schenkling (1921) (as "Abyssinia/Abessinien"), but somehow ignored by subsequent authors. Holm (1990) and Holm & Marais (1992) reported the species from South africa, Namibia, Angola, Zimbabwe, Zambia, Mozambique, Lesotho and eSwatini. More recently, Beinhundner (2017) reported it occurring in Tanzania and Serrano et al. (2020) in central Angola. A few observations posted on the platform iNaturalist have also established its presence in Botswana (e.g. https://www.inaturalist.org/observations/17792913; /20306155), while confirmed records from Rwanda have also been recently obtained (SR, pers. obs.).

Discussion

The genus *Porphyronota* Burmeister, 1842 remains relatively poorly known, both from a systematic and a bioecological point of view. This is partly due to the scarcity of reference material available for most of the ground-dwelling species and the superficial similarity among several species, which makes their identification particularly challenging (Holm 1990; Perissinotto 2012). Thus, it is not surprising that new taxa are recognised and described on a regular basis. The Cameroonian region is a case in point, with the new potentially endemic species described herein and a second species, *P. desfontainei* Antoine, 1999,

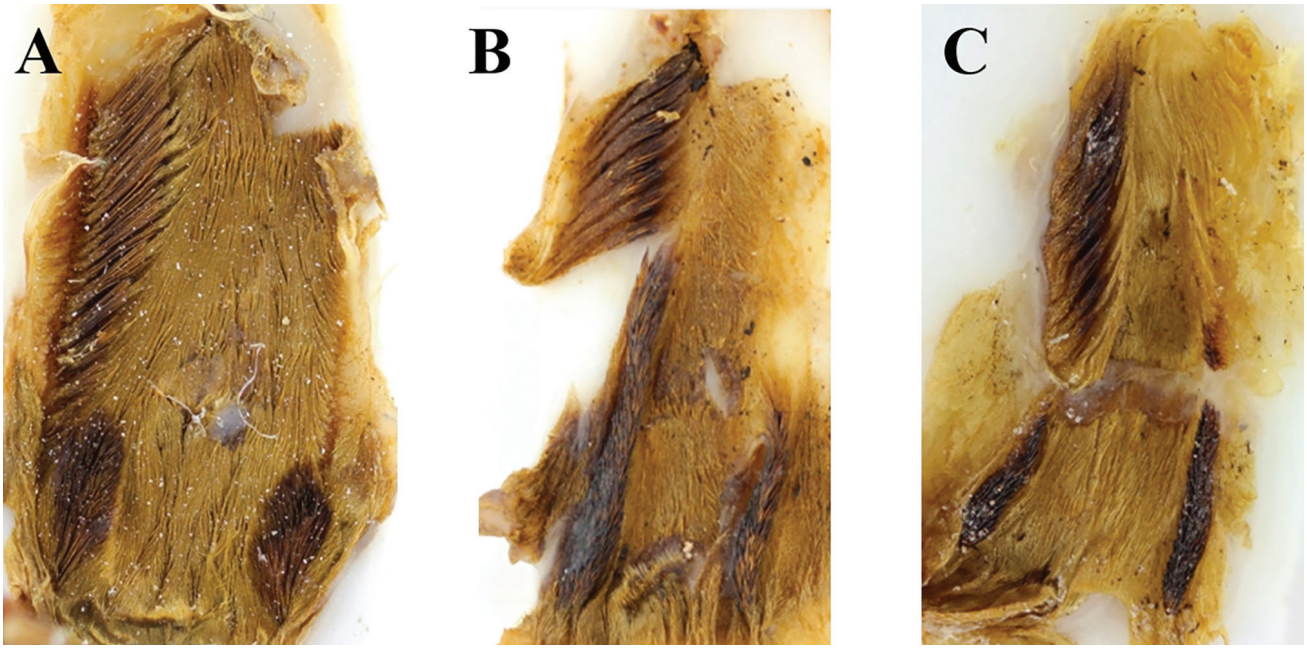

Fig. – 7 Examples of endophallic internal structure in *Porphyronota* species (as the endophallus is dissected from the ventral side, the photos should be interpreted by reversing the sides): *P. maculipennis* **(A)**; *P. cinnamomea* (**B**); *P. desfontainei* (**C**). Photos: Sébastien Rojkoff.

discovered at the turn of the century thanks to the efforts of a few determined collectors and their ability to involve indigenous knowledge in their searches.

An analysis of the interior of the endophallus, carried out for the first time during this study, shows that the species of *Porphyronota* from Cameroon exhibit two different basic conformations. The first shows a relatively homogenous formation of scale-like setae on the right side extending almost all the way to the apex, followed by an oblong area of shorter setae with a symmetric equivalent on the left side (Fig. 7 A). This type occurs only in *P. maculipennis* among the Cameroonian species, but is also seen in *P. hebraea* where a more oblong structure results in an almost spiny setation across its whole surface. The second conformation is typical of *P. cinnamomea* and is made of a right scale-like formation of long setae extending half way to the apex, continuing then in the form of two distinct, long and parallel spiny columns (Fig. 7 B). These latter columns differ in length from each other depending on the species involved. This structure occurs also in *P. antoinei* and *P. desfontainei* (Fig. 7 C). The conformation of the internal surface of the endophallus needs to be studied more systematically, and possibly used as an extra diagnostic character alongside the structure of the aedeagal parameres.

The separation of the members of *Porphyronota* into two broad groups on the basis of endophallic structure seems to be corroborated by the bio-ecological characteristics of the genus. The first includes mainly forest to savanna specialists, generally feeding as adults and encountered regularly in baited traps, at sapping flows or on flowers. The main species representing this category are *P. maculatissima* s.l. (Boheman, 1860), *P. hebraea* and *P. maculipennis*, which are also the most recorded species and best represented in collections. Essentially, these are the species previously grouped under the genus *Poecilophila* Kolbe, 1893, which was eventually synonymized with *Porphyronota* by Holm (1990), as earlier suggested by Péringuey (1907).

Porphyronota maculatissima s.l. is a typical forest dweller, commonly observed in fruit-baited trap, at sap flows and on flowers in dense coastal and inland forests (Holm 1990; Holm & Marais 1992; RP & SR pers. obs.). According to Serrano et al. (2020), some adult specimens of *P. maculatissima* s.s. were attracted to artificial light sources in Angola. This, however, has been observed with a variety of cetoniine species (RP & SR pers. obs.) and is likely to reflect an accidental disruption of the living environment of these beetles by artificial light pollution. Larval stages, pupae and adults have also been retrieved inside rotten wood (Péringuey 1907; Distant 1911; RP pers. obs.), pointing at this as the main breeding ground for the species. Adults of *P. hebraea* have been recorded feeding on a variety of fruits (peaches, apples, fermenting banana and *Ficus* sp.), flowers (*Rosa* sp., *Terminalia sericea*, *Cirsium vulgare*, *Protea caffra*) and other plant tissue (e.g. stems of *Solanum* sp, *Combretum* sp., and *Berkheya* sp.; leaves and heads of *Zea mais*) (Péringuey 1907; Distant 1911; Holm 1990; Holm & Marais 1992; Malec & Šípek 2016, 2017; Serrano et al. 2020). It is often found flying in grassland savanna, or breeding in the soil and in cow dung; it also enters beehives (Holm 1990). Juhel (2010) reported rearing this species in Zambia from larvae found in elephant dung in Zambia. In Cameroon, the closely related *P.*

maculipennis was also recently bred from larvae found in cattle dung (SR per. obs.). In captivity, adults of *P. hebraea* have been kept alive for periods of up to two years on a diet of fermenting fruit (P. Malec pers. comm.).

The second group is composed of species dwelling in grassland or fynbos habitats, that apparently do not feed at the adult stage and spend most of their lifespan underground, often associated with herb roots, herbivore dung or plant litter accumulations in soil. In Cameroon, none of the *Porphyronota* species recorded thus far has yet been collected in fruit traps, but only in flight or perched on bushes (T. Garnier pers. comm.). A typical example of mountain grassland species is *P. variegata* (Boheman, 1857), which in South Africa has been repeatedly collected in flight, but also under cow dung and underground on the roots of an unidentified *Senecio* sp. (Asteraceae) (Perissinotto 2012; Malec & Šípek 2017). It seems likely that this and other related species may actually feed on the roots of these plants, but there is no evidence yet in support of this hypothesis. Like most species in this group apparently do, *P. variegata* undergoes a period of underground dormancy during the dry season, in order to save energy for the activities that will ensue immediately after rainfall events, when the beetles will eventually emerge from the soil to undertake their reproductive and dispersal functions. Under laboratory rearing conditions, its entire life cycle is very fast, lasting usually 1–2 months from egg to adult and the latter is remarkably long-lived, surviving for up to one year in captivity while apparently also feeding on fermenting banana (Malec & Šípek 2017; P. Malec pers. comm.).

In summary, the differences observed in the structure of the endophallus and bioecological properties, add to those originally described in favour of the separation of the species into two genera or at least subgenera, namely *Porphyronota* Burmeister, 1842 and *Poecilophila* Kolbe, 1893. The original characters highlighted in support of this separation were focused mainly on the very deplanate dorsal shape (rather than convex) and the partly obsolete premarginal groove on the subhumeral lobe of the elytra that characterize the members of the latter taxon (Kolbe 1893; Péringuey 1907; Holm 1990). We defer, however, a final decision on this until more comprehensive analyses of the two groups of species are carried out with advanced molecular DNA techniques.

Concerning conservation issues relevant to the genus, *Porphyronota carnifex* (Fabricius, 1781) is a fynbos species that may depend on the availability of dung middens of the Cape grysbok (*Raphicerus melanotis*), or related indigenous antelope species, for its larval development, as reported in Perissinotto (2012). Because of the drastic reduction in the populations size of these antelopes during the last century, *P. carnifex* is now an extreme rarity, with only a few observations recorded on iNaturalist in the past decade (e.g. https://www.inaturalist.org/observations/64360660, /136677923, /156836131, /177957525, /180425620). A similar fate seems to have occurred to *P. severini* s.s. in south-western Democratic Republic of Congo, including around the capital Kinshasa, from where it was recorded in fair numbers during the second half of the last century, but is now regarded as a rarity difficult to find (Rigout & Allard 1992). It is possible that this and other grassland-dwelling *Porphyronota* species have also developed a dependence on specific herbivore dung, and due to the escalating land use change and developmental pressure in their regions may now face local extinction.

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