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# A new species of *Chaetophilharmostes* from São Tomé (Guinea Gulf) with remarks on the generic status of the genus *Chaetophilharmostes* (Coleoptera, Scarabaeoidea, Hybosoridae, Ceratocanthinae)

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## Keywords :

Coleoptera; systematics;  
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Hybosoridae; Africa;  
Ceratocanthinae; São Tomé;  
*Chaetophilharmostes*; Benin;  
*filippii*; Gabon;  
new species; key to species.

**Abstract.** – *Chaetophilharmostes filippii* sp. nov. is described from São Tomé (São Tomé e Príncipe, Guinea Gulf) on the basis of two specimens collected in two localities in the northern portion of the island. Some remarks on the validity of the genus of *Chaetophilharmostes* Paulian, 1977 are provided. *Chaetophilharmostes chevalieri* (Paulian, 1937) is reported for the first time for Benin and an undescribed species of *Chaetophilharmostes* from Gabon is shortly discussed. A key to species is provided.

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## Introduction

The genus *Chaetophilharmostes* Paulian, 1977 was established to accommodate *Philharmostes chevalieri* Paulian, 1937 and is currently monotypic. Paulian did not characterize the new genus with a precise set of characters and the only character on the basis of which the genus seems to have been erected is the strong dorsal setation. The genus *Chaetophilharmostes* belongs to the "*Philharmostes*" generic group, firstly defined by Ballerio (2000) and then further supported by a cladistic analysis based on adult morphology (Ballerio & Grebennikov, 2016) and by molecular data (Grebennikov, 2019). If the "*Philharmostes*" generic group is well defined and represents a natural group, the genera included in this generic group are often ill defined, especially the monotypic genera occurring in the Guineo-Congolian rainforest block (*Chaetophilharmostes*, *Carinophilharmostes* Paulian, 1968, *Petrovitzostes* Paulian, 1977 and *Callophilharmostes* Paulian, 1968). Grebennikov (2019) recently highlighted that maintaining these genera renders *Philharmostes* non-monophyletic. *Chaetophilharmostes* is among the doubtful genera, being nested within non-monophyletic *Philharmostes*. The definitory character used by Paulian in its key to the genera (dorsal setation) does not occur uniquely in this genus: other species belonging to other genera of the "*Philharmostes*" group have dorsal setation, although usually shorter and finer. If dorsal setation cannot be considered to define this genus, then there are no other relevant characters (such as number of antennomeres, shape of pronotal fore angles, shape of head, shape of pronotum, sexual dimorphism) which could separate *Chaetophilharmostes* at least from the genus *Carinophilharmostes* Paulian, 1968.

The status of *Chaetophilharmostes* as a separate genus is therefore debatable. It is however beyond the scope of this paper reassessing the generic status of the taxa belonging to the "*Philharmostes*" generic group, and therefore we here provisionally accept the presence of large setation as a definitory character and retain *Chaetophilharmostes*, provided that the other two species discussed below are clearly morphologically very similar to *C. chevalieri* and that therefore they likely form a clade. *Chaetophilharmostes chevalieri* (Figs. 3a, b, 4a, 5, 6, 8, 9b) is known to occur in Ivory Coast (type locality: "Haut Sassandra") (Paulian, 1937; Paulian, 1946; Paulian, 1977), Guinea (Paulian, 1993), Liberia (Paulian, 1977) and Zaire (Basilevsky, 1955; Paulian, 1977; Paulian, 1979; Petrovitz, 1968 sub *Pterorthochaetes termitophilus* Petrovitz, 1968).

We have examined a specimen from Benin (Bénin, Attogon, forêt de Niaouli, 02 mai 2013, U.V., leg. Alain Coache, in coll. A. Coache, La Brillanne, France), first record for this country. In this paper we describe a second species of *Chaetophilharmostes*, attributed, with the caveats highlighted above, to this genus due to the presence of a strong dorsal setation and of the large body size of adults.

The first author has also examined a female clearly belonging to a third, still undescribed, species, from Gabon ("Belinga 22.3.63 H. Coiffait / Mission Biologique au Gabon P.P. Grassé Directeur / *Chaetophilharmostes* n. sp. Det. A. Ballerio '02" in coll. MNHN). This undescribed species is very well characterized by the presence of extremely dense large and wide scale-like setation covering pronotum and elytra as well as by the elytral lateral carina divided into three short blocks. The protibia is sharp with pointed apex, like in the genera *Callophilharmostes* Paulian, 1968 and *Petrovitzostes* Paulian, 1977 (Ballerio, 2006). Being a single female we don't deem appropriate to formally describe it although we here provide an image (Fig. 7).

## Reviewers :

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## Methods

Methods and terminological conventions follow Ballerio & Grebennikov (2016) and Ballerio (2021) and references therein quoted. Label data are provided verbatim, with a slash to separate labels. In giving collecting data for examined material, authors' comments are in square brackets. Photographs were taken with a Canon Eos D5 MII with a macro objective MP 65 mm. Multi-layer images were then assembled using Helicon Focus software and cleaned and unmasked using a photo processing software.

## Abbreviations

- EL: maximum elytral length;
- EW: maximum total elytral width;
- HL: maximum head length;
- HW: maximum head width;
- L: length;
- PL: maximum pronotal length at middle;
- PW: maximum pronotal width at middle;
- W: width;
- ABCB: Alberto Ballerio collection, Brescia, Italy;
- CAS: California Academy of Sciences collection, San Francisco, CA, USA;
- MHNL: Musée d'Histoire naturelle de Lyon (Musée des Confluences), CCEC, Lyon, France;
- MNHN: Muséum National d'Histoire Naturelle collection, Paris, France;
- MRAC: Musée Royal de l'Afrique Centrale collection, Tervuren, Belgium.

## Systematics

Family **HYBOSORIDAE** Erichson, 1847

Subfamily **CERATOCANTHINAE** Martínez, 1968

Tribe **CERATOCANTHINI** Martínez, 1968

Genus *Chaetophilharmostes* Paulian, 1977

### *Chaetophilharmostes filippii* sp. nov.

(Fig. 1, 2, 3c, d, 4b, 9a)

ZooBank: <http://zoobank.org/D5570049-A7A6-43A9-90E9-72C5DD0B97C4>

**Holotype**, ♂, deposited in the collection of the Musée des Confluences (Centre de Conservation et d'Étude des Collections), Lyon, France, labelled as follows:

/ Archipel de São Tomé et Príncipe, São Tomé: Monte Alêgre (Trindad), 27.10.2021, chasse nuit, ultra-violet et vapeur de mercure, 0°16'46.71"N - 6°40'51.94"E - 245 m, forêt tertiaire, plantations, proche de torrent /

/ *Chaetophilharmostes filippii* n. sp. det. A. Ballerio & A. Coache, 2022  
Holotypus ♂ /

Specimen glued on a card, male genitalia glued on a separate card same pin.

**Paratype**, 1 ♂ (in CASC):

/ CASENT 5001916 /

/ São Tomé and Príncipe, Ilha São Tomé, Palha Plantation near São Tomé town, Quinsinda, 0°18'59.37"N - 6°43'59.70"E - 26 m /

/ pitfall trap, May 2001 J. M. Ledford collector #555 Cal. Acad. Sci. Coll. STP-014 /

/ *Chaetophilharmostes filippii* n. sp. det. A. Ballerio & A. Coache, 2022  
Paratypus ♂ /

**Diagnosis.** – *Chaetophilharmostes filippii* sp. nov., due to the combination of long dorsal setation and large size falls within the genus *Chaetophilharmostes*. It can be differentiated from *C. chevalieri* (Paulian, 1937), the only other *Chaetophilharmostes*

species known thus far, by the following combination of character states:

- a) elytral lateral carina interrupted once (interrupted three times in *C. chevalieri*),
- b) the only interruption of elytral lateral carina is very short, placed in correspondence with the end of humeral area (in *C. chevalieri* the interruption in correspondence with humeral area is much wider),
- c) head punctation smaller (clypeus with some large simple punctures and frons and vertex with dense small strongly impressed simple punctures) whereas in *C. chevalieri* head punctation is larger and deeper, with several transverse short comma-shaped punctures on clypeus and other smaller comma-shaped impressed punctures on frons and vertex),
- d) pronotal disc punctation smaller than in *C. chevalieri*,
- e) pronotal lateral margin setation (setae much finer than the ones covering pronotum, whereas in *C. chevalieri* setae are clavate like on pronotal surface and only slightly smaller),
- f) elytral base with a hint of parasutural tubercle (absent in *C. chevalieri*),
- g) elytral parasutural punctation on basal and median third: more or less similar to the punctation of remaining portion of basal and median third of elytra in *C. chevalieri*, apart from the presence of few longitudinally oriented comma-shaped punctures, whereas in *C. filippii* sp. nov. is made of a mixture of longitudinally oriented comma-shaped punctures and simple punctures,
- h) elytral disc punctation (excluding parasutural punctation), made of horseshoe-shaped punctures with opening very small mixed to ocellate punctures (whereas in *C. chevalieri* the punctation is made of transverse horseshoe-shaped punctures with a broad opening),
- i) the shape of pronotal and elytral setae, which are pennate, i. e., their tip is sharp and pointed, in *C. filippii* sp. nov. and clavate in *C. chevalieri* (i.e., they thicken toward the tip and the tip is subtruncate).

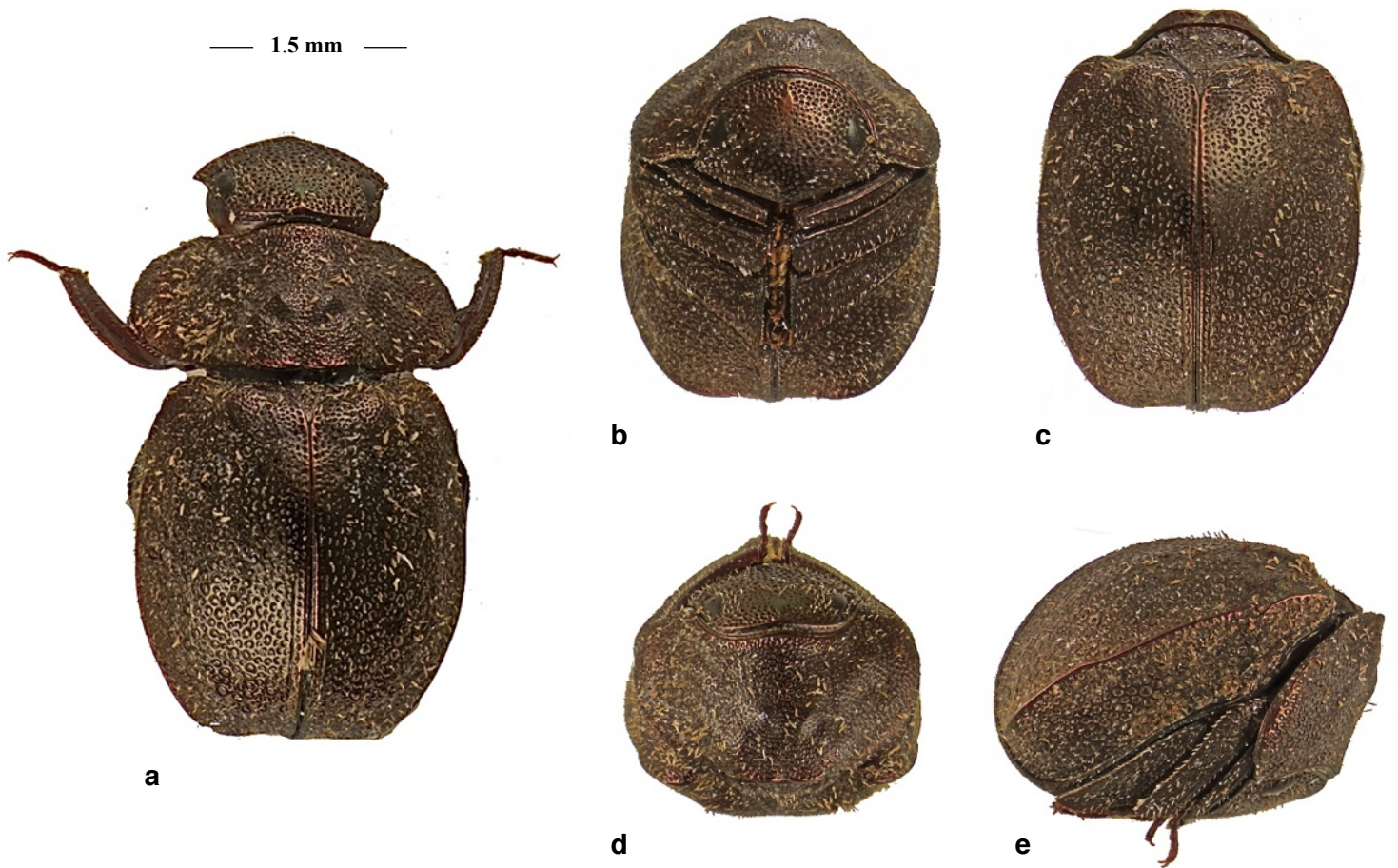
## Description of the holotype

**Dimensions.** – HL: 1.0 mm; HW: 1.5 mm; PL: 1.5 mm; PW: 2.7 mm; EL: 3.0 mm; EW: 2.8 mm.

**General aspect.** – Large sized volant Ceratocanthinae. Body weakly convex. Brown, shiny, dorsum with setigerous punctures bearing a relatively long pennate seta (40×), underside, tarsi and antennae reddish-brown, setation yellowish.

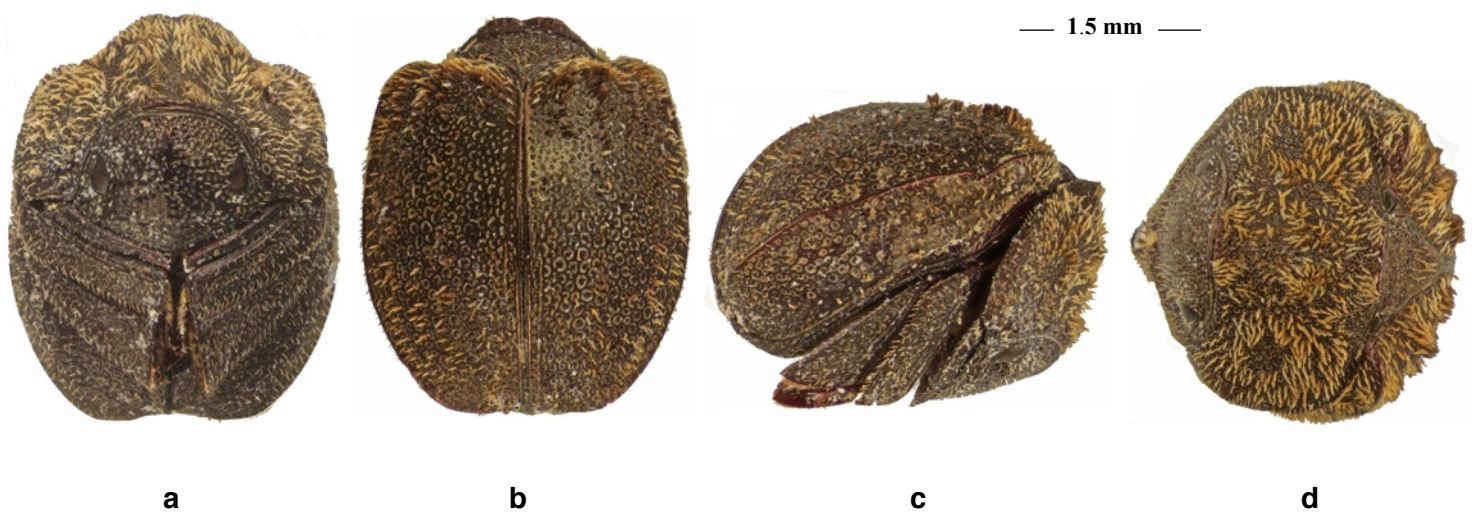
**Head.** – W/L ratio = 1.00; apical margin triangular with angle blunt and obtuse and sides weakly curved; genae distinctly produced outwards, acute; genal canthus complete, fused with the occipital portion of head; dorsal ocular area medium-sized, interocular distance about seven times the maximum width of dorsal ocular area, ventral ocular area large, clypeal surface covered by strongly impressed large simple (sometimes looking like a very short comma-shaped puncture) punctation, frons and vertex covered by strongly impressed dense simple (sometimes looking like a very short comma-shaped puncture) punctation, apart from a longitudinal subovoidal smooth area in the middle of frons. Interpunctural distance shorter than punctural diameter. Strongly impressed punctures simple on disc becoming then comma-shaped centripetally, fore margin with some transverse large comma-shaped punctures. Interpunctural distance of simple and comma-shaped strongly impressed punctures once or twice larger than the punctural diameter. Setation short and very fine. Antennae with ten antennomeres.

**Pronotum.** – Transverse (W/L ratio = 1.8), subtrapezoidal, weakly convex, surface irregular with two weak paradiscal callosities and base slightly raised to form a weak bilobate basal carina (sensu Ballerio, 2021), fore angles distinctly truncate, the whole pronotal margins marked by a continuous impressed line (circumnotal ridge) not visible from above along pronotal base; whole pronotal surface covered by impressed punctation: punctures on disc small and ocellate, sides of disc with larger ocellate punctures, sides of pronotum with larger



**Fig. 1.** *Chaetophilharmostes filippii* sp. nov., holotypus, ♂.

a. Dorsal view (distended). b. Ventral view (rolled up). c. Dorsal view (rolled up). d. Pronotum (rolled up). e. Lateral view (rolled up).



**Fig. 2.** *Chaetophilharmostes filippii* sp. nov., paratypus, ♂, rolled up.

a. Ventral view. b. Dorsal view. c. Lateral view. d. Pronotum.



horseshoe-shaped punctures with opening directed outwards; interpunctural distance shorter than punctural diameter. Setation pennate and erect. Lateral margins with a row of short fine setae (strongly worn).

**Scutellum.** – Covered by several small impressed ocellate punctures, each one bearing a short fine erect seta, interpunctural distance inferior than punctural diameter.

**Elytra.** – Longer than wide (W/L ratio = 0.93); subrectangular (dorsal view); humeral callus visible and marked by the elytral lateral carina; base with a weakly developed parasutural tubercle; elytral surface slightly convex, covered by dense (interpunctural distance much shorter than punctural diameter) impressed punctation. Elytral parasutural punctation on basal and median third made of a mixture of longitudinally oriented comma-shaped punctures and simple punctures, remaining elytral surface made of large horseshoe-shaped punctures with opening very small mixed to some large ocellate punctures. Lateral carina distinct, thick, sharp and almost complete, with only one short interruption in correspondence with the end of the humeral area (lateral view). Pseudoepipleura covered by dense ocellate impressed punctures; interpunctural distance inferior than punctural diameter. Elytral setation pennate and erect.

**Wings.** – Fully developed.

**Sexual dimorphism.** – Unknown due to the lack of available females. The two males examined display the usual secondary sexual dimorphism found in other species of the *Philharmostes* generic group, i.e., male protibiae without sharp tip, and mesotibial inner apical spur bent inwards at a right angle.

**Male genitalia.** – Aedeagus with parameres asymmetrical, with distinct basal apophysis, as in Fig. 3c-d; spiculum gastrale almost triangular as in Fig. 4b.

**Variability.** – The paratype (Fig. 2a-d) is very similar to the holotype in size, shape and color. It differs from the holotype in having slightly denser head punctation, a slightly shorter interruption of the elytral lateral carina and in having better preserved dorsal setation, the latter tend to form distinctive tufts of erect setae in correspondence with pronotal and elytral reliefs, such as in the case of the elytral parasutural tubercle. Lateral margins of pronotum with a distinctly visible row of short fine setae.

**Etymology.** – Noun in the genitive case. Named after Gérard Filippi (Ventrebren, France), president of the “Association Microland” and organizer of the entomological research in São Tomé e Príncipe, which led to the discovery of this new species.

**Distribution and habitat.** – Known from two localities in the northern portion of the island of São Tomé (República Democrática de São Tomé e Príncipe). The area is characterized by the presence of plantations and disturbed tertiary rainforest. The holotype was collected with a light trap while the paratype with a pitfall trap.

**Remarks.** – This is the first Ceratocanthinae known to occur on São Tomé island. The only other Ceratocanthinae known to occur in the Guinea Gulf islands is *Melanophilharmostes poggi* Ballerio, 2016 from Annobón/Pagalú island (Ballerio, 2016).

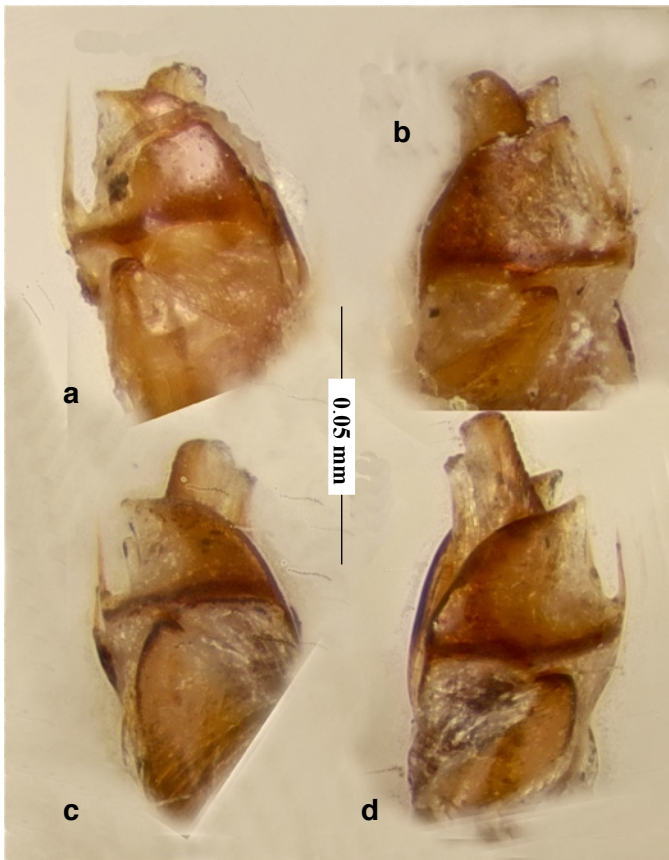


Fig. 3. Parameres in lateral view.

a & b. *C. chevalieri*, ♂ (Guinea, Monts Nimba, MNHN).  
c & d. *C. filippii* sp. nov., holotypus, ♂.

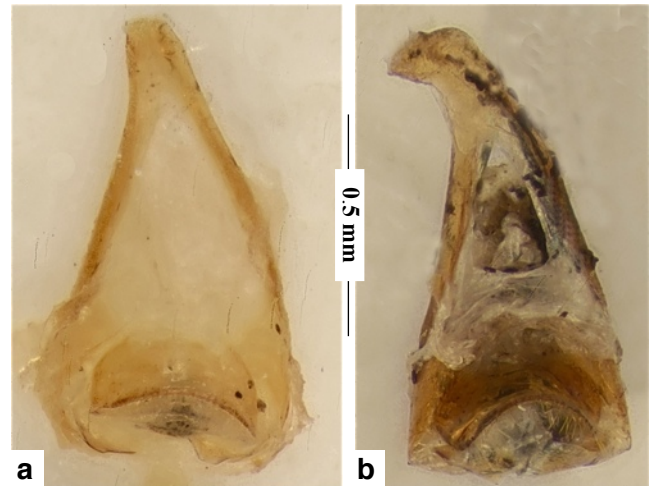


Fig. 4. Spicula gastrales.

a. *C. chevalieri*, ♂ (Guinea, Monts Nimba, MNHN).  
b. *C. filippii* sp. nov., holotypus, ♂.

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Fig. 5. *Chaetophilharmostes chevalieri* holotypus. a. Lateral view. b. Dorsal view. c. Pronotum.



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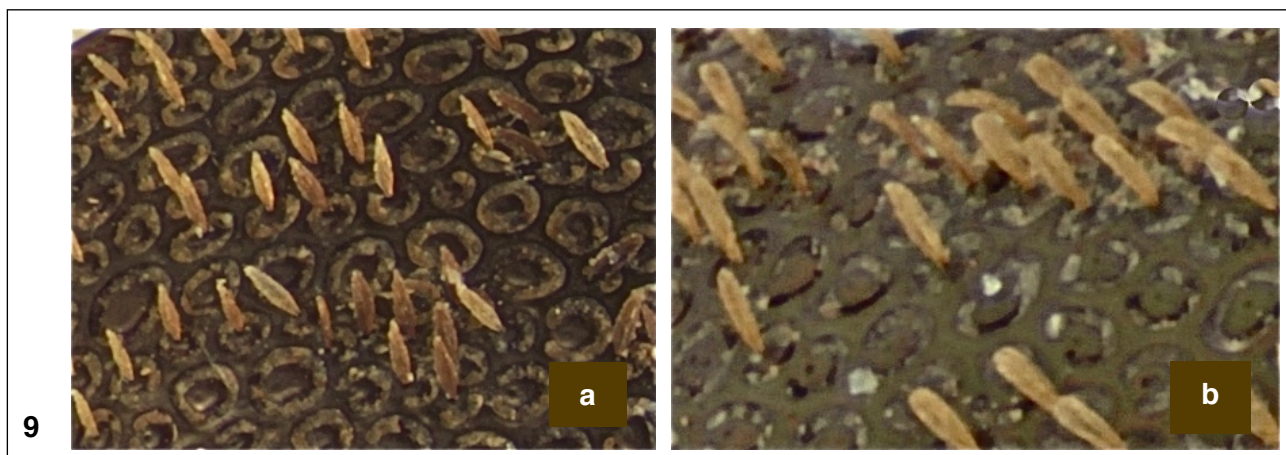


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Fig. 6. *Pterorthochaetes termitophilus* (= *Chaetophilharmostes chevalieri*), holotypus (MRAC), lateral view.

Fig. 7. *Chaetophilharmostes* sp. nov., ♀, from Gabon (MNHN), lateral view.

Fig. 8. Holotypus, labels. a. *Chaetophilharmostes chevalieri*. b. *Pterorthochaetes termitophilus* (= *Chaetophilharmostes chevalieri*).



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Fig. 9. Detail of elytral setation. a. *Chaetophilharmostes filippii* sp. nov. b. *Chaetophilharmostes chevalieri*.



**Key for the identification of the species of *Chaetophilharmostes* within the Afrotropical fauna of Ceratocanthinae**

- |    |  |   |
|----|--|---|
| 1. | Protibiae broadly arcuate, outer margins smooth with weak tooth apically or at most finely serrate, without distinct teeth ...<br>" <i>Philharmostes</i> " generic group ..... | 2   |
| —  | Protibiae straight, outer margin apically with one or more distinct teeth (or S-shaped with outer margin almost smooth) .....  | other genera of Afrotropical <i>Ceratocanthinae</i> |
| 2. | Head dorsally with a trichome, without short sparse setae .....  | <i>Callophilharmostes</i>                           |
| —  | Head dorsally without trichome, sometimes with short sparse setae .....  | 3   |
| 3. | Genal canthus indistinct, no dorsal ocular area visible .....  | 4   |
| —  | Genal canthus distinct, with dorsal ocular area visible .....  | 5   |
| 4. | Head broadly subpentagonal; clypeopleuron about one fourth of clypeal length .....   | <i>Baloghianestes</i>                               |
| —  | Head subrectangular; clypeopleuron about half of clypeal length .....  | <i>Cryptophilharmostes</i>                          |
| 5. | Dorsal surface of elytra and pronotum with several distinct tubercles .....  | <i>Carinophilharmostes</i>                          |
| —  | Dorsal surface of elytra and pronotum without carinae or tubercles (apart from lateral carina) .....   | 6   |
| 6. | Dorsal surface setate .....  | 7   |
| —  | Dorsal surface glabrous or with very short setate, in this case pronotum without deep paradiscal depressions .....   | <i>Philharmostes</i>                                |
| 7. | Dorsal surface with relatively long/large setae; pronotum without paradiscal depressions; antennae with 10 antennomers .....   | 8. <i>Chaetophilharmostes</i>                       |
| —  | Dorsal surface with short and thick setae; pronotum on each side with a deep paradiscal depression; antennae with 7 antennomers .....  | <i>Petrovitzostes</i>                               |
| 8. | Elytral lateral carina interrupted once, dorsal setation of pronotum and elytra pennate (Fig. 9a) .....  | <i>C. filippii</i> sp. nov.                         |
| —  | Elytral lateral carina interrupted three times, dorsal setae of pronotum and elytra scale-like or clavate .....  | 9   |
| 9. | Elytral lateral carina interruptions wide (ranging from 1/10 to 1/3 of the total length of carina), dorsal setae of pronotum and elytra scale-like .....                       | <i>C. sp.</i> from Gabon                            |
| —  | Elytral lateral carina interruptions short (about 1/30 of the total length of carina), dorsal setae of pronotum and elytra clavate (Fig. 9b) .....                             | <i>C. chevalieri</i>                                |

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Carte 1. Stations of *Chaetophilharmostes filippii* sp. nov.





Photo 1. Type locality of *Chaetophilharmostes filippii* sp. nov. São Tomé, Monte Alègre (Trindad).

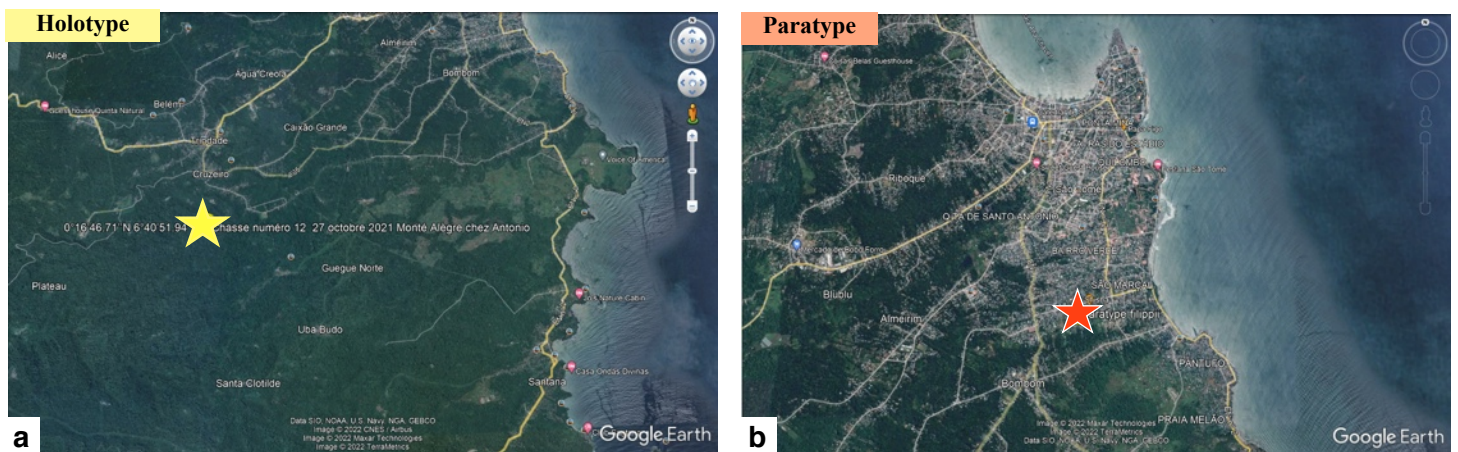
## Résumé

Ballerio A. & Coache A., 2022. – Un nouveau *Chaetophilharmostes* de São Tomé (Golfe de Guinée) avec quelques remarques sur le statut générique du genre *Chaetophilharmostes* (Coleoptera, Scarabaeoidea, Hybosoridae, Ceratocanthinae). *Faunitaxys*, 10(17): 1 – 8.

*Chaetophilharmostes filippii* sp. nov. est décrit de São Tomé (São Tomé et Príncipe, Golfe de Guinée) sur la base de deux spécimens collectés dans deux localités de la partie nord de l'île. Quelques remarques sur le statut douteux du genre *Chaetophilharmostes* Paulian, 1977 sont fournies. *Chaetophilharmostes chevalieri* (Paulian, 1937) est signalé pour la première fois au Bénin et une autre espèce non décrite de *Chaetophilharmostes* du Gabon est brièvement discutée. Une clé des espèces est fournie.

Mots-clés. – Coléoptères, Scarabaeoidea, Hybosoridae, Ceratocanthinae, *Chaetophilharmostes*, *filippii*, nouvelle espèce, systématique, taxonomie, Afrique, São Tomé, Bénin, Gabon, clé des espèces.

## Annexe



Carte 2. Stations of *Chaetophilharmostes filippii* sp. nov.

a. Holotype, São Tomé, Monte Alègre, Trindad (0°16'46.71"N - 6°40'51.94"E - 245m).

b. Paratype, São Tomé, Quinsinda (0°18'59.37"N - 6°43'59.70"E - 26m).

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A new species of *Chaetophilharmostes* from São Tomé (Guinea Gulf) with remarks on the generic status of the genus *Chaetophilharmostes* (Coleoptera Scarabaeoidea Hybosoridae Ceratocanthinae).

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**Illustration de la couverture** : Chasse de nuit à Monte Alègre, Trindade, Archipel de São Tomé et Príncipe, 27.10.2021, 0°16'46.71"N - 6°40'51.94"E - 245 m, forêt tertiaire. Lieu de collecte de l'holotype de *Chaetophilharmostes filippii* **sp. nov.**

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