A Revision of the Madeiran species of *Geostiba* (Coleoptera: Staphylinidae). Supplement I.

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A Revision of the Madeiran species of *Geostiba* (Coleoptera: Staphylinidae). Supplement I. - A study of recently collected material of Staphylinidae from the Madeiran archipelago yielded 4 new species of the *G. lindrothi* species group, which are described and keyed: *G. ericicola* sp. n., *G. temeris* sp. n., *G. tenebrarum* sp. n. and *G. noctis* sp. n. In addition, further data on the distribution and bionomics of the known Madeiran *Geostiba* are presented.

Key-words: Coleoptera - Staphylinidae - Aleocharinae - *Geostiba* - Madeira - taxonomy - new species - distribution

INTRODUCTION

According to ASSING & WUNDERLE (1996) *Geostiba* Thomson, 1858 is represented in the Madeiran archipelago by 15 endemic species, far more than any other genus of Staphylinidae. However, from the material and further data available the authors concluded that the knowledge of Madeiran *Geostiba* was far from complete and that further species remained to be discovered.

During a joint excursion to Madeira, Arved Lompe, Lothar Zerche and I collected abundant material of Coleoptera, especially Staphylinidae, among them 1399 specimens of *Geostiba*. Several species previously known only from the type locality were recorded from further localities. In addition, the material contained four new species, all but one from the area east of Encumeada, below the Pico do Jorge.

Below, the collections are abbreviated as follows: DEI = Deutsches Entomologisches Institut Eberswalde; MHNG = Muséum d’Histoire naturelle, Genève; cAss = author’s collection.

NEW RECORDS OF THE MADEIRAN SPECIES OF *GEOSTIBA* THOMSON

*Geostiba formicarum* (Wollaston, 1854)

2 ♀♂, 1 ♂, Rabacal, 1000m, mixed stand of *Erica arborea* and *Laurus* sp., 23.III. 1996, leg. Assing (cAss); 116 ex., same data, leg. Zerche (DEI); 3 ♀♂, 1 ♂, same locality,

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MADEIRAN SPECIES OF GEOSTIBA

Geostiba bicacanaensis Assing & Wunderle, 1996

1 E Encumeada below Pico do Jorge, 1500m, stand of Erica sp., Laurus sp., 26. III. 1996, leg. Assing (cAss); 48 6 6. 15 9 9, E Encumeada below Pico do Jorge, 1300m, stands of Erica sp., Laurus sp. and Vaccinium padifolium, 26.III.1996, leg. Assing (cAss); 5 6 6. 12 ex., same data, leg. Zerche (DEI); 3 9 9, same locality, 30. III. 1996, leg. Assing (cAss); 1 6 , E Encumeada below Pico do Jorge, 1300m, in deep and moist Laurus litter below old Laurus tree, 30.III.1996, leg. Assing (cAss); 6 6 6. Seixal, Ribeiro do Seixal, 500m, Laurisilva, on fungus Clavaria lauri. 31. III. 1996, leg. Zerche (DEI).

This species was formerly known only from Bica da Cana. Interestingly, the length and shape of the spine-like process at the base of the ventral process of the median lobe differs between populations. While it is minute in specimens from the type locality (see Fig. 5a-b in Assing & Wunderle 1996, p. 130), it is short, but distinct in 6 from the area east of Encumeada (Fig. 1c), and conspicuously long in the single 6 from Seixal (Fig. 1a-b). Either these populations, particularly the one from Seixal, represent different (sub-) species, or this phenomenon is an expression of intraspecific (clinal?) variation. Since no further differential characters were found.

Fig. 1

Geostiba bicacanaensis Assing & Wunderle: aedeagus in ventral and in lateral view (a) and apical lobe of paramere of 6 from Seixal; spine-like process of median lobe (c) in lateral (left) and ventral view (right) of 6 from the area east of Encumeada.

Before, G. formicarum was known only from Rabacal, where this species is apparently very abundant, and from the type localities. The new records show that it is rather widespread at least in the northwest of Madeira proper (west of the Pico Ruivo - Pico Ariéiro mountain range), where it inhabits natural woodlands, particularly Laurus woods, from an altitude of 550m to 1500m. Part of the specimens collected on 25.III. and 3.IV. were tenerial. Larvae, probably of this species, were taken on 25.III.

Geostiba filiformis (Wollaston, 1854)

37 6 6, 67 9 9, Porto Santo, Pico Facho, 500m, mixed stand of Pinus sp., Laurus sp. and Erica arborea, 1.IV.1996, leg. Assing (cAss); 18 6 6, 12 9 9, same data, leg. Zerche (DEI); 29 6 6, 30 9 9, Porto Santo, Pico Branco, 450m, stands of Pinus sp., Laurus sp. and Erica sp., 1.IV.1996, leg. Assing (cAss); 5 6 6, 9 9 9, same data, leg. Zerche (DEI); 7 6 6, 11 9 9, Porto Santo, Pico Juliana, 450m, stands of Pinus sp., Laurus sp. and Erica sp., 1.IV.1996, leg. Lompe (cAss); 7 6 6, 8 9 9, same data, leg. Zerche (DEI).

G. filiformis in now known to inhabit the northern slopes of the four highest peaks in the west of Porto Santo. Together with the adult beetles, many of which were tenerial, a number of larvae were collected.

Geostiba ariheiroensis Assing & Wunderle, 1996

3 6 6, 7 9 9, Pico Ariheiro, 1600m, mixed stands of Erica sp. and Vaccinium padifolium in southern exposition [type locality], 21.III.1996, leg. Assing (cAss); 2 6 6, 3 ex., same data, leg. Zerche (DEI); 7 6 6, 25 ex., Pico Ariheiro, 1650m, 21.III.1996, leg. Zerche (DEI).

The species is only known from the type locality.

Geostiba ruivomontis Assing & Wunderle, 1996

42 6 6, 40 9 9, northern slope of peak of Pico Ruivo, 1850m, stand of Erica sp., 29.III.1996, leg. Assing (cAss); 3 6 6, 5 ex., western slope of peak of Pico Ruivo, 1850m, stand of Erica sp., 29.III.1996, leg. Zerche (DEI); 41 6 6, 39 9 9, NE Pico Ruivo, Achada do Teixeira, 1350m, stand of old Erica arborea in northern exposition [type locality], 29.III.1996, leg. Assing (cAss); 16 6 6, 42 ex., same data, leg. Zerche (DEI).

This species, so far known only from altitudes of 1350 - 1600m, also inhabits the peak of the highest Madeiran mountain, where it was collected together with numerous specimens of Atheta leiferi (Palm).
Geostiba bicacanaensis Assing & Wunderle, 1996

1 ♀, E Encumeada below Pico do Jorge, 1500m, stand of Erica sp. with scattered Laurus sp., 26.III.1996, leg. Assing (cAss); 48 ♂♂, 15 ♀♀, E Encumeada below Pico do Jorge, 1300m, stands of Erica sp., Laurus sp. and Vaccinium padifolium, 26.III.1996, leg. Assing (cAss); 5 ♂♂, 12 ex., same data, leg. Zerche (DEI); 3 ♀♀, same locality, 30.III.1996, leg. Assing (cAss); 1 ♂, E Encumeada below Pico do Jorge, 1300m, in deep and moist Laurus litter below old Laurus tree, 30.III.1996, leg. Assing (cAss); 1 ♂, Seixal, Ribeiro do Seixal, 500m, Laurisilva, on fungus Clavaria lauri, 31.III.1996, leg. Zerche (DEI).

This species was formerly known only from Bica da Cana. Interestingly, the length and shape of the spine-like process at the base of the ventral process of the median lobe differs between populations. While it is minute in specimens from the type locality (see Fig. 5a-b in Assing & Wunderle 1996, p. 130), it is short, but distinct in ♂♂ from the area east of Encumeada (Fig. 1c), and conspicuously long in the single ♂ from Seixal (Fig. 1a-b). Either these populations, particularly the one from Seixal, represent different (sub-?) species, or this phenomenon is an expression of intraspecific (clinal?) variation. Since no further differential characters were found,
however, and without more material from Seixal and from further localities at hand, a
description of new taxa is refrained from, and the specimens listed above are treated
as representatives of one variable species.

Several of the specimens collected on 26. III. were teneral.

**Geostiba portosantoi** Franz, 1981

1 ♂, Porto Santo, Pico Facho, 500m, mixed stand of *Pinus* sp., *Laurus* sp. and *Erica*  
*arborea*, 1.IV.1996, leg. Assing (cAss).

This is the first record of *G. portosantoi* - previously known only from the Pico  
Julianna - from the Pico Facho.

**Geostiba brancomontis** Assing & Wunderle, 1996

2 ♀ ♀, Porto Santo, Pico Branco, 450m, stands of *Pinus* sp., *Laurus* sp. and *Erica* sp.,  
1.IV.1996, leg. Assing (cAss).

There had been considerable doubts that the population of this species,  
apparently a local endemic of the Pico Branco on Porto Santo and previously only  
once recorded there in 1968, still existed (ASSING & WUNDERLE 1996). This question  
is now answered, but since only small patches of natural vegetation have remained on  
the peak of the Pico Branco, *G. brancomontis* must be regarded as highly threatened  
by extinction.

**Geostiba lindrothi** Franz, 1981

5 ♂ ♂, E Encumeada below Pico do Jorge, 1300m, stands of *Erica* sp., *Laurus* sp. and  
*Vaccinium padifolium*, 26.III.1996, leg. Assing (cAss); 3 ♂ ♂, 2 ♀ ♀, same locality, 30.III.1996  
leg. Assing (cAss).

This further record indicates that, as far as is known at present, this species  
may be more widely distributed than the other species of the *lindrothi* group.

**Geostiba graminicola** Assing & Wunderle, 1996

1 ♂, 3 ♀ ♀, E Encumeada below Pico do Jorge, 1300m, stands of *Erica* sp., *Laurus* sp.  
and *Vaccinium padifolium*, 26.III.1996, leg. Assing (cAss); 1 ♂, 1 ♀, same locality, in stand of  

*G. graminicola* was previously known only from the type locality near the  
peak of the Pico Arieiro.

**Geostiba vaccinica** Assing & Wunderle, 1996

4 ♀ ♀, Pico Arieiro, 1650m, stands of *Vaccinium padifolium* [type locality],  

The known distribution of the species is restricted to the type locality.
Geostiba lauricola Assing & Wunderle, 1996

1 ♂, 8 ♀♀, Ribeira da Janela, N Fanal, 900m, Laurus wood in northern exposition [type locality], 25.III.1996, leg. Assing (cAss); 5 ex., same data, leg. Zerche (DEI); 1 ♂, Ribeira da Janela, Fanal, 1000m, mixed stand of Laurus and old Erica arborea, 25.III.1996, leg. Assing (cAss); 1 ex., same data, leg. Zerche (DEI); 1 ♀, Ribeira da Janela, Fanal, 1100m, in debris near pond. 25.III.1996, leg. Assing (cAss); 39 ♂♂, 26 ♀♀, S Seixal, Ribeira do Seixal, 550m, Laurus wood near stream, 31.III.1996, leg. Assing (cAss).

This species, previously known only from the type locality, seems to be widely distributed in the vast Laurus woods of the Ribeira da Janela and the Ribeira do Seixal in the northwest of Madeira, where it was in most cases collected together with G. occulta. Some of the specimens taken on 31.III. were teneral.

Geostiba caligicola Assing & Wunderle, 1996

1 ♂, northern slope of peak of Pico Ruivo, 1850m, stand of Erica sp., 29.III.1996, leg. Assing (cAss); 7 ♂♂, 10 ♀♀, E Pico Ruivo, 1700m, in shade of big rock near, sieved from grass and moist fern debris, 29.III.1996, leg. Assing (cAss); 2 ♀♀, same data, leg. Zerche (DEI).

Apparently, G. caligicola, occurs at high altitudes (1600 - 1850m) and is still only known from the northern slope of the Pico Ruivo.

Geostiba occulta Assing & Wunderle, 1996

18 ♂♂, 21 ♀♀, Ribeira da Janela, N Fanal, 900m, Laurus wood in northern exposition [type locality], 25.III.1996, leg. Assing (cAss); 4 ♂♂, same data, leg. Zerche (DEI); 11 ♂♂, 39 ♀♀, Ribeira da Janela, Fanal, 1000m, mixed stand of Laurus sp. and old Erica arborea, 25.III.1996, leg. Assing (cAss); 5 ♂♂, 3 ♀♀, same data, leg. Zerche (DEI); 1 ♀, S Porto Moniz, 400m, Laurus wood in northern exposition, 28.III.1996, leg. Assing (cAss); 26 ♂♂, 44 ♀♀, S Seixal, Ribeira do Seixal, 550m, Laurus wood near stream, 31.III.1996, leg. Assing (cAss); 8 ♂♂, 7 ♀♀, same data, leg. Zerche (DEI); 1 ♀, Rabacal, 1000m, Laurus wood, 23.III.1996, leg. Zerche (cAss).

Previously only known from the type locality, G. occulta is obviously widespread in the Ribeira da Janela and the adjacent Ribeira do Seixal in the northwest of Madeira, where it inhabits natural woodland, especially Laurus woods at intermediate altitudes (400 - 1000m). On 25.III. and 31.III., several larvae, very likely of this species, were collected together with the adult beetles, many of which were teneral.

Geostiba endogeae Assing & Wunderle, 1996

1 ♀, Ribeira da Janela, N Fanal, 900m, Laurus wood in northern exposition, 25.III.1996, leg. Zerche (DEI); 8 ♂♂, 5 ♀♀, Ribeira da Janela, Fanal, 1000m, mixed stand of Laurus and old Erica arborea, 25.III.1996, leg. Assing (cAss); 1 ♀, Ribeira da Janela, S Fanal, 1300m, mixed stand of Laurus sp., Vaccinium padifolium and Erica arborea, 25.III.1996, leg. Assing (cAss); 3 ♂♂, 3 ♀♀, E Encumeada below Pico do Jorge, 1300m, stands of Erica sp., Laurus sp. and Vaccinium padifolium, 26.III.1996, leg. Assing (cAss); 3 ex., same data, leg. Zerche (DEI); 9 ♂♂, 4 ♀♀, same locality, 30.III.1996, leg. Assing (cAss); 1 ♀, same locality, in stand of old Erica arborea, 30.III.1996, leg. Assing (cAss); 15 ♂♂, 4 ♀♀, E Encumeada below Pico do Jorge, 1300m, in deep and moist Laurus litter below old Laurus tree, 30.III.1996, leg. Assing (cAss).
The presently known distribution of *G. endogea* extends from the Ribeiro da Janela to the Pico do Jorge, where it inhabits natural woodland at higher elevations (800 - 1300m). Part of the specimens collected on 25.III. and 30.III. were teneral.

**DESCRIPTIONS OF NEW SPECIES**

All new species belong to the *G. lindrothi* species group, which are externally highly similar and which can be distinguished with certainty only through examination of the ♂ genitalia. For comparison and further details, the descriptions and illustrations in Assing & Wunderle (1996) are referred to.

In the descriptions, measurements of head width (HW), pronotal width (PW) and length (PL), length of elytra at suture (EL) and the length from labrum to elytral apex (SL) are indicated in μm, the total length from labrum to hind margin of tergite VIII (TL) is given in mm. The arithmetic mean (in parentheses) is given only when more than 20 specimens were available.

In two new species the ♀ sexual characters are not described and ♀ ♀ are not included in the type series, due to the lack of material or to the impossibility of assigning ♀ ♀ to the corresponding ♂ ♂, which was the case for 23 ♀ ♀ taken below the Pico do Jorge.

**Geostiba ericicola** sp. n.  

*Figs 2 a - b*


**Paratypes**: 2 ♂ ♂, same data as holotype (cAss, MHNG).

**Geostiba ericicola** sp. n. (HT): aedeagus in ventral and in lateral view (a); apical lobes of parameres. Scales: 0.1 mm.

Colour and external morphology as in G. lindrothi Franz.

♂: median lobe with ventral process of characteristic shape, in ventral view slightly constricted at base and in lateral view very slender, not widened at apex as in the other species of the G. lindrothi group; internal sac with some very weakly sclerotized spines (Fig. 2a); apical lobe slender and distinctly parallel, its setal pattern similar to G. vaccinicola Assing & Wunderle (Fig. 2b).

♀: unknown.

Derivatio nominis: The name refers to the vegetation of the type locality.

DISTRIBUTION AND BIOINOMICS: At present, G. ericicola is known only from the type locality (which is also the type locality of G. ruivomontis Assing & Wunderle and of Stenus ruivomontis Assing & Wunderle), where it was sieved from soil and litter in an old stand of Erica arborea in northern exposition.

Geostiba temeris sp. n.

PARATYPES: 9 ♂♂, 8 ♀♀, same data as holotype (coll. Assing); 5 ♂♂, same locality as holotype, 26.III.1996 (cAss, coll. Wunderle, DEI, MHNG).


Colour and external morphology as in G. lindrothi Franz.

♂: internal sac of median lobe with two long rows of distinctly sclerotized spines (Fig. 3a); apical lobe of paramere shaped as in Fig. 3b, with one long and three short setae, the subapical short seta slightly longer than the apical ones.

♀: hind margin of sternum VIII distinctly concave posteriorly, but less so than in G. graminicola Assing & Wunderle (Fig. 3d); spermatheca as in Fig. 3c.

Derivatio nominis: The name (genitive of temus (lat.); darkness) refers to the subterraneous habitat of the species.

DISTRIBUTION AND BIOINOMICS: All of the type series was sieved beneath an old Laurus tree in northern exposition from an extremely deep (> 20 cm) Laurus litter layer and the soil below (see above for further details regarding the type locality); in the same samples G. bicacanaensis Assing & Wunderle and numerous specimens of G. endoea Assing & Wunderle and G. formicarum (Wollaston) were present. The ovaries of 3 ♀♀ contained mature eggs.

Geostiba tenebrarum sp. n.

PARATYPES: 5 ♂♂, same data as holotype; 5 ♂♂, same locality as holotype, 26.III.1996 (cAss, coll. Wunderle, MHNG).

Geostiba tenebrarum sp. n.: aedeagus (HT) in ventral and in lateral view (a); apical lobes of parameres (b); spermathecae (c); hind margin of ♀ sternite VIII (d). Scales: 0.1 mm.

**Fig. 3**

*Geostiba tenebrarum* sp. n. (♂: HT): aedeagus in ventral and in lateral view (a); apical lobes of parameres (b); spermathecae (c); hind margin of ♀ sternite VIII (d). Scales: 0.1 mm.

Colour and general external morphology as in *G. lindrothi* Franz, but larger (see measurements).

♂: internal sac of median lobe with two rows of 3 - 5 distinctly sclerotized spines (Fig. 4a); shape of median lobe similar to *G. lindrothi*; apical lobe with setal pattern similar to *G. lindrothi*, but slenderer and more parallel than in that species, and insertion of long seta usually nearer to base of apical lobe (Figs 4b-d).

*Derivatio nominis*: tenebrarum (genitive of tenebrae (lat.): darkness) alludes to the subterraneous habitat.
**Geostiba tenebrarum** sp. n.: aedeagus (HT) in ventral and in lateral view (a); apical lobes of parameres (b: HT, c - d: PTT). Scales: 0.1 mm.

**Distribution and Bionomics:** The type specimens were sieved near the type locality of *G. tenebrarum* sp. n. from soil and litter in mixed stands of *Laurus* sp., *Vaccinium padifolium* and *Erica* sp., together with *G. bicacanaensis*, *G. endoea*, *G. lindrothi* and the following new species.

**Geostiba noctis** sp. n.

**Holotype** ♂: 'P. Madeira, O Encumeada-Pass, b. Pico do Jorge, 1300m, 30.III.1996, leg. Assing' (cAsS).

**Paratypes:** 1 ♂, 1 ♀, same locality as holotype, 26.III.1996, leg. Zerche (DEI, cAss).


Colour and general external morphology as in *G. lindrothi* Franz, but larger, similar in size to *G. tenebrarum* sp. n. (see measurements); eyes without trace of pigmentation, a character shared only with the smaller *G. graminicola*.

♂: ventral process of median lobe of characteristic shape, in ventral view broadly triangular and pointed at apex, in lateral view relatively broad; internal sac with pair of dark, but relatively weakly sclerotized assemblages of structures (Fig. 5a); apical lobe of paramere relatively shorter and stouter than in the related species, subapical external seta short, but distinctly longer than the apical ones (Fig. 5b).
♀: hind margin with an uninterrupted row of stout bristles (Fig. 5d); spermatheca as in Fig. 5c.

*Derivatio nominis:* noctis (genitive of nox (lat.): night, darkness) refers to the subterranean habitat.

**Distribution and Bionomics:** The types were collected under the same circumstances as *G. tenebrarum* sp. n.

![Diagrams showing morphological features](Fig. 5)

*Geostiba noctis* sp. n. (HT): aedeagus in ventral and in lateral view (a); apical lobes of paramere (b); spermatheca (c); hind margin of ♀ sternite VIII (d). Scales: 0.1 mm.
KEY TO THE SPECIES OF MADEIRAN Geostiba

In order to account for the new species the diagnostic key in ASSING & WUNDERLE (1996) is supplemented as follows:

11.  δ: apex of paramere with one long and three short setae. ......................... 11a
    – δ: apex of paramere with two long and two short setae. ......................... 14

11a  δ: internal sac of median lobe with two rows of distinctly sclerotized
     spines. .................................................. 11b
    – δ: internal sac of median lobe without such spines. .............................. 11c

11b  On average larger species: HW >275, PW >315, PL >290, SL >845.
     δ: internal sac with two short rows, each composed of ca. 3 - 6 spines
     (Fig. 4a); apical lobe of paramere as in Figs 4b-d.
     ♀: unknown. ............................................. G. tenebrarum sp. n.

11c  On average smaller: HW <275, PW <325, PL <290, SL <850.
     δ: internal sac with two long rows, each consisting of ca. 10 or more
     spines (Fig. 3a); apical lobe of paramere as in Fig. 3b.
     ♀: hind margin of sternite VIII distinctly concave (Fig. 3d); spermatheca
     as in Fig. 3c. ............................................. G. temeris sp. n.

11d  Eye rudiments without trace of pigmentation; relatively large species.
     δ: ventral process of median lobe in ventral view broadly triangular
     and with pointed apex, in lateral view relatively broad; internal sac with
     pair of dark assemblages of diffuse structures (Fig. 5a); apical lobe of
     paramere relatively stout and short (Fig. 5b).
     ♀: hind margin of sternite VIII with uninterrupted row of stout bristles
     (Fig. 5d); spermatheca as in Fig. 5c. ............................................. G. noctis sp. n.

     – Eye rudiments with traces of pigmentation; mostly smaller species.
     δ: ventral process of median lobe of different shape, internal sac
     without such pair of dark assemblages; apical lobe of paramere relatively
     longer and slenderer.
     ♀: row of stout bristles at posterior margin of sternite VIII interrupted
     in the middle. (Note that the ♀ of G. ericicola is unknown.) .................. 11d

11d  δ: ventral process of median lobe in ventral view constricted basally,
     in lateral view not widened apically (Fig. 2a); apical lobe of paramere
     distinctly parallel and slender (Fig. 2b). ..................................... G. ericicola sp. n.
     δ: ventral process of different shape, not constricted basally and
     broader in ventral view; apical lobe of paramere not distinctly parallel,
     often stouter. .................................................. 12

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