

Linzer biol. Beitr.	31/2	845-928	31.12.1999
---------------------	------	---------	------------

## A revision of the species of *Geostiba* THOMSON 1858 from Greece and Cyprus (Coleoptera, Staphylinidae, Aleocharinae)

V. ASSING

**A b s t r a c t :** A revision of the types and additional material of *Geostiba* from Greece and Cyprus yielded 35 valid species, which are attributed to four subgenera: *Geostiba* s. str. (20 species), *Ditroposipalia* SCHEERPELTZ (4 species), *Chondridiosipalia* SCHEERPELTZ (1 species), and *Sipalotricha* SCHEERPELTZ (10 species). 17 new taxa are described: *G.* (s. str.) *pangeoensis* sp. n., *G.* (s. str.) *siculifera* sp. n., *G.* (s. str.) *falakroensis* sp. n., *G.* (s. str.) *menikioensis* sp. n., *G.* (s. str.) *pauli* sp. n., *G.* (s. str.) *vermionensis* sp. n., *G.* (s. str.) *itiensis* sp. n., *G.* (s. str.) *menalonensis* sp. n., *G.* (s. str.) *killiniensis* sp. n., *G.* (s. str.) *parnoniensis* sp. n., *G.* (s. str.) *zercheana* sp. n., *G.* (s. str.) *acifera* sp. n., *G.* (D.) *schuelkei* sp. n., *G.* (C.) *ulcerifera* sp. n., *G.* (S.) *ahaiaensis* sp. n., *G.* (S.) *fthiotisensis* sp. n., and *G.* (S.) *exsecta* sp. n. The following new synonymies are established: *Geostiba* THOMSON 1858 = *Tropogastrosipalia* SCHEERPELTZ 1951, syn. n.; *Ditroposipalia* SCHEERPELTZ 1951 = *Callosipalia* COIFFAIT 1968, syn. n.; *Sipalotricha* SCHEERPELTZ 1931 = *Lioglutosipalia* SCHEERPELTZ 1951, syn. n.; *Homalota armata* EPPELSHEIM 1878 = *Geostiba loebli* PACE 1983, syn. n.; *Sipalia moczarskii* SCHEERPELTZ 1951 = *Geostiba peninsulaemagnesiae* PACE 1996, syn. n., = *G. peninsulaemagnesiae moczarskii* PACE 1996, syn. n.; *Sipalia meschniggiana* BERNHAUER 1936 = *S. pfefferi* ROUBAL 1940, syn. n.; *Homalota oertzeni* EPPELSHEIM 1888 = *Sipalia kanellidis* SCHEERPELTZ 1962, syn. n., = *S. mandli* SCHEERPELTZ 1963, syn. n., = *S. franziana* COIFFAIT 1968, syn. n., = *S. lichadensis* COIFFAIT 1968, syn. n., = *S. dirfysensis* COIFFAIT 1968, syn. n., = *S. strongylensis* Coiffait 1968, syn. n., = *S. solitaria* FAGEL 1968, syn. n., = *Geostiba solitaria ancyrensis* PACE 1983, syn. n., = *G. s. tmola* PACE 1983, syn. n., = *G. s. ulensis* PACE 1983, syn. n., = *G. s. aksekiensis* PACE, syn. n., = *G. minoica* PACE 1996, syn. n.; *G. euboica* PACE 1990 = *G. elatensis* PACE 1996, syn. n., = *G. samensis* PACE 1996, syn. n. Lectotypes are designated for *Sipalia xerovuniana* SCHEERPELTZ 1959, *S. kanellidis* SCHEERPELTZ 1962, *Geostiba elatensis* PACE 1996, *Sipalotricha leucadiae* SCHEERPELTZ 1931, and *Sipalia beieri* SCHEERPELTZ 1959. The systematic position of *Sipalia graeca* BERNHAUER 1909 in *Paraleptusa* PEYERHIMHOFF is confirmed. The (re-) descriptions of the *Geostiba* species of Greece and Cyprus are complemented by illustrations of sexual and other distinguishing characters, by notes on intraspecific variation, distribution and bionomics, and by a diagnostic key. While most Greek representatives of the genus are more or less endemic, *G. euboica* PACE and especially *G. oertzeni* (EPPELSHEIM) are remarkably widespread. The vast area of distribution of the latter is explained by the observation that the species is wing-dimorphic, which is the first record of wing dimorphism in the genus.

**K e y w o r d s :** Coleoptera, Staphylinidae, Aleocharinae, *Geostiba*, *Paraleptusa*, Palearctic region, Greece, Cyprus, distribution, ecology, taxonomy, revision, new species, new synonyms, lectotype designations, wing dimorphism, endemism.

## 1. Introduction

Except for the neotropics, species of *Geostiba* THOMSON have been described or reported (as *Geostiba* or *Sipalia* auctt. nec MULSANT & REY) from practically all major zoogeographical regions, including the Ethiopian (e. g. BERNHAUER 1939) and the Australian region (e. g. CAMERON 1943). However, the systematic status of the species from the latter regions must be considered uncertain, since their descriptions and systematic affiliations are based exclusively on external similarity and the few species revised by recent authors were transferred to other genera; *Sipalia antipodum* BERNHAUER from New Zealand, for instance, was placed in the new genus *Geostibasoma* by PACE (1985). Judging from more recent studies, *Geostiba* may in fact be confined to the Holarctic and part of the Oriental region.

Numerous species are known from the Western Palaearctic. BERNHAUER & SCHEERPELTZ (1926) listed 83 valid species for this region. In his synopsis of Palaearctic *Sipalia*, SCHEERPELTZ (1951) indicated more than 100 valid taxa (subspecies not included) and approximately 70 additional in-litteris species, only a small fraction of which he actually described in later papers. Since then, a multitude of new taxa have been more or less additively described by several authors in numerous papers, but, unfortunately, there have been few revisory studies or regional catalogues, let alone full-scale revisions. In southern Europe, a recent catalogue is available only for Italy, for which ZANETTI (1995) lists 71 species and subspecies of *Geostiba*; an additional species and a subspecies were described by PACE (1996). A recent revision of the Madeiran *Geostiba* yielded a total of 19 endemic species for that archipelago alone (ASSING 1997, ASSING & WUNDERLE 1996).

In comparison to Italy, only relatively few species have become known from Greece. COIFFAIT (1968) lists 17 valid taxa (7 of them described in that paper) and 12 additional in-litteris species named, but not described, by SCHEERPELTZ (1951); one of the supposed in-litteris names, however, is in fact available, since it is the only species in a newly described subgenus (see comments below *Geostiba moczariskii*). Since 1968, 12 new species and subspecies have been described from Greece and Cyprus by PACE (1983a, 1983b, 1984, 1990, 1996), so that the total number of taxa before the present revision was 29.

The species of *Geostiba* have been assumed to be apterous (e. g. PACE 1983b, 1990; SCHEERPELTZ 1951). The latter author states that "alle Arten der Gattung *Sipalia* MULS. REY [today *Geostiba* THOMSON] ungeflügelt sind" and that "fast jedes größere, mehr oder weniger isolierte Gebirgsmassiv seine eigene *Sipalia*- und *Leptusa*-Art, mitunter deren auch sogar zwei oder gar mehrere Arten aus verschiedenen Untergattungen besitzt" (p. 169). The former assumption, however, is not completely true; at least three species were found to be either macropterous or wing-dimorphic (ASSING, unpubl., and present paper), and the same may also apply to some other species of the genus. There are indeed many *Geostiba* with very restricted distributions, but this need not be true for all the species; *G. circellaris* (GRAVENHORST), for instance, is widespread, and so may be some of its congeners.

Many descriptions of *Geostiba* species are based on only few specimens, and in many cases they mainly rely on the male secondary sexual characters. Preliminary studies on species of which abundant material was available, however, showed that these characters may be subject to pronounced intraspecific variation.

During the past years, abundant material of *Geostiba* from Greece and Cyprus was accumulated during several field trips carried out by Lutz Behne and Lothar Zerche (both Deutsches Entomologisches Institut, Eberswalde), Arved Lompe (Nienburg), Heinrich Meybohm (Stelle), Michael Schülke (Berlin), Paul Wunderle (Mönchengladbach), and

myself to Crete (Wunderle, Meybohm), Cyprus (Wunderle, Assing), Kárpáthos (Meybohm), Rodhós (Meybohm), Pelopónnisos (Behne, Lompe, Wunderle, Zerche, Assing), the south and southeast of mainland Greece (Behne, Schülke, Wunderle, Zerche, Assing), and northeastern Greece (Wunderle, Assing). A taxonomic study of the Greek representatives of *Geostiba* was expected to be particularly promising for several reasons. First, numerous specimens, at least of most of the recently collected species, were available, so that it was possible to adequately assess intraspecific variation. Second, the actual diversity in Greece could be assumed to be much higher than the number of taxa previously described, not only in view of the geology and geography of the region, but also because its staphylinid fauna has been relatively poorly studied (e. g. in relation to Italy). And finally, some of the names of previously described species were suspected to be synonyms partly for biogeographical reasons (two subspecies described from the same mountain), partly because of taxonomic misinterpretation (see comments on *Sipalia franzi* COIFFAIT), and also because both intraspecific variation and the range of distribution of some species was likely to have been underestimated (see above).

## 2. Material

**Material from the following public institutions and private collections was examined:**

DEI ..... Deutsches Entomologisches Institut, Eberswalde (L. Zerche)  
 FMNH..... Field Museum of Natural History, Chicago (P.P. Parrillo)  
 IRSNB ..... Institut Royal des Sciences Naturelles de Belgique, Bruxelles (D. Drugmand)  
 MHNG..... Muséum d'Histoire Naturelle, Genève (G. Cuccodoro, I. Löbl)  
 MNHNP..... Muséum National d'Histoire Naturelle, Paris (N. Berti)  
 NHMW ..... Naturhistorisches Museum Wien (H. Schillhammer)  
 cAss ..... author's private collection  
 cSch ..... Private collection M. Schülke, Berlin  
 cWun..... Private collection P. Wunderle, Mönchengladbach

## 3. The *Geostiba* species of Greece and Cyprus

SCHEERPELTZ (1951) subdivided *Sipalia* auctt. nec MULSANT & REY into 15 subgenera. Since then, several further subgenera have been described in or transferred to *Geostiba* (or *Sipalia*) by COIFFAIT (1968) and PACE (1984, 1993, 1996, 1997), and *Chondrogastrosipalia* SCHEERPELTZ was synonymized with *Geostiba* s. str. by PACE (1996). Although Scheerpeltz' systematic concept is based on typological criteria (eye size and the modifications of the ♂ abdominal terga) rather than on a study of phylogenetic relationships, and evidently comprises several paraphyletic (and possibly also polyphyletic) subgenera, it has been used by almost all later authors. It is for practical reasons that the species treated below are ordered according to this subgeneric concept, so as to allow the reader to trace and compare the taxonomic history of the taxa. Moreover, since the phylogeny of *Geostiba* has never been thoroughly studied, there is currently no convincing alternative.

A distinction of *Geostiba* species is usually difficult. One of the reasons is the external uniformity (colour, size, proportions, etc.) in the genus. In addition, the species are often

subject to considerable intraspecific variation, not only in general appearance, but also in the male secondary sexual characters and to some extent even in the primary sexual characters (especially the shape of the spermatheca). Finally, the morphology of the aedeagus and the structures in the internal sac, which are highly distinctive in many other aleocharinae taxa, are relatively uniform. A separation is often only possible when several males are available and when the precise locality is known. It is for this reason that in the present study a description was refrained from, even if the respective specimens were very likely to represent new species, (a) when only females or a single male were available, or (b) when the locality indicated on the label(s) was too vague (e. g. "Arcadia"). A description in such cases would be inadequate and severely hamper future taxonomic work.

Because of the high interspecific similarity and intraspecific variation of external characters, only few species are described in more detail; the remaining diagnoses rely almost exclusively on distinguishing (mainly primary and secondary sexual) characters.

### 3.1. Subgenus *Geostiba* THOMSON

*Tropogastrosipalia* SCHEERPELTZ 1951: 175, 180; syn. n.

In Greece, *Geostiba* s. str. was found to be more diverse than any other subgenus of *Geostiba*. Apart from the relatively widespread *G. armata* (EPPELSHEIM), the distributions of all the Greek species of *Geostiba* s. str. appear to be confined to a single mountain range; some mountain ranges (Erimanthos, Taygetos, Pilion, Pangéo) are inhabited by two endemic species of the subgenus. Species of *Geostiba* s. str. are unknown from Cyprus and the Greek islands, except for Evvoia.

Intraspecific variation is enormous in the subgenus; for details see the species sections. In order to adequately assess the distinguishing characters, which are often trends rather than discrete conditions, several (larger) males should be examined.

The species of the subgenus are characterized as follows: body colour in most species relatively dark, pronotum with weak to distinct sexual dimorphism, in (larger) males of some species distinctly elongated posteriorly; elytra relatively wide, distinctly wider than elytra, usually with pronounced sexual dimorphism, with the modifications in the males of high taxonomic significance; ♂ anterior abdominal terga in some species with median keels, elevations, or impressions either in anterior impressions or in posterior half of tergal surface; ♂ tergum VII (at least in larger ♂♂) with ± long and in lateral view obliquely projecting median process near hind margin; tergum X with characteristic chaetotaxy (Fig. 145); aedeagus with median lobe of ± uniform shape; "crista apicalis" of median lobe with process, which is often of characteristic shape; "crista proximalis" weakly developed; internal sac without distinctive structures; apical lobe of paramere not distinctive on the species level, slender and with short setae; spermatheca of relatively uniform shape, not very distinctive. The process of the "crista apicalis" of the median lobe of the aedeagus is hereafter referred to as cristal process.

For details regarding the synonymy of *Tropogastrosipalia* with *Geostiba* see comments below *G. meschniggiana* (BERNHAEUER).

#### 3.1.1. *Geostiba* (s. str.) *armata* (EPPELSHEIM 1878) (Figs 1-12)

*Homalota armata* EPPELSHEIM 1878: 418f.

*Geostiba* (s. str.) *loebli* PACE 1983a: 8ff., syn. n.

**Types examined:** *Homalota armata* EPPELSHEIM: Holotype ♂ [dissected prior to present study]; ♂ / *Ocyusa* / Fauv. 66 vāt [?] / *armata* Epp. type. / c. Epp. Steind. d. / *armata* det. Bernh. / TYPUS / VIDIT R. Pace 1981 / Holotypus ♂ *Homalota armata* Eppelsheim, rev. V. Assing 1999 / *Geostiba armata* (Eppelsheim), det. V. Assing 1999 (NHMW). *Geostiba loebli* PACE: Paratypes: 4♂♂, 1♀: GRÈCE, Epire, Polydrosón, 4.V.73, Löbl / PARATYPUS *Geostiba loebli* m. det. R. Pace 1981 (MHNG); 3♀♀: GRÈCE, Epire, près de Kopani, 460m, 3.V.73, Löbl / PARATYPUS *Geostiba loebli* m. det. R. Pace 1981 (MHNG); 3♀♀: GRÈCE, Epire, Mt. Mitsikeli, 750m, 26.IV.73, Löbl / PARATYPUS *Geostiba loebli* m. det. R. Pace 1981 (MHNG).

**Additional material examined:** 1♂, Ossa, 1936, leg. Weirather (cAss); 27♂♂, 39♀♀, Kato Olympos, E Kallipefki, 39°58'34N, 22°29'15E, 1500-1580m, 6.IV.1998, leg. Assing, Wunderle (cAss, cWun); 40♂♂, 39♀♀, same data, but 12.IV.1998, leg. Assing, Schülke, Wunderle (cAss, cSch, cWun); 19♂♂, 30♀♀, Pieria Ori, above Katafygi, 40°15'12N, 22°10'28E, 1950m, 9.IV.1998, leg. Assing, Schülke, Wunderle (cAss, cSch, cWun); 1♀, same data, but 1800m, in nest of *Formica pratensis* (cAss); 1♀, same data, but 1500m, *Pinus* litter, leg. Wunderle (cWun); 2♂♂, 5♀♀, Pieria Ori, above Skotina, 40°11'40N, 22°13'44E, 1000m, beechwood, 9.IV.1998, leg. Schülke (cSch); 1♂, 2♀♀, same data, but 650m, leg. Assing (cAss); 1♀, Ioánnina, Metsovo, 1200m, 7.IV.1992, leg. Kerner (cAss).

**Description:** 2.0-2.8 mm. Colour subject to some intraspecific variation, brown to blackish brown, with the pronotum, elytra, and the abdominal segments III-IV and VIII-X usually lighter in colour; antennae brown to dark brown, with the antennomeres I-II and the apex of XI mostly slightly lighter; legs yellowish to light brown.

Head weakly oblong, with very fine, barely noticeable punctation and shallow microsculpture; eyes of variable size, diametre in lateral view as long as antennomere II or shorter; antennae with antennomeres I-III oblong and subequal in length, IV-X increasing in width and increasingly transverse, and XI approximately as long as the combined length of IX and X.

Pronotum in ♂♂ about as long as wide, with the posterior margin obtusely pointed or simply convex, and sometimes - at least in larger ♂♂ - slightly elevated (lateral view) in the middle, dorsally often with shallow impression(s) of variable size and shape; in ♀♀ weakly transverse, with the posterior margin evenly rounded, dorsally usually without impressions; punctation and microsculpture similar to head.

Elytra slightly wider and much shorter than pronotum; in ♂♂ with ± pronounced carina-like sutural elevations immediately behind apex of scutellum, an extensive ± diagonal impression on each elytron, and with distinctly granulate punctation; in ♀♀ with elevations and impression and with, on average, weaker granulate punctation.

Abdomen with rather sparse and fine punctation.

♂: abdominal terga III and IV often with small and mostly longitudinal central elevations in anterior half; tergum VII usually with spine-like process of variable length (Figs 8-9); hind margins of tergum and sternum VIII as in Figs 10-11; median lobe of aedeagus and apical lobe of paramere as in Figs 1-4; internal sac with pair of broad semitransparent spines.

♀: sternum VIII as in Fig. 12; spermatheca of somewhat variable shape (Figs 5-7).

**Comments:** In absolute size parameters and particularly regarding the ♂ secondary sexual characters, *G. armata* is subject to pronounced intraspecific variation. Especially in small ♂♂, the modifications of the pronotum, the elytra, and the abdominal terga II, III, VII may be almost or completely absent. Slight differences in the shape of the cristal process of the median lobe of the aedeagus were observed between the populations from different mountain ranges, but they are here regarded as an expression of clinal variation.

According to PACE (1983a), *G. loebli* differs from *G. armata* in the smaller eyes, the relatively narrower elytra, in the shape of the process of the ♂ tergum VII, and in the shape of the aedeagus, especially of the process of the crista. A comparison of the types

with material from other mountain ranges, however, showed that the distinguishing characters indicated in the original description are not constant and that they are subject to some intraspecific variation even within populations. Consequently, it is here concluded that the material of *G. armata* indicated above and the type material of *G. loebli* refer to the same variable species and that *G. loebli* PACE is a junior synonym of *G. armata* (EPPELSHEIM).

**Distribution and bionomics:** Apparently, *G. armata* is the only more widespread species of Greek *Geostiba* s. str. Its known distribution ranges from the Pieria Oros (Makedhonia) in the northeast to the Ossa Oros (Thessalia) in the southeast, including the Olympos (type locality) and the Kato Olympos, and to Ipiros in the west. The specimens from the Pieria Oros and the Kato Olympos were sifted from litter of *Juniperus*, *Abies*, *Fagus*, and shrubs, from moss and grass, from a *Formica* nest, and collected under stones near snow-patches at altitudes of 650-1950m.

### 3.1.2. *Geostiba* (s. str.) *moczarskii* (SCHEERPELTZ 1951) (Figs 13-19)

*Sipalia* (*Chondrogastrosipalia*) *moczarskii* SCHEERPELTZ 1951: 180.

*Sipalia* (s. str.) *peninsulae-magnesiae* i. l.: SCHEERPELTZ 1951: 179.

*Sipalia* (s. str.) *peninsulae-magnesiae*, nomen nudum: COIFFAIT 1968: 107.

*Sipalia* (*Chondrogastrosipalia*) *moczarskii*, nomen nudum: COIFFAIT 1968: 107.

*Geostiba* (s. str.) *peninsulaemagnesiae* PACE 1996: 15f., syn. n.

*Geostiba* (s. str.) *peninsulaemagnesiae moczarskii* PACE 1996: 16f., syn. n. (nom. preocc.)

**Types examined:** *Sipalia moczarskii* SCHEERPELTZ: Lectotype ♂: ♂ / Pelion Thessalien / TYPUS *Sipalia moczarskii* O. Scheerpeltz / Holotypus *Geostiba moczarskii* m., det. R. Pace 1982 / *Geostiba moczarskii* n. sp. det. R. Pace 1982 (NHMW). Paralectotypes: 7 ♂, 3 ♀: Pelion Thessalien / COTYPUS *Sipalia moczarskii* O. Scheerpeltz / Paratypus *Geostiba moczarskii* m., det. R. Pace 1982 (NHMW).

*Geostiba peninsulaemagnesiae* Pace: Holotype ♂: ♂ / Pelion Thessalien / TYPUS *Sipalia peninsulae-magnesiae* O. Scheerpeltz / *G. peninsulaemagnesiae* Sch.pl., det. R. Pace 1983 / Holotypus *Geostiba peninsulaemagnesiae* Pace, rev. V. Assing, 1999 (NHMW). Paratypes 1 ♀: ♀, otherwise same labels (NHMW); 3 ♂: same labels, but "COTYPUS..." (NHMW).

**Comments:** SCHEERPELTZ (1951) listed *Sipalia peninsulaemagnesiae* and *S. moczarskii* as new species without explicit description and attributed them to *Sipalia* s. str. and *Chondrogastrosipalia* SCHEERPELTZ, respectively. When describing *Geostiba peninsulaemagnesiae* and *G. peninsulaemagnesiae moczarskii*, PACE (1996) evidently believed both *S. peninsulaemagnesiae* SCHEERPELTZ and *S. moczarskii* SCHEERPELTZ to be in-litteris names. According to article 13c of the ICZN, however, *S. moczarskii* SCHEERPELTZ is an available name, since this is the only species (and type species by monotypy) included by SCHEERPELTZ (1951) in the new subgenus *Chondrogastrosipalia*; *G. peninsulaemagnesiae moczarskii* PACE is consequently a junior homonym. In specifying a holotype from Scheerpeltz' original syntype material of *S. moczarskii*, PACE (1996) designated a lectotype.

PACE (1996) based the description of *Geostiba peninsulaemagnesiae* explicitly on a male holotype and six paratypes, but evidently did not label the types as such. Scheerpeltz, who did not describe the species, but only listed it as "n. sp." (SCHEERPELTZ 1951), had attached "Typus"-labels to the specimens he intended to designate as holo- and allotype and "Cotypus"-labels to those to be designated as paratypes. It can be inferred that the holotype specified in the original description is identical with the male type labelled "Typus" (see also the type labels in *G. moczarskii*).

According to PACE (1996), *Geostiba peninsulaemagnesiae peninsulaemagnesiae* differs from *G. p. moczarskii* in the posteriorly less distinctly narrowed pronotum, in the number

of ommatidia, in the less pronounced tubercles on the abdominal terga III and IV, and in the "more developed" process of the crista of the median lobe of the aedeagus. However, the male secondary sexual characters (shape of pronotum, tubercles on terga III and IV) and eye size are subject to considerable intraspecific variation in *Geostiba* s. str.; the length of the cristal process of the median lobe, too, may vary to some extent. In the type material available to me the differences indicated in the original description were not constant. Moreover, both subspecies were described from the Pilion Oros (= Pelion), records from adjacent mountain ranges are unknown. Such a distribution pattern clearly contravenes generally accepted subspecies concepts. Consequently, in the absence of constant morphological differences and for biogeographical reasons, *G. peninsulaemagnesiae* PACE is here regarded as a junior synonym of *G. moczarskii* (SCHEERPELTZ).

**Description:** Externally similar to *G. armata* (EPPELSHEIM), but distinguished as follows:

Body on average slightly smaller. Colour on the whole lighter, body including antennae yellowish brown to brown, with the abdominal V-VII or VI-VII infusate; legs testaceous.

Pronotum more oblong and more distinctly convex posteriorly, in ♂ ca. 1.05-1.10x longer than wide, with the posterior margin evenly rounded, in ♀ approximately as long as wide.

Elytra in ♂ with distinctly denser and more strongly granulose punctation, dorsal surface ± impressed, but less so than in *G. armata*, without sutural carinae; punctation in ♀ somewhat variable, weakly to distinctly granulose.

Abdomen with punctation of somewhat variable strength and density, but on average as in *G. armata*.

♂: abdominal terga III and IV usually with ± distinct circular median tubercles just behind anterior transverse impression; tergum VII with spine-like process of variable length, in lateral view shorter than in average *G. armata* and less strongly projecting from tergal surface (Fig. 16-17); hind margin of tergum VIII almost truncate (Fig. 18), that of sternum VIII distinctly convex (Fig. 19); median lobe of aedeagus with relatively short ventral process and with cristal process of characteristic shape (Figs 13-14); for additional illustrations see figures 38, 39, 41, 44, 45, 47 in PACE (1996).

♀: for an illustration of the spermatheca see figures 40, 46 in PACE (1996).

**Distribution and bionomics:** The species is currently known only from the Pilion Oros, Thessalia, where it is probably endemic. Bionomic data are unknown.

### 3.1.3. *Geostiba* (s. str.) *xerovuniana* (SCHEERPELTZ 1959) (Figs 20-27)

*Sipalia* (s. str.) *xeravuneana* i. l.: SCHEERPELTZ 1951: 178.

*Sipalia* (s. str.) *xerovuniana* SCHEERPELTZ 1959: 417ff.

**Types examined:** Lectotype ♂, here designated: ♂ / Nisista. Xeravunei, 700-800m, Gesiebe / Mittel-Griechenland, Dr. M. Beier, 6.VI.33 / ex coll. Scheerpeltz / TYPUS *Sipalia xeravuneana* [sic], O. Scheerpeltz / VIDIT R. Pace 1982 / Lectotypus ♂ *Sipalia xerovuniana* Scheerpeltz, desig. V. Assing 1999 (NHMW). **Paralectotypes:** 1 ♀ [spermatheca missing]: ♀ / Nisista. Xeravunei, 700-800m, Gesiebe / Mittel-Griechenland, Dr. M. Beier, 6.VI.33 / ex coll. Scheerpeltz / TYPUS *Sipalia xeravuneana*, O. Scheerpeltz (NHMW); 7 ♂ ♂, 3 ♀ ♀: same labels but: "COTYPUS ..." (NHMW).

**Description:** Highly similar to *G. armata*, but distinguished as follows:

Pronotum as in *G. armata* with weak sexual dimorphism; in ♂ as wide as long or weakly (1.05x) transverse, hind margin simply convex or obtusely pointed; in ♀ slightly (1.05-1.10x) wider than long and posteriorly weakly convex.

Modifications of  $\delta$  elytra similar to *G. armata*.

$\delta$ : terga III-V unmodified; process of tergum VII in antero-dorsal view more slender than in *G. armata* (Figs 25-26); aedeagus with base of ventral process slightly constricted in ventral view, cristal process in lateral view broader than in *G. armata* (Figs 20-22).

$\varphi$ : tergum VIII, sternum VIII (Fig. 27), and spermatheca (Fig. 24) similar to *G. armata*.

**Comments and comparative notes:** The original description does not specify a holotype, but is based on 2 specimens designated "Typus" and 11 "Paratypen". One of the larger male syntypes available for examination was selected as lectotype in order to preserve the present interpretation of the species.

*G. xerovuniana* is separated from *G. armata* and *G. moczarskii* by the unmodified anterior terga in the  $\delta$  and the shape of the cristal process of the aedeagus. From *G. moczarskii*, it is additionally distinguished by the presence of sutural carinae on the  $\delta$  elytra.

**Distribution and bionomics:** *G. xerovuniana* is known only from the Xerovuni Oros, Fthiotis, where it was sifted from leaf and fern litter in a *Platanus* and *Acer* wood at an altitude of 800m (SCHEERPELTZ 1959).

### 3.1.4. *Geostiba* (s. str.) *pangeoensis* sp. n. (Figs 28-34)

**Holotype**  $\delta$ : GR. (NE) Makedhonía, NW Kavála, Pangéo, 1, peak region, above skiing centre, 1900m, 24.V.1999, V. Assing (cAss). **Paratypes**: 92  $\delta$   $\delta$ , 100  $\varphi$   $\varphi$  (partly unmounted): same data as holotype (cAss); 124  $\delta$   $\delta$ , 145  $\varphi$   $\varphi$  (unmounted): same data, but 28.V.1999 (cAss); 19  $\delta$   $\delta$ , 30  $\varphi$   $\varphi$ : GR, Makedonia, NW Kavála, Pangéon, Radiostation, Gipfelregion, 1900m, 24.05.1999, P. Wunderle (cWun); 9  $\delta$   $\delta$ , 19  $\varphi$   $\varphi$ : same data, but 28.05.1999, P. Wunderle (cWun).

**Description:** Externally similar to *G. armata*, but distinguished as follows:

Colour of body on average darker, abdomen (except for apex) in most specimens  $\pm$  completely dark, anterior terga at most only slightly lighter.

Pronotum without distinct sexual dimorphism, in both sexes as wide as long or weakly (1.05x) transverse, hind margin unmodified.

Elytra in  $\delta$  with more pronounced, i. e. more projecting, short sutural carinae just behind apex of scutellum (at least in larger  $\delta$   $\delta$ ), punctation denser and more distinctly granulose; dorsal impression on average more extensive and usually not clearly delimited posteriorly (i. e.  $\pm$  reaching hind margin); in  $\varphi$  at most with weak impressions, punctation on average slightly denser than in *G. armata*.

Abdomen with somewhat denser and more distinct punctation, punctures in the posterior half of the  $\delta$  tergum VI usually distinctly granulose.

$\delta$ : terga III and IV with weak circular or oval median elevations in anterior transverse impressions; shape of process of tergum VII, and hind margins of tergum and sternum VIII similar to *G. armata* (Figs 32-34); aedeagus with ventral process of median lobe in lateral view broader, process of crista much smaller (Figs 28-29).

$\varphi$ : hind margin of tergum VIII almost truncate, that of sternum VIII weakly convex; spermatheca with duct shorter and of different shape (Fig. 31).

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

**Distribution and bionomics:** The species is apparently endemic in the Pangéo, Makedhonía. It was sifted in large numbers from grass, moss, and *Juniperus* litter, partly near and under patches of snow, in an alpine meadow at an altitude of ca. 1900m. The species was absent in samples taken in other biotopes (beechwood, oak-wood) at lower altitudes.



**3.1.5. *Geostiba* (s. str.) *siculifera* sp. n. (Figs 35-43)**

**Holotype** ♂: GR. (NE) Makedhonía, NW Kavála, Pangéo, 12, road from Akrovouni to peak, oak-wood, 500m, 28.V.1999, V. Assing (cAss).

**Paratypes**: 1 ♂, 1 ♀: same data as holotype (cAss); 1 ♀: GR, Makedonia, NW Kavala, Pangéon, Str. z. Skizentrum, 500m, Quercus, 28.05.1999, P. Wunderle (cWun).

**Description**: Externally similar to *G. armata*, but distinguished as follows:

Colour of body similar, but antennae slightly lighter than in average *G. armata*, antennomeres I-II yellowish to ferrugineous, and III-X ± ferrugineous to brown.

Pronotum with distinct sexual dimorphism; in ♂ ca. 1.1x longer than wide and with distinctly convex hind margin (much more so than in *G. armata*); in ♀ approximately as long as wide and with weakly convex hind margin.

Elytra in ♂ with short longitudinal tubercles (not carinae) at some distance behind apex of scutellum slightly anterior to middle of suture, punctation denser and more distinctly granulose, dorsal impression ± obsolete; in ♀ similar to *G. armata*.

Abdomen with punctation as in *G. armata*.

♂: terga III and IV without or with barely noticeable anterior tubercles; process of tergum VII in lateral view more massive (Figs 40-41); hind margin of tergum VIII as in Fig. 42; hind margin of sternum VIII obtusely pointed (Fig. 43); aedeagus with ventral process of median lobe in ventral view basally more constricted; cristal process of different shape (Figs 35-37).

♀: hind margins of tergum and sternum VIII as in *G. armata*; spermatheca with duct of different shape (Fig. 39).

**Derivatio nominis**: The name (*sicula* (lat.): small dagger) refers to the shape of the cristal process of the aedeagus.

**Comparative notes**: For distinction from the similar *G. armata* see description. From the only further species of the subgenus occurring in the Pangéo, it differs especially in the lighter colour (especially of the antennae), in the more oblong and posteriorly more elongated pronotum of the ♂, in the modifications of the ♂ elytra (absence of distinct dorsal impressions, sutural tubercles in different position), the weaker and less distinctly granulose punctation of the abdomen, the different shape of the ♂ sternum VIII, and the much larger and differently shaped cristal process of the aedeagus.

**Distribution and bionomics**: *G. siculifera* is apparently endemic in the Pangéo, Makedhonía. It was sifted from litter in an oakwood at an altitude of 500m.

**3.1.6. *Geostiba* (s. str.) *falakroensis* sp. n. (Figs 44-52)**

**Holotype** ♂: GR. (NE) Makedhonía, Dráma, Falakró, 7, above skiing centre, near snow, ca. 1800m, 26.V.1999, V. Assing (cAss). **Paratypes**: 9 ♂ ♂, 7 ♀ ♀: same data as holotype (cAss); 8 ♂ ♂, 8 ♀ ♀: GR, Makedonia, N Drama, Falakró oberh. Skizentrum, 1750-1850m, 26.05.1999, P. Wunderle (cWun).

**Description**: Externally similar to *G. armata*, but distinguished as follows:

Colour of body on average darker.

Pronotum with pronounced sexual dimorphism; in ♂ 1.07-1.15x longer than wide, posteriorly strongly convex and covering most of scutellum in normal position, with weak, ± extensive median depression anterior to hind margin, middle of hind margin unmodified; in ♀ as long as wide or weakly transverse, hind margin moderately convex.

Elytra in ♂ with oblong carinae just behind apex of scutellum, punctation denser and more distinctly granulose, dorsal impression usually shallower and less extensive than in *G. armata*; in ♀ at most with weak impressions, punctation on average more distinctly granulose than in *G. armata*.

♂: terga III and IV unmodified; process of tergum VII in lateral view rather massive and in antero-dorsal view acute (Figs 50-51); hind margin of tergum VIII not pointed in the middle (Fig. 52); hind margin of sternum VIII posteriorly indistinctly pointed; aedeagus with ventral process of median lobe relatively long, cristal process smaller than in *G. armata* and of characteristic shape (Figs 44-46).

♀: spermatheca as in Figs 48-49.

**Derivatio nominis:** The name refers to the type locality.

**Intraspecific variation:** Size-related parameters and the ♂ secondary sexual characters are extremely variable. Especially the sutural carinae on the elytra may be barely noticeable or even absent in smaller ♂♂, or very long, almost reaching the elytral hind margin in large ♂♂. Similarly, the process of the ♂ tergum VII, which in larger ♂♂ is apically acute and distinctly projecting, may be reduced to a small tubercle at the hind margin of the tergum or even be completely obsolete.

**Comparative notes:** For distinction from *G. armata* see description. From other species of the subgenus occurring in northern Greece, *G. falakroensis* differs in the ♂ primary and secondary sexual characters, especially in the posteriorly strongly convex pronotum and the process of the crista of the aedeagus. In *G. pauli*, which has a similarly shaped pronotum, the hind margin of the pronotum is emarginate in the middle, the sutural carinae of the elytra are more pronounced and more distinctly projecting, the process of the ♂ tergum VII is less acute apically, the morphology of the aedeagus (especially the process of the crista) is different, and the spermatheca is smaller and of different shape.

**Distribution and bionomics:** The species appears to be endemic in the Falakró, Makedhonía. It was sifted from grass, moss, and *Juniperus* litter near patches of snow in an alpine meadow at an altitude of ca. 1800m. One of the ♀♀ had a mature egg in the abdomen.

### 3.1.7. *Geostiba* (s. str.) *menikioensis* sp. n. (Figs 53-62)

**Holotype** ♂: GR. (NE) Makedhonía, E Séres, Menikío, 11, NW-slope, 1500m, litter of shrubs, 27.V.1999, V. Assing (cAss). **Paratypes:** 4♂♂, 3♀♀: same data as holotype (cAss); 1♂: same data, but N-slope, near snowpatch (cAss); 3♂♂, 3♀♀: GR, Makedonia, E Séres, Menikio, Höhenpiste, 1480m, *Juniperus*, 27.05.1999, P. Wunderle (cWun, cAss); 1♂, 3♀♀: same data, but "1500m, Schneereste" (cWun).

**Description:** Externally similar to *G. falakroensis*, but distinguished as follows: Pronotum with weak sexual dimorphism; in ♂ weakly transverse to weakly oblong (0.95-1.05x longer than wide), posteriorly distinctly convex, but much less so than in *G. falakroensis* (about intermediate between *G. falakroensis* and *G. armata*), with or without weak depression posteriorly; in ♀ weakly transverse (ca. 1.05x wider than long), hind margin moderately convex.

Elytra in large ♂♂ with broader and smoother elevation near apex of scutellum, otherwise as in *G. falakroensis*.

♂: terga III and IV unmodified; process of tergum VII short, in lateral view massive and in antero-dorsal view moderately acute to rounded apically (Figs 59-60); hind margin of tergum VIII as in Fig. 61; hind margin of sternum VIII posteriorly smoothly convex (Fig. 62); aedeagus with ventral process of median lobe relatively slender, process of crista shorter in relation to ventral process, but length subject to some variation (Figs 53-56).

♀: spermatheca with very slender duct (Fig. 58)

**Derivatio nominis:** The name refers to the type locality.

**Intraspecific variation:** The ♂ sexual characters are apparently even more variable than in *G. falakroensis*. In small ♂♂, the sutural tubercle on the elytra and

the process of tergum VII may be completely obsolete, and the short cristal process of the aedeagus is subject to some variation in length.

**Comparative notes:** For distinction from *G. falakroensis* see description. In *G. pauli*, the ♂ pronotum is more strongly, in most other Greek species of *Geostiba* s. str. more weakly convex posteriorly. In *G. siculifera*, in which the ♂ pronotum is of somewhat similar shape, the other secondary sexual characters and the morphology of the aedeagus are different. In addition, *G. menikioensis* is particularly characterized by the short process of the ♂ tergum VII, the short and slender cristal process of the aedeagus, and by the slender duct of the spermatheca.

**Distribution and bionomics:** The species is known only from the Menikío Oros, Makedhonia. It was sifted from litter of shrubs and near a snowpatch at an altitude of 1500m.

### 3.1.8. *Geostiba* (s. str.) *pauli* sp. n. (Figs 63-70)

**Holotype** ♂: GR. Thessalia, No. 3, Pilion Oros; 400-500m, 3km S Zagora, 39°26'N, 23°07'E, 3.IV.1998, leg. Assing (cAss).

**Paratypes:** 1 ♀, same data as holotype (cAss); 5 ♂♂, 2 ♀♀: GR-Volos Pelion, 3km S Zagora, ca. 450m, N-Hang, Eiche, Kastanie, 03.04.98, P. Wunderle (cWun, cAss)..

**Description:** Externally similar to *G. armata*, but distinguished as follows: Colour of body less dark than in average *G. armata*, light brown, with the head and the abdominal segments VI and VII slightly darker; antennae ± ferrugineous, legs testaceous.

Head more oblong, 1.1x longer (measured from anterior margin of clypeus to neck) than wide and more distinctly narrowed anteriorly.

Pronotum with more pronounced sexual dimorphism, in ♂ 1.05x (small ♂♂) to 1.15x (large ♂♂) longer than wide, posteriorly distinctly tapering and covering scutellum and anterior parts of elytra (at least in large ♂♂), middle of hind margin emarginate; in ♀ approximately as wide as long and with smoothly convex hind margin.

Elytra in ♂ with very pronounced (more so than in *G. armata*) sutural carinae just behind apex of scutellum; dorsal impressions similar to *G. armata*.

♂: terga III and IV without tubercles or longitudinal elevations; tergum VII with more massive median process than in *G. armata* (Figs 67-68); tergum VIII posteriorly smoothly convex (in *G. armata* weakly pointed) (Fig. 69); hind margin of sternum VIII as in Fig. 70; aedeagus with cristal process of median lobe in lateral view of different shape (Figs 63-64); apical lobe of paramere as in Fig. 65.

♀: spermatheca slightly smaller and with shorter duct than in *G. armata* (Fig. 66).

**Derivatio nominis:** The species is dedicated to the specialist of Staphylinidae and dear friend Paul Wunderle, Mönchengladbach, who not only collected most of the type series, but also contributed abundant material of other *Geostiba* species to the present study.

**Intraspecific variation:** Especially the size and the secondary sexual characters vary considerably. In small ♂♂, the pronotum is distinctly less elongated posteriorly, the sutural carinae on the elytra are less elevated (though always present), and the process on the abdominal tergum VII may be very short or completely absent.

**Comparative notes:** For distinction from *G. armata* see description above. From the only further species of *Geostiba* s. str. known to occur in the Pilion Oros, *G. moczarskii*, *G. pauli* differs in the more oblong head, the slightly larger size, and especially in the ♂ sexual characters: the more oblong and posteriorly more strongly tapering pronotum, the central emargination of the pronotal hind margin, the pronounced sutural carinae of the elytra, the absence of tubercles on the abdominal terga III and IV, the larger

spine-like process on tergum VII, and the different morphology of the aedeagus, especially of the process of the crista (lateral view). In *G. apfelbecki* (EPPELSHEIM) and *G. wunderlei* PACE from Bosnia, species with a similarly elongated and posteriorly shallowly concave ♂ pronotum, the pronotum is more oblong and posteriorly less strongly tapering (at least in larger ♂♂), the sutural carinae of the ♂ elytra are much weaker, the impressions on the ♂ elytra are deeper and more extensive, and the cristal process of the aedeagus is of different shape (see Fig. 26 in PACE 1996). For distinction from *G. siculifera* see below that species.

**Distribution and bionomics:** The species is known only from the Pilion Oros, Thessalia, Greece. The types were collected in a mixed chestnut and oak wood in northern exposition, where they were sifted from litter.

### 3.1.9. *Geostiba* (s. str.) *aculeata* (COIFFAIT 1968) (Figs 71-76)

*Sipalia* (s. str.) *aculeata* COIFFAIT 1968: 102ff.

**Type examined:** Holotype ♂: Eubée, 3.IV.67, Lichas. -30- / HOLOTYPE / *Sipalia* (s. str.) *aculeata* Coiff., H. Coiffait det. 1967 / Muséum Paris 1985, Coll. H. Coiffait / *Geostiba aculeata* (Coiff.), det. R. Pace 1985 (MNHNP).

**Description:** Similar to *G. armata*, distinguished as follows:

Body larger, width of pronotum 0.47 mm (in larger ♂♂ of *G. armata* ca. 0.40 mm).

Pronotum more oblong, 1.05x longer than wide, posteriorly more strongly convex and more distinctly pointed in the middle.

Elytra with relatively small longitudinal tubercle near apex of scutellum, all of posterior half and the anterior lateral area of elytra distinctly depressed; punctation much denser and more strongly granulose than in *G. armata*.

♂: Abdomen with anterior terga unmodified; tergum VII with process as in Figs 73-74; tergum VIII pointed posteriorly (Fig. 75); hind margin of sternum VIII convex (Fig. 76); median lobe of aedeagus as in Figs 71-72.

♀: unknown.

**Comparative notes:** From all other Greek species of the subgenus, *G. aculeata* is distinguished especially by the large size, the shape of the pronotum, the modifications of the elytra, and the shape of the cristal process of the aedeagus.

**Distribution and bionomics:** *G. aculeata* is known only from the type locality, the Likhás peninsula at the northwestern tip of Evvoia, where the holotype was collected in moss and lichens in woodland (COIFFAIT 1968).

### 3.1.10. *Geostiba* (s. str.) *matsakisi* (COIFFAIT 1968) (Figs 77-81)

*Sipalia* (*Tylosipalia*) *matsakisi* COIFFAIT 1968: 101f.

**Types examined:** Holotype ♂: Eubée, 15.IV.67, Dirfys -44- / HOLOTYPE / *S.* (*Tylosipalia*) *matsakisi* Coiff., H. Coiffait det. 1967 / Muséum Paris 1985, Coll. H. Coiffait / *Geostiba matsakisi* (Coiff.), det. R. Pace 1985 (MNHNP). Paratype ♀: same labels as holotype, but: PARATYPE (MNHNP).

**Description:** The holotype is evidently a small ♂. It can be assumed that larger ♂♂ of this species have distinctly more pronounced secondary sexual characters.

External appearance similar to *G. armata*, but distinguished as follows:

Pronotum in ♂ 1.1x longer than wide, its hind margin more strongly convex than in *G. armata*, but less so than in *G. aculeata*; in ♀ approximately as wide as long.

Elytra with denser punctation; in ♂ with indistinct sutural tubercle behind apex of

scutellum; with barely noticeable depression in central posterior area, and with much more strongly granulose punctation than in *G. armata*; in ♀ with weakly granulose punctation.

♂: anterior terga unmodified; tergum VII posteriorly with longitudinal tubercle (but see introductory remark of description); hind margin of tergum VIII weakly, that of sternum VIII distinctly convex (Figs 80-81); median lobe of aedeagus in lateral view with very slender cristal process (Figs 77-78); apical lobe of paramere as in Fig. 79.

♀: the terminalia and the spermatheca of the paratype, which had been dissected prior to the present study, cannot be adequately described and illustrated, as they were malformed and filled with air, respectively.

**Comparative notes:** *G. matsakisi* is distinguished from all other Greek congeners of the subgenus by the slender cristal process of the aedeagus.

**Systematics:** COIFFAIT (1968) apparently attributed the species to the subgenus *Tylosipalia* SCHEERPELTZ, because the holotype has only a longitudinal tubercle instead of long process at the hind margin of the abdominal tergum VII. This process, however, is extremely variable in *Geostiba* s. str. and may even be completely absent in some species. As can be concluded from the ♂ primary and secondary sexual as well as other characters (coloration, shape and sexual dimorphism of pronotum and elytra, punctation, chaetotaxy of tergum and sternum VIII, morphology of the median lobe of the aedeagus, shape and chaetotaxy of the apical lobe of the paramere, and especially the presence of a cristal process), *G. matsakisi* without doubt belongs to *Geostiba* s. str.

**Distribution and bionomics:** The species is known only from the Dirfys Oros, central Evvoia, where it was collected in soil and litter on a northwestern slope at an altitude of 900-1000m (COIFFAIT 1968).

### 3.1.11. *Geostiba* (s. str.) *vermionensis* sp. n. (Figs 82-90)

**Holotype** ♂: GR. Makedhonia, No. 18, Vermion Oros, 1500m, above Seli, 40°32'45N, 22°00'21E, 11.IV.1998, leg. Assing (cAss).

**Paratypes:** 8♂♂, 20♀♀, same data as holotype (cAss); 13♂♂, 10♀♀: Greece: Macedonia (18a), Imathia: Vermion öbh. Seli, 1500m, N-Hang/ unter Steinen, 40°32'45'N/22°00'21'E, 11.IV.1998, leg. M. Schülke (cSch, cAss); 7♂♂, 20♀♀: GR. Vermion Geb. oberh. Seli, 1500m, Kiefer, Juniperus, Steine auf Rasen, 11.04.98, P. Wunderle (cWun).

**Description:** Externally similar to *G. armata*, but distinguished as follows:

General coloration somewhat variable, similar to average *G. armata*, but abdomen usually darker, ± completely dark brown to blackish. Body size as in *G. armata* subject to considerable intraspecific variation.

Head as long (measured from anterior margin of clypeus to neck) as wide or slightly (1.05x) longer than wide; dorsal surface with extremely fine punctation, with very indistinct microsculpture and therefore more shine.

Pronotum with indistinct sexual dimorphism, in ♂ 1.0-1.1x and in ♀ 1.05-1.1x wider than long; posterior margin usually evenly convex in both sexes, in larger ♂♂ sometimes indistinctly pointed centrally; microsculpture and punctation similar to head.

Elytra in ♂ with denser and more distinctly granulose punctation than in *G. armata* (nearly as dense and as granulose as in *G. moczarskii*), without sutural carinae, but with characteristic obtuse fold-like elevations near exterior hind angles; punctation in ♀ weakly granulose.

♂: terga III and IV without tubercles or longitudinal elevations; tergum VII - at least in larger ♂♂ - with long and acute spine-like process distinctly projecting from tergal surface (Figs 87-88); hind margin of tergum VIII obtusely pointed (Fig. 89); sternum VIII

posteriorly convex (Fig. 90); median lobe of aedeagus with more slender (ventral view) and relatively longer ventral process than in *G. armata*, cristal process of median lobe in lateral view of slightly different shape (Figs 82-83); apical lobe of paramere as in Fig. 84.

♀: tergum VIII posteriorly convex; hind margin of sternum VIII weakly convex; spermatheca of somewhat variable shape, but duct slightly more slender than in *G. armata* (Figs 85-86).

**Derivatio nominis:** The name refers to the type locality of this species.

**Intraspecific variation:** Both body size and the ♂ secondary sexual characters are extremely variable. The spine-like process near the hind margin of tergum VII may be reduced to a minute tubercle.

**Comparative notes:** For distinction from *G. armata* see description above. From all the preceding species, *G. vermionensis* differs in the weaker microsculpture and the more pronounced shine of head and pronotum, in the usually more extensively infuscate abdomen, in the presence of a fold-like elevations near the exterior hind angles of the ♂ elytra, in the shape of the spine-like process of the ♂ abdominal tergum VII, and in the primary sexual characters, especially the long and slender ventral process of the median lobe of the aedeagus.

**Distribution and bionomics:** The species is known only from the Vermion Oros, Makedhonía. The types were collected under stones in a subalpine meadow in northern exposition at an altitude of 1500m.

### 3.1.12. *Geostiba* (s. str.) *itiensis* sp. n. (Figs 91-97)

**Holotype** ♂: GR: Fthiótida, Óros Iti, S Kastania, *Abies*, *Juniperus*, Schnee, Kalk-Hang, N-Seite / 1660m, 38°47'22N 22°13'49O, 3.V.1999, leg. Zerche & Behne (DEI).

**Paratypes:** 2♂♂, 4♀♀: same data as holotype (DEI, cAss); 1♂: GR: Fthiótida, Óros Iti, SO Kastania, N-Hang, S Bergsattel, unter Steinen am Schnee / 2010m, 38°48'07N 22°15'14O, 6.V.1999, leg. Zerche (cAss); 1♀: GR: Fthiótida, NP Óros Iti, SO Kastania, Hochebene, *Abies*, Schnee, 1850m / 38°49'09N 22°16'12O, 6.V.1999, leg. Zerche & Behne (DEI).

**Description:** Externally as in *G. armata*, but distinguished as follows:

Pronotum without appreciable sexual dimorphism, in both sexes 1.05-1.10x wider than long; hind margin broadly and weakly convex, in the middle almost straight and without modifications.

Elytra with sexual dimorphism; in ♂ usually with pronounced sutural carinae immediately behind apex of scutellum, extending over the anterior 2/3-3/4 of the sutural length, with (at most) very weak dorsal impressions, and with moderately to distinctly granulose and rather dense punctation; in ♀ without carinae and impressions, punctation indistinctly to weakly granulose.

♂: tergum III and IV unmodified; tergum VII with very erect, slender (lateral view), and apically acute (antero-dorsal view) process (Figs 96-97); hind margins of tergum and sternum VIII similar to *G. armata*; aedeagus with median lobe slightly longer and with ± dagger-shaped cristal process (Figs 91-93); apical lobe of paramere similar to *G. armata* (Fig. 94).

♀: primary and secondary sexual characters similar to *G. armata*, but proximal part of spermathecal duct slightly more strongly developed (Fig. 95).

**Derivatio nominis:** The name refers to the type locality (Iti Oros).

**Intraspecific variation:** As in other species of the subgenus, coloration, size, and especially the ♂ secondary sexual characters are subject to considerable variation. In one of the ♂♂, the sutural carinae were reduced to weakly elevated, indistinct longitudinal elevations, the elytral punctation was only weakly granulose, and the process

of the abdominal tergum VII was completely absent.

**Comparative notes:** In other Greek species of the subgenus with a posteriorly weakly convex hind margin of the  $\delta$  pronotum (larger  $\delta\delta$ !), the  $\delta$  anterior terga are modified (*G. armata*, *G. moczariskii*, *G. meschniggiana*, and other species), the sutural carinae are weaker (*G. armata*, *G. vermionensis*, *G. xerovuniana*), the elytra are otherwise modified (e. g. *G. vermionensis*), the elytral impressions are more distinct (most species), the process of the  $\delta$  tergum VII is less slender, less acute, and less erect (almost all species), and the cristal process is of different shape (*G. xerovuniana*, *G. meschniggiana*, *G. pangeoensis*, and other species).

**Distribution and bionomics:** *G. itiensis* is known only from the Iti Oros, SW Lamia, in the southwest of mainland Greece, where it was collected under stones and in *Abies* and *Juniperus* litter at altitudes of 1660-2010m.

### 3.1.13. *Geostiba* (s. str.) *meschniggiana* PACE 1996 (Figs 98-103)

*Sipalia meschniggiana* i. l.: SCHEERPELTZ 1951: 179.

*Geostiba* (s. str.) *meschniggiana* PACE 1996: 8ff.

**Types examined:** Holotype  $\delta$ :  $\delta$  / Morea, Taygetos, Ing. Meschnigg, *Sipalia armata* / ex coll. O. Kaiser / TYPUS *Sipalia meschniggiana* O. Scheerpeltz / *Geostiba meschniggiana* Sch. i. l., det. R. Pace / Holotypus *Geostiba meschniggiana* Pace, rev. V. Assing 1999 (NHMW).

**Paratypes:** 1  $\delta$ , 5  $\varnothing$ : same labels, but five of the specimens with label: "COTYPUS ..." (NHMW).

Although Pace did not attach type labels to the specimens, it can be regarded as fairly certain that the  $\delta$  "Typus" examined is in fact the holotype. For further details see comments below *G. moczariskii*.

**Additional material examined:** 10  $\delta\delta$ , 13  $\varnothing\varnothing$ , Pelopónnisos, Taygetos, W Perivolía, 37°08'44N, 22°16'03E, 1450m, *Abies* and *Pinus* litter, 24.III.1997, leg. Assing, Wunderle, Zerche (DEI, cAss, cWun); 2  $\delta\delta$ , 1  $\varnothing$ , same data, but 1300m, *Acer* and *Pinus* litter, moss, 24.III.1997, leg. Assing (cAss); 1  $\varnothing$ , same locality, 1350m, *Abies* wood, moss, 24.3.1997, leg. Zerche (DEI); 1  $\delta$ , Taygetos, Langada Pass, 20 km E Kalamata, 1100-1400m, 1.VI.1994, leg. Schulz & Vock (cAss); 1  $\delta$ , 1  $\varnothing$ , N-Taygetos, W Mt. Pserovounia, 37°06'32N, 22°17'21E, 1495m, N-slope, *Abies* wood, 22.IV.1999, leg. Zerche (DEI).

**Description:** Size and coloration variable, but generally similar to *G. armata*.

Punctuation and microsculpture of head and pronotum as in *G. armata*.

Head approximately as wide as long; its shape and eye size similar to *G. armata*.

Pronotum in most specimens with indistinct sexual dimorphism; in  $\delta$  weakly oblong to weakly transverse, its hind margin of very variable shape, weakly to strongly convex, occasionally even  $\pm$  pointed; in  $\varnothing$  1.05-1.1x wider than long.

Elytra in  $\delta$  with more pronounced (i. e. more projecting from elytral surface in lateral view and longer) sutural carinae usually extending over the anterior 1/2 to 3/4 of the elytral suture; extent and depth of elytral impressions very variable, mostly similar to *G. armata*; punctuation moderately granulose, on average denser than in *G. armata*; punctuation in  $\varnothing$  weakly granulose.

Abdomen with slightly denser punctuation and more distinct microsculpture than in *G. armata*.

$\delta$ : abdominal terga III and IV unmodified; tergum VII in larger  $\delta\delta$  with relatively long and acute process distinctly projecting over hind margin of tergum VII (Figs 102-103); tergum and sternum VIII posteriorly convex; aedeagus with cristal process thin and acute (Figs 98-99); apical lobe of paramere as in Fig. 100.

$\varnothing$ : tergum and sternum VIII posteriorly weakly convex; spermatheca with relatively slender duct (Fig. 101).

For further illustrations see figures 31-36 in PACE (1996).

**Intraspecific variation:** As in other species of the subgenus, especially size related parameters and the ♂ secondary sexual characters are subject to considerable intraspecific variation. The pronotum is of very variable shape (see description), the sutural carinae are weaker in smaller ♂♂, the elytral impressions may be completely absent, and the process of tergum VII may be reduced to a minute tubercle.

**Distribution and bionomics:** *G. meschniggi* is known only from the Taygetos Oros in the southern Pelopónnisos, where it was sifted from litter and moss in various woodland biotopes (*Pinus*, *Abies*, *Acer*) at altitudes between 1100 and 1450m.

### 3.1.14. *Geostiba* (s. str.) *meschniggiana* (BERNHAEUER 1936) (Figs 104-112)

*Sipalia meschniggiana* BERNHAUER 1936: 51.

*Sipalia pfefferi* ROUBAL 1940: 78f., syn. n.

*Sipalia* (*Tropogastrosipalia*) *meschniggiana* BERNHAUER: SCHEERPELTZ 1951: 175.

**Material examined:** 6♂♂, 5♀♀, Pelopónnisos, Aroania, road to Chelmos, 38°01'02N, 22°10'21E, 1450m, in litter of *Abies*, 29.III.1997, leg. Assing (cAss); 11♂♂, 11♀♀, same locality, 30.III.1997, leg. Zerche (DEI, cAss); 1♂, Aroania, Chelmos, Xerokambos, 38°00'36N, 22°11'27E, N-slope, 1650m, *Abies* wood, near snow patches, 12.IV.1998, leg. Zerche (DEI); 1♂, 2♀♀, Aroania, Chelmos, Xerokambos, 38°00'41N, 22°11'34E, N-slope, 1650m, *Abies* wood, near snow patches, 27.IV.1998, leg. Zerche (DEI, cAss); 1♂, 1♀, Chelmos, road from Kalávrta to Xerokambos skiing-centre, 38°01'17N, 22°10'43E, 1545m, N-slope, *Abies* wood, 23.IV.1999, leg. Zerche (DEI, cAss).

**Description:** Coloration and size variable, similar to *G. armata*, from which *G. meschniggiana* is distinguished as follows:

Head as long (measured from anterior margin of clypeus to neck) as wide as or slightly (1.05-1.1x) wider than long; dorsal surface in ♂ usually with small ± circular central impression; ♀ sometimes with similar, but on average smaller impression.

Pronotum in ♂ approximately as wide as long, posterior margin centrally indistinctly pointed and with weak granulum or ± evenly convex; in ♀ slightly (1.05-1.1x) wider than long and posteriorly weakly convex.

Elytra in ♂ on average more extensively and deeply impressed (at least in larger ♂♂), without sutural carina, with denser and more distinctly granulose punctation, especially near scutellum where the punctures are sometimes almost confluent; in ♀ usually ± flattened and with weakly granulose punctation.

Abdomen with slightly denser punctation.

♂: abdominal terga III-V in anterior transverse impressions each with a longitudinal or oval tubercle, which may be reduced to various degrees; in smaller ♂♂ such a tubercle is usually noticeable at least on tergum III; tergum VII (in medium-sized and larger specimens) with an apically rounded process (Figs 111-112); tergum VIII posteriorly weakly convex, almost truncate; hind margin of sternum VIII convex; aedeagus with ventral process of median lobe more slender in ventral view than in *G. armata*, cristal process of median lobe thin (Figs 104-107); apical lobe of paramere as in Fig. 108.

♀: hind margins of tergum and sternum VIII weakly convex; spermatheca as in Figs 109-110.

**Intraspecific variation:** Both size and the male secondary sexual characters - especially the elytral impressions and punctation, the tubercles on the abdominal terga III-V, and the process of tergum VII - are subject to pronounced intraspecific variation. The process of tergum VII may be completely absent in smaller males.

**Comments:** The type(s) of *G. meschniggiana* were not examined, but there is no doubt that the present interpretation is correct. The material listed above was collected at



the type locality and is in perfect agreement with the original description, which emphasizes the male secondary sexual characters.

A loan of the holotype of *Geostiba pfefferi* ROUBAL was requested, but there has been no response from the curator in charge of the Roubal collection in Bratislava. According to ROUBAL (1940), *G. pfefferi* differs from *G. meschniggiana* in the smaller size [sic], the more transverse antennomeres IV-X, in the presence of a small circular tubercle on the tergum IV, and in the presence of a tubercle (not a long process) on the ♂ tergum VII. Both species were described from the Chelmos (=Hemos) in the Aroania range, and the holotype of *G. pfefferi* was even collected together with specimens of "*Sipalia Meschniggi* Bernh.". (From an explicit reference to the original description of *G. meschniggiana* it becomes clear that he means *meschniggiana*, not *meschniggi*.) The distinguishing characters referred to by ROUBAL (1940), including the shape of the antennae, are all within the range of variation of *G. meschniggiana*, of which *Sipalia pfefferi* ROUBAL consequently becomes a junior synonym.

*G. meschniggiana* is the designated type species of the subgenus *Tropogastrosipalia* SCHEERPELTZ, 1951. It shares, however, various evident synapomorphies with the species of *Geostiba* s. str., especially the ♂ modifications of the pronotum, the elytra, and of the abdominal tergum VII, as well as the morphology of the aedeagus, especially the cristal process of the median lobe. Moreover, the species is apparently closely related to *G. armata* and *G. moczariskii* of *Geostiba* s. str., a hypothesis supported by the obviously synapomorphic modifications of the ♂ anterior abdominal terga, so that it is practically certain that attributing *G. meschniggiana* and the other species included by Scheerpeltz (1951) to a distinct subgenus would render *Geostiba* s. str. a paraphyletic and *Tropogastrosipalia* a polyphyletic group. For this reason (not to mention the relatively insignificant characters separating *Tropogastrosipalia* from *Geostiba* s. str.) *Tropogastrosipalia* is here placed in the synonymy of *Geostiba* s. str.

**Distribution and bionomics:** *G. meschniggiana* is apparently endemic in the Aroania mountain range, northern Pelopónnisos. The material examined was sifted from *Abies* litter at altitudes of 1450-1650m.

### 3.1.15. *Geostiba* (s. str.) *menalonensis* sp. n. (Figs 113-120)

*Sipalia weiratheriana* i. l.: SCHEERPELTZ 1951: 180.

**Holotype** ♂: ♂ / Mälonal / Gebirge. / Arkadien / Griechenland / Weirather / Innsbruck / 93 / ex coll. Scheerpeltz / TYPUS *Sipalia weiratheriana* O. Scheerpeltz (NHMW).

**Paratypes:** 1♂: same labels as holotype, but additional label "53" and: COTYPUS *Sipalia weiratheriana* O. Scheerpeltz (cAss); 1♀: same labels as holotype, but "♀" and additional labels "55", "726", and: COTYPUS *Sipalia weiratheriana* O. Scheerpeltz (NHMW); 1♀: same labels as holotype, but "♀", "726", and: COTYPUS *Sipalia weiratheriana* O. Scheerpeltz (NHMW); 1♀: ♀ / Mälonal Gebirge, Arkadien, Griechenland, Weirather, Innsbruck / *Sipalia weiratheriana* nov. spec. / COTYPUS *Sipalia weiratheriana* O. Scheerpeltz / Coll. L. Weirather Innsbruck (MHNG).

**Description:** Highly similar to *G. meschniggiana*, but distinguished as follows: Pronotum with indistinct sexual dimorphism; in ♂ approximately as wide as long or indistinctly longer than wide, hind margin moderately convex; in ♀ as wide as long or weakly transverse, hind margin weakly to moderately convex.

Elytra with weak sexual dimorphism; in ♂ without sutural carinae (at most with barely noticeable elevations near apex of scutellum), with deeper dorsal impressions than in average *G. meschniggiana*, the impressions not interrupted by suture (i. e. forming a transverse impression across both elytra); punctuation moderately granulose; in ♀ with shallower impressions, punctuation weakly granulose.

Abdomen with sparser and finer punctuation.

♂: terga III and IV with median keel in anterior impressions (in *G. meschniggiana* often

with oblong, but not distinctly keeled elevations); tergum V with weak median elevation in anterior impression; tergum VII with posterior process less broad in antero-dorsal view than in average *G. meschniggiana* (Figs 119-120); aedeagus with cristal process slightly bent upwards in lateral view (Figs 113-115); apical lobe of paramere as in Fig. 116.

♀: tergum and sternum VIII similar to *G. meschniggiana*; spermatheca with larger capsule (Figs 117-118).

**Derivatio nominis:** The name refers to the type locality of the species, the Menalon Oros in Arkadía.

**Comparative notes:** For distinction from *G. meschniggiana* see description. From other *Geostiba* s. str. from the Pelopónnisos, *G. menalonensis* is distinguished especially by the ♂ secondary sexual characters: the weakly modified pronotum and elytra (see description), and the median keels in the anterior impressions of terga III and IV.

**Distribution and bionomics:** The species is known only from Menalon Oros in the central Pelopónnisos. Nothing is known about the ecological circumstances of collection.

### 3.1.16. *Geostiba* (s. str.) *killiniensis* sp. n. (Figs 121-129)

**Holotype** ♂: GR. Pelopónnisos, Killini-Gebirge, 1300m, S Trikalon, N-Hang, 37°59'00N, 22°27'27N, 31.III.1997, V. Assing (cAss).

**Paratypes:** 1 ♀: same data as holotype (cAss); 1 ♂, 6 ♀ ♀: GR. Nord-Peloponnes, Killini-geb., Ano Trikala, 1450m, Pinusstreu, 7.6.1996 P. Wunderle (cWun); 1 ♂, 1 ♀: GR: Peloponnes, Korinthia, Killini-Geb., S Ano Trikala, *Abies*, *Juniperus*, Schnee / Sattel mit *Abies*, 1700m, 37°55'47N 22°25'15O, 1.V.1999, leg. Zerche (DEI); 16 ♂ ♂, 17 ♀ ♀: GR: Peloponnes, Korinthia, Killini-Geb., S Ano Trikala, Schnee im Rasen, O-Hang / 2010m, 37°55'53N 22°24'06O, 1.V.1999, leg. Zerche & Behne (DEI, cAss).

**Description:** Externally very similar and apparently very closely related to *G. meschniggiana*; distinguished from that species as follows:

Head as in *G. meschniggiana*, also with weak median dorsal impression in most specimens (both sexes).

Pronotum with weak sexual dimorphism; in ♂ approximately as wide as long, its hind margin indistinctly pointed and often with minute tubercle in the middle; in ♀ mostly ca. 1.1x wider than long, rarely as wide as long, posteriorly weakly convex.

Elytra in ♂ with small longitudinal tubercle (not a distinct carina) just behind scutellar apex, with deep, extensive and anteriorly usually well-delimited impressions (at least in larger ♂ ♂); punctuation less dense and less distinctly granulose than in *G. meschniggiana*; in ♀ in posterior half often depressed or impressed (more so than in *G. meschniggiana*), inner anterior limit of this impression often ± diagonal and parallel to margin of scutellum, punctuation very finely granulose and on average less dense than in *G. meschniggiana*.

Abdomen with even weaker microsculpture and finer punctuation.

♂: abdominal terga III-IV with an indistinct smooth central elevation in the anterior transverse impressions, that of tergum IV often barely noticeable or absent (in *G. meschniggiana* these elevations are more pronounced, and that of tergum IV is more pronounced than that of tergum III); process of tergum VII apically more acute and usually less erect (Figs 128-129); tergum VIII ± pointed in the middle; sternum VIII posteriorly more convex; aedeagus of very similar morphology, but base of ventral process of median lobe in lateral view more strongly curved; cristal process of variable shape, but shorter, not reaching middle of ventral process (Figs 121-124).

♀: spermatheca with longer duct (Figs 126-127).

**Derivatio nominis:** The name refers to the Killini Oros, the type locality of this species.

**Intraspecific variation:** As in the preceding species, coloration, size, punctuation and especially the ♂ secondary sexual characters are very variable. Smaller ♂♂ tend to have weaker elytral impressions and a shorter process on the abdominal tergum VII.

**Comparative notes:** For distinction from *G. meschniggiana* see description. The only further representative of the subgenus from the Pelopónnisos with a modified tergum III and without a distinct sexual dimorphism of the pronotum, *G. menalonensis* sp. n., differs from *G. killiniensis* in the absence of a sutural tubercle and other primary and secondary sexual characters.

**Distribution and bionomics:** *G. killiniensis* is apparently endemic in the Killini range, northern Pelopónnisos, where it was collected in litter of *Abies* and *Pinus* at altitudes of 1300-1450m.

### 3.1.17. *Geostiba* (s. str.) *parnoniensis* sp. n. (Figs 130-136)

**Holotype** ♂: GR: Peloponnes, Arkadía, Parnon-Geb., S Kastanitsa, 1385m, 37°12'07N 22°37'52E / 19.IV.1998, Tannen-Kiefern-Wald, Schneefelder, leg. Zerche & Behne (DEI).

**Paratypes:** 3 ♂♂: same data as holotype (DEI, cAss); 1 ♂: GR: Peloponnes, Arkadía, Parnon-Geb., S Kastanitsa, 1380m, 37°12'15N 22°37'58O / 19.IV.1998, Tannen-Kiefern-Wald, Schneefelder, leg. Zerche & Behne (DEI); 2 ♂♂: GR: Peloponnes, Lakonia, Parnon-Geb., Hochebene W Meg. Toúrla, *Abies*-Wald, Schnee, W-Hang / 1700m, 37°16'45N 22°36'29O, 19.IV.1999, leg. Zerche & Behne (DEI); 2 ♂♂, 2 ♀♀: GR: Peloponnes, Lakonia, Parnon-Geb., Hochebene W Meg. Toúrla, *Abies*-Wald, Schnee, N-Hang / 1645m, 37°16'44N 22°36'19O, 19.IV.1999, leg. Zerche & Behne (DEI, cAss).

**Description:** In general appearance similar to *G. meschniggiana*, but distinguished as follows:

On average more distinctly bicoloured, pronotum and elytra ± light brown, head and abdomen dark brown to blackish, with the anterior abdominal terga at most only indistinctly lighter than tergum VII.

Pronotum with distinct sexual dimorphism; in ♂ oblong (more so than in *G. meschniggiana*), in medium-sized and larger ♂♂ 1.15-1.2x longer than wide, posteriorly strongly tapering, elongated, pointed, and hiding scutellum, in small ♂♂ ca. 1.1x longer than wide and posteriorly convex; in ♀ as wide as long or indistinctly oblong.

Elytra with pronounced sexual dimorphism; in ♂ with weakly to distinctly granulose punctuation of variable density; with ± circular, especially anteriorly well-delimited and deep impression (at least in larger ♂♂); without carinae or tubercles near scutellum; in ♀ with shallow subcircular or oblong lateral impression and weakly granulose punctuation.

♂: abdominal tergum III or terga III and IV with ± round or oblong median tubercle in anterior impressions; when a tubercle is present on tergum IV, it is usually less distinct than that of tergum III; process of tergum VII in antero-dorsal view slightly more acute apically than in *G. meschniggiana* (Figs 135-136); tergum VIII truncate posteriorly; hind margin of sternum VIII strongly convex and with row of rather short setae; aedeagus as in Figs 130-131, cristal process of median lobe relatively short, thin, and weakly bent.

♀: hind margins of tergum and sternum VIII weakly convex; spermatheca as in Figs 133-134.

**Derivatio nominis:** The name refers to the type locality (Parnon).

**Intraspecific variation:** Size, punctuation, colour, and the ♂ secondary

sexual characters are highly variable (see description). The process on the abdominal tergum VII may be completely absent.

**Comparative notes:** For distinction from *G. meschniggiana* and *G. killiniensis* from the northern Pelopónnisos see the description above and the comparative notes below the latter species, respectively. *G. meschniggi* from the Taygetos (southern Pelopónnisos) differs in the posteriorly not distinctly elongated ♂ pronotum, the presence of distinct sutural carinae and the much weaker impression on the ♂ elytra, the unmodified ♂ terga III and IV, the longer and apically more acute process on the ♂ tergum VII, and the different shape of the cristal process.

**Distribution and bionomics:** The species is apparently endemic in the Parnon Oros, southeastern Pelopónnisos. It was sifted from litter in a mixed *Abies* and *Pinus* woodland at altitudes of 1385-1700m.

### 3.1.18. *Geostiba* (s. str.) *zercheana* sp. n. (Figs 137-145)

**Holotype** ♂: GR: Peloponnes, Ahaia, Erimanthos-Geb., oberh. Kaletzi, Wiese, N-Hang, unter Steinen am Schnee, 1490m / 37°56'15N 21°47'23O, 26.IV.1999, leg. Zerche & Behne (DEI).

**Paratypes:** 22 ♂ ♂, 25 ♀ ♀: same data as holotype (DEI, cAss).

**Description:** Externally similar to *G. parnonensis*, but distinguished as follows: On average darker and less distinctly bicoloured; usual coloration: head and abdomen blackish brown to blackish, pronotum and elytra dark brown, antennae dark brown except for the slightly lighter basal antennomeres, legs dark testaceous.

Head without dorsal impression.

Pronotum with distinct sexual dimorphism; in ♂ oblong, in larger ♂ ♂ 1.10-1.15x longer than wide, posteriorly elongated, middle of hind margin more broadly convex (not obtusely pointed as in *G. parnonensis*), with ± extensive and usually distinct, transverse or crescent-shaped median impression a short distance before hind margin; in ♀ approximately as wide as long or weakly transverse, hind margin broadly convex, without or with very indistinct median impression.

Elytra with distinct sexual dimorphism; in ♂ with or without small aggregation of granula or with small tubercle at suture immediately or a short distance behind apex of scutellum, with deep, extensive and well-delimited impressions often somewhat shaped like crescents, lateral margins of elytra elevated (i. e. arched in cross-section) and with - often carina-like - elevation in or slightly behind the middle, punctation moderately to distinctly granulate and of variable density; in ♀ at most with shallow impression, sometimes with barely noticeable trace of elevation at lateral margin, punctation weakly granulate.

♂: tergum III highly distinctive, with transverse or crescent-shaped median impression near hind margin; process of tergum VII relatively short, not or only weakly projecting over hind margin of tergum VII, apically rounded in antero-dorsal view and acute in lateral view (Figs 143-144); hind margin of tergum VIII weakly convex, sometimes weakly pointed in the middle; sternum VIII strongly convex to obtusely pointed posteriorly; tergum X as in Fig. 145; median lobe of aedeagus with cristal process of characteristic shape (Figs 137-139); apical lobe of paramere as in Fig. 141.

♀: hind margins of tergum and sternum VIII weakly convex; spermatheca as in Fig 142.

**Derivatio nominis:** This highly distinctive species is dedicated to my friend and colleague Lothar Zerche, Eberswalde, who not only collected part of the types of *G. zercheana*, but (through his repeated collecting trips to southern Greece) also made large quantities of other *Geostiba* species available for the present study.

**Intraspecific variation:** As in other species of the subgenus, size,

coloration, and especially the ♂ secondary sexual characters are highly variable. This particularly applies to the shape of the pronotum, the depth and shape of the elytral impressions, and the length of the process on tergum VII, which may be strongly reduced or completely absent in smaller ♂♂.

**Comparative notes:** For separation from *G. taygetana* (BERNHAEUER) see notes below that species. *G. zercheana* is readily distinguished from all other Greek congeners of the subgenus by its dark colour, the ♂ elytral modifications (shape of impressions, morphology of the lateral margin, absence of distinct sutural carinae), the impression on the ♂ tergum III, and by the shape of the cristal process of the aedeagus.

**Distribution and bionomics:** The species is apparently endemic in the Erimanthos Oros in the northwestern Pelopónnisos, where it was found in grassland under stones at an altitude of nearly 1500m. Interestingly, the following species was collected in the same locality, but sifted from debris near snow-patches.

### 3.1.19. *Geostiba* (s. str.) *acifera* sp. n. (Figs 146-152)

**Holotype** ♂: GR: Peloponnes, Ahaia, Erimanthos-Geb., oberh. Kaletzi, Schnee auf Wiese / N-Hang, 1490m, 37°56'15N 21°47'23O, 26.IV.1999, leg. Zerche & Behne (DEL).

**Paratypes:** 1♂, 3♀♀: same data as holotype (DEL, cAss).

**Description:** Most similar to *G. meschniggi*, but distinguished as follows:

On average of darker colour and less distinctly bicoloured, pronotum and elytra only slightly lighter than head and abdomen.

Pronotum with indistinct sexual dimorphism, hind margin in both sexes weakly convex, centrally almost truncate; in ♂ 1.05-1.1x, in ♀ ca. 1.15x wider than long.

Elytra less densely punctate than in *G. meschniggi*; in ♂ with moderately (HT) to weakly (PT) pronounced sutural carina in anterior half just behind apex of scutellum, without distinct impressions, punctuation moderately granulose; in ♀ without impressions, punctuation weakly granulose.

♂: terga III and IV unmodified; tergum VII with thin and acute process, both in antero-dorsal and in lateral view (Figs 151-152); hind margins of tergum and sternum VIII similar to *G. meschniggi*; aedeagus with ventral process of median lobe basally wider in ventral view, cristal process in lateral view wider (Figs 146-148).

♀: hind margins of tergum and sternum VIII similar to *G. meschniggi*; spermatheca as in Fig. 150.

**Derivatio nominis:** The name (acus (lat.): needle) refers to the shape of the process on the ♂ tergum VII.

**Intraspecific variation:** In view of the few type specimens available, the range of intraspecific variation cannot be fully assessed. In the ♂ paratype the sutural carinae of the elytra and the process on tergum VII are much smaller than in the holotype.

**Comparative notes:** For characters separating *G. acifera* from *G. meschniggi* see the description above. In addition, this species differs from other species of the subgenus in the absence of elytral impressions in the ♂, the shape of the process on the ♂ tergum VII, and the shape of the cristal process of the aedeagus. From the syntopic *G. zercheana*, it is in addition separated by the indistinct sexual dimorphism of the pronotum, and by the absence of a median impression on the ♂ tergum III.

**Distribution:** *G. acifera* is known only from the Erimanthos Oros, where it was sifted from debris near snow in grassland at an altitude of nearly 1500m. It was not found under stones, where (in the same locality) numerous specimens of *G. zercheana* were collected (see above).

### 3.1.20. *Geostiba* (s. str.) *taygetana* (BERNHAUER 1936) (Figs 153-157)

*Sipalia taygetana* BERNHAUER 1936: 50f.

Type examined: Holotype ♂: GRAECIA MERID. 1896, TAYGETOS STUSSINER / Dorf Sola, spinicollis Kr det. Bernh. / *taygetana* Bernh. Typus unic. *Sipalia* / Chicago NHMus M. Bernhauer Collection (FMNH).

Description: Externally most similar to *G. zercheana*, but distinguished as follows: Body larger. Pronotum 0.45 mm wide, 0.54 mm long (in *G. zercheana* usually 0.40-0.42 mm wide and 0.44-0.47 mm long), and more strongly elongated posteriorly, 1.18x longer than wide; near hind margin with more distinct median impression.

Elytra in ♂ with similar modifications as in *G. zercheana*.

Abdomen with punctuation less dense than in average *G. zercheana*.

♂: impression on tergum III as in *G. zercheana*, but shallower and less well-delimited; process of tergum VII and hind margins of tergum and sternum VIII of similar shape as in *G. zercheana* (Figs 156-157); aedeagus with cristal process of different shape (Figs 153-154); apical lobe of paramere as in Fig. 155.

♀: unknown.

Comparative notes: For separation from the similar *G. zercheana* see description above. From all other Greek congeners of the subgenus, *G. taygetana* is distinguished by the male secondary sexual characters alone, especially by the fold-like lateral elevations on the elytra and the impression on the abdominal tergum III.

Distribution and bionomics: So far, only the holotype has become known. According to the original description and the labels attached to the specimen, it was collected in the Taygetos, Pelopónnisos, near the "Dorf Sola".

## 3.2. Subgenus *Ditroposipalia* SCHEERPELTZ

*Callosipalia* COIFFAIT 1968: 104; syn. n.

In Greece, *Ditroposipalia* is represented by four species, one of them widespread and the remaining three apparently with more or less restricted distributions.

The species of the subgenus are characterized as follows: body colour usually testaceous to ferrugineous, often with part of the abdomen (segment VI and part of adjacent segments) and occasionally with the head infuscate; pronotum without sexual dimorphism; elytra only slightly wider than pronotum and with sexual dimorphism, in ♂ with tubercles or carinae near scutellum and in most species with more distinct punctuation; abdominal tergum VII in ♂ with pair of carinae or longitudinal impressions; ♂ tergum VIII posteriorly crenulate or shallowly concave, its hind margin with ± reduced number of setae, chaetotaxy of tergum VIII highly distinctive; median lobe of aedeagus without cristal process and with weakly prominent "crista proximalis"; chaetotaxy and shape of apical lobe of paramere variable; spermatheca only in one species highly distinctive.

For details regarding the synonymy of *Callosipalia* with *Ditroposipalia* see comments below *G. cassagnai* (COIFFAIT).

### 3.2.1. *Geostiba* (*Ditroposipalia*) *oertzeni* (EPPELSHEIM 1888) (Figs 158-171, Map 1)

*Homalota* (*Geostiba*) *oertzeni* EPPELSHEIM 1888: 405f.

*Sipalia* (*Ditroposipalia*) *oertzeni*: SCHEERPELTZ 1951: 177.

*Sipalia* (*Ditroposipalia*) *oertzeni hymetti* i. l.: SCHEERPELTZ 1951: 177.

*Sipalia* (*Ditroposipalia*) *oertzeni pelionensis* i. l.: SCHEERPELTZ 1951: 177.

*Sipalia (Ditroposipalia) oertzeni scyriaca* i. l.: SCHEERPELTZ 1951: 177.

*Sipalia (Ditroposipalia) cretica* i. l.: SCHEERPELTZ 1951: 177.

*Sipalia (Lioglutosipalia) kanellidis* SCHEERPELTZ 1962: 257ff., syn. n.

*Sipalia (Ditroposipalia) mandli* SCHEERPELTZ 1963: 71ff., syn. n.

*Sipalia (Tylosipalia) oertzeni*: COIFFAIT 1968: 107.

*Sipalia (Ditroposipalia) franziana* COIFFAIT 1968: 101, syn. n.

*Sipalia (Ditroposipalia) lichadensis* COIFFAIT 1968: 99f., syn. n.

*Sipalia (Ditroposipalia) dirfysensis* COIFFAIT 1968: 97ff., syn. n.

*Sipalia (Ditroposipalia) strongylensis* COIFFAIT 1968: 100, syn. n.

*Sipalia (Ditroposipalia) solitaria* FÄGEL 1968: 132ff., syn. n.

*Geostiba (Ditroposipalia) solitaria ancyrensis* PACE 1983a: 25, syn. n.

*Geostiba (Ditroposipalia) solitaria tmola* PACE 1983a: 25, syn. n.

*Geostiba (Ditroposipalia) solitaria ulensis* PACE 1983a: 25, syn. n.

*Geostiba (Ditroposipalia) solitaria aksekiensis* PACE 1996: 24ff., syn. n.

*Geostiba (Ditroposipalia) minoica* PACE 1996: 22ff., syn. n.

**Types examined:** *H. oertzeni* EPPELSHEIM: Syntypes: 2♂♂ [on same pin, aedeagus missing in both specimens]: Oertzeni mihi, Parnassos, v. Oertzen / c. Epplsh. Steind. d. / oertzeni det. Bernh. / Typus / Typus / vidit R. Pace 1982 / Syntypi ♂♂, *Homalota oertzeni* Eppelsheim, rev. V. Assing 1999 (NHMW); 1♂, 3♀♀ [the ♂ macropterous; the ♀♀ attached to same pin]: Insel Angistri [= Angistron] / Graecia / Syntypus / Sporaden, Insel Angistri, v. Oertzen leg., Coll. O. Leonhard / Syntypus *Homalota oertzeni* Eppelsheim, rev. V. Assing 1999 (DEI).

A lectotype designation is here refrained from for the following reasons: *G. oertzeni* is a highly variable and apparently polytypic species. The types were collected in the Parnassós and in the island Angistron. A lectotype from the Parnassós would be desirable, as specimens from this locality are intermediate in many characters. However, in the two syntypes available from the Parnassós the aedeagus was missing, and there is a chance that a further syntype may be discovered in the future, which could then be designated as lectotype.

*S. kanellidis* SCHEERPELTZ: Lectotype ♀, here designated: ♂ [sic] / Peloponnes, Ziria-Stock (Kylene), 1600m / Wald von Abies cephalonica / leg. Prof. Dr. Kühnelt, 21.IV.1960 / *Sipalia canellidis* / TYPUS *Sipalia canellidis* O. Scheerpeltz / ex coll. Scheerpeltz / *Sipalia (Lioglutosipalia) canellidis* nov. spec. / Lectotypus ♀ *Sipalia kanellidis* Scheerpeltz, desig. V. Assing 1999 (NHMW). Paralectotype ♀: same labels as lectotype, but "♀" (NHMW).

The paralectotype is a specimen without head, the abdomen posterior to segment III is disconnected, and an additional abdomen (abdominal segments VI and following) is glued to the same mounting label. The original description is based on "ein Männchen und ein leider nicht gut erhaltenes Weibchen (Typen)"; a holotype is not specified. In view of the fact that one of the syntypes is in fact a combination of at least two specimens of uncertain origin, a lectotype designation was necessary.

SCHEERPELTZ (1962) erroneously attributed the species to the subgenus *Lioglutosipalia* SCHEERPELTZ, because what he believed to be a male was in fact a female. The types of *S. kanellidis*, however, are conspecific with *G. oertzeni* (EPPELSHEIM) of *Ditroposipalia* SCHEERPELTZ.

*S. mandli* SCHEERPELTZ: Holotype ♂: ♂ / Insel Rhodos, Dr. K. Mandl, 23.5.-6.8.62 / Philirimos, 28.5.62 / ex coll. Scheerpeltz / TYPUS *Sipalia (Ditroposip.) Mandli*, O. Scheerpeltz (NHMW).

The spines in the internal sac of the aedeagus are somewhat more distinctly sclerotized in specimens from Rhodes, but otherwise they were well within the range of intraspecific variation of *G. oertzeni*.

*S. franziana* COIFFAIT: Holotype ♂: Attique 17.V.61, Mt. Parnès / HOLOTYPE / Muséum Paris 1985, Coll. H. Coiffait / *S. (Ditroposipalia) franziana* Coiff., H. Coiffait det. 1967 / *Geostiba oertzeni* (Epp.) det. R. Pace 1985 (MNHN). Paratype ♀: Grèce 17.V.1961, Mt. Parnès, Franz / Muséum Paris 1985, Coll. H. Coiffait / ALLOTYPE / *Geostiba oertzeni* (Epp.) det. R. Pace 1985 (MNHN).

The types are conspecific with *G. oertzeni* (EPPELSHEIM); see also comments below.

*S. dirfysensis* COIFFAIT (aedeagus mounted on separate slide): Holotype ♂: Eubée 15.IV.67, Dirfys. 42. / Préparation microscopique / HOLOTYPE / Muséum Paris 1985, Coll. H. Coiffait / *S. (Ditroposipalia) dirfysensis* Coiff., H. Coiffait det. 1967 / *Geostiba dirfysensis* (Coiff.) det. R. Pace 1985 (MNHN). Paratype ♂: Eubée 15.IV.67, Dirfys 44 / PARATYPE / Muséum Paris 1985, Coll. H. Coiffait / *Geostiba dirfysensis* (Coiff.) det. R. Pace 1985. Slide with aedeagus labelled: P. V. Holotype Edéage HC. 67 / Eubée, 15.IV.67, Dirfys. (42), *Sipalia (Ditroposipalia) dirfysensis* Coiff. (MNHN).

The types are conspecific with *G. oertzeni*.

*S. lichadensis* COIFFAIT: Holotype ♂ (aedeagus mounted on separate slide): Eubée 1-4-IV.67, Lichas - 19 - / Préparation microscopique / HOLOTYPE / Muséum Paris 1985, Coll. H. Coiffait / *S. (Ditroposipalia) lichadensis* Coiff., H. Coiffait det. 1967 / *Geostiba lichadensis* (Coiff.) det. R. Pace 1985. Slide with aedeagus labelled: P. V. Edéage H.C. 67 / GEubée, 14.IV.67, Lichas. 19, *Sipalia (Ditroposipalia) lichasensis* [sic] Coiff. (MNHN).

An examination of the holotype yielded no evidence that *S. lichadensis* should be specifically distinct from *G. oertzeni*.

*S. strongylensis* COIFFAIT: Holotype ♂ (aedeagus mounted on separate slide): Grèce 12.IV.67, Ile Strongyla. - 40 - / Préparation microscopique / HOLOTYPE / Muséum Paris 1985, Coll. H. Coiffait / *S. (Ditroposipalia) strongylensis* Coiff., H. Coiffait det. 1967 / *Geostiba strongylensis* (Coiff.) det. R. Pace 1985. Slide with aedeagus labelled: P. V. Holotype Edéage HC. 67 / Grèce. 12.IV.67, Ile Strongyla (40), *Sipalia (Ditroposipalia) strongylensis* Coiff. (MNHN).

According to the original description, *Geostiba strongylensis* is distinguished especially by a long median impression on the head and by the weakly pronounced secondary sexual characters. The holotype, however, is obviously an aberrant specimen with a malformed head and pronotum, and with extremely weak carinae on the abdominal tergum VII. The aedeagus is identical to that in *G. oertzeni*.

*S. solitaria* FAGEL: Holotype ♂: ♂ / Anatolie occid. Abant Dag. 1400-1550m, V.1967 G. Fagel / G. Fagel det., *Ditroposipalia solitaria* n. sp. / TYPE / R. I. Sc. N. B. I. G. 24885 / VIDIT R. Pace 1981 (IRSNB).

An examination of the holotype and additional non-type material yielded no evidence that *G. solitaria* is specifically distinct from *G. oertzeni*.

*G. solitaria ancyrensis* PACE: Holotype ♂: Turquie Ankara, Parc nat. Soğuksu, 24.V.67, 1000m, Cl. Besuchet / Holotypus *Geostiba solitaria ancyrensis* m. det. R. Pace 1981 / *Geostiba solitaria ancyrensis* n. ssp det. R. Pace 1981 (MHNG). Paratypes: 7 ♂, 3 ♀: same data as holotype (MHNG, cAss).

According to the original description, the subspecies is distinguished from *G. solitaria solitaria* and other subspecies by the larger eyes, the broader apical lobe of the paramere, and the slightly different shape of the spermatheca. These characters, however, are highly variable and not outside the range of intraspecific variation in *G. oertzeni*.

*G. solitaria tmola* PACE: Holotype ♀: Turquie Manisa, S/ Salihli, 500m, 29.IV.75, Besuchet Löbl / Holotypus *Geostiba solitaria tmola* m. det. R. Pace 1981 / *Geostiba solitaria tmola* n. ssp. det. R. Pace 1981 (MHNG).

The shape of the spermatheca, according to PACE (1983a) the only character distinguishing this subspecies from others, was found to be within the range of intraspecific variation of *G. oertzeni*.

*G. solitaria ulensis* PACE: Holotype ♂: Turquie Muğla, Gökova, 30.IV.75, Besuchet Löbl / Holotypus *Geostiba solitaria ulensis* m. det. R. Pace 1981 / *Geostiba solitaria ulensis* n. ssp. det. R. Pace 1981 (MHNG).

Regarding all the distinguishing characters indicated in the original description (i. e. body shape, the shape of the carinae on the ♂ tergum VII, the length of the ventral process of the median lobe of the aedeagus, the size of the apical lobe of the paramere, and the shape of the spermatheca) the type specimens are within the range of intraspecific variation of *G. oertzeni*.



*G. solitaria aksekiensis* PACE: According to the original description, the holotype is deposited in the collection of H. Franz, which is currently inaccessible. Judging from the only external character indicated in the original description (eye size) and the illustrations of the genitalia, the types are within the range of intraspecific variation of *G. oertzeni*.

*G. minoica* PACE: Paratypes: 1♂, 1♀: GR. - Westkreta, Lefka Ori, 1650m, 17.X.91, Wunderle / Gestiba cf. solitaria, det. R. Pace / Paratypus *Geostiba minoica* Pace, rev. V. Assing 1999 (cWun); 9♂♂, 1♀: GR W-Kreta, Lefka Ori, Kallergi, 1650m, 17.10.91, Wunderle / *Geostiba* cf. solitaria, det. P. Wunderle / Paratypus *Geostiba minoica* Pace, rev. V. Assing 1999 (cWun, cAss).

The paratypes are not labelled as such, but according to the collector of the type series, they were returned to him as *Geostiba* cf. solitaria and only some years later designated as paratypes in the original description of *G. minoica* (WUNDERLE, pers. comm.).

The examined type and non-type material from Crete differed from average *G. oertzeni* in several characters: body on average smaller; head larger in relation to pronotum; eyes on average smaller; ♂ elytra with weakly elevated dense aggregations of granula; aedeagus with slightly less distinct (i. e. almost transparent) spines in the internal sac. (Note that according to PACE (1996) the spines in the internal sac are absent.) In view of the enormous intraspecific variation of these characters observed in other populations of *G. oertzeni*, however, these differences are interpreted as an expression of clinal variation rather than evidence that *G. minoica* represents a distinct species (see also comments below).

#### Additional material examined:

**Greece, Pelopónnisos:** 2♂♂, 3♀♀, 30 km NE Pirgos, Koumani, 37°47'17N, 21°44'33E, 630m, *Quercus* wood, 1.IV.1997, leg. Assing (cAss); 1♂, 4♀♀, same data, but 31.III.1997, leg. Zerche (DEI); 3♂♂, 1♀, Erimanthos Oros, above Kalendzi, 37°56'38N, 21°46'30E, 1500m, sifted from grass, moss and litter, 27.III.1997, leg. Assing, Wunderle (cAss, cWun); 1♂, 1♀, Erimanthos Oros, above Kalendzi, 37°57'02N, 21°46'34E, 1200m, litter of *Abies*, 27.III.1997, leg. Assing (cAss); 10♂♂, 11♀♀, same data, but 1.IV.1997 (cAss); 7♂♂, 3♀♀, same data, but 1150m, 27.III.1997, leg. Zerche (DEI); 6♂♂, 5♀♀, same data, but 31.III.1997 (DEI); 6♂♂, 7♀♀, Erimanthos Oros, Kalentzi, ca. 1350m, *Abies* litter, 27.III.1997, leg. Wunderle (cWun); 2♂♂, 2♀♀, Panahaikón Oros, above Ano Kastritsi, N-slope, 1500m, 28.III.1997, sifted from grass and moss, leg. Assing (cAss); 1♂, 1♀, Panahaikón, northern slope, 38°11'00N, 21°51'41E, 1610m, near snow patches, 26.IV.1998, leg. Zerche (DEI); 2♂♂, Panahaikón Oros, SE Ano Kastritsi, 38°14'29N, 21°51'54E, 1520-1540m, NW-slope, near snow, 24.IV.1999, leg. Zerche & Behne (DEI); 15♂♂, 16♀♀, 8 km E Kalavrita, 38°04'34N, 22°09'43E, bank of Vouraikos, 680m, *Platanus* litter, 30.III.1997, leg. Assing, Zerche (DEI, cAss); 11♂♂, 25♀♀, Aroania, Chelmos, 2000m, near snow patch, 6.VI.1996, leg. Wunderle (cWun, cAss); 5♂♂, 3♀♀, Aroania, Chelmos, 1800m, litter of *Abies*, 6.VI.1996, leg. Wunderle (cWun); 1♂, Aroania, road to Chelmos, *Abies* wood, 29.III.1997, leg. Wunderle (cAss); 1♂, 1♀, N Aroania, Megaspilaeon, 2.V.1922, leg. Liebmann (DEI); 2♂♂, Killini, Ano Trikala, 2300m, near snow patch, 8.VI.1996, leg. Wunderle (cWun, cAss); 4♂♂, Arkadia, Paron, S Kastanitsa, 37°12'07N, 22°37'52E, 1385m, woodland with *Abies* and *Pinus*, near snow patches, 19.IV.1998, leg. Zerche & Behne (DEI, cAss); 2♂♂, 3♀♀, Paron, plateau W Meg. Tóurla, 37°16'45N, 22°36'29E, 1700m, *Abies* wood, W-slope, 19.IV.1999, leg. Zerche & Behne (DEI, cAss); 2♂♂, 1♀: Taygetos / ex coll. Scheerpeltz / TYPUS/COTYPUS *Sipalia taygetica* O. Scheerpeltz (NHMW); 2♂♂, 4♀♀: Kyparissia [=Kiparissia], Gr. 5-10.V.56, leg. F. Schubert / Schubert jun. donavit 10.XII.1936 / ex coll. Scheerpeltz / TYPUS/COTYPUS *Sipalia schuberti* O. Scheerpeltz (NHMW).

**Greece, mainland and smaller islands:** 1♂, Oros Iti, SE Kastania, 38°48'07N, 22°15'14E, 2010m, N-slope, under stones, 6.V.1999, leg. Zerche (DEI); 6♂♂, 7♀♀, Parnassós, 1903, leg. Paganetti (DEI, NHMW); 2♂♂, Parnassós, leg. Paganetti (DEI, NHMW); 1♂, 3♀♀, Parnassós (NHMW); 1♂, Parnassós, 2250m, sifted grass near snow patch, 11.VI.1996, leg. Wunderle (cWun); 7♂♂, 9♀♀, Parnassós, W skiing centre, N-slope, 38°33'08N, 22°34'07, 1650m, *Abies* wood, near snow patch, 14.IV.1998, leg. Zerche (DEI, cAss); 1♀, Parnassós, above skiing centre, 38°33'27N, 22°35'15E, 1985m, near snow patch, 25.IV.1998, leg. Zerche (DEI); 3♂♂, 1♀, Parnassós, W skiing centre, 38°33'02N, 22°34'24E, 1730m, *Abies* wood, 8.V.1999, leg. Zerche (DEI, cAss); 4♂♂, 5♀♀, Ossa Oros, 1200m, *Fagus* wood with *Abies*, 39°48'13N,

- 22°45'09E, 8.IV.1998, leg. Assing, Wunderle (cAss, cWun); 2♂♂, 2♀♀, Ossa Oros, ca. 6km W Karitsa, 39°50'34N, 22°42'39E, 750m, 4.IV.1998, leg. Assing, Wunderle (cAss, cWun); 2♂♂, 3♀♀, Ossa Oros, 1000m, 18.V.1997, leg. Wolf (cSch); 3♂♂, 3♀♀: Pelion, Thessalien / Oertzeni Epp. / TYPUS/COTYPUS *Sipalia Oertzeni* ssp. *pelionensis* O. Scheerpeltz (NHMW); 1♀: Pelion, Thessalien / COTYPUS *Sipalia pelionensis* O. Scheerpeltz / Coll. W. Liebmann, Arnstadt (DEI) / 1♂, 4♀♀: Hymetos Alp. [=Imittós] GR. Strupi / *Sipalia Oertzeni* Epp. / ex coll. Scheerpeltz / TYPUS/COTYPUS *Sipalia Oertzeni* ssp. *hymetti* O. Scheerpeltz (NHMW); 2♂♂, 3♀♀: Nördl. Sporaden, Insel Skyros [= Skiros] / *Sipalia Oertzeni* Epp. / ex coll. Scheerpeltz / TYPUS/COTYPUS *Sipalia Oertzeni* ssp. *scyriaca* O. Scheerpeltz (NHMW).
- Greece, Kriti:** 3♂♂, 5♀♀, Samaria-Schlucht, 24.III.1986, leg. Meybohm (cAss); 2♂♂: Kreta, Paganetti / ex coll. Scheerpeltz / TYPUS/COTYPUS *Sipalia cretica* Scheerpeltz (NHMW).
- Greece, Ródhos:** 1♂, Profitis Ilias, leg. Franz (cAss); 1♂, Faliraki, 50m, 8.IV.1999, leg. Meybohm (cAss); 2♂♂, 3♀♀, Salakos Prof. Ilias, east of hotels, 500m, 9.IV.1999, leg. Meybohm (cAss).
- Macedonia:** 1♂, 1♀, Galičica, near Ohrid, 1800-2000m, sifted from *Fagus* litter, 18.-22.VII.1964, leg. Knappe & wife [both specimens labelled: TYPUS *Sipalia knappeorum* O. Scheerpeltz] (NHMW).
- Turkey:** 2♂♂, 6♀♀: Turquie-Zonguldak, S/ Zonguldak 500m, 23.V.76, Besuchet Löbl / *Geostiba solitaria solitaria* Fagel, det. R. Pace 1981 (MHNG, cAss).

**Description:** 2.0-3.0 mm. Colour of body yellowish brown to ferrugineous, often abdominal segment VI, part of the adjacent segments, and head ± infusate, legs testaceous.

Head approximately as long (measured from anterior margin of clypeus to neck) as wide, of ± ovoid shape; dorsally in ♂ usually with weak longitudinal or circular median impression, in ♀ with on average weaker or without such impression; surface with shallow isodiametric microsculpture, and very fine, barely noticeable punctation; eyes of variable size, their diameter in brachypterous specimens approximately as long as antennomere III or shorter, in macropterous specimens distinctly larger, diameter about as long as antennomere II and ca. 0.7x the length of postgenae (in lateral view); antennomeres I-III oblong, III somewhat shorter than II, IV-X distinctly and increasingly transverse, and XI approximately as long as the combined length of IX and X.

Pronotum without sexual dimorphism; 1.08-1.15x wider than head and usually 1.05-1.1x wider than long, with maximum width in anterior half; lateral margins more strongly tapering posteriorly than anteriorly. Punctation and microsculpture similar to head.

Elytra slightly (brachypterous specimens) or distinctly (macropterous specimens) wider than pronotum, at suture shorter than (brachypterous specimens) or approximately as long as (macropterous specimens) pronotum; in ♂ each with longitudinal, ± crescent shaped sutural tubercle or dense aggregation of large granula almost immediately behind apex of scutellum; dorsal surface usually shallowly impressed; punctation rather dense and weakly to moderately granulose; in ♀ without tubercles, at most with aggregation of granula behind scutellum, with on average slightly finer punctation, and at most with indistinct impression.

Abdomen with weak microsculpture and with very fine and sparse, on tergum VII with extremely sparse punctation.

♂: tergum VII posteriorly with pair of oblong carinae, which may be ± parallel, posteriorly slightly converging, or diverging; tergum VIII posteriorly distinctly convex, weakly crenulate and with characteristic chaetotaxy (Figs 166-168); hind margin of sternum VIII obtusely pointed (Fig. 169); median lobe of aedeagus with two rows of weakly to distinctly sclerotized spines in the internal sac (Figs 158-161); apical lobe of paramere slender, but shape somewhat variable (Fig. 162).

♀: hind margins of tergum and sternum VIII weakly convex (Figs 170-171); spermatheca as in Figs 163-165.

**Comments:** *G. oertzeni* is highly variable, not so much in size, but especially in

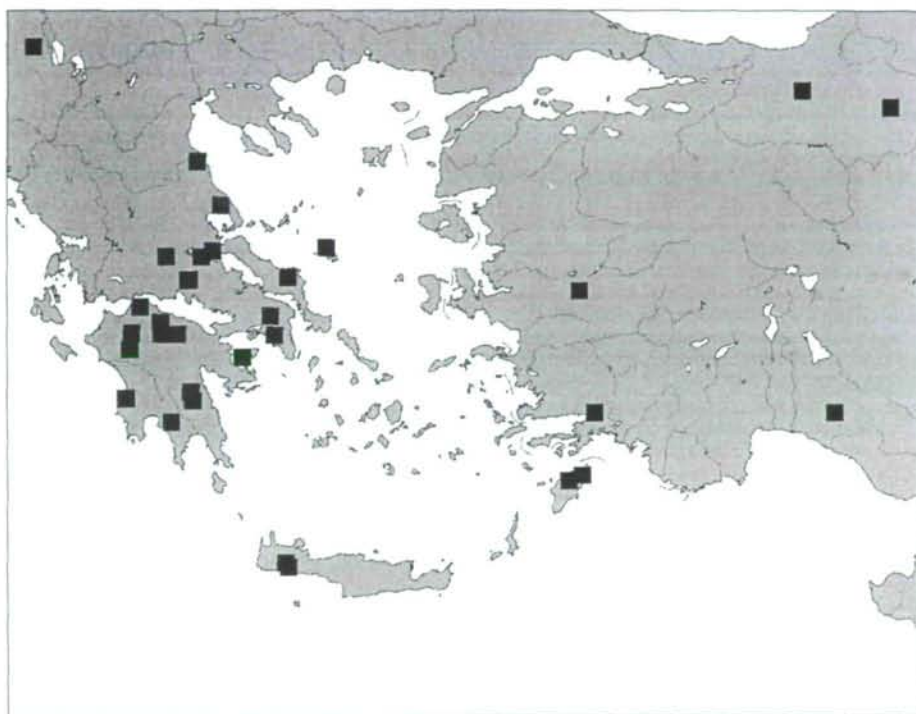
coloration (ranging from a  $\pm$  uniformly rufous to a distinctly bicoloured body), eye size, microsculpture and punctation, and in the  $\delta$  modifications of the elytra. The latter may be a distinct, oblong, and elevated granulose tubercle, with the dorsal ridge smooth and shining or granulose and mat; or it may be an oblong, indistinctly elevated dense aggregation of large granula. The length and elevation of the carinae on the  $\delta$  tergum VII are subject to some variation, but these carinae are usually present. The spines in the internal sac are somewhat variable in length, number and degree of sclerotization. Finally, the shape of the apical lobe of the paramere is subject to some intraspecific variation, even within populations. On the other hand, the shape of the aedeagus (including the internal structures), and of the spermatheca, and the shape and chaetotaxy of the hind margin of the  $\delta$  tergum VIII are constant.

Character variation was also observed between samples from different mountain ranges and islands. The material from the Ossa Oros, for instance, was on average more uniformly coloured and slightly larger than that from the Pelopónnisos, some of the specimens from the Parnassós had larger eyes than is usually the case in the species, in the male from Macedonia the carinae on tergum VII were more distinctly elevated, and in the material from the Pilion Oros, these carinae were broader. There is, however, considerable overlap, so that these populations are here referred to one and the same species, particularly since no differences in the primary sexual characters were found. In the holotype of *G. solitaria* (FAGEL) and additional material from northwestern Turkey and from Ródhos, the spines in the internal sac of the aedeagus are slightly longer, in specimens from Crete these spines were somewhat shorter and less distinctly sclerotized than in populations from mainland Greece, but no further differences in the sexual characters were observed.

The enormous area of distribution of *G. oertzeni* (Map 1), in comparison to most other species of *Geostiba*, can be explained by the fact that the species is wing-dimorphic, so that at least part of the populations is evidently capable of long-distance dispersal (see below). Both pronounced intraspecific variation and the differences between populations are most likely the result of a patchy distribution, in which gene flow is impeded by barriers such as the Mediterranean Sea separating the islands, by uninhabitable stretches of land, and by long distances. Although there is presumably only very little gene flow between the populations especially of different islands, if any at all, they are here referred to one and the same species. Regarding them as distinct taxa on the subspecific level would not be appropriate in the absence of sufficient evidence supporting such a hypothesis, in view of the possibility of long-distance gene flow, because of pronounced overlap in practically all the characters studied, and because the populations from different mountain ranges all would have to be given individual names. Consequently, the following names are here regarded as junior synonyms of *Geostiba oertzeni* (EPPELSHEIM): *Sipalia kanellidis* SCHEERPELTZ 1962, *S. mandli* SCHEERPELTZ 1963, *S. franzi* COIFFAIT 1968, *S. strongylensis* COIFFAIT 1968, *S. lichadensis* COIFFAIT 1968, *S. dirfysensis* COIFFAIT 1968, *S. solitaria* FAGEL 1968, *Geostiba solitaria ulensis* PACE 1983, *G. s. ancyrensis* PACE 1983, *G. s. tmola* PACE 1983, *G. s. aksekiensis* PACE 1996, and *G. minoica* PACE 1996.

In his synopsis of the Greek species of *Sipalia*, COIFFAIT (1968) erroneously attributed *G. oertzeni* to the subgenus *Tylosipalia* SCHEERPELTZ. As can be concluded from his quote (p. 108) from EPPELSHEIM (1888), the new combination suggested by him is based on the original description of *Leptusa oertzeni* EPPELSHEIM, not *Homalota oertzeni* EPPELSHEIM. Similarly, as the type locality of *Homalota oertzeni* he indicated that of *Leptusa oertzeni* ("type: Sud de l'Eubée, Mont Ocha"), which is very likely to be the reason why he considered *Sipalia franzi* (type locality: "Attique, Mont Parnés") to represent a distinct species.

**Distribution and bionomics:** *G. oertzeni* is much more widespread than any other Greek congener, its range extending from the south of Macedonia in the north to the southern Pelopónnisos in the south, to Anatolia in the east, and including various islands, among them Crete and Rhodes (Map 1). The wide distribution is explained by the fact that in contrast to most other species of *Geostiba*, *G. oertzeni* is a wing-dimorphic species. Wing dimorphism has not yet been reported for the genus, but occurs in at least one further congener, the widespread *Geostiba circellaris* (GRAVENHORST) (ASSING, unpubl.). *G. oertzeni* is here recorded from numerous localities in the mainland Greece, the Pelopónnisos, from the Sporades, Crete, Rhodes, from several localities in Anatolia, and from Macedonia. It has been collected in various woodland biotopes (*Abies*, *Fagus*, *Quercus*, *Pinus*, *Platanus*), open habitats (montane grassland), in dry and moist localities at a wide range of altitudes (50-2300m).



**Map 1:** Distribution of *G. oertzeni* (EPPELSHEIM).

### 3.2.2. *Geostiba (Ditroposipalia) schuelkei* sp. n. (Figs 172-179)

**Holotype** ♂: GR. N Larissa, No. 20, Kato Olympos, 1500-1580m, E Kallipefki, 39°57'34"N, 22°29'15"E, 12.IV.1998, V. Assing (cAss).

**Paratypes:** 6♂♂, 6♀♀: same data as holotype (cAss); 2♂♂, same data, but 6.IV.1998 (cAss); 1♂, 1♀: GR-Kato Olympos, E-Kallipefki-Metamorphosi 1500-1580m, 06.04.98 P. Wunderle (cWun); 8♂♂, 9♀♀: same data, but 12.04.98 (cWun, cAss); 12♂♂, 13♀♀: Greece: Thessalia (20), Lárisa: Káto Olimbos, 1500-1550m, Metamorfosi E Kallipefki, 39°57'34"N/22°29'15"E, Rasen/Buche/Tanne, 12.IV.1998, Schülke (cSch, cAss).

**Description:** Distinguished from *G. oertzeni* as follows:

Smaller, 1.9-2.6 mm. Whole body  $\pm$  uniformly testaceous to ferrugineous, abdominal tergum VI at most only indistinctly darker.

Head usually slightly (ca. 1.05x) longer than wide; dorsally without median impression; eyes smaller, their diameter distinctly shorter than antennomere III.

Pronotum 1.1-1.2x wider than head and 1.1-1.15x wider than long, posteriorly weakly tapering, distinctly less so than in *G. oertzeni*.

Elytra in  $\delta$  with longitudinal, posteriorly tapering sutural elevation immediately behind apex of scutellum, the elevations of both elytra together forming a  $\pm$  triangular elevation only narrowly interrupted by the suture; remainder of elytral surface with usually shallow,  $\pm$  extensive impression; punctuation denser than in *G. oertzeni* and more distinctly granulose; in  $\phi$  mostly with weak to moderately distinct, but less clearly delimited and on average shorter elevation near scutellum; punctuation weakly granulose.

$\delta$ : tergum VII with pair of  $\pm$  parallel or slightly bent longitudinal carinae near hind margin (Fig. 177); tergum VIII posteriorly  $\pm$  sinuate and with very few setae especially in the middle (Fig. 178); hind margin of sternum VIII indistinctly pointed and with row of short and very thin setae (Fig. 179); aedeagus with ventral process of median lobe bent in lateral view (Figs 172-179); apical lobe of paramere short, broad, and with very long seta in the middle (Fig. 174).

$\phi$ : tergum VIII posteriorly  $\pm$  truncate; hind margin of sternum VIII weakly convex and with row of long stout setae; shape of spermatheca as in Figs 175-176.

**Derivatio nominis:** I dedicate this species to the specialist of Staphylinidae and dear friend Michael Schülke, Berlin, who not only collected part of the type series, but also contributed abundant material of other Greek *Geostiba* to the present study.

**Intraspecific variation:** The  $\delta$  secondary sexual characters, i. e. the sutural elevation on the elytra and the pair of carinae on tergum VII, may vary in length and/or elevation.

**Distribution and bionomics:** *G. schuelkei* is currently known only from the Kato Olympos, Thessalia, where it was sifted from litter of *Abies* and shrubs, grass and moss, partly near snow patches, at an altitude of 1500-1580m.

### 3.2.3. *Geostiba (Ditroposipalia) weiratheri* PACE 1984 (Figs 180-187)

*Sipalia (Ditroposipalia) weiratheri* i. l.: SCHEERPELTZ 1951: 177.

*Geostiba (Ditroposipalia) weiratheri* PACE 1984: 217f.

**Types examined:** Holotype  $\delta$ :  $\delta$  / 105 / Bos D.-Gbg. b. Drama, Nordost-Griechenland, Weirather, Innsbruck. / *Sipalia Weiratheri* nov. spec. / COTYPUS *Sipalia Weiratheri* Scheerp. / Coll. L.: Weirather, Innsbruck / HOLOTYPUS *Geostiba weiratheri* m. det. R. Pace 1983 / *Geostiba weiratheri* n.sp. det. R. Pace 1983 (MHNG).

Paratype  $\phi$ : same labels but  $\phi$  / ... / PARATYPUS ... / (MHNG).

**Additional material examined:** 85  $\delta$   $\delta$ , 75  $\phi$   $\phi$ , Makedhonia, NW Drama, Falakró, above skiing centre, 1750-1850m, 26.V.1999, leg. Assing, Wunderle (cAss, cWun); 2  $\delta$   $\delta$ , 1  $\phi$ , Falakró; road to skiing centre, 1500m, *Pinus* wood, 26.V.1999, leg. Wunderle (cWun); 2  $\delta$   $\delta$ , 2  $\phi$   $\phi$ : Falakró, leg. Weirather [labelled: TYPUS/COTYPUS *Sipalia Weiratheri* O. Scheerpeltz] (NHMW).

**Identification uncertain:** 1  $\phi$ :  $\phi$  / Pirin Gebirge, / Südwest- / Bulgarien / Weirather / Innsbruck / 105 / Cotypus *Sipalia weiratheri* / ex coll. Scheerpeltz (NHMW).

**Description:** For an illustration of the facies see figure 17 in PACE (1984). In external characters very similar and very closely related to *G. schuelkei*, from which *G. weiratheri* differs as follows:

Eyes slightly larger, antennae slightly less distinctly incrassate apically.

Elytra in ♂ with long sutural carinae, the two carinae forming a ± distinct keel usually extending over the full length of the suture, with weak to moderate, often ± diagonal impression, punctuation rather dense and weakly to moderately granulose; in ♀ with, at most, weak sutural elevation, surface of elytra ± depressed, punctuation fine and not distinctly granulose.

♂: tergum VII posteriorly with pair of ± parallel or converging carinae (Fig. 185); hind margin of tergum VIII almost truncate and weakly crenulate (Fig. 186); sternum VIII as in *G. schuelkei* (Fig. 187); aedeagus with ventral process of median lobe shorter and (in lateral view) more distinctly bent, internal sac with four distinct spines (Figs 180-181); apical lobe of paramere similar to *G. schuelkei* (Fig. 182).

♀: hind margins of tergum and sternum VIII similar to *G. schuelkei*; spermatheca with proximally more strongly dilated duct (Figs 183-184).

**Intraspecific variation:** Especially the ♂ secondary sexual characters are somewhat variable: the sutural carinae on the elytra may be rather weak and of reduced length, the elytral impressions may be indistinct, and the pair of carinae on tergum VII weakly elevated and shorter than illustrated in Fig. 185.

**Comparative notes:** For distinction from the similar *G. schuelkei* see description. From *G. oertzeni* the species differs especially in smaller size, the smaller eyes, the long sutural carinae of the ♂ elytra, and the completely different morphology of the aedeagus and the spermatheca.

**Distribution and bionomics:** *G. weiratheri* was described from the Falakró in northeastern Greece and has only once been recorded again in the type locality (ASSING & WUNDERLE, in press). SCHEERPELTZ (1951) also reports the species from the Pirin range, Bulgaria. The corresponding specimen was examined, but since it is a female, the identification must be considered somewhat uncertain. The spermatheca is of slightly different shape, but this character is somewhat variable in the material from the Falakró, too; no further distinguishing characters were found.

The species was collected in large numbers under stones and in plant debris near a snow patch at an altitude of 1750-1850m. Some specimens were also sifted from *Pinus* litter at 1500m above sealevel.

### 3.2.4. *Geostiba (Ditroposipalia) cassagnai* (COIFFAIT 1968) (Figs 188-194)

*Sipalia (Callosipalia) cassagnai* COIFFAIT 1968: 104ff.

**Types examined:** Holotype ♂ [genitalia dissected prior to present study]: Eurytanie, Karpénission, 9.IV.67. 32 / HOLOTYPE / Muséum Paris 1985, Coll. H. Coiffait / S. (Callosipalia) cassagnai Coiff., H. Coiffait det. 1967 / *Geostiba cassagnai* (Coiff.), det. R. Pace 1985 (MNHN). Paratype ♀ [dissected prior to present study]: same labels, but: ALLOTYPE (MNHN).

**Description:** In coloration and other external characters similar to *G. schuelkei* and *G. weiratheri*, but distinguished as follows:

Body somewhat smaller and especially more slender, pronotum as wide as long or only weakly transverse.

Elytra in ♂ strongly modified, each with pronounced longitudinal elevation along suture, extending almost from apex of scutellum to hind margin, laterad of this elevation with deep and large impression extending from just behind the shoulder to the hind margin, punctuation distinctly granulose (modifications on the whole somewhat resembling those in ♂ *Leptusa ruficollis* (ERICHSON)); in ♀ unmodified, punctuation fine and not distinctly granulose.

Abdomen with indistinct microsculpture, therefore more shining than in *G. schuelkei* and *G. weiratheri*.

♂: tergum VII near hind margin with two shallow furrows instead of carinae, the area between them slightly elevated posteriorly; hind margin of tergum VIII convex, in the middle weakly crenulate and without long pubescence (Fig. 192); hind margin of sternum VIII weakly convex, in the middle with distinctly longer pubescence (Fig. 193); aedeagus with median lobe of similar morphology as in *G. schuelkei* and *G. weiratheri* (Figs 188-189); apical lobe of paramere somewhat shorter and broader, apical and median setae distinctly longer (Fig. 190). The internal sac of the aedeagus apparently contains two rows of semitransparent spines, but since the aedeagus of the holotype, which had been dissected and mounted in a xylol-soluble medium, was no longer fully transparent, the internal structures were not clearly visible.

♀: hind margin of tergum VIII convex and with few setae (Fig. 194); sternum VIII weakly convex posteriorly. The spermatheca of the paratype, which had been dissected and mounted in a xylol-soluble medium, had collapsed and was filled with air, so that the normal shape is probably somewhat different from that illustrated in Fig. 191.

**Comparative notes:** *G. cassagnai* is readily distinguished from all other Greek congeners by the modifications of the ♂ elytra and the ♂ tergum VII (see description above).

**Systematics:** COIFFAIT (1968) attributed *G. cassagnai* to the new subgenus *Callosipalia* because the ♂ abdominal tergum VII is characterized by "un relief triangulaire occupant le tiers apical, ce relief rétréci d'avant en arrière se terminant par une callosité arrondie et lisse située sur le bord postérieur, ...". The impression of a "relief triangulaire", however, is caused by two furrows, which are very likely to represent an autapomorphic condition derived from the usual carinae in *Ditroposipalia*, enclosing a posteriorly slightly elevated area. Judging from the morphology of the genitalia (median lobe, parameres, spermatheca) and from other secondary sexual characters, especially the shape and chaetotaxy of terga VIII and X (Fig. 195), *G. cassagnai* is more closely related to *G. schuelkei* and *G. weiratheri* than the latter two are to many other species currently included in *Ditroposipalia*. Consequently, in order to avoid rendering *Ditroposipalia* paraphyletic, *Callosipalia* is here placed in the synonymy of that taxon.

**Distribution and bionomics:** The species is only known from the Timfristós near Karpenisió, Fthiótis, where it was collected in soil and litter of an *Abies* wood (COIFFAIT 1968).

### 3.3. Subgenus *Chondridiosipalia* SCHEERPELTZ

Based on the ♂ modifications of the abdominal tergum VII, the following species would have to be attributed to *Chondridiosipalia* SCHEERPELTZ. Although there are considerable doubts that it is more closely related to other species currently included in the subgenus than to some of the Greek representatives of the subgenus *Sipalotricha* SCHEERPELTZ (see section 3.4. and comments below *G. ulcerifera*), it is tentatively placed here for the reasons outlined in section 3.

#### 3.3.1. *Geostiba (Chondridiosipalia) ulcerifera* sp. n. (Figs 196-202)

**Holotype** ♂: GR. Pelopónnisos, Taygetos, E Prof. Ilias, 860m, Bachschlucht, 36°57'43N, 22°23'14E, 25.III.1997, V. Assing (cAss).

**Paratypes:** 1 ♂: same data as holotype (cAss); 2 ♂♂, 1 ♀, GR-Peloponnes, Taygetos, Weg z. Prof. Ilias, 860m, Bachtal, Ahorn, 25.3.97, P. Wunderle (cWun, cAss); 3 ♂♂, 2 ♀♀, GR, Peloponnes, Taygetos, Straße zum Prof. Ilias, 11-1400m, 16.6.96, P. Wunderle (cWun, cAss); 1 ♂, ♀ ♀: GR: Peloponnes, Lakona, Taygetos, Weg zum Profitis Ilias, 1000m / Bachtal, Ahornstreu, 36°57'57N/22°22'53O, 25.III.1997, leg. L. Zerche (DEI, cAss); 42 ♂♂, 51 ♀♀: GR: Peloponnes,

Lakonia, Taigetos-Geb., Paleopanagia -> Prof. Ilias, 1630m / 36°57'10N 22°21'52O, 20.IV.1998, Panzerkiefern, Schneefeld, leg. Zerche & Behne (DEI, cAss); 7♂♂, 13♀♀: GR: Peloponnes, Lakonia, Taigetos-Geb., Weg Paleopanagia - Prof. Ilias, *Abies*, *Pinus*, Schnee, N / Hütte, 1605m, 36°56'59N 22°22'15O, 20.IV.1999, leg. Zerche (DEI, cAss); 9♂♂, 14♀♀: GR: Peloponnes, Lakonia, Taigetos-Geb., Weg Paleopanagia - Prof. Ilias, *Abies*, *Pinus*, Schnee / O-Hang, 1615m, 36°57'03N 22°21'58O, 20.IV.1999, leg. Zerche & Behne (DEI, cAss); 5♂♂, 15♀♀: GR: Peloponnes, Lakonia, Taigetos-Geb., Weg Paleopanagia - Prof. Ilias, *Abies*, *Pinus*, Schnee, / O-Hang, 1645m, 36°57'10N 22°21'50O, 20.IV.1999, leg. Zerche & Behne (DEI); 4♀♀: GR: Peloponnes, Lakonia, Taigetos-Geb., Weg Paleopanagia - Prof. Ilias, *Abies*, *Pinus*, Schnee, / O-Hütte, 1570m, 36°57'00N 22°22'06O, 20.IV.1999, leg. Zerche (DEI).

**Description:** 1.8-2.4 mm. Colour variable, usually light brown, with usually the abdominal segments V-VII and often also the head infuscate, antennae and legs testaceous.

Head as long (measured from anterior margin of clypeus to neck) as wide and of subcircular shape; eyes small, their diameter shorter than antennomere III, not protruding from outline of head; dorsal surface in ♂ with shallow median impression, in ♀ with very weak or without such impression; microsculpture isodiametric, but barely noticeable; punctuation extremely fine.

Pronotum without sexual dimorphism, 1.1-1.15x wider than head and 1.1-1.15x wider than long, with maximum width in anterior half; posteriorly distinctly tapering; hind margin weakly convex; punctuation and microsculpture similar to head.

Elytra in ♂ with dense and coarsely granulate, in ♀ with weaker granulate punctuation.

Abdomen with sparse and fine punctuation and with shallow microsculpture.

♂: tergum VII near hind margin usually with small, ± circular granulum, which is sometimes indistinct or absent (Fig. 200); general outline of hind margin of tergum VIII weakly convex, in the middle weakly concave (Fig. 201); sternum VIII posteriorly obtusely pointed (Fig. 202); aedeagus and apical lobe of parameres as in Figs 196-198.

♀: hind margin of tergum VIII similar to that in ♂; sternum VIII posteriorly moderately convex, near hind margin with centrally interrupted row of long stout setae; spermatheca as in Fig. 199.

**Derivatio nominis:** The name (ulcus (lat.): swelling, boil) refers to the small granulum on the ♂ tergum VII.

**Comparative notes and systematics:** *G. ulcerifera* is the only species of *Chondridiosipalia* in Greece. In *Geostiba leonhardi* (BERRNHAEUER) from Italy, the type species of the subgenus, the median impression on the ♂ head is usually absent, the ♂ elytra are slightly elevated and very densely and granulosely punctured along suture, the small granulum on the ♂ tergum VII is usually less well-delimited anteriorly, the ventral process of the median lobe of the aedeagus is longer and more slender, and the spermatheca is of different shape.

Considering the similarities in both external and sexual characters of *G. ulcerifera* with *G. ahaiaensis* sp. n. and *G. fthiotisensis* sp. n. of the subgenus *Sipalotricha*, it appears highly unlikely that the subgenus *Chondridiosipalia* should represent a monophylum.

**Distribution and bionomics:** The species is apparently endemic in the Taygetos, southern Pelopónnisos, where it was collected in *Abies*, *Acer* and *Pinus* litter and near snow patches at altitudes between 860 and 1645m.

### 3.4. Subgenus *Sipalotricha* SCHEERPELTZ

*Sipalotricha* SCHEERPELTZ, 1931: 420ff.

*Sipalotricha* SCHEERPELTZ, subgenus of *Geostiba* THOMSON: PACE 1996: 8.

*Lioglutosipalia* SCHEERPELTZ 1951: 171; syn. n.



The subgenus is represented by ten species in Greece and Cyprus, four of them in the Greek mainland (including the Pelopónnisos), one in Levkás, three in Crete, one in Rhodes, and one in Cyprus. Aside from the widespread *G. euboica* PACE, all of them apparently have a restricted distribution.

The subgenus is mainly characterized by the absence of obvious synapomorphies (see characters indicated for *Lioglutosipalia* in SCHEERPELTZ 1951). Body size and coloration are rather variable, but most species are relatively small and light-coloured, usually with the abdominal tergum VI and part of the adjacent segments, and sometimes also with the head darker. Head and pronotum are without distinct sexual dimorphism. In some species the punctuation of the elytra is denser and more distinctly granulose in males than in females. The hind wings are usually reduced; one species, however, is fully winged and another species may be wing-dimorphic, though macropterous specimens have not become known. The primary and secondary sexual characters are characterized as follows: ♂ terga III-VII unmodified; ♂ tergum VIII unmodified or posteriorly emarginate; median lobe of aedeagus usually with prominent "crista apicalis" and "crista proximalis", internal sac with or without spines; apical lobe of paramere with three long and one short setae; spermatheca of rather uniform shape.

For details regarding the synonymy of *Lioglutosipalia* SCHEERPELTZ with *Sipalotricha* SCHEERPELTZ see comments below *Geostiba leucadiae* (SCHEERPELTZ).

### 3.4.1. *Geostiba (Sipalotricha) euboica* PACE 1990 (Figs 203-212)

*Sipalia (Lioglutosipalia) leucadiae* i. l.: SCHEERPELTZ 1951: 176.

*Sipalia (Lioglutosipalia) breiti* i. l.: SCHEERPELTZ 1951: 176.

*Sipalia (Lioglutosipalia) leucadiae* SCHEERPELTZ 1959: 414ff.

*Geostiba (Lioglutosipalia) euboica* PACE 1990: 151ff.

*Geostiba (Lioglutosipalia) elatensis* PACE 1996: 8; nom. n. for *Sipalia leucadiae* SCHEERPELTZ 1961 [recte: 1959]; syn. n.

*Geostiba (Lioglutosipalia) samensis* PACE 1996: 34ff.; syn. n.

**Types examined:** *Geostiba euboica* PACE: Holotype ♂: Eubée, 3.IV.67, Lichas. 29 / Muséum Paris 1985, Coll. H. Coiffait / Holotypus *Geostiba euboica* m., det. R. Pace 1985 / *Geostiba* (Liogl.) *euboica* sp. n. det. R. Pace 1985 (MNHNP).

*Geostiba elatensis* PACE: Lectotype ♂, here designated: ♀ [sic] / Insel Levkas, Dr. M. Beier leg. / Kaligoni, 21.IV.1932 / ex coll. Scheerpeltz / TYPUS *Sipalia leucadiae* O. Scheerpeltz / Lectotypus ♂ *Sipalia leucadiae* Scheerpeltz, desig. V. Assing 1999 (NHMW).

**Paralectotypes:** 1 ♂, 2 ex.: Insel Levkas, Kaligoni, Mittel-Griechenland, Dr. M. Beier, 19.V.33 / ex coll. Scheerpeltz / COTYPUS *Sipalia leucadiae* O. Scheerpeltz (NHMW); 1 ♂: ♂ / Insel Levkas, Dr. M. Beier leg. / Kaligoni, 18.V.1932 / ex coll. Scheerpeltz / COTYPUS *Sipalia leucadiae* O. Scheerpeltz (NHMW); 1 ♀: ♂ / Insel Levkas, Dr. M. Beier leg. / Kaligoni, 18.V.1932 / ex coll. Scheerpeltz / TYPUS *Sipalia leucadiae* O. Scheerpeltz (NHMW).

*Geostiba samensis* PACE: Holotype ♂: GR. Kefalonia, Enos, 900-1100m, 10.X.1992, SPRICK / *Geostiba* sp. ♂, det. Assing 1992 / HOLOTYPUS *Geostiba samensis* m. det. R. Pace 1993 / *Geostiba samensis* sp. n. det. R. Pace 1993 (cAss).

#### Additional material examined:

**Mainland Greece:** 1 ♂, 1 ♀, 2 ex.: Umg. Volo, Thessalien / TYPUS *Sipalia breiti* O. Scheerpeltz (NHMW); 1 ♂, 1 ♀: Umg. Volo, Thessalien / COTYPUS *Sipalia breiti* O. Scheerpeltz (NHMW); 1 ♂, Thessalia, Volos, Pilion Oros, 39°22'26N, 23°01'48E, ca. 1000m, *Ilex*, 3.IV.1998, leg. Schülke (cSch); 1 ♂, Pilion Oros, 3km S Zagora, 39°26'N, 23°07'E, 400-500m, 3.IV.1998, leg. Assing (cAss).

**Pelopónnisos:** 1 ♀, Patras, university campus, 23.III.1988, leg. Schmidt (cAss); 3 ♂ ♂, 1 ♀, 1 ex., 40 km SE Tripoli, Vourvoura, 920m, 37°19'51N, 22°27'22E, 22.III.1997, leg. Assing, Zerche (DEI, cAss); 1 ♀, Lakonia, Pamón Oros, S Agios Pétros, 37°17'26N, 22°35'38E, 1225m, litter of *Abies* and *Pinus*, 18.IV.1998, leg. Zerche (DEI).

**Kárpáthos:** 1♂, 2♀: Lastos, N Oros Lastos, 600m, 16.IV.1999, leg. Meybohm (cAss); 1♂, Othos, 440m, 20.IV.1999, leg. Meybohm (cAss); 2♂♂, 2♀♀, Aperi, 200m, 20.IV.1999, leg. Meybohm (cAss); 1♂, Menetes, N-slope, Oros Chomali, 500m, 19.IV.1999, leg. Meybohm (cAss); 1♀, Olympos, pass S Prof. Ilias, 500m, 18.IV.1999, leg. Meybohm (cAss).

**Description:** Very variable species. 2.1-2.7 mm. Usually of relatively dark colour, but coloration subject to considerable variation: antennae, pronotum, elytra, anterior abdominal segments and abdominal apex light brown to brown; head usually dark brown; abdominal segment VI and part of adjacent segments blackish; legs testaceous. For an illustration of the facies see figure 228 in PACE (1990) and figure 141 in PACE (1996).

Head about as wide as long or weakly (1.05x) transverse, in dorsal view at least slightly widened behind eyes; dorsally without median fovea; eyes relatively large, their diameter (lateral view) approximately as long as antennomere II; punctation extremely fine, barely noticeable; microsculpture isodiametric, shallow, sometimes very indistinct.

Pronotum 1.1-1.2x wider than head and 1.05-1.15x wider than long; maximum width in anterior half, posteriorly distinctly tapering; lateral margins in dorsal view smoothly curved, posterior angles weakly pronounced or almost obsolete; punctation and microsculpture similar to head.

Elytra not distinctly wider than pronotum; without distinct sexual dimorphism; with weakly to moderately granulose, dense punctation; in posterior half often with shallow impression of variable size and shape.

Abdomen with fine and rather sparse punctation and with shallow transverse microsculpture.

♂: tergum VIII convex posteriorly (Fig. 210); hind margin of sternum VIII strongly convex (Fig. 211); aedeagus and apical lobe of paramere as in Figs 203-205 (see also figures 142-144 in PACE 1996).

♀: tergum VIII weakly convex posteriorly; hind margin of sternum VIII convex and with row of rather long and stout setae (Fig. 212); spermatheca as in Figs 206-209.

**Comments:** According to the original description of *G. samensis* PACE, that species is distinguished from *G. euboica* PACE by the larger eyes, differences in the "crista proximalis" and "crista apicalis" of the aedeagus, and by the slightly different shape of the apical lobe of the paramere. These differences, however, are connected by transitional conditions in the material examined and are all within the range of intraspecific variation of the same species. Similarly, no evidence was found that the type material of *Sipalia leucadiae* SCHEERPELTZ, a secondary homonym later replaced with *Geostiba elatensis* PACE, should represent a distinct species. Since *G. euboica* is the oldest available name, *G. elatensis* and *G. samensis* are here regarded as junior synonyms.

The specimens from Kárpáthos differed from the material from the Greek mainland in the somewhat less densely punctured elytra and in a slightly smaller spermatheca, but since *G. euboica* is rather variable in these characters and no further constant differences were found, they are unlikely to represent a specifically distinct taxon.

**Distribution and bionomics:** The species is here recorded from Levkás, Kefallinia, several localities in the Pelopónnisos, Thessalia, Evvoia, and from Kárpáthos, and it is probably more widespread than is currently known. In view of the wide range, it should not be surprising if *G. euboica* was wing-dimorphic. The material examined was collected at altitudes of ca. 100m to 1225m. Some of the specimens were sifted from litter of *Ilex*, *Quercus ilex*, *Abies*, and *Pinus*. Part of the material collected in April (Kárpáthos) was teneral.

### 3.4.2. *Geostiba (Sipalotricha) leucadiae* (SCHEERPELTZ 1931) (Figs 214-221)

*Sipalotricha leucadiae* SCHEERPELTZ 1931: 423f.

*Geostiba (Sipalotricha) leucadiae* (SCHEERPELTZ): PACE 1996: 8.

**Types examined:** Lectotype ♂, here designated: ♂ / Megan Oros, Levkas, 1000m / 16.IV.29 Beier / ex coll. Scheerpeltz / TYPUS *Sipalotricha leucadiae* O. Scheerpeltz / VIDIT R. Pace 1981 / Lectotypus *Sipalotricha leucadiae* Scheerpeltz, desig. V. Assing 1999 (NHMW).

**Paralectotypes:** 1 ♀: ♀ / Megan Oros, Levkas, 1000m / 16.IV.29 Beier / Photographiert 6.IV.1931, O. Scheerpeltz / ex coll. Scheerpeltz / TYPUS *Sipalotricha leucadiae* O. Scheerpeltz / VIDIT R. Pace 1981 (NHMW); 1 ♂: ♂ [sic] / Megan Oros, Levkas, 1000m / 16.IV.29 Beier / ex coll. Scheerpeltz / COTYPUS *Sipalotricha leucadiae* O. Scheerpeltz (NHMW); 1 ♀: same labels, but "♀" (NHMW)

**Description:** External appearance similar to *G. euboica*, but distinguished as follows:

Antennae shorter and more strongly incrassate apically, antennomeres IV-X more distinctly transverse.

Elytra distinctly longer, at suture (measured from apex of scutellum to elytral hind margin) 0.75-0.80x the length of pronotum; hind wings fully developed.

♂: hind margin of tergum VIII more weakly convex (Fig. 219); sternum VIII obtusely pointed posteriorly (Fig. 220); median lobe of aedeagus slightly smaller, ventral process shorter, crista apicalis less pronounced (Figs 214-215); apical lobe of paramere shorter and broader (Fig. 216).

♀: tergum and sternum VIII similar to *G. euboica* (Fig. 221); spermatheca with capsule of different orientation in relation to (the wider) duct (Figs 217-218).

**Comparative notes:** *G. leucadiae* is readily distinguished from all other Greek congeners by the longer elytra and the presence of long hind wings.

**Comments:** Based on external and sexual characters (especially the chaetotaxy of tergum and sternum VIII and of tergum X, morphology of aedeagus), *G. leucadiae* belongs to the group of species previously referred to *Lioglutosipalia*. According to SCHEERPELTZ (1931) and PACE (1996), *Sipalotricha* is distinguished by the slightly more prominent eyes, the more transverse pronotum, the longer lateral setae of the body, and the longer elytra. I have been unable to appreciate the indicated differences in the length of the setae and the shape of the pronotum; the latter is subject to considerable intraspecific variation. The length of the elytra and the hind wings, and the slightly more prominent eyes are characteristic of flying species. There are many species of Staphylinidae, and at least two species of *Geostiba* (ASSING, unpubl. and present paper), in which such differences (dimorphisms) occur in one and the same species. Therefore, and because there is little doubt that attributing *G. leucadiae* to a distinct subgenus would render the group of species previously referred to *Lioglutosipalia* paraphyletic, they are here referred to the same subgeneric taxon. *Sipalotricha* SCHEERPELTZ 1931 is the older name, of which *Lioglutosipalia* SCHEERPELTZ 1951 becomes a junior synonym.

**Distribution and bionomics:** In spite of its morphological adaptations to dispersal by flight (large eyes, fully developed hind wings), *G. leucadiae* is still known only from the type locality, the Megan Oros, Levkás, where it was found at an altitude of 1000m.

### 3.4.3. *Geostiba (Sipalotricha) ahaiaensis* sp. n. (Figs 222-228)

**Holotype** ♂: GR. Pelopónnisos, Erimanthos, oberh. Kalendzi, Sattel, 1500m, 37°56'38N, 21°46'30E, 27.III.1997, V. Assing (cAss).

**Paratypes:** 38 ♂♂, 19 ♀♀: same data as holotype (cAss); 11 ♂♂, 9 ♀♀: GR-Peloponnes; Erymanthos, Kalentzi, Pass, 1500m, Rasen, Tanne, 27.3.97, P. Wunderle (cWun); 14 ex.: GR: Peloponnes, Ahaia, Erimanthos-Gebirge, oberhalb Kaléntzi, 1500m, Sattel, Rasen mit Steinen / unter Steinen, 37°56'38N/21°46'30O, 27.3.1997, leg. L. Zerche (DEI); 5 ex.: GR: Peloponnes,

Ahaia, Erimanthos-Geb., oberh. Kaletzi, Wiese, N-Hang, unter Steinen am Schnee, 1490m / 37°56'15N 21°47'23O, 26.IV.1999, leg. Zerche & Behne (DEI); 1 ex., same data, but: Schnee auf Wiese, leg. Zerche (DEI); 1 ex.: GR: Peloponnes, Ahaia, Erimanthos-Geb., oberh. Kaletzi, Schnee auf Wiese, N-Hang / 1540m, 37°56'08N 21°47'20O, 30.IV.1999, leg. Zerche (DEI).

**Description:** 1.8-2.2 mm. Coloration: yellowish brown to light brown, with the head often darker, abdominal segment VI and part or all of the adjacent segments infusate; antennae and legs testaceous.

Head approximately as wide as long; dorsally with  $\pm$  distinct subcircular median impression, which may occasionally be absent in  $\varnothing$ ; surface shining, with extremely fine and sparse punctation and with very indistinct isodiametric microsculpture; eyes small, their diameter usually shorter than antennomere III.

Pronotum 1.05-1.1x wider than head and 1.05-1.15x wider than long; maximum width in anterior half; shape similar to that in *G. euboica*; microsculpture and punctation slightly more distinct than on head; usually along median line with two at least weakly indicated longitudinal median impressions, which are very variable in depth, length and shape, and which may occasionally be indistinct especially in  $\varnothing$ .

Elytra approximately as wide as pronotum, without sexual dimorphism; punctation rather dense and weakly to moderately granulose.

Abdomen with very fine and sparse punctation and with shallow transverse microsculpture.

$\delta$ : general outline of hind margin tergum VIII convex, but in the middle weakly concave (Fig. 226); sternum VIII posteriorly obtusely pointed (Fig. 227); general morphology of aedeagus similar to *G. euboica*, but smaller, ventral process of median lobe relatively shorter, "crista apicalis" less strongly protruding from lateral outline and of different shape (Figs 222-223); apical lobe of paramere relatively short (Fig. 224).

$\varnothing$ : hind margin of tergum VIII similar to  $\delta$ ; sternum VIII posteriorly moderately convex and with centrally interrupted row of long stout setae (Fig. 228); spermatheca as in Fig. 225, shape of bulb completely different from that in *G. euboica*.

**Derivatio nominis:** The name refers to the region Ahaia in the northwestern Pelopónnisos, which includes the Erimanthos Oros (type locality).

**Intraspecific variation:** The species shows some, though not pronounced, intraspecific variation especially in the coloration, in the relative width of the pronotum, the pronotal impressions, and in the elytral punctation.

**Comparative notes:** From *G. euboica*, the species differs in the lighter colour, the distinctly smaller size, the smaller eyes (no overlap), and the different primary and secondary sexual characters (see also description above). For distinction from the similar *G. fthiotisensis* sp. n. and *G. beieri* (SCHEERPELTZ) see comparative notes below those species.

**Distribution and bionomics:** *G. ahaiaensis* is known only from the Erimanthos Oros, where it was found under stones and sifted from grass, moss and *Abies* litter at an altitude of 1500m.

#### 3.4.4. *Geostiba (Sipalotricha) fthiotisensis* sp. n. (Figs 229-237)

**Holotype**  $\delta$ : GR: Fthiótida, NP Óros Iti, SO Kastania, Hochebene, *Abies*, Schnee, 1850m / 38°49'09N 22°16'12O, 6.V.1999, leg. Zerche (DEI).

**Paratypes:** 3  $\delta$ , 4  $\varnothing$ : same data as holotype (DEI); 4  $\delta$ , 6  $\varnothing$ : GR: Fthiótida, NP Óros Iti, SO Kastania, *Abies*-Wald, Schnee, N-Hang, 1640m / 38°50'26N 22°15'51O, 6.V.1999, leg. Zerche (DEI, cAss).

**Description:** Externally as in *G. ahaiaensis*, but distinguished as follows:

Head on average wider and often more distinctly widened behind eyes.

Elytra with distinct dimorphism; in ♂ with dense and coarsely granulose punctation; in ♀ with less dense and at most weakly granulose punctation.

♂: tergum VIII similar to *G. ahaiaensis* (Fig. 234); hind margin of sternum VIII slightly less strongly convex (Fig. 235); aedeagus of very similar morphology as in *G. ahaiaensis*, but median lobe with more pronounced crista proximalis and base of median lobe in lateral view of different shape (Figs 229-230); apical lobe of paramere similar to *G. ahaiaensis* (Fig. 231).

♀: hind margins of tergum and sternum VIII similar to *G. ahaiaensis* (Figs 236-237); spermatheca with much wider capsule (Figs 232-233).

**Derivatio nominis:** The name refers to the region Fthiodis (=Fthiótida), which includes the type locality.

**Comparative notes:** For distinction from the closely related *G. ahaiaensis* see description. *G. ulcerifera* from the Taygetos Oros, which is very similar both in external appearance and in sexual characters, differs especially in the less pronounced sexual dimorphism of the elytra, in the presence of a small granulum on the ♂ tergum VII, and in the shapes of the ♂ tergum and sternum VIII, and of the ♀ sternum VIII. For distinction from the similar *G. beieri* (SCHEERPELTZ) see description and comparative notes below.

**Distribution and bionomics:** The species is known only from the Iti Oros, SW Lamia, in the southwest of mainland Greece, where it was sifted from *Abies* litter at altitudes of 1640-1850m.

#### 3.4.5. *Geostiba (Sipalotricha) beieri* (SCHEERPELTZ 1959) (Figs 238-245)

*Sipalia (Lioglutosipalia) beieri* SCHEERPELTZ 1959: 416ff.

**Types examined:** Lectotype ♂, here designated: ♂ / Katarrakti-Paraskevi, Mittel-Griechenland, Dr. M. Beier, 14.VI.33 / ex coll. Scheerpeltz / TYPUS *Sipalia beieri* O. Scheerpeltz / Lectotypus ♂ *Sipalia beieri* Scheerpeltz, desig. V. Assing 1999 (NHMW)

**Paralectotypes:** 1 ♂: ♂ / Katarrakti-Paraskevi, Mittel-Griechenland, Dr. M. Beier, 14.VI.33 / ex coll. Scheerpeltz / COTYPUS *Sipalia beieri* O. Scheerpeltz (NHMW); 1 ♀: ♀ / Paraskevi, Cumerka, 1500m, 9.V.32, Beier / Epirus, Dr. M. Beier leg. / ex coll. Scheerpeltz / TYPUS *Sipalia beieri* O. Scheerpeltz (NHMW).

The original description is based on three specimens, two of them designated as "Typus" and one as "Paratypus" by SCHEERPELTZ (1959). Since no holotype was specified, all the types are syntypes. In view of the similarity of the species of *Lioglutosipalia*, the designation of a lectotype, here the specimen referred to as the male "Typus" in the original description, was deemed appropriate.

**Description:** External appearance as in *G. ahaiaensis* and *G. fthiotisensis*, distinguished only by the primary and secondary sexual characters:

♂: elytra with punctation less dense and less strongly granulose than in *G. fthiotisensis*, but more distinctly granulose than in *G. ahaiaensis*; tergum VIII with distinct emargination posteriorly (Fig. 242); hind margin of sternum VIII obtusely pointed (Fig. 243); aedeagus with ventral process of median more slender in ventral view, crista apicalis more pronounced than in *G. ahaiaensis* and *G. fthiotisensis* (Figs 238-239), apical lobe of paramere very short (Fig. 241).

♀: hind margin of tergum VIII with more distinct central concavity (Fig. 244); sternum VIII posteriorly similar to *G. ahaiaensis* (Fig. 245); spermatheca of similar morphology as in *G. fthiotisensis* (Fig. 240).

**Comparative notes:** For distinction from the similar *G. ahaiaensis* and *G. fthiotisensis* see description. Other species of *Sipalotricha* from the Greek mainland and

the Pelopónnisos are larger, darker, their eyes are larger, and the primary and secondary sexual characters are completely different.

**Distribution and bionomics:** The species is known only from the Tsumerka range some 30 km NE Arta, Ipiros. The types were sifted between limestone rocks at an altitude of 1400-1500m (SCHEERPELTZ 1959).

### 3.4.6. *Geostiba (Sipalotricha) idaea* PACE 1996 (Figs 246-253)

*Geostiba (Lioglutosipalia) idaea* PACE 1996: 36ff.

**Types examined:** **Paratypes:** 1♂, 1♀: GR. - Kreta, Psiloritis, 1550m, 10.X.91 Wunderle / *Geostiba* sp. pr. *cyprensis* m., det. R. Pace 1991 / Paratypus *Geostiba idaea* Pace, rev. V. Assing 1999 (cWun); 5♂♂, 10♀♀: GR Kreta, Psiloritis, Niddha, 1550m, Streu, N-Hang, 10.10.91, Wunderle / *Geostiba* cf. *cyprensis* det. P. Wunderle / Paratypus *Geostiba idaea* Pace, rev. V. Assing 1999 (cWun, cAss).

The paratypes are not labelled as such, but according to the collector of the type series, they were returned to him as "*Geostiba* sp. pr. *cyprensis*" and only some years later designated as paratypes in the original description of *G. idaea* (WUNDERLE, pers. comm.).

**Additional material examined:**

27♂♂, 15♀♀ [collected together with type series]: same data as paratypes (cWun, cAss).

**Description:** 2.1-2.6 mm. Light-coloured species, yellowish red to light brown, with abdominal tergum VI and the anterior half of tergum VII infusate; legs testaceous. For an illustration of the facies see figure 152 in PACE (1996).

Head approximately as wide as long or weakly transverse; dorsally often with trace of median impression; punctuation extremely fine, barely noticeable; microsculpture very shallow; eyes small, their diameter approximately equal to length of antennomere III.

Pronotum ca. 1.15x wider than head and ca. 1.1x wider than long; maximum width in anterior half; lateral margins in dorsal view distinctly tapering posteriorly; hind margin weakly convex; punctuation and microsculpture similar to head.

Elytra about as wide as pronotum; punctuation weakly granulose; usually with weak ± circular, transverse, or diagonal impression.

Abdomen with fine and rather sparse punctuation and with weak transverse microsculpture.

♂: hind margin with shallow central emargination (Fig. 251); sternum distinctly convex posteriorly; aedeagus with ventral process of moderate length, internal sac with long spines, apical lobe of paramere short and stout (Figs 246-248).

♀: hind margin of tergum VIII only indistinctly concave in the middle (Fig. 252); hind margin of sternum VIII moderately convex, in the middle indistinctly concave, and with row of long stout setae (Fig. 253); spermatheca with capsule distinctly delimited from duct (Figs 249-250).

**Comparative notes:** For distinction from other congeners occurring in Crete see below.

**Distribution and bionomics:** The species is known only from the type locality in the Ídhi Óros (= Ida) in central Crete, where it was sifted from debris below xerophytes in northern exposition at an altitude of 1550m (WUNDERLE, pers. comm.). One of the dissected females had a mature egg in the ovaries.

### 3.4.7. *Geostiba (Sipalotricha) exsecta* sp. n. (Figs 254-261)

**Holotype** ♂: 27.3.86, Kreta, Ida Gbg., Umg. Anogia, leg. H. Meybohm (cAss).

**Paratypes:** 3♂♂, 4♀♀, same data as holotype (cAss); 1♂, 3♀♀: 26.3.86, Kreta, Ida Gbg., Nida-

Ebene, leg. H. Meybohm (cAss); 2♂♂, 2♀♀: 26.3.76, Kreta, Anoria, Ida-Geb., Dr Fölscher Meybohm (cAss); 2♂♂: GR Kreta, Psiloritis, Niddha, 1550m, Streu, N-Hang, 10.10.91, Wunderle (cWun, cAss).

**Description:** External characters, apart from the more distinctly granulose punctuation of the elytra and the absence of elytral impressions, as in *G. idaea* (see description above).

♂: hind margin of tergum VIII deeply excised in the middle (Fig. 259); sternum VIII convex posteriorly; aedeagus with very long and slender ventral process (much longer than in *G. idaea*), internal sac without spines, apical lobe of paramere slender (Figs 254-256).

♀: hind margins of tergum and sternum VIII shallowly, but distinctly concave in the middle (Figs 260-261); spermatheca with capsule less clearly delimited from duct than in *G. idaea*, duct shorter and of different shape (Figs 257-258).

**Derivatio nominis:** The name (lat.: excised) refers to the characteristic shape of the hind margin of the ♂ tergum VIII.

**Comparative notes:** For distinction from the highly similar *G. idaea* see description. Judging from the morphology of the aedeagus and the male secondary sexual characters, *G. exsecta* is most closely related to *G. icaria* PACE from the Lévká Óri in western Crete. For separation from that species see description of *G. icaria* below.

**Distribution and bionomics:** The type series was collected in two localities in the Ídhi Óros (= Ida) in central Crete. The two specimens collected by P. Wunderle were sifted from debris below xerophytes in northern exposition at an altitude of 1550m, together with the types of *G. idaea* (WUNDERLE, pers. comm.).

### 3.4.8. *Geostiba (Sipalotricha) icaria* PACE 1996 (Figs 262-268)

*Geostiba (Lioglotosipalia) icaria* PACE 1996: 36.

**Types examined:** **Paratypes:** 2♂♂, 1♀: GR. - Westkreta, Omalos, 1200m, 8.X.91, Wunderle/ *Geostiba* sp. pr. *cyprensis* m., det. R. Pace 1991 / Paratypus *Geostiba icaria* Pace, rev. V. Assing 1999 (cWun, cAss).

The paratypes are not labelled as such, but according to the collector of the type series, they were returned to him as "*Geostiba* sp. pr. *cyprensis*" and only some years later designated as paratypes in the original description of *G. icaria* (WUNDERLE, pers. comm.).

**Description:** Highly similar to *G. exsecta*, but distinguished as follows:

Forebody and abdomen with more distinct microsculpture and less shine. Elytra with denser punctuation.

♂: posterior excision of tergum VIII less pronounced (Fig. 266); hind margin of sternum VIII slightly more convex and with more short setae; median lobe of aedeagus with shorter and wider ventral process (Figs 262-263); apical lobe of paramere similar to *G. exsecta* (Fig. 264).

♀: hind margins of tergum and sternum VIII centrally more weakly concave (Figs 267-268); spermatheca with wider capsule (Fig. 265). (The spermatheca illustrated in figure 149 in PACE (1996) is apparently malformed.)

**Comparative notes:** For distinction from its probable sister species, *G. exsecta*, see description. In *G. idaea*, the only further congener of the subgenus occurring in Crete, the elytra usually have an impression, the posterior excision of the ♂ tergum

VIII is shallower, the ventral process of the median lobe of the aedeagus is shorter and of different shape, the internal sac contains distinct spines, the apical lobe of the paramere is much shorter and broader, and the spermatheca has a smaller capsule and a longer duct.

**Distribution and bionomics:** The species is known only from Omalos, Lefka Ori, in western Crete, where the types were sifted from plant debris between rocks (WUNDERLE, pers. comm.).

### 3.4.9. *Geostiba (Sipalotricha) cyprensis* PACE 1983 (Figs 269-275)

*Geostiba (Lioglutosipalia) cyprensis* PACE 1983a: 35.

**Material examined:**

**Cyprus:** 12♂♂, 10♀♀, Troodos, Olympos, 1900m, N-slope, sifted from litter of *Pinus* and *Alnus*, 1.IV.1995, leg. Assing, Wunderle (cAss, cWun); 119♂♂, 89♀♀, same data, but 10.IV.1995 (cAss, cWun); 1♂, 3♀♀, Troodos, S Prodhromos, 1350m, sifted from litter of *Pinus*, 1.IV.1995, leg. Assing, Wunderle (cAss, cWun); 21♂♂, 27♀♀, 23 ex., Paphos Forest, Kykkos, 1250m, N-slope, litter of *Pinus* and *Quercus*, moss, 6.IV.1995, leg. Assing, Wunderle (cAss, cWun); 1♀, Paphos Forest, road from Kykkos to Pera Vasa, 1000m, N-slope, litter of *Quercus*, 6.IV.1995, leg. Assing (cAss); 1♂, same data, but 800m (cAss); 13 ex., northern Troodos, 1600m, litter of *Pinus*, 8.IV.1995, leg. Assing, Wunderle (cAss, cWun); 5♂♂, 8♀♀, Troodos, S Platres, Moniatas, 700m, *Pinus* litter, leg. Wunderle (cWun).

Although the types were not studied, there is no doubt that the present interpretation is correct. The description is based on specimens from the type locality, which are in full agreement with the original description.

**Description:** In external appearance highly similar to *G. idaea* and *G. exsecta*, but distinguished as follows:

Colour on the whole similar, but the head more often slightly darker than pronotum and elytra, and the anterior terga usually in the middle weakly infusate.

Eyes larger, their diameter approximately equal to length of antennomere II.

Elytra with dense and weakly to moderately granulose punctation; with or without weak  $\pm$  diagonal impression.

♂: hind margin of tergum VIII  $\pm$  triangularly emarginate, this emargination slightly shallower than in *G. exsecta*, but deeper than in *G. idaea* (Fig. 273); sternum VIII posteriorly similar to *G. exsecta*; aedeagus of similar morphology as in *G. exsecta*, but median lobe much smaller, with distinctly shorter ventral process, and apical lobe of paramere more slender (Figs 269-271).

♀: tergum and sternum VIII similar to *G. idaea* (Figs 274-275); spermatheca with slender capsule (Fig. 272).

**Distribution and bionomics:** *Geostiba cyprensis* is apparently endemic in the Troodos range, Cyprus. It was sifted from litter of *Pinus*, *Quercus*, and *Alnus* at altitudes between 800 and 1900m.

### 3.4.10. *Geostiba (Sipalotricha) rhodiensis* PACE 1983

*Geostiba (Lioglutosipalia) rhodiensis* PACE 1983b: 138f.

The original description of *G. rhodiensis* is based on a single male collected in Ródhos, Profitis Ilias. The holotype is kept in the collection of H. Franz, Mödling, and currently inaccessible. For illustrations of the facies and the genitalia, figures 34-38 in PACE (1983b) are referred to.



### 3.5. A note on *Sipalia graeca* BERNHAUER 1909

*Sipalia graeca* BERNHAUER 1909: 102f.

*Paraleptusa graeca*: BERNHAUER & SCHEERPELTZ 1926: 561.

*Sipalia cephallica* i. l.: SCHEERPELTZ 1951: 176.

Types examined: Syntypes: 1♂, 4 ex.: Kephallenia 1905, Eleutherios-Pass, O. Leonhard / Bernhauer det. / Bernhauer det. / Syntypus *Sipalia graeca* Bernhauer, rev. V. Assing 1999 (DEI); 1 ex.: ♂ / Kephallinia / Moczarski / ex coll. Moczarski / ex coll. Scheerpeltz / TYPUS *Sipalia cephallica* O. Scheerpeltz / Syntypus *Sipalia graeca* Bernhauer, rev. V. Assing 1999 (NHMW).

Originally described in the genus *Sipalia*, the species was later transferred to *Paraleptusa* PEYERIMHOFF (BERNHAUER & SCHEERPELTZ 1926), which is distinguished from *Geostiba* by the tarsal formula (4, 4, 5). Based on an examination of six syntypes, the systematic position of this species is here confirmed. Remarkably, SCHEERPELTZ (1951) lists this species as "*Sipalia cephallica* n. sp."; he evidently intended to designate the syntype of *S. graeca* in his collection as the holotype of the new species.

### 4. Key to the species of *Geostiba* from Greece and Cyprus

Most Greek representatives of the genus are difficult to distinguish in a key based exclusively on morphological characters, but have more or less restricted areas of distribution. Therefore, in order to facilitate the use of the key and the identification of the species, biogeographical data are given special weight. Characters such as size, coloration, proportions, punctuation, etc. are indicated, but they are often subject to considerable intra-specific variation and interspecific overlap. The key, therefore, primarily relies on an examination of the primary and secondary sexual characters especially of the males. Since even the male secondary sexual characters may be highly variable, particularly so in *Geostiba* s. str., it is important to base the identification of the species on several - in *Geostiba* s. str. larger - males.

1. Usually darker and on average slightly larger species; elytra distinctly wider than pronotum; pronotum often with distinct sexual dimorphism (in ♂ more oblong and sometimes elongated posteriorly); shape and chaetotaxy of tergum X as in Fig. 145. ♂: tergum VII with median tooth- or spine-like process near hind margin (which is often reduced to various degrees, occasionally even completely absent in smaller ♂♂); median lobe of aedeagus with cristal process; apical lobe of paramere slender, with one moderately long and three short setae. ♀: spermatheca with relatively long and slender duct. Distribution: absent from Cyprus and Greek islands, except for Evvoia. Subgenus *Geostiba* s. str. ....2
- Most species more light-coloured and on average smaller; elytra at most only slightly wider than pronotum; pronotum without sexual dimorphism; tergum X of different shape and chaetotaxy. ♂: tergum VII not or otherwise modified; median lobe of aedeagus without cristal process; apical lobe of paramere, except for one species, with longer setae. ♀: spermatheca mostly with shorter and less slender duct. ....21
2. Species occurring in the Pelopónnisos .....3
- Species absent from the Pelopónnisos. ....10
3. ♂: anterior abdominal terga III, III-IV, or III-V modified, i. e. with median tubercle, keel, or impression either in anterior transverse impression or in posterior half. (These modifications are occasionally indistinct especially in smaller ♂♂.) .....4
- ♂: anterior abdominal terga unmodified .....9
4. Pronotum with pronounced sexual dimorphism, i. e. in ♂ posteriorly distinctly tapering, elongated and (in normal position) covering most or all of scutellum. ....5

- Pronotum with weak sexual dimorphism, in ♂ not distinctly elongated posteriorly; scutellum visible .....7
- 5. ♂: elytra with aggregation of granula or small tubercle near apex of scutellum, lateral margins in or near the middle elevated, almost folded; tergum III with transverse or crescent-shaped median impression near hind margin. ....6
- ♂: elytra with deep subcircular impressions, without granula or tubercle near apex of scutellum, lateral margins unmodified; terga III and IV with round or oblong median tubercle in anterior impression, that of tergum IV often indistinct; aedeagus as in Figs 130-131. ♀: spermatheca as in Figs 133-134. Distribution: Parnon Oros (SE-Pelopónnisos).....*G. (s. str.) parnoniensis* sp. n.
- 6. Larger species. ♂: pronotum 0.45 mm wide and 0.54 mm long, more strongly elongated posteriorly (ca. 1.18x longer than wide). Aedeagus with cristal process as in Fig. 153. Distribution: Taygetos (SW-Pelopónnisos).....*G. (s. str.) taygetana* (BERNHAEUER)
- Smaller species. ♂: pronotum in larger specimens 0.40-0.42 mm wide and 0.44-0.47 mm long, less strongly elongated posteriorly (1.10-1.15x longer than wide). Aedeagus with cristal process as in Figs 137-140. Distribution: Erimanthos (NW-Pelopónnisos). ....*G. (s. str.) zercheana* sp. n.
- 7. ♂: elytra with longitudinal tubercle near apex of scutellum, deeply and extensively impressed; terga III and IV with smooth central elevation in anterior impression, that of tergum IV often very indistinct; aedeagus as in Figs 121-124. ♀: spermatheca as in Figs 126-127. Distribution: Killini (N-Pelopónnisos) .....*G. (s. str.) killiniensis* sp. n.
- ♂: elytra without tubercle near apex of scutellum; primary and secondary sexual characters different. Species absent from the Killini range.....8
- 8. ♂: terga III-IV with median keel, tergum V with weak median elevation in anterior impression; process of tergum VII more slender (Figs 119-120); aedeagus as in Figs 113-115. ♀: spermatheca as in Figs 117-118. Distribution: Menalon Oros.....*G. (s. str.) menalonensis* sp. n.
- ♂: terga III-V with subcircular or oval median elevation in anterior impression, those of terga IV and V often indistinct; process of tergum VII in antero-dorsal view broader (Fig. 112); aedeagus as in Figs 104-107. ♀: spermatheca as in Figs 109-110. Distribution: Aroania (N-Pelopónnisos).....*G. (s. str.) meschniggiana* (BERNHAEUER)
- 9. ♂: elytra with long sutural carina; process of tergum VII and aedeagus as in Figs 98-99, 102-103. ♀: spermatheca as in Fig. 101. Distribution: Taygetos (S-Pelopónnisos). ....*G. (s. str.) meschniggi* PACE
- ♂: elytra with weak to moderately long sutural carina; process of tergum VII and aedeagus as in Figs 146-148, 151-152. ♀: spermatheca as in Fig. 150. Distribution: Erimanthos (NW-Pelopónnisos).....*G. (s. str.) acifera* sp. n.
- 10. Species from Evvoia.....11
- Species from mainland Greece. ....12
- 11. Large species, width of pronotum >0.4 mm. ♂: elytra with extensive and deep impressions; process of tergum VII and aedeagus as in Figs 71-74. Distribution: Likhás peninsula (NW-Evvoia) .....*G. (s. str.) aculeata* (COIFFAIT)
- Smaller species, width of pronotum <0.4 mm. ♂: elytra weakly impressed; cristal process of aedeagus very thin (Figs 77-78). Distribution: Dirfys Oros (central Evvoia). ....*G. (s. str.) matsakisi* (COIFFAIT)
- 12. ♂: anterior abdominal terga III-IV modified, i. e. with median elevation either in or just behind anterior transverse impression. (These modifications are occasionally indistinct especially in smaller ♂ ♂.) .....13
- ♂: anterior abdominal terga unmodified. (Extremely weak, barely noticeable median elevations may be present in *G. siculifera* from the Pangéo.).....15

13. Shape of pronotum with moderate sexual dimorphism, hind margin more convex. ♂: elytra without sutural carina, dorsal surface with weak impression; terga III and IV with subcircular tubercle behind anterior impression; process of tergum VII shorter (Figs 16-17); cristal process of aedeagus of characteristic shape (Fig.13). Distribution: Pilion Oros (Thessalia). ..... *G. (s. str.) moczarskii* (SCHEERPELTZ)
- Shape of pronotum with weak sexual dimorphism. ♂: elytra with sutural carina and distinct impression; terga III and IV with oval or circular median elevation in anterior impression; tergum VII (in large ♂ ♂) with longer process. Distribution different. .... 14
14. ♂: elytra with - in larger ♂ ♂ - longer, but less strongly projecting sutural carina; terga III and IV with oblong median elevation in anterior impression; process of tergum VII and aedeagus as in Figs 1-4, 8-9. ♀: spermatheca as in Figs 5-7. Distribution: Makedhonia, Thessalia, Ipiros. .... *G. (s. str.) armata* (EPPELSHEIM)
- ♂: elytra with shorter, but more strongly projecting sutural carina; terga III and IV with subcircular median elevation in anterior impression; process of tergum VII and aedeagus as in Figs 28-29, 32-33. ♀: spermatheca as in Fig. 31. Distribution: Pangéo (NE-Greece). .... *G. (s. str.) pangeoensis* sp. n.
15. Head and pronotum with extremely weak microsculpture and very shiny. ♂: elytra without carina, tubercle or elevation at suture, but with fold-like elevations near exterior hind angles; process of tergum VII long and acute (Figs 87-88); aedeagus as in Figs 82-83. ♀: spermatheca as in Figs 85-86. Distribution: Vermion (Makedhonia). .... *G. (s. str.) vermionensis* sp. n.
- Head and pronotum with less shine. ♂: elytra with carina, tubercle or elevation at suture, exterior hind angles unmodified. Primary sexual characters and distribution different. .... 16
16. Pronotum with pronounced sexual dimorphism, in ♂ distinctly tapering and elongated posteriorly, in normal position covering most or all of scutellum (larger ♂ ♂!). .... 17
- Pronotum with weak sexual dimorphism, in ♂ not distinctly tapering and elongated posteriorly, scutellum visible. .... 19
17. ♂: hind margin of pronotum emarginate in the middle (large ♂ ♂); elytra with pronounced sutural carinae and impressions; tergum VII massive (Figs 67-68); aedeagus as in Figs 63-64. ♀: spermatheca as in Fig. 66. Distribution: Pilion Oros (Thessalia). .... *G. (s. str.) pauli* sp. n.
- ♂: hind margin of pronotum not emarginate. Species from northeastern Greece. .... 18
18. ♂: elytra with short tubercle at some distance behind apex of scutellum; process of tergum VII apically rounded in antero-dorsal view (Fig. 41); aedeagus with cristal process of distinctive shape (Figs 35, 37). Distribution: Pangéo ..... *G. (s. str.) sicilifera* sp. n.
- ♂: elytra with long sutural carinae; process of tergum VII apically acute in antero-dorsal view (large ♂ ♂!) (Fig. 51); aedeagus with cristal process of different shape (Figs 44, 46). Distribution: Falakró. .... *G. (s. str.) falakroensis* sp. n.
19. ♂: elytra with broad and smooth elevation near apex of scutellum; process of tergum VII in large ♂ ♂ shorter (Figs 59-60); aedeagus with short and slender cristal process (Figs 53-56). Distribution: Menikio (NE-Greece). .... *G. (s. str.) menikioensis* sp. n.
- ♂: elytra with distinct sutural carinae; process of tergum VII longer; aedeagus with longer cristal process of different shape. Species from the south of mainland Greece. .... 20
20. ♂: elytra with distinct impressions; process of tergum VII slender and apically rounded (Figs 25-26); aedeagus with cristal process much broader in lateral view (Figs 20, 22). ♀: spermatheca with longer duct (Fig. 24). Distribution: Xerovuni Oros (Fthiôtis). .... *G. (s. str.) xerovuniana* (SCHEERPELTZ)
- ♂: elytra at most with very weak impressions; process of tergum VII with broader base and apically acute (Figs 96-97). ♀: spermatheca with shorter duct (Fig. 95). Distribution: Iti Oros (Fthiôtis). .... *G. (s. str.) itiensis* sp. n.
21. ♂: tergum VII near hind margin with pair of longitudinal carinae or impressions. Subgenus *Ditroposipalia* SCHEERPELTZ. .... 22
- ♂: tergum VII unmodified or with small median granulum near hind margin ..... 25

22. Larger wing-dimorphic species; eyes usually larger. ♂: elytra with oblong or crescent-shaped tubercles or aggregations of granula immediately behind apex of scutellum; chaetotaxy of tergum VIII as in Figs 166-168; median lobe of aedeagus with straight (lateral view) and more slender (ventral view) ventral process; internal sac with rows of  $\pm$  sclerotized spines (Figs 158-161); apical lobe of paramere slender (Fig. 162). ♀: spermatheca of highly distinctive shape (Figs 163-165). Widespread species: Macedonia, Greece (including several smaller islands, Crete, Rhodes), Turkey.....  
..... *G. (D.) oertzeni* (EPPELSHEIM)
- Smaller brachypterous species with smaller eyes. ♂: secondary sexual characters different; median lobe of aedeagus with curved (lateral view) and relatively broader (ventral view) ventral process; internal sac with fewer or without spines; apical lobe of paramere less slender. ♀: spermatheca of completely different shape. Species with much more restricted areas of distribution.....23
23. ♂: elytra with pronounced longitudinal elevation along suture, extending almost from apex of scutellum to hind margin, laterad of this elevation with deep and large impression extending from just behind the shoulder to the hind margin; tergum VII with pair of impressions; chaetotaxy of tergum VIII as in Fig. 192; median lobe of aedeagus as in Figs 188-189; apical lobe of paramere broader and with three long setae (Fig. 190). Distribution: Timfristós (Fthiótis)..... *G. (D.) cassagnai* (COIFFAIT)
- ♂: modifications of elytra different; tergum VII with pair of carinae; chaetotaxy of tergum VIII and aedeagus different; apical lobe of paramere more slender and with one long seta. Distribution different.....24
24. ♂: elytra with long sutural carinae, the two carinae forming a  $\pm$  distinct keel usually extending over the full length of the suture, and with weak to moderate, often  $\pm$  diagonal impression; posterior margin of tergum VIII crenulate and with more setae (Fig. 186); aedeagus with 4 large spines in internal sac (Figs 180-181). ♀: duct of spermatheca proximally more dilated (Figs 183-184). Distribution: Falákro (NE-Greece), ?Pirin (Bulgaria)..... *G. (D.) weiratheri* PACE
- ♂: elytra with shorter, posteriorly tapering sutural elevation immediately behind apex of scutellum, the elevations of both elytra together forming a  $\pm$  triangular elevation only narrowly interrupted by the suture; remainder of elytral surface with usually shallow,  $\pm$  extensive impression; posterior margin of tergum VIII not crenulate and in the middle with only two short setae (Fig. 178); aedeagus without spines in internal sac (Figs 172-173). ♀: duct of spermatheca proximally more slender (Figs 175-176). Distribution: Kato Olympos (Thessalia)..... *G. (D.) schuelkei* sp. n.
25. ♂: tergum VII with small median granulum near hind margin, which is rarely indistinct or obsolete (Fig. 200); aedeagus as in Figs 196-197. ♀: spermatheca as in Fig. 199. Distribution: Taygetos (SW-Pelopónnisos)..... *G. (Chondridiosipalia) ulcerifera* sp. n.
- ♂: tergum VII unmodified. Subgenus *Sipalotricha* SCHEERPELTZ.....26
26. Winged species, length of elytra at suture 0.75-0.80x the length of pronotum, hind wings present. ♂: hind margin of tergum VIII not emarginate (Fig. 219); median lobe of aedeagus as in Figs 214-215; apical lobe of paramere relatively short and broad (Fig. 216). ♀: spermatheca as in Figs 217-218. Distribution: Megan Oros, Levkás.....  
..... *G. (S.) leucadiae* (SCHEERPELTZ)
- Brachypterous species. (Note that *G. euboica* may be dimorphic, even though winged specimens have not yet been observed.) Elytra distinctly shorter, hind wings reduced. Primary and secondary sexual characters different.....27
27. Colour usually darker, eyes larger. ♂: hind margin of tergum VIII convex (Fig. 210); median lobe of aedeagus as in Figs 203-204; apical lobe of paramere relatively slender (Fig. 205). ♀: spermatheca as in Figs 206-209. Widespread species: Levkás, Kefallinia, Pelopónnisos, Thessalia, Evvoia, Kápathos..... *G. (S.) euboica* PACE
- Colour usually lighter, eyes smaller. ♂: hind margin of tergum VIII at least shallowly concave in the middle; aedeagus of different morphology. ♀: spermatheca different. Species with more restricted areas of distribution.....28
28. Species from mainland Greece and the Pelopónnisos.....29
- Species from Crete, Cyprus, or Ródhos.....31

29. ♂: hind margin of tergum VIII strongly emarginate in the middle (Fig. 242); median lobe of aedeagus with slender ventral process (ventral view) (Figs 239); lateral aspect as in Fig. 238. ♀: spermatheca as in Fig. 240. Distribution: Tsumerka, Ipiros ..... *G. (S.) beieri* (SCHEERPELTZ) ..... 30
- ♂: hind margin of tergum VIII weakly emarginate in the middle; median lobe of aedeagus with broader ventral process (ventral view) and in lateral view of different shape. Distribution different ..... 30
30. Elytra with distinct sexual dimorphism, in ♂ with dense and coarsely granulose punctation. Aedeagus and spermatheca as in Figs 229-233. Distribution: Iti Oros, Fthiotis ..... *G. (S.) fthiotisensis* sp. n. .... 30
- Elytra without sexual dimorphism. Aedeagus and spermatheca as in Figs 222-225. .... Distribution: Erimanthos Oros, NW-Pelopónnisos ..... *G. (S.) ahaiaensis* sp. n. .... 32
31. Species from Crete ..... 32
- Species from Cyprus or Ródhos ..... 34
32. ♂: hind margin of tergum VIII weakly concave in the middle (Fig. 251); aedeagus smaller and with distinct long spines in internal sac (Figs 246-247). ♀: spermatheca as in Figs 249-250. Distribution: Idhi Oros (= Ida), central Crete ..... *G. (S.) idaea* PACE ..... 33
- ♂: hind margin of tergum VIII distinctly emarginate in the middle; aedeagus larger, without or with very indistinct spines in internal sac. ♀: spermatheca different ..... 33
33. ♂: tergum VIII more strongly emarginate in the middle (Fig. 259); median lobe of aedeagus with relatively longer and more slender ventral process (Figs 254-255). ♀: capsule of spermatheca relatively smaller and less distinctly delimited from duct (Figs 257-258). Distribution: Idhi Oros (= Ida), central Crete ..... *G. (S.) exsecta* sp. n. .... 33
- ♂: tergum VIII less strongly emarginate in the middle (Fig. 266); median lobe of aedeagus with relatively shorter and broader ventral process (Figs 262-263). ♀: capsule of spermatheca larger and more distinctly delimited from duct (Fig. 265). Distribution: Lefka Ori, W-Crete ..... *G. (S.) icaria* PACE ..... 34
34. ♂: median lobe of aedeagus with longer ventral process (Figs 269-270); apical lobe of paramere slender (Fig. 271). ♀: spermatheca as in Fig. 272. Distribution: Cyprus ..... *G. (S.) cyprensis* PACE ..... 34
- ♂: median lobe of aedeagus with relatively shorter ventral process; apical lobe of paramere shorter and broader. Distribution: Ródhos ..... *G. (S.) rhodiensis* PACE ..... 34

### Acknowledgements

I am much indebted to the colleagues indicated in the material section for the loan of type and non-type material. In addition, I would like to thank Lothar Zerche (DEI) for helpful discussions.

### Zusammenfassung

Eine Revision der Typen und weiteren Material der *Geostiba*-Arten Griechenlands und Zyperns ergab 35 valide Arten aus vier Untergattungen: *Geostiba* s. str. (20 Arten), *Ditroposipalia* SCHEERPELTZ (4 Arten), *Chondridiosipalia* SCHEERPELTZ (1 Art) sowie *Sipalotricha* SCHEERPELTZ (10 Arten). 17 neue Taxa werden beschrieben: *G. (s. str.) pangeoensis* sp. n., *G. (s. str.) siculifera* sp. n., *G. (s. str.) falakroensis* sp. n., *G. (s. str.) menikioensis* sp. n., *G. (s. str.) pauli* sp. n., *G. (s. str.) vermionensis* sp. n., *G. (s. str.) itiensis* sp. n., *G. (s. str.) menalonensis* sp. n., *G. (s. str.) killiniensis* sp. n., *G. (s. str.) parnoniensis* sp. n., *G. (s. str.) zercheana* sp. n., *G. (s. str.) acifera* sp. n., *G. (D.) schuelkei* sp. n., *G. (C.) ulcerifera* sp. n., *G. (S.) ahaiaensis* sp. n., *G. (S.) fthiotisensis* sp. n. und *G. (S.) exsecta* sp. n. Die folgenden Synonymisierungen werden vorgenommen: *Geostiba* THOMSON 1858 = *Tropogastrosipalia* SCHEERPELTZ 1951, syn. n.;

*Ditroposipalia* SCHEERPELTZ 1951 = *Callosipalia* COIFFAIT 1968, syn. n.; *Sipalotricha* SCHEERPELTZ 1931 = *Lioglutosipalia* SCHEERPELTZ 1951, syn. n.; *Homalota armata* EPPELSHEIM 1878 = *Geostiba loebli* PACE 1983, syn. n.; *Sipalia moczarskii* SCHEERPELTZ 1951 = *Geostiba peninsulaemagnesiae* PACE 1996, syn. n., = *G. peninsulaemagnesiae moczarskii* PACE 1996, syn. n.; *Sipalia meschniggiana* BERNHAUER 1936 = *S. pfefferi* ROUBAL 1940, syn. n.; *Homalota oertzeni* EPPELSHEIM 1888 = *Sipalia kanellidis* SCHEERPELTZ 1962, syn. n., = *S. mandli* SCHEERPELTZ 1963, syn. n., = *S. franziana* COIFFAIT 1968, syn. n., = *S. lichadensis* COIFFAIT 1968, syn. n., = *S. dirfysensis* COIFFAIT 1968, syn. n., = *S. strongylensis* Coiffait 1968, syn. n., = *S. solitaria* FAGEL 1968, syn. n., = *Geostiba solitaria ancyrensis* PACE 1983, syn. n., = *G. s. tmola* PACE 1983, syn. n., = *G. s. ulensis* PACE 1983, syn. n., = *G. s. aksekiensis* PACE, syn. n., = *G. minoica* PACE 1996, syn. n.; *G. euboica* PACE 1990 = *G. elatensis* PACE 1996, syn. n., = *G. samensis* PACE 1996, syn. n. Für *Sipalia xerovuniana* SCHEERPELTZ 1959, *S. kanellidis* SCHEERPELTZ 1962, *Geostiba elatensis* PACE 1996, *Sipalotricha leucadiae* SCHEERPELTZ 1931 und *Sipalia beieri* SCHEERPELTZ 1959 werden Lectotypen designiert. Die systematische Stellung von *Sipalia graeca* BERNHAUER 1909 in der Gattung *Paraleptusa* PEYERHIMHOFF wird bestätigt. Die Diagnosen der *Geostiba*-Arten Griechenlands und Zyperns werden durch Abbildungen von Geschlechts- und weiteren Unterscheidungsmerkmalen, durch Angaben zur intraspezifischen Variabilität, zur Verbreitung und Ökologie, sowie durch eine Bestimmungstabelle ergänzt. Im Unterschied zu den meisten griechischen Vertretern der Gattung sind *G. euboica* PACE und insbesondere *G. oertzeni* (EPPELSHEIM) bemerkenswert weit verbreitet. In Bezug auf Letztere kann dies durch die Beobachtung erklärt werden, dass die Art flügeldimorph ist; es handelt sich dabei um den ersten Nachweis von Flügeldimorphismus bei einer *Geostiba*-Art.

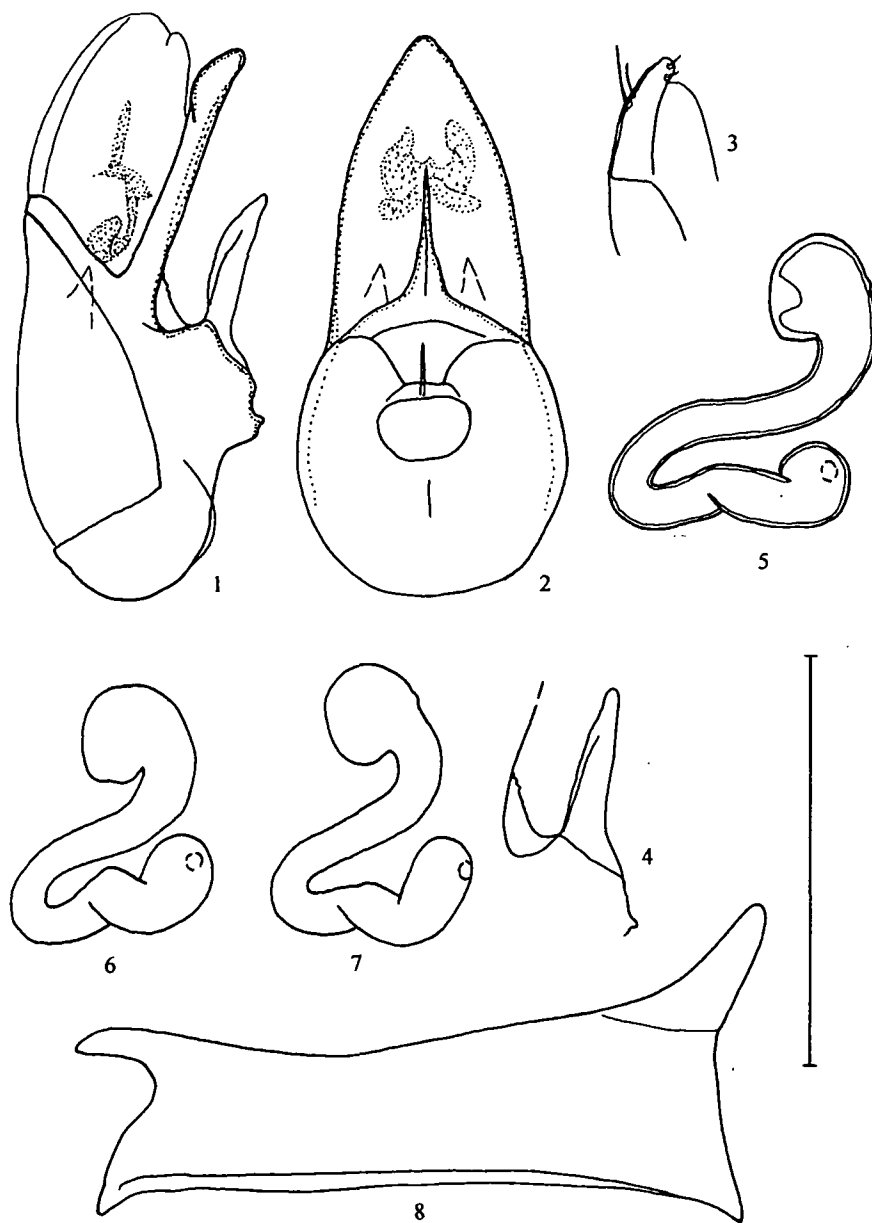
## References

- ASSING V. (1997): A revision of the Madeiran species of *Geostiba* (Coleoptera: Staphylinidae). Supplement I. — Rev. Suisse Zool. **104**: 345-355.
- ASSING V. & P. WUNDERLE (1996): A revision of the Madeiran species of the genus *Geostiba* THOMSON, 1858 (Col.: Staphylinidae). — Rev. Suisse Zool. **103**: 119-150.
- ASSING V. & P. WUNDERLE (in press): On the staphylinid fauna of northeastern Greece (Coleoptera). — Entomol. Zeitschr. **109**.
- BERNHAEUER M. (1909): Beitrag zur Staphylinidengattung *Sipalia*. — Entomol. Blätter **5**: 102-104.
- BERNHAEUER M. (1936): Neuheiten der paläarktischen Staphylinidenfauna. III. — Koleopt. Rdsch. **22**: 50-58.
- BERNHAEUER M. (1939): Zur Staphylinidenfauna von Kamerun. 42. Beitrag zur afrikanischen Fauna. — Entomol. Blätter **35**: 252-262.
- BERNHAEUER M. & O. SCHEERPELTZ (1926): Staphylinidae VI. — In: JUNK W. & S. SCHENKLING (eds.): Coleopterorum Catalogus, pars 82, Berlin: 499-988.
- CAMERON M. (1943): New species of Staphylinidae (Col.) from Australia and New Guinea. — Ann. Mag. Nat. Hist. Ser. 11, **10**: 336-354.
- COIFFAIT H. (1968): Mission du printemps 1967 en Grèce Staphylinidae avec une étude sur les *Sipalia* de Grèce. — Biologia Gallo-Hellenica **1**: 93-109.
- EPPELSHEIM E. (1878): Neue Staphylinen. — Stettiner entomol. Zeitschr. **39**: 417-424.
- EPPELSHEIM E. (1888): IV. Staphylinen. — Deutsche Entomol. Zeitschr. **1888**: 401-410.
- FAGEL G. (1968): Contribution a la connaissance des Staphylinidae. CII. Espèces inédites d'Anatolie et du bassin méditerranéen. — Bull. Ann. Soc. R. Ent. Belg. **104**: 118-134.
- PACE R. (1983a): Specie del genere *Geostiba* THOMSON raccolte dal Dr. C. Besuchet e collaboratori in Marocco, nella Penisola Iberica e Balcanica, e nel Medio Oriente (Coleoptera, Staphylinidae). — Rev. suisse Zool. **90**: 3-46.
- PACE R. (1983b): Nuove specie europee ed asiatiche del genere *Geostiba* THOMSON (Coleoptera Staphylinidae). — G. it. Ent. **1**: 129-139.
- PACE R. (1984): Nuove Aleocharinae microftalme mediterranee e dell'Iran, del Muséum d'Histoire naturelle di Ginevra (Coleoptera Staphylinidae). — Arch. Sc. Genève **37**: 211-219.
- PACE R. (1985): Aleocharinae attere della regione Australiana e Neozelandese raccolte dal Prof. Franz (Coleoptera, Staphylinidae). — Fragm. Entomol., Roma **18**: 105-114.
- PACE R. (1990): Nuove specie e sottospecie del genere *Geostiba* THOMSON. 93° contributo all conoscenza delle Aleocharinae (Coleoptera, Staphylinidae). — In: BERTI N. (ed.): Miscellanées sur les Staphylins. — Mém. Mus. natn. Hist. nat., (A) **147**: 115-154.
- PACE R. (1993): Aleocharinae della Cina (Coleoptera, Staphylinidae). — Boll. Mus. civ. St. nat. Verona **17** (1990): 69-126.
- PACE R. (1996): Descrizione di nuove specie e sottospecie del genere *Geostiba* (Coleoptera, Staphylinidae). — Boll. Assoc. Rom. Ent. **50** (1995): 7-43.
- PACE R. (1997): Descrizione di tre nuove specie del genere *Geostiba* dell'estremo oriente (Coleoptera Staphylinidae). — Boll. Soc. entom. ital., Genova **128**: 189-196.
- ROUBAL J. (1940): O některých Staphylinidech z Pfefferovy exkurse na Peloponnes IV. 1936. — Casopis Č. Spol. Ent. **37**: 78-79.
- SCHEERPELTZ O. (1931): XV. Teil. Staphylinidae (Coleoptera). — In: BEIER M.: Zoologische Forschungsreise nach den Jonischen Inseln und dem Peloponnes. — Sitzungsber. Akad. Wiss. Wien, Mathem.-naturw. Kl., Abt. I **140**: 359-460 + I-III.
- SCHEERPELTZ O. (1951): Die neue Systematik der Gattung *Sipalia* MULS. REY (Col. Staphylinidae). — Verh. Zool.-Bot. Ges. Wien **92**: 166-180.

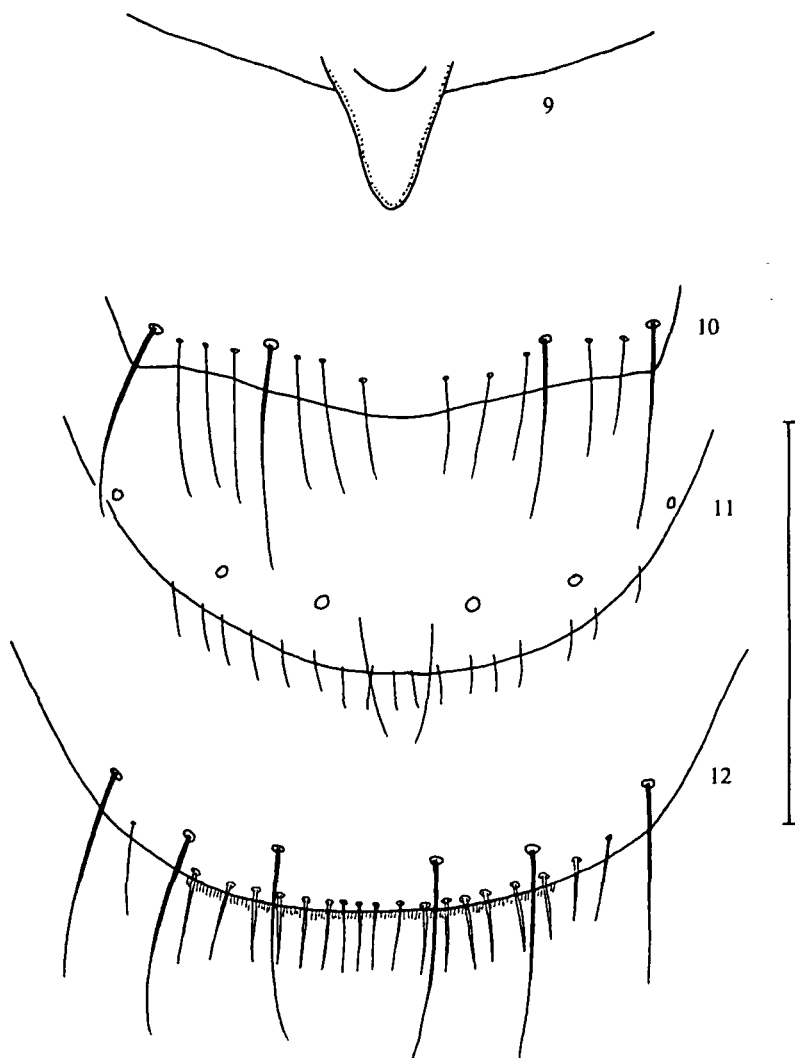
- SCHEERPELTZ O. (1959): VIII. Staphylinidae (Col.). — In: BEIER M.: Zoologische Studien in West-Griechenland. — Sitzungsber. Österr. Akad. Wiss., Mathem.-naturw. Kl., Abt. I, **167**: 363-432.
- SCHEERPELTZ O. (1962): Neue Staphylinidenarten vom Peloponnes (Col. Staph.). — Anz. math.-naturw. Klasse Österr. Akad. Wiss. Nr. **15**: 255-270.
- SCHEERPELTZ O. (1963): Wissenschaftliche Ergebnisse eines Sammelaufenthaltes Prof. Dr. K. Mandl's auf der Insel Rhodos (Col. Staph.). — Koleopt. Rdsch. **40/41** (1962/63): 67-76.
- ZANETTI A. (1995): Habrocerinae, Trichophyinae, Tachyporinae e Aleocharinae (generi 148-314). — pp. 33-58, In: CICERONI A., PUTHZ V. & A. ZANETTI: Coleoptera, Polyphaga III (Staphylinidae). Checklist delle specie della fauna italiana, Calderini Bologna, Fasc. **48**: 1- 65.

Author's address: Volker ASSING  
Gabelsbergerstr. 2  
D-30163 Hannover, Germany  
e-mail: [vassing.hann@t-online.de](mailto:vassing.hann@t-online.de)

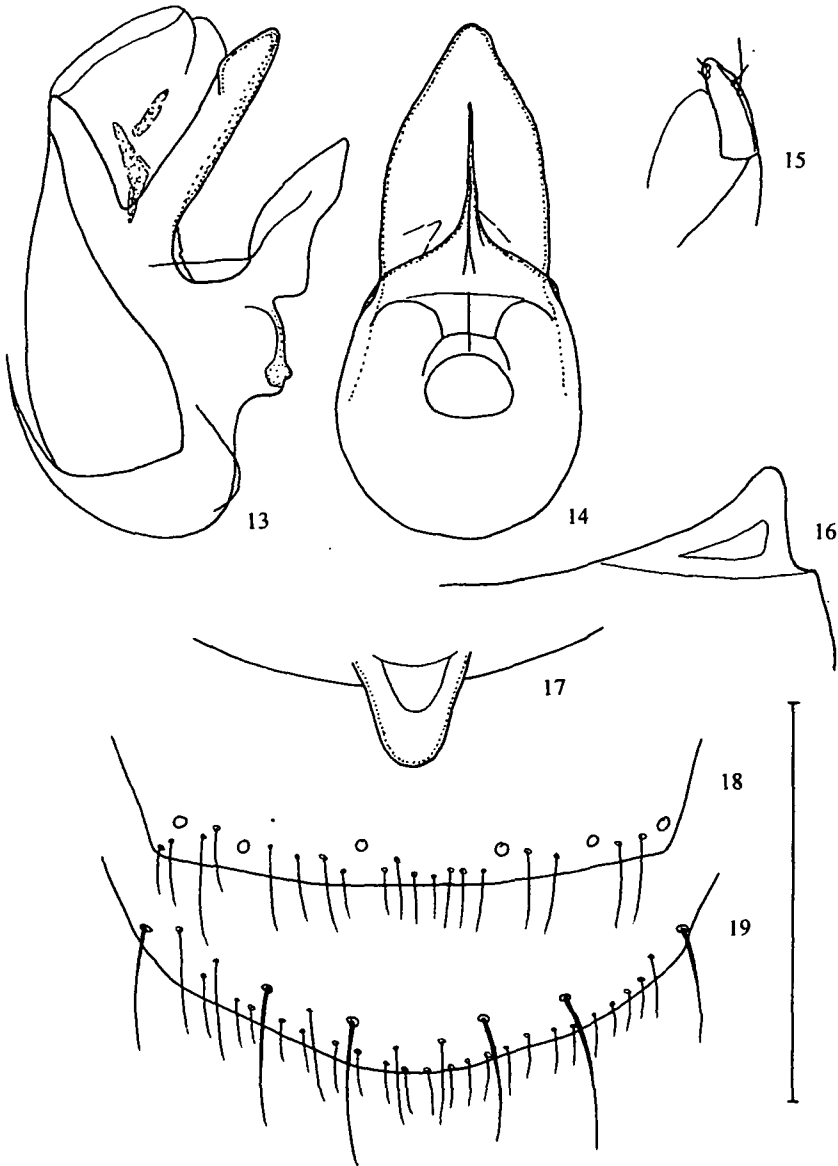




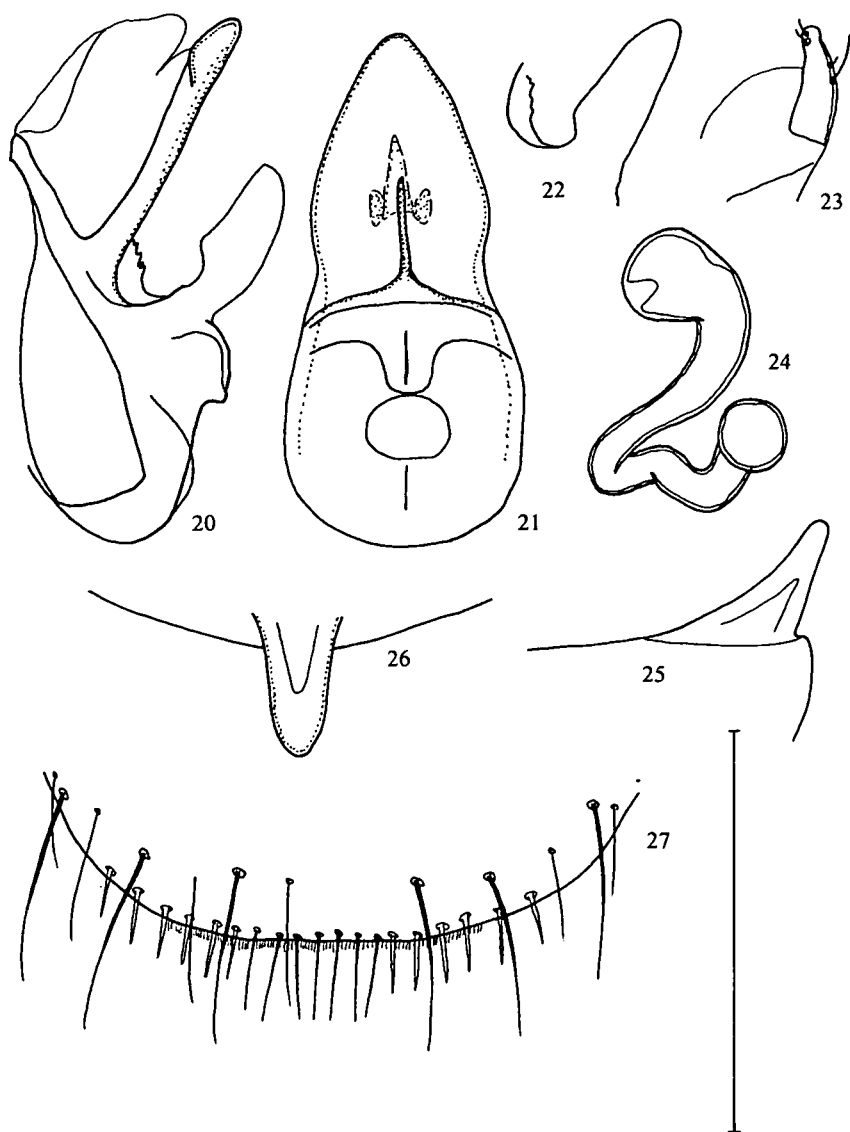
Figs 1-8: *G. armata* (EPPELSHEIM): 1, 2 - median lobe of aedeagus in lateral and in ventral view (Kato Olympos); 3 - apical lobe of paramere; 4 - cristal process of  $\delta$  from Pieria; 5, 6, 7 - spermathecae of three different  $\text{q} \text{q}$ ; 8 -  $\delta$  tergum VII in lateral view. Scale: 0.2 mm.



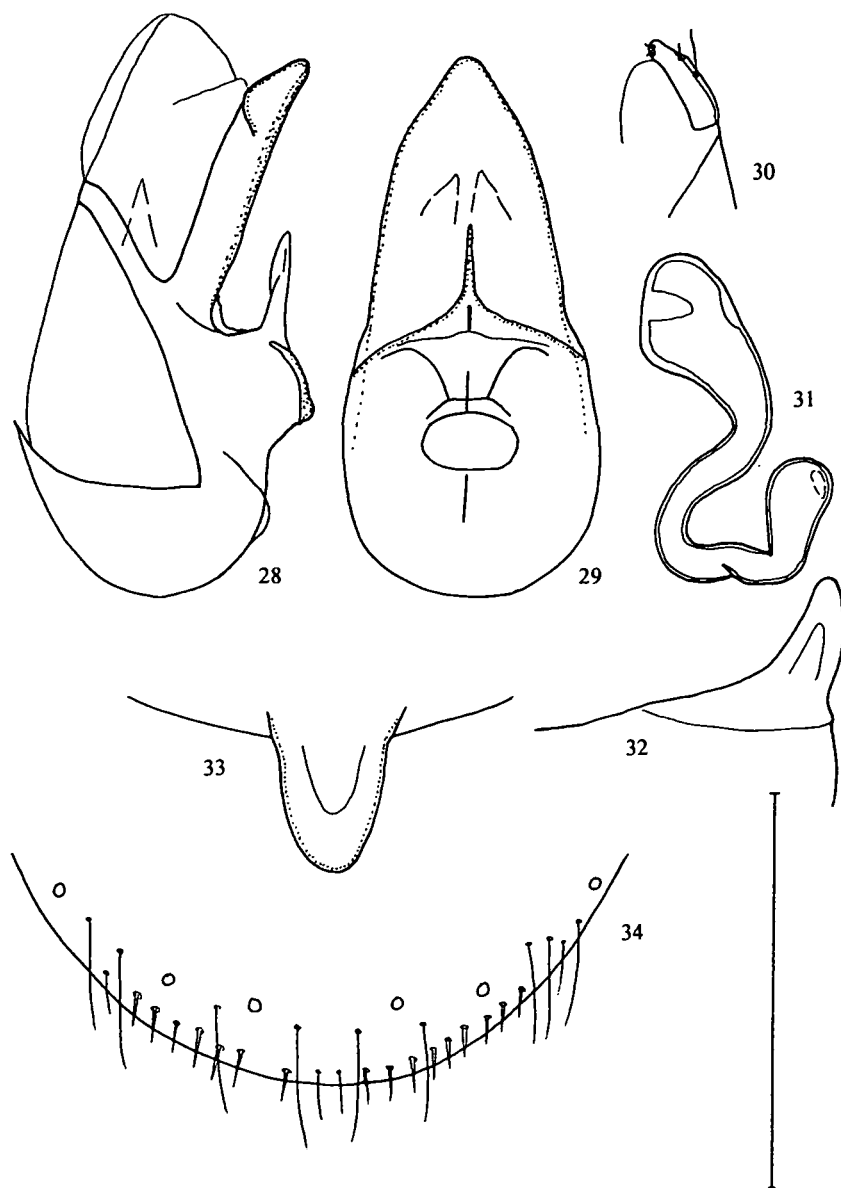
**Figs 9-12:** *G. armata* (EPPELSHEIM): 9 - process of ♂ tergum VII in antero-dorsal view; 10 - hind margin of ♂ tergum VIII; 11 - hind margin of ♂ sternum VIII (long setae omitted); 12 - hind margin of ♀ sternum VIII. Scale: 0.2 mm.



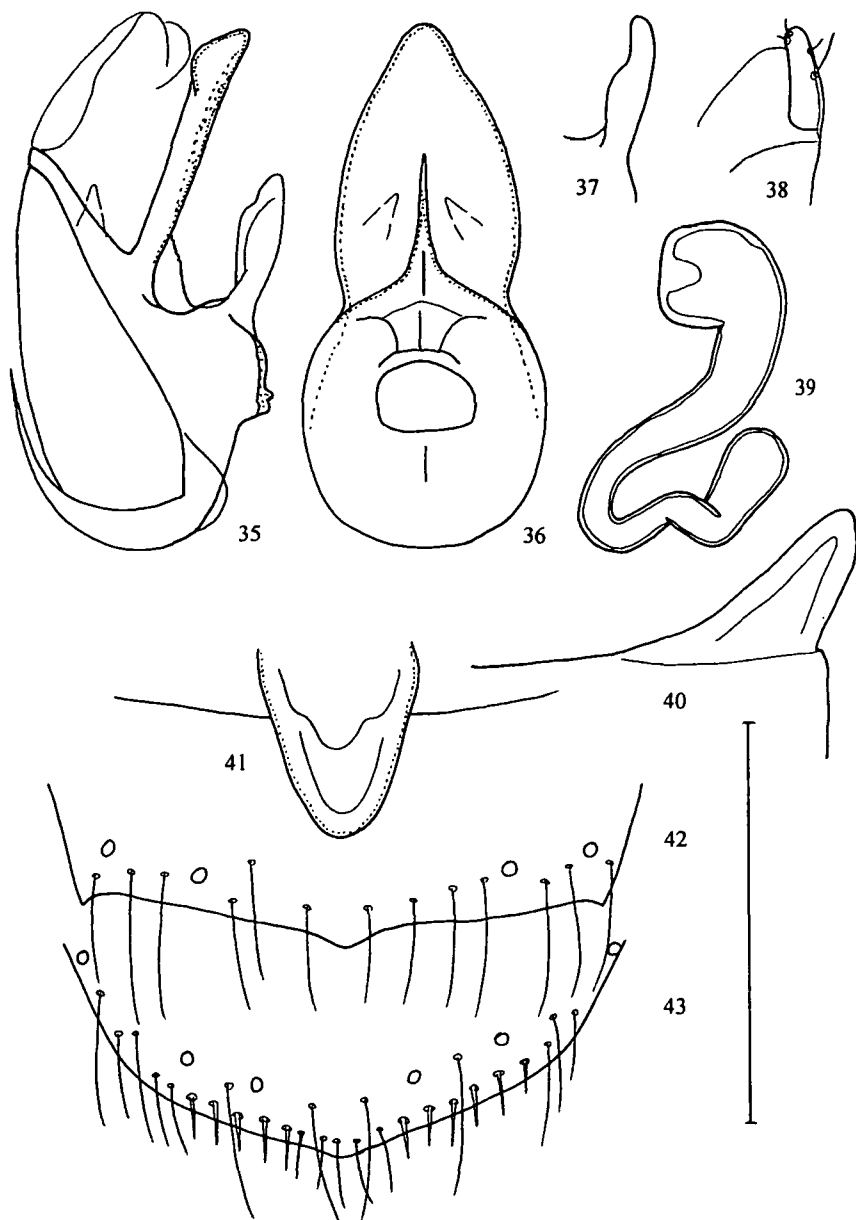
Figs 13-19: *G. moczarskii* (SCHEERPELTZ): 13, 14 - median lobe of aedeagus in lateral and in ventral view; 15 - apical lobe of paramere; 16 - process of  $\delta$  tergum VII in lateral view; 17 - process of  $\delta$  tergum VII in antero-dorsal view; 18 - hind margin of  $\delta$  tergum VIII (long setae omitted); 19 - hind margin of  $\delta$  sternum VIII. Scale: 0.2 mm.



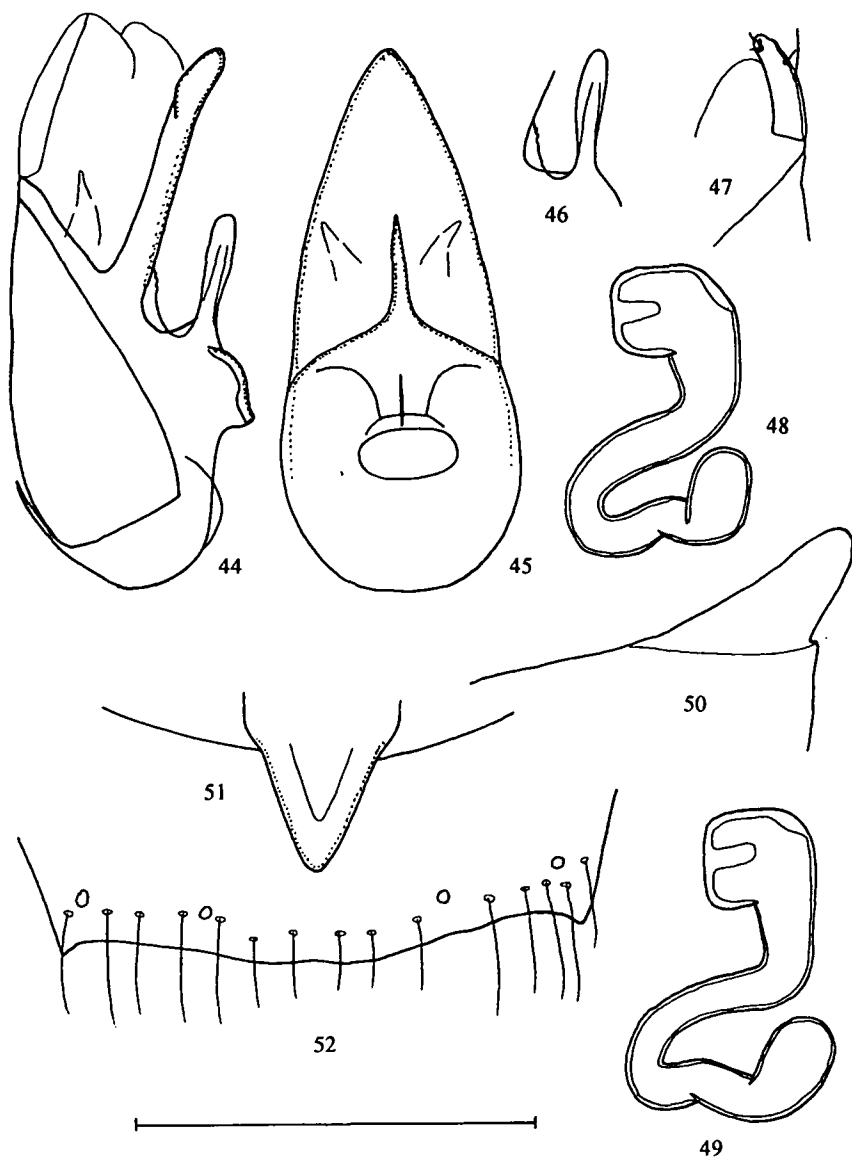
**Figs 20-27:** *G. xerovuniana* (SCHEERPELTZ): 20, 21 - median lobe of aedeagus in lateral and in ventral view (LT); 22 - cristal process of median lobe of PLT; 23 - apical lobe of paramere (LT); 24 - spermatheca; 25 - process of ♂ tergum VII in lateral view; 26 - process of ♂ tergum VII in antero-dorsal view; 27 - hind margin of ♀ sternum VIII. Scale: 0.2 mm.



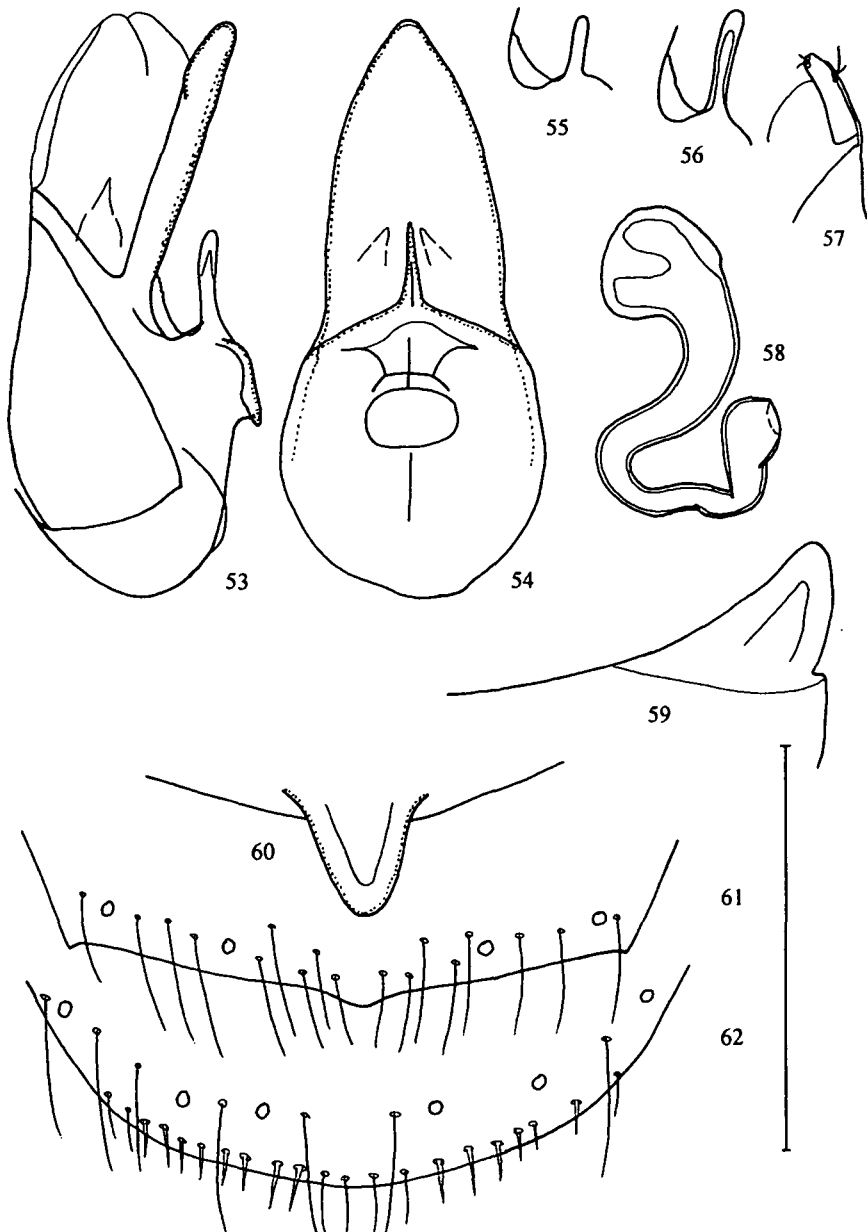
Figs 28-34: *G. pangoensis* sp. n.: 28, 29 - median lobe of aedeagus in lateral and in ventral view; 30 - apical lobe of paramere; 31 - spermatheca; 32 - process of  $\delta$  tergum VII in lateral view; 33 - process of  $\delta$  tergum VII in antero-dorsal view (long setae omitted); 34 - hind margin of  $\delta$  sternum VIII. Scale: 0.2 mm.



**Figs 35-43:** *G. siculifera* sp. n.: 35, 36 - median lobe of aedeagus in lateral and in ventral view; 37 - cristal process of median lobe of other  $\delta$ ; 38 - apical lobe of paramere; 39 - spermatheca; 40 - process of  $\delta$  tergum VII in lateral view; 41 - process of  $\delta$  tergum VII in antero-dorsal view; 42 - hind margin of  $\delta$  tergum VIII (long setae omitted); 43 - hind margin of  $\delta$  sternum VIII (long setae omitted). Scale: 0.2 mm.

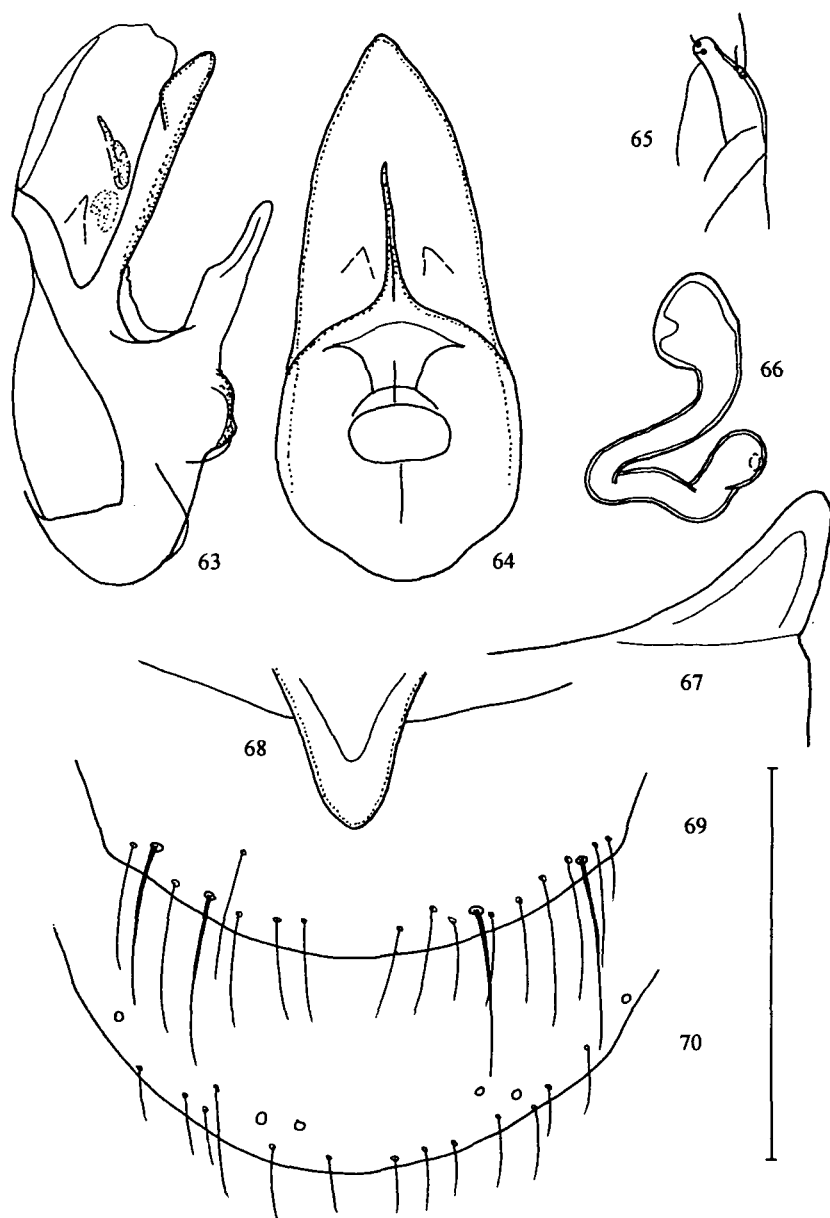


Figs 44-52: *G. falakroensis* sp. n.: 44, 45 - median lobe of aedeagus in lateral and in ventral view (HT); 46 - cristal process of median lobe (PT); 47 - apical lobe of paramere; 48, 49 - spermathecae; 50 - process of  $\delta$  tergum VII in lateral view; 51 - process of  $\delta$  tergum VII in antero-dorsal view; 52 - hind margin of  $\delta$  tergum VIII (long setae omitted). Scale: 0.2 mm.

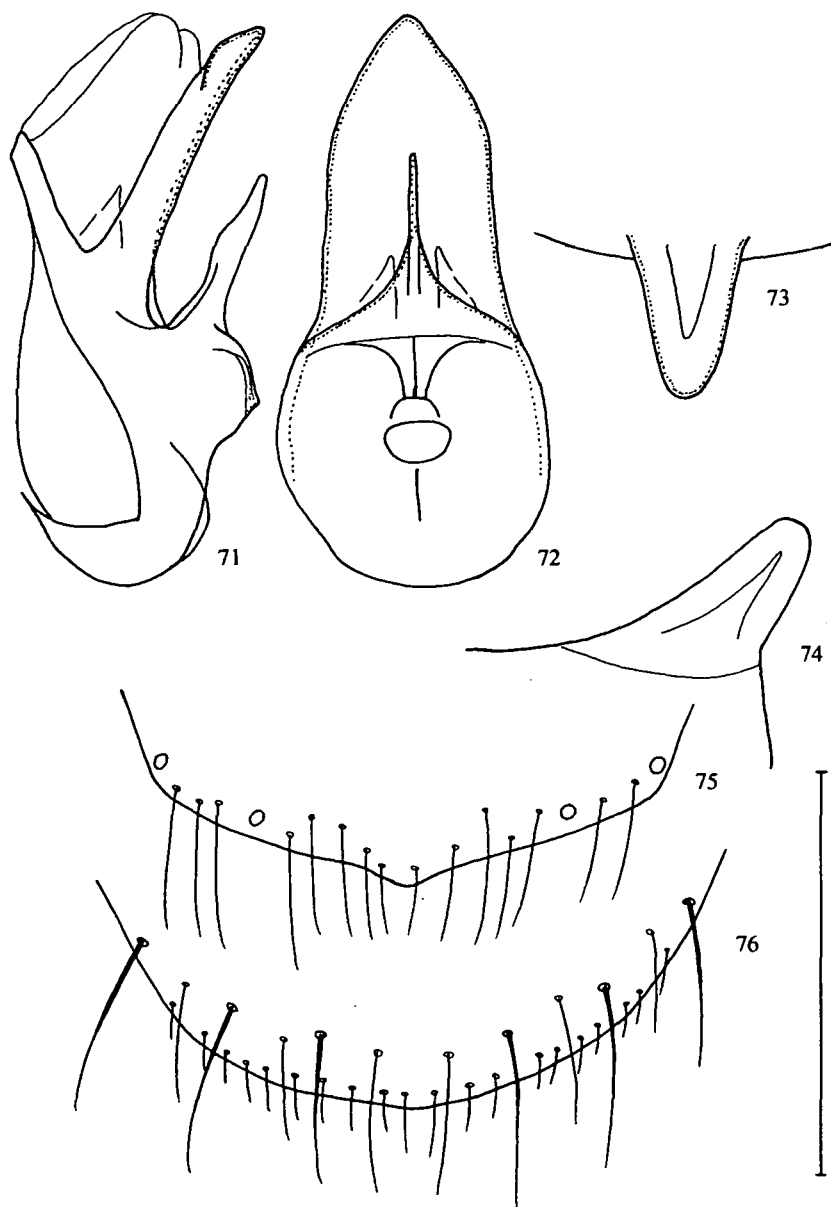


**Figs 53-62:** *G. menikioensis* sp. n.: 53, 54 - median lobe of aedeagus in lateral and in ventral view (HT); 55, 56 - cristal process of median lobe of two PTT; 57 - apical lobe of paramere; 58 - spermatheca; 59 - process of  $\delta$  tergum VII in lateral view (HT); 60 - process of  $\delta$  tergum VII in antero-dorsal view (HT); 61 - hind margin of  $\delta$  tergum VIII (long setae omitted); 62 - hind margin of  $\delta$  sternum VIII (long setae omitted). Scale: 0.2 mm.

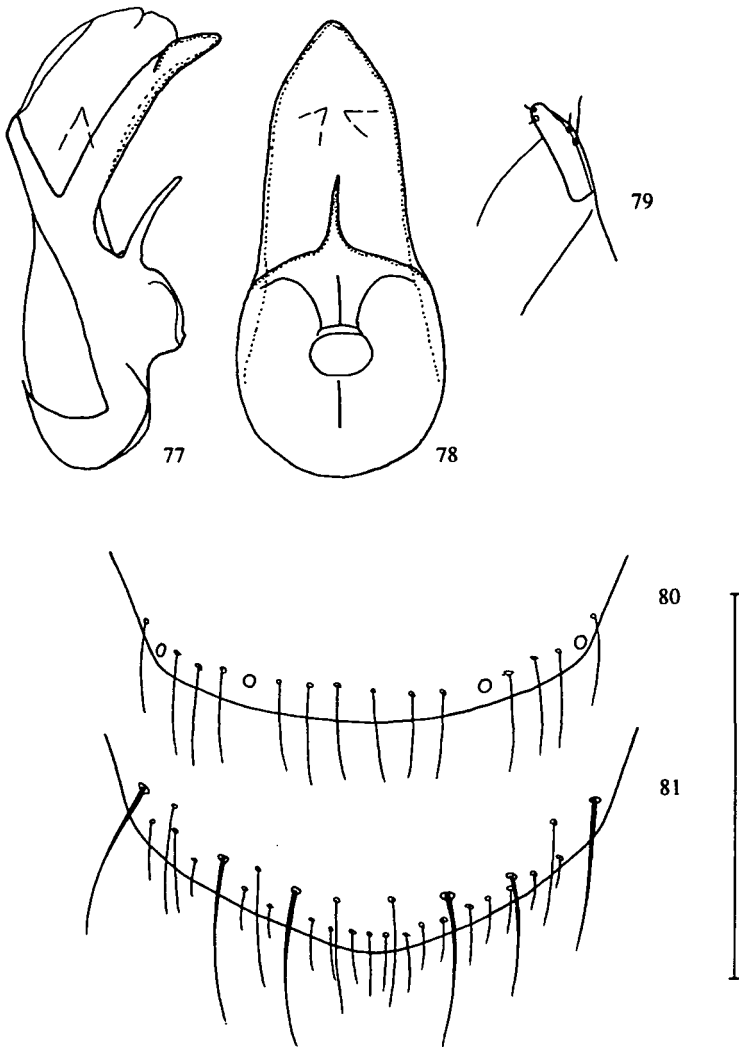




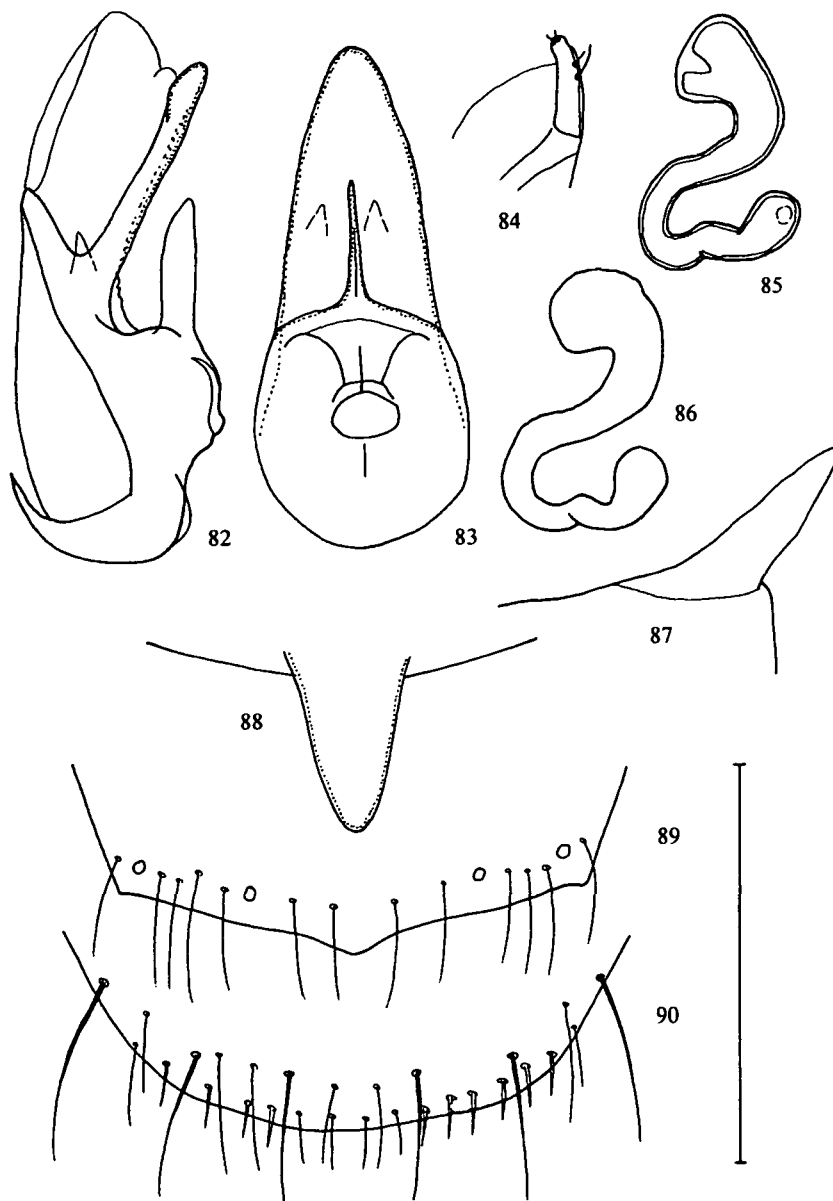
Figs 63-70: *G. pauli* sp. n.: 63, 64 - median lobe of aedeagus in lateral and in ventral view; 65 - apical lobe of paramere; 66 - spermatheca; 67 - process of  $\delta$  tergum VII in lateral view; 68 - process of  $\delta$  tergum VII in antero-dorsal view; 69 - hind margin of  $\delta$  tergum VIII; 70 - hind margin of  $\delta$  sternum VIII (long setae omitted). Scale: 0.2 mm.



Figs 71-76: *G. aculeata* (COIFFAIT), HT: 71, 72 - median lobe of aedeagus in lateral and in ventral view; 73 - process of  $\delta$  tergum VII in lateral view; 74 - process of  $\delta$  tergum VII in antero-dorsal view; 75 - hind margin of  $\delta$  tergum VIII (long setae omitted); 76 - hind margin of  $\delta$  sternum VIII. Scale: 0.2 mm.



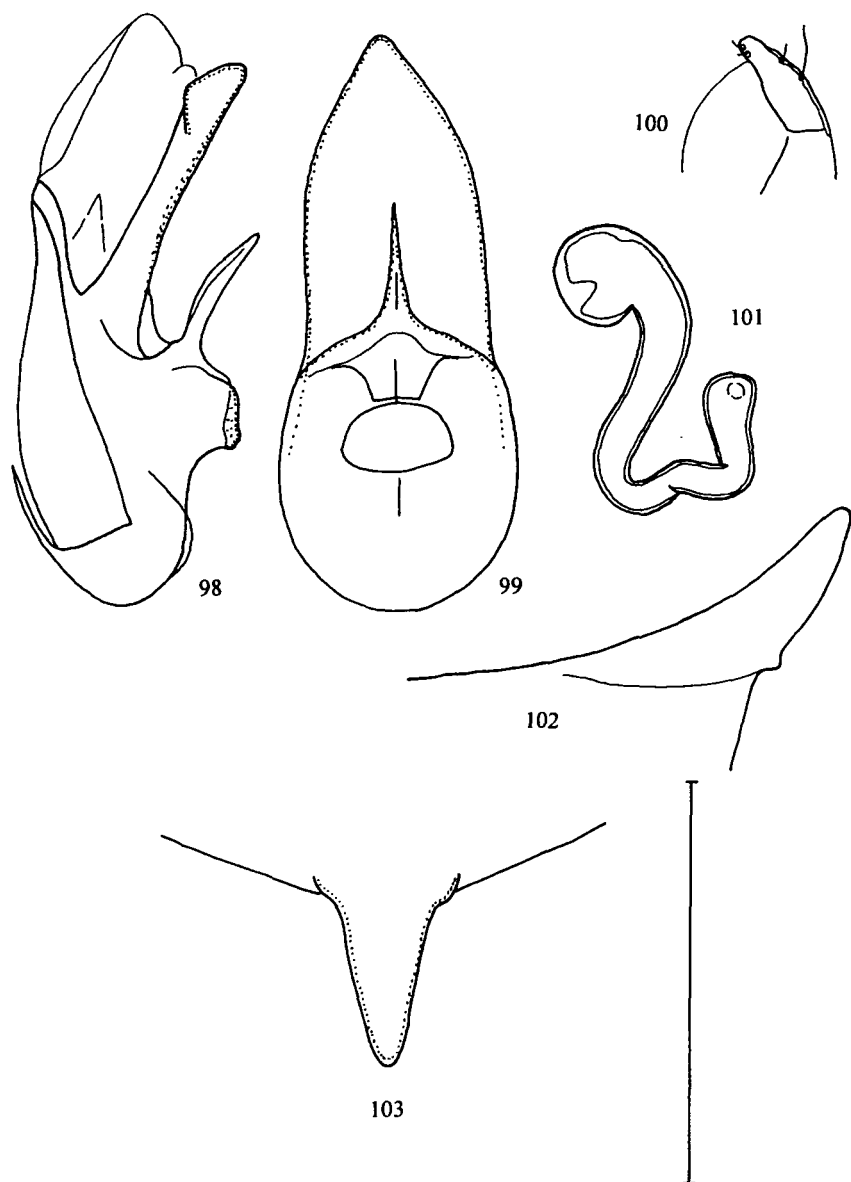
**Figs 77-81:** *G. matsakisi* (COIFFAIT), HT: 77, 78 - median lobe of aedeagus in lateral and in ventral view; 79 - apical lobe of paramere; 80 - hind margin of ♂ tergum VIII (long setae omitted); 81 - hind margin of ♂ sternum VIII. Scale: 0.2 mm.



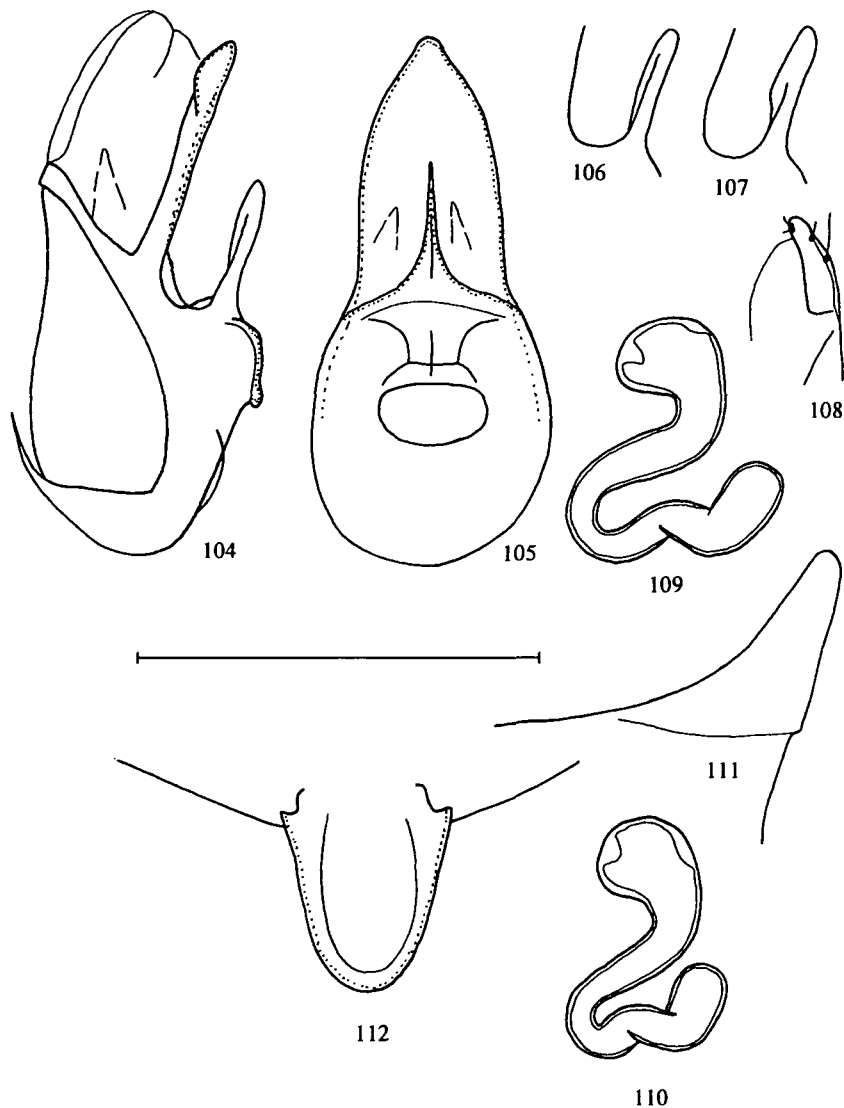
Figs 82-90: *G. vermionensis* sp. n.: 82, 83 - median lobe of aedeagus in lateral and in ventral view; 84 - apical lobe of paramere; 85, 86 - spermathecae; 87 - process of  $\delta$  tergum VII in lateral view; 88 - process of  $\delta$  tergum VII in antero-dorsal view; 89 - hind margin of  $\delta$  tergum VIII (long setae omitted); 90 - hind margin of  $\delta$  sternum VIII. Scale: 0.2 mm.



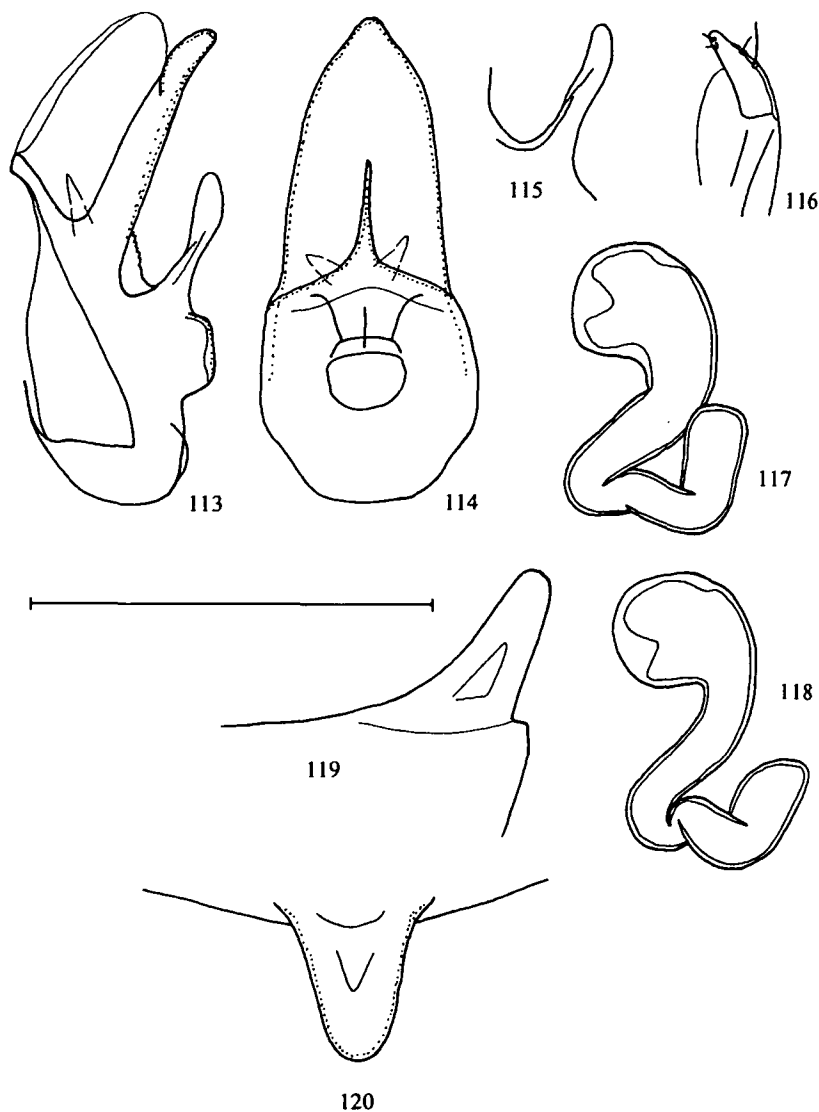
**Figs 91-97:** *G. itiensis* sp. n.: 91, 92 - median lobe of aedeagus in lateral and in ventral view; 93 - cristal process of median lobe of other  $\delta$ ; 94 - apical lobe of paramere; 95 - spermatheca; 96 - process of  $\delta$  tergum VII in lateral view; 97 - process of  $\delta$  tergum VII in antero-dorsal view. Scale: 0.2 mm.



**Figs 98-103: *G. meschniggi* PACE: 98, 99 - median lobe of aedeagus in lateral and in ventral view; 100 - apical lobe of paramere; 101 - spermatheca; 102 - process of ♂ tergum VII in lateral view; 103 - process of ♂ tergum VII in antero-dorsal view. Scale: 0.2 mm.**

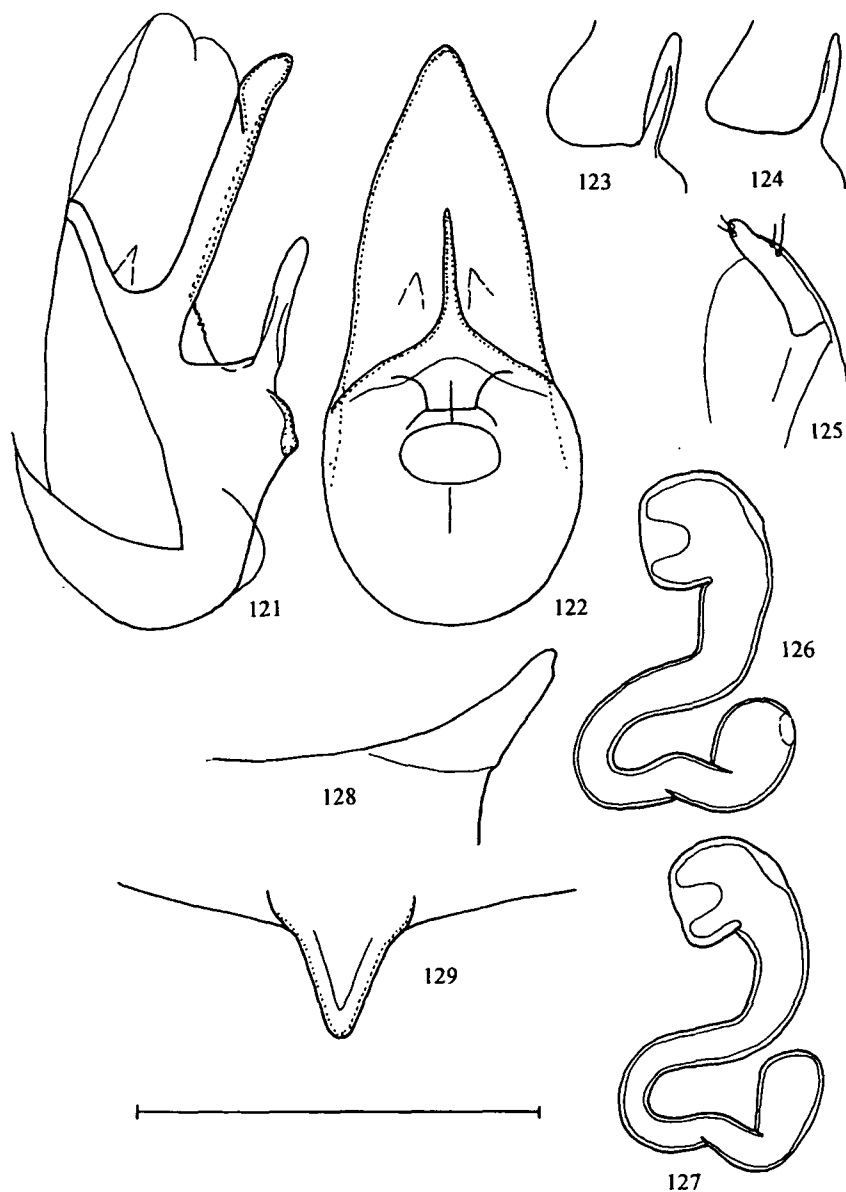


**Figs 104-112:** *G. meschniggiana* (BERNHAEUER): 104, 105 - median lobe of aedeagus in lateral and in ventral view; 106, 107 - cristal process of median lobe of two other ♂♂; 108 - apical lobe of paramere; 109, 110 - spermathecae; 111 - process of ♂ tergum VII in lateral view; 112 - process of ♂ tergum VII in antero-dorsal view. Scale: 0.2 mm.

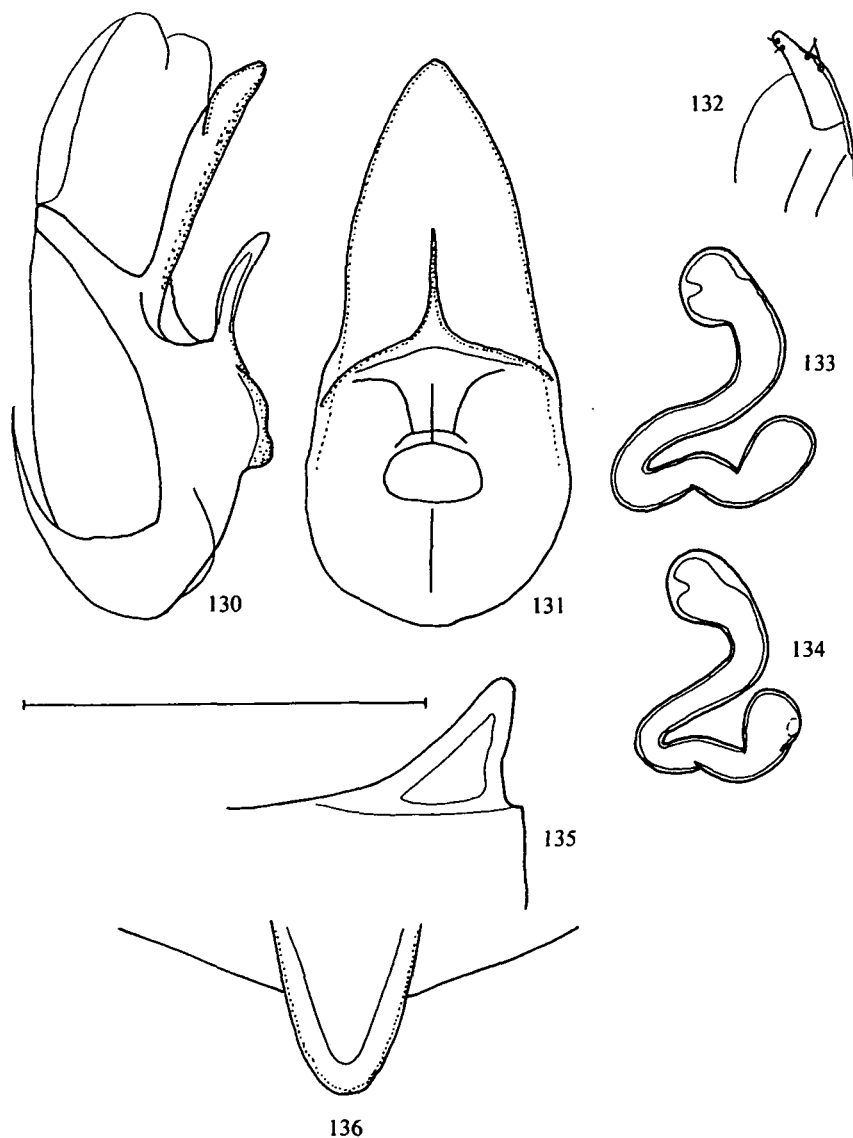


**Figs 113-120:** *G. menalonensis* sp. n.: 113, 114 - median lobe of aedeagus in lateral and in ventral view; 115 - cristate process of HT; 116 - apical lobe of paramere; 117, 118 - spermathecae; 119 - process of  $\delta$  tergum VII in lateral view; 120 - process of  $\delta$  tergum VII in antero-dorsal view. Scale: 0.2 mm.

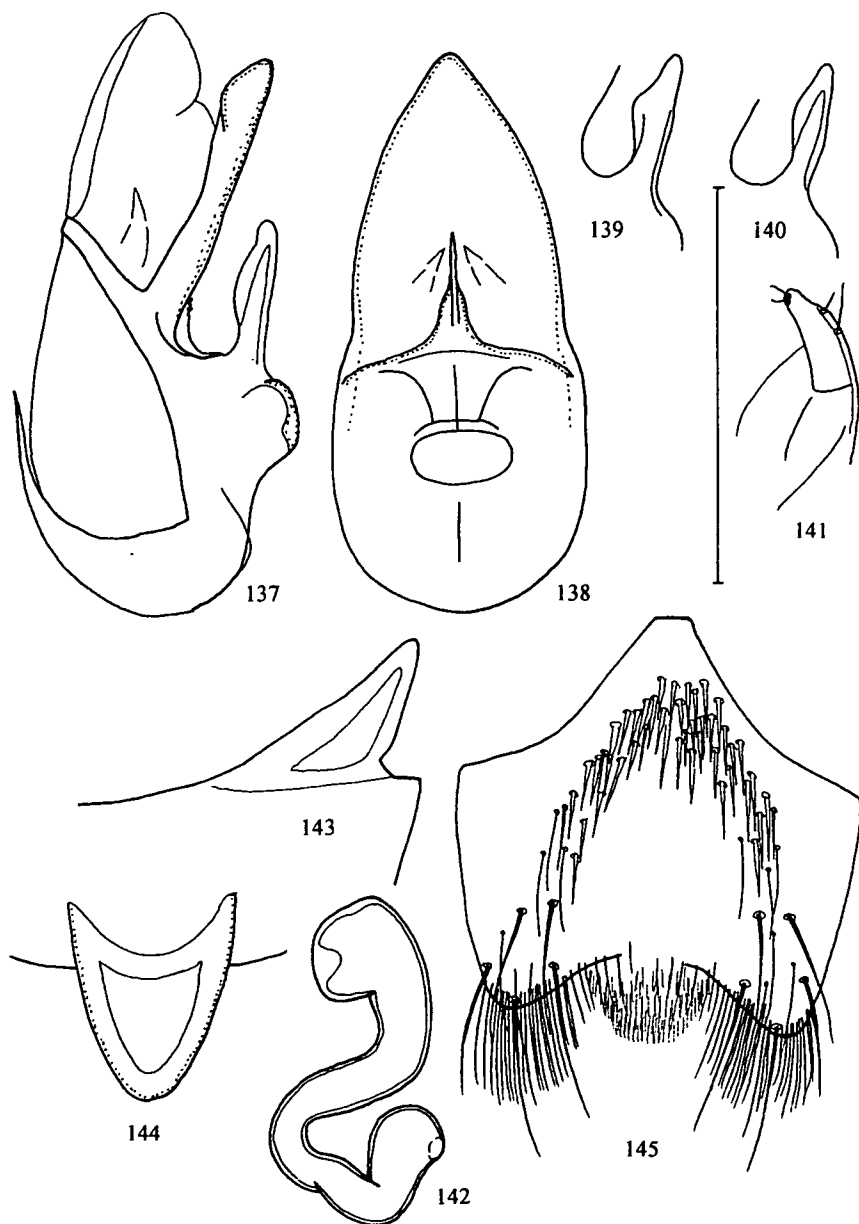




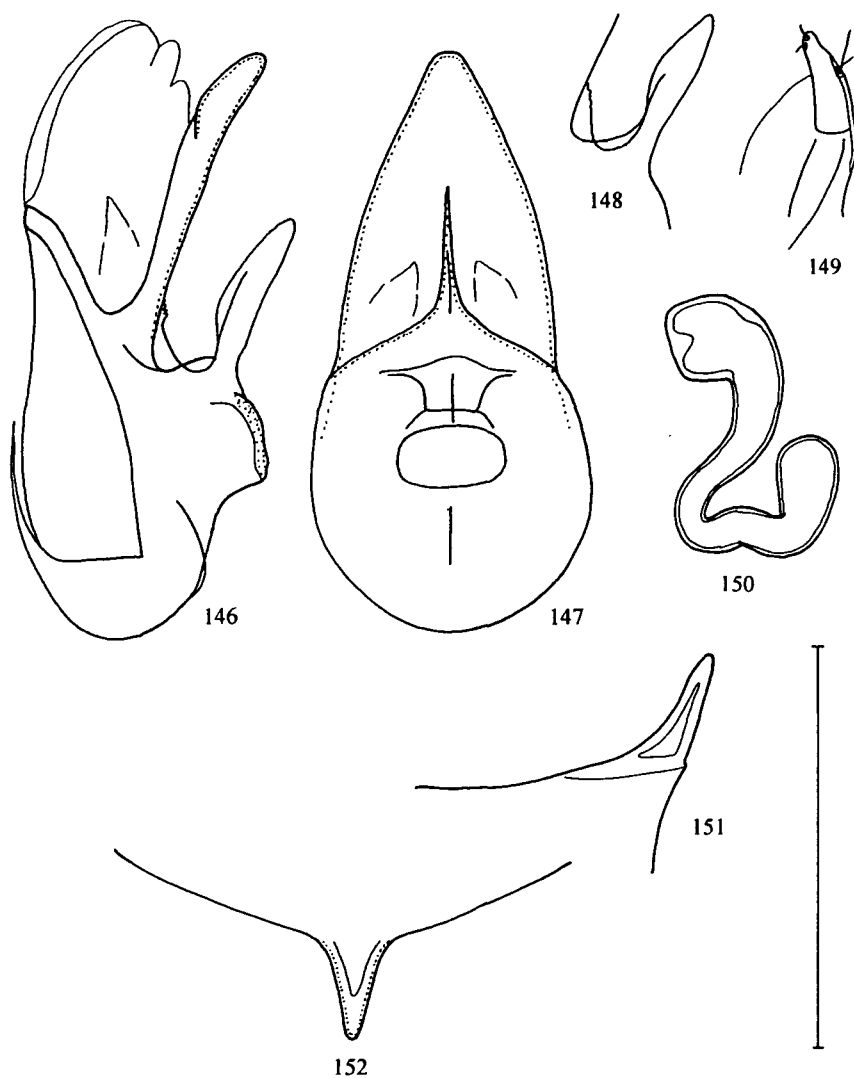
**Figs 121-129:** *G. killiniensis* sp. n.: 121, 122 - median lobe of aedeagus in lateral and in ventral view; 123, 124 - cristate process of median lobe of two other ♂♂; 125 - apical lobe of paramere; 126, 127 - spermathecae; 128 - process of ♂ tergum VII in lateral view; 129 - process of ♂ tergum VII in antero-dorsal view. Scale: 0.2 mm.



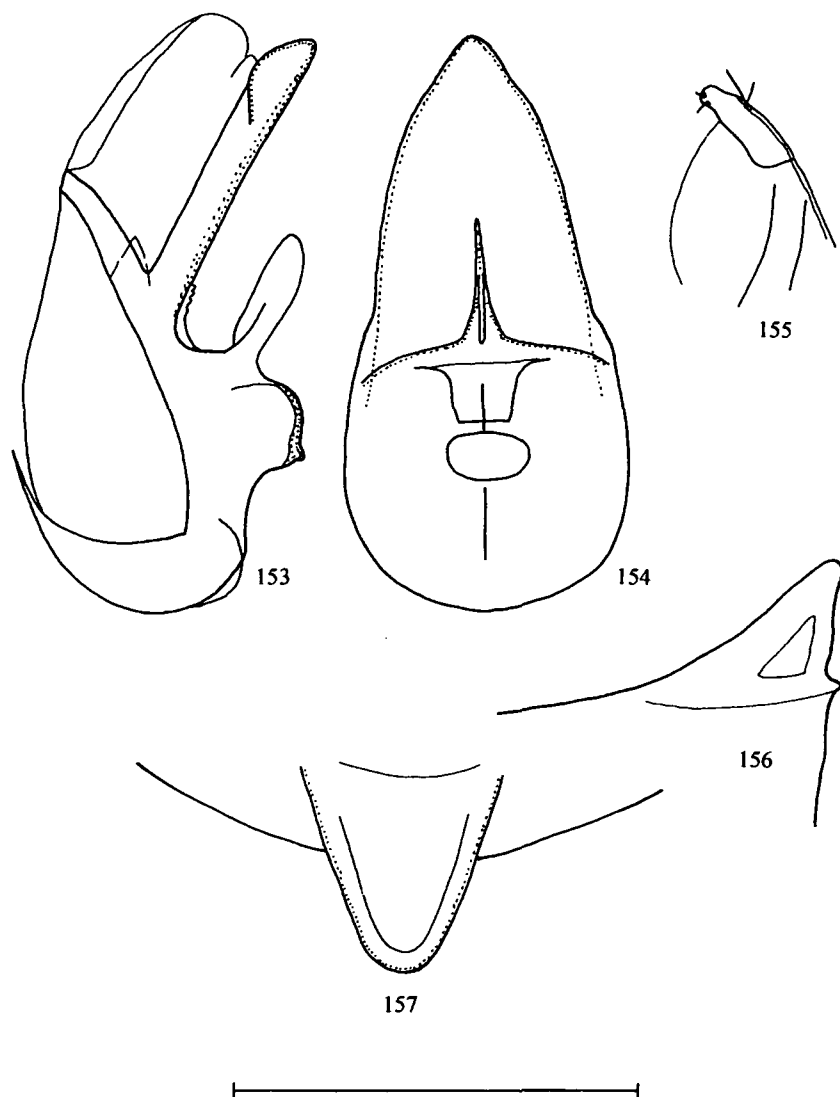
**Figs 130-136:** *G. parnonensis* sp. n.: 130, 131 - median lobe of aedeagus in lateral and in ventral view; 132 - apical lobe of paramere; 133, 134 - spermatheca; 135 - process of  $\delta$  tergum VII in lateral view; 136 - process of  $\delta$  tergum VII in antero-dorsal view. Scale: 0.2 mm.



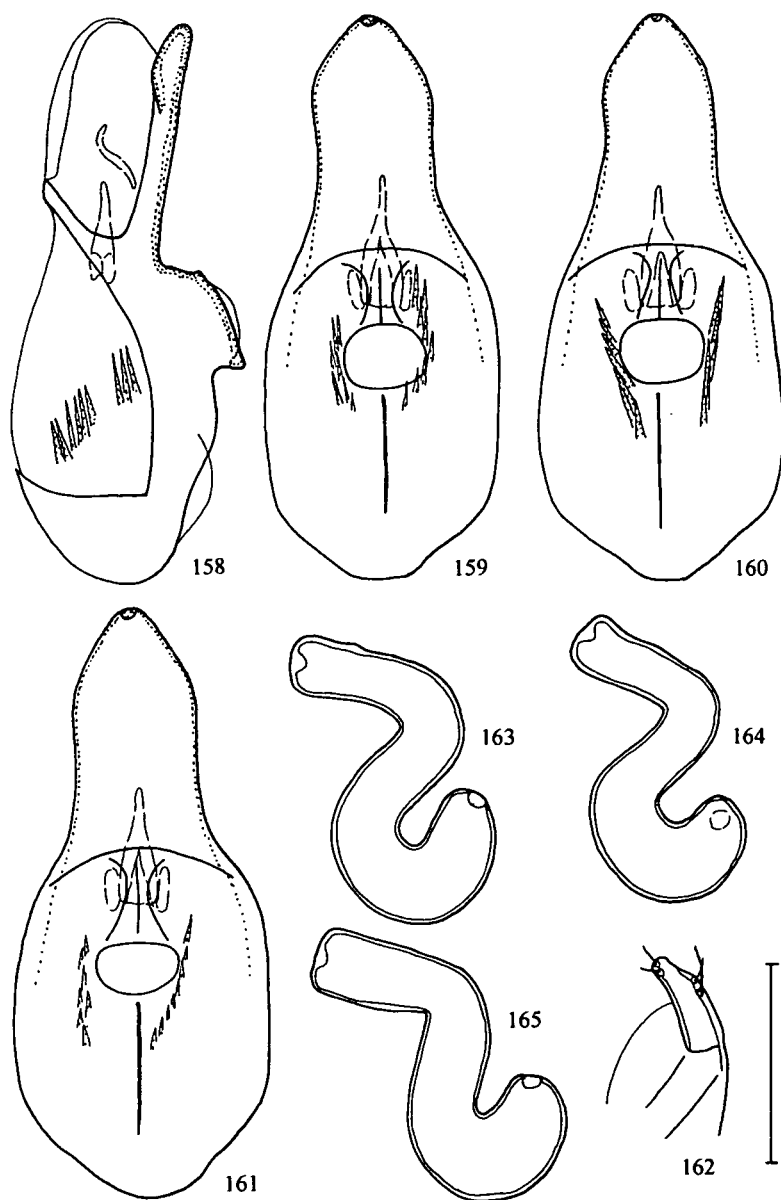
Figs 137-145: *G. zercheana* sp. n.: 137, 138 - median lobe of aedeagus in lateral and in ventral view; 139, 140 - cristate process of median lobe of two other ♂♂; 141 - apical lobe of paramere; 142 - spermatheca; 143 - process of ♂ tergum VII in lateral view; 144 - process of ♂ tergum VII in antero-dorsal view; 145 - tergum X. Scale: 0.2 mm.



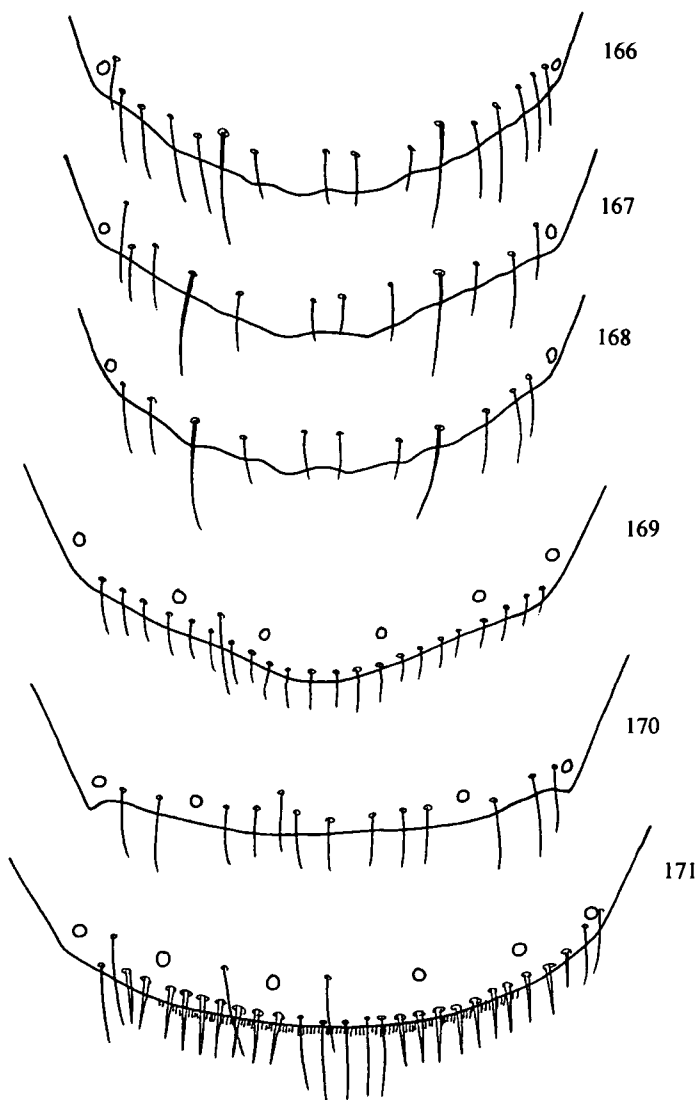
**Figs 146-152:** *G. acifera* sp. n.: 146, 147 - median lobe of aedeagus in lateral and in ventral view (HT); 148 - cristal process of median lobe of PT; 149 - apical lobe of paramere; 150 - spermatheca; 151 - process of ♂ tergum VII in lateral view; 152 - process of ♂ tergum VII in antero-dorsal view. Scale: 0.2 mm.



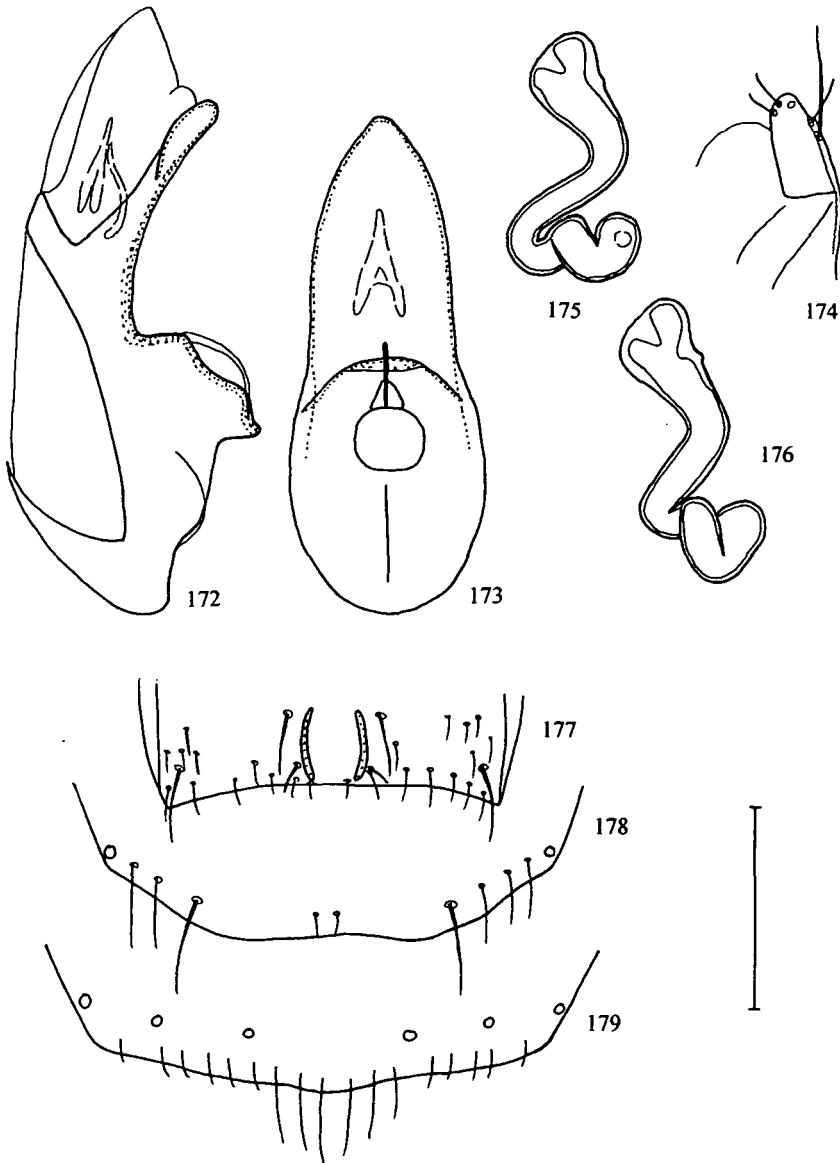
**Figs 153-157:** *G. taygetana* (BERNHAEUER), HT: 153, 154 - median lobe of aedeagus in lateral and in ventral view; 155 - apical lobe of paramere; 156 - process of ♂ tergum VII in lateral view; 157 - process of ♂ tergum VII in antero-dorsal view. Scale: 0.2 mm.



Figs 158-165: *G. oertzeni* (EPPELSHEIM): 158, 159 - median lobe of aedeagus in lateral and in ventral view ( $\delta$  from the Pelopónnisos); 160 - median lobe of aedeagus of  $\delta$  from Ródhos; 161 - median lobe of aedeagus of  $\delta$  from Crete; 162 - apical lobe of paramere; 163 - spermatheca of  $\varphi$  from the Pelopónnisos; 164 - spermatheca of  $\varphi$  from the Ossa Oros; 165 - spermatheca of  $\varphi$  from Macedonia. Scale: 0.1 mm.

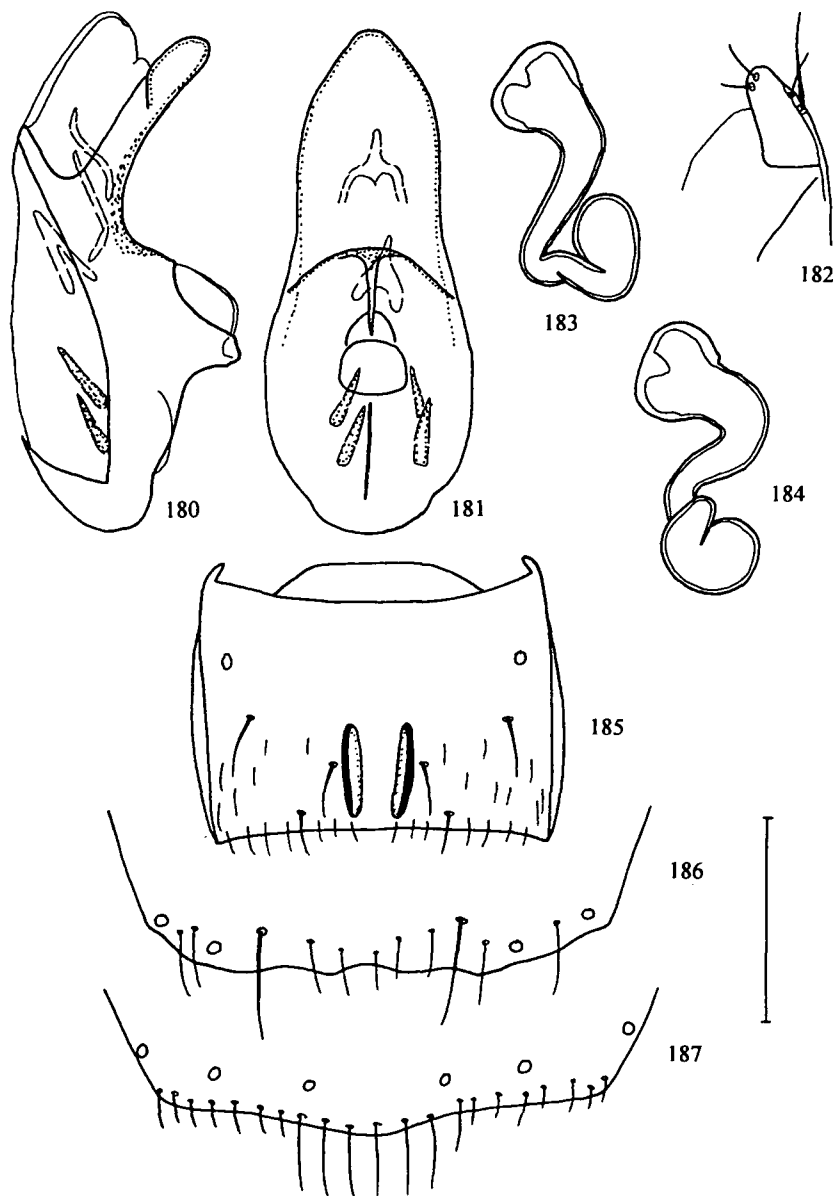


**Figs 166-171: *G. oertzeni* (EPPELSHEIM):** 166-168 - hind margins of tergum VIII of ♂♂ from the Pelopónnisos (166), Ródhos (167), and Crete (168); 169 - hind margin of ♂ sternum VIII (long setae omitted); 170 - hind margin of ♀ tergum VIII (long setae omitted); 171 - hind margin of ♀ sternum VIII (long setae omitted). Scale: 0.1 mm.

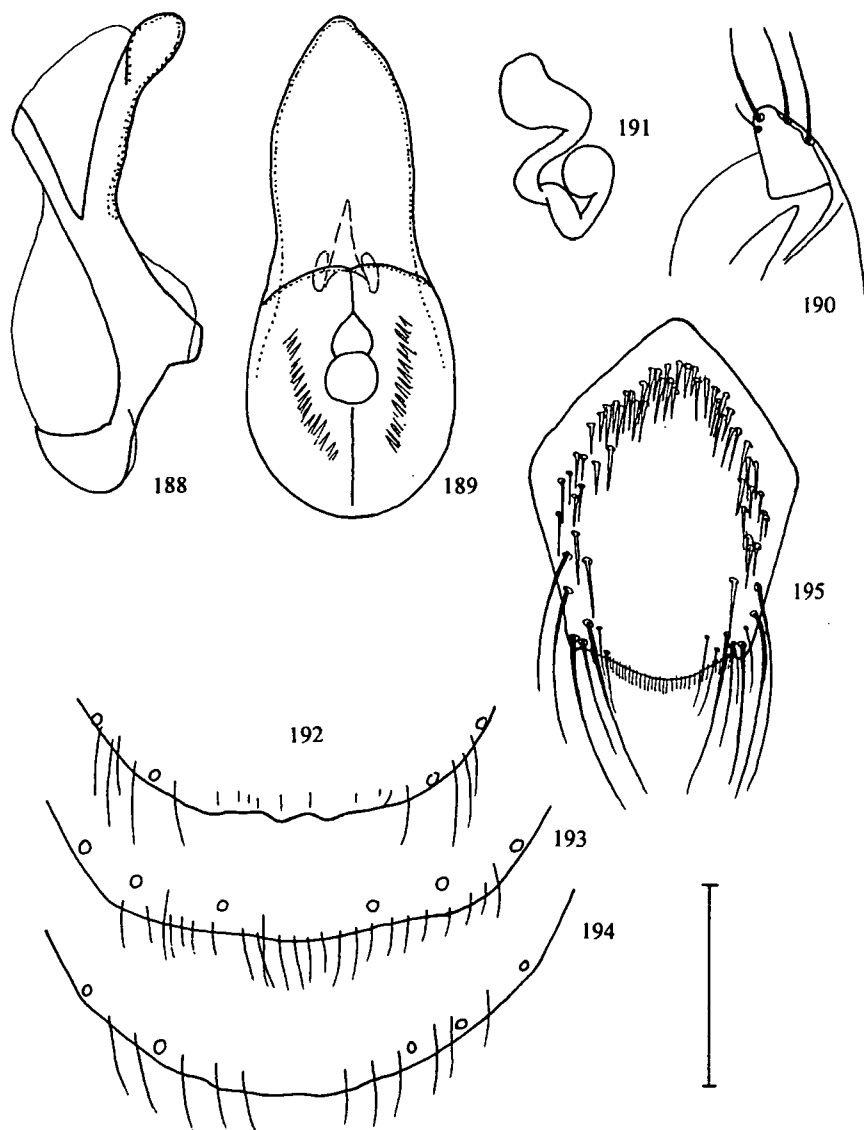


**Figs 172-179:** *G. schuelkei* sp. n.: 172, 173 - median lobe of aedeagus in lateral and in ventral view; 174 - apical lobe of paramere; 175, 176 - spermathecae; 177 - posterior part of ♂ tergum VII; 178 - hind margin of ♂ tergum VIII; 179 - hind margin of ♂ sternum VIII (long setae omitted). Scale: 0.1 mm.

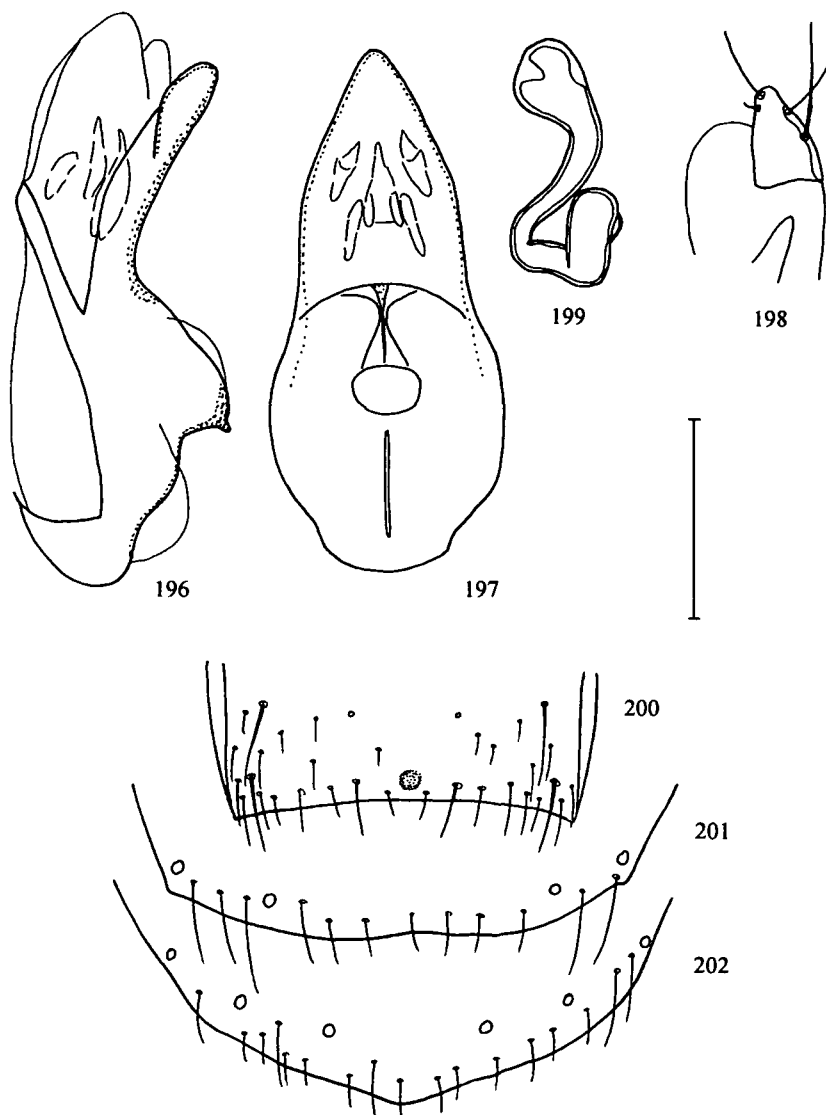




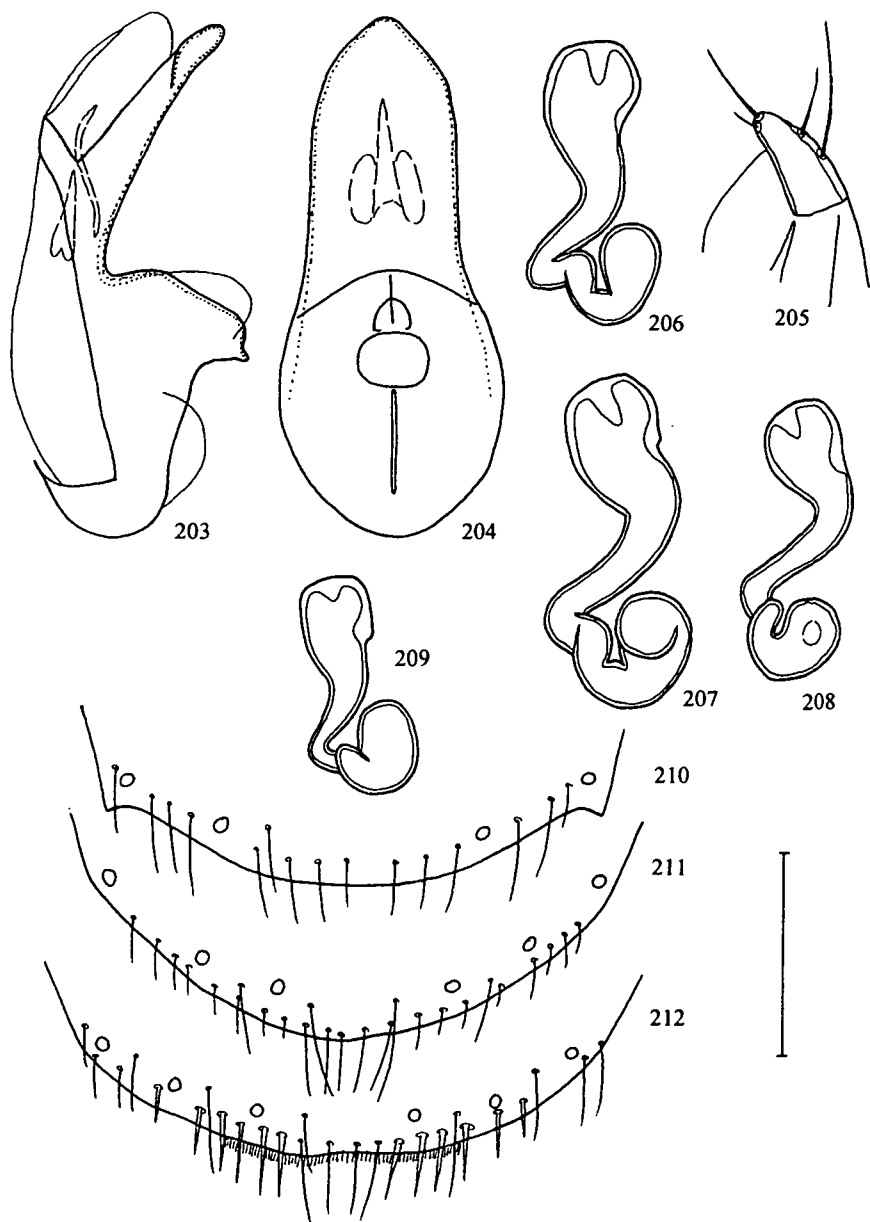
**Figs 180-187:** *G. weiratheri* PACE: 180, 181 - median lobe of aedeagus in lateral and in ventral view; 182 - apical lobe of paramere; 183, 184 - spermathecae; 185 -  $\delta$  tergum VII; 186 - hind margin of  $\delta$  tergum VIII (long setae omitted); 187 - hind margin of  $\delta$  sternum VIII (long setae omitted). Scale: 0.1 mm.



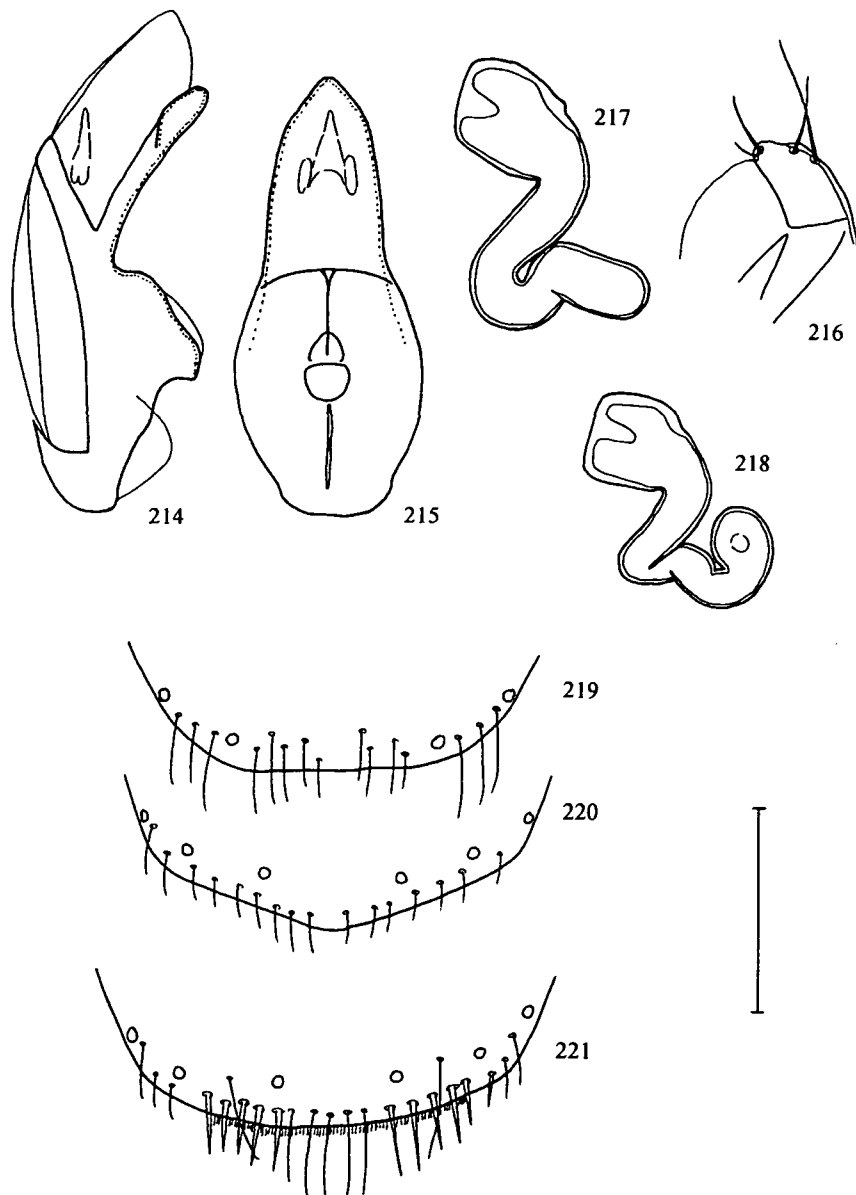
**Figs 188-195:** *G. cassagnai* (COIFFAIT): 188, 189 - median lobe of aedeagus in lateral and in ventral view; 190 - apical lobe of paramere; 191 - spermatheca (slightly collapsed); 192 - hind margin of ♂ tergum VIII (long setae omitted); 193 - hind margin of ♂ sternum VIII (long setae omitted); 194 - hind margin of ♀ tergum VIII (long setae omitted); 195 - tergum X. Scale: 0.1 mm.



**Figs 196-202:** *G. ulcerifera* sp. n.: 196, 197 - median lobe of aedeagus in lateral and in ventral view; 198 - apical lobe of paramere; 199 - spermatheca; 200 - posterior part of ♂ tergum VII; 201 - hind margin of ♂ tergum VIII (long setae omitted); 202 - hind margin of ♂ sternum VIII (long setae omitted). Scale: 0.1 mm.

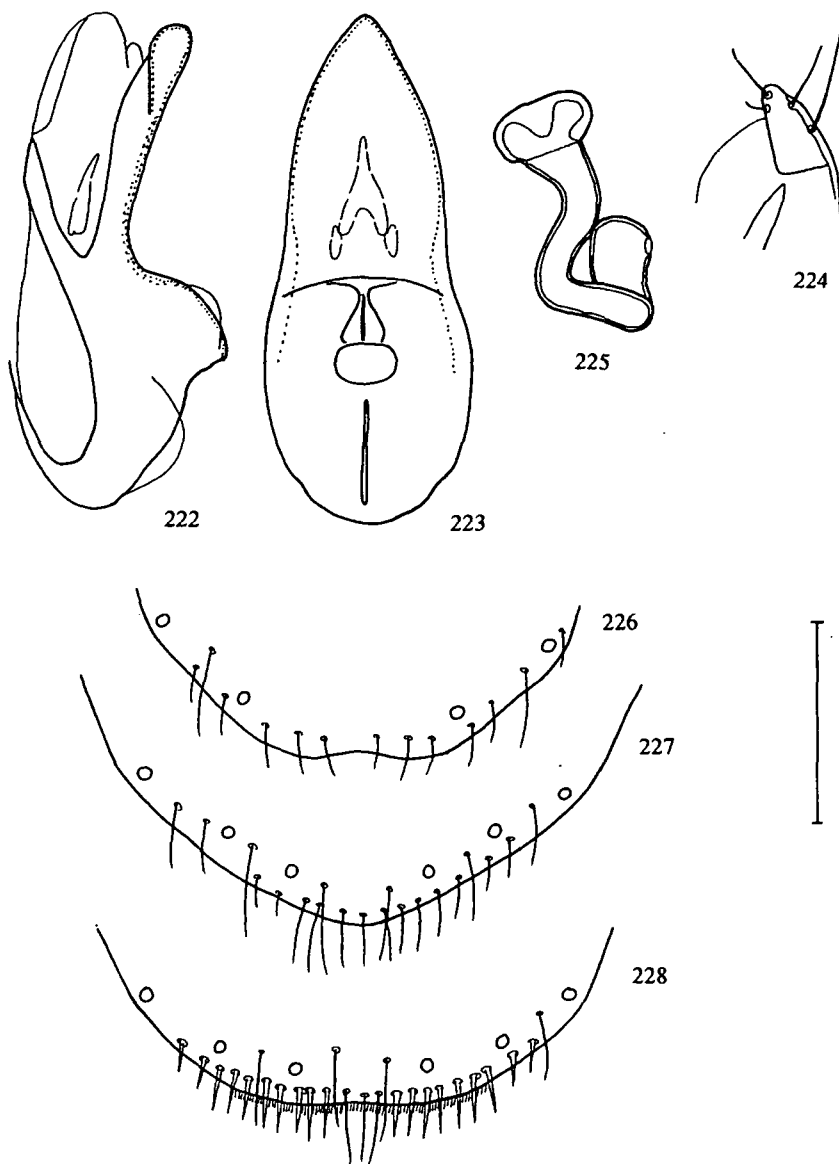


**Figs 203-212:** *G. euboica* PACE: 203, 204 - median lobe of aedeagus in lateral and in ventral view; 205 - apical lobe of paramere; 206-209 - spermathecae of ♂♂ from Levkás (206), Thessalia (207), Pelopónnisos (208), and from Kárpáthos (209); 210 - hind margin of ♂ tergum VIII (long setae omitted); 211 - hind margin of ♂ sternum VIII (long setae omitted); 212 - hind margin of ♀ sternum VIII (long setae omitted). Scale: 0.1 mm.

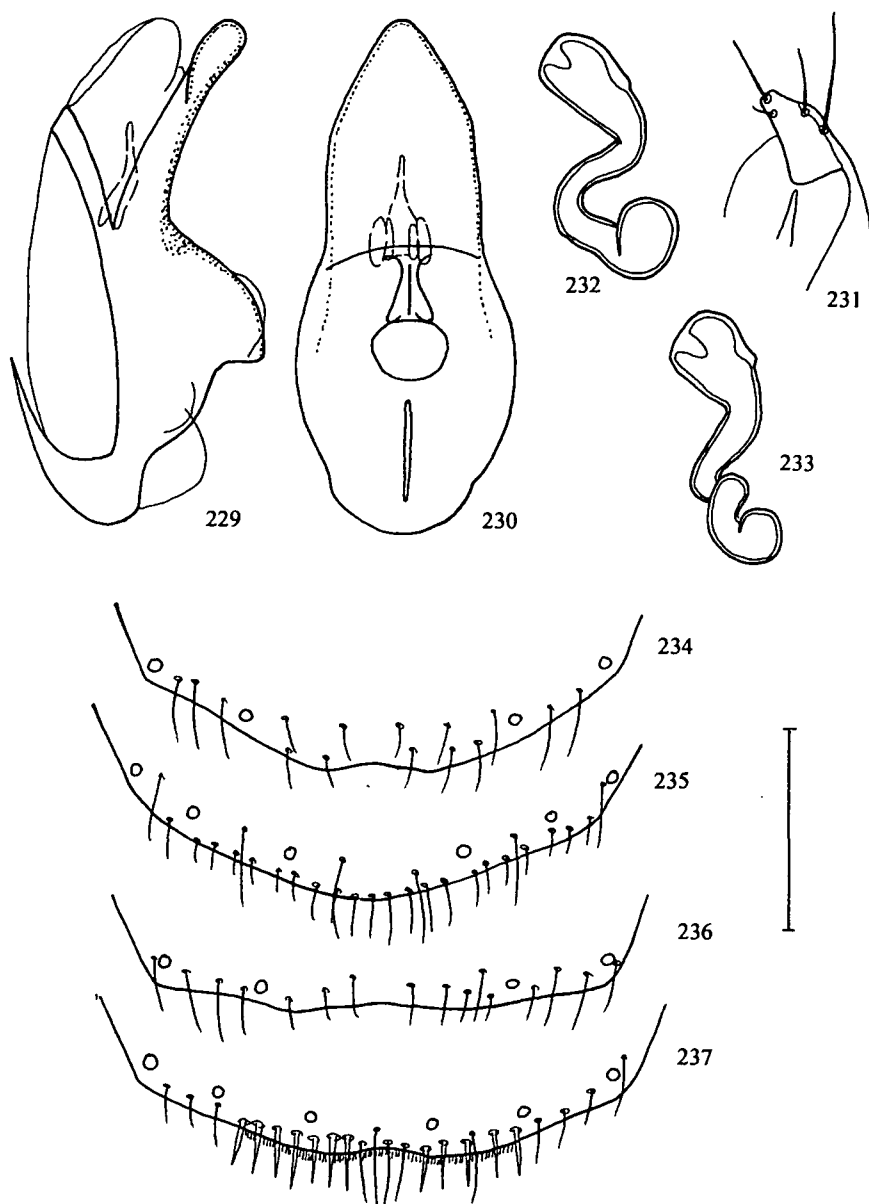


**Figs 214-221:** *G. leucadiae* (SCHEERPELTZ): 214, 215 - median lobe of aedeagus in lateral and in ventral view; 216 - apical lobe of paramere; 217, 218 - spermathecae; 219 - hind margin of ♂ tergum VIII (long setae omitted); 220 - hind margin of ♂ sternum VIII (long setae omitted); 221 - hind margin of ♀ sternum VIII (long setae omitted). Scale: 0.1 mm.

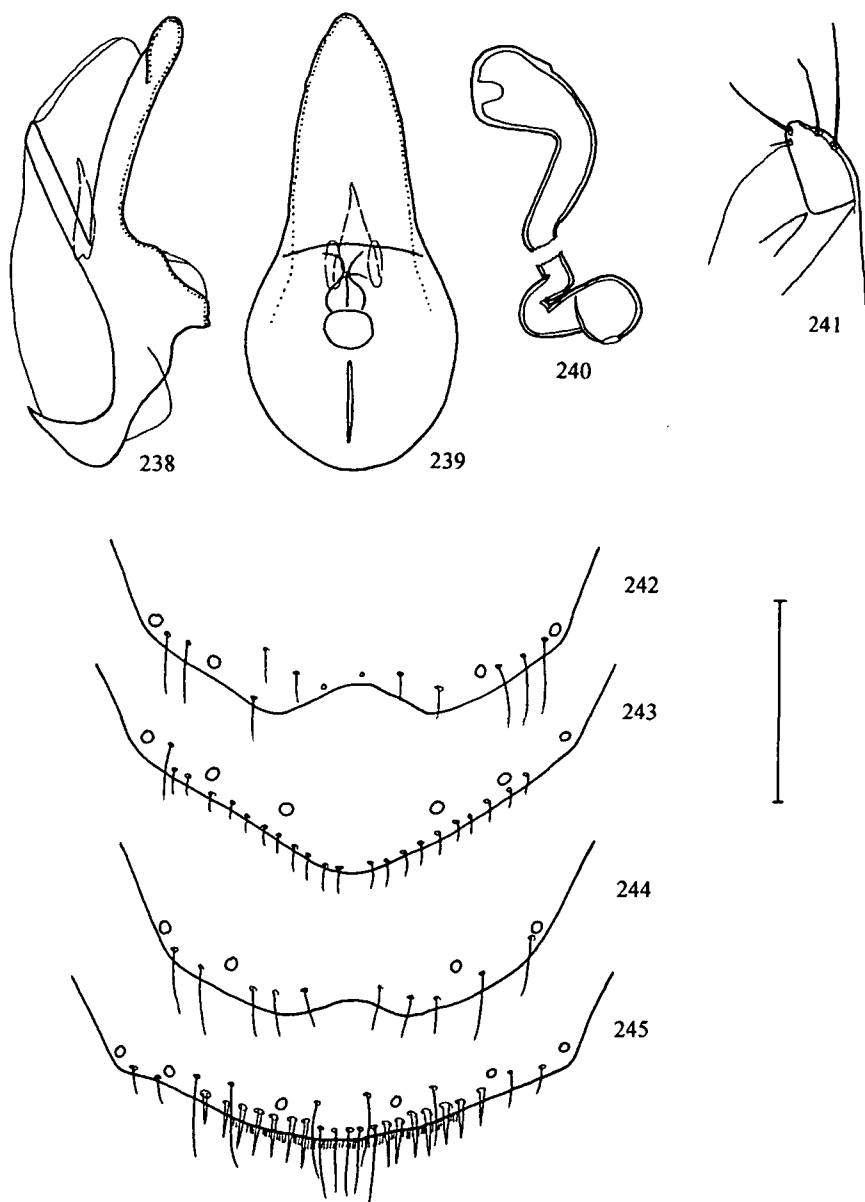
922



**Figs 222-228:** *G. ahaiaensis* sp. n.: 222, 223 - median lobe of aedeagus in lateral and in ventral view; 224 - apical lobe of paramere; 225 - spermatheca; 226 - hind margin of ♂ tergum VIII (long setae omitted); 227 - hind margin of ♂ sternum VIII (long setae omitted); 228 - hind margin of ♀ sternum VIII. Scale: 0.1 mm.

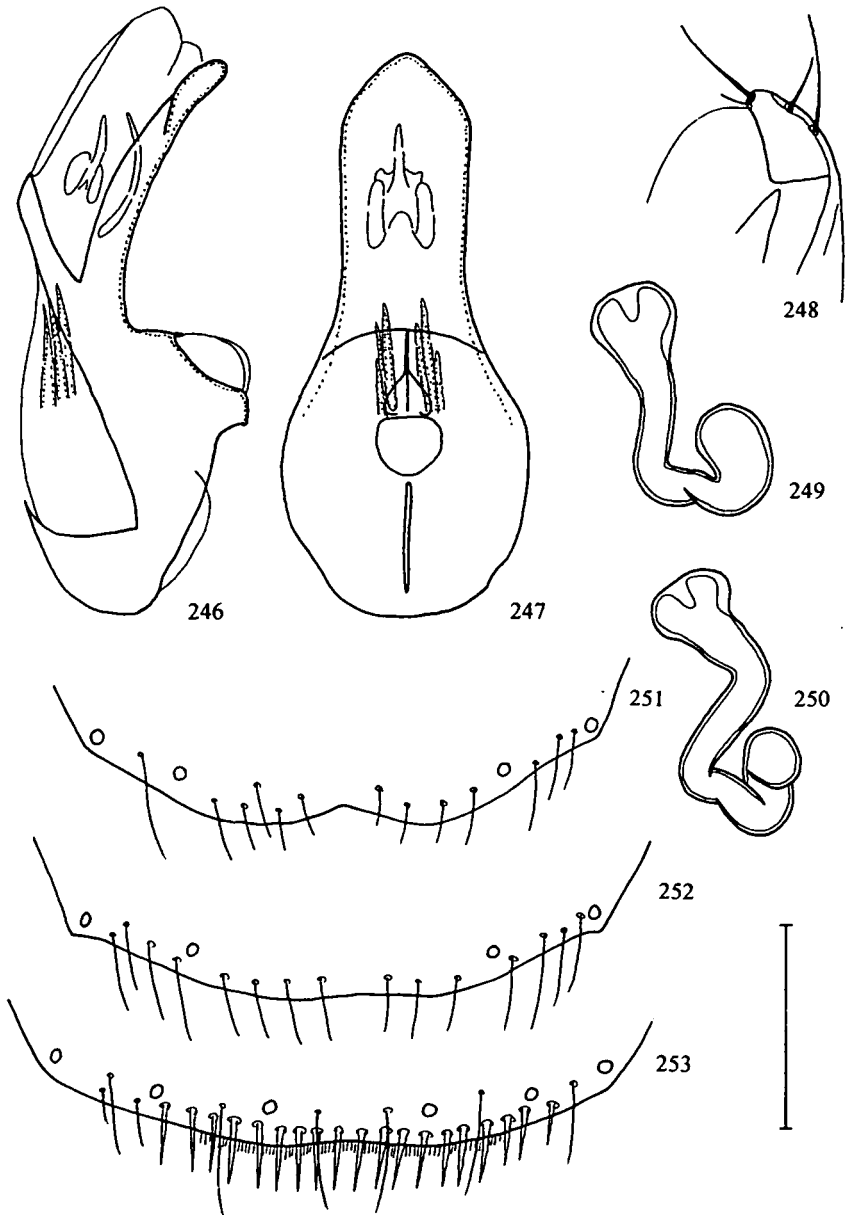


**Figs 229-237:** *G. fthiotisensis* sp. n.: 229, 230 - median lobe of aedeagus in lateral and in ventral view; 231 - apical lobe of paramere; 232, 233 - spermathecae; 234 - hind margin of  $\delta$  tergum VIII (long setae omitted); 235 - hind margin of  $\delta$  sternum VIII (long setae omitted); 236 - hind margin of  $\sigma$  tergum VIII (long setae omitted); 237 - hind margin of  $\sigma$  sternum VIII (long setae omitted). Scale: 0.1 mm.

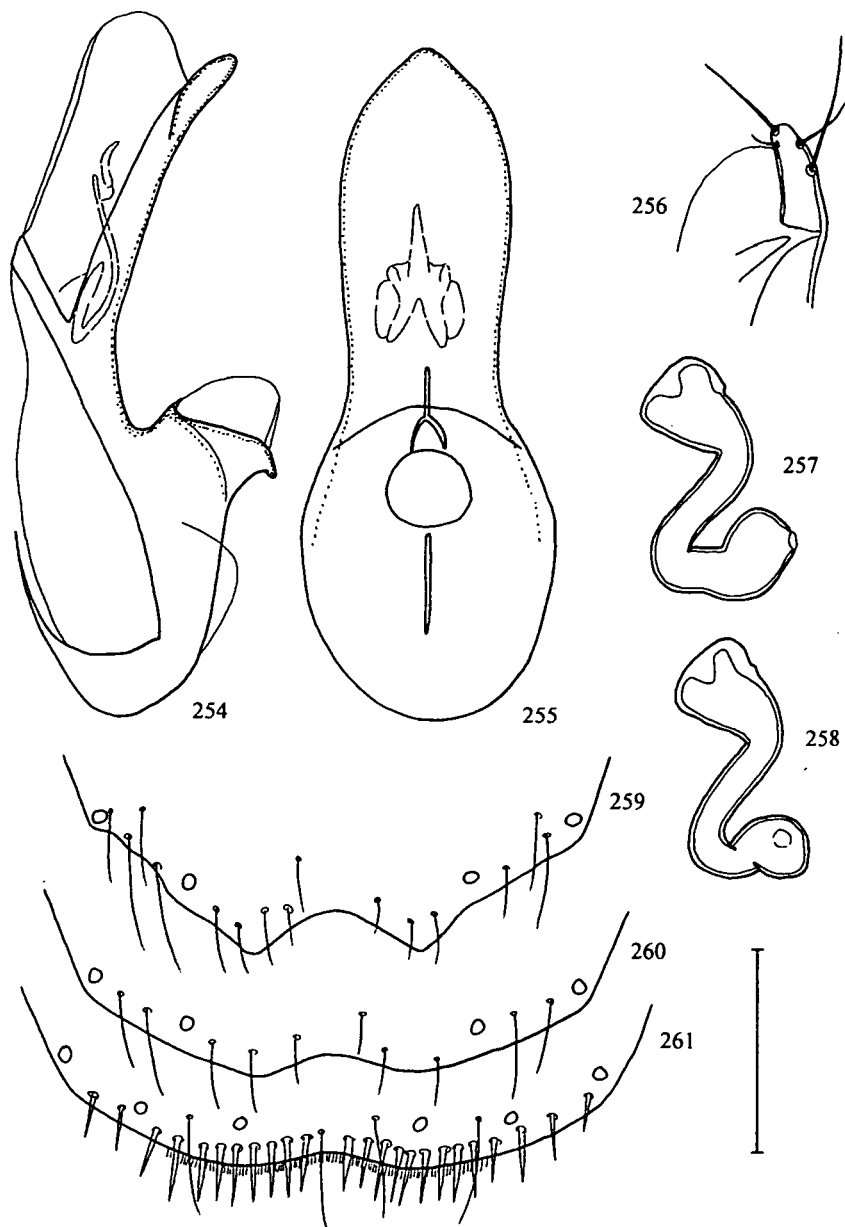


**Figs 238-245:** *G. beieri* (SCHEERPELTZ): 238, 239 - median lobe of aedeagus in lateral and in ventral view (LT); 240 - spermatheca; 241 - apical lobe of paramere; 242 - hind margin of ♂ tergum VIII (long setae omitted); 243 - hind margin of ♂ sternum VIII (long setae omitted); 244 - hind margin of ♀ tergum VIII (long setae omitted); 245 - hind margin of ♀ sternum VIII (long setae omitted). Scale: 0.1 mm.

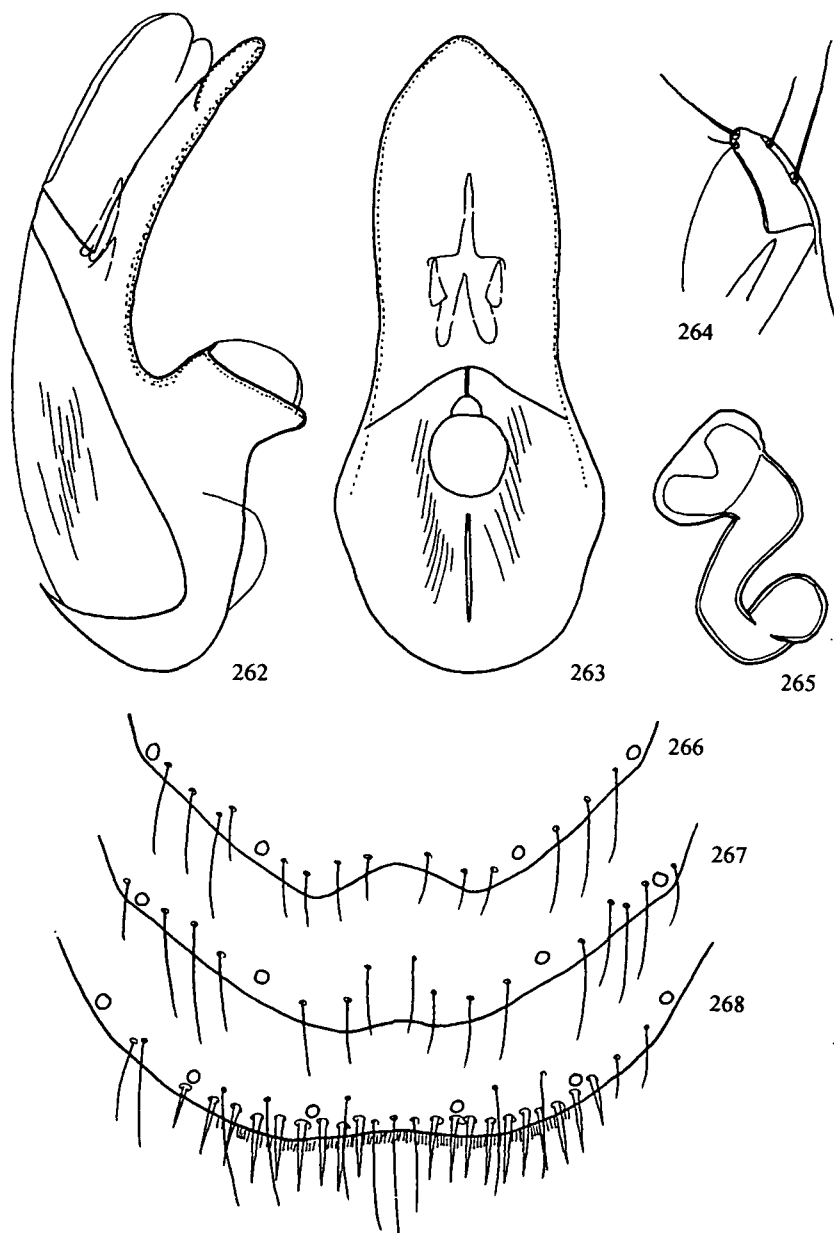




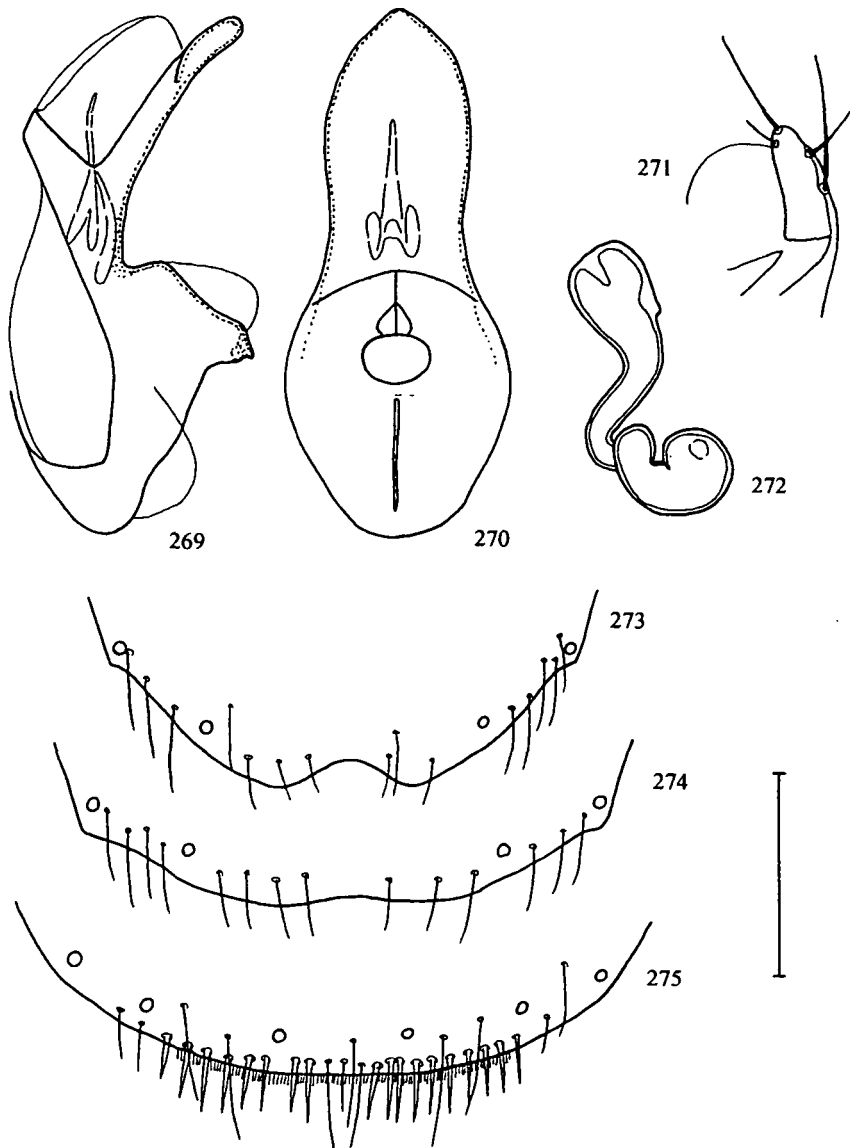
Figs 246-253: *G. idaea* PACE: 246, 247 - median lobe of aedeagus in lateral and in ventral view; 248 - apical lobe of paramere; 249, 250 - spermathecae; 251 - hind margin of ♂ tergum VIII (long setae omitted); 252 - hind margin of ♀ tergum VIII (long setae omitted); 253 - hind margin of ♀ sternum VIII (long setae omitted). Scale: 0.1 mm.



Figs 254-261: *G. exsecta* sp. n.: 254, 255 - median lobe of aedeagus in lateral and in ventral view; 256 - apical lobe of paramere; 257, 258 - spermathecae; 259 - hind margin of ♂ tergum VIII (long setae omitted); 260 - hind margin of ♀ tergum VIII (long setae omitted); 261 - hind margin of ♀ sternum VIII (long setae omitted). Scale: 0.1 mm.



**Figs 262-268: *G. icaria* PACE:** 262, 263 - median lobe of aedeagus in lateral and in ventral view; 264 - apical lobe of paramere; 265 - spermatheca; 266 - hind margin of ♂ tergum VIII (long setae omitted); 267 - hind margin of ♀ tergum VIII (long setae omitted); 268 - hind margin of ♀ sternum VIII (long setae omitted). Scale: 0.1 mm.



**Figs 269-275:** *G. cyrensis* PACE: 269, 270 - median lobe of aedeagus in lateral and in ventral view; 271 - apical lobe of paramere; 272 - spermatheca; 273 - hind margin of ♂ tergum VIII (long setae omitted); 274 - hind margin of ♀ tergum VIII (long setae omitted); 275 - hind margin of ♀ sternum VIII (long setae omitted). Scale: 0.1 mm.

# ZOBODAT - [www.zobodat.at](http://www.zobodat.at)

Zoologisch-Botanische Datenbank/Zoological-Botanical Database

Digitale Literatur/Digital Literature

Zeitschrift/Journal: [Linzer biologische Beiträge](#)

Jahr/Year: 1999

Band/Volume: [0031\\_2](#)

Autor(en)/Author(s): Assing Volker

Artikel/Article: [A revision of the species of Geostiba THOMSON 1858 from Greece and Cyprus \(Coleoptera, Staphylinidae, Aleocharinae\). 845-928](#)