

Revision of the *Cerobasis annulata* group (Psocoptera: Trogiidae) from the Canary Islands

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Key words: Psocoptera; *Cerobasis*; new species; key; Canary Islands.

The species of the *Cerobasis annulata* group from the Canary Islands are revised. A key to the seven species is provided; the Holarctic *C. annulata* is added for comparison. Five new species are described: *Cerobasis rosae* spec. nov., *C. ericaceus* spec. nov., *C. anagaensis* spec. nov., *C. longicornis* spec. nov. and *C. palmensis* spec. nov., and all endemic to the Canary Islands.

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Introduction

The genus *Cerobasis* Kolbe, 1882 is known from the New World (North America including Mexico, South America, Galapagos islands), Europe, and Africa). The taxonomy of the genus are still imperfectly studied. The revision by Lienhard (1984) on the western Palaearctic species has permitted recognition of two systematic groups on the basis of certain micromorphological features. Except for *Cerobasis guestfalica* (Kolbe, 1880), the known Canarian species belong to the *C.annulata* species group, in which the male phallosome has mushroom shaped apodemes and in which the parietal glands of the spermatheca in the females have a central floret of papillae. Seven species of *Cerobasis annulata* group have been found in the Canary islands. So far known all are endemics.

Until the description of *Cerobasis canariensis* (Enderlein, 1910), little was known about this genus in the Archipelago. Only the erroneous record of *Cerobasis annulata* from Gran Canaria (Badonnel, 1944) and the doubtful records of *C. canariensis* from Hierro and Tenerife (Meinander, 1973; see also Lienhard, 1984) have contributed to the knowledge of Canarian *Cerobasis* species. The general ignorance of the Canarian psocid fauna led me to initiate a detailed study on the Canarian Psocoptera. For this purpose, the Canarian Archipelago has been visited three times: January 1990, the islands of Lanzarote and Fuerteventura, of which the results has been published recently (Baz, 1991); July and August 1990, the islands of Tenerife and La Gomera; August 1991, the island of La Palma. Several hundreds of individuals collected at 47 different localities has been examined.

Presumably, the genus *Cerobasis* is more diversified in the Macaronesian Archipelagoes. Other than the Canarian species, endemics have been described from Madeira (*C. maderensis*) and the Cabo Verde islands (*C. harteni*, *C. caboverdensis* and *C. intermedia*) by Lienhard (1983, 1984). The insular endemicity of *Cerobasis* species of "annulata" group is not restricted to the Atlantic islands, i.e. the Galapagos islands harbour three endemic species (Thornton & Woo, 1973), the smaller Mexican islands of Maria Madre and San Juanito possess two endemics (García-Aldrete, 1988) and the Yucatan Peninsula (Mexico) on the Atlantic coast has one endemic (García-Aldrete, 1991).

Material and methods

Specimens were obtained by beating vegetation, namely bushes and trees.

Morphological observations were made on slide preparations in Hoyer's medium under a compound microscope. Colour observations were made on whole specimens in alcohol with direct light under a dissecting microscope. Measurements were made with a filar micrometer.

The following abbreviations are used in connection with the measurements:

- BL = Body length.
 AL = Antennal length.
 IO/D = Least distance between compound eyes divided by greatest antero-posterior eye diameter in dorsal view.
 PO = Transverse diameter of eye divided by greatest antero-posterior diameter of eye in dorsal view.
 f1, f2, f3 = Length of first, second and third flagellomeres.
 F = Hind femur length.
 T = Hind tibia length.
 t1, t2, t3 = Length of first, second and third tarsomeres.

Descriptions

Key to the Canarian *Cerobasis annulata* group (*C. annulata* is included for comparison)

1. Fore wings strongly reduced, represented by veinless, setose lobes *C. rosae* spec. nov.
 - Brachelytropter (sensu Gunther, 1974). Fore wings scale-shaped, veinless (figs. 9-14) covering the lateral zones of metathoracic tergum 2
2. Femora almost completely brown 3
 - Femora very pale, exceptionally with a brown band distally 4
3. Abdominal segments II and III completely brown (fig. 6). Phallosome symmetrical (fig. 34) *C. anagaensis* spec. nov.
 - Only the lateral zones of the abdominal segments II and III marked with brown, the central ones pale (fig. 5). Phallosome asymmetrical (fig. 27)
 *C. canariensis* (Enderlein)
4. Tibia completely pale. First abdominal segment pale, remainder pale brown (fig. 1). Body length more than 2.5 mm *C. pineticola* Baz
 - Tibia marked with brown. First abdominal segment brown. Body length less than 2.5 mm 5
5. Tibia completely brown (figs. 8, 22) *C. palmensis* spec. nov.
 - Tibia with two brown bands in both anterior and posterior regions (figs. 16, 20, 23) 6
6. Colour pattern of head very characteristic (fig. 15). Antennae longer than body ...
 *C. longicornis* spec. nov.
 - Colour pattern of head different (figs. 2, 4). Antennae shorter than body 7
7. Abdomen uniformly coloured except for some pale patches (fig. 2). Phallosome as in fig. 24. Accessory glands of spermatheca with less than 200 pores

..... *C. annulata* (Hagen)
 Abdomen with some brown patches (fig. 4). Phallosome as in fig. 32. Accessory
 glands of spermatheca with more than 200 pores *C. ericaceus* spec. nov.

***Cerobasis pineticola* Baz, 1991**
 (figs. 1, 18, 39-41, 44)

Cerobasis pineticola Baz, 1991: 336.

Material.— 4 ♂♂, 2 ♀♀ (UAH), "Canary Islands, Lanzarote, Mirador de Haría, 24.i.1990, A. Baz, on *Pinus* spec."

This species is the largest *Cerobasis* species with a body length of more than 2.5 mm. For the shape of the phallosome and the gonapophyses see figs. 39 and 40 respectively. Illustrations of the colour pattern of the body (fig. 1) and the leg (fig. 18) and the shape of the spermathecal plate (fig. 41) are given, which are absent in the original description.

Until now this species is only known from the island of Lanzarote (fig. 44), where all individuals has been caught on the branches of *Pinus* spec., surely an exotic species of *Pinus* because the endemic *Pinus canariensis* is absent of the two Oriental islands (Fuerteventura and Lanzarote).

***Cerobasis annulata* (Hagen, 1865)**
 (figs. 2, 10, 16, 24-26)

Clothilla annulata Hagen, 1865: 122.

Atropos annulata; Kolbe, 1880: 135.

Myopsocnema annulata; Enderlein, 1905: 17.

Cerobasis annulata; Smithers, 1967: 11.

Zlinia multispinosa Obr, 1948: 93; Gunther, 1974: 66 (synonymy).

Cerobasis multispinosa; Smithers, 1967: 11.

Cerobasis bundyi Turner, 1977: 283; Lienhard & Halperin, 1988: 14 (synonymy).

Material.— 2 ♂♂ + 3 ♀♀ (UAH), "Greece, Peloponesus, Loutra Killinis, 13.vi.1979, C. Lienhard".

This is a Holarctic species recorded from Europe, North Africa, Israel, North America, Robinson Crusoe Island, Hawaii and St. Helena Island. The records for the Canary Islands are erroneous (Badonnel, 1944, 1976) and has been referred to *C. canariensis* (Lienhard, 1984).

In this paper *C. anulata* is included for comparison: the colour pattern of the body (fig. 2) and the leg (fig. 16), the wing (fig. 10), the phallosome (fig. 24), the gonapophyses (fig. 25) and the spermathecal plate (fig. 26) has been figured. .

***Cerobasis canariensis* (Enderlein, 1910)**
 (figs. 5, 9, 17, 27-29, 44)

Myopsocnema canariensis Enderlein, 1910: 169.

Cerobasis canariensis; Smithers, 1967: 11; Meinader, 1973: xx; Lienhard, 1984: xx.
Cerobasis annulata; Badonnel, 1944: xx, 1976: xx.

Material.— 1 ♂ (MHNG), "Canary Islands, Hierro, Las Playas, 4.iii.1983, Besuchet"; 1 ♀ (MHNG), "Canary Islands, Tenerife, Barranco del Infierno, 27/28.iii.1985, Fjeldsa"; 1 ♂ + 1 ♀ (MHNG), "Canary Islands, Tenerife, Puerto de los Cristianos, 21.iii.1985, Fjeldsa".

Described by Enderlein in 1910 as *Myopsocnema canariensis*, it has been lastly recorded as *C. annulata*, Meinander (1973) by Badonnel (1944, 1976) and Lienhard (1984). New records has been found by Lienhard (pers. comm.). It is known from the islands of Gran Canaria, Tenerife and Hierro (fig. 44). Little is known on it biology and ecology. For the redescription, see Lienhard (1984).

***Cerobasis rosae* spec. nov.**
 (figs. 3, 19, 30, 44)

Material.— Holotype, ♂ (RMNH), "Canary Islands, Tenerife, Las Rosas, 3.viii.1990, A. Baz, on *Pinus canariensis*".

Male. Colour.— (in 70% alcohol). Body pale brown (fig. 3), head without distinctive marks; antennal flagellomeres pale brown, with the distal end of each flagellomere dark brown. Thorax and abdomen uniformly brown. Legs: femora pale, tibiae completely brown (fig. 19).

Morphology.— Ocelli absent. Fore wings almost absent, represented by setose lobes, hind wings absent. Coxal rasp present on hind coxa. Hind tibia with two strong ventral setae and three apical setae. Claws without preapical tooth, pulvillus hyaline and broad distally. Hypandrium rounded apically with a median circular patch of strong setae basally. Phallosome (fig. 30) with the inner arms free and almost parallel to each other, inner posterior bodies with two strong, parallel processes. Apodemes slender, mushroom-shaped.

Female. Unknown

Measurements (in mm).— Holotype ♂: BL = 2.3; IO/D = 2; PO = 0.53; f1 = 0.085; f2 = 0.08; f3 = 0.085; F = 0.57; T = 0.89; t1 = 0.37; t2 = 0.08; t3 = 0.07.

Comments.— The male characters agree well with those of the "*annulata*" species group. However, this is the only Canarian species in which wings are almost completely absent.

In relation to the phallosome shape, *C. rosae* is closer morphologically to *C. ericaceus* than to the another canarian species, but the tibia colour pattern resemble those of *C. palmensis*.

***Cerobasis ericaceus* spec. nov.**
 (figs. 4, 12, 20, 31-33, 44)

Material.— Holotype, ♂ (RMNH), "Canary Islands, Tenerife, Las Cumbrillas, 28.vii.1990, A. Baz, on *Erica arborea*". Paratypes, 5 ♀♀ + 3 ♂♂ (RMNH): 2 ♀♀ (one allotype), topotypic and same date; 2 ♂♂ (RMNH), "Canary Islands, Tenerife, Cruz del Carmen, 29.vii.1990, A. Baz, on *Erica arborea*"; 1 ♂ + 1 ♀ (RMNH), "Canary Islands, Tenerife, Paso, 29.vii.1990, A. Baz, on *Erica arborea*"; 2 ♀♀ (RMNH), "Canary Islands, Tenerife, El Tanque Alto, 28.vii.1990, A. Baz, on *Pinus canariensis*".

Male. Colour (in 70% alcohol).— Body pale brown (fig. 4). Head brown; a V-shaped brown patch on the frons. Thorax pale brown. Abdomen pale brown with some brown patches and some pale zones (fig. 4). Wings scale-shaped, coloured as in fig. 12. Legs (fig. 20): femora pale with a brown band distally, tibia with two brown bands of variable width, first tarsal segment brown, gradually becoming pale.

Morphology.— Ocelli absent. Coxal rasp present on hind coxa. Hind tibia with two strong ventral setae and three apical setae; with seven preapical long setae on its outer edge. Claws without preapical tooth, pulvillus hyaline and broad distally. Hypandrium typical for the genus. Phallosome (fig. 32) with the inner arms free and slightly diverging; inner posterior bodies with two strong, denticulate, parallel processes. Apodemes slender, mushroom-shaped large.

Female. Colour.— Same as the male.

Morphology.— Wings and legs as in the male. Gonapophyses (fig. 31) with elongate dorsal valve, ventral valve present as a small non-sclerotized process. Accessory glands of spermatheca with more than 200 pores (263 in the allotype). Spermathecal plate sclerotized (fig. 33).

Measurements (in mm).— Holotype σ : BL = 2.3; IO/D = 2.09; PO = 0.52; f1 = 0.13; f2 = 0.12; f3 = 0.12; F = 0.57; T = 0.81; t1 = 0.39; t2 = 0.08; t3 = 0.08.

Allotype ♀ : BL = 2.4; IO/D = 2; PO = 0.5; f1 = 0.1; f2 = 0.1; f3 = 0.1; F = 0.67; T = 0.98; t1 = 0.46; t2 = 0.09; t3 = 0.08.

Comments.— In some morphological aspects closely related to *C. rosae* (see the comments of the previous species). This species show a marked preference for inhabiting *Erica*-bushes, where almost all the specimens studied have been collected.

***Cerobasis anagaensis* spec. nov.**
(figs. 6, 13, 21, 34, 35, 44)

Material.— Holotype, σ (RMNH), "Canary Islands, Tenerife, Bailadero, 29.vii.1990, A. Baz, on *Laurus azorica*". Paratypes, 6 ♀♀ + 13 $\sigma\sigma$ (RMNH): 5 ♀♀ (one the allotype) + 7 $\sigma\sigma$ topotypic and same date; 1 ♀ + 4 $\sigma\sigma$ (RMNH), "Canary Islands, Tenerife, Paso, 29.vii.1990, A. Baz, on *Erica arborea*"; 1 σ (RMNH), "Canary Islands, Tenerife, Paso, 27.vii.1990, A. Baz, on *Myrica faya*"; 1 σ (RMNH), "Canary Islands, La Gomera, Bosque del Cedro, 31.vii.1990, A. Baz, on *Apollonias barbusana*".

Male. Colour (in 70% alcohol).— Head and thorax pale brown (fig. 6). Wings as in fig. 13. Legs (fig. 21): femora completely brown except for a pale band at the distal end; tibia with two brown bands, tarsi pale brown. Abdomen (fig. 6): segment I pale brown, segments II and III completely dark brown, the remainder of segments dark brown except for the central area which is pale brown.

Morphology.— Ocelli absent. Coxal rasp present on hind coxa. Hind tibia with two strong ventral setae and two apical setae. with seven preapical long setae on outer edge. Claws without preapical tooth, pulvillus hyaline, broad distally. Hypandrium typical for the genus. Phallosome (fig. 34), inner posterior bodies with two sclerotized and with slightly converging processes. Apodemes slender, mushroom-shaped.

Female. Colour.— Same as of the male.

Morphology.— Legs characters as male, except in the number of strong setae on hind tibia (two ventral setae and three apical setae). Gonapophyses (fig. 35) typical

for the genus. Accessory glands of spermatheca with less than 200 pores (126 in the allotype).

Measurements (in mm).— Holotype ♂ BL = 1.9; IO/D = 2; PO = 0.46; f1 = 0.09; f2 = 0.09; f3 = 0.08; F = 0.5; T = 0.72; t1 = 0.28; t2 = 0.07; t3 = 0.07.

Allotype ♀: BL = 2; IO/D = 2.24; PO = 0.48; f1 = 0.08; f2 = 0.08; f3 = 0.075; F = 0.53; T = 0.72; t1 = 0.31; t2 = 0.08; t3 = 0.07.

Comments.— *C. anagaensis* seems to be closely related to *C. palmensis* on the basis of the phallosome structure. However, the colour pattern of the body is very different. In this respect, *C. anagaensis* is most closely related to *C. canariensis*.

C. anagaensis is known from the islands of Tenerife and La Gomera (fig. 44), where it shows a clear preference for inhabiting lauraceous trees.

***Cerobasis longicornis* spec. nov.**

(figs. 7, 14, 15, 23, 42, 43, 44)

Material.— Holotype, ♀ (RMNH), "Canary Islands, La Palma, Hacienda del Cura, 24.viii.1991, A. Baz, on *Gonospermum canariense*". Paratypes, 2 ♀♀ (RMNH): 1 ♀ "Canary Islands, La Palma, Hacienda del Cura, 24.viii.1991, A. Baz, on *Gonospermum canariense*"; 1 ♀, id., but on *Pinus canariensis*.

Female. Colour (in 70% alcohol).— Head colour pattern very characteristic (fig. 15). Antennal flagellomeres pale brown, each flagellomere distally dark brown. Thorax and abdomen pale brown (fig. 7). Wings coloured as in fig. 14. Legs (fig. 23): femora pale except for a pale brown band distally, tibia with two pale brown bands, tarsi pale.

Morphology.— Antennae longer than body. Ocelli absent. Coxal rasp on hind coxa. Hind tibia with two strong ventral setae and four apical setae, and with eight preapical long setae on its outer edge. Claws without preapical tooth, pulvillus hyaline and broad distally. Gonapophyses (fig. 42) typical for the genus. Accessory glands of spermatheca with less than 200 pores (127 in the holotype). Spermathecal plate slightly sclerotized as in fig. 43.

Male. Unknown.

Measurements (in mm).— Holotype ♀: BL = 2.1; AL = 2.25; IO/D = 2.1; PO = 0.49; f1 = 0.1; f2 = 0.1; f3 = 0.11; F = 0.51; T = 0.81; t1 = 0.32; t2 = 0.32; t3 = 0.07.

Comments.— Is a very characteristic species because of the colour pattern of the head and the extremely long antennae. Regrettably, the lack of knowledge about the male does not allow establishing the more precise relationships of this species.

***Cerobasis palmensis* spec. nov.**

(figs. 8, 11, 22, 36-38, 44)

Material.— Holotype, ♂ (RMNH), "Canary Islands, La Palma, El Charco, 18.viii.1991, A. Baz, on *Pinus canariensis*". Paratypes, 3 ♀♀ (one allotype) + 3 ♂♂ (RMNH), topotypic and with same date.

Male. Colour (in 70% alcohol).— Body pale brown (fig. 8). Abdominal tergites with some brown patches on the pale medial areas. Wings as in fig. 11. Legs (fig. 22) with the femora and tibiae completely pale brown. Tarsi pale.

Morphology.— Ocelli absent. Coxal rasp present on hind coxa. Hind tibia with one strong ventral setae and two apical setae, with nine preapical long setae on outer edge. Claws without preapical tooth, pulvillus hyaline, slowly broad distally. Hypandrium typical for the genus. Phallosome (fig. 36), inner posterior bodies with two sclerotized, slender processes which are slightly curved. Apodemes mushroom-shaped.

Female. Colour.— Same as the male.

Morphology.— Leg characters as in the male, but without strong ventral setae on hind tibia. Gonapophyses as in fig. 37. Accessory glands of spermatheca with less than 200 pores (145 in the allotype). The spermathecal plate is not sclerotized (fig. 38).

Measurements (in mm).— Holotype ♂: BL = 1.8; IO/D = 2.1; PO = 0.5; f1 = 0.09; f2 = 0.08; f3 = 0.085; F = 0.55; T = 0.73; t1 = 0.32; t2 = 0.06; t3 = 0.07.

Allotype ♀: BL = 1.9; IO/D = 2.2; PO = 0.54; f1 = 0.06; f2 = 0.05; f3 = 0.07; F = 0.55; T = 0.79; t1 = 0.32; t2 = 0.07; t3 = 0.07.

Comments.— The phallosome features of *C. palmensis* notably resemble those of *C. anagaensis*, but the different colour patterns of the body and legs, and the different ecology of the two species (*C. anagaensis* inhabits the lauraceous trees of the islands of Tenerife and La Gomera, whereas *C. palmensis* seems to be restricted to the island of La Palma, inhabiting *Pinus canariensis*) allows an easy separation.

Acknowledgements and abbreviations

I am grateful to Charles Lienhard (Geneva Museum) for the loan of specimens and the access to his material. The following abbreviations are used: UAH = Universidad de Alcalá de Henares; MHNG = Museum d'Histoire Naturelle de Geneve; RMNH = Nationaal Natuurhistorisch Museum (formerly Rijksmuseum van Natuurlijke Historie), Leiden.

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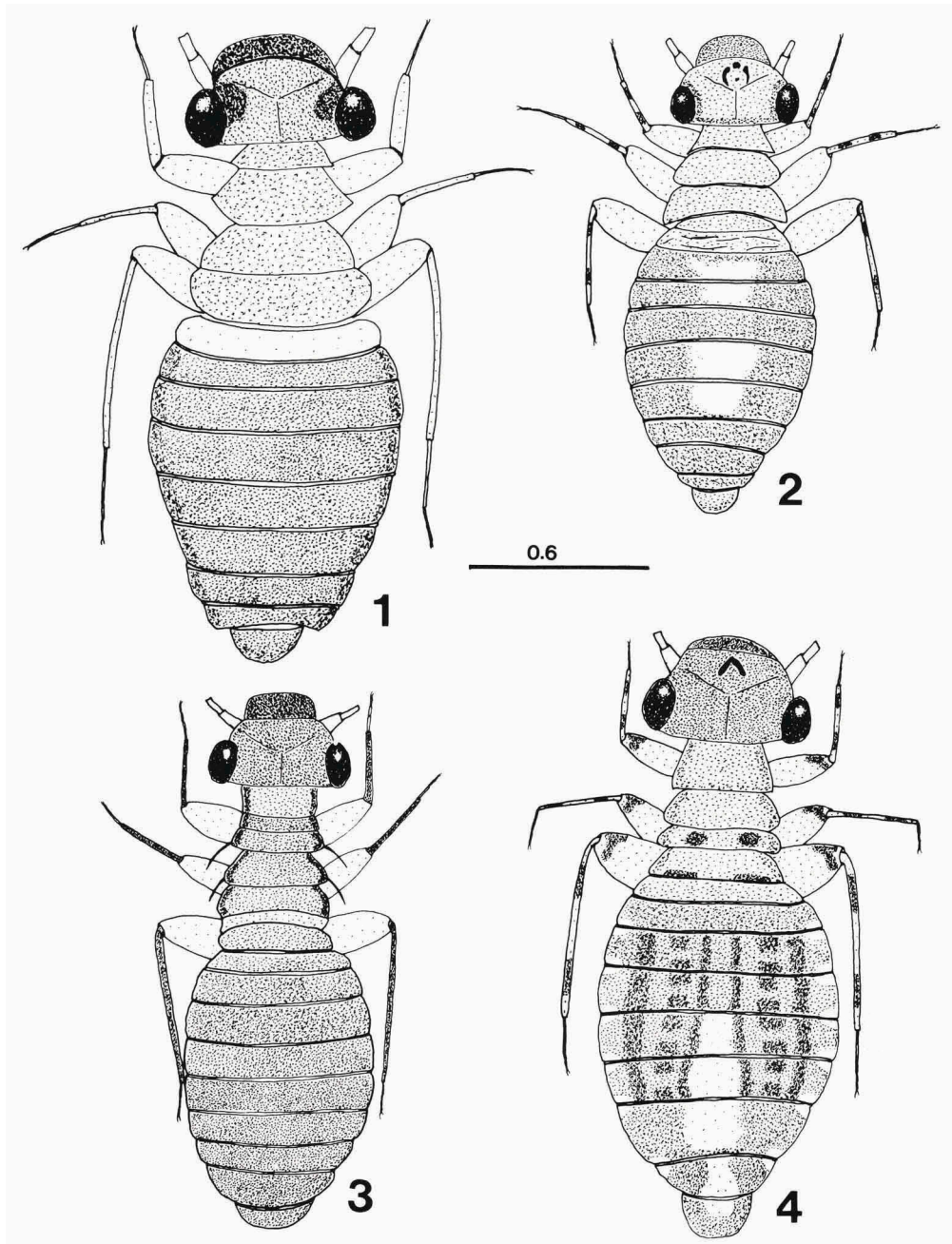
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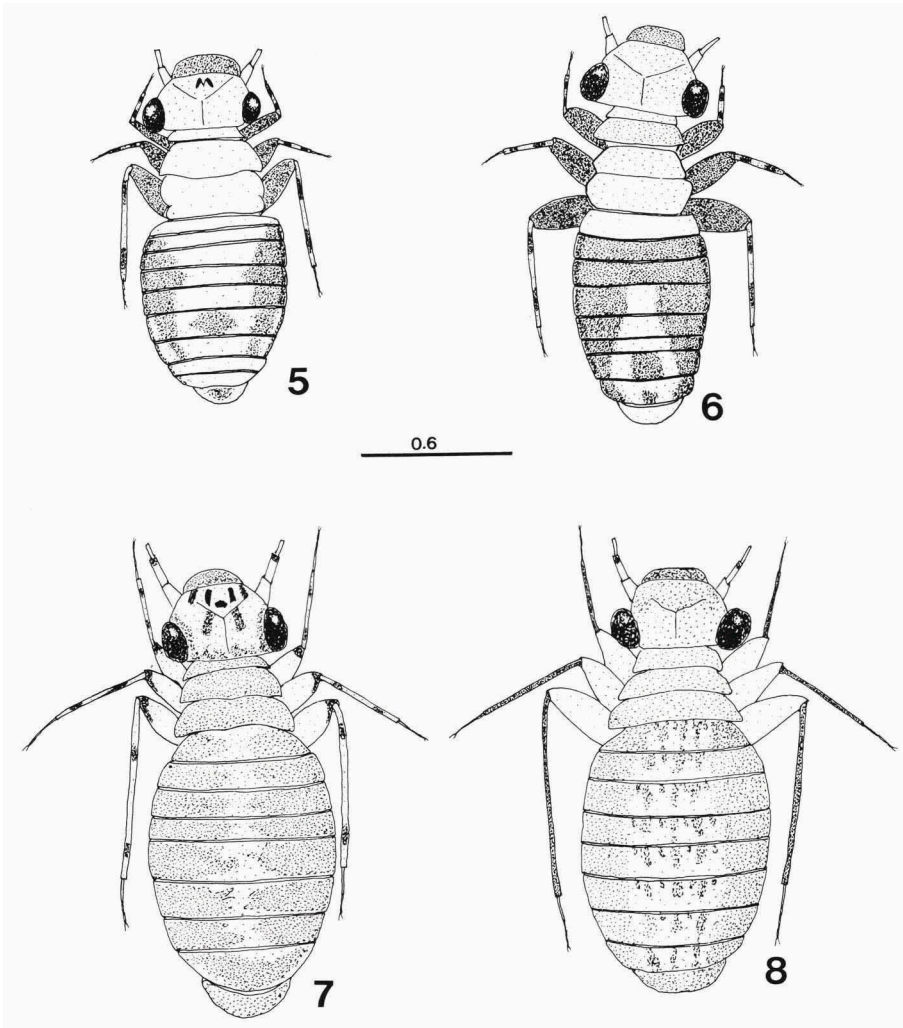
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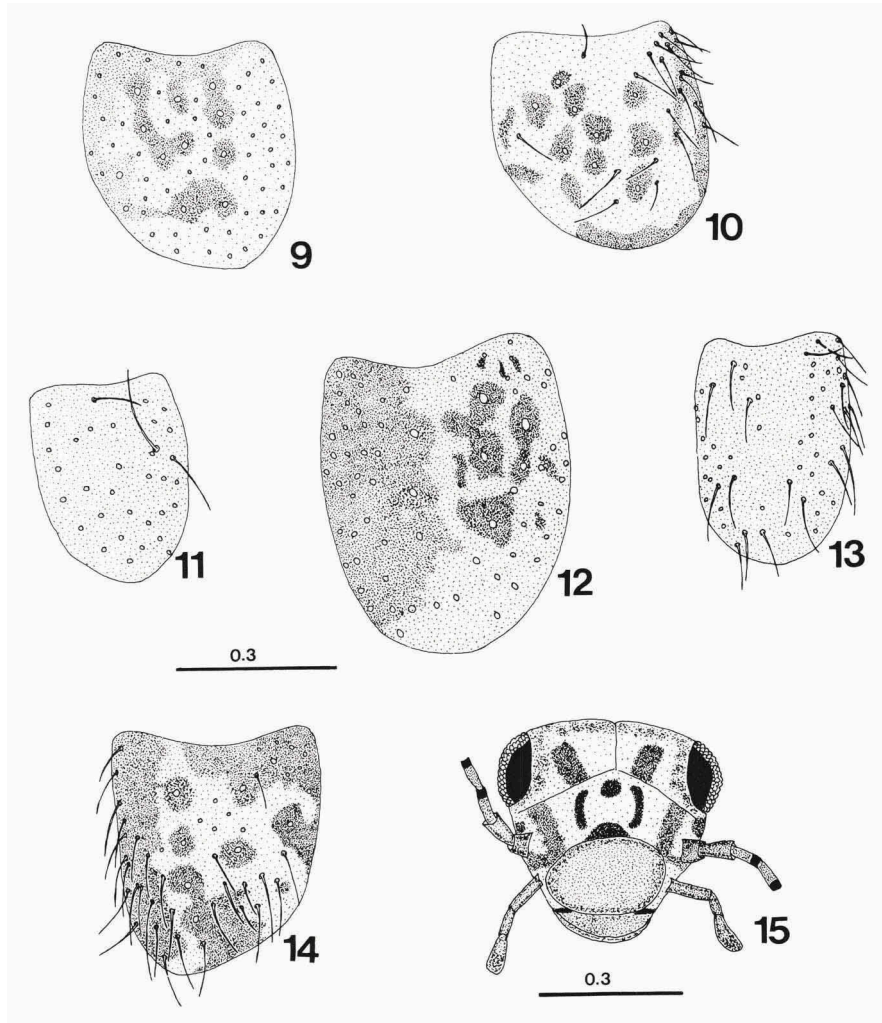
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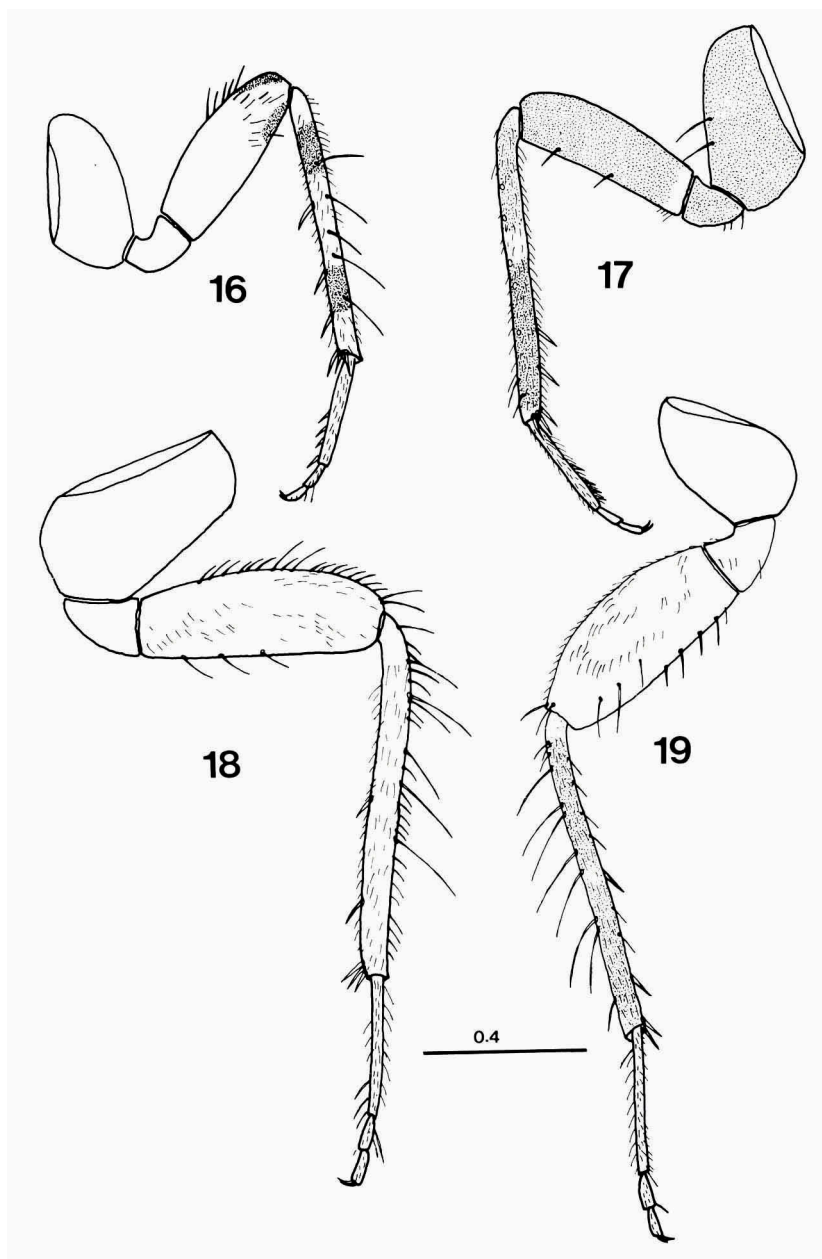
Figs. 1-4, dorsal aspect of body. 1, *Cerobasis pineticola* Baz, σ , Lanzarote, Mirador de Haría; 2, *Cerobasis annulata* (Hagen), σ , Greece, Loutra Killinis; 3, *Cerobasis rosae* spec. nov., holotype σ , Tenerife, Las Rosas; 4, *Cerobasis ericaceus* spec. nov., holotype σ , Tenerife, Las Cumbrillas. Scale in mm.



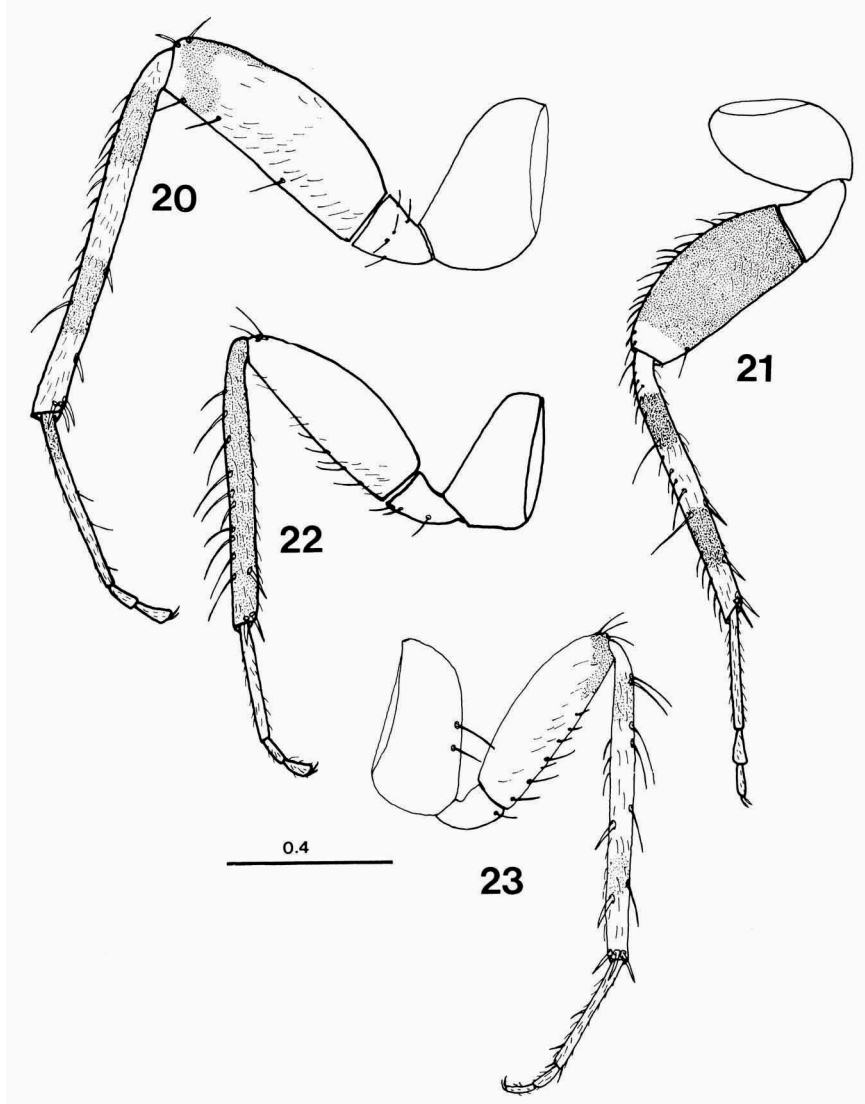
Figs. 5-8, dorsal aspect of body. 5, *Cerobasis canariensis* (Enderlein), ♂, Hierro, Las Playas; 6, *Cerobasis anagaensis* spec. nov., holotype ♂, Tenerife, Bailadero; 7, *Cerobasis longicornis* spec. nov., holotype ♀, La Palma, Hacienda del Cura; 8, *Cerobasis palmensis* spec. nov., holotype ♂, La Palma, El Charco. Scale in mm.



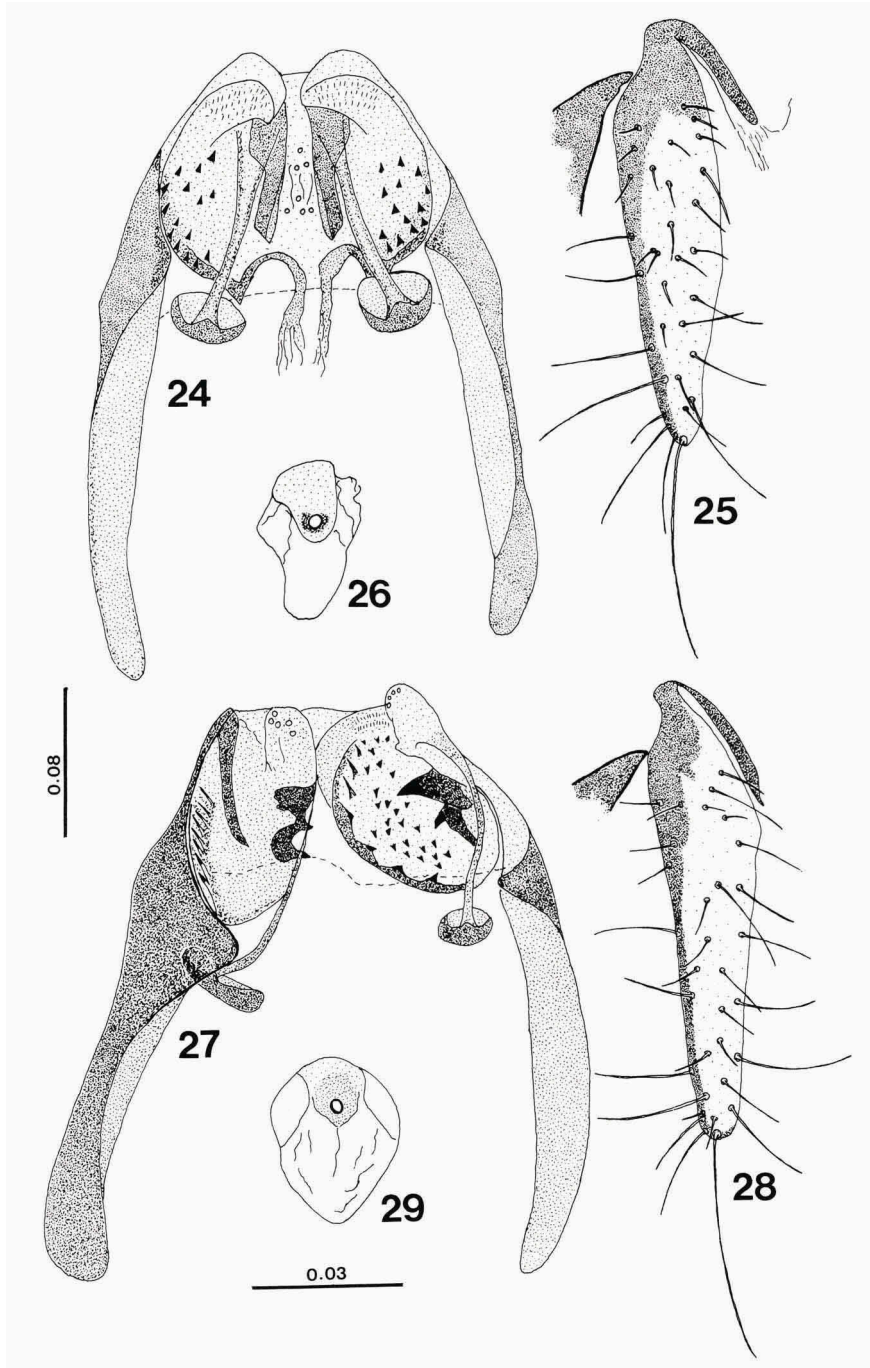
Figs. 9-14, Fore wing; fig. 15 colour pattern of head. 9, *C. canariensis* (Enderlein), ♀; 10, *C. annulata* (Hagen), ♀; 11, *C. palmensis* spec. nov., ♂; 12, *C. ericaceus* spec. nov., ♀; 13, *C. anagaensis* spec. nov., ♂; 14, *C. longicornis* spec. nov., ♀; 15, *C. longicornis* spec. nov., ♀. Scales in mm.



Figs. 16-19, Hind leg. 16, *C. annulata* (Hagen), ♀; 17, *C. canariensis* (Enderlein), ♀; 18, *C. pineticola* Baz, ♀; 19, *C. rosae* spec. nov., ♂. Scale in mm.



Figs. 20-23, Hind leg. 20, *C. ericaceus* sp. n., ♀; 21, *C. anagaensis* sp. n., ♀; 22, *C. palmensis* sp. n., ♀; 23, *C. longicornis* sp. n., ♀. Scale in mm.



Figs. 24-26, *Cerobasis annulata* (Hagen); figs. 27-29, *C. canariensis* (Enderlein). 24, 27, phallosome; 25, 28, gonapophyses; 26, 29, spermathecal plate. Scales in mm; 25-26, 28-29 at the same scale.

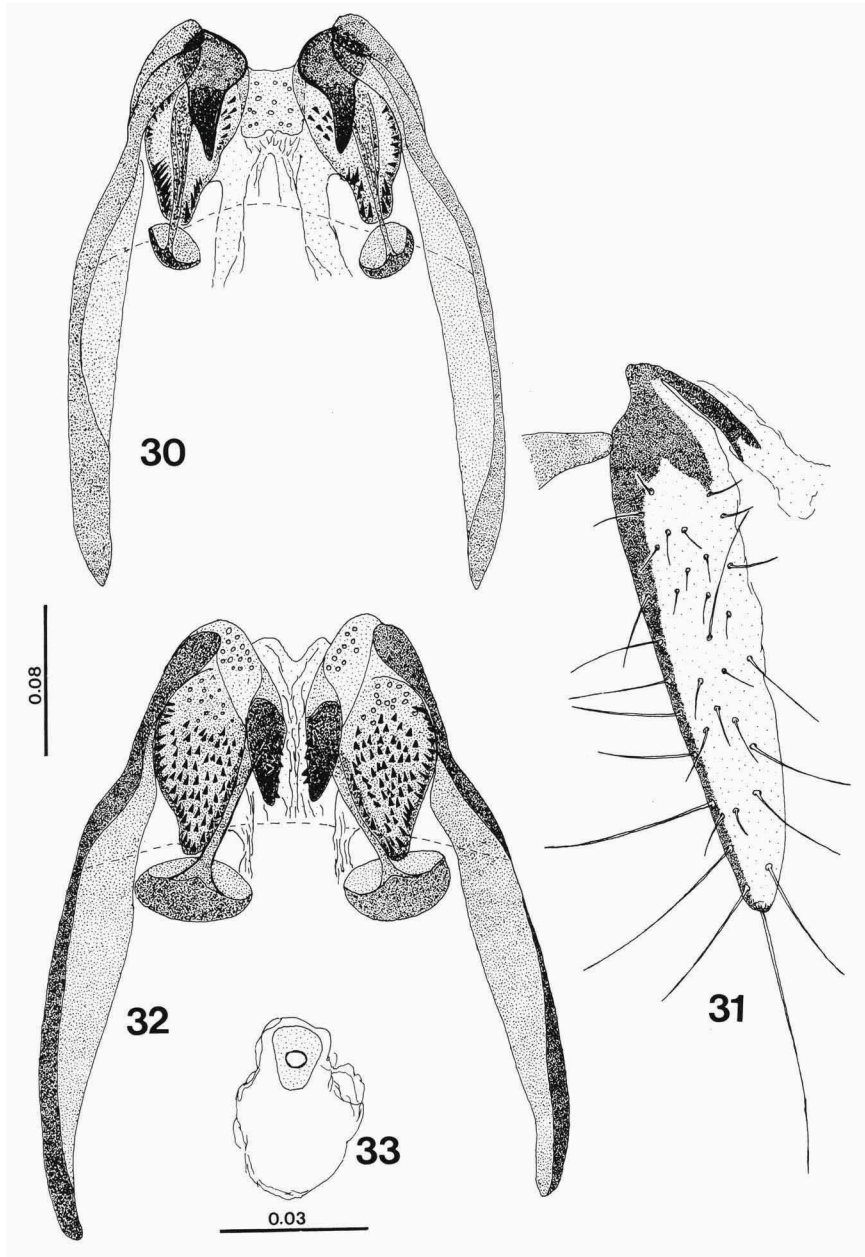
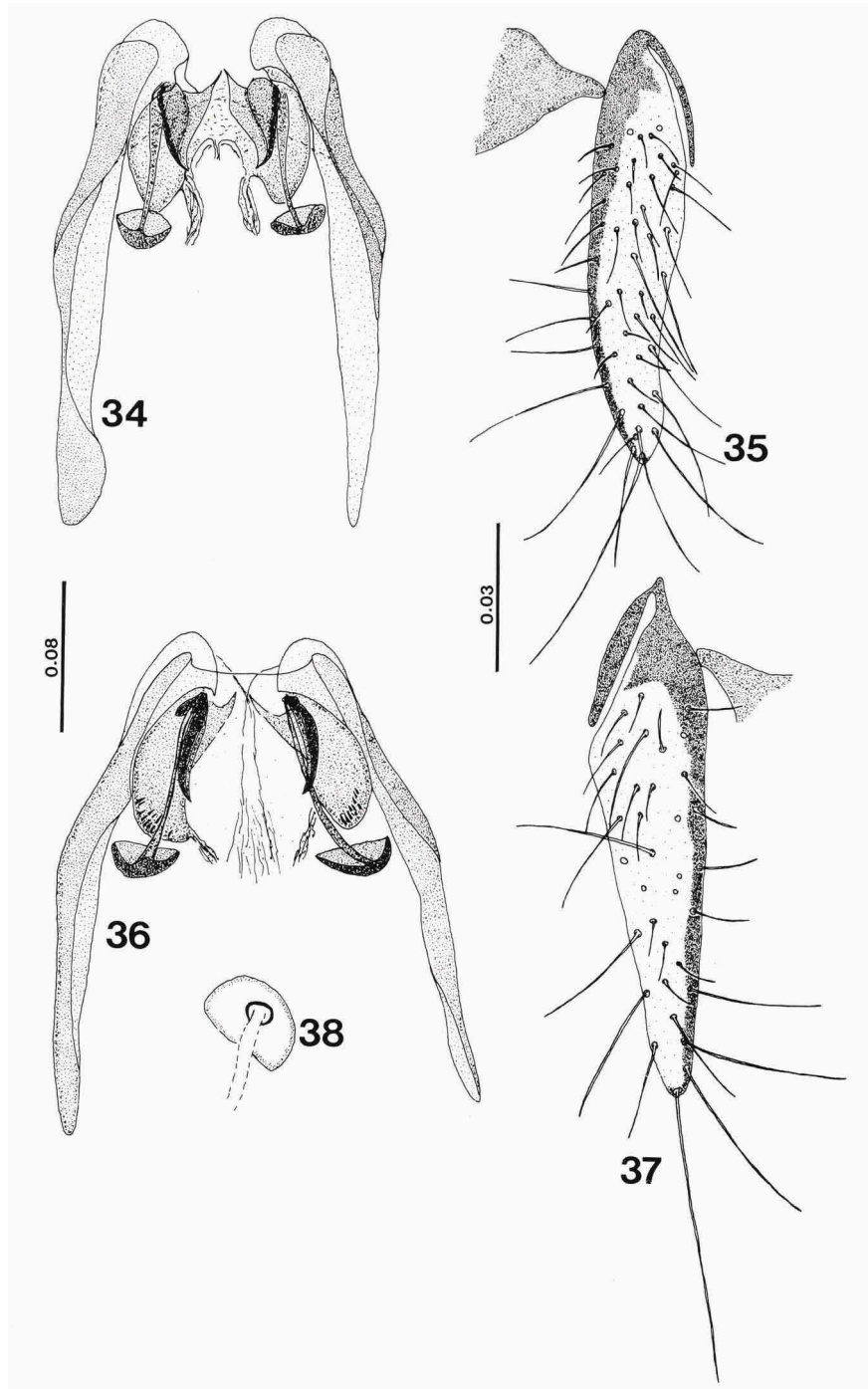
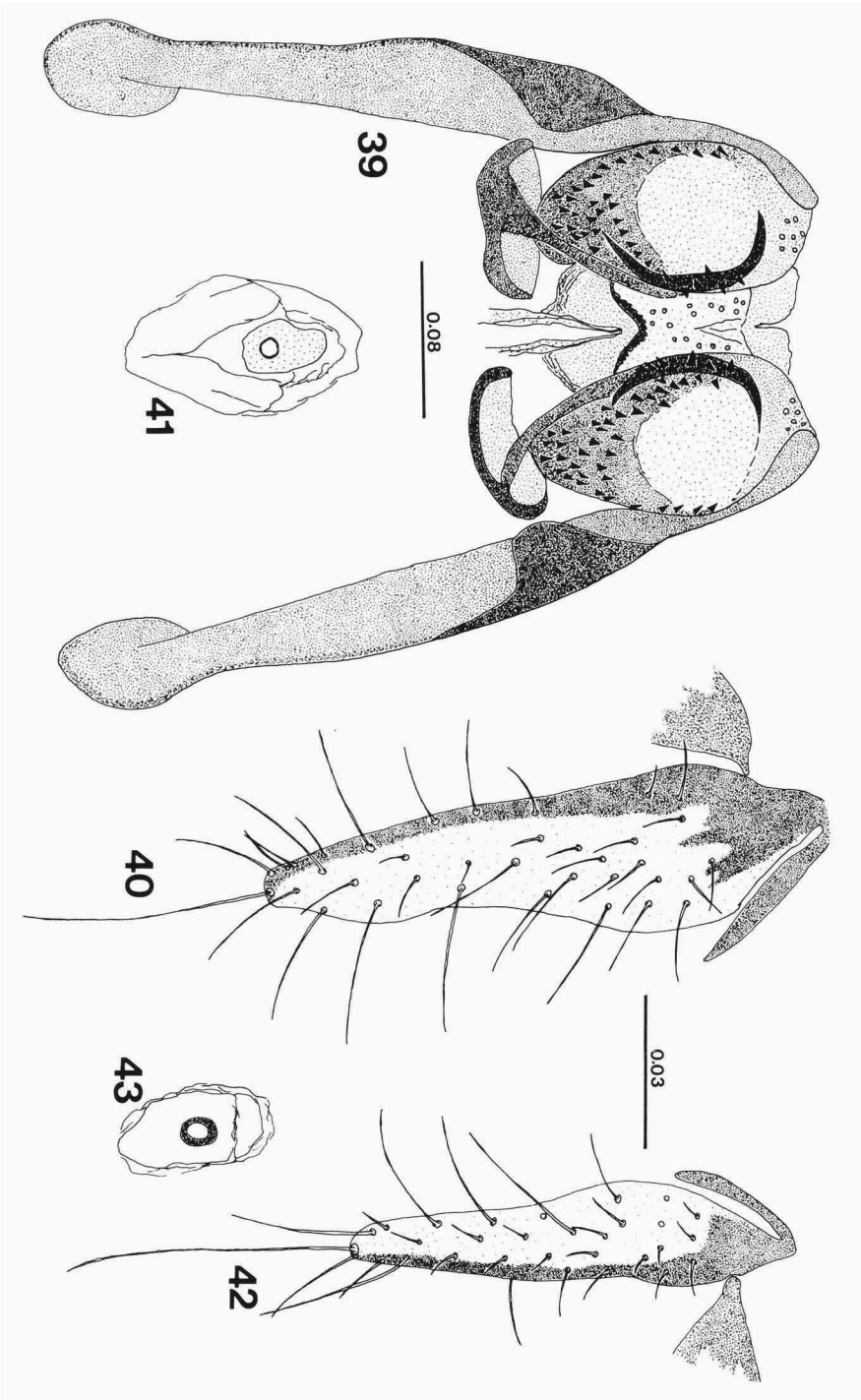


Fig. 30, *Cerobasis rosae* spec. nov.; *C. ericaceus* spec. nov. 31, gonapophyses; 30, 32, phallosome; 33, spermathecal plate. Scales in mm; 32-33 at the same scale.



Figs. 34-35, *Cerobasis anagaensis* spec. nov.; figs 36-38, *C. palmensis* spec. nov. 34, 36, phallosome; 35, 37, gonapophyses; 38, spermathecal plate. Scales in mm; 35, 37-38 at the same scale.



Figs. 39-41, *Cerobasis pinethicola* Baz; figs. 42-43, *Clongiscorriis* spec. nov. . 39, phallosome; 40, 42, gonapophyses; 41, 43, spermathecal plate. Scales in mm; 40-43 at the same scale.

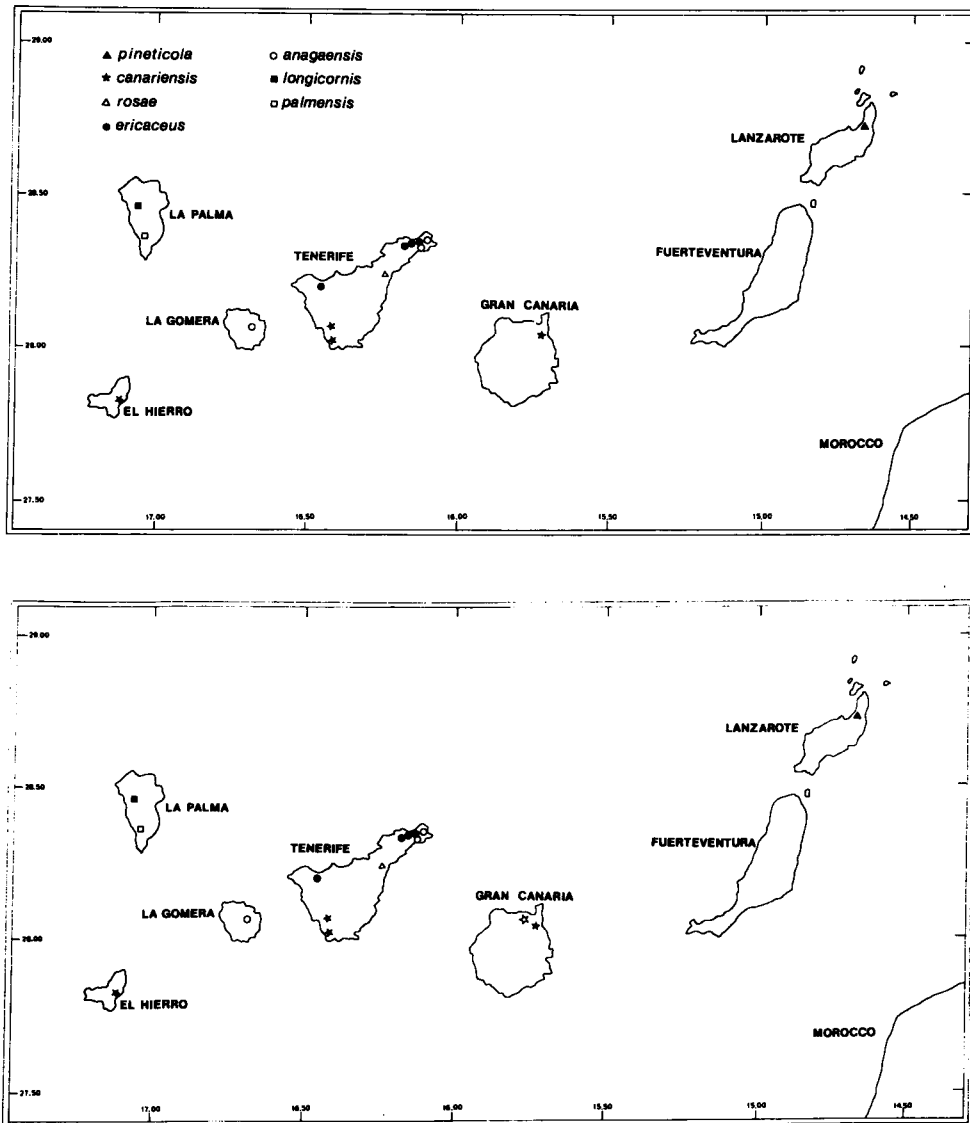


Fig. 44, distribution of species of the *Cerobasis annulata* group in the Canary Islands.