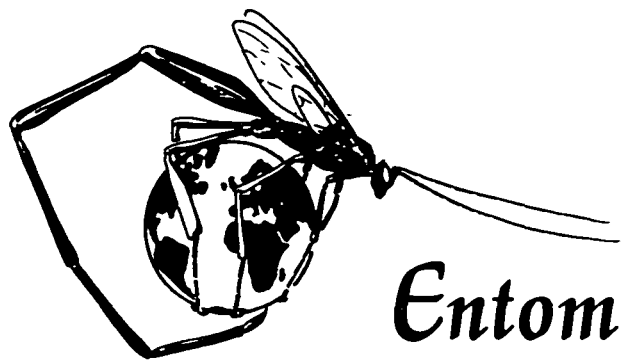




Entomofauna

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The taxonomic value of male genitalia of
Spilomena Shuckard, 1838,
from the palearctic region (excl. Japan)
(Hymenoptera, Sphecidae)

Hermann Dollfuss

Abstract

The taxonomic value of male genital organs of *Spilomena* SHUCKARD, 1838, to distinguish different species is discussed. Gonostyles, penis valves, volsellae and sternite VIII are depicted. *Spilomena maghrebensis* sp.n. and *Spilomena pulawskii* sp.n. are described.

Zusammenfassung

Der taxonomische Wert des männlichen Genitalapparates für die Artentrennung der Gattung *Spilomena* SHUCKARD, 1838, wird anhand von vergleichenden Darstellungen der Gonostylen, der Penis-Valven, der Volsellae und des 8. Sternites gezeigt. *Spilomena maghrebensis* sp.n. und *Spilomena pulawskii* sp.n. werden beschrieben.

Introduction

Revising the genus *Spilomena* SHUCKARD, 1838, I have

come to examine their male genitalia and tried to establish specific distinctions between the species, which will be discussed in the following. Due to the small size of these wasps, I believe, no examination of this kind has been made so far. Hoping to provide some useful suggestions I have decided to publish these particular results before finishing my complete revision. With some species the number of wasps examined was limited because only few males of *Spilomena* are available in most museums. Unfortunately I have not been able to receive any material from Japan so that this region had to be ignored in my examination. The description of two new species will be added at the end of my paper.

Acknowledgements

The present paper is based on material from several museums and private collections and it is an agreeable duty for the author to express here his sincere thanks to the following persons. Austria: Univ.-Doz.Dr.M. F i s c h e r (Naturhistorisches Museum Wien), M.S c h w a r z (Ansfelden/Linz), Dr.J. G u s e n l e i t n e r (Linz). Belgium: Pro.Dr.J. L' e c l e r c q (Faculté des Sciences Agronomiques Gembloux), Dr.P. D e s s a r t (Institut Royal des Sciences Naturelles Bruxelles). Federal Republic of Germany: Dr.J.P. K o p e l k e (Forschungsinstitut Senckenberg Frankfurt), E. D i l l e r (Zoologische Staatssammlung München). German Democratic Republic: Dr. F. K o c h (Zoologisches Museum Berlin), Dr.J. O e h l k e (Institut für Pflanzenforschung Eberswalde). Finland: Dr.A. J a n s s o n (Zoological Museum of the University of Helsinki), Dr.M. K o p o n e n (Department of Agricultural and Forest Zoology, University of Helsinki), A.K. M e r i s u o (Turku). Hungary: Dr.J. P a p p (Natural History Museum Budapest). The Netherlands: Dr.C. van A c h t e r b e r g (Rijksmuseum van Natuurlijke Historie Leiden). Spain: Dr.S.F. G a y u b o (Department of Zoology, University of Salamanca). Sweden: R. D a n i e l s s o n (Zoological Museum Lund). Switzerland: Dr.C. B e s u c h e t (Muséum d'Histoire Naturelle Genève), Dir.P. G o e l d l i n (Musée Zoologique Lausanne). USSR: Dr.V.G. M a r s h a k o v (All-Union Scientific

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I would also like to express my thanks to Dr. J. S p i e l l e i t n e r for translation of Russian papers and to Mag.R. E g l h o f e r for help with English. Furthermore, I would like to thank my family for the understanding that they have shown for my dedication to my work, which I carried out in my leisure time.

Methods

After putting the genital organs in KOH for maceration they were put on a small drop of Polyvinylactophenol. I have drawn the shape of the gonostyles in dorsal and lateral view at the magnification of 100x by means of a stereo-microscope. Then the genitals were dissected and their pieces separated. They were put on a small slide fixed to a small piece of cardboard with a hole in it (fig.1) and thus embedded in Polyvinylactophenol. It can be stuck on the insect-pin together with the wasp. Penis valves and Volsellae were drawn by means of a microscope at the magnification of 300x, sternite VIII at the magnification of 100x.

Material examined

1. *Spilomena troglodytes* (LINDEN,1829)

Austria: 1♂, Bgld., Spitzzicken, 30.7.58, leg. F i - s c h e r, det. P u l a w s k i (Mus. Vienna). 1♂, A. sup.,Linz,24.5.47, leg. P r i e s n e r, det. B l ü t h - g e n (coll. S c h w a r z). 1♂, Wien, Mauer, 30.5.58, leg. F u l m e k, det. D o l l f u s s (Mus. Vienna). 1♂, A. inf., Melk, Emmersdorf, 18.8.79, leg.et det. D o l l - f u s s (coll.m.). 3♂♂, A. inf., Lunz, Kasten, 29.7.80, leg. R e s s l, det. D o l l f u s s (coll.m.). 1♂, A. inf., Scheibbsbach, Solnböck 23.7.80, leg. R e s s l, det. D o l l f u s s (coll.m.). 2♂♂, A. inf., Purgstall, 14.7.80, 4.9.80, leg. et det. D o l l f u s s (coll.m.). 1♂, A. inf., Scheibbs, Hochkogelberg, 31.7.80, leg. R e s s l, det. D o l l f u s s (coll.m.).

Belgium: 1♂, Forêt de Soignes, 30.6.41, det. L e -

c l e r c q (Mus. Bruxelles). 1♂, Boendael, 9.7.36, det.
L e c l e r c q (Mus. Bruxelles). 1♂, S.André, 5.7.26,
det. C r è v e c o e u r (Mus. Bruxelles).

Italy: 2♂♂, S-Tirol, Bozen, leg. K o h l, det. D o l l -
f u s s (Mus. Vienna).

Yugoslavia: 1♂, Triest, leg. G r ä e f f e, det. D o l l -
f u s s (Mus. Vienna).

Federal Republic of Germany: 2♂♂, Bieber, Spess., 25.5.
68, leg. P e t e r s, det. D o l l f u s s (Mus. Sencken-
berg).

Sweden: 1♂, Hallands, 28.6.77, leg. V l u g (Mus. Leiden).

USSR: 1♂, Azharia, chelba tschaurski, r.n.s. Angisa, 13.
6.81, leg. et det. A n t r o p o v.

Spain: 1♂, Membribe de la Sa., 11.5.77, leg. N i e v e s,
det. D o l l f u s s (coll. G a y u b o).

2. *Spilomena vagans* BLÜTHGEN, 1953

Austria: 1♂, A. inf., Mank, 6.7.80, leg. et det. D o l l -
f u s s (coll. m.). 7♂♂, A. inf., Mank, Gr. Aigen, 10.6.
82, leg. et det. D o l l f u s s (coll. m.). 1♂, A. sup.,
Linz, Ebelsberg, 7.8.60, leg. et det. S c h w a r z (coll.
S c h w a r z).

Federal Republic of Germany: 2♂♂, Frankfurt, Bot. Garten,
21.5.69, 7.7.69, leg. P e t e r s, det. D o l l f u s s
(Mus. Senckenberg).

Finland: 2♂♂, Ta: Vanaja, 19.6.63, 22.6.59, leg. et det.
V a l k e i l a (coll. S c h w a r z). 1♂, Ta: Vanaja,
19.6.63, leg. et det. V a l k e i l a (coll. Univ. Hel-
sinki Forest Zool.). 1♂, Kitee, 29.6.63, leg. et det.
V a l k e i l a (coll. Univ. Helsinki Forest Zool.).

German Democratic Republic: 1♂, Dessau-Msk., 7.7.48, leg.
H e i d e n r e i c h (coll. O e h l k e, Eberswalde).

3. *Spilomena beata* BLÜTHGEN, 1953

Austria: 5♂♂, A. inf., Scheibbs, St. Georgen, 15.7.82, leg.
et det. D o l l f u s s (coll. m.). 1♂, A. sup., Linz, St.
Martin, 7.61, leg. S c h w a r z, det. D o l l f u s s
(coll. S c h w a r z). 2♂♂, Salzburg, Parsch, 13.6.62,
29.5.63, leg. B a b i y, det. D o l l f u s s (coll.
S c h w a r z). 1♂, Wien, Mauer, 11.8.57, leg. F u l -

m e k, det. D o l l f u s s (Mus. Vienna). 1♂, Bgld., Spitzzicken, 20.8.59, leg. F i s c h e r, det. L e - c l e r c q (Mus. Vienna).

Belgium: 1♂, Forêt de Soignes, 24.6.41, det. L e c l e r c q (coll. L e c l e r c q, Gembloux). 2♂♂, Boendael, 26.7.38, 1.9.36, det. L e c l e r c q (Mus. Bruxelles). 1♂, Uccle, 26.6.36, det. L e c l e r c q (Mus. Bruxelles).

England: 1♂, Kent, Wrotham Heath, 17.7.64, det. L e - c l e r c q (coll. L e c l e r c q, Gembloux).

German Democratic Republic: 1♂, Naumburg, 13.5.59, leg. et det. B l ü t h g e n (Mus. Berlin).

USSR: 1♂, Adzharia, chelba tschaurski, r.n.s. Angisa, 13.6.81, leg. et det. A n t r o p o v.

Spain: 1♂, Solana de B., 9.8.78, leg. G a y u b o, det. D o l l f u s s (coll. G a y u b o).

4. *Spilomena exspectata* VALKEILA, 1957

Finland: 1♂, Ta: Hämeenlinna, 1966, leg. et det. V a l - k e i l a (coll. Univ. Helsinki Forest Zool.).

5. *Spilomena differens* BLÜTHGEN, 1953

Austria: 1♂, A.inf., Scheibbs, Göstling, 29.7.80, leg. et det. D o l l f u s s (coll.m.). 1♂, A.inf., Scheibbs, Lunz, Kasten, 29.7.80, leg. et det. D o l l f u s s (coll.m.). 1♂, A.inf., Sebenstein, 6.6.59, leg. F i s c h e r, det. B e a u m o n t (Mus. Vienna). 1♂, Stmk., Fischbach, Falkenstein, Ofenluger, 15.8.74, leg. F i s c h e r, det. D o l l f u s s (Mus. Vienna).

Belgium: 1♂, Forêt de Soignes, 11.6.40, det. L e - c l e r c q (Mus. Bruxelles). 1♂, Brabant, Bois de la Cambre, 5.1940, det. L e c l e r c q (Mus. Bruxelles).

Finland: 1♂, Ta: Janakkala, 15.6.61, leg. et det. V a l - k e i l a (coll. Univ. Helsinki Forest Zool.). 1♂, Ta: Vanaja, 19.6.63, leg. et det. V a l k e i l a (coll. Univ. Helsinki Forest Zool.). 1♂, Ta: Vanaja, 7.7.54, leg. et det. V a l k e i l a (coll. Univ. Helsinki Forest Zool.).

Italy: 1♂, S-Tirol, Ratzes, 1890, leg. K o h l, det. D o l l f u s s (Mus. Vienna).

The Netherlands: 1♂, Emmen, 22.6.71, det. D o l l f u s s (Mus. Leiden).

6. *Spilomena mocsaryi* KOHL, 1898

Austria: 1♂, A.inf., St.Pölten, Karlstetten, 8.7.80, leg. et det. D o l l f u s s (coll.m.). 1♂, A.inf., Guntramsdorf, 8.1957, det. B e a u m o n t (Mus. Vienna). 1♂, A.inf., Guntramsdorf, 10.6.60, leg. et det. S c h w a r z (coll. S c h w a r z).

Belgium: 1♂, Basses-Alpes, St-Michel-Peyresq, 20.8.67, det. L e c l e r c q (coll. L e c l e r c q, Gembloux). 2♂♂, Entrevaux, 7.8.66, det. L e c l e r c q (coll. L e c l e r c q, Gembloux).

Greece: 1♂, Rhodos, Lindos, 22.5.71, leg. v. L i t h, det. D o l l f u s s (Mus. Leiden).

Italy: 1♂, Sicilia, Taormina, 2.5.61, leg. et det. S c h w a r z (coll. S c h w a r z).

Spain: 2♂♂, Salamanca, 11.8.80, 9.8.80, leg. et det. G a y u b o (coll. G a y u b o, Univ. Salamanca).

Turkey: 1♂, Istanbul, 1.7.55, leg. P r i e s n e r (Mus. Vienna).

USSR: 1♂, Adzharia, Batumy gruzbiolaboratorija, 3.7.81, leg. et det. A n t r o p o v.

7. *Spilomena punctatissima* BLÜTHGEN, 1953

Austria: 4♂♂, A.inf., Scheibbs, Purgstall, 13.8.76, 16.8.79, 25.7.80, 2.8.81, leg. R e s s l, det. D o l l f u s s (coll.m.). 2♂♂, Salzburg, Parsch, 1.7.61, 26.6.62, leg. B a b i y, det. S c h w a r z (coll. S c h w a r z). 1♂, A.sup., Kremsmünster, leg. C e r n y, det. D o l l f u s s (Mus. Vienna). 1♂, A.inf., Kirchberg/Piel., det. D o l l f u s s (Mus. Vienna).

Italy: 1♂, S-Tirol, Bozen, leg. K o h l, det. D o l l f u s s (Mus. Vienna). 1♂, Friaul, Interneppo, 3.7.60, leg. et det. S c h w a r z (coll. S c h w a r z).

Yugoslavia: 2♂♂, Istrien, leg. G r a e f f e, det. D o l l f u s s (Mus. Vienna). 1♂, Kroatien, Plitvice, 9.8.52, leg. V e r h o e f f, det. D o l l f u s s (Mus. Leiden).

8. *Spilomena enslini* BLÜTHGEN, 1953

Austria: 2♂♂, A.inf., Dürnwien, 29.7.59, leg. F i s c h e r, det. D o l l f u s s (Mus. Vienna). 1♂, Bgld.,

Spitzzicken, 18.7.58, leg. F i s c h e r, det. B e a u -
m o n t (Mus. Vienna). 1♂, Stmk. Falkenstein, Fischbach,
Ofenluger, 17.8.74, leg. F i s c h e r, det. D o l l -
f u s s (Mus. Vienna).

German Democratic Republic: 1♂, Erlangen, S t o e k -
k e r t, 22.5.17, Allotypus, det. B l ü t h g e n (Mus.
Berlin).

Finland: 2♂♂, Ta: Janakkala, 1959, 1960, leg. et det.
V a l k e i l a (coll. Univ. Helsinki Forest Zool.), 1♂,
Ta: V a n a j a, 1961, leg. et det. V a l k e i l a
(coll. Univ. Helsinki Forest Zool.). 2♂♂, Ta: Vanaja,
1952, leg. et det. V a l k e i l a (coll. S c h w a r z).

9. *Spilomena canariensis* BISCHOFF, 1937

Spain: 1♂, Canary Isles, Tenerife, Orotava, Allotypus,
det. B i s c h o f f (Mus. Berlin).

10. *Spilomena fulvicornis* GUSSAKOVSKIJ, 1931

USSR: 1♂, Kondara, 7.7.36, leg. et det. G u s s a -
k o v s k i j (Mus. Leningrad). 1♂, Kumak, 24.5.23, det.
G u s s a k o v s k i j (Mus. Leningrad).

11. *Spilomena rudesculpta* GUSSAKOVSKIJ, 1952

USSR: 1♂, Kondara, 25.6.37, leg et det. G u s s a -
k o v s k i j (Mus. Leningrad). 1♂, Kondara, 1100 m, 22.
9.38, leg et det. G u s s a k o v s k i j (Mus. Leningrad).

12. *Spilomena obscurior* GUSSAKOVSKIJ, 1952

USSR: 1♂, Kondara, 1100 m, 19.8.38, leg. et det. G u s -
s a k o v s k i j (Mus. Leningrad).

13. *Spilomena roshanica* GUSSAKOVSKIJ, 1952

USSR: 1♂, Kalan-Wamar, Roschak, 29.6.37, det. G u s s a -
k o v s k i j (Mus. Leningrad).

14. *Spilomena maghrebensis* sp.n.

Morocco: 1♂, Tanger, Holotypus (Mus. Genève, Switzer-
land).

15. *Spilomena pulawskii* sp.n.

Poland: 1♂, Tatra, Natl. Pk. Dolina ku Dziurze, 900 m, 6.7.72, leg. F i s c h e r, Holotypus (Mus. Vienna).

Male genital organs of *Spilomena*

The morphological characteristics of genitalia in dorsal and lateral view are shown in fig.2. The male genitalia of *Spilomena* consist of four main pieces which are of taxonomic value: (1.) The shape of the gonostyle (2.) the shape of the penis valves (3.) the shape of the volsella and (4.) the shape of sternum VIII.

Fig.3 shows the gonostyles in dorsal and lateral view. In fig.4 the penis valves are presented in lateral view. The volsellae depicted in fig.5 are pressed flat between small slides. Sternite VIII is variable in shape and furnishes characteristics of taxonomic value (fig.6). They are also pressed flat between slides.

Discussion

The study of the male genital organs has turned out to be an invaluable aid for the distinction of species of the genus *Spilomena*. A safe diagnosis of species is facilitated by the examination of as many parts of the genital organs as possible.

Spilomena vagans is probably synonymous with *troglydites*. Genital organs are identically shaped. A further biological examination might verify this issue. *Spilomena beata* can clearly be distinguished from all other species by the size and the shape of the genital organs. *Spilomena beata* and *Spilomena exspectata* do not seem to differ in regard to external morphology but clear differences are visible with gonostyles in lateral view and the shape of the penis valves. Unfortunately I have only been able to examine one specimen of *exspectata*. *Spilomena differens* is characterised by long and distinctly shaped penis valves, which are clearly longer than the gonostyles. No male specimen of *Spilomena curruca* has been available so far. *Spilomena mocsaryi* and *Spilomena punctatissima* are two closely related species, a fact which becomes apparent in the similarity of the genital

organs. They can, however, clearly be distinguished by the shape of volsella and the sternite VIII. *Spilomena enslini* is very similar to *troglydytes*. On account of genital organs a distinction is hardly possible. *Spilomena canariensis* is, above all, distinguished from all other species by a dorsal view of gonostyles. Of the Sibirian species *Spilomena roshanica* is very similar to the European species *punctatissima* in external as well as in genital morphology. *Spilomena rudesculpta* resembles the boreal species *expectata*. *Spilomena fulvicornis* can easily be recognized by the characteristic yellow facial markings. Genital organs are similar to *punctatissima*. *Spilomena obscurior* can easily be distinguished by the lateral view of the gonostyles. *Spilomena maghrebensis* sp.n. is characterised by the shape of the volsella which differs distinctly from *troglydytes*. *Spilomena pulawskii* can be recognized by the shape of penis valves.

Spilomena maghrebensis sp.n.

Holotypus Marocco, Tanger 2.45 (Muséum d'Histoire Naturelle Genève, Switzerland)

Male: Length 2,8 mm. Flagellum brown and hairy. Flagellar segments 3-5 ventral distinctly excavated (fig.9), these excavations are brightened up. Facial markings yellow (fig.7, 8). Clypeus, Scapus and pronotal lobe yellow. Mandibles yellow with a narrow brown stripe. Tegulae brown. Frons, vertex and mesonotum densely dotted. Anterior transverse groove of scutellum narrow and not pitted. Dorsal face of propodeum distinctly transverse striate and with two longitudinal carinae. Dorsal face and posterior face of propodeum not separated by a well developed carina. Stigma brown. Legs yellow-brown, only hindfemura brown. Tergite 1 shining, tergite 2 delicately reticulate, tergite 3-7 distinctly reticulate. Genital apparatus fig. 3-6. POL:OOL = 3:4 (fig.10).

Differential diagnosis: very similar to *troglydytes* but differs to all palearctic species by excavations of flagellar segments and the shape of volsella.

Female, material examined: Marocco, Tanger 2.45. 1♀

Tanger, Vaucher. 1♀, Tanger Oleèse, ex coll. T o u r -
n i e r (Muséum d'Histoire Naturelle Genève, Switzerland).

Length 3,0 mm. Frons, vertex and mesonotum densely dotted. POL:OOL = 2:3 (fig.11, 12). Anterior transverse groove of scutellum narrow and not pitted. Mesopleures shining and dotted. Dorsal face of propodeum transverse striate with two longitudinal carinae. Dorsal face, posterior face and lateral face of propodeum are not separated by a well developed carina. Tegulae and stigma brown, pronotal lobe light brown. Legs dark brown, only foretibiae and midtibiae light brown. Tergite 1 shining, tergite 2 delicately reticulate, tergite 3-6 distinctly reticulate. Tergite 6 only with a short keel and bristles on it (fig.13).

Differential diagnosis: very similar to *troglydites* but without long keels on tergite 6. It is to be distinguished from *beata* by light brown mandibles and lack of surrounding carina on dorsal face of propodeum.

Spilomena pulawskii sp.n.

Holotypus ♂: Poland, Tatra Natl. Pk. Dolina ku Dziurze, -150-, 900-950m, 6.7.1972, leg. F i s c h e r (Naturhist. Museum Wien, Austria).

Length 2,5 mm. Head with whitish facial markings (fig. 14, 17). Mandibles whitish with a narrow rusty brown stripe. Flagellum dorsal dark-brown, ventral brightened up (fig.16). Scapus ventral whitish. Frons, vertex and mesonotum dotted. POL:OOL = 3:7 (fig.15). Posterior face of mesonotum with longitudinal rugae. Anterior transverse groove of scutellum wide and pitted. Tegulae anterior half whitish, posterior half light brown. Pronotal lobe whitish. Mesopleuron shining. Lateral face of propodeum reticulate. Legs light brown. Stigma and wing veins brown. Tergite 1 very delicately reticulate, tergite 2-7 distinctly reticulate. Genital organs fig.3-6.

Differential diagnosis: to be distinguished from *differens* by shape of male genitalia and facial markings. It can be separated from *mocsaryi* by the shape of the clypeus. Distinguishable to *troglydites* by rugae on the posterior face of mesonotum and a wide anterior groove

of scutellum.

Female unknown.

Figures (p. 360 - 369):

Fig. 1: Cardboard with slides and genital organs.

Fig. 2: *Spilomena troglodytes* (LINDEN, 1829), genital organs.

Fig. 3: Gonostyles of *Spilomena* SHUCKARD, 1838, lateral and dorsal view.

Fig. 4: Penis valves of *Spilomena* SHUCKARD, 1838, in lateral view.

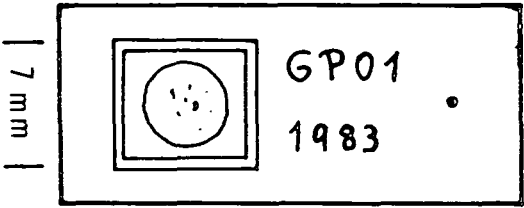
Fig. 5: Volsellae of *Spilomena* SHUCKARD, 1838.

Fig. 6: Sternite VIII in ventral view.

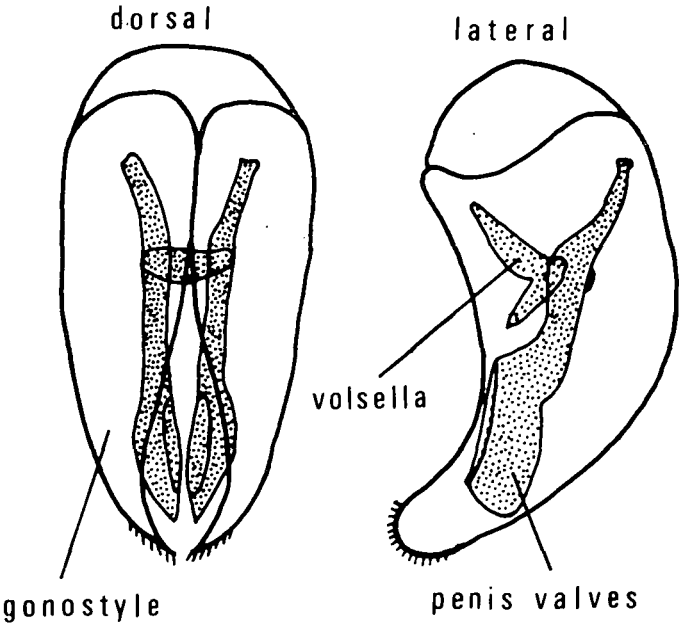
Fig. 7 - 10: *Spilomena meghrebensis* sp.n. ♂.

Fig. 11 - 13: *Spilomena maghrebensis* sp.n. ♀

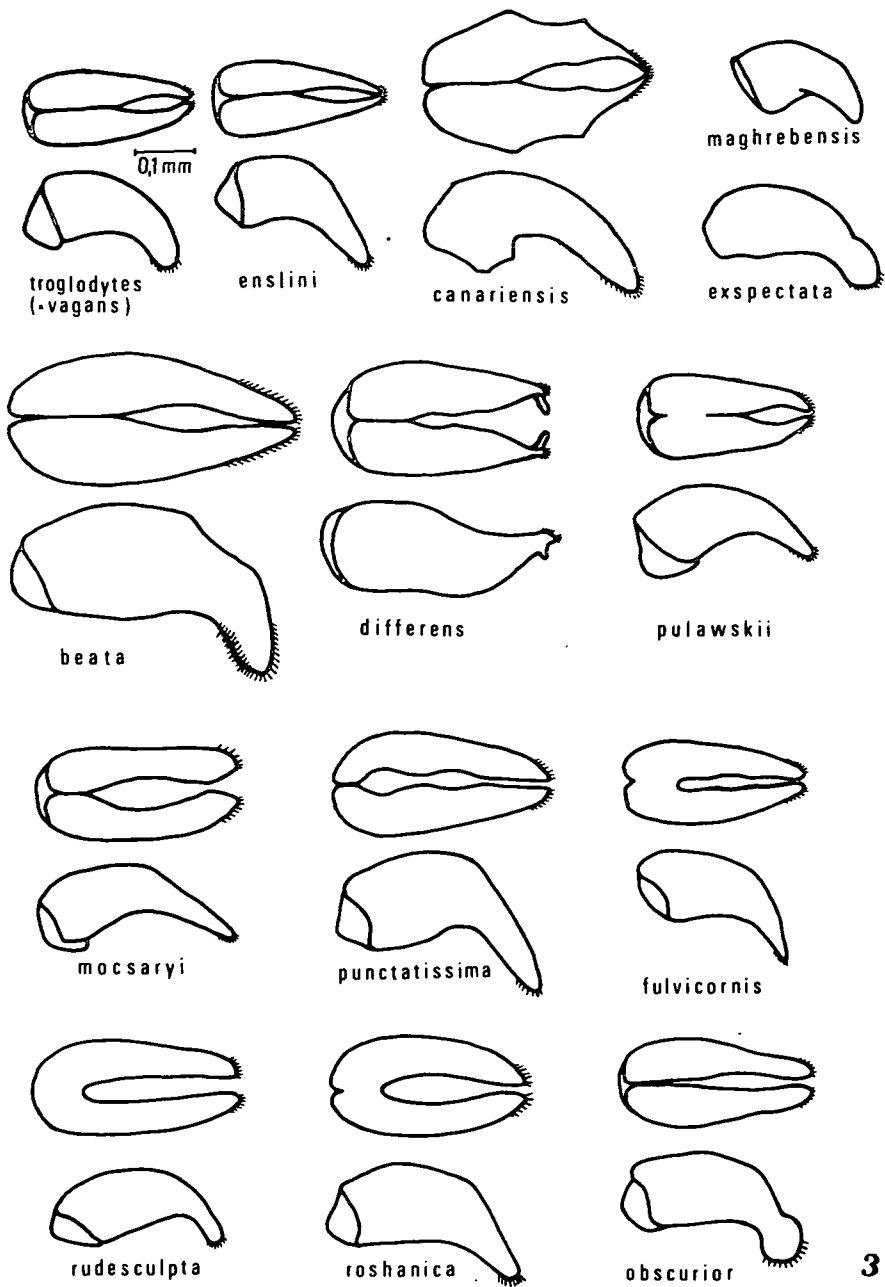
Fig. 14 -17: *Spilomena pulawskii* sp.n. ♂.

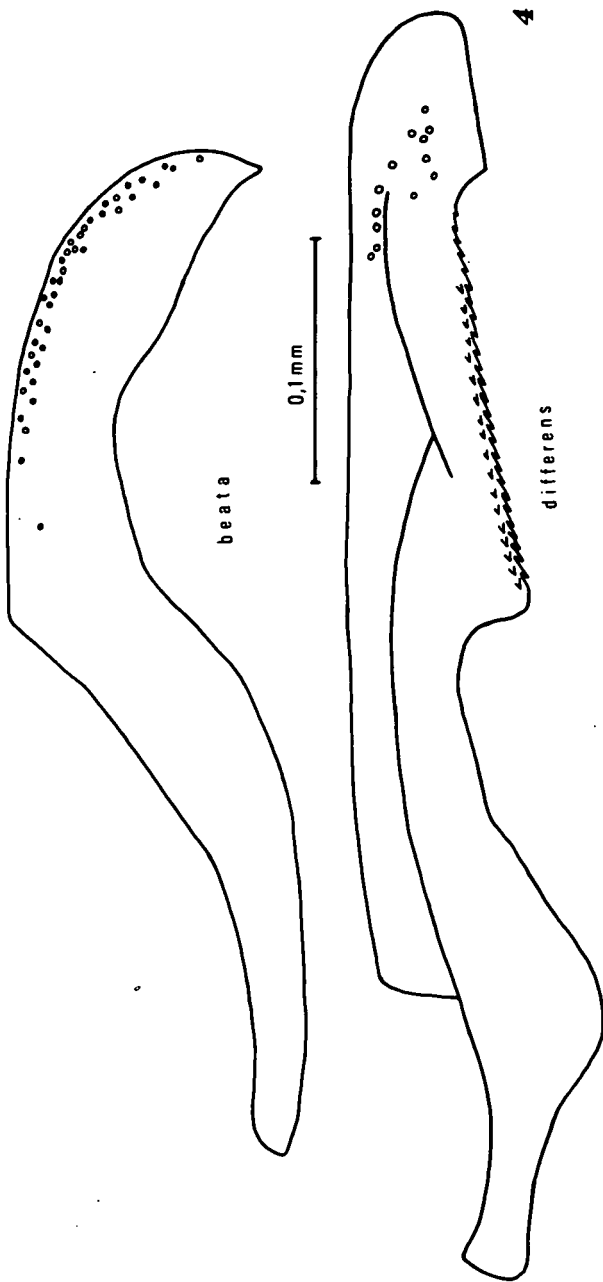


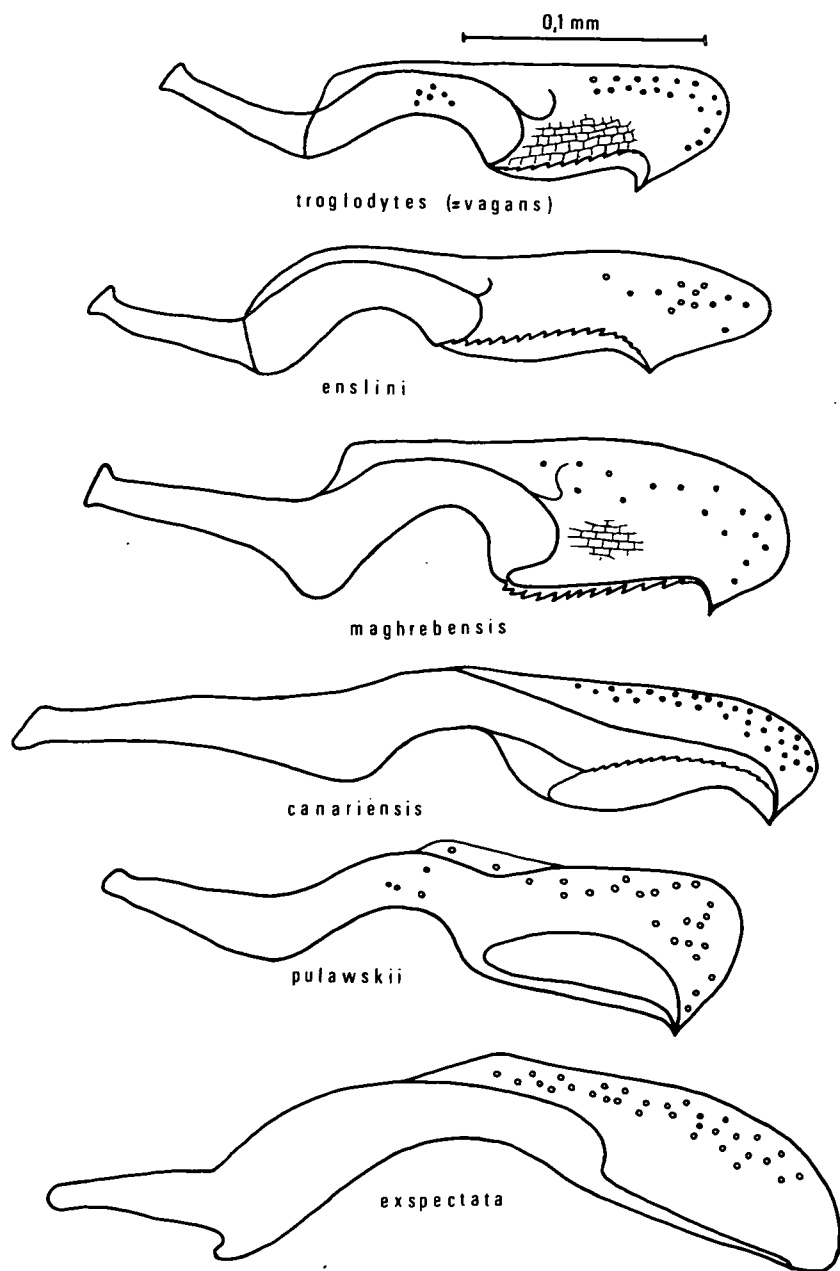
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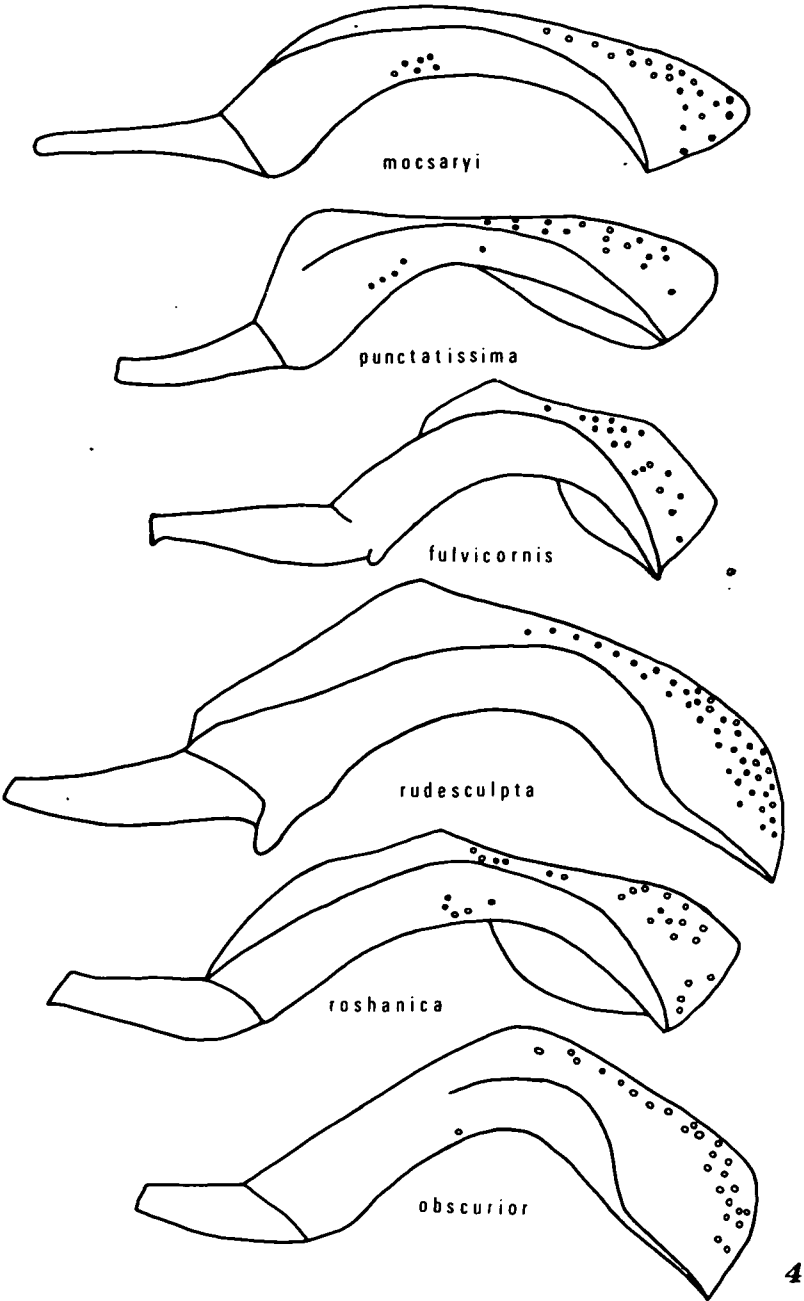


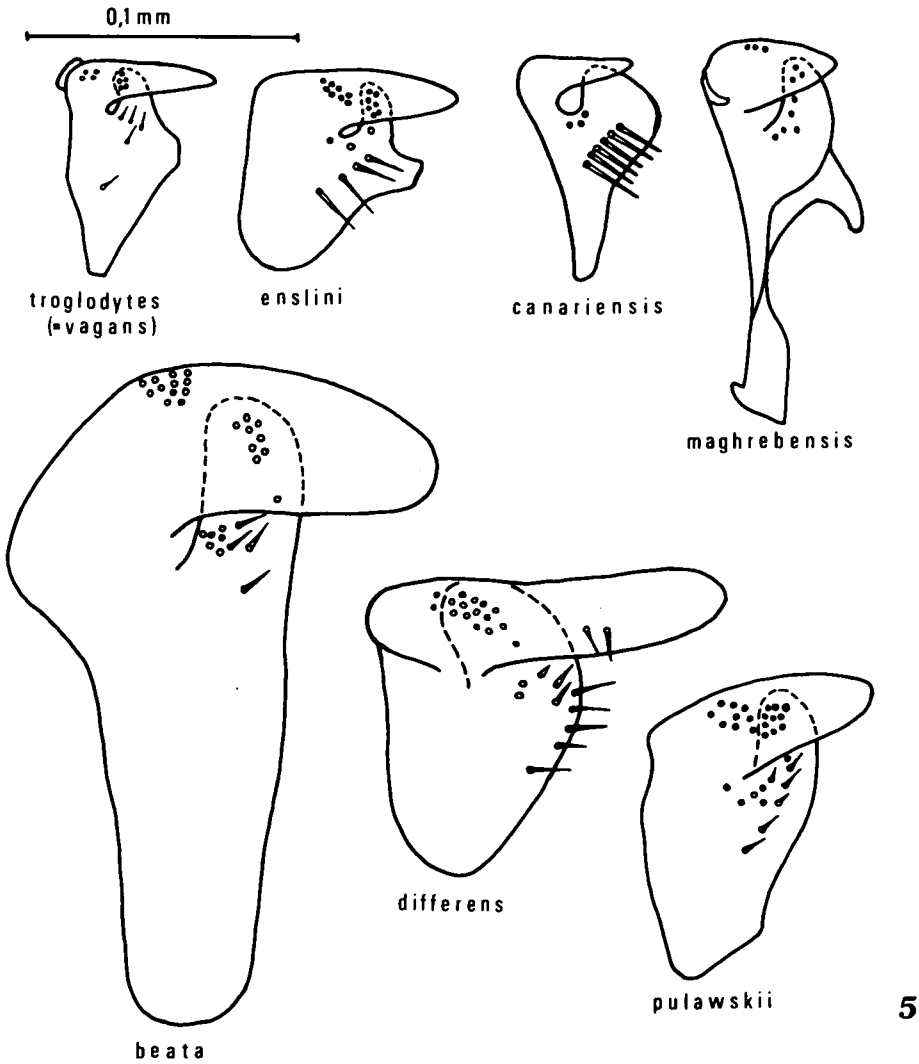
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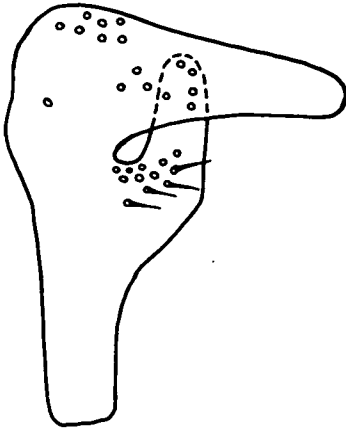








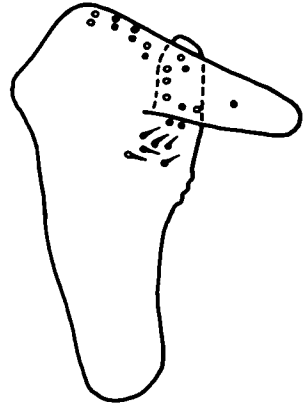




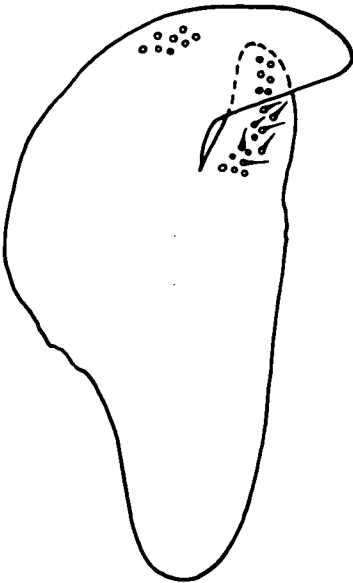
mocsaryi



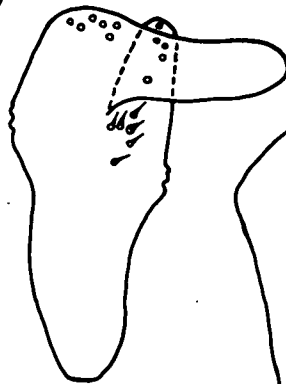
punctatissima



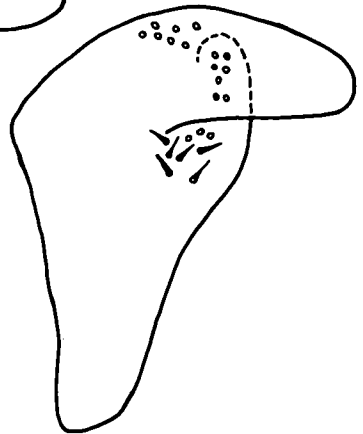
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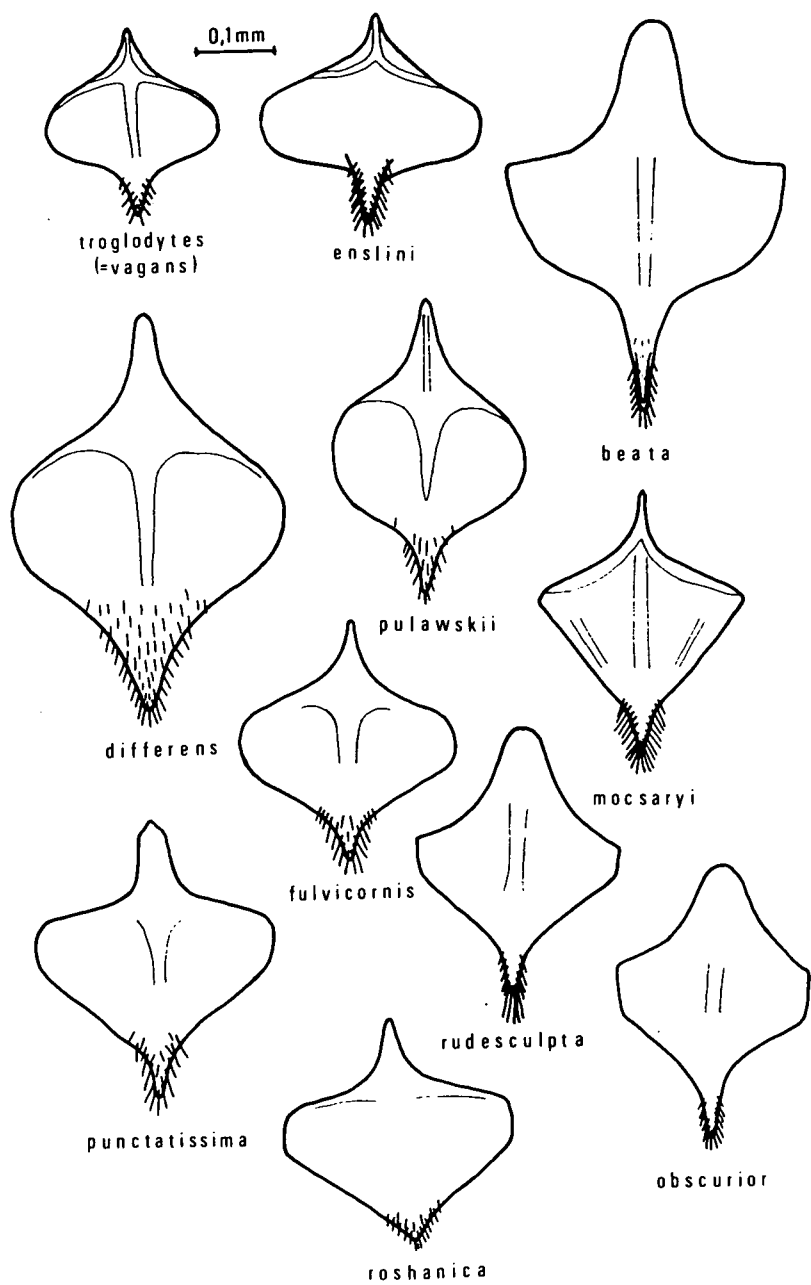
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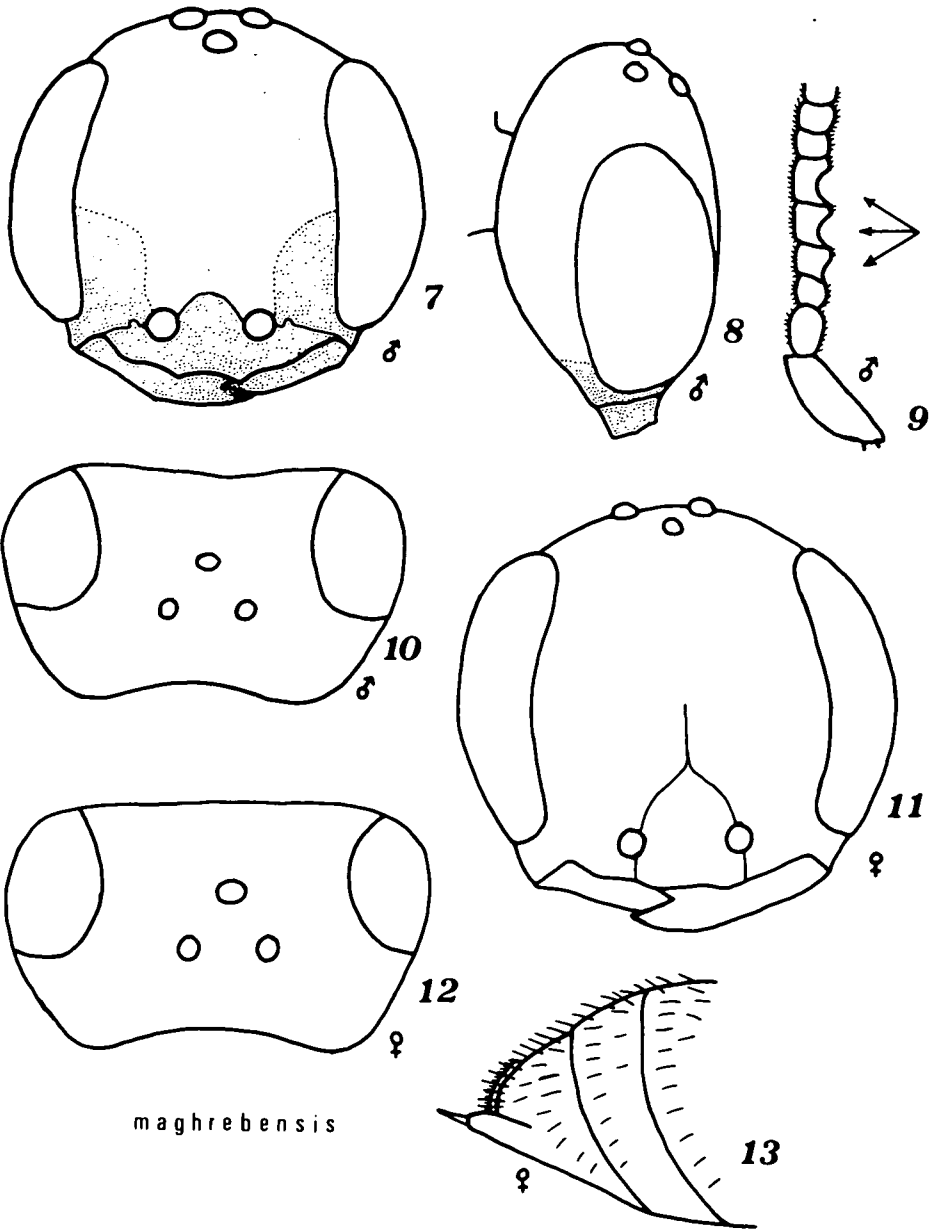


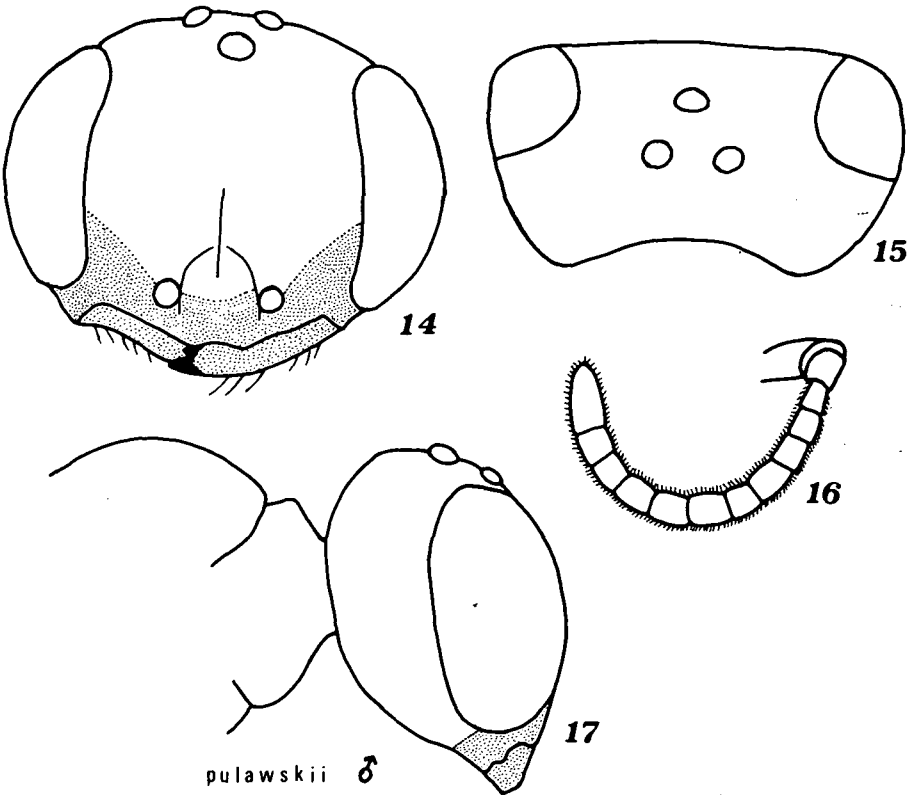
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obscurior







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Author's address:

Mag.rer.nat. Hermann D o l l f u s s
Dr. Gortgasse 120
A-3240 Mank
Austria

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