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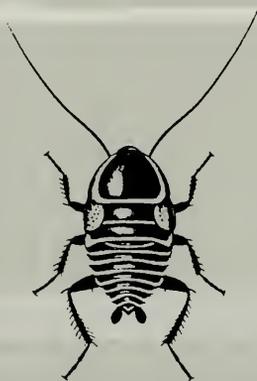
SPIXIANA

Zeitschrift für Zoologie

Revision of the *carpetana*-group
of *Phyllodromica* Fieber
from Spain, Portugal and France

(Insecta, Blattaria, Blatellidae, Ectobiinae)

Horst Bohn



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Weibchen von *Phyllodromica carpetana* (Bolivar)
Abbildung aus der Erstbeschreibung von Bolívar (1873)

SPIXIANA

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Revision of the *carpetana*-group of *Phyllodromica* Fieber from Spain, Portugal and France

(Insecta, Blattaria, Blattellidae, Ectobiinae)*

Horst Bohn

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The *carpetana*-group of *Phyllodromica* is a group of closely related species endemic to the Iberian peninsula. It comprises 3 known species: *P. carpetana* (Bolívar), *P. moralesi* Fernandes, *P. sacarraoi* Fernandes, and 21 new species: *P. septentrionalis*, *P. delospuertos*, *P. isolata*, *P. laticarinata*, *P. javalambrensis*, *P. sulcata*, *P. clavisacculata*, *P. tenebricosa*, *P. brevisacculata*, *P. globosacculata*, *P. porosa*, *P. barbata*, *P. acuminata*, *P. lativittata*, *P. rhomboidea*, *P. acuminata*, *P. bolivariana*, *P. tenuirostris*, *P. crassirostris*, *P. atlantica*, and *P. fernandesiana*.

The revision contains the characterization of the group, considerations about its relationship with other groups, descriptions and pictures of all species and their distribution, a key for the determination of the males, and a cladogram showing the assumed phylogenetic relationships between the species.

Prof. Dr. Horst Bohn, Zoologisches Institut der Universität, Karlstr. 23, D-80333 München, Germany

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* in part supported by a grant of the Deutsche Forschungsgemeinschaft, Bo 453/16-1

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Introduction

The *carpetana*-group of *Phyllodromica* is a group of closely related species endemic to the Iberian peninsula but widely distributed within this area. As defined here, the group comprises 3 known species: *P. carpetana* (Bolívar), *P. moralesi* Fernandes, and *P. sacarraoi* Fernandes, which were formerly placed in two different subgenera, the first in *Lobolanpra*, the latter two in *Phyllodromica* s.str.. 21 species are described as new.

The late discovery of many of the species is not astonishing considering the great similarity between them. The main distinguishing features of the males, the tergal glands of tergites 7 and 8, are usually completely hidden below the overlapping tergites and only visible after unnatural stretching or during preparation. Moreover, because of the short lifespan of the males mostly females, which are almost indistinguishable, had been collected. The entomology collection of the Museo nacional de historia natural de Madrid contained 85 specimens from 43 localities; males from only 14 localities were represented.

Personal collectings soon revealed an unexpectedly high species diversity within the *carpetana*-group. In order to cover the group as completely as possible thorough collectings in various regions of the Iberian peninsula were undertaken finally comprising about 500 localities covering most montane regions in Spain and Portugal. Though there are still some regions which are not or not sufficiently investigated the collected material certainly includes the majority of the species of this group giving a solid base for the present revision.

Methods, depositories, localities, and abbreviations

Preparation

The specimens collected by the author are preserved in 5% formaldehyde.

The light microscopic photographs were made from slide preparations of KOH-treated cuticular structures mounted in Canada Balsam. Because of the high similarity of most species at least one, often

more, representatives per species and locality were prepared and studied.

For scanning electron microscopy (SEM) the abdominal tergites were also treated with KOH, after washing transferred to acetone, dried on a Polaron E3000 CP dryer from CO₂, mounted on aluminum stubs with adhesive carbon tabs, and sputtered with gold in a BioRad SEM coating system and then inspected with a Philips XL 20 SEM at 10-12kV.

For the histological sections the formalin fixed tissues were dehydrated, embedded in Durcupan, cut with a glass knife (1 µm) on a RMC ultratome III, stained with Richardson's, and mounted with Eukitt on microscopic slides.

Figures

In several cases the species as defined here show a great variability between different localities. Future studies might suggest a further splitting into different subspecies or even species. In order to allow a clear identification of the species by other workers, the type specimens were dissected completely and mounted on microscope slides, and photographs of all relevant cuticular structures were taken. In few cases, when either a part had been damaged during preparation, or had an unsuitable position for photographing the respective figures of the type were replaced by those of a similar specimen.

In some cases the dark pigmentation of the tergite surface did not allow a photographic reproduction of the glandular pits of T7 and T8. An artificial bleaching of the type specimens necessary for a better depiction of the gland structures seemed inapt. In these cases other specimens with naturally or artificially (prolonged treatment with KOH) lighter pigmentation had to be used to demonstrate the species specific structures of the glandular pits. The bleaching is always mentioned in the figure captions.

In the figures the objects are usually depicted in dorsal view with anterior end on top. There is one exception: The hook of the left phallomere is shown with the posterior end on top.

The photographs of a given species (beginning with Fig. 9) are usually arranged in two plates. The first plate shows pictures of the thoracic segments of male and female (left row) and SEM pictures of male tergites 7 and 8 (right row). In both cases deviations from the natural conditions have to be taken into consideration. The pronotum during mounting may become slightly deformed; in contrast to what is seen in most pictures the anterior border of the pronotum normally is well rounded. In the SEM pictures the shape of the segments very much depends on the angle under which it is scanned. The outline of a segment (for example, depth of excavation of the posterior border) is therefore better realized on the light microscopic reproductions of plate 2.

In the second plate are depicted: T5 of the female and T5-10 of the male (usually left row); phallomere structures (hook) of the male (upper right corner); subgenital plate of the male (lower right corner); details of the male glandular pits of T7 and T8 (sometimes also on the first plate) and forewings of male and female (remaining pictures in the median part of the plate).

T5 of male and female (which is usually larger than the male) are brought to about the same size and thus reproduced in different enlargement. The wings of male and female are reproduced in identical enlargement; in species with shorter wings they have the same enlargement as the male tergites, in species with longer wings they have the same enlargement as the female T5.

Because of the mostly consistent arrangement of the various structures on the plates a consequent citing of the figure numbers in the text seemed unnecessary. I have restricted it to the descriptions of the T7 and T8 glandular structures, where often extra photographs are shown, and to those cases in which different alternatives have to be demonstrated.

Females

Because of the difficulty in specifying females special care was taken in selecting the specimens for figures and description: Only those females were used which either had been found in copula with an identifiable male, or which were from localities where only one species had been found.

The scarcity of distinguishing characters does not allow the presentation of a determination key for the females. In connection with the distribution maps a fairly reliable determination is possible in most cases. In the descriptions the accompanying species are always mentioned and the differences between the females – if present – specified.

Localities at which only females had been found are specifically marked: in the material lists by the addition of (♀) behind the locality number, in the distribution maps (Figs 3-6) by a specific symbol. The

determination of the female specimens has to be considered with some reservation; it is fairly reliable only under the assumption that the distribution areas of the species do not deviate too much from the picture shown in this paper. Undeterminable female material is listed on p. 100 after the descriptions.

Material

The investigation was mainly based on material from two collections: The collection of the Museo nacional de historia natural de Madrid (MNHNM) and the author's own collection obtained during several trips through Spain and Portugal. A few specimens were also from the Museum national de Histoire naturelle de Paris (MNHNP) and from the Museum Alexander König in Bonn (MAKB).

The holotypes of the newly described species are deposited in the Madrid Museum.

List of localities, identification of specimens

The locality data of the material collected by the author are presented here in full length. In the text the localities will be mentioned only by their indices consisting of an abbreviation of the country (Sp, Po, F) and the locality number. Subsequent collectings at the same locality are marked with small letters behind the number (a, b etc.). Example for the locality citing in the material section: Sp 12 (a) means that animals were collected at Sp 12 and 12a; Sp 12a means that animals were collected only at 12a.

Further explanations of the locality labels:

“9km SE place 1”: 9 km (by road!) SE of place 1

“btw. place 1 & place 2”: approximately in the middle between place 1 and place 2

“place 1 – place 2”: somewhere on the way between the two places

Specimens used for microscopic preparations (slides, SEM) and photographs have an identification number consisting of the locality index and – separated by a diagonal – an individual number. Specimens grown from a larva are additionally marked by the underlining of the locality number (s. figure captions).

The listing of Portuguese districts and Spanish provinces under descriptions/material are arranged geographically from north to south and from west to east.

Spain (Sp)

- 4 Prov. Soria, Pto. Esteras (S Medinaceli), 1000 m, 12.VIII.1983
- 5 Prov. Madrid, 2 km NE Miraflores de la Sierra (N Madrid), 1200 m, 11.VIII.1983
- 5a Prov. Madrid, 2 km NE Miraflores de la Sierra (N Madrid), 1200 m, 1.VI.1985
- 6a Prov. Madrid, Pto. de la Morcuera (W Miraflores d. l. Sa., N Madrid), 1600-1780 m, 1.VI.1985
- 7 Prov. Madrid, S. de Guadarrama, Pto. de Peñalara, 2200 m, 13.VIII.1983
- 11 Prov. Ciudad Real, Campo de Montiel, 10 km NNE Villahermosa, 950 m, 17.VIII.1983
- 11a Prov. Ciudad Real, Campo de Montiel, 10 km NNE Villahermosa, 900 m, 3.VI.1985
- 12 Prov. Albacete, Sa. de Alcaraz, ca. 2 km NNW Pto. del Barrancazo, 1200 m, 17.VIII.1983
- 12a Prov. Albacete, Sa. de Alcaraz, ca. 2 km NNW Pto. del Barrancazo, 1200 m, 3.VI.1985
- 13 Prov. Albacete, Sa. de Alcaraz, ca. 4 km ESE Pto. del Barrancazo, 1200 m, 17.VIII.1983
- 13a Prov. Albacete, Sa. de Alcaraz, ca. 4 km ESE Pto. del Barrancazo, 1200 m, 3.VI.1985
- 14a Prov. Albacete, Sa. de Alcaraz, Pto. de las Crucetillas, 1450 m, 17.VI.1991
- 15 Prov. Albacete, Sa. de Alcaraz, near Riópar (SW Pto. de las Crucetillas), 1200 m, 18.VIII.1983
- 16 Prov. Jaén, Sa. de Segura, Siles – Los Arroyos, 1000-1500 m, 18.VIII.1983
- 16a Prov. Jaén, Sa. de Segura, Siles – Los Arroyos, 1000-1500 m, 17.VI.1991
- 17a Prov. Jaén, Sa. de Cazorla, Emb. del Tranco, near Bujaraiza, 700 m, 19.VI.1984
- 18a Prov. Jaén, Sa. de Cazorla, Pto. de las Palomas (NE Cazorla), 1300 m, 18.VI.1984
- 19 Prov. Jaén, Sa. de Cazorla, 5 km S Puente de las Herrerías, 1300 m, 20.VIII.1983
- 19a Prov. Jaén, Sa. de Cazorla, 5 km S Puente de las Herrerías, 1300 m, 18.VI.1984
- 20 Prov. Jaén, Sa. de Pozo, W slope of Mt. Cabañas, 1600 m, 20.VIII.1983
- 24a Prov. Almería, Sa. de los Filabres, 5 km SW Observatorio del Calar Alto, 2000 m, 12.VI.1984
- 28 Prov. Granada, Sierra Nevada, Pto. de la Ragua, 1993 m, 23.VIII.1983
- 28a Prov. Granada, Sierra Nevada, Pto. de la Ragua, 1993 m, 12.VI.1984
- 32a Prov. Granada, Sierra Nevada, S slope of Mulhacén, Loma de Piedra Blanca, 2100-2350 m, 16.VI.1984
- 32b Prov. Granada, Sierra Nevada, S slope of Mulhacén, Loma de Piedra Blanca, 2100-2350 m, 12.VI.1991
- 33 Prov. Granada, Sierra Nevada, S slope of Mulhacén, Loma de Piedra Blanca, 2600 m, 25.VIII.1983
- 33a Prov. Granada, Sierra Nevada, S slope of Mulhacén, Loma de Piedra Blanca, 2600 m, 16.VI.1984

- 33b Prov. Granada, Sierra Nevada, S slope of Mulhacén, Loma de Piedra Blanca, 2600 m, 11.VI.1991
 35 Prov. Granada, Sierra Nevada, Solynieve (Sierra Nevada), 2250 m, 25.VIII.1983
 36 Prov. Granada, Sierra Nevada, Collado de las Sabinas, 2000 m, 25.VIII.1983
 36a Prov. Granada, Sierra Nevada, Collado de las Sabinas, 2000 m, 14.VI.1984
 65 Prov. Granada, Sierra Nevada, 2 km NE Tocón (NE Granada), 1300 m, 13.VI.1984
 66 Prov. Granada, Sierra Nevada, Solynieve (Sierra Nevada) – Pinos Genil, 1750 m, 14.VI.1984
 67 Prov. Granada, Sierra Nevada, Solynieve (Sierra Nevada) – Pinos Genil, 1500 m, 14.VI.1984
 71a Prov. Granada, Sierra Nevada, Pto. de la Mora (NE Granada), 1390 m, 9.VI.1989
 73 Prov. Jaén, Sa. de Pozo, 2 km S slope of Mt. Cabañas, 1700 m, 18.VI.1984
 74 Prov. Jaén, Sa. de Cazorla, 6 km SSW Cotorrios, 800 m, 18.VI.1984
 81 Prov. Logroño, Sa. de la Demanda, above Anguiano, 900 m, 30.V.1985
 82 Prov. Logroño, Sa. de la Demanda, 3 km SW Anguiano, 700 m, 30.V.1985
 83 Prov. Logroño/Burgos, Sa. de la Demanda, 5 km W Canales, 1200 m, 30.V.1985
 84 Prov. Burgos, 2 km E Santo Domingo de Silos, 1000 m, 31.V.1985
 84a Prov. Burgos, 2 km E Santo Domingo de Silos, 1000 m, 5.V.1992
 84b Prov. Burgos, 2 km E Santo Domingo de Silos, 1000 m, 13.V.1996
 86 Prov. Segovia/Madrid, Sa. de Guadarrama, Pto. de Navafría, 1700 m, 31.V.1985
 87 Prov. Madrid, Sa. de Guadarrama, btw. Pto. de Navafría & Lozoya, 1400 m, 31.V.1985
 88 Prov. Madrid, 4 km SSW Robledo de Chavela (NE S. Martín de Valdeiglesias), 900 m, 1.VI.1985
 90 Prov. Madrid/Toledo, 9 km SE San Martín de Valdeiglesias, 700 m, 2.VI.1985
 95 Prov. Cuenca, 20 km SW Cuenca (Carret. N 420), 900 m, 5.VI.1985
 96 Prov. Cuenca, Serranía de Cuenca, 2 km NNW La Ciudad Encantada, 1300 m, 5.VI.1985
 97 Prov. Cuenca, Serranía de Cuenca, Embalse de la Toba, 1100 m, 5.VI.1985
 98 Prov. Cuenca, Serranía de Cuenca, 8 km WSW Pto. de El Cubillo, 1400 m, 5.VI.1985
 99 Prov. Teruel, Montes Universales, 5 km W Frías de Albarracín, 1600 m, 5.VI.1985
 99a Prov. Teruel, Montes Universales, 5 km W Frías de Albarracín, 1600 m, 2.VI.1997
 100 Prov. Teruel, 10 km SE Albarracín, 1400 m, 6.VI.1985
 121 Prov. Navarra, Sa. de Urbasa, 3 km W Pto. de Urbasa (20 km NW Estella), 700 m, 25.V.1986
 122 Prov. Burgos, Sotovellanos (30 km S Aguilar de Campó), 850 m, 25.V.1986
 123 Prov. Palencia, near Mave (8 km S Aguilar de Campó), 850 m, 26.V.1986
 124 Prov. Palencia, Embalse de la Requejada (near Cervera d. P.), 1100 m, 26.V.1986
 125 Prov. Palencia, Pto. de Piedrasluengas (ca. 50 km N Cervera d. P.), 1300 m, 26.V.1986
 127 Prov. Cantabria, Picos de Europa, btw. La Vega & Enterrias, 600 m, 26.V.1986
 129 Prov. Cantabria/León, Picos de Europa, Pto. de San Glorio, 1600 m, 27.V.1986
 130 Prov. León, Picos de Europa, 3 km W Llánaves de la Reina, 1300 m, 27.V.1986
 131 Prov. León/Palencia, Alto de las Portillas (6 km N Guardo), 1250 m, 27.V.1986
 132 Prov. Palencia, Emb. de Compuerto (4 km NE Otero de Guardo), 1300 m, 27.V.1986
 133 Prov. Palencia, Membriillar (ca. 30 km NNW Carrión d. los Condes), 1000 m, 27.V.1986
 134 Prov. Palencia, 5 km ENE Villaelos de Valdavia (40 km N Carrión d. los Condes), 900 m, 27.V.1986
 135 Prov. Burgos, 3 km E Sarracín (S Burgos), 900 m, 28.V.1986
 136 Prov. Soria, 10 km W Abejar (30 km W Soria), 1100 m, 28.V.1986
 137 Prov. Soria, 2 km E Abejar (30 km W Soria), 1100 m, 28.V.1986
 137a Prov. Soria, 2 km E Abejar (30 km W Soria), 1100 m, 14.V.1996
 138 Prov. Zaragoza, Sa. del Moncayo, below Santuario del Moncayo, 1400 m, 29.V.1986
 152 Prov. León, btw. Almanza & Mondreganes (N Sahagún), 900 m, 8.VI.1987
 153 Prov. León, Sotillos (12 km NW Cistierna), 1200 m, 8.VI.1987
 154 Prov. León, Sa. de los Fuentes de Invierno, Isoba (SE Pto. de San Isidro), 1500 m, 9.VI.1987
 155 Prov. Oviedo, Sa. de los Fuentes de Invierno, 6 km NW Pto. de San Isidro, 1400 m, 9.VI.1987
 156 Prov. Oviedo, Collado de la Cobertoria (W Pola de Lena), 1000-1170 m, 9.VI.1987
 157 Prov. León/Oviedo, Puerto Ventana (SW Pola de Lena), 1500 m, 10.VI.1987
 158 Prov. León, Villasecino (NW Emb. de los Barrios de Luna), 1100 m, 10.VI.1987
 159 Prov. León, 3 km NW Villafranca del Bierzo (WNW Ponferrada), 500 m, 10.VI.1987
 160 Prov. Lugo, btw. Pedrafita do Cebreiro & Cebreiro (SW Pto. de Pedrafita do C.), 1000 m, 11.VI.1987
 161 Prov. Lugo, btw. Cebreiro & Linares (SW Pto. de Pedrafita do Cebreiro), 1000 m, 11.VI.1987
 162 Prov. Lugo, 10 km NNE Quiroga, 900 m, 11.VI.1987
 163 Prov. Orense, btw. Cambela & Alto de Covelo (S A Rúa), 1000 m, 11.VI.1987
 164 Prov. Zamora, Padornelo (W Puebla de Sanabria), 1300 m, 11.VI.1987
 165 Prov. Zamora, Sa. de la Cabrera, 5 km N San Martín de Castañeda, 1700 m, 11.VI.1987
 166 Prov. Zamora, Sa. de la Cabrera, 5 km ESE San Martín de Castañeda, 1000 m, 12.VI.1987
 167 Prov. Zamora, Sa. de la Culebra, San Pedro de las Herrerías (25 km N Alcañices), 900 m, 12.VI.1987

- 170 Prov. Salamanca, Sa. de la Peña de Francia, surr. of El Cabaco, 900-1100 m, 13.VI.1987
 171 Prov. Salamanca, Sa. de la Peña de Francia, Peña de Francia, 1400-1700 m, 13.VI.1987
 171a Prov. Salamanca, Sa. de la Peña de Francia, Peña de Francia, 1400-1700 m, 26.IV.1992
 172 Prov. Salamanca, Sa. de la Peña de Francia, El Portillo (near La Alberta), 1150 m, 14.VI.1987
 172a Prov. Salamanca, Sa. de la Peña de Francia, El Portillo (near La Alberta), 1150 m, 25./26.IV.1992
 173 Prov. Salamanca/Cáceres, 9 km NW Vegas de Coria (near Emb. de Gabriel y Galán), 400 m, 14.VI.1987
 173a Prov. Salamanca/Cáceres, 9 km NW Vegas de Coria (near Emb. de Gabriel y Galán), 400 m, 25.IV.1992
 174 Prov. Salamanca, Lagunilla (SW Béjar), 900 m, 14.VI.1987
 174a Prov. Salamanca, Lagunilla (SW Béjar), 900 m, 25.IV.1992
 175 Prov. Cáceres, Montes de Tras la Sierra (NE Plasencia), Pto. de Honduras, 1200-1450 m, 15.VI.1987
 175a Prov. Cáceres, Montes de Tras la Sierra (NE Plasencia), Pto. de Honduras, 1200-1450 m, 25.IV.1992
 176 Prov. Cáceres/Avila, Pto. de Tornavacas (ca. 50 km NE Plasencia), 1280 m, 15.VI.1987
 176a Prov. Cáceres/Avila, Pto. de Tornavacas (ca. 50 km NE Plasencia), 1280 m, 25.IV.1992
 177 Prov. Avila, Sa. de Villafranca, NW Pto. de la Peña Negra, 1700 m, 15.VI.1987
 178 Prov. Avila, Sa. de Gredos, 3 km W Hoyos del Collado (NW Arenas de S. Pedro), 1300 m, 15.VI.1987
 179 Prov. Avila, Sa. de Gredos, 5 km SE Hoyos del Espino (NNW Arenas de S. Pedro), 1300 m, 16.VI.1987
 180 Prov. Avila, Sa. de Gredos, 10 km SSW Hoyos del Espino (NW Arenas de S. Pedro), 1500 m, 16.VI.1987
 181 Prov. Avila, Sa. de Gredos, Pto. del Pico (NE Arenas de S. Pedro), 1360 m, 16.VI.1987
 181a Prov. Avila, Sa. de Gredos, Pto. del Pico (NE Arenas de S. Pedro), 1360 m, 24.IV.1992
 182 Prov. Avila, Sa. de Gredos, Pto. de Casillas (W S. Martín d. Vald.), 1480 m, 17.VI.1987
 182a Prov. Avila, Sa. de Gredos, Pto. de Casillas (W S. Martín d. Vald.), 1480 m, 23.IV.1992
 183 Prov. Avila, Sa. de Guadarrama, 3 km NW El Hoyo de Pinares (SE Avila), 1000 m, 17.VI.1987
 184 Prov. Avila, Sa. de Guadarrama, 4-8 km SW Pto. de Guadarrama, 1500-1700 m, 17./18.VI.1987
 185 Prov. Segovia/Guadalajara, Sa. de Ayllón, Collado de la Quesera, 1700 m, 18.VI.1987
 191 Prov. Almería, Sierra Alhamilla, btw. Mts. Colatívi & Sa. Alhamilla, ca. 1200 m, 15.V.1989
 202 Prov. Granada, Sa. de la Sagra, btw. Puebla de Don Fadrique & Cortijos Nuevos de la Sierra, 1300 m, 5.IV.1991
 225 Prov. Salamanca, Villasrubias (33 km SSW Ciudad Rodrigo), 900 m, 23.IV.1991
 226 Prov. Salamanca/Cáceres, Sa. de Gata, Pto. de Perales (ca. 40 km SSW Ciudad Rodrigo), 950 m, 23.IV.1991
 227 Prov. Salamanca/Cáceres, Sa. de Gata, btw. Navasfrias & Valverde del Fresno, 1000-1100 m, 23.IV.1991
 233 Prov. Cáceres, Sa. de Guadalupe, btw. Ermita del Humilladero & Mt. Villuerca (near Guadalupe), 1100 m, 25.IV.1991
 235 Prov. Almería, Sa. de Gádor, N slope of Mt. Dos Hermanos, 1700-1950 m, 6.VI.1991
 237-241 Prov. Almería, Sierra Nevada, N slope of Mts. Buitre & Polarda (S Fiñana – Abruca), 1400-1800 m, 7.VI.1991
 242 Prov. Granada, Sierra Nevada, N slope of Mt. Chullo (N Bayárcal), 2000-2150 m, 7./8.VI.1991
 243 Prov. Almería, Sierra Nevada, E slope of Mt. Chullo (N Bayárcal), 2400-2600 m, 8.VI.1991
 244 Prov. Almería, Sierra Nevada, Loma de la Majada de las Vacas (NW Laujar de Andarax), 1650-2200 m, 8./9.VI.1991
 245 Prov. Granada, Sierra Nevada, Barranco del Hornillo (N Laroles), 2000 m, 9.VI.1991
 246 Prov. Granada, Sierra Nevada, SW slope of Mt. Morron (N Mecina – Alfahar), 2050-2550 m, 9.VI.1991
 247 Prov. Granada, Sierra Nevada, Loma del Riachuelo (N Mecina Bombarón), 2150-2600, 10.VI.1991
 249 Prov. Granada, Sierra Nevada, Rio Lanjarón (above Lanjarón), 1900 m, 12.VI.1991
 254 Prov. Granada, Sierra Nevada, Barranco La Solana (ENE Guejar – Sierra), 1800-1900 m, 14./15.VI.1991
 259 Prov. Almería, Sa. de los Filabres, near Observatorio del Calar Alto, 2000 m, 16.VI.1991
 260 Prov. Granada, Sa. de la Sagra, Collado Blanco, 1650 m, 16.VI.1991
 261 Prov. Granada, Sa. de Segura: Sa. de Guillimona, 3 km N La Losa, 1700 m, 16.VI.1991
 262 Prov. Jaén, Sa. de Segura: Sa. de Almorchón, 4 km WNW Santiago de la Espada, 1700 m, 16.VI.1991
 263 Prov. Jaén, Sa. de Segura: Sa. de Almorchón, 4 km ESE Pontones, 1600 m, 16.VI.1991
 264 Prov. Albacete, Sa. de Alcaraz, Pto. del Arenal, 1150 m, 17.VI.1991
 265 Prov. Tarragona, surr. of Los Puertos (ca. 20 km W Tortosa), 750-1400 m, 11.IV.1992
 266 Prov. Castellón, Pto. de Querol (50 km W Vinarós), 1030 m, 11.IV.1992
 268 Prov. Castellón, btw. Cinctores & Portell de Morella (SW Morella), 1200 m, 12.IV.1992
 269 Prov. Teruel, Sa. del Rayo, btw. Cantavieja & Mosqueruela, 1500 m, 12.IV.1992
 269a Prov. Teruel, Sa. del Rayo, btw. Cantavieja & Mosqueruela, 1500 m, 17.IV.1995
 270 Prov. Teruel, Sa. de Noguera, 16 km NNE Rubielos de Mora, 1600 m, 12.IV.1992
 272 Prov. Teruel, Sa. de Javalambre, btw. Collado de El Gavilán & Mt. Javalambre, 1600 m, 13.IV.1992
 274 Prov. Cuenca, Sa. de Mira, Mt. Rebollo, 1250 m, 13.IV.1992
 278 Prov. Murcia, Sa. de Taibilla, Mt. Revolcadores, 1450-1550 m, 15.IV.1992
 279 Prov. Granada, Sa. de la Hoya del Espina, Pto. del Pinar, 1500-1600 m, 15.IV.1992

- 280 Prov. Almería, btw. Casablanca & María (NW Vélez Rubio), 1200 m, 15.IV.1992
 282 Prov. Almería, S. de María, ca. 4 km N Chirivel (W Vélez Rubio), 1400 m, 16.IV.1992
 283 Prov. Granada/Almería, Sa. de Lucar, btw. Oria & Cúllar Baza, 1200 m, 16.IV.1992
 285 Prov. Jaén, Sa.de Alta Coloma, Mt. Cerro Quemado, 1150-1450, 17.IV.1992
 287 Prov. Jaén, Sa. Almadén, btw. Mancha Real & Mt. El Almadén, 1300-1550 m, 18.IV.1992
 290 Prov. Ciudad Real, Sa. de la Garganta, 3 km S Pto. Valderrepisa (SW Puertollano), 850 m, 20.IV.1992
 291 Prov. Ciudad Real, Sa. del Rey, Mt. Chorreras (SW Puertollano), 1050 m, 20.IV.1992
 294 Prov. Ciudad Real, Mtes. del Toledo, Sa. de los Torneros, Mt. Becerra, 1300 m, 21.IV.1992
 295 Prov. Toledo, Mtes. de Toledo, Mt. Corral de Cantos (10 km S Navahermosa), 1000 m, 22.IV.1992
 296 Prov. Toledo, Sa. de San Vicente (NE Talavera), 2 km N El Real de San Vicente, 900 m, 22.IV.1992
 297 Prov. Toledo, Sa. de San Vicente (NE Talavera), Mt. San Vicente, 1250-1350 m, 23.IV.1992
 298 Prov. Ávila, Sa. de Gredos, near Cassillas (18 km W San Martín d. V.), 1200 m, 23.IV.1992
 299 Prov. Ávila, Sa. de Gredos, btw. Mijares & Pto. de Mijares (W Piedralaves), 1200-1570 m, 23.IV.1992
 301 Prov. Ávila, Sa. de la Paramera, Pto. de Naval Moral, 1450-1500 m, 24.IV.1992
 303 Prov. Ávila, Sa. de la Paramera, 3 km W Navalacruz, 1300 m, 24.IV.1992
 304 Prov. Ávila, Sa. de la Paramera, Pto. de Menga, 1560 m, 24.IV.1992
 305 Prov. Cáceres, Sa. de Gredos, near Guijo de Sta. Bárbara (N Jarandilla d. L.V.), 800-900 m, 24.IV.1992
 306 Prov. Cáceres, Pto. del Piornal (NE Plasencia), 1200 m, 24./25.IV.1992
 307 Prov. Salamanca, btw. El Cubo de Don Sancho & Traguntía (W Salamanca), 800 m, 26.IV.1992
 308 Prov. Orense, btw. Vilamea & Fondevila (ca. 40 km S Celanova), 500 m, 30.IV.1992
 309 Prov. Pontevedra, Parque natural del Monte Alhoya (near Tui), 400-600 m, 1.V.1992
 310 Prov. Pontevedra, near Portela (20 km N Pontevedra), 200 m, 1.V.1992
 311 Prov. La Coruña, near Villar da Torre (5 km NE Negreira), 400 m, 1.V.1992
 313 Prov. La Coruña, 4 km S Susana (13 km SE Santiago d. C.), 200 m, 2.V.1992
 314 Prov. Pontevedra, near Toboada (14 km NW Lalín), 500 m, 2.V.1992
 315 Prov. Pontevedra, 3 km NW Castro (12 km SE Lalín), 700 m, 2.V.1992
 316 Prov. Orense, Alto del Couso (22 km E Orense), 750 m, 2.V.1992
 317 Prov. Orense, 2.5 km NW Alto del Rodicio (ca. 32 km E Orense), 1050 m, 2.V.1992
 318 Prov. Orense, 2 km SW Covas (NE O Barco), 600 m, 3.V.1992
 319 Prov. León, hill S Ponferrada, 500 m, 3.V.1992
 320 Prov. León, btw. Molinaseca & Riego de Ambros (E Ponferrada), 750-850 m, 4.V.1992
 321 Prov. León, Montes de León, btw. Aceto & Monjarín, 1300 m, 4.V.1992
 322 Prov. León, Montes de León, btw. Foncebadón & Rabanal del Camino, 1350 m, 4.V.1992
 323 Prov. León, 7 km E Astorga, 850 m, 4.V.1992
 325 Prov. Burgos, btw. Iblas de J. & Arlanzón (E Burgos), 900 m, 5.V.1992
 326 Prov. Burgos, 3 km E Herreros (20 km E Burgos), 1100 m, 5.V.1992
 327 Prov. Burgos, Sa. de la Demanda, Mt. Mencilia, 1425 m, 5.V.1992
 328 Prov. Burgos, Sa. de la Demanda, Cóllado el Manquillo, 1400 m, 5.V.1992
 329 Prov. Burgos/Soria, Sa. de la Demanda, Pto. del Hierro (8 km SE Quintanar de la Sa.), 1200-1375 m, 6.V.1992
 330 Prov. Soria, near Lubia (15 km S Soria), 1050-1100 m, 6.V.1992
 331 Prov. Soria, 4 km S Adradas (23 km N Medinaceli), 1100 m, 6.V.1992
 332 Prov. Guadalajara, btw. Alcolea del Pinar & Luzaga (S Medinaceli), 1200 m, 6.V.1992
 333 Prov. Guadalajara, btw. Huertahernando & Olmeda de Cobeta (ca 30 km W Molina d. A.), 1200 m, 7.V.1992
 334 Prov. Guadalajara, 6 km E Cobeta (ca. 20 km W Molina de Aragón), 1225 m, 7.V.1992
 335 Prov. Guadalajara, btw. Embid & Eta. de Sto. Domingo (SW Daroca), 1125 m, 7.V.1992
 365 Prov. Castellón, 2 km E Pto. de Torre Miró (11 km N Morella), 1200 m, 17.IV.1995
 368 Prov. Teruel, Pto. de Cuarto Pelado (89 km NE Teruel), 1600 m, 18.IV.1995
 369 Prov. Teruel, 2 km SE Pto. de Cuarto Pelado (89 km NE Teruel), ca. 1600 m, 18.IV.1995
 370 Prov. Teruel, Pto. de Villaroya (ca. 70 km NE Teruel), 1700 m, 18.IV.1995
 372 Prov. Teruel, Pto. de Cabigordo (27 km NE Teruel), 1550 m, 18.IV.1995
 373 Prov. Teruel, Mt. Castelfrío (32 km NE Teruel), 1600 m, 19.IV.1995
 374 Prov. Teruel, 3 km SW Aliaga (ca. 70 km NE Teruel), ca. 1200 m, 19.IV.1995
 375 Prov. Teruel, Pto. de Majalinos (90 km NE Teruel), 1450 m, 19.IV.1995
 377 Prov. Teruel, Pto. de Fonfría (ca. 30 km SE Daroca), 1470 m, 19.IV.1995
 378 Prov. Teruel, btw. Calamocha & Tornos (S Daroca), 1100 m, 20.IV.1995
 379 Prov. Zaragoza, Sa. de Sta. Cruz (W Daroca), Pto. de Used, 1200 m, 20.IV.1995
 379a Prov. Zaragoza, Sa. de Sta. Cruz (W Daroca), Pto. de Used, 1200 m, 3.VI.1997
 399 Prov. Navarra, below Pico Gorramakil (ESE Irun), 1000 m, 4.V.1996

- 400 Prov. Navarra, 2 km W Pto. de Artesiaga (ca. 30 km NNE Pamplona), 1140 m, 5.V.1996
 404 Prov. Navarra, Sa. de Aralar (S San Sebastian), Sant. de San Miguel de Aralar, 1200 m, 5.V.1996
 406 Prov. Álava, Pto. de Opacua (5 km SE Salvatierra), 1020 m, 6.V.1996
 407 Prov. Guipúzcoa, btw. Arantzazu & Mt. Aitzgorri (SE Oñati), 1150 m, 6.V.1996
 408 Prov. Guipúzcoa, btw. Oñati & Legazpia, 600 m, 7.V.1996
 409 Prov. Guipúzcoa, btw. Vidania & Regil (NW Tolosa), 750 m, 7.V.1996
 410 Prov. Vizcaya, E Pto. Urquiola, 650 m, 7.V.1996
 411 Prov. Vizcaya, Mt. Sollube, 600 m, 7.V.1996
 412 Prov. Álava, 3 km N Pto. de Orduña (S Amurrio), 600 m, 8.V.1996
 413 Prov. Álava/Burgos, Pto. de Orduña (S Amurrio), 900 m, 8.V.1996
 414 Prov. Burgos, near Villaventín (ca. 20 km NE Medina de Pomar), 700 m, 8.V.1996
 415 Prov. Cantabria, 3 km S Pto. del Asón (ca. 50 km SE Santander), 850 m, 8.V.1996
 417 Prov. Burgos, near Espinos de los Monteros (ca. 70 km WSW Bilbao), 775 m, 9.V.1996
 418 Prov. Burgos, 2 km SE Sancillo (ca. 75 km S Santander), 940 m, 9.V.1996
 422 Prov. Burgos, 1 km W Cornudilla (18 km NW Briviesca), 670 m, 9.V.1996
 423 Prov. Burgos, 3,5 km W Poza de la Sal (23 km NW Briviesca), 950 m, 9.V.1996
 424 Prov. Burgos, btw. Masa & La Nuez de Arriba (ca. 34 km N Burgos), 1050 m, 9.V.1996
 425 Prov. Burgos, 2 km NE Urbel del Castillo (40 km SE Aguilar d. C.), 950 m, 10.V.1996
 426 Prov. Burgos, btw. La Riba d.V. & Humada (ca. 20 km SE Aguilar d. C.), 1000 m, 10.V.1996
 427 Prov. Burgos, 2 km W Rebolledo de Traspeña (SE Aguilar d. C.), 1000 m, 10.V.1996
 428 Prov. Palencia, 12 km NW Villela (15 km S Aguilar d. C.), 950 m, 10.V.1996
 429 Prov. Cantabria, Pto. Pozazal (12 km S Reinoso), 950 m, 10.V.1996
 430 Prov. Cantabria, Monumento (7 km NW Pto. de Palomera, NW Reinoso), 800 m, 11.V.1996
 431 Prov. Palencia, near San Cebrián de Buena Madre (20 km SE Fomista), 850 m, 11.V.1996
 432 Prov. Palencia, btw. Dueñas & Sta. Cecilia del Acor (SW Palencia), 850 m, 11.V.1996
 433 Prov. Valladolid, 6 km NE Urueña (ca. 44 km NNW Valladolid), 850 m, 12.V.1996
 437 Prov. Segovia, 1 km W Sepúlveda, 1000 m, 12.V.1996
 439 Prov. Segovia, btw. Navares d. l. C. & Aldeanueva d.l.S. (S Aranda d.D.), 1150 m, 13.V.1996
 440 Prov. Burgos, 3 km NE Oquillas (ca. 20 km N Aranda d.D.), 950 m, 13.V.1996
 441 Prov. Burgos, 3,5 km S Tejada (W Sto. Domingo d. S.), 1075 m, 13.V.1996
 442 Prov. Burgos, Pico de la Sierra (W Sto. Domingo d. S.), 1300 m, 13.V.1996
 443 Prov. Burgos, btw. Carazo & Hacinas (E Sto. Domingo d. S.), 1050 m, 14.V.1996
 444 Prov. Soria, 2 km N Pto. del Madero (btw. Soria & Tarazona), 1220 m, 14.V.1996
 445 Prov. Soria, Sa. de Madera, Mt. Vaniegras (btw. Soria & Tarazona), 1400 m, 14.V.1996
 460 Prov. Teruel, Sa. de Javalambre, near Torrijas, 1400-1500 m, 1.VI.1997
 461 Prov. Teruel, Sa. de Javalambre, SE slope of Mt. Javalambre, 1900 m, 1.VI.1997
 464 Prov. Teruel, Montes Universales, below (S) Mt. Carbonera (SE Albarracín), 1300 m, 1.VI.1997
 465 Prov. Teruel, Montes Universales, Pto. de Valdecuena, 1400-1450 m, 2.VI.1997
 466 Prov. Teruel, Montes Universales, btw. Calomarde & Frías de Albarracín, 1550 m, 2.VI.1997
 467 Prov. Teruel, Montes Universales, El Portillo (SW Guadalaviar), 1700 m, 2.VI.1997
 468 Prov. Teruel, Montes Universales, btw. El Portillo & Guadalaviar, 1500 m, 2.VI.1997
 469 Prov. Teruel, Montes Universales, 2 km E Orihuela del Tremedal, 1400 m, 2.VI.1997
 470 Prov. Teruel, Montes Universales, Pto. de Bronchales (NE Bronchales), 1500 m, 2.VI.1997
 471 Prov. Teruel, Montes Universales, 2 km SW Tramacastilla, 1500 m, 2.VI.1997

Portugal (Po)

- 1 Distr. de Beja, Alentejo, 10 km SE Serpa, 100 m, 17.IV.1991
 2 Distr. de Beja, Serra do Caldeirão, Moimentos, ca. 500 m, 17.IV.1991
 3 Distr. de Beja/Faro, Serra de Monchique, 5 km S Nave Redonda, 300 m, 17.IV.1991
 4 Distr. de Faro, Serra de Monchique, Mt. Fóia, 800 m, 18.IV.1991
 5 Distr. de Beja, 3 km N Santa Clara-a-Velha (Rio Mira), 100 m, 18.IV.1991
 6 Distr. de Setubal, Serra de Grândola, ca. 13 km S Grândola, ca. 200 m, 18.IV.1991
 7 Distr. de Setubal, Palma (16 km NW Alcácer do Sal), 50 m, 19.IV.1991
 8 Distr. de Lisboa, Serra de Sintra (W Lisboa), near Malveira de Cima, 200 m, 19.IV.1991
 9 Distr. de Lisboa, Cheleiros (10 km S Mafra), 50 m, 19.IV.1991
 10 Distr. de Lisboa, Serra do Montejunto, 2 km WSW Quartel, 500 m, 19./20.IV.1991
 11 Distr. de Leiria, Serra dos Candeeiros, Bezerra (near Serro Ventoso), 400 m, 20.IV.1991
 12 Distr. de Santarém, 2 km NW Carregueiros (near Tomar), 150 m, 20.IV.1991
 13 Distr. de Coimbra/Leiria, Serra da Lousã, btw. Espinhal & Campelo, 800 m, 21.IV.1991
 14 Distr. de Leiria, Serra da Lousã, 10 km N Castanheira de Pêra, 800 m, 21.IV.1991

- 15 Distr. de Coimbra, 3 km N Mouronho (btw. Coimbra & Guarda), 300 m, 21.IV.1991
16 Distr. de Guarda, Serra da Estrela, Sabugueiro (10 km ESE Seia), 1000 m, 22.IV.1991
17 Distr. de Guarda, Serra da Estrela, 10 km S Sabugueiro (10 km ESE Seia), 1500 m, 22.IV.1991
18 Distr. de Castelo Branco, Serra da Estrela, Penhas da Saúde (10 km NW Covilhã), 1500 m, 22.IV.1991
22 Distr. de Bragança, Serra de Mogadouro, 1 km E Santiago (E Mogadouro), 750 m, 27.IV.1992
23 Distr. de Bragança, Serra de Bornes, Mt. Ladaino, 1050 m, 27.IV.1992
24 Distr. de Bragança, Serra de Nogueira, N slope of Mt. Nogueira, 1000-1300 m, 27./28.IV.1992
26 Distr. de Vila Real, btw. Argemil & Algeriz (ca. 35 km NE Vila Pouca d. A.), 700 m, 28.IV.1992
27 Distr. de Vila Real, Serra da Padrela, Mt. Padrela (15 km NE Vila Pouca d. A.), 1100-1147 m, 28.IV.1992
28 Distr. de Vila Real, Serra do Marão (SW Vila Real), 2 km SE Soutelo, 700 m, 29.IV.1992
30 Distr. de Vila Real, 2 km S Alto de Velão (ca. 20 km W Vila Real), 800 m, 29.IV.1992
33 Distr. de Vila Real, 7 km W Boticas (WSW Chaves), 1000 m, 29.IV.1992
34 Distr. de Vila Real, btw. Gralhos & Montalegre, WNW Chaves, ca. 1000 m, 29./30.IV.1992
35 Distr. de Vila Real, Serra do Larouco, btw. Pardornelos & Sendim, 1150 m, 30.IV.1992
36 Distr. de Braga, Serra do Gerês, Portela de Leonte, 850 m, 30.IV.1992
37 Distr. de Viana de Castelo, Touvedo (4 km E Ponte da Barca), 150 m, 30.IV.1992
38 Distr. de Viana de Castelo, 4 km W Bico (4 km SE Paredes de Coura), 450 m, 1.V.1996

France (F)

- 43 Dept. Aude, Montagne de Tauch (near Tuchan), Tour de Géographes, 870-900 m, 8.IV.1995
43a Dept. Aude, Montagne de Tauch (near Tuchan), Tour de Géographes – Pech de Fraysse, 870-900 m, 20.V.1996
69 Dept. Pyrénées-Atlantiques, Col de Lecharria (ca. 20 km SSW Mauléon-Licharre), 800 m, 4.V.1996
70 Dept. Pyrénées-Atlantiques, Ahusquy (ca. 20 km ESE St.Jean-Pied-de-Port), 1000 m, 4.V.1996
73 Dept. Haute-Garonne, Col de Portet d'Aspet (28 km W St. Girons), 1000 m, 18.V.1996
74 Dept. Ariège, 1 km NW Col de la Core (btw. Seix & Castillon-en-Couserans), 1300 m, 18.V.1996
81 Dept. Aude, Mt. Milobre de Mossac (btw. Soulatgé & Auriac), 850-900 m, 21.V.1996

Abbreviations

SEM	scanning electron microscope
T(5)	(5th) abdominal tergite
pron.	pronotum
meson.	mesonotum
metan.	metanotum
L	larva(e)

Characteristics of the *carpetana*-group

Legs (Common characteristics of the genera *Phyllodromica* and *Ectobius*)

Front femur at anteroventral edge with 2-3 proximal, 2 distal spines, and tiny bristlelike spinules in between (Type B2); middle and hind femora at the anteroventral edge with 1-3 spines in the middle and 1 distal spine. Pulvilli on the four proximal tarsal segments of all legs; claws asymmetrical, unspecialized; arolia well-developed.

Wings

Forewings strongly reduced, never surpassing the second abdominal segment; outer (anterior) border more or less straight, inner (posterior) border strongly convex, wings, therefore, always broadest in the middle or behind. Colouration: Forewings, except at the costal area, scattered with dark spots, at the base fusing to a larger patch.

Male. Forewings variously long and broad, from scarcely longer than the mesonotum to reaching up to the second abdominal segment; broadly to narrowly egg-shaped (obtuse pole posteriorly, at the apex) (Fig. 12M) or reversely egg-shaped (obtuse pole anteriorly, at the base) (Fig. 54M), from medially touching each other to widely separated. Hindwings in species with longer forewings developed as short lobes of the length of the segment, but absent especially in species with shorter forewings.

Female. Forewings reversely egg-shaped or hatchet-shaped, scarcely longer than mesonotum, widely separated. Hindwings absent.

Differences to other groups. Long-winged species: *baetica*-group with similarly coloured forewings, but basal patch missing and wings truncate. Short-winged species: *subaptera*- and *nana*-group with narrower wings having almost parallel borders, broadest near the base (Figs 7I-L); species of the *panteli*-group and the north African *Lobolanpra* species may have similar wing size and shape but are missing the typical colouration pattern.

Male

Glandular structures: Tergites 7 and 8 each with a pair of **glandular pits** near the anterior border of the segments, usually mostly hidden below the overlapping tergites of the preceding segments.

T7 typically with a pair of bowl-shaped pits (p in Fig. 9F) completely separated by a longitudinal **median ridge** (mr in Fig. 9F). The anterior part of the ridge is often elevated to a noselike structure, the **anterior process** (ap in Fig. 35F). Opposite the anterior process on the surface of the tergite behind the pits there is a bipartite bristle field, the **bristle tuft** (bt in Fig. 9F), continuing on the posterior part of the ridge up to the anterior process. The bristles of the tuft are specialized, being strongly broadened and curved at the tip (Fig. 7F); in *P. sacarraoi* the bristle tuft is missing (Figs 27E,F). Among the species there is much variability in the shape of the pits and associated structures: The anterior process may be weakly set off from the ridge (*P. moralesi*, *P. septentrionalis*, *sacarraoi*-subgroup). The ridge can be reduced (*P. carpetana*) or even missing (*P. acarinata*). The pits in their extent are seldom completely visible in dorsal view, i.e. truly open bowl-shaped; they are often deepened anteriorly or medioanteriorly beneath the anterior borders of the openings to variously extended **pouches**, in the slide preparations appearing as dark areas (Figs 14G,H, 15C); in the *sacarraoi*-subgroup the pouches are deepened further to large, saclike structures (Figs 26D,G). In some cases the pits are reduced to more or less narrow transversal deepenings or furrows (*P. sulcata* [Figs 21D-F], *P. lativittata*, *P. rhomboidea*). The bristle tuft is in some of the species (more derived species of the *moralesi*-subgroup) not on the segment surface but as a whole invaginated, on the photographs recognizable by a broad dark lining (Figs 14G, 15C, 18G) representing the steep walls of the invagination. In other cases the bristle tuft and the adjacent surface is moulded to a longitudinal groove (Figs 44G-I, 50G,H, 51D,E) with the median parts of the tuft on the bottom, the borders of the tuft running along the walls or borders of the groove. In this case the bristle tuft is described as being “recessed”, for instance, into a mound.

The glandular pits of T8 occur in two different forms. In the *moralesi*- and *sacarraoi*-subgroup the pits are well-developed, more or less open bowl-shaped (Fig. 9G). The posterior borders of the pits follow a rather high elevation in the center of the segment; the posterior walls, therefore, are usually higher and steeper than the anterior. The pits in T8 are – as in T7 – often deepened, though only to rather shallow pouches, posteriorly or medioposteriorly beneath the posterior borders of the openings (Figs 12H, 15D). The pits are separated by a median ridge; crest of the ridge often membranous, posteriorly more or less elevated and ending in a knoblike structure bearing short straight bristles, the **bristle knob** (Figs 9G,H). In some species the bristles are mostly lost (*P. javalambrensis* [Figs 19G,H], *P. sulcata*), in others the knob is reduced, incorporated into the ridge, the site of incorporation still recognizable by the bristles (*P. globososacculata* [Figs 31G,H], *P. porosa*). In the *barbata*-subgroup the pits are tiny and shallow, in several species obsolete or even completely missing (*P. rhomboidea* [Fig. 41H], *P. acarinata*); a clear median ridge is not developed; the “pits” are either separated by a very low swelling or elevation (Fig. 43H) or they are united to a common depression (*P. acuminata*, *P. lativittata* [Fig. 39H], *P. barbata*).

Membrane glands. Apart from the glandular pits on T7 and T8 there is another set of presumably glandular structures: the intersegmental membranes of T4/5 and T5/6 near the lateral borders of the segments show saclike invaginations, internally with alveolate cuticular structure (Figs 8E-H, 21E). Similar structures may also be found in the preceding and following segments, but more weakly expressed. Often two membrane sacs are developed in succession (Figs 8E,G) on each side of the intersegmental region. The size of the sacs varies considerably between species and segments. At the position of the membrane glands the tergites usually show a – depending on the size of the gland – more or less pronounced excavation (Fig. 49E), indicating that part of the tergite region has been transformed to membrane glands.

Tergites 9 and 10 in the longitudinal midline elevated to a rooflike structure. Posterior lobe of T10 (behind insertion of cerci) either long (posterior border of T10 narrowly parabolic, Fig. 10F), of

intermediate length (posterior border broadly parabolic or semicircularly rounded, Fig. 22F), or short (posterior border broadly rounded, Fig. 26F). In the descriptions only the shape of the posterior border will be mentioned. In the figures these differences in the shape of T10 are not always obvious since during mounting the terminalia may become dorsoventrally compressed. Left **paraproct** as in all species of *Phyllostroma* and *Ectobius* with a short spiny process.

Subgenital plate (Fig. 20M). Posterior lobe (visible, more or less sclerotized part) rounded triangular, slightly asymmetrical, with one (left) unspecialized, short stylus (s); anteriorly with two very long apodemal processes (a) of unequal length.

Genitalia. Not much different from the usual Ectobiinae pattern except for a quite specialized hook in some species. **Left phallomere**: with hook and spatular endophallic apodeme (e) (Fig. 20M), both connected by muscles with and lying parallel to the longer left apodeme of the subgenital plate. **Hook** (L3 according to McKittrick, 1964) with a long shaft (sh) bearing at its apical part a sclerotized longitudinal trough measuring $\frac{2}{3}$ or less of the length of the shaft (Fig. 8B); shaft apically tapering to a short stalk (st) followed by an angularly bent claw (cl). – *Sacarraoi*-subgroup partly with aberrant hook structures, the most extreme found in *P. sacarraoi* (Figs 28K, 57N): shaft with a spinelike process at the apical end, stalk very long, widely curved, with a shovellike claw. – **Right phallomere** (Fig. 20M): consisting of the cleft sclerite (cs) continuing into a rather weakly developed R3 apodeme. Between the phallomeres with a well-developed helmet sclerite (h).

Female

Genitalia. Not much differing from the usual Ectobiinae pattern. **Dorsal complex** (Fig. 8I): Recently Klass (1997) has reinvestigated the homologies of the sclerites and proposed a new terminology for some of them. Laterodorsal sclerites of basivalvula (bd; McKittricks “anterior arms of first valvifer”) slightly converging anteriorly but not fused, broader in the posterior, narrower in the anterior half; accompanying lateroventral sclerites of basivalvula (bv; McKittricks “basivalvula”) anteriorly often broadened, forming a laterally or ventrally open trough. **Ventral complex** (Fig. 8K): Laterosternal shelf (l) with a rounded central part including the vestibular sclerite, and with two short posteriorly diverging arms; between the arms the intersternal folds (i). **Subgenital plate** undivided, broadly rounded, posteriorly with a tiny median emargination.

Ootheca short, smooth, without longitudinal ridges, rotated 90° prior to deposition as in all Ectobiinae (keel at the right).

Colouration

Male: Mostly dark except for some whitish-transparent areas: margins around the pronotal disk, lateral and posterior margins of meso- and metanotum (Fig. 17A), posterior part of lateral margins and posterior margin of abdominal tergites and sternites (Figs 18B-E); transition zone between whitish posterior margin and the dark anterior part of the tergites, especially in species with broader whitish margins, with dispersed dark spots on a more yellowish ground colour (Figs 10B,C, 42B,C); tergites 9 and 10 in the middle usually with a whitish longitudinal stripe widening towards the posterior borders; tergites 7 and 8 usually further lightened (Figs 50D,E), sometimes for the most part lightly coloured (Figs 54D,E). Head mostly dark; interocular space posteriorly in all species with a narrow whitish transversal band, anteriorly in the *moralesi*- and *sacarraoi*-subgroup reddish, in the *barbata*-subgroup as dark as the remaining parts of the head. In the following descriptions the larger anterior part of the interocular space will be referred to just as “interocular space”. In some species of the first two subgroups the reddish colour may be still more extended: up to the antennae or, in the extreme, all over the face. Antenna dark, at the base yellowish. Legs mostly dark. Lateral borders and distal part of coxa (inclusively part of the adjacent trochanter) whitish: in most species the whitish distal part of the coxa comprises $\frac{1}{4}$ or less of its length; in *P. bolivariana* and *P. atlantica* about the distal half of the coxa is whitish (“coxa half dark half whitish”); in *P. moralesi*, *P. septentrionalis*, and *P. fernandesiana* the extent of the whitish zone is variable and may also measure up to a half of the coxa length. Another regularly lightened area is at the base of the tarsus; in lightly coloured species tibia and femur may also be lightened to a various extent. **Female**: Usually lighter coloured and with lightened areas more extended than in male. Dark central areas of meso- and metanotum in some species interrupted by yellowish patches (Fig. 31D). Abdominal tergites in dark specimens/species mostly dark, with narrow

whitish margins (Fig. 16A). In lighter coloured specimens/species posterior part of the dark area broken up into patches or spots on a yellowish ground colour, either only laterally (Fig. 50A) or over the entire breadth of the tergite (Fig. 42A) (in the descriptions called “patchy zone”). Dark areas at five positions of the segment often more extended (Fig. 10A) giving the abdomen – the dark basal part of the respective tergite is usually covered by the lightly pigmented posterior part of the preceding tergite – the appearance of being lightly coloured with five dark longitudinal stripes. Legs as in male, but more often and to a larger extent lightened, sometimes completely yellowish. Cerci usually dark as in male, in lighter pigmented species or specimens some intermediate segments dorsally lightened.

Disk of pronotum either semicircular (Fig. 35A) or with lateral extensions possibly reaching the lateral borders of the pronotum (Fig. 37A). In some species the pronotum disk may occur in two colour variations, either dark or red-orange (Figs 9A,C,D), as is also observed in other Ectobiinae (*P. subaptera*, *P. marginata*).

Biology

The species of the *carpetana*-group are mainly found in montane regions. They usually prefer higher altitudes but – especially those inhabiting localities near the western or northern Atlantic coast – can also be found at lower altitudes (*P. moralesi*: 50 m; *P. fernandesiana*: 150 m). They seem to prefer grassy localities but may also occur in other low vegetation and under leaf litter. The imagos appear in the spring; the longer-living females may be found till September. The oothecae presumably need a winter period for the larvae to hatch. The larvae mainly grow during the following vegetation period, winter once more nearly full grown, and moult to imagos in the following spring.

Phylogenetic considerations

The *carpetana*-group belongs to those Ectobiinae having a helmet sclerite and a small unspecialized stylus. Other members of this category are, among others, the *sylvestris*-group (Bohn 1989), the *panteli*-group (Bohn 1993), and the *brevipennis*-group.

The closest relatives of the group are the *subaptera*-, the *nana*- (group of species not yet described, occurring in and around the Pyrenees), and the *panteli*-group, which all together seem to form a monophyletic category characterized by the possession of membrane glands in the intersegmental areas especially of tergites 4/5 and 5/6 (Fig. 1, Table 1) [apomorphy 2].

The close relationship of *carpetana*-, *nana*-, and *subaptera*-group is based on three synapomorphies: presence of glandular pits on tergites 7 and 8 (Figs 7A-D; in other species only on tergite 7) [8], the shortened sclerotized trough in the shaft of the hook (in other species in full length of the shaft, Figs 8A-D) [9], and the modified bristles of the T7 glandular pit [4]. The modification mainly concerns the upper part of the bristles being strongly broadened and curled, with an irregular tip (Figs 7F-H). The plesiomorphic structure is undoubtedly a bristle with a long straight shaft and a curved apical part with a conical tip which is found in the T7 glandular pits of many groups of the Ectobiinae (*syloestris*-[Fig. 7E], *pallidus*-, *vittiventris*-, *brevipennis*-group).

The closer relationship of the *carpetana*- and *subaptera*-group can be inferred from two common features: the more pronounced specialization of the bristles (Figs 7F,G) [5] as compared to the *nana*-group (Fig. 7H), and the concentration of the bristles at the posterior border of the glandular pit (Figs 7A, 9E) [6]. The more or less equal distribution of bristles over the bottom of the pit as found in the *nana*-group (Fig. 7C) is undoubtedly the plesiomorphic state of this character.

The elucidation of the phylogenetic position of the *panteli*-group is impeded by the strong specializations found in the hook and the T7 glandular pit which do not allow a comparison with the other groups. But the relatively long sclerotized trough in the shaft of the hook would argue for a position basal to the three other groups.

The cladogram shown in Fig. 1 requires the assumption of a repeatedly independent reduction of wings. Since several species of the *carpetana*-group still have rudimentary hindwings and relatively long forewings, the disappearance of the hindwings and reduction of the forewings to squamiform structures not surpassing the mesonotum [1] must have occurred in all groups independently, twice even within the *carpetana*-group (not indicated in the cladogram). The extreme reduction found in the *nana*- and *subaptera*-group (forewings very narrow, broadest at the base, Figs 7K,L), accordingly, should

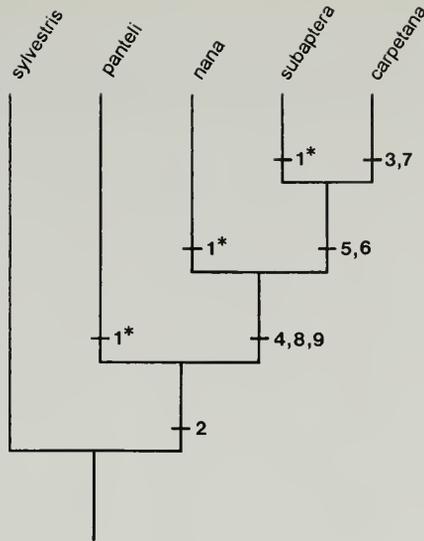


Fig. 1. Cladogram showing the assumed relationships between the *carpetana*-group and related groups of the Ectobiinae. The numbers represent apomorphic characters listed in Tab. 1; homoplasies marked with an asterisk. Autapomorphies of the other groups not shown. The *sylvestris*-group only serves here as a representative of the more basal groups; it is not necessarily the sister group of the other four groups.

also have been independent events (not indicated in the cladogram). The independent evolution of similarly reduced wings does not seem to be extremely unlikely. Wing reduction obviously was a very frequent event in cockroach evolution. Similar reduction stages can be found at virtually all taxonomic levels.

A tentative cladogram of the species of the *carpetana*-group is shown in Fig. 2 (Table 2). It shows a basal dichotomy separating the species having reddish interocular space [5] and a pair of well-developed T8 glandular pits separated by a median ridge with a bristle knob [21] (*moralesi*- and

Tab. 1. List of characters used for the reconstruction of the cladogram of Fig. 1.

Characters	No. Apomorphic state	Plesiomorphic state
Wings:		
forewings	1 ¹⁾ widely separated, scarcely longer than mesonotum	touching each other, at least reaching to 2. abdominal segment
hindwings	absent	present
Tergite structures:		
membrane glands	2 present	absent
T7 glandular pit:		
median ridge	3 present	absent
shape of bristles	4 modified	not modified
distribution of bristles	5 – strongly modified	moderately modified
distribution of bristles	6 bristles concentrated at posterior border of pit	distributed over the entire bottom of the pit
distribution of bristles	7 – bristles united to a tuft	two more or less separated portions of bristles
T8 glandular pit	8 present	absent
Genitalia, hook of left phallomere:		
sclerotized trough of shaft	9 in the apical 2/3	in full length of the shaft

1 The reduction of fore- and hindwings is considered here as one character.

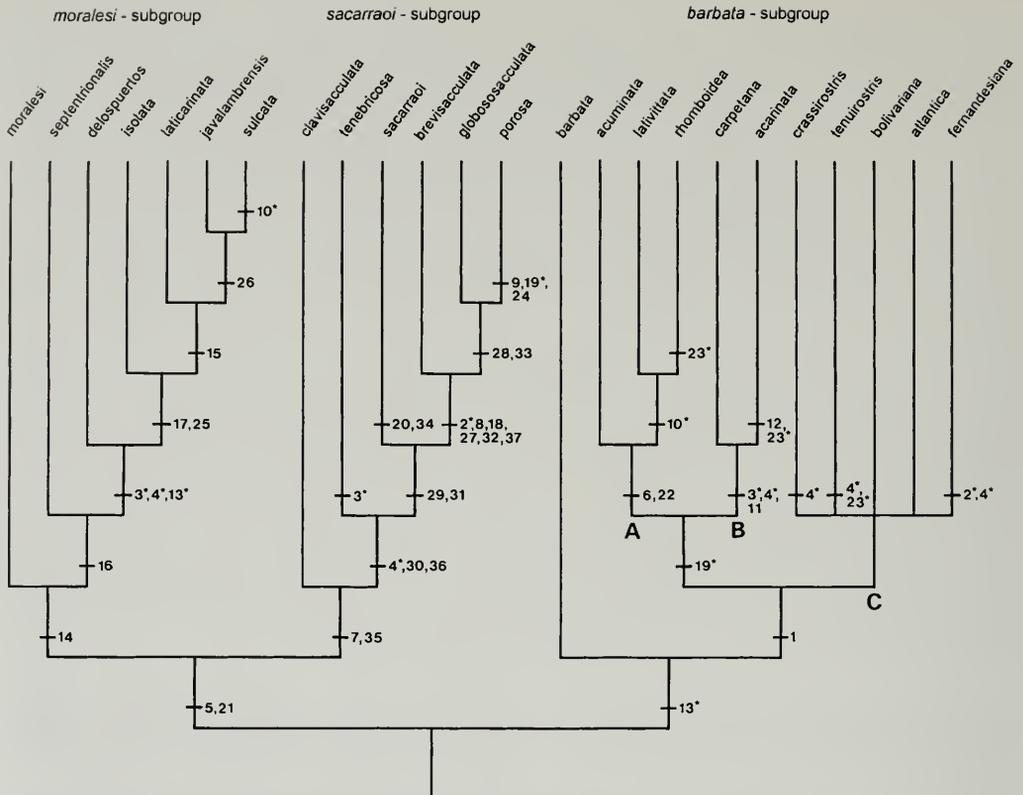


Fig. 2. Cladogram of the species of the *carpetana*-group showing the assumed phylogenetic relationships. The three main branches represent subgroups designated as *moralesi*-, *sacarraoi*-, and *barbata*-subgroup. The numbers represent the main apomorphic characters listed in Table 2; homoplasies marked with an asterisk.

Tab. 2. List of male characters used for the reconstruction of the cladogram of the *carpetana*-group (Fig. 2); apomorphies 5-8 are also valid for females.

Characters	No. Apomorphic state ¹⁾	Plesiomorphic state
Wings:		
forewings ²⁾	widely separated	touching each other
	1 – long, surpassing the metanotum	
	2 – of intermediate length	
	3 – short, not longer than mesonotum	
hindwings	4 not or not clearly set off	clearly set off
Colouration:		
head, interocular space	5 reddish	dark
pronotum disk	6 regularly with lateral extensions	not regularly with extensions ³⁾
T7 glandular structures:		
pits	7 with deep pouches	open bowl-shaped
	8 – pouches opening into a lowered atrium	openings on segment surface

- 1 The further modification of a previous apomorphic state is indicated by a dash (apomorphies 7-9 etc.).
- 2 Apomorphies 1-3 represent the three most frequently observed reduction forms of the forewings; they do not necessarily represent successive reduction steps.
- 3 In the apomorphic state the extensions are present in all individuals (males and females), in the plesiomorphic state extensions may be present, but in the females only exceptionally (see remarks under *P. acuminata*).

Tab. 2. (continued).

Characters	No.	Apomorphic state ¹⁾	Plesiomorphic state
	9	– pouches reduced to flat baglike structures	not reduced
median ridge	10	reduced to transversal furrows	well-developed
	11	strongly lowered behind anterior process ⁴⁾	not lowered
anterior process	12	– almost completely missing ⁵⁾	
	13	very distinct	weakly set off
	14	with transversal folds/furrows	without
bristle tuft	15	– transversal furrows deepened to slits	no slits
	16	invaginated	not invaginated ⁶⁾
	17	longitudinal ridge within the bristle tuft	without
	18	complete bristle tuft on a broad bulge	not so
	19	forming a long band with parallel borders	not so
	20	absent	present
T8 glandular structures:			
pits	21	well-developed, with median ridge	shallow, no median ridge
	22	forming a kidney shaped transversal trough	not so
	23	absent	present
median ridge	24	margins with huge glandular pores	with small or no pores
	25	membranous crest regularly folded	not regularly folded
	26	– crest forming a torus with a posterior extension	not forming a torus
bristle knob	27	mainly sclerotized	membranous
	28	lowered, almost incorporated into ridge	strongly elevated
surface behind pits	29	with median longitudinal elevation and adjacent lateral depressions	without elevations and depressions
Genitalia, hook of left phallomere:			
shaft	30	sclerotized trough much shorter than ½ of its length	longer
	31	spine or dent at apical end	without spine or dent
	32	curved	straight
stalk	33	long, claw not reaching to spine (dent)	short, claw reaching or surpassing the spine (dent)
hook	34	highly specialized ⁷⁾	not specialized in this way
Other structures:			
supraanal plate (T10)	35	short, posteriorly broadly rounded	long, less broadly rounded
subgenital plate	36	apical sclerotization slightly reduced ⁸⁾	not reduced
	37	– strongly reduced	

4 In *P. bolivariana* there is – due to the ascending anterior process – also a deep step between anterior process and the median ridge behind, but the ridge itself is not lowered.

5 Because of the absence of the median ridge pits of both sides combine to a common transversal furrow similar to apomorphy 13, but differing by the stronger deepness of the furrow and the presence of a prominent anterior process partly covering the furrow.

6 see discussion on p. 14, 3rd paragraph.

7 see discussion on p. 20, 4th paragraph.

8 see discussion on p. 20, 4th paragraph.

sacarraoi-subgroup) from those having a dark interocular space and, on T8, only rather obsolete depressions (*barbata*-subgroup). Comparison with the outgroups indicates that the latter more likely represents the plesiomorphic state: The species of the *nana*-group have very similar T8 glandular pits (Fig. 7D); in the *subaptera*-group these structures vary considerably, from well-developed to nearly obsolete; but the median ridge – typical of the left branch – is never found. Other features of the presumable stem species of the *carpetana*-group are: relatively long, rounded wings reaching at least up to the posterior border of T2 and a pair of T7 glandular pits completely separated by a ridge [3 in Table 1], posteriorly bearing the tuft [7 in Table 1], anteriorly with a little pronounced noselike

projection, the anterior process. The anterior process becomes more pronounced in the more derived species of the *moralesi*- and *barbata*-subgroup [13].

The three main branches of the dendrogram represent three well-defined subgroups. A common feature of the species of the *moralesi*-subgroup is the formation of transversal cuticular folds/furrows on and above the anterior process of T7 glandular pit [14]. In the more derived species (*P. laticarinata*, *P. javalambrensis*) the furrows are deepened to pronounced slits [15]. The close relationship of the five terminal species is well-founded by a series of apomorphic characters: pronounced anterior process on the median ridge of the T7 glandular pit [13]; invagination of the tuft area already indicated in *P. septentrionalis* [16]; very short and narrow forewings [3], no hindwings [4]. Important steps in the evolution of this group are: Development of a longitudinal ridge within the bristle tuft [17]; the membranous crest of the ridge separating the glandular pits of T8 becoming regularly folded [25] and finally transforming to a round swelling (torus) [26]. In *P. sulcata* the glandular pits of T7 are reduced to narrow transversal furrows [10].

Considering the great similarity between *P. isolata* and *P. javalambrensis* in the regular folding of the membranous crest of the median ridge of T8 (Figs 15H, 19H) one might argue for a closer relationship of the two species. But the great similarities of the T7 glandular pits between *P. delospuertos* and *P. isolata* on the one hand, and between *P. laticarinata* and *P. javalambrensis* on the other hand (not contained in Table 2) and the common possession of deep slits on the anterior process [15] in *P. laticarinata* and *P. javalambrensis* but not in *P. isolata* clearly argue for the relationship shown in Fig. 2. The absence of transversal slits in *P. sulcata* (not specified in Table 2) has to be seen in connection with the reduction of the complete complex. The less regular arrangement of the folds in *P. laticarinata* (Fig. 17I) then would be due to a secondary reduction possibly in connection with the broadening of the ridge. The proposed phylogeny is additionally supported by the steady shortening of the anterior process at least from *P. isolata* to *P. javalambrensis* (not specified in Table 2).

The species of the *sacarraoi*-subgroup are characterized by deep glandular pouches on T7 [7] which, however, in one of the terminal species (*P. porosa*) are secondarily reduced to small and flat baglike structures [9]. Another characteristic is the rather short and posteriorly broadly rounded (in *P. sacarraoi* transversely cut) supraanal plate (T10) [35]. The hook, which in the species of the other subgroups is almost invariable, shows various modifications useful for the reconstruction of the phylogeny: shortening of the sclerotized trough of the shaft to less than half of its length [30], development of a dental process at the apical end of the shaft [31], curvature of the shaft [32], elongation of the stalk of the claw [33]. An extremely aberrant hook is found in *P. sacarraoi* [34] (see below). Another structure variable within the subgroup is the length of the apical sclerotization of the subgenital plate (Table 3). In the sequence of the assumed phylogeny the sclerotization is steadily reduced. For the construction of the cladogram only the two steepest steps in the reduction series are considered as apomorphies: 62% → 56% [36] and 53% → 48% [37]. Other apomorphic characters of the more derived species are sclerotization of the bristle knob [27], and finally its diminishment and disappearance [28]. Obviously, the hindwings were reduced very early in the evolution of the group [4]; forewings at least twice independently reduced [2,3].

The position of *P. sacarraoi* as indicated in the cladogram seems to be contradictory to some of its characters. The apparent discrepancies are due to its highly aberrant hook. *P. sacarraoi* should, for example, have apomorphy [30], but the sclerotized trough of the hook measures about half of its length (Fig. 57N). However, the strong narrowing of the shaft towards the base suggests a diminuation of the

Tab. 3. Length of apical sclerotization of the male subgenital plate in the *sacarraoi*-subgroup (compared with *P. moralesi*), in % of total length; points of measurements see Fig. 24L.

	N	mean [%] ± SD	range [%]
<i>P. clavisacculata</i>	8	62 ± 1.4	61-65
<i>P. tenebricosa</i>	20	56 ± 3.1	51-61
<i>P. sacarraoi</i>	16	53 ± 2.6	47-56
<i>P. brevisacculata</i>	10	48 ± 2.5	44-51
<i>P. globosacculata</i>	16	46 ± 3	42-51
<i>P. porosa</i>	7	44 ± 2.2	40-47
<i>P. moralesi</i>	10	61 ± 2.6	60-65

basal parts; the relative size of claw and trough is not different from that of *P. tenebricosa* (Fig. 261) having apomorphy [30]. Whether the angle in the shaft is correlated with apomorphy [32, curvature of the shaft] remains unclear. Apomorphy [33, elongation of the stalk] seems also to be realized in *P. sacarraoi* and would suggest a possible positional exchange with *P. brevisacculata*. Similarities in the shape of the median ridge with *P. globososacculata* would also point in this direction. But a series of synapomorphies [8, 18, 27, 37] shared by *P. brevisacculata* and *P. globososacculata*, and partly also by *P. porosa*, in my eyes argues for the relationships as shown in Fig. 2. The elongation of the stalk in *P. sacarraoi* is thus considered as an independent development in connection with the strong transformation of the hook [34].

The close relationship of *P. porosa* with *P. globososacculata* is – apart from synapomorphies [28, 33] – further supported by other features not contained in Table 2. The shape of the pits in T7 (flat pouches) and T8 (very low pits) in *P. porosa* suggest that a dorsal-ventral flattening of the structures of the tergites had occurred. The shape of the bristle tuft in *P. porosa* (longitudinal band) is quite unusual for the subgroup, but can easily be deduced from a shape found in *P. globososacculata* when it is assumed that the longitudinal bulge bearing the bristle tuft is strongly reduced in height (compare Figs 32H and 34G). The assumed flattening could also have caused the disappearance of the atrium in *P. porosa* (not specified in Table 2). The two species also share the elevations between bristle tuft (or bulge with bristle tuft) and the lateral borders of the pouch openings; however, this structure is not found in the southern population of *P. globososacculata* (see there under remarks).

The species of the **barbata**-subgroup have, as a plesiomorphic feature, mostly obsolete glandular pits on T8. While *P. barbata* has – a presumably plesiomorphic feature – long, broadly rounded forewings nearly touching each other, in the other species distinctly shaped forewings have been developed: The wings are long, passing beyond the metanotum, but narrow and well separated, broadest near the middle [1]. Wings have been further reduced: only hindwings in *P. crassirostris* and *P. tenuirostris* [4], both pairs of wings in *P. carpetana* and *P. acarinata* [3,4], and, to a lesser degree, in *P. fernandesiana* [2,4]. The glandular structure of T7 originally (*P. barbata*, as presumably also in the stem species of the whole *carpetana*-group) consists of a pair of bowl-shaped pits separated by a median ridge. This shape is maintained with only little variation in all species of branch C; in the other branches the median ridge [11,12] (branch B) or the pits including the ridge may be reduced [10] (branch A). Reduction of the pits of T8 obviously has occurred several times independently (*P. rhomboidea*, *P. acarinata*, *P. tenuirostris*) [23].

There is little doubt about the close relationship of the species within **branch A** or **B**, but the proposed mutual relationships are less well-founded. The common feature in the T7 glandular pits [19] is also found in a similar expression in *P. porosa* (*sacarraoi*-subgroup), a fact which may relativize the value of this synapomorphy though I am quite certain that both structures are homoplasies (see p. 21, 2nd paragraph). The geographical distribution of the species of both branches – they are mainly restricted to the central sierras of the Iberian peninsula (Figs 5,6) – also supports the proposed relationships.

Macroscopically, *P. carpetana* and *P. acarinata* (branch B) are very similar to the species of the upper branch of the *moralesi*-subgroup (*P. delospuertos* through *P. sulcata*). Similar colouration and wing structures [3,4] make them nearly indistinguishable in the field (geographically they are separated). They also share a distinct anterior process [13] neither found in the two basal species of the *moralesi*-subgroup nor in the *sacarraoi*-subgroup. However, the species of the two groups show strong differences in the glandular structures of T8 [21] and in the colouration of the interocular space [5]; moreover, the transversal furrows/folds on the anterior process [14] and the invagination of the bristle tuft [16] are not found in the species of branch B. The assumption of an independent reduction of the wings (s. above) and independent development of a more pronounced anterior process seems to be the more likely hypothesis.

There is another similarity with species of the *moralesi*-subgroup: *P. lativittata* and *P. rhomboidea* (branch A) have similarly reduced T7 glandular pits as *P. sulcata* [10]. But the strong differences between the two groups just mentioned [5,21] and, in addition, the differences in the shape of the pronotum disc [6] and in the wing structures [1] make a close relationship quite unlikely. Independent reduction of the glandular pits of T7 in both groups is, in my eyes, the more parsimonious assumption.

The phylogeny of the species of **branch C** cannot be resolved satisfactorily. The species in various combinations share certain features which, however, in no case can be convincingly used as synapomorphies for the establishment of sister-group relationships: 1. *P. crassirostris* and *P. tenuirostris* have

similarly reduced hindwings [4], a characteristic they also share with *P. fernandesiana* which, in addition, has shortened forewings [2]; but wing reductions are susceptible to homoplasies. 2. There are similarities between *P. tenuirostris* and *P. bolivariana* in the shape of T7 (posterior border strongly concave) and the T7 glandular pits (narrow anterior process, relatively steep mound behind openings); but the differences in the shape of the T7 gland within one species (*P. fernandesiana*) are nearly as great as between the species. 3. *P. bolivariana* has in common with *P. atlantica* and *P. fernandesiana* a similarly coloured coxa (half dark half whitish); but this feature is not realized in all individuals of *P. fernandesiana*. 4. Finally *P. atlantica* and *P. fernandesiana* are similar in the light pigmentation of T7 and T8; but *P. barbata*, the most basal species of the subgroup, may have similarly lightened tergites.

Geographical distribution

The four closely related groups of *Phyllodromica* shown in Fig. 1 seem to have evolved and radiated within the Iberian peninsula: the *carpetana*-group is found only within the peninsula (s. below); the *nana*-group is restricted to its northeastern corner; the *panteli*-group is distributed in the southern part of the peninsula and in northern Morocco – in the latter region only with the more derived species; *subaptera* is the only group with a wider distribution including most Mediterranean countries. But the fact that males of this group are only found within the Iberian peninsula argues for an Iberian origin of the *subaptera*-group, too, with a subsequent spreading of presumably parthenogenetic strain(s) over the Mediterranean region.

For a possible candidate as the sister taxon of the whole complex one must look in the *sylvestris*-group, of which four species inhabit mainly northern Spain: *Ectobius lucidus*, *E. brunneri*, *Phyllodromica pyrenaicus*, and *P. chopardi*. Among these *P. pyrenaicus* seems to be the most likely candidate since it has a similar T7 glandular pit as the species of the *nana*-group and at least slightly shortened wings. But the lack of unique synapomorphic characters does not allow a clear decision at the moment.

The geographical distribution of the species of the *carpetana*-group (Figs 3-6) is in good agreement with the proposed relationships (Fig. 2). Most species have a rather restricted distribution. The obviously low mobility of the species is at least partly due to the inability to fly and the preference for higher altitudes. As a consequence many species are still found near to their presumable sites of origin. Thus, closely related species inhabit, in most cases, neighbouring regions. Under favorable conditions it is even possible to project the cladogram upon the distribution map and follow spreading and branching of the species.

The *sacarraoi*-subgroup, for example, as seen from the geographical distribution (Fig. 4), had its origin in the western part of the Sierra Nevada and spread and radiated from there towards the east and north. *P. globosoculata*, the only species of this subgroup with a wider distribution, presumably originated in the area of the Sierra de Segura and then spread over the most part of northern Spain.

The congruence of phylogeny and geographical distribution is also quite obvious in the *barbata*-subgroup despite considerable overlap between species (Figs 5, 6). The two main branches of this subgroup are geographically separated, the left (branches A and B) being restricted to the central, the right (branch C) to the northern sierras, while *P. barbata*, which is closest to the common stem species, is found in both regions.

The distribution of the basal species of the *moralesi*-subgroup (Fig. 3) supposes an initial spreading from south to north. The radiation of the terminal species finally took place within a rather small area in the east, in the area SW of the Ebro Delta. The great distance of *P. isolata* from its next relatives suggests that it has reached its present habitat passively by over-long-distance-dispersal, maybe by birds.

So far, no species of the *carpetana*-group has been found in the southwestern corner of the peninsula and in the region between the Pyrenees and the Ebro, up to its tributary Arga in the west (Fig. 3) inspite of extensive collectings in both areas. Two smaller distributions gaps in montane regions – in Portugal between the rivers Mondego and Douro and in northern Galicia – are most likely due to collecting gaps. Two species have succeeded in colonizing the French Pyrenees and the Corbières: *P. bolivariana* (Fig. 5), presumably coming from the west, and *P. isolata* (Fig. 3, see preceding paragraph).

A further spreading of the group outside the Iberian peninsula does not seem to have occurred. Among the museum material which I could study there were three specimens of supposedly North

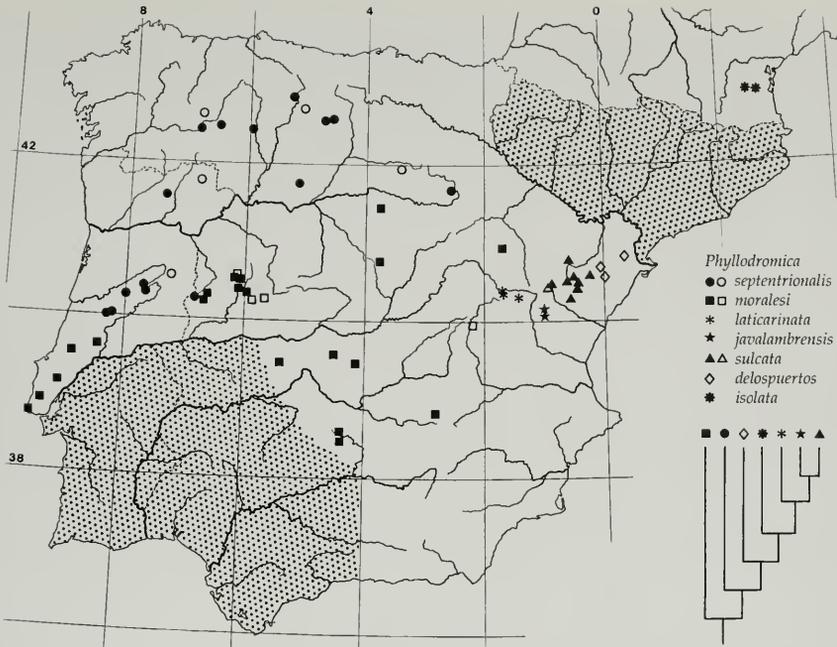


Fig. 3. Geographic distribution of the species of the *moralesi*-subgroup. In cases with two symbols for one species, filled symbols: both sexes found, empty symbols: only female(s) found. At the lower right margin: the cladogram for this subgroup. In the stippled areas so far no representatives of the *carpetana*-group had been found.

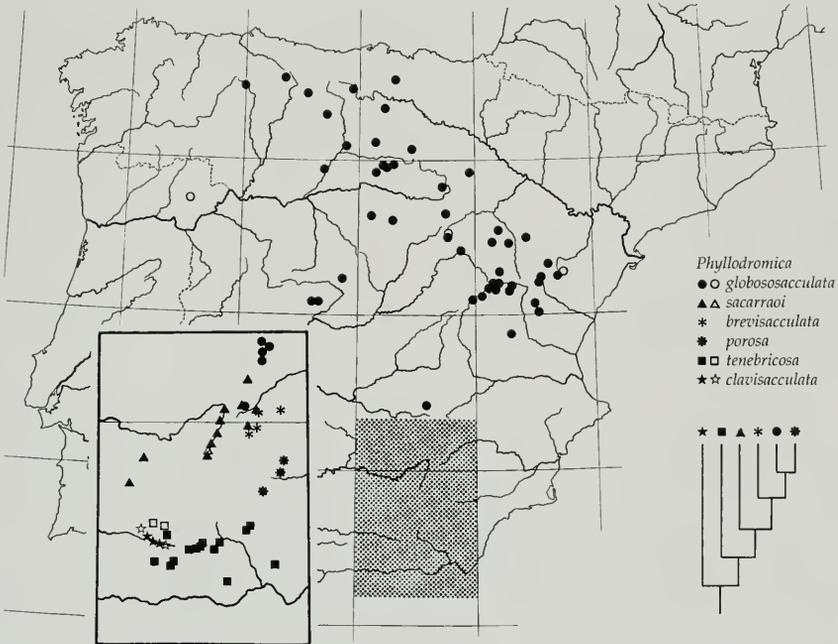


Fig. 4. Geographic distribution of the species of the *sacarraoi*-subgroup; stippled area enlarged at the left. Full symbols: both sexes found, empty symbols: only female(s) found. At the lower right margin: the cladogram for this subgroup.

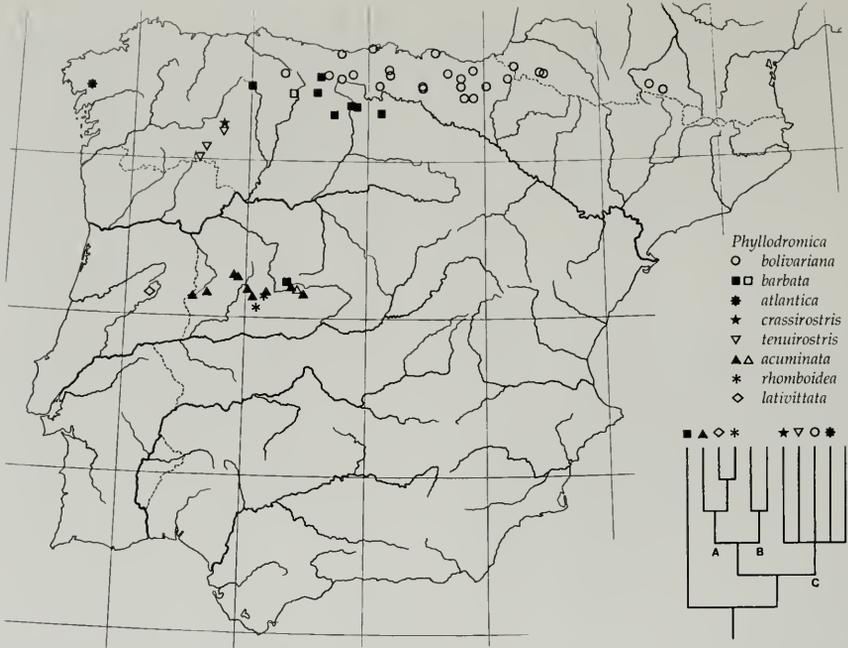


Fig. 5. Geographic distribution for part of the species of the *barbata*-subgroup. In cases with two symbols for one species, full symbols: both sexes found, empty symbols: only female(s) found. At the lower right margin: the cladogram for the subgroup with the species treated in this figure.

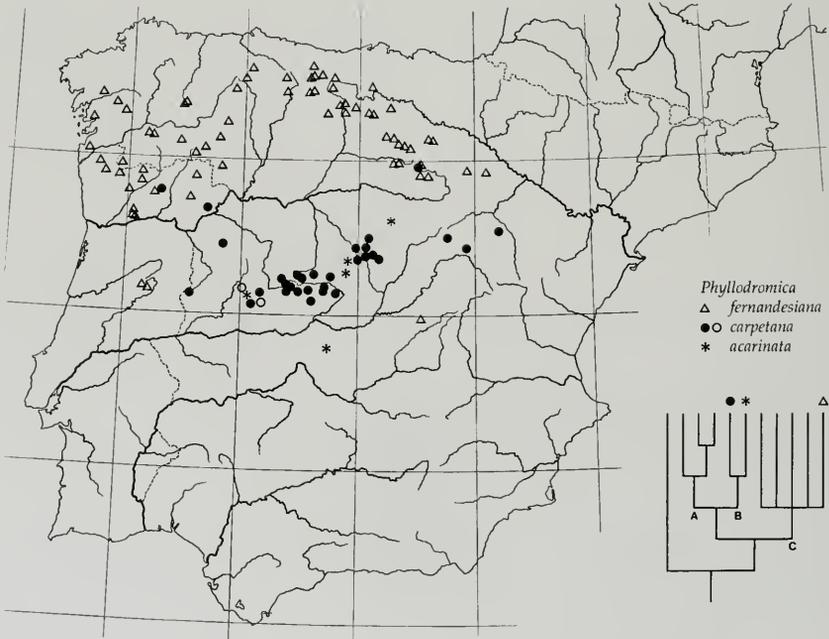


Fig. 6. Geographic distribution for part of the species of the *barbata*-subgroup. In cases with two symbols for one species, full symbols: both sexes found, empty symbols: only female(s) found. At the lower right margin: the cladogram for the subgroup with the species treated in this figure.

African origin. The material from the museum in Madrid contained two females labelled with "Azrou? Fez?". Morales Agacino (1948) had already mentioned the two specimens which presumably belong to *P. sacarraoi*. The third specimen, a male of *P. fernandesiana* from the museum in Paris, did not have any locality label. It was hidden among material from Algeria determined as *Hololanupra algerica* (Chopard). The doubtful and incomplete labellings of the specimens in connection with the fact that I had repeatedly collected cockroaches in North Africa and never found any representative of the *carpetana*-group there makes a North African origin of the three specimens highly unlikely. The *carpetana*-group is obviously endemic to the Iberian peninsula.

Key for the determination of the males of the *carpetana*-group

(Due to its variable wing length *P. porosa* appears twice in the key)

1. Forewings considerably longer than mesonotum, reaching or surpassing the posterior border of the metanotum (Fig. 11A); hindwings set off or not 2.
 - Forewings at the most reaching the middle of the metanotum (Fig. 25A); hindwings not set off (Fig. 25B) 14.
2. Hindwings clearly set off, incision at least up to the middle of the segment (Fig. 37B) 6.
 - Hindwings not set off or only indicated by a shallow emargination at the posterior border of the metanotum (Fig. 27B) 3.
3. Posterior border of T10 (supraanal plate) transversely cut (Fig. 28F); T7 glandular pits with a pair of deep pouches, bristle tuft missing (Fig. 28D); forewings nearly touching each other
 - *P. sacarraoi* Fernandes
 - Posterior border of supraanal plate rounded (Fig. 34F); T7 glandular pit with very short or no pouches, bristle tuft present; forewings widely separated 4.
4. Posterior borders of T6 and T7 nearly straight (Figs 34C,D); T7 glandular pits developed as short flat pouches, tuft area extending far beyond opening (Fig. 34G); T8 strongly sculptured, with two well-developed glandular pits (Fig. 34H) *P. porosa*, spec. nov.
 - Posterior borders of T6 and T7 concave; T7 glandular pits open bowl-shaped, tuft area ending shortly behind opening (Figs 48G, 50G); T8 scarcely sculptured, pits obsolete (Figs 48E, 50E) 5.
5. Posterior borders of T6 and T7 strongly concave (Figs 50C,D), anterior process of T7 gland narrow and long (Figs 50G,H); posterior border of the dark central marking of T7 in the middle transversely cut, laterally with posterior extensions (Fig. 50D) *P. tenuirostris*, spec. nov.
 - Posterior border of T6 and T7 less strongly concave (Figs 48C,D), anterior process of T7 gland broad and short (Figs 48G,H); dark central marking of T7 in the middle with a broad trigonal posterior extension (Fig. 48D) *P. crassirostris*, spec. nov.
6. Forewings egg-shaped, broadest behind the middle, apex broadly rounded, nearly touching each other or separated (Fig 36L) 11.
 - Forewings reversely egg-shaped, usually broadest in or near the middle, apex narrowly rounded, well-separated (Fig. 38O) 7.
7. Disk of pronotum semicircular, without lateral extensions (Fig. 51A); distal ½ of coxa whitish ...
 - 10.
 - Disk of pronotum posteriorly with lateral extensions possibly reaching the lateral border of the pronotum (Fig. 37A); at most distal ¼ of coxa whitish 8.
8. Lateral extensions usually not reaching lateral borders of the pronotum (Fig. 41A); surface of T8 more or less smooth, without glandular pits (Fig. 41H) *P. rhomboidea*, spec. nov.

- Lateral extensions reaching lateral borders of pronotum; surface of T8 strongly sculptured, anteriorly with a narrowly kidney-shaped transversal groove posteriorly followed by a rounded or triangular elevation 9.
- 9. Lateral extensions very broad (Figs 39A,C); T7 glandular pits reduced to a broad transversal furrow (Figs 39E-G); elevation of T8 broadly rounded (Fig. 40H) *P. lativittata*, spec. nov.
- Lateral extensions less broad (Fig. 37A); T7 glandular pits well-developed (Fig. 37E); elevation of T8 triangular (Figs 38H-K) *P. acuminata*, spec. nov.
- 10. Forewings very narrow (length/breadth 1.72-1.84), T8 anteriorly dark (Fig. 52E), behind pits of T7 with a relatively steep mound *P. bolivariana*, spec. nov.
- Forewings broader (length/breadth 1.55-1.67), T8 anteriorly lightly coloured (Figs 54E,H), behind pits of T7 with a flat mound *P. atlantica*, spec. nov.
- 11. T7 glandular pits with deep pouches, openings occupying most of the tergite length (Fig. 24D); posterior border of T6 strongly concave (Fig. 24C) *P. clavisacculata*, spec. nov.
- T7 glandular pits without deep pouches, openings much smaller; posterior border of T6 less strongly concave 12.
- 12. Posterior border of T10 broadly rounded (Fig. 36F), T8 with very shallow glandular pits (Fig. 35G), interocular space dark *P. barbata*, spec. nov.
- Posterior border of T10 narrowly parabolic (Fig. 10F), T8 with a pair of deep pits, separated by a high ridge (Fig. 9G), interocular space reddish 13.
- 13. T7 glandular pits in outline semicircular, posterior borders quite distinct (Figs 9F,G); knob of T8 glandular pits at the level of the remaining crest *P. moralesi* Fernandes
- T7 glandular pits without definable posterior border (Fig. 11E); knob of T8 glandular pits much higher than remaining crest *P. septentrionalis*, spec. nov.
- 14. Forewings relatively broad, distance between wings not larger than wing breadth (Figs 29A, 33C) 15.
- Forewings narrow, distance between wings considerably larger than wing breadth (Figs 25A, 13A, 43A) 18.
- 15. Distal ½ of coxae whitish (in most cases), T8 glandular pits obsolete, interocular space dark *P. fernandesiana*, spec. nov.
- At most distal ¼ of coxae whitish, T8 glandular pits well-developed, interocular space reddish 16.
- 16. T7: posterior border nearly straight, glandular pits forming short pouches not surpassing the anterior border of the segment (Fig. 34D) *P. porosa*, spec. nov.
- T7: posterior border strongly concave, glandular pits forming large pouches considerably surpassing the anterior border of the segment 17.
- 17. Pouches not or only slightly widening beyond opening, shorter than length of tergite (Figs 30D,H) *P. brevisacculata*, spec. nov.
- Pouches strongly widening beyond opening, globular, at least of the length of the segment (Fig. 32D) *P. globosacculata*, spec. nov.
- 18. T8 glandular pits well-developed, interocular space reddish 20.
- T8 glandular pits obsolete or missing, interocular space dark 19.
- 19. Anterior process of T7 glandular pit sinusoid, gradually tapering towards the rounded tip (Figs 46D,H,G); T8 without pits (Fig. 46E) *P. acarinata*, spec. nov.
- Anterior process dentiform, with almost parallel borders (Figs 44D,G-I); T8 with shallow pits, at least anterior borders clearly visible (Fig. 43H) *P. carpetana* (Bolívar)

20. T7 gland with a pair of deep pouches extending far beyond anterior border of tergite (Fig. 26D) *P. tenebricosa*, spec. nov.
- T7 with no or only short pouches not extending beyond the anterior border of the tergite 21.
21. Anterior process and median ridge of T7 pit almost missing, pits reduced to narrow transversal furrows (Fig. 21F) *P. sulcata*, spec. nov.
- Anterior process, median ridge and pits well-developed 22.
22. Median ridge nearly not extending behind anterior process, tuft area invaginated below surface, but in itself plane (Figs 14G,H) *P. delospuertos*, spec. nov.
- Median ridge continuing well behind anterior process and elevating the tuft area medially more or less in full length (Fig. 18E) 23.
23. Tuft area much narrower than the laterally remaining parts of the pit openings (Fig. 15C); surface behind openings elevated to a relatively high, broad mound modelling the pits to oblique broad troughs opening in the lateroposterior edges (Figs 15E, 16G) *P. isolata*, spec. nov.
- Tuft area as broad as or broader than the laterally remaining parts of the pit openings (Fig. 18G); surface behind openings nearly not elevated, gland openings directed posteriorly (Figs 17E, 19D) 24.
24. T7: ridge in tuft area low and broad (Fig. 19D), pits relatively shallow; T8: median ridge narrower, crest forming a membranous, posteriorly tapering torus regularly segmented by narrow slots, bristles reduced (Figs 19G,H) *P. javalambrensis*, spec. nov.
- T7: ridge in tuft area high and narrow (Fig. 18G), pits rather deep; T8: median ridge unusually broad, crest membranous, with widely separated transversal folds, at the posterior end with numerous bristles (Figs 17H,I) *P. laticarinata*, spec. nov.

Description of species

1. *Moralesi*-subgroup

The species of this subgroup (*P. moralesi*, *P. septentrionalis*, *P. delospuertos*, *P. isolata*, *P. laticarinata*, *P. javalambrensis*, *P. sulcata*) are characterized by the transversal folds/furrows above the anterior process. Glandular pits of T8 well-developed, with median ridge and bristle knob; interocular space reddish.

Phyllodromica moralesi Fernandes, 1962

Figs 3, 9A-H, 10A-P

Phyllodromica moralesi Fernandes, 1962: 207, figs 10 A,B; Princis 1965: 37, 45; 1971: 1106; Harz 1976: 297, figs 1027-1031.

Types. Holotype: ♂, Tapada de Mafra; allotype, ♀ and 4 paratypes, 2♂♂, 2♀♀, same data as holotype (Museu Bocage, Lisboa); 1♂ paratype, Soure (Laboratório de Biologia Florestal de Lisboa). All types destroyed by a fire. Neotype, herewith designated, ♂, Portugal, Distr. Lisboa, Cheleiros (10 km S Mafra), 50 m, 19.IV.1991, leg. Bohn (on two slides, Po9/5).

Additional material. Portugal. Distr. Lisboa: Po 8, 9 (same data as neotype), 10. Distr. Leiria: Po 11. Distr. Santarém: Po 12. Spain. Prov. Salamanca: Sp 170 (♀), 171a, 172a, 174(a), 225. Prov. Salamanca/Cáceres: Sp 173a, 226. Prov. Cáceres: Sp 175 (♀), 233. Prov. Cáceres/Avila: 176 (♀). Prov. Segovia: Sp 439. Prov. Madrid: Sp 5a. Prov. Toledo: Sp 295. Prov. Ciudad Real: Sp 11a, 290, 291, 294. Prov. Guadalajara: Sp 335. Prov. Cuenca: Sp 95 (♀).

Description

Size. Portuguese specimens. Length of pronotum: ♂ 1.86-2.05 (mean 1.98) mm, ♀ 2.11-2.37 (mean 2.23) mm; length of wings: ♂ 2.08-2.53 (mean 2.31) mm. Spanish specimens. Length of pronotum: ♂ 1.54-1.79 (mean 1.7) mm, ♀ 1.92-2.18 (mean 2.08) mm; length of wings: ♂ 1.73-2.14 (mean 1.95) mm.

Wings. Male: Forewings from touching each other to well separated, reaching or surpassing the posterior border of the metanotum, egg-shaped, broadest behind the middle, apex broadly rounded. Hindwings clearly set off. Female: Forewings widely separated, hatchet-shaped (Fig. 10P) or rounded hatchet-shaped (Fig. 10O). Hindwings absent.

Colouration. Male: Pronotum. Disk dark (Fig. 9A) or orangish (Fig. 9C), semicircular or rounded triangular, anteriorly often extending up to the anterior border of the pronotum, and interrupting there the whitish transparent margin. In animals with orange disk central part of mesonotum also orange. Tergites. Lightly coloured margins relatively broad. Head. Interocular space reddish. Legs. Whitish distal zone of coxa may comprise nearly half of the coxa length. – Female: Pronotum as in male; individuals with reddish pronotum may also have a variously lightened meso- and metanotum, but individuals with dark pronotum never with yellowish patches in the dark central area of meso- or metanotum (compare with females of *P. septentrionalis* and of the *sacarraoi*-subgroup). Tergites. Patchy zone broad, nearly as broad as the remaining dark anterior area. Head. Interocular space or complete face reddish. Legs variously lightened, often almost completely yellowish.

Male tergite structures. Posterior borders of T6 moderately, of T7 more strongly, of T8 weakly concave, of T10 convex, narrowly parabolic. Glandular pits of T7 (Figs 9E,F, 10D,H,I) open bowl-shaped, in outline semicircular, anterior walls often deepened to shallow pouches (Fig. 10H); median ridge well-developed, relatively narrow, anterior process not well set off, posterior part of ridge broadening to a pyramidal structure bearing the very extended bristle tuft (Figs 10H,I); above (anteriorly) the ridge with weak transversal folds (arrow in Fig. 9F); segment surface behind the pit openings with an extended and rather prominent dome-shaped elevation (Fig. 9E). Pits of T8 (Figs 9G,H, 10E,G) open bowl-shaped, posterior walls deepened to shallow pouches; median ridge well-developed, crest of ridge membranous (Fig. 10G) posteriorly ending in a well-developed bristle knob (Fig. 9H).

Male genitalia. Hook of left phallomere. Shaft straight, with sclerotized trough along its apical ½.

Remarks. The type material has been lost in 1979 by a fire in which the complete collection of the Museu Bocage was destroyed. Since I could not find any other species of the *carpetana*-group in the further surroundings of the locus typicus (Tapada de Mafra) – the next locality with other species is as far as about 160 km away – I have no doubt about the correct designation of the neotype. The Portuguese specimens differ in several aspects from those of central Spain: 1. They are considerably larger (see size). 2. They have broader wings almost touching each other; the Spanish forms usually have well separated wings. 3. Forms with reddish pronotum disk are mainly found among the Portuguese populations; there was only one Spanish locality (Sp 225) near the Portuguese frontier containing one female with orange pronotum.

Geographical distribution (Fig. 3). Dispersed in the central and western part of the Iberian peninsula, at altitudes between 50 (Atlantic coast) and 1700 m.

Accompanying species, discrimination of females. *P. acuminata* (Sp 171, 172, 174, 225): pronotum disk with lateral extensions, interocular space dark; *P. carpetana* (Sp 5) and *P. acarinata* (Sp 295): Wings narrower, interocular space dark; *P. globososacculata* (Sp 11, 335): indistinguishable except for individuals which have a pair of light markings on the meso- or metanotum.

Phyllodromica septentrionalis, spec. nov.

Figs 3, 11A-H, 12A-N

Holotype: ♂, Portugal, Distr. Coimbra/Leiria, Serra da Lousã, betw. Espinhal & Campelo, 800 m, 21.IV.1991, leg. Bohn (on two slides, Po 13/3).

Additional material. **Portugal.** Distr. Bragança: Po 24 (♀). Distr. Vila Real: Po 26. Distr. Guarda: 2♀♀, Guarda; 1♀, Manteiga, Sa. Estrela, 5.VI.59, Morales (MNHNM); Po 16, 17. Distr. Coimbra: Po 15. Distr. Coimbra/Leiria: Po 13 (same data as holotype). Distr. Leiria: Po 14. **Spain.** Prov. Orense: Sp 318. Prov. León: Sp 152 (♀), 153, 159 (♀), 320, 323. Prov. Salamanca/Cáceres: Sp 227. Prov. Palencia: Sp 133, 134. Prov. Valladolid: Sp 433. Prov. Burgos: Sp 84a (♀). Prov. Soria: Sp 330.

Etymology. The name of the species refers to the more northern distribution of the species as compared to the very similar species *P. moralesi*.

Description

Size. Length of pronotum: ♂ 1.6-1.86 (mean 1.76) mm, ♀ 1.92-2.24 (mean 2.12) mm; length of forewings: ♀ 1.92-2.37 (mean 2.12) mm.

Wings. Male: Forewings touching each other or nearly so, at least reaching or surpassing the posterior border of the metanotum, egg-shaped, broadest behind the middle, apex broadly rounded. Hindwings clearly set off. Female: Forewings widely separated, hatchet-shaped (Fig. 12N) or rounded hatchet-shaped (Fig. 11D). Hindwings absent.

Colouration. Male: Pronotum. Disk dark (Fig. 11A), sometimes orangish (Fig. 11C), semicircular; whitish margin anteriorly often very narrow, but disk rarely reaching the anterior border of the pronotum; in individuals with orangish disk central part of the mesonotum also of the same colour. Head. Interocular space reddish. Legs. Whitish distal part of the coxa may comprise half of its length, tibia and femur often variously lightened. Female: Pronotum as in male with dark or orangish disk. Individuals with dark disk may have yellowish patches on meso- and metanotum (Fig. 11D), usually close together and often near to or in connection with the light posterior border (compare with *P. globososacculata*, Fig. 31D). Tergites. Patchy zone broad, nearly as broad as remaining anterior dark area. Head. Interocular space or complete face reddish. Legs. Variously lightened, often nearly completely yellowish; but dorsal (anterior) edge of femora at least partly dark (difference to the otherwise very similar *P. moralesi* and *P. globososacculata*).

Male tergite structures. Posterior borders of T6 moderately, of T7 strongly, of T8 weakly concave, of T10 convex, narrowly parabolic. Glandular pits of T7 (Figs 11E,F, 12D,G) with ill-defined lateral and posterior borders, rather shallow, with only weak pouches; median ridge broad, anterior process not set off, above ridge (anteriorly) with weak transverse folds (Fig. 11F); bristle tuft less extended than in preceding species but still quite large, more or less invaginated, on top of an elevation which is not much broader than the bristle tuft and which gradually slopes down towards the posterior border of the segment (Fig. 11E). Glandular pits of T8 (Figs 11G,H, 12E,H) open bowl-shaped, separated by a well-developed median ridge with membranous crest (Fig. 12H); bristle knob highly elevated above the crest (Fig. 11H); posterior walls of pits possibly deepened to very shallow pouches (arrow in Fig. 12H). Elevation behind the pits tripartite by two shallow longitudinal depressions near the middle (Fig. 11G).

Male genitalia. Hook of left phallomere. Shaft straight, or nearly so, with sclerotized trough along its apical ½.

Geographical distribution (Fig. 3). Dispersed in the northern part of the Iberian peninsula, at altitudes of 300-1500 m. The gap in the distribution between the rivers Mondego and Douro in Portugal is presumably due to the absence of collecting data in this region.

Accompanying species, discrimination of females. *P. fernandesiana* (Po 17, Sp 134, 153): coxa usually half dark and half whitish, interocular space dark; *P. acuminata* (Sp 227): pronotum disk with lateral extensions, interocular space dark; *P. carpetana* (Po 26, Sp 227): wings narrower, interocular space dark; *P. barbata* (Sp 134): legs for the most part dark, interocular space dark; *P. globososacculata* (Sp 134, 330): often not unambiguously distinguishable, more central position of yellow markings on meso- and metanotum (if present), femora without dark dorsal edge.

Phyllodromica delospuertos, spec. nov.

Figs 3, 13A-H, 14A-O

Holotype: ♂, Spain, Prov. Tarragona, surr. of Los Puertos (ca. 20 km W Tortosa), 750-1400 m, 11.IV.1992, leg. Bohn (on two slides, Sp 265/1).

Additional material. Spain. Prov. Tarragona: Sp 265 (same data as type). Prov. Castellón: Sp 266, 365.

Etymology. The name of the species refers to the distribution area, frequently in combination with the name puertos – Puertos de Beseit, Los Puertos (locality and region).

Description

Size. Length of pronotum: ♂ 1.76-1.86 (mean 1.78) mm, ♀ 1.92-2.11 (mean 2.02) mm; length of wings: ♂ 1.28-1.47 (mean 1.39) mm.

Wings. Both sexes. Forewings widely separated, scarcely longer than mesonotum, reversely egg-shaped, apex acutely (Fig. 14O) or obtusely (Fig. 14N) rounded. Hindwings missing.

Colouration. Male: Pronotum. Disk dark, semicircular, lateroposterior edges sometimes with weak lateral extensions. Tergites with relatively broad light posterior margins (as compared to the following three species). Head. Interocular space reddish. Legs. Whitish distal zone of coxa not longer than $\frac{1}{4}$ of its length; often tibia and, sometimes, also distal part of femur slightly lightened. Female: Pronotum as in male. Tergites very dark, patchy zone almost missing except possibly laterally. Head. Interocular space, sometimes complete face, reddish. Legs often moderately lightened to a various extent. Wings (both sexes) often with infuscated margins.

Male tergite structures. Posterior borders of T6 moderately, of T7 strongly angularly, of T8 weakly concave, of T10 convex, between narrowly and broadly parabolic (usually less broadly rounded than appearing on Fig. 14F). Glandular pits of T7 (Figs 13D-F, 14D,G,H) forming rather deep posteriorly diverging troughs (Figs 13D, 14G,H) medially ending at the median ridge in relatively deep pouches (arrows in Figs 14G,H); between the troughs posteriorly with a rounded elevation bearing the bristle tuft (Fig. 13E). Anterior process well set off (Figs 13E,F), completely covering the median ridge, in dorsal view rounded triangular, along its posterior border with a sharp edge, surface above (anteriorly) with a wide transversal depression with weak transversal furrows/folds. Bristle tuft behind the median ridge deeply invaginated, narrow, much narrower than the remaining parts of the pit openings on either side of the tuft. Glandular pits of T8 (Figs 13G,H, 14E,I) open bowl-shaped, posterior walls rarely deepened to very shallow pouches, median ridge with a crest consisting of an irregularly folded membrane and ending posteriorly in a little prominent bristle knob (Fig. 13H).

Male genitalia. Hook of left phallomere. Shaft straight or nearly so, with sclerotized trough along its apical $\frac{1}{2}$ (or slightly more).

Remarks. This and the following four species (*P. isolata*, *P. laticarinata*, *P. javalambrensis*, *P. sulcata*) are very closely related. They are characterized by the narrow and short forewings being scarcely longer than the mesonotum in both sexes; other species with similar wing size have very different T7 (*sacarraoi*-subgroup: *P. tenebricosa*) or T8 gland structure (*barbata*-subgroup: *P. carpetana*, *P. acarinata*). T7 glandular pits of males with a distinct anterior process (not found in *P. moralesi* and *P. septentrionalis*) and a strongly invaginated bristle tuft (already indicated in *P. septentrionalis*). One may ask whether it is justified to consider the five forms as different species. Their distribution – at least three of the forms have a more or less extended distribution with only little variation in their structures – indicates that the five forms should at least be treated as subspecies. Thus an eventually necessary change of the status, from species to subspecies, would cause only relatively slight nomenclatory changes. Until either a sympatric occurrence of the species is observed or intermediate forms are found a final decision about their state is impossible. I prefer to consider them preliminarily as different species.

Geographical distribution (Fig. 3). Found in the mountains west of the Ebro Delta: Puertos de Beseit and the southern adjacent mountains, at altitudes of 750-1400 m.

Phyllodromica isolata, spec. nov.

Figs 3, 15A-I, 16A-N

Holotype: ♂, France, Dept. Aude, Mt. Milobre de Mossac (btw. Soulatgé & Auriac), 850-900 m, 21.V.1996, leg. Bohn (on two slides, F 81/2).

Additional material. France. Dept. Aude: F 43(a), 81 (same data as holotype).

Etymology. The name of the species refers to its occurrence far from its next relatives.

Description

Size. Length of pronotum: ♂ 1.79-1.92 (mean 1.89) mm, ♀ 2.08-2.27 (mean 2.16) mm; length of forewings: ♂ 1.34-1.6 (mean 1.49) mm.

Wings. Both sexes. Forewings widely separated, scarcely longer than mesonotum, reversely egg-shaped, apex acutely or obtusely rounded. Hindwings missing.

Colouration. Male: Pronotum. Disk dark, rounded trigonal, lateroposterior edges usually acutely produced. Head. Interocular space reddish. Tergites. Lightly coloured posterior margins quite narrow. Legs. Whitish distal zone of coxa not longer than $\frac{1}{4}$ of its length, tibia rarely lightened. Female:

Pronotum. Disk similar as in male, but edges less pronounced, almost semicircular. Tergites. Lightly coloured posterior margins very narrow, patchy zone except possibly laterally almost missing. Head as in male. Legs. Dark as in males or, to a various extent, moderately lightened. Wings (both sexes) often with infuscated margins.

Male tergite structures. Posterior borders of T6 moderately, of T7 strongly angularly, of T8 weakly concave, of T10 convex, narrowly parabolic. Glandular pits of T7 (Figs 15C,E,F, 16D,G) very similar to the preceding species forming broad oblique troughs, medioanteriorly ending in shallow pouches (Figs 15C, 16G), between the troughs posteriorly with a rounded elevation bearing the tuft area (Fig. 15E). Anterior process with rounded edges, surface above (anteriorly) with a transversal depression with weak transversal furrows/folds (Fig. 15F). Median ridge behind anterior process continuing into the deeply invaginated tuft area leaving only laterally, along the border, unelevated narrow stripes (Figs 15C, 16G); ridge anteriorly narrower than posteriorly. Tuft area long and narrow, broadest posteriorly and slightly narrowing anteriorly, at its broadest position much narrower than the width of the pit openings on either side of the tuft area. Glandular pits of T8 (Figs 15 D,G-I, 16E,H) open bowl-shaped, posterior walls deepened to very shallow pouches (Figs 15D, 16H), median ridge relatively narrow, with a membranous crest moulded in regular transversal folds, at the end with bristles (bristle knob) (Figs 15H,I).

Male genitalia. Hook of left phallomere. Shaft straight, with sclerotized trough in its apical ½.

Geographical distribution (Fig. 3). Found at two neighbouring localities in the Corbières, in southern France near the Pyrenees, at altitudes of 850-900 m.

Phyllodromica laticarinata, spec. nov.

Figs 3, 17A-I, 18A-O

Holotype: ♂, Spain, Prov. Teruel, Montes Universales, 5 km W Frías de Albarracín, 1600 m, 5.VI.1985, leg. Bohn (on two slides, Sp 99/5).

Additional Material. Spain. Prov. Teruel: Sp 99 (same data as type) (a), 465, 468.

Etymology. The name of the species refers to the unusually broad median ridge of the glandular pits of T8.

Description

Size. Length of pronotum: ♂ 1.6-1.82 (mean 1.69) mm, ♀ 1.86-2.14 (mean 2.02) mm; length of forewings: ♂ 1.25-1.44 (mean 1.32) mm.

Wings. Both sexes. Forewings widely separated, scarcely longer than mesonotum, reversely egg-shaped, apex acutely (Fig. 18O) or obtusely rounded (Fig. 18N). Hindwings missing.

Colouration. Male: Pronotum. Disk dark, semicircular (Fig. 17A) or – when the posterior part is slightly more extended – rounded triangular (Fig. 17B); the whitish-transparent margins often, especially near the lateroposterior edges, infuscated. Tergites. Lightly coloured posterior margins very narrow. Head. Interocular space reddish. Legs. Whitish distal zone of coxa not longer than ¼ of its length, tibia rarely lightened. Female: Pronotum. Disk dark, semicircular. Tergites. Lightly coloured posterior margins very narrow, patchy zone restricted to the lateral parts of the tergites. Head as in male. Legs often moderately lightened to a various extent. Wings (both sexes) often with infuscated margins.

Male tergite structures. Posterior borders of T6 moderately, of T7 strongly angularly, of T8 weakly concave, of T10 convex, semicircularly rounded (usually less broadly rounded than appearing on Fig. 18F). Glandular pits of T7 (Figs 17E-G, 18D,G). Central elevation behind openings very low (Fig. 17F), posterior borders of pits, therefore, ill-defined; pits anteriorly with relatively deep pouches opening posteriorly (Figs 17E, 18G). Anterior process short, in dorsal view broadly rounded, with a sharp-edged posterior border, surface above (anteriorly) with transversal ridges and slits (arrow in Fig. 17G). Median ridge posteriorly continuing into the invaginated tuft area and elevating it medially in full length, anteriorly narrower than posteriorly (Fig. 18G). Tuft area broad, borders anteriorly diverging, at its broadest part much broader than the width of the pit openings on either side of the tuft area. Glandular pits of T8 (Figs 17H,I, 18E,H,I) open bowl-shaped, posterior walls often deepened to shallow pouches (Figs 18H,I), median ridge unusually broad, crest covered with a series of membranous transversal folds, posteriorly diminishing in size and at the end provided with bristles (bristle knob) (Fig. 17I).

Male genitalia. Hook of left phallomere. Shaft straight, with sclerotized trough in its apical $\frac{1}{2}$ (or slightly more).

Geographical distribution (Fig. 3). Found at three neighbouring localities in the Montes Universales in eastern central Spain, at altitudes of 1400-1600 m.

Phyllodromica javalambrensis, spec. nov.

Figs 3, 19A-H, 20A-O

Holotype: ♂, Spain, Prov. Teruel, Sa. de Javalambre, btw. Collado de El Gavilán & Mt. Javalambre, 1600 m, 13.IV.1992, leg. Bohn (on two slides, Sp 272/4).

Additional material. Spain. Prov. Teruel: Sp 272 (same data as holotype), 461.

Etymology. The name of the species refers to the type locality.

Description

Size. Length of pronotum: ♂ 1.54-1.66 (mean 1.61) mm, ♀ 1.82-1.92 (mean 1.87) mm (only two specimens); length of forewings: ♂ 1.15-1.38 (mean 1.29) mm.

Wings. Both sexes. Forewings widely separated, scarcely longer than the mesonotum, reversely egg-shaped, apex usually acutely rounded, sometimes obtuse or subtruncate. Hindwings missing.

Colouration. Male: Pronotum. Disk dark, semicircular. Head. Interocular space reddish. Tergites. Lightly coloured posterior margins relatively broad. Legs. Whitish distal zone of coxa not longer than $\frac{1}{4}$ of its length, tibia sometimes with lightened dorsal surface. Female: Pronotum and head as in male. Tergites. Lightly coloured posterior margins rather narrow, patchy zone missing except possibly laterally. Legs. Tibia and femur moderately lightened. Wings (both sexes) often with infuscated margins.

Male tergite structures. Posterior borders of T6 moderately, of T7 quite strongly angularly (usually stronger concave than visible on Figs 20D,I), of T8 weakly concave, of T10 convex, broadly parabolic. Glandular pits of T7 (Figs 19D-F, 20D,G,I) very similar to *P. laticarinata* but usually less deep; anterior process still shorter (Figs 19E,F), posterior border with a sharp edge, surface above (anteriorly) with strong transversal slits; median ridge quite low, of the same breadth throughout its length, especially anteriorly sparsely covered with bristles (Figs 19D, 20G) (in the two preceding species broadening towards posterior and densely covered with bristles). Glandular pits of T8 (Figs 19G,H, 20E,H) open bowl-shaped, posterior walls deepened to very shallow pouches (Fig. 20H), median ridge with crest consisting of a membranous torus regularly segmented by narrow deepening (Figs 19G,H); torus broad anteriorly and strongly tapering towards posteriorly, last part protruding over the surface, without bristles (or hidden beneath the posterior end of the torus as in the following species?).

Male genitalia. Hook of left phallomere. Shaft straight, with sclerotized trough in its apical $\frac{2}{3}$.

Geographical distribution (Fig. 3). Found at two neighbouring localities in eastern Spain, in the Sierra de Javalambre (NW of Valencia), at an altitude of 1600 m, preferably under *Juniperus*.

Accompanying species, discrimination of females. *P. globososacculata* (Sp 272): wings broader, legs often nearly completely yellowish, meso- and metanotum sometimes with yellow markings.

Phyllodromica sulcata, spec. nov.

Figs 3, 21A-H, 22A-N

Holotype: ♂, Spain, Prov. Castellón, btw. Cincorres & Portell de Morella (SW Morella), 1200 m, 12.IV.1992, leg. Bohn (on two slides, Sp 268/1).

Additional material. Spain. Prov. Castellón: Sp 268 (same data as holotype). Prov. Teruel: Sp 269(a), 270, 368, 369, 370, 372 (♀), 373, 375.

Etymology. The name of the species refers to the shape of the glandular pits of T7.

Description

Size. Length of pronotum: ♂ 1.50-1.79 (mean 1.64) mm, ♀ 1.92-2.11 (mean 2.02) mm; length of forewings: ♂ 1.21-1.41 (mean 1.28) mm.

Wings. Both sexes. Forewings widely separated, scarcely longer than mesonotum, reversely egg-shaped, apex acutely or obtusely rounded. Hindwings missing.

Colouration. Male: Pronotum. Disk dark, semicircular, lateroposterior edges sometimes slightly produced. Tergites. Lightly coloured posterior margins rather broad. Head. Interocular space reddish. Legs. Whitish distal zone of coxa not longer than $\frac{1}{4}$ of its length, tibia often lightened. Female: Pronotum. Disk dark, semicircular. Tergites. Lightly coloured posterior margins relatively narrow but broadest among the last five species, patchy zone narrow in the middle, but relatively extended laterally. Head as in male. Legs often moderately lightened to a various extent. Wings (both sexes) often with infuscated margins.

Male tergite structures. Posterior borders of T6 moderately, of T7 strongly angularly, of T8 weakly concave, of T10 convex, between narrowly and broadly parabolic. Glandular pits of T7 (Figs 21D-F, 22D,G) reduced to narrow transversal furrows, median ridge and anterior process strongly reduced, bristle tuft well-developed on a rather flat mound, invaginated as in the preceding species. Glandular pits of T8 (Figs 21G,H, 22E,H) very similar to *P. javalambrensis*, open bowl-shaped, posterior walls rarely deepened to very shallow pouches (Fig. 22H), median ridge with a crest consisting of a torus of regularly folded membrane (Fig. 21H), torus with parallel borders, at the end protruding over the surface, with some bristles beneath the posterior end.

Male genitalia. Hook of left phallomere. Shaft straight or nearly so, with sclerotized trough in its apical $\frac{1}{2}$ (or more).

Geographical distribution (Fig. 3). Occurring in eastern Spain in the sierras between Teruel and Morella: Sa. de Gúdar and Sa. del Rayo, at altitudes of 1200-1600 m.

Accompanying species, discrimination of females. *P. globosacculata* (Sp 368, 370, 372): see under *P. javalambrensis* (p. 41).

2. *Sacarraoi*-subgroup

The species of this subgroup (*P. clavisacculata*, *P. tenebricosa*, *P. sacarraoi*, *P. brevisacculata*, *P. globosacculata*, *P. porosa*) are well-characterized by the structure of the glandular pits of T7 which are deepened to large pouches (secondarily reduced in *P. porosa*). Glandular pits of T8 well-developed with median ridge and bristle knob. T10 short, broadly rounded, giving the animals a rather stout appearance. Interocular space reddish. Females often with yellow patches in the dark central areas of meso- and metanotum.

Two structures which in the other subgroups are rather constant show considerable variation: the hook (see p. 20, 4th paragraph) and the subgenital plate. In the latter case the length of the apical sclerotization is to a various degree reduced (Table 3 and p. 20) presumably in connection with an elongation and/or narrowing of the posterior lobe of the subgenital plate (compare Figs 24L and 32L).

Phyllodromica clavisacculata, spec. nov.

Figs 4, 23A-H, 24A-N

Holotype: ♂, Spain, Prov. Granada, Sierra Nevada, Solynieve (Sierra Nevada) – Pinos Genil, 1750 m, 14.VI.1984, leg. Bohn (on two slides, Sp 66/5).

Additional material. Spain. Prov. Granada: 1♀, Alfacar, Chicote! [MNNHM]; Sp 35 (♀), 36(a), 66 (same data as holotype), 67.

Etymology. The name of the species refers to the club-shaped gland pouches of T7.

Description

Size. Length of pronotum: ♂ 1.66-1.82 (mean 1.74) mm, ♀ 1.98-2.18 (mean 2.03) mm; length of wings: ♂ 2.05-2.37 (mean 2.21) mm.

Wings. Male: Forewings touching each other or nearly so (Fig. 23A, the wings of the holotype are unusually narrow), reaching the middle of T2, broadly egg-shaped, broadest behind the middle, apex broadly rounded. Hindwings well set off. Female: Forewings widely separated, scarcely longer than mesonotum, rounded hatchet-shaped.

Colouration. Male: Pronotum. Disk dark, semicircular. Tergites. Lightly coloured posterior margins relatively broad, especially in T6. T7 with large light lateroposterior edges. Head. Interocular space reddish. Legs. Whitish distal zone of coxa not longer than $\frac{1}{4}$ of its length. Tibia sometimes, especially on the dorsal side, lightened. Female: Pronotum as in male. Meso- and metanotum often with pairs of yellowish patches (Figs 23C,D). Tergites. Patchy zone broad, nearly as broad as remaining dark anterior area. Head as in male. Legs variously lightened, sometimes almost completely yellowish.

Male tergite structures. Posterior borders of T6 and T7 deeply angularly concave, of T8 very weakly concave, of T10 convex, broadly rounded. T6 rather long; anterior border with deep lateral excavations, towards the middle forming pronounced edges. Glandular pits of T7 (Figs 23E,F, 24D,G) with wide openings leading into large club-shaped pouches surpassing the anterior border of the segment at least by a segment length (Fig. 24D). Bristle tuft on the broad median ridge separating the openings (Fig. 24G), no anterior process set off (Fig. 23F). Openings at the lateroposterior edges continuing into rims running to the posterior border of the segment, area in between slightly elevated (Fig. 23E). Pits of T8 (Figs 23G,H, 24E,H) open bowl-shaped, posterior borders more or less transversal, regularly with shallow pouches (Fig. 24H); median ridge with a very prominent bristle knob, posteriorly set off from the ridge by lateral furrows with short bristles (Fig. 23H); crest of ridge membranous (Fig. 24H).

Male genitalia. Hook of left phallomere. Shaft straight, sclerotized trough in the apical $\frac{1}{2}$ of its length.

Geographical distribution (Fig. 4). Restricted to a small area in the western part of the Sierra Nevada, at altitudes of 1500-2000 m.

Phyllodromica tenebricosa, spec. nov.

Figs 4, 25A-I, 26A-N

Holotype: ♂, Spain, Prov. Granada, Sierra Nevada, Loma del Riachuelo (N Mecina Bombarón), 2150-2600 m, 10.VI.1991, leg. Bohn (on two slides, Sp 247/2).

Additional material. Spain. Prov. Granada: 1♂ (terminalia on slide Bo 162), 1♀, Sierra Nevada, Puerto de la Ragua, I.Mateu-A.Cobos; 4♀♀, Pto. Ragua, 2000 m, 12.VII.1903, Escalera; 2♀♀, Sierra Nevada, Horcajo Trevélez, 15.-30.VI.1953, I.Mateu-A.Cobos [MNNHM]; Sp 28(a), 32a,b, 33(a,b), 65 (♀), 71 (♀), 242, 245, 246, 247 (same data as holotype), 249, 254. Prov. Almería: Sp 24a, 191, 235, 237-241, 243, 244, 259.

Etymology. The name of the species refers to the dark colouration (pronotum, wings) of the animals.

Description

Size. Length of pronotum: ♂ 1.54-1.79 (mean 1.64) mm, ♀ 1.86-2.14 (mean 2.03) mm; length of forewings: ♂ 1.18-1.41 (mean 1.31) mm.

Wings. Male: Forewings widely separated, slightly longer than mesonotum, reversely egg-shaped, apex obtusely rounded, sometimes nearly truncate. Hindwings absent. Female: Forewings similar as in males, usually more acutely rounded, scarcely longer than mesonotum. Hindwings absent.

Colouration. Male: Pronotum. Disk dark, semicircular (Fig. 25C), whitish margins often infuscated, in the extreme reduced to narrow lines (Fig. 25A). Wings very dark: dark patches larger than normal, margins infuscated. Tergites. Whitish margins often infuscated, T7 almost completely dark. Head. Interocular space in most cases reddish, occasionally dark. Legs. Whitish distal zone of coxa not longer than $\frac{1}{4}$ of its length, tibia rarely lightened. Female: Pronotum. Disk dark, semicircular, whitish margins of pronotum usually not infuscated. Meso- and metanotum without light patches. Tergites. Lightly coloured posterior margins narrow, patchy zone only laterally more extended. Head. Interocular space reddish. Legs. Variously, in most cases only moderately lightened, but sometimes nearly yellowish.

Male tergite structures. Posterior borders of T6 and T7 moderately concave, of T8 very weakly concave, of T10 convex, broadly rounded. Anterior borders of T6 with deep lateral excavations,

towards the middle forming pronounced edges (Fig. 26C). Glandular pits of T7 (Figs 25F,G, 26D,G) similar to the preceding species, but openings further away from the posterior border of the segment (Fig. 26G), with wide openings leading into large club-shaped (Fig. 26D,G) or globular pouches (Fig. 25F) surpassing the anterior border of the segment by at least a segment length. Bristle tuft on the broad median ridge separating the openings; anterior process not set off. Openings continuing at the lateroposterior edges into rims running to the posterior border of the segment, area in between weakly elevated (Fig. 25G). Pits of T8 (Figs 25H,I, 26E,H) open bowl-shaped, posterior borders strongly converging towards the median ridge, regularly with shallow pouches (Fig. 26H). Median ridge with a prominent bristle knob, as in the preceding species posteriorly set off from the ridge by lateral furrows with short straight bristles (Fig. 25I). Crest of ridge (and knob) membranous (Fig. 26H).

Male genitalia. Hook of left phallomere. Shaft straight, with sclerotized trough in its apical $\frac{1}{3}$.

Geographical distribution (Fig. 4). In the southeastern sierras of Spain: Sierra Nevada, Sa. de los Filabres, S. de Gádor, and Sa. Alhamilla, at altitudes of 1200-2600 m.

Phyllodromica sacarraoi Fernandes, 1967

Figs 4, 27A-H, 28A-N, 57H-N

Phyllodromica sacarraoi Fernandes, 1967: 57, figs 1A, B; Harz 1976: 296, figs 881, 882, 908, 1018-1026.

Types. Holotype: ♂, Spain, Prov. Jaén, Sa. deazorla, Pnte. las Herrerias, Mateu-Cobos coll. (terminalia on slide Bo 161); allotype, ♀, same data as holotype; paratype, 1♂, same data as holotype (not seen) [MNHNM].

Additional material. Spain. Prov. Jaén: Sp 16, 17, 18, 19, 20 (♀), 73, 74, 263, 285, 287. Prov. Granada: Sp 261, 279. 2♀♀, Azrou? Fez? [MNHNM].

Description

Size. Length of pronotum: ♂ 1.86-2.14 (mean 1.98) mm, ♀ 1.86-2.24 (mean 2.12) mm; length of forewings: ♂ 2.24-2.88 (mean 2.53) mm.

Wings. Male: Forewings touching each other or nearly so, reaching the middle of T2, rounded hatchet-shaped, broadest behind the middle. Hindwings not well set off, posterior border of metanotum only with shallow emarginations. Female: Forewings widely separated, scarcely longer than mesonotum, rounded hatchet-shaped. Hindwings absent.

Colouration. Male: Pronotum. Disk dark, semicircular or, more often, by lateral extensions rounded triangular or transversely rhomboidal, sometimes pronotum, except for a narrow whitish border, completely dark. Head. Interocular space reddish. Legs. Whitish distal zone of coxa not longer than $\frac{1}{4}$ of its length. Legs may be variously lightened. Female: Pronotum. Disk dark, semicircular, rarely with weak lateral extensions. Mesonotum and metanotum often with yellowish patches (Fig. 27D), sometimes occupying most of the segment surface. Tergites. Patchy zone broad, nearly as broad as remaining anterior dark area. Head. At least interocular space, often complete face reddish. Legs. Variously lightened, often almost completely yellowish.

Male tergite structures. Posterior borders of T6 and T7 very deeply angularly concave, of T8 very weakly concave, of T10 truncate. T6 long; anterior borders with deep lateral excavations, towards the middle forming rather pronounced edges; transversal ridge in the middle strongly curved anteriorly (Fig. 57H) (a characteristic not found in any other species of the *carpetana*-group, Fig. 57B). – Glandular pits of T7 (Figs 27E,F, 28D,G, 57I) deepened to large club-shaped pouches which are at least reaching the length of the segment (Figs 28D,G, 57I). Bristle tuft missing (Fig. 27F), behind the median ridge with a longitudinal elevation flanked by shallow depressions, in the middle of the elevation often with a longitudinal furrow. Segment surface behind the openings slightly elevated laterally followed by a variously extended longitudinal depression (Fig. 27E). Pits of T8 (Fig 27G,H, 28E,H,I, 57K,L). Bottom of pits rather small and shallow, without pouches, in outline rounded or square (Figs 27G, 28H,I, 57L) in the lateroposterior edges elongated into troughs ascending towards the segment surface and ending at posteriorly curved transversal mounds (Fig. 27H). Median ridge low and broad; anterior part higher, about at the height of the anterior borders of the pits, and posteriorly ending with an often very slightly elevated bristle knob (arrow in Fig. 27H); posterior half of ridge very low. Highest point of the segment some distance behind the posterior border of the pits, surface from here descending towards the pits, in the middle – in continuation of the median ridge – with a low longitudinal elevation, on both sides

flanked by depressions often provided with low transversal folds (Fig. 27H). Crest of bristle knob and of median ridge anterior to it membranous (Figs 28H,I).

Male genitalia. Hook of left phallomere. Shaft angularly bent, tapering towards the base (Fig. 57N) with sclerotized trough in about its apical $\frac{1}{2}$, apically with an erect spike; neck of claw extremely long and curved, claw broadened, shovel-like.

Geographical distribution (Fig. 4). Occurring in the sierras north of the Sierra Nevada: Sa. de Alta Coloma, Sa. Almadén, Sa. de Cazorla, and S. de Segura, at altitudes of 700-1700 m.

Accompanying species, discrimination of females. *P. globososacculata* (Sp 263) and *P. brevisacculata* (Sp 279): The females are virtually indistinguishable.

Phyllodromica brevisacculata, spec. nov.

Figs 4, 29A-H, 30A-N

Holotype: ♂, Spain, Prov. Granada, Sa. de la Sagra, Collado Blanco, 1650 m, 16.VI.1991, leg. Bohn (on two slides, Sp 260/8).

Additional material. Spain. Prov. Murcia: Sp 278. Prov. Granada: Sp 202, 260 (same data as holotype), 279.

Etymology. The name of the species refers to the comparatively small size of the glandular pouches of T7.

Description

Size. Length of pronotum: ♂ 1.54-1.76 (mean 1.68) mm, ♀ 1.92-2.14 (mean 2.03) mm; length of forewings: ♂ 1.41-1.86 (mean 1.65) mm.

Wings. Male: Forewings well separated (slightly less than wing breadth), reaching approximately the middle of the metanotum, rounded hatchet-shaped to broadly egg-shaped. Hindwings absent. Female: Forewings widely separated, scarcely longer than mesonotum, (rounded) hatchet-shaped. Hindwings absent.

Colouration. Male: Pronotum. Disk dark, semicircular (Fig. 29A), rarely – by lateral extensions – elliptical (Fig. 29C). Tergites. Whitish margins relatively broad. Head. Interocular space, often complete face reddish. Legs. Whitish distal zone of coxa not longer than $\frac{1}{4}$ of its length. Legs often variously lightened, sometimes nearly completely yellowish. Female: Pronotum. Disk dark, semicircular, rarely with weak lateral extensions (Fig. 29D). Meso- and especially metanotum often with pairs of yellowish patches. Tergites. Patchy zone usually broad, nearly as broad as remaining anterior dark area. Head as in male. Legs variously lightened, often almost completely yellowish.

Male tergite structures. Posterior borders of T6 and T7 moderately concave, of T8 nearly straight, of T10 convex, broadly rounded. Lateral excavations at the anterior border of T6 moderately deep, towards the middle with or without (Fig. 30C) pronounced edges. Glandular pits of T7 (Figs 29E,F, 30D,H) deepened to thimble-shaped pouches of less than segment length, scarcely broadening beyond openings (Figs 29E, 30D,H). Pouches not opening on the surface of the segment but into a lowered atrium (Fig. 29F). Median ridge integrated into a large longitudinal elevation (bulge) on the floor of the atrium; bulge broadly conical, tapering towards posterior, almost completely covered by the bristle tuft, at its broadest part about as broad as the pit opening (Figs 29E, 30H). Segment surface behind the atrium slightly elevated, laterally on each side bordered by a depression leading at the lateroposterior edges down to the atrium (Fig. 29F). Pits of T8 (Figs 29G,H, 30E,G) open bowl-shaped; posterior walls regularly deepened to shallow pouches (Fig. 30G), posterior borders transversal. Median ridge bearing a prominent bristle knob (higher than in *P. sacarraoi*), bristle knob usually fully sclerotized, crest of ridge anteriorly to the knob membranous. Behind pits with a towards the pits descending surface having a longitudinal median elevation, on both sides flanked by depressions (not well seen in Fig. 29G).

Male genitalia. Hook of left phallomere. Shaft slightly curved, sclerotized trough only in the apical $\frac{1}{3}$ or less, at the apical end of the shaft with a strong dent; stalk of the same length as the claw, claw reaching up to the dent.

Geographical distribution. (Fig. 4) The species is found in the mountains east of the Sa. de Segura: Sa. de la Sagra and Sa. de Taibilla, at altitudes of 1300-1650 m.

Accompanying species, discrimination of females. *P. sacarraoi* (Sp 279): The females cannot be distinguished.

Phyllodromica globososacculata, spec. nov.

Figs 4, 31A-H, 32A-N

Holotype: ♂, Spain, Prov. Cuenca, Sa. de Mira, Mt. Rebollo, 1250 m, 13.IV.1992, leg. Bohn (on two slides, Sp 274/1).

Additional material. **Portugal.** Distr. Bragança: Po 23 (♀). **Spain.** Prov. León: Sp 154, 158, 319. Prov. León/Palencia: Sp 131. Prov. Palencia: Sp 123, 134, 431, 432. Prov. Burgos: Sp 84 (a), 135, 414, 423, 440, 441, 442. Prov. Segovia: Sp 437. Prov. Madrid: Sp 88. Prov. Toledo: Sp 296, 297. Prov. Ciudad Real: Sp 11. Prov. Jaén: Sp 263. Prov. Logroño/Burgos: Sp 83. Prov. Soria: Sp 4 (♀), 330, 331, 444. Prov. Segovia/Guadalajara: Sp 185. Prov. Guadalajara: Sp 332, 333. Prov. Cuenca: Sp 96, 97, 98, 274 (same data as holotype). Prov. Albacete: Sp 12(a), 13(a), 14a, 264. Prov. Zaragoza: Sp 379. Prov. Teruel: Sp 99a, 100, 272, 368 (♀), 370, 372, 374, 377, 378, 460, 464, 465, 466, 467, 468, 469, 470 (♀), 471 (♀). Prov. Cantabria: Sp 429.

Etymology. The name of the species refers to the globular shape of the glandular pouches of T7.

Description

Size. Length of pronotum: ♂ 1.70-1.98 (mean 1.88) mm, ♀ 2.18-2.37 (mean 2.21) mm; length of forewings: ♂ 1.54-2.02 (mean 1.78) mm.

Wings. Male: Forewings well separated by about the breadth of the wings, approximately reaching the middle of the metanotum, rounded hatchet-shaped. Hindwings absent. Female: Forewings widely separated, scarcely longer than mesonotum, rounded hatchet-shaped to reversely egg-shaped (Fig. 30N). Hindwings absent.

Colouration. Male: Pronotum. Disk dark, semicircular or, quite often by lateral extensions, transversely elliptical. Head. Interocular space reddish. Legs. Whitish distal zone of coxa not longer than ¼ of its length, distal parts sometimes variously lightened. Female: Pronotum. Disk dark, semicircular, rarely with weak lateral extensions. Meso- and metanotum often with yellowish pairs of patches. Tergites. Patchy zone broad, nearly as broad as remaining anterior dark area. Head. Interocular space or complete face reddish. Legs. Variously lightened, often almost completely yellowish.

Male tergite structures. Posterior borders of T6 moderately, of T7 strongly, of T8 weakly concave, of T10 convex, broadly rounded. Lateral excavations on the anterior border of T6 relatively shallow, but with prominent edges towards medial. Glandular pits of T7 (Figs 31E,F, 32D,H) deepened to large globular pouches of at least segment length, as in the preceding species opening into a lowered atrium (Fig. 31E); longitudinal bulge bearing the bristle tuft much smaller than in *P. brevisacculata*, very weakly conical or oval, at its broadest part not broader than half of the pit opening (Fig. 32H); bottom of atrium between the bulge and the lateral borders of the pouch openings elevated to a low mound of irregular shape. Segment surface behind atrium slightly elevated. Pits of T8 (Figs 31G,H, 32 E,G) quite variable, in outline circular or oval, rounded square or rounded rectangular; posterior walls regularly deepened to shallow pouches (Fig. 32G). Median ridge similar as in *P. sacarraoi*, anterior half higher than posterior half, bristle knob very low, almost integrated into the completely sclerotized ridge (arrow in Fig. 31H). Behind pits with a surface descending towards the pits, having a median longitudinal elevation, on both sides flanked by depressions (Fig. 31G). Anterior and lateral borders of the pits often with numerous small glandular pores (Figs 31H, 32G).

Male genitalia. Hook of left phallomere. Shaft curved, with sclerotized trough only in its apical ¼, apically with a sharp dentlike edge; stalk long and slender, claw not reaching the dental edge.

Remarks. The species shows considerable variation in the structures of the glandular pits of T7 and T8, which is at least partly correlated with its distribution. The southern population (south of the 39th parallel) – separated by a larger gap from the northern population – deviates from the typical form especially by its T8 glandular pits having no posterior pouches and nearly no glandular pores; in T7 the elevations on the bottom of the atrium are missing. Since I am not sure that there is really a gap in the distribution I hesitate to consider it as a separate subspecies.

Geographical distribution (Fig. 4). *P. globososacculata* is one of the most widely distributed species of the *carpetana*-group occurring from the Sa. de Cazorla in the south up to the Picos de Europa in the north, at altitudes of 500-1700 m.

Accompanying species, discrimination of females. *P. fernandesiana* (Sp 82, 83, 123, 132, 154): coxa usually half dark half whitish, interocular space dark; *P. carpetana* (Sp 297, 322) and *P. acarinata* (Sp 185): wings narrower, legs for the most part dark; interocular space dark; *P. javalambrensis* (Sp 272) and

P. sulcata (Sp 370): wings narrower, legs for the most part dark; *P. septentrionalis* (Sp 134): dorsal edges of femora at least partly dark; *P. barbata* (Sp 123, 131, 134, 158): interocular space dark, legs for the most part dark; *P. sacarraoi* (Sp 263) and *P. moralesi* (Sp 11, 335): females not distinguishable.

Phyllodromica porosa, spec. nov.

Figs 4, 33A-H, 34A-O

Holotype: ♂, Spain, Pov. Granada/Almería, Sa. de Lucar, btw. Oria & Cúllar Baza, 1200 m, 16.IV.1992, leg. Bohn (on two slides, Sp 283/2).

Additional material. Spain. Prov. Granada/Almería: Sp 283 (same data as holotype). Prov. Almería: Sp 280, 282.

Etymology. The name of the species refers to the large and numerous glandular pores found on T8.

Description

Size. Length of pronotum: ♂ 1.63-1.92 (mean 1.80) mm, ♀ 1.98-2.18 (mean 2.04) mm; length of forewings: ♂ 1.6-2.11 (mean 1.84) mm.

Wings. Male: Forewings. Size and shape variable, well separated, mostly by less, sometimes by more than wingbreadth, length from slightly longer than mesonotum up to nearly reaching the posterior border of the metanotum, egg-shaped, broadest behind the middle. Hindwings absent. Female: Forewings widely separated, scarcely longer than the mesonotum, rounded hatchet-shaped (Fig. 34N) or obliquely so (Fig. 34O).

Colouration. Male: Rather dark. Pronotum. Disk dark, semicircular, variously extended (Figs. 33A,C), in the extreme the whitish margins reduced to narrow lines. Wings rather dark: Dark patches larger and more numerous than usual, margins often infuscated. Tergites. Whitish margins usually very narrow. Head. Interocular space reddish. Legs. Whitish distal zone of coxa not longer than $\frac{1}{4}$ of its length, tibia may be lightened. Female: Pronotum. Disk dark, semicircular, with broad whitish borders. Metanotum often with yellowish patches. Tergites. Patchy zone broad, nearly as broad as remaining anterior dark area. Head. Interocular space, or complete face reddish. Legs. Variously lightened, often almost completely yellowish.

Male tergite structures. Posterior borders of T6 very weakly concave, of T7 and T8 nearly straight, of T10 convex, broadly rounded or subtruncate. T6 very long, anterior border laterally only shallowly excavated. Surface of T7 and T8 flatter, less vaulted than in the other species of the subgroup. Glandular pits of T7 (Figs 33E,F, 34D,G) anteriorly deepened to very flat (dorsoventrally compressed) and short, in outline rounded bag-shaped pouches (Fig 34G) with narrow, crescent-shaped openings; median ridge almost absent, bristle tuft on a very slight elevation forming a longitudinal band behind the median ridge (Fig. 33F); surface between bristle tuft and the lateral borders of the pouch openings nearly in full breadth elevated to a very low mound. Posterior half of the segment covered by numerous transversal folds (Fig. 33E). Pits of T8 (Figs 33G,H, 34E,H) very shallow, triangular, anteriorly and laterally bordered by broad margins perforated by numerous large glandular pores (Figs 33H, 34H); anterior part of ridge and bristle knob (arrow in Fig. 33H) integrated into the median part of the anterior margin of the pits; median ridge behind the knob very shallow, almost obsolete, behind pits continuing into a low but clearly set off longitudinal elevation, on each side flanked by an extended but very shallow depression with numerous transversal folds (Figs 33G,H).

Male genitalia. Hook of left phallomere. Shaft curved, with sclerotized trough in its apical $\frac{1}{3}$ - $\frac{1}{4}$, apically with a knoblike protrusion bearing a small apically directed denticle; stalk long but thick, claw not reaching to denticle.

Geographical distribution (Fig. 4). The species is found in the mountains north of the Sierra de los Filabres: Sa. de María and Sa. de Lucar, at altitudes of 1200-1400 m.

3. *Barbata*-subgroup

The species of the *barbata*-subgroup (*P. barbata*, *P. acuminata*, *P. lativittata*, *P. rhomboidea*, *P. carpetana*, *P. acarinata*, *P. crassirostris*, *P. tenuirostris*, *P. bolivariana*, *P. atlantica*, *P. fernandesiana*) are characterized by the T8 glandular pits being very shallow and having no median ridge or being completely absent. Interocular space dark.

Phyllodromica barbata, spec. nov.

Figs 5, 35A-H, 36A-M

Holotype: ♂, Prov. León/Palencia, Alto de las Portillas (6 km N Guardo), 1250 m, 27.V.1987, leg. Bohn (on two slides, Sp 131/4).

Additional material. Spain. Prov. León: Sp 153 (♀), 158. Prov. León/Cantabria: Sp 129. Prov. León/Palencia: Sp 131 (same data as holotype). Prov. Palencia: Sp 123, 134. Prov. Burgos: Sp 424, 427. Prov. Avila: Sp 177.

Etymology. The name of the species refers to the very extended bristle tuft of T7, appearing on REM photographs like a beard.

Description

Size. Length of pronotum: ♂ 1.66-1.86 (mean 1.75) mm, ♀ 1.92-2.05 (mean 1.98) mm; length of forewings: ♂ 1.92-2.43 (mean 2.26) mm.

Wings. Male: Forewings touching each other or nearly so, reaching up to the posterior border of the second abdominal tergite, broadly egg-shaped, broadest behind the middle, apex broadly rounded. Hindwings well set off. Female: Forewings widely separated, scarcely longer than mesonotum, rounded hatchet-shaped. Hindwings absent.

Colouration. Male: Pronotum. Disk dark, semicircular. T1-6 with relatively narrow lightly coloured borders, T7,8 variously lightened, sometimes for the most part lightly coloured, T7 at least around pits with dark markings. Head. Interocular space dark. Legs. Whitish distal part of coxa not longer than ¼ of its length, tibia rarely lightened. Female: Pronotum. Disk dark, semicircular. Mesonotum and metanotum without yellowish patches. Tergites. Lightly coloured posterior margins narrow, patchy zone almost missing except possibly laterally. Head. Interocular space dark. Legs. Various, but only moderately lightened.

Male tergite structures. Posterior borders of T6 and T7 moderately concave, of T8 weakly concave, of T10 convex, semicircularly rounded. Glandular pits of T7 (Figs 35D-F, 36D,G) rather small, open bowl-shaped, in outline semicircular, sometimes with very shallow pouches anteriorly or posteriorly; median ridge very broad, with well-developed anterior process. Behind the openings with a well demarcated oval transversal elevation not reaching the posterior border of the segment (Figs 35E,F). Bristle tuft large, for the most part lying on the elevation behind the anterior process (Figs 35D, 36G). Pits of T8 obsolete, usually forming together a very shallow bipartite depression (Figs 35G,H); T8 (Fig. 36E) otherwise unsculptured.

Male genitalia. Hook of left phallomere. Shaft straight, with sclerotized trough along its apical ¾.

Geographical distribution (Fig. 5). Occurring in and south of the Picos de Europa (between 3°40' and 6°W) and – at one locality – in the Sierra de Gredos, at altitudes of 850-1700 m.

Accompanying species, discrimination of females. *P. fernandesiana* (Sp 123, 129, 131, 134, 424): coxa usually half dark half whitish; *P. globosacculata* (Sp 123, 131, 134, 442) and *P. septentrionalis* (Sp 134): legs often for most part yellowish, interocular space reddish.

Phyllodromica acuminata, spec. nov.

Figs 5, 37A-H, 38A-P

Holotype: ♂, Spain, Prov. Salamanca, Sa. de la Peña de Francia, Peña de Francia, 1400-1700 m, 26.IV.1992, leg. Bohn (on two slides, 171a/2).

Additional material. Spain. Prov. Salamanca: Sp 171(a, same data as holotype), 172(a), 174a, 225. Prov. Salamanca/Cáceres: Sp 227. Prov. Cáceres: Sp 175(a). Prov. Cáceres/Avila: Sp 176(a). Prov. Avila: Sp 178, 179 (♀), 181(a). Prov. Madrid: Sp 87.

Etymology. The name of the species refers to the shape of the elevation behind the glandular groove of T8.

Description

Size. Length of pronotum: ♂ 1.70-1.92 (mean 1.82) mm, ♀ 2.08-2.24 (mean 2.14) mm; forewings of ♂: length 2.08-2.37 (mean 2.19) mm, length/breadth: 1.35-1.61 (mean 1.5) mm.

Wings. Male: Forewings well separated, approximately reaching the middle of T2, at least surpassing the metanotum, reversely egg-shaped, apex acute-angularly rounded, broadest approximately in the middle. Hindwings well set off. Female: Forewings widely separated, scarcely longer than mesonotum, reversely broadly egg-shaped to rounded hatchet-shaped. Hindwings absent.

Colouration. Male: Pronotum. Disk dark, broadly triangular or rhomboid by lateral extensions mostly reaching the lateral borders of the pronotum. Tergites. Whitish margins of T1-6 moderately broad. T7 usually with extended lightening in the lateroposterior edges, the dark central marking behind pits with a posterior extension nearly reaching the posterior border of the segment. T8 mostly dark, triangular elevation yellowish. Head. Interocular space dark. Legs. Whitish distal zone of coxa not longer than ¼ of its length, dorsal half of tibia usually lightened. Female: Pronotum. Disk dark (Fig. 37C) or (rarely) reddish (Fig. 37D), broadly rounded triangular or rhomboid, lateral extensions slightly less extended than in male. Tergites. Patchy zone broad, as broad as the remaining dark anterior area. Interocular space dark. Legs. Various, but only moderately lightened.

Male tergite structure. Posterior borders of T6 moderately, of T7 deeply concave, of T8 weakly concave, and of T10 convex, broadly parabolic. Glandular pits of T7 (Figs 37E,F, 38D,G) open bowl-shaped, in outline semicircular or triangular, with ill-defined lateral borders, separated by a relatively narrow median ridge and a much broader prominent conical anterior process (Figs 37E,F). Bristle tuft forming a relatively narrow band (Fig. 38G) running from the ridge up to a mound, arising behind the pits and sloping down towards lateroposterior edges of the openings and towards the posterior border of the segment (Fig. 37E). Pits of T8 (Figs 37G,H, 38E,H-K) together forming a kidney- or crescent-shaped, moderately deep trough (Figs 37G,H); in the posterior excavation with a, in outline, rectangular to acuteangular elevation (Figs 38H-K).

Male genitalia. Hook of left phallomere. Shaft straight, with sclerotized trough in its apical ⅓.

Remarks. This and the following two species (*P. lativittata* and *P. rhomboidea*) are without doubt very closely related. A common feature is the characteristic colouration pattern of the pronotum which is found in all individuals (males and females) of the three species. (Lateral extensions of the pronotum disk may also be observed in the males of *P. sacarraoi* and *P. brevisacculata* [quite frequently], and in *P. globosacculata* [occasionally], but the females of the three species only occasionally have lateral extensions). Another common characteristic is the colouration of T7 with a dark central marking reaching up to the posterior border of the segment. *P. acuminata* and *P. lativittata* show great similarities in the unique pit structures of T8, while in the pit structures of T7 the greater similarity is between *P. lativittata* and *P. rhomboidea*.

Geographical distribution (Fig. 5). Occurring in the central sierras of Spain: Sa. de Gata, Sa. de la Peña de Francia, Sa. de Gredos, Sa. de Guadarrama, at altitudes of 900-1700 m.

Accompanying species, discrimination of females. *P. moralesi* (Sp 171, 172, 174, 225): disk without lateral extensions, interocular space reddish, legs often for most part yellowish; *P. carpetana* (Sp 176, 178, 181) and *P. acarinata* (Sp 175): disk without lateral extensions, wings narrower; *P. rhomboidea* (Sp 176): indistinguishable.

Phyllodromica lativittata, spec. nov.

Figs 5, 39A-H, 40A-N

Holotype: ♂, Portugal, Distr. Castelo Branco, Serra da Estrela, Penhas da Saúde (10 km NW Covilhã), 1500 m, 22.IV.1991, leg. Bohn (on two slides, Po 18/7).

Additional material. Portugal. Distr. de Castelo Branco: Po 18 (same data as holotype): 6♂♂, 10♀♀, 1 L (all imagines grown from larvae).

Etymology. The name of the species refers to the black marking of the pronotum forming a broad transversal band.

Description

Size. Length of pronotum: ♂ 1.6-1.86 (mean 1.7) mm, ♀ 1.87-2.11 (mean 1.96) mm; forewings of ♂: length 1.86-2.05 (mean 1.94) mm, length/breadth 1.54-1.57 (mean 1.55) mm.

Wings. Male: Forewings well separated, approximately reaching the middle of T2, at least surpassing the metanotum, reversely egg-shaped, broadest in or slightly behind the middle, apex narrowly or more broadly rounded. Hindwings well set off. Female: Forewings widely separated, scarcely longer than mesonotum, hatchet-shaped or rounded hatchet-shaped.

Colouration. Male: Pronotum. Disk dark, with very broad lateral extensions reaching the lateral borders of the pronotum. Tergites. Whitish margins of T1-6 moderately broad. T7 with lightly coloured lateroposterior edges, dark marking behind the pits with a posterior extension reaching the posterior border of the segment. T8 similar as T7, with a median extension of the dark area reaching the posterior border of the segment; elevation behind pits usually yellowish. Head. Interocular space dark. Legs. Whitish distal zone of coxa not longer than $\frac{1}{4}$ of its length. Female: Pronotum. Similar as in male, but lateral extensions usually less broad. Tergites. Patchy zone about as broad as remaining dark anterior area. Head. Interocular space dark. Legs. Tibia variously lightened.

Male tergite structures. Posterior borders of T6 moderately, of T7 strongly, of T8 weakly concave; of T10 convex, broadly parabolic. Glandular pits of T7 (Figs 39E-G, 40D,G) ill-defined, shallow, median ridge and anterior process strongly reduced, pit region forming a reverse w-shaped broad transversal furrow (Figs 39E-G). Bristle tuft large, opposite the anterior process. Posteriorly adjacent segment surface with a moderately elevated mound soon sloping down towards laterally and posteriorly (Fig. 39E). Pits of T8 (Figs 39H, 40E,H) together forming a crescent-shaped, moderately deep groove; in the posterior concavity with a rounded mound.

Male genitalia. Hook of left phallomere. Shaft straight, sclerotized trough along its apical $\frac{2}{3}$.

Remarks. The species is only known from one locality; all specimens had been collected as larvae and had moulted to imagines in captivity. Description of a new species based on animals grown from larvae is problematical since artefacts caused by inadequate cultivation conditions cannot be excluded. But the small differences between the specimens (7♂♂, 10♀♀) and the pronounced differences to the neighbouring species (*P. acuminata*, *P. rhomboidea*) in colouration and in the structure of the glandular pits of T7 and T8 leave no doubt that the establishment of a separate species for them is justified.

Geographical distribution (Fig. 5). Found only at one locality in the Serra da Estrela (Portugal), at an altitude of 1500 m.

Accompanying species, discrimination of females. *P. fernandesiana* (Po 18): Pronotum disk without lateral extensions, coxa usually half dark half whitish.

Phyllodromica rhomboidea, spec. nov.

Figs 5, 41A-H, 42A-N

Holotype: ♂, Spain, Prov. Càceres, Pto. del Piornal (NE Plasencia), 1200 m, 24./25.IV.1992, leg. Bohn (on two slides, Sp 306/3).

Additional material. Spain. Prov. Càceres: Sp 306 (same data as holotype); Prov. Càceres/Avila: Sp 176(a).

Etymology. The name of the species refers to the shape of the pronotum disk.

Description

Size. Length of Pronotum: ♂ 1.79-1.98 (mean 1.89) mm, ♀ 2.02-2.24 (mean 2.13) mm; forewings of ♂: length 2.11-2.43 (mean 2.25) mm, length/breadth 1.61-1.71 (mean 1.65) mm.

Wings. Male: Forewings well separated, approximately reaching the middle of T2, narrowly reversely egg-shaped, broadest approximately in the middle, apex narrowly rounded. Hindwings well set off. Female: Forewings widely separated, scarcely longer than mesonotum, hatchet-shaped or rounded so. Hindwings absent.

Colouration. Male: Pronotum. Disk broadly triangular or transversely rhomboid, lateral extensions reaching or nearly reaching the lateral borders. Whitish margins of T1-6 moderately broad, in T6 laterally much broader than in the middle. T7 with lightly coloured lateroposterior corners separated by a broad dark marking reaching the posterior border of the segment. T8 almost completely dark. Head. Interocular space dark. Legs. Whitish distal zone of coxa not longer than ¼ of its length, dorsal half of tibia usually lighter coloured. Female: Pronotum similar as in male. Tergites. Patchy zone broad, as broad as remaining dark anterior area. Head. Interocular space dark. Legs. Various, but only moderately lightened.

Male tergite structures. Posterior borders of T6 rather deeply, of T7 deeply, of T8 weakly concave, of T10 convex, broadly parabolic or semicircularly rounded. Glandular pits of T7 (Figs 41E-G, 42D,G,H) very shallow and small, in outline triangular or crescent-shaped, median ridge and anterior process very low, behind pits with a low transversely oval elevation, steeper anteriorly and gradually sloping down towards, but not reaching, the posterior border of the segment, and bearing the more or less circular bristle tuft (Fig. 42H). T8 without pits and without any sculpturing (Fig. 41H).

Male genitalia. Hook of left phallomere. Shaft straight or nearly so, sclerotized trough along its apical ⅓.

Geographical distribution (Fig. 5). Found at two localities in the western part of the Sa. de Gredos, at altitudes of 1200-1300 m.

Accompanying species, discrimination of females. *P. carpetana* (Sp 176, 306): disk without lateral extensions, wings narrower; *P. acuminata* (Sp 176): indistinguishable.

Phyllodromica carpetana (Bolívar, 1873)

Figs 6, 43A-H, 44A-O, 57A-C

Blatta carpetana Bolívar, 1873: 214, figs 1A-C.

Phyllodromica (Lobolampra) carpetana: Fernandes 1962: 210, Figs 11 A,B; Princis 1965: 39, 45; 1971: 1111; Harz 1976: 303, Figs 868 B(?), 1061.

Holotype: ♂, [Spain, Prov.] Madrid, Navacerrada, Bolívar (terminalia on slide Bo 156) [MNHNM].

Additional material. Portugal. Distr. Bragança: Po 22. Distr. Vila Real: Po 26. Spain. Prov. Salamanca: Sp 307. Prov. Salamanca/Cáceres: Sp 227. Prov. Cáceres: Sp 306. Prov. Cáceres/Avila: Sp 176. Prov. Avila: Sp 177, 178, 179, 180, 181(a), 182(a), 183, 298, 299, 301, 303, 304. Prov. Segovia: 1♂, La Granja, VI.1908, Arias (terminalia on slide Bo 163); 1 L [MNHNM]. Prov. Segovia/Madrid: Sp 86. Prov. Madrid: 2♂♂, 5♀♀, 2 L, Cercedilla, C. Bolívar (terminalia of 1♂ on slide Bo 157); 1 L, Cercedilla, III.1957, G. Menor; 5♀♀, Cercedilla, Estación Alpina, 1500 m, VII.1933, E. Morales; 1♀, Cercedilla, Estación Alpina, 1480 m, VIII.1959, J.Abajo; 1♂, 2♀♀, El Chaparral, Montejo de la Sierra, 14.-22.VI.[19]48, Exp. Ent. Inst. Esp. Entomología (terminalia of ♂ on slide Bo 160); 1♂, 1L, El Paular, X.1908, Arias (terminalia of ♂ on slide Bo 159) [MNHNM]; Sp 5a, 6(a). Prov. Madrid/Toledo: Sp 90. Prov. Toledo: Sp 297. Prov. Burgos/Soria: Sp 329. Prov. Guadalajara: Sp 322, 334. Prov. Zaragoza: Sp 379(a).

Description

Size. Length of pronotum: ♂ 1.54-1.79 (mean 1.65) mm, ♀ 1.86-2.11 (mean 2.04) mm; length of forewings: ♂ 1.22-1.54 (mean 1.37) mm.

Wings. Male: Forewings widely separated, slightly longer than mesonotum, narrowly reversely egg-shaped, apex narrowly (Fig. 44N) or broadly (Fig. 43A) rounded. Hindwings absent. Female: Forewings widely separated, scarcely longer than mesonotum, reversely egg-shaped. Hindwings absent.

Colouration. Male: Pronotum. Disk dark, semicircular. Tergites with relative broad lightly coloured margins. Head. Interocular space dark. Legs. Whitish distal zone of coxa not longer than ¼ of

its length; tibia often, femur less frequently, variously lightened. Female: Pronotum and head as in male. Tergites. Patchy zone broad, nearly as broad as remaining dark anterior area. Legs. Variously lightened, sometimes nearly yellowish.

Male tergite structures. Posterior borders of T6 and T7 moderately, of T8 weakly concave, of T10 convex, between narrowly and broadly parabolic. Glandular pits of T7 (Figs 43D-G 46D,G-I) at least anteriorly and posteriorly well demarcated, in outline semicircular or triangular, mostly open bowl-shaped, anteriorly sometimes deepened to very shallow pouches; anterior process strong, conical or with parallel lateral borders, posteriorly rounded or truncate; median ridge behind the anterior process very low, with a deep gap between the posterior end of the anterior process and the bristle tuft (not visible on the figures); behind the pits with a rather steep but not very extended mound; bristle tuft forming a narrow band considerably recessed into this mound (Figs 43D, 44G-I). Pits of T8 (Figs 43H, 44E) shallow, but with pronounced anterior borders, separated by a broad median swelling (Fig. 43H), T8 otherwise unsculptured.

Male genitalia. Hook of left phallomere. Shaft straight, sclerotized trough along its apical $\frac{2}{3}$.

Geographical distribution (Fig. 6). In the central sierras of the Iberian peninsula, radiating also into northern Portugal, up to Sa. de la Demanda in the northeast and nearly up to the Serrania de Cuenca in the east, at altitudes of 700-1800 m.

Remarks. The type of *P. carpetana* (Figs 57A-G) differs in one respect from all other specimens: The right-left-asymmetry of the genitalia (phallomeres, paraprocts, subgenital plate with stylus) is reversed. Reversal of the right-left-asymmetry is a characteristic of some Blattellid taxa as, for instance, the subgenus *Capraiellus* of the genus *Ectobius* (Brown 1975) and Plecopterinae, and of the Blaberidae. The reversal of the symmetry has been interpreted as being caused by the mutation of a developmental gene which must have occurred several times independently during the evolution of the Blattaria (Bohn 1987, Klass 1997). The symmetry reversal in the type specimen may have been an individual event, either by mutation or by a developmental error, or the specimen is a representative of a larger population showing the same symmetry reversal. The latter possibility is not supported by the collected material: another male from a locality near by (Cercedilla) shows normal symmetry.

It is not known whether individuals with reversed symmetry are able to cross with individuals having normal symmetry. In the case of a sexual isolation of the individuals or populations with reversed symmetry one would have to consider nomenclatorial consequences. But as long as the circumstances are not clarified and as long as the type specimen does not show any remarkable differences other than in right-left-asymmetry I feel no necessity not to consider it as the type specimen of the respective animals with normal symmetry.

Accompanying species, discrimination of females. *P. globososacculata* (Sp 297, 332), *P. moralesi* (Sp 5), *P. septentrionalis* (Po 26, Sp 227): wings broader, interocular space reddish; *P. fernandesiana* (Sp 329): wings broader, coxa usually half dark half whitish; *P. acuminata* (Sp 176, 178, 181, 227) and *P. rhomboidea* (Sp 176, 306): wings broader, disk with lateral extensions; *P. barbata* (Sp 177): wings usually broader, but not always unambiguously distinguishable.

Phylldromica acarinata, spec. nov.

Figs 6, 45A-H, 46A-N

Holotype: ♂, Spain, Prov. Toledo, Mtes. de Toledo, Mt. Corral de Cantos (10 km S Navahermosa), 1000 m, 22.IV.1992, Bohn (on two slides, Sp 295/2).

Additional material. Spain. Prov. Cáceres: Sp 175(a). Prov. Avila: Sp 184. Prov. Segovia/Guadalajara: Sp 185. Prov. Madrid: 1♂, 2♀, 1 L, El Escorial, V.[19]34, E. Morales (terminalia of ♂ on slide Bo 158); 1 L, El Escorial, 18.III.1906, Arias [MNHNM]. Prov. Toledo: Sp 295 (same data as holotype).

Etymology. The name of the species refers to the glandular structure of T7 where a median ridge is almost completely missing.

Description

Size. Length of the pronotum: ♂ 1.47-1.76 (mean 1.63) mm, ♀ 1.92-2.08 (mean 1.99) mm; length of forewings: ♂ 1.12-1.44 (mean 1.34) mm.

Wings. Male: Forewings widely separated, slightly longer than mesonotum, narrowly reversely egg-shaped, apex acutely to obtusely rounded. Hindwings absent. Female: Forewings widely separated, scarcely longer than mesonotum, reversely egg-shaped. Hindwings absent.

Colouration. Male: Pronotum. Disk dark, semicircular. Tergites with relatively broad whitish margins. Head. Interocular space dark. Legs. Whitish distal zone of coxa not longer than $\frac{1}{4}$ of its length. Dorsal half of tibia often lightened. Female: Pronotum and head as in male. Tergites. Patchy zone may be as broad as remaining dark anterior area, usually slightly darker than in *P. carpetana*. Legs variously lightened, sometimes almost completely yellowish.

Male tergite structures. Posterior borders of T6 and T7 moderately concave, of T8 very weakly concave, of T10 convex, between narrowly and broadly parabolic. Glandular pits of T7 (Figs 45D-H, 46D,G,H) poorly demarcated except anteriorly, with a well-developed anterior process forming a short, narrowly (Fig. 46H) or broadly rounded dent (Fig. 45D); median ridge strongly reduced, beneath the anterior process weakly developed, posteriorly (between anterior process and bristle tuft) completely missing, pits of both sides, therefore, widely communicating and together forming a transversal furrow; furrow either rather wide, posteriorly ill defined by a very low mound behind the anterior process (Figs 45D, 46H), or, when the mound is higher, narrower and posteriorly, at least in the middle, better delineated (Figs 45E, 46G). Bristle tuft forming a more or less narrow band on the mound opposite the anterior process. Pits beneath the anterior process sometimes anteriorly deepened to very narrow pouches. T8 (Fig. 46E) without glandular pits, unsculptured.

Male genitalia. Hook of left phallomere. Shaft straight, or nearly so, sclerotized trough along its apical $\frac{3}{5}$.

Remarks. Very similar to the preceding species (*P. carpetana*) but easily distinguished, at least on slide preparations, by the different structure of the T7 glandular pit (shape of anterior process, median ridge). There is considerable variation in the shape of the anterior process, the breadth of the bristle tuft, and width of the pit furrow between the animals from different localities, but also between different specimens from one locality.

Geographical distribution (Fig. 6). Found at only few localities – approximately within the distribution area of *P. carpetana*, but not at the same localities – in the central Iberian sierras: Montes de Tras la Sierra, Sa. de Guadarrama, Sa. de Ayllón, and Montes de Toledo, at altitudes of 1000-1700 m.

Accompanying species, discrimination of females. *P. moralesi* (Sp 295) and *P. globososacculata* (Sp 185): broader wings, interocular space reddish; *P. acuminata* (Sp 175): broader wings, pronotum disk with lateral extensions.

Phyllodromica crassirostris, spec. nov.

Figs 5, 47A-H, 48A-N

Holotype: ♂, Spain, Prov. León, Montes de León, btw. Aceto & Monjarín, 1300 m, 4.V.1992, Bohn (on two slides, Sp 321/4).

Additional material. Spain. Prov. León: Sp 321 (same data as holotype): 21♂♂, 12♀♀, 1 L, 3♀♀ ex L.

Etymology. The name of the species refers to the broad and short anterior process of T7 (as compared to the following species, *P. tenuirostris*).

Description

Size. Length of pronotum: ♂ 1.79-1.98 (mean 1.91) mm, ♀ 1.86-2.21 (mean 2.11) mm; forewings of ♂: length 2.05-2.30 (mean 2.13) mm, length/breadth 1.64-1.82 (mean 1.7) mm.

Wings. Male: Forewings well separated, reaching approximately the posterior border of the metanotum, narrowly reversely egg-shaped, broadest near the middle, apex narrowly rounded. Hindwings only weakly set off by superficial furrows and/or slight emarginations at the posterior border of the segment. Female: Forewings widely separated, scarcely longer than mesonotum, reversely egg-shaped or rounded hatchet-shaped. Hindwings absent.

Colouration. Male: Pronotum. Disk dark, semicircular, quite extended, whitish-transparent margins of pronotum, therefore, relatively narrow. Wings rather dark: dark patches large, margins infuscated. Tergites 1-6 with relatively narrow whitish posterior margins; T7 and T8 lighter coloured than

preceding segments, dark central marking on both segments in the middle mostly with a characteristic triangular posterior extension; pit region of T8 normally lightly coloured. Head. Interocular space dark. Legs. Whitish distal zone of coxa not longer than $\frac{1}{4}$ of its length, tibia rarely lightened in its dorsal half. Female: Pronotum. Disk dark, semicircular. Tergites. Patchy zone usually restricted to the lateral parts of the segment. Head as in male. Legs. Rarely and only moderately lightened.

Male tergite structures. Posterior borders of T6 and T7 moderately concave, of T8 weakly concave, of T10 convex, broadly parabolic. Glandular pits of T7 (Figs 47E-G, 48D,G,H) open bowl-shaped, in outline semicircular, separated by a broad median ridge and a rather short anterior process often not much longer than $\frac{1}{2}$ of the ridge (Figs 48G,H), broad at the base and gradually tapering towards its broadly rounded tip; posterior borders of the openings straight; bristle tuft on the posterior part of the median ridge and on a posteriorly following moderate elevation gradually sloping laterally and posteriorly. Pits of T8 (Figs 47H, 48E) forming a shallow transversely oval depression, sometimes divided by a low median swelling; tergite surface otherwise unsculptured.

Male genitalia. Hook of left phallomere. Shaft straight, sclerotized trough along its apical $\frac{2}{3}$.

Remarks. In the T7 gland structures the species is very similar to the western forms of *P. fernandesiana* (Figs 49G-I, 55D), but differs in longer forewings and the incompletely reduced hindwings. It is only known from one locality, and – having in mind the obvious ease by which wings can be reduced – one might ask whether it is justified to consider it as a separate species. Arguments for a separate species are: The pit structures are not really identical: the pits are longer and the bristle tuft is narrower than in the western population of *P. fernandesiana* (not visible on the REM photographs), the pigmentation of T7 and T8 is darker, and the dark pigmentation of the pronotum is much more extended. Moreover, the locality where *P. crassirostris* is found is still within the area of the eastern form of *P. fernandesiana* (the next locality with this species, Sp 322, is only about 10 km away) having a quite different T7 pit.

Geographical distribution (Fig. 5). Known only from one locality in the Montes de León, in the NE of the Iberian peninsula, at an altitude of 1300 m.

Phyllodromica tenuirostris, spec. nov.

Figs 5, 49A-D, 50A-N

Holotype: ♂, Spain, Prov. Zamora, Padornelo (W Puebla de Sanabria), 1300 m, 11.VI.1987, Bohn (on two slides, Sp 164/5).

Additional material. Spain. Prov. León: 1♂, 1♀, Monte Teleno, 10.VII.[19]59, Cobos (terminalia of ♂ on slide Bo 167); 1♀, El Teleno, 13.VII.[19]55, Mateu [MNHM]. Prov. Zamora: Sp 164 (same data as holotype): 1♂, 8♀♀; Sp 165: 3♂♂, 15♀♀.

Etymology. The name of the species refers to the comparatively (see *P. crassirostris*) narrow and long anterior process of T7.

Description

Size. Length of pronotum: ♂ 1.73-1.86 (mean 1.81) mm, ♀ 1.92-2.14 (mean 2.05) mm; forewings of ♂: length 1.73-2.05 (mean 1.93) mm, length/breadth 1.5-1.67 (mean 1.61) mm.

Wings. Male: Forewings well separated, approximately reaching the posterior border of the metanotum, reversely egg-shaped, broadest near the middle, apex narrowly (Figs 49C, 50M) or, rarely, broadly rounded (Fig. 49A). Hindwings only very weakly set off by superficial furrows. Female: Forewings widely separated, scarcely longer than mesonotum, rounded hatchet-shaped. Hindwings absent.

Colouration. Male: Pronotum. Disk dark, semicircular. Tergites 1-6 with slightly broader whitish margins than in *P. crassirostris*; T7 variously lightened, often only central area around pits dark; behind pit openings characteristically with a dark transversal bar, on both sides with posterior extensions; T8: central dark area often broken up into 3 longitudinal patches. Head. Interocular space dark. Legs. Whitish distal zone of coxa not longer than $\frac{1}{4}$ of its length, dorsal half of tibia often lightened. Female: Pronotum and head as in male. Tergites. Patchy zone usually restricted to the lateral parts of the segment, but more extended than in *P. crassirostris*. Legs often, but only moderately lightened.

Male tergite structures. Posterior borders of T6 and T7 rather strongly concave, of T8 weakly

concave, of T10 convex, broadly parabolic. Glandular pits of T7 (Figs 50D,G,H) open bowl-shaped, in outline semicircular. Median ridge narrower than in *P. crassirostris*, anterior process with almost parallel lateral borders and a rounded or truncate tip, reaching nearly to the posterior end of the ridge. Bristle tuft narrow. Posterior borders of pit openings not straight but protruding anteriorly on both sides of the bristle tuft, walls of the pits beneath these protrusions posteriorly hollowed out to shallow pouches; elevation behind openings higher than in *P. crassirostris* and posteriorly well set off forming a rather narrow transversal lip (less than $\frac{1}{2}$ of the segment length behind the openings); bristle tuft recessed considerably into this elevation. Pits of T8 (Fig. 50E) obsolete and very shallow depressions; segment surface otherwise unsculptured.

Male genitalia. Hook of left phallomere. Shaft straight, sclerotized trough along its apical $\frac{2}{3}$.

Remarks. Externally very similar to the preceding species (*P. crassirostris*), but well distinguishable by the more deeply concave posterior borders of T6 and T7, and the different pit structure and colouration of T7.

Geographical distribution (Fig. 5). Found within a small region in the NW of the Iberian peninsula, in the Montes de León, Sa. del Teleno, and Sa. de la Cabrera, at altitudes of 1300-1700 m.

Accompanying species, discrimination of females. *P. fernandesiana* (Sp 164): Coxa usually half dark half whitish.

Phyllodromica bolivariana, spec. nov.

Figs 5, 51A-H, 52A-N

Misidentification: *Phyllodromica carpetana*: Fernandes 1962: Fig. 11 D; Harz 1976: Figs. 903, 1056, 1057, 1059.

Holotype: ♂, Spain, Prov. Cantabria, Picos de Europa, btw. La Vega & Enterrias, 600 m, 26.V.1986, Bohn (on two slides, Sp 127/6).

Additional material. Spain. Prov. Asturias: Sp 155. Prov. Cantabria: 1♂, 2♀, S. Vicente de la Barquera, VII-IX, Bolívar (terminalia of ♂ on slide Bo 169); 1♂, 1♀, Santander, VII, Delgras (terminalia of ♂ on slide Bo 168) [MNHNM]; Sp 127 (same data as holotype), 415, 430. Prov. Palencia: Sp 125. Prov. Vizcaya: Sp 410, 411. Prov. Burgos: Sp 417, 418. Prov. Burgos/Álava: Sp 413. Prov. Álava: Sp 406, 412. Prov. Guipúzcoa: 1♀, San Sebastian, Escalera [MNHNM]; Sp 407, 408, 409. Prov. Navarra: Sp 121, 399, 400, 404. France. Dept. Pyrénées-Atlantiques: F 69, 70. Dept. Haute-Garonne: F 73. Dept. Ariège: F 74.

Etymology. The species is dedicated to the Spanish orthopterologist I. Bolívar who first discovered and described differences between *P. carpetana* and a representative of the new species.

Description

Size. Length of pronotum: ♂ 1.73-2.14 (mean 1.98) mm, ♀ 2.05-2.37 (mean 2.21) mm; length of forewings: ♂ 1.76-2.5 (mean 2.27) mm, length/breadth: 1.72-1.84 (mean 1.76) mm.

Wings. Male: Forwings well separated, nearly reaching the posterior end of T2, very narrowly reversely egg-shaped, narrower than in any other species of the subgroup, broadest near the middle, apex narrowly rounded. Hindwings well set off. Female: Forewings widely separated, scarcely longer than mesonotum, rounded hatchet-shaped. Hindwings absent.

Colouration. Male: Pronotum. Disk dark, semicircular. Tergites 1-6 with moderately broad whitish margins; T7 posteriorly and especially in the lateroposterior corners with extended light areas, central dark marking often with three triangular posterior extensions (Figs 51D,E, 52G,H); T8: anterior half mostly dark, dark marking posteriorly split into three bands, the median usually strongly trigonal. Head. Interocular space dark. Legs. Whitish distal zone of coxa comprising about $\frac{1}{2}$ of its length; tibia and femur variously, but usually only moderately lightened. Female: Pronotum and head as in male. Tergites. Patchy zone usually restricted to the lateral parts of the segments. Legs variously lightened, but the dark-whitish contrast in the middle of the coxa usually well visible.

Male tergite structures. Posterior borders of T6 and T7 quite strongly concave, of T8 moderately concave, of T10 convex, broadly parabolic. T6 relatively long. Glandular pits of T7 (Figs 51D-H, 52D,G,H) open bowl-shaped, quite large, in outline semicircular, separated by a well-developed median ridge. Anterior (and lateral) wall of pits slowly declining towards the bottom of the pits (in other species with bowl-shaped pits the anterior walls are steep, in most cases even hollowed out

anteriorly); posterior walls hollowed out to shallow pouches beneath the posterior borders of the pits (Figs 51D,E); posterior borders on both sides of the narrow bristle tuft protruding anteriorly. Anterior process often slightly club-shaped by a weak basal constriction (Fig. 51H), in contrast to all other species of the subgroup ascending towards posteriorly, giving rise to a deep step between its tip and the posteriorly following median ridge with the bristle tuft. Surface behind openings elevated to an at least posteriorly well demarcated transversely oval lip (Figs 51F-H); bristle tuft considerably recessed into this elevation. Structure of T8 glandular pits somewhat similar to *P. lativittata* though much lower: pits forming together a crescent-shaped depression, posterior concavity with a rounded very flat mound; T8 otherwise unsculptured (Fig. 52E).

Male genitalia. Hook of left phallomere. Shaft straight, sclerotized trough along its apical $\frac{2}{3}$ or $\frac{3}{4}$.

Remarks. Representatives of this species had already attracted the attention of earlier authors. Bolívar (1897) in his *Catalogo sinoptico* had mentioned an individual from Santander (slide Bo 168, s. above under material) having larger wings than the other *P. carpetana* specimens. Fernandes reported a second specimen from S. Vicente de La Barquera (not very far from Santander) (slide Bo 169) with the same characteristics and mentioned the possibility that the two might represent a local form or race. *B. bolivariana* shares the colouration of the coxa being half dark half whitish with the two following species.

Geographical distribution (Fig. 5). Distributed in the northern part of the Iberian peninsula between Picos de Europa in the west, the river Ebro in the south, and the river Arga in the east. The species has also been found in the northern Pyrenées in France. Altitudes: 600-1400 m.

Accompanying species, discrimination of females. *P. fernandesiana* (Sp 125, 127, 418): no distinction possible.

Phyllodromica atlantica, spec. nov.

Figs 5, 53A-H, 54A-N

Holotype: ♂, Spain, Prov. La Coruña, near Villar de Torre (5 km NE Negreira), 400 m, 1.V.1992, Bohn (on two slides, Sp 311/3).

Additional material. Spain. Prov. La Coruña: Sp 311 (same data as Type): 7♂♂, 1♀, 1♂ ex L, 6♀♀ ex L.

Etymology. The name of the species refers to its habitat near the Atlantic Ocean.

Description

Size. Length of pronotum: ♂ 1.98-2.24 (mean 2.09) mm, ♀ 2.14-2.24 (mean 2.22) mm; length of forewings: ♂ 2.11-2.56 (mean 2.36) mm, length/breadth: 1.55-1.67 (mean 1.60) mm.

Wings. Male: Forewings well separated, reaching nearly to the posterior end of T2, reversely egg-shaped, broadest near the middle, apex narrowly rounded. Hindwings well set off. Female: Forewings widely separated, scarcely longer than mesonotum, rounded hatchet-shaped. Hindwings absent.

Colouration. Male: Pronotum. Disk dark, semicircular. Tergites 1-6 with relatively broad whitish posterior margins, especially broad on T6; T7 and T8 for the most part lightly coloured, dark marking sometimes reduced to few patches. Head. Interocular space dark. Legs. Whitish distal zone of coxa comprising about $\frac{1}{2}$ of its length; femur and tibia variously lightened. Female: Pronotum and head as in male. Tergites. Patchy zone restricted to the lateral parts of the segments. Legs usually strongly lightened, coxa for the most part light, at the base with sharply delineated dark areas.

Male tergites structures. Posterior borders of T6 and T7 moderately concave, of T8 weakly concave, of T10 convex, broadly parabolic. Glandular pits of T7 (Figs 53D-G, 54D,G) open bowl-shaped, in outline semicircular, separated by a broad median ridge; anterior process broad at the base, gradually tapering towards the rounded tip; posterior borders of the pits nearly straight; behind openings with a rather flat elevation. Pits of T8 shallow depressions (Fig. 53H).

Male genitalia. Hook of left phallomere. Shaft straight, sclerotized trough along its apical $\frac{2}{3}$ to $\frac{3}{4}$.

Remarks. In gland structure and in the light colouration of the last tergites very similar to the next species (*P. fernandesiana*), but easily distinguished by the longer forewings and the hindwings being clearly set off. Externally also very similar to the preceding species (*P. bolivariana*) from which it is distinguished by the broader wings, the darker colouration of T8, and the different gland structures of T7 and T8.

Geographical distribution (Fig. 5). Known only from one locality in the extreme NW corner of the Iberian peninsula near Santiago de Compostela; altitude 400 m.

Phyllodromica fernandesiana, spec. nov.

Figs 6, 49E-I, 55A-G, 56A-N

Figs in earlier papers under *Phyllodromica carpetana*: Fernandes 1962: Fig. 11c.

Holotype: ♂, Spain, Prov. Zaragoza, Sa. del Moncayo, below Santuario del Moncayo, 1400, 29.V.1986, Bohn (on two slides, Sp 138/2).

Additional material. **Portugal**. Distr. Viana de Castelo: Po 37, 38. Distr. Braga: Po 31, 32, 36. Distr. Vila Real: Po 27, 28, 30, 33, 34, 35. Distr. Vila Real/Porto: Po 29. Distr. Porto: 1♀, Porto, Nobre [MNHNM]. Distr. Bragança: Po 23, 24. Distr. Guarda: Po 17. Distr. Castelo Branco: Po 18. **Spain**. Prov. La Coruña: Sp 313. Prov. Pontevedra: Sp 309, 310, 314, 315. Prov. Lugo: 1♀, Piedrafita del Cabrero, 1100 m, 28.-30.VII.1949, Exp. Inst. Esp. Entomología [MNHNM]; Sp 160, 161. Prov. Orense: 1♀, Carballino, G.Varela [MNHNM]; Sp 163, 308, 316, 317. Prov. Oviedo: Sp 156. Prov. Oviedo/León: Sp 157. Prov. León: 1♂, 1♀, Truchas, VII.1959, A.Cobos (terminalia of ♂ on slide Bo 165); 1♂, Sa. de Bayos, 1400 m, 1.-10.VIII.1950, Exp. Inst. Esp. Entomología (terminalia on slide Bo 166); 1♀, Villablino, 1000 m, VII.1949, E. Morales; 2♀♀, Villablino, 1000 m, 4.-12.VIII.1949, Exp. Inst. Esp. Entomología; 1♀, Pto. Ceredo, 4.-12.VIII.1949, Exp. Inst. Esp. Entomología [MNHNM]; Sp 130, 153, 154, 322. Prov. León/Palencia: Sp 131. Prov. Zamora: Sp 164, 166, 167. Prov. Cantabria: 1♂, 2♀♀, Picos Europa, Espinama, M. Escalera (terminalia of ♂ on slide Bo 170) [MNHNM], Sp 127. Prov. Cantabria /León: Sp 129. Prov. Palencia: Sp 123, 124, 125, 132, 134, 428. Prov. Burgos: Sp 84a,b, 122, 325, 326, 327, 328, 418, 422, 424, 425, 426, 443. Prov. Burgos/Logroño: Sp 83. Prov. Logroño: Sp 81, 82. Prov. Soria: Sp 136, 137(a), 329, 445. Prov. Zaragoza: 17♂♂, 11♀♀, 7 L, Moncayo, 17.VI.1940, E. Morales (terminalia of 1♂ on slide Bo 164); 2♀♀, Moncayo, F. Navarro; 1♀, Moncayo, VIII.1908, Navas [MNHNM]; Sp 138 (same data as holotype). Prov. Cuenca: 1♂, Uclés (terminalia on slide Bo 209) [MAKB].

Etymology. The species is dedicated to the Portuguese orthopterologist J. de A. Fernandes who in his revision of the Iberian Ectobiinae had already pointed out the distinct appearance of the specimens from the Sa. de Moncayo representing possibly a local form or race of *P. carpetana* (Fernandes 1962, p. 211).

Description

Size. Length of pronotum: ♂ 1.79-2.05 (mean 1.94) mm, ♀ 2.05-2.30 (mean 2.16) mm; length of forewings: ♂ 1.6-1.92 (mean 1.77) mm.

Wings. Male: Forewings well separated, approximately reaching the middle of the metanotum, rounded hatchet-shaped (Fig. 56C) or, rarely, reversely egg-shaped (Fig. 56M). Hindwings absent. Female: Forewings widely separated, scarcely longer than mesonotum, rounded hatchet-shaped. Hindwings absent.

Colouration. Male: Pronotum. Disk dark, semicircular. Tergites with relatively broad whitish margins; T7 and T8 usually for the most part lightly coloured, dark areas often reduced to a few patches, in T7 around the pits. Head. Interocular space dark. Legs. Whitish distal zone of coxa in most cases comprising about ½ of its length, but sometimes, especially in the western populations, only ¼ of its length or less; distal parts of legs often lightened. Female: Pronotum and head as in male. Tergites. Patchy zone variously extended, either only laterally or over the segment breadth. Legs up to nearly completely yellowish but usually coxa with dark basal half.

Male tergite structures. Posterior borders of T6 and T7 moderately (to weakly) concave, of T8 weakly concave, of T10 convex, broadly parabolic. Glandular pits of T7 (Figs 49G-I, 55D-F, 56D,G) open bowl-shaped, in outline semicircular, separated by a relatively broad median ridge with well-developed anterior process; posterior borders of pits almost straight; behind openings with a flat, poorly demarcated elevation. The pits of T7 vary considerably between the different regions. In the eastern forms (holotype) the anterior process is more slender (Figs 55E,F), the pits are anteriorly deepened below the borders to shallow pouches (Figs 56D,G). The specimens from Portugal show a broader anterior process and flatter pits without pouches (Figs 49 G-I, 55D). Pits of T8 shallow depressions (Figs 55G,H).

Male genitalia. Hook of left phallomere. Shaft straight, sclerotized trough along its apical ⅓ or ¼.

Remarks. The wide distribution of the species is accompanied by a considerable variation in the pit structure of T7 (s. above). The differences in pit structures are correlated with differences in the size

of the membranous glands: In the eastern forms the membrane glands of T5/6 are larger than those of T4/5 (Figs 56B,C); in specimens from Portugal the reverse is true (Figs 49E,F). The two populations are connected by a very broad transition zone with intermediate forms around the line connecting Santiago de Compostela and Salamanca. The differences in gland structure may justify the establishment of subspecies for the two populations, but the breadth of the transition zone makes me hesitate to do so at the moment.

Geographical distribution (Fig. 6). Widely distributed in the northern part of the Iberian peninsula, but – apart from one locality S of Santander – not occurring E and N of the Ebro. The distribution gap in Portugal between the Rivers Mondego and Douro is presumably an artifact: there are no collecting data from this region nor from the northern parts of the provinces La Coruña, Lugo, and Asturias. In the east of central Spain there is one very isolated occurrence in the Province Cuenca, near Tarascon. The reference is based on a single male labelled only with “Uclés” [MAKB]. Though there is obviously no other locality in Spain with this name I have some doubt whether the labelling is correct. At altitudes of 150-1500 m.

Accompanying species, discrimination of females. *P. globososacculata* (Sp 83, 84, 123, 131, 134, 154) and *P. septentrionalis* (Po 17, Sp 134, 153): interocular space reddish; *P. lativittata* (Po 18): pronotum disk with lateral extensions; *P. barbata* (Sp 123, 129, 131, 134, 424) and *P. tenuirostris* (Sp 164): coxa for most part dark; *P. carpetana* (Sp 329): narrower wings, coxa for most part dark; *P. bolivariana* (Sp 125, 127, 418): indistinguishable.

Unidentified females from Spain

(Sp: author's collection, all others: MNHNM)

P. moralesi or *P. globososacculata*? Prov. Segovia: 1♀, La Granja, Arias. Prov. Madrid: 1♀, Madrid, I.Bolívar; 1♀, El Pardo, IV.[1]932, # 1560, E.Morales; 1♀, Escorial, Arias; 1♀, Cercedilla, Estación Alpina, 1500 m, IV.1930, J.Hernandez. Prov. Guadalajara: 1♀, Brihuega, VII.1900, L.Navas. Prov. Cuenca: 3♀♀, Tragacete, Julio 1906, Arias; 1♀, Cañada del Cubillo, Julio 1906, Arias; 2♀♀, Cañizares, Selgas.

saccaraoi-group: Prov. Granada: 3♀♀, Sp 262.

P. barbata? Prov. Logroño: 1♀, Sierra de la Demanda, Sn. Lorenzo, J.Carandell.

P. acuminata or *P. rhomboidea*? Prov. Salamanca: 1♀, La Hoya, 1300 m, Presa 15 Q, 24.VII.[19]78, S.Fdez.Gayubo.

P. carpetana or *P. acarinata*? Prov. Salamanca: 1♀, Sp 174. Prov. Cáceres: 1♀, Sp 305. Prov. Avila: 1♀, Navarredonda, VI.1909, # 1566, Exp. del Museo; 2♀♀, Valle de Iruelas, V.1920, C.Bolívar. Prov. Segovía: 1♀, Balsain; 1♀, San Rafael, 1300 m, I.Bolívar; 1♀, San Rafael, 15.VI.1929, Escalera; 1 L, San Rafael, 5.V.1912, C.Bolívar. Prov. Madrid: 2♀♀, El Ventorillo, VII.[19]35, E.Mor.; 1♀, En el Hayelo de Monteja de la Sierra, 14.V.1965; 1♀, Monteja de la Sierra, C.Bolívar; 2♀♀, Pto. Navacerrada, VII.[19]35, E.Mor.; 1♀, Guadarrama, Pto. Navacerrada, 1700 m, VIII.[19]60, J.Abajo; 3♀♀, Sp 7.

P. bolivariana or *P. fernandesiana*? Prov. Oviedo: 1♀, Rondiella, P.N. Cavadonga, C.Bolívar; 2♀♀, Somiedo, Valle del Lago, 1565 m, 4-12.VIII.1949, Exp. Inst. Esp. Entomología. Prov. León: 3♀♀, Torrebarrio, 1212 m, 1.-10.VIII.1950, Exp. Inst. Esp. Entomología; 3♀♀, Torrebarrio, 4.-12.VIII.1949, Exp. Inst. Esp. Entomología; 3♀♀, Sp 152. Prov. Cantabria: 5♀♀, Picos Europa, VIII, # 1567, Bolívar. Prov. Palencia: 1♀, Sp 123.

P. atlantica or *P. fernandesiana*? Prov. La Coruña: 1♀, Villa Rutis, Bolívar.

P. fernandesiana? 1♀, Castro Loureiro [= Castro Laboreira, Sa. da Peneda, Portugal?], A.Casares.

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Tables

(Figs 7-57)

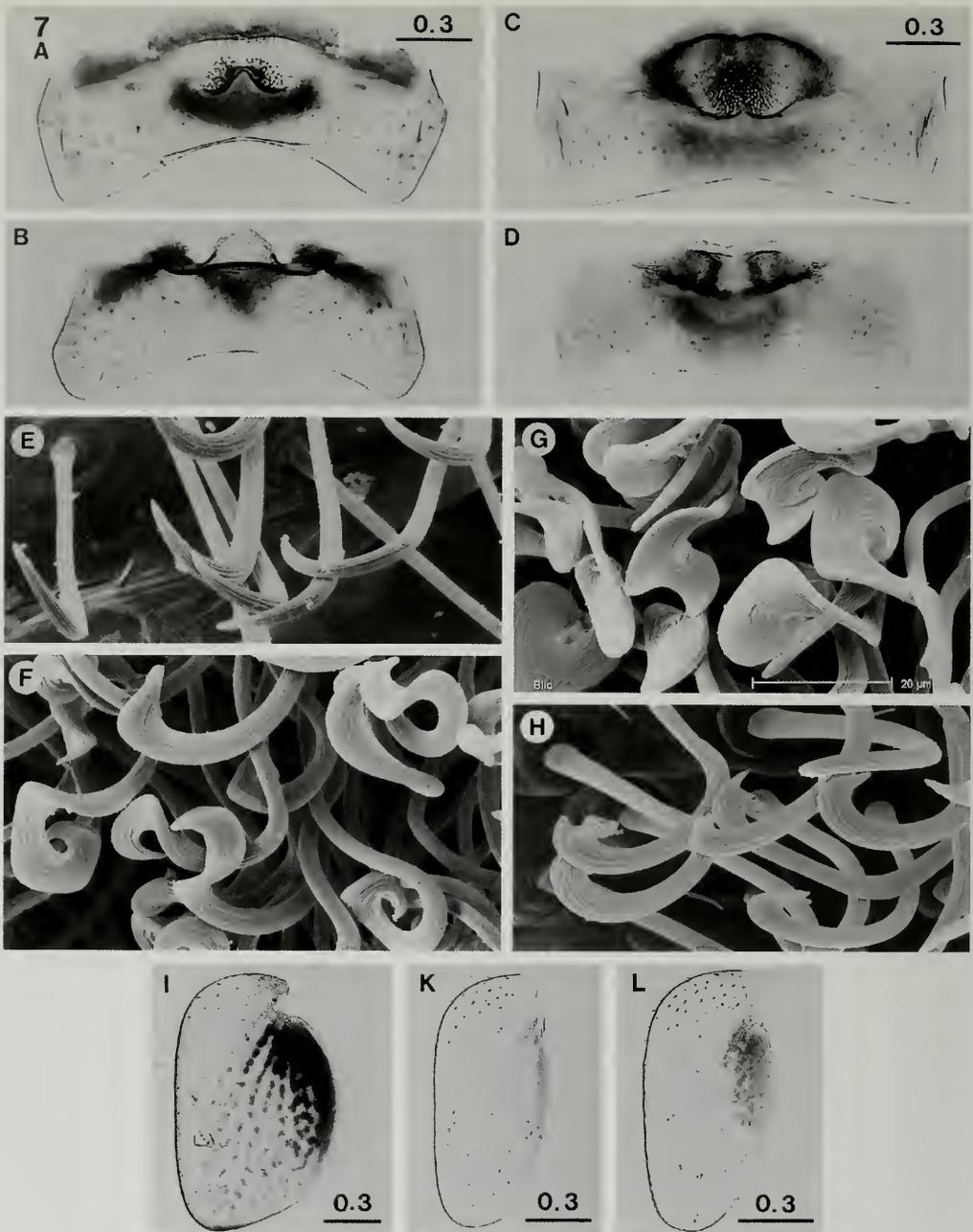


Fig. 7. Male structures of the *carpetana*-group and related groups. (A-D) Specializations on T7 (A,C) and T8 (B,D) in the *subaptera*- (A,B) and *nana*-group (C,D). (E-H) Bristles of the glandular pits of T7: Unspecialized bristles in *P. brevipennis* (E); specialized bristles with broadened tips in the *carpetana*- (F), the *subaptera*- (G), and the *nana*-group (H). (I-L) Forewings in the *carpetana*- (I), the *subaptera*- (K), and the *nana*-group (L). Identification: (A,B) Sp 330/4, (C,D) Sp 113/1, (E) Yu 34/2, (F) Sp 278/4 (*P. brevisacculata*), (G) Sp 203/4, (H), Sp 414/3, (I) Sp 461/5 (*P. javalambrensis*), (K) Sp 365/3, (L) Sp 374/2. Same scale (in mm) for (A,B), (C,D), and (E-H).

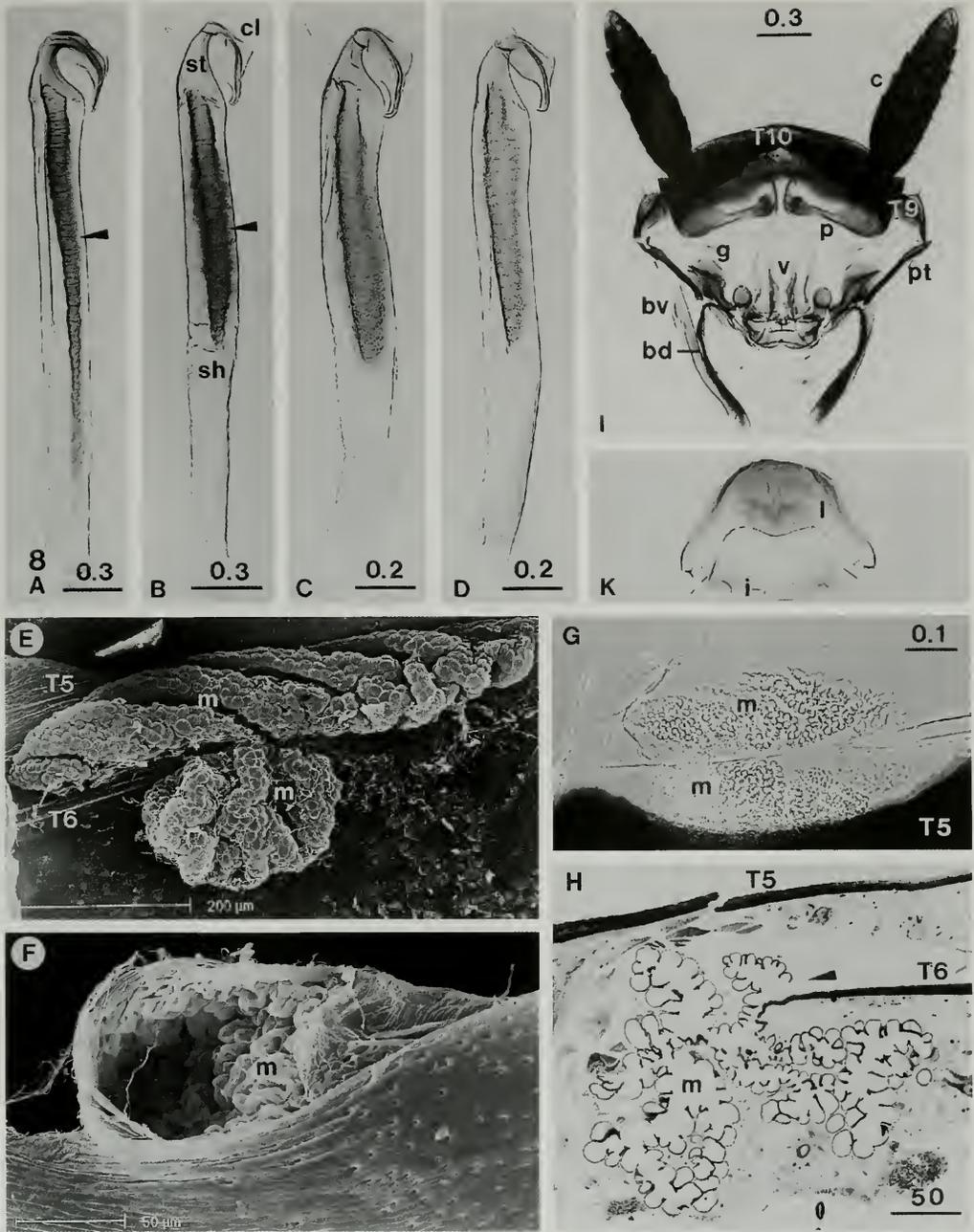


Fig. 8. (A-D) Hook of left phallosome with a long trough (arrows) in *Ectobius lucidus* (A) but a short trough in the *carpetana*- (B), the *subaptera*- (C), and the *nana*-group (D). (E-H) Membrane glands in the *carpetana*-group. SEM pictures: (E) Intersegmental region between T5 and T6 with two pouches, internal view, soft tissues removed by KOH; (F) membrane pouch at the left anterior border of T7 (detail of Fig. 15/E). (G) Phase contrast picture of the left anterior border of T5. (H) Histological sagittal section through the intersegmental region of T5/6 showing the alveolate structure of the membrane gland (arrow points to opening of the gland). (I, K) Female genital sclerites: (I) dorsal, (K) ventral complex. Identification: (A) It 48/3, (B) Sp 175a/2 (*P. acuminata*), (C) Sp 330/4, (D) Sp 148/2, (E) Sp 269/9 (*P. sulcata*), (F) Sp 123/9 (*P. barbata*), (G) F 81/13 (*P. isolata*), (H) Sp 99/8

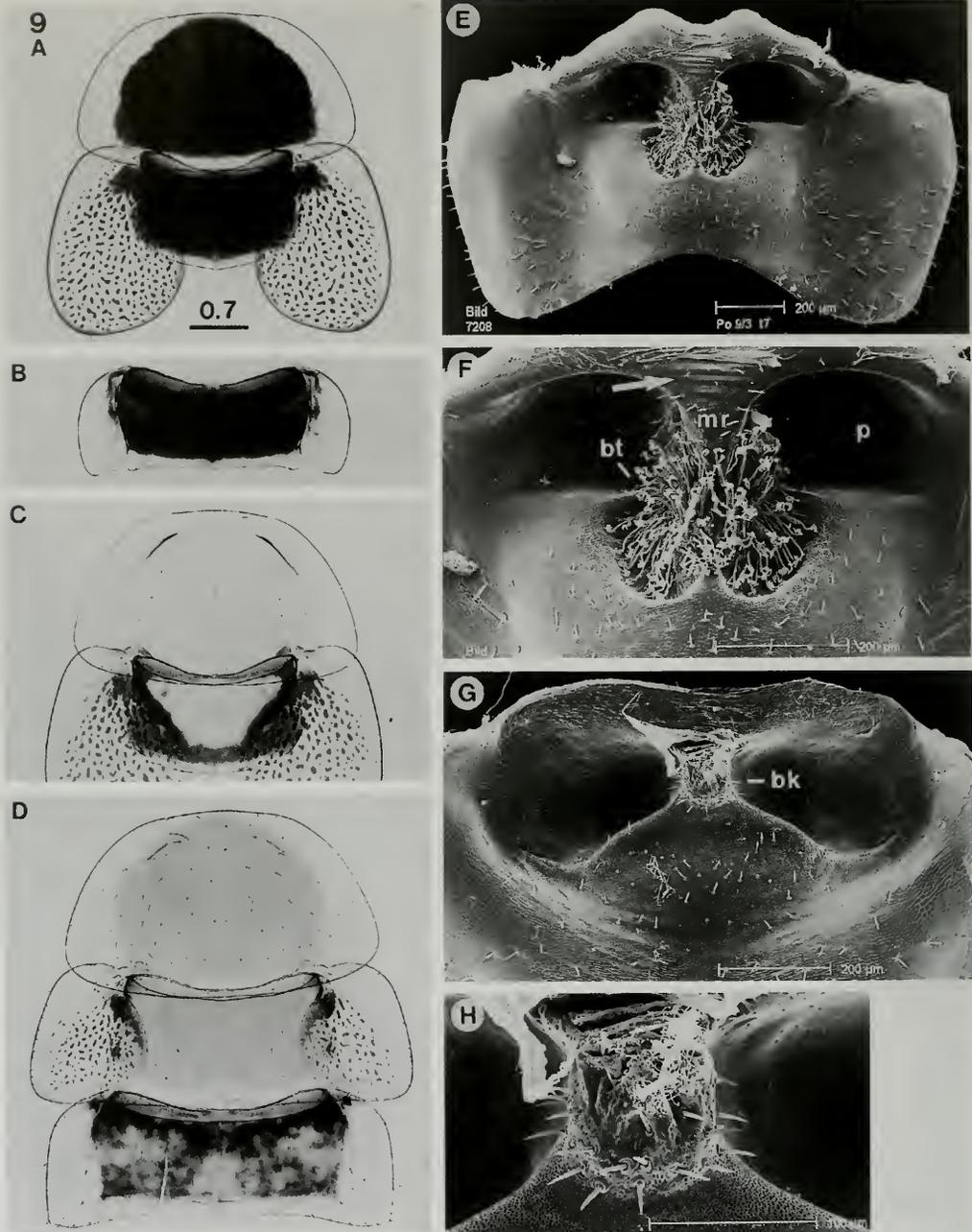


Fig. 9. *P. moralesi*, male (A-C, E-H), female (D). (A-D) Thoracal segments: (A,C) pron. and meson., (B) metan., (D) complete thorax. (E-H) SEM pictures: T7 (E; gland region: F, arrow points to cuticular folds), gland region of T8 (G; bristle knob: H). Identification: (A,B) Po 10/1, (C) Po 9/1, (D) Po 10/4, (E-H) Po 9/3. Same scale (in mm) for (A-D). – Abbreviations: (bk) bristle knob, (bt) bristle tuft, (mr) median ridge, (p) glandular pit.

◁ (*P. laticarinata*), (L,K) Po 18/10,13 (*P. lativittata*). Scale in (A-D,G,I,K) in mm, in (H) in µm; same scale for (L,K). – Abbreviations: (bd, bv) dorsal, ventral sclerite of basivalvula, (c) cercus, (cl) claw, (g) gonangulum, (i) intersternal fold, (l) laterosternite, (m) membrane gland, (pt) paratergites 8+9, (sh) shaft, (st) stalk, (v) valves.

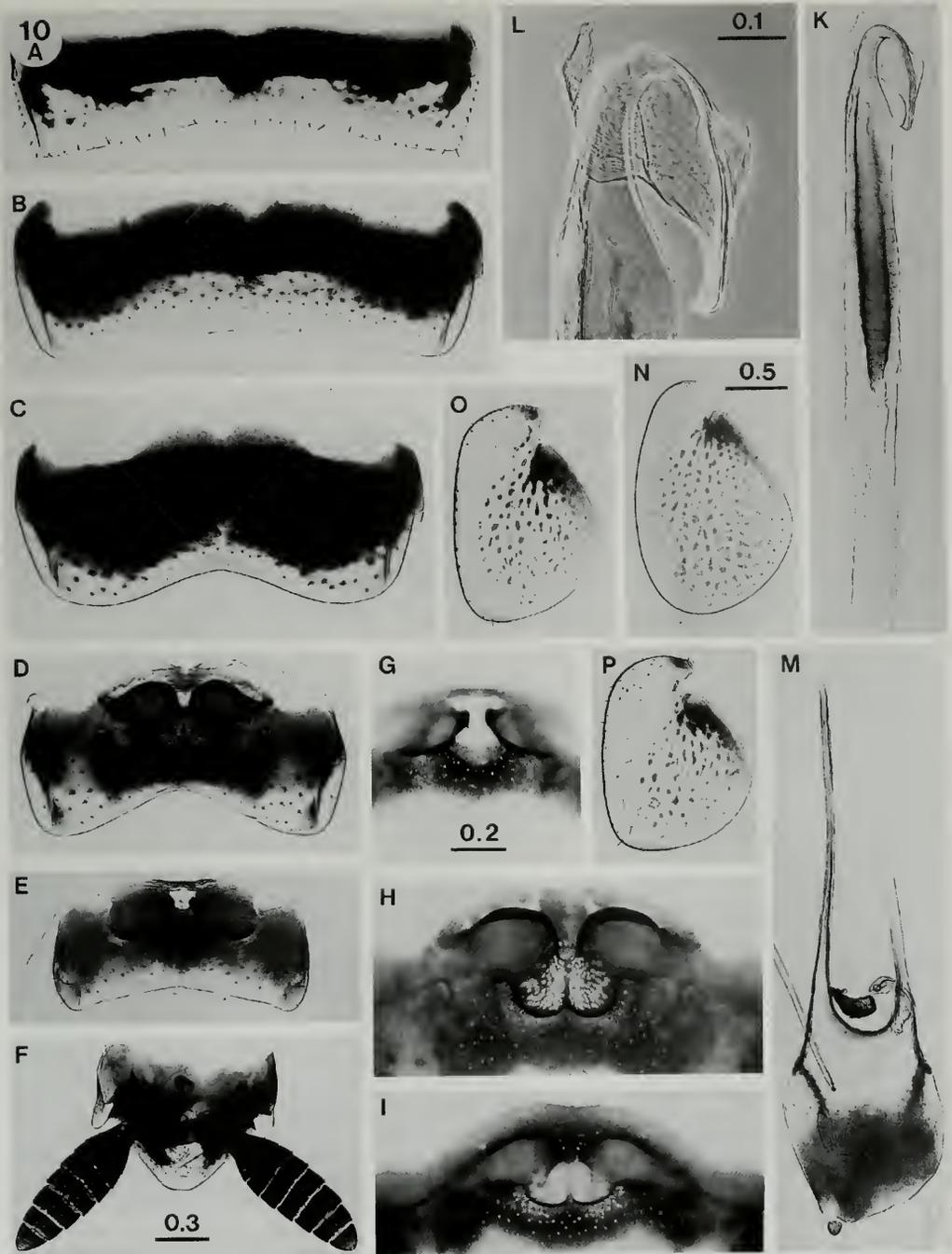


Fig. 10. *P. moralesi*, male (B-N), female (A,O,P). T5 (A,B), T6 (C), T7 (D; gland region: H,I), T8 (E; gland region: G), T9+10 (F), hook of left phallomere (K,L), subgenital plate (M), forewings (N-P). Identification: (A) Po 10/4, (B-F,M) Po 10/1, (G,I) Sp 290/1, (H) Po 9/1, (K,L) Po 8/1, (N) Sp 11a/6, (O) Po 8/10, (P) Po 8/9. Same scale (in mm) for (A,N-P), (B-F,M), and (G-K).

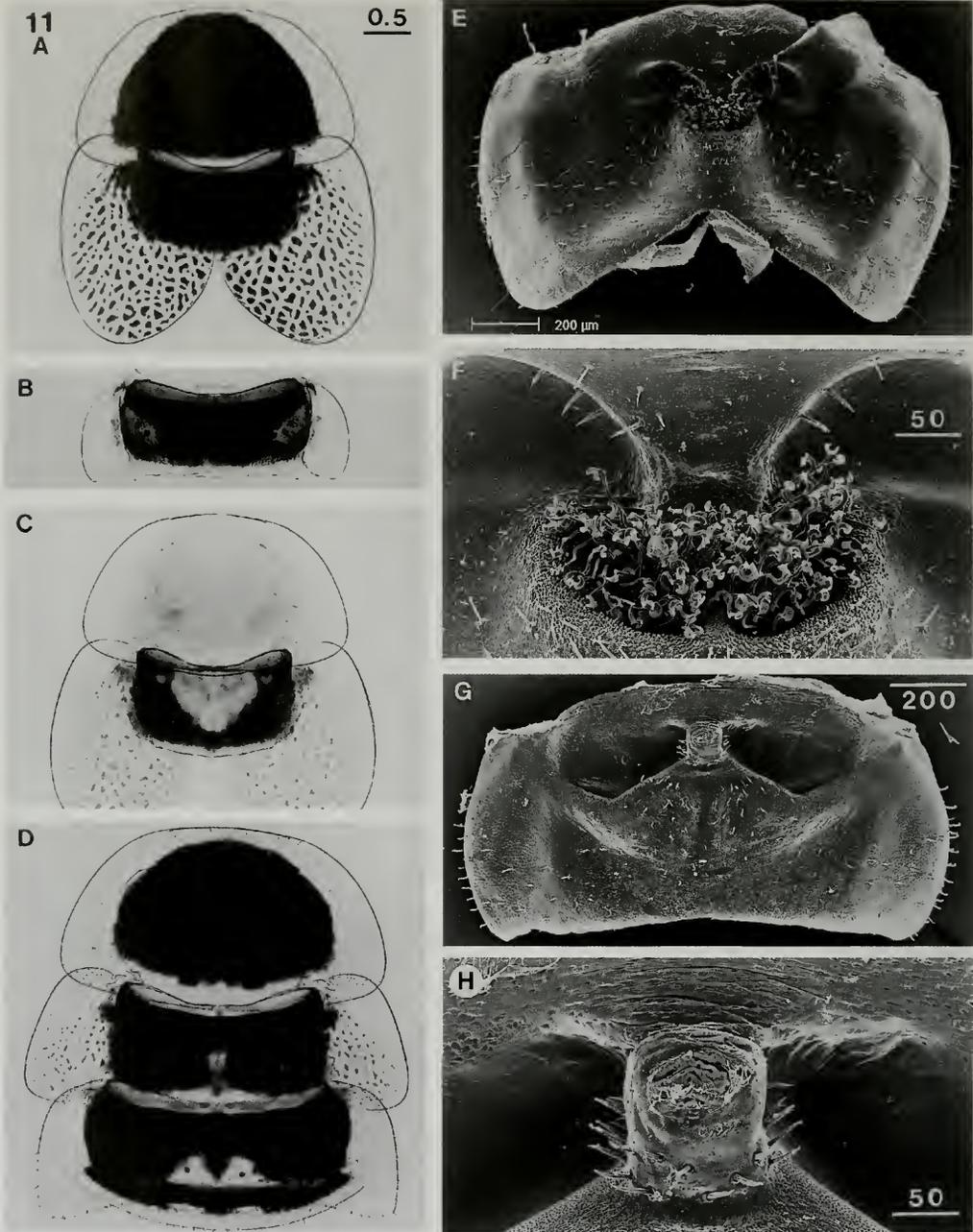


Fig. 11. *P. septentrionalis*, male (A-C,E-H), female (D). (A-D) Thoracal segments: (A,C) pron. and meson., (B) metan., (D) complete thorax (and first abdominal segment). (E-H) SEM pictures: T7 (E; ridge and bristle tuft: F), T8 (G; median ridge and bristle knob: H). Identification: (A,B) Po 13/1, (C) Po 15/2, (D) Po 26/5, (E,F) Po 14/4, (G,H) Po 14/3. Scale in mm in (A), in μm in (F-H); same scale for (A-D).

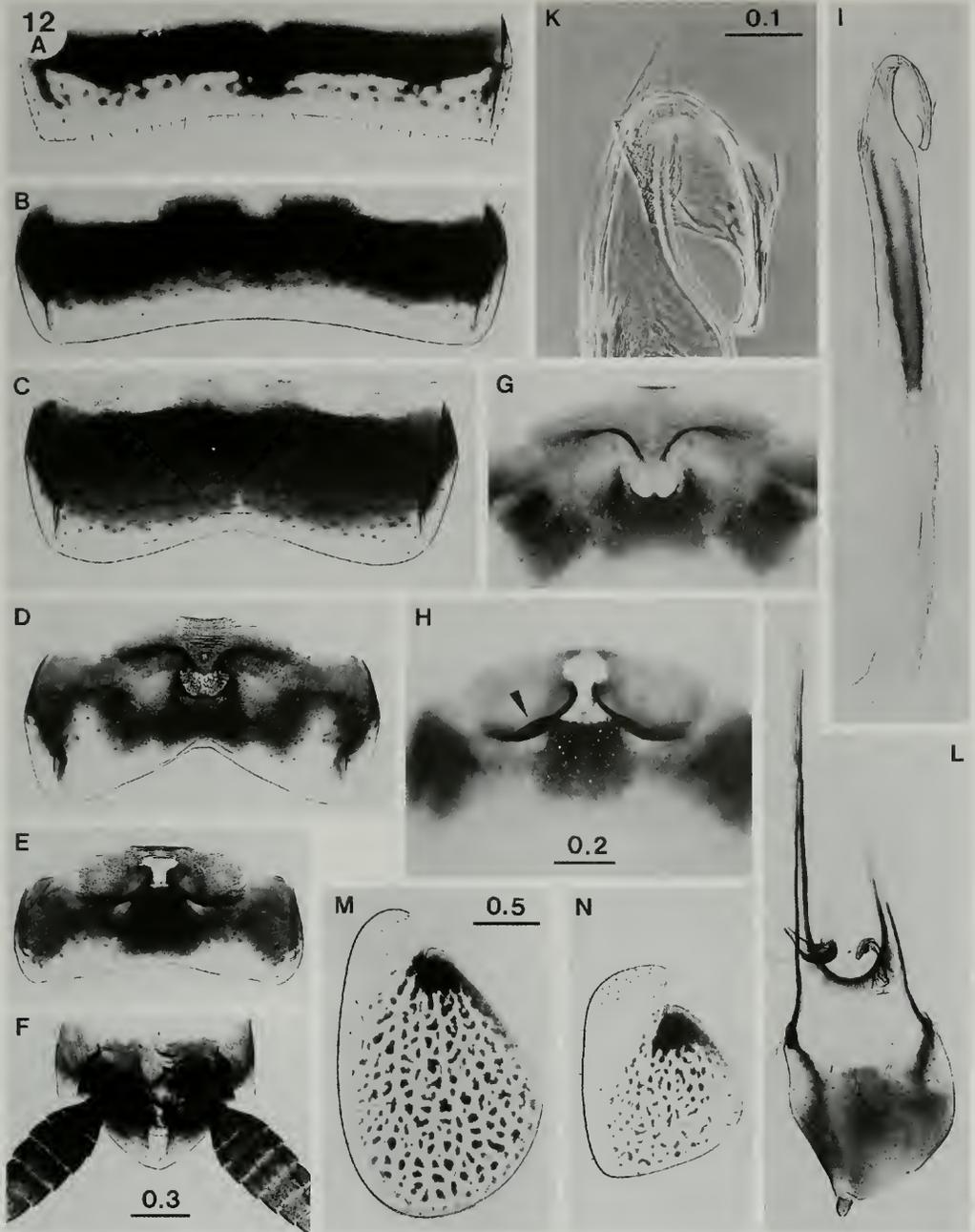


Fig. 12. *P. septentrionalis*, male (B-M), female (A,N). T5 (A,B), T6 (C), T7 (D; gland region: G), T8 (E; gland region: H, arrow points to shallow pouch), T9+10 (F), hook of left phallomere (I,K), subgenital plate (L), forewings (M,N). Same scale (in mm) for (A,M,N), (B-F,L), and (G,H,I). Identification: (A) Po 13/7, (B-F,I-M) Po 13/3 (Holotype), (G,H) Sp 227/3, (N) Po 13/8.

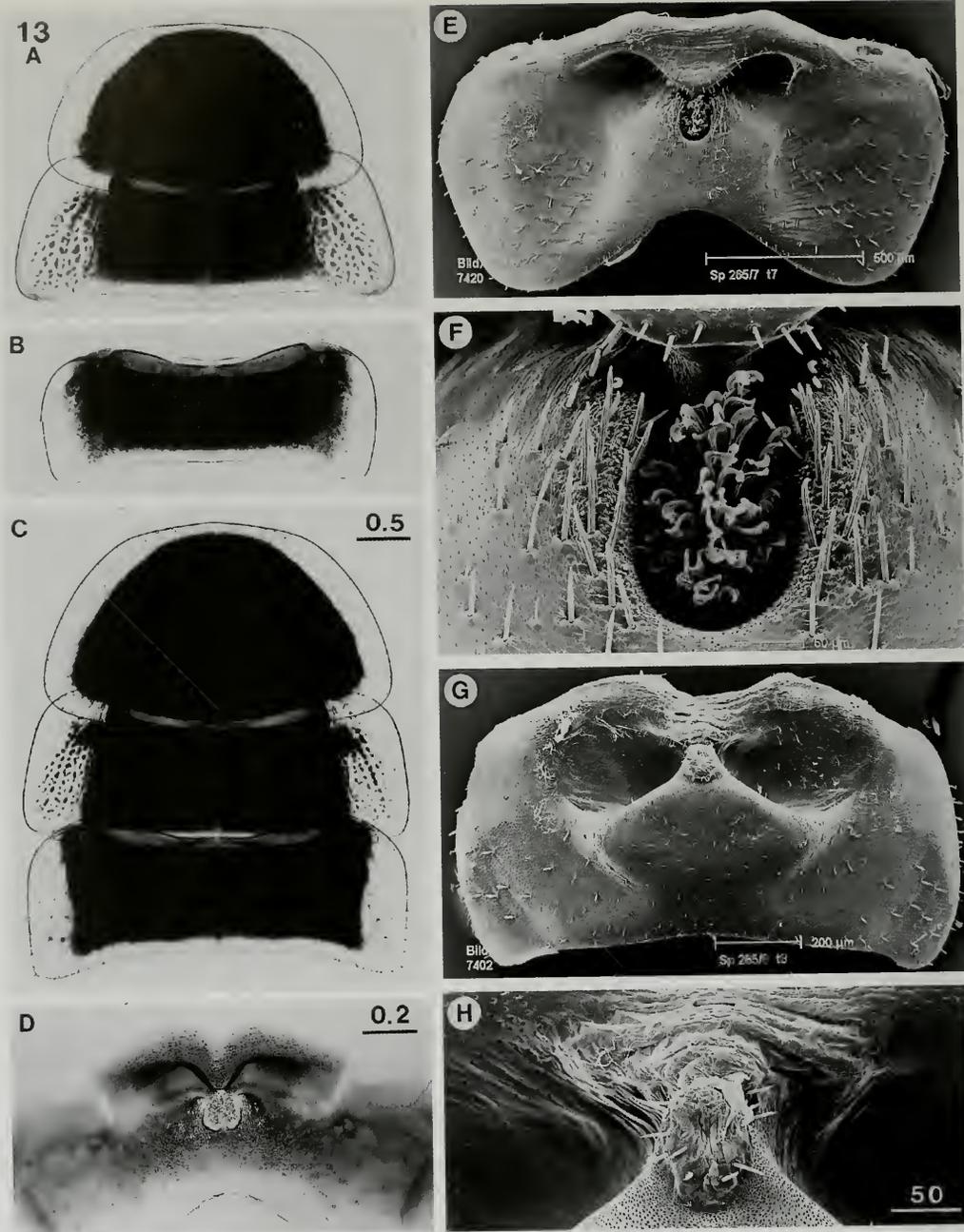


Fig. 13. *P. delospuertos*, male (A,B,D-H), female (C). (A-C) Thoracal segments: (A) pron. and meson., (B) metan., (C) complete thorax. (D) gland region of T7. (E-H) SEM pictures: T7 (E); bristle tuft: F); T8 (G); median ridge and bristle knob: H). Identification: (A,B) Sp 265/1 (Holotype), (C) Sp 265/10, (D) Sp 266/2, (E,F,H) Sp 265/7, (G) Sp 265/8. Scale in (C,D) in mm, in (H) in μm; same scale for (A-C).

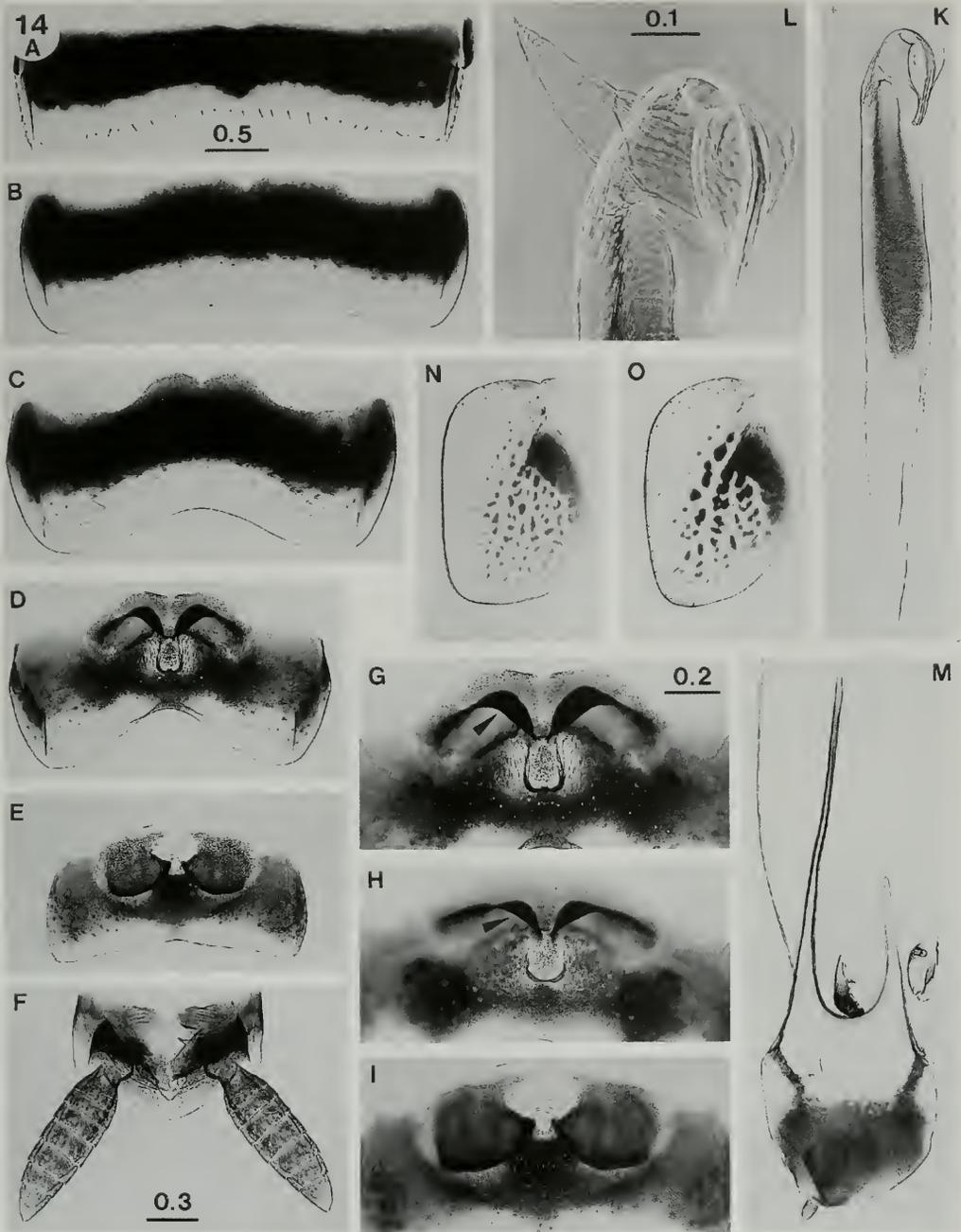


Fig. 14. *P. delospuertos*, male (B-N), female (A,O). T5 (A,B), T6 (C), T7 (D); gland region: G,H, arrows point to shallow pouches), T8 (E); gland region: I), T9+10 (F), hook of left phallomere (K,L), subgenital plate (M), forewings (N,O). Identification: (A) Sp 265/10, (B-G,I-M) Sp 265/1 (Holotype), (H) Sp 266/1, (N) Sp 266/3, (O) Sp 265/11. Same scale (in mm) for (B-F,M-O) and (G-K).

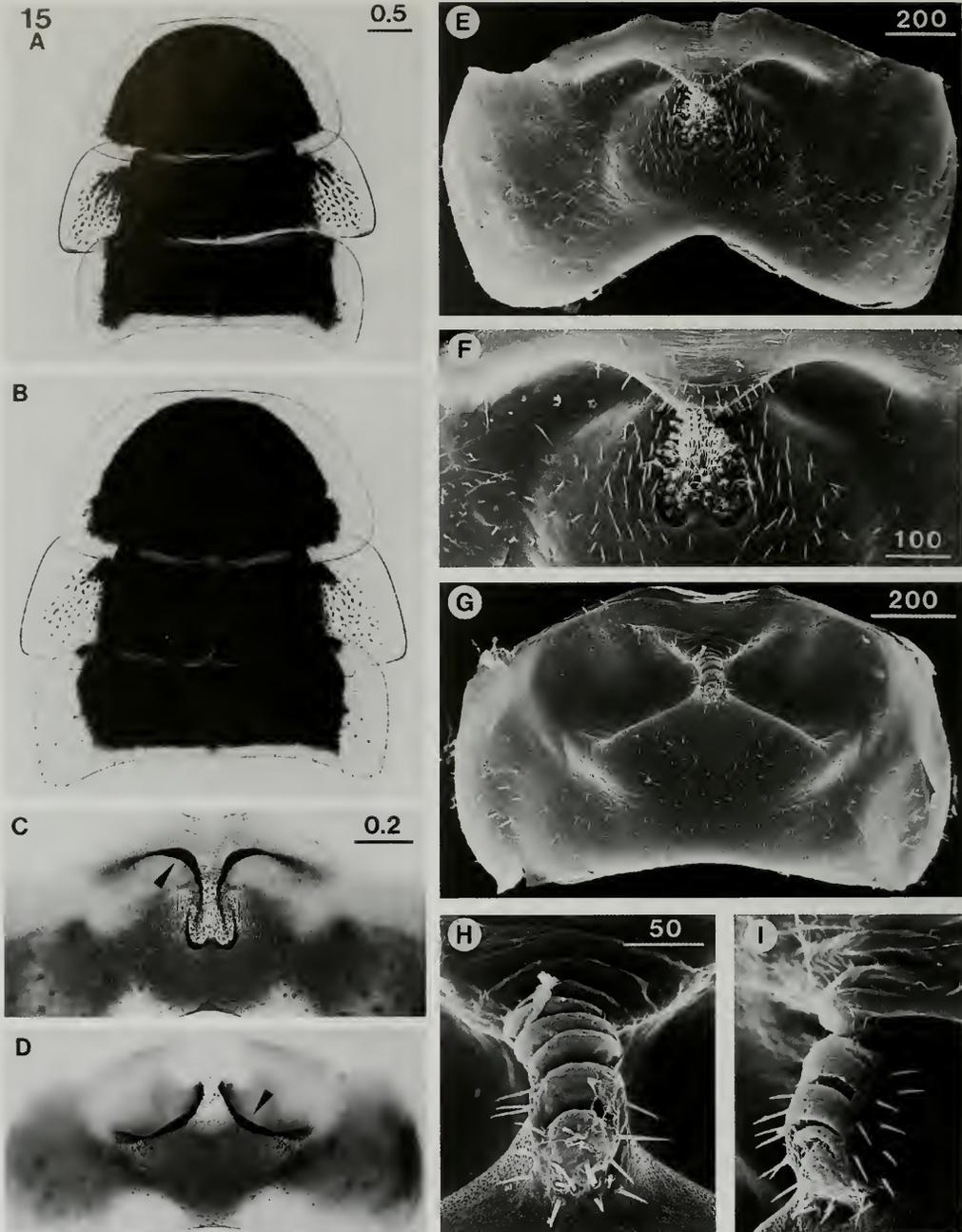


Fig. 15. *P. isolata*, male (A,C-I), female (B). (A,B) Thoracal segments. (C,D) Gland region of T7 (C) and T8 (D), arrows point to shallow pouches. (E-I) SEM pictures: T7 (E; gland region: F), T8 (G; median ridge and bristle knob: H,I, the latter in dorsolateral view). Identification: (A) F 81/12, (B) F 81/10, (C,D) F 43a/1, (E,F,I) F 81/3, (G,H) F 81/4. Scale in (A,C) in mm, in (E-H) in µm; same scale for (A,B) and (H,I).

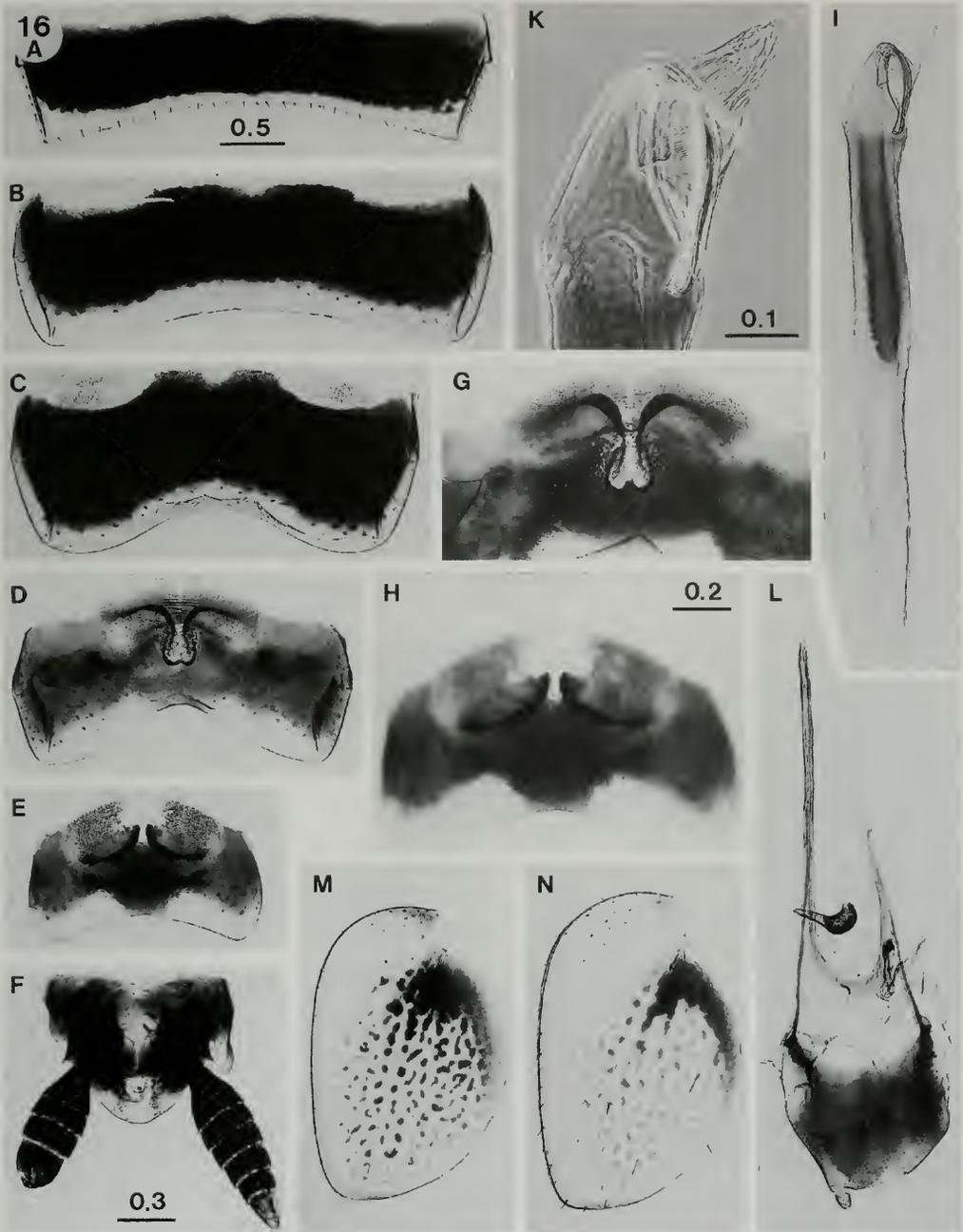


Fig. 16. *P. isolata*, male (B-M), female (A,N). T5 (A,B), T6 (C), T7 (D; gland region: G), T8 (E,H), T9+10 (F), hook of left phallomere (I,K), subgenital plate (L), forewings (M,N). Identification: (A,N) F81/10, (B,C,E-L) F 81/2 (Holotype), (D,M) F 81/13. Same scale (in mm) for (B-F,L-N) and (G-I).

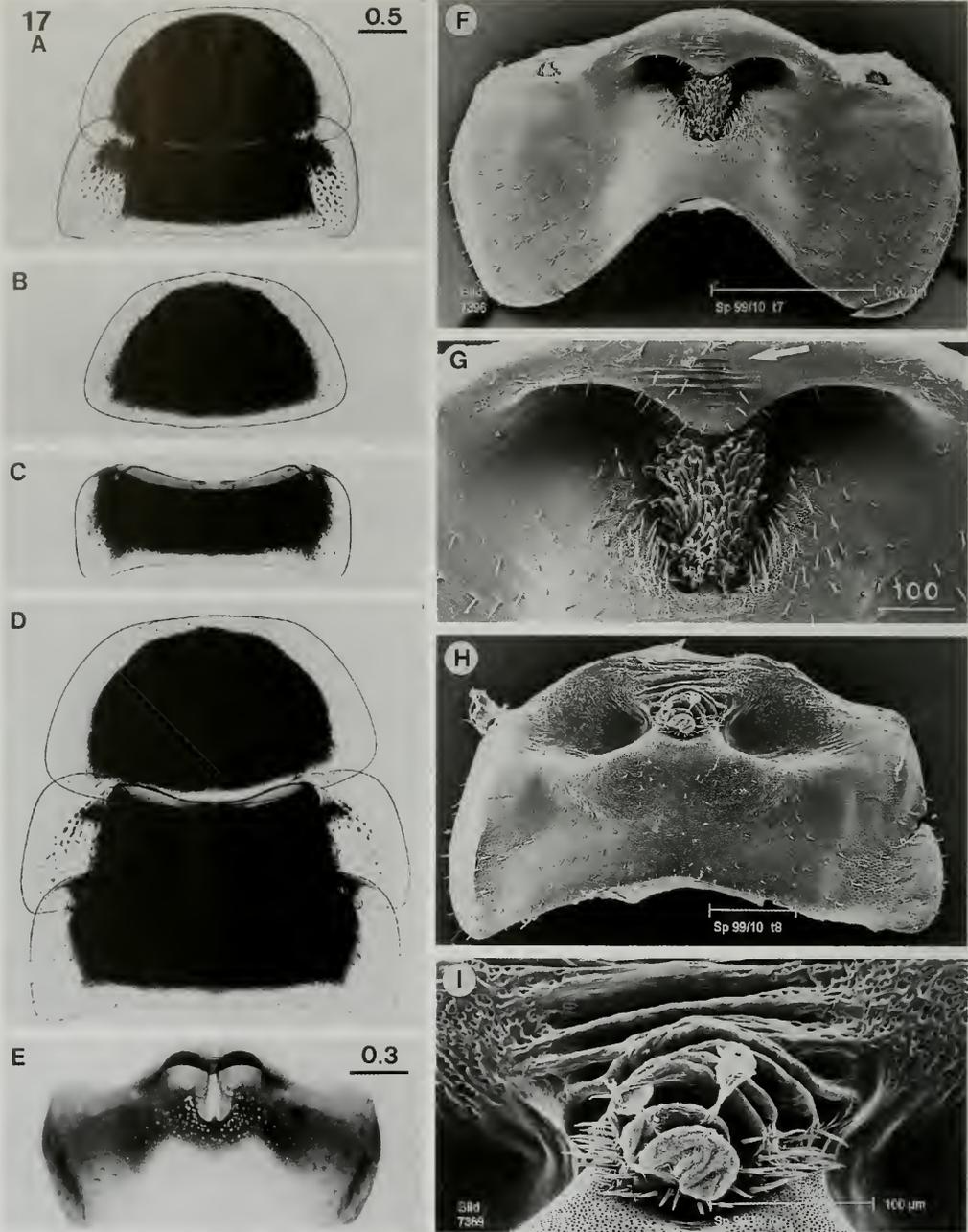


Fig. 17. *P. laticarinata*, male (A-C,E-I), female (D). (A-D) Thoracal segments: (A) pron. and meson., (B) pron., (C) metan., (D) complete thorax. (E) T7. (F-I) SEM pictures: T7 (F; gland region: G, arrow points to transversal slits and ridges), T8 (H; median ridge with bristle knob: I). Identification: (A) Sp 99/9, (B, C) Sp 99/5 (Holotype), (D) Sp 99/13, (E) Sp 99/3, (F-I) Sp 99/10. Scale in (A,E) in mm, in (G) in µm; same scale for (A-D).

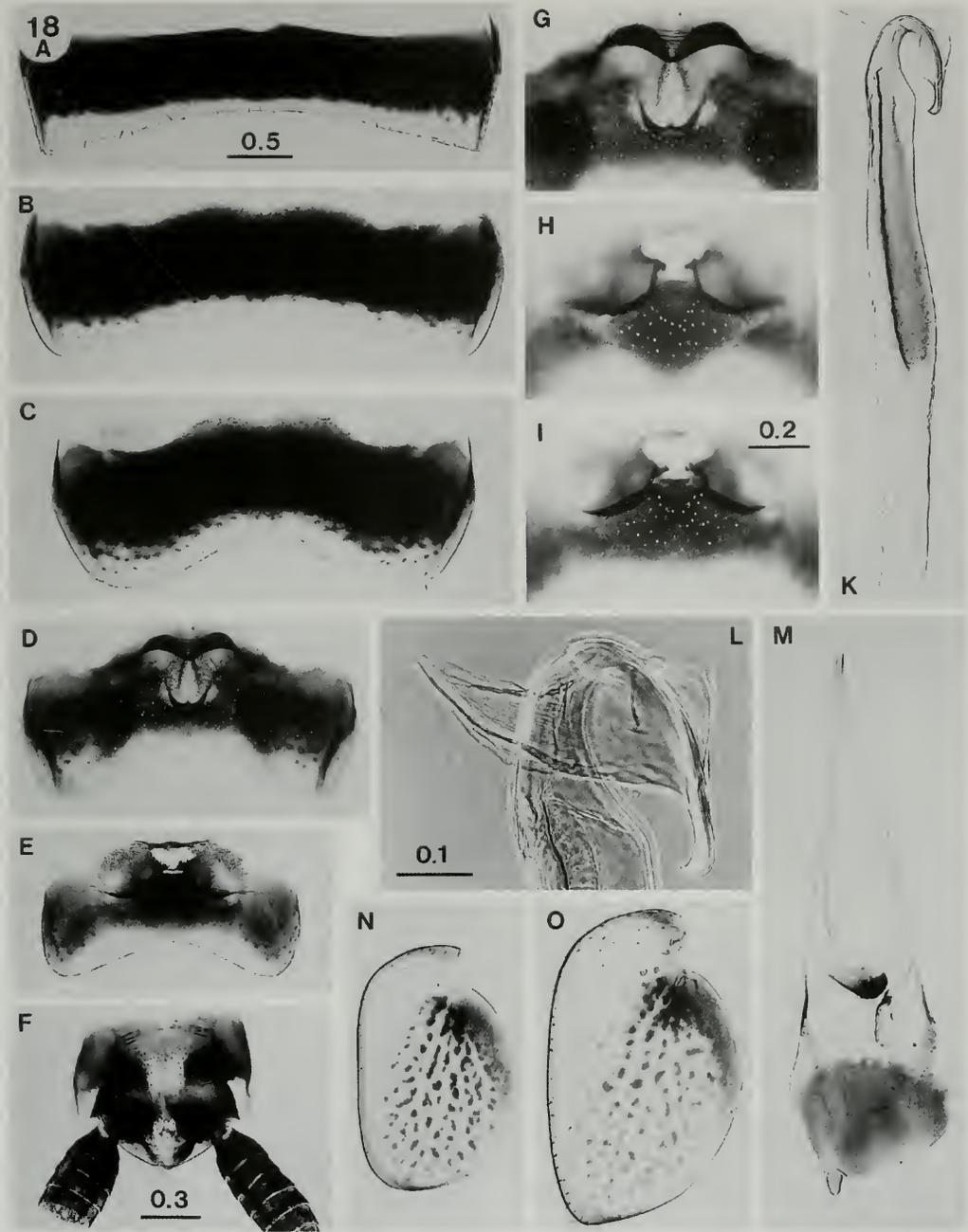


Fig. 18. *P. laticarinata*, male (B-N), female (A,O). T5 (A,B), T6 (C), T7 (D; gland region: G), T8 (E, gland region: H,I), T9+10 (F), hook of left phallosome (K,L), subgenital plate (M), forewings (N,O). Identification: (A) Sp 99/13, (B-G,I-L-N) Sp 99/5 (Holotype), (H) Sp 99/3, (O) Sp 99/11. Same scale (in mm) for (B-F,M-O) and (G-K).

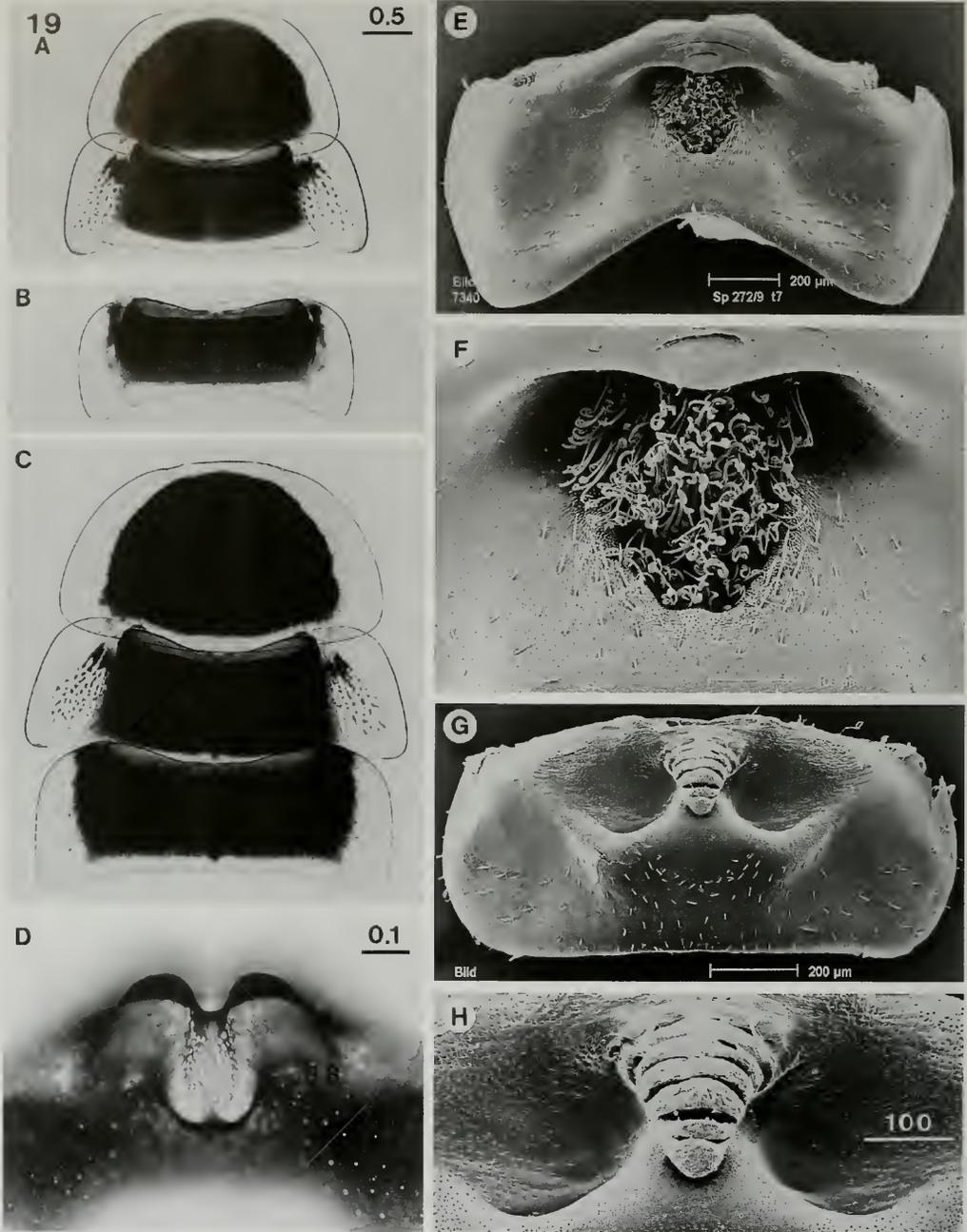


Fig. 19. *P. javalambrensis*, male (A,B,D-H), female (C). (A-C) Thoracal segments: (A) pron. and meson., (B) metan., (C) complete thorax. (D) gland region of T7. (E-H) SEM pictures: T7 (E; gland region: F), T8 (G; gland region: H). Identification: (A,B) Sp 272/4 (Holotype), (C) Sp 461/2, (D) Sp 272/3, (E-H) Sp 272/9. Scale in (A,D) in mm, in (H) in μm; same scale for (A-C).

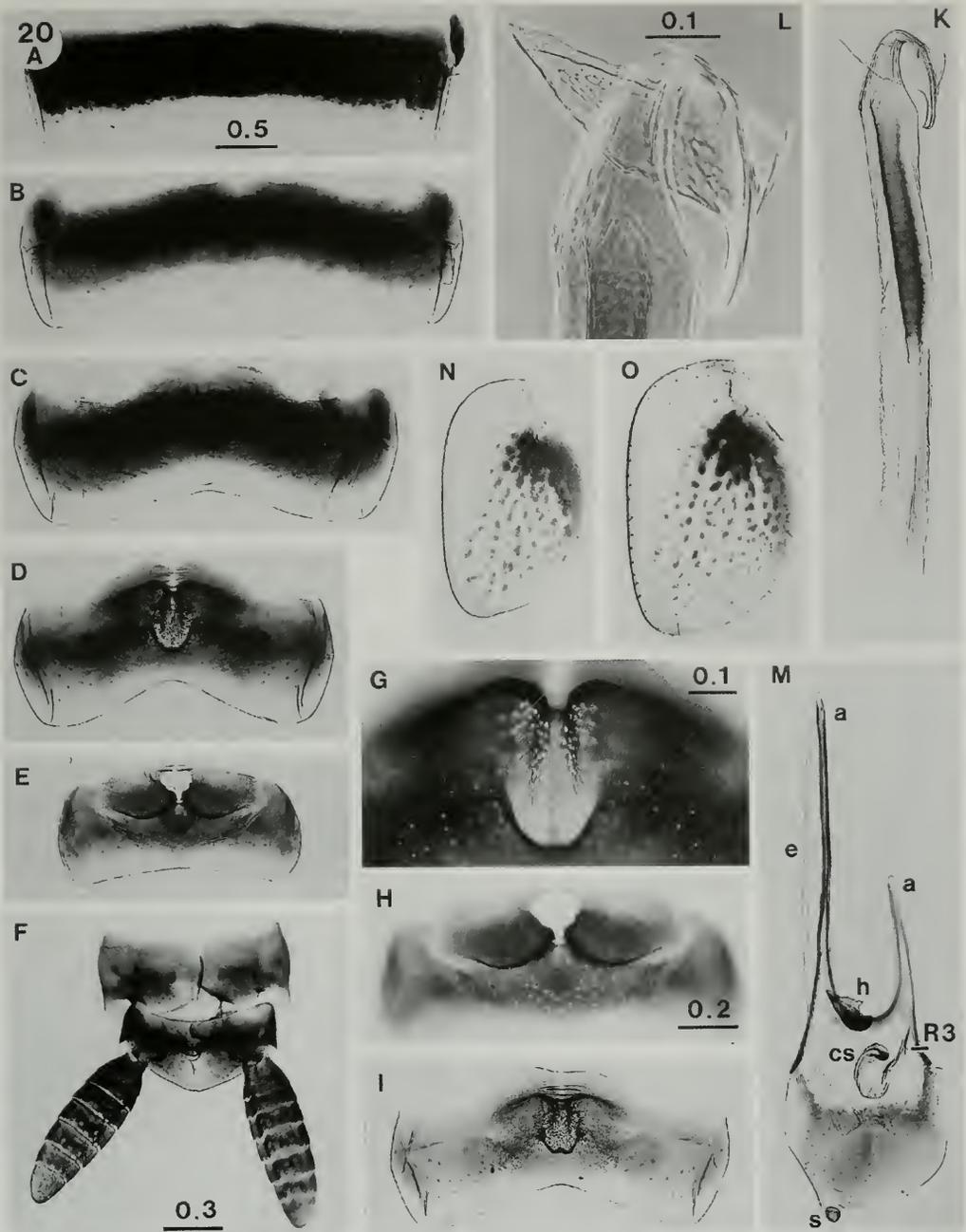


Fig. 20. *P. javalambrensis*, male (B-N), female (A,O). T5 (A,B), T6 (C), T7 (D,I); gland region: G, T8 (E,H), T9+10 (F), hook of left phallomere (K,L), subgenital plate (M), forewings (N,O). Identification: (A) Sp 461/2, (B-H,K-M) Sp 272/4 (Holotype), (I) Sp 272/5, (N) Sp 272/9, (O) Sp 461/4. Same scale (in mm) for (B-F,I,M-O) and (H,K). - Abbreviations: (a) apodemes of the subgenital plate, (cs) cleft sclerite, (e) endophallic apodeme, (h) helmet sclerite, (R3) R3 sclerite, (s) stylus.

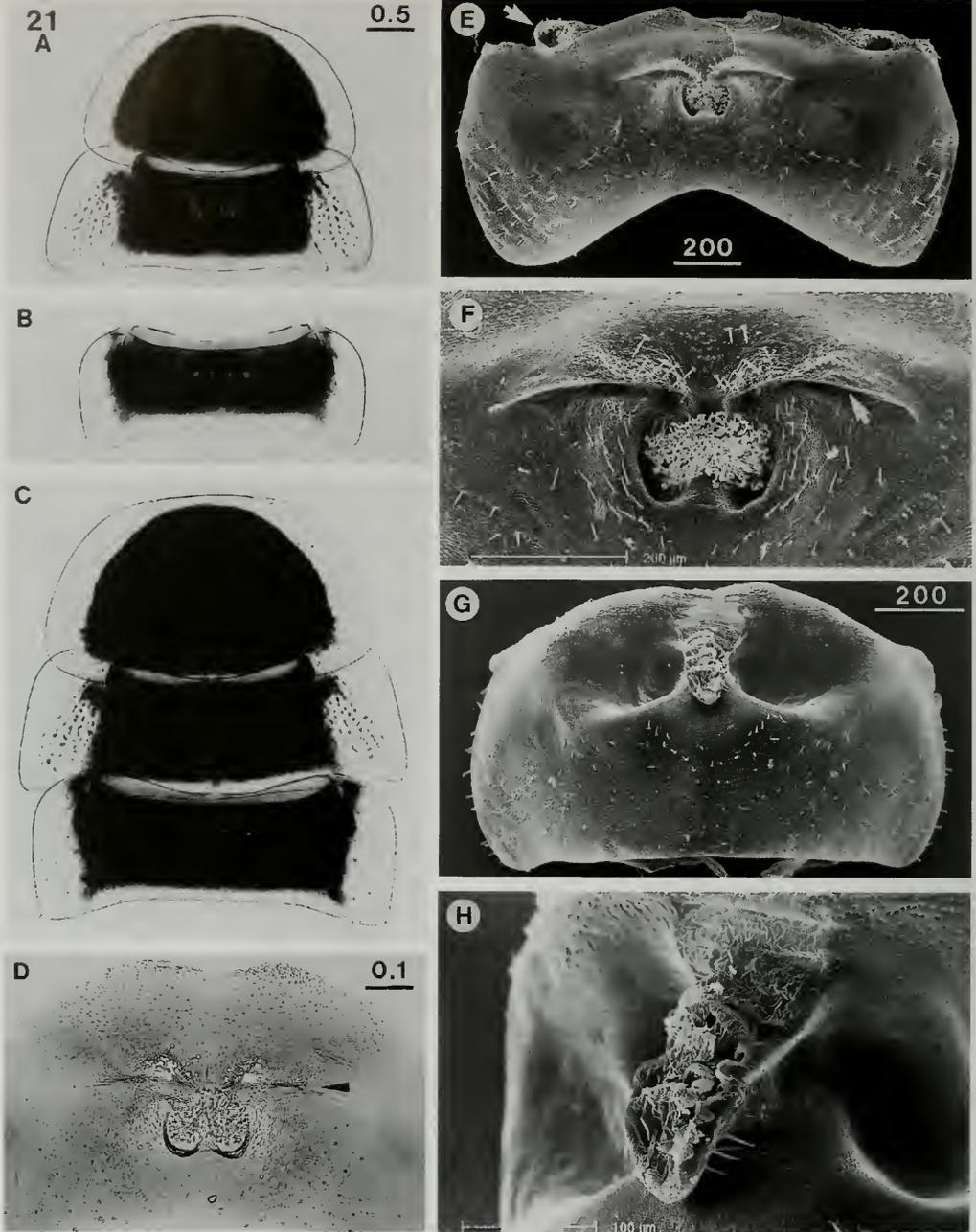


Fig. 21. *P. sulcata*, male (A,B,D-H), female (C). (A-C) Thoracal segments: (A) pron. and meson., (B) metan., (C) complete thorax. (D) gland region of T7 (bleached, arrow points to transversal furrow). (E-H) SEM pictures: T7 (E, arrow points to membrane pouch; gland region: F, arrow points to transversal furrow), T8 (G; median ridge and bristle knob, in dorsolateral view: H). Identification: (A,B) Sp 268/1 (Holotype), (C) Sp 268/7, (D) Sp 269a/1, (E) Sp 269/9, (F-H) Sp 269/8. Scale in (A,D) in mm, in (E,G) in µm; same scale for (A-C).

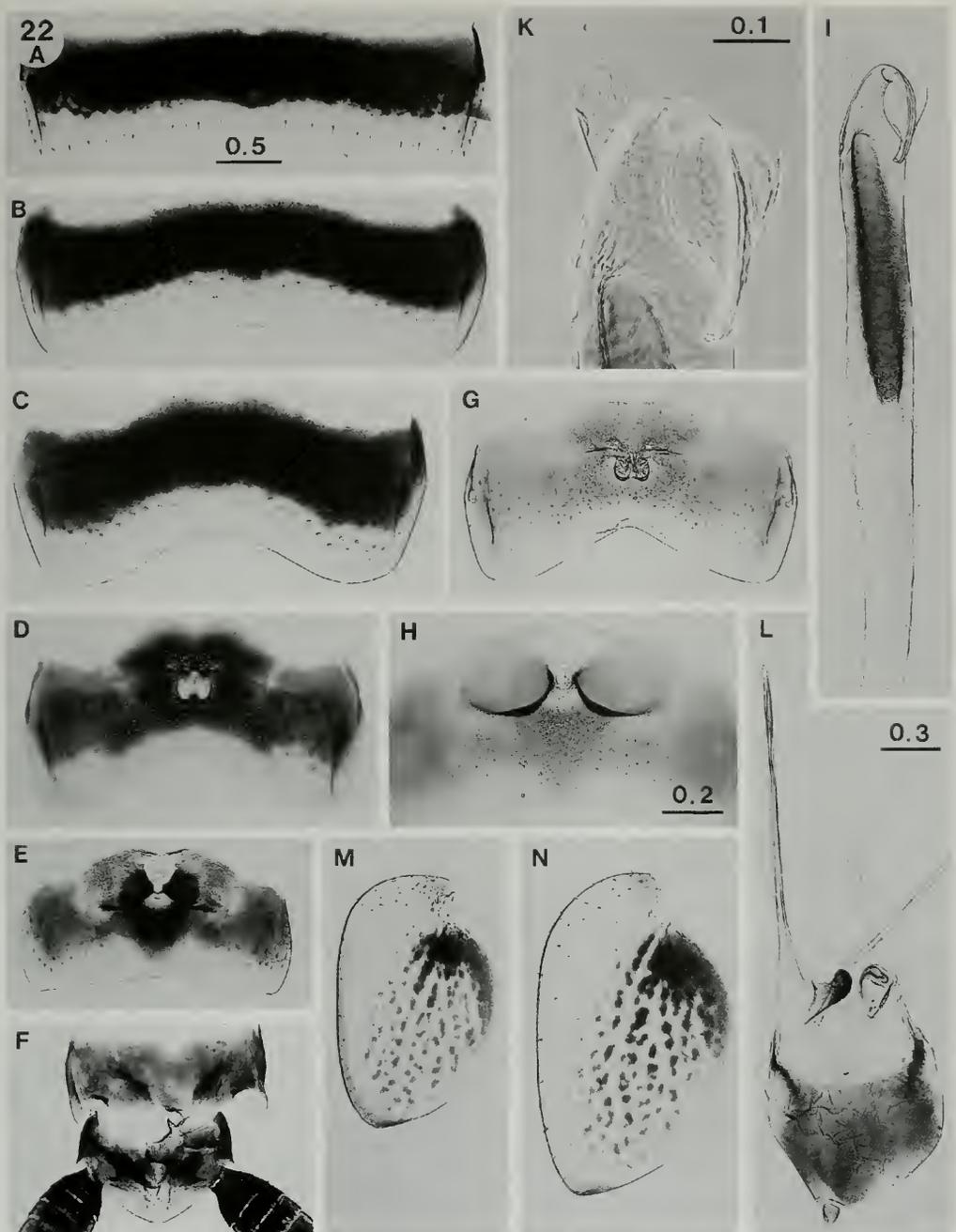


Fig. 22. *P. sulcata*, male (B-M), female (A,N). T5 (A,B), T6 (C), T7 (D,G, the latter bleached), T8 (E; gland region, bleached: H), T9+10 (F), hook of left phallomere (I,K), subgenital plate (L), forewings (M,N). Identification: (A) Sp 268/7, (B-F,L) Sp 268/1 (Holotype), (G) Sp 269a/1, (H) Sp 269a/2, (I,K) Sp 268/2, (M) Sp 269/4, (N) Sp 268/8. Same scale (in mm) for (B-G,L-N) and (H,I).

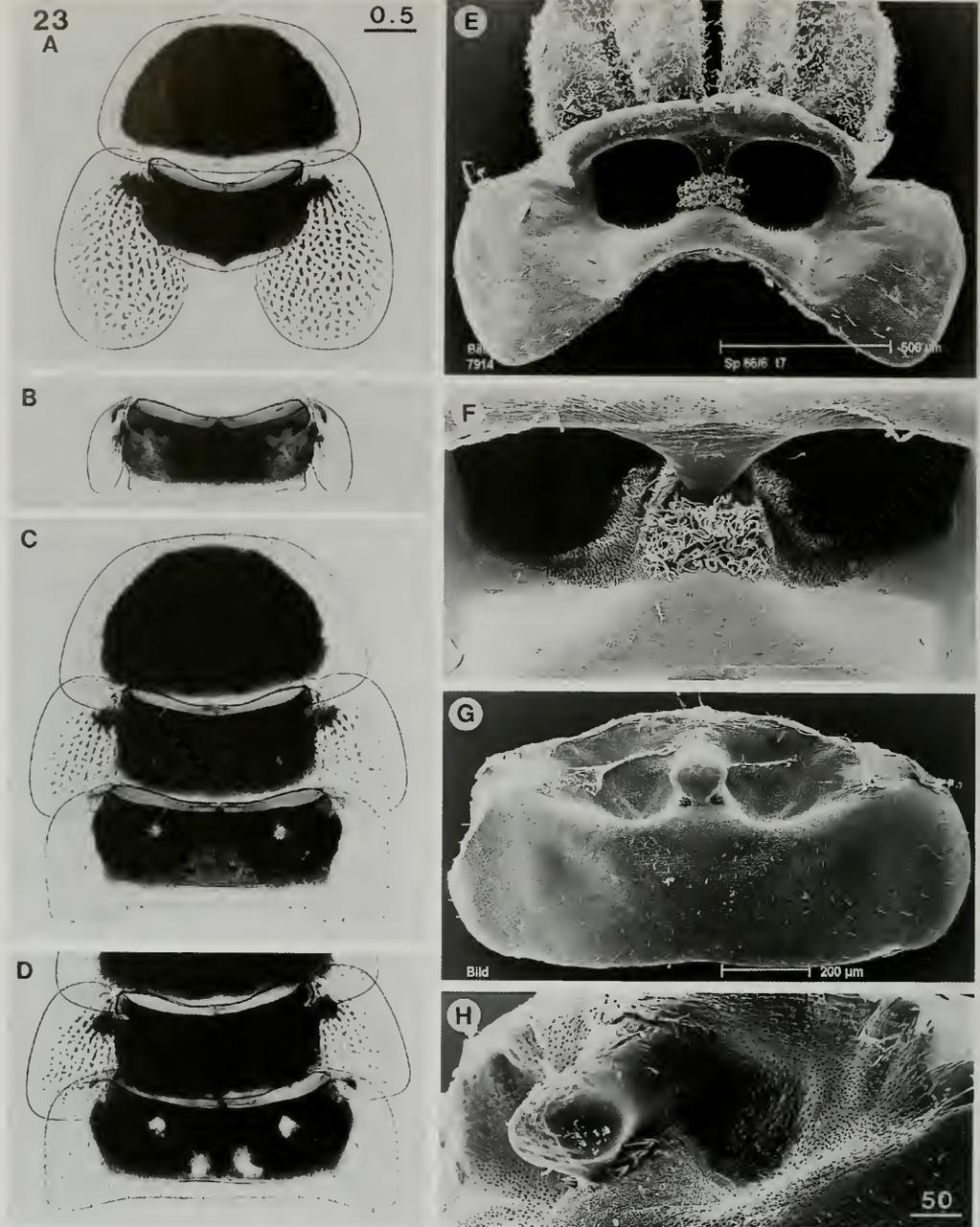


Fig. 23. *P. clavisacculata*, male (A,B,E-H), female (C,D). (A-D) Thoracal segments: (A) pron. and meson., (B) metan., (C,D) complete or nearly complete thorax. (E-H) SEM pictures: T7 (E; gland openings: F), T8 (G; median ridge and bristle knob, in dorsolateral view: H). Identification: (A,B) Sp 66/5 (Holotype), (C) Sp 66/7, (D) Sp 66/8, (E,H) Sp 66/6, (F,G) Sp 67/6. Scale in (A) in mm, in (H) in μm ; same scale for (A-D).

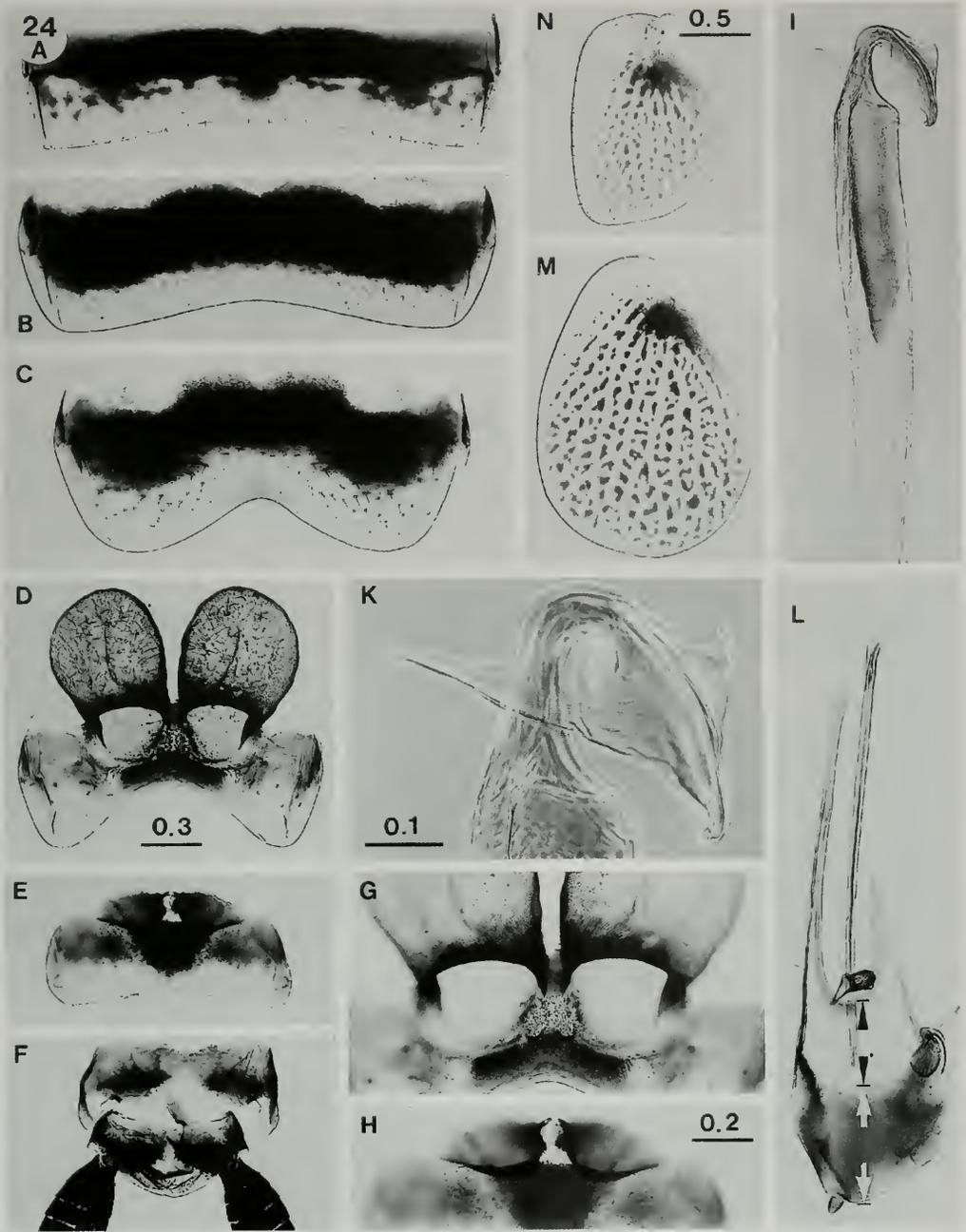


Fig. 24. *P. clavisacculata*, male (B-M), female (A,N). T5 (A,B), T6 (C), T7 (D); gland region: G, T8 (E); gland region: H, T9+10 (F), hook of left phallomere (I,K), subgenital plate (L, white arrows indicate length of apical sclerotization, black arrows the remaining part of the subgenital plate), forewings (M,N). Identification: (A) Sp 66/7, (B-L) Sp 66/5 (Holotype), (M) Sp 66/4, (N) Sp 66/9. Same scale (in mm) for (A,M,N), (B-F,L), and (G-I).

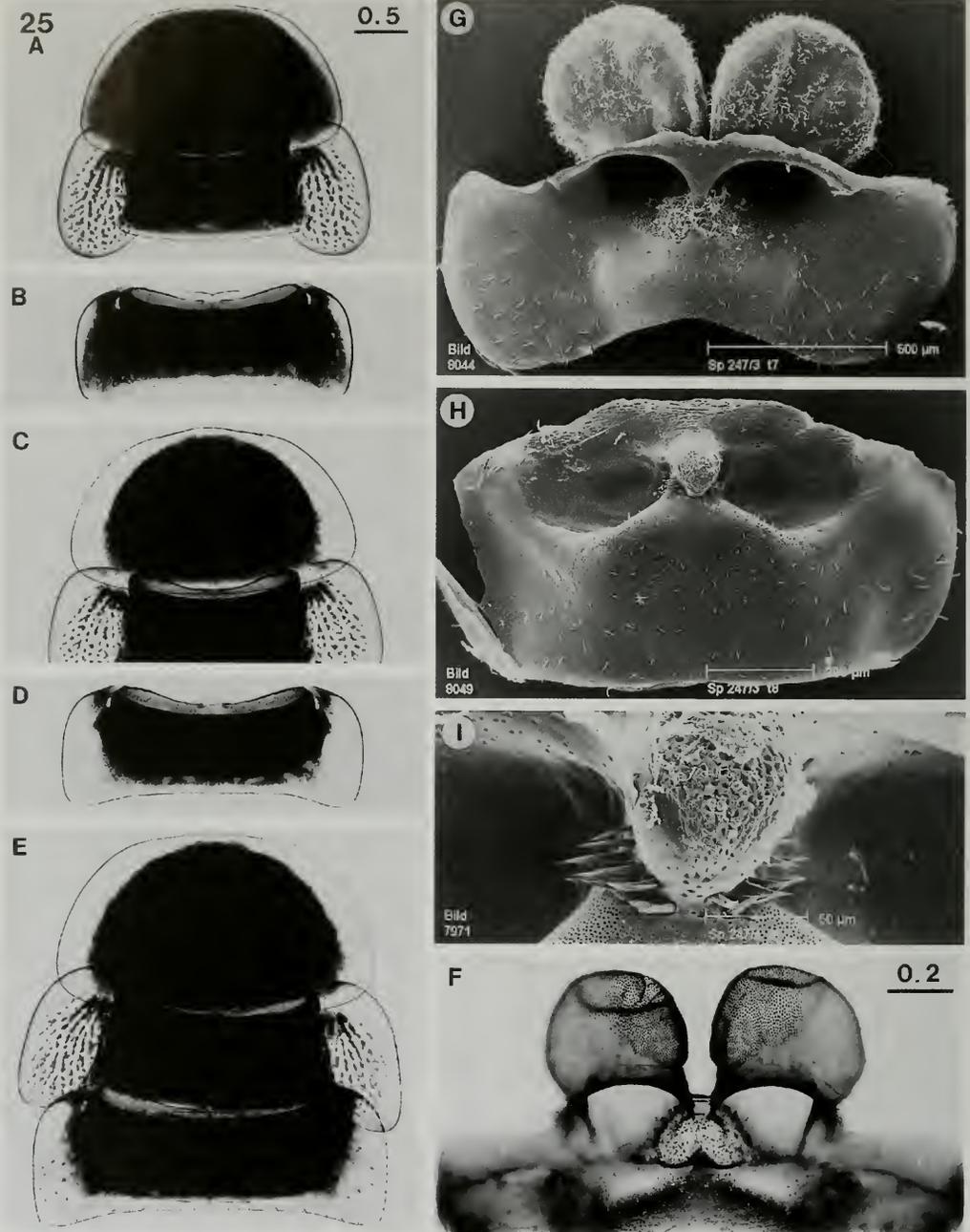


Fig. 25. *P. tenebricosa*, male (A-D,F-I), female (E). (A-E) Thoracal segments: (A,C) pron. and meson., (B,D) metan., (E) complete thorax. (F) gland region of T7. (G-I) SEM pictures: T7 (G), T8 (H; bristle knob: I). Identification: (A,B) Sp 247/2 (Holotype), (C,D) Sp 242/3, (E) Sp 247/5, (G-I) Sp 247/3, (F) Sp 246/3. Same scale (in mm) for (A-E).

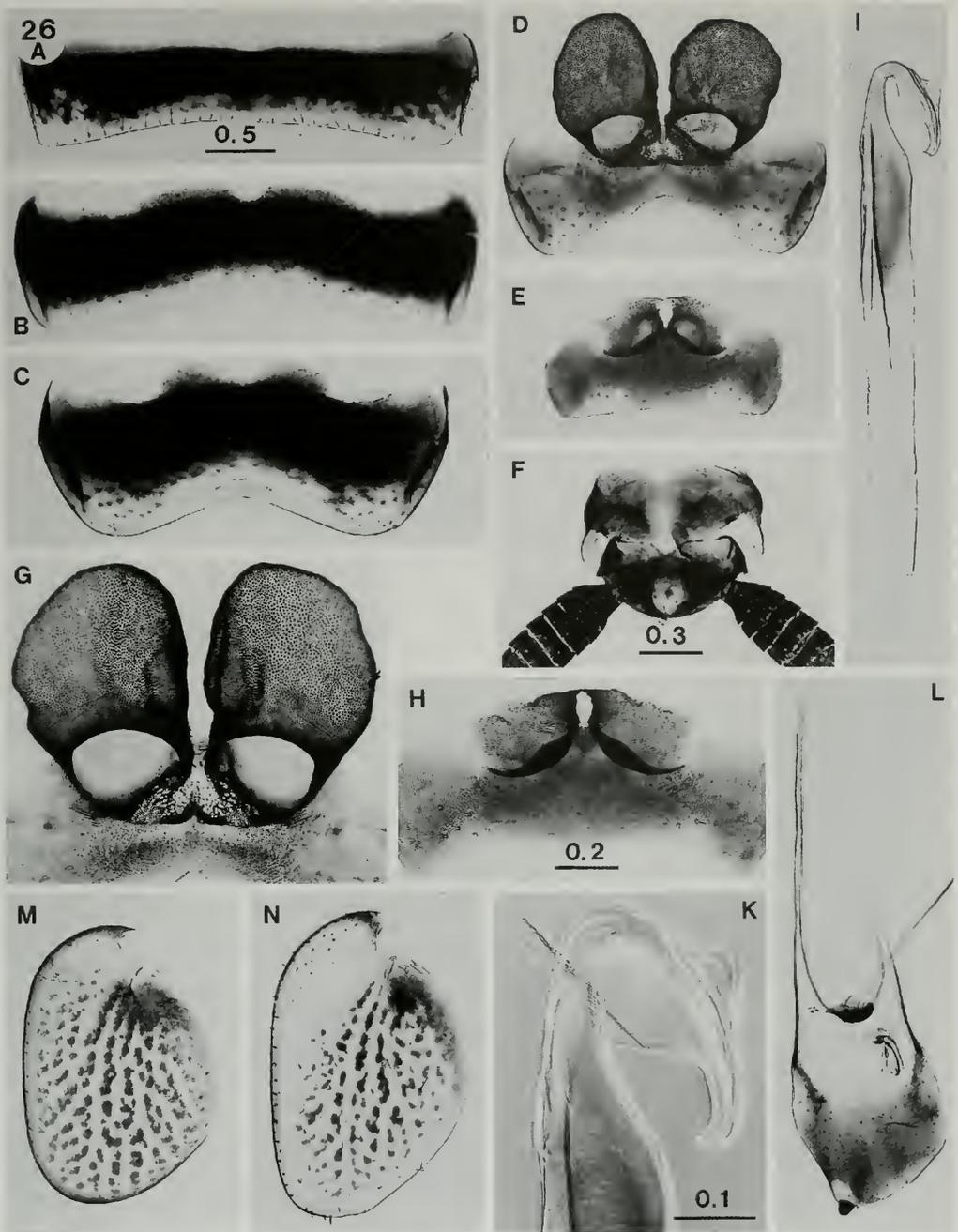


Fig. 26. *P. tenebricosa*, male (B-M), female (A,N). T5 (A,B), T6 (C), T7 (D; gland region: G), T8 (E; gland region: H), T9+10 (F), hook of left phallomere (I,K), subgenital plate (L), forewings (M,N). Identification: (A,N) Sp 247/6, (B-E,I-L) Sp 247/2 (Holotype), (F) Sp 254/1, (G,H) Sp 242/3, (M) Sp 33a/2. Same scale (in mm) for (B-F,L-N) and (G-I).

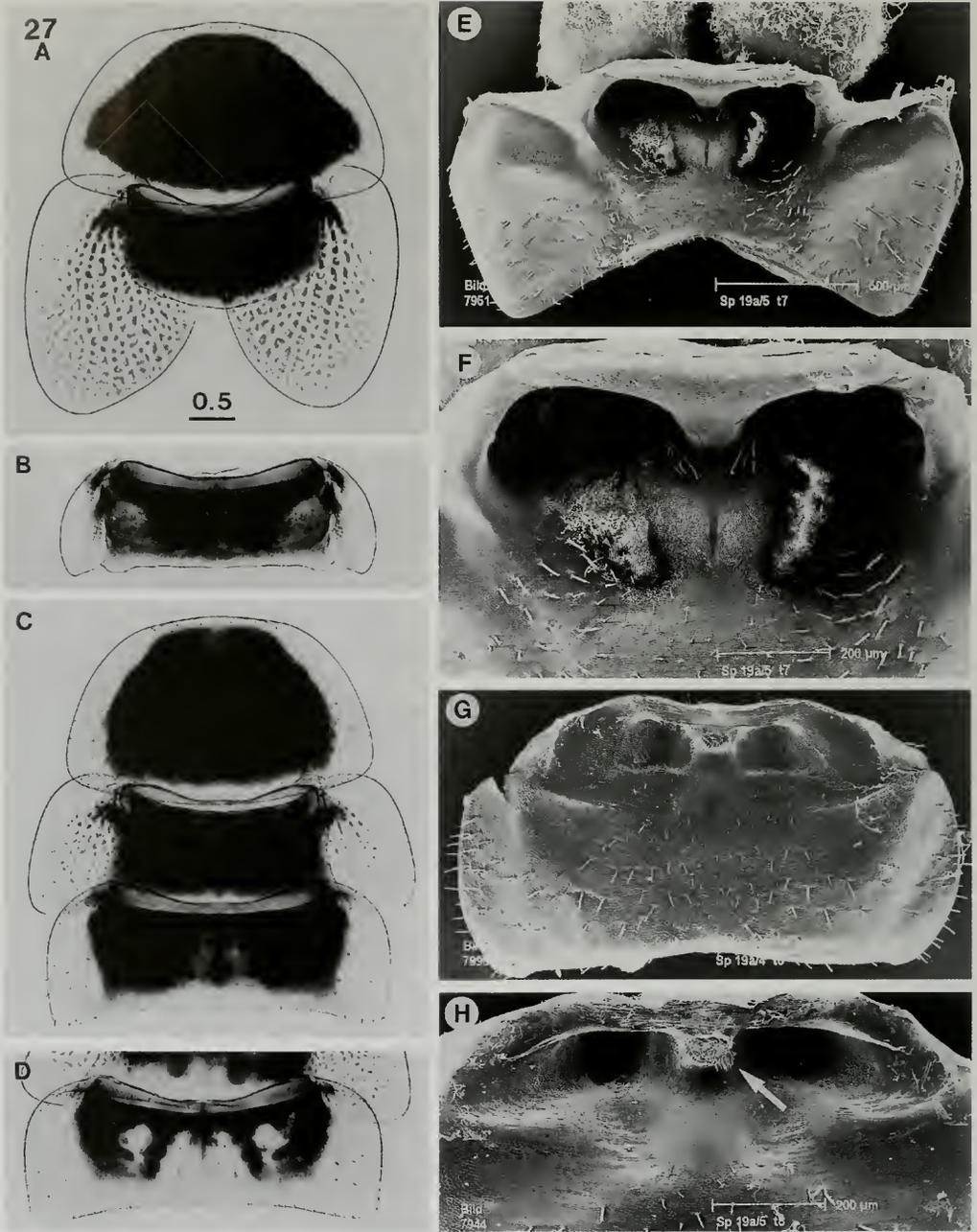


Fig. 27. *P. sacarraoi*, male (A,B,E-H), female (C,D). (A-D) Thoracal segments: (A) pron. and meson., (B,D) metan., (C) complete thorax. (E-H) SEM pictures: T7 (E; gland openings: F), T8 (G; gland region: H, arrow points to bristle knob). Identification: (A,B) Sp 74/6, (C) Sp 19/8, (D) Sp 19/9, (E,F,H) Sp 19a/5, (G) Sp 19a/4. Same scale (in mm) for (A-D).

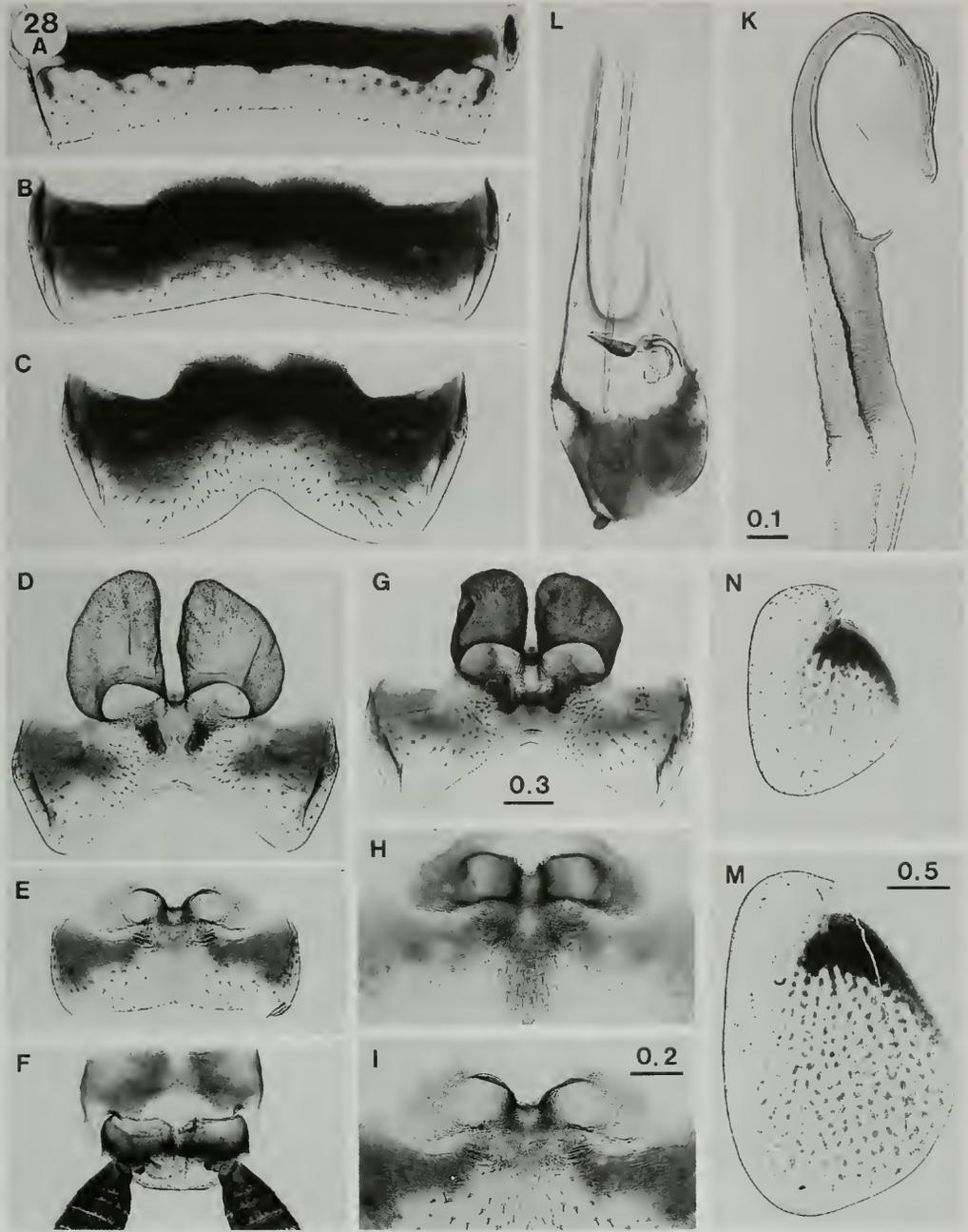


Fig. 28. *P. sacarraoi*, male (B-M), female (A,N). T5 (A,B), T6 (C), T7 (D,G), T8 (E; gland region: H,I), T9+10 (F), hook of left phallomere (K), subgenital plate (L), forewings (M,N). Identification: (A) Sp 19/9, (B-F,I,K) Sp 74/6, (G) Sp 285/1, (H) Sp 19a/3, (L) Sp 18a/3, (M) Type, (N) Sp 19/10. Same scale (in mm) for (A,M,N), (B-G,L), and (H,K).

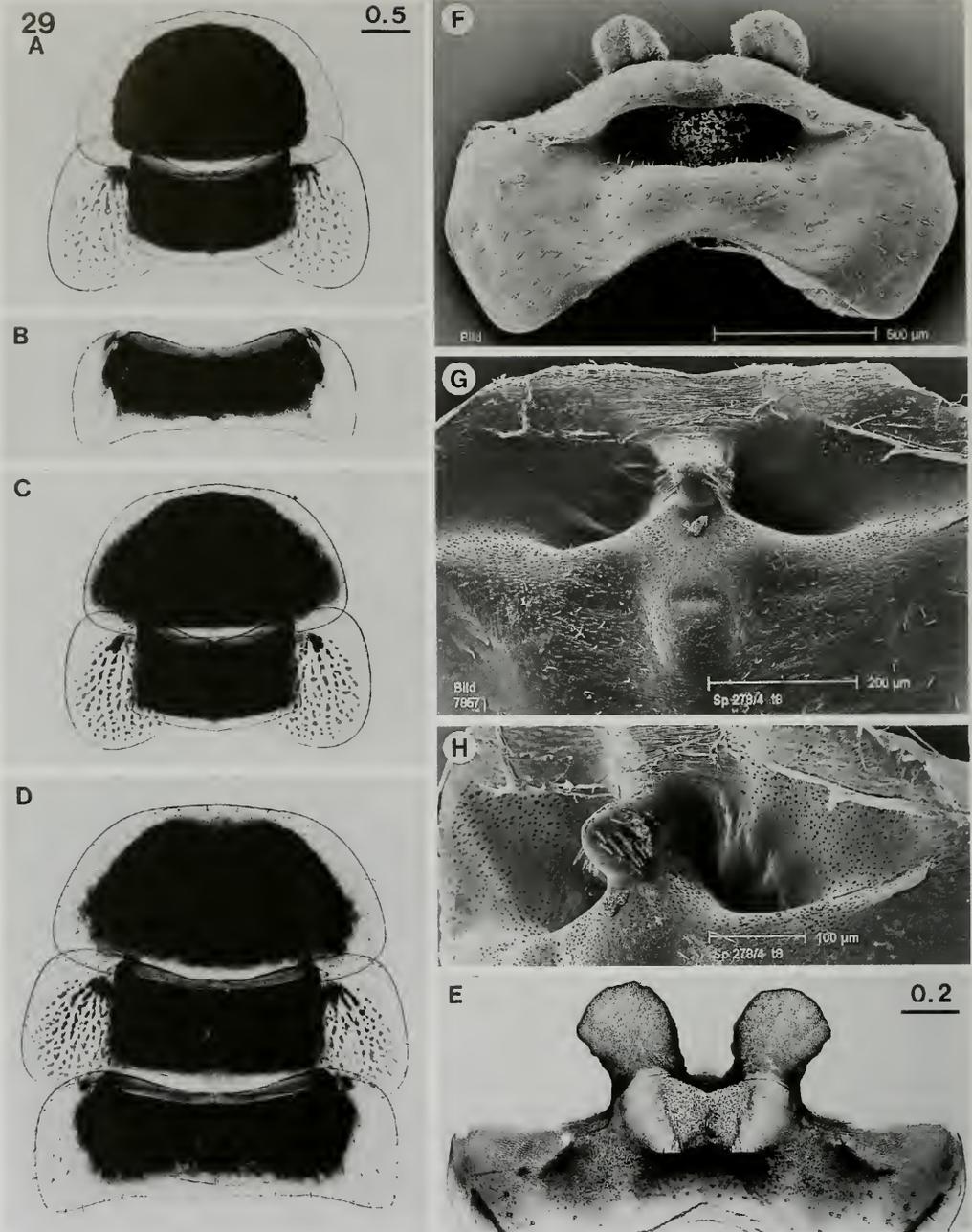


Fig. 29. *P. brevisacculata*, male (A-C,E-H), female (D). (A-D) Thoracal segments: (A,C) pron. and meson., (B) metan., (D) complete thorax. (E) T7. (F-H) SEM pictures: T7 (F), T8 (G,H: gland region, the latter in dorsolateral view). Identification: (A,B) Sp 260/8 (Holotype), (C) Sp 279/1, (D) Sp 260/12, (E) Sp 202/1, (F-H) Sp 278/4. Same scale (in mm) for (A-D).

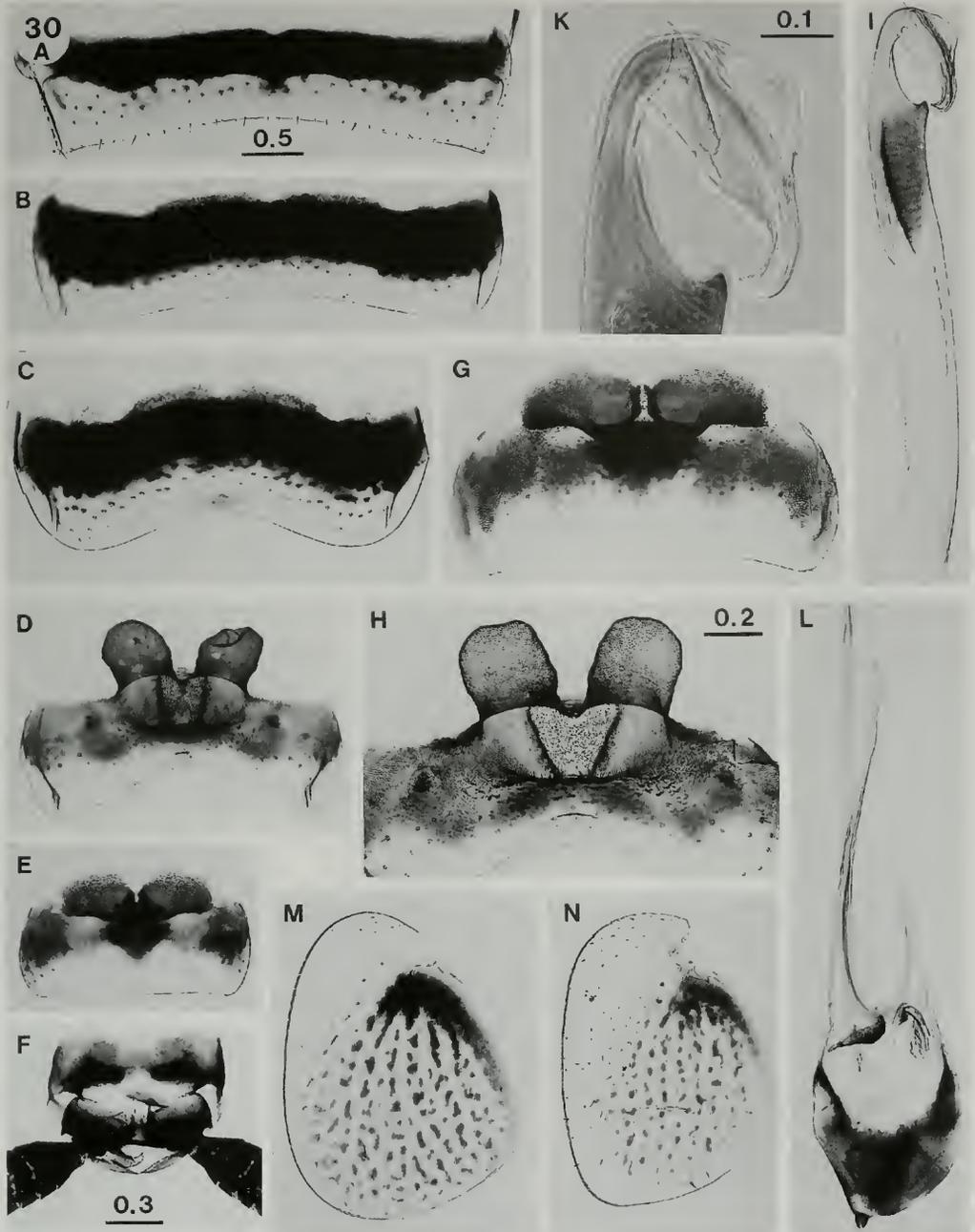


Fig. 30. *P. brevisacculata*, male (B-M), female (A,N). T5 (A,B), T6 (C), T7 (D; gland region: H), T8 (E,G), T9+10 (F), hook of left phallomere (I,K), subgenital plate (L), forewings (M,N). Identification: (A) Sp 260/14, (B-F,I-L) Sp 260/8 (Holotype), (G,H) Sp 260/9, (M) Sp 165/3, (N) Sp 260/13. Same scale (in mm) for (B-F,L-N) and (G-I).

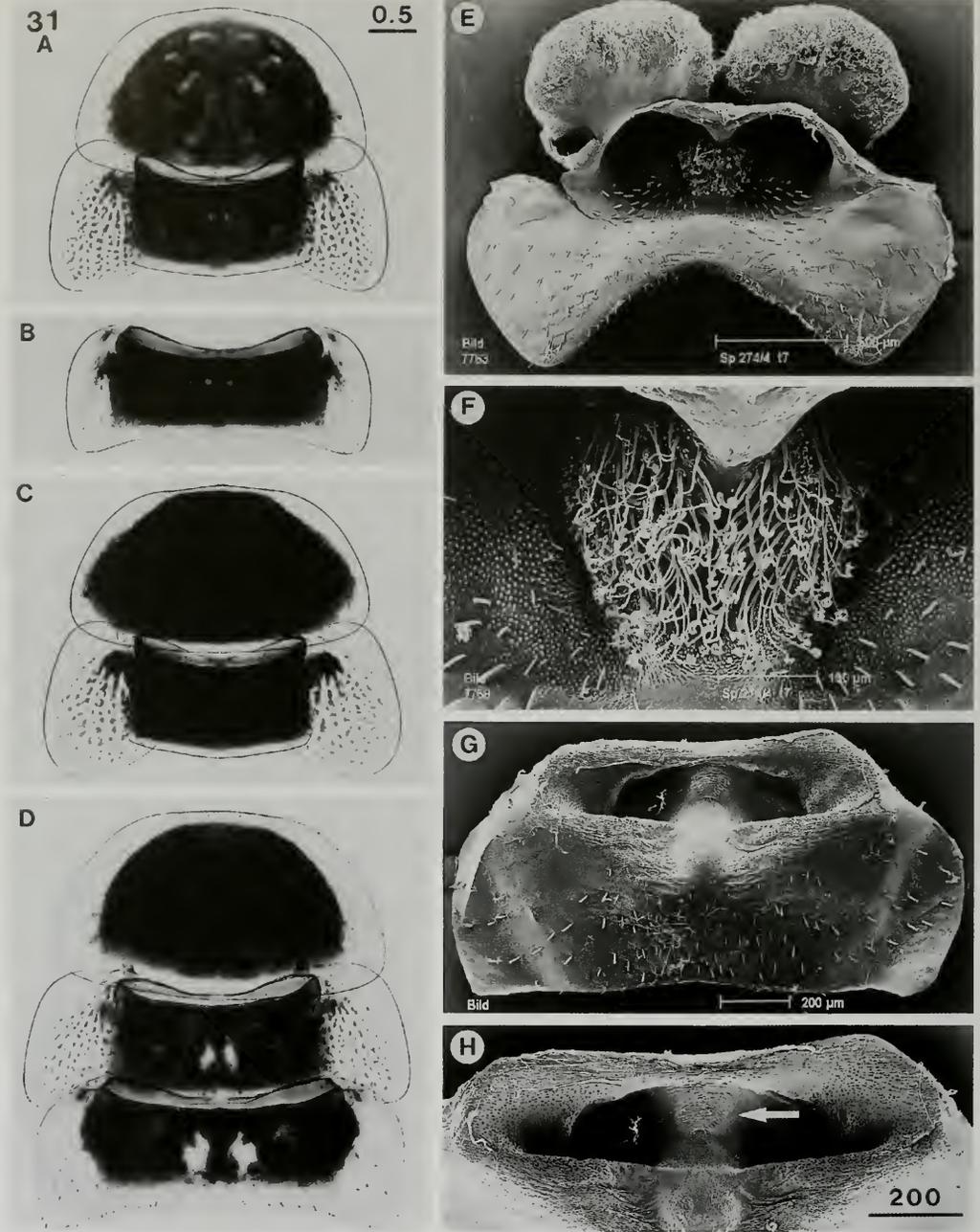


Fig. 31. *P. globososacculata*, male (A-C,E-H), female (D). (A-D) Thoracal segments: (A,C) pron. and meson., (B) metan., (D) complete thorax. (E-H) SEM pictures: T7 (E; bristle tuft: F), T8 (G; gland region: H, arrow points to bristle knob). Identification: (A,B) Sp 274/1 (Holotype), (C) Sp 14a/2, (D) Sp 13a/6, (E-H) Sp 274/4. Scale in (A) in mm, in (H) in µm; same scale for (A-D).

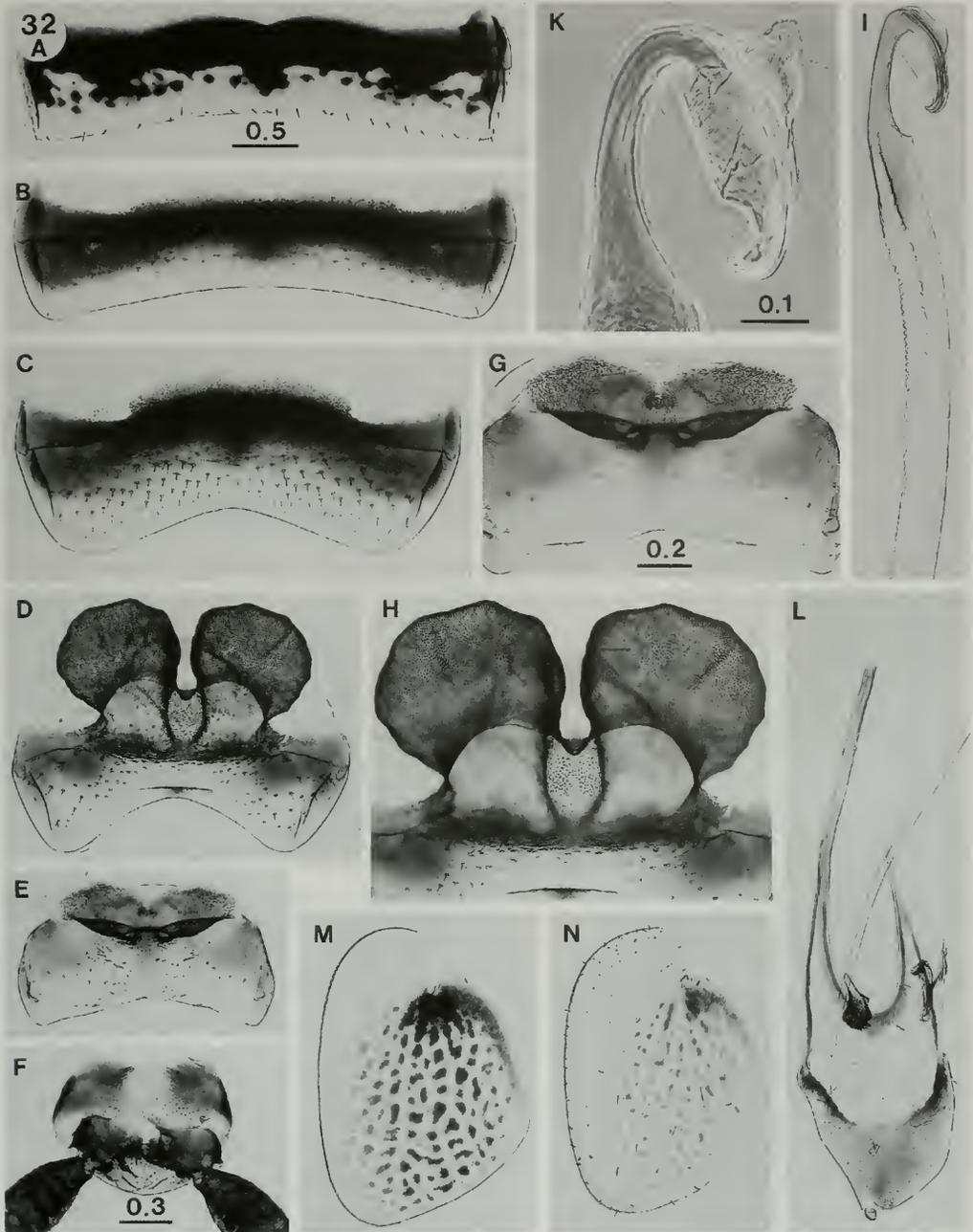


Fig. 32. *P. globosacculata*, male (B-M), female (A,N). T5 (A,B), T6 (C), T7 (D; gland region: H), T8 (E; gland region: G), T9+10 (F), hook of left phallomere (I,K), subgenital plate (L), forewings (M,N). Identification: (A) Sp 274/5, (B-I,L) Sp 274/1 (Holotype), (K) Sp 263/5, (M) Sp 98/2, (N) Sp 274/6. Same scale (in mm) for (B-F,L-N) and (G-I).

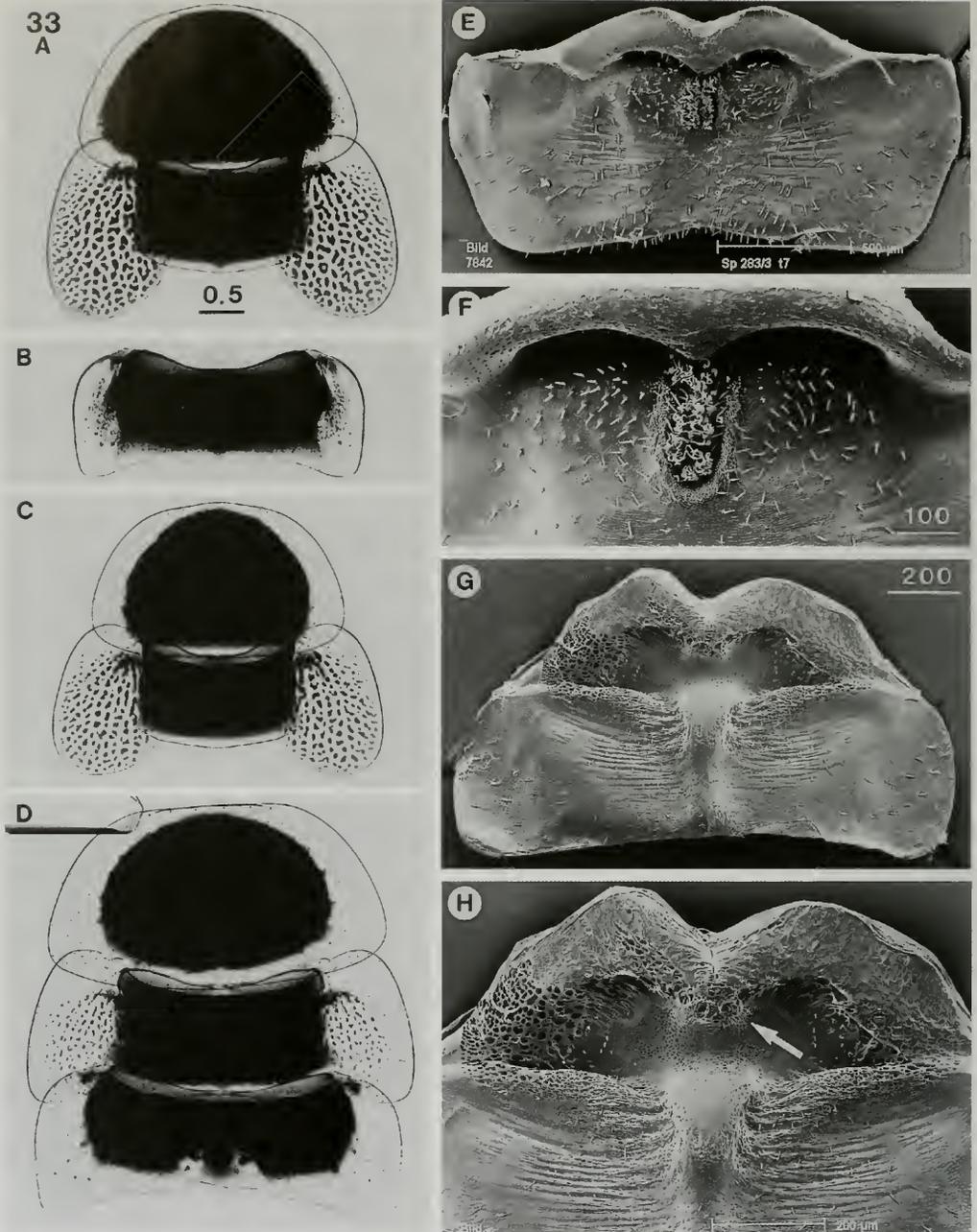


Fig. 33. *P. porosa*, male (A-C,E-H), female (D). (A-D) Thoracic segments: (A,C) pron. and meson., (B) metan., (D) complete thorax. (E-H) SEM pictures: T7 (E; gland region: F), T8 (G; gland region: H, arrow points to bristle knob). Identification: (A,B) Sp 283/2 (Holotype), (C) Sp 280/1, (D) Sp 283/5, (E) Sp 283/3, (F-H) Sp 280/4. Scale in (A) in mm, in (F,G) in µm; same scale for (A-D).

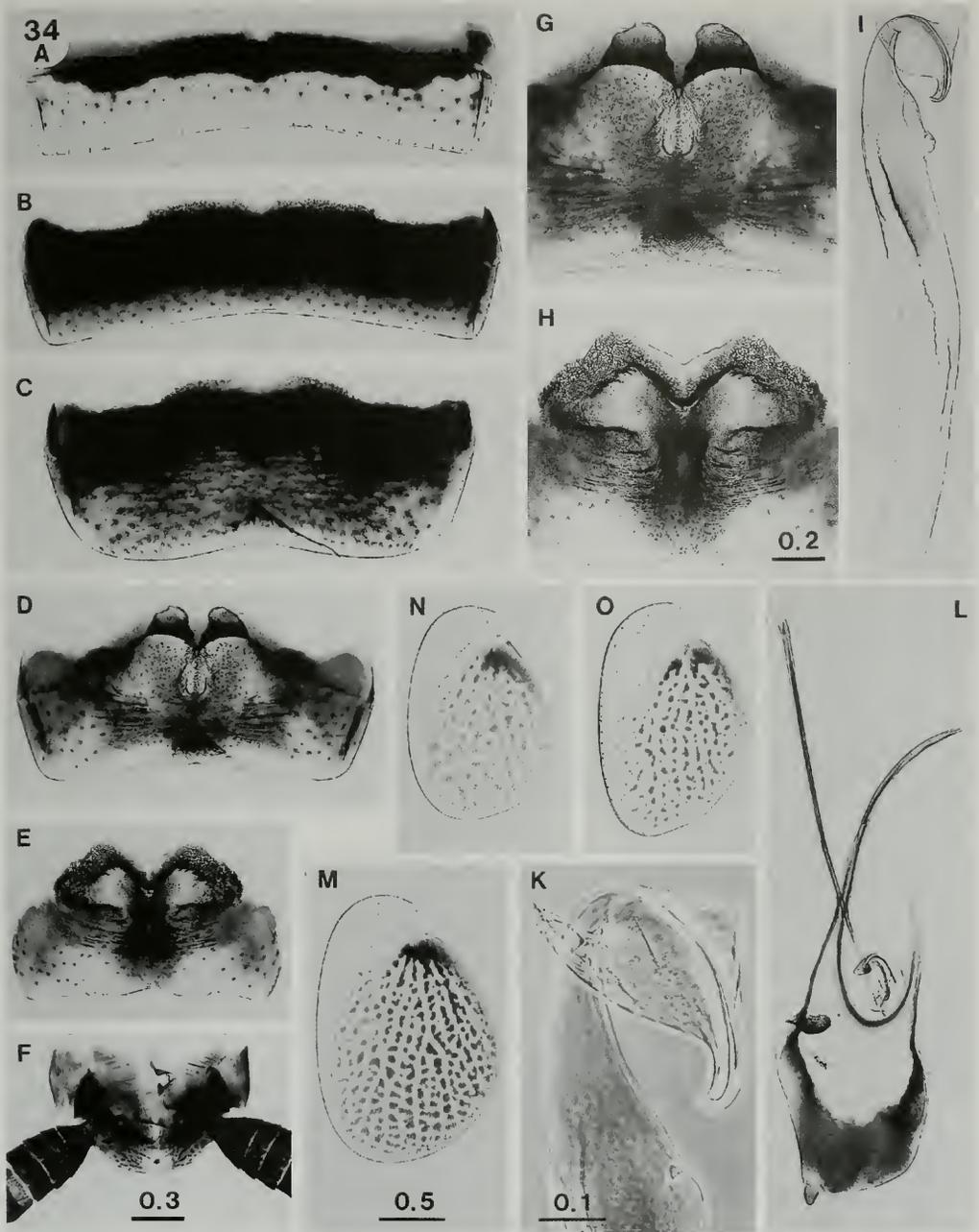


Fig. 34. *P. porosa*, male (B-M), female (A,N,O). T5 (A,B), T6 (C), T7 (D; gland region: G), T8 (E; gland region: H), T9+10 (F), hook of left phallomere (I,K), subgenital plate (L), forewings (M-O). Identification: (A) Sp 283/4, (B-I,L) Sp 283/2 (Holotype), (K) Sp 282/1, (M) Sp 283/3, (N) Sp 280/4, (O) Sp 283/6. Same scale (in mm) for (A,M-O), (B-F,L) and (G-I).

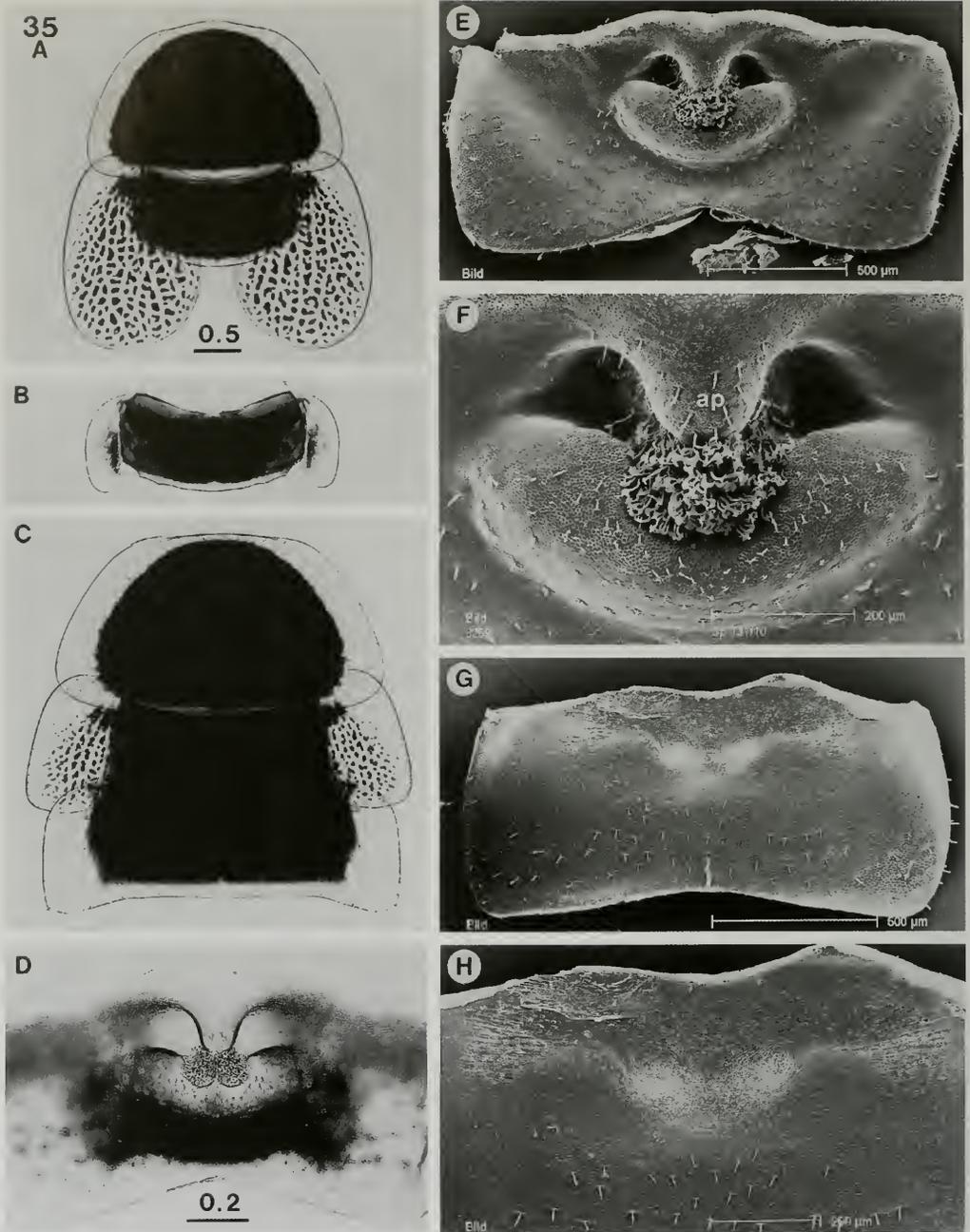


Fig. 35. *P. barbata*, male (A,B,D-H), female (C). (A-C) Thoracal segments: (A) pron. and meson., (B) metan., (C) complete thorax. (D) gland region of T7. (E-H) SEM pictures: T7 (E; gland region: F), T8 (G; gland region: H). Identification: (A,B) Sp 131/4 (Holotype), (C) Sp 123/7, (D) Sp 158/3, (E-H) Sp131/10. Same scale (in mm) for (A-C). - Abbreviations: (ap) anterior process.

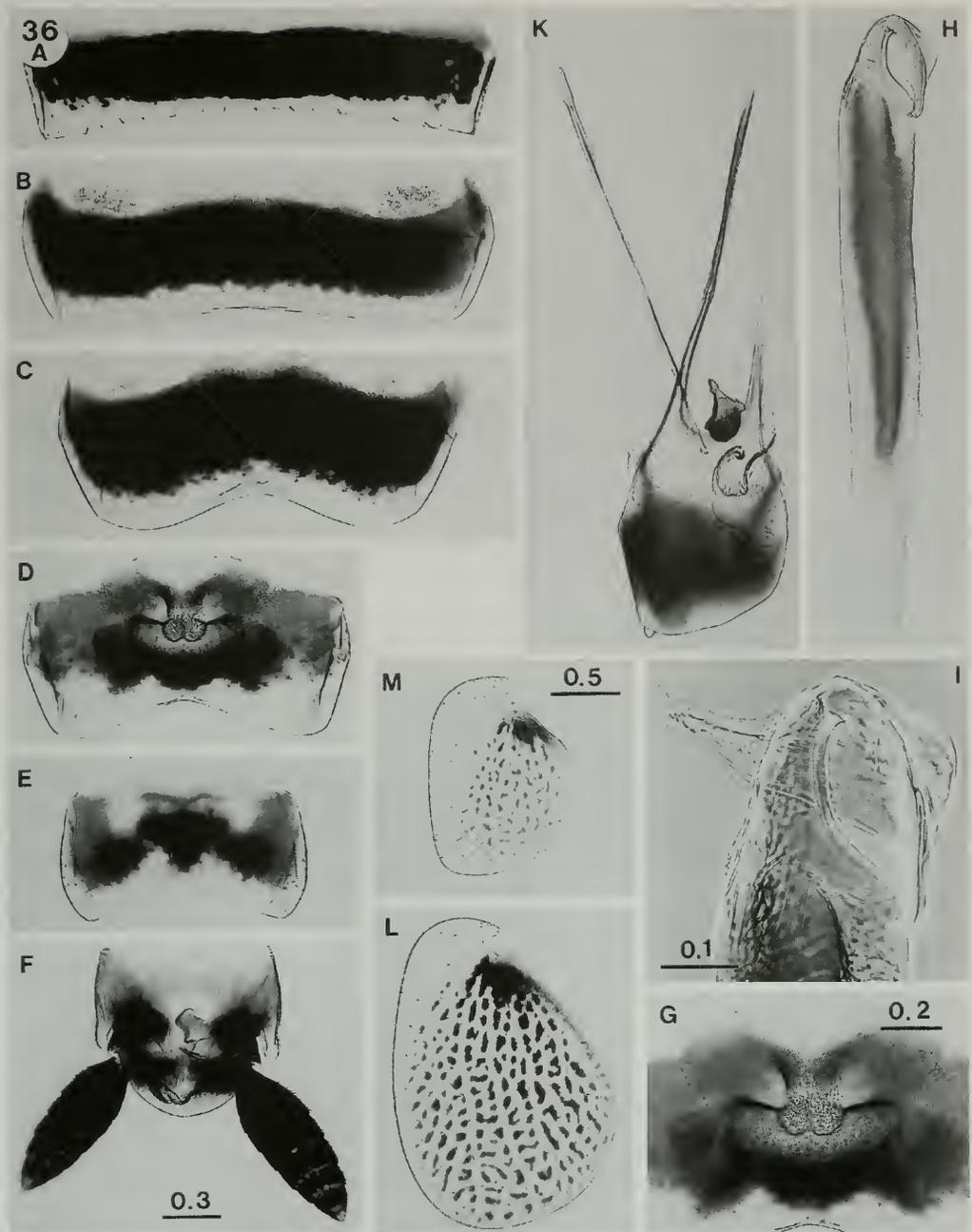


Fig. 36. *P. barbata*, male (B-L), female (A,M). T5 (A,B), T6 (C), T7 (D; gland region: G), T8 (E), T9+10 (F), hook of left phallomere (H,I), subgenital plate (K), forewings (L,M). Identification: (A) Sp 123/7, (B) Sp 129/3, (C-K) Sp 131/4 (Holotype), (L) Sp 131/8, (M) Sp 123/8. Same scale (in mm) for (A,L,M), (B-F,K), and (G,H).

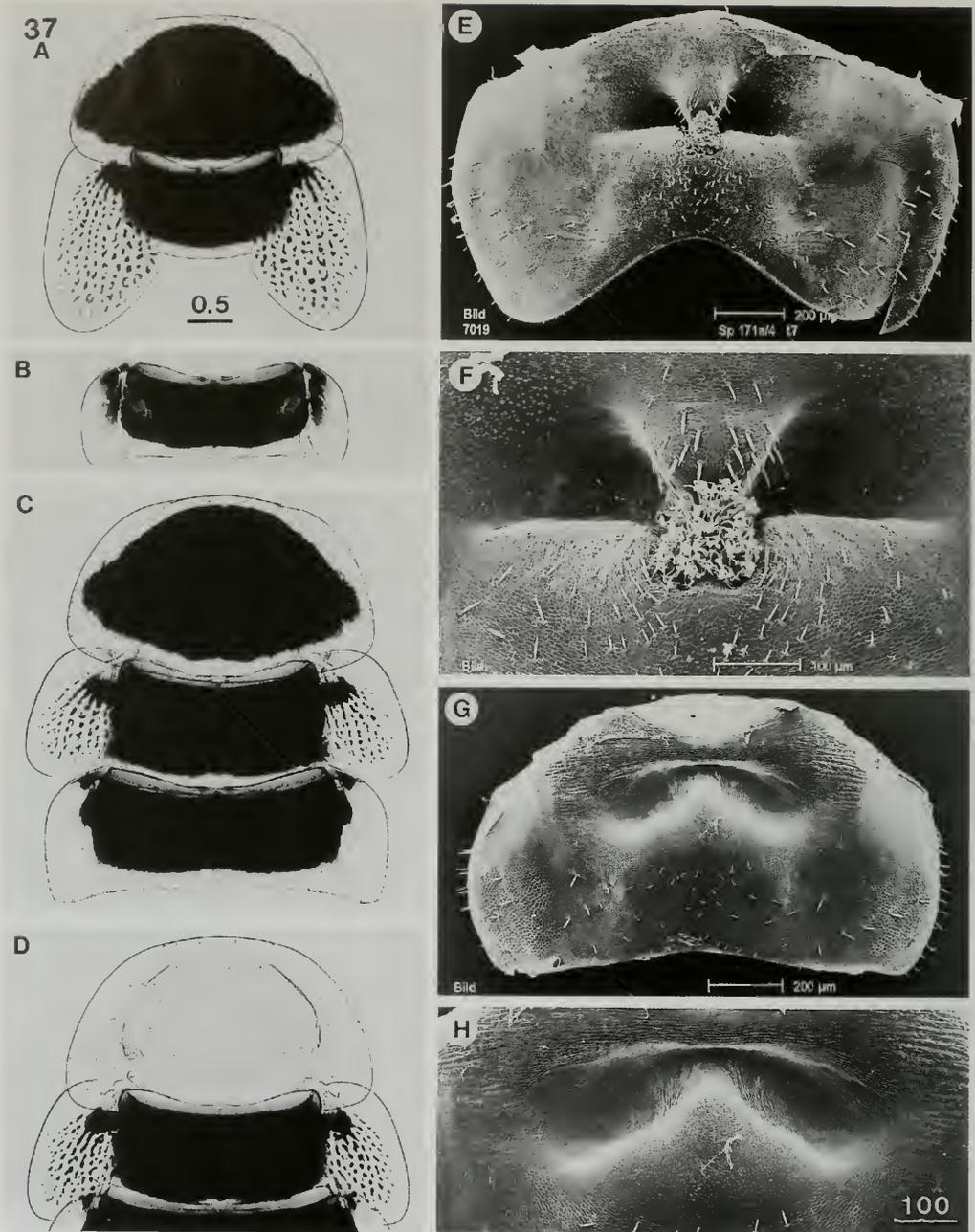


Fig. 37. *P. acuminata*, male (A,B,E-H), female (C,D). (A-D) Thoracal segments: (A,D) pron. and meson., (B) metan., (C) complete thorax. (E-H) SEM pictures: T7 (E; gland region: F), T8 (G; gland region: H). Identification: (A,B) Sp 171a/2 (Holotype), (C) Sp 171/14, (D,E) Sp 171a/4, (F-H) Sp 171a/3. Scale in (A) in mm, in (H) in µm; same scale for (A-D).

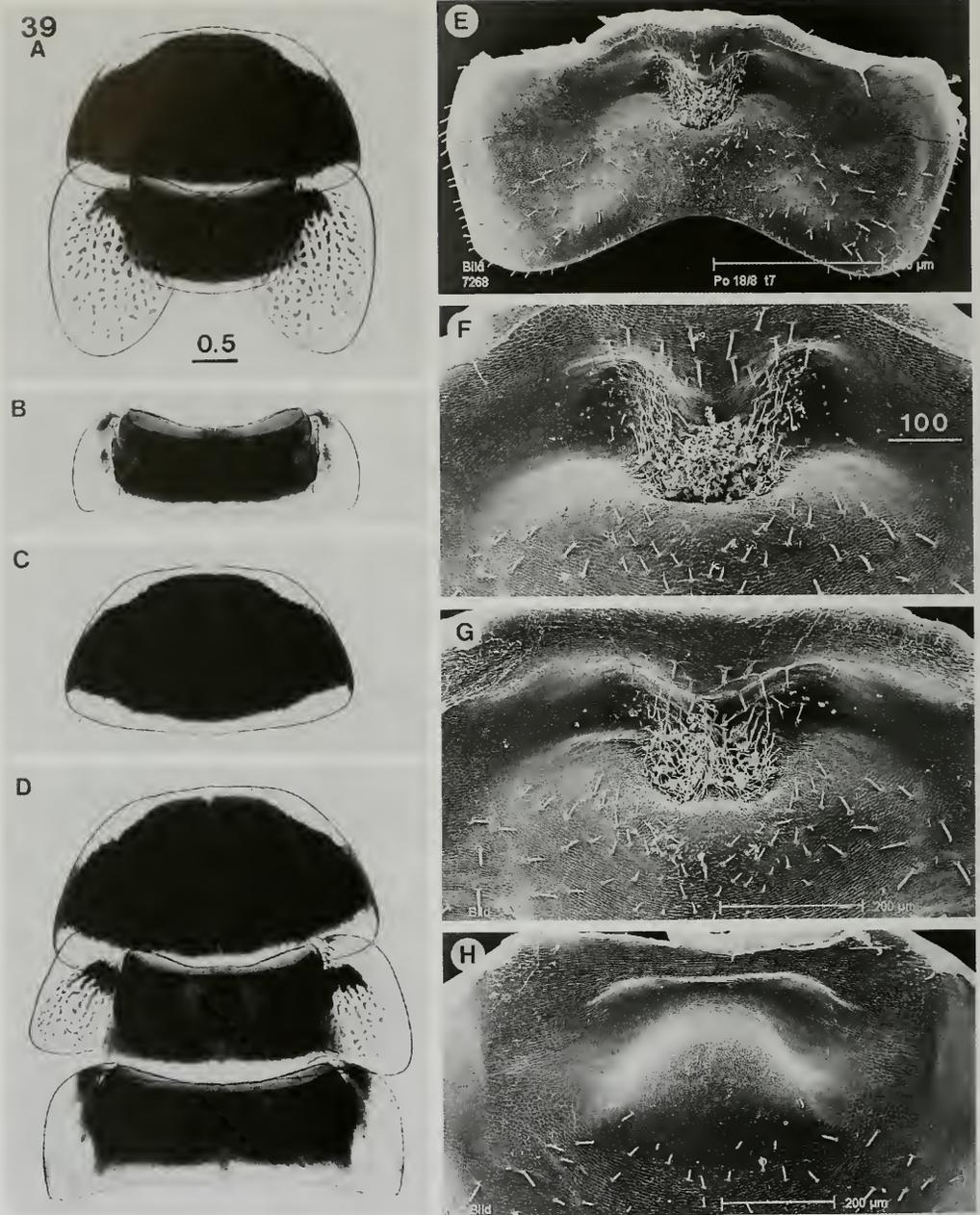


Fig. 39. *P. lativittata*, male (A-C,E-H), female (D). (A-D) Thoracal segments: (A) pron. and meson., (B) metan., (C) pron., (D) complete thorax. (E-H) SEM pictures: T7 (E; gland region: F,G), gland region of T8 (H). Identification: (A) Po 18/4, (B,C) Po 18/7 (Holotype), (D) Po 18/10, (E,F,H) Po 18/8, (G) Po 18/9. Scale in (A) in mm, in (F) in μm ; same scale for (A-D).

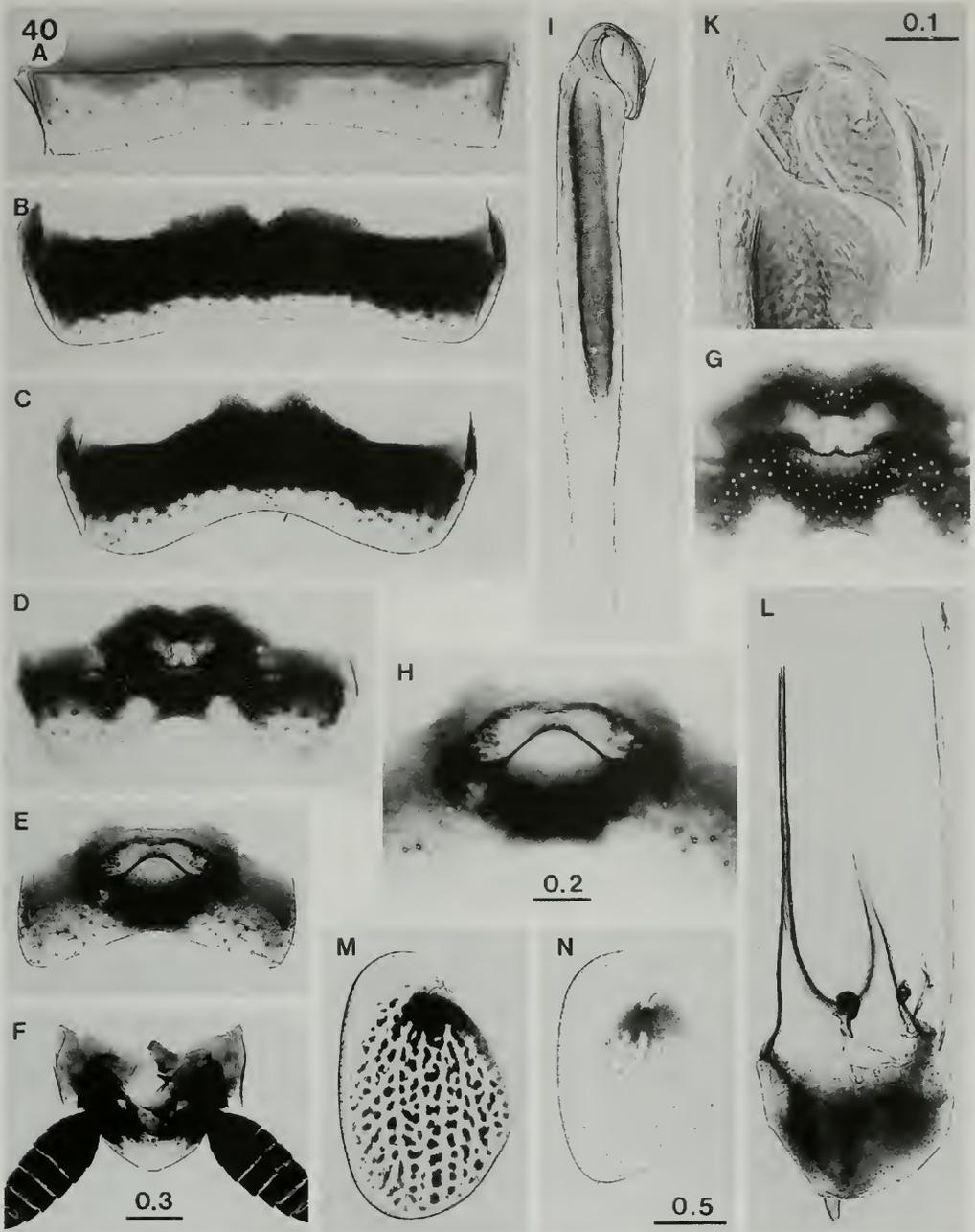


Fig. 40. *P. lativittata*, male (B-M), female (A,N). T5 (A,B), T6 (C), T7 (D; gland region: G), T8 (E; gland region: H), T9+10 (F), hook of left phallosome (I,K), subgenital plate (L), forewings (M,N). Identification: (A) Po 18/12, (B-M) Po 18/7 (Holotype), (N) Po 18/11. Same scale (in mm) for (A,M,N), (B-F,L), and (G,H,I).

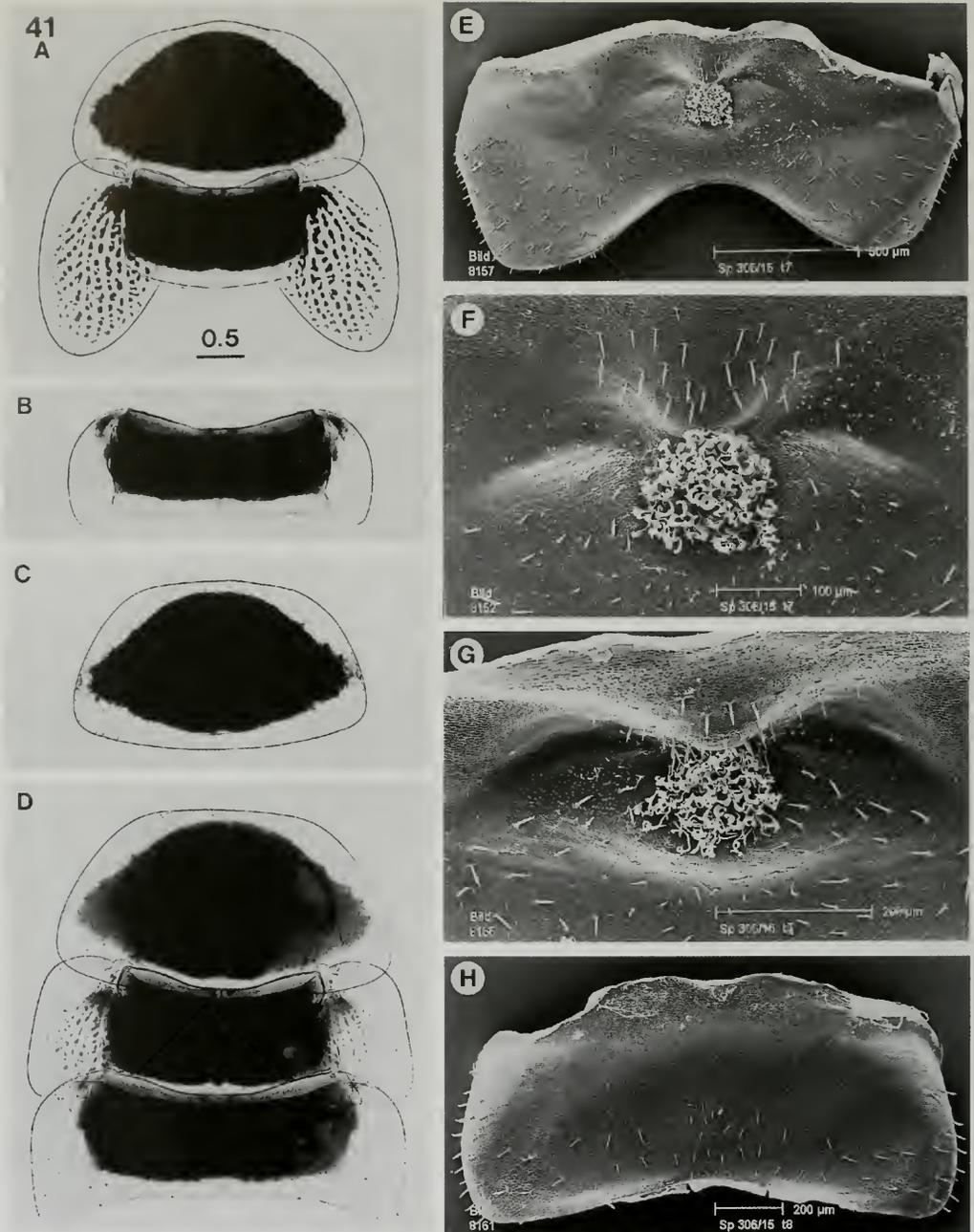


Fig. 41. *P. rhomboidea*, male (A-C,E-H), female (D). (A-D) Thoracal segments: (A) pron. and meson., (B) metan., (C) pron., (D) complete thorax. (E-H) SEM pictures: T7 (E; gland region: F,G), T8 (H). Identification: (A) Sp 306/2, (B,C) Sp 306/3 (Holotype), (D) Sp 306/13, (E,F,H) Sp 306/15, (G) Sp 306/16. Same scale (in mm) for (A-D).

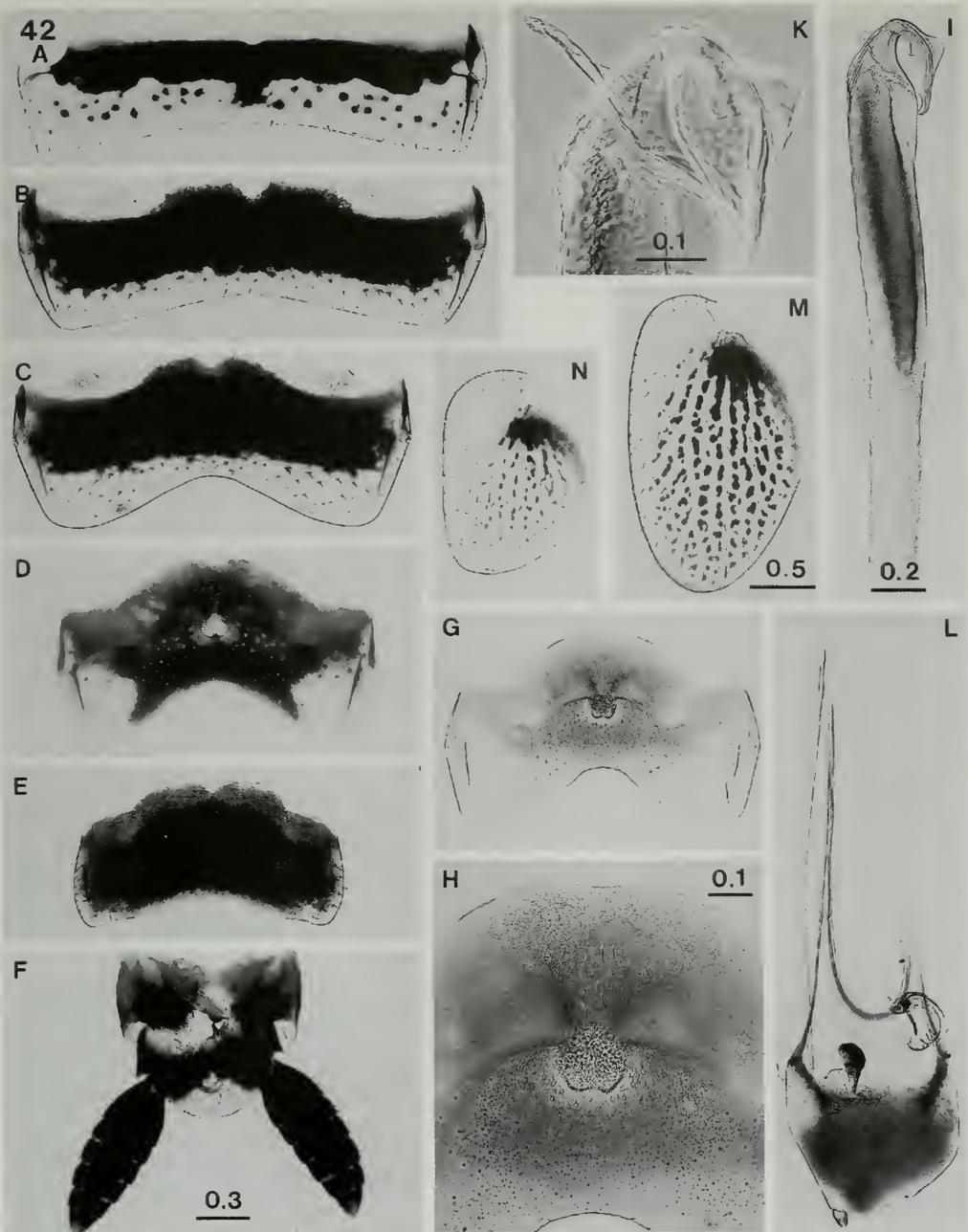


Fig. 42. *P. rhomboidea*, male (B-M), female (A,N). T5 (A,B), T6 (C), T7 (D,G; gland region: H), T8 (E), T9+10 (F), hook of left phallomere (I,K), subgenital plate (L), forewings (M,N). Identification: (A) Sp 306/13, (B-E,L,M) Sp 306/3 (Holotype), (F) Sp 260/2, (G,H) Sp 176a/7 (bleached to show the shape of the gland), (I,K) Sp 176a/2, (N) Sp 306/14. Same scale (in mm) for (A,M,N) and (B-G,L).

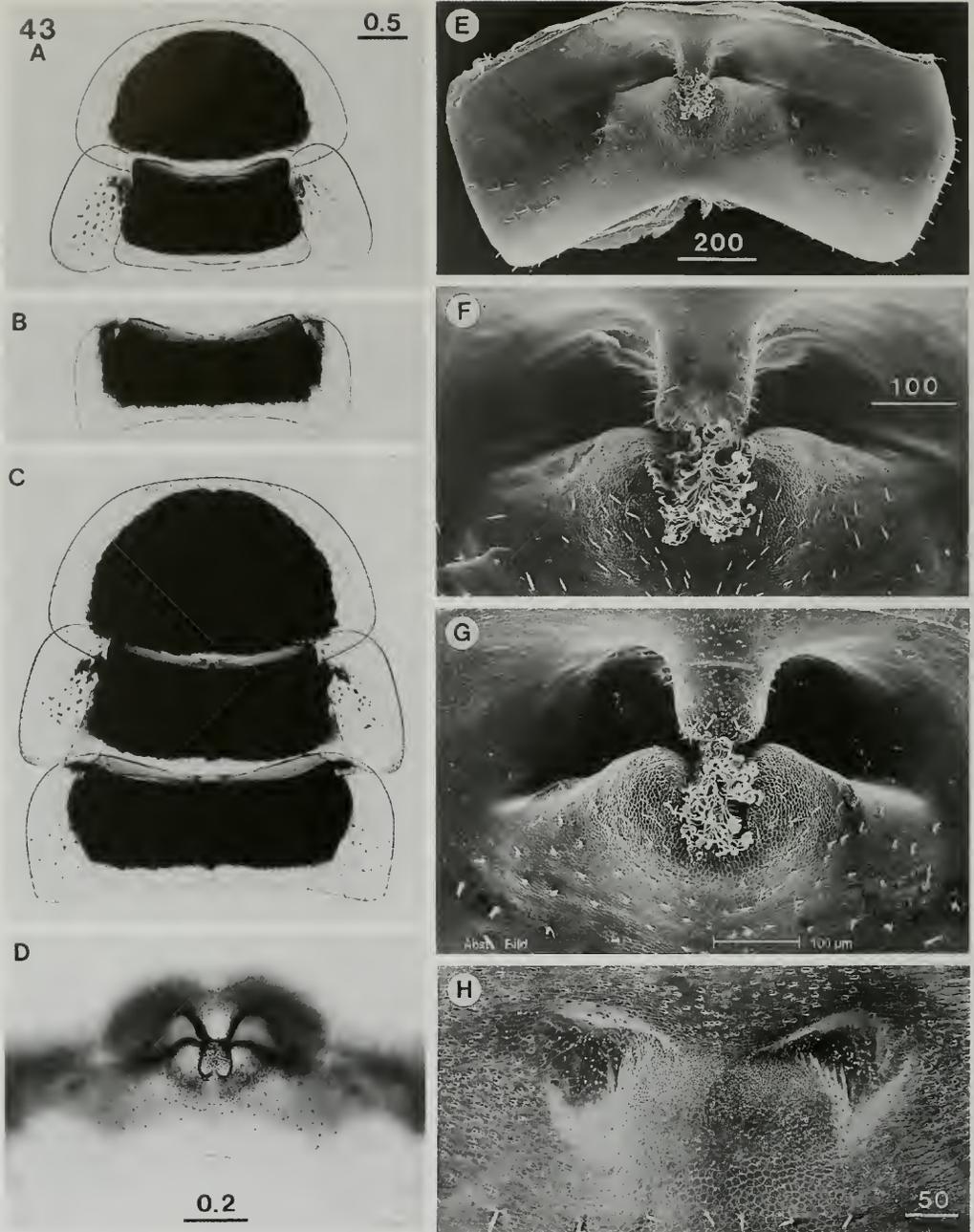


Fig. 43. *P. carpetana*, male (A,B,D-H), female (C). (A-C) Thoracal segments: (A) pron. and meson., (B) metan., (C) complete thorax. (D) gland region of T7. (E-H) SEM pictures: T7 (E; gland region: F,G), gland region of T8 (H). Identification: (A,B) Sp176a/1, (C) Sp 183/4, (D) Sp 332/2, (E,F) Sp 306/20, (G) Sp 306/4, (H) Sp 306/17. Scale in (A,D) in mm, in (E,F,H) in µm; same scale for (A-C).

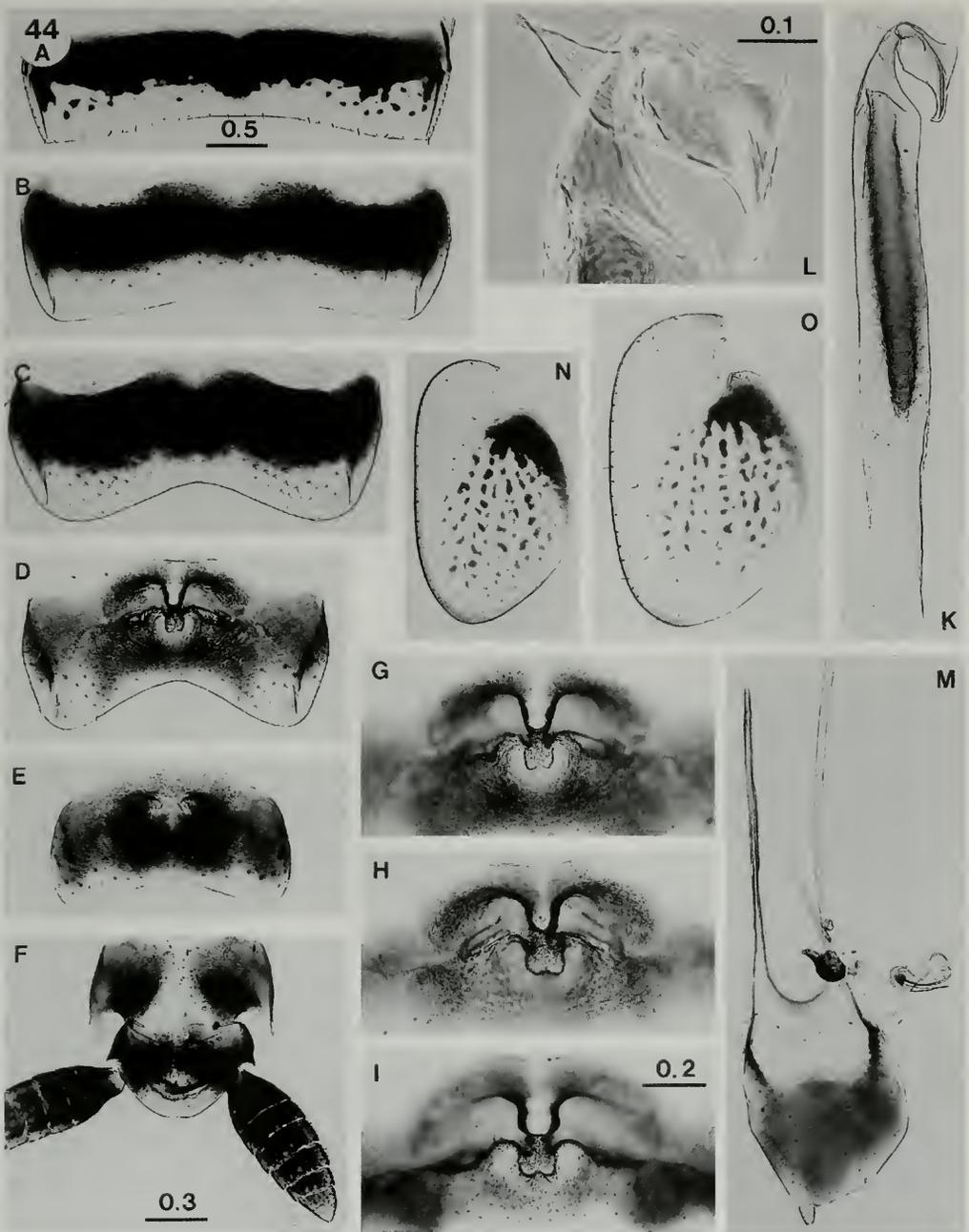


Fig. 44. *P. carpetana*, male (B-N), female (A,O). T5 (A, B), T6 (C), T7 (D; gland region: G-I), T8 (E), T9+10 (F), hook of left phallomere (K,L), subgenital plate (M), forewings (N,O). Identification: (A) Sp 183/4, (B-C,K-M) Sp 176a/1, (H) Sp 178/2, (I) Sp 334/1, (N) Sp 6a/1, (O) Sp 183/5. Same scale (in mm) for (B-F,M-O) and (G-K).

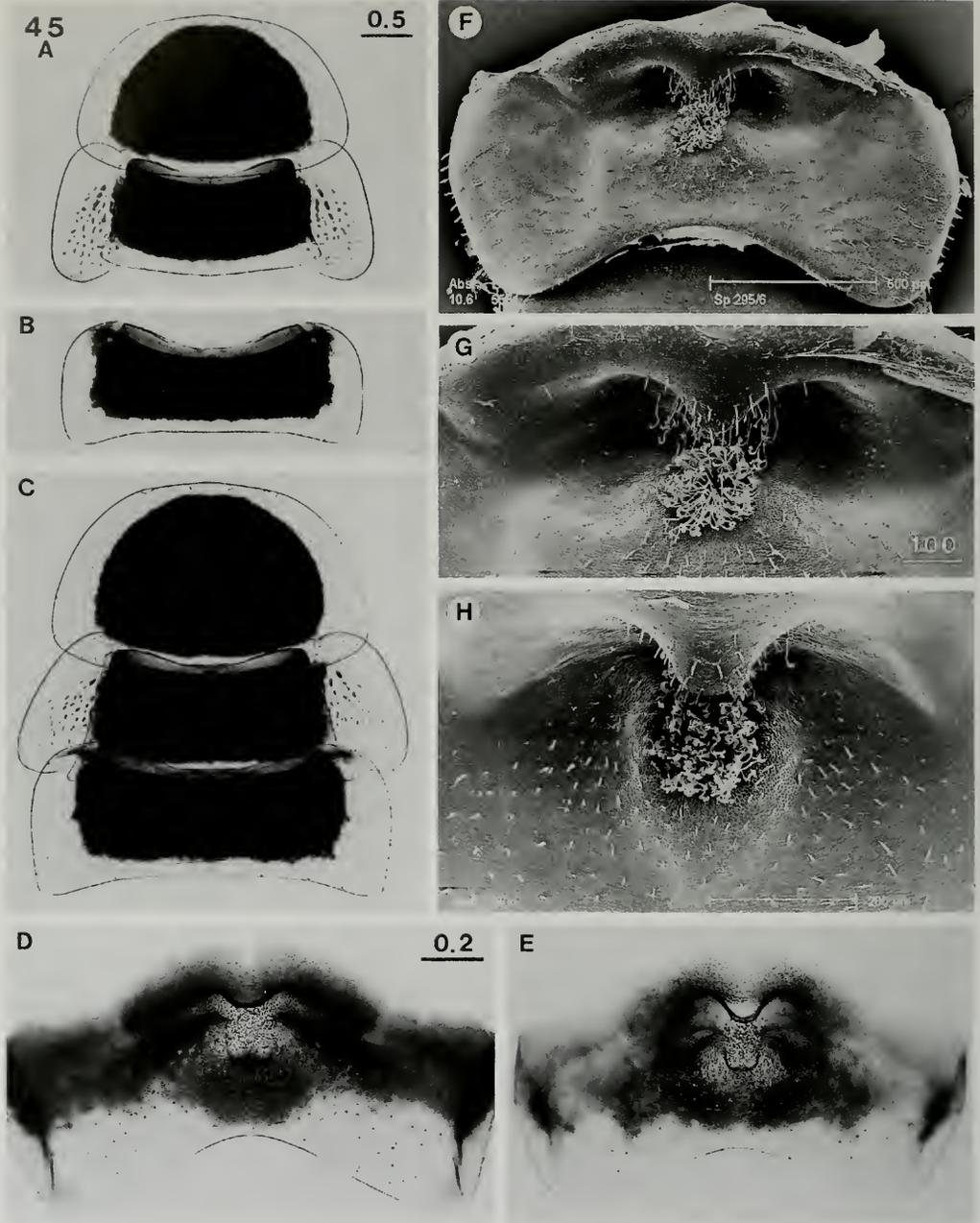


Fig. 45. *P. acarinata*, male (A,B,D-H), female (C). (A-C) Thoracal segments: (A) pron. and meson., (B) metan., (C) complete thorax. (D,E) T7. (F-H) SEM pictures: T7 (F; gland region: G,H). Identification: (A,B) Sp 295/3, (C) Sp 184/5, (D) Sp 175a/3, (E) Sp 185/1, (F,G) Sp 295/6, (H) Sp 184/4. Scale in (A,D) in mm, in (G) in µm; same scale for (A-C) and (D,E).

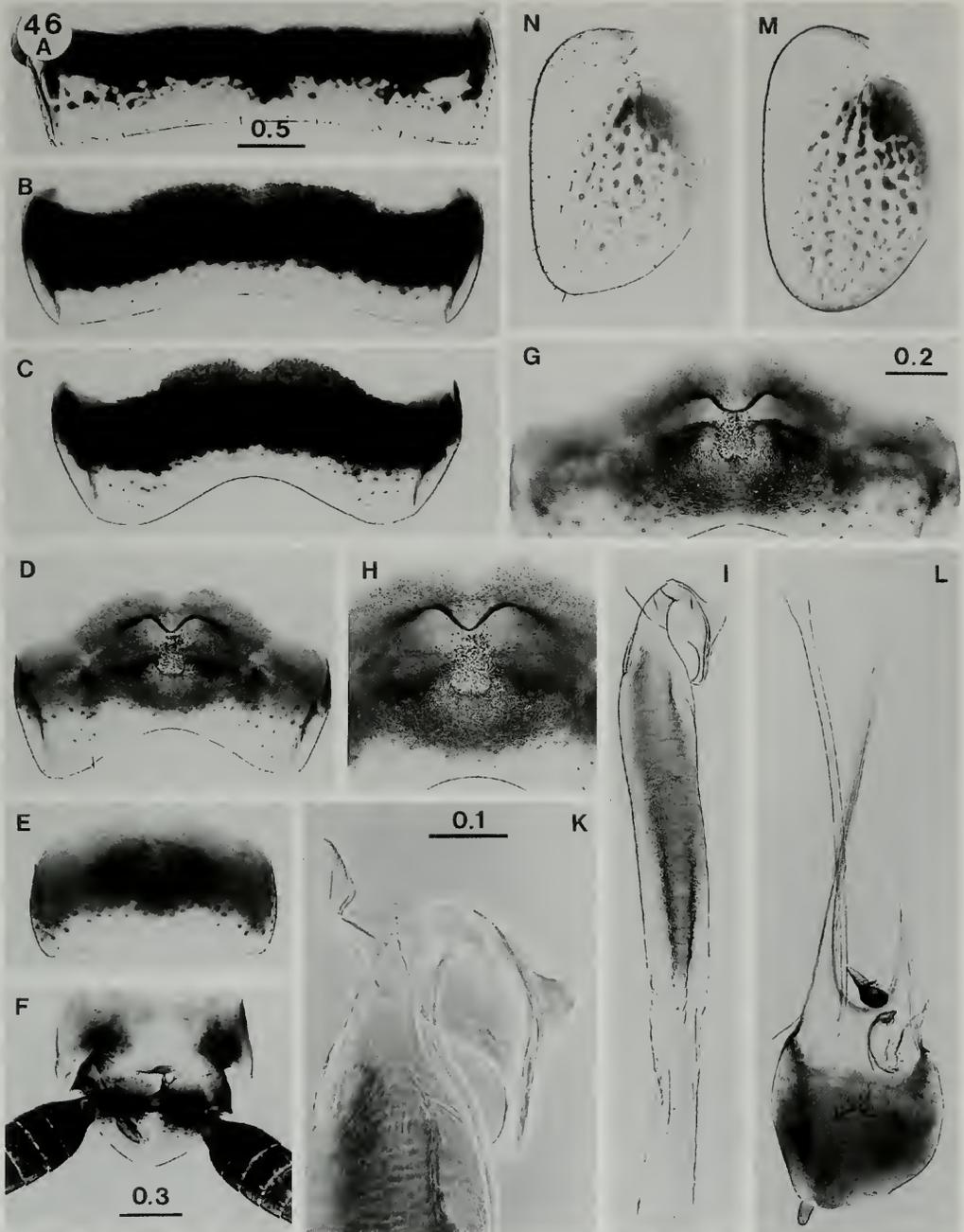


Fig. 46. *P. acarinata*, male (B-M), female (A,N). T5 (A,B), T6 (C), T7 (D,G; gland region: H), T8 (E), T9+10 (F), hook of left phallomere (I,K), subgenital plate (L), forewings (M,N). Identification: (A) Sp 184/5, (B-E,H-M) Sp 295/2 (Holotype), (F) Sp 295/3, (G) Sp 184/2, (N) Sp 184/6. Same scale (in mm) for (B-F,L-N) and (G-I).

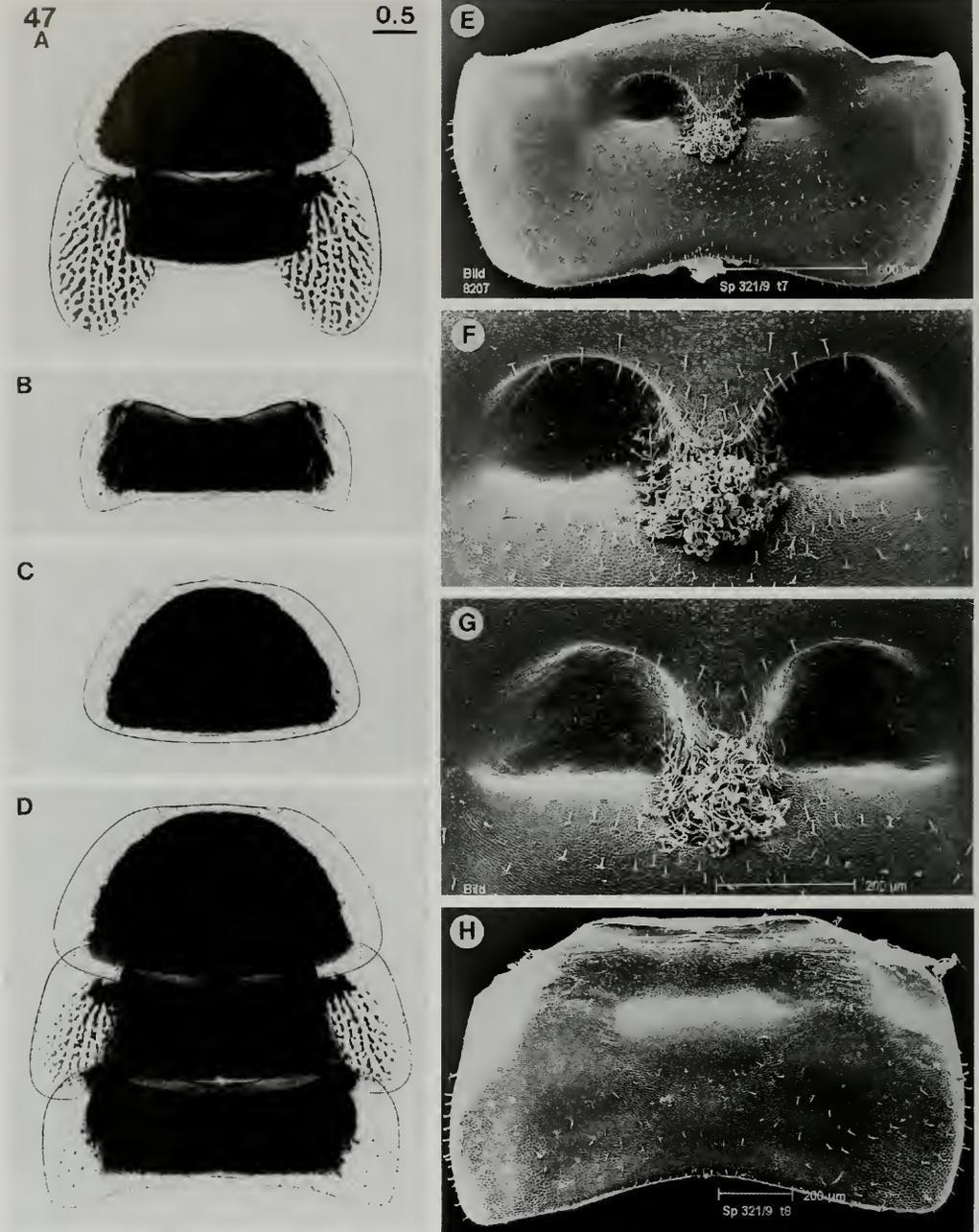


Fig. 47. *P. crassirostris*, male (A-C,E-H), female (D). (A-D) Thoracic segments: (A) pron. and meson., (B) metan., (C) pron., (D) complete thorax. (E-H) SEM pictures: T7 (E; gland region: F,G), T8 (H). Identification: (A) Sp 321/5, (B,C) Sp 321/4 (Holotype), (D) Sp 321/8, (E,F,H) Sp 321/11, (G) Sp 321/10. Scale in (A) in mm; same scale for (A-D) and (F,G).

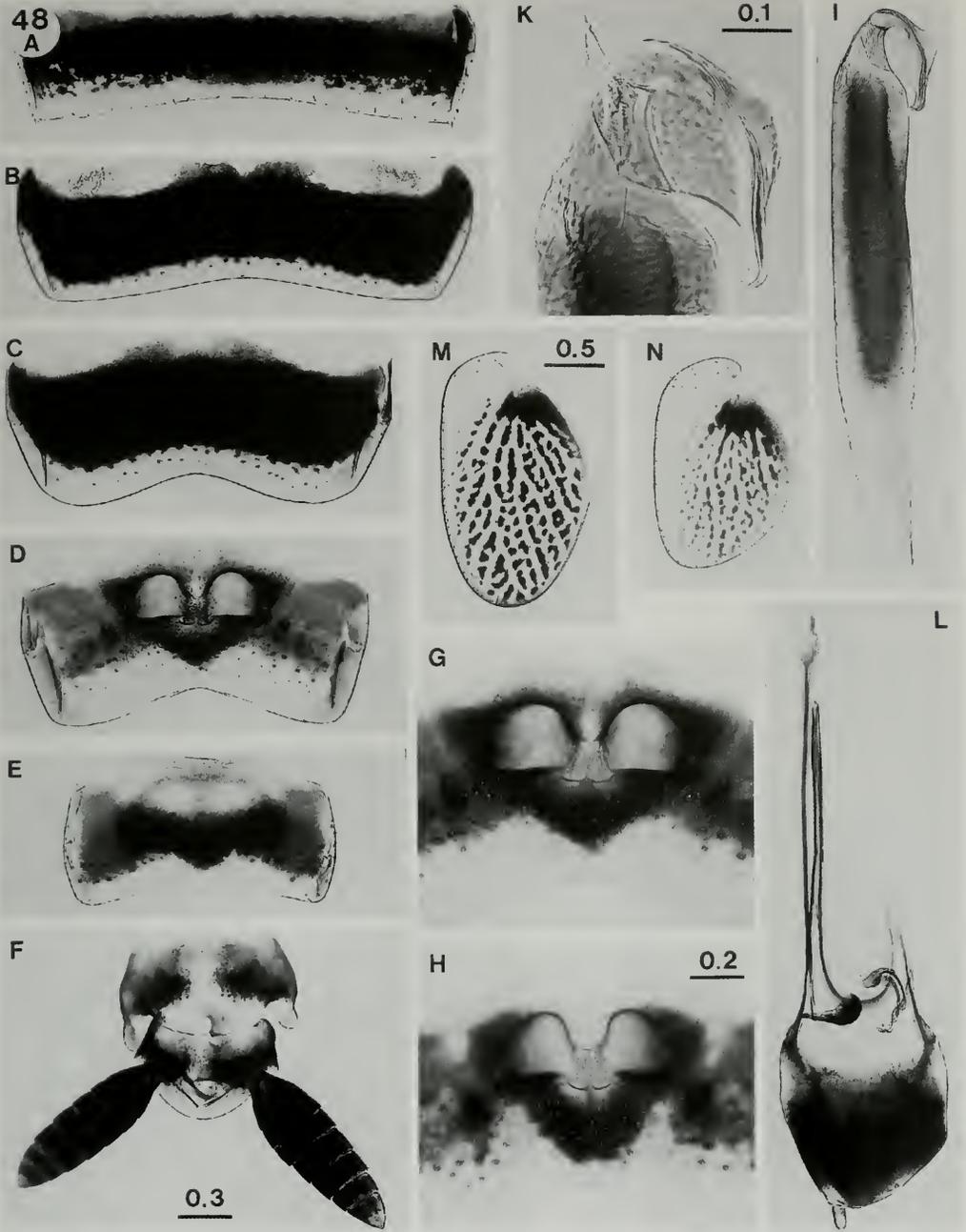


Fig. 48. *P. crassirostris*, male (B-M), female (A,N). T5 (A,B), T6 (C), T7 (D; gland region: G,H), T8 (E), T9+10 (F), hook of left phallomere (I,K), subgenital plate (L), forewings (M,N). Identification: (A) Sp 321/8, (B,C,H-M) Sp 321/4 (Holotype), (D,E,G) Sp 321/5, (F) Sp 321/3, (N) Sp 321/9. Same scale (in mm) for (A,M,N), (B-F,L), and (G-I).

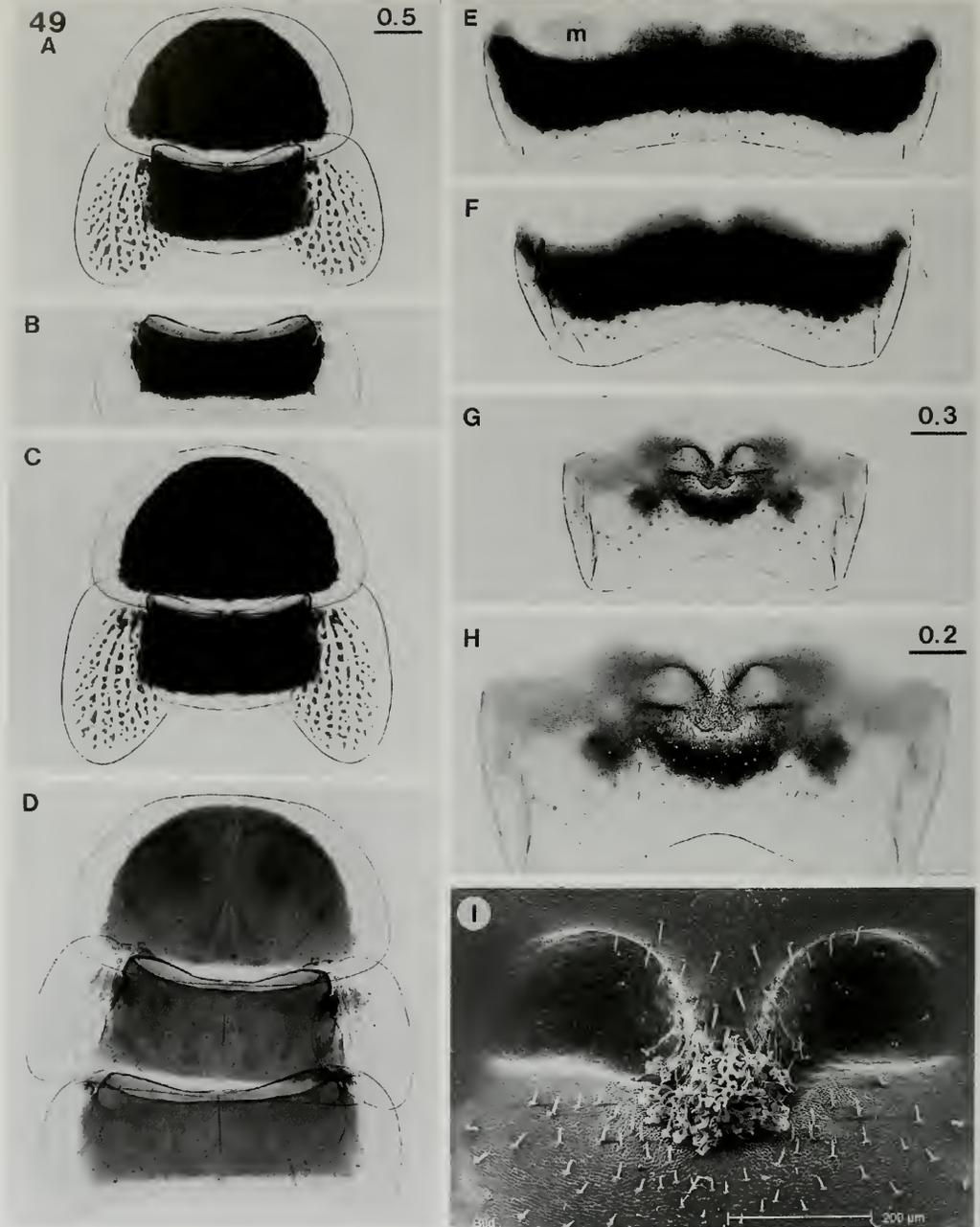


Fig. 49. (A-D) *P. tenuirostris*, male (A-C), female (D). Thoracal segments: (A,C) pron. and meson., (B) metan., (D) complete thorax. (E-I) *P. fernandesiana*, male. T5 (E), T6 (F), T7 (G,H; SEM picture of gland region: I). Identification: (A,B) Sp 164/5 (Holotype), (C) Sp 164/4, (D) Sp 165/4, (E-H) Po 30/1, (I) Po 29/6. Same scale (in mm) for (A-D) and (E-G). – Abbreviations: (m) membrane pouch.

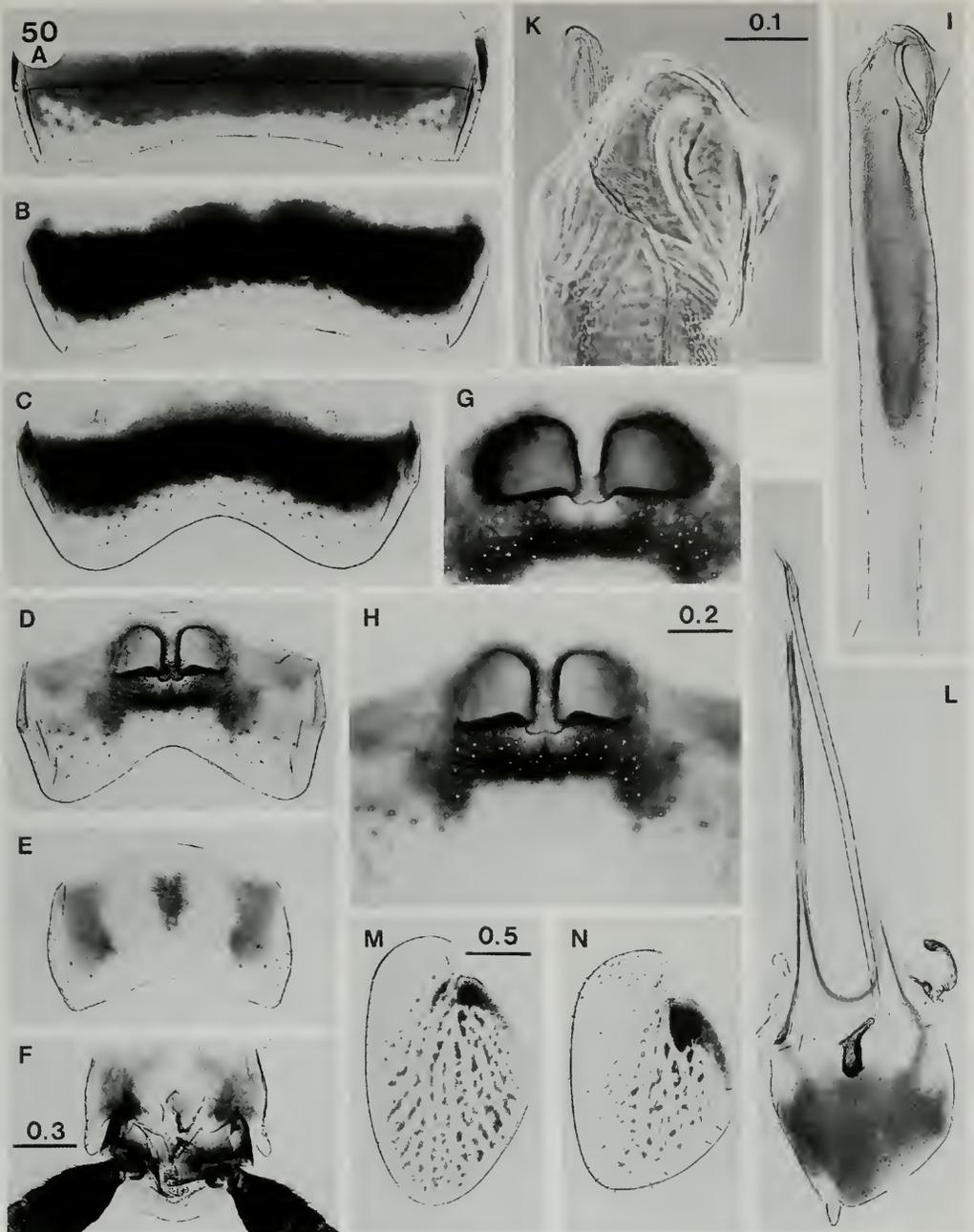


Fig. 50. *P. tenuirostris*, male (B-M), female (A,N). T5 (A,B), T6 (C), T7 (D; gland region: G,H), T8 (E), T9+10 (F), hook of left phallomere (I,K), subgenital plate (L), forewings (M,N). Identification: (A) Sp 165/4, (B-F,H,L) Sp 164/5 (Holotype), (G,I,K) Sp 165/1, (M) Sp 165/3, (N) Sp 164/8. Same scale (in mm) for (A,M,N), (B-F,L), and (G-I).

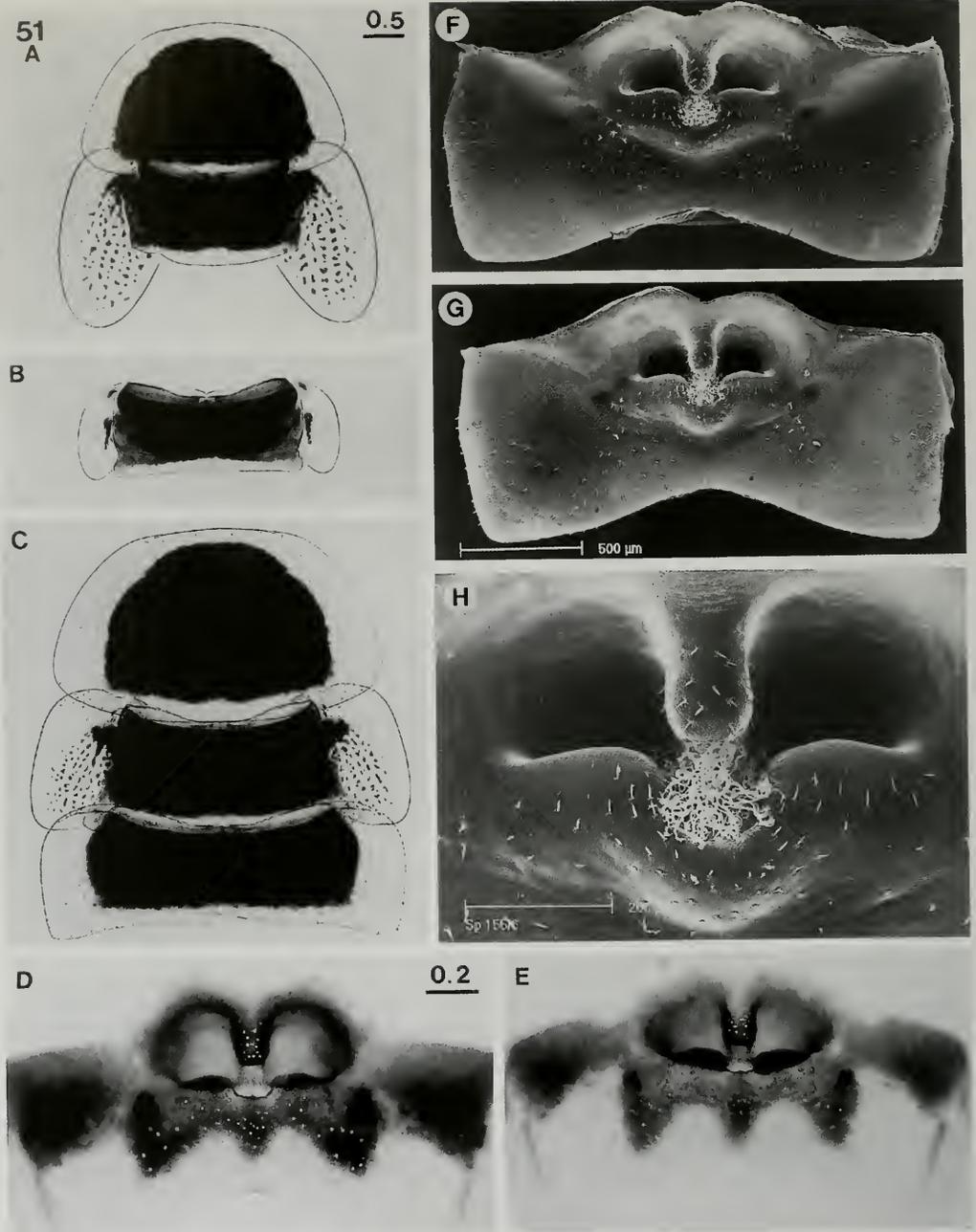


Fig. 51. *P. bolivariana*, male (A,B,D-H), female (C). (A-C) Thoracal segments: (A) pron. and meson., (B) metan., (C) complete thorax. (D,E) T7. (F-H) SEM pictures: T7 (F,G; gland region: H). Identification: (A,B) Sp 127/6 (Holotype), (C) Sp 155/3, (D) Bo 168, (E) Sp 121/2, (F) Sp 155/5, (G,H) Sp 155/6. Scale in (A,D) in mm; same scale for (A-C), (D,E) and (F,G).

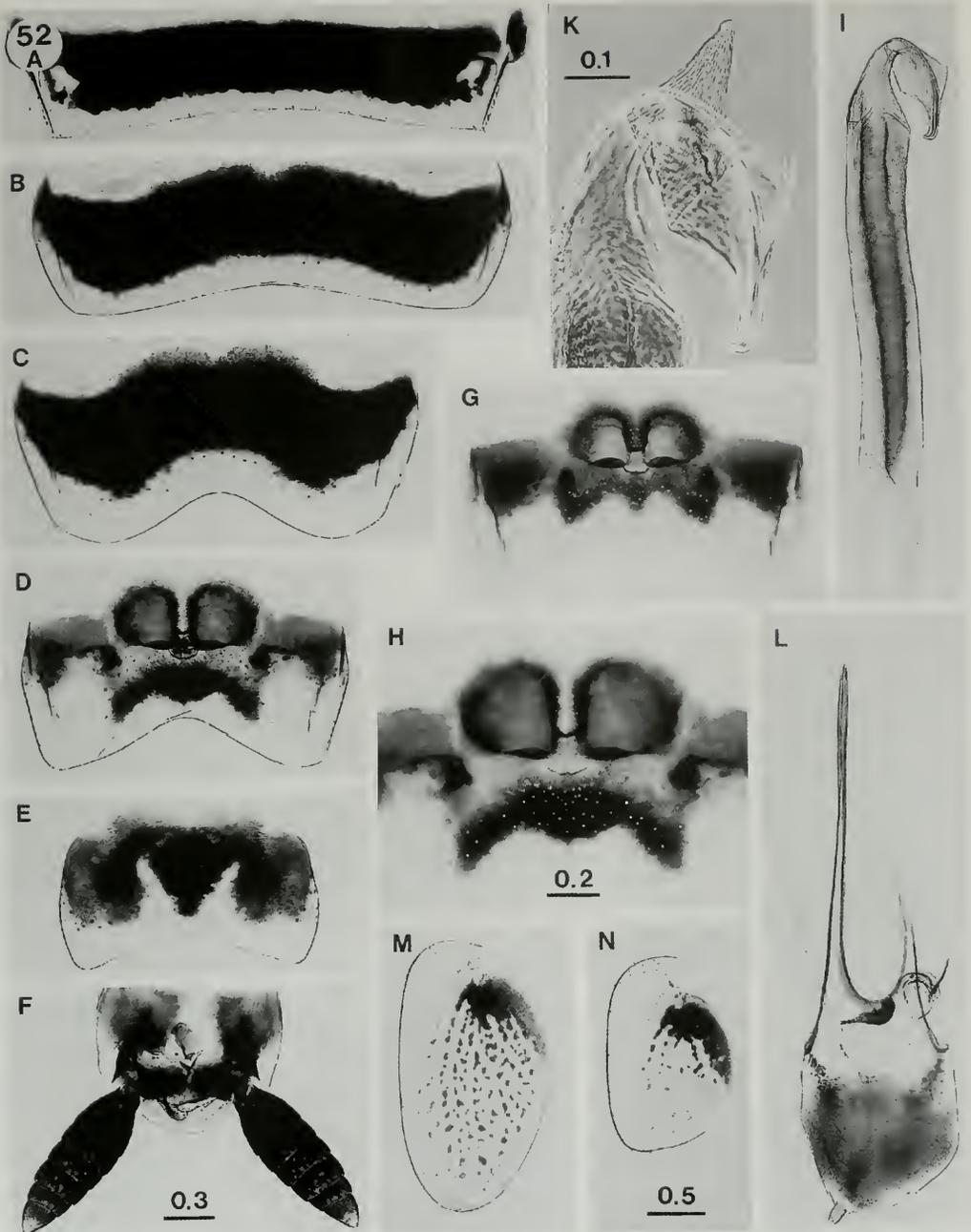


Fig. 52. *P. bolivariana*, male (B-M), female (A,N). T5 (A,B), T6 (C), T7 (D,G; gland region: H), T8 (E), T9+10 (F), hook of left phallomere (I,K), subgenital plate (L), forewings (M,N). Identification: (A) Sp 155/3, (B-F,H-L) Sp 127/6 (Holotype), (G) Bo 168, (M) Sp 127/7, (N) Sp 155/4. Same scale (in mm) for (A,M,N), (B-G,L) and (H,I).

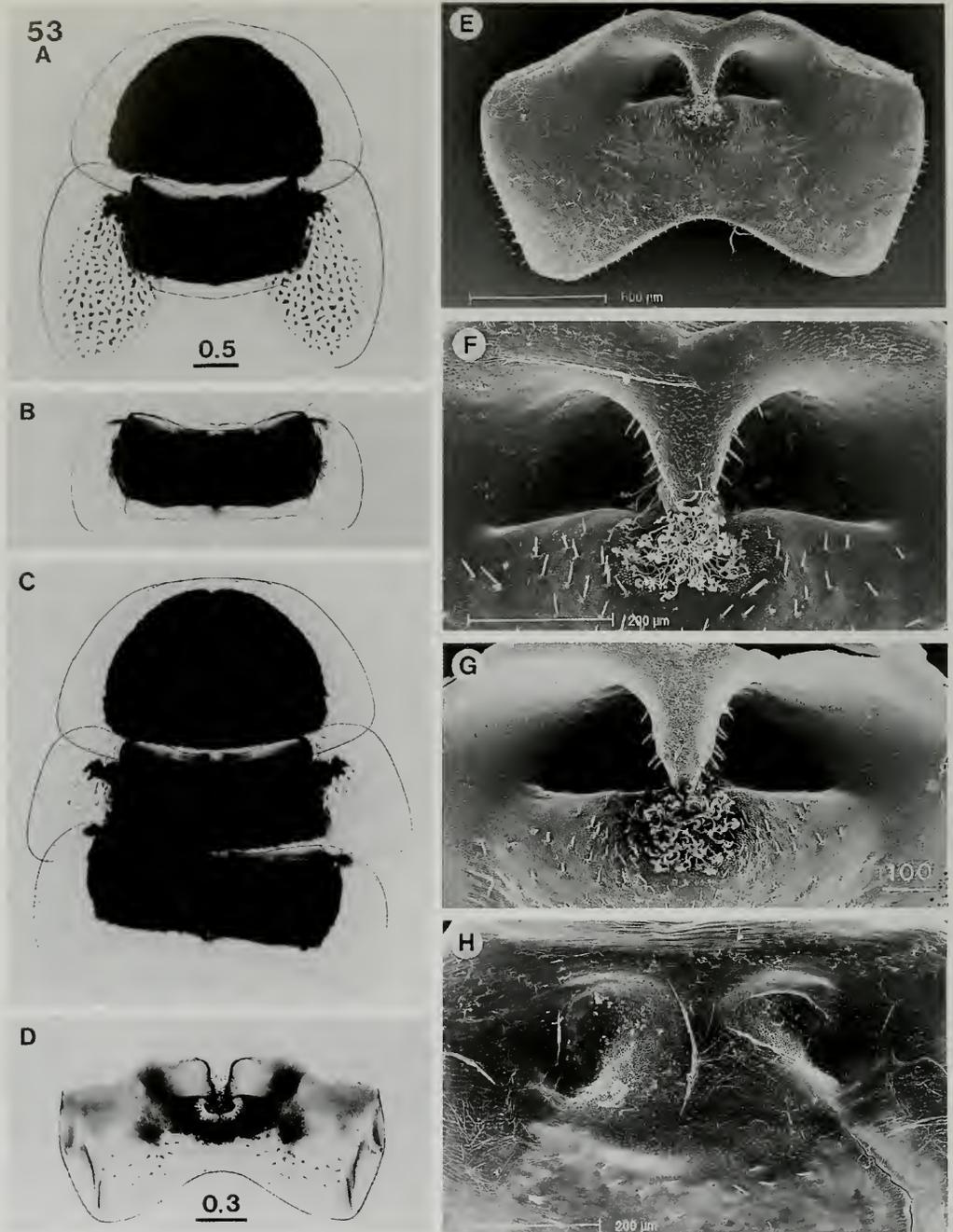


Fig. 53. *P. atlantica*, male (A,B,D-H), female (C). (A-C) Thoracal segments: (A) pron. and meson., (B) metan., (C) complete thorax. (D) T7. (E-H) SEM pictures: T7 (E; gland region: F,G), gland region of T8 (H). Identification: (A,B) Sp 311/3 (Holotype), (C) Sp 311/7, (D) Sp 311/4, (E,F,H) Sp 311/10, (G) Sp 311/5. Scale in (A,D) in mm, in (G) in μm ; same scale for (A-C).

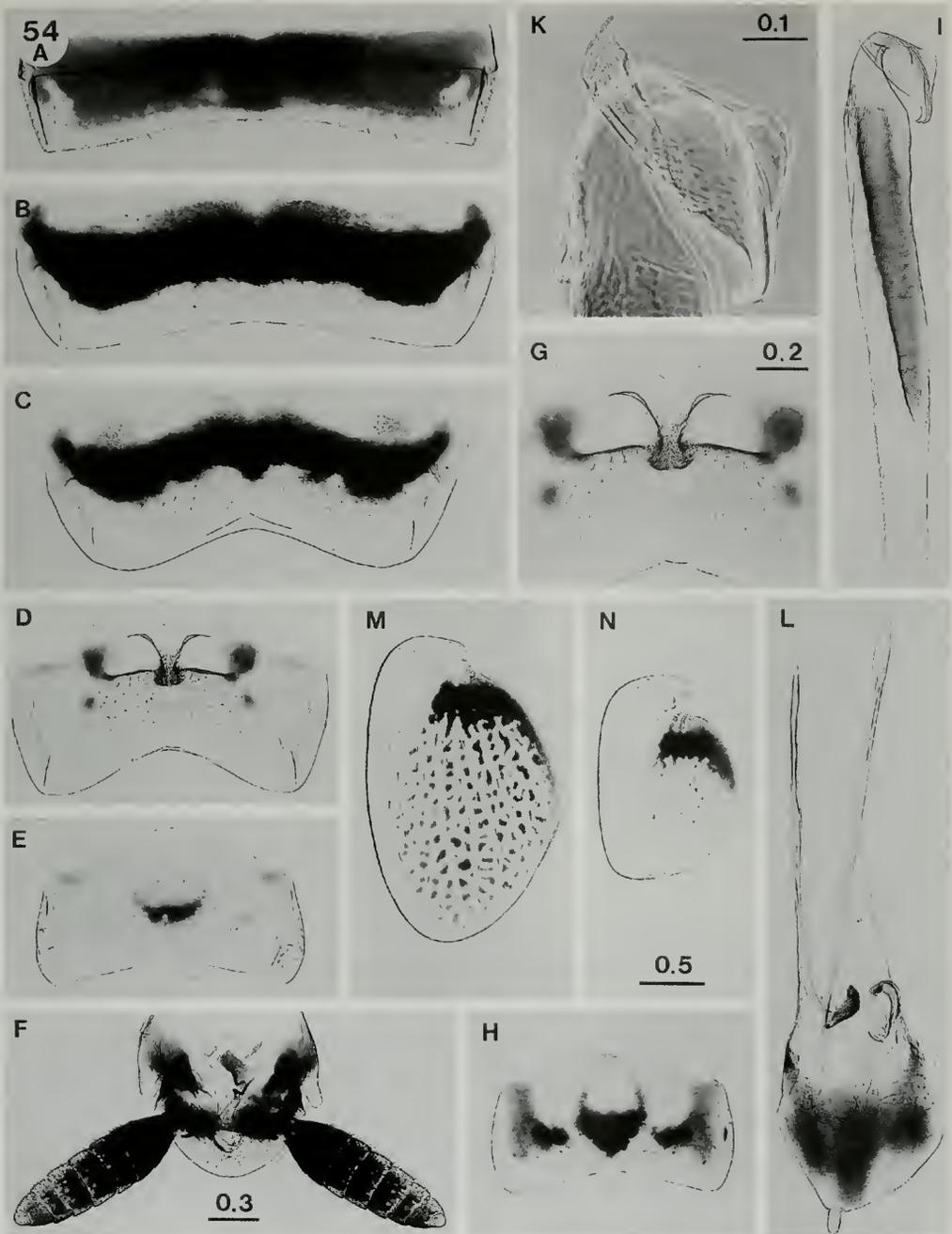


Fig. 54. *P. atlantica*, male (B-M), female (A,N). T5 (A,B), T6 (C), T7 (D; gland region: G), T8 (E,H), T9+10 (F), hook of left phallomere (I,K), subgenital plate (L), forewings (M,N). Identification: (A) Sp 311/12, (B-G,I-L) Sp 311/3 (Holotype), (H) Sp 311/2, (M) Sp 311/4, (N) Sp 311/8. Same scale (in mm) for (A,M,N), (B-F,H,L), and (G,I).

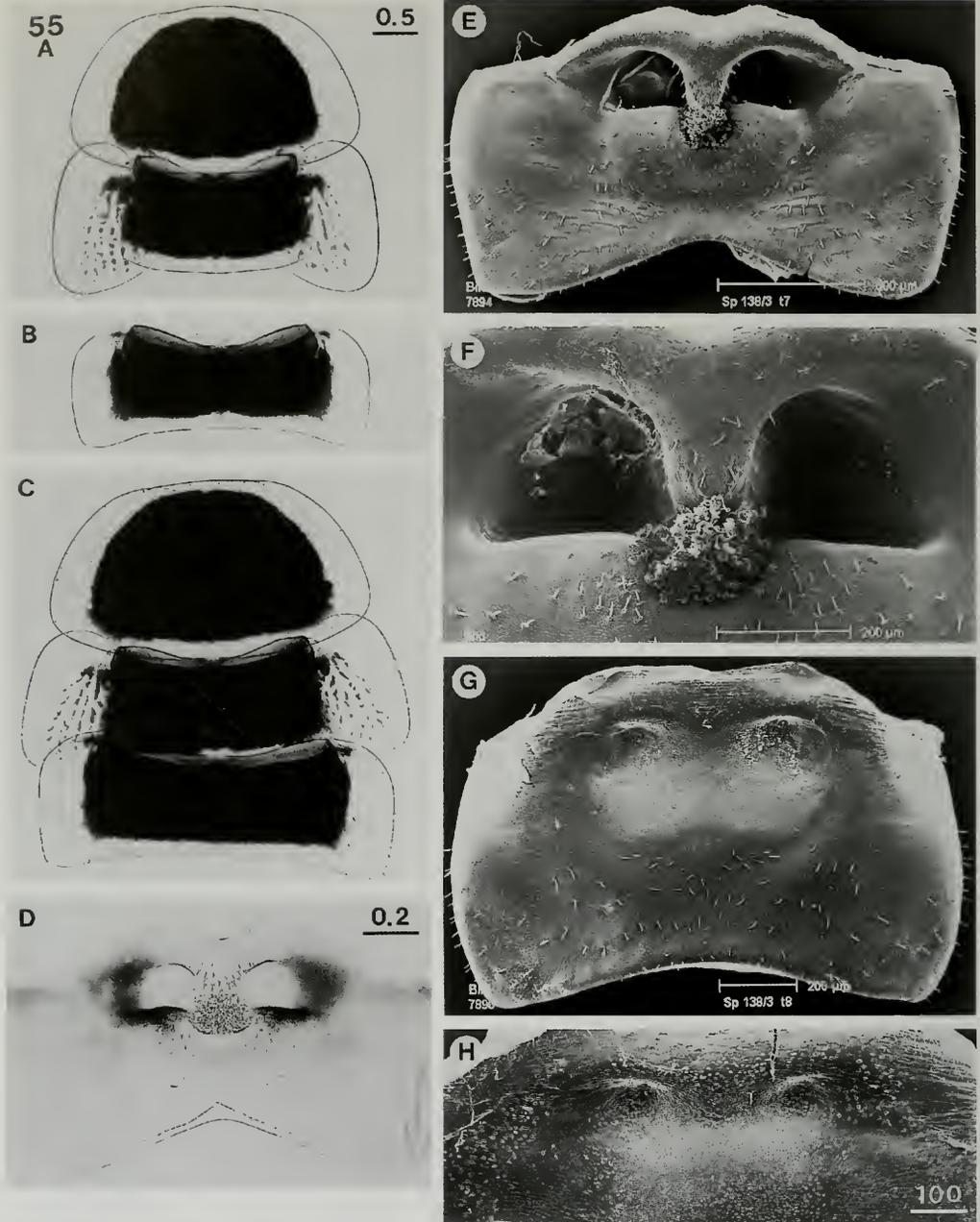


Fig. 55. *P. fernandesiana*, male (A,B,D-H), female (C). (A-C) Thoracal segments: (A) pron. and meson., (B) metan., (C) complete thorax. (D) gland region of T7. (E-H) SEM pictures: T7 (E; gland region: F), T8 (G; gland region: H). Identification: (A,B) Sp 138/2 (Holotype), (C) Sp 138/5, (D) Po 18/6, (E,H) Sp 138/3, (F) Sp 138/4, (G) Sp 164/9. Scale in (A,D) in mm, in (H) in µm; same scale for (A-C).

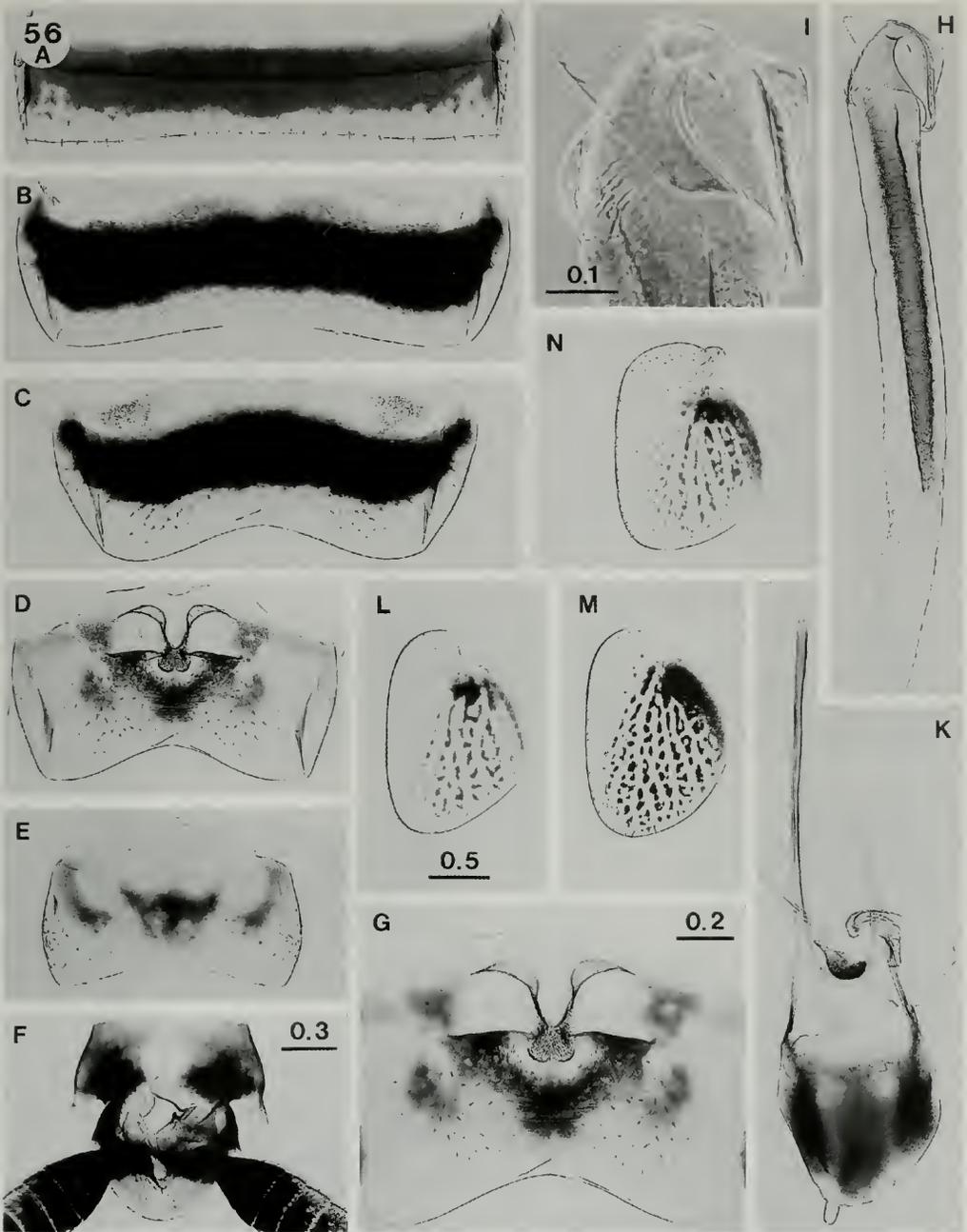


Fig. 56. *P. fernandesiana*, male (B-M), female (A,N). T5 (A,B), T6 (C), T7 (D; gland region: G), T8 (E), T9+10 (F), hook of left phallosome (H,I), subgenital plate (K), forewings (L-N). Identification: (A) Sp 138/7, (B-E,G-I) Sp 138/2 (Holotype), (F,K) Sp 329/1, (L) Sp 83/2, (M) Po 27/4, (N) Sp 138/6. Same scale (in mm) for (A,L-N), (B-F,K), and (G,H).

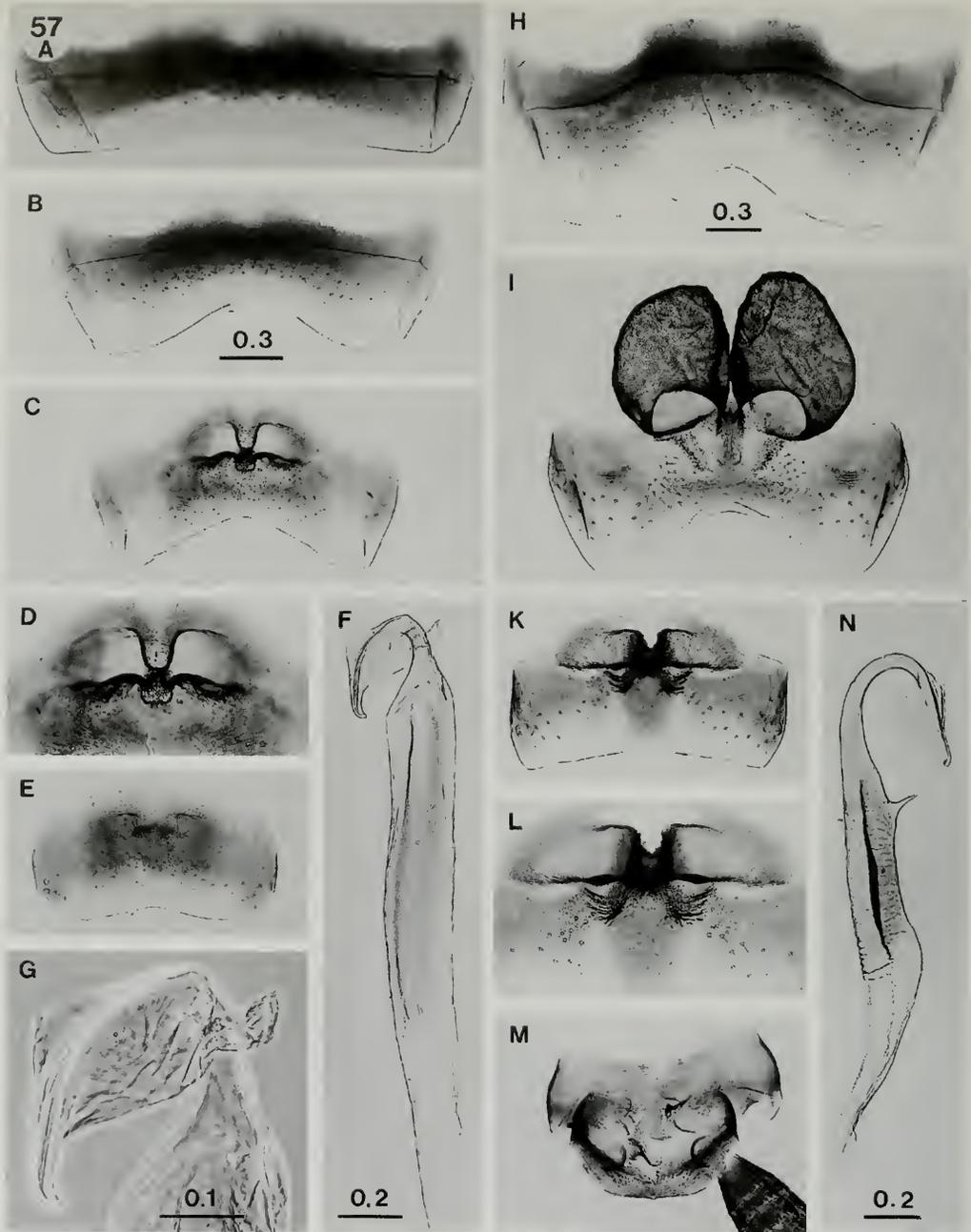


Fig. 57. (A-G) *P. carpetana*, holotype. T5 (A), T6 (B), T7 (C; gland region: D), T8 (E), hook of 'left' phallomere (G,F). (H-N) *P. sacarraoi*, holotype. T6 (H), T7 (I), T8 (K; gland region: L), T9+10 (M), hook of left phallomere (N). Same scale (in mm) for (A-C,E), (D,F), (H-K,M), and (L,N). – Photographs B and H are slightly underexposed in order to show the different shape of the transversal ridge on T6.

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