ANNALES

de la
SOCIÉTÉ SUISSE DE ZOOLOGIE
et du
MUSÉUM D'HISTOIRE NATURELLE
de la Ville de Genève

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TOME 115—FASCICULE 1

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Il est constitué en outre du président de la Société suisse de Zoologie, du directeur du Muséum de Genève et de représentants des instituts de zoologie des universités suisses.

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Catalogue du matériel type des mantes conservé au Muséum d'histoire naturelle de Genève (Insecta: Mantodea)

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Catalogue of mantid types deposited in the Natural History Museum of Geneva (Insecta: Mantodea). - Type specimens for at least potentially 125 species-group names of Mantodea have been identified in the collection of the Natural History Museum of Geneva. The names are listed alphabetically together with the number of specimens, sex, kind of type-material, box number in the collection, locality data and current combinations where they have changed, and other institutions where types are deposited. Most of these types were described by Saussure, several by Giglio-Tos, and some by other authors. No lectotypes are designated.

Keywords: Dictyoptera - Mantodea - type material - Henri de Saussure.

INTRODUCTION

La collection de Mantes du Muséum d'histoire naturelle de Genève, qui renferme actuellement du matériel type, au moins potentiellement, pour 125 noms du niveau espèce, a été essentiellement rassemblée pendant les quarante dernières années du 19^{e} siècle par Henri Louis Frédéric de Saussure (1829-1905) qui a décrit pendant cette période plus de 50 genres et de 300 espèces, seul, puis en collaboration avec Leo Zehntner. Sur cet ensemble les types de 105 espèces sont présents au Muséum, dans certains cas cependant avec doute, les autres étant en grande partie au Muséum national d'Histoire naturelle à Paris et au Natural History Museum (anciennement British Museum of Natural History) à Londres, ainsi que dans divers autres établissements, pas toujours identifiés.

A l'époque, le Code International de Nomenclature Zoologique n'avait pas encore vu le jour, et les auteurs n'indiquaient pas forcément dans leurs descriptions le nombre des spécimens pris en considération, ni les établissements où ils devaient être conservés, d'où une confrontation nécessaire entre ces descriptions et les spécimens pour déterminer celui (holotype) ou ceux (syntypes) qui sont vraiment des références pour ces noms, et la certitude n'est pas forcément toujours acquise en raison d'imprécisions d'ordres divers.

Manuscript accepted 18.11.2007

Par la suite Ermanno Giglio-Tos a décrit 12 espèces entre 1912 et 1916 d'après des spécimens rassemblés par Saussure, en précisant cette fois clairement le matériel type, tandis que les espèces décrites par divers autres auteurs ont été peu nombreuses. Dans certains cas, ce sont d'ailleurs seulement des paratypes qui figurent dans la collection; la localisation de l'holotype est alors mentionnée.

Dans l'intervalle, la nomenclature a évolué et beaucoup d'espèces ont changé de nom, par suite de synonymies, d'homonymies ou de changements de genre, ce qui a été indiqué à chaque fois, afin de préciser le statut actuel des noms concernés.

La liste ci-après recense les noms du niveau espèce par ordre alphabétique avec pour chacun l'auteur, la date de parution et la page dans la publication, la combinaison originale, le nombre et le statut des spécimens avec les indications suffisantes pour les retrouver (étiquetage et cadre où ils sont conservés), et éventuellement l'état de conservation, des commentaires critiques, ainsi que, s'il y a eu changement, le statut actuel du nom (valide ou non), la combinaison actuelle de l'espèce et d'éventuels synonymes plus anciens en cas de non-validité. Les autres institutions dans lesquelles du matériel type est également déposé sont indiquées dans la mesure du possible. A noter encore que les descriptions de certaines des espèces nommées par Saussure en 1871 ont fait l'objet la même année d'une réimpression à l'identique, mais avec pagination différente, ce qui est explicité.

Aucun acte nomenclatural nouveau n'intervient dans cette étude destinée simplement à servir de référence pour des travaux ultérieurs. Nous espérons n'avoir rien oublié d'important pour qu'elle joue pleinement ce rôle.

ABREVIATIONS

ANSP Academy of Natural Sciences, Philadelphia, Etats-Unis.
BMNH The Natural History Museum, London, Angleterre.
IZPAN Instytut Zoologiczny, Polska Akademia Nauk, Warszawa, Pologne.
MBAC Museo del Dipartimento di biologia animale dell'Università, Catania, Italie.
MHNG Muséum d'histoire naturelle de Genève, Suisse.
MNHN Muséum national d'Histoire naturelle, Paris, France.
NHMW Naturhistorisches Museum, Wien, Autriche.
OXUM Oxford University Museum of Natural History, Oxford, Angleterrre.
SMF Forschungsinstitut und Naturmuseum Senckenberg, Frankfurt-am-Main, Allemagne.
ZMHB Zoologisches Museum der Humboldt-Universität, Berlin, Allemagne.

NB: la collection Harz est déposée au MHNG et la collection Pantel au MNHN.

LISTE DU MATÉRIEL TYPE

africana Saussure & Zehntner, 1895: 215 [*Acanthomantis*]. Holotype ♀ du Mozambique (cadre 46), portant quatre étiquettes blanches «620 73 Delagoa Bai Afr. merid M^{r} Brady», «Del. Bay», «AFR. MER.» et «277» ainsi qu'une étiquette rose «Acanthomantis africana Sss. ♀». Espèce mise en synonymie d'*Otomantis scutigera* Bolívar, 1890 (voir Kirby, 1904: 296).

alata Saussure, 1872a: 51 [*Armene*]. Deux syntypes ♂ «Turkestan Exped. Fedschenko» avec étiquette «599-58» (cadre 7 bis). Au MHNG se trouvent deux autres ♂ étiquetés «Turkestan M. H. de Saussure» et une ♀ étiquetée «Samarkand M. H. de Sauss.» qui ont seulement valeur de comparés aux types par l'auteur. L'espèce a été mise en synonymie de *Mantis pusilla* Eversmann, 1859, devenue *Armene pusilla* (voir Giglio-Tos, 1927: 180).

apicalis Saussure, 1869: 73 [*Creobotra*]. Holotype ♀ en mauvais état (pattes incomplètes, aile gauche déchiquetée, abdomen abimé) de l'Inde (cadre 45), avec deux étiquettes «♀ Assam» (blanche) et «Creobotra apicalis Sauss.» (jaune). L'espèce est devenue *Creobroter apicalis* (voir Giglio-Tos, 1927: 558).

argentina Saussure, 1870: 237 [*Miopteryx*]. Un ♂ étiqueté «Corrientes M. H. de Saussure» pourrait faire partie de la série typique (cadre 51); Saussure indique uniquement dans sa description «Ager argentinus» et n'indique pas le nombre de spécimens examinés; à noter encore que ce ♂ est un peu plus petit que les mensurations indiquées (20 mm au lieu de 22), qu'il n'a plus les ailes du côté gauche et qu'il a également perdu la plupart de ses pattes. L'espèce est devenue *Musoniella argentina* (voir Giglio-Tos, 1916: 4).

assamica Giglio-Tos, 1915b: 161 [*Eumantis*]. Holotype ♂ sans abdomen (cadre 7) portant une étiquette «Silhet Assam» et une étiquette «Eumantis assamica Gigl. Tos typus E. Giglio-Tos det.». L'espèce est devenue *Gimantis assamica* (voir Beier, 1935: 29).

atopogamia Saussure, 1892: 123 [*Melliera*]. Holotype ♂ à abdomen incomplet (cadre 36) avec une étiquette blanche «Chontales Nicaragua Janson» et une étiquette verte «Melliera atopogamia Sss. Pict». Au BMNH se trouvent 1 ♂ et 1 ♀ de la même espèce vus par son auteur, mais qui n'ont pas valeur de types (voir Marshall, 1975: 311). L'espèce a été mise en synonymie de *Melliera major* Saussure, 1872 (voir Giglio-Tos, 1927: 312).

australis Saussure & Zehntner, 1895: 169 [*Tropidomantis*]. Holotype ♂ d'Australie (cadre 8) avec étiquettes «603; 33 Peak-Down Nouv. Holl. Mus. Godeffroy» (manuscrite), «Peak-Downs» (imprimée), «603: 33; Tropidomantis sp? Mus. Gdf.; Queensland, n. s. Wales» (manuscrite), «158 15» (manuscrite), «Tropidomantis australis, Sss. u Z. M» (manuscrite sur papier bleu violacé). L'espèce est devenue *Neomantis australis* (voir Beier, 1935: 59).

aztecus Saussure, 1859: 60 [*Acanthops*]. Holotype ♀ du Mexique (cadre 8) en mauvais état (pattes médianes et postérieures manquantes, abdomen incomplet), ce qui devait déjà être le cas au départ, la description originale n'indiquant pas la longueur du corps et ne mentionnant que les pattes antérieures «*femoribus anticis minus gracilibus*» pour ce spécimen qualifié alors de «Larva» qui porte les étiquettes «Morelia Mexique M^r H. de Saussure» (blanc passé) et «Yersinia mexicana Sauss.» (verte). L'espèce a en effet été transférée sous ce nom par Saussure lui-même (1869: 72) dans son genre *Yersinia* proposé dans la même

publication (1869: 59), et mise en synonymie avec *Acanthops mexicanus* décrit juste avant (Saussure, 1859: 60) sur un mâle considéré également au départ comme un juvénile, la nature adulte des deux spécimens étant cette fois reconnue.

bacillaris Giglio-Tos, 1914: 9 [*Oestomantis*]. Holotype juvénile ♀ (cadre 55) avec les mentions manuscrites «Oestomantis bacillaris Gigl.-Tos typus» sur une étiquette imprimée E. Giglio-Tos det., et une étiquette manuscrite «Je n'ai pas réussi à élever cette larve. Elle a refusé toute nourriture. Java Zchutz».

batesi Saussure & Zehntner, 1895: 230 [*Popa*]. Neuf ♀ collectées par Sikora ou Elliot (cadre 55) doivent être considérées comme syntypes, la description originale mentionnant ces deux noms de récolteurs et «Un grand nombre d'individus». Un ♂ et quatre ♀ syntypes sont également présents au MNHN dans la collection Pantel.

betanimena Saussure & Zehntner, 1895: 196 [*Hierodula* (*Tarachomantis*)]. Deux syntypes ♂ et ♀ avec chacun deux étiquettes manuscrites «Madagascar Rev W. D. Cowan 1882» (blanche) et «Hierodula betanimena ♂ (ou ♀) Sss. & Z.» (rose) (cadre 30). D'autres syntypes doivent être à l'OXUM. L'espèce est devenue *Tarachomantis betanimena* (voir Kirby, 1904: 241).

betsilea Saussure & Zehntner, 1895: 191 [*Hierodula* (*Tarachomantis*)]. 3 ♂ et 1 ♀ de Madagascar sans autre précision, avec étiquette rose «Hierodula betsilea S. et Z.» (cadre 30) ne doivent être que des spécimens comparés aux types, en collection au MNHN et à l'OXUM comme indiqué dans la description originale. L'espèce est devenue *Tarachomantis betsilea* (voir Kirby, 1904: 241).

biocellata Saussure, 1869: 67 [*Stagmatoptera*]. Holotype ♀ (cadre 50) avec trois étiquettes manuscrites «600 81 Amer. merid Anc. Coll» (blanc passé), «biocellata Sss. Amérique merid.» (verte), «Stagmat. biocellata Sauss.» (verte).

biramosa Saussure & Zehntner, 1894: 152 [*Metriomantis*]. Cinq ♀ du Brésil (cadre 51) qui devraient être des syntypes, portant des étiquettes vertes «Espirito-Santo ex. coll. Fruhstorfer». La description est seulement suivie de «*Hab.* BRAZIL (Mus. Genavense)». L'espèce est devenue *Photinella biramosa* (voir Beier, 1935: 122).

bispina Saussure & Zehntner, 1895: 211 [*Hoplocorypha*]. Une ♀ sans localité, à abdomen incomplet, avec une étiquette «Musée Senkenberg» [sic] et une étiquette rose «Hoplocorypha bispina S u Z ♀» pourrait être un syntype (cadre 13).

bollianus Saussure & Zehntner, 1894: 173 [*Oligonyx*]. Cinq spécimens du Texas (cadre 42) qui doivent être des syntypes, deux ♂ «602-33; Dallas; Texas» et trois ♀ «601-95; Texas; Etats-Unis, Mr Boll», tous étiquetés «Oligonyx Bolliana Sauss.». La description originale fait mention de mâles et de femelles sans préciser les nombres des spécimens, elle indique «*Hab.* North America. Dallas in Texas (Boll.).- Northern Mexico (Mus. Genavense)». Les dimensions

indiquées concordent bien avec les spécimens en collection, dont aucun n'est en provenance du Mexique. L'espèce est devenue *Oligonicella bolliana* (voir Giglio-Tos, 1915b: 192).

brachyptera Saussure, 1899: 586 [*Pseudomantis*]. Une ♀ holotype ou syntype d'Afrique du Sud (cadre 10) étiquetée «620-74 Cap b. sp. Mr Peringuey» et «Pseudomantis brachyptera Sss. Type!». L'espèce est devenue *Miomantis brachyptera* (voir Kirby, 1904: 235).

brevipennis Yersin, 1860: 511 [*Mantis*]. Les deux syntypes ♂ et ♀ de France, Hyères, Raymond. Les genitalia du mâle sont disséqués et collés sur une paillette (cadre 8). L'espèce est devenue *Pseudoyersinia brevipennis* (voir Kirby, 1904: 231).

brunneri Saussure, 1871b: 304, et 1871d: 428 [*Iris* (*Fischeria*)]. Une ♀ (cadre 12) «Himalaya M. H. de Saussure» et «Sphendale brunneri Sauss.» (étiquette jaune) doit être l'holotype de l'espèce, devenue *Deiphobe brunneri* (voir Giglio-Tos, 1927: 488).

caelebs Saussure, 1869: 73 [*Hymenopus*]. Holotype ♂ sans abdomen (cadre 46) «Orizaba Mexique». La description originale indique «Long. 57 mill.- Patria?»; la longueur du spécimen est bien de 57 mm de la tête jusqu'au bout des ailes. Deux étiquettes ont dû être ajoutées par la suite «TYPE» (étiquette rouge imprimée) et «Pseudocant. Caelebs Sauss.» (étiquette verte manuscrite). L'espèce est en fait devenue *Pseudacanthops caelebs* (voir Saussure, 1871e: 148).

capensis Saussure, 1872a: 46 [*Mantis*]. Le ♂ et la ♀ syntypes d'Afrique du Sud (cadre 32), le mâle à abdomen incomplet, les deux avec les étiquettes «cap b. sp. coll^{r} Jurine» (blanche) et «Mantis capensis Sauss.» (rose) mentionnant leur sexe, ainsi qu'une étiquette «Mantis religiosa Linn. E. Giglio-Tos det.». L'espèce que la description originale traite de «diminutif de la *M. religiosa*» a en effet été mise en synonymie de *M. religiosa* par Giglio-Tos (1912: 13) après l'avoir été de *M. pia* Audinet-Serville, 1839, par Kirby (1904: 251), espèce décrite également du cap de Bonne-Espérance; le statut exact de ces taxons reste toutefois à préciser.

carli Giglio-Tos, 1916: 10 [*Hoplocorypha*]. Holotype ♀ (cadre 13) avec les étiquettes «Njarugenje, Ruanda centrale, Dr. J. Carl» et «Hoplocorypha Carli G. Tos typus E. Giglio-Tos det.».

caucasica Saussure, 1871a: 110, et 1871c: 258 [*Iris* (*Fischeria*)]. Deux ♂, deux ♀ et un juvénile qui devraient être des syntypes (cadre 11): les étiquettes mentionnent «Caucase (ou Caucasus) Mr H. de Saussure» et «Fischeria caucasica Sss.» (bleue). D'autres syntypes doivent se trouver au NHMW. L'espèce est devenue *Rivetina caucasica* (voir Beier, 1935: 108).

cayennensis Saussure & Zehntner, 1894: 136 [*Acontista*]. Holotype ♀ de Guyane à abdomen incomplet (cadre 6) avec trois étiquettes «620-85 Cayenne» (blanche

manuscrite), «CAYENNE» (verte imprimée), «Acontista cayennensis Sauss.» (blanche manuscrite).

cayennensis Saussure, 1869: 62 [*Liturgousa*]. Holotype ♀ de Guyane (cadre 37) avec deux étiquettes vertes «CAYENNE» et «Liturgousa cayennensis Sauss.» auxquelles ont été rajoutées indûment une étiquette rouge «Paralectotype» et une étiquette blanche imprimée «Det. M. C. Polsbroek 1973» avec la mention manuscrite «Liturgusa cayennensis (Sauss.) ♀ Paralectotype», tandis qu'une autre femelle de Cayenne, nettement plus petite, ne correspondant pas à la description originale, a reçu des étiquettes «Lectotype in litt.» (rouge) et une étiquette blanche identique à la précédente sauf que «Paralectotype» y est remplacé par «Lectotype!». Mais apparemment, ces désignations erronées n'ont jamais été publiées. A noter encore que l'émendation de *Liturgousa* en *Liturgusa* a été proposée par Stål (1877: 40) et a été officialisée par Giglio-Tos (1927: 292); cependant elle ne s'imposait pas.

ceylonica Saussure, 1869: 62 [*Humbertiella*]. Holotype ♂ (cadre 5) étiqueté «Trincomalie, Ceylan, V^ge^ Humbert».

coarctata Saussure, 1869: 67 [*Hierodula*]. Holotype ♀ (cadre 27) étiqueté «Indes Or., C. Guérin» et «coarctata Sauss. Indes orient^es^ ». Espèce devenue *Parhierodula coarctata* (voir Giglio-Tos, 1912: 124).

coerulans Saussure & Zehntner, 1894: 145 [*Stagmomantis*]. Holotype ♀ (cadre 35) indiqué de «Central America?» dans la description originale et figuré pl. IX, fig. 9. Il porte trois étiquettes «Amérique M. H. de Saussure» (blanche), «Stagmomantis coerulans ♀ Sauss.» (verte), et «figuré» (petite blanche). Beier (1935: 96) mentionne avec doute cette espèce comme synonyme de sa *Phaeomantis brevipes* Beier, 1931, décrite d'après un ♂ du Costa Rica, espèce devenue *Melliera brevipes* (voir Terra, 1995: 57). Cette synonymie resterait à vérifier.

confusa Giglio-Tos, 1912: 26 [*Tarachomantis*]. Les deux syntypes ♂ et ♀ (cadre 30) avec les mêmes deux étiquettes «H. de Saussure Madagascar» (blanche, imprimée), et «Tarachomantis confusa typus Gigl. Tos» (blanche, manuscrite, avec mention imprimée E. Giglio-Tos det.). Le syntype ♀ porte en plus une étiquette rose «Hierodula betsilea S. et Z.» témoignant de son identification initiale.

cordillerae Saussure, 1869: 62 [*Acontista*]. Holotype ♂ du Mexique (cadre 6) avec trois étiquettes, «Cordova Mexique M. H. de Saussure» (blanche), «Acontista cordillerae Sauss. ♀» (verte) et «HOLOTYPE» (rouge imprimée). Le spécimen n'a plus d'abdomen, ce qui devait déjà être le cas lors de la description originale, celle-ci ne mentionnant pas la longueur du corps.

coxalis Saussure, 1898: 189 [*Miomantis*]. Sur les dix spécimens présents (cadre 13), au moins trois ♂ et une ♀ doivent pouvoir être considérés comme syntypes,

porteurs d'étiquettes «620 73 Cap. b. sp. M[r] Peringuey» et «Miomantis coxalis Sss.» (étiquettes roses manuscrites). Cinq autres mâles (trois également du cap de Bonne Espérance et deux de Lourenço-Marquès) avec une étiquette rose identique ont dû simplement être comparés aux types par Saussure; le dernier spécimen, une femelle de «Busoga, Uganda», identifiée postérieurement *Calidomantis coxalis* par Giglio-Tos, ne fait évidemment pas partie de la série typique. A noter encore que la description originale ne précisait pas le nombre des spécimens dont la provenance était seulement indiquée «Africa meridionalis».

cubensis Saussure, 1869: 70 [*Thespis*]. Les trois ♂ présents (cadre 42) en provenance de Cuba avec une étiquette verte manuscrite «Musonia cubensis ♂ Sauss.» doivent pouvoir être considérés comme syntypes de cette espèce devenue *Paramusonia cubensis* (voir Rehn, 1904: 567).

cupido Saussure, 1869: 66 [*Cardioptera*]. Holotype ♀ en mauvais état (l'arrière du pronotum manque, les pattes sont incomplètes et les élytres abimés) du Brésil (cadre 51) avec trois étiquettes «♀ coll. Jurine» (blanche), «cupido Sauss» (verte) et «Metriomantis cupido Sauss.» (verte). L'espèce est devenue *Metriomantis cupido* dans Saussure & Zehntner (1894: 152).

delalandi Saussure, 1870: 230 [*Gonypeta*]. Un syntype ♀ étiqueté «Afrique M. H. de Saussure» et «Type de Sss.» (cadre 7 bis où se trouvent deux autres femelles). Un autre syntype ♀ et deux syntypes ♂ étiquetés «Afrique australe, Delalande» sont conservés au MNHN. L'espèce est devenue *Entella delalandi* (voir Saussure, 1899: 595).

dentifrons Saussure & Zehntner, 1895: 244 [*Idolomorpha*]. Holotype ♀ de Zanzibar (cadre 60) avec les étiquettes «670 73 Zanzibar M[r] Brady» (blanche), «Zanzibar» (rose pâle) et «Idolomorpha dentifrons Sauss. ♀» (rose).

diabolicum Saussure, 1869: 60 [*Idolum*]. Holotype ♀ juvénile (cadre 58) sans abdomen et sans la patte médiane gauche, avec deux étiquettes «Inter[r] de l'Afrique» (blanche) et «Idolum diabolicum Sauss.» (rose). L'espèce est devenue *Idolomantis diabolica* pour raison d'homonymie (Uvarov, 1940: 175).

dubia Giglio-Tos, 1912: 127 [*Parhierodula*]. Holotype ♀ (cadre 26) avec les étiquettes «S. Borneo H. Fruhstorfer» et «Parhierodula dubia Giglio-Tos Typus». L'espèce est devenue *Hierodula dubia* (voir Giglio-Tos, 1927: 447).

femoralis Saussure & Zehntner, 1894: 186 [*Stagmatoptera*]. Deux ♂ et trois ♀ syntypes (cadre 50) étiquetés «620 85 Cayenne, M[r] Prudhomme».

fraterna Saussure & Zehntner, 1894: 144 [*Stagmomantis*]. Deux ♀ syntypes avec les étiquettes «Guatemala amer. cent. Dr H. Dohrn» et «Tamahu Vera Paz Champion» (cadre 35). Un ♂ et deux ♀ syntypes sont au BMNH et d'autres syntypes doivent se trouver à l'IZPAN (Marshall, 1975: 315).

fumosus Saussure & Zehntner, 1894: 179 [*Thrinaconyx*]. Cinq ♂ syntypes de Panama étiquetés «V. de Chiriqui, Champion» (cadre 42). Quatre autres ♂ syntypes sont au BMNH (Marshall, 1975: 315).

glauca Saussure, 1869: 63 [*Iridopteryx*]. Holotype ♀ de Ceylan (cadre 5). L'espèce a été transférée par Saussure dans son genre *Micromantis* (1870: 225) et en est devenue l'espèce-type (voir Saussure, 1870: 228).

goeldiana Saussure & Zehntner, 1894: 153 [*Hicetia*]. Holotype ♀ du Brésil (cadre 40) avec une étiquette imprimée «R. JANEIRO M. H. de Sauss.» (verte).

gracilipes Saussure, 1872a: 50 [*Ameles*]. Un ♂ en deux morceaux (cadre 7 bis) avec deux étiquettes «620 74 cap. b. sp. M^r^ Peringuey» et «Entella gracilipes Sss.» (étiquette rose) ne doit être qu'un spécimen comparé au type que la description originale indique être au «Musée de Stuttgard»[sic]. L'espèce a été mise en synonymie de *Gonypeta delalandi* Saussure, 1870, maintenant dans le genre *Entella* (voir Giglio-Tos, 1927: 194).

gracilis Saussure, 1861b: 470 [*Oxyophthalmus*]. Holotype ♀ du Sri Lanka (cadre 3), avec l'abdomen détaché, l'aile et la patte médiane gauches manquantes; deux étiquettes «♀ Trincomalie Ceylan V^ge^ Humbert» (blanche) et «Oxyophthalmus gracilis Sauss.» (jaune). L'espèce est devenue *Oxyophthalma gracilis* pour raison d'homonymie (voir Giglio-Tos, 1927: 115).

grandidieri Saussure & Zehntner, 1895: 226 [*Stagmatoptera*]. Le syntype ♀ de Madagascar (cadre 51), désigné comme lectotype (Roy, 2005: 50), avec l'abdomen mutilé et les tarses manquants aux pattes antérieures et postérieures; une étiquette ronde à verso bleu «199 69» et une étiquette rose «Stagmatoptera grandidieri, S & Z.». L'espèce a été mise en synonymie de *S. acutipennis* Westwood, 1889 (voir Kirby, 1904: 301), devenue *Tisma acutipennis* (*voir* Giglio-Tos, 1917: 68). Le syntype ♂, signalé à la suite sans description et conservé au MNHN, s'est révélé appartenir à une autre espèce et est devenu l'holotype de *Tisma pauliani* Roy, 2005.

grandis Saussure, 1870: 233 [*Hierodula*]. Le syntype ♂ du Bangladesh (cadre 24) avec deux étiquettes «♀ Silhet M^r^ H. de Saussure» (blanche), et «Hierodula grandis Sauss.» (jaune). La description fait état des deux sexes, mais la ♀ manque.

grandis Saussure, 1869: 69 [*Phasmomantis*]. Holotype ♀ sans localité à abdomen incomplet «Phasmomantis grandis Sauss.» (étiquette rose) (cadre 36). L'espèce est devenue synonyme de *Solygia sulcatifrons* décrite au départ comme *Thespis* par Audinet-Serville en 1839 (voir Giglio-Tos, 1927: 475).

grisea Giglio-Tos, 1915b: 146 [*Dystactella*]. Holotype ♂ du Mozambique (cadre 7 bis), étiqueté «Lourenço Marquès, Dr G. Audeoud», genitalia R. Roy n° 3798. Espèce devenue *Dystactula grisea* pour raison d'homonymie (Giglio-Tos, 1927: 202).

haanii Saussure, 1871a: 37, et 1871c: 185 [*Pseudomantis*]. Deux ♂ en provenance de Java, localité type de l'espèce, pourraient être des syntypes, ou tout au moins des spécimens comparés au type (cadre 10). L'espèce a été mise en synonymie de *Mantis maculata* Thunberg, 1784, rangée depuis dans le genre *Statilia* Stål (voir Kirby, 1904: 236).

humbertiana Saussure, 1869: 63 [*Gonypeta*]. Holotype ♂ étiqueté «Trincomalie Ceylan V^ge^ Humbert» (cadre 7). L'espèce a été mise en synonymie de *Mantis punctata* De Haan, 1842, devenue *Gonypeta punctata* (voir Giglio-Tos, 1927: 173).

humbertiana Saussure, 1869: 71 [*Parathespis*]. Deux ♂ syntypes, l'un en mauvais état, étiquetés «♂ Trincomalie Ceylan M^r^ Humbert» (cadre 42).

humeralis Saussure, 1871a: 195, et 1871c: 343 [*Cardioptera*]. Holotype ♂ du Natal (cadre 9) avec deux étiquettes manuscrites «Cilnia humeralis Sauss.» (rose) et «♂ Natal» (blanche). L'espèce est en effet devenue *Cilnia humeralis* (voir Stål, 1877: 53).

icterica Saussure & Zehntner, 1894: 190 [*Oxyops*]. Holotype ♀ (cadre 48) avec trois étiquettes «♀ Amer. merid. M. H. de Saussure» (blanche), «Oxyops icterica ♀ Sss & Z.» (verte) et «Parastagmatoptera flavipennis Sauss. in litteris» (verte). L'espèce devenue l'espèce-type du genre *Paroxyopsis* (Rehn, 1911: 8).

iheringi Saussure & Zehntner, 1894: 193 [*Theoclytes*]. Holotype ♀ (cadre 53) «Brésil rio Gr da Sul Jhering» (étiquette verte imprimée) et «Theoclytes iheringi Sauss.» (étiquette verte manuscrite); la patte antérieure droite manque. L'espèce est devenue *Phyllovates iheringi* (voir Kirby, 1904: 304).

indica Roy, 2007: 508 [*Deroplatys*]. Holotype ♂ (cadre 47) de l'Inde (Kerala) «Cardamon Hills, Periyar, 959 m, 4.II.1972, leg. R. Mussard, C. Besuchet & I. Löbl», genitalia R. Roy n° 4043.

indica Giglio-Tos, 1915a: 52 [*Ormomantis*]. Holotype ♂ (cadre 6) étiqueté «Indes inter. M. H. de Saussure», l'abdomen est incomplet.

infuscata Saussure & Zehntner, 1894: 163 [*Pseudomiopteryx*]. Huit ♂ syntypes (quatre du Guatemala, un du Nicaragua, trois de Panama) (cadre 41). Quatre autres ♂ syntypes au BMNH (Marshall, 1975: 317).

inquinata Saussure & Zehntner, 1894: 136 [*Acontista mexicana* var.]. Deux ♂ syntypes du Mexique avec des étiquettes «Acapulco Guerrero H. H. Smith» (cadre 6); deux autres ♂ syntypes également du Mexique au BMNH (Marshall, 1975: 317). Cette «variété» est considérée comme espèce à part entière depuis Kirby (1904: 233).

iridipennis Saussure, 1869: 63 [*Iridopteryx*]. Deux syntypes ♂ et ♀ du Sri Lanka (cadre 7), le mâle à abdomen incomplet portant seul une étiquette rouge

«TYPUS», les deux avec une étiquette jaune «Iridopteryx iridipennis Sauss.». L'étiquette de localité est «Ceylan Vge Humbert» pour le mâle, «P. O Valley Ceylan Vge Humbert» pour la femelle.

jucunda Saussure, 1899: 594 [*Entella*]. Holotype ♀ (cadre 7 bis) d'Afrique du Sud avec trois étiquettes «620 74 Cap b. sp. Mr Peringuey» (blanche), «pris in copula avec la Ligaria trigonalis?» (blanche) et «Entella jucunda Sss. type!» (rose). Espèce effectivement mise en synonymie de *Ligaria trigonalis* Saussure, 1899: 596, devenue *Ligariella trigonalis* (voir Giglio-Tos, 1915b: 172).

kapaurana Giglio-Tos, 1912: 122 [*Parhierodula* (*Parhierodula*)]. Les deux syntypes ♀ de Nouvelle Guinée, «Kapaur Holl N. Guinea Fruhstorfer» et «Neu-Guinea Finschhafen 1891» (étiquettes jaunes), les deux avec les mentions «Parhierodula kapaurana Gigl. Tos typus» manuscrites sur une étiquette imprimée «E. Giglio-Tos det.». L'espèce est devenue *Hierodula kapaurana* (voir Beier, 1935: 80).

kinzelbachi Harz, 1988: 208 [*Kinzelbachia*]. Holotype ♂, allotype ♀ et sept paratypes de Turquie (cadre 5 de la collection Harz). Tous ces spécimens sont en fait des juvéniles en assez mauvais état. L'holotype est étiqueté «Türkei Ruins of Castalar Hierapoli, 37.11 – 36.11, 23.7.1986. 86 / 71 R. Kinzelbach», l'allotype porte deux étiquettes qui font plus ou moins double emploi «TR: road Gaziantep-Bahçe, 17 km E of Sakçagözü 37°10' / 37°07' 23.07.86 86 / 75» et «Türkei, Road Gezianter-Bahçe 17 Km E of Sakçagözü; 37°10 / 37°07' 23.7.86»; les paratypes proviennent de localités plus ou moins proches «Ruinen Hierapolis», «Nurdag», «Ruins of Castobal», «road tunnel nr De mirkapiya» et «TR: Gökirmak N of the road nr. Haciehmetli, 14 km NW of Boyabat 41°35' / 34°41'». L'espèce a été mise en synonymie de *Rivetina asiatica* Mistshenko, 1967, par Ehrmann (2000: 3) avec désignation de néotypes d'après des récoltes ultérieures dans des localités voisines en croyant que la série typique était détruite, néotypes qui n'ont plus raison d'être.

lagrecai Lombardo, 1984: 23 [*Pseudoyersinia*]. Un paratype ♂ de Sicile (cadre 8) avec les étiquettes «Catenanuova (Enna) 29.IX.1969 Nobile Messina leg.» et «Pseudoyersinia lagrecai Lombardo det.». Dans le même cadre se trouve une femelle de même localité, 7.X.1969 coll. La Greca, qui en toute rigueur a seulement valeur de topotype car cette date n'a pas été mentionnée dans la description originale. L'holotype ♂, l'allotype ♀ et des paratypes des deux sexes au MBAC.

longicollis Stål, 1877 [*Dysaules*]. Holotype ♂ dont le prothorax est réparé (cadre 3) avec quatre étiquettes dont une «♂ Bengale Mr H. de Saussure», deux «Desaules [sic] longicollis, Stål» et une petite illisible. La description originale fait état d'une femelle, erreur qui a été corrigée par Wood-Mason (1882: 25).

macilenta Saussure & Zehntner, 1894: 170 [*Thesprotia*]. Un ♂ et deux ♀ syntypes du Brésil (cadre 41); les trois avec une étiquette verte manuscrite «Thesprotia

macilenta Sss. & Z.». Le mâle a son abdomen incomplet, ce qui était déjà le cas lors de la description originale; il porte deux étiquettes blanc passé «Brésil M. H. de Saussure» et «VI». Les deux femelles (aptères) ne sont apparemment qu'au dernier stade juvénile étant donné leurs dimensions, elles sont étiquetées «Rio Janeiro (Mr Erni)».

macula Saussure & Zehntner, 1895: 199 [*Hierodula* (*Hierodula*)]. Un ♂ et trois ♀ syntypes au départ, Madagascar (cadre 30). L'espèce a été classée, d'abord avec doute (Kirby, 1904: 242), puis à part entière (Giglio-Tos, 1912: 30) dans le genre *Tarachomantis* Brancsik, 1893. Maintenant elle se situe dans le genre *Mantasoa* Mériguet, 2005, et le mâle a été désigné comme lectotype (genitalia b77, Mériguet, 2005: 46).

major Saussure & Zehntner, 1894: 165 [*Musonia*]. Deux syntypes ♂ et ♀ (cadre 42), le mâle sans localité (étiquette «Patria?») à abdomen incomplet, ce qui était déjà le cas lors de la description originale; la femelle indiquée Cayenne. L'espèce est devenue l'espèce-type du genre *Macromusonia* (Hebard, 1923: 329).

malagassa Saussure & Zehntner, 1895: 197 [*Hierodula* (*Tarachomantis*)]. Certains au moins des trente spécimens en collection (cadre 29) doivent pouvoir être considérés comme des syntypes, en particulier 6 ♂ et 3 ♀ étiquetés «Madagasc., Sikora», le nom de ce récolteur étant mentionné dans la description originale. Deux autres syntypes, ♂ et ♀, sont au MNHN dans la collection Pantel. L'espèce est devenue *Tarachomantis malagassa* (voir Kirby, 1904: 242), puis a été considérée comme une variété de *Mantis caldwellii* Bates, 1863, maintenant *Tarachomantis caldwellii* (voir Giglio-Tos, 1912: 27).

manillana Giglio-Tos, 1912: 96 [*Hierodula* (*Hierodula*)]. Le syntype ♂ et un syntype ♀ des Philippines (cadre 24), les deux avec les mentions manuscrites «Hierodula manillana Gigl. Tos typus» sur une étiquette imprimée «E. Giglio-Tos det.», et avec une étiquette jaune «Hierodula bipapilla Serv.» témoignant de leur identification antérieure. Le mâle a en plus une étiquette «600 38 Manilla Indes Or. M^{r} H. de Saussure» et la femelle une étiquette «♀ Indes or. M. H. de Saussure». Deux autres femelles syntypes doivent se trouver au ZMHB d'après la description originale. L'espèce a été considérée comme une sous-espèce de *H. patellifera* Audinet-Serville, 1839 (voir Beier, 1935: 83).

marmorata Saussure & Zehntner, 1894: 180 [*Bantia*]. Un syntype ♀ du Brésil «R. JANEIRO M. H. de Sauss.» (étiquette verte, imprimée), spécimen en deux morceaux, l'avant-corps collé sur une paillette (cadre 41). La description originale donnant 14-15 mm pour la longueur, cela suppose au moins un autre syntype (non localisé).

marmorata Roy, 1996: 104 [*Sibylla* (*Sibylla*)]. Deux paratypes ♂ de République Centrafricaine (La Maboké et Boukoko) (cadre 47). Le ♂ holotype, la ♀ allotype et plusieurs paratypes ♂ sont au MNHN.

maya Saussure & Zehntner, 1894: 160 [*Liturgousa cayennensis* var.]. Deux syntypes ♂ et ♀ du Mexique avec chacun cinq étiquettes dont celle de localité «Temax N. Yucatan Gaumer» (cadre 37). Deux ♂ et une ♀ syntypes de la même localité sont présents au BMNH (Marshall, 1975: 318). Cette variété est maintenant considérée comme espèce à part entière sous le nom de *Liturgusa maya* (voir Giglio-Tos, 1927: 293).

maya Saussure & Zehntner, 1894: 125 [*Mantoida*]. Deux syntypes ♀ du Mexique avec cinq étiquettes pour l'une, six pour l'autre, dont celle de localité «620 90 Yucatan Amer. Cent. Coll. Godm. u. salv.» (cadre 1). Deux autres ♀ syntypes du Yucatan sont présentes au BMNH (Marshall, 1975: 318).

meridana Giglio-Tos, 1915b: 183 [*Pseudomiopteryx*]. Holotype ♂ (cadre 41) «Venezuela Heyne V.» avec étiquette manuscrite de Giglio-Tos «typus».

meridionalis Saussure, 1871b: 297, et 1871d: 421 [*Ameles*]. Deux ♂ syntypes d'Afrique du Sud (cadre 8) «Natal M. H. de Saussure» et «Hapalomantis meridionalis Sauss.» (étiquette rose). L'espèce est en effet rangée depuis Kirby (1904: 226) dans le genre *Hapalomantis* Stål, 1871; elle a été par la suite (Giglio-Tos, 1927: 127) mise en synonymie de *Hapalomantis orba* (Stål, 1856), décrite au départ comme *Mantis*.

mexicana Saussure & Zehntner, 1894: 135 [*Acontista*]. Quatre ♀ syntypes, dont deux en provenance du Mexique (Cordova et Guerrero), une du Nicaragua (Chontales) et une de Panama (Bugaba) (cadre 6). Trois autres femelles syntypes au BMNH (Marshall, 1975: 319) en provenance du Mexique et de Panama.

mexicana Saussure, 1861a: 127 [*Mantis*]. Holotype ♂ du Mexique (cadre 36) à abdomen incomplet avec seulement une étiquette «Mexique» sans autre précision en plus de l'étiquette verte d'identification «Phasmomantis sumichrasti Sauss.». Six autres mâles du Mexique (Yucatan) dans le même cadre doivent seulement être considérés comme comparés au type par l'auteur qui a mis en synonymie cette espèce avec *Mantis* (*Cardioptera*) *sumichrasti* décrite d'après des femelles sur la page précédente (1861a: 126), espèce qu'il a par la suite prise (1869: 69) comme espèce-type de son genre *Phasmomantis* proposé dans la même publication (1869: 57).

mexicanus Saussure, 1859: 60 [*Acanthops*]. Holotype ♂ du Mexique (cadre 8) en mauvais état (yeux abîmés, pronotum troué, patte antérieure droite cassée à la base du fémur, pattes médiane et postérieure gauches réduites à des moignons) qui correspond bien à la description originale qui le qualifie de «Larva». Ses étiquettes sont «Morelia Mexique M^{r} H. de Saussure» (blanc passé) et «Yersinia mexicana Sauss.» (verte). L'espèce a en effet été transférée sous ce nom par Saussure lui-même (1869: 72) dans son genre *Yersinia* créé dans la même publication (1869: 59) tandis que le caractère adulte du spécimen type a été reconnu. Elle est devenue l'espèce-type de ce genre par désignation subséquente (Kirby, 1904: 229).

micans Saussure, 1871a: 194, et 1871c: 342 [*Gonypeta* (*Iridopteryx*)]. Un ♂ et une ♀ syntypes de l'Inde (cadre 5). L'espèce a été mise en synonymie de *Mantis pulchra* Fabricius, 1787, comme *Antissa pulchra* (voir Kirby, 1904: 222), puis comme *Euantissa pulchra* (voir Giglio-Tos, 1927: 541).

montana Saussure & Zehntner, 1894: 146 [*Stagmomantis*]. Trois ♂ syntypes du Mexique (Chilpancingo, Cordova et Tepetlapa) (cadre 35); seul celui de Cordova a les ailes étalées, mais son abdomen manque. Un ♂ et deux ♀ syntypes du Mexique, ainsi que deux ♂ syntypes du Guatemala se trouvent au BMNH (Marshall, 1975: 320).

nahua Saussure, 1869: 65 [*Stagmomantis*]. Au moins trois ♂ et trois ♀ syntypes du Mexique étiquetés «Orizaba, Sumichrast» (cadre 35) parmi les 14 spécimens en collection. Deux autres ♂ syntypes sont présents au MNHN, également en provenance du Mexique.

natalensis Saussure, 1871b: 299, et 1871d: 423 [*Ameles*]. Deux ♂ en mauvais état (abdomen incomplet ou manquant) (cadre 8), avec deux étiquettes «Natal M. H. de Saussure» et «Gonypeta natalensis Sss.» (rose) pourraient être des syntypes de cette espèce effectivement traitée un temps comme *Gonypeta* en étant mise en synonymie de *Gonypeta punctigera* Stål, 1871, maintenant *Bolbella punctigera* (voir Giglio-Tos, 1927: 124).

numida Saussure, 1872a: 6 [*Eremiaphila*]. Holotype ♀ étiqueté «Sud Biskra Algérie M. H. de Saussure» (cadre 2).

ocellata Saussure, 1871a: 130, et 1871c: 278 [*Thespis*]. Un ♂ syntype (cadre 12) avec deux étiquettes: «Inde centrale M^{r} H. de Saussure» et «Thespis ocellata Sauss. Inde centrale ♂». Espèce mise en synonymie de *Phasmomantis infuscata* Saussure, 1870, qui avait été décrite sur une femelle, maintenant *Deiphobe infuscata* (voir Giglio-Tos, 1927: 488).

ovata Saussure & Zehntner, 1894: 152 [*Metriomantis*]. La seule ♀ en collection (cadre 51) devrait logiquement être l'holotype, avec les quatre étiquettes «620 85 Cayenne M^{r} Prudhome [sic]» (blanche), «Cayenne» (verte), «M^{r} H. de Sauss.» (verte) et «Metriom: ovata» (verte), qui correspondent bien aux indications de la description originale. Cependant ses mensurations sont en désaccord flagrant avec celle-ci, en particulier avec son pronotum long de 13 mm au lieu de 8,2 indiqués, et qui n'est pas exactement «*ampliato ovata, subelliptica*»; il y a là un mystère à élucider.

paraensis Saussure & Zehntner, 1894: 135 [*Acontista*]. Holotype ♀ du Pará, Brésil (cadre 5). Espèce considérée depuis Kirby (1904: 233) comme synonyme de *Callimantis eximia* Pascoe, 1882, maintenant *Acontista eximia*, synonymie qui serait à confirmer (Roy, 2006: 331).

paraensis Saussure, 1871e: 168 [*Vates*]. Holotype ♀ du Pará, Brésil (cadre 52). Espèce devenue *Pseudovates paraensis* (voir Kirby, 1904: 304).

pardalina Saussure, 1899: 589 [*Omomantis*]. Holotype ♂ du Delagoa (maintenant Mozambique), M. Junod (cadre 10). Espèce mise en synonymie de *Mantis zebrata* Charpentier, 1843, devenue *Omomantis zebrata* (voir Kirby, 1904: 235).

parva Giglio-Tos, 1915a: 99 [*Odontomantis*]. Holotype ♀ (cadre 5), étiqueté «600 38 Cochinchina Indes Or., M[r] H. de Saussure» et «typus» sur une étiquette E. Giglio-Tos det.

pectinata Saussure, 1871e: 163 [*Vates*]. Holotype ♂ du Mexique (avec ? dans la description originale), en mauvais état (cadre 52): tête endommagée, la patte antérieure gauche manque, la droite est recollée, la patte postérieure gauche s'arrête au fémur. Etiquettes «♂ Mexique c. Guérin» (blanc passé) et «Zoolea pectinata Sauss.» (verte), combinaison qui n'a jamais été publiée, à juste titre.

pellucida Saussure, 1870: 238 [*Miomantis*]. Les deux spécimens en collection, ♂ (sans abdomen) et ♀ étiquetés «Guinée M[r] H. de Saussure» (cadre 13), ne correspondent pas vraiment à la description originale qui mentionne «Senegalia», mais tout à fait à la description ultérieure faite à l'occasion de la révision du genre (Saussure, 1898: 191). Soit il ne s'agit pas des types, qui alors seraient probablement perdus, soit la description d'origine serait erronée et approximative.

pharaonica Saussure, 1898: 193 [*Miomantis*]. Deux ♂ et une ♀ syntypes, ainsi qu'un juvénile ♀ (cadre 13), non mentionné dans la description originale, étiqueté «Egypte M[r] A. de Neville» comme l'un des mâles, l'autre mâle portant une étiquette «Senaar M[r] H. de Saussure». Quant à la femelle, elle porte trois étiquettes «Egypte», «Miomantis pharaonica Sss type!» (étiquette rose) et «conf. M. scabricollis». L'auteur considère donc la femelle seule comme type et évoque sa ressemblance avec *M. scabricollis* Gerstäcker, 1833, décrite sur une femelle dont il ne connaît que la description. A noter encore que *M. pharaonica* a été mise en synonymie de *Miomantis paykullii* Stål, 1871 (voir Ragge & Roy, 1967: 627).

phryganea Saussure, 1869: 64 [*Miopteryx*]. Deux ♂ syntypes sans localité (cadre 41) avec seulement une étiquette verte «Miopteryx phryganea Sauss.» pour l'un et «Miopteryx phryganea Sss.» pour l'autre. Les mensurations correspondent bien à la description qui mentionne «Patria?». L'espèce est devenue *Miobantia phryganea* (voir Terra, 1995: 43), et sa présence avérée au Brésil.

phthisica Saussure, 1869: 70 [*Thespis*]. Un ♂ (cadre 43) à abdomen mutilé et à tarses manquants sauf à la patte antérieure droite, avec les étiquettes «Amer.? coll[r] Jurine» (blanche), «phthisica Sauss. Amérique?» (verte) et «Leptocola gracillima Gerst.» (rose), pourrait être l'holotype de cette espèce décrite d'après un ♂ de «Brasilia» dont la longueur du corps n'est pas précisée. En fait il s'agit d'une espèce ouest-africaine reclassée d'abord (Kirby, 1904: 263) dans le genre *Solygia* Stål, 1877, et devenue depuis *Leptocola phthisica* (voir Giglio-Tos, 1927: 244). *Leptocola gracillima* Gerstaecker, 1883, est une espèce distincte.

pia Saussure & Zehntner, 1894 [*Stagmatoptera*]. Holotype ♀ (cadre 49) avec quatre étiquettes «♀ Brésil M^r H. de Saussure», «Brésil ♀ M H de Saussure», «M^r H^y de Sauss.» (verte imprimée) et «Stagmatoptera pia Sss & Z ♀» (verte manuscrite).

picteti Saussure, 1869: 72 [*Parameles*]. Trois ♂ et une ♀ syntypes d'Espagne, les mâles récoltés par Ed. Pictet, l'un à Grenade, un autre à Malaga, le troisième portant simplement la mention Espagne; la femelle provient de Malaga (cadre 8). L'espèce est devenue *Ameles picteti* (voir Kaltenbach, 1963: 559), le genre *Parameles* que Saussure avait proposé (1869: 59) pour cette espèce n'ayant pas été retenu depuis Giglio-Tos (1927: 158) qui l'a mis en synonymie avec *Ameles* Burmeister, 1838.

praecontatrix Saussure, 1898: 205 [*Theopropus*]. Deux ♂ syntypes avec les deux étiquettes «620 86 Java D^r H. Dohrn» et «Theopropus praecontatrix Sss.» (jaune) (cadre 45). L'un porte en plus une étiquette «Theopropus elegans (Westw.) det. Beier». L'espèce a en effet été mise en synonymie de *Th. elegans* (Westwood, 1832) qui avait été décrit d'après une femelle comme *Blepharis* (voir Giglio-Tos, 1927: 561).

quadripunctata Saussure, 1898: 188 [*Miomantis*]. Deux syntypes ♂ et ♀ dont les dimensions correspondent tout à fait à celles indiquées dans la description originale, tous les deux avec une étiquette rose «Miomantis quadripunctata Sss.»; la femelle a en plus une étiquette «620 73 cap b. sp. Mr Brady» et le mâle «620 74 cap b. sp. Mr Peringuey» (cadre 13). Dans le même cadre se trouvent un ♂ et trois ♀ indiqués «quadripunctata var.», annoncés p. 189 de la description originale; il s'agit apparemment d'une autre espèce, encore sans nom.

ragnari Harz, 1988: 208 [*Kinzelbachia*]. Holotype ♂ et deux paratypes apparemment également mâles, tous ces spécimens en fait des juvéniles (cadre 5 de la collection Harz). L'holotype a deux étiquettes blanches manuscrites «TR: ruins of Castabal (Hierapolis) 37°11' / 36°11' 23.07.86 86 / 77 leg. Kinzelbach» et «Krbe: Eukit cosbox xy / 0 / 7 / 6» (cette dernière sous toutes réserves étant peu lisible); les paratypes sont des mêmes localités et date. L'espèce a été mise en synonymie de *Rivetina caucasica caucasica* (Saussure, 1871) par Ehrmann (2000: 3) avec désignation de néotypes d'après des récoltes ultérieures dans des localités très voisines en croyant que la série typique était détruite, néotypes qui n'ont plus de raison d'être.

reticulata Saussure, 1871a: 196 et 1871c: 344 [*Cardioptera*]. Holotype ♂ avec une étiquette blanche «M. H. S.» et une étiquette bleue «reticulata Sauss. Natal ♂» (cadre 41). Les mensurations concordent bien avec celles indiquées dans la description originale qui mentionne «*Habite*: l'Afrique méridionale? Natal?» et deux lignes après «*Obs.* L'indication de patrie n'est pas certaine. L'insecte pourrait venir du Para?». En fait il s'agit bien d'une espèce sud-américaine devenue l'espèce-type du genre *Paraphotina* (Giglio-Tos, 1915a: 72).

robusta Roy, 1989: 15 [*Polyspilota*]. Deux paratypes ♂ et ♀ de Madagascar (cadre 18c) avec étiquette imprimée de localité «Oriental Forest Dist. Tanovana [en fait Fanovana] betw. Tamatave & Tananarive, Madagascar». Le mâle porte une autre étiquette «1.V.1937 (C. Lamberton)» et la femelle une étiquette similaire avec comme dates XII.1936-IV.1937. L'holotype ♂, l'allotype ♀ et plusieurs autres paratypes sont conservés à l'ANSP; deux ♂ et une ♀ paratypes sont au MNHN.

rubiginosa Saussure & Zehntner, 1895: 194 [*Hierodula* (*Tarachomantis*)]. Le syntype ♂ avec deux étiquettes roses «Madagasc Antanari» et «Hierodula rubiginosa ♂ S et Z», genitalia b-78 (Bruno Mériguet); un syntype ♀ avec une seule étiquette rose «Madagascar F. Sikora» (cadre 30). Un autre syntype ♀ au MNHN. L'espèce est devenue *Tarachomantis rubiginosa* (voir Kirby, 1904: 241).

saevus Saussure & Zehntner, 1894: 167 [*Mionyx*]. Deux syntypes ♂ de Panama (cadre 42), tous les deux avec une étiquette verte «Mionyx saeva, ♂ Sauss.»; l'un à abdomen étiré «*Abdomen elongatum*» dans la description originale «David, Chiriqui, Champion», l'autre à abdomen incomplet «V. de Chiriqui 25-4000 ft Champion». Deux autres syntypes ♂ au BMNH (Marshall, 1975: 324). L'espèce a été mise en synonymie de *Musonia lineativentris* Stål, 1877, devenue *Pseudomusonia lineativentris* (voir Terra, 1995: 47).

sakalava Saussure & Zehntner, 1894: 190 [*Hierodula* (*Tarachomantis*)]. Une ♀ syntype avec trois étiquettes «WEST MADAGASC.» (rose imprimée), «Voeltzkow» (blanche imprimée) et «Hierodula sakalava, ♀ Sss & Z.» (rose manuscrite) (cadre 30). Il doit y avoir au moins un ♂ syntype, sans doute au SMF. L'espèce est devenue *Tarachomantis sakalava* (voir Kirby, 1904: 241).

semialata Saussure, 1872a: 71 [*Miomantis*]. Holotype ♀ d'Afrique du Sud (cadre 13), avec deux étiquettes «Natal M. H. de Saussure» et «Miomantis semialata Sss.» (rose).

siccifolium Saussure, 1870: 240 [*Deroplatys*]. Holotype ♂ (cadre 47) avec quatre étiquettes «♂ Indes or. ? M^{r} H. de Saussure» (blanche), «rhombica ♂ De H.» (blanche), «Deroplatys siccifolium Sauss.» (jaune) et «Deroplatys truncata (Guér.) ♂ det. Beier» (blanche). L'espèce est en effet devenue synonyme de *D. truncata* (Guérin-Méneville, 1843), tandis que *D. rhombica* De Haan, 1842, est une espèce différente (voir Giglio-Tos, 1927: 344).

sobrina Saussure, 1872a: 26 [*Archimantis*]. Un syntype ♀ à abdomen incomplet, d'Australie (cadre 14) avec deux étiquettes: «♀ Nouv. Holl.» et «Archimantis sobrina Sauss.» (étiquette mauve). La description originale laisse supposer au moins un autre syntype ♀ qui serait de taille plus grande.

spinicollis Saussure & Zehntner, 1894: 193 [*Theoclytes*]. Holotype ♀ du Brésil (cadre 53) avec deux étiquettes vertes «Rio Janeiro» et «Theoclytes spinicolis [sic] Sauss.». L'espèce est devenue *Phyllovates spinicollis* (voir Kirby, 1904: 304).

spinifrons Saussure, 1859: 61 [*Empusa* (*Idolomorpha*)]. Holotype ♂ (cadre 60) avec plusieurs étiquettes parmi lesquelles «Sénégal» (rose), «Idolomorpha spinifrons ♂ Sauss.» (rose), «TYPE» (rouge). L'espèce a été mise en synonymie d'*Empusa* (*Idolomorpha*) *lateralis* Burmeister, 1838, devenue *Idolomorpha lateralis* (voir Roy, 2004a: 12).

squilla Saussure, 1869: 72 [*Choeradodis*]. Holotype ♂ étiqueté «Peradenia, Ceylan, Vge Humbert» (cadre 1). L'espèce est devenue l'espèce-type du genre *Asiadodis* (Roy, 2004b: 118).

subaptera Saussure, 1869: 71 [*Brunneria*]. Holotype ♀ d'Argentine, étiqueté «Bahia blanca Rep. Arg. G. Claraz» (cadre 38).

sumichrasti Saussure, 1861a: 126 [*Mantis* (*Cardioptera*)]. Deux syntypes ♀ avec étiquette verte «Phasmom. sumichrasti Sauss.», l'un à abdomen incomplet avec une étiquette «Cordova, Mexique, Mr H. de Saussure», l'autre long de 90 mm avec une étiquette «Mexique, Mr H. de Saussure» (cadre 36). La description originale indique «Longit., 0,090» et «Mexico calida, Cordova» et peut donc s'appliquer à l'un comme à l'autre. L'espèce est effectivement devenue *Phasmomantis sumichrasti* (voir Kirby, 1904: 254) avec comme synonyme *Mantis mexicana* Saussure, 1861a: 127, décrite à la suite d'après un mâle avec la mention «*An masculus praecedentis?*».

tasmaniensis Saussure, 1870: 227 [*Paraoxypilus*]. Deux syntypes ♂ et ♀ de Tasmanie (cadre 1), avec étiquette mauve «Parao. tasmaniensis Sauss.», le mâle avec en plus une étiquette «Tasmanie, Mr H. de Saussure», la femelle avec une étiquette «Nouv. Holl. M. H. de Saussure». Un syntype ♂ et trois syntypes ♀ sont en outre présents au MNHN.

tenuidentata Saussure, 1869: 68 [*Hierodula*]. Holotype ♀ sans indication de localité, alors que la description originale mentionne «India» (cadre 23), avec étiquette blanche «collr. Jurine» et étiquette bleue «Hierodula tenuidentata Sauss.».

tessellata Saussure & Zehntner, 1894: 188 [*Parastagmatoptera*]. Deux syntypes ♂ et ♀ de Guyane (cadre 48) avec chacun quatre étiquettes identiques «Mr H de Sauss.» (verte, imprimée), «625 85 Cayenne Mr Prudhomme» (blanc passé, manuscrite), «CAYENNE» (vert clair, imprimée), «Parastam. tessellata Saussure» (verte, manuscrite).

thalassina Saussure, 1899: 593 [*Tropidomantis*]. Un syntype ♂ de Madagascar, avec deux étiquettes «Voeltzkow Nossi Bé» (blanc passé) et «Tropidomantis thalassina Sauss.» (rose), genitalia R. Roy n° 4072 (cadre 8). L'espèce est devenue l'espèce-type du genre *Ilomantis* (Giglio-Tos, 1915a: 46), mis en synonymie de *Nilomantis* Werner, 1907 (Beier, 1935: 54). Il doit y avoir au moins un syntype ♀, sans doute au SMF.

tiflisina Giglio-Tos, 1915a: 74 [*Iris*]. Un syntype ♂ et deux syntypes ♀ de Syrie (cadre 9) avec l'étiquette «609 56, Tiflis, Syrie, Mr Brunner d. W. Mus. Ginevra» en plus de l'étiquette de Giglio-Tos portant la mention «typus» sauf pour l'une des femelles.

tolteca Saussure, 1861a: 127 [*Mantis* (*Stagmatoptera*)]. Deux ♂, trois ♀ et deux juvéniles sont présents en provenance du Mexique (cadre 34) avec entre autres une étiquette verte manuscrite «Stagmom. tolteca Sauss.» ou «Stagmomantis tolteca Sauss.», et ils doivent être considérés comme syntypes de cette espèce décrite à l'origine sans indications de nombres de spécimens, de sexes ni de dimensions, seulement avec la mention «Mexico calida». L'espèce a en effet été placée par la suite dans le genre *Stagmomantis* par Saussure lui-même (1869: 65) et elle est maintenant considérée comme synonyme de *Stagmomantis carolina* (Johansson, 1763), en particulier par Terra (1995: 70) et Ehrmann (2002: 331); cependant Otte & Spearman (2005: 212) la traitent à nouveau comme espèce séparée.

tolteca Saussure, 1859: 61 [*Theoclytes*]. Holotype ♀ avec trois étiquettes «Cordova, Mexique, de Saussure» (blanche, manuscrite), «Tolteca Sauss., Mexique» (verte, manuscrite) et «Zoolea Tolteca Sauss.» (verte, manuscrite) (cadre 52). L'espèce est devenue l'espèce-type du genre *Pseudovates* (Saussure, 1869: 60) sans jamais avoir été traitée dans une publication comme *Zoolea* Audinet-Serville, 1839, genre qui n'a effectivement aucun représentant au Mexique.

trigonalis Saussure, 1899: 596 [*Ligaria*]. Quatre ♂ syntypes d'Afrique du Sud (cadre 7 bis) avec chacun deux étiquettes «620 74 Cap b. sp. M^{r} Peringuey» et «Ligaria trigonalis Sss.» (rose). Un seul de ces spécimens porte la mention «type!» en plus sur l'étiquette rose, mais ce n'est pas celui qui correspond le mieux aux indications de la description originale. L'espèce est devenue l'espèce-type du genre *Ligariella* (Giglio-Tos, 1915b: 172).

trincomaliae Saussure, 1869: 63 [*Gonypeta*]. Deux ♂ syntypes avec chacun deux étiquettes manuscrites «Ceylan, V^{ge} Humbert» (blanche) et «Gonypeta trincomaliae Sauss.» (jaune) (cadre 7). L'espèce est devenue l'espèce-type du genre *Elmantis* (Giglio-Tos, 1915b: 161).

venusta Saussure & Zehntner, 1894: 145 [*Stagmomantis*]. Une ♀ syntype du Guatemala, «Sinanja Vera Paz Champion» (étiquette blanche) et «Stagmomantis venusta Saussure» (étiquette verte) (cadre 35). Un ♂ et deux autres ♀ syntypes au BMNH (Marshall, 1975: 326).

vidua Saussure & Zehntner, 1894: 170 [*Thesprotia*]. Holotype ♀ d'Amérique du Sud (cadre 41) étiqueté «Amer mer, M. H. de Saussure» et «Thesprotia vidua ♀ Sss & Z» (étiquette verte) avec en plus une troisième étiquette «Thesprotia infumata (Serv.) det. Beier». L'espèce a en effet été mise en synonymie de *T. infumata* (voir Giglio-Tos, 1927: 272).

vitrea Saussure & Zehntner, 1894: 138 [*Acontista*]. Deux ♂ syntypes de Panama (cadre 6) avec chacun trois étiquettes «620-90 Chiriqui Amer. cent. coll. Goldn. & Salv.», «V. de Chiriqui 2-3000 ft Champion» et «Sauss.» (étiquette verte) (cadre 6). Un autre ♂ syntype au BMNH (Marshall, 1975: 327).

westwoodi Saussure & Zehntner, 1894: 134 [*Acontista*]. Un ♂ et une ♀ syntypes de Colombie (cadre 6). Un ♂ et une ♀ syntypes du Brésil sont en outre présents au BMNH (Marshall, 1975: 327). L'espèce est devenue *Raptrix westwoodi* (voir Lombardo & Marletta, 2004: 23).

INDEX DES NOMS DU NIVEAU GENRE MENTIONNÉS DANS LA LISTE DU MATÉRIEL TYPE

Pseudomusonia: *saevus.*
Pseudovates: *paraensis, tolteca.*
Pseudoyersinia: *brevipennis, lagrecai.*
Raptrix: *westwoodi.*
Rivetina: *caucasica, kinzelbachi, ragnari.*
Sibylla: *marmorata.*
Solygia: *grandis, phthisica.*
Sphendale: *brunneri.*
Stagmatoptera: *biocellata, femoralis, grandidieri, pia, tolteca.*
Stagmomantis: *coerulans, fraterna, montana, nahua, tolteca, venusta.*
Statilia: *haanii.*
Tarachomantis: *betanimena, betsilea, confusa, macula, malagassa, rubiginosa, sakalava.*
Theoclytes: *iheringi, spinicollis, tolteca.*
Theopropus: *praecontatrix.*
Thespis: *cubensis, grandis, ocellata, phthisica.*
Thesprotia: *macilenta, vidua.*
Thrinaconyx: *fumosus.*
Tisma: *grandidieri.*
Tropidomantis: *australis, thalassina.*
Vates: *paraensis, pectinata.*
Yersinia: *aztecus, mexicanus.*
Zoolea: *pectinata, tolteca.*

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Four new West Palaearctic species of *Rhamphomyia* (s. str.) Meigen (Diptera: Empididae)

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Four new West Palaearctic species of *Rhamphomyia* (s. str.) Meigen (Diptera: Empididae). - *Rhamphomyia* (s. str.) *bohousi* sp. n. (Turkey), *R.* (s. str.) *haenuii* sp. n. (France), *R.* (s. str.) *iranica* sp. n. (Iran), and *R.* (s. str.) *sulcanda* sp. n. (France, Spain, Switzerland), are described and illustrated.

Keywords: *Rhamphomyia* (s. str.) - new species - West Palaearctis - taxonomy.

INTRODUCTION

The species of the subgenus *Rhamphomyia* (s. str.) Meigen, 1822 are usually medium-sized to large flies, possessing setose propleura, acute axillary angle and complete anal vein (A_1). A more detailed description is given by Barták (1982) and Barták & Sinclair (2003). A list of the Palaearctic species of the subgenus has been provided by Chvála & Wagner (1989) which should be supplemented with species described more recently (Barták & Syrovátka, 1983; Barták, 1998; Barták *et al.*, 2007; Barták, 2007).

MATERIAL AND METHODS

The material studied is deposited in the following collections:

CULSP	Czech University of Life Sciences, Prague – former Czech University of Agriculture
DEI	Deutsches Entomologisches Institut, Müncheberg
MHK	Museum of eastern Bohemia, Hradec Králové
MHNG	Muséum d'histoire naturelle, Geneva
MHNN	Muséum d'Histoire Naturelle, Neuchâtel
NMP	National Museum, Prague
UMO	University Museum, Oxford

The genitalia were macerated in 10% KOH (24 hours, room temperature) and they were stored together with specimens in plastic microvials with glycerine. The morphological terms used here follow those of Merz & Haenni (2000) and Sinclair (2000). Abbreviations: T1l,T2l,T3l = length of fore, mid, hind tibia; B1l,B2l,B3l = length of fore, mid, hind basal tarsomere; B1w,B2w,B3w = width of fore, mid, hind basal tarsomere; M2/D = length of vein M2: greatest length of discal medial cell (= discal cell); M3/Db = length of apical: preapical sections of vein CuA_1; lw: ww = greatest length of wing: greatest width of wing. Ratio of antennal segments = length of

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first: 2nd: 3rd: style (in 0.01 mm scale). Characters marked with ? are unclear (e.g. width of face or frons may be difficult to measure when shrunken, or length of setae when broken, etc.).

SYSTEMATIC PART

Rhamphomyia* (s. str.) *bohousi sp. n. Figs 1, 2

HOLOTYPE MALE: Turcia bor. occ., Abant Lake Natural Park, Abant Golu Lake, 40°34´N, 31°14´E, 1200 m, mixed forest, B. Mocek, 13.v.1996 (MHK).

PARATYPES: Same data as the holotype, 3 ♂, 7 ♀ (CULSP, MHK).

DISTRIBUTION: Turkey.

DATES OF OCCURRENCE: May.

MALE: Eyes holoptic, facets in ventral half of eye much smaller than in dorsal half. Frons black, grey microtrichose, bare. Ocellar setae fine, black, less than 1/3 as long as frons, ocellar triangle with several additional shorter setae. Face black, grey microtrichose (polished on small area in central part ventrally), at least 0.35? mm broad ventrally and 0.40 mm long, bare. Occiput black, grey microtrichose, rather densely and fine black setose, bare just behind eyes in ventral half. Antennae black, ratio of antennal segments = 25: 15: 65: 14, the longest setae on basal two segments about 0.35 mm long. Labrum brown, polished, 1.5-1.8 times as long as head is high. Palpus brown, short, rather sparsely covered with setae along whole length (the longest ones 0.35 mm long). Genae medium broad and mostly polished, clypeus polished on outer parts and microtrichose along central part. Thorax black, rather light grey microtrichose, mesoscutum with somewhat darker and more brownish stripes on the lines of the acrostichal and dorsocentral setae. All thoracic setae black. Chaetotaxy: the whole of prosternum and proepisternum covered with numerous setae; about 10 setae on proepisternal depression; more than 50 irregularly 3-5 serial, fine and short acrostichals (about 0.20 mm long); multiserial dorsocentrals somewhat longer than acrostichals, ending in 4-5 prescutellars, the whole presutural area of mesoscutum densely covered with similar setae, both intrahumeral and posthumeral not prominent; postpronotal seta only scarcely differentiated from surrounding setae; 3 notopleurals (anterior part of notopleural depression densely setose); 2-3 supraalars; 4-5 setae on prealar area; 1 long and several small postalars; 6-8 scutellars; laterotergite (metapleura) with black setae. Coxae concolorous with pleura, microtrichose, black setose. Legs brownish-black, black setose. One long seta present in comb at tip of hind tibia. Fore femur with irregular anteroventral row of rather fine setae subequally long as femur is deep, posteroventrals equally fine but much shorter, in middle less than 1/3 as long as femur is deep. Fore tibia without anterodorsals, posterodorsally with almost homogeneous setation slightly longer than tibia is deep, ventral setae very short. Mid femur with rows of anteroventral and posteroventral setae about as long as femur is deep, dorsal setation short. Mid tibia with 4-5 strong anterodorsal setae nearly three times as long as tibia is deep, and with 3-4 much shorter posterodorsals; two irregular ventral rows of setae slightly shorter than tibia is deep, sometimes 1-2 more prominent setae present. Hind femur with anteroventral row of mostly very short setae, less than half as long as femur is deep and with similar but less numerous posteroventrals, several longer but fine

anteroventrals and posteroventrals present only in basal part of femur. Hind tibia slightly swollen distally, with 6-8 pairs of setae dorsally, the longest setae slightly longer than tibia is deep, ventral setae very short. Basal tarsomere of fore leg slender, dorsal setae slightly longer than this tarsomere is deep, short ventral spine-like setae present, T1l: B1l = 2.1-2.3, B1l: B1w = 8.8-9.4, basal tarsomere of mid legs slender and short setose, with short ventral spine-like setae, T2l: B2l = 2.0-2.3, B2l: B2w = 6.8-7.8. Basal tarsomere of hind leg slightly narrower than tip of tibia (but slightly broader than remainder tarsomeres), with several setae dorsally twice as long as this tarsomere is deep, T3l: B3l = 1.9-2.0, B3l: B3w = 6.5-6.6. Wing light brownish, stigma brown, veins brown, anal vein (A_1) complete. Costal seta absent, axillary angle sharply acute. M2/D = 1.5-1.8, M3/Db = 2.7-3.0, lw: ww = 2.8-3.0. Halter yellow; calypter brownish-yellow with dark fringes. Abdomen brownish-black, tergite 6 and sternite 8 partly polished, tergite 7 polished, other parts grey microtrichose. All abdominal setae dark. Hind marginal setae on sides of tergites 2-5 slightly longer than corresponding segments, on tergite 6-7 short, discal setae shorter than marginals; dorsum of tergites with short setae; sternite 1 setose on sides. Terminalia as in Figs 1-2: cercus twice higher than long; epandrium simple, long setose around tip; hypandrium short; phallus thin and evenly bowed. Length of body 5.9-6.5 mm, wing 6.0-6.5 mm.

Female: Similar to male but with the following exceptions. Eyes broadly dichoptic, all facets subequal in size. Frons 0.35-0.40 mm long and 0.30 mm broad, bearing several rather long (nearly 0.20 mm) marginal setae arranged irregularly (not in a single row) and extending to level of ocellar triangle. Ocellar setae strong and 2/3 as long as frons. Face 0.30-0.35 mm broad in middle and nearly 0.40 mm long. Ratio of antennal segments = 25: 11: 45: 10. Labrum 2.0 times as long as head is high. Palpus with shorter setae than in male (maximum 0.20 mm). Occiput similarly coloured as in male but differently setose: dorsal half with sparse moderately strong setae, mid part bare, ventral part with fine setae. Thorax similarly coloured and setose as in male, but setae slightly shorter (both acrostichals and dorsocentrals about 0.15-0.20 mm long), only 1-2 prescutellar dorsocentrals and 4-6 scutellars. Both fore femur and tibia very short setose. Mid femur with very short anteroventral setae (only 0.05 mm long), dorsally along whole length and posteroventrally in distal half with pennate setation shorter than femur is deep. Mid tibia with posterodorsal pennation slightly shorter than femur is deep, otherwise very short setose. Hind femur with short dorsal and posteroventral pennation, and with short anteroventral spine-like setae. Hind tibia slightly broadened and flattened (about as broad as hind femur), with pennation slightly shorter than tibia is deep in exactly dorsal position in addition to 4-5 pairs of anterodorsal and posterodorsal setae slightly shorter than tibia is deep, ventral setae very short. Basal tarsomere of fore leg slender and short setose, with short ventral spine-like setae. T1l: B1l = 2.1-2.3, B1l: B1w = 8.3, basal tarsomere of mid leg slender and short setose, dorsal setae distinctly flattened, T2l: B2l = 2.0-2.1, B2l: B2w = 5.6-6.5, basal tarsomere of hind leg slender, with several dorsal setae slightly longer than this tarsomere is deep and with short spine-like setae ventrally, T3l: B3l = 2.4, B3l: B3w = 5.0-5.7. Wing as in male or slightly darker brownish. M2/D = 1.5, M3/Db = 2.5-2.6, lw: ww = 2.6-2.9. Abdomen black, grey microtrichose. Hind marginal setae on segments 2-3(4?) about half as long as corresponding segments, on remainder

segments very short. Dorsum of abdomen very short setose. Length of body 6.5-7.7 mm, wing 5.9-6.5 mm.

DIFFERENTIAL DIAGNOSIS: *Rhamphomyia* (s. str.) *bohousi* sp. n. belongs to the *R.* (s. str.) *tibialis* Meigen, 1822 complex of species (species completely black setose, with multiserial acrostichals, costal seta absent and male cercus not cranially elongated and without submedian processi, see also Barták, 2001: 314). The pilosity of the prosternum of *R. bohousi* is similar as in species of the *R. sulcata* (Meigen, 1804) complex (see discussion under *R. sulcanda*), however, male hypopygium is different. The new species differs from all allied species (beside terminalia) by relatively long labrum. The most allied species are undoubtedly *R. haennii* sp. n. and *R. tibialis*. The most striking differences between these three species (beside length of labrum) are as follows: *R. haennii* has at least extreme posterior tip of prosternum bare, the male has nearly all abdominal tergites polished, several long and strong posteroventral setae on hind femur and slightly different terminalia. The legs of the female are without pennate setation. The male of *R. tibialis* has tergite 5 of abdomen almost bare and the female of this species has mid legs and hind femur ventrally without pennation and abdominal tergite 3 with very short hind marginal setae.

DERIVATIO NOMINIS: The species is named after the familiar form of the first name of Dr. Bohuslav Mocek (Muzeum Hradec Králové), the collector of the type series.

Rhamphomyia* (s. str.) *haennii sp. n. Figs 3-5

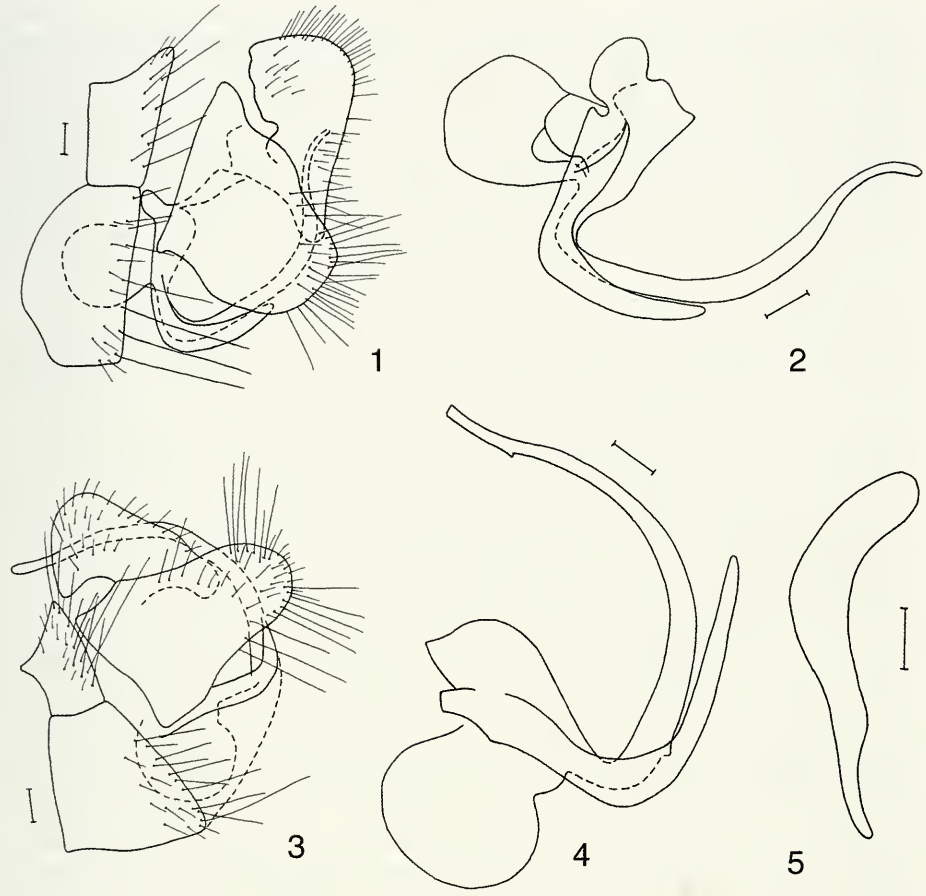
HOLOTYPE MALE: France, Col de Tourniol, pasture, 44°55'06"N, 5°11'04"E, 1050 m, 26.v.2006, leg. M. Barták (CULSP).

PARATYPES: Same data as in the holotype, 3♂, 3♀ (CULSP). – France, Gard, Dourbies 2 km S, (La Ressançon), 44°2'54"N, 3°26'34"E, 850-900m, 20-25.v.1985, 1♂, 1♀ (in copula), J-P. Haenni leg. (MHNN). – France, Col du Cabaretous, 43°32'02"N, 2°45'24"E, edge of wood, 940 m, 26.v.2006, 2♀, Barták leg. (CULSP).

DISTRIBUTION: France.

DATES OF OCCURRENCE: May.

MALE: Eyes holoptic, facets in ventral half of eye smaller than in dorsal half. Frons black, grey microtrichose, bare. Ocellar setae moderately strong, black, nearly half as long as frons, ocellar triangle with 2-4 pairs of additional slightly shorter setae. Face black, grey microtrichose along sides and subshining in central and ventral parts, about 0,35-0.40 mm broad ventrally and equally long, bare. Occiput black, grey microtrichose, rather densely and long black setose. Both basal segments of antennae brown, remainder parts black, ratio of antennal segments = 20: 10-12: 60: 12, the longest setae on basal two segments about 0.30 mm long. Labrum brown, polished, as long as or slightly shorter than head is high. Palpus brown, slightly exceeding beyond clypeus, rather densely covered with setae along whole length (the longest about 0.35 mm long). Genae narrow and polished, clypeus polished. Thorax black, grey microtrichose, mesoscutum rather dark brownish-grey, with three somewhat darker but scarcely visible stripes on the lines of the acrostichal and dorsocentral setae. All thoracic setae black. Chaetotaxy: about 50 setae on proepisternum extending to cranial



FIGS 1-5

Rhamphomyia (s. str.) *bohousi* sp. n., male paratype (1-2) and *Rhamphomyia* (s. str.) *haennii* sp. n., male paratype, Col de Tourniol (3-5). (1) Terminalia (macerated), lateral view. Scale 0.1 mm. (2) Phallus, lateral view. Scale 0.1 mm. (3) Terminalia (macerated), lateral view. Scale 0.1 mm. (4) Terminalia (macerated), lateral view. Scale 0.1 mm. (5) Left cercus, posterior view. Scale 0.5 mm.

(basal) half of prosternum, caudal (apical) half to third of prosternum bare; about 10 setae on proepisternal depression; numerous irregularly 5 serial, fine and short acrostichals (nearly 0.25 mm long in middle), separated by very narrow bare space from similar and multiserial dorsocentrals (ending in 1 strong and several fine prescutellars), entire presutural area of mesoscutum lateral of dorsocentrals densely covered with similar setae, both intrahumeral and posthumeral not prominent; postpronotal seta scarcely differentiated from surrounding postpronotal setae; 4 notopleurals (notopleural depression densely setose on anterior part); a row of 4-6 supraalars in rather caudal position, and several rather long setae on prealar area; 1 long and several small postalars; 6-8 long and strong and 0-4 additional shorter scutellars; laterotergite

(metapleura) with black setae. Coxae concolorous with pleura, microtrichose, black setose. Legs brown, all femora (fore ones only slightly) and tibiae polished to subpolished. Legs black setose. One long seta present in comb at tip of hind tibia. Fore femur with anteroventral and posteroventral setae nearly half as long as femur is deep in distal half (shorter in basal half of femur). Fore tibia with several anterodorsal setae and denser posterodorsal setation nearly 1.5 times as long as tibia is deep, ventral setae very short. Mid femur with rows of anteroventral and posteroventral spine-like setae (10-25 setae in each row, anteroventrals more numerous) at most half as long as femur is deep, otherwise very short and sparsely setose. Mid tibia with very short anteroventral and posteroventral setae (less than half as long as tibia is deep), and with 5 anterodorsal and 4 posterodorsal setae nearly 3 times as long as tibia is deep (preapical anterodorsal long and posterodorsal short), otherwise very short and sparsely setose. Hind femur with anteroventral row of setae nearly 2/3 as long as femur is deep and with similar but less numerous and slightly longer posteroventrals, other setae short (anterodorsals not prominent). Hind tibia slightly swollen distally, with 6-8 pairs of anterodorsal and posterodorsal setae, the longest slightly longer than tibia is deep, ventral setae short. Basal tarsomeres of fore and mid legs slender and short setose, T1l: B1l = 2.1-2.3, B1l: B1w = 6.1-8.3, T2l: B2l = 2.6-2.7, B2l: B2w = 4.9-6.3. Basal tarsomere of hind leg slightly narrower than tip of tibia, with 3-4 dorsal setae slightly longer than this tarsomere is deep, ventrally with short spine-like setae, T3l: B3l = 2.0-2.1, B3l: B3w = 4.6-5.3. Wing brown, stigma darker, veins brown, anal vein (A_1) complete. Costal seta absent, axillary angle sharply acute. M2/D = 1.4-1.6, M3/Db = 2.0-2.7, lw: ww = 2.6-3.0. Halter yellow, calypter brownish-yellow with dark fringes. Abdomen brownish-black, all tergites (except tergite 1 and basal part of tergite 2) polished, sternites light grey microtrichose, greater part of cercus and whole of epandrium polished. All abdominal setae dark. Hind marginal setae on sides of tergites 2-4 slightly longer and those on tergite 5 slightly shorter than corresponding segments, those on tergites 6-7 short, discal setae subequal; dorsum of tergites with very short setae; sternite 1 bare or with several setae submedially. Terminalia as in Figs 3-5: cercus simple, with very small projection in ventral third; epandrium at apex with long setae both dorsally and ventrally (short setose at extreme tip); hypandrium long; phallus simply bowed, slender, with very small subapical tooth dorsally. Length of body 5.8-6.9 mm, wing 5.9-7.0 mm.

Female: Similar to male but with the following exceptions. Eyes broadly dichoptic, all facets subequal in size. Frons 0.30-0.40 mm long and 0.25-0.30 mm broad, with about 10 setae on each side. Ocellar setae about half as long as frons. Face subequally sized as frons. Labrum 1.3-1.4 times as long as head is high. Occiput similarly setose as in male, but setae shorter, no bare median area (contrary to females of several other species of *Rhamphomyia* s. str.). Also thorax similarly setose as in male, but setae slightly shorter (both acrostichals and dorsocentrals about 0.12 mm long). Fore femur, fore tibia and mid tibia very short setose, without prominent setae (the longest setae less than half as long as particular parts of legs are deep). Mid femur with very short but distinct anteroventral and posteroventral spine-like setae. Hind femur with 7-8 short anteroventrals (most of them in distal half), posteroventrals absent, dorsal setae about half as long as femur is deep (and indistinctly flattened). Hind tibia

slender, with several very short but distinct dorsal setae, otherwise very short setose. Basal tarsomeres of all legs slender and short setose, T1l: B1l = 2.0-2.1, B1l: B1w = 6.6-7.3, T2l: B2l = 2.0-2.1, B2l: B2w = 6.0-6.4, T3l: B3l = 2.1-2.3, B3l: B3w = 5.8-6.7. M2/D = 1.4-1.5, M3/Db = 2.5-3.0, lw: ww = 2.6-2.8. Abdomen black, at least segments 3-6 very light (almost silvery) grey microtrichose, otherwise grey microtrichose, terminal segments brown microtrichose. Lateral setae on segment 2 about 0.30 mm long, those on segment 3 about 0.15 mm long and those on remainder segments very short (0.05 mm), dorsum of abdomen almost bare. Length of body 6.0-8.0 mm, wing 5.4-8.1 mm.

DIFFERENTIAL DIAGNOSIS: *Rhamphomyia* (s. str.) *haennii* sp. n. belongs to the *R. tibialis* (s. str.) complex of species (see discussion under *R. bohousi* sp. n.). The new species is very similar to *R. tibialis*, however, male of *R. tibialis* has tergite 5 of abdomen almost bare and female of this species has broadened hind tibia with short dorsal pennate setation. Many characters of the female of *R. haennii* are common with (circumboreal) *R nigrita* (Zetterstedt, 1838) (e.g. multiserial acrostichals, complete anal vein, dark wing, short setose legs, setose proepisternal depression, yellow halter, lacking costal seta), however, the latter species differs in having microtrichose legs, abdomen not silvery, ventral part of hind femur covered with very short (not spine-like) setae only and it belongs to the *R.* (s. str.) *plumipes* (Meigen, 1804) complex of species.

DERIVATIO NOMINIS: the species is named in honour of our colleague and the collector of part of the type series, Jean-Paul Haenni (Neuchâtel).

Rhamphomyia* (s. str.) *iranica sp. n. Figs 6, 7

HOLOTYPE MALE: Iran, loc. No 66, Damavand, 35°56'N, 52°08'E, 4200 m, 22.vii.1970, leg. J. Moucha (NMP).

DISTRIBUTION: Iran.

DATES OF OCCURRENCE: July.

MALE: Eyes holoptic, facets in ventral half of eye much smaller than in dorsal half. Frons black, light grey microtrichose, bare. Ocellar setae black and fine, half as long as frons, accompanied with 2-3 pairs of slightly shorter setae. Face black, light grey microtrichose dorsally and polished in ventralmost portion, about 0.30? mm broad ventrally and subequally long, bare. Occiput black, light grey microtrichose, fine black setose, postocular row incomplete. Both basal segments of antennae dark reddish-brown, remainder parts black, ratio of antennal segments = 15: 12: 45: 12, the longest setae on basal two segments about 0.25 mm long. Labrum brownish-black, polished, slightly shorter than head is high. Palpus brown and rather short, covered with moderately long, dense setae along the whole length (the longest about 0.35 mm long). Genae narrow and polished, clypeus mostly polished. Thorax black, light grey microtrichose, with scarcely visible brownish stripes on the lines of the acrostichal and dorsocentral setae. All thoracic setae black. Chaetotaxy: almost 30 setae on proepisternum; about 10 setae on proepisternal depression; prosternum bare; more than 30? (posterior ones damaged by a pin) irregularly triserial, fairly fine acrostichals nearly 0.30 mm long; numerous multiserial dorsocentrals (also, numerous setae laterad of dorsocentrals covering entire presutural area) ending in 3 stronger prescutellars;

intrahumeral scarcely distinguishable from numerous setae; a single posthumeral distinctly stronger (but not much longer) than nearby setae; 1-2 scarcely prominent postpronotal setae; 3 strong notopleurals and about 10 long setae on anterior part of notopleura; 2-3 strong supraalars and about 15 setae on prealar area; 1 long and 2 small postalars; 4 subequally long and strong scutellars; laterotergite (metapleura) with black setae. Coxae concolorous with pleura, black setose. Legs brown, microtrichose (mid femur polished anteriorly and hind femur polished except ventrally), black setose. One long seta present in comb at tip of hind tibia. Fore femur with rows of fine anteroventral and posteroventral setae about as long as femur is deep, dorsal setae short. Fore tibia with several posterodorsal setae about 1.5 times as long as tibia is deep, remaining posterodorsal setae slightly shorter, anterodorsal surface bare, ventral setation very short. Mid femur with regular anteroventral and irregular posteroventral rows of short and fine setae about half as long as femur is deep, dorsal setae short. Mid tibia with 3-4 anterodorsal and 3-4 posterodorsal setae nearly twice as long as tibia is deep, anteroventral setae short, 2-3 setae in posteroventral position about as long as tibia is deep. Hind femur with several irregularly arranged anteroventral setae in basal third of femur about half as long as femur is deep (in distal part of femur fine and short), several slightly longer posteroventral setae in basal half of femur (distal posteroventral part of femur bare), dorsal setae short, ventral "pilosity" developed throughout length of hind femur. Hind tibia slightly swollen and flattened, with 5-8 pairs of anterodorsal and posterodorsal setae about as long as tibia is deep, ventral setae short. Basal tarsomeres of both fore and mid legs slender and short setose, mid basitarsus with short ventral spine-like setae, T1l: B1l = 2.5, B1l: B1w = 6.8-6.9, T2l: B2l = 2.6-2.7, B2l: B2w = 5.0. Basal tarsomere of hind leg slightly swollen, with several dorsal setae somewhat longer than this tarsomere is deep, T3l: B3l = 2.6, B3l: B3w = 3.8-3.9. Wing hyaline, stigma light brownish, veins brown, anal vein (A_1) complete. Costal seta absent, axillary angle sharply acute. M2/D = 1.5-1.6, M3/Db = 3.1, lw: ww = 2.8. Halter yellow, calypter brownish-yellow with dark fringes. Abdomen black, light grey microtrichose, genital lamellae subpolished. All abdominal setae dark. Hind marginal setae on sides of tergites at least as long as corresponding segments, discal setae slightly shorter than marginals; dorsum of tergites with short setae; sternite 1 bare. Terminalia (Figs 6-7) simple: cercus about twice as long as broad; epandrium broadly ovate and short setose; phallus with a small subapical tooth dorsally. Length of body 4.5 mm, wing 5.2 mm.

FEMALE: Unknown.

DIFFERENTIAL DIAGNOSIS: *Rhamphomyia* (s. str.) *iranica* sp. n. belongs to the *R.* (s. str.) *tibialis* complex of species. However, superficially it resembles species of *R. ignobilis* Zetterstedt, 1859 complex (differing from *R. tibialis* complex only in biserial acrostichals), especially *R. hungarica* (Wéber, 1969) and *R. nigromaculata* von Roser, 1840. However, *R. hungarica* has peculiarly elongated hind "knee" and *R. nigromaculata* has abdomen dark brown viewed from above with contrastingly silvery sides, hind femur strongly setose anteroventrally throughout its length, acrostichals regularly biserial, epandrium narrowly triangular in shape and it is a smaller species (wing about 4 mm). Female remains unknown.

DERIVATIO NOMINIS: The species is named after the country of the type locality.

Rhamphomyia* (s. str.) *sulcanda sp. n. Figs 8-11

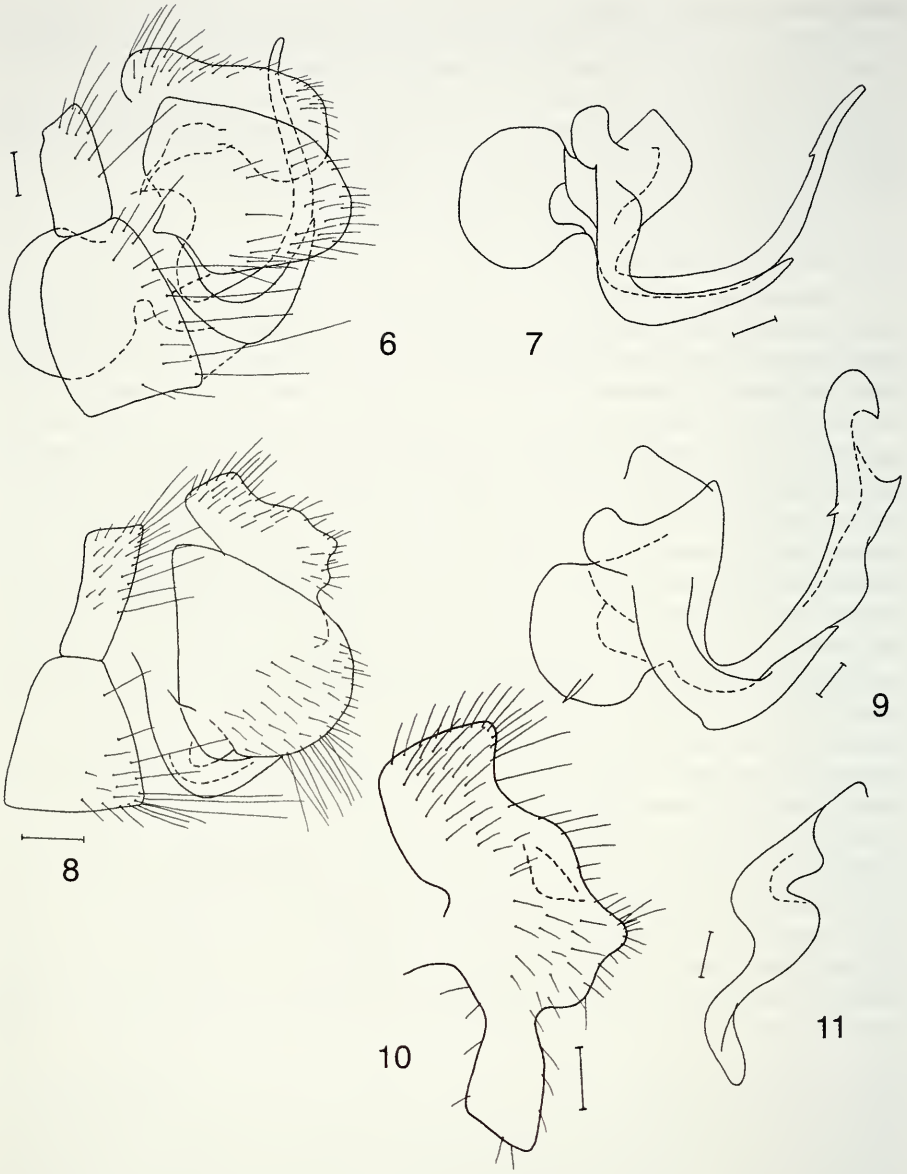
HOLOTYPE MALE: Spain, St. Sylvain, 28.iii.1911, "*sulcanda* Coll.", "*R. sulcanda* det. Collin '21", "Ex.Coll. Hervé-Basin", "Coll Oldenberg" (DEI).

PARATYPES: France: Trélazé, 30.iii.1911, 1 ♂ (UMO). – Switzerland: GE, Bernex, 5.iv.2003, B. Merz and Eggenberger leg, 1 ♂. – GE, 500 m, Bernex-Signal, 23.iii.2002, leg B. Merz, 4 ♂. – GE, 360m, Russin, Teppes de Biolay, 10.iv.1999, B. Merz leg, 1 ♂. – GE, 450m, Sézenove-Maisonettes, 2.iv.1999, B. Merz leg, 1 ♂ (CULSP, MHNG).

DISTRIBUTION: France, Spain, Switzerland.

DATES OF OCCURRENCE: March - April.

MALE: Eyes holoptic, facets in ventral third of eye smaller than in dorsal part. Frons brownish-black, light grey microtrichose, bare. Ocellar setae fine, hair-like, one third as long as frons, black, ocellar triangle with 4-6 additional setae. Face brownish-black, light grey microtrichose, 0.40-0.50 mm broad ventrally and subequally long, bare. Occiput brownish-black, grey microtrichose, black setose, bare in middle part just behind eyes, setae fairly fine, long and dense. Both basal segments of antennae brown, remainder parts black, ratio of antennal segments = 22: 13: 62: 11, setae on basal two segments slightly longer than their antennomeres. Labrum brown, polished, about as long as head is high. Palpus brown, not exceeding beyond clypeus, with several setae along whole length. Genae narrow and microtrichose, clypeus polished. Thorax brownish-black, light grey microtrichose, mesoscutum with brown stripes on the lines of the acrostichal and dorsocentral setae. All thoracic setae black. Chaetotaxy: proepisternum with about 20 and proepisternal depression with 10 setae, prosternum setose; about 40 irregularly 2-3 serial, very fine acrostichals twice as long as distance between rows of acrostichals and dorsocentrals; numerous multiserial, similarly long and fine dorsocentrals ending in 1 strong and several finer prescutellars, entire presutural area of mesoscutum laterally of dorsocentrals densely covered with setae; both intrahumeral and posthumeral not prominent; postpronotal seta scarcely differentiated; 3 notopleurals (numerous long setae on anterior part of notopleura); 1 supraalar and 10-15 rather long setae covering prealar area; 1 long and 1 small postalar; 10-12 scutellars; laterotergite (metapleura) with black setae. Coxae brownish-black, microtrichose, black setose. Legs brownish-black, black setose, all femora and tibiae polished to subpolished. One long seta present in comb at tip of hind tibia. Fore femur with fine setae nearly as long as femur is deep (posteroventrals about half as long except subapicals which are longer). Fore tibia with several anterodorsal setae and denser posterodorsal setation nearly twice as long as tibia is deep, ventral setae very short. Mid femur with two rows of spine-like setae ventrally (10-20 setae in each row, anteroventral row usually more numerous) about half as long as femur is deep (setae in posteroventral row sometimes slightly longer), otherwise very short and sparsely setose. Mid tibia with anteroventral row of setae nearly as long as tibia is deep (sometimes this row consists of short setae only), posteroventral row forming by fewer but longer setae, 4-6 pairs of anterodorsal and posterodorsal setae nearly 3 times as long as tibia is deep, otherwise very short and sparsely setose. Hind femur with anteroventral row of setae half as long as femur is deep, posteroventral row complete, setae longer than corresponding anteroventrals except in distal fourth (where anteroventrals are slightly longer than posteroventrals). Hind tibia swollen distally, with 8-10 pairs of



FIGS 6-11

Rhamphomyia (s. str.) *iranica* sp. n., male holotype (6-7) and *Rhamphomyia* (s. str.) *sulcanda* sp. n., male paratype, Bernex (8-11). (6) Terminalia (macerated), lateral view. Scale 0.1 mm. (7) Phallus, lateral view. Scale 0.1 mm. (8) Terminalia (macerated), lateral view. Scale 0.1 mm. (9) Phallus, lateral view. Scale 0.1 mm. (10) Cercus, lateral view. Scale 0.1 mm. (11) Left cercus, caudal view. Scale 0.1 mm.

anterodorsal and posterodorsal setae, the longest setae slightly longer than tibia is deep, ventral setae short. Basal tarsomere of fore leg slender and short setose, only 1-2 dorsal setae (beside preapicals) slightly longer than this tarsomere is deep, ventral spine-like setae not prominent, T1l: B1l = 2.3-2.7, B1l: B1w = 4.5-5.5. Basal tarsomere of mid leg short setose, T2l: B2l = 3.0-3.4, B2l: B2w = 3.9-5.0. Basal tarsomere of hind leg swollen (as tip of tibia), dorsal setae slightly longer than this tarsomere is deep, T3l: B3l = 1.9-2.3, B3l: B3w = 3.7-4.8. Wing yellowish, stigma brown, veins brown, anal vein (A_1) complete. Costal seta absent, axillary angle sharply acute. M2/D = 1.3-1.4, M3/Db = 2.1-2.4, lw: ww = 2.8-3.2. Halter yellow, calypter yellow with fine dark fringes. Abdomen brownish-black, light grey microtrichose, last tergites sometimes slightly subpolished in dorsal view, dorsal part of epandrium polished. All abdominal setae dark. Hind marginal setae on sides of tergites 2-5 nearly as long as corresponding segments (discal setae subequal), those on tergites 6-7 half as long as corresponding segments (discal setae shorter); dorsum of tergites with very short setae. Terminalia as in Figs 8-11: cercus with two projections in caudal view, dorsal one smaller than ventral one; phallus broadened apically (as in *R. sulcata*). Length of body 5.0-7.0 mm, wing 5.8-6.7 mm.

Female: Unknown. There are several females labelled "*sulcanda*" in UMO. However, they represent at least two different species and none is provided with a locality label corresponding to one of the males of the new species.

Differential diagnosis: *Rhamphomyia* (s. str.) *sulcanda* sp. n. belongs to the *R.* (s. str.) *sulcata* complex of species (species with prosternum entirely setose, acrostichals mostly multiserial, both costal and posthumeral seta absent and male cercus with one to several rounded projections dorsally but not protruding above abdomen, see also Barták, 2001: 323). The male differs from all species of this complex in having microtrichose sides of abdominal segments 3-4 and the dorsal process of cercus smaller than the ventral one (in contrast, in all other species of the complex except *R. teberdana* Barták in Barták & Syrovátka, 1983 the ventral process is smaller than the dorsal one). Moreover, the combination of complete row of posteroventral setae on the hind femur and a very light wing is very rare in this complex of species (similar conditions occur in *R. filipjefi* Frey, 1950, another species of *R. sulcata* complex).

Derivatio nominis: J. E. Collin's manuscript name was used.

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New species of *Holoparasitus* Oudemans, 1936 (Acari, Parasitidae) from Spain, North Africa, the Canary and Madeira Islands

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New species of *Holoparasitus* Oudemans, 1936 (Acari, Parasitidae) from Spain, North Africa, the Canary and Madeira Islands.- Fourteen new species of *Holoparasitus* Oudemans are descriebed: *H. mahnerti*, *H. vaucheri*, *H. franzi*, *H. variabilis*, *H. canariensis*, *H. anaga*, *H. lapalma*, *H. giganteus*, *H. lunae*, *H. malleus*, *H. rifensis*, *H. algiersensis*, *H. eivissa*, and *H. singularis*. All these are included in the *Holoparasitus mallorcae* species-group sensu Juvara-Bals & Witalinski (2000) and were collected from south Spain, Morocco, Algeria, the Balearic, the Canary and Madeira Islands. A key to the species of this group is presented. Comments on the relationship between these species and some observations on their geographical distribution are given.

Keywords: Acari - Gamasida - Parasitidae - taxonomy - key.

INTRODUCTION

The predatory soil mite *Holoparasitus* Oudemans, 1936 has been the subject of many studies in the last decade. New taxa have been described, the species from the collection of Berlese have been revised, and neotypes have been designated (Juvara-Bals & Witalinski, 2000; Witalinski, 1994a, 1994b; Witalinski & Skorupski, 2002, 2003).

I analysed numerous soil samples and specimens from the Gamasida collection in the Museum of Natural History of Geneva (MNHG) and discovered 14 new species belonging to the *H. mallorcae* species-group sensu Juvara-Bals & Witalinski, 2000. This species group has a surprisingly high diversity. *Holoparasitus mallorcae* Juvara-Bals, 1975 was found of new localities (Balearic Islands and Spain), therefore an analysis of the variability of some features was possible. This has led to a better understanding of the characteristics of this species and has helped delimit their variability within and between populations. The purpose of this paper is to describe the new taxa and to analyse their distribution. I am aware that the species presented herein are only a small part of the many undescribed species of this strongly diversified genus *Holoparasitus.*

The diagnoses of the different species groups, as defined by different authors (Micherdzinski, 1969; Juvara-Bals, 1975; Juvara-Bals & Witalinski, 2000; Witalinski & Skorupski, 2002, 2003; Juvara-Bals & Witalinski, 2006) will probably be better

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understood and modified, in time, after further investigation of *Holoparasitus* material from additional parts of the Palaearctic region.

MATERIAL AND METHODS

The material used in this study is part of the Gamasida collection of the Natural History Museum of Geneva, Switzerland (MNHG) which includes the collection of C. Athias-Henriot. Prof. H. Franz (H.F.) sampled material from Spain, Portugal, Morocco, the Canary, the Balearic and Madeira Islands. C. Athias-Henriot (A-H), C. Besuchet (C.B.), B. Hauser (B.H.) and I. Löbel (I.L.) have collected mites from various other localities. Localities labelled in this text by initials followed by a number refer to material from the Athias-Henriot collection.

The morphological terminology follows the one established by Evans & Till (1979), the setal notation for the idiosoma that of Lindquist & Evans (1965) with modification of the opisthogaster as given by Lindquist (1994).

I selected some morphometric characters of the female in order to differentiate better these closely related species. The measurements were taken as follows: epigynium height (h) represents the midline from the tip of the shield to the posterior margin and its basal width (b) is the length of the posterior margin of the epigynium; ratio h/b indicates the proportion between the height and the width of the epigynium (Fig. 3J); setae distance *st-st'* was measured between the two setae of the pair *st* inserted on the sternal and epigynial shields. For the endogynium, characterized by two protrusions on its posterior margin, the following parameters were taken: height of the protrusion (a) and basal distance between the protrusions (b) (Fig. 2K). Length of the idiosoma, of the peritrema, of tarsus I and IV (of both sexes) indicate the size of the mites.

A compilation of morphometric values (in micrometers) is given in table I.

All types are deposited in the MNHG.

SYSTEMATIC ACCOUNT

Holoparasitus mallorcae species-group

All species treated in this paper belong to the *H. mallorcae* species-group and share the following morphological characters.

The idiosoma is strongly sclerotized, yellow brownish in colour; the colour depends on the age of the mite, young specimens are more yellowish and older ones became brown reddish. On the dorsal side the longest setae are on the podonotum and their lengths decrease towards the posterior margin of the opisthonotum, some being shorter than 10 μm. The opisthogaster has eight pairs of ventral setae and three circumanal setae. The gland pore *gv1* located under the seta *st3* can be absent (Figs. 1G, 17G). The gland *gv2* located on smooth cuticule behind coxa IV can be simple (one gland, one pore, see Fig. 15K) or double (two glands, one pore, see Fig. 7M). Pedipalp: the femur has a small rounded protuberance located next to a broad and slightly pectinate seta *al* (Fig. 1C); on the tibia setae *al1* and *al2* are spatulate.

Legs. Coxae II have on his antero-lateral face, in most of the species, a group of denticles and an extra basal denticle located near a gland pore (Fig. 1L).

TABLE I. Measurements (in μm) and indices characterizing females and males (in parentheses) of new species of the *H. mallorcae* species-group. Abbreviations: Epi. = epigynium; l = length; st = setae on sternal shield.

Species	Locality	Idiosoma-l	Peritrema-l	Tarsus I-l	Tarsus IV-l	Epi.-h	Epi.-b	Epi. h/b	*st5-st5'*	*st1-st1'*	*st2-st2'*	*st3-st3'*
H. mallorcae J-Bals	Balearic Islands		196-205 (168-190)	154-156 (135-148)	173-178 (150-168)	144-151	168-173	0.86-0.89	91-106	54-56	78-84	96-108
H. ellipticus J-B & Wit.	Italy-Sicily	690-770	(184-190)	164-168 (160-168)	175-183 (173-184)	154-161	168-180	0.89	96-117	55-60	86-96	105-116
H. gibber J-B & Wit.	Spain-Andalusia		204	156-163 (159-169)	173-185 (164-170)	150-160	168	0.92	83-100	54	78-80	102-106
H. mahnerti sp.n.	Morocco		228 (216)	180 (168)	196-198 (180-184)	132	192	0.69		58	99	127
H. vaucheri sp.n.	Morocco-Tanger		226 (206)	180 (172-180)	197 (192-197)	132	192	0.69	113	58	99	127
H. variabilis sp.n.	Algeria-Kabylia	648-672 (620-624)	216-220 (197)	168-190 (155-160)	192-216 (175-180)	150-156	168-192	0.8-0.9	100-108	55-60	90-98	110-126
H. franzi sp.n	Spain, Morocco	600-730 (590-620)	205-215 (190-204)	161-197 (156-173)	168-209 (170-190)	140-160	156-192	0.85-0.95	48-60	78-98	104-119	
H. canariensis sp.n.	Canary Islands	720-768 (648-672)	(228-235)	184-199 (168-194)	204-297 (197-228)	156-173	204-216	0.77	120-125	60-66	98-102	130-138
H. anaga sp.n.	Spain-Tenerife		264-266 (252-264)	204-206 (204-216)	252-264 (264-276)	187	226-233	0.82	144	60-66	96-98	132-134
H. lapalma sp.n.	Spain-La Palma	864 (720-768)	240-250 (235-245)	214 (204-228)	237-257 (228-252)	156-168	240-264	0.64	132-156	55-66	96-98	120-132
H. giganteus sp.n.	Spain-Madeira		264-276 (280)	240-252 (240-247)	264-297 (270)	156-170	264	0.61	151-163	70-74	108-120	144-168
H. lunae sp.n.	Spain-Andalusia		204 (192)	161-168 (138-145)	168-172 (150)	140-144	156-184	0.83	106-113	54	84	102
H. malleus sp.n.	Spain-Andalusia	620-648 (570-575)	180 (190)	160-173 (156-168)	168-180 (165-180)	132-144	144-168	0.9	84-96	53-60	53-60	84-90
H. rifensis sp.n.	Morocco-Rif	648-672 (600-624)	192-197 (190)	156 (151-156)	168 (168-170)	132	163-168	0.78-0,80	96-108	54	84-90	102-118
H. algiersensis sp.n.	Algeria-Algiers		175-184 (165-175)	144-150 (140-145)	150-158 (150-154)	161-168	168-173	0.95	96-103	54	84	108-112
H. eivissa sp.n.	Spain-Ibiza	(528)	173-192 (146)	144 (132)	156-163 (145)	125-132	156-163	0.8-0.83	90-86	54	78	96
H. singularis sp.n.	Algeria	(528)	(163)	(127-132)	(134-140)							

Male. The sternogenital shield is reticulated. The genital orifice is flanked by triangular presternal platelets and is provided with a subgenital microsclerite bearing a biramous tritosternum; the shape of this microsclerite can be rectangular or trapezoidal large and sclerotized. The genital lamina is located on a more or less pronounced concavity surrounded by lateral protuberances. The species belonging to this group have two types of genital lamina:

1 – the genital lamina is well-sclerotized on its inner face and slightly rounded. The microsclerite bearing the tritosternum is connected to a sclerotized structure, which runs along the internal anterior border of the sternal shield towards the lateral protrusions (in *H. algiersensis* sp. n., *H. variabilis* sp. n., *H. eivissa* sp. n., *H. singularis* sp. n.) (see Fig. 16).

2 – the genital lamina is transparent, with a central prong and more or less developed lateral angles; the microsclerite bearing the tritosternum is rectangular. This type characterizes the other taxa of *H. mallorcae* species-group (see Fig. 4E, F).

The common character of the gnathosoma is the incision of the sclerotized cuticle behind simple or pilose hypostomatic setae; the palpcoxal setae are slightly pilose. The movable digit of the chelicera is provided with an arthrodial membrane bearing paraxially a brush-like process and antiaxially a setiform fringe (Fig. 1A). The brush-like process differs from one species to another.

Armature of leg II: the femoral apophysis and the axillary process are short; the genu and tibia have one apophysis.

Female. The presternal plate is ribbon-like, more or less serrated, and the lateral presternal platelets are free. The sternal shield is reticulated, with an axially granular strip. The heptagonal epigynium is slightly reticulated and has sharp lateral spines which are separated from the central apex by deep concavities. The shape of the endogynium differs from species to species and it is always covered by delicate lamina.

On the gnathosoma the gnathotectum is trispinate; the corniculi are conical. The movable digit of the chelicera has three teeth and the fixed digit has two teeth in front of the pilus dentilis and two larger teeth followed by lamellar margin behind the pilus dentilis (Fig. 11L).

Holoparasitus mahnerti sp. n. Fig. 1

TYPE MATERIAL: ♂ holotype, 4♂, 3♀ paratypes, MOROCCO, Ibel Mousa by Ceuta, sifting litter under shrubs, 27.03.1963, leg. H.F. (Sp. 882).

DIAGNOSIS: Male. Movable digit of chelicera with 3-4 teeth, fixed digit with 9-10 denticles located subapically; arm of spermatotreme curved ventrally; corniculi with protuberance in distal third; femoral apophysis with small protuberance on its basis. Female. Endogynium sack-like with curtain-like membranous structures.

ETYMOLOGY: This species is dedicated to Prof. V. Mahnert, who kindly helped me to continue my acarological research.

DESCRIPTION: Male. Length of idiosomal setae: on podonotum *j1* = 30 μm, *r3* = 40 μm others around 30 μm; on opisthonotum 13-15 μm.

Ventral idiosoma. Sternal shield reticulated, without a pattern; genital lamina with bifid central process and rounded margin, located in small concavity (Fig. 1B). Opisthogaster with 8-9 pairs of ventral setae, their length 36 μm. Gland *gv2* simple.

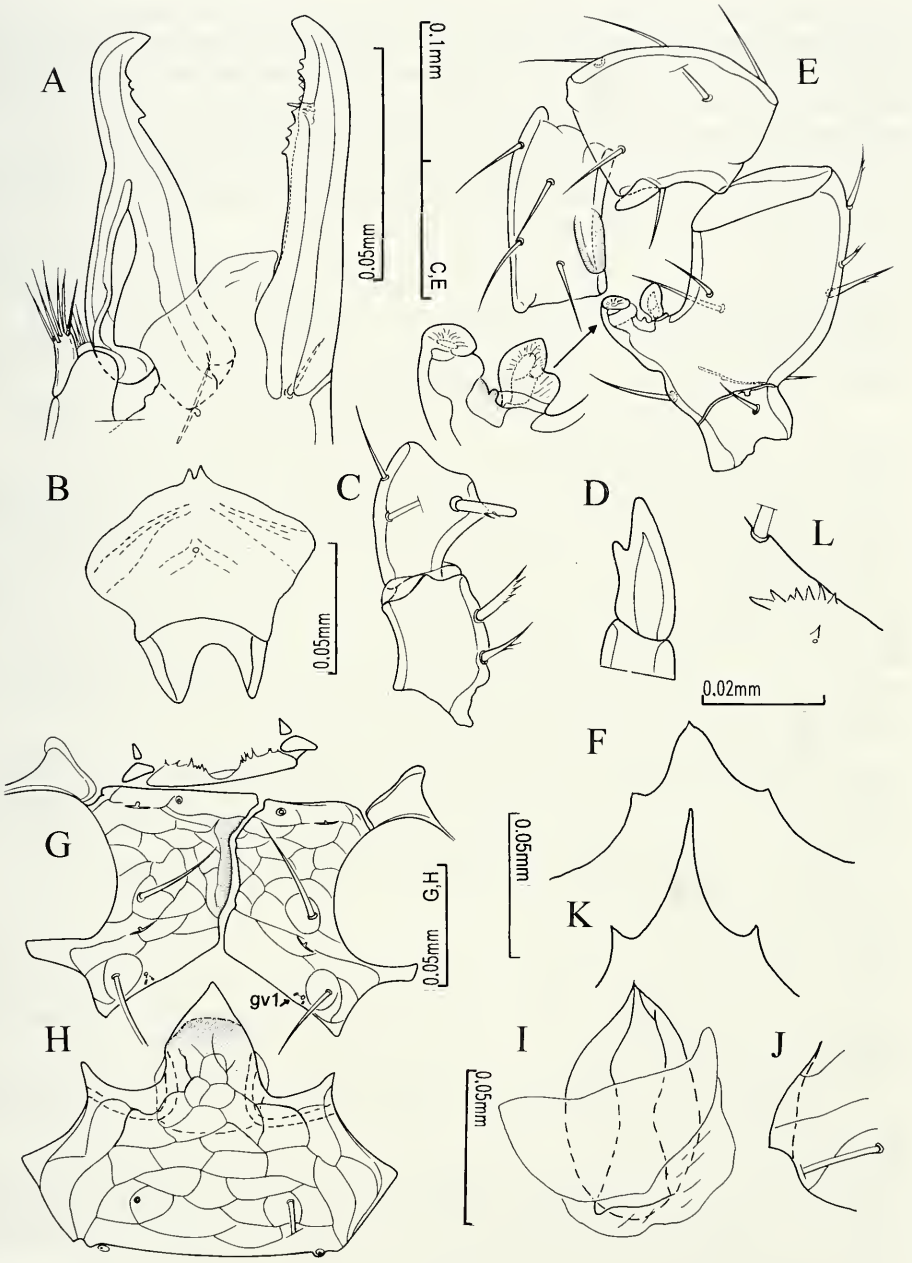

FIG. 1

Holoparasitus mahnerti sp. n. male (A-F). (A) Chelicera, paraxial view. (B) Genital lamina. (C) Palptrochanter and palpfemur. (D) Corniculus. (E) Femur, genu, tibia of leg II. (F) Gnathotectum. Female (G-L). (G) Presternal plate and sternal shield. (H) Epigynium. (I) Endogynium. (J) Paragynium, posterolateral protrusion. (K) Gnathotectum. (L) Group of denticles on coxa II.

Gnathosoma. Gnathotectum trispinate, with large and broad median prong carrying a small pointed tip and two smaller lateral prongs (Fig. 1F). Hypognathal groove provided with 10 rows of fine denticles; hypostomatic and palpcoxal setae simple. Corniculi with ventral protuberance in their distal third (Fig. 1D). Palptrochanter with protuberance situated under slightly pilose seta *v1,* seta *v2* barbed (Fig. 1C).

Chelicera (Fig. 1A). Fixed digit straight, its apex truncate, with 9-10 denticles on internal margin. Movable digit with curved apex and 3-4 denticles located subapically; arthrodial membrane with short brush-like process.

Legs. Coxa I with big membranous crenulations; margin of coxa II with group of 5-8 denticles and a basal denticle. Leg II with spurs as follows (Fig. 1E): femoral apophysis thumb-like, axillary process trapezoidal, tiny protuberance between basis of femoral apophysis and basis of axillary process; genu with triangular spur located distally; tibia with oval, sometimes truncated, apophysis.

Female. Length of idiosomal setae: on podonotum *j1*, *r3* = 52 μm, *z1* = 13 μm, others about 36 μm, on opisthonotum setae shorter, about 13-16 μm.

Ventral idiosoma. Presternal plate entire, with median constriction and anterior margin serrated; sternal shield reticulated with granular strip medially (Fig. 1G). Length of sternal setae: *st1* = 54-60 μm, *st2* = 60-64 μm, *st3* = 66 μm. Paragynia slightly reticulated, with triangular posterior protrusions (Fig. 1J). Epigynium with sharp lateral spines separated from central apex by concavities; subapical epigynial structure rounded, extending slightly beyond apex margin (Fig. 1H). Endogynium cup-like, with two membranous curtain-like structures on its ventral side, endogynial opening covered with fine lamina (Fig. 1I). Opisthogaster with 8 pairs of ventral setae, their length ranging from 40 μm to 52 μm. Gland *gv2* double.

Gnathosoma. Gnathotectum trispinate, with long median prong and tiny lateral ones (Fig. 1K). Hypognathal groove with 8-9 denticulated rows, the last two of them simple. Hypostomatic setae simple, palpcoxal setae pilose. Border of palptrochanter thickened between slightly pilose seta *v1* and barbed seta *v2*.

Legs. Coxa I like in male, coxa II with denticulated ridge formed by 5-7 denticles and a basal denticle (Fig. 1L).

Holoparasitus mallorcae Juvara-Bals, 1975

MATERIAL EXAMINED: Mallorca Island. 1♀, Palma, field near a dry stream, from a hollow olive tree, 1.IV. 1960 (Sp. 700). – 1♂, 1♀, Palma, spring at the end of a valley, rocks in stream bed, leaf litter, 1.IV.1960 (Sp. 701). – 2♂, 2♀, Playa Tirant Nou, wet litter composed of sledge and *Tamarix,* 5.IV.1960 (Sp. 713).

Menorca Island. 1♂, Menorca, road towards El Marcadal, in valley, wet leaf litter, 3.IV.1960 (Sp. 707). –6♂, 5♀, Finca Lavernica near Mahon, spring near road Mahon-Fornells, leaf litter, 4.IV.1960 (Sp. 709).

Ibiza Island. 1♂, 2♀, Sierra Grosa near San Jose, soil near a spring, altitude 350 m, 9.IV.1960 (Sp. 718). – 6♂, 7♀, San Miguel, hollow pistachio tree in a small field near a stream, leaf litter and very dry soil, 10. IV. 1960 (Sp. 720). – 4♂, 6♀, San Miguel near a stream place with rubbish on rocky soil, 10.IV.1960 (Sp. 722). – 7♂, 5♀, St. Eulalia, from the village towards the interior of the island, hollow tree trunk, wet, altitude 500 m, 11.IV.1960 (Sp. 724a).

Andalusia. 3♂, 3♀, Barranco de Hermanas, south of Sevilla, *Eucalyptus* leaf litter, 22.II.1951. All specimens collected by H. Franz.

REMARKS: The material examined from different places in the Balearic Islands and from the continent allowed us to show the variability of some morphological characters and compare these specimens with the type material from Mallorca.

The variable characters in females are the shape of the posterior protrusion of the paragynia and the number of denticles on the lateral walls of the endogynium. These variations are not linked to the localities where the mites were sampled.

Posterior paragynial protrusions can be rounded or triangular. The type specimen has triangular protrusions but some specimens have one rounded and the other triangular. The lateral endogynium walls are provided with two or four denticles in different combinations (1+1, 1+2, 2+2). The characteristics of males examined seem not to be variable.

Holoparasitus vaucheri sp. n. Fig. 2

TYPE MATERIAL: ♂ holotype, 1♀, 1♂, paratypes; MOROCCO, Gabo Spartel near Tangier, reforestation with *Pinus* and *Thuya,* sifting of litter, 24.03.1964, leg. H.F. (Sp. 961).

ETYMOLOGY: This species is dedicated to Dr. C. Vaucher who kindly provided working space and laboratory facilities.

DIAGNOSIS: Male. Gnathotectum with tongue-like apex provided with sharp angles between its basis and lateral prongs. Chelicera: straight fixed digit its apex slightly curved, carrying 9 denticles on its inner margin; movable digit with 6 denticles and arched arm of spermatotreme. Female. Endogynium cup-shaped, with two short protrusions on posterior margin, epigynium with its subapical structure elliptical.

DESCRIPTION: Male. Dorsal idiosoma. Colour yellowish brown, well-sclerotized. Dimension of idiosomal setae: on podonotum *j1* = 42 μm, *r5* = 48 μm, *j3* = 30 μm and others about 24-26 μm; opisthonotal setae about 12-13 μm.

Ventral idiosoma. Genital lamina situated in large concavity of anterior margin of sternal shield; anterior margin of genital lamina with central prong and rounded margin; two well-sclerotized finger-like formations on inner face. Sternogenital shield with scale-like reticulation; length of sternal setae about 36 μm. Gland *gv2* double. Length of ventral setae about 48-50 μm.

Gnathosoma. Gnathotectum with tongue-like central process and two triangular lateral prongs (Fig. 2E). Corniculi elongated, with small prominence located in its proximal part (Fig. 2C). Hypognathal groove with 10 finely denticulate rows. Hypostomatic setae simple, palpcoxal setae pilose. Palptrochanter with setae *v1* fine, slightly pilose, whereas *v2* thicker and pilose; a small, sharp protuberance situated between these setae (Fig. 2B).

Chelicera (Fig. 2A). Fixed digit straight, with 8 fine denticles. Movable digit with curved apex and 6 small teeth on inner margin, spermatodactyl arched; arthrodial membrane with big brush-like process and antiaxially with fine setiform fringe.

Legs. Coxa II with ridge formed by 10 denticles and an extra basal denticle (Fig. 2G). Spurs on leg II as illustrated in figure 2F: short, rounded femoral apophysis and trapezoidal axillary process; genu with triangular spur located distally; elongated tibial spur situated medially, its mucronate top reaching distal margin of tibia.

Female. Dorsal idiosoma well-sclerotized, brown yellowish coloured. Dimensions of idiosomal dorsal setae: *j1* = 48 μm, *z1* = 13 μm; opisthonotal setae tiny, about 13 μm.

Ventral idiosoma. Presternal plate ribbon-like, serrated; sternal shield slightly reticulated with a granular central strip, *gv1* located medially near posterior margin (Fig. 2H).

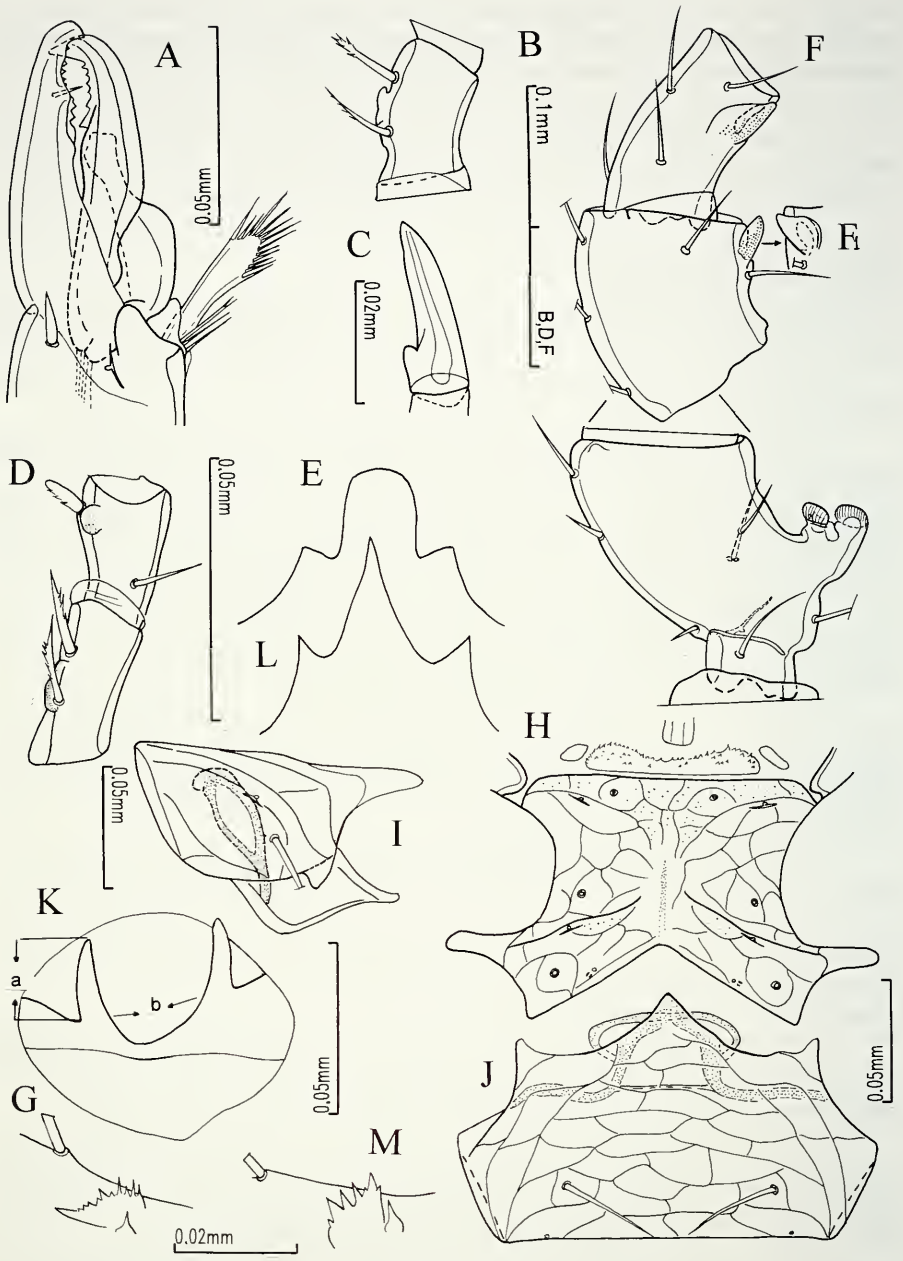

FIG. 2

Holoparasitus vaucheri sp. n. male (A-C, E-G). (A) Chelicera, antiaxial view. (B) Palptrochanter. (C) Corniculus. (E) Gnathotectum. (F) Femur, genu, tibia of leg II. F1 tibial apophysis, ventral view. (G) Group of denticles on coxa II. Female (D, H-M). (D) palptrochanter and palpfemur. (H) Presternal plate and sternal shield. (I) Paragynium. (J) Epigynium. (K) Endogynium. (L) Gnathotectum. (M) Group of denticles on coxa II.

Paragynial shield with triangular, posterolateral protrusion; metagynial sclerite ellipsoidal (Fig. 2I). Anterior margin of epigynium with a large triangular apex; subapical epigynial structure formed by a sclerotized rectangle and ellipsoidal hyaline wings (Fig. 2J). Endogynium a large cup with two short, conical protrusions on its posterior margin, covered by a delicate membrane (Fig. 2K). Gland *gv2* double.

Gnathosoma. Gnathotectum trispinate, its central prong sharply pointed (Fig. 2L). Corniculi conical; hypognathal groove with 9 oligodenticulated rows of denticles. Palpcoxal seta and hypostomatic setae slightly pilose, hypostomatic seta 3 simple. Palptrochanter with a flattened protuberance between setae *v1* and *v2*, both setae pilose (Fig. 2D).

Legs. Coxa II with a comb-like structure with 8 denticles and an extra basal denticle (Fig. 2M).

Holoparasitus franzi sp. n. Fig. 3

TYPE MATERIAL: ♂ holotype, 68♂, 144♀ paratypes; MOROCCO, southwest of Taza, col Bab-Azhar, National Park "Jbel Tazzeka, cedar wood (*Cedrus atlantica* Manetti), 1770 m, sifting leaf litter 16.06.1990, leg. B. Hauser.

OTHER MATERIAL EXAMINED

FRANCE. 1♀; between Argelès and Collioure, sifting of leaf litter of cork oak, 22.03.1959, leg. H.F. (Sp. 628).

SPAIN. 1♀; Montes of Malaga, road from Malaga to Puento del Leon, turf and litter, 28.03.1959 (Sp. 642). – 2 ♀, Sierra Nevada, close to the road to the Albergo, 1600 m, near a little stream, moss and litter under bushes, 10.04.1959 (Sp. 679). – 1♂, Cantoria Almeria, soil from inside a hollow olive tree, 22.03.1964 (Sp. 957). – 2♀, 2♂, Sierra de la Filares (Almeria) near tunnel on the road Cantoria-Uleila, humid litter under *Ulex*, 22. 04.1964 (Sp. 958a). All the material was collected by H. Franz.

MOROCCO, Middle Atlas. 1♀, 1♂, road from Ifrane to Boulemane, leaf litter from cedar and oak (*Quercus petraea*), 30.03.1963 (Sp. 893). – 3♀, 1♂, Ifrane, leaf litter from cedar and oak, 30.03.1963 (Sp. 894). – 5♀, 3♂, Jbel Tazzeka, cedar forest on north slope, sifting of leaf litter, 1950 m, 1.04.1963 (Sp. 897). – 2♀, Tanout Pass between Khenifra and Midelt, litter under oak, 2070 m, 2.04.1963 (Sp. 900).

MOROCCO, Upper Atlas. 2♀, 2♂, 2dn, "Cirque" of Jaffar near Midelt, litter under oak, 3.04.1963 (Sp. 902). – 3♀, 3♂, Toufliat near Marrakech, soil and leaf litter under cork oak, 6.04.1963 (Sp. 912). – 1♀, 2♂, Oukaimeden near Marrakech, moss under bushes, 2100 m, 12.04.1963 (Sp. 925). – 3♀, 3♂, Valley under Oukaimeden, leaf litter from maquis near little stream, 12.04.1963 (Sp, 926). – 1♀, Bin el-Ouidane towards Afourer, maquis litter in gully, 17.04.1963 (Sp. 934). – 2♀, 3♂, idem, slope towards Afourer, litter in humid gully, 17.04.1963 (Sp. 935). – 2♀, 2♂, Middle Atlas, near Bin el-Ouidane, maquis leaf litter, 27.03.1964 (Sp. 967). All the material was collected by H. Franz.

MOROCCO, Middle Atlas. 3♀, 8♂, 1dn, Bab-Azhar, Tazzeka region, 1330 m, soil under cork oak, 1.06.1978. – 12♂, 15♀, between Ifrane and Azrou, 1600 m, soil under oak, 4.06.1978. – 6♂, 4♀, Taza, road from Col Bab-Taka to Bab-Azhar, National Park "Jbel Tazzeka", 1940 m, sifting of soil and leaf litter under a fallen cedar tree, 16.06.1990. – 6♂, 20♀, Sefrou to Boulame, 41 km before Sefrou near Tizi-Abekhnanus Pass, 1700 m, green oak forest, soil under trees, 22.06.1990. – 8♂, 8♀, road Ifrane-Mischliffen, south Ifrane, 1930 m, cedar wood mixed with green oak and maple tree, before the ski station, soil sampled under cedar (*Cedrus atlantica*), 23.06.1990. – 5♂, 3♀, Azrou-Midelt road junction 1 km before "Cèdre Gourauld", 1770 m, soil under cedar, 23.06.1990. All the material was collected by B. Hauser.

ETYMOLOGY: This species is named in honour of Prof. H. Franz whose conscientious collecting of arthropods has helped so much to increase our knowledge of the soil fauna.

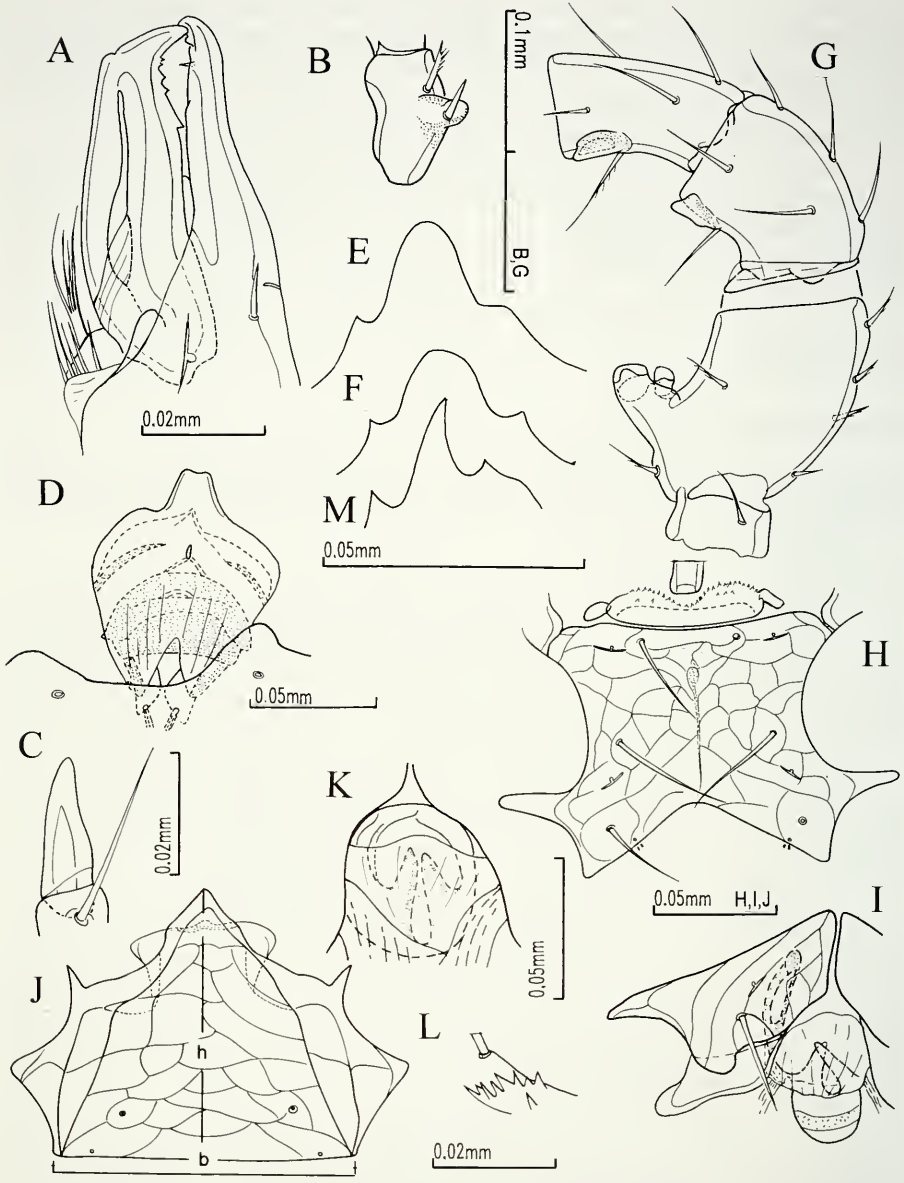

FIG. 3

Holoparasitus franzi sp. n. male (A-G, L). (A) Chelicera, antiaxial view. (B) Palptrochanter. (C) Corniculus. (D) Genital lamina. (E, F) Gnathotectum. (G) Femur, genu, tibia of leg II. (L) Group of denticles on coxa II. Female (H-K, M). (H) Presternal plate and sternal shield. (I) Paragynium and endogynium. (J) Epigynium. (K) Endogynium. (M) Gnathotectum.

DIAGNOSIS: Male. Gnathotectum with anterior margin of apex rounded, small concavities between its basis and lateral prongs; chelicera with straight fixed digit carrying one tooth between slightly curved apex and pilus dentilis; movable digit bearing 5 denticles on its inner margin and a specific prominence on external side at end of spermatotreme; palptrochanter with short seta *v1* inserted on big protuberance and with barbed seta *v2*. Female. Endogynium, cup-like, with 2 short triangular protrusions.

DESCRIPTION: Male. Dorsal idiosoma. Well-sclerotized, yellowish brown in colour. Length of podonotal setae: *j1* = 36 μm, *r5* = 42 μm, *s6* = 30 μm, others from 24 to 36 μm. Opisthonotal setae from 18 μm to 12 μm.

Ventral idiosoma. Sternal shield reticulated, without a particular pattern; length of sternal setae about 42 μm. Genital lamina with large central process and rounded angles; rectangular microsclerite with rounded anterior corners (Fig. 3D). Length of ventral setae 30-36 μm. Simple gland *gv2*.

Gnathosoma. Gnathotectum with rounded apex and two little lateral prongs; central part of gnathotectum granular (Fig. 3E-F). Hypostome with hypognathal groove provided with 9-11 rows of fine denticles; hypostomatic and palpcoxal setae slightly pilose, hypostomatic seta 3 simple. Corniculi conical, slightly swollen paraxially (Fig. 3C). Palptrochanter with thick, simple seta *v1* inserted on big protuberance and with barbed seta *v2* (Fig. 3B).

Chelicera (Fig. 3A). Fixed digit slender, its apex slightly curved; 1-2 little teeth between pilus dentilis and apex. Movable digit with 5 teeth on its inner margin and large curved apex with a specific rounded prominence on external side at end of spermatotreme; small brush-like process on base of movable digit.

Legs. Coxa II with comb-like structure formed by 8 denticles and extra basal denticle (Fig. 3L). Armature of leg II (Fig. 3G): femur with short thumb-like apophysis and short rounded axillary spur; genu with triangular apophysis extending slightly beyond distal margin; triangular tibial apophysis situated medially on anterolateral face.

Measurements. Specimens from the Upper Atlas (Sp. 902) are bigger than the others: tarsus I = 168-173 μm, tarsus IV = 192-197 μm.

Female. Idiosoma well-sclerotized, yellowish brown. Length of podonotal setae: *j1* = 36-42 μm, *r5* = 42 μm, *z1* =16-17 μm, other setae about 36 μm; setae shorter on opisthonotum, 20-18 μm.

Ventral idiosoma. Presternal plate ribbon-like, densely denticulated; sternal shield reticulated; length of sternal setae: *st1*, *st2* = 54-60 μm; *st3* = 65-70 μm; gland pore *gv1* located below setae *st3* (Fig. 3H). Paragynia weakly reticulated, triangular posterolateral protrusions; metagynial sclerite with its paraxial margins straight (Fig. 3I). Epigynium with anterior margin formed by a large triangular apex and two spine-like lateral prongs; subapical epigynial structure with hyaline wing-like protrusions extending laterally and with a subapical sclerotized line (Fig. 3J). Endogynium cup-shaped, covered by a fine membrane; posterior margin with two short triangular protrusions, their tips reaching anterior margin of endogynium (Fig. 3K). Length of ventral setae: *ZV1* = 48 μm, others about 36 μm. Gland *gv2* double.

Gnathosoma. Gnathotectum trispinate, with long median prong and two tiny lateral tips (Fig. 3M). Hypognathal groove with 9-11 rows of denticles, the last four oligodent. Hypostomatic setae and palpcoxal seta slightly pilose. Palptrochanter with flat protuberance between slightly pilose seta *v1* and barbed seta *v2* .

Legs. Coxa II with a comb-like ridge formed by 8-9 denticles, sometimes also with basal one.

Holoparasitus variabilis sp. n. Fig. 4

TYPE MATERIAL: ♂ holotype, 5♂, 3♀ paratypes, ALGERIA, Djurdjura-Kabylia, road Tala Guilel, 1100 m, sifting of leaf litter and moss, oak wood, 8.05.1988.

OTHER MATERIAL EXAMINED: 4♂, 9♀, 2 dn, Djurdjura Tikijada-Kabylia, 1430 m, sifting of soil and litter near cedar trunks, 8.05.1988. All material was collected by C. Besuchet and I. Löbl.

ETYMOLOGY: The species name *variabilis* refers to the different shapes of the female endogynial protrusions.

DIAGNOSIS: Male. Chelicera with straight and narrow fixed digit, its apex slightly curved, 5-8 denticles on inner margin; movable digit with 3-6 denticles, arm of spermatotreme arched. Female: epigynium with triangular apex, subapical structure small and rounded; endogynium cup-like, posterior margin with two protrusions close each to another and in some specimens unequal in size.

DESCRIPTION: Male. Dorsal idiosoma. Colour reddish brown. Dimensions of podonotal setae: *j1* = 36 μm, others from 24 μm to 30 μm. Opisthonotal setae from 12 μm to18 μm.

Ventral idiosoma. Sternogenital shield reticulated. Genital lamina located in a shallow concavity; its anterior margin undulating, with a rectangular median process (Fig. 4F). Subgenital microsclerite large, rectangular and well-sclerotized (Fig. 4E). Length of ventral setae from 36 to 24 μm. Gland *gv2* double.

Gnathosoma. Gnathotectum trispinate (Fig. 4D). Corniculi conical, with small prominence medially (Fig. 4G). Hypognathal groove with 9 rows of small denticles, simple hypostomatic setae, pilose palpcoxal setae. Palptrochanter with *v1* pilose and *v2* barbed (Fig. 4C).

Chelicera (Fig. 4B). Narrow fixed digit with slightly curved apex, internal antiaxial margin provided with 6-8 small denticles. Movable digit bearing 3-6 denticles, ventral arm of spermatotreme arched; arthrodial membrane with small brush-like process.

Legs. Coxa II provided with a ridge of 10-11 denticles and a tiny basal denticle (Fig. 4H). Armature of leg II characterized by small, rounded femoral apophysis and axillary process; an elongated apophysis located on anterior margin of genual segment; tibial apophysis rectangular (Fig. 4A).

Female. Dorsal idiosoma. Length of setae: podonotum *j1* = 37 μm, other setae of row *j* = 40-42 μm, *s1* = 12 μm; on opisthonotum small setae, their length 14-18 μm.

Ventral idiosoma. Presternal plate serrated and sternal shield reticulated with small granular strip medially, gland pore *gv1* located near posterior margin in vicinity of seta *st3* (Fig. 4I). Paragynial shield reticulated with oval posterior protrusions; metagynial sclerite elliptical (Fig. 4J). Epigynium with sharply, triangular apex and

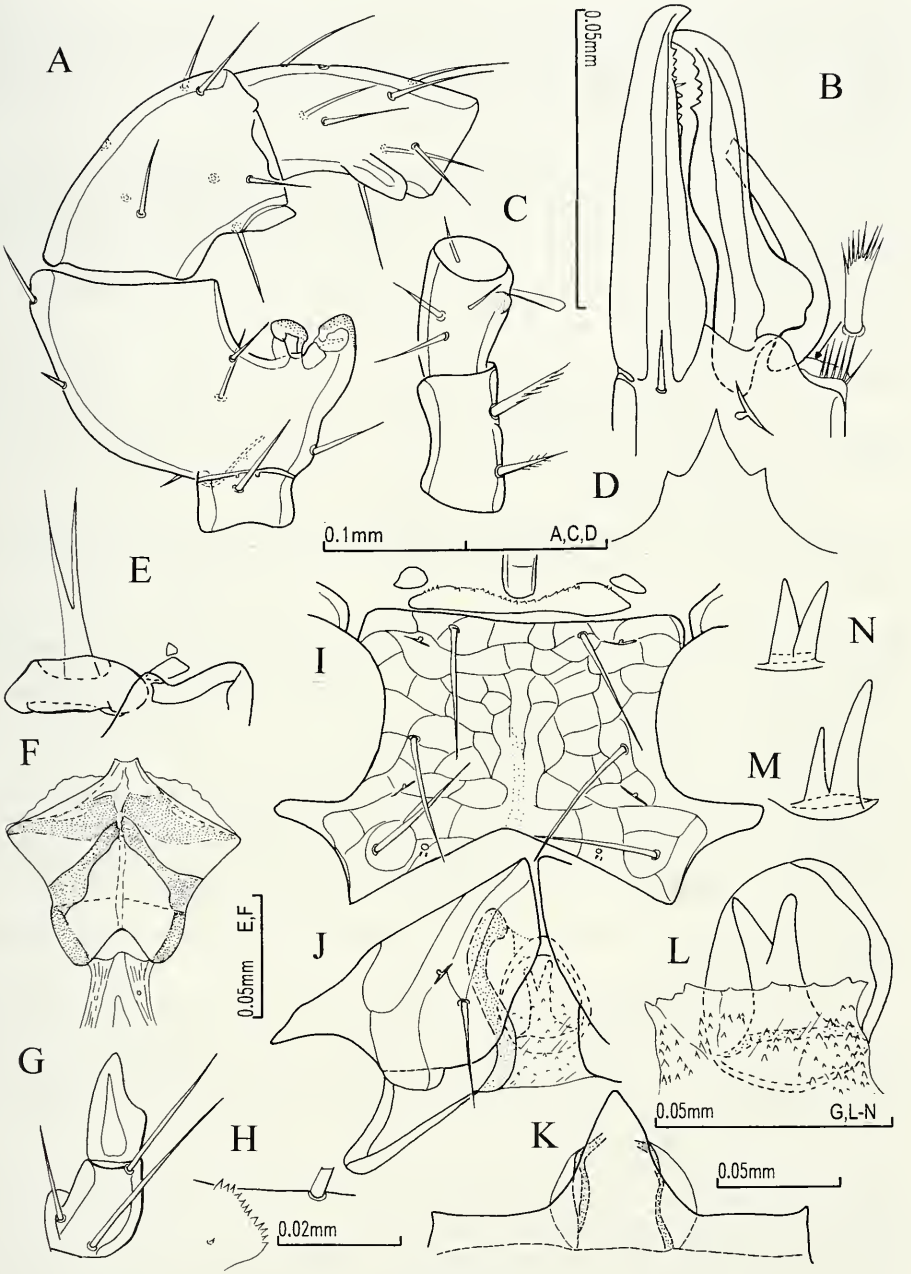

FIG. 4

Holoparasitus variabilis sp. n. male (A-G). (A) Femur, genu, tibia of leg II. (B) Chelicera, antiaxial view. (C) Palptrochanter and palpfemur. (D) Gnathotectum. (E) Microsclerite and tritosternum. (F) Genital lamina. (G) Corniculus. (H) Group of denticles on coxa II. Female (I-N). (I) Presternal plate and sternal shield. (J) Paragynium and endogynium. (K) Apex of epigynium. (L) Endogynium. (M, N) Endogynial protrusions.

faintly sclerotized, rounded subapical structure (Fig. 4K). Endogynium cup-shaped, posterior margin with two protrusions of various shapes: finger like and equal to each other, one short and other long, or bifid, close to each other or even fused (Fig. 4L-N). Opening of endogynium covered by fine scaled lamina. Length of ventral setae 36-40 μm. Gland *gv2* double.

Gnathosoma. Gnathotectum trispinate, with one long central prong and two tiny laterals. Hypognathal groove with 11 rows of denticles, the last 4 with 2 denticles. Hypognathal setae simple and palpcoxal setae pilose. Palptrochanter with pilose seta *v1* and barbed seta *v2*.

Legs. Characteristics of legs inconspicuous. Anterolateral ridge of coxa II as in males.

Holoparasitus canariensis sp. n. Figs 5, 6A-E

TYPE MATERIAL: ♂ holotype, 9♂, 9♀ paratypes, SPAIN, Canary Islands, Gran Canaria, El Brezal, sifting of litter and rotten wood, laurel forest "Laurisilvia", 25.03.1967, leg H.F. (Sp. 1129).

OTHER MATERIAL EXAMINED:

Gran Canaria. 4♂, 4♀, El Brezal, sifting of leaf litter in laurel forest, 4.08.1966, leg H.F. (Sp. 1079). – 1♂, 1♀, El Brezal, sifting of leaf litter, laurel forest, 11.08 1966, leg. H.F (Sp. 1095). – 2♂, Barranco de Fingas, sifting of leaf litter near a waterfall, 10.08.1966, leg. H.F (Sp. 1092).

La Gomera. 2♂, 4♀, El Campamento, sifting of leaf litter, laurel forest, 22.04.1965, leg. H.F (Sp. 1064-1065). – 2♂, 1♀, Monte de Valle, Hernosa, laurel forest, 21.04.1965, leg H.F. (Sp. 1060). – 2♀, El Campamento, laurel forest, 22.04.1965 leg. H.F. (Sp. 1064). – 2♂, 12♀, "Parque Nacional Garajonay", road towards Alajero, under the summit of Garajonay, 1320 m, forest with *Pinus* sp. and *Erica* sp., soil, 3.05.1993, leg. B.H.

El Hierro. 14♂, 16♀, above Frontera, side of the road to Valverde, laurel forest, "Laurisilva", soil near an old laurel, 1130m, 5.05.1993, leg. B.H.

Tenerife. 2♂, 1♀, north Erjos (Teno district), leaf litter under *Erica arborea* and *Laurus* sp., 4.04.1965, leg. H.F. (Sp. 1027). – 3♂, 2♀, north Erjos, leaf litter under *Castanea* tree, 4.04.1965, leg. H.F. (Sp. 1028). – 1♀ Monte de Erjos (Teno district), rotten wood and litter, 13.08.1972, leg. H.F. (Sp. 1273). – 5♂, 6♀, 2dn, "Parque Nacional del Teide" (Las Canadas) under the cable car station, 2280 m, soil under *Spartocytisus supranubius*, 8.05.1993, leg. B.H.

ETYMOLOGY: The species name refers to the Canary Islands where the species seems to be common.

DIAGNOSIS: Male. Movable digit of chelicera with curved apex and 6 denticles on inner margin; straight and long fixed digit with 8 denticles; gnathotectum produced into a pyramidal process with rounded apex. Female. Cup-shaped endogynium with two prolongations (a = 24-30 μm) separated by a distance of 40-45 μm; subapical structure of epigynium elliptical.

DESCRIPTION: Male. Dorsal idiosoma. Colour reddish brown. Podonotal setae simple, their length: *j1* = 36-38 μm, *z1* = 12 μm, others from 36 to 42 (*r3*) μm. Opisthonotal setae shorter, around 12-15 μm.

Ventral idiosoma. Genital lamina with large central trapezoidal process and with rounded angles; microsclerite rectangular (Fig. 5A). Sternal shield reticulated; length of sternal setae 30 to 42 μm; *gv1* located medially. Length of ventral setae about 24-25 μm. Variability of gland *gv2*: simple (Gran Canaria) or double (Gomera, El Hierro).

Gnathosoma. Gnathotectum a pyramidal process, its apex rounded; some specimens with two tiny spines located lateral to apex (Fig. 5D-F). Hypognathal

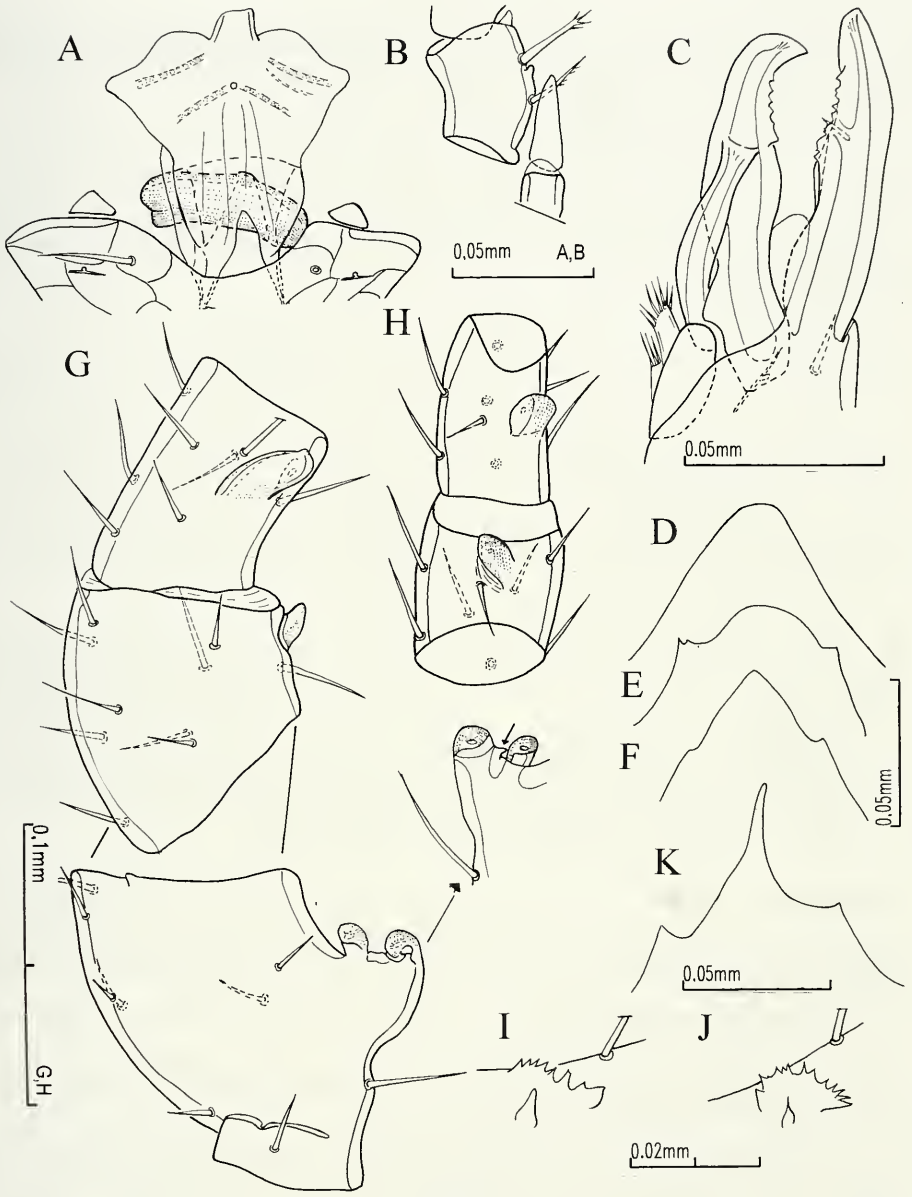

FIG. 5

Holoparasitus canariensis sp. n. male (A-I). (A) Genital lamina and microsclerite. (B) Palptrochanter and corniculus. (C) Chelicera, paraxial. (D, E, F) Gnathotectum. (G) Femur, genu, tibia of leg II, anterolateral view. (H) Genu, tibia, ventral view. (I) Group of denticles on coxa II. Female (J, K). (J) Group of denticles on coxa II. (K) Gnathotectum.

groove with 8 rows of very fine denticles. Hypostomatic setae simple, palpcoxal setae pilose. Corniculi slender and conical (Fig. 5B). Palptrochanter with slightly thickened ridge between pilose seat *v1* and pectinate seta *v2* (Fig. 5B).

Chelicera (Fig. 5C). Fixed digit straight, its apex truncate; internal margin with 7-9 denticles located paraxially and a sinuous margin antiaxially; pilus dentilis situated between these edges. Movable digit hooked, with 6 denticles on inner margin; arthrodial membrane with short brush-like process.

Legs. Coxa II with ridge bearing from 6 to 11 denticles and an extra basal denticle; one specimen with 10 denticles on left and 5 on right coxa (Fig. 5I). Leg II bearing spurs as follows (Fig. 5G, H): rounded femoral apophysis and trapezoidal axillary process, both their apices at same level; short, triangular genual spur located near distal margin of the segment; triangular tibial apophysis or sometimes with a bud-like apex.

Female. Dorsal idiosoma. Colour brownish yellow. Setae on podonotal region from 48 μm (*j1*) to 12 μm (*z1*), others around 24 μm; length of opisthonotal setae 12-18 μm.

Ventral idiosoma. Presternal plate serrated, sternal shield reticulated, with granular strip medially; length of sternal setae around 70 μm, gland pore *gv1* located medially on posterior sternal margin (Fig. 6A). Paragynial shields slightly reticulated, with small rounded posterior protrusions; metagynial sclerite elongated (Fig. 6B). Epigynium with triangular apex; subapical epigynial structure with a sclerotized strip continued by elliptical membranous wings (Fig. 6C-E).

Endogynium cup-shaped, with two digitiform protrusions (24-30 μm) on its posterior margin; distance between their bases 40-45 μm; a fine hyaline flap covering endogynium on ventral side (Fig. 6D-E). Length of ventral setae 36 μm. Gland *gv2* simple or double.

Gnathosoma. Gnathotectum trispinate, with long median spine (Fig. 5K). Hypognathal groove with 7-8 oligodent rows; palpcoxal seta pilose, hypostomatic setae simple. Palptrochanter with simple seta *v1* and pilose *v2*.

Legs. Coxa II with a fan-like ridge as in males (Fig. 5J).

Holoparasitus anaga sp. n. Figs 6 F-K, 7

TYPE MATERIAL: ♂ holotype, 5♂, 4♀ paratypes; SPAIN, Canary Islands, Tenerife, Anaga Mountains, on the road towards Pico del Inglés, sifting of leaf litter in a laurel forest, 8.04.1965, leg H.F. (Sp. 1038).

OTHER MATERIAL EXAMINED: 1♂, 1♀, northern slope of Pico del Inglés, leaf litter in a laurel forest, 13.04.1965, leg. H.F. (Sp. 1406).

ETYMOLOGY: The species name, a noun in apposition, refers to Mount Anaga where the specimens were sampled.

DIAGNOSIS: Both sexes with ventral protuberance on trochanter IV. Males with straight and very large fixed digit of chelicera and trapezoidal gnathotectum. Females with simple triangular gnathotectum; endogynium with two small, 36 to 48 μm long protrusions on posterior margin, distance between their bases 48 μm.

DESCRIPTION: Male. Dorsal idiosoma. Length of idiosomal setae: *j1* = 48 μm, *z1* = 18 μm, *r3-r5* = 42-48 μm, others on podonotum 24 μm. Opisthonotal setae short 12-15 μm.

Ventral idiosoma. Genital lamina with rounded angles and trapezoidal central prong (Fig. 7H). Sternogenital shield reticulated with marked line under setae *st2*;

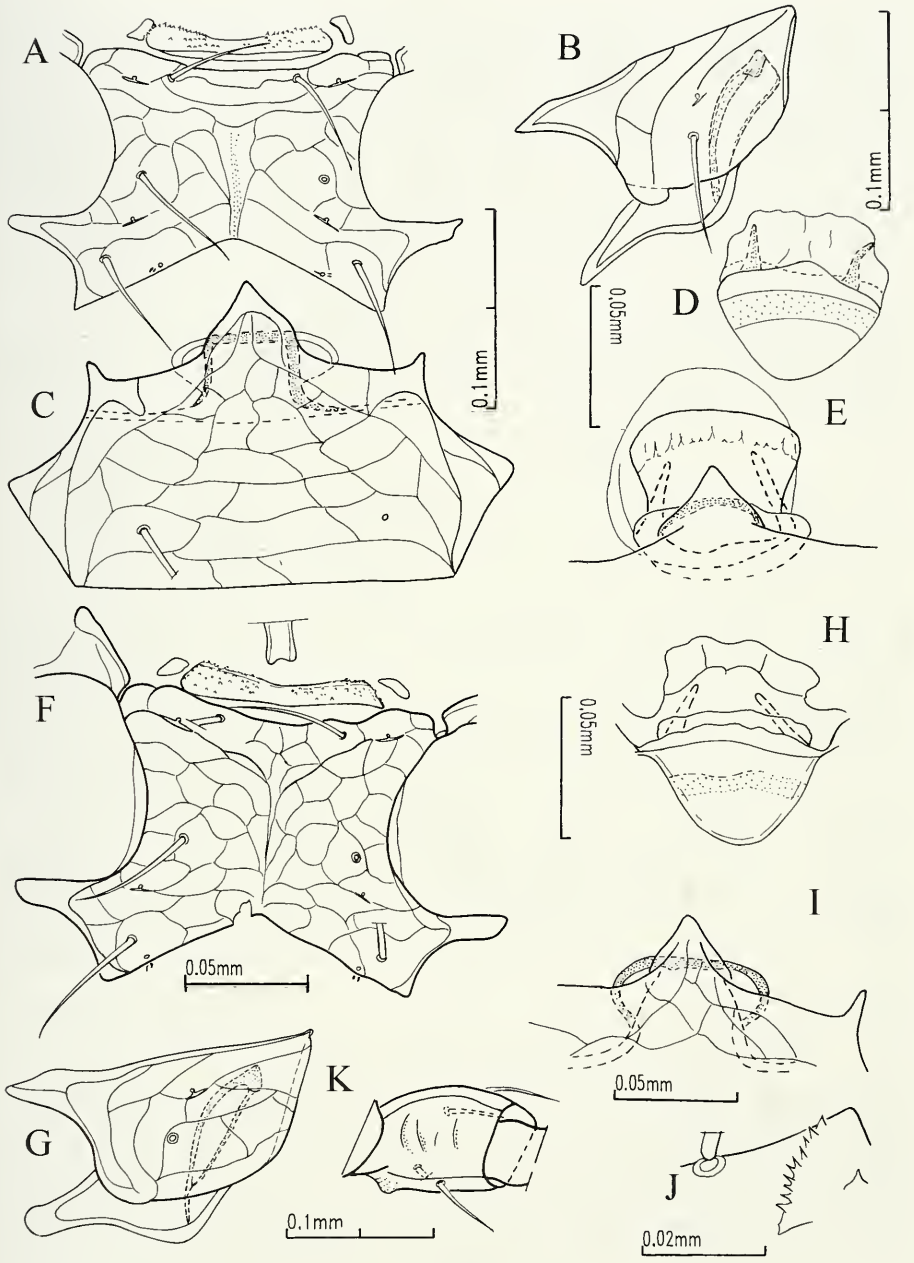

FIG. 6

Holoparasitus canariensis sp. n. female (A-E). (A) Presternal plate and sternal shield. (B) Paragynium. (C) Epigynium. (D) Endogynium. (E) Apex of epigynium and endogynium. *Holparasitus anaga* sp. n., female (F-K). (F) Presternal plate and sternal shield. (G) Paragynium. (H) Endogynium. (I) Apex of epigynium. (J) Group of denticles on coxa II. (K) Trochanter IV.

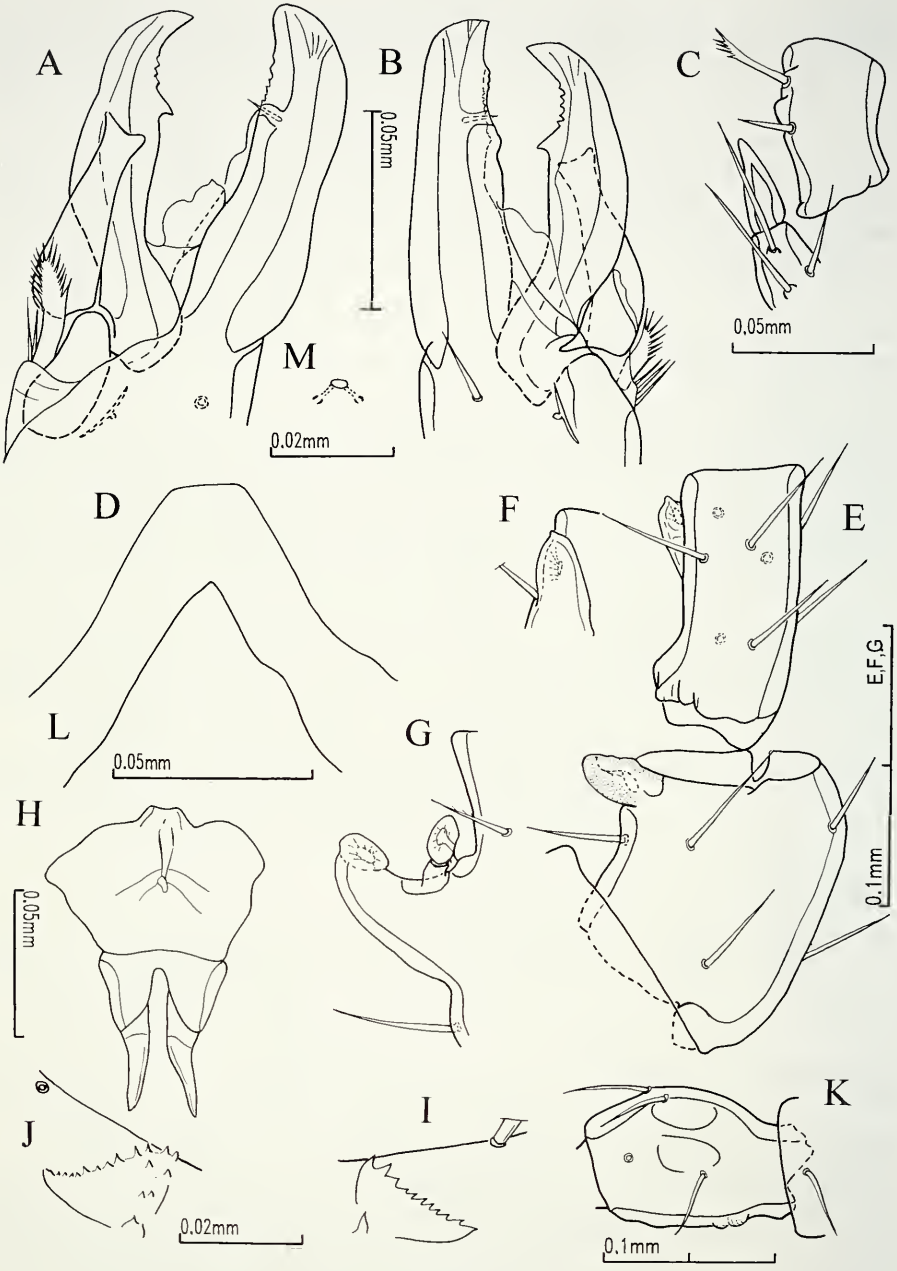

FIG. 7

Holoparasitus anaga sp. n. male (A-K). (A) Chelicera, paraxial view. (B) Chelicera, antiaxial view. (C) Palptrochanter and corniculus. (D) Gnathotectum. Leg II. (E) Genu and tibia. (F) Tibial apophysis, ventral view. (G) Femoral apophysis and axillary process. (H) Genital lamina. (I, J) Group of denticles on coxa II. (K) Trochanter IV. Female (L-M). (L) Gnathotectum. (M) Double gland *gv2*.

length of sternal setae: *st1* = 60 μm, *st2-st3* = 54 μm. Length of ventral setae around 36 μm, *ZV1* = 42 μm. Gland *gv2* with one gland, some specimens with two glands.

Gnathosoma. Trapezoidal gnathotectum, some specimens with slightly concave apex (Fig. 7D). Hypognathal groove with 7-8 rows of fine denticles, hypostomatic setae simple, palpcoxal seta finely pilose. Corniculi triangular. Palptrochanter with protuberance between simple seta *v1* and pilose seta *v2* (Fig. 7C).

Chelicera (Fig. 7A-B): fixed digit very large, with 5-6 denticles around pilus dentilis; movable digit slightly hooked with 4-5 denticles and a tooth on inner margin; arthrodial membrane with medium-size brush-like process.

Legs. Coxa II with ridge bearing 11 denticles and a basal denticle, one specimen with ridge of 14 denticles and 5 basal denticles (Fig. 7I-J). Armature of leg II as in figures 7 E-G: curved femoral apophysis, oval axillary process, both ending on same level; elongated genual apophysis protrude beyond distal margin of the segment; large triangular tibial apophysis carrying a small tip on its apex. Trochanter IV with protuberance located ventrally (Fig. 7K).

Female. Dorsal idiosoma. Colour brownish yellow; length of podonotal setae: *j1* = 54 μm, *z1* = 18 μm, *r3* = 36 μm, *r5* = 60 μm; opisthonotal setae shorter 15-18 μm.

Ventral idiosoma. Presternal plate ribbon-like, serrated, some specimens with few denticles; sternal shield reticulated, with two marked lines forming a "V" under setae *st1*, length of sternal setae from 66 to 72 μm; gland pore *gv1* usually located on posterior margin of sternal shield, in some specimens on cuticule (Fig. 6F). Paragynia reticulated, with rounded posterior protrusion not very prominent; metagynia elliptical (Fig. 6G). Epigynium with large triangular apex, subapical epigynial structure ellipsoidal, with sclerotized anterior border (Fig. 6I). Endogynium cup-like, two small protrusions located on posterior margin and covered by hyaline flap (Fig. 6H). Length of ventral setae from 36 μm to 50 μm. Gland *gv2* double

Gnathosoma. Gnathotectum triangular, lateral tips obliterated (Fig. 7L). Hypognathal groove with 9 rows of fine denticles. Hypostomatic setae simple. Palptrochanter bumpy between pilose setae *v1* and barbed setae *v2*.

Legs. Coxa II with ridge of 12 denticles and a basal denticle (Fig. 6J). Trochanter IV with protuberance situated ventrally (Fig. 6K).

Holoparasitus lapalma sp. n. Figs 8-9

TYPE MATERIAL: ♂ holotype, 1 ♀ paratype; SPAIN, Canary Islands, La Palma, Los Tilos, leaf litter in a gorge near Cascada de Los Tilos, 14.08.1966 leg. H.F. (Sp. 1100).

OTHER MATERIAL EXAMINED: 2♂, 1♀, La Palma, Cascada de Los Tilos near Sauces, leaf litter in a gorge, 17.04.1965, leg. H.F. (Sp. 1051-1052). – 3♂, 2♀, La Palma, Parrador des Los Tilos, leaf litter, 17.04.1965 leg. H.F. (Sp. 1053). – 1♂, 1♀, La Palma, Fuente de la Zarza, moss near a spring, 17.08.1966, leg. H.F. (Sp. 1109). – 1♂, 1♀, La Palma, Barranco Franceses, sifting of *Laurus* leaf litter, 17.08.1966 leg. H.F. (Sp. 1110). – 1♂, idem, 27.03 1970. – 1♂, La Palma, Roque del Faro, rotten bark of *Pinus canariensis,* 27.03.1970 leg. H.F. (Sp. 1235). – 1♂, 1♀, La Palma, Road between Santa Cruz and El Paso, 15 km away from Santa Cruz, anterior leaf litter and soil in laurel forest, 880m, 10.05.1993, leg. B. H.

ETYMOLOGY: The species name, a noun in apposition, is derived from La Palma Island where the specimens were found.

DIAGNOSIS: Male. Gnathotectum tongue-like; chelicera with straight fixed digit with inner margin denticulate near pilus dentilis and with movable digit bearing 6-8

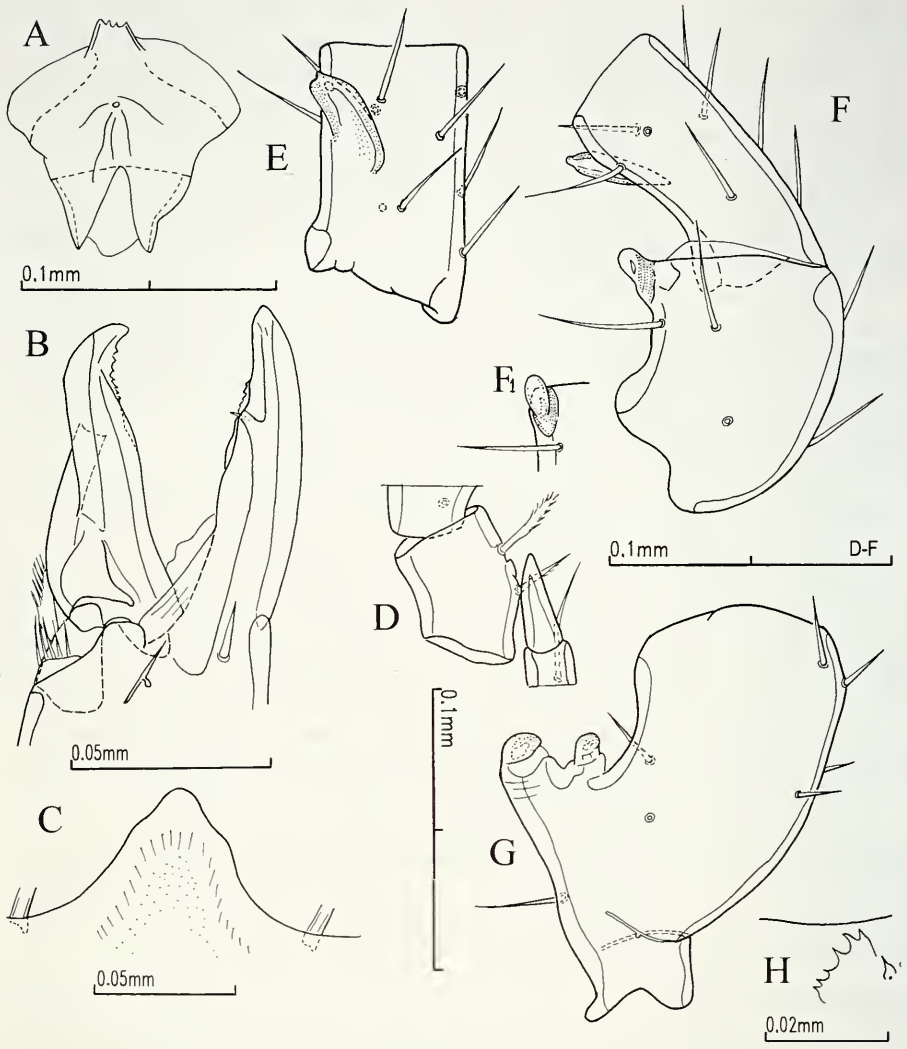

FIG. 8

Holoparasitus lapalma sp. n. male. (A) Genital lamina. (B) Chelicera, antiaxial. (C) Gnathotectum. (D) Palptrochanter and corniculus. Leg II. (E) Tibia, ventral view. (F) Genu, tibia posterolateral view, F1genual apophysis, ventral view. (G) Femur, posterolateral view. (H) Group of denticles on coxa II.

denticles. Female: presternal plates without or with few denticles; epigynium with sharp triangular apex and trapezoidal subapical structure surrounded by membranous lateral wings; endogynium sack-like, with vestigial protrusions.

DESCRIPTION: Male. Dorsal idiosoma. Colour brownish red; length of podonotal seate: *j1* = 36 μm, z1 = 18 μm, others from 24 to 30 μm; seate on opisthonotum 18 μm.

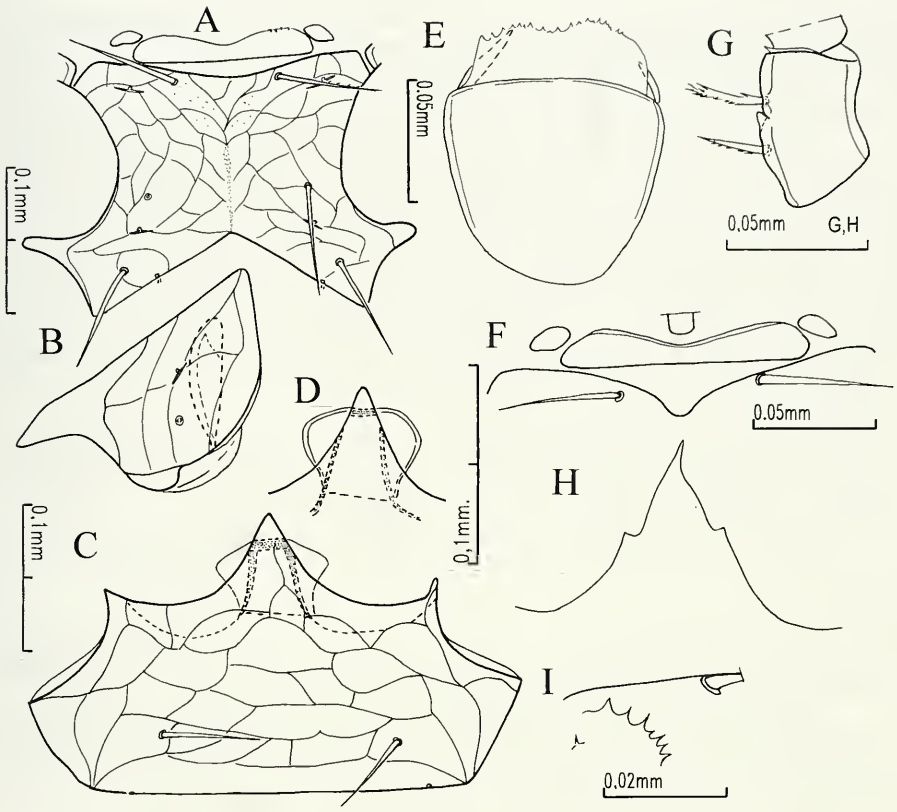

FIG. 9

Holoparasitus lapalma sp. n. female. (A) Presternal plate and sternal shield. (B) Paragynium. (C) Epigynium. (D) Apex of epigynium. (E) Endogynium. (F) Presternal plate. (G) Palptrochanter. (H) Gnathotectum. (I) Group of denticles on coxa II.

Ventral idiosoma. Genital lamina with trapezoidal process and rounded lateral corners; rectangular microsclerite located behind genital lamina (Fig. 8A). Sternogenital shield with a polygonal reticulation and a distinct line near setae *st2*; length of sternal setae: *st1*, *st2* = 60 μm, *st3* = 54 μm. Length of ventral setae 25-30 μm. Gland *gv2* double.

Gnathosoma. Gnathotectum tongue-like (Fig. 8C). Corniculi triangular. Hypognathal groove with 9-10 rows of denticles; hypostomatic setae simple, palpcoxal setae pilose. Palptrochanter with pilose seta *v1* and barbed seta *v2*, between them a small protuberance (Fig. 8D).

Chelicera (Fig. 8B): straight fixed digit with truncate apex and 5-6 tiny denticles around pilus dentilis; movable digit with 7-8 denticles on inner margin and with medium-sized brush-like process.

Legs. Coxa II with ridge bearing 6 denticles and a basal denticle (Fig. 8H). Armature of leg II as in figures 8E-G: short, rounded femoral apophysis and axillary

process; finger-like and protruded apophysis situated on distal margin of genual segment; tibia with large triangular mucronate apophysis.

Female. Dorsal idiosoma. Podonotal setae: *j1* = 36 μm, *z1* = 15-18 μm, *r*3 = 42 μm, others about 24 μm. Opistonotal setae around 12-18 μm.

Ventral idiosoma. Presternal plate ribbon-like, generally simple, some specimens with few denticles; sternal shield reticulated, with granular strip medially, position of gland pore *gv1* variable, either medially, on posterior margin, or in some specimens on cuticle. (Fig. 9A, F). Length of sternal setae: *st1* = 66 μm, *st2* = 60 μm, *st3* = 70 μm. Paragynial shield reticulated, with rounded posterior paragynial protrusion; metagynial sclerite elliptical (Fig. 9B). Epigynium with sharp triangular apex, trapezoidal subapical structure surrounded by membranous fan-like wings (Fig. 9C-D). Endogynium sack-like with two vestigial protrusions located on posterior margin, covered by delicate, serrated lamina (Fig. 9E). Length of ventral setae from 30 μm to 36 μm. Gland *gv2* double.

Gnathosoma. Gnathotectum trispinate (Fig. 9H). Hypognathal groove with 10 rows of fine denticles; hypostomatic setae and palpcoxal setae pilose. Palptrochanter with thickened boarder between pilose seta *v1* and barbed seta *v2*.

Legs. Coxa II with anterolateral ridge bearing 7-9 denticles plus a basal denticle (Fig. 9I).

Holoparasitus giganteus sp. n. Fig. 10

Type material: ♂ holotype, 1 ♀ paratype, SPAIN, Madeira, Ribeiro Grande and Ribeiro Bonito, leaf litter, laurel forest, 7.04.1967, leg. H.F. (Sp. 1148-1151).

Other material examined: 2 ♀, Queimadas near Santana, leaf litter in laurel forest, 1.04.1967, leg. H.F. (Sp. 1141). – 1 ♀, Acha das Areias, under Boca de Encumeada, leaf litter in laurel forest, 5.04.1967, leg. H.F. (Sp. 1146).

Etymology: The species name alludes to the size of this mite.

Diagnosis: Big species, ♂ tarsus I = 242-247 μm, tarsus IV = 270 μm; ♀ tarsus I = 240-252 μm, tarsus IV = 265-300 μm. Male. Sternogenital shield reticulated, with granular cuticule; gnathotectum triangular, with rounded apex; chelicera with straight fixed digit bearing 9 denticles around pilus dentilis and movable digit with 5 denticles and a tooth. Female. Presternal shield ribbon-like, platelets free; endogynium cup-like, with two protrusions, their height 48 μm and basal distance between them 55 μm; epigynium large, subapical structure with two triangular wings.

Description. Only some of the main characters could be observed because the specimens examined were squashed.

Male. Dorsal idiosoma. Colour reddish brown. Most setae lost during the preparation; length of setae on opisthonotum from 14 to 18 μm.

Ventral idiosoma. Sternogenital shield reticulated, with granular cuticle. Genital lamina with anterior margin undulating, with rectangular apex and rounded lateral angles (Fig. 10D). Microsclerite rectangular and mucronate.

Gnathosoma. Gnathotectum triangular, with rounded apex (Fig. 10B). Corniculi conical; palptrochanter with simple seta *v1* and pilose *v2* (Fig. 10A). Chelicera (Fig. 10C): straight fixed digit with 9 denticles around pilus dentilis; movable digit with 5 denticles and a tooth, arm of spermatotreme straight. Arthrodial membrane with small brush-like process.

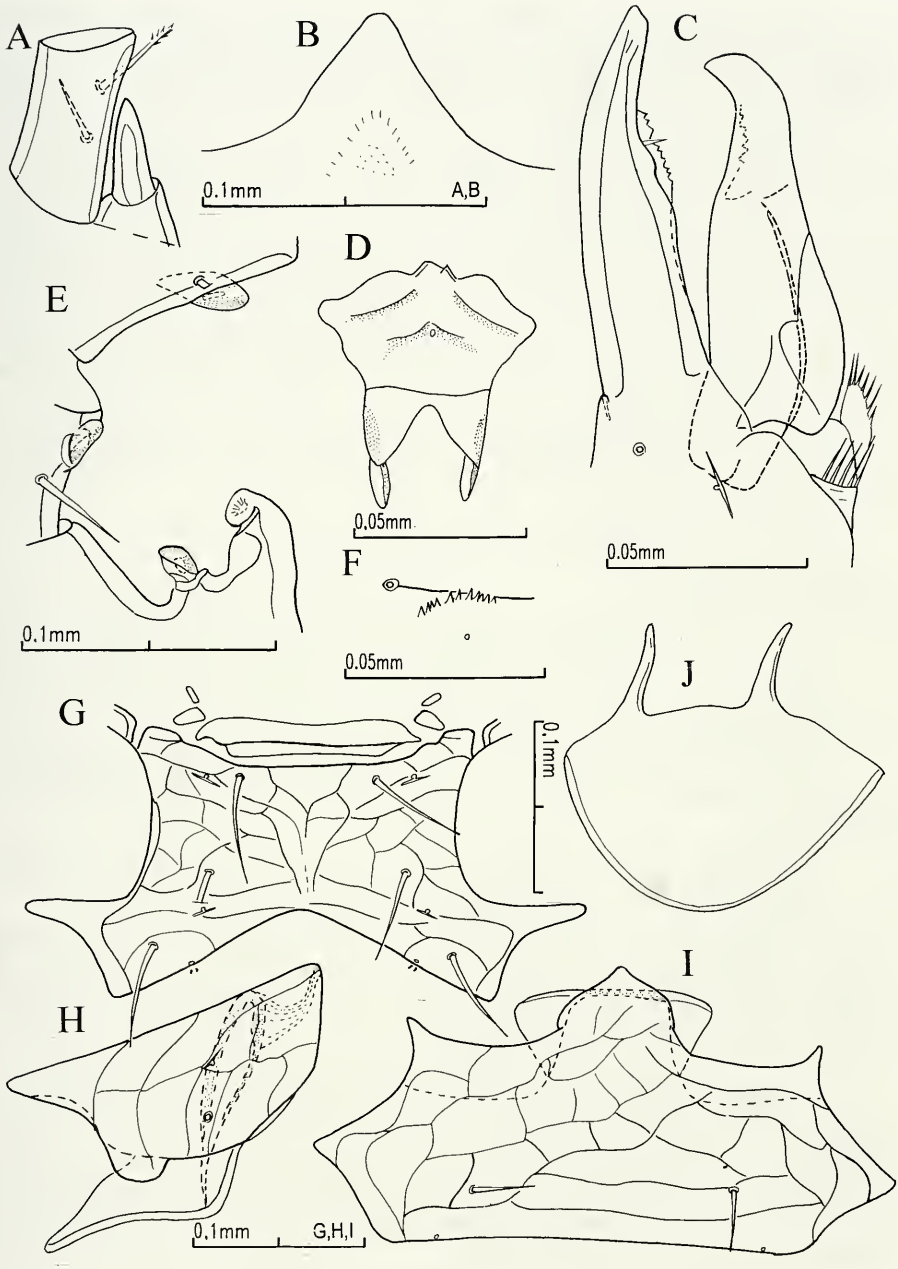

FIG. 10

Holoparasitus giganteus sp. n. male (A-F). (A) Palptrochanter and corniculus. (B) Gnathotectum. (C) Chelicera, antiaxial view. (D) Genital lamina. (E) Femur, genu, tibia of leg II. (F) Group of denticles on coxa II. Female (G-J). (G) Presternal plate and sternal shield. (H) Paragynium. (I) Epigynium. (J) Endogynium.

Leg II. Coxa with an anterolateral ridge of 11 denticles (Fig. 10F). Armature of leg II illustrated in figure 10E: short and thumb-like femoral apophysis and short rectangular axillary process located distally to main femoral spur; on genu an elongated spur near distal margin of segment; rectangular tibial apophysis with rounded apex.

Female. Dorsal idiosoma. Colour reddish brown. On podonotum seta *j1* = 48 μm, others from 24 to 36 μm; length of setae on opisthonotum around 18 μm.

Ventral idiosoma. Presternal plate without denticles; sternal shield reticulated, length of sternal setae 54 to 60 μm, *gv1* located in distal quarter of posterior margin (Fig. 10G). Paragynia with rounded posterior protrusion and elliptical metagynial sclerite (Fig. 10H). Epigynium large, apex triangular, mucronate, subapical structure extended into two triangular wings (Fig. 10I). Endogynium cup-like, with two protrusions on posterior margin, their height 48 μm, distance between them 55 μm (Fig. 10J). Gland *gv2* simple.

Gnathosoma. Gnathotectum triangular with rounded apex and vestiges of lateral prongs. Hypostomatic and palpcoxal setae pilose. Palptrochanter with simple seta *v1* and pilose seta *v2*.

Legs. Coxa II with ridge of 8 denticles, basal denticle absent.

Holoparasitus lunae sp. n. Fig. 11

TYPE MATERIAL: ♂ holotype, 2♂, 3♀ paratypes; SPAIN, Ceiro de Mirador, Sierra de Luna, near Algeciras, Andalusia; sifting of leaf litter and humus, 28.02.1951, leg. H.F. (Sp. 41).

ETYMOLOGY: The species name refers to the Sierra de Luna where the specimens were found and is also a dedication to my grand-daughter Luna.

DIAGNOSIS: Male. Gnathotectum with straight lateral angles and tongue-like central apex. Female: endogynium cup-like, with one finger-like protrusion on posterior margin.

DESCRIPTION: Male. Dorsal idiosoma. Length of setae: on podonotal region from 24 μm to 18 μm, *j1* 30 μm; on opisthonotal region about 13 μm.

Ventral idiosoma. Sternogenital shield slightly reticulated, length of sternal setae *st1* = 40 μm, *st3* = 33 μm. Genital lamina located in small concavity of sternogenital margin. Genital lamina with rounded angles and an indented median process (Fig. 11E); microsclerite large and trapezoidal. Opisthogaster with 8 pairs of ventral setae, their length about 26-30 μm. Gland *gv2* double.

Gnathosoma. Gnathotectum with anterior margin having lateral teeth and rounded, prominent central prong. Hypognathal groove provided with 9 rows of very fine denticles, simple hypostomatic setae located on small protuberance, palpcoxal setae simple. Corniculi triangular, with sharp, small protuberance in their inner, proximal third (Fig. 11C). Palptrochanter with slightly pilose seta *v1* located on rounded prominence and pilose seta *v2* (Fig. 11D).

Chelicera (Fig. 11A). Fixed digit slender, with slightly truncated apex protruding above movable digit; inner margin of fixed digit with 4-6 teeth. Movable digit curved, its inner margin provided with 5-6 denticles and a large median tooth; spermatotreme reaching level of proximal tooth; arthrodial cuticle with a small brush-like process.

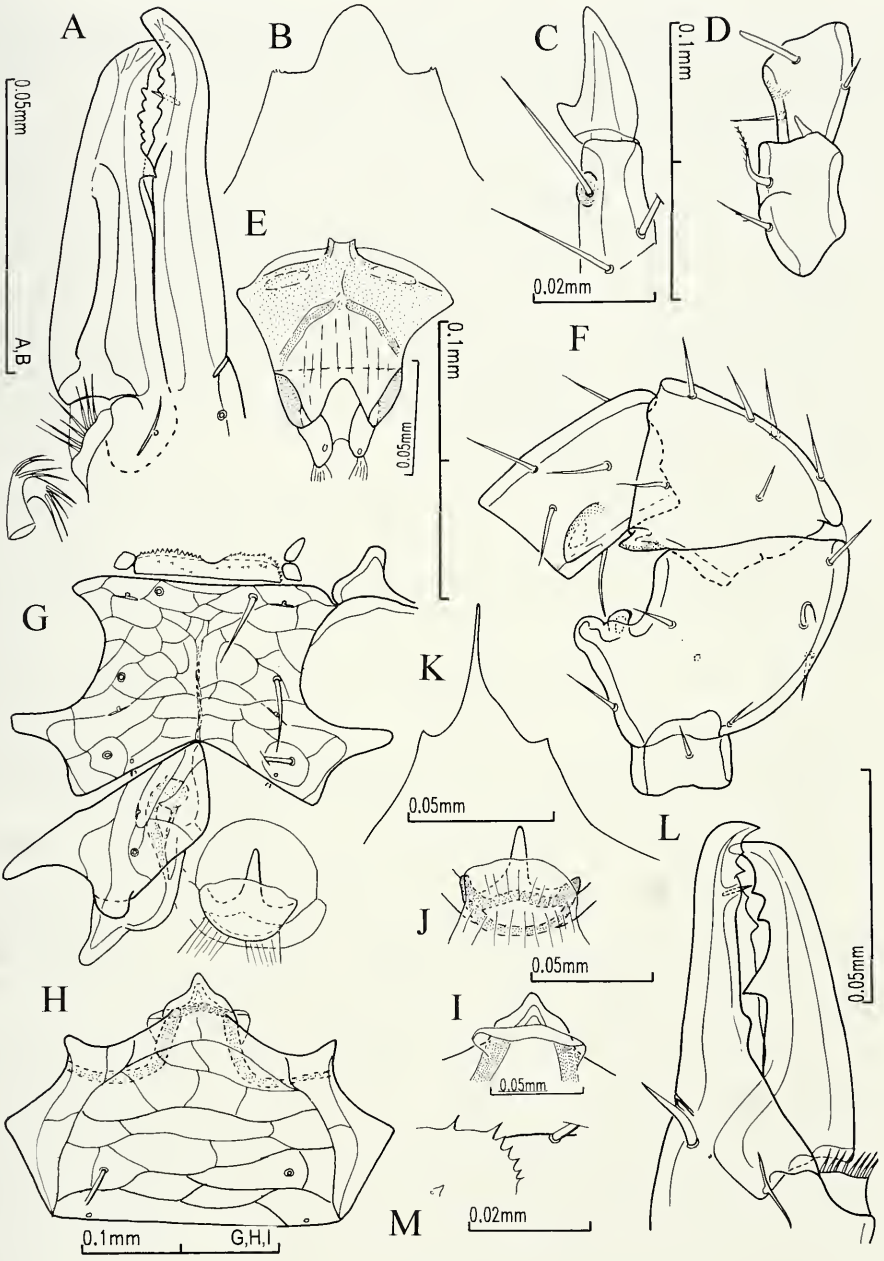

FIG. 11

Holoparasitus lunae sp. n. male (A-F). (A) Chelicera, antiaxial view. (B) Gnathotectum. (C) Corniculus. (D) Palptrochanter and palpfemur. (E) Genital lamina. (F) Femur, genu, tibia of leg II. Female (G-M). (G) Presternal plate, sternal shield, paragynium and endogynium. (H) Epigynium. (I) Apex of epigynium, dorsal view. (J) Endogynium. (K) Gnathotectum.

Legs. Coxa II with rounded comb-like structure formed by 6 denticles and a basal extra one. Armature of leg II (Fig. 11F): short, thumb-like femoral apophysis and trapezoidal axillary process; triangular spur located near distal margin of genual segment; large triangular tibial apophysis situated medially.

Female. Dorsal idiosoma. Length of setae: on podonotum from 24 to 36 μm, on opisthonotum shorter around 12 μm.

Ventral idiosoma. Presternal plate entire, ribbon-like, serrated; sternal shield reticulated with a longitudinal strip medially, length of sternal setae 36-40 mm; gland pore *gv1* located in vicinity of seta *st3* (Fig. 11G). Paragynial shield reticulated, with rounded posterolateral protrusions; arched metagynial sclerite (Fig. 11G). Epigynial shield with anterior margin formed by a broad triangular apex and two lateral, not very prominent prongs; subapical epigynial structure with a strong sclerotized rectangle and two hyaline wing-like protrusions (Fig. 11H-I). Endogynium a cup with one central finger-like protrusion located on an elliptical sclerotized structure and covered by a hyaline membrane (Fig. 11G, J).

Opisthogastric region with 8-9 pairs of ventral setae, their length about 26 μm. Gland *gv2* double.

Gnathosoma. Gnathotectum trispinate with long central prong and two tiny lateral spines (Fig. 11K). Hypognathal groove with 10 weakly denticulated rows. Simple hypostomatic and pilose palpcoxal setae. Palptrochanter with simple seta *v1* and pilose *v2*.

Legs. Coxa II with a group of 7-8 denticles and a tiny basal denticle (Fig. 11M).

Holoparasitus malleus sp. n. Fig. 12

TYPE MATERIAL: 1♂ holotype, 2♂, 9♀ paratypes, SPAIN, Malaga Mountains, Venta Galvey, sifting leaf litter under bushes, 20.04.1963, leg. H.F. (Sp. 942).

ETYMOLOGY: The species name (Latin: *malleus* = hammer), a noun in apposition, refers to the form of the fixed digit of the male chelicera.

DIAGNOSIS: Male. Gnathotectum with large, protuberant and rounded apex and a sharp angle between its base and lateral prongs, corniculi with small protuberance medially, chelicera with hammer-like fixed digit. Female: endogynium with one slender protrusion, located on posterior margin, apex of protrusion sharp or bifid.

DESCRIPTION: Male. Dorsal idiosoma. Well-sclerotized, light brown in colour. Length of podonotal setae: *j1* = 32 μm, other setae of *r* row 26 μm to 30 μm. Opisthonotal setae very short 10 to 12 μm.

Ventral idiosoma. Sternal shield reticulated, genital lamina situated in a shallow concavity. Anterior margin of genital lamina with a trapezoidal prong and rounded lateral margins (Fig. 12F). Microsclerite trapezoidal (Fig. 12E). Opisthogaster with 8 pairs of ventral setae, their length: *JV3*, *JV5* = 24 μm, *ZV1* = 30 μm. Gland *gv2* simple.

Gnathosoma. Gnathotectum with triangular lateral prongs forming a sharp angle with basis of protuberant and rounded central prong (Fig. 12B). Hypognathal groove with 9 slightly denticulated rows. Simple hypostomatic and pilose palpcoxal setae. Corniculi with small prominence situated medially on ventral face (Fig. 12D). Palptrochanter with short seta *v1* located on protuberance and pilose seta *v2* (Fig. 12C).

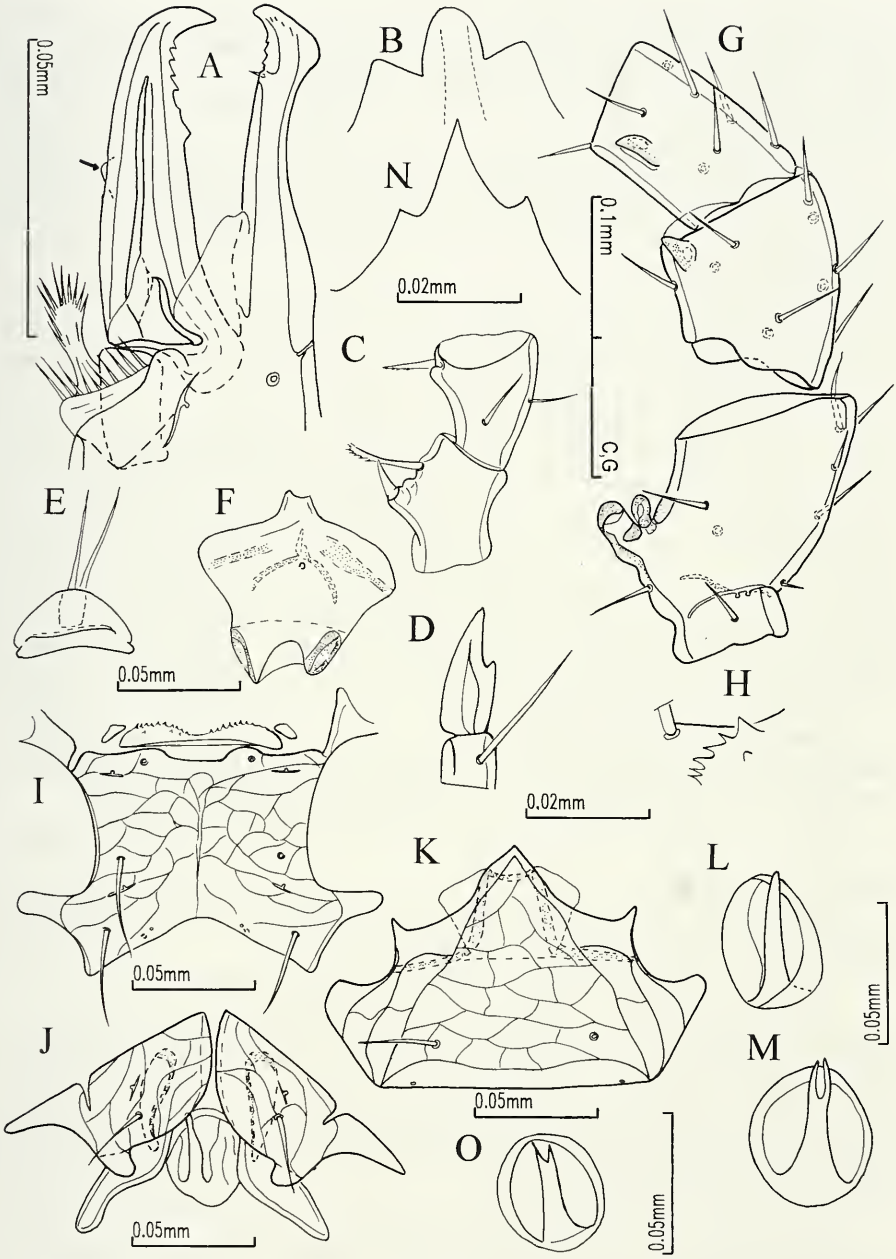

FIG. 12

Holoparasitus malleus sp. n. male (A-H). (A) chelicera, antiaxial view. (B) Gnathotectum. (C) Palptrochanter and palpfemur. (D) Corniculus. (E) Microsclerite and tritosternum. (F) Genital lamina. (G) Femur, genu, tibia of leg II. (H) Group of denticles on coxa II. Female (I-N). (I) Presternal plate and sternal shield. (J) Paragynium and endogynium. (K) Epigynium. (L, M, O) Endogynium. (N) Gnathotectum.

Chelicera (Fig. 12A). Fixed digit hammer-like, with 6 denticles on its inner margin between pilus dentilis and apex. Movable digit with hooked apex and 4-5 denticles on its inner margin; long spermatotreme ending at level of third denticle on movable digit, its arm with small protuberance medially; arthrodial membrane with long brush-like process.

Legs. Coxa II with rounded ridge of 8 denticles and an extra basal denticle (Fig. 12H). Spurs on leg II as in figure 12G. Short femoral apophysis and oval axillary process ending on same level; genu with conical spur located distally; tibia with a short trapezoidal spur.

Female. Dorsal idiosoma. Cuticule reddish-brown coloured. Length of podonotal seate: *j1* = 32μm, *j2* and *j6* = 32 μm, *j3* = 46 μm, *j4* and *j5* = 39 μm; *z1* = 13 mm, *z3* = 35 μm, *z4* and z5 = 30 μm, *z6* = 25 μm; setae of *s* row 26 μm; *r2* = 20 μm, *r3* = 46 μm. Opisthonotum with short setae from 7 to 13 μm.

Ventral idiosoma. Presternal plate ribbon-like, serrated especially on anterior margin; sternal shield reticulated, with a longitudinal strip medially; gland pore *gv1* located medially on posterior sternal margin (Fig. 12I). Length of sternal setae: *st1* = 48 μm, *st2* from 48 to 54 μm, *st3* = 54 μm. Paragynial shield with triangular posterolateral protrusions, their apex rounded (Fig. 12J). Anterior epigynium margin with large triangular apex, subapical epigynial structure formed by a well-sclerotized rectangular line and by a hyaline fan-like structure, spreading out like two wings (Fig. 12K). Endogynium a rounded cup with posterior margin forming a long slender protrusion; its tip bifid in some specimens (Fig. 12L, M, O). Length of ventral setae *JV2* = 45 μm, *JV3* = 30 μm, others 32-35 μm.

Gnathosoma. Gnathotectum trispinate, with long central prong (Fig. 12N). Hypostomatic setae simple, palpcoxal setae slightly pilose. Pedipalps: trochanter with slight protuberance between pilose seta *v1* and thicker, barbed seta *v2*.

Legs. Coxa II with a rounded ridge of 6-8 denticles and an extra denticle.

Holoparasitus rifensis sp. n. Figs 13-14

TYPE MATERIAL: ♂ holotype, 5♂, 8♀ paratypes, MOROCCO, El Gouzat near Taineste, Rif mountains, 1500 m, soil under cork oak, 2.06.1978, leg. B.H.

ETYMOLOGY: The species name refers to the Rif mountain region.

DIAGNOSIS: Male. Both digits of chelicera with 6-7 denticles; arm of spermatotreme with small prominence located on inner side; gnathotectum with rounded apex and two tiny lateral prongs. Female: endogynium circular, cup-like with 6-8 denticles on anterior and lateral walls and with posterior margin protruded into one prolongation; epigynium with triangular, well sclerotized subapical structure with two small hyaline wings extended beyond epigynial apex.

DESCRIPTION: Male. Dorsal idiosoma. Cuticle brownish yellow. Length of podonotal seate from 36 μm (*j1*, *r3*), 42 μm (*j* row) to 24 μm (*s4*); setae on opisthonotum from 24 μm to18 μm.

Ventral idiosoma. Sternal shield without a particular pattern; length of sternal setae from 30 to 36 μm. Genital lamina with rectangular central prong and two triangular lateral extensions; subgenital sclerite rectangular (Fig. 13A). Gland *gv2* double. Length of ventral setae from 30 μm to 36 μm.

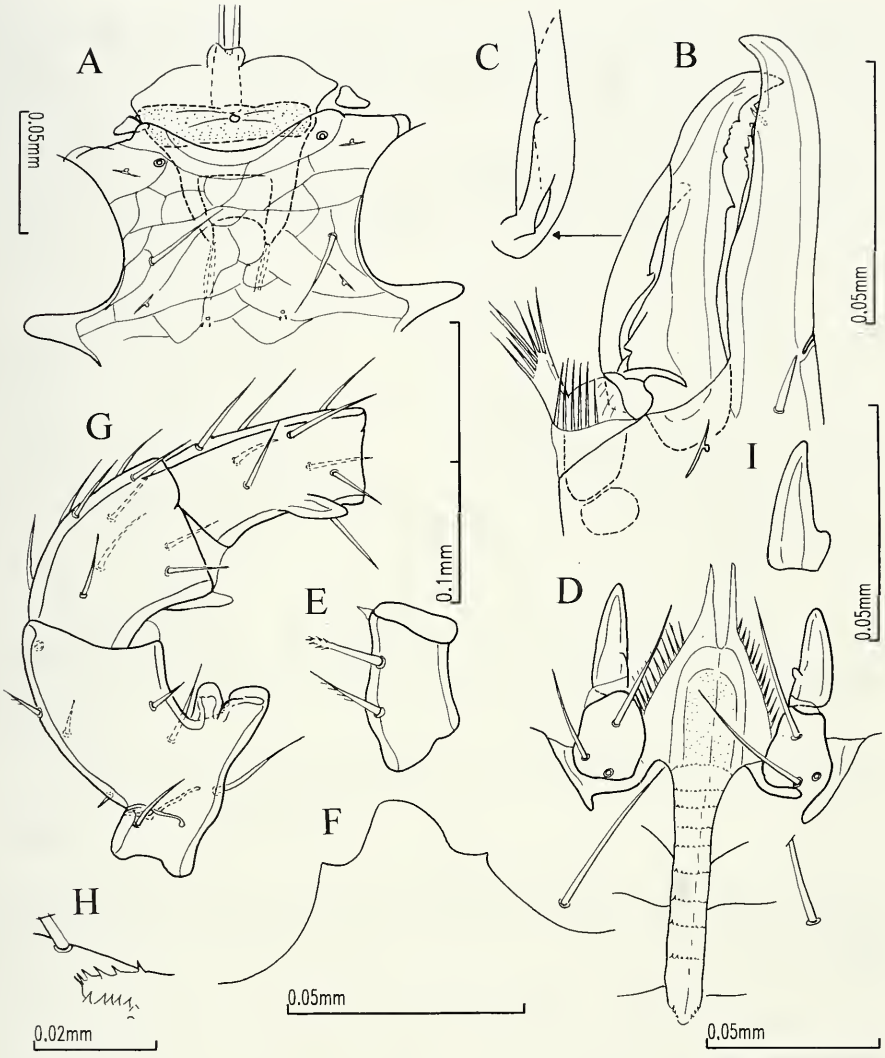

FIG. 13

Holoparasitus rifensis sp. n. male. (A) Genital lamina, microsclerite and anterior part of sternogenital shield. (B) Chelicera, antiaxial. (C) Spermatotreme, paraxial. (D) Hypognathum and corniculi. (E) Palptrochanter. (F) Gnathotectum. (G) Femur, genu, tibia of leg II. (H) Group of denticles on coxa II.

Gnathosoma. Gnathotectum with big, round central prong and two tiny lateral prongs (Fig. 13F). Corniculi with small prominence in their basal third; hypognathal groove with 10 rows of denticles; hypostomatic setae simple, palpcoxal setae pilose (Fig. 13D, I). Palptrochanter with pilose seta *v1* and thicker, barbed *v2* (Fig. 13E).

Chelicera (Fig. 13B-C). Fixed and movable digits with their apices curved and a row of 6-7 denticles on their inner margins. Arm of spermatotreme with small promi-

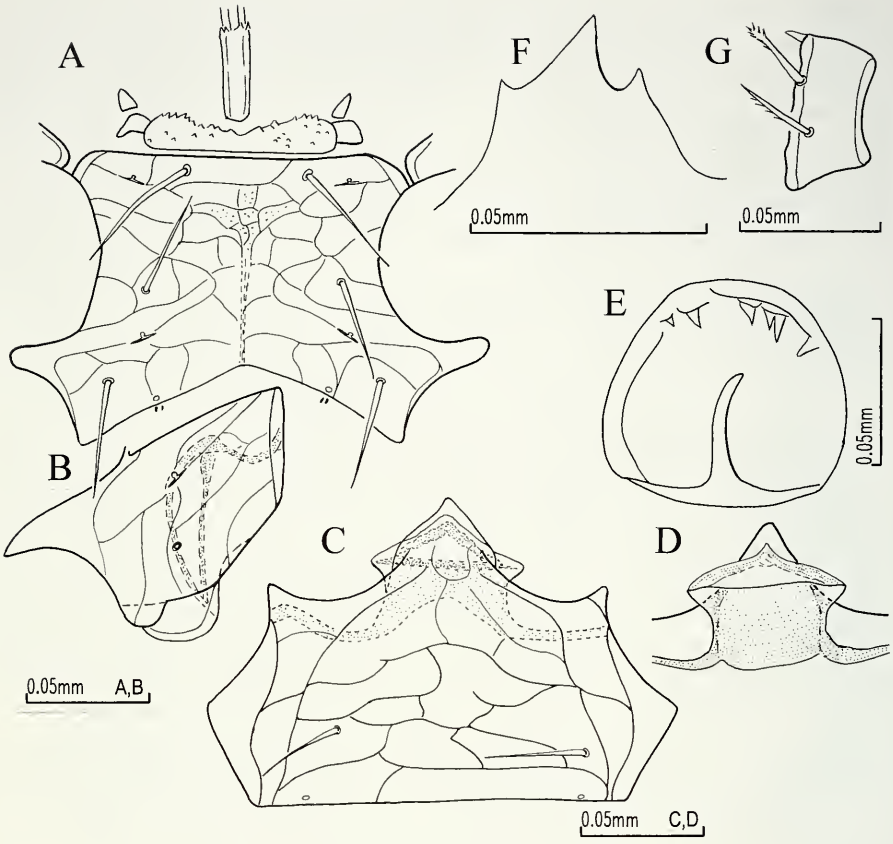

FIG. 14

Holoparasitus rifensis sp. n. female. (A) Presternal plate and sternal shield. (B) Paragynium. (C) Epigynium. (D) Apex of endogynium, dorsal view. (E) Endogynium. (F) Gnathotectum. (G) Palptrochanter.

nence located in its inner basal third; arthrodial membrane with short brush-like process.

Legs. Leg II: coxa with 6 to 12 denticles on two ridges, without basal denticle located near pore (Fig. 13H). Femoral apophysis and axillary process thumb-like; genu and tibia with triangular spurs (Fig. 13G). Apohysis on tibia appearing mucronate and rounded when squashed.

Female. Dorsal idiosoma. Colour brownish yellow, well-sclerotized. Length of podonotal setae from 36 to 42 μm (*j* row), opisthonotal setae 12 to 18 μm.

Ventral idiosoma. Presternal plate serrated, reticulation of sternal shield regular, with granular strip medially; length of sternal setae from 54 μm (*st1*) to 48 μm (*st2*, *st3*); gland pore *gv1* located medially on posterior margin (Fig. 14A). Paragynial shield reticulated with rounded posterolateral protrusions; metagynial sclerite almost straight (Fig. 14B). Epigynial shield with triangular apex; sclerotized subapical structure trian-

gular (like a Chinese hat in profile), with elongated hyaline wings extending beyond epigynial margin (Fig. 14C-D). Endogynium circular, cup-shaped, with 7-8 spines on anterior and lateral walls and with posterior margin forming a single straight or sometimes forked protrusion (Fig. 14E). Gland *gv2* double. Length of ventral setae from 36 μm to 42 μm.

Gnathosoma. Gnathotectum trispinate, lateral prongs small (Fig. 14F). Corniculi triangular. Hypognathal groove with 9-10 rows of denticles; hypostomatic setae simple, palpcoxal setae pilose. Palptrochanter with pilose seta *v1* and barbed seta *v2* (Fig. 14G).

Legs. Coxa II with a ridge of 7-8 denticles and a tiny basal denticle.

Holoparasitus algiersensis sp. n. Figs 15, 16A-B

TYPE MATERIAL: ♂ holotype, 2 ♀ paratypes, ALGERIA, east of Algiers, Rassauta swamp, littoral, 7.10.1956 (L. 102).

OTHER MATERIAL EXAMINED: 1♂, 2♀, ALGERIA, Algiers near "Maison Carée", vegetation under *Ulmus*, 12.05.1957 (L. 709). – 2♀, ALGERIA, Algiers, soil, garden of the geriatrics hospital, 12.05.1956 (LD. 874). – 2♂, ALGERIA, Algiers, "Ecole nationale agronomique" propriety, pine forest, leaf litter, 22.05.1960. All the material collected by C. Athias-Henriot.

ETYMOLOGY: The name species refers to the type locality, Algiers the capital of Algeria.

DIAGNOSIS: Male. Movable digit of chelicera with 2 teeth and 1 denticle between them, fixed digit straight, with truncate apex and inner margin with hump and one denticle. Female: apex of epigynium elongated, tongue-like; endogynium a small, simple sack.

DESCRIPTION: Male. Dorsal idiosoma. Cuticle well-sclerotized, colour reddish yellow. Length of setae on podonotal shield from 30-36 μm, setae on opisthonotum small, 12 μm.

Ventral idiosoma. Sternal shield reticulated with two concave sclerotized lines between *st1* and *st2*; length of sternal setae about 40-42 μm. Rectangular sclerotized strip on internal anterior margin of sternogenital shield between protuberances delimiting genital concavity. Genital lamina rounded, with two small lateral prongs; anterior margin and central part well sclerotized (Fig. 16A, B). Rectangular and well-sclerotized microsclerite bearing tritosternum. Gland *gv2,* simple (Fig. 15K).

Gnathosoma. Gnathotectum with three prongs, median longer than lateral ones (Fig. 15F). Hypognathal groove with 9 rows of very fine denticles; palpcoxal seta finely pilose, hypostomatic setae simple; corniculi triangular, with small prominence situated paraxially (Fig. 15C, D). Palptrochanter with simple seta *v1* and slightly pilose *v2* (Fig. 15D).

Chelicera (Fig. 15A, B). Movable digit with three teeth and denticle between them. Specimens from slide LD 887 only with two big teeth; short spermatotreme ending distally at level of basal tooth; arthrodial membrane with short brush-like process paraxially. Fixed digit straight, apex truncate, its inner margin with membranous hump and denticle near pilus dentilis

Legs. Coxa II with ridge bearing 7-8 denticles. Leg II armed as follows (Fig. 15E): short thumb-like, femoral apophysis and trapezoidal axillary process; triangular

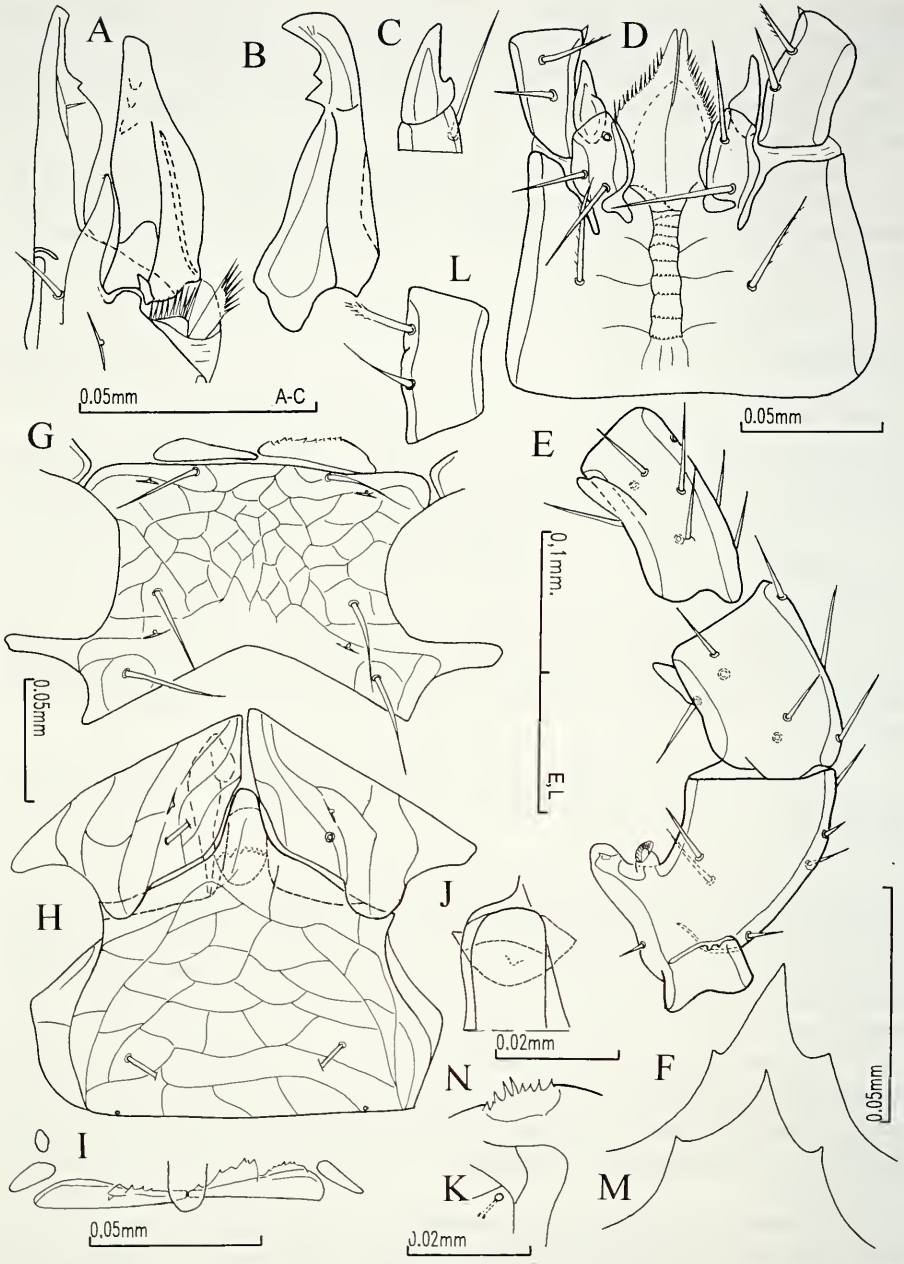

FIG. 15

Holoparasitus algiersensis sp. n. male (A-F). (A) Chelicera, antiaxial. (B) Spermatotreme, paraxial. (C) Corniculus. (D) Palptrochanter and gnathosoma, ventral view. (E) Femur, genu, tibia of leg II. (F) Gnathotectum. Female (G-N). (G) Presternal plate and sternal shield. (H) Paragynium and epigynium. (I) Presternal plate. (J) Endogynium. (K) Simple gland-pore *gv2*. (L) Palptrochanter. (M) Gnathotectum. (N) Group of denticles on coxa II.

spur located distally on genual margin; trapezoidal tibial apophysis ending nearly at distal margin of segment.

Female. Dorsal idiosoma as in male. Length of setae on podonotal region 24 μm (row *j*), 24-30 μm other, 30-36 μm (*j1*); setae on opisthonotal region shorter, 12 μm.

Ventral idiosoma. Presternal plate ribbon-like, with slightly denticulate anterior margin; sternal shield reticulated, length of sternal setae from 45 μm to 54 μm; gland pore *gv1* absent (Fig. 15G, I). Paragynial shield reticulated, posterolateral protrusions rounded (Fig. 15H). Epigynial shield with tongue-like apex and two lateral spines (Fig. 15H). Endogynium small, sack-like, with two tiny lateral prolongations (Fig. 15J). Length of ventral setae from 30 to 36 μm. Gland *gv2* simple.

Gnathosoma. Gnathotectum trispinate (Fig. 15M). Hypognathal groove with 10 rows of denticles, the last four oligodent; hypostomatic setae simple, palpcoxal seta pilose.

Pedipalp. Border of trochanter thickened between pilose seta *v2* and simple seta *v1* (Fig. 15L).

Legs. Denticulated ridge on coxa II with 8 denticles.

Holoparasitus eivissa sp. n. Figs 16C, 17

Type material: ♂ holotype, SPAIN, Ibiza, road between St Juan and St Miguel, pine forest, sifting of leaf litter and soil, 20.09.2006, leg. I. Juvara-Bals. – 4 ♀ paratypes, San Miguel, Ibiza, small field with almond trees, leaf litter and dry soil, 10.04.1960, leg. H.F. (Sp. 720).

Etymology: The species name is given the catalane name (Eivissa) of Ibiza, noun in apposition.

Diagnosis: Gland *gv1* absent. Male: fixed digit straight and toothless; movable digit with three teeth. Genital lamina well-sclerotized on inner face, with rounded lateral margins and bifurcate central prong. Female: apex of epigynium rounded, sclerotized subapical structure in the form of an inverted T; sack-like, rounded endogynium with sclerotized central part.

Description: Male. Dorsal idiosoma. Colour reddish brown. Length of idiosomal setae: on podonotum from 30 to 36 μm except for seta *z1* 12 μm; length of opisthonotal setae 18 to 24 μm, lateral setae of row *R* very short, 12 μm.

Ventral idiosoma. Sternogenital shield reticulated. Anterior margin of sternal shield with two well-sclerotized protuberances. Genital lamina with two small prongs on anterior margin and rounded lateral angles; its inner side with two lateral and one median heavyly sclerotized formations. Sclerotized central structure continued on posterior side with a sclerotized element attached to inner side of anterior margin of sternal shield (Fig. 16C). Microsclerite pentagonal. Gland *gv1* absent, gland *gv2* simple. Length of sternal and ventral setae from 30 to 36 μm.

Gnathosoma. Gnathotectum trispinate, with long central prong and tiny lateral ones (Fig. 17C). Corniculi with proximal protuberance (Fig. 17D). Simple hypostomatic and pilose palpcoxal setae; hypognathal groove with 9 rows of denticles. Palptrochanter with simple seta *v1* and pilose seta *v2* (Fig. 17D).

Chelicera (Fig. 17A, B). Fixed digit straight, its inner margin toothless except for one tiny tooth situated distally near pilus dentilis. Movable digit with curved apex

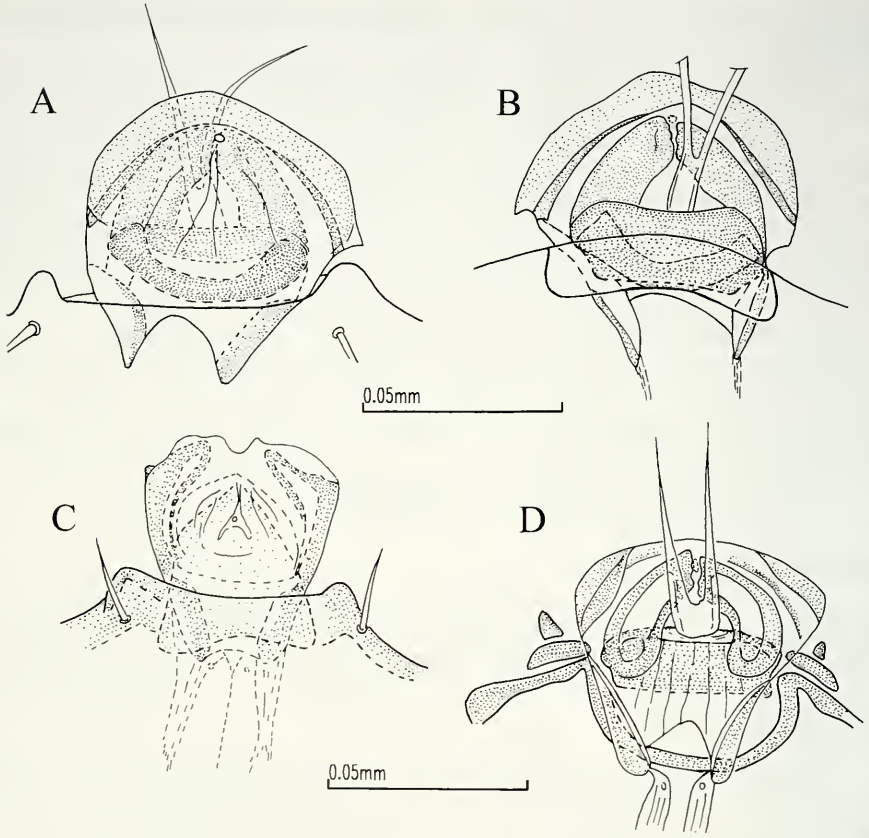

FIG. 16

Anterior margin of sternogenital shield, genital lamina and microsclerite. (A, C) ventral view, (B, D) dorsal view. (A-B) *Holoparasitus algiersensis* sp. n. (C) *Holoparasitus eivissa* sp. n. (D) *Holoparasitus singularis* sp. n.

and three teeth; spermatotreme straight. Arthrodial membrane with short brush-like process.

Legs. Armature of leg II (Fig. 17E): femoral apophysis and axillary process short and rounded; ellipsoidal genual apophysis and elongated tibial apophysis situated near distal margin of respective segment. Trochanter IV with ventral protuberance (Fig. 17F).

Female. Dorsal idiosoma. Colour brownish yellow. Length of setae on podonotum: *r5* = 42 μm, others around 24 to 30 μm; setae on opisthonotum short, their length around 18 μm.

Ventral idiosoma. Presternal plate ribbon-like, serrated; sternal shield reticulated, with a concave line above seta *st2*; gland *gv1* absent (Fig. 17G). Paragynia with big rounded posterior protrusion; large triangular metagynial sclerite (Fig. 17I). Epigynium with round apex and sclerotized subapical structure in the form of an inverted T (Fig. 17H). Endogynium with a sclerotized opening presumably connected

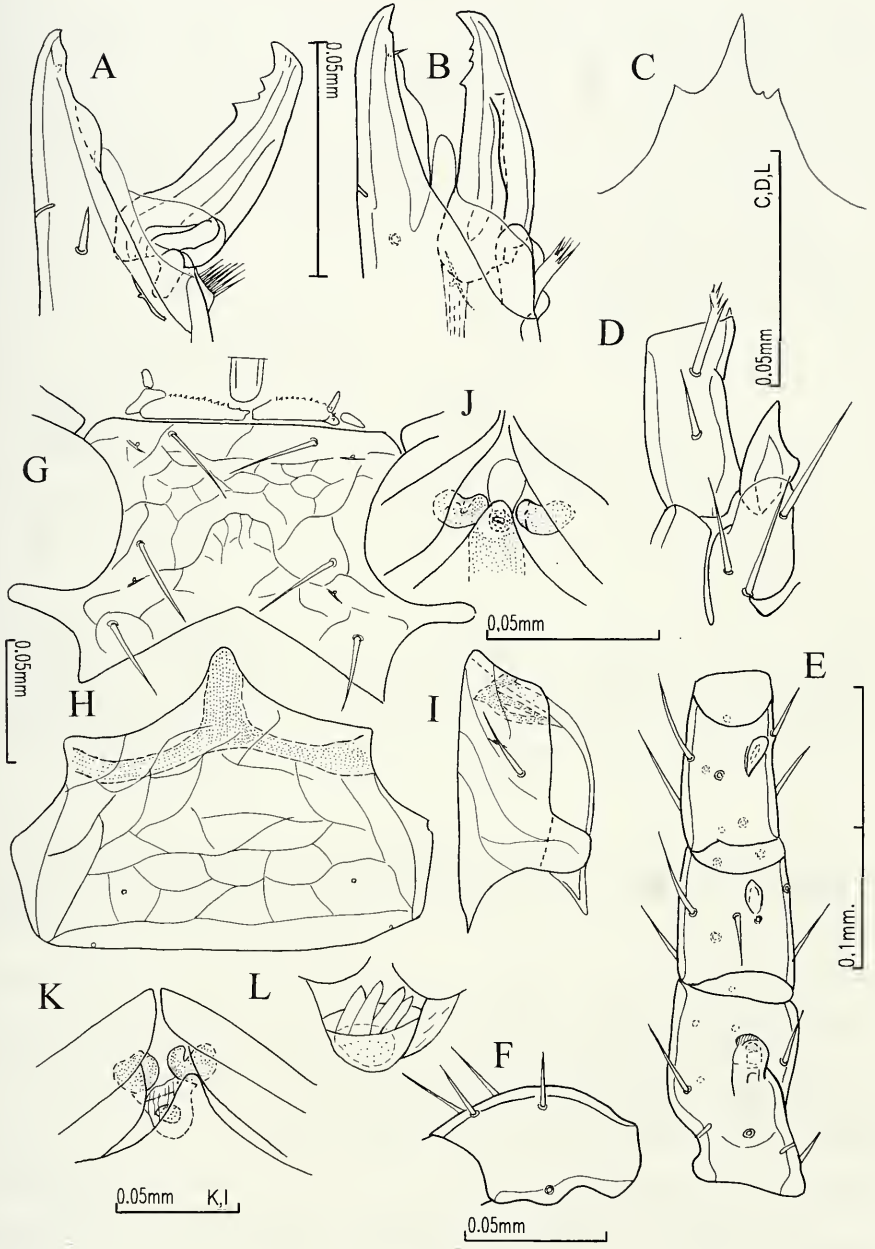

FIG. 17

Holoparasitus eivissa sp. n. male (A-F). (A) Chelicera, antiaxial view. (B) Chelicera, paraxial view. (C) Gnathotectum. (D) Palptrochanter and corniculus. (E) Femur, genu, tibia of leg II, ventral view. (F) Trochanter IV. Female (G-L). (G) Presternal plate and sternal shield. (H) Epigynium. (I) Paragynium. (J, K, L) Endogynium.

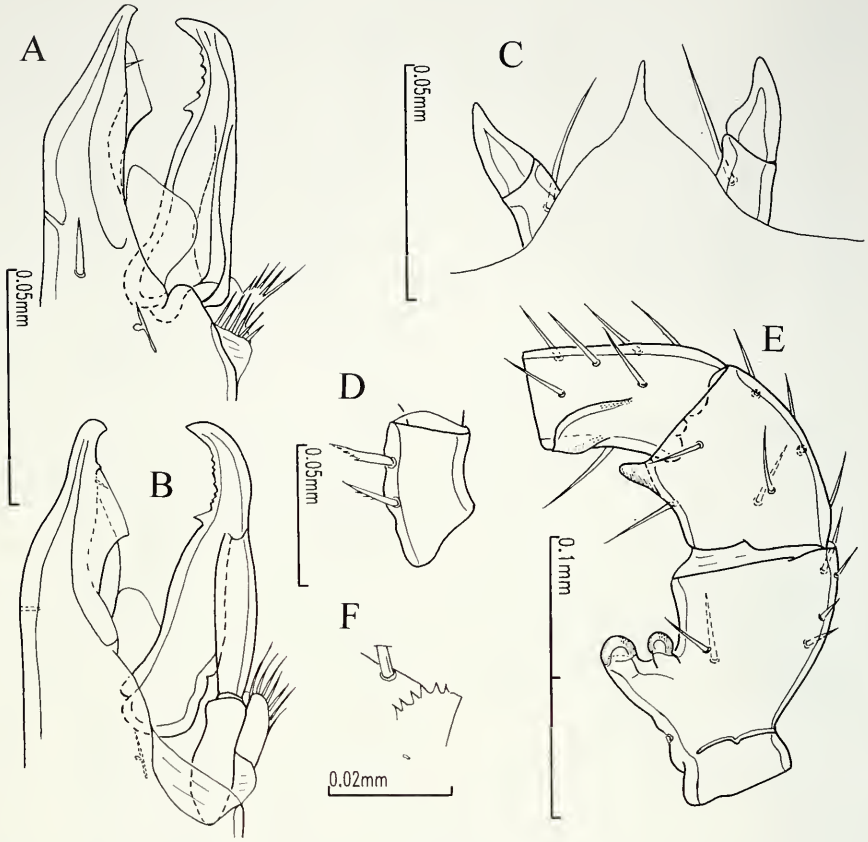

FIG. 18

Holoparasitus singularis sp. n. male. (A) Chelicera, antiaxial view. (B) Chelicera, paraxial view. (C) Gnathotectum and corniculi. (D) Palptrochanter. (E) Femur, genu, tibia of leg II. (F) Group of denticles on coxa II.

to a small sack (Fig. 17 J, K, L). Gland *gv2* simple with a tiny pore; length of sternal setae 48μm and of ventral setae around 36 μm.

Gnathosoma. Hypostomatic setae simple, palpcoxal setae slightly pilose. Palptrochanter with simple seta *v1* and pilose seta *v2*.

REMARK: The female specimens (4 slides) are not in good condition so that the characters of the gnathosoma could not be studied in detail.

Holoparasitus singularis sp. n. Figs 16D, 18

TYPE MATERIAL: ♂ holotype, 2♂ paratypes, ALGERIA, "Sahel d'Alger", Oued Bouzariah, valley, east side, laurel forest, 0-5 cm deep soil, 3.01.1961, leg.C. Athias-Henriot (LB. 636).

OTHER MATERIAL EXAMINED: 1♂, ALGERIA, Kaddaous, Hydra, pine forest, leaf litter and soil, 6.11.1960, leg. C. Athias-Henriot (LD. 960).

ETYMOLOGY: The species name refers to the particular morphology of its chelicera.

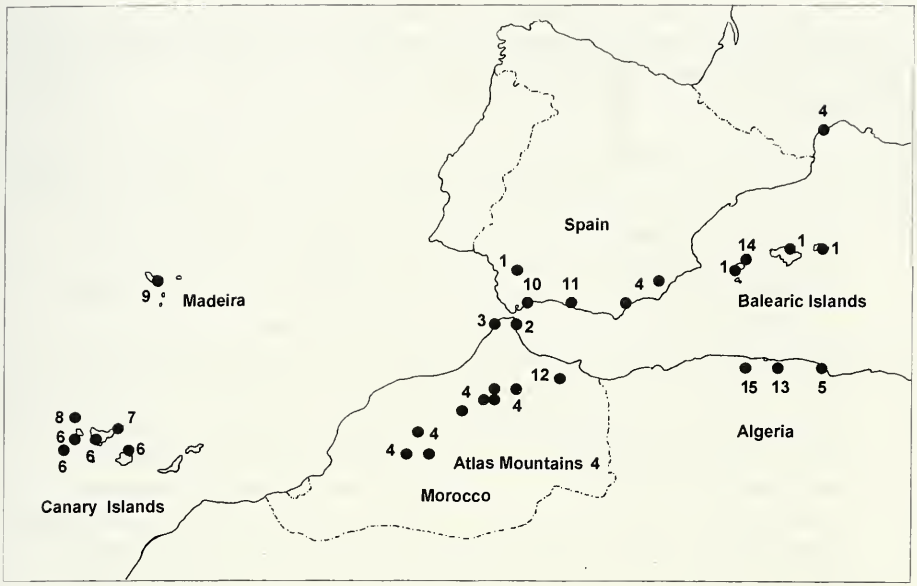

FIG. 19

Distribution of *Holoparasitus mallorcae* Juvara-Bals and the new species of the *H. mallorcae* species-group. (1) *H. mallorcae* Juvara-Bals. (2) *H. mahnerti* sp. n. (3) *H. vaucheri* sp. n. (4) *H. franzi* sp. n. (5) *H. variabilis* sp. n. (6) *H. canariensis* sp. n.. (7) *H. anaga* sp. n. (8) *H. lapalma* sp. n. (9) *H. giganteus* sp. n. (10) *H. lunae* sp. n. (11) *H. malleus* sp. n. (12) *H. rifensis* sp. n. (13) *H. algiersensis* sp. n. (14) *H. eivissa* sp. n. (15) *H. singularis* sp. n.

DIAGNOSIS: Gnathotectum triangular. Chelicera: fixed digit toothless, its inner margin with triangular formation; hooked movable digit with 5-7 denticles. Gland *gv1* absent.

DESCRIPTION: Only the male is known. Not all the characteristics are visible on the slides from the collection of Athias-Henriot.

Dorsal idiosoma. Small species, colour brownish yellow. Length of podonotal setae from 30 μm (*j1*) to 24 μm; setae on opisthonotum very short, 10-12 μm.

Ventral idiosoma. Reticulation simple. Genital lamina rounded, located in deep concavity of sternal margin; inner face of genital lamina with a horseshoe-shaped sclerotization (Fig. 16D). Large subgenital microsclerite bearing tritosternum. Gland *gv1* usually absent; one specimen with single gland on one side.

Gnathosoma. Gnathotectum triangular (Fig. 18C). Hypognathal groove with 10 denticulate rows; simple hypostomatic setae located on a tiny protuberance; palpcoxal setae pilose. Palptrochanter with simple seta *v1* and pilose seta *v2* (Fig. 18D).

Chelicera (Fig. 18A, B). Fixed digit toothless, with enlarged basis and slender apex; on its inner margin a triangular formation. Movable digit with hooked apex and 5-7 denticles on inner margin; small brush-like process on arthrodial membrane; spermatotreme straight.

Legs. Coxa II with fan-like ridge formed by 7-8 denticles (Fig. 18F). Armature of leg II (Fig. 18E): straight, thumb-like femoral apophysis and short, rounded axillary process; triangular genual spur situated on distal margin of segment; tibial apophysis large, mucronate.

KEY TO SPECIES OF THE " *HOLOPARASITUS MALLORCAE*" SPECIES GROUP.

Males

1a Genital lamina rounded, well-sclerotized on inner face; large trapezoidal microsclerite bearing tritosternum, gland *gv1* absent 2

1b Genital lamina with lateral angles, not or only slightly sclerotized on inner face; microsclerite rectangular, gland *gv1* present 4

2a Gnathotectum trispinate; fixed digit of chelicera straight with hump on inner margin; movable digit with two or three small teeth 3

2b Gnathotectum triangular, with long central prong; fixed digit of chelicera with a large basis, a slender hooked apex and a triangular extension on inner margin; movable digit with 5-7 denticles and one tooth; Algeria . . . . . *H. singularis* sp. n.

3a Anterior margin of genital lamina with central prong; movable digit of chelicera with 3 teeth; fixed digit with pilus dentilis near slightly curved apex; Spain: Ibiza . . . . . *H. eivissa* sp. n.

3b Anterior margin of genital lamina without central prong; movable digit of chelicera with 2 teeth; fixed digit straight, with truncate apex and pilus dentilis located medially; Algeria . . . . . *H. algiersensis* sp. n.

4a Gnathotectum trispinate ,"three prongs type" 5

4b Gnathotectum otherwise, "lobe type", with central prong large, triangular or rounded, flanked by small lateral spines or triangular prongs 8

4c Gnathotectum as a simple triangular process, its apex more or less rounded 13

5a Fixed digit of chelicera straight, its apex slightly hooked and with denticles around pilus dentilis; movable digit straight, with apex slightly hooked and denticles on inner face 6

5b Fixed digit straight, with few or no denticles on inner face; movable digit otherwise 7

6a Palptrochanter with seta *v1* simple, *v2* barbed, between them a protuberance; movable digit of chelicera carrying 3-4 denticles and one tooth, arm of spermatotreme straight; genu II with triangular apophysis; Spain: Balearic Islands, Andalusia . . . . . *H. mallorcae* Juvara-Bals, 1975

6b Palptrochanter with *v1* pilose, *v2* barbed, without intermediate protuberance; movable digit of chelicera carrying 5-6 denticles and one tooth, arm of spermatotreme arched; genu II with rectangular apophysis; Algeria: Djudjura . . . . . *H. variabilis* sp. n.

7a Gnathotectum with triangular central prong; movable digit with a big tooth medially on internal margin and a rounded hump on external margin; fixed digit with denticles only in distal third; Spain: Andalusia . . . . . *H. gibber* Juvara-Bals & Witalinski, 2000

7b Gnathotectum with long and sinuous central prong; movable and fixed digits straight, without denticles or teeth; England, Ireland, North of Spain ..... *H. lawrencei* Hyatt, 1987

8a Gnathotectum with central prong large and rounded, lateral prongs small, with minute spines 9

8b Gnathotectum with central prong tongue-like and lateral prongs small 10

8c Gnathotectum with rounded prominent central prong and lateral prongs large, triangular, forming an angle with basis of central prong 12

9a Corniculi conical; palptrochanter with protuberance between pilose *v1* and barbed *v2*; movable digit of chelicera with 6 denticles; genital lamina with bilobate central prong and undulating margin of lateral lobes; Italy: Sicily ..... *H. ellipticus* Juvara-Bals & Witalinski, 2000

9b Corniculi with tubercle in distal third; palptrochanter with small prominence between pilose *v1* and barbed *v2* and with a protuberance under *v1*; movable digit of chelicera with 3 denticles; genital lamina with simple lateral lobes; Morocco ..... *H. mahnerti* sp. n.

10a Apex of movable digit bearing a prominence on ventral side at end of spermatotreme; palptrochanter with *v1* simple, located on a prominent, digitiform tubercle; corniculi simple; Spain, Morocco ..... *H. franzi* sp. n.

10b Apex of movable digit without prominence; palptrochanter with *v1* pilose, not located on tubercle; corniculi with prominence in proximal third 11

11a Arm of spermatotreme arched, with small internal protuberance and a large brush-like process; tI = 151-156 μm, tIV = 168-178 μm; Morocco ..... *H. rifensis* sp. n.

11b Arm of spermatotreme straight and a short brush-like process; tI = 138-145 μm, tIV =149 μm; Spain: Andalusia ..... *H. lunae* sp. n.

12a Fixed digit of chelicera straight, with curved apex and 6-8 denticles around pilus dentilis; movable digit with 6 denticles and arched arm of spermatotreme, brush-like process long; palptrochanter with sharp protuberance between pilose *v1* and barbed *v2*; corniculi elongated, with tubercle near their bases; tI = 172-180 μm, tIV = 192-197 μm; Morocco: Tangier ..... *H. vaucheri* sp. n.

12b Fixed digit hammer-like, 5 denticles between pilus dentilis and curved apex; movable digit with 4 denticles and small tooth, brush-like process on arthrodial membrane short; palptrochanter with simple *v1* located on tubercle and barbed *v2*; corniculi with small protuberance located medially; tI = 158-168 μm; tIV = 168-180 μm; Spain: Andalusia . *H. malleus* sp. n.

13a Gnathotectum produced into a triangular process; big species 680-750 μm long; Great Britain, Spain: Madeira,Tenerife . . . *H. maritimus* Hyatt, 1987

13b Gnathotectum produced into a prominent, more or less rounded, process; Canary Islands, Madeira 14

14a Apex of gnathotectum truncated; chelicera with large and straight fixed digit bearing 6 fine denticles between pilus dentilis and apex; Tenerife ..... *H. anaga* sp. n.

14b Apex of gnathotectum rounded; chelicera with straight and truncate fixed digit, inner margin with 7-10 denticles around pilus dentilis 15

15a Palptrochanter with simple *v1*, pilose *v2,* without protuberances between them; leg II with oval genual apophysis; distance of the trapezoidal tibial apophysis to the margin of the segment 22 μm; big species, tI = 242-247 μm, tIV = 271 μm; Madeira . . . . . *H. giganteus* sp. n.

15b Palptrochanter with pilose *v1*, barbed *v2,* and sharp protuberance between them; leg II with different apophysis; distance of the tibial apophysis to the anterior margin of tibia 12-18 μm; Canary Isles 16

16a Gnathotectum rounded, some specimens with two tiny spines laterally; fixed digit with 7 denticles around pilus dentilis; leg II with small, triangular genual apophysis and trapezoidal tibial apophysis; tI = 168-194 μm; tIV = 192-228 μm; Canary Islands . . . . . *H. canariensis* sp. n.

16b Gnathotectum tongue-like; chelicera with fixed digit bearing 5 small denticles above pilus dentilis; leg II with big, prominent genual apophysis located on distal margin and tibial apophysis mucronate; tI = 204-228 μm, tIV= 228-247 μm; Canary Isles: La Palma . . . . *H. lapalma* sp. n.

Females

1a Endogynium a small sack; epigynium with rounded apex, lateral prongs not very sharp, subapical structure of epigynium without membranous structures; gland *gv1* absent 2

1b Endogynium cup-like, with courtain-like structures, with fleshy lobes or with one or two protrusions on its posterior margin; epigynium with triangular apex and salient lateral prongs, subapical structure of epigynium with membranous structures; gland *gv1* present 3

2a Endogynium a sack with dentate anterior margin; epigynial ratio h/b=0.95; Algeria . . . . . *H. algiersensis* sp. n.

2b Endogynium a sack with a round sclerotized part in its middle; epigynial ratio h/b=0.83; Spain: Ibiza . . . . . *H. eivissa* sp. n.

3a Endogynium with many internal teeth and two big curved denticulated protrusions; epigynium with mucronate apex; tI = 192 μm, tIV = 228-240 μm; England, Ireland . . . . . *H. lawrencei* Hyatt, 1987

3b Endogynium otherwise, with curtain-like structures or protrusions on its posterior margin; epigynium with rounded or triangular apex 4

4a Endogynium with two membranous curtain-like structures or two fleshy lobes 5

4b Endogynium with one or two protrusions on posterior margin 6

5a Endogynium with two membranous curtain-like structures; epigynium with large triangular apex, rounded subapical structure with two tiny oval extensions near apex basis; Morocco . . . . . *H. mahnerti* sp. n.

5b Endogynium with two fleshy lobes; epigynium with short broad tip, subapical structure rectangular, with two membranous triangular extensions near apex; Great Britain, Madeira, Tenerife . . . . . *H. maritimus* Hyatt, 1987

6a Endogynium with one protrusion on posterior margin 7

6b Endogynium with two protrusions on posterior margin 9

7a Endogynium with one finger-like protrusion and 6-7 denticles on its lateral walls; Morocco . . . . . *H. rifensis* sp. n.

7b Endogynium with one protrusion but without denticles on its walls 8

8a Apex of finger-like protrusion sharp; apex of epigynium mucronate; epigynial subapical structure trapezoidal and well sclerotized, with small hyaline extensions; Spain: Sierra de Luna . . . . . *H. lunae* sp. n.

8b Apex of slender protrusion sharp or bifid; large and triangular apex of epigynium; epigynial subapical structure formed by a sclerotized rectangular line under apex and by two fan-like hyaline extensions; Spain: Malaga . . . . . *H. malleus* sp. n.

9a Presternal plate not serrated, endogynium with two short posterior protrusions (a = 40-48 μm) apart from other: 60 μm; big species tI = 240 –252 μm, tIV = 264-297 μm; Spain: Madeira . . . . . *H. giganteus* sp. n.

9b Presternal plate more or less distinctly serrated, endogynial protrusions of different shape and size, tI = 144-228 μm, tIV = 151-257 μm 10

10a Presternal plate with few denticles, gland pore *gv1* located on soft cuticle or on posterior margin; endogynial protrusions involute, inequal in size and distant to each other; epigynium with well-protruded triangular apex and a subapical structure with a conspicuous sclerotized line continued by two trapezoidal membranous wings; tI = 204-228 μm; tIV = 252-264 μm; Spain: La Palma . . . . . *H. lapalma* sp. n.

10b Presternal plate distinctly serrated; gland-pore *gv1* always located on sternal shield near posterior margin; endogynial protrusions well developed; epigynial apex triangular but not protruded, subapical structure otherwise 11

11a Endogynium with two protrusions of different length, their bases very close to each other or with one bifid protrusion (Fig. 4M-N); Algeria: Djurdjura . . . . . *H. variabilis* sp. n.

11b Endogynium with two equal protrusions 12

12a Gnathotectum large, triangular; large cup-like endogynium with two fine protrusions, their apices oriented medially and away from each other; trochanter IV with ventral protuberance; Tenerife: Anaga Mountains . . . . . *H. anaga* sp. n.

12b Gnathotectum trispinate; endogynium otherwise; trochanter IV without protuberance 13

13a Endogynium with two horn-like or triangular protrusions 14

13b Endogynium with two finger-like, more or less, long protrusions 15

14a Endogynium with two short straight horn-like protrusions; epigynial apex large, not prominent, subapical structure with oval wings; palp-trochanter with pilose *v1,* barbed *v2*, between them a protuberance; epigynial ratio h/b = 0.70; Morocco- Tangier .....*H. vaucheri* sp. n.

14b Endogynium with two triangular protrusions; epigynial apex large, prominent; epigynial subapical structure extending into fan-like wings; epigynial ratio h/b= 0.85; Spain, Morocco: Atlas Mountains . . . *H. franzi* sp. n.

15a Endogynium with teeth on lateral and anterior walls, endogynial long protrusions straight or sinous, their tips reaching at anterior margin of endogynium and their bases close to each other; tI = 156-180 μm, tIV = 173-198 μm 16

15b Endogynium without teeth, straight and short (a = 25-30 μm) endogynial protrusions with a gap of 40-45μm between their bases; tI = 184-199 μm, tIV = 204-297 μm; Canary Islands . . . . . *H. canariensis* sp. n.

16a Endogynium with straight (a=34 μm) protrusions, distance between their bases 10 μm; palptrochanter with simple *v1*, barbed *v2* and a protuberance between them; Spain: Balearic Islands . . . . . *H. mallorcae* Juvara-Bals, 1975

16b Endogynium with sinous and long protrusions (45 μm), their bases very close each to another; palptrochanter with pilose *v1* and barbed *v2* 17

17a Endogynium lateral walls with 2 teeth, epigynial ratio= 0.92; Spain: Seville . . . . . *H. gibber* Juvara-Bals & Witalinski, 2000

17b Endogynium lateral and superior walls with 3-7 denticles; epigynial ratio h/b=0.89; Italy: Sicily . . . . . *H. ellipticus* Juvara-Bals & Witalinski, 2000

RELATIONSHIPS

The opportunity to study the rich material deposited in the collection of the MNHG has enlarged our knowledge about the complexity and the diversification of the genus *Holoparasitus*.

The species described in this paper shares a number of characters, which includes them in the *H. mallorcae* species-group. As a result of all the newly discovered species, and of the revisions of some Berlese types (Hyatt, 1987; Juvara-Bals & Witalinski, 2000; Witalinski & Skorupski, 2002) this species group as established by Juvara-Bals & Witalinski (2000) has to be redefined as follows.

Male: Sternogenital shield without excipulum; hypostomatic setae insereted on distinct piece of cuticle separated by incisions, hypostome more or less distinctly extended between corniculi; coxa II anterolaterally provided with a denticulated ridge and a basal denticle; main apophysis and axillary process of femur II thumb-like and short.

Female: Presternal plate provided with denticles, lateral platelets free; paragynia without sclerotized elliptical thickenings facing coxa III; chelicera with 3 teeth on movable digit and 5 denticles on fixed digit; opening of gland *gv2* in smooth cuticle.

This short diagnosis will probably be modified after the description of still unknown taxa from other parts of southern Europe, Asia and North Africa. Characters, which allow to distinguish females of different species are the structure of the endogynium, the shape of the subapical structure of the epigynium and, to a lesser extent, the shape of the posterior paragynial lobe and the epigynial ratio h/b. The species treated here posses several types of endogynia which characterize the different lineages:

- endogynium cup-shaped, with two protrusions on its posterior margin and sometimes with denticles on the lateral walls (*H. mallorcae* Juvara-Bals, *H. gibber*

Juvara-Bals & Witalinski, *H. ellipticus* Juvara-Bals & Witalinski, *H. canariensis* sp. n., *H. lapalma* sp. n., *H. anaga* sp. n., *H. giganteus* sp. n., *H. variabilis* sp. n.).

- endogynium cup-shaped, with two triangular protrusions on posterior margin (*H. franzi* sp. n., *H. vaucheri* sp. n.).

- endogynium cup-shaped, with one protrusion on the posterior margin, and the lateral walls in some species provided with denticles (*H. lunae* sp. n., *H. malleus* sp. n., *H. rifensis* sp. n.).

- endogynium cup-shaped, with different structures (*H. maritimus* Hyatt, *H. mahnerti* sp. n., *H. lawrencei* Hyatt).

- endogynium a small, simple sack (*H. algiersensis* sp. n, *H. eivissa* sp. n.).

The heptagonal epigynium occurs in two distinct types: one, characteristic for the majority of taxa included in the *H. mallorcae* species-group, with very sharp lateral angles and a subapical structure with membranous wings of various forms extending over the apex margin; the other without angular lateral angles and with a sclerotization under the apex in the form of an inverted T. This last type is associated with a simple sack-like endogynium and the lack of gland *gv1* (in *H. algiersensis* sp. n. and *H. eivissa* sp. n.).

The characteristics of the gnathotectum and those of the chelicera make the males easily distinguishable. Three forms of the gnathotectum can be observed:

- trispinate with a slender central prong and two similar and shorter lateral ones (*H. gibber* Juvara-Bals & Witalinski, *H. mallorcae* Juvara-Bals, *H. lawrencei* Hyatt, *H. variabilis* sp. n., *H. ellipticus* Juvara-Bals & Witalinski, *H. algiersensis* sp. n., *H. mahnerti* sp. n.).

- trifid with a tongue-like central prong and two short, more or less, triangular lateral ones (*H lunae* sp. n., *H. malleus* sp. n., *H. franzi* sp. n., *H. rifensis* sp. n., *H. vaucheri* sp. n.).

- one single prominent protrusion, rounded or triangular (*H. lapalma* sp. n., *H. canariensis* sp. n., *H. anaga* sp. n., *H. giganteus* sp. n., *H. maritimus* Hyatt).

Another character that differentiates the males is the shape of the chelicera. The fixed digit has two different forms:

- apex hooked and inner margin with denticles or oligodent.

- straight and toothless or oligodent.

The movable digit is generally hooked, but can also be straight and toothless (*H. lawrencei* Hyatt), carries denticles (*H. mallorcae* Juvara-Bals, *H. vaucheri* sp. n.) or is oligodent (*H. algiersensis* sp. n.); its external margin has a hump (*H. gibber* Juvara-Bals & Witalinski); the apex is provided with a prominence (*H. franzi* sp. n.). The length of the spermatotreme is different from one species to another,

Generally the form of the gnathotectum in males is not correlated with that of the endogynium in females. However, it can be noted that in *H. lunae* sp. n. and in *H. rifensis* sp. n. the female possesses an endogynium with one protrusion and the male a gnathotectum with one central lobe-like apex and two small lateral prongs. All four species described from the Canary and Madeira Islands have the male gnathotectum protuberant, more or less, rounded and the female endogynium with two protrusions on the posterior margin.

I consider as plesiomorphic the following character states of males: the trifid gnathotectum, the chelicera with hooked apex and with tooth and denticles on the inner

margin of fixed and movable digits, corniculi simple and stalked, the palptrochanter with simple *v1* and barbed *v2* and a rectangular microsclerite bearing tritosternum.

According to my opinion the plesiomorphic characters in females are the trifid gnathotectum, the chelicera with three teeth on the movable digit and five denticles on the fixed digit, the simple ribbon-like presternal plate and the endogynium with two protrusions on its posterior margin. *H. mallorcae* Juvara-Bals from the Balearic Islands possesses most of these characteristics; the only derived character is a protuberance on the corniculi instead of simple conical shape.

The presumably monophyletic *H. mallorcae* species-group currently includes two different lineages. *H. algiersensis* sp. n., *H. eivissa* sp. n., *H. singularis* sp. n. form a lineage characterized by the lack of gland *gv1* in both sexes. The females are distinguishable by the small sack-like endogynium with a round opening and by the form of the epigynium and its inverted T-shaped sclerotization of the subapical structure. In males the form of the chelicera as well as the heavyly sclerotized genital lamina and subgenital microsclerite are easily discernible. These species seems to be closer to *H. sardensis* Juvara-Bals & Witalinski, 2006 and *H. annulus* Juvara-Bals & Witalinski, 2006 from Sardinia and North Africa, respectively. The second lineage comprises the other species mentioned in this paper in which the gland *gv1* is present; the females of these species possess a cup-shaped endogynium with various structures (protrusions, lobes) on the posterior margin, and the epigynium has a sclerotized subapical structure with membranous structures. The genital lamina in males of that second evolutionary lineage has a central prong and a weak sclerotization on the posterior face. The rectangular or trapezoidal microsclerite is not very large.

The only clearly apomorphic character in females of the *H. mallorcae* species-group is the serrated presternal plate. This character also appears in *H. annulus* Juvara-Bals & Witalinski, one of the two species included in the *H. annulus* species-group. This species shows strong intraspecific variation in the number of denticles on the presternal plate which seems to be an unstable character. The other species of this group, *H. sardensis* Juvara-Bals & Witalinski, possesses a smooth presternal plate which is an ancestral trait (Juvara-Bals & Witalinski, 2006).

Among the species examined the specimens of *H. lapalma* sp. n. either have few denticles (3-5) or a smooth presternal plate. In *H. giganteus* sp. n. from Madeira, the presternal plate is smooth. These two species are closely related by characteristics in the gnathotectum and chelicera of the males. I assume that the character state "the presternal plate smooth" is in *H. giganteus* sp. n. a reversal.

BIOGEOGRAPHY

The mites of the *H. mallorcae* species-group are distributed in the western Mediterranean Basin, in the northern part of Africa, spread along the Atlas Mountains (Morocco), and were also discovered on the Canary and Madeira Islands (Fig. 19). This spatial pattern is due to allopatric speciation by vicariance during the formation of the Western Mediterranean Basin in the Miocene period and by colonizing events in the volcanic Archipelago of Canary.

I try to explain the distribution of the following species:

1 – *H. rifensis* sp. n. and the closely related species *H. lunae* sp. n. and *H. malleus* sp. n.

2 – *H. lawrencei* Hyatt and *H. maritimus* Hyatt.

3 – The four species (*H. canariensis* sp. n., *H. lapalma* sp. n., *H. anaga* sp. n., *H. giganteus* sp. n.) from the Canary and Madeira Islands.

1. *H. rifensis* sp. n. was found in the Rif Mountains (Morocco) and *H. lunae* sp. n. and *H. malleus* sp. n. were collected in south-western Spain between Malaga and Algeciras. This kind of distribution is correlated with the paleogeographical history of the Betico-Rifain Massif. This massif existed as an isolated unit from the late Oligocene to the early Miocene and was later integrated into the northern Africa-Rif Mountains and the South of Spain. The geographical upheavals in the Western Mediterranean area between late Oligocene and late Miocene were described, among others authors, by Pomerol (1973), De Jong (1998) and recently also by Dercourt *et al.* (2000). All the major geological changes led to isolation of populations and speciation in different groups. The localities of the species described herein correspond with the distribution of other terrestrial arthropods with low dispersal abilities. Examples can be found among insects (Jeannel, 1956; Besuchet, 1960; Oosterbroek & Arntzen, 1992; De Jong, 1998), isopods (Vandel, 1969) or scorpions (Gantenbein & Largiadèr, 2003).

2. Another interesting distribution is that of *H. maritimus* Hyatt and *H. lawrencei* Hyatt in Great Britain described by Hyatt (1987). I identified these two species in the Athias-Henriot collection in samples from the northern coast of Spain and from France.

In the same collection I discovered a new species found in leaf litter north of Madrid (Juvara-Bals unpublished). The occurrences of these species can be explained by the existence of several refuge areas on the Iberian Peninsula and in South-West England during the cooler and arid period of the Pleistocene (Reille *et al.*, 1996; Dercourt *et al.*, 2000). Their distribution over a larger area was linked to the expansion of forests. I only mention the existence of *H. maritimus* Hyatt on the islands of Madeira and Tenerife without trying to explain the colonization events due to lack of information (Juvara-Bals unpublished).

3. The occurrence of the *H. canariensis* sp. n., *H. lapalma* sp. n., *H. anaga* sp. n. in the western Canary Islands is the result of secondary invasions and subsequent colonization of the islands from east towards west. A good example of this kind of distribution was given by Pinto *et al.* (1997) for *Drosophila subobscura* Collin, 1936. The distribution of the *Holoparasitus* species is connected to the laurasilva habitat and is similar to that of other soil arthropods like carabid beetles (Machado, 1976). The most frequent species is *H. canariensis* sp. n. found in Great Canary, Gomera, El Hierro, and Tenerife. Small differences in the shape of the male gnathotectum (Fig. 5D-F) or the length of the idiosoma (the specimens from Gomera are smaller than others) have been observed in the population on the western islands. The gland gv2 is also variable: some specimens have two glands others only one.

Tenerife provides an interesting case of geographical isolation in which volcanism played an important role. The three massifs, Anaga in the northeast, Teno in the northwest and Roque del Conde in the south, have previously existed as two or three paleo-islands and became attached to each other by intensive volcanic activity only

two million years ago (Ancochea *et al.*, 1990). I distinguished two species on the island, *H. canariensis* sp. n. and *H. anaga* sp. n. The first was found in the northwest district of Teno and in the Teide National Park (centre of the island), while the second occurs in the northeast and seems to be endemic to the Anaga Mountains. *Holoparasitus anaga* sp. n. differs from *H. canariensis* sp. n. in the shape of the male chelicera, with a large fixed digit, and in having a triangular gnathotectum and a ventral protuberance on trochanter IV in both sexes.

A similar case of speciation in the oribatid genus *Steganacarus* is described in the remarkable work of Salmone and Bernini (2002) who analyzed population structure and divergence on the basis of the mitochondrial DNA variation. These two cases of speciation found in the mites *Steganacarus* and *Holoparasitus* can be considered as intra-island speciation (Emerson & Oromi, 2005).

Holoparasitus lapalma sp. n., found only on La Palma Island, is another case of speciation through geographic isolation. La Palma is one of the youngest island of the archipeleago and its first colonization was followed by speciation. This was the case in the beetle genus *Tarphius* Erichson (Emerson & Oromi, 2005).

Holoparasitus lapalma sp. n., characterized by special morphological characters, is closely related to *H. giganteus* sp. n. described from Madeira (see discussion in Relationships).

The biogeographic relation between the Canary and Madeira Islands was the subject of many studies, but not all of them arrived at the same conclusion. A. Machado kindly informed me about the dispersal of the carabid beetle *Zargus crotchianus* Wollaston, 1865 and those of the curculionid *Rhopalomesites euphorbiae* (Wollaston, 1845) on both groups of islands, possibly due to the marine current from Madeira to western Canary Islands (Machado, 1992; Machado & Oromi, 2000). According to Trusty *et al.* (2005) the colonization route for the plant genus *Bystropogon* L'Hèr. (fam. Lamiaceae) was from Canary to Madeira. Our knowledge of the acarofauna of these Archipelagos is still to poor to explain about the origin of the endemic species *H. lapalma* sp. n.

Much more faunistic data and molecular phylogenetic analyses on material all around the Mediterranean region and in Atlantic Islands, is needed to explain the distribution and the origin of the *H. mallorcae* species-group.

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New species of the spider genus *Platocoelotes* Wang, 2002 (Araneae: Amaurobiidae)

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New species of the spider genus *Platocoelotes* Wang, 2002 (Araneae: Amaurobiidae). - Nine species from China, including four new species described in the current paper, are placed in the spider genus *Platocoelotes*. The new species are: *Platocoelotes daweishanensis* sp. n., *Platocoelotes globosus* sp. n., *Platocoelotes latus* sp. n. and *Platocoelotes paralatus* sp. n. A key and a distribution map for all nine species in this genus are provided.

Keywords: Taxonomy - morphology - cave adaptation - China.

INTRODUCTION

The spider genus *Platocoelotes* was established and revised by Wang in 2002 and 2003, respectively. Five valid *Platocoelotes* species were so far known, i.e. *P. impletus* (Peng & Wang, 1997), *P. icohamatoides* (Peng & Wang, 1997) and *P. polyptychus* Xu & Li, 2007 from Hunan, *P. kailiensis* Wang, 2003 from Guizhou, *P. lichuanensis* (Chen & Zhao, 1998) from Hubei (see Platnick, 2007). All these species are distributed in central and southwest China, which lie in the transition zone between the Palaearctic and the Oriental realms.

The current paper provides descriptions of four new *Platocoelotes* species, three of which were collected in caves, i.e. *P. globosus* sp. n., *P. latus* sp. n. and *P. paralatus* sp. n. These three new cave species all have simple and more or less rounded spermathecae, indistinct copulatory ducts, mesally situated epigynal hoods, a short cymbial furrow, and a single patellar apophysis. However, the presence of a ventral conductor apophysis on the male palp and the broad, shallow atrium in the female epigynum indicate that they are congeneric with the type species of *Platocoelotes*.

METHODS

Specimens were examined with an Olympus SZ40 stereomicroscope; details were studied with an Olympus BX41 compound microscope. All illustrations were made using an Olympus drawing tube. Male palps and female epigyna were examined and illustrated after being dissected from the spider bodies.

All measurements were obtained using an Olympus SZ40 stereomicroscope and are given in millimeters. Leg measurements are given as: Total length (femur, patella

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+ tibia, metatarsus, tarsus). Only structures (e.g., palp, legs) of the left body side were described and measured. The terminology used in text and figure legends follows Wang (2002). Abbreviations used in text and legends: A = atrium; ALE = anterior lateral eye; AME = anterior median eye; AME-ALE = distance between AME and ALE; AME-AME = distance between AME and AME; ALE-PLE = distance between ALE and PLE; C = conductor; CD = copulatory duct; CDA = dorsal conductor apophysis; CF = cymbial furrow; E = embolus; FD = fertilization duct; H = epigynal hood; LTA = lateral tibial apophysis; PA = patellar apophysis; PLE = posterior lateral eye; PME = posterior median eye; PME-PLE = distance between PME and PLE; PME-PME = distance between PME and PME; RTA = retrolateral tibial apophysis; S = spermatheca; SB = spermathecal base; SST = spermathecal stalk; ST = subtegulum; T = tegulum; TS = tegular sclerite. All types of the new species are deposited in the Institute of Zoology, Chinese Academy of Sciences in Beijing (IZCAS), and in the Muséum d'histoire naturelle de Genève, Switzerland (MHNG).

TAXONOMY

Platocoelotes Wang, 2002

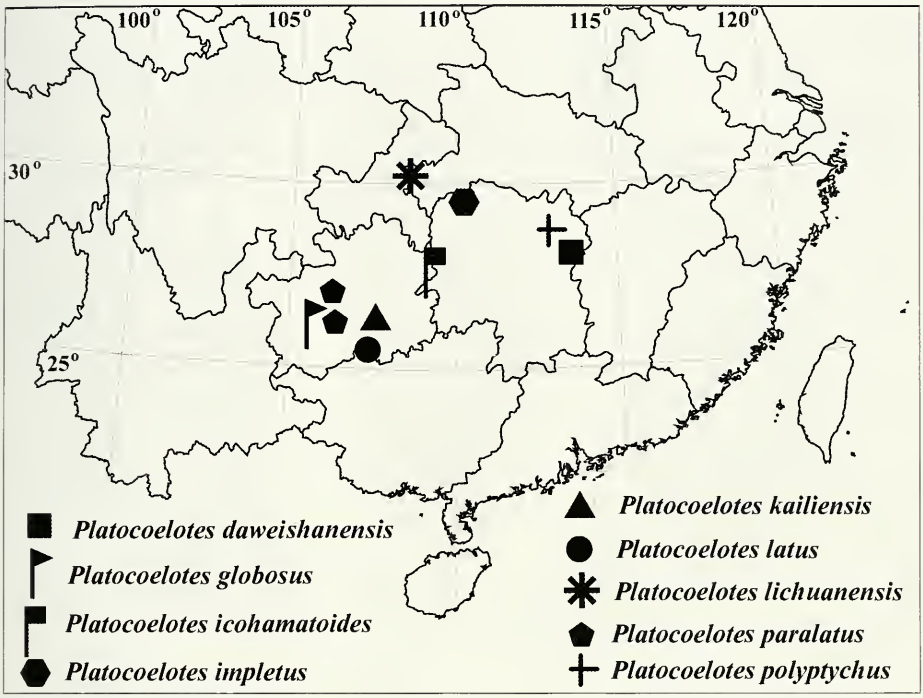
Platocoelotes Wang, 2002: 119. – Wang, 2003: 561.

Diagnosis: Male palpal organ without median apophysis and with ventral conductor apophysis; two patellar apophyses and a dorsal conductor apophysis present in most species; cymbial furrow length varying from less than one third to more than two thirds of cymbium length. Epigynum without epigynal teeth; epigynal hoods distinct, situated close to or widely apart from epigastric furrow; genital atrium large and shallow; spermathecae strongly convoluted or simple and globose; spermathecal heads and copulatory ducts small in most species.

Distribution: China (Guizhou, Hubei, Hunan, Sichuan) (Map 1).

Key to the species of the genus *Platocoelotes*:

1a Males (those of *P. globosus* and *P. icohamatoides* unknown) 2
1b Females (those of *P. lichuanensis* unknown) 8
2a Conductor strongly modified and forming a large cavity 3
2b Conductor not forming a large cavity 4
3a Ventral conductor apophysis short and blunt . . . . . *paralatus* sp. n.
3b Ventral conductor apophysis long and slender . . . . . *latus* sp. n.
4a Conductor deeply bifid . . . . . *polyptychus*
4b Conductor not bifid 5
5a Apical conductor apophysis present 6
5b Apical conductor apophysis absent . . . . . *daweishanensis* sp. n.
6a Apical conductor apophysis large . . . . . *lichuanensis*
6b Apical conductor apophysis small 7
7a Embolus with base extending posteriorly . . . . . *kailiensis*
7b Embolus with base extending prolaterally . . . . . *impletus*
8a Atrium with atrial septum . . . . . *polyptychus*
8b Atrium without atrial septum 9



MAP 1
Records of nine *Platocoelotes* species in southern China.

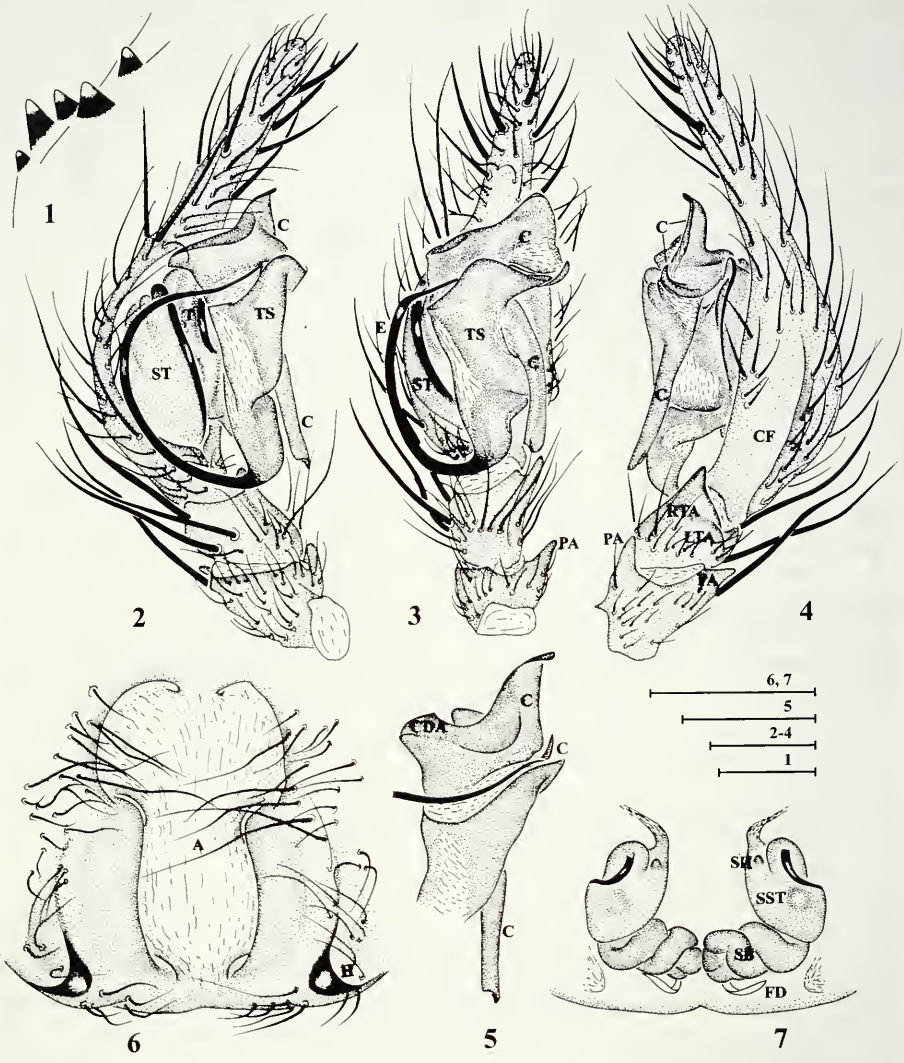
9a Epigynal hoods close to the epigastric furrow 10
9b Epigynal hoods situated mesally and widely separated from the epigastric furrow 12
10a Posterior atrium broad . . . . . *daweishanensis* sp. n.
10b Posterior atrium narrow 11
11a Spermathecal stalks extremely long, with at least five loops . . . . . *kailiensis*
11b Spermathecal stalks moderately long, with three or four loops . . *icohamatoides*
12a Lateral atrial margins anteriorly diverging and posteriorly converging . . . . . *globosus* sp. n.
12b Lateral atrial margins parallel or slightly diverging posteriorly 13
13a Spermathecal heads situated laterally . . . . . *latus* sp. n.
13b Spermathecal heads situated posteriorly . . . . . *paralatus* sp. n.

***Platocoelotes daweishanensis* sp. n.** Figs 1- 7

HOLOTYPE ♂ (IZCAS): Mt Daweishan, Liuyang County (28.1°N, 113.6°E), Hunan Province, China, collected by Xiang Xu, October 6, 2005.

PARATYPES: 1 ♀ (IZCAS) and 1 ♀ (MHNG), same locality as for the holotype, collected by Xiang Xu and Yufa Luo, October 7, 2005.

ETYMOLOGY: The specific name is an adjective derived from the name of the type locality.



FIGS 1-7

Platocoelotes daweishanensis sp. n., male holotype (1-5), female (6-7). (1) Cheliceral teeth, posterior view. (2) Palp, prolateral view. (3) Palp, ventral view. (4) Palp, retrolateral view. (5) Conductor, prolateral view. (6) Epigynum, ventral view. (7) Vulva, dorsal view. Scale lines: 1 = 0.2 mm; 2-7 = 0.5 mm.

DIAGNOSIS: The new species can be distinguished from all other *Platocoelotes* by the flat distal margin of its conductor and by the longitudinally extended spermathecal stalks which are abruptly turning back distally.

DESCRIPTION: Male (holotype). Total length 8.3. Carapace length 4.2, width 2.8; abdomen length 4.1, width 2.2. Eye measurements: AME 0.15; ALE 0.23; PME 0.18;

PLE 0.23; AME-AME 0.08; AME-ALE 0.03; ALE-PLE 0; PME-PME 0.13; PME-PLE 0.15. Clypeus height 0.13. Leg IV longest; leg formula: IV, I, II, III; leg measurements as follows: I: 18.5 (4.8, 6.0, 4.8, 2.9); II: 16.3 (4.5, 5.2, 4.1, 2.5); III: 14.5 (4.0, 4.3, 4.0, 2.2); IV: 19.6 (5.2, 6.1, 5.8, 2.5). ALE in contact with PLE. Chelicerae with three promarginal and two retromarginal teeth (Fig. 1). Palp with two widely separated patellar apophyses (Fig. 4); RTA with its distal end extending beyond the distal margin of the tibia; LTA wide; cymbial furrow less than half of cymbium length (Fig. 4); distal margin of conductor flat (Fig. 3); dorsal conductor apophysis situated prolaterally (Fig. 5); ventral conductor apophysis long, strongly extended proximally and almost reaching the distal end of the RTA (Figs 2-4); median apophysis absent; embolus long, proximal in origin (Fig. 3).

Female. A specimen of total length 6.1 measures: Carapace length 2.9, width 1.9; abdomen length 3.2, width 1.9. Eye measurements: AME 0.10; ALE 0.18; PME 0.15; PLE 0.17; AME-AME 0.08; AME-ALE 0.03; ALE-PLE 0; PME-PME 0.10; PME-PLE 0.10. Clypeus height 0.10. Leg IV longest; leg formula: IV, I, II, III; leg measurements as follows: I: 9.8 (2.7, 3.4, 2.2, 1.5); II: 8.4 (2.4, 2.8, 1.9, 1.3); III: 7.8 (2.1, 2.5, 2.0, 1.2); IV: 10.7 (2.8, 3.4, 3.0, 1.5). Genital atrium large, becoming slightly narrower posteriorly; epigynal hoods distinct, situated close to the epigastric furrow and widely separated from the lateral atrial margins (Fig. 6); copulatory ducts small, originating anteriorly in the genital atrium; spermathecal bases situated close to each other, twisted and elongated horizontally; spermathecal stalks elongated longitudinally and abruptly turning back distally; spermathecal heads small (Fig. 7).

Variation: The total lengths of the two females examined are 6.1 and 9.4.

Distribution: China (Hunan) (Map 1).

***Platocoelotes globosus* sp. n.** Figs 8-10

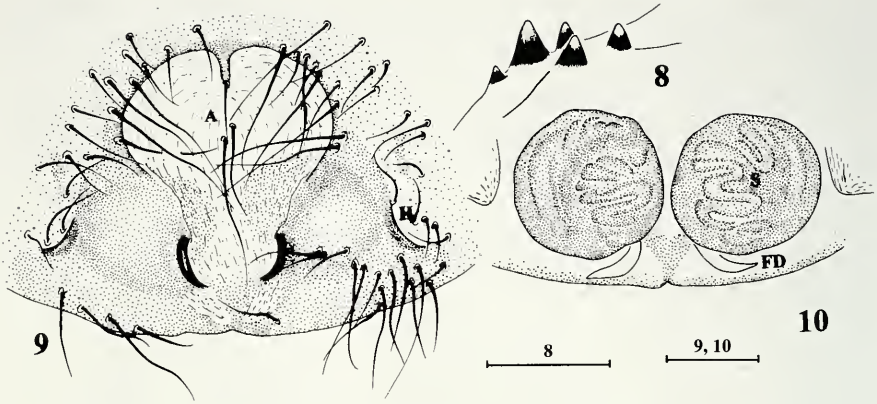
Holotype ♀ (IZCAS): Xianglushandong Cave, Caiguan Town, Anshun County (26.3°N, 106.0°E), Guizhou Province, China, collected by Yanfeng Tong, April 29, 2005.

Paratype: 2 ♀ (IZCAS) and 2 ♀ (MHNG), same data as for the holotype.

Etymology: The specific name is taken from the Latin adjective *globosus* and refers to the globular spermathecae of this species.

Diagnosis: Females of this new species can be distinguished from other *Platocoelotes* by their rounded spermathecae and indistinct spermathecal heads.

Description: Female (holotype). Total length 6.4. Carapace length 3.2, width 2.1; abdomen length 3.2, width 2.2. Eye measurements: AME 0.18; ALE 0.23; PME 0.18; PLE 0.18; AME-AME 0.08; AME-ALE 0.04; ALE-PLE 0; PME-PME 0.10; PME-PLE 0.15. Clypeus height 0.15. Leg IV longest; leg formula: IV, I, II, III; leg measurements as follows: I: 10.7 (2.9, 3.6, 2.6, 1.6); II: 9.6 (2.6, 3.1, 2.4, 1.5); III: 8.5 (2.3, 2.6, 2.3, 1.3); IV: 11.2 (2.9, 3.5, 3.3, 1.5). ALE in contact with PLE. Chelicerae with three promarginal and two retromarginal teeth (Fig. 8). Genital atrium large, anterior margin two times as wide as posterior margin; epigynal hoods widely separated from lateral atrial margin and slightly separated from the epigastric furrow (Fig. 9); spermathecae simple, globose; spermathecal heads absent; copulatory ducts not visible (Fig. 10).



FIGS 8-10

Platocoelotes globosus sp. n., female holotype. (8) Cheliceral teeth, posterior view. (9) Epigynum, ventral view. (10) Vulva, dorsal view. Scale lines: 8-10 = 0.2 mm.

Male. Unknown.

VARIATION: The total length varies from 6.4 to 6.9 in the five females examined.

DISTRIBUTION: China (Guizhou) (Map 1).

***Platocoelotes latus* sp. n.** Figs 11-16

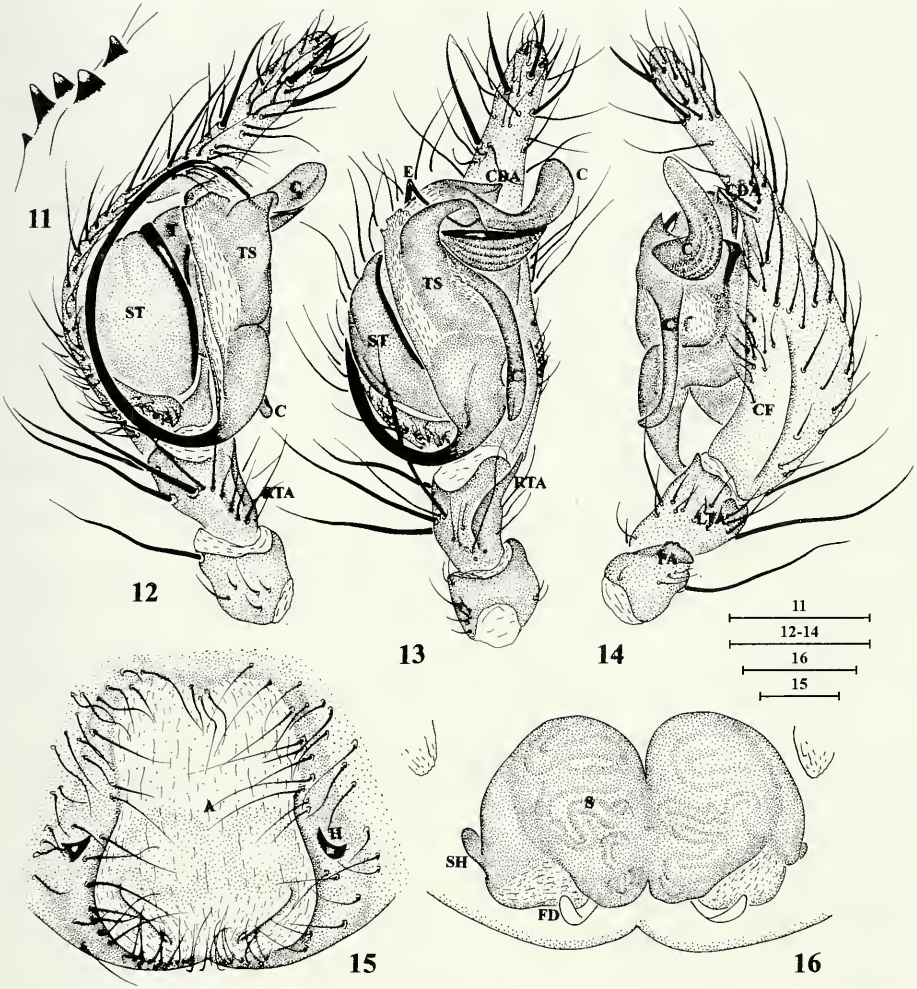
HOLOTYPE ♂ (IZCAS): Huoyaodong Cave, Xiasi Town, Dushan County (25.5°N, 107.4°E), Guizhou Province, China, collected by Yanfeng Tong, May 20, 2005.

PARATYPES: 3 ♀ (IZCAS), same data as for the holotype. – 1 ♂ (MHNG), Shenxiandong Cave, Bajing Village, Xiasi Town, Dushan County, Guizhou Province, China, collected by Yanfeng Tong, May 20, 2005. – 1 ♀ (MHNG), a cave without name, Yangjiao Village, Xiasi Town, Dushan County, Guizhou Province, China, collected by Yanfeng Tong, May 24, 2005.

ETYMOLOGY: The specific name is taken from the Latin adjective *latus*, meaning broad; it refers to the broad female genital atrium of this species.

DIAGNOSIS: The new species is similar to *Platocoelotes daweishanensis* sp. n. in having a long ventral conductor apophysis and a large genital atrium, but males can be distinguished by the presence of a single patellar apophysis and by the modified and unique conductor which possesses a large cavity; females are distinguished by the epigynal hoods that are situated close to the lateral atrial margin and widely separated from the epigastric furrow, by the anterior margin of the genital atrium that is almost equal in width to the posterior margin, by the simple and fused spermathecae and by the large spermathecal heads.

DESCRIPTION: Male (holotype). Total length 5.9. Carapace length 2.9, width 2.0; abdomen length 3.0, width 2.0. Eye measurements: AME 0.13; ALE 0.17; PME 0.15; PLE 0.17; AME-AME 0.06; AME-ALE 0; ALE-PLE 0; PME-PME 0.06; PME-PLE 0.08. Clypeus height 0.05. Leg IV longest; leg formula: IV, I, II, III; leg measurements as follows: I: 12.0 (3.1, 3.9, 3.0, 2.0); II: 10.3 (2.8, 3.2, 2.6, 1.7); III: 9.8 (2.5, 3.0, 2.8, 1.5); IV: 13.2 (3.4, 3.9, 4.0, 1.9). AME and PLE in contact with ALE. Chelicerae with



FIGS 11-16

Platocoelotes latus sp. n., male holotype (11-14), female (15, 16). (11) Cheliceral teeth, posterior view. (12) Palp, prolateral view. (13) Palp, ventral view. (14) Palp, retrolateral view. (15) Epigynum, ventral view. (16) Vulva, dorsal view. Scale lines: 11, 15, 16 = 0.2 mm; 12-14 = 0.5 mm.

three promarginal and two retromarginal teeth (Fig. 11). Patellar apophysis thumb-shaped (Fig. 14); RTA with its distal end sharp and extending beyond distal margin of tibia; LTA small, widely separated from RTA (Fig. 14); cymbial furrow less than half of cymbium length (Figs 13, 14); conductor modified, forming a large medio-distal cavity and slight terminal extension (Figs 12, 13); dorsal conductor apophysis small (Fig. 14); ventral conductor apophysis long and strongly extended posteriorly (Figs 13, 14); median apophysis strongly reduced, vestige visible (Fig. 14); embolus long, proximal in origin (Figs 12, 13).

Female. A specimen of total length 6.1 measures. Carapace length 3.2, width 2.2; abdomen length 2.9, width 1.8. Eye measurements: AME 0.13; ALE 0.15; PME 0.15; PLE 0.18; AME-AME 0.09; AME-ALE 0.04; ALE-PLE 0; PME-PME 0.11; PME-PLE 0.06. Clypeus height 0.15. Leg IV longest; leg formula: IV, I, II, III; leg measurements as follows: I: 11.1 (2.9, 3.8, 2.7, 1.7); II: 9.5 (2.6, 3.1, 2.3, 1.5); III: 8.9 (2.4, 2.8, 2.4, 1.3); IV: 11.8 (3.1, 3.8, 3.2, 1.7). Genital atrium large, occupying two thirds of epigynum; epigynal hoods situated mesally, close to the lateral atrial margin (Fig. 15); spermathecae simple and medially fused to each other; spermathecal heads situated laterally, widely separated from each other; copulatory ducts small; fertilization ducts widely separated (Fig. 16).

Variation: The total length in the two males examined is 5.7 and 5.9, and it varies from 5.5 to 7.3 in the four females examined.

Distribution: China (Guizhou) (Map 1).

***Platocoelotes paralatus* sp. n.** Figs 17-22

Holotype ♂ (IZCAS): Guanyin Cave, Jinbi Town, Qianxi County (26.9°N, 106.0°E), Guizhou Province, China, collected by Yanfeng Tong, May 18, 2005.

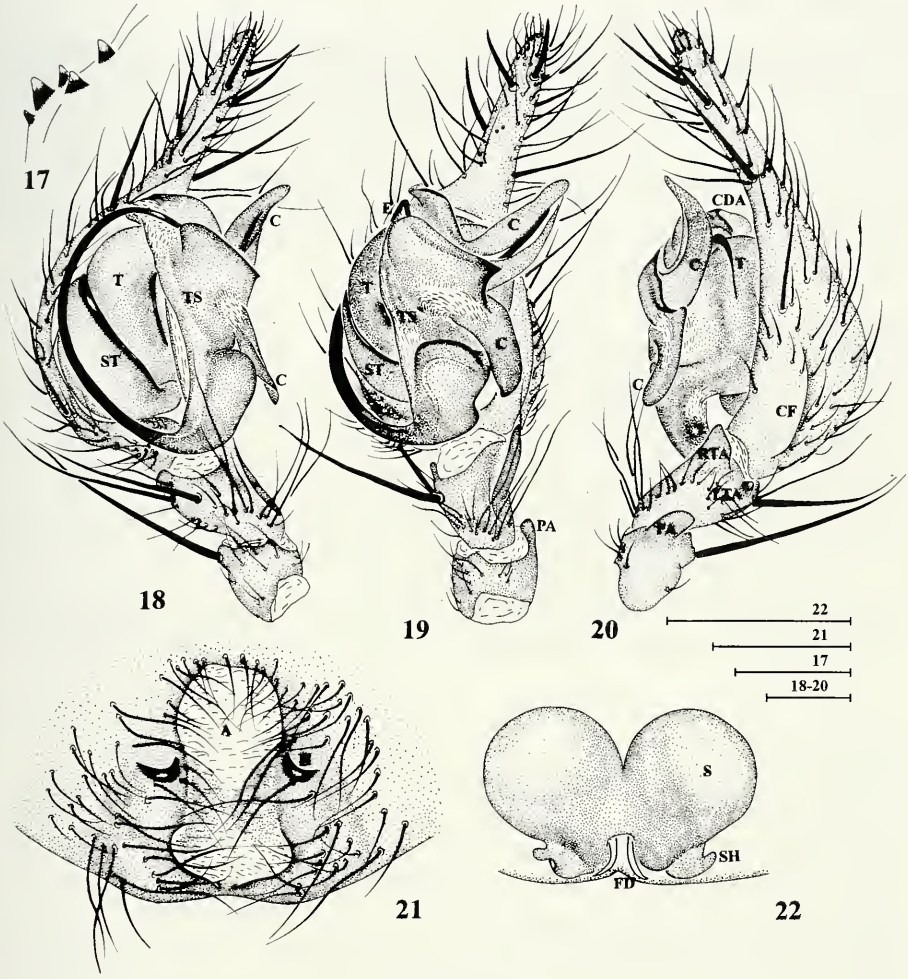
Paratypes: 4 ♀ (MHNG), same data as for the holotype; 8 ♀ (IZCAS), Xianglushan Cave, Caiguan Town, Anshun County (26.3°N, 106.0°E), Guizhou Province, China, collected by Yanfeng Tong, April 29, 2005.

Etymology: The specific name is a compound word of the Greek prefix "*para*" and the Latin adjective "*latus*", referring to similarities with *Platocoelotes latus* sp. n.

Diagnosis: The new species is similar to *Platocoelotes latus* sp. n. in the shape of its conductor, the presence of a large genital atrium and simple, fused spermathecae, but can be distinguished by its narrower atrium, short and blunt ventral conductor apophysis and fertilization ducts situated close to each other.

Description: Male (holotype). Total length 5.5. Carapace length 2.6, width 2.2; abdomen length 2.9, width 1.9. Eye measurements: AME 0.15; ALE 0.20; PME 0.15; PLE 0.18; AME-AME 0.03; AME-ALE 0; ALE-PLE 0; PME-PME 0.05; PME-PLE 0.08. Clypeus height 0.13. Leg IV longest; leg formula: IV, I, II, III; leg measurements as follows: I: 13.2 (3.4, 4.3, 3.4, 2.1); II: 11.5 (3.1, 3.6, 3.0, 1.8); III: 10.6 (2.8, 3.2, 3.0, 1.6); IV: 13.6 (3.6, 4.0, 3.9, 2.1). AME and PLE in contact with ALE. Chelicerae with three promarginal teeth and two retromarginal teeth (Fig. 17). Patellar apophysis large (Fig. 20); RTA with its distal end slightly extending beyond distal margin of tibia; LTA small (Fig. 20); cymbial furrow about one third of cymbium length (Fig. 20); conductor modified, forming a long medio-distal cavity (Fig. 19); proximal conductor margin with a sharp tooth (Fig. 19); dorsal conductor apophysis small (Fig. 20); ventral conductor apophysis short and blunt; tegular sclerite small (Fig. 19); embolus long, proximal in origin (Figs 18, 19).

Female. A specimen of total length 5.5 measures: Carapace length 2.3, width 1.6; abdomen length 3.2, width 2.6. Eye measurements: AME 0.10; ALE 0.15; PME 0.13; PLE 0.15; AME-AME 0.03; AME-ALE 0; ALE-PLE 0; PME-PME 0.04; PME-PLE 0.09. Clypeus height 0.10. Leg IV longest; leg formula: IV, I, II, III; leg measurements as follows: I: 9.4 (2.6, 3.1, 2.2, 1.5); II: 7.9 (2.3, 2.5, 1.9, 1.2); III: 7.0



FIGS 17-22

Platocoelotes paralatus sp. n., male holotype (17-20), female (21, 22). (17) Cheliceral teeth, posterior view. (18) Palp, prolateral view. (19) Palp, ventral view. (20) Palp, retrolateral view. (21) Epigynum, ventral view. (22) Vulva, dorsal view. Scale lines: 17-20 = 0.2 mm; 21-22 = 0.5 mm.

(1.9, 2.1, 1.9, 1.1); IV: 9.8 (2.6, 3.0, 2.8, 1.4). Genital atrium large, occupying half of epigynum; epigynal hoods situated mesally, close to the lateral atrial margin (Fig. 21); copulatory ducts not visible; spermathecae simple and medially fused to each other; spermathecal heads small, situated posteriorly and widely separated from each other; fertilization ducts situated close to each other (Fig. 22).

VARIATION: The total length varies from 3.6 to 5.5 in the twelve female examined.

DISTRIBUTION: China (Guizhou) (Map 1).

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A further study on the species of the spider family Agelenidae from China (Arachnida: Araneae)

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A further study on the species of the spider family Agelenidae from China (Arachnida: Araneae). - Six agelenid spider species belonging to the genera *Agelena*, *Ageleradix* and *Benoitia* occurring in China are diagnosed, described and illustrated. The name *Agelena micropunctala* Wang, 1992 is placed in the synonymy of *Agelena poliosata* Wang, 1991; *Agelena otiforma* Wang, 1991 is transferred to the genus *Ageleradix*; *Benoitia agraulosa* (Wang & Wang, 1990) is newly reported from Xinjiang Province of China. Three new species are described: *Ageleradix schwendingeri* sp. n., *Ageleradix sternseptum* sp. n. and *Ageleradix zhishengi* sp. n.

Keywords: Taxonomy - new species - new synonymy - new combination - funnel-webs.

INTRODUCTION

Spiders of the family Agelenidae C. L. Koch, 1837, which construct conspicuous funnel-webs, are common inhabitants of the vegetation in China. According to Platnick's spider catalogue (2007), Agelenidae spiders are now represented by 41 genera and 508 species worldwide, and by 6 genera (*i.e.*, *Agelena* Walckenaer, 1805; *Ageleradix* Xu & Li, 2007; *Allagelena* Zhang, Zhu & Song, 2006; *Benoitia* Lehtinen, 1967; *Huangyuania* Song & Li, 1990; and *Tegenaria* Latreille, 1804) and 23 species occurring in China. A re-examination of the type material of the agelenid species known from China is becoming more and more important because some of the original descriptions do not provide sufficient information to meet the current requirements for species identification and phylogenetic evaluation. The current study aims to provide more information on type material of the known agelenid species in China, and it presents three new species.

MATERIAL AND METHODS

All specimens treated in the current paper are deposited in the Institute of Zoology, Chinese Academy of Sciences, Beijing, China (IZCAS), in the Hunan Biological Institute, Changsha, China (HBI) and in the Muséum d'histoire naturelle de la Ville de Genève, Switzerland (MHNG). Specimens were examined and measured under an SZ40-Olympus stereomicroscope; details were studied under an Olympus

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BX40 compound microscope. All illustrations were made using a drawing tube. Male palp and female epigynum were examined and illustrated after they were separated from the spider's body, the vulva was examined after being macerated in lactic acid for about 12 hours. For examination of the genital structures under transmitted light microscopy, male palp and female epigynum were immersed in 75% alcohol.

All measurements are given in millimeters. Leg measurements are shown as: Total length (femur, patella and tibia, metatarsus, tarsus). The terms used in the description of genitalia follow Wang (1997, 2002), Zhang, Zhu & Song (2006) and Xu & Li (2007). Abbreviations used in the text are: A = atrium; AER = anterior eye row; ALE = anterior lateral eye; ALS = anterior lateral spinneret; AME = anterior median eye; C = conductor; CB = copulatory bursa; D = diverticula; E = embolus; FD = fertilization duct; LTA = lateral tibial apophysis; MA = median apophysis; MOA = median ocular quadrangle; MOA-L = length of MOA; MOA-WA = anterior width of MOA; MOA-WP = posterior width of MOA; PA = patellar apophysis; PER = posterior eye row; PLE = posterior lateral eye; PLS = posterior lateral spinneret; PME = posterior median eye; PMS = posterior median spinneret; R = radix; RTA = retrolateral tibial apophysis; S = spermatheca; SA = spermathecal apophysis; ST = subtegulum; T = tegulum; TP = tegular process.

TAXONOMY

Agelena poliosata Wang, 1991 Figs 1-3

Agelena poliosata Wang, 1991: 411, figs 24-25. – Chen & Zhao, 1998: 3, figs 2.1-2. – Song, Zhu & Chen, 1999: 354, fig. 205O-P.

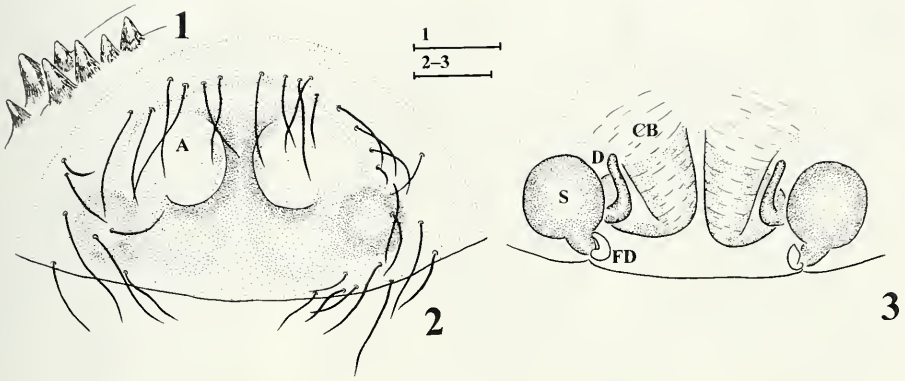
Agelena micropunctulata Wang, 1992: 288, figs 11-12, **syn. n.** – Song, Zhu & Chen, 1999: 354, fig. 205J-K.

Type material examined: ♀ holotype (HBI) of *Agelena poliosata* Wang, 1991: Mt Tianmushan (30.4° N, 119.5° E), Zhejiang Province, China, collected by Jiafu Wang, October, 1979. ♀ holotype (HBI) of *A. micropunctulata* Wang, 1992: Sangang County (27.7° N, 117.6° E), Fujian Province, China, collected by Jiafu Wang, 20 July, 1986.

Other material examined: 1 ♀ (IZCAS), Mt Tianmushan, Zhejiang Province, collector unknown, 12-17 October 1974. – 3 ♀ (MHNG), same locality as for the preceding, collector unknown, 12 October 1976. – 1 ♀ (IZCAS), Mt Huangshan (29.7° N, 118.3° E), Anhui Province, collector unknown, 27 October 1974. – 1 ♀ (IZCAS), Hongchunping Town, Mt Emeishan (29.6° N, 103.5° E), Sichuan Province, collector unknown, 24 September 1975.

Diagnosis: Females of this species are similar to those of *A. limbata*, but can be distinguished by the different shape of their genital atrium and copulatory bursa (Figs 2-3).

Description: Female (holotype). Total length 10.00; carapace length 3.50, width 2.60; abdomen length 7.00, width 3.80. Anterior eye row and posterior eye row procurved in dorsal view. Eye measurements: AME 0.24; ALE 0.20; PME 0.20; PLE 0.21; AME-AME 0.12; AME-ALE 0.03; ALE-PLE 0.03; PME-PME 0.22; PME-PLE 0.17; MOA-L 0.60; MOA-WA 0.52; MOA-WP 0.58. Carapace yellow-brown; cervical groove and radial grooves black-brown; fovea short, slightly depressed. Each chelicera with 3 promarginal and 4 retromarginal teeth (Fig. 1). Maxillae and labium yellow-brown, labium wider than long. Sternum with slightly pointed posterior end only slightly inserted between coxae IV. Median and distal portion of leg femora and tibiae



FIGS 1-3

Agelena poliosata Wang, female. (1) Cheliceral teeth, left side. (2) Epigynum, ventral view. (3) Vulva, dorsal view. Scale bars: 0.2 mm.

with brown annulus. Leg formula (from longest to shortest): IV, I, II, III; leg measurements: I: 12.30 (3.50 + 4.10 + 3.00 + 1.70); II: 11.00 (3.10 + 3.70 + 2.60 + 1.60); III: 10.70 (3.20 + 3.40 + 2.60 + 1.50); IV: 13.60 (3.80 + 4.50 + 3.80 + 1.50). Abdomen ovoid. Dorsal side of abdomen gray; cardiac mark black; posterodorsal part of abdomen with several indistinct yellowish chevron-like markings; ventral side of abdomen without pattern. Apical segment of PLS about 1.8 times longer than basal segment. Epigynum (Figs 2-3) with median septum; atria separated by median septum and situated anteriorly on epigynum; copulatory bursa slightly shaped like the letter "L", with digitiform diverticula; spermathecae red-brown and round (Figs 2-3).

Male. Unknown.

VARIATION: The total length varies from 10.00 to 12.30 in females examined (n = 8).

DISTRIBUTION: China: Anhui, Fujian, Sichuan, Zhejiang (Map 1).

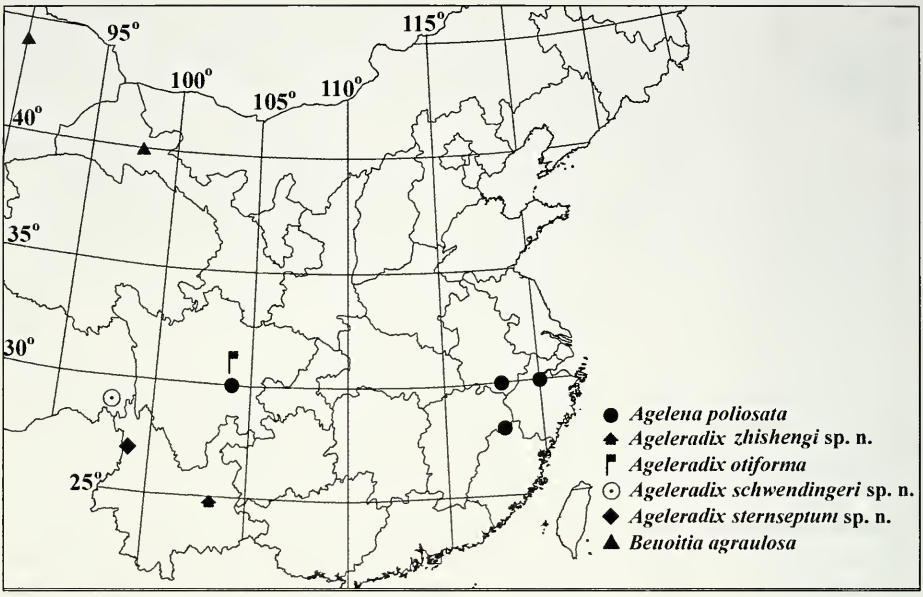
Ageleradix otiforma (Wang, 1991) comb. n. Figs 4-9

Agelena otiforma Wang, 1991: 409, figs 16-20. – Song, Zhu & Chen, 1999: 354, figs 205M-N, 206K, 207C.

TYPE MATERIAL EXAMINED: ♀ holotype (HBI); Sichuan Province, China, collected by Zhongming Luo, July 1981.– Paratypes; 2 ♂ (HBI), same data as for the holotype.

DIAGNOSIS: Females of this species can be recognized from those of other species by the tongue-shaped median septum, the strongly curved copulatory bursa, the shape of spermathecae and the position of the diverticulum (Fig. 9), and males by the brush-shaped distal end of the elongated conductor, the strongly modified radix (forming a cavity and with 2 apophyses), and the relatively long and slender embolus (Figs 4-6).

DESCRIPTION: Female (holotype). Total length 7.50. Carapace length 3.40, width 2.40; abdomen length 4.30, width 2.50. Anterior eye row and posterior eye row strongly procurved in dorsal view. Eye measurements: AME 0.20; ALE 0.18; PME 0.18; PLE 0.18; AME-AME 0.06; AME-ALE 0.03; ALE-PLE 0.03; PME-PME 0.17; PME-PLE 0.14; MOA-L 0.54; MOA-WA 0.46; MOA-WP 0.52. Carapace yellow-



Map 1
Locality records for seven agelenid spider species in China.

brown, with brown margin. Each chelicera with 3 promarginal and 4 retromarginal teeth. Maxillae and labium light brown, labium wider than long. Sternum brown, covered with white fuzz and long brown hair. Basal and median portion of leg femora and tibiae with yellow-brown annulus. Leg formula (from longest to shortest): IV, I, II, III; leg measurements: I: 10.80 (2.50 + 3.90 + 2.70 + 1.70); II: 9.90 (2.50 + 3.60 + 2.30 + 1.50); III: 9.60 (2.60 + 3.30 + 2.50 + 1.30); IV: 13.60 (3.70 + 4.20 + 3.80 + 1.90). Dorsal side of abdomen brown, cardiac mark mauve and with white margin; posterodorsal part of abdomen with 5 yellowish chevron-like markings; ventral side of abdomen with 2 brown longitudinal markings between epigastric groove and spinnerets. Apical segment of PLS about 1.45 times longer than basal segment. Epigynum (Figs 8-9) with a tongue-shaped median septum; anterior part of vulva in the shape of two ears; spermathecae moderately large, copulatory bursa strongly curved, diverticula resting in a bend of the sigmoid spermathecae.

Male (paratype). Total length 7.30; carapace length 3.30, width 2.50; abdomen length 4.20, width 2.60. Eye measurements: AME 0.22; ALE 0.24; PME 0.17; PLE 0.24; AME-AME 0.03; AME-ALE 0.03; ALE-PLE 0.03; PME-PME 0.18; PME-PLE 0.12; MOA-L 0.54; MOA-WA 0.48; MOA-WP 0.54. Leg measurements: I: 14.88 (3.90 + 4.98 + 3.72 + 2.28); II: 13.74 (3.72 + 4.20 + 3.72 + 2.10); III: 13.50 (3.66 + 4.02 + 3.90 + 1.92); IV: 17.28 (4.56 + 4.74 + 5.40 + 2.58). Each chelicera with 3 promarginal and 5 retromarginal teeth (Fig. 7). Palp (Figs 4-6) without patellar apophysis; retrolateral tibial apophysis small, with distal end beak-shaped in ventral view; tegulum with processes; conductor slightly curved; embolus originating subapically, moderately long and slender; median apophysis small.

FIGS 4-9

Ageleradix otiforma (Wang). (4-6) Palp of male, left side. (4) Prolateral view. (5) Ventral view. (6) Retrolateral view. (7) Cheliceral teeth of male, left side. (8-9) Female genitalia. (8) Epigynum, ventral view. (9) Vulva, dorsal view. Scale bars: 4-6, 0.5 mm; 7-9, 0.2 mm.

VARIATION: The total length in the two males examined is 7.15 and 7.30.

DISTRIBUTION: China: Sichuan (Map 1).

Ageleradix schwendingeri sp. n. Figs 10-16

HOLOTYPE ♂ (MHNG): Xiazayü, Zayü County (28.6° N, 97.4° E), Tibet, China, collected by Xiaoen Chen and Junchuan Gao, 8 July 1981.

PARATYPE: 1♀ (MHNG), Kangga Town, Litang County (30.0°N, 100.2°E), Sichuan, China, 5 June 1982.

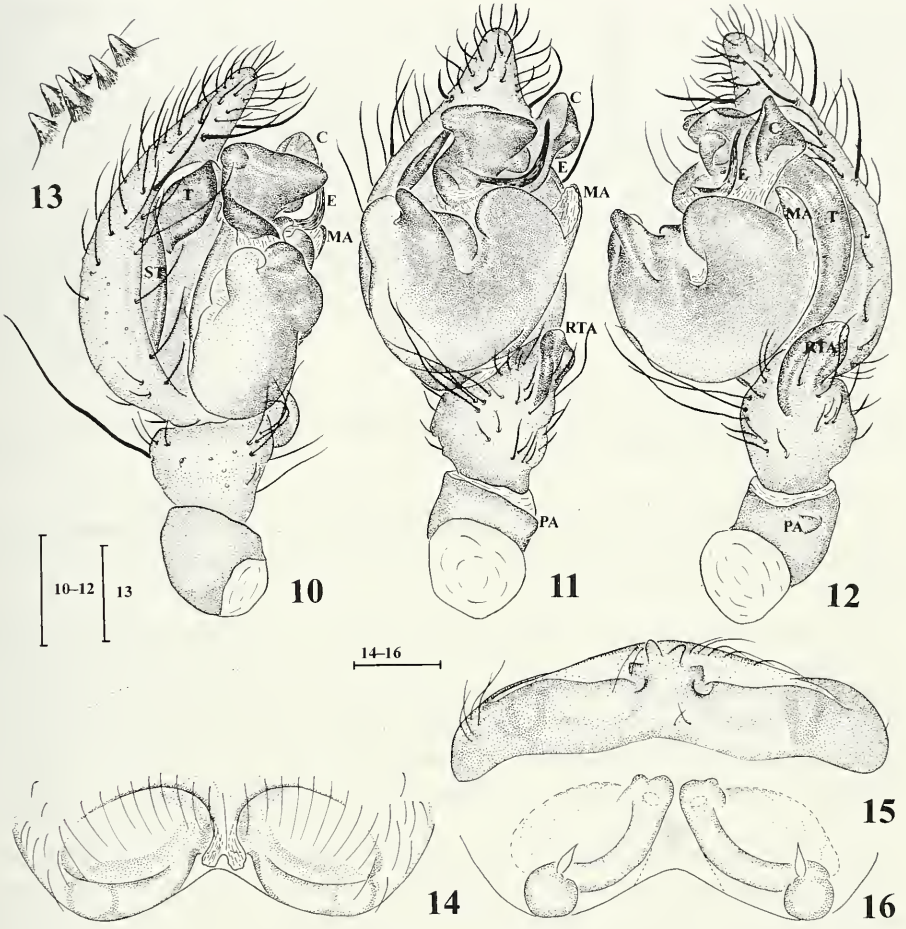
Etymology: The new species is named in honor of Dr Peter J. Schwendinger (MHNG) for his contribution to arachnology.

Diagnosis: The male of this species can be distinguished from those of other species by its short, anteriorly situated conductor, its slightly bifid tegulum process and its strong radix (Figs 10-12), and the female by the presence of an epigynal tooth, a deep cavity on the posterior edge of the epigynum and distinctive spermathecal stalks (Figs 14-16).

Description: Male (holotype). Total length 7.30; carapace length 3.60, width 2.60; abdomen length 3.70, width 2.00. Anterior eye row and posterior eye row procurved in dorsal view. Eye measurements: AME 0.18; ALE 0.23; PME 0.18; PLE 0.23; AME-AME 0.05; AME-ALE close to each other; ALE-PLE close to each other; PME-PME 0.10; PME-PLE 0.10; MOA-L 0.53; MOA-WA 0.33; MOA-WP 0.45. Carapace brown, with black margin and yellow-brown submargin. Head region clearly narrower than thorax region. Cervical groove and radial grooves black. Fovea longitudinal, long. Chelicerae red-brown, each with 3 promarginal and 3 retromarginal teeth (Fig. 13). Maxillae and labium brown, labium longer than wide. Sternum gray, with distal end slightly rounded, not very sharp. Leg brown, leg formula (from longest to shortest): IV, I, II, III; leg measurements: I: 14.85 (4.50 + 4.70 + 3.55 + 2.10); II: 13.45 (3.90 + 4.25 + 3.40 + 1.90); III: 12.40 (3.60 + 3.80 + 3.40 + 1.60); IV: 16.10 (4.10 + 5.00 + 4.80 + 2.20). Dorsal side of abdomen nut-brown, color of central region lighter than that of lateral region. Ventral side of abdomen with a line of light dots along each side. Colulus reduced to a tiny plate covered with several setae. ALS slightly longer than the basal segment of PLS. Apical segment of PLS about 1.3 times longer than that of basal segment. Palp (Figs 10-12) with small patellar apophysis; tegular process bifid, situated prolaterally on the tegulum; conductor strong and forming a moderate concavity; embolus short and sharp, originating subapically, in concavity of cunductor; stout radix with several blunt apophyses; median apophysis wide and situated retrolaterally on the bulb.

Female (paratype). Total length 7.00, carapace 3.00 long, 2.27 wide, abdomen 4.00 long, 2.53 wide. AER and PER strongly procurved. AME 0.13, ALE 0.20, PME 0.14, PLE 0.19; AME-AME 0.10, AME-ALE 0.08, PME-PME 0.13, PME-PLE 0.13, ALE-PLE 0.13; MOA-L 0.50, MOA-WA 0.33, MOA-WP 0.40. Carapace yellow-brown, with light yellow submargin and black margin. Cervical groove and radial grooves distinct, black-brown. Head region slightly narrower than thorax region. Fovea long and moderately deep. Chelicera with 3 promarginal and 3 retromarginal teeth. Legs yellow-brown, metatarsi and tarsi with trichobothria. Leg formula: IV, I, II, III; leg measurements: I: 10.03 (2.75, 3.25, 2.50, 1.53); II: 8.76 (2.50, 2.88, 2.13, 1.25); III: 8.63 (2.38, 2.75, 2.25, 1.25); IV: 11.76 (3.13, 3.63, 3.50, 1.50).

Abdomen dorsally with the indistinct cardiac pattern, a few scattered light dots and several chevrons. ALS strong, widely separated, about one third of the diameter of ALS. PLS about twice as long as ALS. Apical segment of PLS slender and sharp, about as long as basal segment. Epigynum in ventral view with a longitudinal septum, atrium divided into two inclined ellipses; posterior edge of the epigynum strongly indented; a single epigynal tooth with fishtail-shaped tip situated on the septum. Two small and



Figs 10-16

Ageleradix schwendingeri sp. n. (10-12) Palp of male, left side. (10) Prolateral view. (11) Ventral view. (12) Retrolateral view. (13) Cheliceral teeth of male, left side. (14-16) Female genitalia. (14) Epigynum, ventral view. (15) Epigynum, posterior view. (16) Vulva, dorsal view. Scale bars: 10-12, 0.5 mm; 13, 0.2 mm; 14-16, 0.1 mm.

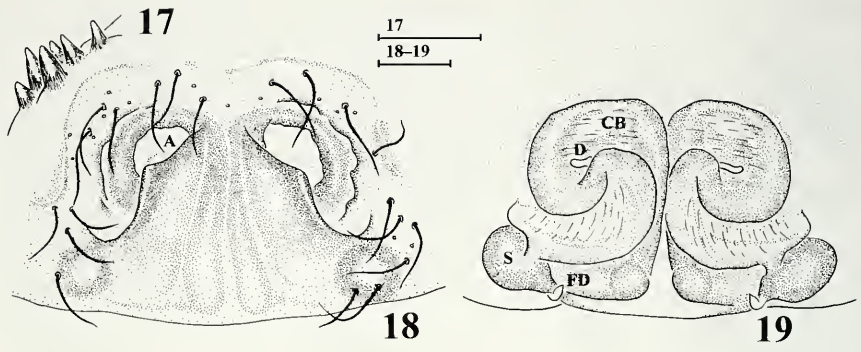
slightly pointed apophyses visible near the epigynal tooth in posterior view. Spermathecal heads in dorsal view small; spermathecae with round, widely separated bases and elongated, anteriorly converging stalks (Figs 14-16).

Distribution: China: Tibet, Sichuan (Map 1).

Ageleradix sternseptum sp. n. Figs 17-19

Holotype ♀ (IZCAS): Judian Town, Lijiang County (27.2° N, 99.4° E), Yunnan Province, China, collected by Jinwen Shang, 13 July 1981.

Etymology: This species name, a noun in apposition, refers to the shape of the median septum of the epigynum.



Figs 17-19

Ageleradix sternseptum sp. n. (17) Cheliceral teeth of female, left side. (18) Epigynum, ventral view. (19) Vulva, dorsal view. Scale bars: 0.2 mm.

Diagnosis: *A. sternseptum* can be distinguished from other *Ageleradix* species by the shape of its median epigynal septum (Fig. 18), the spermathecae and the twisted copulatory bursae (Fig. 19).

Description: Female (holotype). Total length 6.79. Carapace length 2.99, width 2.12; abdomen length 3.80, width 2.34. AER procurved and PER strongly procurved in dorsal view. Eye measurements: AME 0.14; ALE 0.17; PME 0.13; PLE 0.15; AME-AME 0.05; AME-ALE 0.03; ALE-PLE close to each other; PME-PME 0.11; PME-PLE 0.07; MOA-L 0.45; MOA-WA 0.31; MOA-WP 0.36. Carapace brown, covered with white and brown plumose hairs. Head region clearly narrower than thorax region. Cervical groove and radial grooves black. Fovea longitudinal, long. Chelicerae red-brown, with 3 promarginal and 3 retromarginal teeth (Fig. 24). Maxillae and labium brown, labium much longer than wide. Sternum gray, covered with white plumose hairs, its distal end slightly rounded, not very sharp. Legs yellow-brown, with annuli on femora, patellae, tibiae and distal end of metatarsi. Leg formula (from longest to shortest): IV, I, II = III; leg measurements: I: 8.00 (2.27 + 2.64 + 1.82 + 1.27); II: 7.81 (2.18 + 2.72 + 1.82 + 1.09); III: 7.81 (2.18 + 2.45 + 2.00 + 1.18); IV: 10.54 (2.91 + 3.27 + 2.91 + 1.45). Abdomen densely covered with white and brown plumose hairs. Middorsal region yellow, the rest brown. A broad brown pattern in the middle of the venter. Colulus reduced to a tiny plate covered with several setae. ALS about as long as basal segment of PLS; apical segment of PLS as long as basal segment. Epigynum (Figs 18-19) with large, shield-like median septum, posteriorly much wider than anteriorly, and with two posterior depressions. Genital atria situated anteriorly of median septum, giving the appearance of two nostrils. Spermathecae pear-shaped and widely separated from each other; copulatory bursae strongly twisted.

Male. Unknown.

Distribution: China: Yunnan (Map 1).

Ageleradix zhishengi sp. n. Figs 20-23

Agelena cymbiforma Wang, 1991: 408, figs 11-13 (misidentification of male). – Song, Zhu & Chen, 1999: 353, figs 206G, Q.
Ageleradix cymbiforma. – Xu & Li 2007: 60. (only male)

Holotype ♂ (HBI): Mt Xishan, Kunming City (25.0° N, 102.7° E), Yunnan Province, China, collected by Jiafu Wang, 30 July 1987 (male paratype of *Agelena cymbiforma* Wang, 1991).

Etymology: The new species is named in honor of Dr Zhisheng Zhang for his contribution to the current paper. Specimens collected by his colleague made us aware of the incorrect match of male and female in the original description of *Agelena cymbiforma*. He also confirmed the match of male and female in *Ageleradix schwendingeri* sp. n.

Diagnosis: This species can be recognized by a short, sharply pointed embolus, a strong, boat-shaped conductor, and a torch-like, distally serrated radix in males (Figs 20-22).

Description: Male (holotype). Total length 5.50; carapace length 2.70 width 2.10; abdomen length 3.00, width 1.60. Eye measurements: AME 0.11; ALE 0.18; PME 0.15; PLE 0.18; AME-AME 0.06; AME-ALE 0.06; ALE-PLE 0.04; PME-PME 0.12; PME-PLE 0.09; MOA-L 0.45; MOA-WA 0.32; MOA-WP 0.42. Leg measurements: I: 11.64 (2.94 + 3.78 + 3.00 + 1.92); II: 9.84 (2.52 + 3.36 + 2.64 + 1.32); III: 9.72 (2.70 + 3.00 + 2.82 + 1.20); IV: 14.64 (3.66 + 4.74 + 4.26 + 1.98). Promargin and retromargin of each chelicera with 3 teeth (Fig. 23). Palp (Figs 20-22) without patellar apophysis; retrolateral tibial apophysis relatively distinct; tegulum with 2 processes; conductor boat-shaped, long and strong; embolus originating subapically, needle-shaped; radix long and broad, torch-like, with a serrate membranous distal edge; median apophysis wide, membranous.

Distribution: China: Yunnan (Map 1).

Remark: 3 ♀ and 2 ♂ of this species, collected by Zizhong Yang at Xiaguan near Dali City, Yunnan Province, China on 28 March 2003, are deposited in the Dali University and were examined by Zhisheng Zhang. They show that the female holotype and the male paratype of *A. cymbiforma* are not conspecific. *Ageleradix zhishengi* sp. n. appears to be a common species in that area.

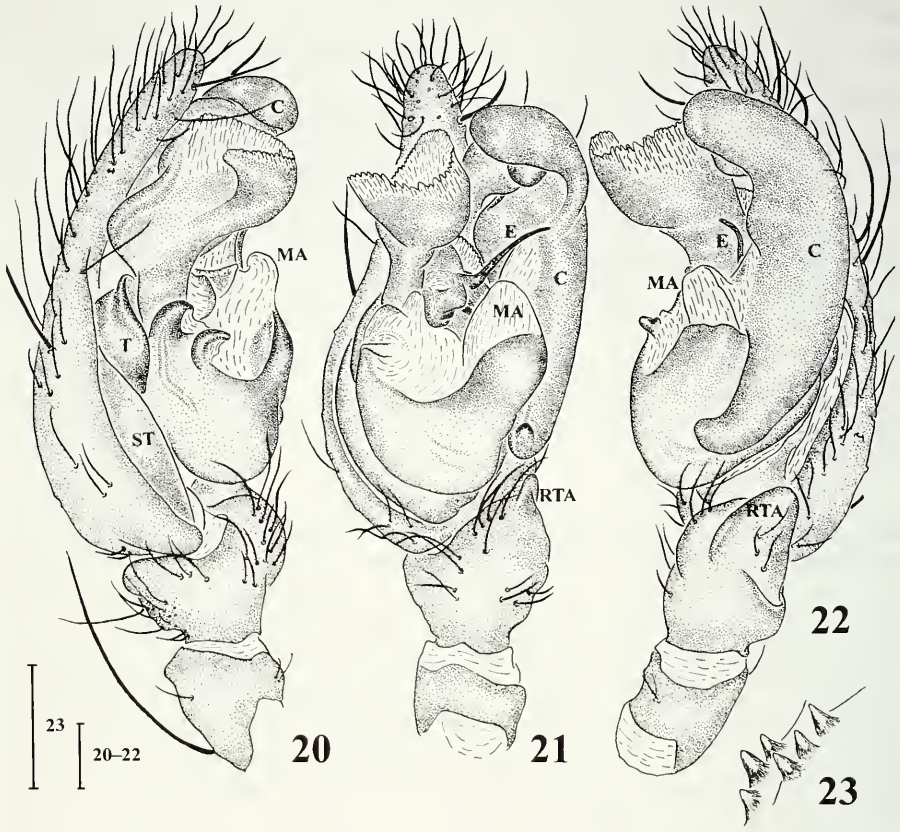
Benoitia agraulosa (Wang & Wang, 1990) Figs 24-29

Agelena agraulosa Wang & Wang, 1990: 40, figs 1-5. – Wang, 1997: 254, figs 11-15;
Benoitia agraulosa. – Song, Zhu & Chen, 1999: 355, figs 207K-L, M-N (transferred from *Agelena*, following comments by Wang, 1997).

Type material examined: ♀ holotype (IZCAS); Jiayuguan Great Wall, Jiayuguan City (39.8° N, 98.3° E), Gansu Province, China, collected by Xinping Wang and Xinai Hu, 26 July 1988. – Paratypes, 1 ♂ and 2 ♀ (IZCAS), same data as for the holotype.

Other material examined: 1 ♀ (MHNG), Mt Baitashan, Qitai County (44.1° N, 89.8° E), Xinjiang, China, collector and date unknown.

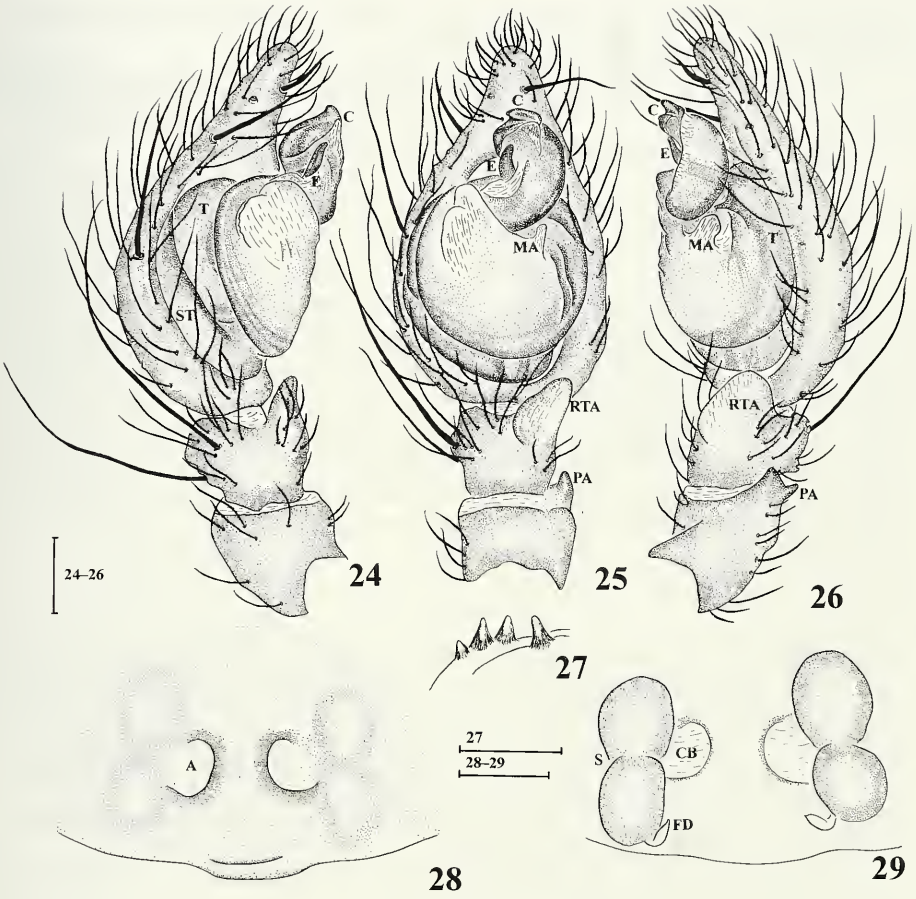
Diagnosis: *B. agraulosa* can be distinguished from other *Benoitia* species by the shape of conductor and embolus in males (Figs 24-26), and by the small separated epigynal openings and medially constricted spermathecae in females (Figs 28-29).



FIGS 20-23

Ageleradix zhishengi sp. n. (20-22) Palp of male, left side. (20) Prolateral view. (21) Ventral view. (22) Retrolateral view. (23) Cheliceral teeth of male, left side. Scale bars: 0.2 mm.

DESCRIPTION: Female (holotype). Total length 10.00; carapace length 4.19, width 2.58; abdomen length 5.97, width 3.55. AER and PER procurved in frontal view. Eye measurements: AME 0.18; ALE 0.12; PME 0.12; PLE 0.18; AME-AME 0.06; AME-ALE 0.06; ALE-PLE 0.06; PME-PME 0.12; PME-PLE 0.12; MOA-L 0.45; MOA-WA 0.42; MOA-WP 0.39. Carapace yellow-brown, with black-brown spots. Several long hairs in MOA and some between PME and thoratic groove. Clypeus covered with white plumose hairs. Chelicerae red-brown, each with 3 promarginal teeth and 1 retromarginal tooth. Maxillae, sternum and legs yellow-brown, maxillae much longer than wide. Labium brown. Sternum slightly longer than wide and covered with quite long hairs. Legs with a stripe on their ventral side. Leg formula (from longest to shortest): IV, I, III, II; leg measurements: I: 12.70 (3.17 + 4.92 + 2.86 + 1.75); II: 10.32 (2.86 + 3.93 + 2.54 + 1.59); III: 11.75 (2.86 + 4.76 + 2.38 + 1.75); IV: 13.81 (3.97 + 4.44 + 4.13 + 1.27). Dorsal side of abdomen brown, clothed with several pairs of black and silvery white spots. Lateral sides of abdomen brown. Epigynum with



Figs 24-29

Benoitia agraulosa (Wang & Wang). (24-26) Palp of male, left side. (24) Prolateral view. (25) Ventral view. (26) Retrolateral view. (27) Cheliceral teeth of male, left side. (28-29) Female genitalia. (28) Epigynum, ventral view. (29) Vulva, dorsal view. Scale bars: 0.2 mm.

two relatively small openings, these clearly separated from each other. Wide, depressed septum lying between finely sclerotized rims of epigynal openings. Copulatory bursae bordered by long, medially constricted spermathecae (Figs 28-29).

Male (paratype). Total length 8.87; carapace length 4.03, width 2.10; abdomen length 5.00 width 2.26. Eye measurements: AME 0.15; ALE 0.18; PME 0.15; PLE 0.15; AME-AME 0.07; AME-ALE 0.03; ALE-PLE 0.06; PME-PME 0.15; PME-PLE 0.15; MOA-L 0.51; MOA-WA 0.42; MOA-WP 0.39. Leg measurements: I: 11.94 (3.00 + 3.54 + 3.72 + 1.68); II: 11.16 (2.88 + 3.60 + 3.06 + 1.62); III: 11.52 (3.00 + 3.78 + 3.06 + 1.68); IV: 14.54 (4.02 + 4.50 + 4.92 + 1.10). Each chelicera with 3 promarginal teeth and 1 retromarginal tooth (Fig. 27). Palp (Figs 24-26) with large retrolateral tibial apophysis; patellar apophysis with two distal ends; corkscrew-shaped conductor

with sclerotised and membranaceous structures describing one whorl; embolus short, with blunt tip; median apophysis thumb-shaped.

VARIATION: The total length in females examined (n = 4) varies from 9.90 to 11.58.

DISTRIBUTION: China: Gansu, Xinjiang (Map 1).

ACKNOWLEDGEMENTS

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Generi e specie della tribù Lomechusini del Borneo (Coleoptera, Staphylinidae)*

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The genera and species of the tribe *Lomechusini* of Borneo (Coleoptera, Staphylinidae). - This study on the tribe *Lomechusini* from Borneo contains the illustration and the revision of the following six holotypes or lectotypes from Borneo: *Drusilla carinithorax* (Bernhauer, 1915), *Drusilla aerea* (Cameron, 1933), *Drusilla monticola* (Cameron, 1943), *Drusilla borneensis* (Bernhauer, 1915), *Drusilla montanella* (Bernhauer, 1936), *Zyras montanus* (Bernhauer, 1915). A lectotype of *Drusilla aerea* (Cameron, 1933) is designated. *Amaurodera montanella* Bernhauer, 1936, is transferred to *Drusilla* as *Drusilla montanella* (Bernhauer, 1936) and *Drusilla montana* (Bernhauer, 1915) to the genus *Zyras* as *Zyras montanus* (Bernhauer, 1915). The followings 34 species are described as new: four of the genus *Chaetosogonocephus* (*borneensis* sp. n., *notaticornis* sp. n., *burckhardti* sp. n., *kinabaluensis* sp. n.), five of the genus *Amaurodera* (*amabilis* sp. n., *incisa* sp. n., *bulbosa* sp. n., *frondium* sp. n., *discoidea* sp. n.), fourteen of the genus *Drusilla* (*bruneiorum* sp. n., *necaerea* sp. n., *terrestris* sp. n., *fossulicollis* sp. n., *sculpticollis* sp. n., *bruneiensis* sp. n., *fontis* sp. n., *bicarinicollis* sp. n., *caelaticollis* sp. n., *neocoenonicacollis* sp. n., *rufocaelata* sp. n., *spissatheca* sp. n., *semimonticola* sp. n., *foeda* sp. n.), ten of the genus *Zyras* (*bajauanus* sp. n., *horridus* sp. n., *longe furcatus* sp. n., *kinabaluensis* sp. n., *quadriterminalis* sp. n., *alboterminalis* sp. n., *pervariolosus* sp. n., *pallipyga* sp. n., *daiaccorum* sp. n., *paederinus* sp. n.) and one of the genus *Myrmedonota* (*borneensis* sp. n.). The genera *Chaetosogonocephus* and *Myrmedonota* are new from Borneo. Habitus and male and female genitalia of the new species are illustrated. Keys to the Bornean species of the genera *Chaetosogonocephus*, *Amaurodera*, *Drusilla* and *Zyras* are provided. The genus of Lomechusini *Orphnebius* Motschulscky, 1858, has been treated in a precedent paper.

Keywords: Coleoptera - Staphylinidae - Aleocharinae - taxonomy - Borneo.

INTRODUZIONE

Il presente lavoro ha lo scopo di esporre i risultati dell'esame degli Staphylinidae della tribù Lomechusini della sottofamiglia Aleocharinae raccolti nel Parco Nazionale del Monte Kinabalu e altrove nel Borneo, dal Dr. Aleš Smetana di

* 211° Contributo alla conoscenza delle Aleocharinae.
Manoscritto accettato il 27.11.2007

Ottawa, dal Dr. Burckhardt e dal Dr. Ivan Löbl già del Museo di Storia Naturale di Ginevra. Alcuni esemplari provengono dal DEI di Eberswalde, dal Museo di Storia naturale di Londra e dal *Naturhistorisches Museum* di Vienna. Cinque specie della tribù appartengono a due generi prima sconosciuti (Hammond, 1984): *Chaetosogonocephus* Pace, 1986, e *Myrmedonota* Cameron, 1920. Dopo esame della maggior parte delle serie tipiche delle specie del Borneo appartenenti al genere *Drusilla* Leach, 1819, e *Zyras* Stephens, 1835, nel corso dell'esame del nuovo materiale ho constatato che le specie di questi generi nel Borneo sono assai poco note. Il genere dei Lomechusini *Orphnebius* Motschulscky, 1858, è stato trattato a parte (Pace, in stampa).

MATERIALE E METODO

L'esame è basato prevalentemente sugli esemplari adulti raccolti generalmente nel Parco Nazionale del Monte Kinabalu dal Dr. Aleš Smetana di Ottawa durante le sue spedizioni nel 1987 e 1988, dalla spedizione D. Burckhardt & I. Löbl del Museo di Storia Naturale di Ginevra del 1987 e 1988.

La tassonomia delle nuove specie del Borneo presenta serie difficoltà, in molti casi superate grazie all'esame dei caratteri dell'organo copulatore maschile, dei segmenti genitali maschili e femminili e della spermateca. Prima della pubblicazione del presente lavoro nessun esame a fini tassonomici di questi importanti organi e strutture è stato compiuto dagli autori del lontano passato. Gli holotypi delle specie note sono stati da me esaminati e disegnati, quando disponibili, e inseriti nelle chiavi qui date per la prima volta. Le recenti restrizioni riguardo ai prestiti di materiale tipico imposte dal Museo di Storia Naturale di Londra, tuttavia, mi hanno impedito di esaminare alcuni esemplari tipici. L'etimologia delle nuove specie è omessa quando evidente come *borneensis* o *kinabaluensis*.

Quasi tutti gli esemplari sono stati dissezionati per le serie di pochi individui. Le strutture genitali sono state montate in balsamo del Canadà su piccoli rettangoli trasparenti di materiale plastico, infilzati sullo spillo dell'esemplare. Le strutture genitali sono state studiate usando un microscopio composto e disegnate mediante oculare a reticolo. Gli habitus sono stati disegnati con l'uso di un oculare micrometrico di un microscopio binoculare. Tutti i disegni sono dell'autore fino alla fase finale.

Il sicuro riconoscimento, da parte del lettore, dei generi e delle specie è qui affidato soprattutto alla parte illustrativa che ha linguaggio internazionale. Per questo motivo le descrizioni sono brevi, limitate a porre in evidenza ciò che non è riproducibile graficamente come il colore, la reticolazione e la granulosità. D'altronde per molte specie della sottofamiglia Aleocharinae la sola descrizione anche molto accurata e lunga non dà quasi mai la certezza di un'esatta identificazione delle varie specie. È l'osservazione del disegno dell'edeago e/o della spermateca, insieme con quello dell'habitus, che aiuta molto a risolvere problemi interpretativi dati dalla sola descrizione.

Gli holotypi delle nuove specie sono depositati nel Museo di Storia Naturale di Ginevra (MHNG), in collezione Franz al Naturhistorisches Museum di Vienna (Austria) (NHMW), nel DEI di Eberswalde (DEI) e nell'Institut Royal des Sciences

Naturelles de Belgique di Bruxelles (IRSN). Paratypi sono conservati in collezione Smetana e nell'Institut Royal des Sciences Naturelles de Belgique di Bruxelles.

ESAME DI MATERIALE TIPICO

PREMESSA: Hammond (1984) nella sua checklist cita ancora *Drusilla antennalis* (Cameron, 1936). Gli è sfuggito che questa specie, allora attribuita al genere *Astilbus* Dillwyn, 1829, dallo stesso Cameron (1950) è stata attribuita al nuovo genere *Neocoenonica* Cameron, 1950, della tribù Homalotini. Questo genere non è nemmeno riportato da Blackwelder (1953). Di *Neocoenonica antennalis* (Cameron, 1936), ho esaminato l'holotypus di Selangor e una serie di esemplari di Sumatra. Ho confermato la validità del genere *Neocoenonica* in un mio lavoro (Pace, 1986), in cui per la prima volta ho dato a pag. 231 le figure dell'habitus, dell'edeago e della spermateca.

Drusilla (Tropignorimus) carinithorax (Bernhauer, 1915) Figg. 36-38

Astilbus (Tropignorimus) carinithorax Bernhauer, 1915: 154.
Drusilla carinithorax. – Hammond, 1984: 210.

HOLOTYPUS: Maschio etichettato come segue, I° Cartellino: Matang 3.XI.13, Sarawak, ded. Moulton, II°: 5, III°: *Tropignorimus carinithorax* Bernh., TYPUS UNIC., IV°: Chicago NH Mus., M. Bernhauer collection.

NOTA: L'holotypus di questa specie è qui da me illustrato per la prima volta. Nonostante le differenze morfologiche del pronoto *carinithorax* non è attribuibile a *Tropignorimus* come genere poiché l'edeago ha struttura simile a quella dell'edeago di decine di specie del genere *Drusilla*. Anche le parti boccali rientrano nell'ambito del genere *Drusilla*.

Drusilla aerea (Cameron, 1933) Figg. 42-45

Astilbus borneensis Cameron, 1928: 419.
Astilbus aereus Cameron, 1933: 360, nota (nom. preocc., *Astilbus borneensis* Bernhauer, 1915: 153).
Drusilla aereus. – Hammond, 1984: 209.

LECTOTYPUS: Maschio così etichettato, Borneo, Mt. Mundi, *Astilbus aereus* Cam. (*borneensis* Cam. praeocc.), *Myrmedonia borneensis*, Borneo Dr. Cameron, British Mus. Presente designazione.

PARALECTOTYPUS: Femmina, Borneo, Dr. Cameron, British Mus.

NOTA: La descrizione di Cameron per *Astilbus borneensis* Cameron, 1928, coincide con l'esemplare lectotypus maschio. Hammond (1984) attribuisce a Scheerpeltz il nome nuovo di *aerea*. Gli è sfuggito che Cameron (1933) in una nota in calce ha rilevato l'omonimia con *Astilbus borneensis* Bernhauer. Ha pertanto rinominato la sua specie con il nome di *Astilbus aereus*.

Drusilla monticola (Cameron, 1943) Figg. 67-68

Astilbus monticola Cameron, 1943: 140.
Drusilla monticola. – Hammond, 1984: 210.

HOLOTYPUS: Maschio così etichettato, M. Pais Borneo, *A. monticola* Cam. TYPE, British Mus.

NOTA: Qui è dato per la prima volta il disegno dell'edeago dell'holotypus.

Drusilla borneensis (Bernhauer, 1915) Figg. 85-86

Astilbus borneensis Bernhauer, 1915: 153.
Drusilla borneensis. – Hammond, 1984: 210.

HOLOTYPUS FEMMINA, ETICHETTATO COME SEGUE: I° cartellino: Madang (sic! = Matang), 23.XII.13, II°: Borneo, Madang, Sarawak Mus.., III°: *Astilbus borneensis* Bernh. Typus unic., IV°: Chicago NH Mus, M. Bernhauer collection.

NOTA: L'esemplare holotypus è danneggiato alle antenne. La sinistra conserva l'antennomero basale, la destra gli otto antennomeri basali, Fig. 86. Nella descrizione di Bernhauer non sono segnalate queste lacune.

Drusilla montanella (Bernhauer, 1936), **comb. n.** Fig. 84

Amaurodera montanella Bernhauer, 1936: 215; Hammond, 1984: 208.

HOLOTYPUS FEMMINA, COSÌ ETICHETTATO: Sarawak, Mt Dulit, R. Koyan, 2500 ft, Primary forest, 16.XI.32, sweeping ferns, Oxford Univ.. Exped. B.M. Hobby & A.W. Moore, B.M. 1933-254, J. Ford, *Astilbus montanellus* Brnh, Typ., Chicago NH Mus, M. Bernhauer collection.

NOTA: La descrizione di Bernhauer coincide con l'esemplare holotypus da me esaminato, tranne che per la lunghezza delle elitre. Bernhauer afferma: «Flügeldecken viel kürzer als der Halsschild». In base alle mie misurazioni con micrometro oculare le elitre, misurate dall'omero al margine posteriore, sono appena più corte del pronoto. I caratteri del pronoto descritti da Bernhauer li ho riscontrati esatti se applicati all'holotypus. L'esemplare holotypus è lievemente immaturo, ne ha sofferto il disegno della spermateca, Fig. 84, che risulta deformata perché poco sclerificata.

Zyras (Zyras) montanus (Bernhauer, 1915), **comb. n.** Figg. 107-108

Astilbus montanus Bernhauer, 1915: 152.
Drusilla montana. – Hammond, 1984: 210.

HOLOTYPUS FEMMINA, ETICHETTATO COME SEGUE: I° cartellino: Matang 20.XII.19, II°: 32, III°: Borneo Matang Sarawak Mus., IV°: *montanus* Bernh. Typus unic., V°: Chicago NH Mus, M. Bernhauer collection.

NOTA: Bernhauer ha attribuito questa specie al genere *Astilbus* sicuramente a motivo della presenza di un profondo solco mediano del pronoto, carattere proprio del genere *Astilbus* = *Drusilla*. L'esame della spermateca, tuttavia, indica senza dubbio l'appartenenza al genere *Zyras*. La forma a matassa di quest'organo non si è mai osservata in *Drusilla*, regolarmente invece nel sottogenere *Zyras* di *Zyras*. Il profondo solco mediano del pronoto in questa specie di *Zyras* è puro fenomeno di convergenza morfologica che ha ingannato Bernhauer.

CHAETOSOGONOCEPHUS PACE, 1986

Questo genere è nuovo per il Borneo, finora noto di Sulawesi e Malaysia.

CHIAVE DELLE SPECIE DEL GENERE *CHAETOSOGONOCEPHUS* PACE, 1986, NEL BORNEO

1 Quinto urotergo libero con punteggiatura evidente sulla sua metà posteriore, Fig. 1; armatura genitale interna dell'edeago a forma di uncino, Fig. 3; spermateca Fig. 4. Lunghezza 2,2 mm . . . . . *C. borneensis* sp. n.

- Quinto urotergo libero coperto totalmente o parzialmente di strie longitudinali; armatura genitale interna dell'edeago non ad uncino 2
2 Undicesimo antennomero lunghissimo, pari ai sei precedenti antennomeri riuniti; le strie longitudinali del quinto urotergo libero sono molto corte e poste presso il margine posteriore, Fig. 5; porzione distale dell'edeago sinuosa, in visione laterale, Fig. 6. Lunghezza 2,3 mm . . . . . *C. notaticornis* sp. n.
- Undicesimo antennomero lungo quanto i due antennomeri precedenti riuniti; le strie longitudinali del quinto urotergo libero sono lunghe fino a metà dello stesso urotergo libero o per tutta la sua lunghezza; porzione distale dell'edeago rettilinea, in visione laterale 3
3 Le strie longitudinali del quinto urotergo libero raggiungono la base dello stesso urotergo libero, Fig. 8; penultimi antennomeri fortemente trasversi; edeago sinuato ai lati, Fig. 10; spermateca robusta, con porzione prossimale fortemente flessa, Fig. 11. Lunghezza 1,9 mm . . . . . *C. burckhardti* sp. n.
- Le strie longitudinali del quinto urotergo libero raggiungono e non superano circa la metà della lunghezza dello stesso urotergo libero, Fig. 12; spermateca esile con porzione prossimale appena flessa, Fig. 15. Lunghezza 2 mm . . . . . *C. kinabaluensis* sp. n.

KEY TO SPECIES OF THE GENUS *CHAETOSOGONOCEPHUS* PACE, 1986 OF BORNEO

1 Fifth free urotergum with evident puncture on his posterior half, Fig. 1; inside genital armor of the aedeagus to form of hook, Fig. 3; spermatheca Fig. 4. Length 2.2 mm . . . . . *C. borneensis* sp. n.
- Fifth free urotergum totally or partially covered with longitudinal striae; inside genital armour of the aedeagus not to hook 2
2 Eleventh antennomere as long as to the six preceding reunited antennomeres; the longitudinal striae of the fifth free urotergum are very short and placed near the posterior border, Fig. 5; distal portion of the aedeagus sinuous, in lateral view, Fig. 6. Length 2.3 mm . . . . *C. notaticornis* sp. n.
- Eleventh antennomere as long as the two reunited preceding antennomeres; the longitudinal striae of the fifth free urotergum are long up to half of the same free urotergum or for all of its length; distal portion of the aedeagus rectilinear, in lateral view 3
3 The longitudinal striae of the fifth free urotergum reach the base of the same free urotergum Fig. 8; penultimate antennomeres strongly transverse; aedeagus winding to the sides, Fig. 10; spermatheca strong, with proximal portion strongly flexed, Fig. 11. Length 1.9 mm *C. burckhardti* sp. n.
- The longitudinal striae of the fifth free urotergum reach and don't overcome around the half of the length of the same free urotergum, Fig. 12; spermatheca slender with proximal portion just flexed, Fig. 15. Length 2 mm . . . . . *C. kinabaluensis* sp. n.

Chaetosogonocephus borneensis sp. n. Figg. 1-4

HOLOTYPUS: MASCHIO: Borneo-Sarawak, Lambir Nat. Park, (senza data), leg Franz (NHMW).

PARATYPI: 1 femmina, Sabah, Mt. Kinabalu, Poring Hot Springs, 550-600 m, 9.V.1987, leg. D. Burckhardt & I. Löbl. – 1 femmina, Sabah, Poring Hot Springs, 850 m, 14.V.1987, leg. D. Burckhardt & I. Löbl. – 1 femmina, Sabah, Mt. Kinabalu, Poring Hot Springs, 500 m, 6.V.1987, leg. D. Burckhardt & I. Löbl.

DESCRIZIONE: Lunghezza 2,2 mm. Corpo lucido e giallo-rossiccio; antenne rossicce con i tre antennomeri basali giallo-rossicci; zampe giallo-rossicce; setole nere. Manca una reticolazione del corpo. La punteggiatura o la granulosità del capo è assente. Il pronoto e le elitre sono coperti di granulosità saliente. Il decimo antennomero è notevolmente più robusto del nono. Gli uroterghi liberi quinto e sesto presentano una profonda punteggiatura distribuita come da Fig. 1. Edeago Figg. 2-3, spermateca Fig. 4.

Chaetosogonocephus notaticornis sp. n. Figg. 5-7

HOLOTYPUS: Maschio, Borneo, Sabah, Poring Hot Springs, 550-600 m, 9.V.1987, Leg. D. Burckhardt & I. Löbl (MHNG).

PARATYPI: 1 maschio, stessa provenienza dell'holotypus; 1 maschio, Sabah, Poring Hot Springs, 500 m, 7.V.1987, leg. D. Burckhardt & I. Löbl.

DESCRIZIONE: Lunghezza 2,3 mm. Corpo lucido, privo di reticolazione e giallo-rossiccio; antenne e zampe giallo-rossicce. La punteggiatura del capo è molto rada e superficiale, quella del pronoto è distinta. La granulosità delle elitre è fine e ben visibile. L'undicesimo antennomero è notevolmente lungo, Fig. 5. Edeago Figg. 6-7.

DERIVATIO NOMINIS: Il nome della nuova specie significa «Antenne contraddistinte» a motivo dell'eccezionale lunghezza dell'undicesimo antennomero.

Chaetosogonocephus burckhardti sp. n. Figg. 8-11

HOLOTYPUS: Maschio, Sabah, Crocker Range, 1550-1650 m, 16.V.1987, leg. D. Burckhardt & I. Löbl (MHNG).

PARATYPI: 1 femmina, stessa provenienza dell'holotypus; 1 femmina, Sabah, Poring Hot Springs, 500 m, 7.V.1987, leg. D. Burckhardt & I. Löbl. – 1 es., Sabah, Poring Hot Springs, 500 m, 11.V.1987, leg. D. Burckhardt & I. Löbl.

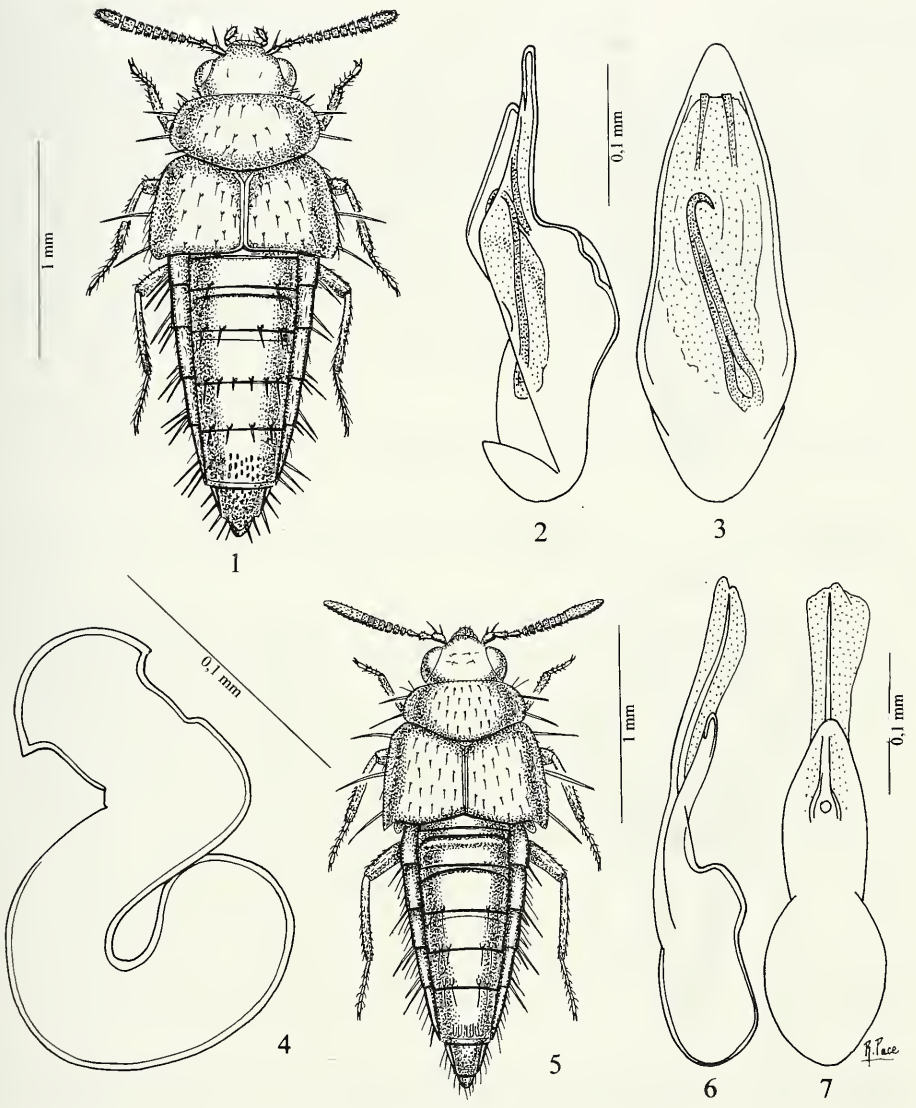
DESCRIZIONE. Lunghezza 1,9 mm. Corpo lucido, privo di reticolazione e giallo-rossiccio con lati del pronoto gialli; antenne e zampe gialle. La granulosità del capo è raggruppata solo sulla fronte, quella del pronoto e delle elitre è saliente. Gli uroterghi liberi quinto e sesto sono solcati da strie longitudinali. Edeago Figg. 9-10, spermateca Fig. 11.

DERIVATIO NOMINIS: Il nome della nuova specie ricorda che è stata raccolta da uno dei ricercatori del Museo di Ginevra, il Dr. Daniel Burckhardt.

Chaetosogonocephus kinabaluensis sp. n. Figg. 12-15

HOLOTYPUS: Maschio, Sabah, Mt. Kinabalu Nat. Pk, HQ 1560-1660 m, 24.IV.1987, leg. A. Smetana (MHNG).

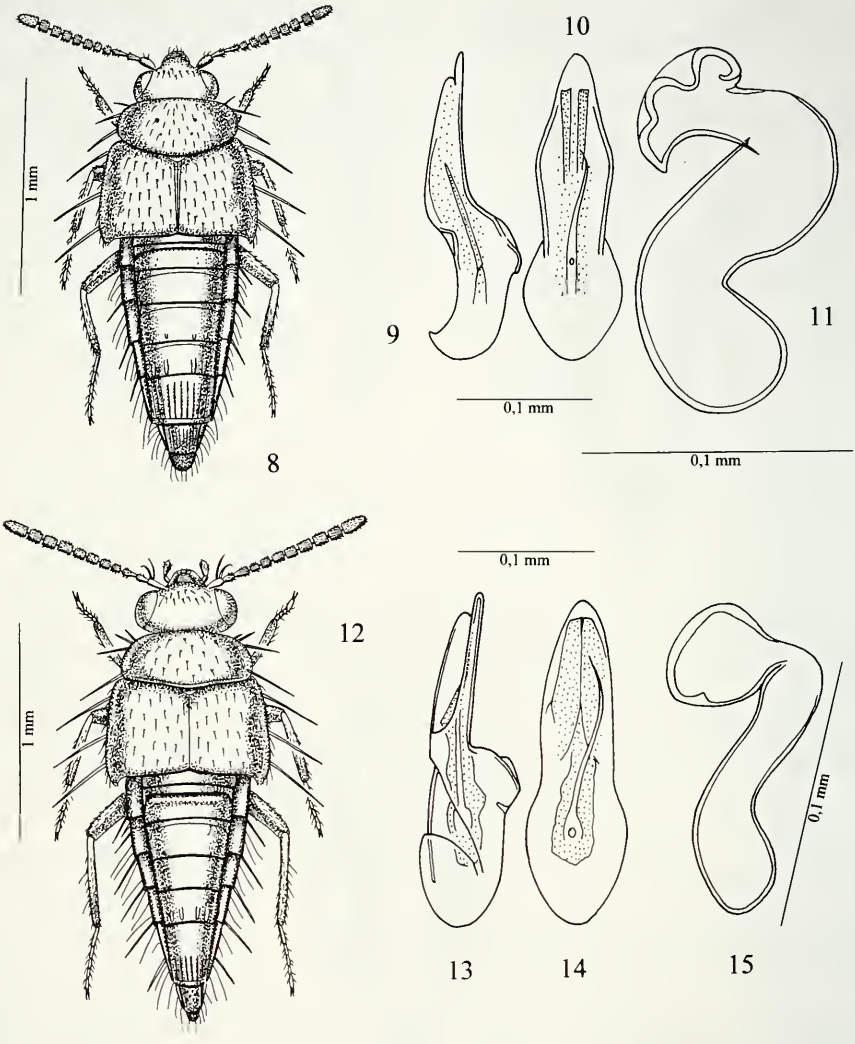
PARATYPI: 1 maschio, Sabah, Mt. Kinabalu Nat. Pk, HQ Liwagu Riv. trail, 1500-1550 m, 27.IV.1987, leg. A. Smetana. – 1 maschio, Borneo, Sabah, Mt. Kinabalu, HQ Liwagu Rv. trail,



FIGG. 1-7

Habitus, edeago in visione laterale e ventrale e spermateca. (1-4) *Caetosogonocephus borneensis* sp. n. (5-7) *Caetosogonocephus notaticornis* sp. n.

1520 m, 11.VIII.1988, leg. A. Smetana. – 1 maschio, Borneo, Sabah, Mt. Kinabalu, HQ at Liwagu River, 1500 m, 14.VIII.-1.IX.1988, leg. A. Smetana. – 1 maschio, Sabah, Mt. Kinabalu Nat. Pk., Int. trap., HQ 1500 m, 30.IV-8.V.1987, leg. A. Smetana.– 1 maschio, Sabah, Poring Hot Springs, Langanan Falls, 900-950 m, 12.V.1987, leg. D. Burckhardt & I. Löbl. – 1 maschio e 2 femmine, Sabah, Poring Hot Springs, 550-600 m, 9.V.1987, leg. D. Burckhardt & I. Löbl. – 2 es., Sabah, Poring Hot Springs, 500 m, 7.V.1987, leg. D. Burckhardt & I. Löbl. – 1 maschio, Borneo, Sabah, Mt. Kinabalu, 1430 m, 22.V.1987, leg. D. Burckhardt & I. Löbl. – 1 maschio, Borneo, Sabah, Mt. Kinabalu, 1450-1550 m, 23.V.1987, leg. D. Burckhardt & I. Löbl. – 1



FIGG. 8-15

Habitus, edeago in visione laterale e ventrale e spermateca. (8-11) *Caetosogonocephus burckhardti* sp. n. (12-15) *Caetosogonocephus kinabaluensis* sp. n.

maschio, Sabah, Mt. Kinabalu, 1500 m, 21.V.1987, leg. D. Burckhardt & I. Löbl. – 1 maschio, Borneo, Sabah, Crocker Ra., 1600 m, Km 51 rte. Kinabalu-Tambunan, 18.V.1987, leg. D. Burckhardt & I. Löbl.

DESCRIZIONE. Lunghezza 1,9 mm. Corpo lucido, privo di reticolazione e rossiccio, con lati del pronoto gialli; antenne e zampe gialle. La granulosità del capo è presente solo sulla fronte, la parte restante è priva di punteggiatura e di granulosità. La granulosità del pronoto è evidente, quella delle elitre è superficiale. Il quinto urotergo libero presenta strie longitudinali sulla metà posteriore, il sesto è nettamente punteggiato. Edeago Figg. 13-14, spermateca Fig. 15.

Tetrabothrus Bernhauer, 1915

Tetrabothrus borneensis Cameron, 1943

Tetrabothrus borneensis Cameron, 1943: 140; Hammond, 1984: 212.

Materiale: 1 maschio e 6 es., Sabah, Mt. Kinabalu Nat. Pk., HQ Silau-Silau Tr., 1565 m, 3.VIII.1988, leg. A. Smetana. – 1 femmina, Sabah, Mt. Kinabalu Nat. Pk, HQ 1560-1660 m, 24.IV.1987, leg. A. Smetana. – 2 femmine, Borneo, Sabah, Mt. Kinabalu, Liwagu River tr., 1495 m, 12.VIII.1988, leg. A. Smetana. – 1 es., Borneo, Sabah, Crocker Rge. N.P., Hwy. A 3, Km 48 cca, 1000 m, 5.IX.1988, leg. A. Smetana. – 2 es., Sabah, Mt. Kinabalu, HQ 1500 m, 25-30.IV.1987, int. trap, leg. A. Smetana. – 2 es., Sabah, Crocker Ra., 1550-1650 m, 16.V.1987, leg. D. Burckhardt & I. Löbl. – 2 es., Borneo, Sabah, Crocker Ra., 1600 m, Km 51 rte. Kota Kinabalu-Tambunan, 18.V.1987, leg. D. Burckhardt & I. Löbl. – 2 es., Borneo, Sabah, Mt. Kinabalu, Poring Hot Springs, 500 m, 6.V.1987, leg. D. Burckhardt & I. Löbl

Nota: E' l'unica specie del genere nel Borneo.

Amaurodera Fauvel, 1905

Nella chiave che segue non è compresa *Amaurodera montanella* Bernhauer, 1936, qui sopra trasferita al genere *Drusilla*, dopo mio esame dell'holotypus.

CHIAVE DELLE SPECIE DEL GENERE *AMAURODERA* FAUVEL, 1905, NEL BORNEO

1 Specie attera; occhi assai ridotti; elitre cortissime con sutura lunga circa un terzo della lunghezza del pronoto che ha un'area mediana reticolata opaca solo posteriormente. Lunghezza 4 mm ..... *A. kinabaluensis* Pace

\- Specie alate o microttere; occhi ben sviluppati o poco ridotti; elitre più corte del pronoto, ma non cortissime, con loro sutura lunga circa una metà della lunghezza del pronoto che è interamente o quasi interamente opaco 2

2 Corpo interamente giallo-rossiccio. Lungh. 2,75 mm .. *A. intermedia* Cameron

\- Corpo bicolore o multicolore 3

3 Capo e pronoto neri o nero-bruni 4

\- Capo e pronoto rossicci, giallo-bruni o bruno-rossicci 5

4 Porzione intermedia delle antenne nera; capo e pronoto neri; femori giallo-rossicci con porzione distale bruna. Lunghezza 4 mm ... *A. similis* Cameron

\- Antenne interamente rossicce; capo e pronoto nero-bruni; femori bruno-rossicci; edeago Figg. 18-19; introflessione apicale del bulbo distale della spermateca bruna, Fig. 17. Lunghezza 4,8 mm .. *A. amabilis* sp. n.

5 Antenne gialle con antennomeri terzo, quarto e quinto giallo-bruni; corpo giallo con elitre giallo-brune; porzione anteriore del pronoto lucida, porzione posteriore opaca; edeago Figg. 23-24; spermateca Fig. 25. Lunghezza 2,8 mm ..... *A. incisa* sp. n.

\- Antenne giallo-rossicce o bruno-rossicce; corpo multicolore; pronoto interamente opaco 6

6 Zampe unicolori giallo-rossicce; capo e pronoto unicolori bruno-rossicci; spermateca Fig. 27. Lunghezza 4 mm ..... *A. bulbosa* sp. n.

\- Femori medi e posteriori gialli con metà distale oscurata di bruno o bruno-rossiccio 7

7 Antenne giallo-rossicce; capo rossiccio, pronoto ed elitre bruno-rossicci; paratergiti basali giallo-rossicci con terzo posteriore bruno; edeago Figg. 29-30, spermateca Fig. 31. Lunghezza 4 mm ..... *A. frondium* sp. n.

- Antenne bruno-rossicce con antennomeri distali rossicci; capo e pronoto bruno-rossicci; elitre bruno-rossicce con una macchia triangolare bruna all'angolo posteriore esterno; paratergiti basali uniformemente bruno-rossicci; edeago Figg. 33-34, spermateca Fig. 35. Lunghezza 4,1 mm *A. discoidea* sp. n.

KEY TO SPECIES OF THE GENUS *AMAURODERA* FAUVEL, 1905 OF BORNEO

1 Species apterous; eyes very reduced; elytra short with suture long around a third of the length of the pronotum that has only a median area opaque reticular posterior. Length 4 mm ..... *A. kinabaluensis* Pace

- Species winged or micropterous; eyes well increased or little reduced; elytra shorter than the pronotum, but not very short, with their suture long about a half the length of the pronotum that is entirely or almost entirely opaque 2

2 Body yellow-reddish entirely. Lungh. 2.75 mm ..... *A. intermedia* Cameron

- Body bicolorous or motley 3

3 Head and pronotum black or black-brown 4

- Head and pronotum reddish, yellow-brown or brown-reddish 5

4 Intermediary portion of the antennae black; head and pronotum black; femurs yellow-reddish with distal portion brown. Length 4 mm ..... *A. similis* Cameron

- Antennae entirely reddish; head and pronotum black-brown; femurs brown-reddish; aedeagus Figs 18-19; umbilicus of the distal bulb of the spermatheca brown, Fig. 17. Length 4.8 mm ..... *A. amabilis* sp. n.

5 Antennae yellow with third, fourth and fifth antennomeres yellow-brown; body yellow with yellow-brown elytra; anterior portion of the pronotum shining, posterior portion opaque; aedeagus Figs 23-24; spermatheca Fig. 25. Length 2.8 mm ..... *A. incisa* sp. n.

- Antennae yellow-reddish or brown-reddish; motley body; opaque pronotum entirely 6

6 Legs yellow-reddish unicoloured; head and pronotum brown-reddish unicoloured; spermatheca Fig. 27. Length 4 mm ..... *A. bulbosa* sp. n.

- Middle and posterior femurs yellows with distal half darkened of brown or brown-reddish 7

7 Antennae yellow-reddish; head reddish, pronotum and elytra brown-reddish; basal paratergites yellow-reddish with posterior third brown; aedeagus Figs 29-30, spermatheca Fig. 31. Length 4 mm ... *A. frondium* sp. n.

- Antennae brown-reddish with distal antennomeres reddish; head and pronotum brown-reddish; elytra brown-reddish with a brown triangular stain to the external posterior angle; basal paratergites brown-reddish uniformly; aedeagus Figs 33-34, spermatheca Fig. 35. Length 4.1 mm ..... *A. discoidea* sp. n.

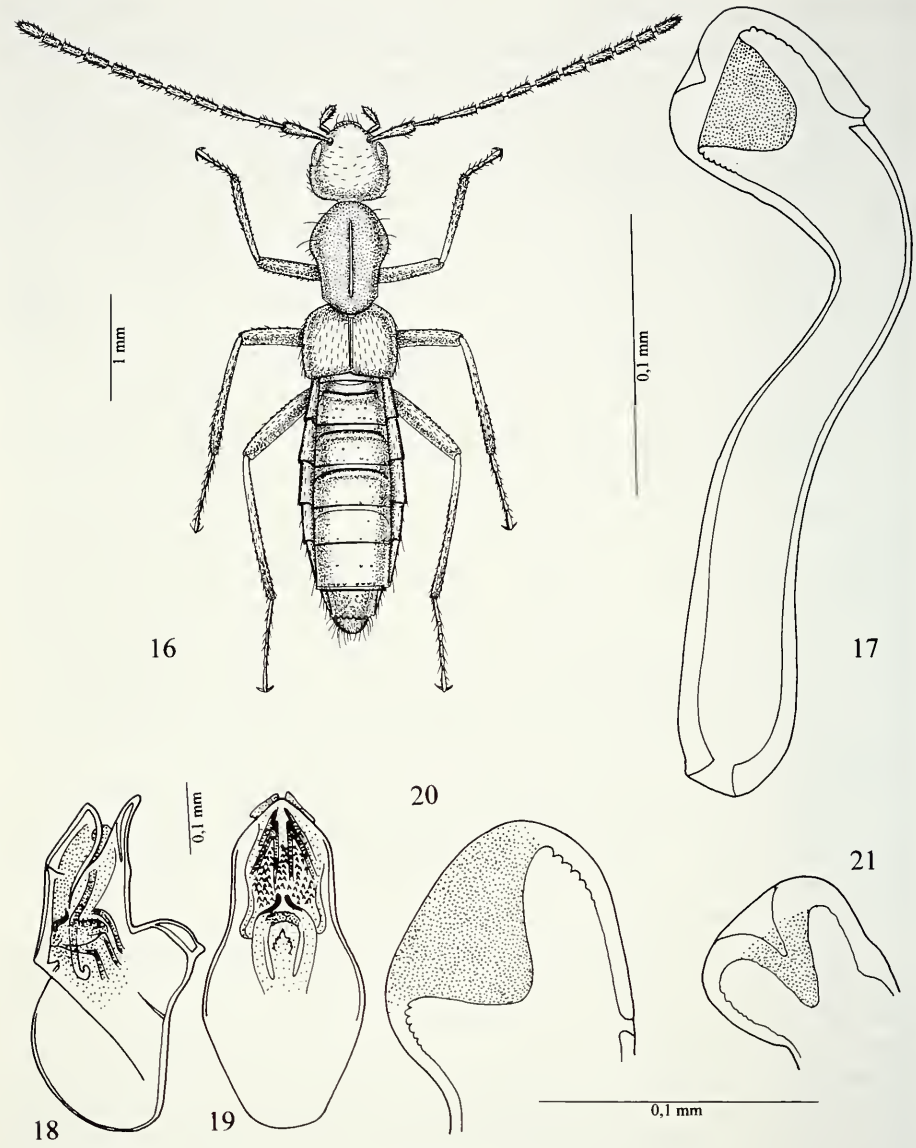
Amaurodera amabilis sp. n. Figg. 16-21

HOLOTYPUS: Maschio, Sabah, Kinabalu N.P., 29.X.1990, leg. G. de Rougemont (IRSN).

PARATYPI: 6 es., stessa provenienza dell'holotypus. – 1 femmina, Borneo, Mawar, Waterfall nr. Patau village, 31.V.1998, leg. P. Hlavac, Rougemont collection. – 1 femmina, Sabah, E Mt. Kinabalu, 1150 m, rte. Ranau-Kota Kinabalu, 24.V.1987, leg. D. Burckhardt & I. Löbl. – 20 maschi, Sabah, Mt. Kinabalu, 1450-1550 m, 23.V.1987, leg. D. Burckhardt & I. Löbl. – 1 es., Sabah, Poring Hot Springs, Langanan river, 850 m, 14.V.1987, leg. D. Burckhardt & I. Löbl. – 49 es., Sabah, Mt. Kinabalu, 1550 m, 29.IV.1987, leg. D. Burckhardt & I. Löbl. – 14 es., Sabah, Poring Hot Springs, Langanan Falls, 900-950 m, 11.V.1987, leg. D. Burckhardt & I. Löbl. – 13 es., Borneo, Sabah, Crocker Ra., 1550-1650 m, 16.V.1987, leg. D. Burckhardt & I. Löbl. – 74 es., Sabah, Mt. Kinabalu, 1550-1650 m, 24.IV.1987, leg. D. Burckhardt & I. Löbl. – 102 es., Borneo, Sabah, Mt. Kinabalu, 1500 m, 25.IV.1987, leg. D. Burckhardt & I. Löbl. – 1 es., Borneo, Sabah, Mt. Kinabalu, 1550 m, 27-28.IV.1987, leg. D. Burckhardt & I. Löbl. – 27 es., Borneo, Sabah, Crocker Ra., 1600 m, Km 51 rte. Kinabalu-Tambunan, 18.V.1987, leg. D. Burckhardt & I. Löbl. – 4 es., Borneo, Sabah, Mt. Kinabalu, 1430 m, 22.V.1987, leg. D. Burckhardt & I. Löbl. – 18 es., Sabah, Mt. Kinabalu, Liwagu River, 1490 m, 10.VIII.1988, leg. A. Smetana. – 6 es., Borneo, Sabah, Mt. Kinabalu, HQ Liwagu River Trail, 1520 m, 11.VIII.1988, leg. A. Smetana. – 33 es., Borneo, Sabah, Mt. Kinabalu Nat. Pk., HQ at Liwagu Rv., 1500 m, 4.VIII.1988, leg. A. Smetana. – 4 es., Borneo, Sabah, Mt. Kinabalu Nat. Pk., HQ Silau-Silau Tr., 1550 m, 2.IX.1988, leg. A. Smetana. – 6 es., Sabah, Mt. Kinabalu, Poring Hot Springs, 480-520 m, 9.V.1987, leg. A. Smetana. – 14 es., Borneo, Sabah, Mt. Kinabalu, Poring Hot Springs, 510 m, 30.VIII.1988, leg. A. Smetana. – 7 es., Borneo, Sabah, Mt. Kinabalu N. P., Poring Hot Springs, area Eastern Ridge tr., 1000 m, 28.VIII.1988, leg. A. Smetana. – 4 es., Sabah, Poring Hot Springs, Langanan Falls, 900-950m, 12.V.1987, leg. D. Burckhardt & I. Löbl. – 1 es., Sabah, Poring Hot Springs, Langanan River, 850m, 14.V.1987, leg. D. Burckhardt & I. Löbl. – 45 es., Sabah, Mt. Kinabalu, 1500m, 21.V.1987, leg. D. Burckhardt & I. Löbl. – 28 es., Borneo, Sabah, Mt. Kinabalu Nat. Pk. HQ, 1560-1660m, 24.IV.1987, leg. A. Smetana. – 6 es., Borneo, Sabah, Mt. Kinabalu Nat. Pk., HQ at Liwagu riv., 1500m, 25.IV.1987, leg. A. Smetana. – 8 es., Borneo, Sabah, Mt. Kinabalu Nat. Pk. HQ, Liwagu riv. Tr., 1500-1550m, 27.IV.1987, leg. A. Smetana. – 20 es., Borneo, Sabah, Mt. Kinabalu Nat. Pk., HQ Liwagu riv., 1490m, 5.VIII.1988, leg. A. Smetana. – 9 es., Borneo, Sabah, Mt. Kinabalu Nat. Pk., HQ Liwagu riv., 1490m, 3.IX.1988, leg. A. Smetana. – 1 es., Borneo, Sabah, Mt. Kinabalu Nat. Pk. HQ, Silau-Silau Tr., 1550m, 4.IX.1988, leg. A. Smetana. – 3 es., Borneo, Sabah, Mt. Kinabalu Nat. Pk. HQ, Silau-Silau Tr., 1565m, 3.VIII.1988, leg. A. Smetana. –1 es., Borneo, Sabah, Mt. Kinabalu Nat. Pk., Poring Hot Springs, 480m, 10.V.1987, leg. A. Smetana. – 2 es., Borneo, Sabah, Crocker Rge. N.P., Hwy A3 km 48, cca. 1000 m, 5.IX.1988, leg. A. Smetana.

DESCRIZIONE: Lunghezza 4,8 mm. Corpo lucido con pronoto molto opaco, elitre e uroterghi liberi basali primo, secondo e terzo brunicci; antenne rossicce; zampe rossicce con femori bruno-rossicci. La punteggiatura del capo è fine e superficiale. Il pronoto presenta una reticolazione vigorosa e un solco mediano. Le elitre sono coperte da punteggiatura finissima e da reticolazione molto superficiale. Il sesto urotergo libero del maschio è coperto di granuli salienti e da reticolazione distinta. Edeago Figg. 18-19, spermateca variabile, costante è il colore bruno dell'introflessione apicale del bulbo distale Figg. 17, 20 e 21.

DERIVATIO NOMINIS: Il nome della nuova specie significa «Colei che ispira simpatia». Ciò a causa dell'introflessione apicale del bulbo distale della spermateca di colore bruno che rende la specie facilmente riconoscibile.



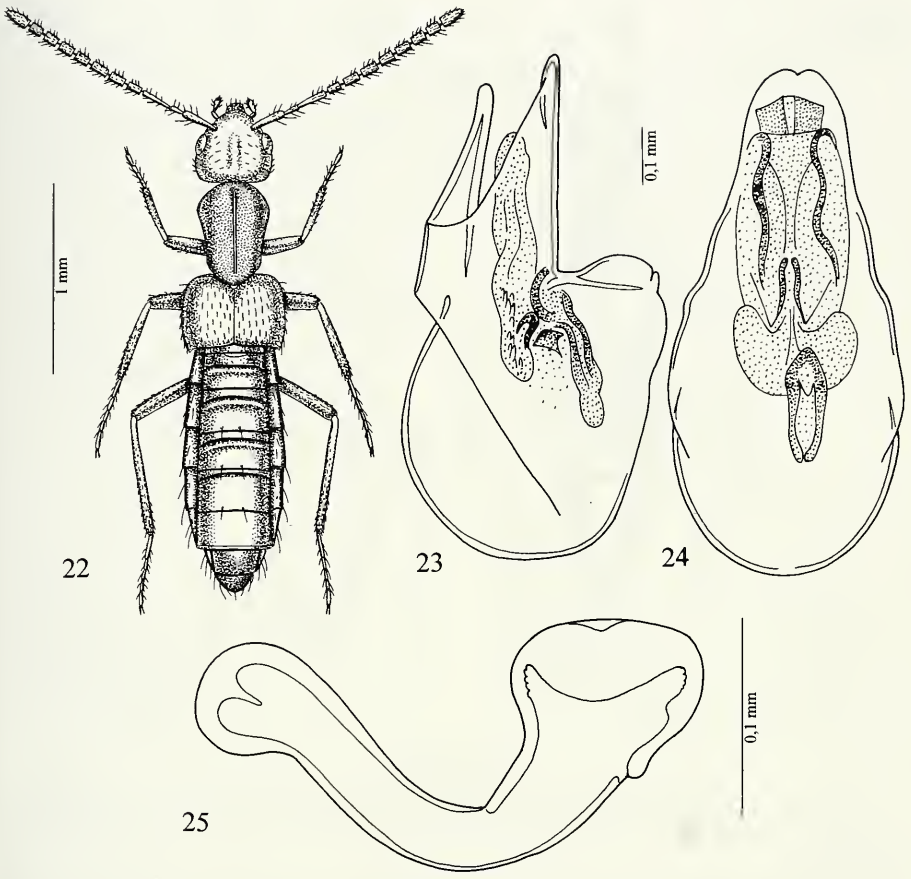
FIGG. 16-21

Habitus, spermateca, bulbo distale della spermateca (20-21) e edeago in visione laterale e ventrale. (16-21) *Amaurodera amabilis* sp. n.

Amaurodera incisa sp. n. Figg. 22-25

HOLOTYPUS: Maschio, Sabah, Poring Hot Springs, Langanan river, 850 m, 14.V.1987, leg. D. Burckhardt & I. Löbl, (MHNG).

PARATYPUS: 1 femmina, Borneo, Sabah, Mt. Kinabalu N. P., Poring Hot Springs, area Eastern Ridge tr., 900 m, 17.VIII.1988, leg. A. Smetana.



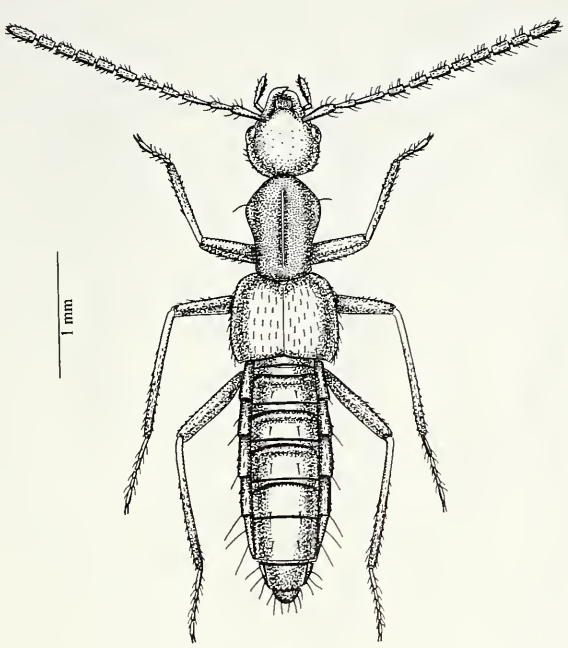
FIGG. 22-25
Habitus, edeago in visione laterale e ventrale e spermateca. (22-25) *Amaurodera incisa* sp. n.

DESCRIZIONE: Lunghezza 2,8 mm. Corpo lucido, tranne il pronoto che è opaco nei due terzi posteriori e lucido nel terzo anteriore. Corpo giallo-bruno con elitre e margine posteriore dei quattro uroterghi liberi basali bruni; antenne gialle con antennomeri terzo a quinto giallo-bruni; zampe gialle. La punteggiatura del capo è finissima. Il pronoto mostra una reticolazione forte solo sui due terzi posteriori e un solco mediano a fondo lucido e poco profondo. La punteggiatura delle elitre è finissima. Il capo ha il disco longitudinalmente solcato. L'edeago ha l'apice inciso, Figg. 23-24, spermateca Fig. 25.

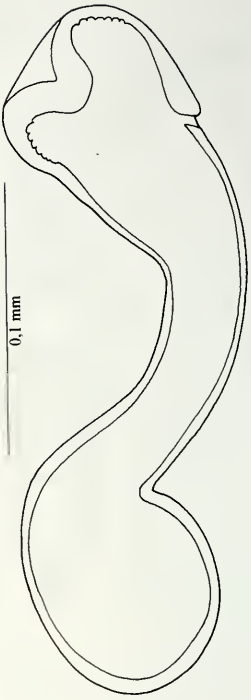
DERIVATIO NOMINIS: Il nome di «incisa» della nuova specie deriva dalla presenza di un'incisione apicale dell'edeago, in visione ventrale.

Amaurodera bulbosa sp. n. Figg. 26-27

HOLOTYPUS: Femmina, Sabah, Poring Hot Springs, 500 m, 11.V.1987, leg. D. Burckhardt & I. Löbl (MHNG).



26



27

FIGG. 26-27
Habitus e spermateca. (26-27) *Amaurodera bulbosa* sp. n.

PARATYPUS: 1 femmina, Sabah, Poring Hot Springs, 500 m, 7.V.1987, leg. D. Burckhardt & I. Löbl.

DESCRIZIONE: Lunghezza 4 mm. Corpo lucido con pronoto molto opaco. Corpo bruno-rossiccio con elitre, tranne la base, e quarto urotergo libero bruni; antenne rossicce con i tre antennomeri distali giallo-rossicci; zampe giallo-rossicce. La granulosità del capo è rada e poco visibile, quella delle elitre è meno rada e poco distinta. Il solco mediano del pronoto è poco profondo. Spermateca Fig. 27.

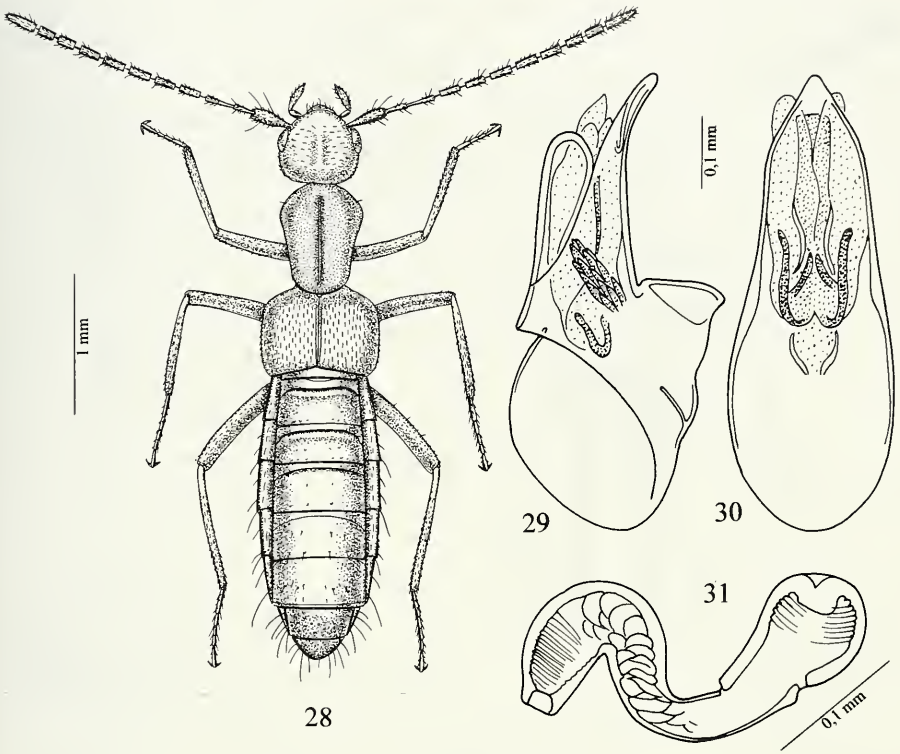
DERIVATIO NOMINIS: Il nome di «bulbosa» deriva dal ben sviluppato bulbo prossimale della spermateca.

Amaurodera frondium sp. n. Figg. 28-31

HOLOTYPUS: Maschio, Sabah, Kinabalu N.P., Poring Hot Spring, 26.X.1990, from rotten Tarap fruit (*Artocarpus*), leg. G. de Rougemont (IRSN).

PARATYPI: 1 femmina, stessa provenienza. – 1 maschio, Sabah, Kinabalu N.P., Poring Hot Spring, 3.III.1990, leg. G. de Rougemont. – 1 femmina, Borneo, Sabah, Towai N.P., V.1998, leg. P. Hlavac, De Rougemont collection. – 1 maschio, Sabah, Poring Hot Springs, 500 m, 7.V.1987, leg. D. Burckhardt & I. Löbl. – 1 maschio, Sabah, Poring Hot Springs, 500 m, 13.V.1987, leg. D. Burckhardt & I. Löbl.

DESCRIZIONE: Lunghezza 4 mm. Corpo lucido, tranne il pronoto molto opaco. Corpo bruno-rossiccio con capo rossiccio. Sono giallo-rossicci gli uroterghi liberi



FIGG. 28-31
Habitus, edeago in visione laterale e ventrale e spermateca. (28-31) *Amaurodera frondium* sp. n.

primo e secondo e il pigidio; zampe gialle con femori anteriori giallo-bruni e con quelli medi e posteriori giallo-bruni con base giallo-rossiccia. La reticolazione del capo, assente sulla fronte, e quella delle elitre è composta di maglie ampie distinte, quella dell'addome è molto trasversa e ben visibile. La reticolazione del pronoto è vigorosa tanto da dare un aspetto opaco della superficie. Edeago Figg. 29-30, spermateca Fig. 31.

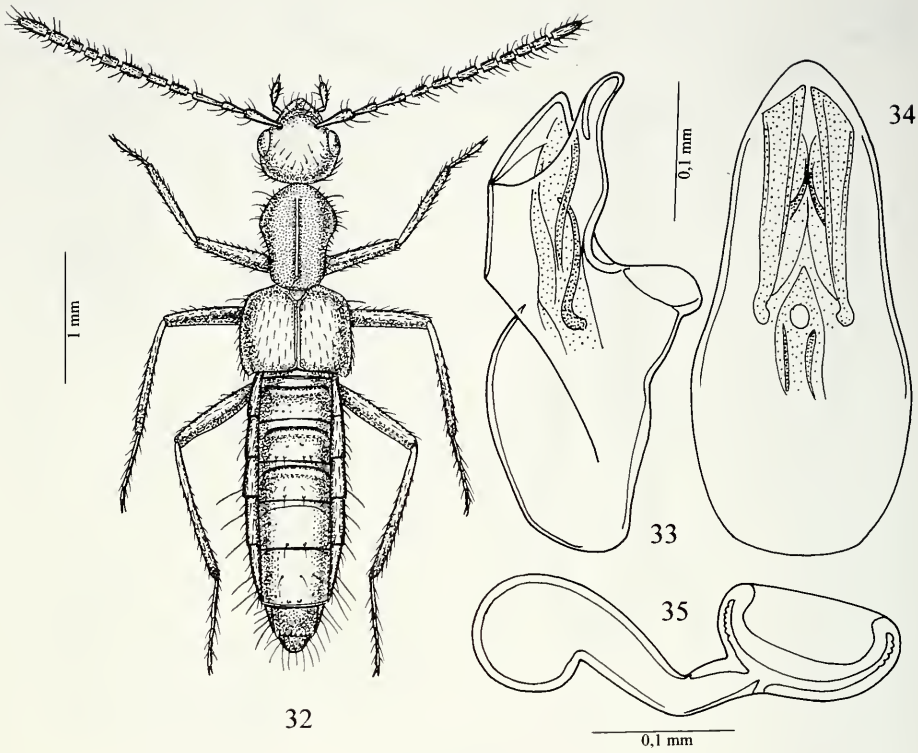
DERIVATIO NOMINIS: Il nome della nuova specie significa «del fogliame».

Amaurodera discoidea sp. n. Figg. 32-35

HOLOTYPUS: Maschio, Borneo, Brunei, Temburong, Kuala Belalong K8FSC, 25.II.1995, leg. Borcherding (IRSN).

PARATYPI: 1 femmina, stessa provenienza: 2 es., Sabah, Poring Hot Springs, 500 m, 13.V.1987, leg. D. Burckhardt & I. Löbl. – 2 maschi, Sabah, Poring Hot Springs, 500 m, 7.V.1987, leg. D. Burckhardt & I. Löbl.

DESCRIZIONE: Lunghezza 4,1 mm. Corpo lucido, tranne il pronoto che è opaco. Corpo bruno-rossiccio con parte esterna delle elitre e quarto urotergo libero bruni; antenne bruno-rossicce con i tre antennomeri distali rossicci; zampe giallo-rossicce con metà distale dei femori medi e posteriori bruno-rossiccia. La granulosità del capo è



FIGG. 32-35
Habitus, edeago in visione laterale e ventrale e spermateca. (32-35) *Amaurodera discoidea* sp. n.

presente solo ai lati e dietro il disco. Il solco mediano del pronoto è profondo. La granulosità delle elitre è saliente. Edeago Figg. 33-34, spermateca Fig. 35.

DERIVATIO NOMINIS: Il nome della nuova specie deriva dalla forma di disco del bulbo distale della spermateca, in visione dorsale.

Amaurodera kinabaluensis Pace, 1989
Amaurodera kinabaluensis Pace, 1989: 6.

MATERIALE: 5 es., Borneo, Sabah, Mt. Kinabalu Nat. Pk., Paka Cave, 2997 m, 5.V.1987, leg. A. Smetana. – 29 es., Borneo, Sabah, Mt. Kinabalu Nat. Pk., Paka Cave, 2995 m, 5.V.1987, leg. A. Smetana. – 8 es., Borneo, Sabah, Mt. Kinabalu Nat. Pk., Paka Cave, 2995 m, 6.V.1987, leg. A. Smetana. – 83 es., Borneo, Sabah, Mt. Kinabalu Nat. Pk., above Gunting Lagadan, 3400 m, 6.V.1987, leg. A. Smetana. – 16 es., Borneo, Sabah, Mt. Kinabalu Nat. Pk., above Gunting Lagadan, 3400 m, 7.V.1987, leg. A. Smetana. –5 es., Sabah, Mt. Kinabalu, 3150-3200 m, 3.V.1987, leg. D. D. Burckhardt & I. I. Löbl.

DRUSILLA LEACH, 1819

Nella chiave che segue non è inclusa *Drusilla montana* (Bernhauer) perché trasferita a *Zyras* (vedi sopra).

CHIAVE DELLE SPECIE DEL GENERE *DRUSILLA* LEACH, 1819, NEL BORNEO

1 Pronoto con un'impressione laterale più o meno distinta 2
- Pronoto senza impressioni laterali 10
2 Pronoto con tre profonde concavità: una mediana ampia e una a ciascun lato che delimita due carene dorsali affilate, Fig. 36, o non, Fig. 39 3
- Pronoto senza carene dorsali salienti 4
3 Pronoto poco trasverso; capo giallo-rossiccio; antennomeri sesto a decimo più lunghi che larghi; edeago Figg. 37-38. Lunghezza 4 mm . . . . . *D. carinithorax* (Bernhauer)
- Pronoto molto trasverso; capo nero, antennomeri sesto a decimo trasversi; edeago Figg. 40-41. Lunghezza 6,6 mm . . . . . *D. bruneiorum* sp. n.
4 Pronoto nettamente trasverso 5
- Pronoto debolmente trasverso o più lungo che largo 8
5 Sutura delle elitre più lunga del pronoto; edeago con una protuberanza ventrale nella porzione distale 6
- Sutura delle elitre più corta del pronoto; edeago senza protuberanza ventrale, per le specie di cui è noto il maschio 7
6 Quinto antennomero più lungo che largo; protuberanza ventrale dell'edeago poco sviluppata, Fig. 43. Lunghezza 5,7 mm . . . *aerea* (Cameron)
- Quinto antennomero trasverso; protuberanza ventrale dell'edeago molto sviluppata Fig. 47. Lunghezza 4,6 mm . . . . . *D. necaerea* sp. n.
7 Antennomeri quarto a decimo fortemente ristretti alla base e più lunghi che larghi; occhi più sviluppati; solco mediano del pronoto superficiale; elitre con impressione laterale. Lunghezza 7,8 mm . . . . . *D. operosa* Pace
- Antennomeri quarto a decimo trasversi e non fortemente ristretti alla base; solco mediano del pronoto profondo; elitre senza impressioni laterali. Lunghezza 4 mm . . . . . *D. terrestris* sp. n.
8 Pronoto non sinuato davanti agli angoli posteriori e con spigolo che delimita una forte depressione semilunare, Fig. 53; edeago Figg. 54-55, spermateca Fig. 56. Lunghezza 4,2 mm . . . . . *D. fossulicollis* sp. n.
- Pronoto sinuato, anche se lievemente, davanti agli angoli posteriori, senza spigolo e forte depressione semilunare 9
9 Antennomeri nono e decimo trasversi; corpo uniformemente rossiccio; undicesimo antennomero giallo-rossiccio in contrasto con il decimo bruno-rossiccio. Lunghezza 4,8 mm . . . . . *D. sculpticollis* sp. n.
- Antennomeri nono e decimo più lunghi che larghi; corpo bicolore o tricolore; undicesimo antennomero dello stesso colore del decimo 10
10 Occhi ridotti, sicché le tempie sono poco più corte di ciascun occhio; i quattro antennomeri distali hanno lo stesso colore dei quattro precedenti; armatura genitale interna dell'edeago con un fascio di spicole Fig. 60. Lunghezza 4 mm . . . . . *D. bruneiensis* sp. n.
- Occhi molto sviluppati, sicché le tempie sono molto corte; i quattro antennomeri distali sono giallo-rossicci in contrasto con i quattro precedenti bruni; armatura genitale interna dell'edeago senza spicole. Lunghezza 4,8 mm . . . . . *D. fontis* sp. n.

11 Pronoto molto trasverso 11
- Pronoto poco trasverso, lungo quanto largo o più lungo che largo 12
12 Capo ed elitre bruno-rossicci, addome giallo-rossiccio; edeago Figg. 67-68. Lunghezza 3,9 mm ..... *D. monticola* (Cameron)
- Capo e addome rossicci, elitre giallo-rossicce; edeago Figg. 70-71. Lunghezza 3,9 mm ..... *D. bicarinicollis* sp. n.
13 Pronoto con riflessi violetti; capo nero, elitre nericce e addome giallo-bruno. Lunghezza 4 mm ..... *D. intermedia* (Cameron)
- Pronoto senza riflessi violetti, resto del corpo diversamente colorato 13
14 Pronoto coperto da strie longitudinali interrotte. Lunghezza 3,2 mm ..... *D. strigicollis* (Cameron)
- Pronoto normalmente punteggiato 14
15 Pronoto con fovea circolare mediana posteriore; pronoto ed elitre con riflessi di bronzo. Lunghezza 3 mm ..... *D. laevicauda* (Bernhauer)
- Pronoto senza fovea circolare mediana posteriore, al massimo si trova un'impressione; pronoto ed elitre senza riflessi di bronzo 15
16 Pronoto senza solco mediano e nettamente reticolato 16
- Pronoto con solco mediano, non nettamente reticolato 18
17 Antennomeri nono e decimo molto trasversi; addome unicolore giallo-rossiccio, con quinto urotergo libero non punteggiato; spermateca Fig. 73. Lunghezza 4,8 mm ..... *D. caelaticollis* sp. n.
- Antennomeri nono e decimo più lunghi che larghi; addome bicolore o unicolore rossiccio, con quinto urotergo libero fittamente punteggiato 19
18 I cinque antennomeri distali giallo-rossicci; addome giallo-rossiccio con una fascia longitudinale mediana oscura. Lunghezza 3 mm ..... *D. veluticollis* (Cameron)
- Solo l'undicesimo antennomero distale è giallo-rossiccio; addome unicolore rossiccio; spermateca Fig. 75. Lunghezza. 4,2 mm ..... *D. neocoenonicacollis* sp. n.
19 Solco mediano del pronoto molto corto: esso non raggiunge il disco; capo e pronoto giallo-rossicci; spermateca Fig. 77. Lunghezza 4 mm ..... *D. rufocaelata* sp. n.
- Solco mediano del pronoto lunga dalla fossetta mediana basale fino presso il margine anteriore; capo e pronoto mai giallo-rossicci 20
20 Il solco mediano del pronoto sta nel fondo di un'ampia concavità mediana. Lunghezza 5,3 mm ..... *D. dusunorum* Pace
- Il solco mediano del pronoto è infossato, ma non in un'ampia concavità ... 21
21 Penultimi antennomeri trasversi 22
- Penultimi antennomeri più lunghi che larghi 24
22 Undicesimo antennomero bicolore, giallo pallido all'estremità distale e rossiccio alla sua base; il solco mediano del pronoto è finissimo nella porzione anteriore: spermateca Fig. 79. Lunghezza 3,8 mm ..... *D. spissatheca* sp. n.
- Undicesimo antennomero unicolore; il solco mediano del pronoto profondo in tutta la sua lunghezza 23

23 Capo con una fossetta discale; granulosità del pronoto gradualmente saliente all'indietro; addome giallo-rossiccio; spermateca Fig. 80. Lunghezza 4,2 mm ..... *D. semimonticola* sp. n.
- Capo senza fossetta discale; granulosità del pronoto uniforme; addome giallo-bruno con una fascia posteriore bruna; spermateca Fig. 83. Lunghezza 3,6 mm ..... *D. foeda* sp. n.
24 Antenne nere; addome giallo-rossiccio con macchia bruno-rossiccia al margine posteriore dei tre paratergiti basali; spermateca Fig. 85. Lunghezza 5 mm ..... *D. borneensis* (Bernhauer)
- Antenne giallo-rossicce o rossicce con base gialla; addome uniformemente bruno-rossiccio con una fascia bruna; paratergiti mai bicolori 25
25 Antenne uniformemente giallo-rossicce; terza porzione anteriore del pronoto senza punteggiatura o con qualche punto finissimo, resto del pronoto profondamente e fittamente punteggiato; addome unicolore bruno-rossiccio; bulbo distale della spermateca senza profonda introflessione apicale Fig. 84. Lunghezza 4,4 mm ..... *D. montanella* (Bernhauer)
- Antenne rossicce con base gialla; pronoto fortemente punteggiato, tranne su una piccola area mediana anteriore; addome bicolore; bulbo distale della spermateca con profonda introflessione apicale. Lunghezza 4,1 mm ..... *D. kinabaluensis* Pace

KEY TO SPECIES OF THE GENUS *DRUSILLA* LEACH, 1819, IN BORNEO

1 Pronotum with a more or less distinct lateral impression 2
- Pronotum without lateral impression 10
2 Pronotum with three deep concavities: an ample median and one to every side that delimits two dorsal carinae Fig. 36, or not, Fig. 39 3
- Pronotum without salient dorsal carinae 4
3 Pronotum scarcely transverse; head yellow-reddish; antennomeres sixth to tenth longer than wide; aedeagus Figs 37-38. Length 4 mm ..... *D. carinithorax* (Bernhauer)
- Pronotum very transverse; head black, antennomeres sixth to tenth transverse; aedeagus Figs 40-41. Length 6.6 mm ..... *D. bruneiorum* sp. n.
4 Pronotum clearly transverse 5
- Pronotum scarcely transverse or longer than wide 8
5 Elytra suture longer than the pronotum; aedeagus with a ventral protuberance in the distal portion 6
- Elytra suture shorter than the pronotum; aedeagus without ventral protuberance, for the species of which the male is known 7
6 Fifth antennomere longer than wide; ventral protuberance of the aedeagus scarcely developed, Fig. 43. Length 5.7 mm ..... *D. aerea* (Cameron)
- Fifth antennomere transverse; ventral protuberance of the aedeagus very developed Fig. 47. Length 4.6 mm ..... *D. necaerea* sp. n.
7 Antennomeres fourth to tenth strongly narrow to the base and longer than wide; eyes more developed; median impressed line of the pronotum superficial; elytra with lateral impression. Length 7,8 mm .... *D. operosa* Pace

- Antennomeres fourth to tenth transverse and not strongly narrow to the base; median impressed line of the pronotum deep; elytra without lateral impressions. Length 4 mm . . . . . *D. terrestris* sp. n.

8 Pronotum not sinuate in front of the posterior angles and with edge that delimits a strong semilunar depression, Fig. 53; aedeagus Figs 54-55, spermatheca Fig. 56. Length 4.2 mm . . . . . *D. fossulicollis* sp. n.

- Pronotum sinuate, even if scarcely, in front of the posterior angles, without edge and strong semilunar depression 9

9 Antennomeres ninth and tenth transverse; body uniformly reddish; eleventh antennomere yellow-reddish in contrast with the tenth antennomere brown-reddish. Length 4.8 mm . . . . . *D. sculpticollis* sp. n.

- Antennomeres ninth and tenth longer than wide; body bicoloured or tricoloured; eleventh antennomere same coloured than tenth antennomere 10

10 Eyes reduced, so the temples are scarcely more court than every eye; the four distal antennomeres have the same colour of the four precedents antennomeres; inside genital armour of the aedeagus with a bundle of spiculae Fig. 60. Length 4 mm . . . . . *D. bruneiensis* sp. n.

- Eyes very developed, so the temples are very short; The four distal antennomeres are yellow-reddish in contrast with the four precedents antennomeres brown; inside genital armour of the aedeagus without spiculae. Length 4.8 mm . . . . . *D. fontis* sp. n.

11 Pronotum very transverse 11

- Pronotum scarcely transverse, as long as wide or longer than wide 12

12 Head and elytra brown-reddish, abdomen yellow-reddish; aedeagus Figs 67-68. Length 3.9 mm . . . . . *D. monticola* (Cameron)

- Head and abdomen reddish, elytra yellow-reddish; aedeagus Figs 70-71. Length 3.9 mm . . . . . *D. bicarinicollis* sp. n.

13 Pronotum with violet reflexes; head black, elytra blackish and abdomen yellow-brown. Length 4 mm . . . . . *D. intermedia* (Cameron)

- Pronotum without violet reflexes, rest of the body otherwise coloured 13

14 Pronotum covered by interrupted longitudinal striae. Length 3.2 mm . . . . . *D. strigicollis* (Cameron)

- Pronotum normally punctured 14

15 Pronotum with posterior median circular fovea; pronotum and elytra with bronze reflexes. Length 3 mm . . . . . *D. laevicauda* (Bernhauer)

- Pronotum without posterior median circular fovea, at the most an impression is found; pronotum and elytra without bronze reflexes 15

16 Pronotum without impressed line and clearly coriaceus 16

- Pronotum with median impressed line, not clearly coriaceus 18

17 Antennomeres ninth and tenth very transverse; abdomen yellow-reddish unicoloured, with fifth free urotergum not punctured; spermatheca Fig. 73. Length 4.8 mm . . . . . *D. caelaticollis* sp. n.

- Antennomeres ninth and tenth longer than wide; abdomen bicoloured or reddish unicoloured, with fifth free urotergum densely punctured 19

18 The five distal antennomeres yellow-reddish; abdomen yellow-reddish with a median longitudinal band dark. Length 3 mm . *D. veluticollis* (Cameron)

- Only the eleventh distal antennomere is yellow-reddish; abdomen unicoloured reddish; spermatheca Fig. 75. Length. 4.2 mm ..... *D. neocoenonicacollis* sp. n.

19 Median impressed line of the pronotum very short: it doesn't reach the disk; head and pronotum yellow-reddish; spermatheca Fig. 77. Length 4 mm ..... *D. rufocaelata* sp. n.

- Median impressed line of the pronotum long from the basal median impression until near the anterior border; head and pronotum never yellow-reddish 20

20 The median impressed line of the pronotum is in the bottom of an ample median concavity. Length 5.3 mm ..... *D. dusunorum* Pace

- The median impressed line of the pronotum is put in a impression, but not in an ample concavity 21

21 The penultimate antennomeres transverse 22

- The penultimate antennomeres longer than wide 24

22 Eleventh antennomere bicoloured, yellow pale to the distal extremity and to his base reddish; the median impressed line of the pronotum is fine in the anterior portion; spermatheca Fig. 79. Length 3.8 mm ..... *D. spissatheca* sp. n.

- Eleventh antennomere unicoloured; the median impressed line of the pronotum deep in all of his length 23

23 Head with a discal impression; the granularity of the pronotum gradually salient in the posterior half; abdomen yellow-reddish; spermatheca Fig. 80. Length 4.2 mm ..... *D. semimonticola* sp. n.

- Head without discal impression; granularity of the pronotum uniform; abdomen yellow-brown with a posterior band brown; spermatheca Fig. 83. Length 3.6 mm ..... *D. foeda* sp. n.

24 Antennae black; abdomen yellow-reddish with brown-reddish stain to the posterior border of the three basal paratergites; spermatheca Fig. 85. Length 5 mm ..... *D. borneensis* (Bernhauer)

- Antennae yellow-reddish or reddish with yellow base; abdomen uniformly brown-reddish with a posterior band brown; paratergites never bicoloured 25

25 Antennae uniformly yellow-reddish; third anterior portion of the pronotum without puncture or with some fine point, rest of the pronotum deeply and densely punctured; unicoloured abdomen brown-reddish; distal bulb of the spermatheca without apical deep umbilicus Fig. 84. Length 4.4 mm ..... *D. montanella* (Bernhauer)

- Antennae reddish with yellow base; pronotum deeply punctured, except on a small anterior median area; abdomen bicoloured; distal bulb of the spermatheca with deep apical umbilicus. Length 4.1 . . . *D. kinabaluensis* Pace

Drusilla dusunorum Pace, 1993

Drusilla dusunorum Pace, 1993: 162.

MATERIALE: 1 maschio e 1 femmina, Borneo, Sabah, Mt. Kinabalu Nat. Pk. HQ, 1560-1660m, 24.IV.1987, leg. A. Smetana.

Drusilla bruneiorum sp. n. Figg. 39-41

HOLOTYPUS: Maschio, Borneo, Brunei, Temburong K8FSC, 17.III.1995, leg. Borcherding (IRSN).

DESCRIZIONE: Lunghezza 6,6 mm. Corpo debolmente lucido, con elitre lievemente opache. Capo nero, pronoto rossiccio, elitre brune con base e area suturale rossicce, addome nero-bruno con i tre paratergiti basali giallo-bruni, macchiati di nero-bruno al margine posteriore il secondo e il terzo; antenne bruno-rossicce con l'antennomero basale giallo macchiato di bruno; zampe rossicce con femori anteriori gialli, i medi e i posteriori gialli con terzo distale rossiccio. La reticolazione del capo e del pronoto è netta. La granulosità del capo è forte e saliente, quella del pronoto è distinta. La punteggiatura delle elitre è fittissima, quella dell'addome è distinta, ma assente sulla fascia longitudinale mediana. Il capo presenta un'ampia concavità estesa da occhio a occhio. L'ampia concavità mediana del pronoto è delimitata da una carena, all'esterno della quale la superficie è depressa. Edeago Figg. 40-41.

Drusilla necaerea sp. n. Figg. 46-49

HOLOTYPUS: Femmina, Borneo, Sabah, Mt. Kinabalu N. P., Poring Hot Springs, area Eastern Ridge tr., 850 m, 28.VIII.1988, leg. A. Smetana, (MHNG).

PARATYPI: 1 femmina, stessa provenienza, ma 1000 m. – 1 femmina, Borneo, Sabah, Mt. Kinabalu N. P., Poring Hot Springs, area Eastern Ridge tr., 850 m, 28.VIII.1988, leg. A. Smetana, (MHNG).

DESCRIZIONE: Lunghezza 4,6 mm. Corpo lucido e giallo-bruno con i tre uroterghi liberi basali oscurati alla base; antenne bruno-rossicce con i due antennomeri basali e la base del terzo giallo-rossicci; zampe gialle. La reticolazione del capo è distinta, quella del pronoto e delle elitre è superficiale e quella dell'addome è molto trasversa e ben visibile. La punteggiatura del capo è distinta e assente sulla fascia longitudinale mediana, quella del pronoto è superficiale e quella delle elitre è ben impressa. Sulla fronte si trova una bozza. Il solco mediano del pronoto è presente solo sulla metà posteriore dello stesso pronoto. Edeago Figg. 47-48, spermateca Fig. 49.

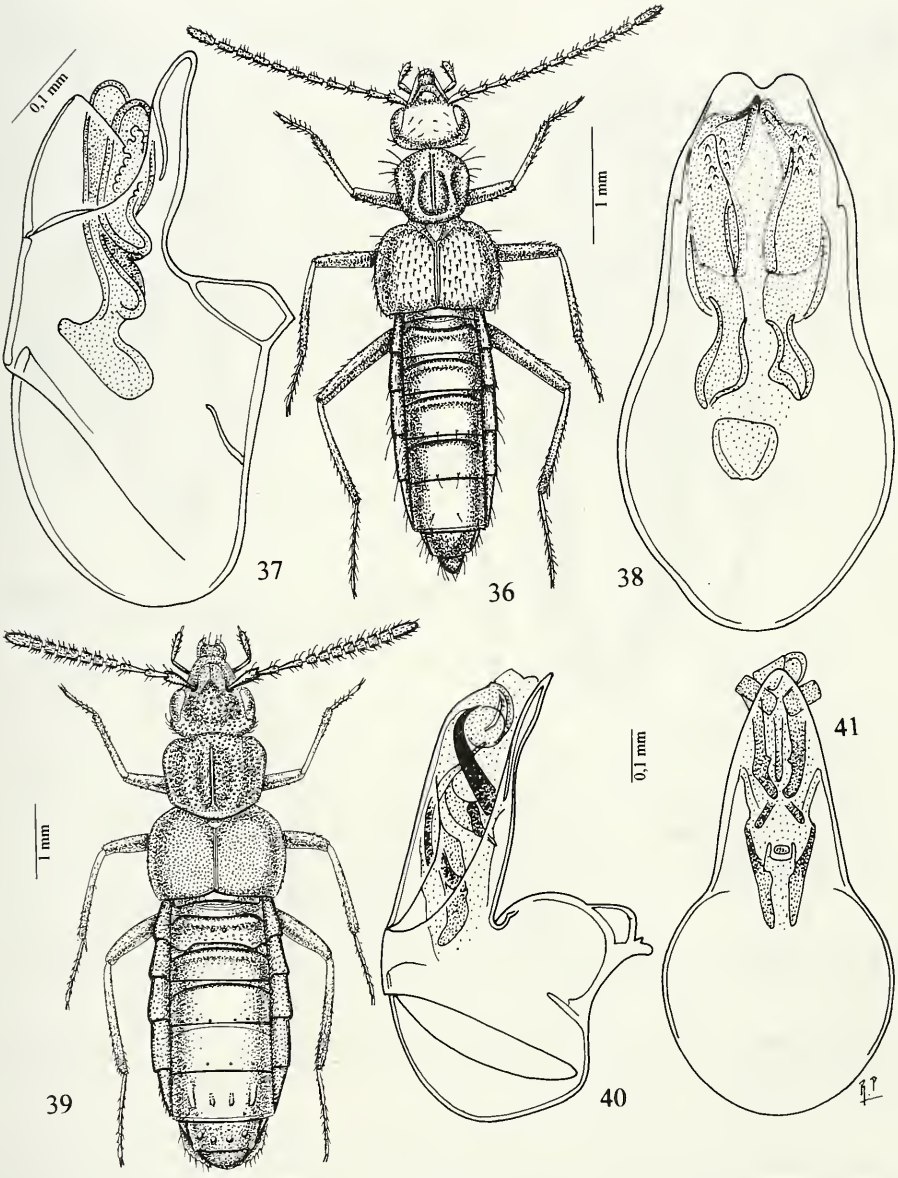
DERIVATIO NOMINIS.: Il nome della nuova specie significa «non *aerea*», vale a dire che per la forma dell'edeago non può essere determinata come *Drusilla aerea* Cameron.

Drusilla terrestris sp. n. Figg. 50-52

HOLOTYPUS: Maschio, Sabah, Mt. Kinabalu Nat. Pk. HQ, Int. trap., 1500 m, 30.IV-8.V.1987, leg. A. Smetana (MHNG).

PARATYPI: 1 maschio e 1 femmina, Borneo, Mt Murndi, *Astilbus aereus* Cam. (*borneensis* Cam. praeocc.), cotypi di *Drusilla aerea* (Cameron).

DESCRIZIONE: Lunghezza 4 mm. Corpo lucido e bruno-rossiccio. Avancorpo con debolissimi riflessi bronzei; antenne bruno-rossicce con i due antennomeri basali rossicci; zampe rossicce con femori gialli, tranne sulle ginocchia che sono rossicce. La reticolazione del capo è assai superficiale, quella del resto del corpo è assente. La punteggiatura del capo è ampia, ma superficiale, quella del pronoto è fine e quella delle elitre è netta e profonda. Il pronoto presenta un'ampia depressione mediana nel cui fondo sta un solco mediano. Edeago Figg. 51-52, spermateca non rinvenuta nell'addome.



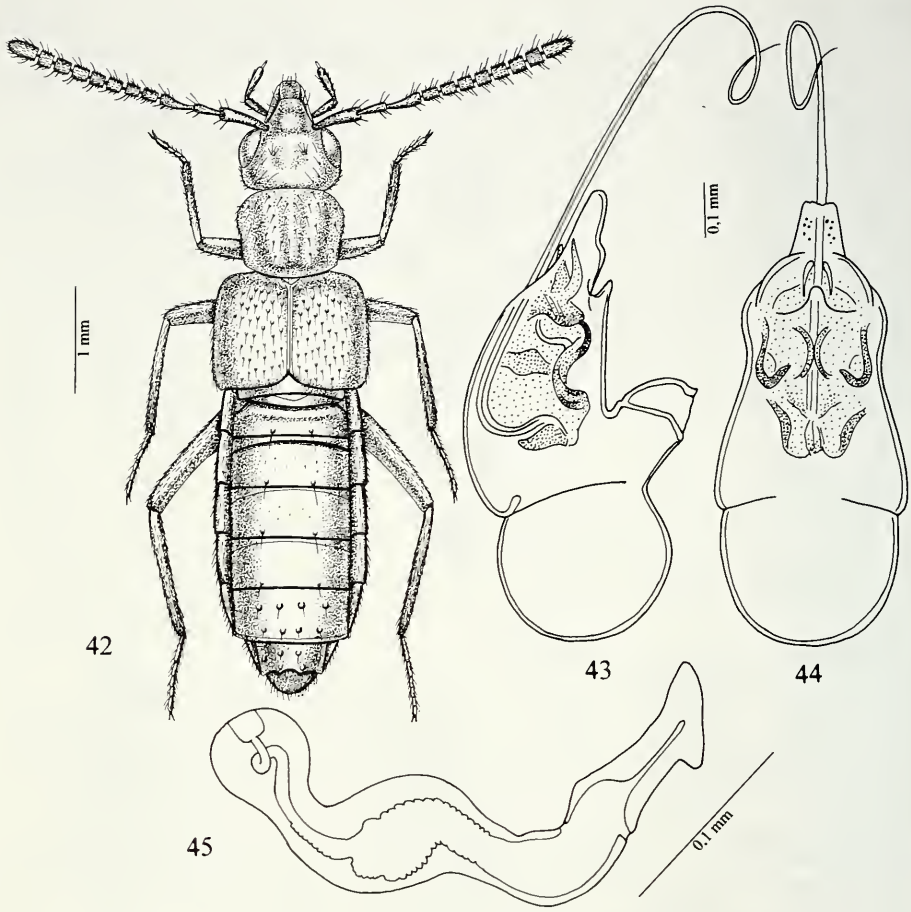
FIGG. 36-41

Habitus e edeago in visione laterale e ventrale. (36-38) *Drusilla carinithorax* (Bernhauer), holotypus maschio. (39-41) *Drusilla bruneiorum* sp. n.

Drusilla fossulicollis sp. n. Figg. 53-56

HOLOTYPUS: Maschio, Borneo, Sabah, Mt. Kinabalu N. P., Poring Hot Springs, area Eastern Ridge tr., 850 m, 28.VIII.1988, leg. A. Smetana, (MHNG).

PARATYPI: 1 maschio e 1 femmina, Sabah, M. Kinabalu, 1550 m, 28.IV.1987, leg. D. Burckhardt & I. Löbl. – 1 maschio, Sabah, Mt. Kinabalu, 1550-1650 m, 24.IV.1987, leg.

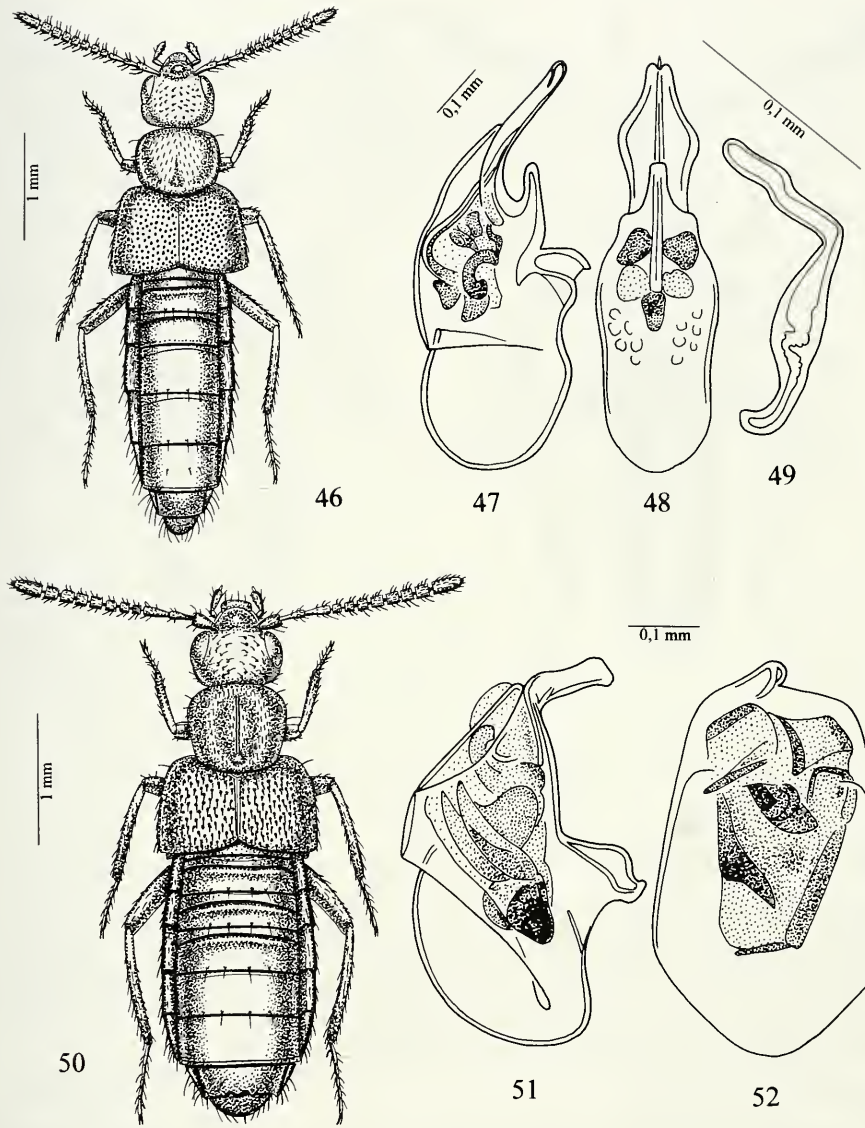


FIGG. 42-45

Habitus, edeago in visione laterale e ventrale e spermateca. (42-45) *Drusilla aerea* (Cameron), lectotypus maschio e paralectotypus femmina.

D. Burckhardt & I. Löbl. – 1 femmina, Sabah, Mt. Kinabalu Nat. Pk., HQ Silau-Silau Tr., 1565 m, 3.VIII.1988, leg. A. Smetana. – 1 femmina, Borneo, Sabah, Mt. Kinabalu Nat. Pk., HQ at Liwagu Rv., 1500 m, 4.VIII.1988, leg. A. Smetana.

DESCRIZIONE: Lunghezza 4,2 mm. Corpo lucido e bruno-rossiccio con elitre brune e addome giallo-rossiccio, tranne il margine posteriore dei paratergiti e il quinto urotergo libero che sono bruni; zampe brune con base dei femori medi e posteriori di colore giallo pallido, tibie anteriori bruno-rossicce tranne le estremità rossicce, tibie medie e posteriori di colore giallo pallido con metà distale bruna. La punteggiatura del capo è assai superficiale e assente sulla fascia longitudinale mediana. La punteggiatura delle elitre è netta e rada. Il pronoto è privo di punteggiatura e di granulosità e presenta un rilievo spigoloso che prende origine dal margine laterale e prosegue accanto alla base dello stesso pronoto. In tal modo determina un'ampia concavità. Edeago Figg. 54-55, spermateca Fig. 56.



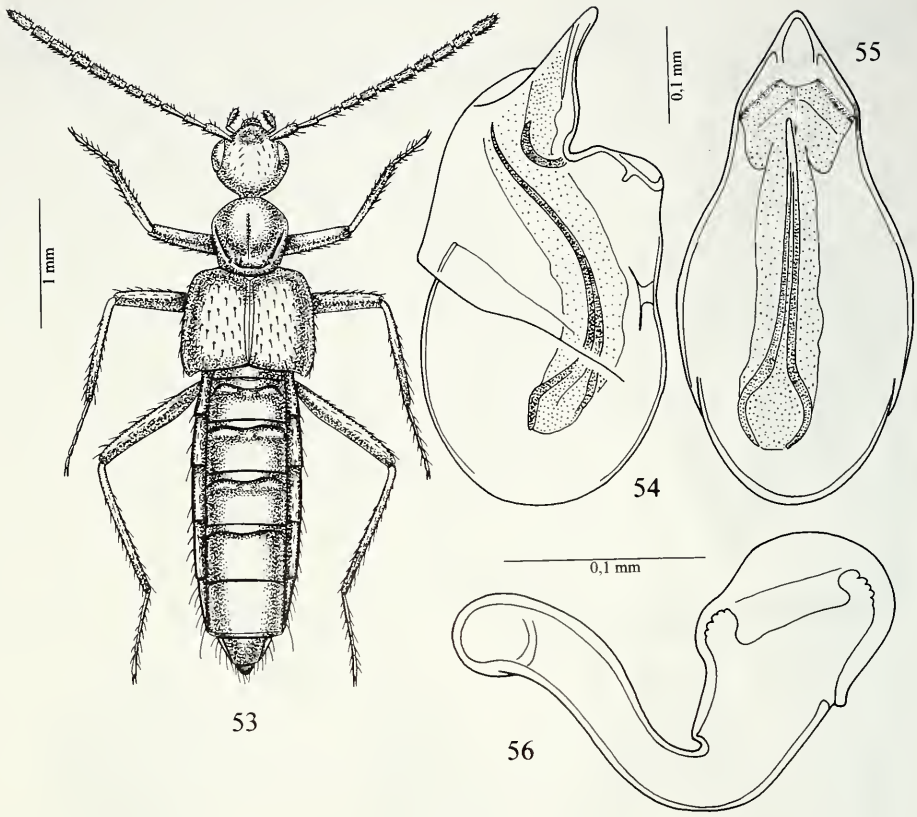
FIGG. 46-52

Habitus, edeago in visione laterale e ventrale e spermateca. (46-49) *Drusilla necaerea* sp. n. (50-52) *Drusilla terrestris* sp. n.

Drusilla sculpticollis sp. n. Figg. 57-58

HOLOTYPUS: Femmina, Sabah, Poring Hot Springs, Langanan Falls, 900-950 m, 12.V.1987, leg. D. Burckhardt & I. Löbl (MHNG).

DESCRIZIONE: Lunghezza 4,8 mm. Corpo lucido e rossiccio; antenne bruno-rossicce con i due antennomeri basali e l'undicesimo giallo-rossicci; zampe giallo-



FIGG. 53-56
Habitus, edeago in visione laterale e ventrale e spermateca. (53-56) *Drusilla fossulicollis* sp. n.

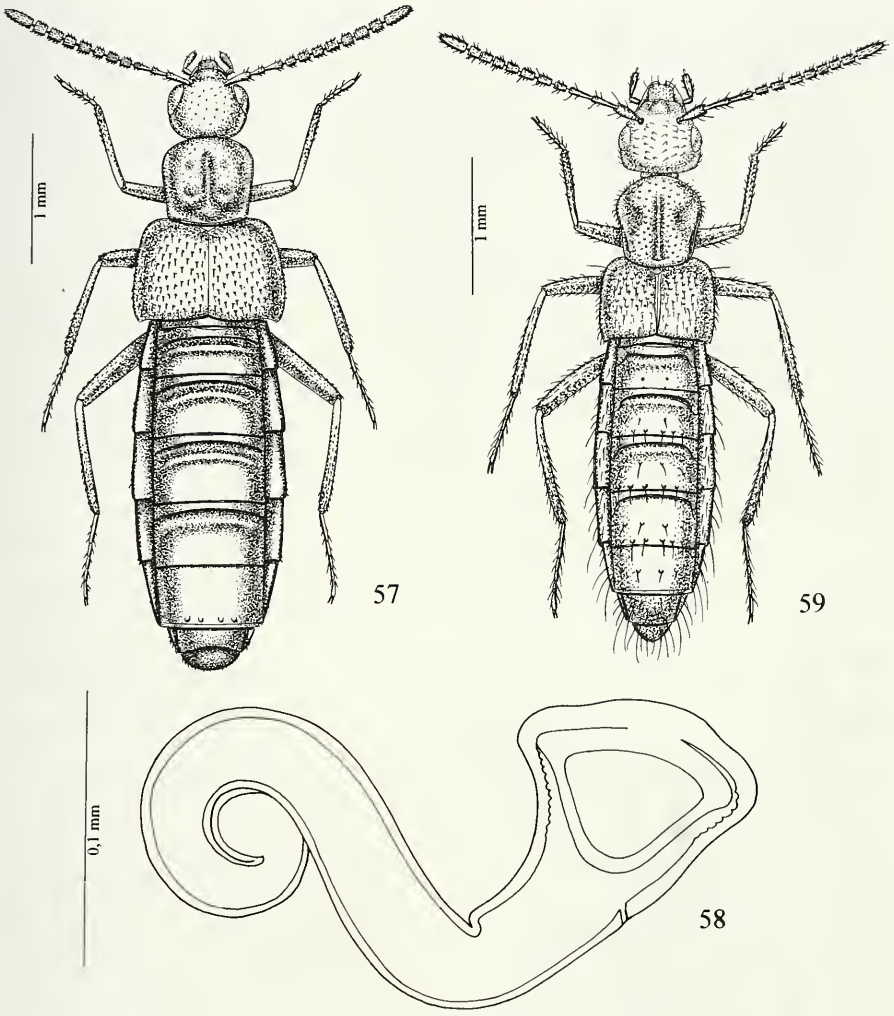
rossicce. Il corpo non presenta reticolazione. La punteggiatura del capo e del pronoto è netta fine e sparsa. La granulosità delle elitre è saliente. L'addome è privo di punteggiatura, pubescenza o granulosità e presenta solchi basali arcuati sugli uroterghi liberi secondo e terzo. Il pronoto mostra un solco mediano largo e quattro impressioni: le due posteriori sono più evidenti, Fig. 57. Spermateca Fig. 58.

Drusilla bruneiensis sp. n. Figg. 59-62

HOLOTYPUS: Femmina, Borneo, Brunei, Temburong, Kuala Belalong K8FSC, 25.II.1995, leg. Borcherding (IRSN).

PARATYPI: 5 es., Sabah, Poring Hot Springs, 500 m, 13.V.1987, leg. D. Burckhardt & I. Löbl. – 1 es., Sabah, Mt. Kinabalu N.P., 500 m, 10.V.1987, leg. D. Burckhardt & I. Löbl . – 3 es., Sabah, Poring Hot Springs, 500 m, 8.V.1987, leg. D. Burckhardt & I. Löbl. – 1 maschio, Borneo, Mawar, Waterfall nr. Patau village, 31.V.1998, leg. P. Hlavac, Rougemont collection . – 1 maschio e 1 femmina, Sabah, Poring Hot Springs, 550-600m, 9.V.1987, leg. D. Burckhardt & I. Löbl.

DESCRIZIONE: Lunghezza 4 mm. Corpo lucido e giallo-bruno, con margine posteriore degli uroterghi liberi bruno-rossiccio; antenne giallo-brune con i due antennomeri basali gialli; zampe gialle con ginocchia medie e posteriori rossicce. Il corpo



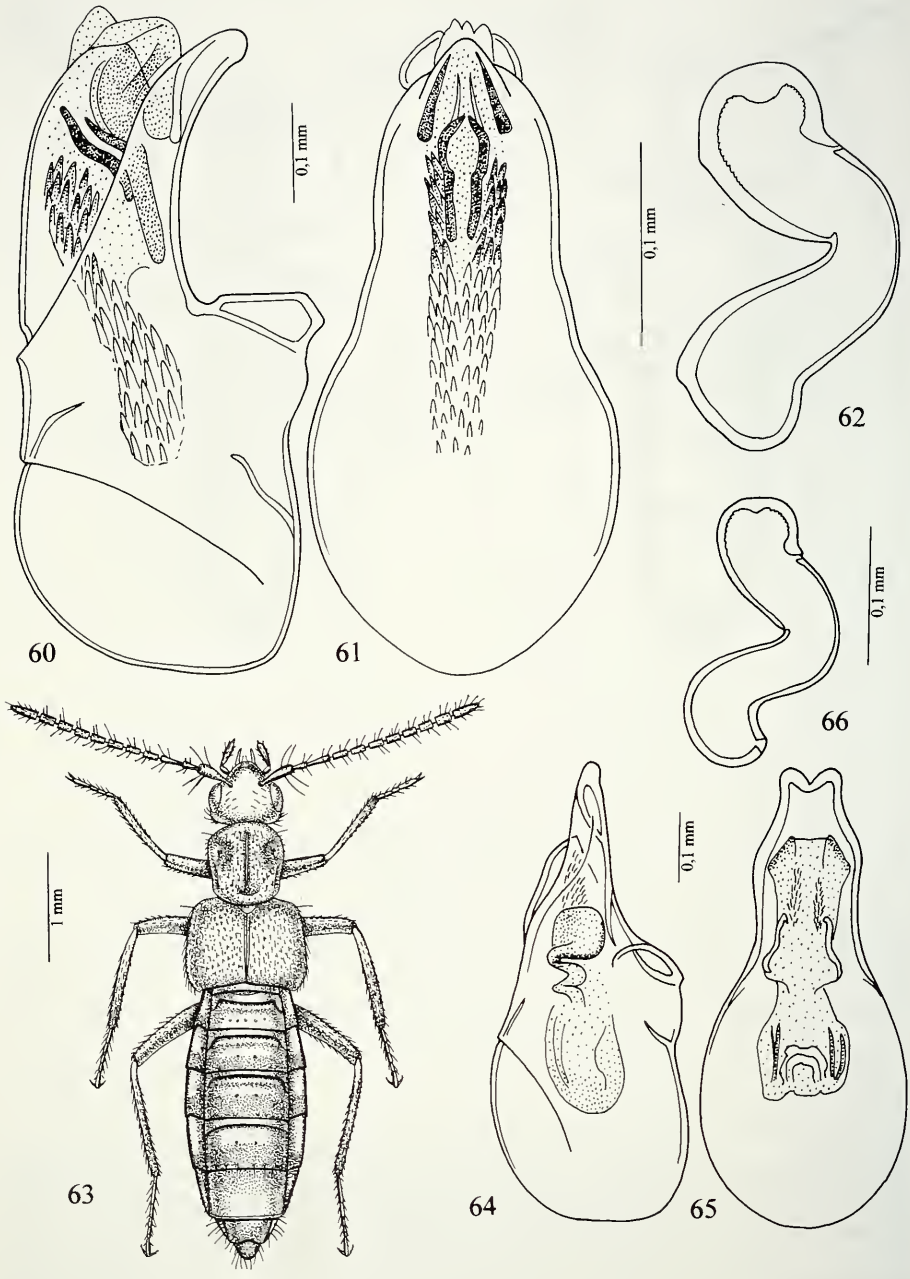
FIGG. 57-59
Habitus e spermateca. (57-58) *Drusilla sculpticollis* sp. n. (59) *Drusilla bruneiensis* sp. n.

non è coperto di reticolazione. La granulosità del capo è distinta, ma assente sulla fascia longitudinale mediana. La granulosità del pronoto è molto saliente, ma diradata ai lati dello stesso pronoto che presenta un profondo solco mediano e un'impressione ampia a ciascun lato, Fig. 59. Edeago Figg. 60-61, spermateca Fig. 62.

Drusilla fontis sp. n. Figg. 63-66

HOLOTYPUS: Maschio, Sabah, Kinabalu N.P., Poring Hot Spring, 26.X.1990, from rotten Tarap fruit (*Artocarpus*), leg. G. de Rougemont (IRSN).

PARATYPI: 1 femmina e 1 es. (senza addome), stessa provenienza . – 1 maschio, Sabah, Mt. Kinabalu, HQ at Liwagu Rv., 1500 m, 25.IV.1987, leg. A. Smetana. – 4 es., Sabah, Mt.



FIGG. 60-66

Edeago in visione laterale e ventrale, spermateca e habitus. (60-62) *Drusilla bruneiensis* sp. n. (63-66) *Drusilla fontis* sp. n.

Kinabalu, above Poring Hot Springs, 520 m, 9.V.1987, leg. A. Smetana. – 1 es., Sabah, Mt. Kinabalu Nat. Pk., Int. trap., HQ 1500 m, 30.IV-8.V.1987, leg. A. Smetana. – 1 es., Sabah, Mt. Kinabalu Nat. Pk., Int. trap., HQ 1500 m, 25-30.IV.1987, leg. A. Smetana. – 1 es., Sabah, Mt. Kinabalu, Liwagu River, 1490 m, 3.IX.1988, leg. A. Smetana. – 1 maschio, Sabah, Crocker Ra., 1200 m, Km 63 rte Kota Kinabalu-Tambunan, 19.V.1987, leg. D. Burckhardt & I. Löbl. – 2 es., Sabah, Poring Hot Springs, 500 m, 7.V.1987, leg. D. Burckhardt & I. Löbl. – 1 es., Borneo, Sabah, Crocker Ra., 1600 m, Km 51 rte. Kota Kinabalu-Tambunan, 18.V.1987, leg. D. Burckhardt & I. Löbl. – 1 es., Borneo, Sabah, Mt_Kinabalu Nat. Pk., Poring Hot Springs, 500 , 10.V.1987, leg. A. Smetana.

DESCRIZIONE: Lunghezza 4,8 mm. Corpo lucido e bruno, con pronoto bruno-rossiccio a riflessi di bronzo, addome giallo-rossiccio con margine posteriore e area mediana degli uroterghi liberi e completamente il sesto e il settimo, bruni; antenne brune con i tre antennomeri basali rossicci e i tre antennomeri distali di colore giallo pallido; zampe rossicce con i tre quarti basali dei femori di un giallo pallido e il quarto apicale bruno. Non è presente reticolazione sul corpo. La granulosità del capo è ben visibile, quella del pronoto è saliente, tranne che nelle impressioni laterali quasi prive di granuli. La granulosità delle elitre è saliente. Il pronoto presenta un solco mediano poco profondo e a ciascun lato di esso una larga concavità con un poro setigero centrale, Fig. 63. Edeago Figg. 64-65, spermateca fig. 66.

DERIVATIO NOMINIS: Il nome delle nuova specie significa «della sorgente», una di quelle di Poring Hot Springs.

Drusilla bicarinicollis sp. n. Figg. 69-71

HOLOTYPUS: Maschio, Sabah, Poring Hot Springs, 9.III.1990, leg. G. De Rougemont (IRSN).

DESCRIZIONE: Lunghezza 3,9 mm. Corpo lucido con pronoto debolmente opaco ed elitre opache. Corpo giallo-rossiccio con capo rossiccio ed elitre giallo-brune; antenne rossicce con i due antennomeri basali gialli; zampe rossicce con tarsi e femori gialli. La granulosità del capo è fine e poco saliente, quella del pronoto è pure saliente, ma più fitta sulla metà posteriore dello stesso pronoto. La granulosità delle elitre è fittissima, tanto che dà un aspetto opaco alla superficie. Un solco trasverso si trova tra le antenne. Il solco mediano del pronoto è poco profondo e stretto. Termina all'indietro tra due carene molto salienti e tra loro unite all'indietro, Fig. 69. Il primo urotergo libero del maschio presenta un tubercolo mediano posteriore sporgente. Il quinto urotergo libero del maschio ha un tubercolo mediano allungato e molto saliente. Edeago Figg. 70-71.

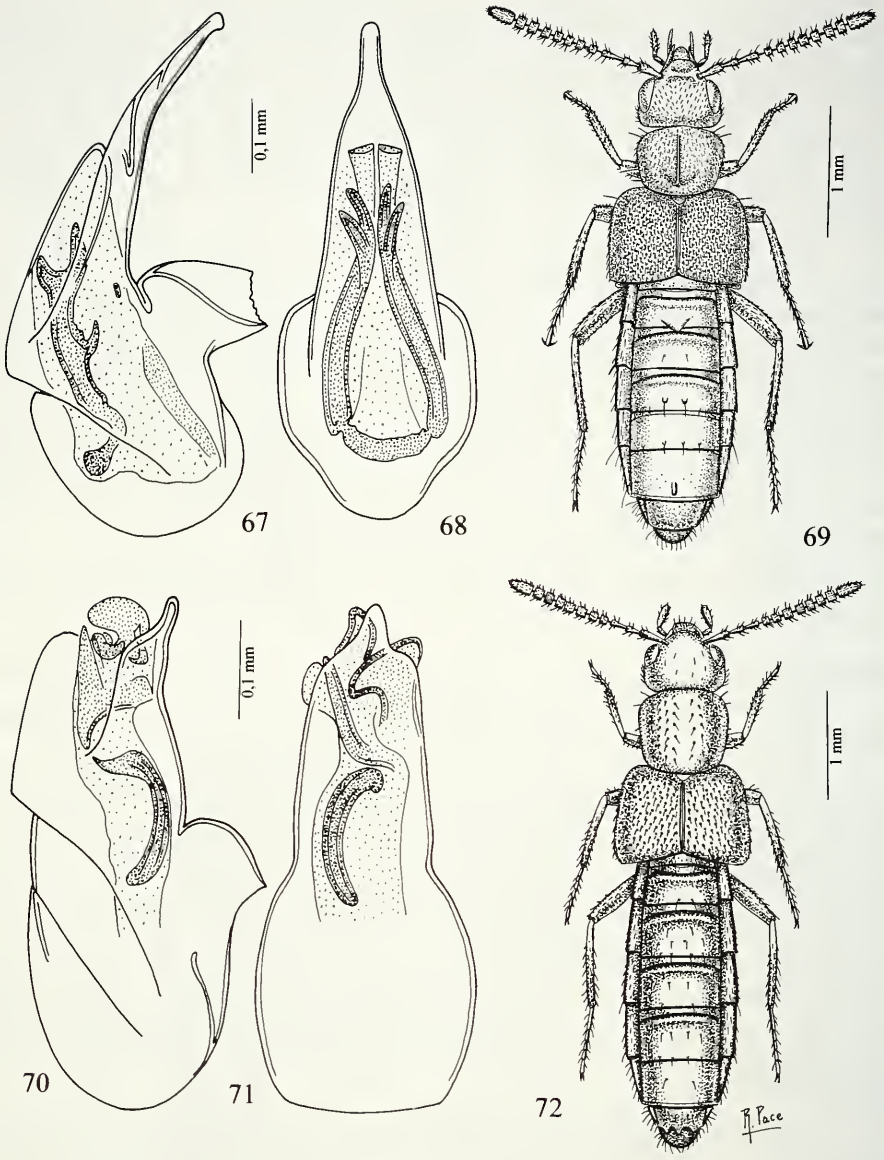
DERIVATIO NOMINIS: Il nome delle nuova specie significa «due carene del pronoto».

Drusilla caelaticollis sp. n. Figg. 72-73

HOLOTYPUS: Femmina, Borneo, Sabah, Mt. Kinabalu, HQ 1500 m, 25-30.IV.1987, int. trap, leg. A. Smetana (MHNG).

PARATYPUS: 1 femmina, stessa provenienza.

DESCRIZIONE: Lunghezza 4,8 mm. Capo e pronoto debolmente opachi, resto del corpo lucido. Corpo bruno-rossiccio con elitre brune e addome giallo-rossiccio; antenne bruno-rossicce con i due antennomeri basali rossicci e metà apicale dell'undi-



FIGG. 67-72
Edeago in visione laterale e ventrale e habitus. (67-68) *Drusilla monticola* (Cameron), holotypus maschio. (69-71) *Drusilla bicarinicollis* sp. n. (72) *Drusilla caelaticollis* sp. n.

cesimo gialla; zampe giallo-rossicce. La reticolazione dell'avancorpo è netta, quella dell'addome è distinta. La punteggiatura del capo è rada e superficiale, quella del pronoto è ben visibile e assente sulla fascia longitudinale mediana, quella delle elitre è nettamente visibile. Spermateca Fig. 73.

DERIVATIO NOMINIS: Il nome «pronoto cesellato» delle nuova specie deriva dalla netta reticolazione del pronoto.

Drusilla neocoenonicacollis sp. n. Figg. 74-75

HOLOTYPUS: Femmina, Sabah, Crocker Range, 1550-1650 m, 16.V.1987, leg. D. Burckhardt & I. Löbl (MHNG).

DESCRIZIONE: Lunghezza 4,2 mm. Corpo lucido e pronoto opaco. Corpo rossiccio; antenne rossicce con antennomeri settimo a undicesimo giallo-rossicci; zampe giallo-rossicce. Punteggiatura e granulosità del capo, del pronoto e delle elitre sono assenti. Il pronoto è coperto di una reticolazione a maglie salienti di grandezza uniforme. Gli uroterghi liberi quinto e sesto sono fortemente punteggiati. Spermateca Fig. 75.

DERIVATIO NOMINIS: Il nome «pronoto di *Neocoenonica*» della nuova specie deriva dalla netta reticolazione del pronoto simile a quella del pronoto di *Neocoenonica antennalis* Cameron.

Drusilla rufocaelata sp. n. Figg. 76-77

HOLOTYPUS: Femmina, Borneo, Sabah, Mt. Kinabalu Nat. Pk., Poring Hot Springs, 480 m, 10.V.1987, leg. A. Smetana (MHNG).

DESCRIZIONE: Lunghezza 4 mm. Corpo lucido e giallo-rossiccio con metà posteriore delle elitre bruna; antenne rossicce con i due antennomeri basali e l'undicesimo giallo-rossicci; zampe giallo-rossicce. La punteggiatura del capo è ombelicata, netta e assente sulla fascia longitudinale mediana, quella del pronoto è fitta e netta, ma sui tre quarti posteriori è fittissima e quella delle elitre è pure evidente, ma meno fitta di quella del pronoto. Il pronoto è sinuato davanti agli angoli posteriori e presenta un debole solco mediano posteriore. Il quinto urotergo libero è fortemente punteggiato. Spermateca Fig. 77.

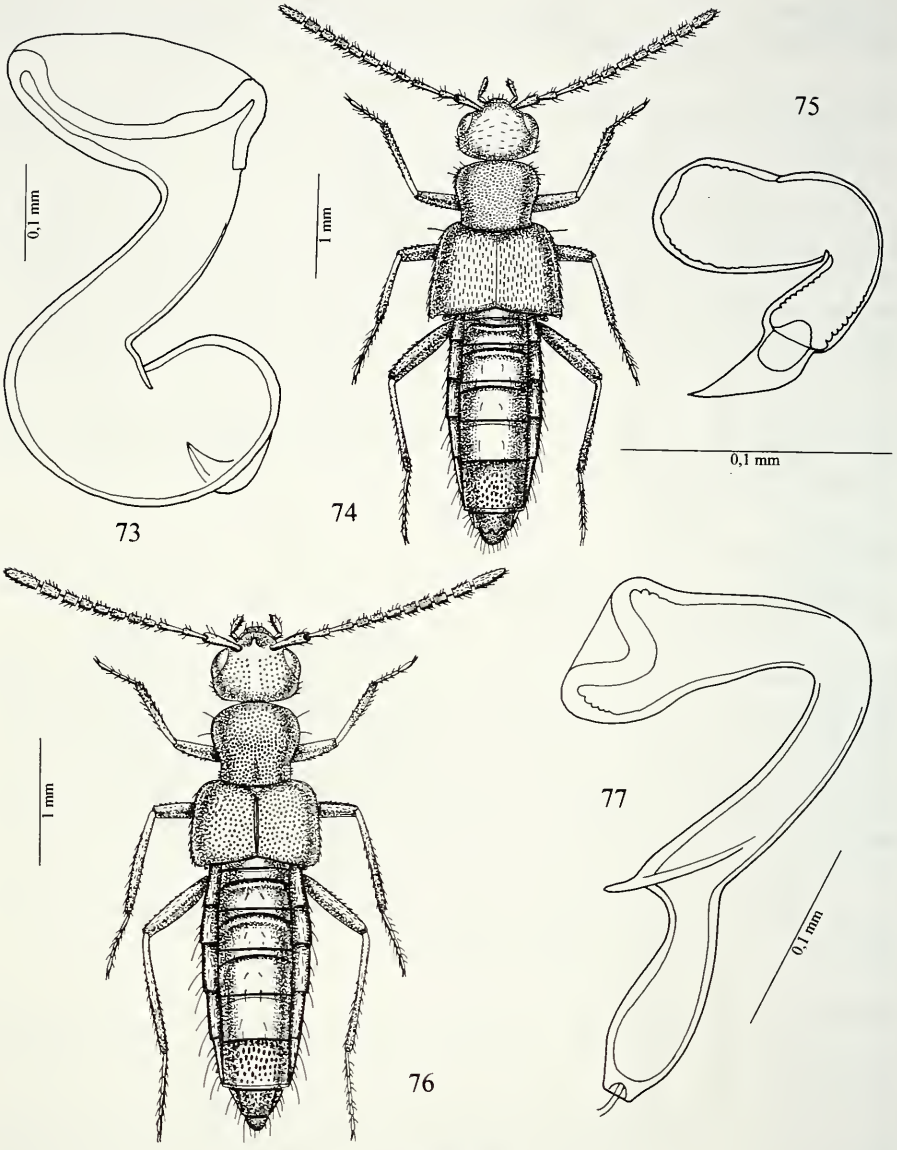
DERIVATIO NOMINIS: Il nome «rossiccia e cesellata» della nuova specie deriva dalla netta punteggiatura e dal colore del corpo.

Drusilla spissatheca sp. n. Figg. 78-79

HOLOTYPUS: Femmina, Sabah, Poring Hot Springs, 500 m, 6.V.1987, leg. D. Burckhardt & I. Löbl (MHNG).

DESCRIZIONE: Lunghezza 3,8 mm. Corpo lucido e rossiccio con metà posteriore delle elitre brune e addome giallo-rossiccio con margine posteriore dei paratergiti bruno; antenne rossicce con i due antennomeri basali giallo-rossicci e apice dell'undicesimo giallo pallido; zampe gialle con tibie rossicce. Sul corpo non è presente reticolazione. La punteggiatura del capo è fine e fitta, quella delle elitre è fittissima e profonda. La granulosità del pronoto è saliente. E' presente un tubercolo frontale tra le antenne. Il solco mediano del pronoto è finissimo sulla metà anteriore e profondo sulla posteriore. Spermateca Fig. 79.

DERIVATIO NOMINIS: Il nome della nuova specie significa «spermateca spessa» a motivo delle pareti della spermateca con largo spessore.



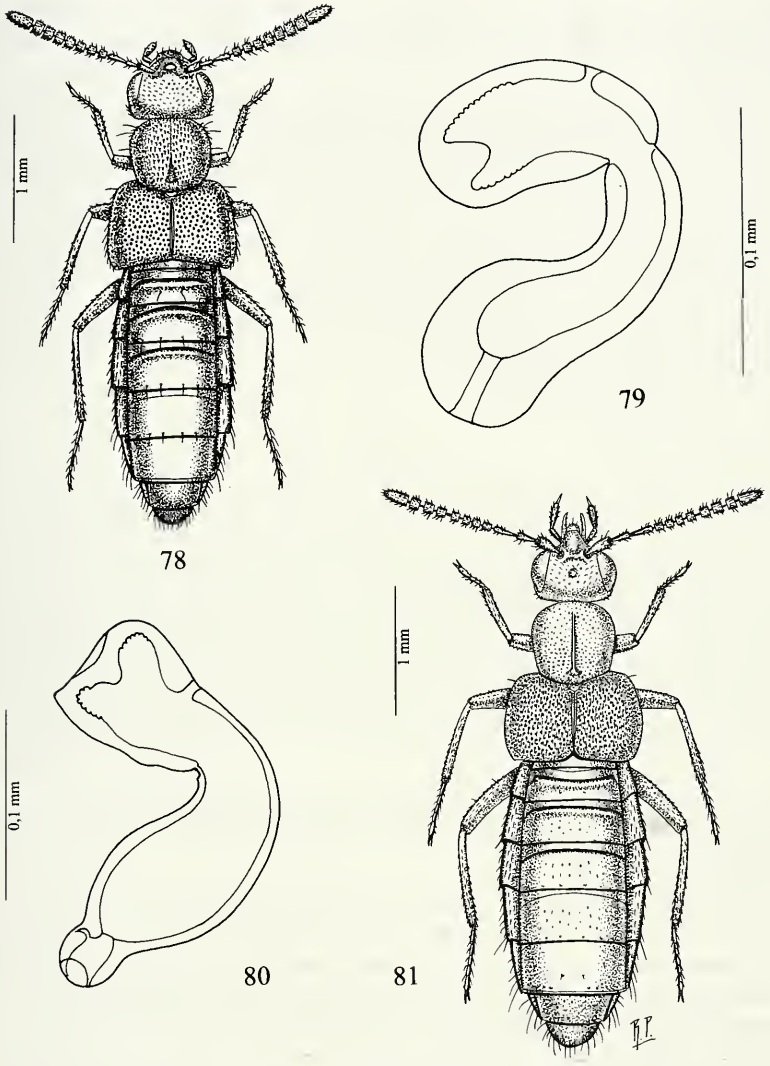
FIGG. 73-77

Spermateca e habitus. (73) *Drusilla caelaticollis* sp. n. (74-75) *Drusilla neocoenonicacollis* sp. n. (76-77) *Drusilla rufocaelata* sp. n.

Drusilla semimonticola sp. n. Figg. 80-81

HOLOTYPUS: Femmina, Sabah, Kinabalu N.P., Poring Hot Spring, 26.X.1990, from rotten Tarap fruit (*Artocarpus*), leg. G. de Rougemont (IRSN).

DESCRIZIONE: Lunghezza 4,2 mm. Corpo lucido con avancorpo bruno e addome giallo-rossiccio; antenne brune con i due antennomeri basali e base del terzo rossicci;



FIGG. 78-81
Habitus e spermateca. (78-79) *Drusilla spissatheca* sp. n. (80-81) *Drusilla semimonticola* sp. n.

zampe rossicce con femori gialli. La reticolazione del capo e del pronoto è assente, quella delle elitre è superficiale e quella dell'addome è molto trasversa e distinta. La granulosità del capo è poco saliente, quella del pronoto è gradualmente saliente da davanti all'indietro. Tra le antenne è impresso un solco trasverso e sul disco del capo si trova una fossetta. Il solco mediano del pronoto è poco profondo. Spermateca Fig. 80.

DERIVATIO NOMINIS: Il nome della nuova specie significa «*monticola* a metà» a motivo della somiglianza del suo colore corporeo a quello di *Drusilla monticola* (Cameron).

Drusilla foeda sp. n. Figg. 82-83

HOLOTYPUS: Femmina, Sabah, Poring Hot Springs, 500 m, 6.V.1987, leg. D. Burckhardt & I. I. Löbl (MHNG).

DESCRIZIONE: Lunghezza 3,6 mm. Corpo lucido e giallo-bruno con elitre, tranne la base gialla, e uroterghi liberi terzo, quarto e quinto bruni; antenne giallo-brune con i due antennomeri basali gialli; zampe giallo-rossicce. La reticolazione dell'avancorpo è assente, quella dell'addome è a distinte maglie molto trasverse alla base di ciascun urotergo libero. La granulosità del capo è fine e molto saliente, quella del pronoto è grossolana e pure saliente. La punteggiatura delle elitre è forte, netta e fitta. Tra le antenne si trova una forte bozza, Fig. 82. Spermateca Fig. 83.

DERIVATIO NOMINIS: Il nome della nuova specie significa «brutta», a motivo del suo corpo senza vivi e attraenti colori.

ZYRAS STEPHENS, 1835

Nella chiave che segue non è compresa la specie *Z. compressicornis* Fauvel, citata per il Borneo (Hammond, 1984). All'esame della spermateca di esemplari del Borneo e di regioni vicine, si è alla presenza di specie ben distinte da *compressicornis* di cui ho esaminato esemplari della serie tipica di Giava. Esse sono *Z. bajauanus* sp. n. sotto descritta e *Z. ibanorum* Pace, 1993. Le specie del Borneo, conservate nei musei e determinate come *Z. compressicornis* vanno attribuire a queste due specie. Va pertanto corretta l'opinione corrente che *compressicornis* è specie largamente distribuita nella regione orientale. Nella chiave compare *Zyras montanus* (Bernhauer), già attribuito al genere *Drusilla* (vedi sopra).

CHIAVE DELLE SPECIE DEL GENERE *ZYRAS* STEPHENS, 1835, NEL BORNEO

1 Antennomeri quarto e seguenti compressi; terzo antennomero molto più lungo del secondo che è minuscolo, Subgen. *Diaulaconia* 2
- Antennomeri non compressi o lievemente compressi dal sesto antennomero . 3
2 Porzione distale della spermateca molto lunga e strettissima, porzione prossimale a forma di bulbo, Fig. 90. Lunghezza 8,5 mm . . . *Z. ibanorum* Pace
- Porzione distale della spermateca corta e larga, porzione prossimale ricurva, Fig. 88. Lunghezza 8,3 mm . . . . . *Z. bajauanus* sp. n.
3 Pronoto trapezoidale e molto trasverso 4
- Pronoto in avanti e all'indietro ugualmente ristretto, generalmente poco trasverso 6
4 Tempie non divergenti all'indietro; pronoto senza lunghe setole laterali isolate. Lunghezza 3,5 mm. Subgen. *Trachydonia* . . . . . *Z. orientis* Cameron
- Tempie divergenti all'indietro; pronoto con lunghe setole laterali isolate. Subgen. *Trigonozyras* 5
5 Capo nero-bruno, pronoto giallo-rossiccio con due deboli impressioni laterali; antennomeri dal quinto al decimo trasversi. Lunghezza 4 mm . . . . . *Z. sarawakensis* Cameron

- Capo e pronoto giallo-rossicci, con due forti solchi laterali; antennomeri dal quinto al decimo molto più lunghi che larghi; edeago Figg. 92-93. Lunghezza 4,5 mm ..... *Z. horridus* sp. n.

6 Secondo antennomero molto più corto del terzo; edeago con due pezzi copulatori sporgenti dall'orifizio apicale, anche allo stato di riposo. Subgen. *Glossacantha* 7

- Secondo antennomero poco più corto del terzo: edeago con pezzi copulatori non sporgenti dall'orifizio apicale. Subgen. *Zyras* 9

7 Antennomeri sesto a decimo più lunghi che larghi e non compressi; pronoto più lungo che largo; primo urotergo libero del maschio con lunghissime appedici laterali; edeago Figg. 95-96. Lunghezza 7,8 mm ..... *Z. longefurcatus* sp. n.

- Antennomeri sesto a decimo trasversi e più o meno compressi; pronoto trasverso; primo urotergo libero del maschio semplice, ma con il secondo espanso e lobato posteriormente 8

8 Antennomeri sesto a decimo ben compressi; pronoto, elitre e addome giallo-rossicci; armatura genitale interna dell'edeago uncinata all'estremità distale. Lunghezza 9,5 mm ..... *Z. expectatus* Pace

- Antennomeri sesto a decimo lievemente compressi; pronoto rossiccio, elitre e addome bruno-rossicci; armatura genitale interna dell'edeago non uncinata all'estremità distale. Lunghezza 10 mm ..... *Z. borneorum* Pace

9 Sutura delle elitre distintamente più corta del pronoto; specie attere o microttere 10

- Sutura lunga quanto il pronoto o scarsamente più corte, oppure più lunghe; specie alate 12

10 Antenne unicolori giallo-rossicce; lati del pronoto non sinuati davanti agli angoli posteriori; specie attera; edeago Figg. 98-99. Lunghezza 3,7 mm ..... *Z. kinabaluensis* sp. n.

- Antenne tricolori, con porzione distale di colore giallo pallido; lati del pronoto sinuati; specie microttere 11

11 I quattro antennomeri distali colorati di giallo pallido; addome rossiccio con una fascia bruna; edeago Figg. 101-102 ..... *Z. quadriterminalis* sp. n.

- Solo l'undicesimo antennomero colorato di giallo pallido; addome uniformemente bruno; edeago Figg. 104-105, spermateca Fig. 106. Lunghezza 5,2 mm ..... *Z. alboterminalis* sp. n.

12 Pronoto senza fovea mediana posteriore 13

- Pronoto con fovea mediana posteriore o con una profonda fossetta arcuata .. 14

13 Porzione distale delle antenne unicolore bruna; antennomeri quinto e sesto trasversi; capo e pronoto finemente punteggiati; pronoto debolmente sinuato davanti agli angoli posteriori. Lunghezza 6,5 mm ..... *Z. matangensis* Cameron

- Porzione distale delle antenne bicolore bruna e giallo chiara; antennomeri quinto e sesto più lunghi che larghi; capo e pronoto fortemente punteggiati; pronoto non sinuato davanti agli angoli posteriori; spermateca Fig. 107. Lunghezza 6 mm ..... *Z. montanus* (Cameron)

14 Pronoto con profonda fossetta mediana posteriore trasversa; capo e pronoto con punteggiatura straordinariamente profonda e forte, sicché le porzioni senza punteggiatura sono salienti; edeago Figg. 110-111. Lunghezza 5,8 mm ..... *Z. pervariolosus* sp. n.
- Pronoto con profonda fossetta mediana posteriore circolare; capo e pronoto con punteggiatura al massimo robusta 15
15 Pronoto lungo quanto largo; elitre fortemente granulose. Lunghezza 6 mm ..... *Z. granulipennis* Cameron
- Pronoto da appena trasverso a trasverso; elitre punteggiate 16
16 Pigidio giallo-rossiccio, pronoto e porzione restante dell'addome rossicci; spermateca Fig. 112. Lunghezza 4 mm ..... *Z. pallipyga* sp. n.
- Pigidio bruno o nero-bruno, se giallo-rossiccio, il resto dell'addome è interamente giallo-rossiccio 17
17 Addome interamente giallo-rossiccio; spermateca Fig. 115. Lunghezza 5 mm. Mt Kinabalu ..... *Z. daiaccorum* sp. n.
- Addome bicolore o unicolore rossiccio 18
18 Pronoto e base dell'addome giallo-rossicci; edeago Figg. 117-118. Lunghezza 3,8 mm ..... *Z. paederinus* sp. n.
- Pronoto mai giallo-rossiccio; base dell'addome giallo-rossiccia, rossiccia o nera 19
19 Pronoto rossiccio, addome giallo-rossiccio con pigidio nero. Lunghezza 4,5 mm ..... *bryanti* Cameron
- Pronoto nero o bruno-rossiccio, addome nero o rossiccio 20
20 Antenne interamente giallo-rossicce; addome nero, con punteggiatura giallo-rossiccia. Lunghezza 5 mm. Mt Poi ..... *Z. nigerrimus* Cameron
- Antenne nere con base gialla o brune con base rossiccia; addome rossiccio o rossiccio con pigidio nero 21
21 Antenne nere con base giallo-rossiccia, addome rossiccio con pigidio nero. Lunghezza 5,5 mm ..... *Z. bettotanus* Cameron
- Antenne brune con base rossiccia, addome uniformemente rossiccio. Lunghezza 4,7 mm ..... *Z. adulescens* (Pace)

KEY TO THE SPECIES OF THE GENUS *ZYRAS* STEPHENS, 1835, IN BORNEO

1 Fourth antennomere and following compressed; third antennomere longer than the second which is minuscule. Subgen. *Diaulaconia* 2
- Antennomeres non compressed or slightly compressed by the sixth antennomere 3
2 Distal portion of the spermatheca very long and narrow, proximal portion to form of bulb, Fig. 90. Length 8.5 mm ..... *Z. ibanorum* Pace
- Distal portion of the spermateca short and wide, proximal portion curved, Fig. 88. Length 8,3 mm ..... *Z. bajauanus* sp. n.
3 Pronotum trapezoidal and very transverse 4
- Pronotum in front and behind equally narrow, generally scarcely transverse 6

4 Temples behind non-divergent; pronotum without long isolated lateral setae. Length 3.5 mm. Mt Matang. Subgen. *Trachydonia* . . *Z. orientis* Cameron

\- Temples behind divergent; pronotum with long isolated lateral setae. Subgen. *Trigonozyras* 5

5 Head black-brown, pronotum yellow-reddish with two feeble lateral impressions; antennomeres from the fifth one to the tenth transverse. Length 4 mm . . . . . *Z. sarawakensis* Cameron

\- Head and pronotum yellow-reddish, with two strong lateral impressions; antennomeres from the fifth one to the tenth very longer than wide; aedeagus Figs 92-93 Length 4.5 mm . . . . . *Z. horridus* sp. n.

6 Second antennomere shorter than the third; aedeagus with two copulative pieces leaning from the apical orifice, also to the state of repose. Subgen. *Glossacantha* 7

\- Second antennomere a little shorter than the third: aedeagus with copulative pieces non-leaning from the apical orifice. Subgen. *Zyras* 9

7 Antennomere sixth to tenth longer than wide and not compressed; pronotum longer than wide; first-free urotergum of the male with long lateral spines; aedeagus Figs 95-96. Length 7.8 mm . . . . *Z. longefurcatus* sp. n.

\- Antennomere sixth to tenth transverse and compressed; pronotum transverse; first free urotergum of the male simple, but with the second urotergum expanded and lobated behind 8

8 Antennomere sixth to tenth well compressed; pronotum, elytra and abdomen yellow-reddish; inside genital armour of the aedeagus hooked to the distal extremity. Length 9.5 mm . . . . . *Z. expectatus* Pace

\- Antennomeres sixth to tenth slightly compressed; pronotum reddish, elytra and abdomen brown-reddish; inside genital armour of the aedeagus not hooked to the distal extremity. Length 10 mm . . . *Z. borneorum* Pace

9 Suture of the elytra distinctly shorter than the pronotum; apterous or micropterous species 10

\- Suture of the elytra as long as the pronotum or scarcely more court, or longer; winged species 12

10 Antennae unicoloured yellow-reddish; sides of the pronotum not sinuate in front of the posterior angles; apterous species; aedeagus Figs 98-99. Length 3.7 mm . . . . . *Z. kinabaluensis* sp. n.

\- Antennae tricoloured, with distal portion of pale yellow colour; sides of the pronotum sinuate; micropterous species 11

11 The four distal antennomeres coloured of pale yellow; abdomen reddish with a brown band; aedeagus Figs 101-102 . . . . . *Z. quadriterminalis* sp. n.

\- Only the eleventh antennomere coloured of pale yellow; abdomen uniformly brown; aedeagus Figs 104-105, spermatheca Fig. 106. Length 5.2 mm . . . . . *Z. alboterminalis* sp. n.

12 Pronotum without posterior median fovea 13

\- Pronotum with posterior median fovea or with a deep curved sulcus 14

13 Distal portion of the antennae unicoloured brown; fifth and sixth antennomeres transverse; head and pronotum finely punctured; pronotum

feebly sinuate in front of the posterior angles. Length 6.5 mm ..... *Z. matangensis* Cameron

- Distal portion of the antennae bicoloured brown and yellow clear; fifth and sixth antennomeres longer than wide; head and pronotum deeply punctured; pronotum not sinuate in front of the posterior angles; spermatheca Fig. 107. Length 6 mm ..... *Z. montanus* (Cameron)

14 Pronotum with deep, transverse, posterior and median fovea; head and pronotum with extraordinarily deep and strong punctuation, so the portions without punctuation are salient; aedeagus Figs 110-111. Length 5.8 mm ..... *Z. pervariolosus* sp. n.

- Pronotum with deep, circular, posterior and median fovea; head and pronotum with punctuation at the most strong 15

15 Pronotum as long as wide; elytra strongly granulose. Length 6 mm ..... *Z. granulipennis* Cameron

- Pronotum from scarcely transverse to transverse; punctured elytra 16

16 Pygidium yellow-reddish and pronotum and portion remained of the abdomen reddish; spermatheca Fig. 112. Length 4 mm .... *Z. pallipyga* sp. n.

- Pygidium brown or black-brown, if yellow-reddish, the rest of the abdomen is entirely yellow-reddish 17

17 Abdomen entirely yellow-reddish; spermatheca Fig. 115. Length 5 mm ..... *Z. daiaccorum* sp. n.

- Abdomen bicoloured or unicoloured reddish 18

18 Pronotum and base of the abdomen yellow-reddish; aedeagus Figs 117-118. Length 3.8 mm ..... *Z. paederinus* sp. n.

- Pronotum never yellow-reddish; base of the abdomen yellow-reddish, reddish or black 19

19 Pronotum reddish, abdomen yellow-reddish with black pygidium. Length 4.5 mm ..... *Z. bryanti* Cameron

- Pronotum black or brown-reddish, abdomen black or reddish 20

20 Antennae entirely yellow-reddish; abdomen black, with yellow-reddish punctuation. Length 5 mm ..... *Z. nigerrimus* Cameron

- Antennae black with base yellow or brown with reddish base; abdomen reddish or reddish with black pygidium 21

21 Antennae black with yellow-reddish base, abdomen reddish with black pygidium. Length 5.5 mm ..... *Z. bettotanus* Cameron

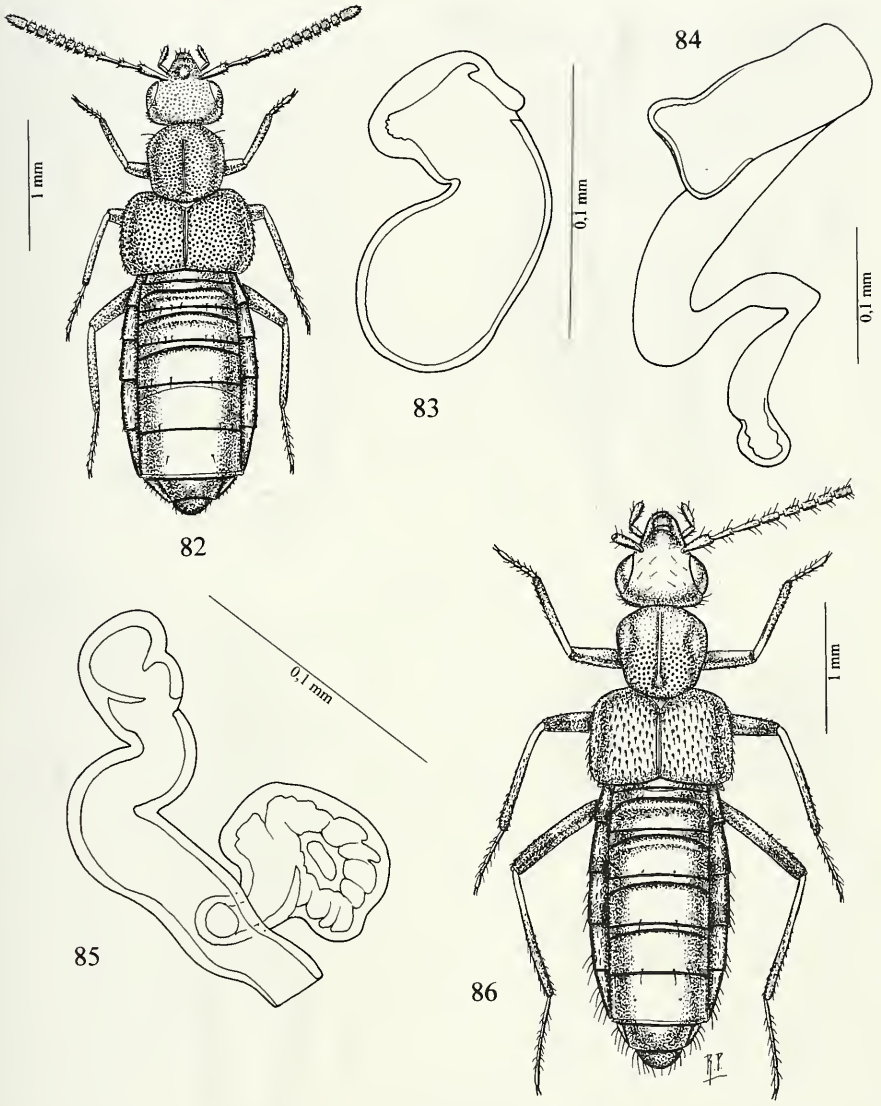
- Antennae brown with reddish base, abdomen uniformly reddish. Length 4.7 mm ..... *Z. adulescens* (Pace)

Zyras (Diaulaconia) bajauanus sp. n. Figg. 87-88

HOLOTYPUS: Femmina, N. Borneo, Sabah, Ranau, 2.VIII.1985, leg. K. Maruyama (DEI).

PARATYPI: 1 femmina, N. Borneo, Sabah, Bunsit Keningan, 31.VII.1985, leg. K. Maruyama. – 3 femmine, Sabah, Mt. Kinabalu, above Poring Hot Springs, 520 m, 9.V.1987, leg. A. Smetana.

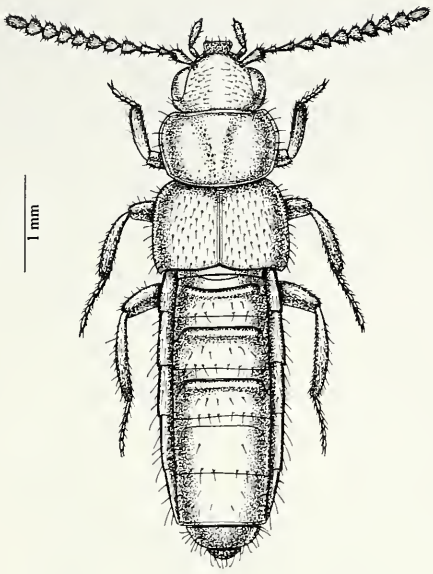
DESCRIZIONE: Lunghezza 8,3 mm. Corpo lucido e rossiccio, capo bruno-rossiccio; antenne e zampe rossicce. La reticolazione del capo e dell'addome è netta, quella del pronoto è a maglie longitudinali distinte solo in avanti e all'indietro, sul resto



FIGG. 82-86
Habitus e spermateca. (82-83) *Drusilla foeda* sp. n. (84) *Drusilla montanella* (Bernhauer), holotypus femmina. (85-86) *Drusilla borneensis* (Bernhauer), holotypus femmina.

della superficie del pronoto è assente. L'evidente reticolazione delle elitre è a maglie trasverse e oblique. La punteggiatura del capo e delle elitre è ombelicata e superficiale, quella del pronoto è distinta, distribuita come da Fig. 87. Gli antennomeri sono compressi. Le tibie sono appiattite e larghe. Spermateca Fig 88.

DERIVATIO NOMINIS: Il nome della nuova specie deriva da quello del gruppo etnico dei Bajau distribuito nel Sabah.



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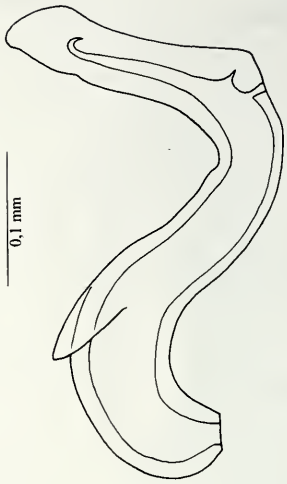

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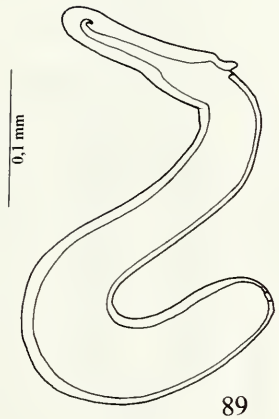

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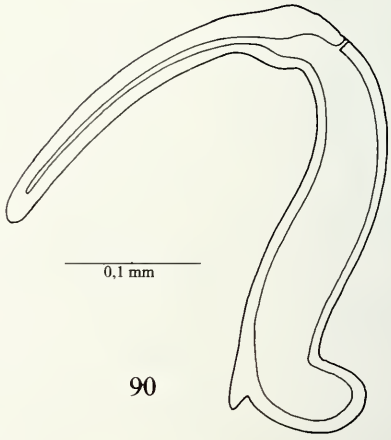

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FIGG. 87-90

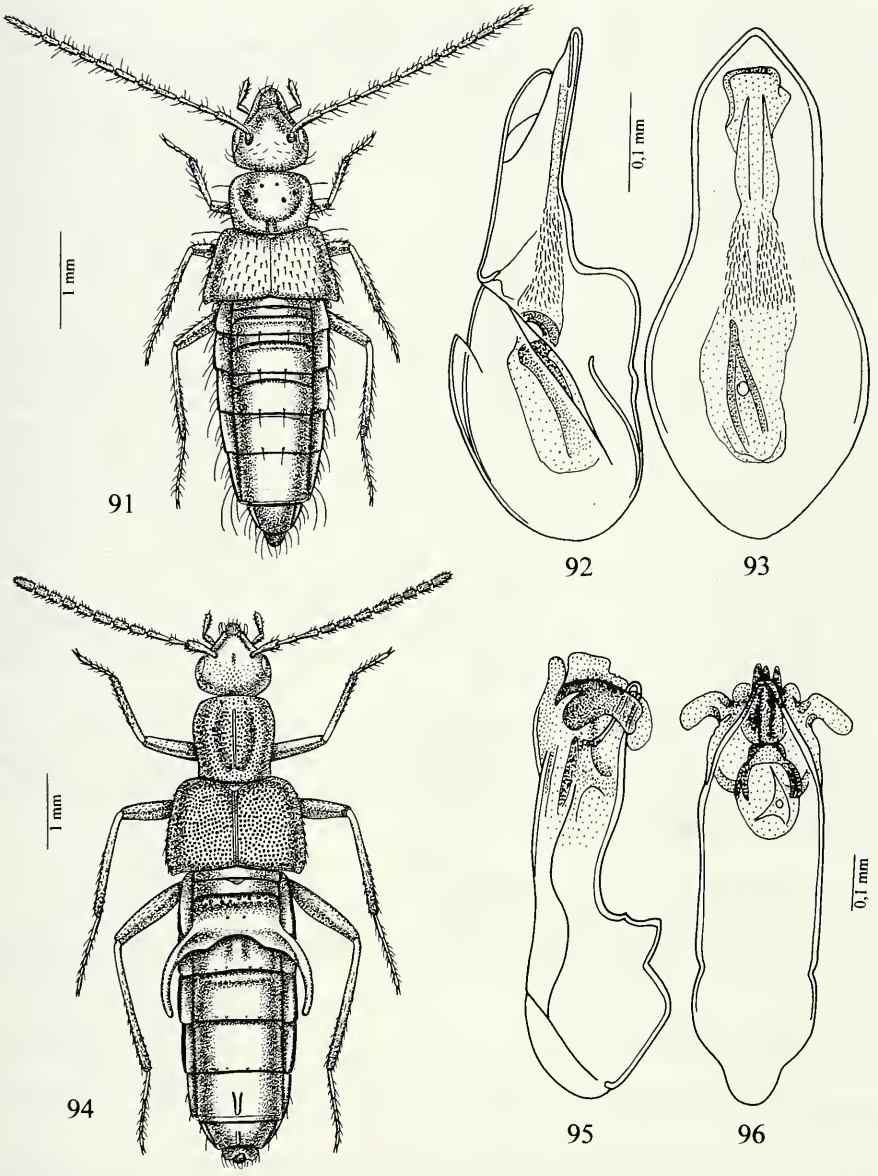
Habitus e spermateca. (87-88) *Zyras bajauanus* sp. n. (89) *Zyras compressicornis* Fauvel, paralectotypus femmina di Giava. (90) *Zyras ibanorum* Pace, del Borneo.

Zyras (Trigonozyras) horridus sp. n. Figg. 91-93

HOLOTYPUS: Maschio, Sabah, Crocker Ra., 1200 m, Km 63 r.te Kota Kinabalu-Tambunan, 19.V.1987, leg. D. Burckhardt & I. Löbl, (MHNG).

PARATYPI: 1 maschio, stessa provenienza; 1 femmina, Sabah, Crocker Ra., 1550-1650 m, 16.V.1987, leg. D. Burckhardt & I. Löbl.

DESCRIZIONE: Lunghezza 4,5 mm. Corpo lucido e giallo-rossiccio, con elitre rossicce; antenne rossicce con i tre antennomeri distali di colore giallo pallido; zampe



FIGG. 91-96
Habitus e edeago in visione laterale e ventrale. (91-93) *Zyras horridus* sp. n. (94-96) *Zyras longefurcatus* sp. n.

rossicce. Le antenne sono inserite dietro il margine anteriore degli occhi. La granulosità del capo è confinata solo sulle tempie. Il pronoto presenta alcuni distinti punti distribuiti come da Fig. 91, un solco laterale e una fossetta mediana posteriore. L'addome non presenta punteggiatura, tranne quattri punti al margine posteriore di

ciascun urotergo libero. Edeago Figg. 92-93, spermateca con parte mediana avvolta a matassa, con bulbo distale piriforme ben sviluppato e il prossimale lungo e stretto. Quest'organo è stato purtroppo da me perduto prima che fosse disegnato.

DERIVATIO NOMINIS: Il nome della nuova specie si riferisce alle lunghe setole laterali del corpo che suscitano orrore o sono sgradevoli alla vista.

Zyras (Glossacantha) longefurcatus sp. n. Figg. 94-96

Drusilla longefucata Pace, in litteris

HOLOTYPUS: Maschio, Borneo, Sabah, Mt. Kinabalu Nat. Pk., HQ Silau-Silau Tr., 1540 m, 14.VIII-1.IX.1988, leg. A. Smetana (MHNG).

DESCRIZIONE: Lunghezza 7,8 mm. Corpo lucido e bruno con addome giallo-bruno, tranne una fascia bruna agli uroterghi liberi quarto e quinto; antenne nero-brune con i tre antennomeri basali bruno-rossicci e nono, decimo e metà apicale dell'undicesimo giallo-rossicci; zampe giallo-rossicce. La reticolazione del corpo è distinta, quella dell'addome a maglie molto trasverse. La punteggiatura del capo è fitta solo sulla fascia longitudinale mediana, sul resto della superficie è rada, quella del pronoto e delle elitre è netta e fitta. Gli uroterghi liberi sono privi di punteggiatura o granulosità. La fronte è debolmente solcata. Un poro sensoriale si trova presso ciascun occhio, Fig. 94. Altri pori sensoriali si trovano sul pronoto che presenta un'ampia concavità mediana solcata longitudinalmente nel fondo. Il primo urotergo libero del maschio è prolungato in due stretti e lunghi lobi ricurvi; gli uroterghi liberi quinto e sesto hanno una carena mediana posteriore. Edeago Figg. 95-96.

NOTA: Il pronoto solcato avrebbe permesso l'attribuzione a *Drusilla*, ma la forma dell'edeago e soprattutto la sua parte dell'armatura genitale interna sporgente dall'orifizio apicale si ritrova in molte specie di *Zyras* del sottogenere *Glossacantha* Gemminger & Harold, 1868.

Zyras (Zyras) adulescens (Pace, 1986), **comb. n.**

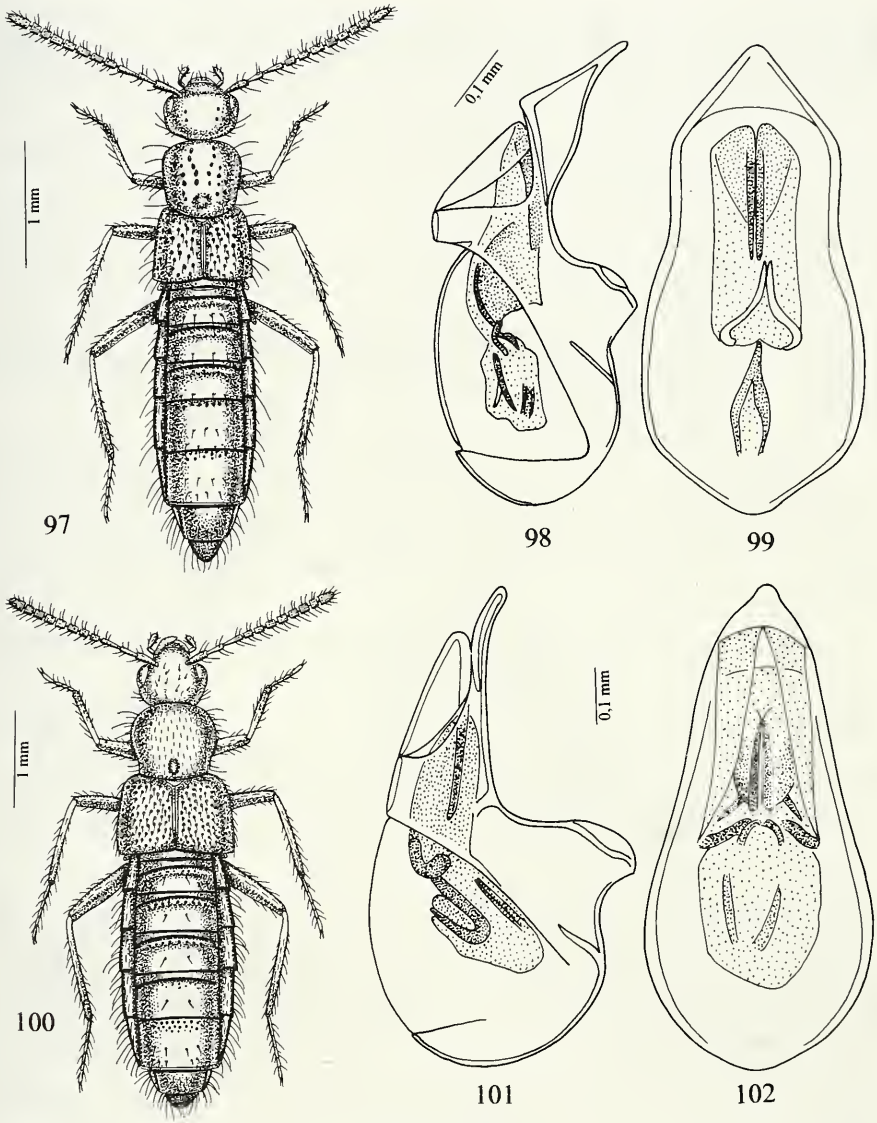
Drusilla adulescens Pace, 1986: 212.

MATERIALE: 2 es., Borneo, Sabah, Mt. Kinabalu Nat. Pk., above Poring Hot Springs, 520 m, 9.V.1987, leg. A. Smetana.

Zyras (Zyras) kinabaluensis sp. n. Figg. 97-99

HOLOTYPUS: Maschio, Sabah, Mt. Kinabalu, 1500 m, 21.V.1987, leg. D. Burckhardt & I. Löbl (MHNG).

DESCRIZIONE: Lunghezza 3,7 mm. Specie microttera, le ali metatoraciche in estensione sono lunghe quanto metà della lunghezza di un'elitra. Corpo lucido e bruno con pigidio rossiccio; antenne e zampe giallo-rossicce, femori posteriori debolmente oscurati sulla metà distale. La reticolazione del corpo è assente. Il capo è punteggiato solo ai lati sicché vi è una larga fascia longitudinale mediana senza punti. La punteggiatura del pronoto è distinta, ma manca sulla fascia longitudinale mediana e all'indietro. La punteggiatura delle elitre è profonda e forte, però diradata all'indietro. Il pronoto presenta una fovea mediana posteriore. Edeago Figg. 98-99.



FIGG. 97-102
Habitus e edeago in visione laterale e ventrale. (97-99) *Zyras kinabaluensis* sp. n. (100-102) *Zyras quadriterminalis* sp. n.

Zyras (Zyras) quadriterminalis sp. n. Figg. 100-102

HOLOTYPUS: Maschio, Borneo, Sabah, Mt. Kinabalu, Poring Hot Springs, 485 m, 29.VIII.1988, leg. A. Smetana (MHNG).

DESCRIZIONE: Lunghezza 7,8 mm. Corpo lucido e rossiccio con uroterghi liberi quarto e quinto bruni; antenne nero-brune con i due antennomeri basali rossicci e i quattro distali di colore giallo pallido; zampe rossicce. La reticolazione è assente su

tutto il corpo. La punteggiatura del capo è distinta, ma assente sulla fascia longitudinale mediana, quella del pronoto è superficiale e quella delle elitre è netta e profonda, ma assente presso il margine posteriore di ciascuna elitra. Il pronoto è sinuato davanti agli angoli posteriori. Edeago Figg. 101-102.

DERIVATIO NOMINIS: Il nome della nuova specie deriva dai quattro antennomeri distali o terminali di colore giallo pallido.

Zyras (Zyras) alboterminalis sp. n. Figg. 103-106

HOLOTYPUS: Maschio, Sabah, Kibongol V., 7 Km N Tambunan, 700 m, 20.V.1987, leg. D. Burckhardt & I. Löbl (MHNG).

PARATYPUS: 1 femmina, stessa provenienza; 1 maschio, Sabah, Poring Hot Springs, Langanan Falls, 900-950 m, 12.V.1987, leg. D. Burckhardt & I. Löbl. – 1 femmina, Sabah, Poring Hot Springs, 500 m, 11.V.1987, leg. D. Burckhardt & I. Löbl. – 1 maschio, Sabah, Mt. Kinabalu, Poring Hot Springs, 480 m, 10.V.1987, leg. A. Smetana.

DESCRIZIONE: Lunghezza 5,2 mm. Corpo lucido e bruno; antenne brune con i due antennomeri basali rossicci e l'undicesimo di colore giallo pallido; zampe gialle con metà distale dei femori bruna. La punteggiatura del capo e del pronoto è forte, ma assente sulla fascia longitudinale mediana, sul pronoto con alcuni punti isolati più forti distribuiti come da Fig. 103. La punteggiatura delle elitre è evidente. Edeago Figg. 104-105, spermateca Fig. 106.

DERIVATIO NOMINIS: Il nome della nuova specie deriva dall'antennomero terminale di colore giallo pallido, quasi bianco.

Zyras (Zyras) pervariolosus sp. n. Figg. 109-111

HOLOTYPUS: Maschio, Sabah, Mt. Kinabalu Nat. Pk., HQ at Liwagu Rv., 1500 m, 30.IV.1987, leg. A. Smetana (MHNG).

PARATYPI: 2 es. femmine, Sabah, E Mt. Kinabalu, 1150 m, rte. Ranau-Kota Kinabalu, 24.V.1987, leg. D. Burckhardt & I. Löbl.

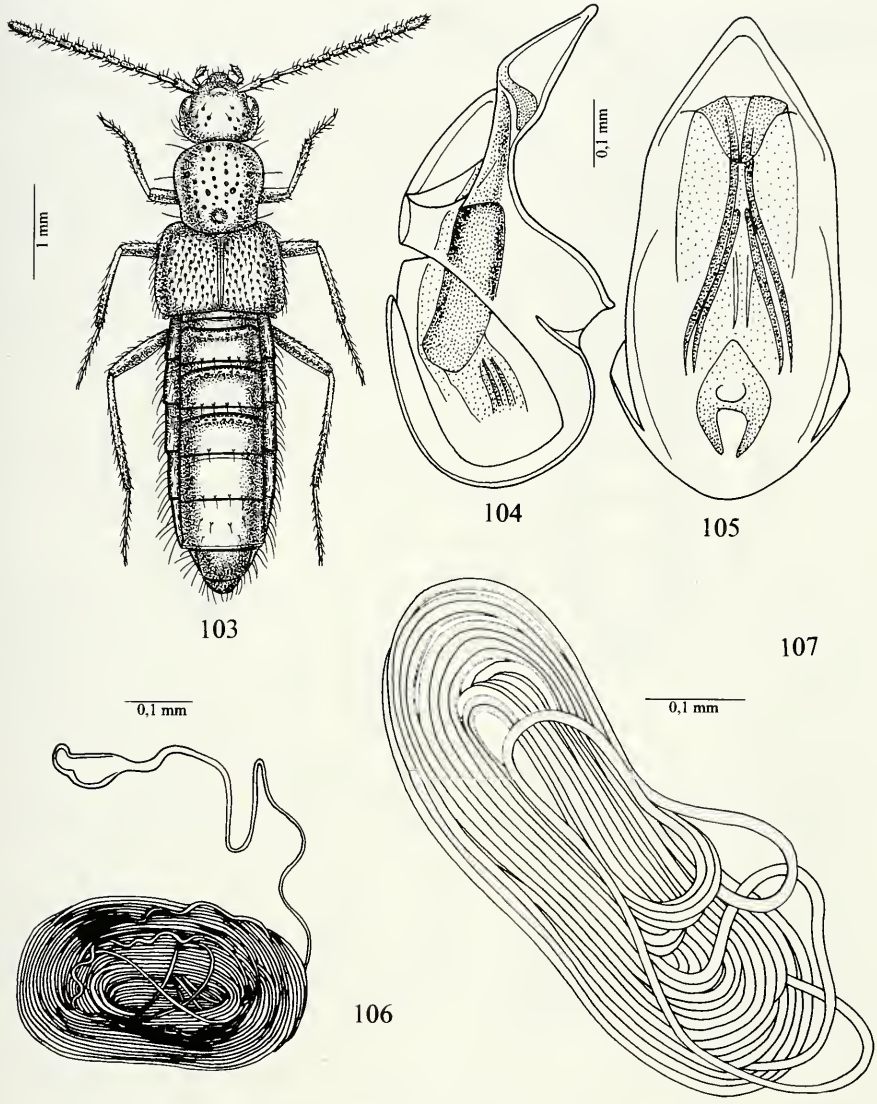
DESCRIZIONE: Lunghezza 5,8 mm. Corpo lucido e bruno con capo bruno-rossiccio e addome rossiccio; antenne rossicce con i tre antennomeri basali e i due terminali giallo-rossicci; zampe rossicce con tibie gialle. Il capo è coperto di punti enormi e profondi. Il pronoto presenta punteggiatura forte e confluente, tranne che sulla fascia longitudinale mediana che è saliente, delimitata posteriormente da una fossetta semicircolare., Le elitre sono coperte di forti granuli conici fitti, assenti presso il margine posteriore. Il corpo non presenta reticolazione. Tra le antenne vi è un solco trasverso. Edeago Figg. 110-111, spermateca avvolta a matassa non molto differente da quella di Fig. 106.

DERIVATIO NOMINIS: Il nome della nuova specie significa «molto variolato» a motivo della punteggiatura profondissima simile alla forma di pustole cicatrizzate del vaiolo.

Zyras (Zyras) pallipyga sp. n. Figg. 112-113

HOLOTYPUS: Femmina, Sabah, E Mt. Kinabalu, 1150 m, rte. Ranau-Kota Kinabalu, 24.V.1987, leg. D. Burckhardt & I. Löbl (MHNG).

DESCRIZIONE: Lunghezza 4 mm. Corpo lucido e rossiccio con metà posteriore delle elitre bruna e pigidio giallo-rossiccio; antenne brune con i due antennomeri basali

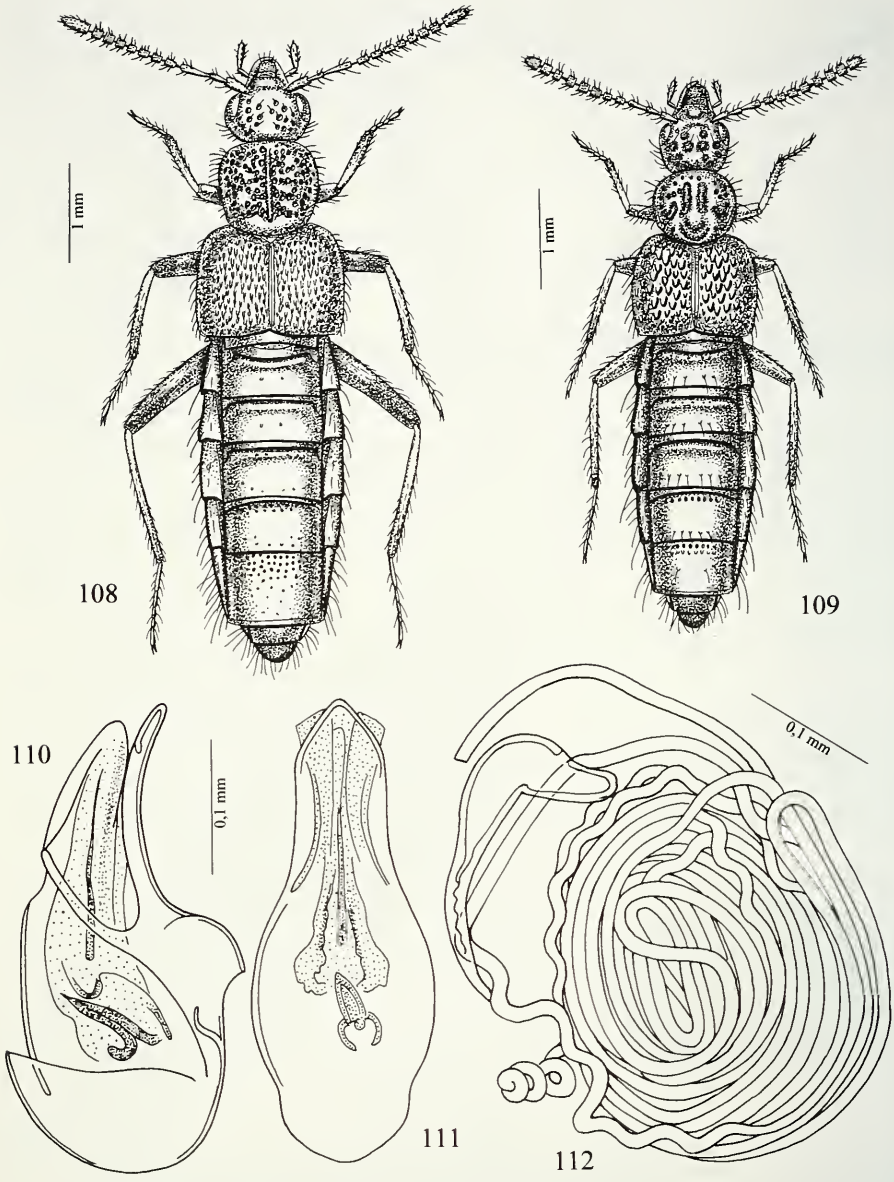


FIGG. 103-107

Habitus, edeago in visione laterale e ventrale e spermateca. (103-106) *Zyras alboterminalis* sp. n. (107) *Zyras montanus* (Cameron), holotypus femmina.

e l'undicesimo giallo-rossicci. La punteggiatura del capo è distinta, ma assente sulla fascia longitudinale mediana, quella del pronoto è raggruppata in fasce longitudinali ed è assente sulla fascia longitudinale mediana e quella delle elitre è fine e assente lungo il margine posteriore. Gli uroterghi liberi hanno la base punteggiata, tranne quella del quinto libero che è senza punteggiatura basale. Il pronoto presenta una fossetta mediana posteriore. Spermateca Fig. 112.

DERIVATIO NOMINIS: Il nome della nuova specie significa «pigidio pallido».



FIGG. 108-112

Habitus, edeago in visione laterale e ventrale e spermateca. (108) *Zyras montanus* (Cameron), holotypus femmina. (109-111) *Zyras pervariolosus* sp. n. (112) *Zyras pallipyga* sp. n.

Zyras (Zyras) daiaccorum sp. n. Figg. 114-115

HOLOTYPUS: Femmina, Borneo, Sabah, Mt. Kinabalu Nat. Pk., HQ Liwagu River, 1490 m, 10.VIII.1988, leg. A. Smetana (MHNG).

PARATYPI: 1 femmina, Borneo, Sabah, Mt. Kinabalu Nat. Pk., HQ Liwagu River, 1490 m, 5.VIII.1988, leg. A. Smetana. – 1 femmina, Sabah, Mt. Kinabalu, Liwagu River, 1490 m, 3.IX.1988, leg. A. Smetana. – 1 femmina, Sabah, Mt. Kinabalu, HQ Liwagu River, 1490 m, 8-16.V.1987, leg. A. Smetana

DESCRIZIONE: Lunghezza 5 mm. Corpo lucido e rossiccio con addome giallo-rossiccio; antenne brune con i due antennomeri basali e i tre terminali giallo-rossicci; zampe giallo-rossicce. La punteggiatura del capo è netta e assente sulla fascia longitudinale mediana, quella del pronoto è evidente e lascia libere tre aree longitudinali tra cui la fascia longitudinale mediana. Le elitre sono coperte di punteggiatura fine. La base degli uroterghi liberi è punteggiata tranne quella del primo urotergo libero basale. Il pronoto mostra una fovea mediana posteriore. Spermateca Fig. 115.

DERIVATIO NOMINIS: Il nome della nuova specie deriva da quello del gruppo etnico dei Daiacchi del Borneo.

Zyras (Zyras) paederinus sp. n. Figg. 116-118

HOLOTYPUS: Maschio, Sabah, Mt. Kinabalu, above Poring Hot Springs, 520 m, 9.V.1987, leg. A. Smetana (MHNG).

DESCRIZIONE: Lunghezza 3,8 mm. Corpo lucido e giallo-rossiccio con capo, elitre e uroterghi liberi quarto e quinto bruni; antenne (incomplete) brune con i due antennomeri basali e la base del terzo giallo-rossicci; zampe giallo-rossicce. La punteggiatura del capo è netta, ma assente sulla fascia longitudinale mediana, quella del pronoto e delle elitre è profondissima, fitta e uniformemente distribuita. Sono punteggiati alla base solo i tre uroterghi liberi basali. Il pronoto presenta una fovea mediana posteriore. Edeago Figg. 117-118.

DERIVATIO NOMINIS: Il nome della nuova specie deriva dal colore del corpo, simile nell'alternanza di colori a specie del genere *Paederus* Fabricius, 1775 (Staphylinidae).

Myrmedonota drugmandi Pace, 2000

Myrmedonota drugmandi Pace, 2000: 151.

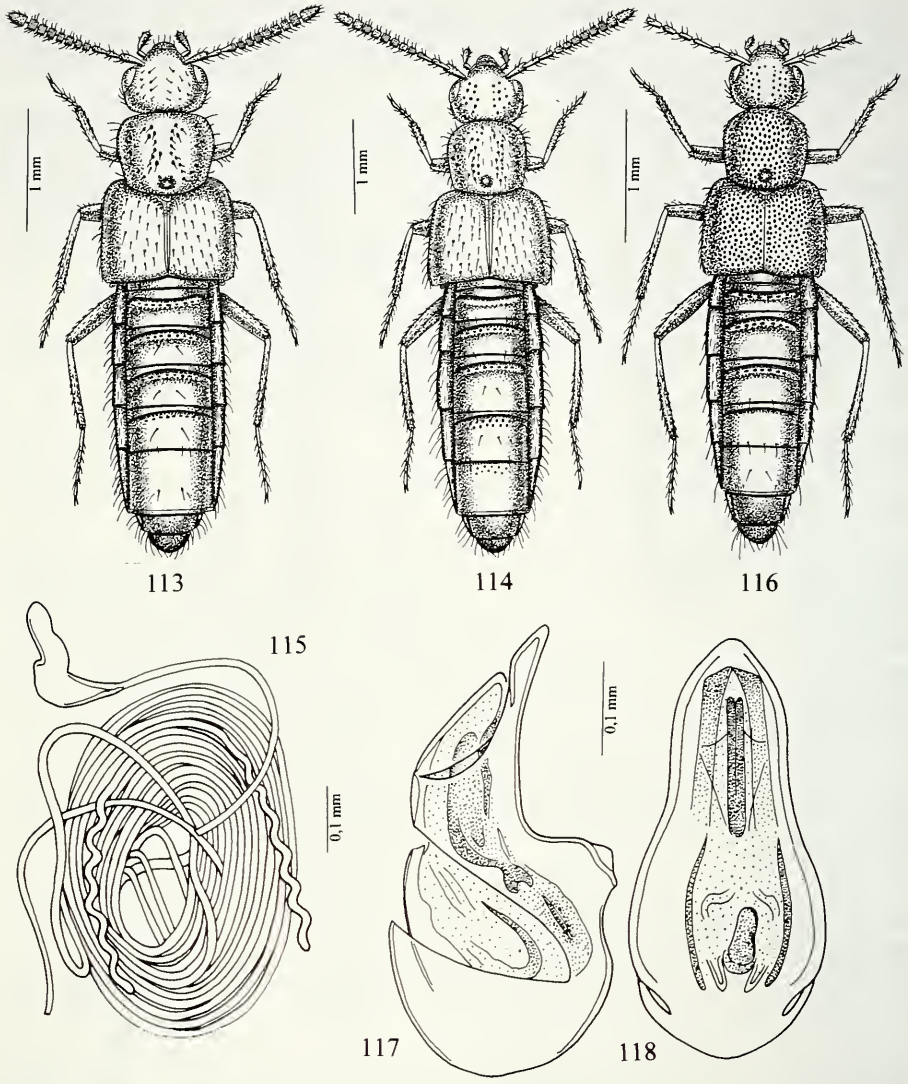
MATERIALE: 1 maschio e 1 femmina, Sabah, Poring Hot Springs, 500 m, 12.V.1987, leg. D. Burckhardt & I. Löbl.

Myrmedonota borneensis sp. n. Figg. 119-120

HOLOTYPUS: Femmina, Sabah, Poring Hot Springs, 500 m, 6.V.1987, leg. D. Burckhardt & I. Löbl (MHNG).

DESCRIZIONE: Lunghezza 3,8 mm. Corpo lucido e bruno-rossiccio; antenne brune con i tre antennomeri basali e la metà apicale dell'undicesimo rossicci; zampe giallo-rossicce. Sul corpo non esiste reticolazione. La punteggiatura del capo è evanescente. La granulosità del pronoto e delle elitre è superficiale. Gli uroterghi liberi presentano setole solo ai lati e lungo il margine posteriore. Spermateca Fig. 120.

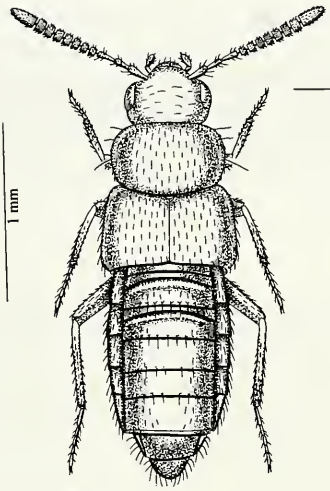
COMPARAZIONI: Questa nuova specie è la prima del genere *Myrmedonota* Cameron, 1920 nota del Borneo. Si distingue dall'affine e geograficamente vicina *M. celebensis* Pace, 1993, di Sulawesi, per avere le elitre più corte, il pronoto più



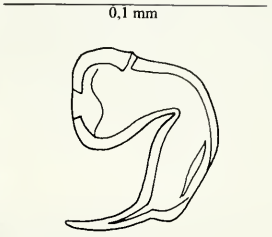
FIGG. 113-118

Habitus, spermateca e edeago in visione laterale e ventrale. (113) *Zyras pallipyga* sp. n. (114-115) *Zyras daiaccorum* sp. n. (116-118) *Z. paederinus* sp. n.

trasverso, poco più stretto delle elitre, per le elitre di differente colore e per la porzione intermedia della spermateca meno sviluppata. E' pure distinta da *M. drugmandi* Pace, 2000, di Papua-Nuova Guinea, per l'assenza di forti punti isolati sul pronoto e per la porzione prossimale della spermateca più stretta della massima larghezza del bulbo distale della stessa spermateca (larga quanto il bulbo distale in *drugmandi*).



119



120

FIGG.119-120
Habitus e spermateca. (119-120) *Myrmedonota borneensis* sp. n.

RINGRAZIAMENTI

Rivolgo i miei più cordiali ringraziamenti a coloro che mi hanno affidato in studio il materiale oggetto del presente studio: il Dr. Aleš Smetana di Ottawa, il Dr. Ivan Löbl, già del Museo di Storia Naturale di Ginevra, il Dr Lothar Zerche del DEI di Eberswalde (Berlino), il collega Guillaume De Rougemont di Londra e il Dr. Volker Assing di Hannover. Per il prestito di tipi ringrazio il Dr. A.F. Newton del *Field Museum of Natural History* di Chicago e il Dr. P.M. Hammond e il Dr. Brendell del Museo di Storia Naturale di Londra.

RÉSUMÉ

Les genres et espèces de la tribu Lomechusini de Bornéo (Coleoptera, Staphylinidae). - Cette étude sur la tribu Lomechusini de Bornéo contient l'illustration et la révision des six holotypes ou lectotypes de Bornéo suivants: *Drusilla carinithorax* (Bernhauer), *Drusilla aerea* (Cameron), *Drusilla monticola* (Cameron), *Drusilla borneensis* (Bernhauer), *Drusilla montanella* (Bernhauer), *Zyras montanus* (Bernhauer). Le lectotype de *Drusilla aerea* (Cameron) est désigné. *Amaurodera montanella* Bernhauer est transférée à *Drusilla* et *Drusilla montana* (Bernhauer) à *Zyras*. Les 34 espèces suivantes sont décrites comme nouvelles: quatre du genre *Chaetosogonocephus* (*borneensis* sp. n., *notaticornis* sp. n., *burckhardti* sp. n., *kinabaluensis* sp. n.), cinq du genre *Amaurodera* (*amabilis* sp. n., *incisa* sp. n., *bulbosa* sp. n., *frondium* sp. n., *discoidea* sp. n.), quatorze du genre *Drusilla* (*bruneiorum* sp. n., *necaerea* sp. n., *terrestris* sp. n., *fossulicollis* sp. n., *sculpticollis* sp. n., *bruneiensis* sp. n., *fontis* sp. n., *bicarinicollis* sp. n., *caelaticollis* sp. n., *neocoenonicacollis* sp. n., *rufocaelata* sp. n., *spissatheca* sp. n., *semimonticola* sp. n., *foeda* sp. n.), dix du genre *Zyras* (*bajauanus* sp. n., *horridus* sp. n., *longefurcatus* sp. n., *kinabaluensis* sp. n., *quadriterminalis* sp. n., *albo-*

terminalis sp. n., *pervariolosus* sp. n., *pallipyga* sp. n., *daiaccorum* sp. n., *paederinus* sp. n.) et une du genre *Myrmedonota* (*borneensis* sp. n.). Les genres *Chaetosogonocephus* et *Myrmedonota* sont nouveaux pour Bornéo. Les habitus et les organes génitaux masculins et féminins des nouvelles espèces sont illustrés. Des clefs des espèces de Bornéo des genres *Chaetosogonocephus*, *Amaurodera, Drusilla* et *Zyras* sont fournies. Le genre de Lomechusini *Orphnebius* Motschulscky a été traité dans un précédent travail.

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Le specie di Thamiaraeini, Oxypodini, Hoplandriini e Aleocharini del Borneo (Coleoptera, Staphylinidae)*

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The species of Thamiaraeini, Oxypodini, Hoplandriini and Aleocharini from Borneo (Coleoptera, Staphylinidae). - Twenty-four new species of the subfamily Aleocharinae collected in the Mt Kinabalu National Park, Borneo, are described and illustrated. The followings genera are reported for the first time from Borneo: *Mimacrotona* Cameron and *Franzidota* Pace of the Thamiaraeini, *Apimela* Mulsant and Rey, *Amarochara* Thomson, *Calodera* Mannerheim and *Ischyrocolpura* Pace of the Oxypodini, *Tinotus* Solier of the Hoplandriini, *Tetrasticta* Kraatz of the Aleocharini. Eight new species belong to the genus *Mimacrotona* (*M. opacissima* sp. n., *M. kinabaluensis* sp. n., *M. monotorta* sp. n., *M. burckhardti* sp. n., *M. quinquetorta* sp. n., *M. obscura* sp. n., *M. laticollis* sp. n., *M. terminicornis* sp. n.), two to the genus *Franzidota* Pace (*F. borneensis* sp. n., *F. pallescens* sp. n.), seven to the genus *Apimela* (*A. curticornis* sp. n., *A. major* sp. n., *A. borneensis* sp. n., *A. lambirensis* sp.n., *A. arcuata* sp. n., *A. plicata* sp. n., *A. kinabaluicola* sp. n.), one to the genus *Amarochara* (*A. borneensis* sp. n.), two to the genus *Calodera* (*C. cultellifera* sp. n., *C. borneensis* sp. n.), one to the genus *Ischyrocolpura* (*I. borneensis* sp. n.), one to the genus *Tinotus* (*T. caelatimas* sp. n.), one to the genus *Tetrasticta* (*T. kinabaluensis* sp. n.) and one to the genus *Aleochara* (*A. scapularis* sp. n.). The new genus *Episkacrotona* is proposed. The genus *Cratoacrochara* Pace is synonymised with *Aleochara* Gravenhorst. The species *Cratoacrochara rougemonti* Pace, is transferred to the genus *Aleochara* Grav. A key to all species known from Borneo of the genera *Mimacrotona, Franzidota, Apimela* and *Calodera* is provided.

Key-words: Coleoptera - Staphylinidae - Aleocharinae - taxonomy - Borneo.

INTRODUZIONE

Il presente lavoro ha lo scopo di esporre il risultato dell'esame degli Staphylinidae della sottofamiglia Aleocharinae raccolti nel Parco Nazionale del Monte Kinabalu e altrove nel Borneo, dal Dr. Aleš Smetana di Ottawa, dal Dr. Burckhardt e dal Dr. Ivan Löbl del Museo di Storia Naturale di Ginevra e dal Prof. Herbert Franz. Le 28 specie qui riconosciute appartengono alle tribù dei Thamiaraeini, Oxypodini,

* 213° Contributo alla conoscenza delle Aleocharinae.
Manoscritto accettato il 05.12.2007

Hoplandriini e Aleocharini. I generi e le specie di queste tribù nel Borneo sono assai poco noti. Hammond (1984) nella sua checklist sugli Staphylinidae del Borneo non elenca i seguenti generi, nel presente lavoro rappresentati da una o più specie: *Mimacrotona* Cameron, 1920, *Franzidota* Pace,1982 *Apimela* Mulsant & Rey, 1874, *Amarochara Thomson,* 1858, *Calodera* Mannerheim, 1831, *Ischyrocolpura* Pace, 1990, *Tetrasticta* Kraatz, 1857 e *Tinotus* Sharp, 1883.

MATERIALE E METODO

L'esame è basato sugli esemplari adulti raccolti prevalentemente nel Parco Nazionale del Monte Kinabalu dal Dr. Aleš Smetana di Ottawa durante le sue spedizioni nel 1987 e 1988, dalla spedizione Burckhardt & Löbl del Museo di Storia Naturale di Ginevra del 1987, dal materiale del museo zoologico dell'Università Humboldt di Berlino e dal materiale raccolto dal Prof. H. Franz (senza anno).

La tassonomia delle nuove specie del Borneo presenta serie difficoltà, in molti casi superate grazie all'esame dei caratteri dell'organo copulatore maschile, dei segmenti genitali maschili e femminili e della spermateca. Prima della pubblicazione del presente lavoro nessun esame a fini tassonomici di questi importanti organi e strutture è stato compiuto dagli autori del lontano passato. L'etimologia delle nuove specie è omessa quando evidente come *borneensis* o *kinabaluensis*.

Quasi tutti gli esemplari sono stati dissezionati per le serie di pochi individui. Le strutture genitali sono state montate in balsamo del Canadà su piccoli rettangoli trasparenti di materiale plastico, infilzati sullo spillo dell'esemplare. Le strutture genitali sono state studiate usando un microscopio composto e disegnate mediante oculare a reticolo. Gli habitus sono stati disegnati con l'uso di un oculare micrometrico di un microscopio binoculare. Tutti i disegni sono dell'autore fino alla fase finale. Il sicuro riconoscimento dei generi e delle specie è qui affidato soprattutto alla parte illustrativa che ha linguaggio internazionale. Per questo motivo le descrizioni sono brevi, limitate a porre in evidenza ciò che non è riproducibile graficamente come il colore, la reticolazione e la granulosità. D'altronde per le specie della sottofamiglia Aleocharinae la sola descrizione anche molto accurata e lunga non dà quasi mai la certezza di un'esatta identificazione delle varie specie. È l'osservazione del disegno dell'edeago e/o della spermateca insieme a quello dell'habitus che aiuta molto a risolvere problemi interpretativi dati dalla sola descrizione.

Gli holotypi delle nuove specie sono depositati nel Museo di Storia Naturale di Ginevra (MHNG), nel Museo zoologico dell'Università Humboldt di Berlino (MZB) e in collezione Franz al Naturhistorisches Museum di Vienna (Austria) (NHMW). Paratypi sono conservati in collezione Smetana e nell'Institut Royal des Sciences Naturelles de Belgique di Bruxelles.

THAMIARAEINI

Thamiaraea scapularis (Fairmaire, 1849)

Placusa scapularis Fairmaire, 1849: 288.
Thamiaraea insigniventris Fauvel, 1878: 299; Pace, 2004: 319.

Materiale: 1 es., Borneo, Sabah, Mt. Kinabalu N.P., summit trail Pondok-Ubah, 2050 m, 26.IV.1987, leg. A. Smetana. – 15 es., Sabah, Mt. Kinabalu, Poring Hot Springs, 480 m,

10.V.1987, leg. A. Smetana. – 1 es., Sabah, Mt. Kinabalu, Poring Hot Springs, 480 m, 15.V.1987, leg. A. Smetana. – 3 femmine, Sabah, Mt. Kinabalu Nat. Pk, HQ at Liwagu Rv., 1500 m, 17.V.1987, leg. A. Smetana. – 1 es., Borneo, Sabah, Mt Kinabalu Nat. Pk., HQ at Liwagu Riv., 1500m, 21.V.1987, leg. A. Smetana.

DISTRIBUZIONE: Sri Lanka, Hong Kong, Sulawesi, Singapore, Nuova Guinea, Filippine, Sabah, Nuova Caledonia, Nuove Ebridi e Tahiti. Già nota del Borneo (Scheerpeltz, 1934, come *insigniventris*).

Mimoxypoda borneensis Pace, 1986

Mimoxypoda borneensis Pace, 1986: 202.

MATERIALE: 1 maschio, Sabah, Crocker Ra., 1200 m, Km 63 r.te Kota Kinabalu-Tambunan, 19.V.1987, leg. D. Burckhardt & I. Löbl.

DISTRIBUZIONE: Specie finora nota solo di Pangi, Sabah.

CHIAVE DELLE SPECIE DEI GENERI *MIMACROTONA* CAMERON, 1920 ED *EPISKACROTONA* GEN. N. NEL BORNEO

1 Capo e pronoto molto opachi; ligula con lembi apicali assai sviluppati, Fig. 5; edeago Figg. 2-3, spermateca Fig. 4. Lunghezza 1,7 mm ..... *Episkacrotona* gen. n. *opacissima* sp. n.

\- Capo e pronoto lucidi; ligula con lembi apicali corti, Fig. 22. *Mimacrotona* . . 2

2 Corpo prevalentemente giallo-rossiccio 3

\- Corpo prevalentemente bruno 6

3 Corpo interamente giallo-rossiccio; antenne giallo-rossicce, undicesimo antennomero compreso; spermateca Fig. 7. Lunghezza 1,8 mm ..... *M. kinabaluensis* sp. n.

\- Corpo bicolore giallo-rossiccio con porzioni ridotte di bruno o bruno-rossiccio 4

4 Capo bruno-rossiccio, porzione restante del corpo giallo-rossiccia; edeago Figg. 9-10. Lunghezza 1,7 mm ..... *M. monotorta* sp. n.

\- Capo giallo-rossiccio come il pronoto e l'addome, elitre bicolori giallo-rossicce e brune 5

5 Scultura squamiforme estesa sui quattro uroterghi liberi basali; sutura delle elitre lunga quanto il pronoto; flagello dell'armatura genitale interna dell'edeago corta, Fig. 12. Lunghezza 1,7 mm . . . *M. burckhardti* sp. n.

\- Scultura squamiforme estesa sui tre uroterghi liberi; sutura delle elitre più corta del pronoto; flagello dell'armatura genitale interna dell'edeago lunghissimo, alla base avvolto a matassa in cinque spire, Figg. 15-16. Lunghezza 1,4 mm ..... *M. quinquetorta* sp. n.

6 Undicesimo antennomero giallo-rossiccio; addome bruno con base e pigidio rossicci; spermateca strettamente ricurva alle porzioni distale e prossimale, Fig. 19. Lunghezza 1,5 mm ..... *M. obscura* sp. n.

\- Undicesimo antennomero giallo e corpo uniformemente bruno; spermateca largamente ricurva alle porzioni distale e prossimale, Fig. 24 7

7 Pronoto più largo delle elitre; porzione prossimale della spermateca assai ridotta, Fig. 21. Lunghezza 1,8 mm ..... *M. laticollis* sp. n.

\- Pronoto più stretto delle elitre; porzione prossimale della spermateca sviluppata, Fig. 24. Lunghezza 1,7 mm ..... *M. terminicornis* sp. n.

KEY TO SPECIES OF THE GENERA *MIMACROTONA* CAMERON, 1920 AND *EPISKACROTONA* GEN. N. OF BORNEO

1 Head and pronotum very opaque; ligula with very developed apical lobes, Fig. 5; aedeagus Figs 2-3, spermatheca Fig. 4. Length 1.7 mm ..... *Episkacrotona* gen. n. *opacissima* sp. n.
- Head and pronotum shiny; ligula with short apical lobes, Fig. 22. *Mimacrotona* 2
2 Body predominantly yellow-reddish 3
- Body predominantly brown 6
3 Body entirely yellow-reddish; antennae yellow-reddish, inclusive eleventh antennomere; spermatheca Fig. 7. Length 1.8 mm ..... *M. kinabaluensis* sp. n.
- Body bicoloured yellow-reddish with reduced portions of brown or brown-reddish 4
4 Head brown-reddish, remainder of the portion of the body yellow-reddish; aedeagus Figs 9-10. Length 1.7 mm ..... *M. monotorta* sp. n.
- Head as yellow-reddish as the pronotum and the abdomen, bicoloured elytra yellow-reddish and brown 5
5 Squamous sculpture present on four basal free urotergites; suture of the elytra as long as the pronotum; flagellum of the inside genital armour of the aedeagus short, Fig. 12. Length 1.7 mm ..... *M. burckhardti* sp. n.
- Squamous sculpture present on three free urotergites; suture of the elytra shortest than pronotum; flagellum of the inside genital armour of the aedeagus long, to the base wound to skein in five coils, Figs 15-16. Length 1.4 mm ..... *M. quinquetorta* sp. n.
6 Eleventh antennomere yellow-reddish; abdomen brown with base and pigidium reddish; spermatheca tightly narrow to the distal and proximal portions, Fig. 19. Length 1.5 mm ..... *M. obscura* sp. n.
- Eleventh antennomere yellow and body uniformly brown; spermatheca largely curved to the distal and proximal portions, Fig. 24 7
7 Pronotum wider than the elytra; proximal portion of the spermatheca very reduced, Fig. 21. Length 1.8 mm ..... *M. laticollis* sp. n.
- Pronotum narrower than the elytra; proximal portion of the spermatheca developed, Fig. 24. Length 1.7 mm ..... *M. terminicornis* sp. n.

Giustificazione della proposta del nuovo genere

Vedere i caratteri distintivi dati al punto uno e successivo della chiave immediatamente precedente.

Tipo del genere *Episkacrotona: Episkacrotona opacissima* sp. n.

Derivatio nominis: Il nome femminile del nuovo genere significa «*Acrotona* opaca».

Nota: Il genere *Mimacrotona* Cameron, 1920, è nuovo per il Borneo.

Episkacrotona opacissima sp. n. Figg. 1-5

HOLOTYPUS: Maschio, Sabah, Crocker Ra., 1200 m, Km 63 r.te Kota Kinabalu-Tambunan, 19.V.1987, leg. D. Burckhardt & I. Löbl, (MHNG).

PARATYPI: 18 es., stessa provenienza; 1 femmina, Sabah, Poring Hot Springs, 500 m, 7.V.1987, leg. Burckhardt & Löbl. – 1 femmina, 6 es., Sabah, Poring Hot Springs, 550-600 m, 9.V.1987, leg. D. Burckhardt & I. Löbl.

DESCRIZIONE: Lunghezza 1,7 mm. Capo e pronoto molto opachi, resto del corpo lucido. Corpo bruno con pigidio rossiccio; antenne brune con i due antennomeri basali e il decimo e l'undicesimo gialli; zampe gialle. Il quarto antennomero è lungo quanto largo, i successivi fino al decimo sono fortemente trasversi. Gli occhi sono più lunghi delle tempie che non sono solcate. Il capo, il pronoto e le elitre sono coperti di punteggiatura fittissima. Le elitre sono più corte del pronoto. Il processo mesosternale è acuto e le mesocoxe sono contigue. Edeago Figg. 2-3, spermateca Fig. 4, labio con palpo labiale Fig 5.

DERIVATIO NOMINIS: La nuova specie deriva il suo nome dall'opacità del capo e pronoto.

Mimacrotona kinabaluensis sp. n. Figg. 6-7

HOLOTYPUS: Femmina, Borneo, Sabah, Mt. Kinabalu Nat. Pk, HQ 1500 m, int. trap, 8-16.V.1987, leg. A. Smetana(MHNG).

DESCRIZIONE.: Lunghezza 1,8 mm. Corpo lucido e giallo-rossiccio; antenne giallo-rossicce con i due antennomeri basali gialli; zampe gialle. La reticolazione del capo è superficiale, quella del pronoto e delle elitre è evidente. La granulosità del capo e del pronoto è poco evidente, quella delle elitre è ben visibile. I tre uroterghi liberi basali sono coperti di netta scultura squamiforme, sul quarto è poco evidente e sul quinto assente. Spermateca Fig. 7.

Mimacrotona monotorta sp. n. Figg. 8-10

HOLOTYPUS: Maschio, Sabah, Mt. Kinabalu, 1750 m, 21.V.1987, leg. D. Burckhardt & I. Löbl (MHNG).

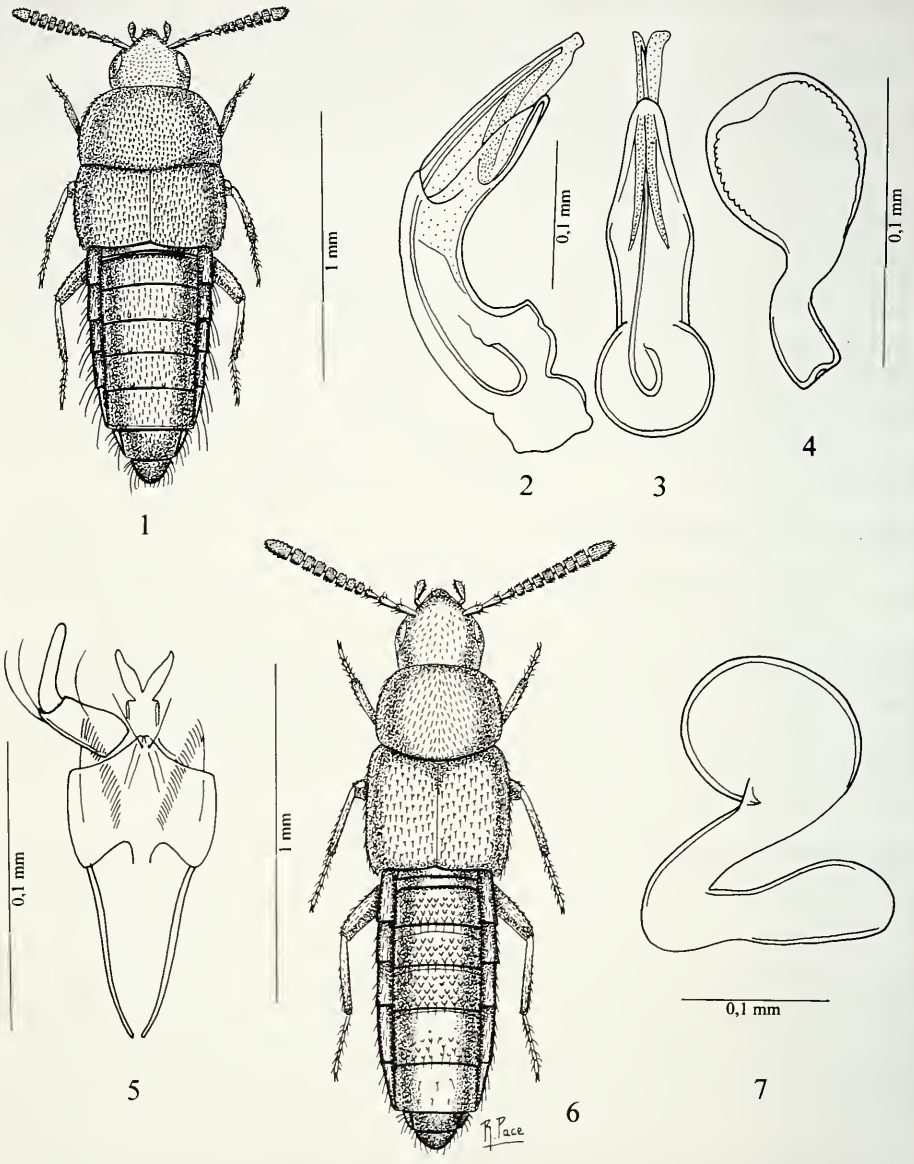
DESCRIZIONE: Lunghezza 1,7 mm. Corpo lucido e giallo-rossiccio con capo bruno-rossiccio; antenne bruno-rossicce con i due antennomeri basali e l'undicesimo gialli; zampe gialle. Sul corpo non si nota reticolazione. La punteggiatura del capo è fitta e profonda. La granulosità del pronoto e delle elitre è grossolana, fitta e saliente. I quattro uroterghi liberi basali sono coperti di una scultura squamiforme regolare. La base del pronoto è bisinuata a metà. Edeago Figg. 9-10.

DERIVATIO NOMINIS: Il nome della nuova specie significa «Avvolta una sola volte» a motivo della presenza nel bulbo basale dell'edeago di una sola spira del flagello interno.

Mimacrotona burckhardti sp. n. Figg. 11-13

HOLOTYPUS: Maschio, Sabah, Crocker Ra., 1270 m, Km 60 rte. Kota Kinabalu-Tambunan, 17.V.1987, leg. D. Burckhardt & I. Löbl (MHNG).

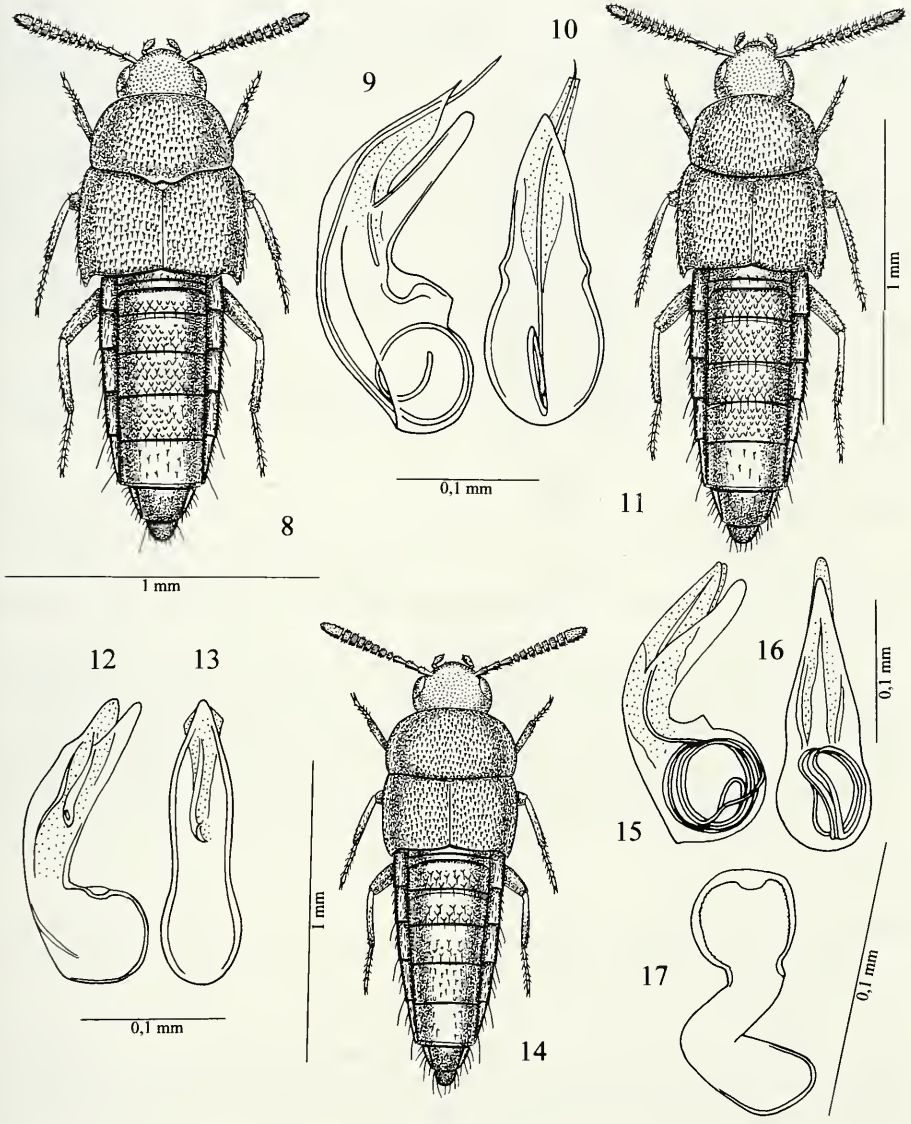
DESCRIZIONE: Lunghezza 1,7 mm. Corpo lucido e giallo-rossiccio con metà posteriore delle elitre bruna; antenne giallo-rossicce con i tre antennomeri basali e metà



FIGG. 1-7

Habitus, edeago in visione laterale e ventrale, spermateca e labio con palpo labiale. (1-5) *Episkacrotona opacissima* gen. n., sp. n. (6-7) *Mimacrotona kinabaluensis* sp. n.

apicale dell'undicesimo gialli; zampe giallo-rossicce. Sul corpo la reticolazione è assente. La granulosità del capo è fitta e superficiale, quella del pronoto e delle elitre è saliente. I quattro uroterghi liberi basali sono coperti di una scultura squamiforme evidente. Edeago Figg. 12-13.



FIGG. 8-17

Habitus, edeago in visione laterale e ventrale e spermateca. (8-10) *Mimacrotona monotorta* sp. n. (11-13) *Mimacrotona burckhardti* sp. n. (14-17) *Mimacrotona quinquetorta* sp. n.

DERIVATIO NOMINIS: La nuova specie è dedicata a uno dei suoi raccoglitori, il Dr. Burckhardt, già del Museo di Storia naturale di Ginevra.

Mimacrotona quinquetorta sp. n. Figg. 14-17

HOLOTYPUS: Maschio, Sabah, Mt. Kinabalu N.P., above Poring Hot Springs, 520 m, 9.V.1987, leg. A. Smetana (MHNG).

PARATYPI: 1 femmina, stessa provenienza. – 1 maschio, Borneo, Sabah, Mt. Kinabalu N.P., Poring Hot Springs, 500 m, 13.V.1987, leg. D. Burckhardt & I. Löbl. – 3 maschi e 1 femmina, Borneo, Sabah, Mt. Kinabalu N.P., Poring Hot Springs, 550-600 m, 9.V.1987, leg. D. Burckhardt & I. Löbl. – 1 femmina, Borneo, Sabah, Mt Kinabalu Nat. Pk., poring Hot Springs, 480 m, 8.V.1987, leg. A. Smetana.

DESCRIZIONE: Lunghezza 1,4 mm. Corpo lucido e giallo-rossiccio, con elitre brune, tranne la base giallo-rossiccia; antenne giallo-brune con i due antennomeri basali, la base del terzo e l'undicesimo gialli; zampe gialle. La reticolazione del capo è assente, quella del pronoto è superficiale e quella delle elitre è ben visibile. La punteggiatura del capo è fitta ed evidente. La granulosità del pronoto e delle elitre è netta. I tre uroterghi liberi sono coperti di scultura squamiforme superficiale. Edeago Figg. 15-16, spermateca Fig. 17.

DERIVATIO NOMINIS: Il nome della nuova specie significa «Avvolta cinque volte» a motivo della presenza nel bulbo basale dell'edeago di cinque spire del flagello interno.

Mimacrotona obscura sp. n. Figg. 18-19

HOLOTYPUS: Femmina, Sabah, Mt. Kinabalu, 1750 m, 21.IV.1987, leg. D. Burckhardt & I. Löbl (MHNG).

PARATYPUS: 1 femmina, Sabah, Poring Hot Springs, 500 m, 6.V.1987, leg. D. Burckhardt & I. Löbl.

DESCRIZIONE: Lunghezza 1,5 mm. Corpo lucido e bruno con base dell'addome e pigidio rossicci; antenne brune con i tre antennomeri basali e apice dell'undicesimo giallo-rossicci; zampe gialle. La reticolazione del corpo è assente. La granulosità del capo è superficiale, quella del pronoto e delle elitre è evidente. Sulla metà basale degli uroterghi liberi primo a quarto si trova una scultura squamiforme. Spermateca Fig. 19.

DERIVATIO NOMINIS: Il nome della nuova specie deriva dal colore oscuro del corpo.

Mimacrotona laticollis sp. n. Figg. 20-21

HOLOTYPUS: femmina, Sabah, E Mt. Kinabalu, 1150 m, rte. Ranau-Kota Kinabalu, 24.V.1987, leg. D. Burckhardt & I. Löbl (MHNG).

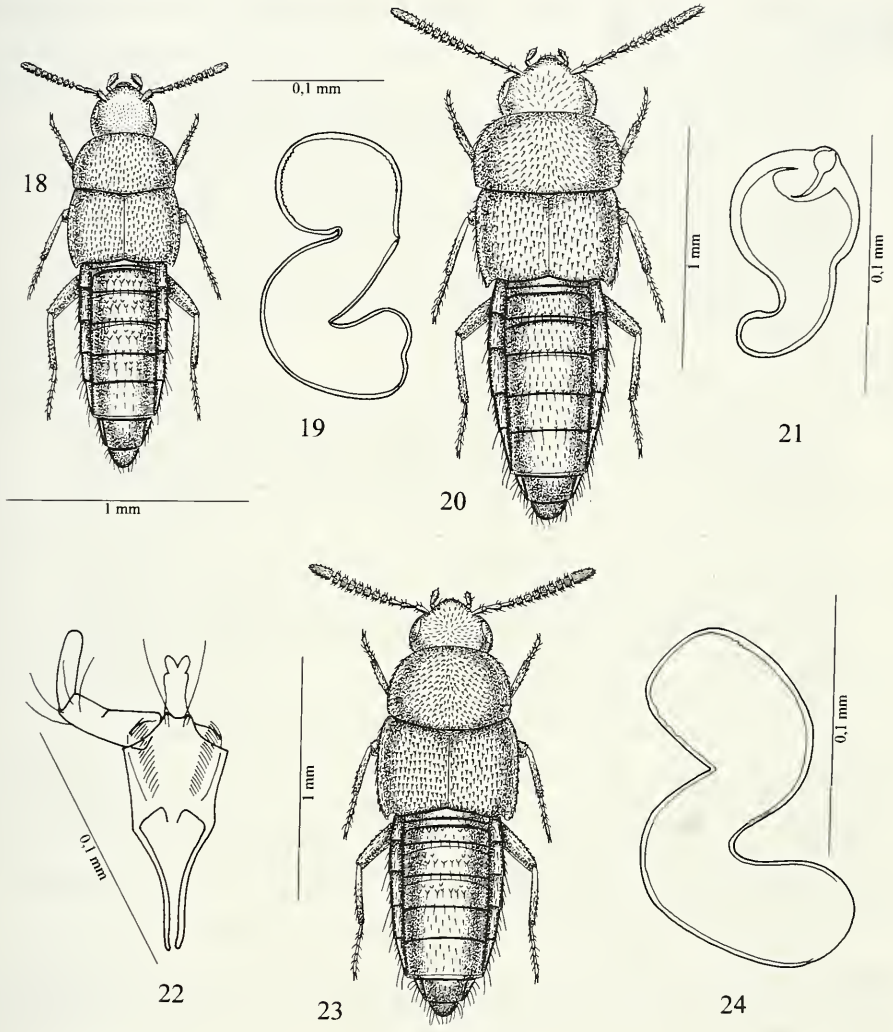
DESCRIZIONE: Lunghezza 1,8 mm. Corpo lucido e bruno; antenne bruno-rossicce con antennomero basale e l'undicesimo gialli; zampe gialle. La reticolazione del corpo è assente. La granulosità del capo è fine, quella del pronoto è evidente e quella delle elitre è saliente. Scultura squamiforme dell'addome assente. L'undicesimo antennomero è lungo quanto i quattro antennomeri precedenti riuniti. Il pronoto è lievemente più largo delle elitre. Spermateca Fig. 21, labio con palpo labiale Fig. 22.

DERIVATIO NOMINIS: Il nome della nuova specie significa «Pronoto largo».

Mimacrotona terminicornis sp. n. Figg. 23-24

HOLOTYPUS: femmina, Borneo, Sabah, Mt. Kinabalu Nat.Pk., HQ at Liwagu River, 1490 m, 18.V.1987, leg. A. Smetana (MHNG).

PARATYPUS: 1 femmina, Sabah, Poring Hot Springs, Langanan Falls, 900-950 m, 12.V.1987, leg. D. Burckhardt & I. Löbl.



FIGG. 18-24

Habitus, spermateca e labio con palpo labiale. (18-19) *Mimacrotona (Mimacrotona) obscura* sp. n. (20-22) *Mimacrotona laticollis* sp. n. (23-24) *Mimacrotona terminicornis* sp. n.

DESCRIZIONE: Lunghezza 1,7 mm. Corpo lucido e bruno; antenne brune con l'antennomero basale, il nono e il decimo giallo-rossicci, l'undicesimo giallo; zampe giallo-brune. La reticolazione del pronoto è superficiale, quella delle elitre è evidente e quella dell'addome è molto trasversa e molto superficiale. La granulosità del capo è talmente fitta da rendere la superficie opaca. La granulosità del pronoto è fitta ed evidente, quella delle elitre è saliente. La scultura squamiforme copre la metà basale dei tre uroterghi liberi basali. Spermateca Fig. 24.

DERIVATIO NOMINIS: Il nome della nuova specie significa «Terminale d'antenna». L'undicesimo antennomero, infatti, ha colore differente dal resto dell'antenna.

CHIAVE DELLE SPECIE DEL GENERE *FRANZIDOTA* PACE, 1982, NEL BORNEO

1 Elitre molto lunghe, specie alata, atta al volo; addome giallo-rossiccio con uroterghi liberi terzo, quarto e quinto giallo-bruni; bulbo prossimale della spermateca stretto e lungo, Fig. 28. Lunghezza 1,2 mm . . . . . *F. borneensis* sp. n.

- Elitre corte, specie microptera, non atta al volo, ciascuna ala distesa è lunga come la metà della lunghezza di un'elitra; addome giallo con quarto urotergo libero giallo-bruno; bulbo prossimale della spermateca assai dilatato, a forma di palloncino, Fig. 30. Lunghezza ipotetica (mancano il capo e il pronoto) 1,2 mm . . . . . *F. pallescens* sp. n.

KEY TO SPECIES OF THE GENUS *FRANZIDOTA* PACE, 1982, OF BORNEO

1 Elytra very long, species winged, fit to the flight; abdomen yellow-reddish with free urotergites third, fourth and fifth yellow-brown; proximal bulb of the spermateca narrow and long, Fig. 28. Length 1.2 mm . . . . . *F. borneensis* sp. n.

- Elytra short, micropterous species, not fit to the flight, every extended wing is as long as halves the length of an elytra; abdomen yellow with fourth free urotergum yellow-brown; proximal bulb of the spermateca very dilated, to form of toy balloon, Fig. 30. Hypothetical length (missing head and pronotum) 1.2 mm . . . . . *F. pallescens* sp. n.

NOTA: Il genere *Franzidota* Pace, 1982, è nuovo per il Borneo.

Franzidota borneensis sp. n. Figg. 25-28

HOLOTYPUS: Maschio, Borneo, Sabah, Mt. Kinabalu N. P., Poring Hot Springs, area Eastern Ridge tr., 850 m, 28.VIII.1988, leg. A. Smetana, (MHNG).

PARATYPUS: Borneo, Sabah, Mt. Kinabalu N. P., Poring Hot Springs, area Eastern Ridge tr., 850 m, 30.VIII.1988, leg. A. Smetana, (MHNG).

DESCRIZIONE: Lunghezza 1,2 mm. Corpo lucido e giallo-rossiccio con capo rossiccio, elitre e uroterghi liberi terzo, quarto e quinto giallo-bruni; zampe gialle. La reticolazione dell'avancorpo e del quinto urotergo libero è assente, quella dell'addome è superficiale sul primo urotergo libero basale, evidente sugli uroterghi liberi secondo, terzo e quarto. La punteggiatura del capo è fine e assente sulla fascia longitudinale mediana. La granulosità del pronoto è quasi indistinta, quella delle elitre è fine e superficiale. Edeago Figg. 26-27, spermateca Fig. 28.

Franzidota pallescens sp. n. Figg. 29-30

HOLOTYPUS: Femmina, Sabah, Mt. Kinabalu N.P., Poring Hot Springs, 500 m, 6.V.1987, leg. D. Burckhardt & I. Löbl (MHNG).

DESCRIZIONE: Lunghezza 1,2 mm (ipotetica perché mancano capo e pronoto). Corpo lucido e giallo con quarto urotergo libero giallo-bruno; zampe gialle. Specie microttera: ciascuna ala distesa raggiunge solo la metà dell'elitra. Elitre corte, perdute nel corso delle manipolazioni di studio. Gli uroterghi liberi sono coperti di granulosità fitta e di reticolazione evidente solo sul quinto urotergo libero. Spermateca Fig. 30.

OXYPODINI

CHIAVE DELLE SPECIE DEL GENERE *APIMELA* MULSANT & REY, 1874, NEL BORNEO

1 Sutura delle elitre più corta della linea mediana del pronoto 2
- Sutura delle elitre più lunga della linea mediana del pronoto 5
2 Specie attera, occhi assai ridotti; corpo giallo; elitre più corte del pronoto, Fig. 31; edeago Figg. 32-33, spermateca Fig. 34: Lunghezza 1,6 mm . . . . . *A. curticornis* sp. n.
- Specie alate o microttere; occhi poco ridotti o ben sviluppati 3
3 Occhi lunghi quanto le tempie; pronoto rossiccio, Fig. 35. Lunghezza 2,4 mm . . . . . *A. major* sp. n.
- Occhi più corti delle tempie; pronoto giallo-rossiccio 4
4 Undicesimo antennomero giallo; addome bicolore giallo-rossiccio con fascia rossiccia; spermateca avvolta a matassa meno sviluppata, Fig. 41; edeago Figg 39-40. Lunghezza 1,5 mm . . . . . *A. borneensis* sp. n.
- Undicesimo antennomero giallo-bruno; addome unicolore giallo-rossiccio; spermateca avvolta a matassa molto sviluppata, Fig. 43. Lunghezza 2 mm . . . . . *A. lambirensis* sp. n.
5 Addome unicolore giallo-rossiccio; pronoto poco trasverso, Fig. 47; edeago ampiamente ricurvo al lato ventrale, Fig. 44; spermateca Fig. 46. Lunghezza 4,4 mm . . . . . *A. arcuata* sp. n.
- Addome bicolore rossiccio e giallo-bruno; pronoto più trasverso; edeago strettamente ricurvo al lato ventrale, Fig. 52 6
6 Undicesimo antennomero giallo-rossiccio; pronoto rossiccio, capo ed elitre bruni; pronoto con larga depressione mediana; edeago con una plica ventrale, Figg. 49-50. Lunghezza 1,7 mm . . . . . *A. plicata* sp. n.
- Undicesimo antennomero bruno-rossiccio; pronoto ed elitre giallo-brune; pronoto senza depressione mediana; edeago senza plica ventrale, Fig. 52-53; spermateca, Fig. 54. Lunghezza 1,7 mm . . . *A. kinabaluicola* sp. n.

KEY TO SPECIES OF THE GENUS *APIMELA* MULSANT & REY, 1874, OF BORNEO

1 Suture of the elytra shorter than the median line of the pronotum 2
- Suture of the elytra longer than the median line of the pronotum 5
2 Wingless species, eyes very reduced; body yellow; elytra shorter than the pronotum, Fig. 31; aedeagus Figs 32-33, spermateca Fig. 34: length 1.6 mm . . . . . *A. curticornis* sp. n.
- Winged or micropterous species; eyes a little reduced or well developed . . . 3
3 Eyes as long as the temples; pronotum reddish, Fig. 35. Length 2,4 m . . . . . *A. major* sp. n.
- Eyes shorter than the temples; pronotum yellow-reddish 4
4 Eleventh antennomere yellow; bicoloured abdomen yellow-reddish with reddish band; spermatheca rolled to skein less developed, Fig. 41; aedeagus Figs 39-40. Length 1.5 mm . . . . . .*A. borneensis* sp. n.

- Eleventh antennomere yellow-brown; unicoloured abdomen yellow-reddish; spermatheca rolled to skein very developed, Fig. 43. Length 2 mm ..... *A. lambirensis* sp. n.

5 Unicoloured abdomen yellow-reddish; pronotum a little transverse, Fig. 47; aedeagus broadly curved to the ventral side, Fig. 44; spermatheca Fig. 46. Length 4.4 mm ..... *A. arcuata* sp. n.

- Bicoloured abdomen reddish and yellow-brown; pronotum transverse; aedeagus tightly curved to the ventral side, Fig. 52 6

6 Eleventh antennomere yellow-reddish; pronotum reddish, head and elytra brown; pronotum with wide median depression; aedeagus with a ventral plica, Figs 49-50. Length 1.7 mm ..... *A. plicata* sp. n.

- Eleventh antennomere brown-reddish; pronotum and elytra yellow-brown; pronotum without median depression; aedeagus without ventral plica, Fig. 52-53; spermatheca, Fig. 54. Length 1.7 mm. *A. kinabaluicola* sp. n.

NOTA: Il genere *Apimela* Mulsant & Rey, 1874, è nuovo per il Borneo.

Apimela curticornis sp. n. Figg. 31-34

HOLOTYPUS: Maschio, Sabah, Poring Hot Springs, 550-600 m, 9.V.1987, leg. D. Burckhardt & I. Löbl (MHNG).

PARATYPI: 5 es., stessa provenienza. – 1 es. Borneo, Sabah, Poring Hot Springs, 500 m, 6.V.1987, leg. D. Burckhardt & I. Löbl. – 1 es., Sabah, Kibongol V., 7 Km N. Tambunan, 700 m, 20.V.1987, leg. D. Burckhardt & I. Löbl.

DESCRIZIONE: Lunghezza 2,4 mm. Corpo lucido e giallo; antenne brune con i tre antennomeri basali gialli; zampe gialle. Specie attera e microftalma. Le elitre sono più corte del pronoto. Antennomeri quarto a decimo fortemente trasversi. La punteggiatura del capo è fitta e superficiale. La granulosità del pronoto è fine ed evanescente, quella delle elitre e dell'addome è molto evanescente. Edeago Figg. 32-33, spermateca Fig. 34.

DERIVATIO NOMINIS: Il nome della nuova specie significa « Antenne corte».

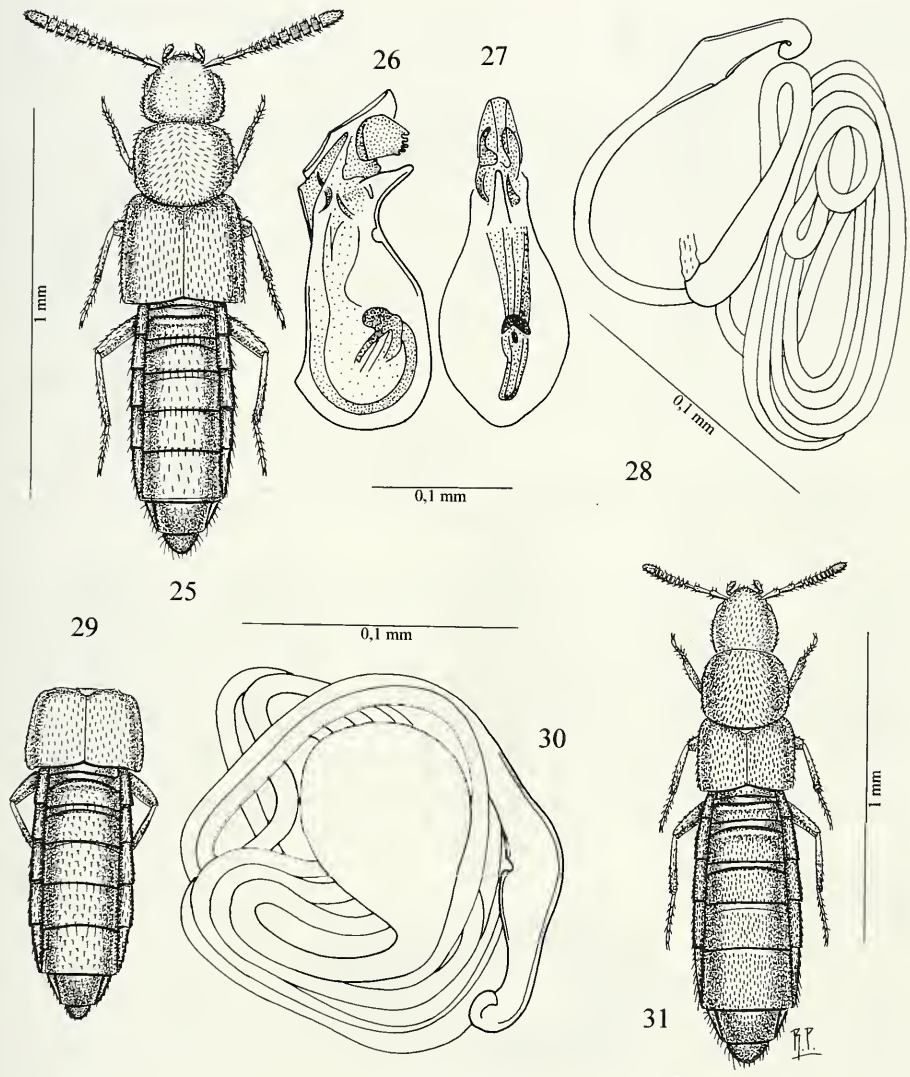
Apimela major sp. n. Figg. 35-37

HOLOTYPUS: Maschio, Sabah, Mt. Kinabalu Nat. Pk., HQ 1560 m, 30.IV.1987, leg. A. Smetana (MHNG).

PARATYPUS: 1 maschio, Borneo, Sabah, Mt. Kinabalu, 1500 m, 30.IV.1987, leg. D. Burckhardt & I. Löbl.

DESCRIZIONE: Lunghezza 1,6 mm. Corpo lucido e bruno-rossiccio con capo e uroterghi liberi terzo, quarto e quinto bruni; antenne brune con i due antennomeri basali rossicci; zampe gialle. La reticolazione dell'avancorpo è assente, quella dell'addome è superficiale. La punteggiatura del capo è fitta e fine. la granulosità del pronoto è superficiale e quella delle elitre e dell'addome sono evidenti. La pubescenza del quinto urotergo libero è meno fitta di quella degli uroterghi liberi basali.

DERIVATIO NOMINIS: Il nome della nuova specie significa «La più grande». Si riferisce alla taglia corporea. Così denominata prima di aver esaminato altre specie dello stesso genere pure con taglia corporea grande.



FIGG. 25-31

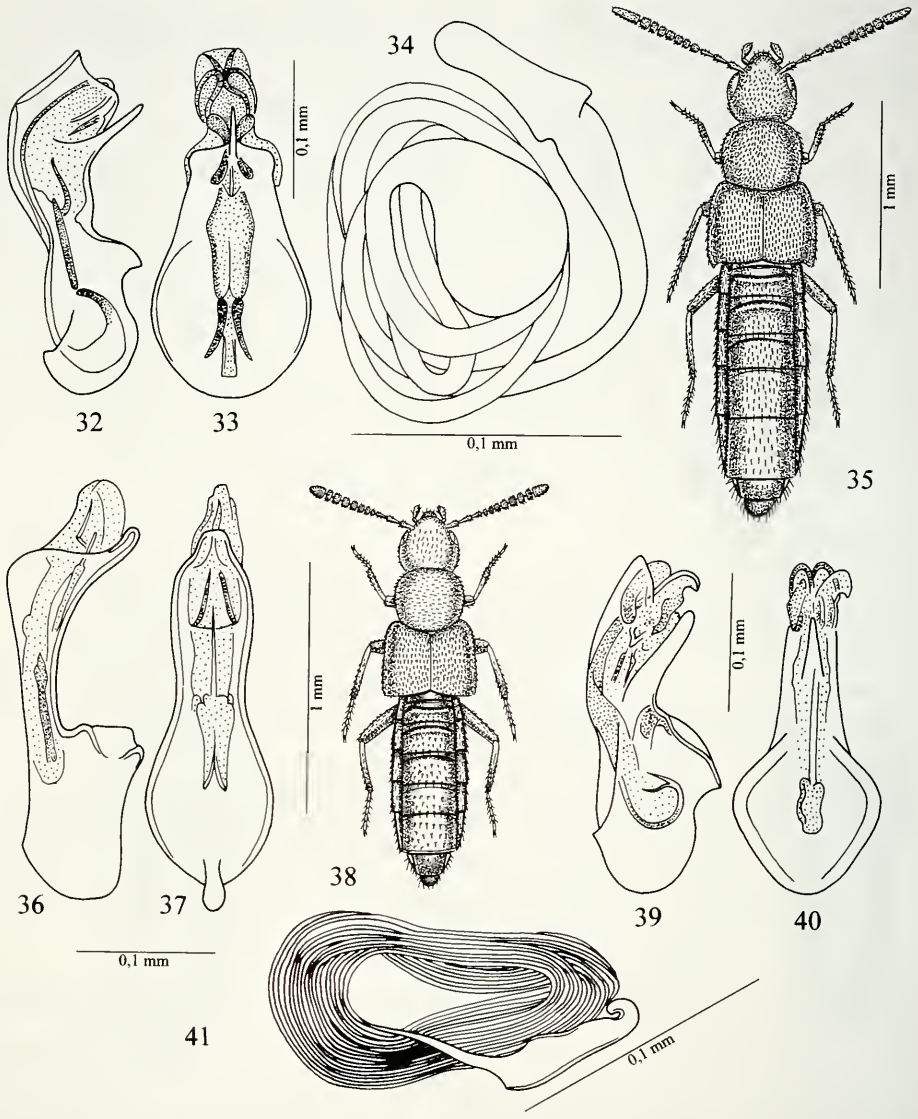
Habitus, edeago in visione laterale e ventrale e spermateca. (25-28) *Franzidota borneensis* sp. n. (29-30) *Franzidota pallescens* sp. n. (31) *Apimela curticornis* sp. n.

Apimela borneensis sp. n. Figg. 38-41

HOLOTYPUS: Maschio, Borneo, Sabah, Mt. Kinabalu N.P., HQ Liwagu Rv. trail, 1520 m, 11.VIII.1988, leg. A. Smetana (MHNG).

PARATYPUS: 1 femmina, stessa provenienza. – 2 es., Borneo, Sabah, Mt Kinabalu Nat. Pk., HQ Liwagu Trail, 1500-1550 m, 27.IV.1987, leg. A. Smetana.

DESCRIZIONE: Lunghezza 1,5 mm. Corpo lucido e giallo-rossiccio, con capo, elitre e uroterghi liberi quarto e quinto rossicci; antenne giallo-brune con i due



FIGG. 32-41

Edeago in visione laterale e ventrale, spermateca e habitus. (32-34) *Apimela curticornis* sp. n. (35-37) *Apimela major* sp. n. (38-41) *Apimela borneensis* sp. n.

antennomeri basali e l'undicesimo gialli; zampe gialle. Il corpo è privo di reticolazione. La granulosità del capo è fine e fittissima, quella del pronoto è superficiale, quella delle elitre e dell'addome è evidente. Gli occhi sono molto più corti delle tempie, in visione dorsale. Gli antennomeri quarto a decimo sono molto trasversi. Edeago Figg. 39-40, spermateca Fig. 41.

Apimela lambirensis sp. n. Figg. 42-43

HOLOTYPUS: Femmina, Borneo, Sarawak, Lambir Nat. Park, (senza data), leg. H. Franz (NHMW).

DESCRIZIONE: Lunghezza 2 mm. Corpo lucido e giallo-rossiccio con capo ed elitre bruno-rossicci; antenne brune con i tre antennomeri basali gialli e l'undicesimo giallo-bruno; zampe gialle. Il corpo è privo di reticolazione. La punteggiatura del capo e del pronoto è finissima, fitta e superficiale. La granulosità delle elitre è evanescente, quella dell'addome è saliente solo sui tre uroterghi liberi basali, sui restanti è fine e superficiale. Gli occhi sono più corti delle tempie, in visione dorsale. Il quarto antennomero è debolmente trasverso, i successivi fino al decimo sono molto trasversi. Spermateca Fig. 43.

Apimela arcuata sp. n. Figg. 44-47

HOLOTYPUS: Maschio, Sabah, Crocker Ra., km 60 rte Kota Kinabalu-Tambunan, 1350 m, 17.V.1987, leg. D. Burckhardt & I. Löbl, (MHNG).

PARATYPI: 1 maschio, Borneo-Sabah, Crocker Ra., 1550-1650 m, 16.V.1987, leg. D. Burckhardt & I. Löbl. – 1 maschio e 1 femmina, Sabah, Poring Hot Springs, 500 m, V.1987, leg. D. Burckhardt & I. Löbl.

DESCRIZIONE: Lunghezza 4,4 mm. Corpo lucido e bruno-rossiccio con elitre brune, tranne la base bruno-rossiccia, addome giallo-rossiccio; antenne rossicce con i tre antennomeri basali e i tre quarti apicali dell'undicesimo giallo-rossicci; zampe gialle. L'avancorpo è privo di reticolazione, questa è superficiale sull'addome. La granulosità del capo, pronoto ed elitre è fitta e superficiale, quella dell'addome è saliente. Gli occhi sono più corti delle tempie, in visione dorsale. Gli antennomeri quarto a decimo sono fortemente trasversi. Edeago Figg. 44-45, spermateca Fig. 46.

DERIVATIO NOMINIS: La nuova specie prende nome dall'edeago che è molto arcuato al lato ventrale.

Apimela plicata sp. n. Figg. 48-50

HOLOTYPUS: Maschio, Borneo, Sabah, Mt. Kinabalu N.P., above Poring Hot Springs, 520 m, 9.V.1987, leg. A. Smetana, (MHNG).

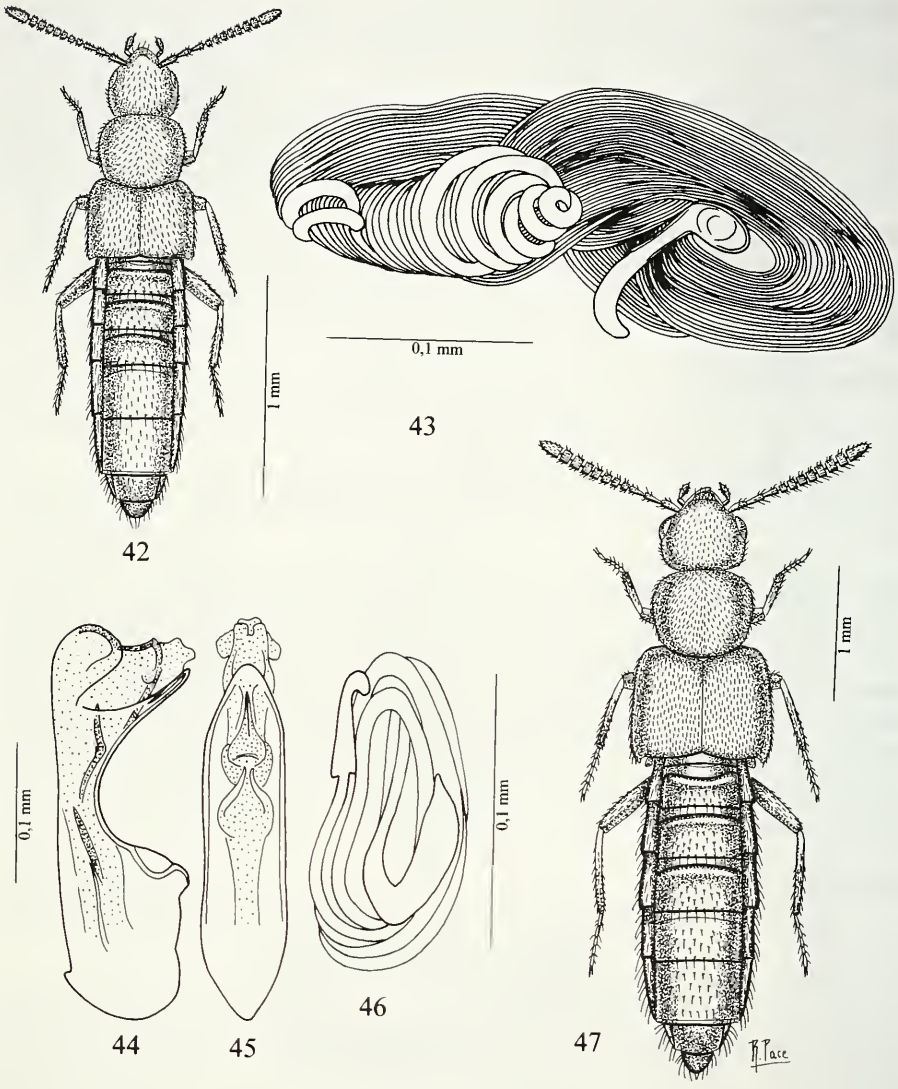
DESCRIZIONE: Lunghezza 1,7 mm. Corpo lucido e rossiccio con capo, elitre e uroterghi liberi quarto e quinto bruni; antenne rossicce con i due antennomeri basali e l'undicesimo giallo-rossicci; zampe gialle. L'avancorpo è privo di reticolazione, questa sull'addome è evidente. La punteggiatura del capo è fitta e fine. La granulosità del pronoto e delle elitre è fine e fitta, quella dell'addome è evidente. Gli occhi sono più corti delle tempie, in visione dorsale. Gli antennomeri quarto a decimo sono fortemente trasversi. Il pronoto presenta una larga depressione mediana. Edeago Figg. 49-50.

DERIVATIO NOMINIS: La nuova specie prende nome dalla plica ventrale del suo edeago.

Apimela kinabaluicola sp. n. Figg. 51-54

HOLOTYPUS: Maschio, Sabah, Mt. Kinabalu N.P., HQ Liwagu Riv. trail, 1580 m, 27.IV.1987, leg. D. Burckhardt & I. Löbl (MHNG).

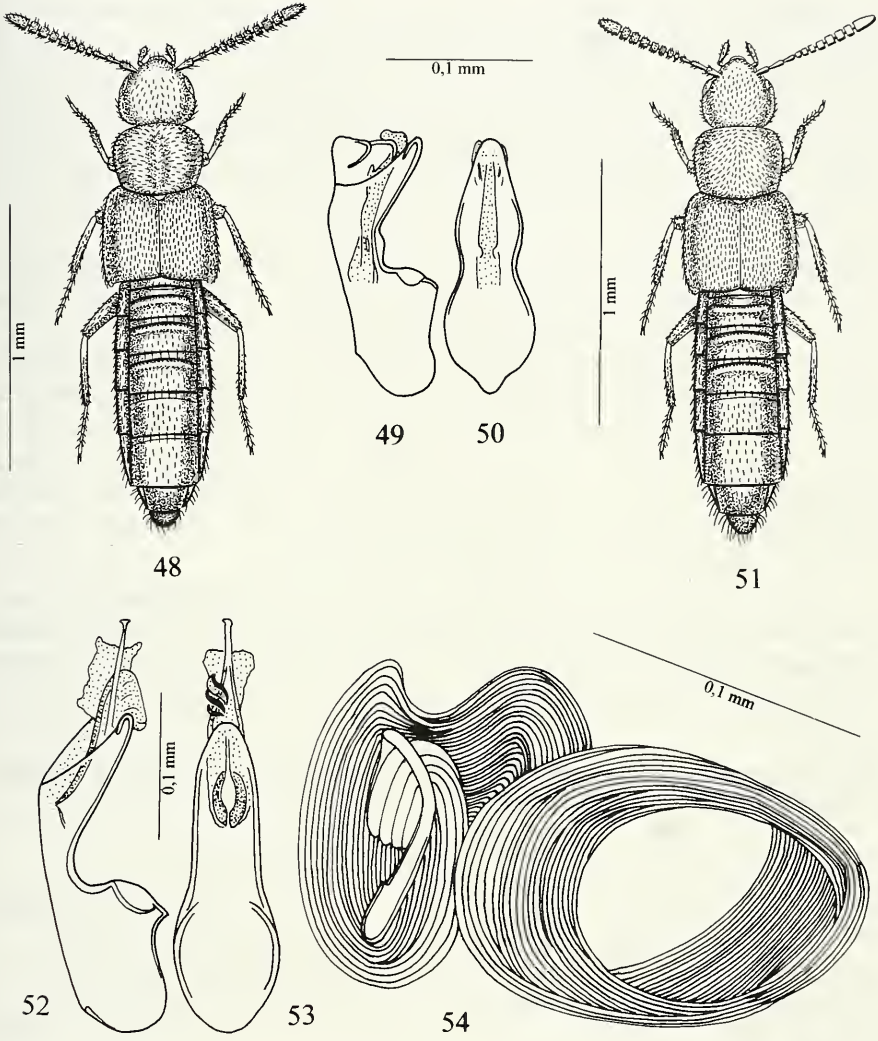
PARATYPI: 2 es. stessa provenienza. – 1 es., Sabah, Mt Kinabalu, 1750 m, 27.IV.1987, leg. D. Burckhardt & I. Löbl. – 1 es., Sabah, Mt Kinabalu, 1500 m, 25.IV.1987, leg. D. Burckhardt



FIGG. 42-47

Habitus, spermateca e edeago in visione laterale e ventrale. (42-43) *Apimela lambirensis* sp. n. (44-47) *Apimela arcuata* sp. n.

& I. Löbl. – 1 es., Sabah, Mt Kinabalu, 1500 m, 21.IV.1987, leg. D. Burckhardt & I. Löbl . – 1 es., Sabah, Mt Kinabalu, 1500 m, 30.IV.1987, leg. D. Burckhardt & I. Löbl . – 3 es., Sabah, Mt Kinabalu, 1550-1650 m, 24.IV.1987, leg. D. Burckhardt & I. Löbl . – 1 es., Sabah, Poring Hot Springs, 550-600m, 9.V.1987, leg. D. Burckhardt & I. Löbl. – 2 es., Sabah, Poring Hot Springs, 500 m, 11.V.1987, leg. D. Burckhardt & I. Löbl. – 1 es., Sabah, Poring Hot Springs, Langanan Falls, 900-950m, 12.V.1987, leg. D. Burckhardt & I. Löbl. – 1 es., Sabah, Poring Hot Springs, Langanan River, 850m, 14.V.1987, leg. D. Burckhardt & I. Löbl. – 2 es., Sabah, Crocker Rge., km 60 rte Kota Kinabalu-Tambunan, 1350 m, 17.V.1987, leg. D. Burckhardt & I.



FIGG. 48-54

Habitus, edeago in visione laterale e ventrale e spermateca. (48-50) *Apimela plicata* sp. n. (51-54) *Apimela kinabaluicola* sp. n.

Löbl. – 4 es., Sabah, Crocker Rge., km 51 rte Kota Kinabalu-Tambunan, 1600 m, 18.V.1987, leg. D. Burckhardt & I. Löbl. – 2 es., Borneo, Sabah, Mt. Kinabalu Nat. Pk., HQ at Liwagu riv., 1505 m, 14.VIII-1.IX.1988, leg. A. Smetana. – 1 es., Borneo, Sabah, Mt. Kinabalu Nat. Pk., HQ at Liwagu riv., 1500 m, 1.IX.1988, leg. A. Smetana. – 1 es., Borneo, Sabah, Mt. Kinabalu Nat. Pk. HQ, Silau-Silau Tr., 1550m, 2.IX.1988, leg. A. Smetana. – 1 es., Borneo, Sabah, Mt. Kinabalu Nat. Pk. HQ, Silau-Silau Tr., 1505m, 2.IX.1988, leg. A. Smetana. – 1 es., Borneo, Sabah, Mt. Kinabalu Nat. Pk. HQ, Silau-Silau Tr., 1550m, 4.IX.1988, leg. A. Smetana. – 1 es., Borneo, Sabah, Mt. Kinabalu Nat. Pk., HQ Liwagu riv., 1495m, 21.V.1987, leg. A. Smetana.

DESCRIZIONE: Lunghezza 1,7 mm. Corpo lucido e giallo-bruno con capo e uroterghi liberi quarto e base del quinto bruni; antenne bruno-rossicce con i due antennomeri basali e la base del terzo rossicci; zampe gialle. L'avancorpo è privo di reticolazione, questa sull'addome è superficiale. La punteggiatura del capo è fittissima. La granulosità del pronoto e delle elitre è fitta e superficiale, quella dell'addome è evidente. Gli occhi sono più corti delle tempie, in visione dorsale. Gli antennomeri quarto a decimo sono fortemente trasversi. Edeago Figg. 52-53, spermateca Fig. 54.

Amarochara borneensis sp. n. Figg. 55-57

HOLOTYPUS: Maschio, Sabah, Crocker Ra., 1600 m, Km 51 rte. Kota Kinabalu-Tambunan, 18.V.1987, leg. D. Burckhardt & I. Löbl (MHNG).

DESCRIZIONE. Lunghezza 3,5 mm. Corpo lucido e nero-bruno con elitre giallo-brune; antenne brune con i due antennomeri basali rossicci; zampe rossicce. Il corpo è privo di reticolazione. La punteggiatura del capo è superficiale, quella del pronoto è evidente. La granulosità delle elitre è ben visibile. Gli antennomeri quarto a decimo sono fortemente trasversi. Gli occhi sono poco più corti delle tempie, in visione dorsale. Il pronoto è poco trasverso. Il fondo dei solchi trasversi basali degli uroterghi liberi primo a quarto è punteggiato. Edeago Figg. 56-57.

NOTA: Il genere *Amarochara* Thomson, 1858, è nuovo per il Borneo. La nuova specie è ben distinta da *A. megalops* Assing, 2002, di Taiwan per l'edeago più ricurvo al lato ventrale e per l'armatura genitale interna dell'edeago nettamente più robusta, composta da due lamine larghe e lunghe (strette e corte in *megalops*).

CHIAVE DELLE SPECIE DEL GENERE *CALODERA* MANNERHEIM, 1831, NEL BORNEO

1 Addome uniformemente bruno; pronoto subgloboso, Fig. 61; edeago non ristretto nella porzione apicale, in visione ventrale, Fig. 63. Lunghezza 2,8 mm ..... *C. cultellifera* sp. n.

- Addome bicolore rossiccio con fascia bruno-rossiccia; pronoto trasverso, Fig. 58; edeago ristretto nella porzione apicale, in visione ventrale, Fig. 60. Lunghezza 2,1 mm ..... *C. borneensis* sp. n.

KEY TO SPECIES OF THE GENUS *CALODERA* MANNERHEIM, 1831 OF BORNEO

1 Abdomen uniformly brown; pronotum subglobulary, Fig. 61; aedeagus non-strangled in the apical portion, in ventral view, Fig. 63. Length 2,8 mm ..... *C. cultellifera* sp. n.

- Bicoloured abdomen, reddish with brown-reddish band; pronotum transverse, Fig. 58; aedeagus strangled in the apical portion, in ventral view, Fig. 60. Length 2,1 mm ..... *C. borneensis* sp. n.

NOTA: Il genere *Calodera* Mannerheim, 1831, è nuovo per il Borneo.

Calodera borneensis sp. n. Figg. 58-60

HOLOTYPUS: Maschio, Borneo, Sabah, Mt. Kinabalu N.P., Liwagu River, 1490 m, 3.IX.1988, leg. A. Smetana (MHNG).

PARATYPI: 1 es., stessa provenienza. – 1 es., Borneo, Sabah, Mt Kinabalu Nat. Pk. HQ, 1500 m, 8-16.V.1987, int. Trap., leg. A. Smetana.

DESCRIZIONE. Lunghezza 2,1 mm. Corpo lucido e rossiccio con capo e quarto urotergo libero bruno-rossicci; antenne brune con i due antennomeri basali giallo-rossicci; zampe gialle. Sul corpo la reticolazione è assente. La punteggiatura del capo è fitta e molto superficiale, quella dell'addome è molto evidente e allineata trasversalmente in una sola riga sugli uroterghi liberi primo, secondo e terzo. I solchi trasversi basali degli uroterghi liberi primo a quarto sono punteggiati. La granulosità del pronoto è molto superficiale, quella delle elitre è evidente. Gli antennomeri quarto a decimo sono fortemente trasversi. Gli occhi sono poco più corti delle tempie, in visione dorsale. Edeago Figg. 59-60.

Calodera cultellifera sp. n. Figg. 61-63

HOLOTYPUS: Maschio, Sabah, Mt. Kinabalu, 1750 m, 21.IV.1987, leg. D. Burckhardt & I. Löbl (MHNG).

DESCRIZIONE: Lunghezza 2,1 mm. Corpo lucido e bruno con elitre giallo-brune; antenne brune con i due antennomeri basali giallo-bruni; zampe giallo-rossicce. La punteggiatura del capo è fitta e superficiale, assente sulla fascia longitudinale mediana. La granulosità del pronoto è superficiale, quella delle elitre e dell'addome è evidente. Gli antennomeri quarto a decimo sono fortemente trasversi. Gli occhi sono poco più corti delle tempie, in visione dorsale. Edeago Figg. 62-63.

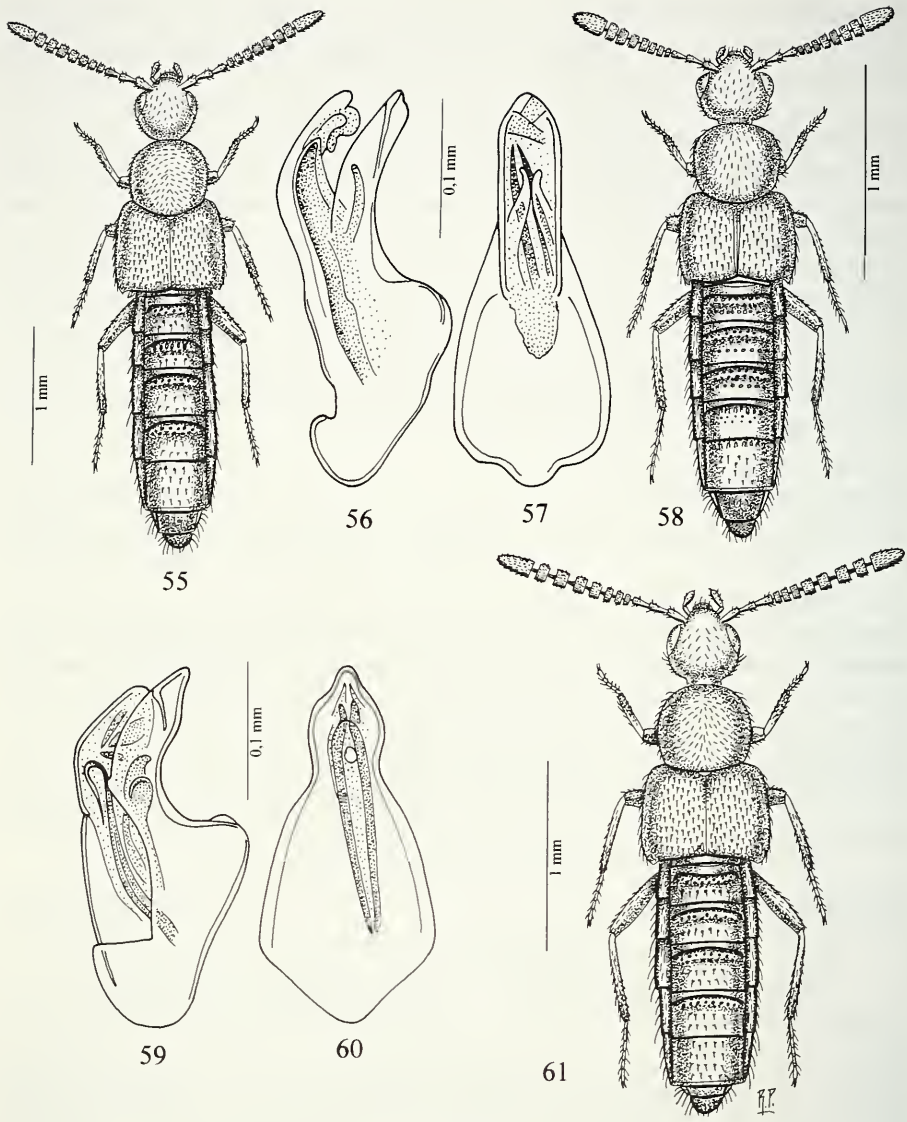
DERIVATIO NOMINIS: La nuova specie prende nome dall'armatura genitale interna dell'edeago che presenta due lamine a forma di coltello.

Ischyrocolpura borneensis sp. n. Figg. 64-68

HOLOTYPUS: Maschio, Borneo, Sabah, Mt. Kinabalu Nat. Pk., HQ at Liwagu Rv., 1500 m, 4.VIII.1988, leg. A. Smetana (MHNG).

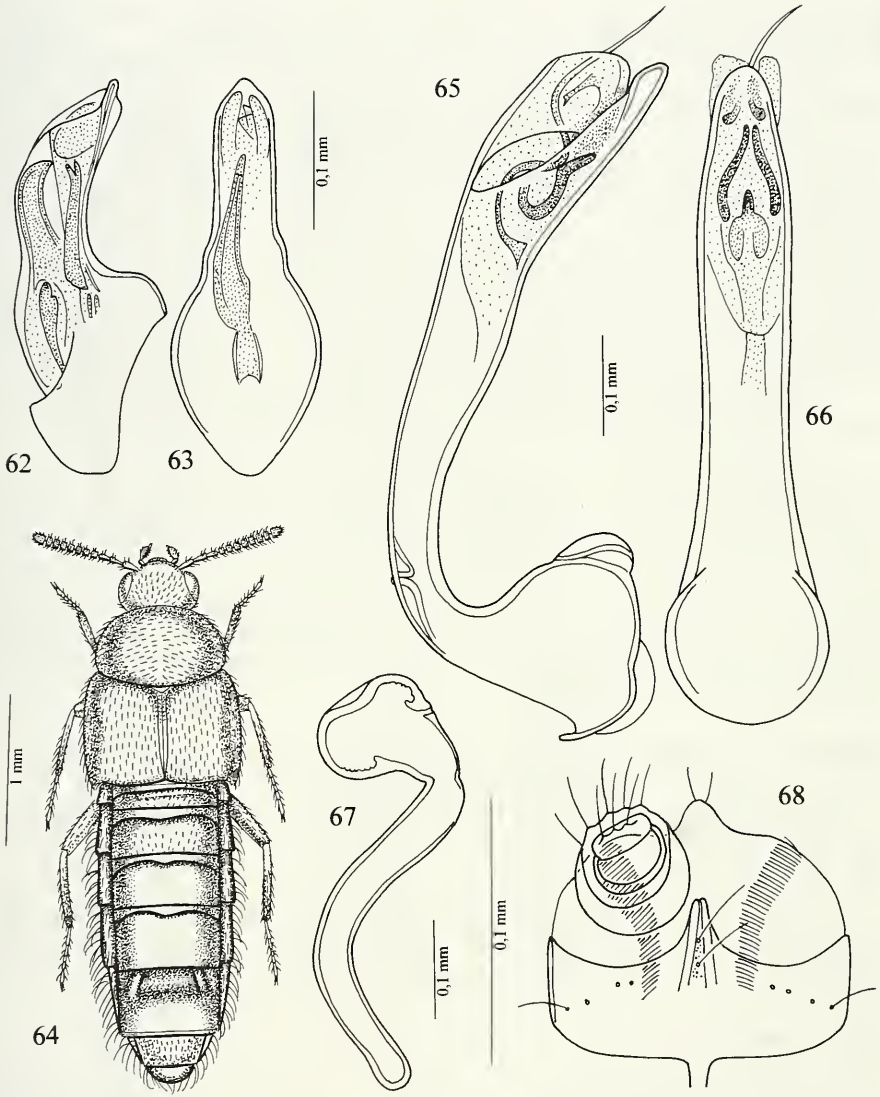
PARATYPI: 1 es., stessa provenienza. – 1 es., Borneo, Sabah, Mt. Kinabalu N.P., HQ at Liwagu Rv., 1500 m, 30.IV-8.V.1987, leg. A. Smetana. – 1 es., Borneo, Sabah, Mt. Kinabalu N.P., HQ at Liwagu River, 1505 m, 14.VIII.-1.IX.1988 , leg. A. Smetana. – 6 es., Sabah, Mt. Kinabalu, 1500 m, 21.V.1987, leg. D. Burckhardt & I. Löbl. – 1 es., Borneo, Sabah, Mt. Kinabalu N.P., 1450-1550 m, 23.V.1987, leg. D. Burckhardt & I. Löbl. – 1 maschio, Borneo, Sabah, Mt. Kinabalu N.P., 1550 m, 23.V.1987, leg. D. Burckhardt & I. Löbl. – 1 femmina, Borneo, Sabah, M. Kinabalu N.P., Laban Rata, 3200 m, in trap, 9-20.V.1987, leg. A. Smetana.

DESCRIZIONE: Lunghezza 4 mm. Corpo lucido e rossiccio, con pigidio giallo-rossiccio; antenne rossicce con i due antennomeri basali e base del terzo giallo-rossicci; zampe bruno-rossicce con tarsi rossicci. Il corpo è privo di reticolazione. La punteggiatura del capo è evidente, quella del pronoto è assente. La granulosità delle elitre è superficiale. Solo i due uroterghi liberi basali e il sesto sono coperti di pubescenza, il terzo, il quarto e il quinto sono completamente glabri. Il quinto urotergo libero presenta un profondo e largo solco trasverso basale e una plica obliqua a ciascun lato. Edeago Figg. 65-66, spermateca Fig. 67 e labio con palpo labiale Fig. 68.



FIGG. 55-61
Habitus e edeago in visione laterale e ventrale. (55-57) *Amarochara borneensis* sp. n. (58-60) *Calodera borneensis* sp. n. (61) *Calodera cultellifera* sp. n.

NOTA: Il genere *Ischyrocolpura* Pace, 1990, è nuovo per il Borneo. La nuova specie è affine a *I. philippinensis* Pace, 1990, delle Filippine, di cui è nota la sola femmina. La nuova specie se ne distingue per gli occhi più lunghi delle tempie, in visione dorsale (più corti delle tempie in *philippinensis*), il pronoto più trasverso, le elitre granulose e non punteggiate e per la presenza di docce interne del bulbo distale della spermateca, assenti in *philippinensis*.



FIGG. 62-68

Edeago in visione laterale e ventrale, habitus, spermateca e labio con palpo labiale. (62-63) *Calodera cultellifera* sp. n. (64-68) *Ischyrocolpura borneensis* sp. n.

HOPLANDRIINI

Tinotus caelatimas sp. n. Figg. 69-72

HOLOTYPUS: Maschio, Borneo, Sabah, Mt. Kinabalu Nat. Pk., Poring Hot Springs, 495 m, 21.VIII.1988, leg. A. Smetana (MHNG).

PARATYPI: 3 es., stessa provenienza. – 3 es., Sabah, Mt. Kinabalu Nat. Pk., Poring Hot Springs, 480-485 m, 19-23.VIII.1988, leg. A. Smetana. – 1 es., Borneo, Sabah, Mt. Kinabalu

Nat. Pk., Poring Hot Springs, 480 m 19.VIII.1988, leg. A. Smetana. – 1 es.. Borneo, Sabah. Mt. Kinabalu Nat. Pk., Poring Hot Springs. 495 m. 23.VIII.1988. leg. A. Smetana.

DESCRIZIONE: Lunghezza 1,9 mm. Corpo lucido, tranne un'area opaca mediana anteriore del pronoto del maschio. Corpo bruno-rossiccio con i tre uroterghi liberi basali rossicci; antenne brune con i due antennomeri basali giallo-rossicci; zampe giallo-rossicce. La reticolazione del capo è evidente, quella del pronoto è molto superficiale, La punteggiatura del capo, delle elitre e dell'addome è evidente, ma poco profonda sul capo. Il pronoto del maschio presenta una depressione mediana anteriore a forma di ellisse, essa è coperta di reticolazione vigorosissima e a maglie regolari; il resto della superficie del pronoto è coperto di reticolazione molto superficiale. La granulosità delle elitre è saliente. Solo nel solco trasverso basale del quarto urotergo libero del maschio si trova una fila di punti. Edeago Figg. 70-71, spermateca Fig. 72.

DERIVATIO NOMINIS: Il nome della nuova specie significa «Maschio cesellato» a motivo della presenza, nel maschio, di un'area reticolata sul pronoto.

NOTA: Il genere *Tinotus* Sharp, 1883, è nuovo per il Borneo. La nuova specie è ben distinta da *T. minutissimus* (Kraatz, 1857) dello Sri Lanka, di cui ho esaminato l'holotypus femmina, così etichettato: Ceylon, J. Nietner, *Aleochara minutissima* Kr, DEI. La nuova specie se ne distingue per il pronoto più trasverso, i solchi trasversi basali degli uroterghi liberi primo e secondo senza punteggiatura (punteggiatura presente in *minutissima*) e per la forma differente della spermateca che nella nuova specie ha la parte prossimale più lunga e strozzata mentre in *minutissima* la stessa porzione è corta e non strozzata.

Paroxypodinus pendleburyi Cameron, 1933 Figg. 73-76

Paroxypodinus pendleburyi Cameron, 1933: 351. – Sawada, 1980: 59.

MATERIALE: 1 maschio, Borneo, Sabah, Mt. Kinabalu N.P., Liwagu River tr., 1495-1550 m, 12.VIII.1988, leg. A. Smetana.

DISTRIBUZIONE: Specie finora nota solo del Kinabalu.

NOTA: Sawada (1980) ha illustrato l'edeago di un sintipo. Corrisponde in tutto all'esemplare raccolto da Smetana, tranne che io ho osservato la presenza di due setole ventrali dell'edeago, Figg. 74-75, non riprodotte graficamente da Sawada.

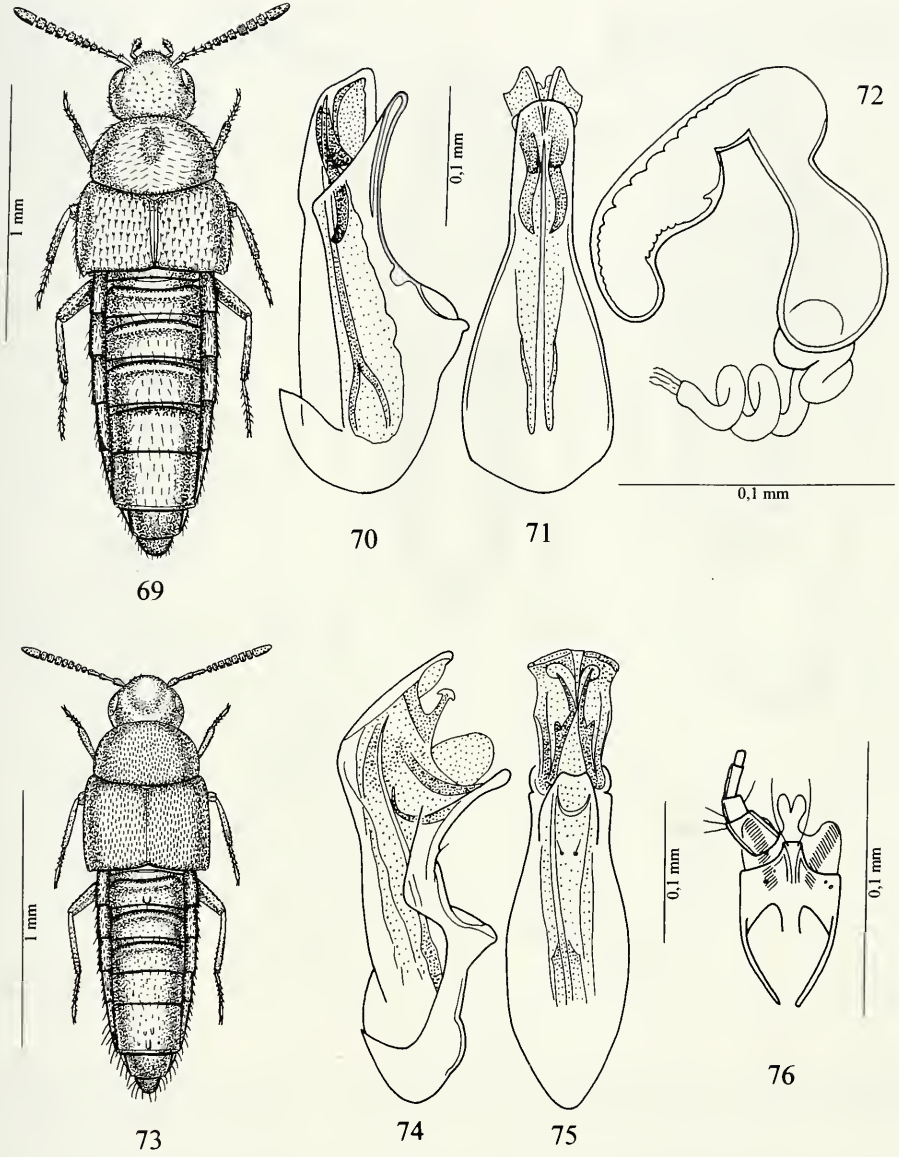
ALEOCHARINI

Tetrasticta kinabaluensis sp. n. Figs 77-80

HOLOTYPUS: Maschio, Borneo-Sabah, Mt. Kinabalu Nat. Pk., Int. trap., HQ 1500 m, 25-30.IV.1987, leg. A. Smetana (MHNG).

PARATYPI: 1 femmina, stessa provenienza: 1 femmina, Sabah, Crocker Ra., 1200 m, Km 63 rte Kota Kinabalu-Tambunan, 19.V.1987, leg. D. Burckhardt & I. Löbl. – 1 es., Borneo, Sabah, Mt. Kinabalu N.P., HQ at Liwagu Rv., 1500 m, 30.IV.1987, leg. A. Smetana.

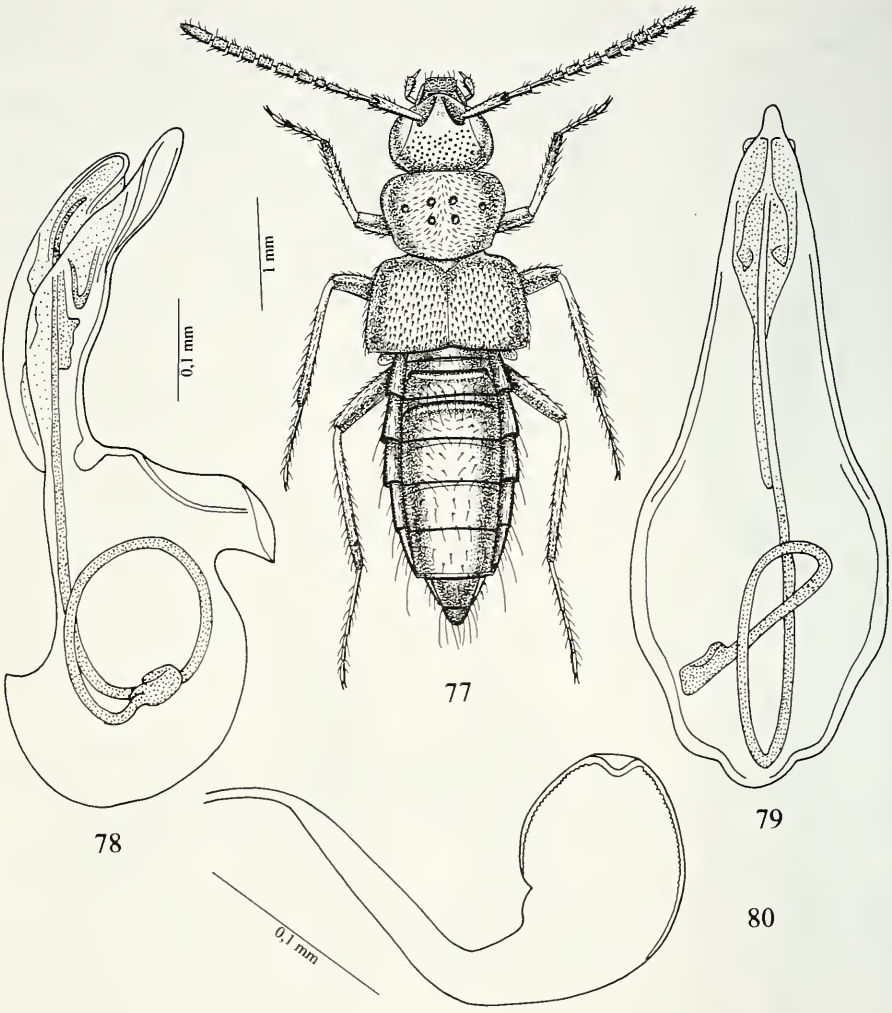
DESCRIZIONE: Lunghezza 5 mm. Corpo lucido e bruno con urotergo libero primo e pigidio rossicci; antenne brune con i due antennomeri basali giallo-rossicci; zampe giallo-rossicce. Sul corpo non è presente reticolazione. La punteggiatura del capo è evidente, ma assente tra le antenne, quella del pronoto è molto superficiale e quella delle elitre è ben distinguibile. La granulosità dell'addome è evidente. Edeago Figg. 78-79, spermateca Fig. 80.



FIGG. 69-76

Habitus, edeago in visione laterale e ventrale, spermateca e labio con palpo labiale. (69-72) *Tinotus caelatimas* sp. n. (73-76) *Paroxypodinus pendleburyi* Cameron, 1933.

NOTA: Il genere *Tetrasticta* Kraatz, 1957, è nuovo per il Borneo. La nuova specie si distingue da *T. polita* Kraatz, 1857, dello Sri Lanka, di cui ho esaminato la serie tipica di 4 maschi e due femmine, e designato il lectotypus maschio, etichettato Ceylon, *Tetrasticta polita* Kr. DEI, per avere l'edeago poco ricurvo al lato ventrale



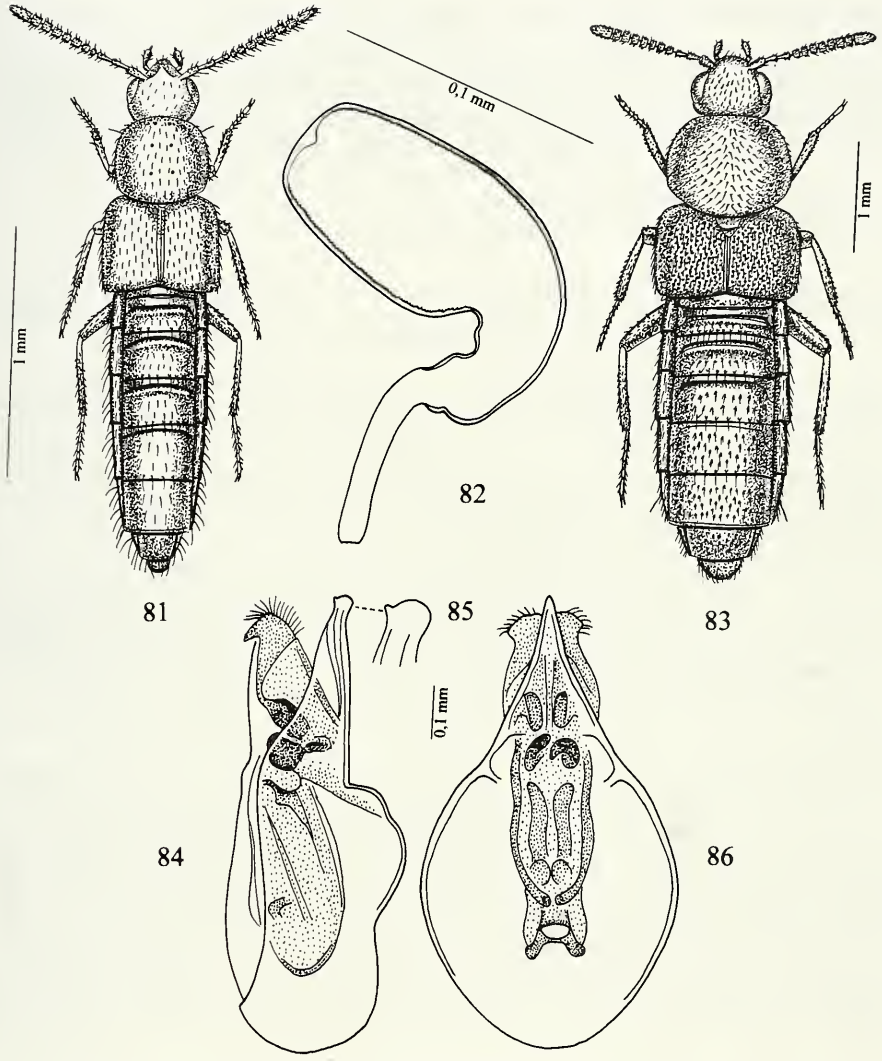
FIGG. 77-80
Habitus, edeago in visione laterale e ventrale e spermateca. (77-80) *Tetrasticta kinabaluensis* sp. n.

(molto in *polita*) con flagello dell'armatura genitale interna dell'edeago avvolto in una spira all'interno del bulbo basale (lo stesso avvolto più di sette volte in *polita*) e per gli antennomeri quinto a decimo più lunghi che larghi (trasversi in *polita*).

Aleochara (Xenochara) puberula Klug, 1833

Aleochara puberula Klug, 1833:139.
Aleochara (Xenochara) puberula: Cameron, 1939: 632.

MATERIALE: 1 maschio, Sabah, Mt. Kinabalu,1500 m, 25.IV.1987, leg. D. Burckhardt & I. Löbl.



FIGG. 81-86

Habitus, spermateca e edeago in visione laterale e ventrale. (81-82) *Aleochara (Coprochara) rougemonti* (Pace, 1986), comb. n. (83-86) *Aleochara (Aleochara) scapularis* sp. n.

DISTRIBUZIONE: Specie cosmopolita perché cacciatrice di larve di *Musca domestica.*

Aleochara (Coprochara) rougemonti (Pace, 1986), **comb. n.** Figg. 81-82

Cratoacrochara rougemonti Pace, 1986: 230.

MATERIALE: 1 maschio e 1 femmina, Sabah, Mt. Kinabalu N.P., Liwagu River, 1490 m, 3.IX.1988, leg. A. Smetana. – 3 femmine, Borneo, Sabah, Mt. Kinabalu N.P., HQ Liwagu Rv. trail, 1520 m, 11.VIII.1988, leg. A. Smetana. – 1 femmina, Borneo, Sabah, Mt. Kinabalu N.P., HQ Liwagu Riv. trail, 1500-1550 m, 27.IV.1987, leg. A. Smetana.

DISTRIBUZIONE: Specie finora nota solo di Pangi, Borneo.

NOTA: Il motivo della descrizione del genere *Cratoacrochara* Pace, 1986 derivava dalla forma molto corta dei palpi labiali. Il ritrovamento di nuovi esemplari, con palpi labiali come in *Aleochara*, mi ha permesso di considerare i palpi labiali corti osservati in precedenza come teratologici. Pertanto si propone la seguente sinonimia:

Aleochara Gravenhorst, 1802: 67
Cratoacrochara Pace, 1986: 230, **syn. n.**

Aleochara (Aleochara) scapularis sp. n. Figg. 83-86

HOLOTYPUS: Maschio, Borneo, (senza data), leg. Dr. Scheidt (MZB).

DESCRIZIONE: Lunghezza 4,9 mm. Corpo lucido e bruno con pronoto e lati esterni delle elitre giallo-rossicci, margine posteriore degli uroterghi liberi bruno-rossicci; antenne e zampe rossicce. Il corpo è privo di reticolazione. La punteggiatura del capo è ombelicata e superficiale, quella del pronoto e delle elitre è evidente e quella dell'addome è a raspa. Gli uroterghi liberi primo e secondo hanno un orlo nel fondo del solco trasverso basale. Edeago Figg. 84-85.

NOTA: La nuova specie per la forma dell'edeago è sicuramente affine ad *A. planicranis* Klimaszewski & Smetana, 1990, pure del Borneo. Se ne distingue per il colore del corpo (uniformemente nero in *planicranis*) e per la differente struttura dell'armatura genitale interna dell'edeago. L'apice dell'edeago, in visione laterale, presenta un dentino stretto nella nuova specie e largo in *planicranis*.

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The Tortricidae (Lepidoptera) of the Galapagos Islands, Ecuador

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The Tortricidae (Lepidoptera) of the Galapagos Islands, Ecuador. Sixteen species of Tortricidae are recorded as being established on the Galapagos Archipelago, including nine that are described as new by Razowski & Landry and presumed to be endemic (*Hedya brunneograpta, Eccopsis galapagana, E. floreana, Megalota johni, Episimus alcedanus, Epinotia microscyphos, Proteoteras atromacula, Coniostola isabelae,* and *Dichrorampha galapagana*). Two other endemic tortricids have been described from the Galapagos by Meyrick (*Platynota colobota* and *Crocidosema synneurota*). The other five species are either native or recently introduced by humans (*Bactra philocherda* Diakonoff, *Endothenia eidolon* Razowski & Pelz, *Episimus transferranus* (Walker), *Epinotia lantana* (Busck), *Strepsicrates smithiana* Walsingham). Four additional species are reported to have been intercepted by the Galapagos quarantine system (*Anopinella* sp., *Lasiothyris* sp., *Transtillaspis* sp., and *Epinotia cosmoptila* (Meyrick)), but they are apparently not established in the Galapagos. *Hedya, Eccopsis, Proteoteras*, and *Coniostola* are recorded for the first time from South America. *Olethreutes olorina* Walsingham is transferred to *Hedya* Hübner.

Keywords: Sparganothini - Bactrini - Olethreutini - Eucosmini - Grapholitini - new species - endemics - introduced species - new combination.

INTRODUCTION

As part of a continuing program to survey the Lepidoptera of the Galapagos Islands, initiated by the second author (BL) in 1989, this is the 25th contribution towards a complete taxonomic assessment of the microlepidopteran fauna of the Archipelago (see for example Landry & Gielis, 1992; Landry, 2001, 2002, 2006; Landry & Roque-Albelo, 2004).

The first report on Galapagos Tortricidae was by Schaus (1923), who recorded *Strepsicrates smithiana* Walsingham and *Crocidosema plebejana* Zeller (then not yet

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recognized as a separate species) along with three unidentified species of *Epinotia*, at least one of which did not belong to that genus. Then Meyrick (1926) described *Crocidosema synneurota* and *Platynota colobota*, without recording other species. These three taxa were simply listed by Linsley & Usinger (1966), and Linsley (1977) did not add any new records. In their papers on introduced insects in the Galapagos, Peck *et al.* (1998) and Causton *et al.* (2006) mentioned *C. plebejana* and *S. smithiana*, as well as *Bactra philocherda* Diakonoff and *Episimus transferranus* (Walker). Perry & de Vries (2003) recorded *C. plebejana* as widespread in the Galapagos and feeding on *Acacia* sp. (Fabaceae).

Tortricidae larvae usually feed in hiding, either in tied leaf shelters or inside plant tissue; several species are polyphagous. In the Galapagos one or more host plants are known for only three species, and the host plants of two more widespread species are known from elsewhere.

In addition to the species treated below, four others along with *Epinotia lantana* (Busck) were reared from larvae intercepted with various goods by the quarantine system of the Galapagos Islands (SICGAL). They were identified by BL and JR as follows: *Anopinella* sp. (Euliini), *Lasiothyris* sp. (Cochylini), *Transtillaspis* sp. (Euliini, reared from apples), and *Epinotia cosmoptila* (Meyrick, 1917) (Eucosmini), the last of which representing a new record for the western part of the South American continent. We do not believe that these four are established on the Galapagos. However, the unique female illustrated as Fig. 34 (wingspan: 24 mm), collected on Isabela, Volcan Darwin, 630 m in elevation (MHNG [ENTO] No. 3094) represents an unknown species that is probably established on the archipelago; it is not described here owing to the paucity of material.

Among the 28 families of Lepidoptera recorded from the Galapagos, the Tortricidae and Geometridae occupy the fourth rank in terms of species numbers, behind the Noctuidae, Pyralidae, and Gelechiidae. They are followed by the Sphingidae and Pterophoridae, which have 15 species each.

MATERIAL AND METHODS

The responsibilities of the authors in this project were as follows. The first author (JR) made most taxonomic decisions and specimen identifications, and prepared all new species descriptions and most diagnoses. BL collected most of the specimens during five expeditions to the Galapagos Islands in 1989, 1992, 2002, 2004, and 2005. He mounted and labeled them, made some genitalia preparations and identifications, shaped the final text, listed the paratypes, and prepared the illustrations. LR arranged and participated in the last three expeditions of BL. He has also collected since 1994, mounted, and prepared about 190 specimens, reared some specimens, obtained additional material from the Galapagos Quarantine System (SICGAL), and provided Galapagos National Park authorizations for the export of specimens and their deposition in Geneva and Krakow.

The manner of giving the label data of the holotypes and paratypes is presented in Landry (2006) as are the methods used for specimen collecting. Most dissections and genitalia slides were made in Krakow by W. Zajda. The host plant nomenclature follows Lawesson *et al.* (1987). We also studied older material from the Natural

History Museum, London, UK (BMNH) and a few specimens collected in 2006 by P. Schmitz and deposited in the Muséum d'histoire naturelle, Geneva (MHNG).

The following additional abbreviations are used: CDRS for Charles Darwin Research Station, Santa Cruz Islands, Galapagos, Ecuador; CNC for Canadian National Collection of Insects, Ottawa, Canada; USNM for National Museum of Natural History, Washington, USA; and ZMJU for Zoological Museum, Jagiellonian University, Krakow, Poland.

SPECIES TREATMENTS

Sparganothini

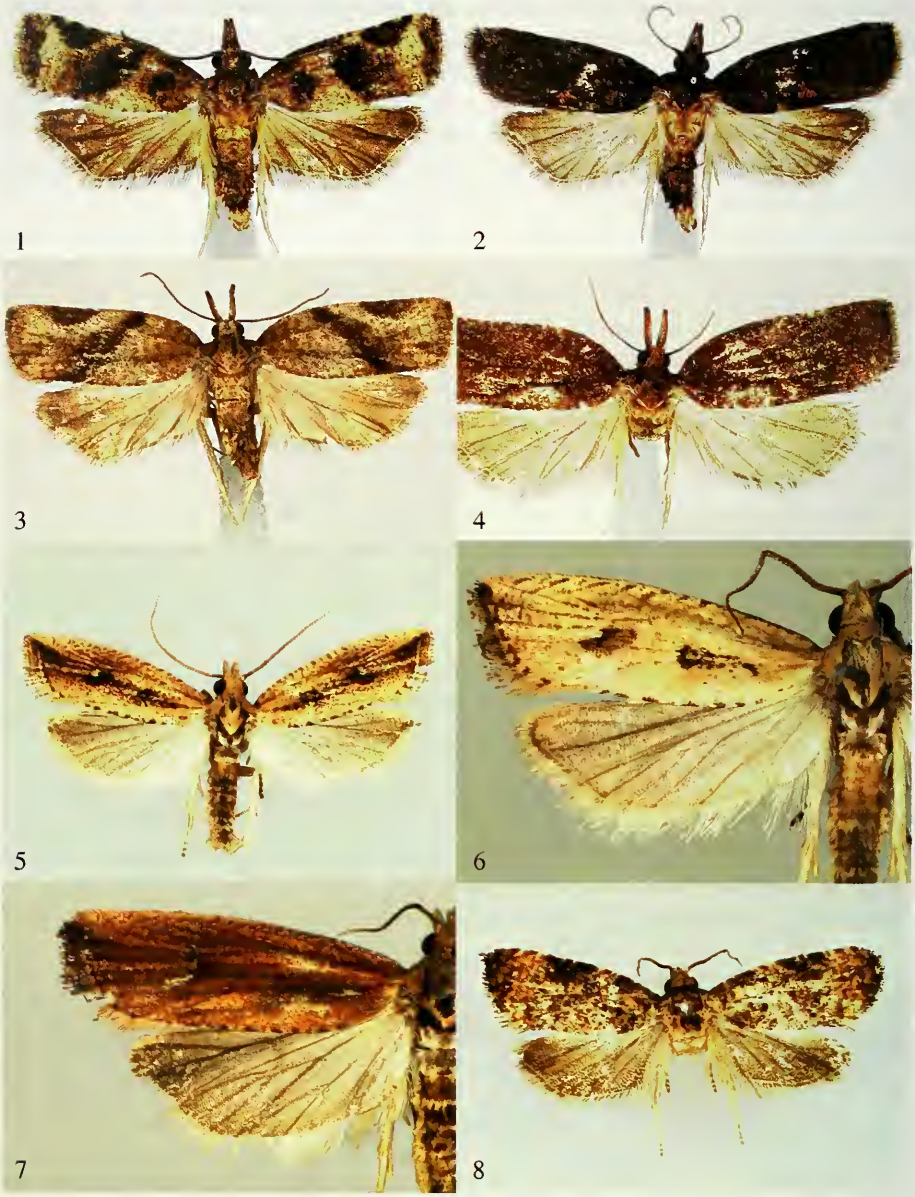
Platynota colobota Meyrick, 1926 Figs 1-4, 35, 36, 59

Platynota colobota Meyrick, 1926 – Linsley & Usinger (1966: 163).

MATERIAL EXAMINED: 96 ♂, 117 ♀. – *Floreana*: Las Cuevas; Finca Las Palmas, 300 m. – *Isabela, Volcan Alcedo*: 300 m; near pega-pega camp, 483 m; 570 m; 850 m; 900 m; 1100 m; East side, 700 m; Nort-east side, Guayabillos Camp, 700 and 900 m; cumbre, La Caseta, 1100 and 1200 m; *Isabela, Volcan Darwin*: base; 200 m; 300 m; 400 m; 630 m; 700 m; 900 m; 1000 m; 1240 m. *Isabela, Volcan Sierra Negra*: Puerto Villamil; 1 and 2 km W Puerto Villamil; 3, 8.5, 11, and ± 15 km N Puerto Villamil; pampa zone, 1000 m. – *Marchena*: no precise locality. – *Pinta*: ± 50 m; 200 m; 400 m; 421 m. – *Rabida*: Tourist trail. – *San Cristobal*: Puerto Baquerizo; 4 km SE Puerto Baquerizo; 1 km S El Progreso; SW El Progreso, 75 m; base of Cerro Pelado; pampa zone. – *Santa Cruz*: CDRS, Invertebrates laboratory, 11 m; CDRS, Barranco, 20 m; 4 and 5 km N Puerto Ayora, transition zone; casa L. Roque-Albelo & V. Cruz, 137 m; transition zone, recently cut road; Tortuga Reserve, W Santa Rosa; Finca S. Devine; Finca Vilema, 2 km W Bella Vista; near (NNW) Bella Vista, 223 m; Los Gemelos, 580 m; – *Santiago*: Bahia Espumilla; Cerro Inn; 200 m elevation; Aguacate, 520 m; Central, 700 m; Jaboncillo, ± 850 m; N side, 147 m. Deposited in BMNH, CDRS, CNC, MHNG, ZMJU.

DIAGNOSIS: This is a highly variable species (Figs 1-4). The colour ranges from pale to dark brown, and sometimes slightly reddish brown. The forewing pattern may be completely absent or consist of a darker costal spot postmedially and a more or less complete diagonal band from costa subbasally to dorsal margin medially. The wingspan ranges between 11-15 mm in males, and between 12-19 mm in females. The species can be separated easily from the other Galapagos Tortricidae by the long, porrect labial palpi reaching beyond eye by 2.75 largest eye diameter in females, and 1.75 in males. The species is similar in male genitalia to *Sparganothis subacida* Meyrick described from French Guiana (Clarke, 1958: 220), but in the latter the forewing seems to have only oblique and darker pattern elements subapically, and the male genitalia have the uncus shorter, the socii narrower, and the valvae wider at base than towards apex.

REMARKS: This species was described on the basis of a male collected on Albemarle [=Isabela] Island, Galapagos (Meyrick, 1926). It is believed to be endemic to the archipelago. The holotype, deposited in the BMNH (slide JFGC 9424) was examined by the second author (BL) and is illustrated by Clarke (1958: 178). So far the species has been found on the islands of Isabela, Marchena, Pinta, Rabida, San Cristobal, Santa Cruz, and Santiago from sea level to the volcanoes rims (e.g. Alcedo, Darwin, Sierra Negra) at 1000, 1240, and 1000 m respectively. Larvae were reared from leaves of *Psidium guajava* L. (Myrtaceae; vouchers in BMNH), *Pteridium*



FIGS 1-8

Adults of Galapagos Sparganothini and Bactrini. (1, 2) *Platynota colobota* males: (1) Santiago, 8.iv.1992, MHNG; (2) Isabela, 18.v.1992, MHNG. (3, 4) *P. colobota* females: (3) Pinta, 18.iii.1992, MHNG; (4) Isabela, 6.iv.2002, MHNG. (5-7) *Bactra philocherda*: (5) ♂, Santa Cruz, 4.v.2002, MHNG; (6) ♂, Santa Cruz, 1.iv.1992, MHNG; (7) ♀, San Cristobal, 25.ii.2005, MHNG. (8) *Endothenia eidolon*: ♀, San Cristobal, 18.ii.1989, CNC.

aquilinum (L.) Kuhn (Polypodiaceae; vouchers in CNC), *Chioccoca alba* (L.) Hitch. (Rubiaceae; vouchers in CDRS), and *Clerodendrum molle* HBK. (Verbenaceae; vouchers in CDRS). The moths likely fly all year round; we have studied specimens collected from January to May and from September to December.

We examined 17 genitalia preparations made from specimens from all of the islands of occurrence except Marchena and Rabida, from which we have seen only one specimen each, and there is no significant variation, unlike the forewing pattern and colour.

Bactrini

Bactra philocherda Diakonoff, 1964 Figs 5-7, 37, 38, 60

Bactra philocherda Diakonoff, 1964: Peck *et al.* (1998: 227); Causton *et al.* (2006: 141).

MATERIAL EXAMINED: 37 ♂, 31 ♀. – *Floreana*: close to Loberia, 6 m. – *Isabela Volcan Alcedo*: higher arid zone, 200 m; NE side, pega-pega camp, 400 m; NE side, guayabillos camp, 700 m; NE side, cumbre, caseta Cayot, 1100 m. – *San Cristobal*: near Loberia, sea level; antiguo botadero, 4 km SE Puerto Baquerizo, 169 m; La Toma, ca. 5.6 km E El Progreso, 299 m; East side of El Junco, 654 m; shore of El Junco, 655 m. – *Santa Cruz*: Bahia Conway; 4 km N Puerto Ayora; Finca Vilema, 2 km W Bella Vista; NNW Bella Vista, 225 m; Los Gemelos; vic. Mirador, W Media Luna, ± 620 m; Media Luna, pampa zone. – *Santiago*: Bahia Espumilla; 200 m [above Bahia Espumilla]; Aguacate camp, 520 m; Central camp, 700 m; Jaboncillo camp, ± 850 m; NE side, close to Caseta, 686 m. Deposited in BMNH, CDRS, CNC, MHNG, ZMJU.

DIAGNOSIS: The Galapagos specimens vary in colour from pale beige to reddish brown (Figs 5-7). The pattern is usually inconspicuous and consists mainly in a median longitudinal line with a dark brown (and often white) spot at the end of the cell. The wingspan of the males is 10-17 mm, and that of the females 10-20 mm. Compared to other Galapagos species, *Bactra philocherda* can be separated by its relatively large size, the elongate and apically produced forewing, and the relative absence of forewing pattern. With regards to the other species of *Bactra*, Diakonoff (1964) mentions that this species is related to *B. boschmai* Diakonoff from Central West New Guinea and *B. limitata* Diakonoff from Java, but the 'clear differences' in the male genitalia are not mentioned specifically.

REMARKS: This species was described from Dominica, but it occurs also in Angola, Brazil, Cuba, Jamaica, Panama, Peru, and the U.S.A. (Florida) (Diakonoff, 1964). The holotype in the USNM was not examined, but the well-illustrated description provides sufficient information for a confident identification. A paratype from Pompano, Florida, was reared from *Cyperus* sp. (Cyperaceae), but none of the Galapagos specimens have been reared. Peck *et al.* (1998) and Causton *et al.* (2006) reported the species from the islands of Santa Cruz and Santiago. We have examined Galapagos specimens collected on these two islands, but also on Floreana, Isabela, and San Cristobal. These were collected at light or with the net mostly in the highest (pampa) zone of these islands (up to 1100 m on Isabela, Alcedo), but also at sea level and intermediate elevations, between January and June.

Endothenia eidolon Razowski & Pelz, 2002 Figs 8, 39, 61

MATERIAL EXAMINED: 4 ♂, 1 ♀. – *Isabela*: Volcan Alcedo, NE side, Guayabillos camp, 700 m; Volcan Sierra Negra, 11 km N Puerto Villamil. – *San Cristobal*: pampa zone. Deposited in CDRS, CNC, MHNG, ZMJU.

DIAGNOSIS: The five available specimens have a wingspan of 9 to 10 mm. None is in perfect condition and no differences in colour or pattern can be detected (Fig. 8). The species is very close to the Holarctic *E. hebesana* (Walker, 1863), but it has the uncus more rounded at apex laterally and the valva slightly wider towards apex. *Endothenia eidolon* can be separated from several other small, mostly dark brown Galapagos Tortricidae by the absence of forewing terminal spots and tornal speculum. However, the male genitalia (Fig. 39), especially the uncus and base of valva, are critical to examine for accurate determination, especially with regard to the externally similar *Megalota johni*, described below.

REMARKS: This species was described from the continent (Ecuador, Morona-Santiago Province) and is still the only one of the genus to occur in South America. The Galapagos specimens do not differ from the type. They have been collected so far only on Isabela and San Cristobal. The host plants are unknown. The female genitalia are described here for the first time: Sterigma subsquare, submembranous; vicinity of ostium bursae strongly sclerotized, forming posterior broadening; sclerite of antrum slender; signum moderate, typical of genus.

Olethreutini

Hedya brunneograpta Razowski & Landry, sp. n. Figs 9, 10, 41, 42, 62

MATERIAL EXAMINED: Holotype male: 'HOLOTYPUS' [small, rectangular, orange, printed]; 'ECU[ADOR]. GALAPAGOS, Alcedo | Isabela, North East side 200m | 14 IV 2002 U[ltra]V[iolet]L[ight] | L. Roque & B. Landry' [white, printed, except 'Alcedo']; '27. ♂ Geneve' [yellow, printed except for '♂']; 'HOLOTYPE | Hedya | brunneograpta | Razowski & Landry' [red, handwritten]. Deposited in the CDRS.

Paratypes: 41 ♂, 30 ♀, 2 of undetermined sex from the Galapagos Islands, Ecuador: – *Espanola*: 1 ♂, 1 ♀, Las Tunas Trail, 100 m elev[evation]., 30.iv.1992, M[ercury]V[apour] L[amp] (B. Landry). – *Fernandina*: 1 ♂, 2 ♀ (one dissected, slide Zajda '26. ♀ Geneve', CDRS), North side, 1300 m, S 00° 21.862', W 091° 34.308', 15.i.2002 UVL (L. Roque, C. Causton); 1 ♀, SW side, GPS: 815 m elev., S 00° 21.270', W 091° 35.341', 11.ii.2005, UVL (B. Landry, P. Schmitz); 2 ♂, same data except: crater rim, 1341 m elev., S 00° 21.910', W 091° 34.034', 12.ii.2005; 1 ♂, same data except: 13.ii.2005; 1 ♀, Punta Espinosa, 12.v.1992, MVL (B. Landry). – *Floreana*: 1 ♀ (dissected, Slide MHNG [ENTO] 3081), Scalesias near Cerro Pajas, GPS: elev. 329 m, S 01° 17.743', W 90° 27.111', 12.iv.2004, UVL (P. Schmitz). – *Isabela*: 1 ♂, 3 km N S[an]to Tomas, Agr[iculture]. Zone, 8.iii.1989, MVL (B. Landry); 1 ♂, 1 ♀, Alcedo, NE slope, Los Guayabillos Camp, 892 m, 1.iv.2004 (B. Landry, P. Schmitz); 1 ♀, V[olcan]. Alcedo, North East side, 900 m, Guayabillos Camp, 16.iv.2002, UVL (L. Roque, B. Landry); 1 ♂, Alcedo, lado NE, 700 m, camp guayabillos, 16.iv.2002, UVL (B. Landry, L. Roque); 1 ♀, Alcedo, lado NE, cumbre, caseta Cayot, 17.iv.2002 (B. Landry, L. Roque); 2 ♀, V. Darwin, 300 m elev., 15.v.1992, MVL (B. Landry); 1 ♂, V. Darwin, 1240 m elev., 19.v.1992 (B. Landry); 1 ♂, V. Alcedo, 300 m elev., 10.x.1998, UVL (L. Roque); 2 ♂, V. Alcedo: 850 m, 12.x., and 1100 m, 13.x. – *Pinta*: 1 ♀, 400 m elev., 18.iii.1992, MVL (B. Landry). – *San Cristobal*: 2 ♀, pampa zone, 15.ii.1989, MVL (B. Landry); 1 ♂, La Toma, ca. 5.6 km E El Progreso, GPS: 299 m elev., S 00° 55.356', W 089° 31.089', 23.ii.2005, uvl (B. Landry); 2 ♂, El Junco, East side, GPS: 654 m elev., S 00° 53.734', W 089° 28.727', 25.ii.2005, UVL (B. Landry). – *Santa Cruz*: 4 ♂ (one dissected, Slide BL 1237, CNC), 3 ♀ (one dissected, Slide Zajda '4. Landry', CNC), Media Luna, Pampa zone, 21.i.1989, MVL (B. Landry); 1 ♀, 5 km N Puerto Ayora, 23.i.2003, outdoor [white] light (L. Roque); 1 ♀, Los Gemelos, 31.i.1989, MVL (B. Landry); 1 ♀, Tortuga Res[erve]., W S[an]ta Rosa, 6.ii.1989, MVL (B. Landry); 1 ♂, Media Luna, Pampa zone, 8.ii.1989, MVL (B. Landry); 1 ♀, Los Gemelos, 4.v.2002, UVL (B. Landry, L. Roque); 1 ♂, 1 ♀, Los Gemelos, 27.v.1992, MVL (B. Landry); 2 ♂ (one dissected, Slide Zajda '28. Geneve', CDRS), 2 unknown sex, 5 km N Puerto Ayora, Transition Zone, 17.ix.2001, UVL (L.

Roque); 3 ♂, 5 ♀, Media Luna, 580 m[eters]s[obre el]n[ivel del]m[ar], Miconia pampa zone, S 00° 39' 28.7", W 090° 19' 37.8", in fluorescent light trap (L. Roque); 5 ♂, Los Gemelos, xii.2001, UVL (L. Roque). – *Santiago*: 2 ♂, 1 ♀, 200 m elev., 5.iv.1992, MVL (B. Landry); 2 ♂, Aguacate, 520 m elev., 6.iv.1992, MVL (B. Landry); 1 ♂, Aguacate, 7.iv.; 3 ♂, Aguacate, 12.iv.; 2 ♀, Central, 700 m elev., 9.iv.1992, MVL (B. Landry); 1 ♂, Central, 10.iv.1992. Deposited in BMNH, CDRS, CNC, MHNG, ZMJU.

DIAGNOSIS: Close to *Hedya olorina* (Walsingham, 1914), **comb. n.**, described from Tabasco, Mexico. *H. brunneograpta* differs from *olorina* in the weakly convex sacculus, the smaller ventral lobe, and the lack of median and postmedian groups of setae. The female of *brunneograpta* is characterized by unequally sized signa (the proximal is larger), whilst in *olorina* the signa are small and similar in size. From the other mostly brown Galapagos species of Tortricidae, *H. brunneograpta* can be distinguished by the absence of a forewing speculum with black spots and by the presence of well-marked brown or rust-brown median and subterminal fasciae.

DESCRIPTION: Adult (Figs 9, 10). Wingspan 12 mm. Head ferruginous. Base of tegula brown, remaining parts of thorax brown, apex of tegula whitish grey. Costa of forewing slightly convex, termen weakly oblique, hardly convex. Ground colour glossy whitish with grey scaling; costal strigulae fine, concolorous; dorsum and base of wing suffused with grey, strigulated with brown. Markings rust brown: basal blotch reduced in dorsal half, consisting of a few costal and median spots; median fascia consisting of slenderer costal half and broader mediodorsal portion, usually not reaching dorsum; subterminal fascia parallel to dorsal part of median fascia; terminal fascia weak; cilia paler than markings. Hindwing cream brown, brown in distal portion; cilia concolorous with middle of wing, whiter in anal area.

Variation: Wingspan 11-14 mm. Ground colour of forewing more or less grey or white with more or less distinct suffusions or strigulation. Markings rust to brown. Some specimens with forewing ferruginous and rust brown, diffuse markings.

Male genitalia (Figs 41, 42): Uncus fairly well sclerotized, hairy, tapering to beyond middle, rounded terminally; socii short; base of tuba analis differentiated; valva slender with short basal cavity; sacculus gently convex; ventral incision of valva shallow, limited by posterior lobe; cucullus long; fold short, spiny; sacculus with median group of bristles.

Female genitalia (Fig. 62): Postostial sterigma with large lateral lobes and pair of prominences at posterior edge of ostium bursae; antrum broadening posteriorly; ductus bursae slender, well sclerotized from beyond middle; two funnel-like signa.

ETYMOLOGY: The species name is from *brunneus*, Latin for brown, and *grapta* – *graptos*, Greek for painted, in reference to the forewing colour.

REMARKS: Currently known from eight islands of the Galapagos archipelago where it appears to be more common at highest elevations. The food plant is unknown. Specimens have been collected at light from January to May and in September, October, and December.

Eccopsis galapagana Razowski & Landry, sp. n. Figs 11, 12, 43, 63

MATERIAL EXAMINED: Holotype male: 'HOLOTYPUS' [small, rectangular, orange, printed]; 'ECU[ADOR]. GALAPAGOS | Santa Cruz, Barranco C[harles]D[arwin]R[esearch] S[tation] | 12 IX 2001 U[ltra]V[iolet]L[ight] | L. Roque' [white, printed]; '44. ♂ Geneve.'

[yellow, printed except for '♂']; 'HOLOTYPE | Eccopsis | galapagana | Razowski & Landry' [red, handwritten]. Deposited in the CDRS.

Paratypes: 9 ♂, 25 ♀ from the Galapagos Islands, Ecuador: – *Floreana*: 4 ♂ (2 dissected, Slides Zajda '23. ♂ Landry.', CDRS & MHNG ENTO 3622), 8 ♀ (2 dissected, Slides Zajda '20. ♀ Landry.', CDRS & MHNG ENTO 3623), zona arida, 300 m, Finca Las Palmas, 26.xii.1997, UVL-FL (L. Roque). – *Isabela*: 1 ♂, 3 ♀, Puerto Villamil, 2.iii.1989, M[ercury]V[apour]L[amp] (B. Landry); 2 ♂ (one dissected, Slide Zajda '30. ♂ Geneve.', CNC), 2 ♀, 1 km W Puerto Villamil, 3.iii.1989, MVL (B. Landry); 4 ♀, 2 km W Puerto Villamil, 5.iii.1989, MVL (B. Landry); 1 ♀, 8.5 km N Puerto Villamil, 11.iii.1989, MVL (B. Landry). – *San Cristobal*: 1 ♂, 2 ♀, P[uer]to Baquerizo, 17.ii.1989, MVL (B. Landry); 1 ♀, antiguo botadero, ca. 4 km SE Pto Baquerizo, GPS: 169 m elev[ation]., S 00° 54.800', W 089° 34.574', 22.ii.2005, UVL (B. Landry). – *Santa Cruz*: 1 ♀, C[harles]D[arwin]R[esearch]S[tation], arid zone, 3.ii.1989, MVL (B. Landry); 1 ♀, 2 km W Bella Vista, 27.ii.1989, MVL (B. Landry); 1 ♂, 2 ♀, same data as holotype. Deposited in BMNH, CDRS, CNC, MHNG, ZMJU.

Diagnosis: Similar to *Eccopsis floreana* sp. n. but male with long, curved spine from the terminal part of the left sacculus and shorter and wider uncus with thick apical spines, and female with longer sclerite of antrum and basal position of ostium. From the other Galapagos species of Tortricidae the two *Eccopsis* species are most similar to *Bactra philocherda* in colour, but the latter is generally larger and its markings, when present, are longitudinal along the middle of the forewing (Figs 5-7). Almost all *Eccopsis* are characterized by the presence of basal lobes on the valvae. In *E. wahlbergiana* Zeller, 1852, the type-species of the genus, the basal lobes are strongly reduced and the socii are more rigid than in the two Galapagos species. The apical concavity of the uncus, often well developed in African *Eccopsis*, is strongly reduced in the Galapagos species and the asymmetry of the valvae is stronger.

Description: Adult (Figs 11, 12). Wingspan 11 mm. Head and thorax pale brownish cream; labial palpus about twice longer than diameter of eye. Forewing mostly beige on basal half; mostly dark brown suffused with white-tipped scales in distal half; with light to dark chestnut brown scales below costa distally and below apex; darker brown along outer margin; main dark brown markings as oblique band before middle of costa and as blotch on dorsum medially; costal strigulae cream, divisions ochreous brown; cilia a mixture of dark brown and chestnut brown, beige-tipped scales, with longer whitish brown scales at termen. Hindwing mostly brown; whitish brown at base, with darker brown on venation; cilia pale greyish brown and white.

Variation: Wingspan 10.5-12 mm. Ground colour of forewing sometimes mostly ochreous cream, obscuring brown markings; sometimes (Fig. 12) with darker brown covering most of wing except basal 2/5 along costa and distal third.

Male genitalia (Fig. 43): Uncus slender with terminal hairs and spines; socius drooping, hairy; valvae asymmetrical, without basal lobes; right valva: sacculus uniformly convex, with marginal setae reaching end of neck of valva and group of spines at ventral angle of cucullus; cucullus elongate, angled ventro-caudally; fold short; left valva: sacculus longer, less convex than in right valva, with triangular termination armed with long, hooked spine and, more dorsal, group of shorter and longer spines; cucullus short, subtriangular with ventro-caudal angle; fold long; aedeagus large, curved, convex ventro-subterminally, membranous dorsally.

Female genitalia (Fig. 63): Postostial part of sterigma forming pair of large lobes connected with ostium area by means or weak sclerites; sclerite of antrum long; signum half-moon-shaped with four proximal processes.

ETYMOLOGY: The species name refers to the Galapagos Islands.

REMARKS: This probable Galapagos endemic has been found so far on four of the Galapagos islands between sea level and 300 m. The host plant is unknown. This is the first species of the genus to be recorded from outside of the Afrotropical region, where it is widely spread, including on islands such as Cape Verde, the Comoros, and Madagascar. The genus was revised by Aarvik (2004). The New World fauna of *Eccopsis* includes several more undescribed species (JR, unpublished).

Eccopsis floreana Razowski & Landry, sp. n. Figs 13, 14, 44, 64

MATERIAL EXAMINED: Holotype male: 'HOLOTYPUS' [orange, printed]; 'ECU[ADOR]., GALAPAGOS | Española, Las Tunas | Trail, 100 m elev[ation]., | 30.iv.1992, M[ercury]V[apour]L[amp] | *leg*. B. Landry' [white, printed]; 'MHNG ENTO | Prép. micr. | No 3090 ♂' [white, printed, except for 'MHNG' and number and ♂]; '29. ♂ Landry.' [white, printed, except for ♂]; 'Photograph | M. Kopec' [green, printed]; 'HOLOTYPE | Eccopsis | floreana | Razowski & Landry' [red, hand-written]. Deposited in the MHNG.

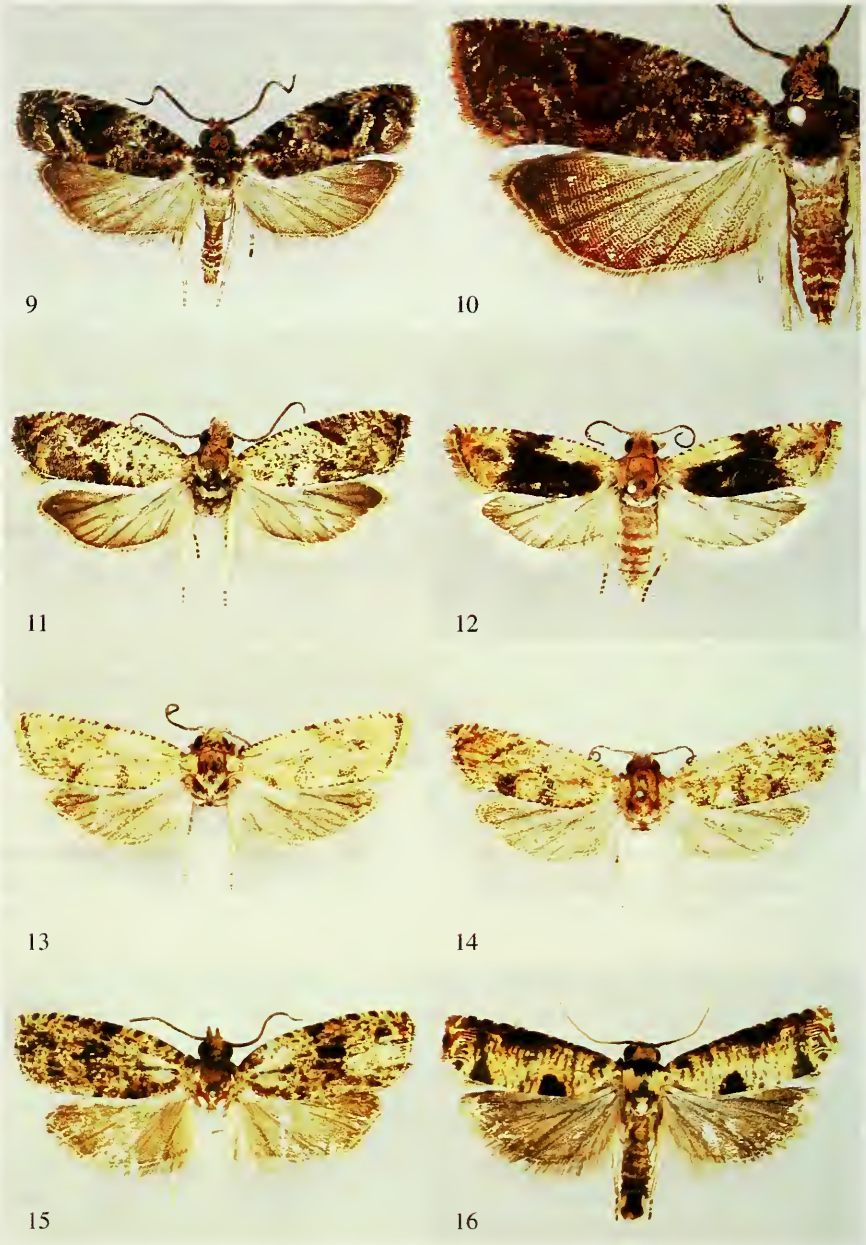
Paratypes: 8 ♂, 17 ♀ from the Galapagos Islands, Ecuador: – *Espanola*: 1 ♀ (dissected, Slide MHNG [ENTO] 3092), same data as holotype; 7 ♀, Bahia Manzanillo, 25.iv.1992, M[ercury]V[apour]L[amp] (B. Landry); 1 ♂, 2 ♀ (one dissected, Slide MHNG [ENTO] 3091), idem except 29.iv.1992. – *Floreana*: 1 ♀, Punta Cormoran, 21.iv.1992, MVL (B. Landry); 1 ♂, Las Cuevas, 23.iv.1992, MVL (B. Landry). – *Pinta*: 1 ♀, Plaja Ibbetson, 14.iii.1992, MVL (B. Landry); 1 ♂, 1 ♀, arid zone, 15.iii.1992, MVL (B. Landry); 1 ♂, 1 ♀, Cabo Ibbetson, N 00° 32.819', W 90° 44.229', 8 m elev[ation]., 15.iii.2006, U[ltra]V[iolet]L[ight] (P. Schmitz, L. Roque); 1 ♀, 200 m elev., 16.iii.1992, MVL (B. Landry); 2 ♂, ± 50 m elev., 20.iii.1992, MVL (B. Landry); 1 ♂ (dissected, Slide MHNG [ENTO] 3093), ± 15 m elev., 21.iii.1992, MVL (B. Landry). – *Santa Cruz*: 1 ♀, littoral zone, Tortuga Bay, 29.i.1989, MVL (B. Landry); 1 ♂ (dissected, Slide Zajda '19 ♂ GALAPAGOS', CNC), 1 ♀ (dissected, Slide Zajda '20 ♀ GALAPAGOS', CNC), C[harles]D[arwin]R[esearch]S[tation], arid zone, 3.ii.1989, MVL (B. Landry). Deposited in BMNH, CDRS, CNC, MHNG, ZMJU.

DIAGNOSIS: Closely related to *E. galapagana* but the male can be distinguished by the large triangular lobe on the middle part of the valva, the lack of a long spine from the terminal part of the left sacculus, and the longer and narrower uncus without strong spines apically. The female has a shorter sclerite in the antrum and the ostium is more apically positioned, just beyond the middle of the sternite.

DESCRIPTION: Adult (Figs 13, 14). Wingspan 10 mm. Head and thorax pale ochreous cream; labial palpus 1.2 times diameter of eye, darker. Forewing uniformly broad throughout; pale ochreous cream with indistinct darker suffusions and trace of costal portion of median fascia; tornal area finely strigulated with brown, a line from dorsum and termen concolorous; dots along costa and dorsum fine, brown; cilia as ground colour. Hindwing white at base, pale brown towards termen; cilia pale brown and white.

Variation: Wingspan 8-10 mm. In some paratypes ground colour of forewing brownish cream to brownish orange; strigulation more or less distinct; markings brown or grey-brown in form of two or three transverse lines; median fascia complete or interrupted, or only tornal blotch present.

Male genitalia (Fig. 44): Uncus long, slender, expanding terminad; socius slender, slightly expanding terminally; valvae asymmetric, with long neck and short cucullus; right valva with small, elongate median lobe and group of shorter bristles, and rather short cucullus; left valva with larger lobe, stronger bristles and shorter cucullus; aedeagus fairly short, bent.



FIGS 9-16

Adults of Galapagos Olethreutini. (9, 10) *Hedya brunneograpta* paratypes: (9) ♂, Isabela, 8.iii.1989, CNC; (10) ♀, San Cristobal, 15.ii.1989, CNC. (11, 12) *Eccopsis galapagana*: (11) Holotype; (12) ♀ paratype, Isabela, 11.iii.1989, CNC. (13, 14) *E. floreana*: (13) Holotype; (14) ♀ paratype, Española, 29.iv.1992, MHNG. (15) *Megalota johni*, holotype. (16) *Episimus transferranus*: ♂, Santa Cruz, 7.iv.2004, MHNG.

Female genitalia (Fig. 64): Lobes of postostial sterigma weak, submembranous; cup-shaped part of sterigma distinct; sclerite of antrum occupying posterior 1/3 of ductus bursae; signum with several processes.

ETYMOLOGY: The species epithet refers to one of the islands of occurrence, Floreana.

REMARKS: This *Eccopsis* species is probably endemic to the Galapagos, where it has been collected at light on four islands, mostly at sea level, but also up to 200 m in elevation, between January to April. The host plant is unknown.

Megalota johni Razowski & Landry, sp. n. Figs 15, 40

MATERIAL EXAMINED: Holotype male: 'ECU[ADOR]. GALAPAGOS | Isabela. V[olcan]. Alcedo | 850 m elev., 12 x 1998 | U[ltra]V[iolet]L[ight]. leg. L. Roque' [white, printed]; 'HOLOTYPE | Megalota | johni | Razowski & Landry' [red, hand-written]; Photagraph [sic] | M. Kopec' [green, printed]; '42. ♂ Geneve.' [yellow, printed except for ♂]. Deposited in the CDRS.

DIAGNOSIS: Related to *M. delphinosema* (Walsingham, 1913) but distinguished by the much smaller dorsobasal processes of the valvae. In *M. delphinosema* the valvae are longer and slenderer than in this species and the aedeagus shorter and distinctly bent in the middle. Among the Galapagos Tortricidae *Megalota johni* is similar to *Endothenia eidolon* in ground colour and absence of forewing speculum. It can be separated from that species by the distinct male genitalia, notably the very broad uncus and the more complex features of the valvae.

DESCRIPTION: Adult (Fig. 15). Wingspan 13.5 mm. Head and thorax dark brown and brownish cream, and base of tegula dark brown; labial palpus about 2 times diameter of eye, brownish cream basally, browner posteriorly. Ground colour of forewing dirty cream sprinkled and strigulated with brown; costal divisions brown; markings paler (worn) consisting of incomplete median fascia and weak subterminal and terminal fasciae; basal blotch reduced to series of spots; cilia (worn) concolorous with ground colour, with some brown divisions. Hindwing white on costa, brown elsewhere, slightly darker at apex; cilia concolorous with middle of wing.

Male genitalia (Fig. 40): Uncus very broad, slightly concave apically; dorsobasal lobe of valva large, provided with both short and long spines and bristles; group of bristles dorsally to terminal part of sacculus; with group of long setae just beyond middle of sacculus; aedeagus slender; cornuti absent.

Female unknown.

ETYMOLOGY: The species is named after Dr. John W. Brown who kindly compared our specimens with the Neotropical species of *Megalota*.

REMARKS: Known from a single male, this species is probably native given that Volcan Alcedo has never been inhabited by humans except when Galapagos Park wardens or scientists spend time in temporary camp sites or at the hut (caseta Linda Cayot) built on the crater rim. The area also has been visited by tourists on day-time outings in the past.

Episimus transferranus (Walker, 1863) Figs 16, 45, 46, 65

Episimus transferranus (Walker, 1863): Peck *et al.* (1998: 227); Causton *et al.* (2006: 141).

MATERIAL EXAMINED: 8 ♂, 9 ♀. – *Floreana*: Finca Las Palmas, 300 m. – *Isabela*, 3 km Sto Tomas, agricultural zone. – *San Cristobal*: La Toma, ca. 5.6 km E El Progreso, 299 m; SW

El Progreso, 75 m. – *Santa Cruz*: CDRS, Barranco; NNW Bella Vista, 223 m; Finca Vilema, 2 km W Bella Vista; transition zone, recently cut road. Deposited in CDRS, CNC, MHNG, ZMJU.

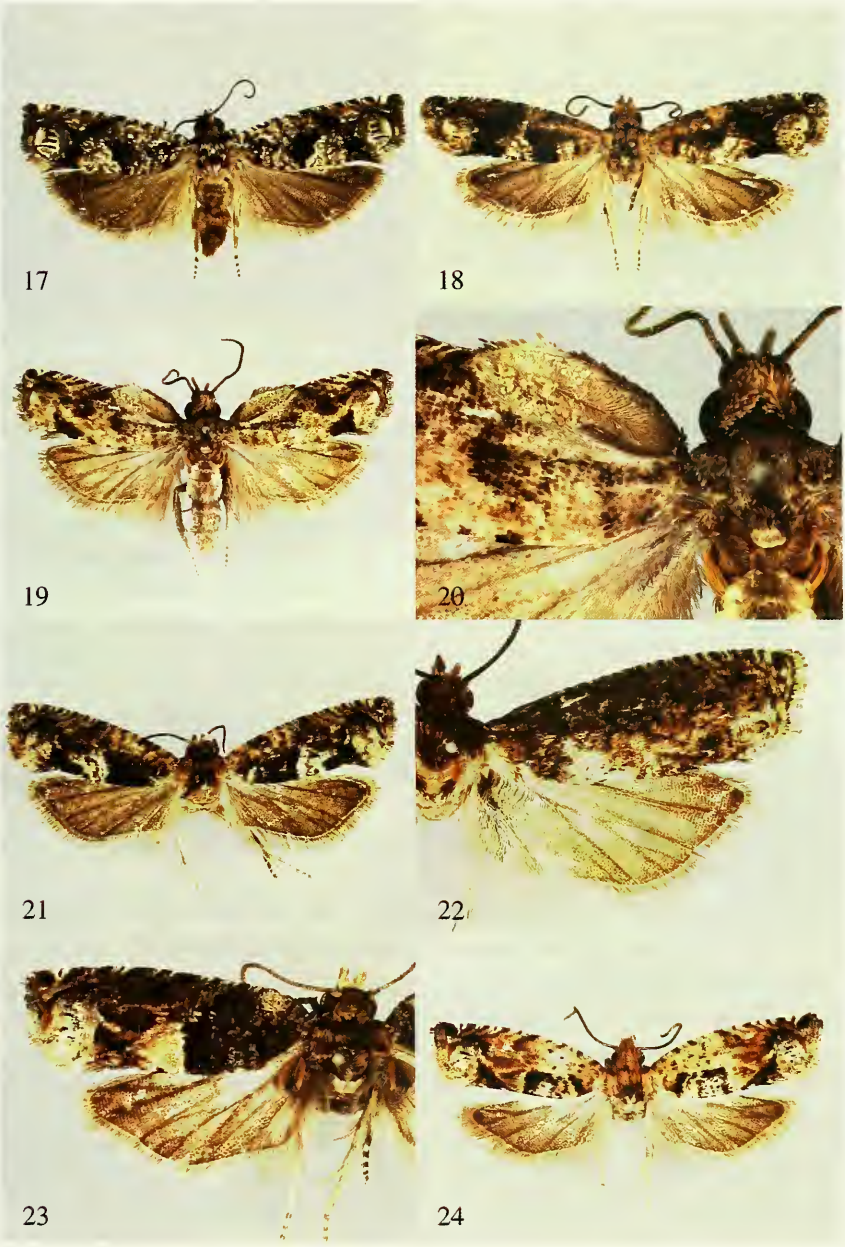
DIAGNOSIS: The deep dark brown spot before the middle of the forewing dorsal margin (Fig. 16) readily distinguishes this species from all of the other Galapagos Tortricidae. In the presence of the same kind of spot on the forewing dorsal margin this species is most similar to *E. augmentanus* (Zeller, 1877) from Cuba and south Florida, but in *E. transferranus* the vertex is dark fuscous, as opposed to orange-buff (Heppner, 1994), the cucullus is longer and slenderer, and the sclerite of the antrum is longer.

REMARKS: Described from Brazil (Amazonas), *Episimus transferranus* has a circum-Caribbean distribution, from the Southern USA (Florida and Texas) to Venezuela, south to Brazil (Heppner, 1994). It was reported from the Galapagos island of Isabela by Peck *et al.* (1998) and by Causton *et al.* (2006), and we add Floreana, San Cristobal, and Santa Cruz to this distribution. Most of the Galapagos specimens were collected at light, between December and May, between 75 and 330 m in elevation. One specimen was reared on Floreana by LR from *Spondias purpurea* L. (Anacardiaceae; vouchers in CDRS), which was recorded also as a host plant for this species in Robinson *et al.* (2007). Other known host plants are also in the Anacardiaceae (Heppner, 1994; Robinson *et al.*, 2007).

Episimus alcedanus Razowski & Landry, sp. n. Figs 17, 47, 66

MATERIAL EXAMINED: Holotype male: 'ECU[ADOR]., GALAPAGOS | Isabela, V[olcan]. Darwin | 300 m elev[ation]., 15.v.1992 | M[ercury]V[apour]L[amp], *leg*[*it*]. B. Landry' [white, printed]; 'HOLOTYPE | Episimus | alcedanus | Razowsky & Landry' [red, hand-writtten]. Deposited in the MHNG.

Paratypes: 9 ♂, 30 ♀ from the Galapagos Islands, Ecuador. – *Fernandina*: 1 ♀, North Side, 300 m, S 00° 20.541', W 091° 36.815', 12.i.2002, U[ltra]V[iolet]L[ight] (L. Roque, C. Causton); 1 ♂, SW side, GPS: 352 m elev., S 00° 20.503', W 091° 36.969', 10.ii.2005, UVL (B. Landry, P. Schmitz); 1 ♂, 1 ♀, Zona de vegetacion, #98: 74, 19.vi.1998, B[lack].L[ight].-F[luorescent].L[ight]. (L. Roque, C. Causton); 1 ♀, Vegetation Zone, S 00° 17' 2.5", W 091° 31' 13.3", LR #98: 74, 19.vi.1998, BL Trap (L. Roque, C. Causton). – *Genovesa*: 1 ♀, Bahia Darwin, 26.iii.1992, M[ercury]V[apour]L[amp] (B. Landry). – *Isabela*: 1 ♂ (dissected, Slide Zajda '18. ♂ Landry.', CDRS), V[olcan]. Darwin, 200 m, No. 99. 16, 11.ii.1999, UVL (L. Roque); 1 ♀, V. Darwin, campamento base, #2000-04, 1.iii.2000, BL-W[hite]L[ight] Trap (L. Roque); 1 ♀, Volcan Darwin, 200 m[eters]s[obre el]n[ivel del]m[ar], #2000-05, 2.iii.2000, UVL-WLTrap (L. Roque); 1 ♀, Puerto Villamil, 2.iii.1989, MVL (B. Landry); 1 ♀, Volcan Darwin, 400 msnm, #2000-07, 3.iii.2000, UVL-WLTrap (L. Roque); 1 ♂, 5 km W Puerto Villamil, 5.iii.1989, MVL (B. Landry); 2 ♀, Volcan Darwin, 900 msnm, #2000-010, 6.iii.2000, UVL-WLTrap (L. Roque); 1 ♂ (dissected, Slide Baixeras 20262, CNC), 11 km N Puerto Villamil, 9.iii.1989, MVL (B. Landry); 1 ♀, 8.5 km N Puerto Villamil, 11.iii.1989, MVL (B. Landry); 1 ♂ (dissected, Slide MHNG [ENTO] 3063), 1 ♀ (dissected, Slide MHNG [ENTO] 3064), NE slope Alcedo, near shore, GPS: 9 m elev., S 090° 23.619', W 90° 59.715', 29.iii.2004, UVL (B. Landry, P. Schmitz); 1 ♀, Alcedo, lado NE, low arid zone, bosq[ue]. palo santo, 18.iv.2002, UVL (B. Landry, L. Roque); 2 ♀, Tagus Cove, 13.v.1992, MVL (B. Landry); 2 ♀, same data as holotype; 1 ♂, V. Darwin, 630 m elev., 16.v.1992, MVL (B. Landry); 1 ♀, idem except 17.v.1992; 1 ♂ (dissected, Slide MHNG [ENTO] 3065), V. Darwin, 1240 m elev., 19.v.1992, MVL (B. Landry); 1 ♀, near Tagus Cove, 100 m elev., 21.v.1992, MVL (B. Landry); 1 ♀, ± 15 km N Puerto Villamil, 25.v.1992, MVL (B. Landry). – *Marchena*: 1 ♀, 12.iii.1992, MVL (B. Landry); 2 ♀, 23.iii.1992, MVL (B. Landry); 2 ♂, 1 ♀ (dissected, Slide Zajda '50. ♀ Geneve', CDRS), Playa Negra, N 00° 18.089', W 090 ° 30.452', 7.iv.2002, UVL (L. Roque). – *Pinta*: 2 ♂, Plaja Ibbetson, 13.iii.1992, MVL (B. Landry); 1 ♂, idem except 14.iii.1992; 1 ♀, arid zone, 15.iii.1992, MVL (B. Landry); 1 ♂, 3 ♀, ± 50 m elev., 20.iii.1992, MVL (B. Landry);



FIGS 17-24

Adults of Galapagos Olethreutini and Eucosmini. (17) *Episimus alcedanus*: ♀ paratype, Isabela, 15.v.1992, MHNG. (18-20) *Epinotia lantana*: (18) ♀, Pinta, 17.iii.1992, MHNG; (19, 20) ♂, Isabela, 25.v.1992, MHNG. (21, 22) *E. microscyphos* paratypes: (21) ♀, Fernandina, 15.i.2002, CDRS; (22) ♂, Santa Cruz, 21.i.1989, CNC. (23, 24) *Crocidosema synneurota*: (23) ♂, Santa Cruz, 17.iii.1989, CNC; (24) ♀, San Cristobal, 14.ii.1989, CNC.

1 ♀, ± 15 m elev., 21.iii.1992, MVL (B. Landry). – *Rabida*: 1 ♀, Tourist trail, 3.iv.1992, MVL (B. Landry). – *Santiago*: 1 ♀, Bahia Espumilla, 4.iv.1992, MVL (B. Landry); 1 ♀, La Bomba, GPS: 6 m elev., S 00° 11.151', W 090° 42.052', 1.iii.2005, UVL (P. Schmitz). Deposited in BMNH, CDRS, CNC, MHNG, ZMJU.

DIAGNOSIS: Closest to *E. prudens* (Meyrick, 1917) from Peru, but with dark brown forewing markings, broad cucullus, and more distal posterior lobe of sacculus. Female genitalia somewhat similar to those of *E. guiana* (Busck, 1913), but differing in the larger signa. Among Galapagos Tortricidae this species is most similar in ground colour and markings (with a forewing speculum) to *Coniostola isabelae*, *Crocidosema synneurota,* and *Dichrorampha galapagana*. *Episimus alcedanus* differs from all these in having the most contrasted black speculum spots in the form of four dashes, with the most terminal one reaching the margin at termen.

DESCRIPTION: Adult (Fig. 17). Wingspan 14 mm. Head and thorax greyish white with grey-black markings. Ground colour of forewing whitish cream suffused with grey, slightly mixed ochreous beyond middle subcostally; strigulation dark grey and blackish grey, in part diffuse. Costal strigulae and part of ocellus white, divisions black. Markings grey-black consisting of dorsopostbasal blotch extending towards middle of wing and almost connecting with costal half of median fascia; remaining markings paler; cilia black except for basal half at median portion of termen and at tornus. Hindwing greyish brown, paler towards base. In female base of wing only slightly paler than the median part.

Variation: Wingspan 12-16 mm. The appearance of the moths may be more or less dark brown with markings varying slightly in shape and contrast.

Male genitalia (Fig. 47): Uncus slender; socius broad, rounded; valva fairly broad; cucullus broad, convex ventrocaudally; sacculus convex in basal half, with moderate posterior lobe.

Female genitalia (Fig. 66): Sterigma almost subsquare; sclerite of antrum shorter than signum; signum large.

ETYMOLOGY: The specific epithet refers to the name of one of the collecting localities, Volcan Alcedo, on the island of Isabela, which peaks at 1125 m.

REMARKS: This species has not been collected on the older Galapagos Islands of Floreana, San Cristobal, Espanola, and Santa Cruz, the latter being the best collected of the archipelago. *Utetheisa devriesi* Hayes (Lepidoptera; Arctiidae) has a similar distribution pattern. These two species probably evolved on one of the younger islands and extended their distribution from there, successfully colonizing other islands where the host plants and habitats were suitable. The host plant is unknown. The moths come to light and have been collected from the sea shore to the pampa zone, such as on the rim of Volcan Darwin, at 1240 m, between January and June.

Eucosmini

Epinotia lantana (Busck, 1910) Figs 18–20, 49, 50, 67, 74

MATERIAL EXAMINED: 1 ♂, 7 ♀. – *Baltra*: intercepted by the Galapagos Quarantine System (SICGAL) with *Pelargonium graveolens* l'Hér. ex Aiton (Geraniaceae). – *Isabela:* Volcan Alcedo, 900 m; Volcan Darwin, 300 and 1300 m; Volcan Sierra Negra, 1000 m. – *Pinta*: 400 m. Deposited in CDRS, CNC, MHNG, and ZMJU.

DIAGNOSIS: Related to *E. microscyphos*, described below, but the male is distinguished easily by the large forewing costal fold and the pair of long, orange hairbrushes arising from the thorax apicolaterally and inserted into pockets of modified scales at the base of the abdomen dorsally (Figs 20, 74). In *E. microscyphos* (Fig. 22), the forewing costa is only slightly modified, there are no hairbrushes arising from the thorax apicolaterally and no modifications of the abdominal tergites I-III, but there are modified black scales at the base of the hindwing and apex of the thorax laterally. The male genitalia of *E. lantana* have a smaller but wider and apically blunt uncus (Fig. 49) and the costa of the valva has a sharp bend before midlength and its sacculus is much more pronounced than in *E. microscyphos* (Fig. 48). The female genitalia (Fig. 67) can be separated from those of *E. microscyphos* (Fig. 68) by the position of the ostium at the apical edge of the shallowly concave sternite VII, compared to an ostium situated near the middle of a deeply concave sternite VII, the narrow sclerotized ring around the ostium compared to a larger cup-shaped structure, and the wide paired lamella postvaginalis with a small, elongate median plate entering into the ostium compared to a simple, narrow, transverse crescent-shaped plate at the edge of sternite VII. *Crocidosema longipalpana* (Möschler, 1890), described from Puerto Rico, also has a large forewing costal fold and orange brushes on the thorax apicolaterally. *Crocidosema lantana* has a simple sacculus while that of *longipalpana* has a subtriangular fold and the sterigma of *lantana* is broadly rounded while that of *longipalpana* is deeply incised in the middle posteriorly.

REMARKS: This is a Mexican species introduced to the Hawaiian Islands in 1902 for the control of *Lantana camara* L. (Verbenaceae) (Busck, 1910), and redescribed from Australia and Sri Lanka (see Brown, 2005 for synonymy). The lantana flower cluster moth or lantana tortricid moth is known to feed in pods of *Bignonia chrysantha* Jacq. (Bignoniaceae); in flower head, on berries and as a borer in tender twigs of *Lantana camara*; in stems of litchi (*Litchi chinensis* Sonnerat, Sapindaceae); and in terminal twigs of *Tecoma stans* (L.) Juss. ex Kunth in H.B.K. (Bignoniaceae) (Zimmerman, 1978; Robinson *et al.*, 2007). The Galapagos endemic *Lantana peduncularis* Andersson should be surveyed as a possible host of this species. Except for the female intercepted in quarantine, all Galapagos specimens were collected at light and the first Galapagos record is from 12 March 1989 on Sierra Negra, Isabela Island.

Epinotia microscyphos Razowski & Landry, sp. n. Figs 21, 22, 48, 68

MATERIAL EXAMINED: Holotype female: 'HOLOTYPUS' [orange, printed]; 'ECU[ADOR]. GALAPAGOS | Fernandina, North side 1300m | S 00 21.862' W 091 34.308' | 15 I 2002 U[ltra]V[iolet]L[ight] | L. Roque & C. Causton' [white, printed]; 'Photagraph [sic] | M. Kopec' [green, printed]; '24. ♀ Geneve' [yellow, printed except for ♀]; 'HOLOTYPE | Epinotia | microscyphos | Razowski & Landry' [red, hand-written]. Deposited in the CDRS.

Paratypes: 4 ♂, 6 ♀ from the Galapagos Islands, Ecuador. – *Fernandina*: 2 ♀ (one dissected, Slide Zajda '25. ♀ Geneve', CDRS), same data as holotype; 1 ♂ (dissected, Slide MHNG ENTO 3620), vegetation zone, S 00° 17' 2.5", W 091° 31' 13.3", LR # 98-74, 19.vi.1998, B[lack]L[ight] Trap (L. Roque & C. Causton). – *Isabela*: 1 ♂ (dissected, Slide Zajda '40. ♂ Geneve', CDRS), Volcan Darwin, 700 m[eters]s[obre el]n[ivel del]m[ar], LR #2000 – 09, 4.iii.2000, U[ltra]V[iolet]-W[hite]L[ight] Trap (L. Roque); 1 ♀, V[olcan]. Darwin, 630 m elev[ation]., 16.v.1992, M[ercury]V[apour]L[ight] (B. Landry); 1 ♂, idem except 17.v.1992; 1 ♀, V. Darwin, 1240 m elev., 19.v.1992, MVL (B. Landry); 1 ♀, V. Alcedo, 1100 m elev.,

13.x.1998, UVL (L. Roque). – *Santa Cruz*: 1 ♂ (dissected, Slide Baixeras 20266, CNC), Media Luna, Pampa Zone, 21.i.1989, MVL (B. Landry); 1 ♀, Los Gemelos, 27.v.19992, MVL (B. Landry). Deposited in CDRS, CNC, MHNG, and ZMJU.

DIAGNOSIS: Closely related to *E. callida* (Meyrick, 1917) from Peru but distinguished chiefly by the longer uncus. From the Argentinean *E. cosmoptila* (Meyrick, 1917) it differs in the longer, slender cucullus and the much larger basal part of the valva, the longer cup-shaped part of the sterigma, and the presence of long bristles at the distal edge of the sterigma. Also related to *E. lantana* (see Diagnosis above).

DESCRIPTION: Adult (Figs 21, 22). Wingspan 14 mm. Head and proximal part of thorax greyish brown, posterior part of thorax greyish cream; labial palpus about twice as long as diameter of eye, greyish cream medially, cream terminally and along edges. Ground colour of forewing brownish cream suffused with grey-brown, in costal area and near termen scaled with yellowish brown; costal strigulae cream; divisions brownish grey; dorsal patch cream with grey-brown lines; strigulation and lines black; speculum concolorous with dorsal patch, scaled with brown-grey inside, with indistinct spots; cilia cream with greyish brown. Hindwing brown-grey; cilia paler.

Variation: Wingspan 12.5-14 mm. Ground colour of forewing pale brownish grey to grey with ochreous suffusions, dorsum occasionally blackish brown entirely or to dorsal patch; strigulation grey or blackish brown; speculum in a few specimens white with black inner spots; black lines more or less distinct, especially that limiting costal edge of speculum. Two specimens distinctly suffused with blackish grey.

Male genitalia (Fig. 48): Uncus long, uniformly broad; socii long, curved; basal half of valva broad, incision short; cucullus semi-oval, convex ventrocaudally, with small proximal lobe; aedeagus nearly as long as costa of valva.

Female genitalia (Fig. 68): Papillae anales slender; apophyses slender, long; posterior part of sterigma weakly sclerotized, cup-shaped part short; antrum membranous; ductus bursae partly sclerotized in two longitudinal, striated plates; corpus bursae with small digitate projection near connection with ductus bursae, mostly scobinated except for proximal end, with pair of laterally compressed signa of medium length and slightly curved.

ETYMOLOGY: From the Greek *micros*, meaning small, and *scyphos*, meaning a cup, in reference to the cup-shaped part of the sterigma.

REMARKS: This species seems to be restricted to higher elevation habitats of the Galapagos. The few available specimens were attracted to light in January, March, May, June, and October, on the islands of Fernandina, Isabela, and Santa Cruz. The host plant is unknown. The species should be looked for on Santiago, of which the highlands are now free of feral goats and pigs, but it may be absent on the older islands of San Cristobal and Floreana although they seem sufficiently high in elevation to harbor suitable habitats.

Crocidosema synneurota Meyrick, 1926, status revised Figs 23–26, 52–54, 69, 70

Crocidosema synneurota Meyrick, 1926: 276.

Crocidosema plebejana Zeller, 1847: Schaus (1923: 31); Linsley & Usinger (1966: 163); Linsley (1977: 37); Peck *et al.* (1998: 227); Perry & de Vries (2003: 144); Causton *et al.* (2006: 141). Misidentifications.

MATERIAL EXAMINED: 133 specimens of both sexes. – *Espanola*: Bahia Manzanillo; Punta Suarez; Las Tunas Trail, 100 m elevation. – *Fernandina*: North side, 1300 m; SW side, 352 & 1341 m elevation (crater rim). – *Floreana*: zona arida, Finca Las Palmas, 300 m; Punta Cormoran. – *Genovesa*: Bahia Darwin. – *Isabela, Volcan Alcedo*: zona arida baja; zona arida alta; 300 & 570 m elevation; pega-pega camp, 700 m; cumbre, 1200 m. – *Isabela, Volcan Darwin*: 300, 630, 900 & 1000 m elevation. – *Isabela, Volcan Sierra Negra*: Puerto Villamil; 8.5 km N Puerto Villamil; 3 km N Santo Tomas, Agriculture Zone. – *Marchena*: Playa Negra. – *Pinta*: Playa Ibbetson; ± 50, 200 & 400 m elevation. – *Pinzon*: Playa Escondida. – *Plaza Sur*: 18 m elevation. – *Rabida*: Tourist Trail. – *San Cristobal*: Puerto Baquerizo; 1 km S El Progreso; antiguo botadero, 4 km SE Puerto Baquerizo, 169 m; base of Cerro Pelado; La Toma, ca. 5.6 km E El Progreso, 299 m elevation. – *Santa Cruz*: Charles Darwin Research Station, Barranco; low agriculture zone; 5 km N Puerto Ayora, transition zone; Finca Steve Devine; Tortuga Reserve, W Santa Rosa; 2 km W Bella Vista; Los Gemelos, 580 m elevation; Media Luna, miconia - pampa zone, 580 m. – *Santa Fe*: Tourist Trail. – *Santiago*: Bahia Espumilla; La Bomba, 6 m elevation; 200 m elevation; North side, 437 m; Aguacate, 520 m; NE side, close to Caseta, 686 m; Central, 700 m; Cerro Inn. – *Seymour Norte*. Deposited in the BMNH, CDRS, CNC, MHNG, and ZMJU.

DIAGNOSIS: In habitus this is a highly variable species as shown in Figs 23-26. In some cases (not shown) there is a complete dark brown bar on the dorsum of the forewing from the base to the speculum. The abdomen of males varies from cream-coloured dorsally on the first two segments (Fig. 25) to completely dark brown, with intermediates. The wingspan varies from 9 to 14 mm. Strictly among Galapagos Tortricidae, the male of *C. synneurota* is easily recognized by the slightly modified scale patch subbasally on the forewing costa and by the large patch of elongate, grey-brown and cream-coloured scales at the base of the hindwing's cubital stem along with a smaller set of shorter slender scales at the base of the anal sector. The females may be brushed or dissected to unravel the distinctive projections at the base of sternite VII laterally. In male genitalia (Figs 52-54) the shape of the valva varies slightly, as well as the number of large spines of the pollex, counting 1 to 3. In female genitalia (Figs 69, 70) there is variation in the extent and shape of the sclerotization of the base of sternite VII and in the shape of the antrum. This species differs from the Palaearctic *C. plebejana* in the longer, slender uncus postbasally slightly enlarged.

REMARKS: This species was described from Albemarle [Isabela] and Indefatigable [Santa Cruz] Islands, Galapagos. A male 'type' from Albermarle was identified and illustrated by Clarke (1958: 318, 319) and examined by BL in 2000. Another species of *Crocidosema*, *C. ptiladelpha* was described by Meyrick (1917) both from Ecuador and Peru, and Clarke (1958) selected the Peruvian specimen as the lectotype. Based on the illustrations provided in that publication an accurate assessment of these species is impossible because the unci of the specimens are insufficiently visible. Although both *C. synneurota* and *C. ptiladelpha* are presumed to be valid species, more specimens from the continent need to be examined to assess their variability and differences. *Crocidosema synneurota* was reported by Perry & de Vries (2003) (as *C. plebiana* [sic]) as feeding on *Acacia* sp. (Leguminosae). LR reared three specimens at the Charles Darwin Station on flowers of *Abutilon depauperatum* (Hook. f.) Andersson (Malvaceae). LR's collaborator Alejandro Mieles reared a specimen on *Waltheria ovata* Cav. (Sterculiaceae) from Santa Fe. We have examined specimens from the islands of Fernandina, Floreana, Genovesa, Isabela, Marchena, Pinta, Pinzon, Plaza Sur, Rabida, San Cristobal, Santa Cruz, Santa Fe, Santiago, and Seymour Norte,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FIGS 25-32

Adults of Galapagos Eucosmini and Grapholitini. (25, 26) *Crocidosema synneurota*: (25) ♂, Española, 29.iv.1992, MHNG; (26) ♀, Española, 2.v.1992, MHNG. (27, 28) *Strepsicrates smithiana*, males from Santa Cruz: 27. 31.i.1989, CNC; (28) 8.ii.1989, CNC. (29, 30) *Proteoteras atromacula*, female paratypes from Isabela: (29) 9.iii.1989, CNC; (30) 25.v.1992, MHNG. (31, 32) *Coniostola isabelae* paratypes from Isabela: (31) ♂, 15.v.1992, MHNG; (32) ♀, 21.v.1992, MHNG.

between sea level and the rim of high volcanoes (at 1341 m on Fernandina). Linsley & Usinger (1966: 163) mentioned it from Baltra under the name *C. plebiana* [sic]. Specimens have been collected at light in all months of the year except June, July, and August.

Strepsicrates smithiana Walsingham, 1892 Figs 27, 28, 51, 71

Strepsicrates smithiana Walsingham, 1892: Schaus (1923: 31); Linsley & Usinger (1966: 163); Peck *et al.* (1998: 227); Causton *et al.* (2006: 141).

MATERIAL EXAMINED: 62 ♂ and ♀. – *Isabela*: Alcedo, NE side, 900 m, guayabillos camp; Volcan Darwin, 900 m; Sierra Negra, 1 km W Puerto Villamil; Sierra Negra, ± 15 km N Puerto Villamil; pampa zone, 1000 m. – *San Cristobal*: Puerto Baquerizo; 2 km SW Puerto Baquerizo; 4 km SE Puerto Baquerizo; 1 km S El Progreso; base of Cerro Pelado; pampa zone. – *Santa Cruz*: 4 km N Puerto Ayora; Finca S. Devine; Tortuga Reserve, W of Santa Rosa; 2 km W of Bella Vista; Los Gemelos; Media Luna, Pampa zone. (BMNH, CDRS, CNC, MHNG, ZMJU).

DIAGNOSIS: The forewing colour is mostly a mixture of various shades of brown, grey, and white, but one specimen also has olive green. The markings are more or less conspicuous and mostly consist in a large, V-shaped median blotch not reaching dorsum, and two smaller spots near midline subterminally and on dorsum before termen. Paler scaling is present mostly on dorsum below the large blotch and between it and the two smaller spots. There is no distinct speculum, but there is a conspicuous patch of raised scales at $^1/_4$, dorsad of the fold. The male costal fold is strongly developed and hides fine, white hair-like scales (Fig. 27). The male antenna is modified with a notch involving flagellomeres 7-11. The wingspan is fairly constant, around 13 mm, but varies between 10 and 14 mm. The species is somewhat similar to the Australian *S. dilacerata* (Meyrick, 1928), but with almost uniformly broad valvae and a longer aedeagus. Among Galapagos Tortricidae, *Strepsicrates smithiana* is most similar to *Proteoteras atromacula* as mentioned below.

REMARKS: This species was described from St. Vincent, West Indies. It has been reported from British Guiana and from Florida and Georgia, USA, from where it was introduced to Hawaii for the control of firebush (*Morella faya* (Ait. Wilbur, Myricaceae). The larva also feeds on *Morella cerifera* (L.) Small (Myricaceae) and common guava (*Psidium guajava* L., Myrtaceae) (Zimmerman, 1978: 611-615). Fortunately, the invasive *Morella* species do not occur on the Galapagos, but two species of *Psidium* are present on the archipelago (McMullen, 1999; Lawesson *et al.*, 1987). Other Myrtaceae and Myricaceae host plants are listed for this species in Robinson *et al.* (2007). In the Galapagos, the host plants remain unknown. Ferguson *et al.* (1991) record the distribution as widespread in the West Indies and on the mainland from Central America to Massachusetts (USA). *Strepsicrates smithiana* is believed to have been introduced accidentally (maybe on guava) to the Galapagos where it was reported as early as 1923 from the island of Baltra (Schaus, 1923), but no new island records have been reported since. We have examined specimens from Isabela, San Cristobal, and Santa Cruz, all inhabited islands, although on Isabela one specimen each were found on Volcan Alcedo and Volcan Darwin, which have never been inhabited. Interestingly, the species was found commonly on Isabela, San Cristobal, and Santa Cruz in 1989 (55 specimens collected in two months by BL), but since then, only seven specimens have been collected during at least 200 nights of collecting in 1992, and

each year since 1994. Perhaps an external factor has affected this species as mentioned for the following species. The moths are attracted to light and were collected from January until May.

Proteoteras atromacula Razowski & Landry, sp. n. Figs 29, 30, 55, 72

MATERIAL EXAMINED: Holotype male: 'HOLOTYPUS' [orange, printed]; 'ECUADOR | GALAPAGOS | 3 km N. S[an]to Tómas, Agr[iculture]. Zone | 8.iii.1989, M[ercury]V[apour]L[ight] | B. Landry' [white, printed]; 'Photagraph [sic] | M. Kopec' [green, printed]; '15. ♂ Landry.' [white, printed except for ♂]; 'HOLOTYPE | *Proteoteras* | *atromacula* | Razowski & Landry' [red, handwritten]. Deposited in the CNC.

Paratypes: 5 ♂, 13 ♀ from the Galapagos Islands, Ecuador and collected by B. Landry at M[ercury]V[apour]L[ight]. – *Isabela*: 1 ♀, 1 km W Puerto Villamil, 3.iii.1989; 2 ♀, 2 km W Puerto Villamil, 5.iii.1989; 3 ♂, 5 ♀ (one dissected, Slide Zajda '8 ♀ GALAPAGOS', CNC), same data as holotype; 1 ♂, 2 ♀ (one dissected, Slide MHNG ENTO 3621), 11 km N Puerto Villamil, 9.iii.1989; 1 ♂, idem except 13.iii.1989; 2 ♀ (one dissected, Slide MHNG [ENTO] 3083), ± 15 km N P[uer]to Villamil, 25.v.1992. – *Santiago*: 1 ♀, Aguacate, 520 m elev[ation]., 6.iv.1992. Deposited in the BMNH, CDRS, CNC, MHNG, and ZMJU.

DIAGNOSIS: Related to the Nearctic *P. willingana* (Kearfott, 1904), but *atromacula* has a shorter cucullus, very large spines on the neck of the valva, and the transverse rib connecting the thorns of the subgenital sternite is deeply concave. Among Galapagos Tortricidae, this species is most similar to *Strepsicrates smithiana*, mentioned above, because of their narrow forewings and absence of distinct speculum. However, in contrast with *S. smithiana* the male of *P. atromacula* has no costal fold and its flagellum is not notched. Also in contrast to *S. smithiana*, which has one large patch of raised scales on the forewing, this species has several smaller patches of raised scales mostly on the dorsal half of the forewing. The two or three strong, curved spines on the ventral margin of the valvae medially (Fig 55) are a unique feature of the male genitalia of *P. atromacula*. Its female genitalia are most similar to those of *Epinotia*, *Crocidosema*, and *Episimus alcedanus* in possessing a pair of large blade-like signa and a partly sclerotized ductus bursae. Details of the antrum area and sterigma must be examined to separate these taxa.

DESCRIPTION: Adult (Figs 29, 30). Wingspan 12 mm. Head brownish cream; labial palpus about 1.5 times diameter of eye, greyish cream; thorax grey-cream, tegula browner basally. Forewing weakly expanding terminally; termen concave beneath apex. Ground colour brownish cream; suffusions browner; costal divisions brown, strigulae dirty cream. Markings brown; basal blotch weak, consisting of some spots; median fascia black to middle, ill-defined towards dorsum, extending medially towards black subapical spot; with several small patches of raised scales mostly on dorsal half; cilia concolorous with wing. Hindwing greyish brown, paler basally; cilia pale brown.

Variation: Wingspan 11.5-14 mm. Ground colour of forewing brownish cream to brown; strigulation and/or suffusions pale brown. Markings brown or yellowish brown with dark brown or black marks; basal blotch usually weak, median fascia distinct or diffuse, often with black longitudinal line in middle; markings in posterior third of wing usually weakly developed. One unicolourous specimen.

Male genitalia (Fig. 55): Socii long, pointed, rather well sclerotized; valva broad basally, slender before cucullus, with 2 or 3 strong outer, ventral spines medially.

Female genitalia (Fig. 72): Apophyses thin, posterior slightly longer than anterior. Postostial part of sterigma long, weakly concave terminally; anterior part reaching mid-length of posterior part; colliculum membranous; sclerotized part of ductus bursae long; signa two strong blades.

ETYMOLOGY: The species name refers to the colouration of the forewing: *ater* = black, *macula* = spot.

REMARKS: Despite many collecting events, only three specimens of this species have been collected since 1989, when it was found commonly along the slope of Sierra Negra, on Isabela, from the littoral zone to about the middle of the Scalesia (or agriculture) zone (about 500 m). Maybe an external agent, such as a new predator or parasite, reduced its populations. The host plant is unknown. Specimens were attracted to light from March until May on Isabela and Santiago.

Grapholitini

Coniostola isabelae Razowski & Landry, sp. n. Figs 31, 32, 56, 73

MATERIAL EXAMINED: Holotype male: 'HOLOTYPUS' [orange, printed]; 'ECUADOR | GALAPAGOS | Isabela, 2 km W. | Puerto Villamil | 5.III.1989, M[ercury]V[apour]L[ight] | B. Landry' [white, printed]; 'Photagraph [sic] | M. Kopec' [green, printed]; '7. ♂ Landry' [white, printed except for ♂]; 'HOLOTYPE | *Coniostola* | *isabelae* | Razowski & Landry' [red, handwritten]. Deposited in the CNC.

Paratypes: 24 ♂, 46 ♀, from the Galapagos Islands, Ecuador. – *Baltra*: 1 ♂, arid zone, 24.i.1989, M[ercury]V[apour]L[ight] (B. Landry). – *Espanola*: 2 ♂, 1 ♀, Las Tunas Trail, 100 m elev[ation]., 30.iv.1992, MVL (B. Landry). – *Fernandina*: 2 ♀ (one dissected, Slide Zajda '38. ♀ Geneve.', CDRS), North side, 300 m, S 00° 20.541', W 091° 36.815', 12.i.2002, U[ltra] V[iolet]L[ight] (L. Roque & C. Causton). – *Floreana*: 1 ♀ (dissected, Slide MHNG [ENTO] 3066), close to Las Palmas, GPS: elev. 154 m, S 01° 17.049', W 90° 28.305', 15.iv.2004, UVL (P. Schmitz); 1 ♂, 3 ♀, Las Cuevas, 23.iv.1992, MVL (B. Landry). – *Isabela*: 1 ♂ (dissected, Slide Zajda '39. ♂ Geneve', CDRS), 1 ♀ (dissected, Slide Zajda '22. ♀ Landry.', CDRS), V[olcan] Darwin, 200 m, No. 99. 16, 11.ii.1999, UVL (L. Roque); 1 ♂ (dissected, Slide Zajda '33. ♂ Geneve', CDRS), V. Darwin, campamento base, LR #2000-03, 1.iii.2000, Malaise Trap (L. Roque); 2 ♀ (one dissected, Slide Zajda '34. ♀ Geneve', CDRS), idem except for LR #2000-04, B[lack]L[ight]-W[hite]L[ight] Trap; 1 ♀, Puerto Villamil, 2.iii.1989, MVL (B. Landry); 1 ♂, 2 ♀ (one dissected, Slide Baixeras 20269, CNC), 1 km W Puerto Villamil, 3.iii.1989, MVL (B. Landry); 2 ♀ (one dissected, Slide Zajda '36. ♀ Geneve', CDRS), Volcan Darwin, 400 m[eters]s[obre el]n[ivel del]m[ar], LR #2000-07, 3.iii.2000, UVL-WL Trap (L. Roque); 2 ♀, same data as holotype; 1 ♀, Volcan Darwin, 900 msnm, LR #2000-010, 6.iii.2000, UVL-WL Trap (L. Roque); 1 ♀, 3 km N S[an]to Tomas, Agr[iculture]. Zone, 8.iii.1989, MVL (B. Landry); 1 ♂, 8.5 km N Puerto Villamil, 11.iii.1989, MVL (B. Landry); 1 ♀, Alcedo, lado NE, playa, night on bushes, 13.iv.2002 (B. Landry); 1 ♀, Alcedo, North East side, 200 m, 14.iv.2002, UVL (L. Roque & B. Landry); 1 ♀, V. Alcedo, North East side, Guayabillos camp, 900 m, 16.iv.2002, UVL (L. Roque & B. Landry); 2 ♂, 1 ♀, Alcedo, lado NE, low arid zone, bosque palo santo, 18.iv.2002, UVL (L. Roque & B. Landry); 2 ♂, Tagus Cove, 13.v.1992, MVL (B. Landry); 1 ♂, 1 ♀, V. Darwin, 300 m elev., 15.v.1992, MVL (B. Landry); 1 ♀, n[ea]r Tagus Cove, 100 m elev., 21.v.1992, MVL (B. Landry); 1 ♂, 1 ♀, z[ona de] transicion, bosque de pega pega, 570 msnm, S 00° 23' 54.9", W 91° 2' 49.0", 14.x.1999, dry Malaise (L. Roque). – *Marchena*: 1 ♀, 23.iii.1992, MVL (B. Landry); 1 ♂ (dissected, Slide Zajda '35. ♂ Geneve', CDRS), 1 ♀ (dissected, Slide Zajda '21. ♀ Geneve', CDRS), Playa Negra, N 00° 18.089', W 90° 30.452', 7.iv.2002, UVL (L. Roque). – *Pinzon*: 1 ♀, Playa Escondida, S 00° 35.928', W 90° 39.291', 14 m elev., 27.iii.2006, UVL (P. Schmitz); 3 ♂, 1 ♀, same locality, 20.iv.2002, UVL (B. Landry & L. Roque); 2 ♀ (one dissected, Slide Zajda '18. ♀ Geneve', CDRS), idem except (L. Roque & B. Landry). – *Santa Cruz*: 1 ♀, C[harles]D[arwin]R[esearch]S[tation], Arid zone, 17.i.1989,


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FIGS 33, 34

Adults of Galapagos Grapholitini and unknown Tortricidae. (33) *Dichrorampha galapagana*, holotype. (34) Unknown Tortricidae species, ♀, Isabela, 17.v.1992, MHNG.

MVL (B. Landry); 1 ♂, idem except 19.i.1989; 1 ♂, 2 ♀, idem except 3.ii.1989; 1 ♀, Tortuga Res[erve]., W S[an]ta Rosa, 6.ii.1989, MVL (B. Landry); 2 ♀, E[stacion].C[ientifica]. C[harles].D[arwin]., 4.iii.1992, MVL (B. Landry); 1 ♂, ECCD, El Barranco, 13.iii.2000, MVL Trap (L. Roque); 1 ♀, CDRS, wall of Invertebrates Lab, elev. 11 m, 19.iii.2004, UVL (B. Landry, P. Schmitz); 2 ♀ (one dissected, Slide MHNG ENTO 3610), ECCD, El Barranco, S 00° 44.291', W 90° 18.107', 22 m elev., 23.iii.2006, UVL (P. Schmitz); 2 ♀, Finca Vilema, 2 km W Bella Vista, 1.iv.1992, MVL (B. Landry); 1 ♂, Bahia Conway, 14.iv.1992, MVL (B. Landry); 1 ♀, CDRS, Barranco, 23.x.2001, UVL (L. Roque). – *Santiago*: 2 ♂, N side, GPS: 147 m elev., S 00° 12.186', W 90° 42.888', 2.iii.2005, UVL (P. Schmitz); 1♀, Bahia Espumilla, 4.iv.1992, MVL (B. Landry); 1 ♀, Central, 700 m elev., 9.iv.1992, MVL (B. Landry). Deposited in the BMNH, CDRS, CNC, MHNG, and ZMJU.

DIAGNOSIS: This is the only Neotropical species of the genus. The male is characterized by the broad valva and proximal part of the aedeagus, and the female, by the long, slender ductus bursae and the half-moon-shaped distal sclerite of the corpus bursae. From the other greyish brown species of Galapagos Tortricidae *Coniostola isabelae* can be separated by the small size and the speculum with two weak black spots dorsal to a bigger spot anterior to a small, oval white patch. In addition, the male has a distinctive patch of very small grey scales set close to each other at the base of the costa. The males of the other two described species of *Coniostola* have very similar genitalia, but their tegumen apparently is less broadly rounded apicodorsally and the aedeagus is less curved (Diakonoff, 1961, 1988). The male of *C. omistus* Diakonoff (1988), from Madagascar, has a long, narrow "streak of androconial scales" in the anal region, which is absent in the Galapagos species. The female of *C. omistus* is unknown, but that of *C. stereoma* (Meyrick, 1912), from India and the Seychelles, has a much narrower base of the ductus seminalis.

DESCRIPTION: Adult (Figs 31, 32). Wingspan 8.5 mm; head and thorax pale cream grey; labial palpus about 1.5 times diameter of eye. Ground colour of forewing grey suffused with cream at base, with yellowish brown along subcostal area; male with semi-oval patch of minute, grey scales on costa at base; distal half grey; speculum greyish cream distally with black inner spots and grey shades; anterior refractive line of speculum present; costal strigulae white, divisions dark greyish brown; dorsal patch

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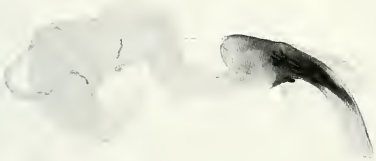

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FIGS 35-40

Male genitalia of Galapagos Sparganothini, Bactrini, and Olethreutini. (35, 36) *Platynota colobota*: (35) Slide BL 1525, CNC; (36) Slide BL 1517, MHNG. (37, 38) *Bactra philocherda*, slide MHNG ENTO 3085. (39) *Endothenia eidolon*, slide W. Zajda No. 1 GALAP., CNC. (40) *Megalota johni*, holotype.

white suffused with grey, marked with dark grey lines; cilia grey. Hindwing whitish brown at base; veins and most of distal half brown; cilia grey-white.

Variation: Wingspan: 7-10 mm. Ground colour more or less dark, occasionally grey-brown or cream grey; suffusions grey to brown-grey; markings dark grey-brown consisting of basal blotch, median fascia often subdivided.

FIGS 41-46

Male genitalia of Galapagos Olethreutini. (41, 42) *Hedya brunneograpta*, paratype, slide BL 1237, CNC. (43) *Eccopsis galapagana*, paratype, slide W. Zajda No. 23 Landry, CDRS. (44) *E. floreana*, holotype. (45, 46) *Episimus transferranus*, slide MHNG ENTO 3082.

Male genitalia (Fig. 56): Top of tegumen broad; socii membranous; valva broad with weak ventral incision; cucullus elongate-ovoid; aedeagus long, broad proximally, slender, bent beyond zone.

Female genitalia (Fig. 73): Sterigma submembranous except for median portion formed by two weak sclerites; ductus bursae long, slender, sclerotized in proximal half; antrum ill-defined; base of ductus seminalis broad, originating from distal portion of corpus bursae, protected by half-moon-shaped sclerite; signa two, horn like.

FIGS 47-51

Male genitalia of Galapagos Olethreutini and Eucosmini. (47) *Episimus alcedanus*, paratype, slide J. Baixeras No. 20262, CNC. (48) *Epinotia microscyphos*, paratype, slide J. Baixeras No. 20266, CNC. (49, 50) *E. lantana*, slide MHNG ENTO 3607. (51) *Strepsicrates smithiana*, slide W. Zajda No. 19 Geneve, CDRS.

FIGS 52-55

Male genitalia of Galapagos Eucosmini. (52-54) *Crocidosema synneurota*: (52) Slide J. Baixeras No. 20267, CNC; (53) Slide MHNG ENTO 3070; (54) Slide MHNG ENTO 3072. (55) *Proteoteras atromacula*, holotype.

ETYMOLOGY: The species epithet refers to Isabela Island.

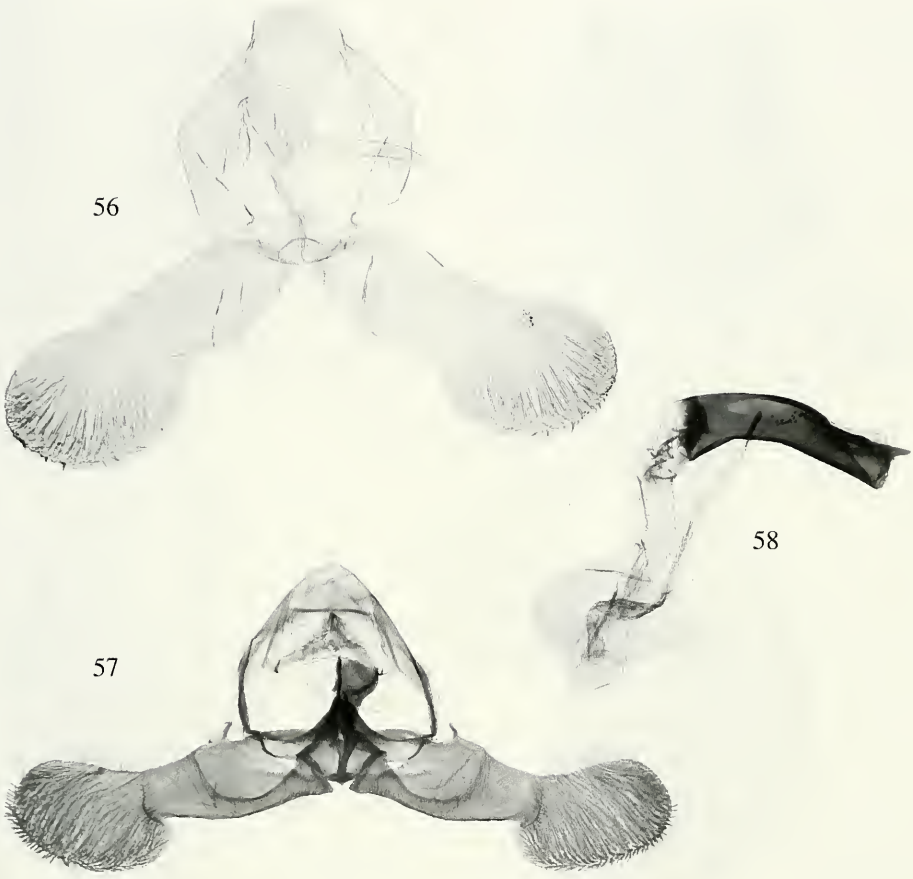
REMARKS: This rather commonly encountered species mostly inhabits lowlands, with the highest record at 570 m. The host plant is unknown. It has been collected mostly at light on nine islands, between January and May, and in October. Its two described congeners are known from Madagascar and the Oriental region (Brown, 2005).

Dichrorampha galapagana Razowski & Landry, sp. n. Figs 33, 57, 58

MATERIAL EXAMINED: Holotype male: 'HOLOTYPUS' [orange, printed]; 'ECU.[ADOR] GALAPAGOS | Isabela, V[olcan]. Darwin | 300 m elev[ation]., 15.v.1992, M[ercury]V[apour] L[ight], *leg*[*it*]. B. Landry' [white, printed]; 'MHNG [ENTO] | Prép. micr. | No 3095 ♂' [white, printed except for 'MHNG, 3095', and '♂']; 'genitalia slide | BL 1239 ♂' [green, printed except for ♂]; 'Photagraph [sic] | M. Kopec' [green, printed]; 'HOLOTYPE | *Dichrorampha* | *galapagana* | Razowski & Landry' [red, handwritten]. Deposited in the MHNG.

Paratypes: 5 ♂ from the Galapagos Islands, Ecuador. – *Floreana*: 1 ♂ (dissected, MHNG [ENTO] 3077), Scalesias near Cerro Pajas, GPS: elev[ation]. 329 m, S 01° 17.743', W 90° 27.111', 12.iv.2004, U[ltra]V[iolet]L[ight] (P. Schmitz). – *Isabela*: 2 ♂, NE slope Alcedo, GPS: elev. 292 m, S 00° 23.829', W. 91° 01.957', 30.iii.2004, UVL (B. Landry, P. Schmitz); 1 ♂, same data as holotype; 1 ♂, V[olcan]. Alcedo, zona arida alta, 13.x.1999, UV-F[luorescent]L[ight] (L. Roque). Deposited in CDRS, MHNG, and ZMJU.

DIAGNOSIS: Related to *D. sarmentana* Zeller, 1877 from Colombia but differing in the strong dorsoterminal process and large terminal process of the aedeagus and the smaller ventral lobe of the cucullus. This species is easily separated from the other Galapagos Tortricidae by its dark grey-brown forewings with a pattern of slightly darker lines and 3-4 black terminal dots.



FIGS 56-58
Male genitalia of Galapagos Grapholitini. (56) *Coniostola isabelae*, paratype, slide W. Zajda No. 35 Geneve, CDRS. (57, 58) *Dichrorampha galapagana*, holotype.

DESCRIPTION: Adult (Fig. 33). Wingspan 13 mm. Head and thorax ash grey, median and posterior parts of tegula and median portion of thorax dark grey. Forewing ground colour grey suffused with ash grey basally; cream in distal part of costa and terminal third of wing; dorsal patch ash grey with grey lines; speculum tinged with cream followed by row of black terminal dots; without costal fold; cilia concolorous with suffusions, creamer basally. Hindwing brown; cilia greyish brown with darker short scales, especially toward apex.

Variation: Wingspan 11-13.5 mm. In some specimens forewing grey or olive grey with weak ash grey and whitish cream suffusions and small terminal part mixed with yellowish cream. There is also some variation in forewing breadth.

Male genitalia (Figs 57, 58): Tegumen with minute prominence dorsomedially; socii atrophied; neck of valva twice slenderer than base of valva, ventral incision

FIGS 59, 60
Female genitalia of Galapagos Sparganothini and Bactrini. (59) *Platynota colobota*, slide BL 1518, CDRS. (60) *Bactra philocherda*, slide MHNG ENTO 3089.

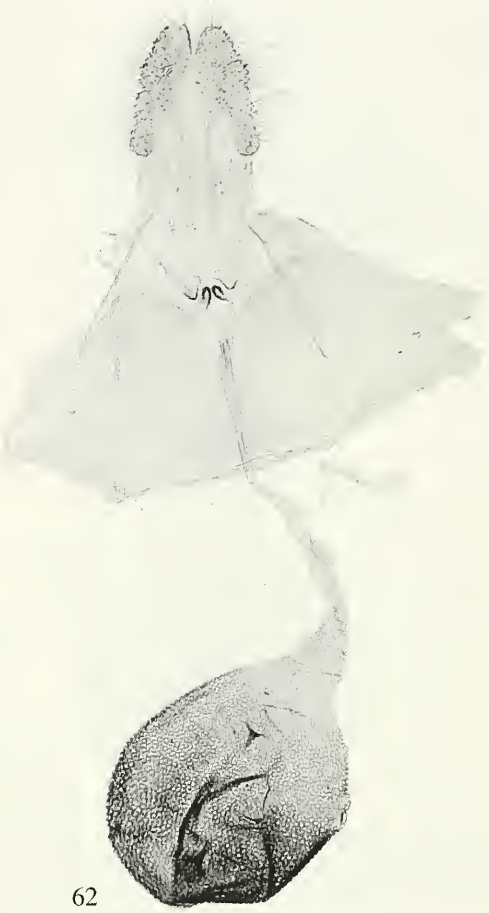
strong; cucullus oval, with broad ventral lobe; aedeagus short, uniformly broad, provided with simple or bifid dorsoterminal projection.

Female unknown.

ETYMOLOGY: Named after the Galapagos Islands.

REMARKS: This scarcely collected taxon probably has a wider distribution as it occurs on one of the oldest (Floreana) and one of the youngest (Isabela) islands of the archipelago. It is probably endemic, or at least native as it occurs in wild habitats on Isabela. The food plant is unknown.

61



62

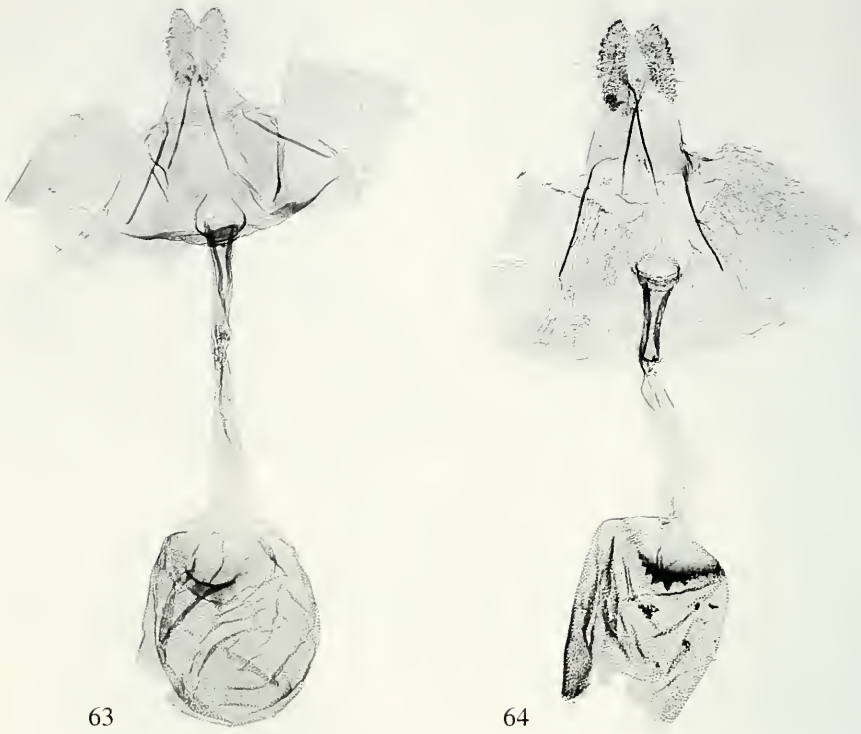
FIGS 61, 62

Female genitalia of Galapagos Bactrini and Olethreutini. (61) *Endothenia eidolon*, slide W. Zajda No. 6 Galapag., CNC. (62) *Hedya brunneograpta*, paratype, slide W. Zajda No. 26 Geneve, CDRS.

CONCLUSIONS

The generic composition of the Galapagos Tortricidae may be still incompletely known on the basis of the available material, but the taxa found so far revealed a few surprises.

First, there is a distinct disproportion between the species numbers of Tortricinae and Olethreutinae (Chlidanotinae have not been found in Galapagos at all). There is only one established member of Tortricinae Sparganothini, and three undetermined and apparently unestablished species of Tortricinae Euliini (*Anopinella* sp. and *Transtillaspis* sp.) and Cochylini (*Lasiothyris* sp.). This may depend on the vegetation. On the continent various types of forests dominate while in Galapagos the main plant



FIGS 63, 64
Female genitalia of Galapagos Olethreutini. (63) *Eccopsis galapagana*, paratype, slide W. Zajda No. 20 Land., CDRS. (64) *E. floreana*, paratype, MHNG ENTO 3091.

formations on the low islands and the coastal areas are adapted to xeric conditions and include few low tree species and many Cactaceae. The open areas are more convenient to various groups of Olethreutinae, here represented by Bactrini (one species of *Bactra*, usually bound with wet biotopes, and one *Endothenia* of unprecised requirements); Olethreutini (6 species); Eucosmini (5 species); and Grapholitini (2 species). Our knowledge of the biology of the Tortricidae in the Neotropical region and in Galapagos is still poor. Thus any explanation for the paucity of Tortricinae on the Galapagos is at present impossible.

Second, the primarily Holarctic olethreutine genus *Endothenia* is now known to be more widely distributed in the Neotropics as its only South American species, *E. eidolon* Razowski & Pelz, 2002 is now found in the Galapagos.

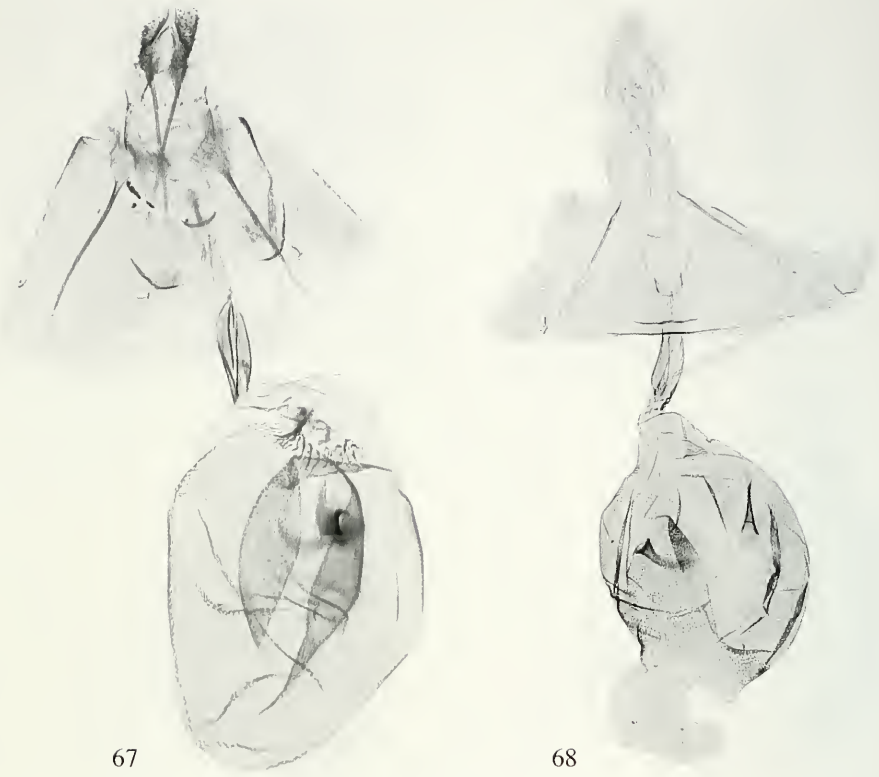
Third, we describe the first species of *Megalota* Diakonoff, 1966 from the New World. The genus, described from the Oriental and Australian regions, then recorded from tropical Africa, is pantropical as mentioned by Horak (2006) based on a personal communication from J. W. Brown, who was the first to find *Megalota* in the Neotropics and is preparing a revision of the genus.

FIGS 65, 66
Female genitalia of Galapagos Olethreutini. (65) *Episimus transferranus*, slide MHNG ENTO 3080. (66) *E. alcedanus*, paratype, slide MHNG ENTO 3064.

Fourth, it was supposed that *Eccopsis* Zeller, 1852 was restricted to the Afrotropical region. However, its type-species, described from South Africa, was found also in Saudi Arabia (Diakonoff, 1983). Here we include in *Eccopsis* two Neotropical species (*galapagana, floreana*) based on characters of the genitalia despite some differences as mentioned under the Diagnosis of *E. galapagana* sp. n., above.

Fifth, regarding the cosmopolitan genus *Crocidosema* Zeller, 1847, many publications (cf. Clarke, 1958, 1963) suggest that it is represented in the Neotropics only by the Palaearctic *C. plebejana* Zeller, 1847, its type species. The first author is of the opinion that there are some closely related species that show only slight differences to *plebejana* and that their synonymy (e.g. *C. ptiladelpha* Meyrick, 1917 and *C. synneurota* Meyrick, 1917) is incorrect.

Sixth, genus *Proteoteras* Riley, 1881 was until now known only from North America, where it is represented by eight species (Brown, 2005) of which the most southern representative is found in Florida, U.S.A. (*P. implicata* Heinrich, 1924). Thus, the new Galapagos species considerably extends the distribution of the genus.



FIGS 67, 68

Female genitalia of Galapagos Eucosmini. (67) *Epiuotia lantana*, slide J. Baixeras No. 20268, CNC. (68) *E. microscyphos*, paratype, slide W. Zajda No. 25 Geneve, CDRS.

Finally, the Grapholitini genus *Coniostola* Diakonoff, 1961 known till now from one Madagascan and one Oriental species is also found in the Galapagos fauna.

Out of the 16 species of Tortricidae established on the Galapagos, 11 are believed to be endemic (or 68.75%). In total, including the introduced species, the endemism for all Galapagos microlepidoptera is 54%. For the Cosmopterigidae, Pterophoridae, and Pyralidae, the percentages of endemism are 78%, 53%, and 31.5% respectively. Thus, the percentage of endemism for the Galapagos Tortricidae is high. However, a better knowledge of the South American West Coast lepidopteran fauna will be necessary to obtain a more decisive picture of the true endemism of the Galapagos fauna, especially with regards to micro-moths.

Check-list of the Galapagos Tortricidae

Sparganothini

Platynota colobota Meyrick, 1926

Bactrini

Bactra philocherda Diakonoff, 1964

Endothenia eidolon Razowski & Pelz, 2002

69

70

FIGS 69, 70

Female genitalia of Galapagos Eucosmini, *Crocidosema synneurota*: (69) Slide MHNG ENTO 3068. (70) Slide MHNG ENTO 3073.

Olethreutini

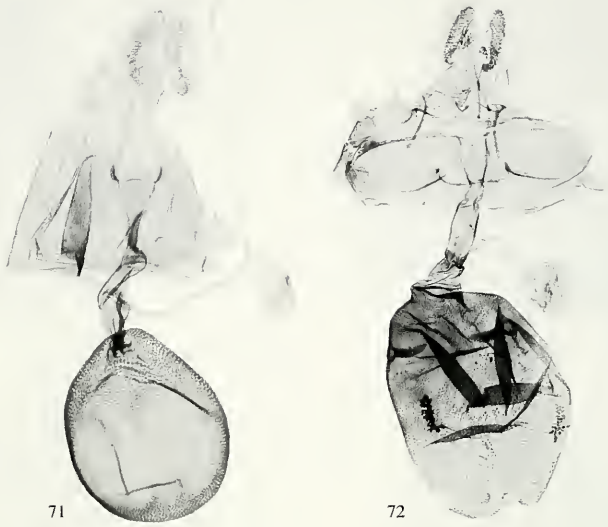
Hedya brunneograpta Razowski & Landry, sp. n.
Eccopsis galapagana Razowski & Landry, sp. n.
Eccopsis floreana Razowski & Landry, sp. n.
Megalota johni Razowski & Landry, sp. n.
Episimus transferranus (Walker, 1863)
Episimus alcedanus Razowski & Landry, sp. n.

Eucosmini

Epinotia lantana (Busck, 1910)
Epinotia microscyphos Razowski & Landry, sp. n.
Crocidosema synneurota Meyrick, 1926
Strepsicrates smithiana Walsingham, 1892
Proteoteras atromacula Razowski & Landry, sp.n.

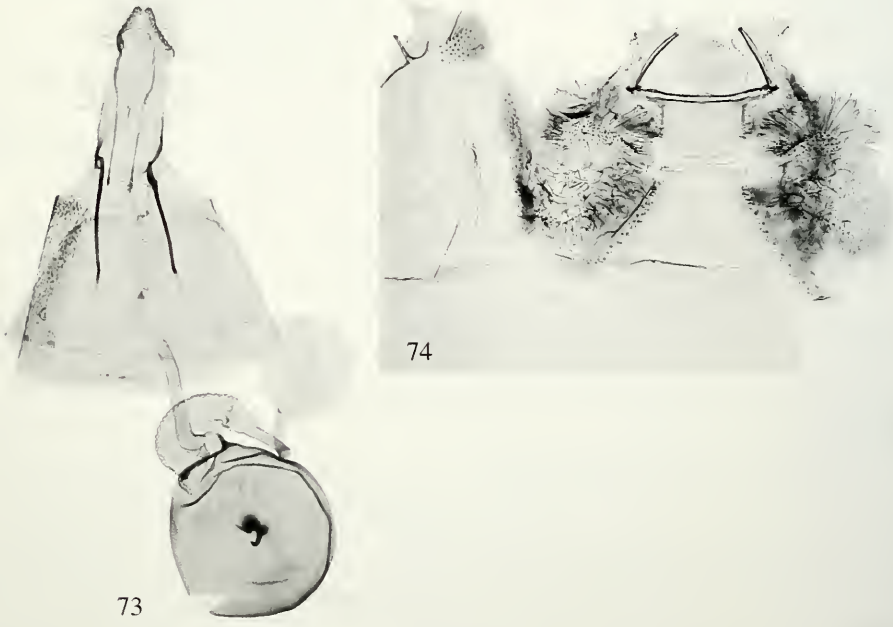
Grapholitini

Coniostola isabelae Razowski & Landry, sp. n.
Dichrorampha galapagana Razowski & Landry, sp. n.



FIGS 71, 72

Female genitalia of Galapagos Eucosmini. (71) *Strepsicrates smithiana*, slide J. Baixeras No. 20265, CNC. (72) *Proteoteras atromacula*, paratype, slide W. Zajda No. 8 Galapag., CNC.



FIGS 73, 74

(73) Female genitalia of *Coniostola isabelae* (Grapholitini), paratype, slide J. Baixeras No. 20269, CNC. (74) Base of abdomen of male *Epinotia lantana*, slide MHNG ENTO 3607.

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