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Revision of the genus *Opatrinus* DEJEAN, 1821 (*Coleoptera*: *Tenebrionidae*: *Platynotini*)

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ABSTRACT. *Opatrinus* Dejean is the only New World genus of *Platynotini*. It includes 13 species; of them *O. insperatus* (Guiana), *O. ecuadorensis* (Ecuador) and *O. girardi* (Colombia) are new to the science. The following new synonyms are proposed: *O. clathratus* (FABRICIUS, 1792) (=*O. gridellii* MARCUZZI, 1949); *O. angustus* BURMEISTER, 1875 (=*Diastolinus quadricollis* FAIRMAIRE, 1905); *O. moestus* MULSANT et REY, 1853 (=*O. luederwaldti* GEBIEN, 1928); *O. pullus* (SAHLBERG, 1823) (=*O. puertoricensis* MARCUZZI, 1977) and *Selinus menouxi* MULSANT et REY, 1853 (=*O. sayi* HORN, 1870). *O. acuticollis* (FAIRMAIRE, 1905) has been reestablished as a species. A new subgenus *Alaetrinus*, type species *Tenebrio pullus* SAHLBERG, is distinguished. The subgenus *Zidalus* MULSANT et REY, 1853 including 12 African species and till now assigned to *Opatrinus* DEJ. is raised to the generic rank. Early developmental stages are described for *O. aciculatus* LE CONTE, *O. minimus* (PALISOT DE BEAUVOIS) and *O. gibbicollis* MULSANT et REY. A modern identification key to the species *Opatrinus* DEJ. and known larvae belonging of the subtribe *Platynotina* is presented. The closest relatives of *Opatrinus* DEJ. are African genera: *Zidalus* MULS. et REY, *Quadrideres* KOCH and *Ectateus* KOCH. These genera originated from a common, probably Afrobrazilian, ancestor in the Upper Cretaceous period. The present distribution of *Platynotini* is a result of the continental drift after the split of Gondwanaland. A cladistic and a zoogeographical analysis of the genus *Opatrinus* DEJ. showed that it includes relatively young species, whose speciation and present distribution result from climatic changes which took place mainly in the Pleistocene and post-Pleistocene periods.

Key words: Entomology, taxonomy, revision, *Coleoptera*, *Tenebrionidae*, *Opatrinus*.

INTRODUCTION

The first species of the genus *Opatrinus* DEJ. to be discovered was *O. clathratus* described by FABRICIUS in 1792, and included by that author in the genus *Opatrum*. In 1821 DEJEAN, using the generic name *Opatrinus*, mentioned three species, only

one of which - *clathratus*, had been described before. In his 1837 catalogue DEJEAN listed names of 21 species with their distribution in the New World, Africa and the Orient.

The first revision of the genus *Opatrinus* DEJ. was published in 1853 (MULSANT and REY 1853a, 1853b). This work, which includes both African and American species, presents diagnoses, descriptions and a simplified classification of the genus. It is the only work so far which gives a key and detailed descriptions of the New Worlds species.

In his 1938 catalogue GEBIEN lists 25 species (36 names) of the genus *Opatrinus* DEJ., 12 of them (19 names) coming from the New World. The other genera and the species of *Platynotini* are endemic to Africa (32 genera, 226 species) or the Orient (10 genera, 69 species) (fig. 177).

In 1947 GRIDELLI presented a revision of the genus *Opatrinus* DEJ. covering the African species only. The author did not study species from the New World, but based on information about the geographical distribution of members of the genus *Opatrinus* DEJ., using methods from JEANNELL's (1946) work on the relationships of the tribe *Hiletini* (*Carabidae*), he advanced a hypothesis concerning their origin and relationships. It suggests existence of an Afrobrazilian ancestor and a Mesozoic age of the group.

In Koch's (1956) revision of the tribe *Platynotini* the genus *Opatrinus* DEJ. was placed in the monotypic opatrinoid group *Platynotina*, erected to accomodate species with well developed wings and elongated metasternum. When studying the tribe *Platynotini* KOCH had only African material, but he hardly knew anything about the fauna of the Orient and the New World. Because of this his classification of the tribe *Platynotini* is inaccurate and should be verified.

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ABBREVIATIONS

e.l. - elytral length;
e.w. - elytral width;
f - female;
l.a.p. - length of apical part of edeagal tegmen;
l.b.p. - length of basal part of edeagal tegmen;
l.c. - length of coxite;
l.e. - length of edeagus;
l.f.l. - length of first lobe of coxite;
l.f.v. - length of first abdominal ventrite;
l.m.cav. - length of metacoxal cavities;
l.o. - length of ovipositor;
l.p. - length of paraproct;
m - male;
m.l.c. - metasternal length between meso- and metacoxal cavities;
m.l.m. - metasternal length in the middle;
p.l. - pronotal length;
p.w. - pronotal width;
w.f.l. - width of first lobe of coxite.

REDEFINITION OF THE GENUS *OPATRINUS* DEJEAN

The main character used by KOCH (1956) to identify the genus *Opatrinus* DEJ. (well developed wings) is plesiomorphic. It does not imply monophyly of this taxon, especially that the genus *Opatrinus* sensu lato, includes also species with partly reduced wings (*O. insularis*, *Apterozidalus royi*, *O. exalatus*) or completely wingless (*O. clathratus*, *O. insperatus*, *O. laticolis*, *O. gibbicollis*). An analysis of all the

available characters based on detailed comparative studies did not reveal a synapomorphy which would justify the currently accepted interpretation of the genus *Opatrinus* DEJ. (sensu MULSANT and REY 1853a, 1853b, KOCH 1956).

Derived characters distinguishing the fauna of the New World have been found. These are: widely interrupted margin in the middle of the base of the pronotum and large, round funnel-shaped holes forming lines on the elytra so that the elevation of the intervals is not uniform. These synapomorphies provide evidence that the New World species form a monophyletic group.

Distinctive elevation of the pseudopleura of the elytra in the apex (apomorphy) points to a close relationship of the African species of *Opatrinus* DEJ. (sensu KOCH 1956) with the anchophthalmoid *Platynotina*, whereas the structure of the female genitalia indicates a relationship with the genera: *Ectateus* KOCH and *Qudrideres* KOCH (selinoid *Platynotina*). It seems that, at present, the best solution will be to treat the discussed group as a separate genus *Zidalus* MULSANT et REY (subgenus sensu KOCH 1956).

CLADISTIC ANALYSIS OF THE GENUS *OPATRINUS* DEJ.

Cladistic analysis was used to study 13 species of the genus *Opatrinus* DEJ., i.e. is all the New World members of the tribe *Platynotini*.

After a preliminary study 20 characters were listed; their character states were used to construct the data matrix (appendix 4).

The characters were polarized on the basis of a study of out-groups (genera of the *Platynotini*, mainly *Zidalus* MULS. et REY and African genera belonging to the subtribe *Platynotina*) and data from papers on the family *Tenebrionidae* (TSCHINKEL and DOYEN 1980, DOYEN and TSCHINKEL 1982). Primitive and derived conditions are marked by 0 and 1 respectively (appendix 4).

The monophyly of the genus *Opatrinus* DEJ. is indicated by the following characters: emargination of the base of pronotum widely interrupted in the middle (fig. 22); elytra with large, round funnel-shaped punctures forming rows so that the elevation of intervals is not uniform (fig. 18).

List of characters and their states (0-plesiomorphy; 1-apomorphy):

1. Genal canthus: wider than eyes (0), equal to or narrower than eyes (1).
2. Tempora: narrower than eyes (0), wider than or equal to eyes (1).
3. Apical margin of the middle part of mentum: with no pronounced lateral margins (0), clearly defined, with detectable lateral margins (1).
4. Widest part of pronotum: halfway along (0), at the anterior margin or the base (1).

4a. Sides of pronotum: rounded or narrowing anterad (0), parallel on 2/3 length from the base (1).

4b. Sides of pronotum: rounded or parallel on 2/3 length from the base (0), narrowing anterad (1).
5. Lateral edges of pronotum: smooth (0), notched (1).
6. Emargination of prosternal process: complete (0), interrupted at the apex (1).
7. Sides of elytra: all visible from above (0), tucked underneath (1).
8. Humeral angle of elytra: right or slightly obtuse (0), widely obtuse (1).
9. 1, 3, 5 and 7 intervals of elytra: more elevated than the others (0), flattened and wider than the others (1).
10. Apical part of pseudopleura of elytra: flat (0), elevated (1).
11. Scutellum: well developed (0), reduced (1).
12. Wings: well developed (0), completely reduced (1).
13. Last abdominal ventrite: without groove (0), with groove by the outer edge (1).
14. Outer edge of last abdominal ventrite: smooth (0), with emargination (1).
15. Puncturation of last abdominal ventrite: fine (0), rough (1).
16. Sexual dimorphism in the structure of tibia: present (0), absent (1).
17. Tooth on male protibia: absent (0), present (1).
18. Troughs of underside of female tarsi: fore - one segment, mid and hind - first and second segment (0), fore - absent, mid - first segment, hind first and second segment (1).
19. Process of apical part of tegmen of aedeagus: separate, divided by longitudanal slit (0), fused with visible suture in the middle (1).
20. Bursa copulatrix: membranous (0), with sclerites (1).
20a. Bursa copulatrix: membranous or with small spines (0), with two sclerotized bars (1).
20b. Bursa copulatrix: plain or with two sclerites (0), with small spines (1).

As a result of a the analysis with use of Hennig86 (version 1.5) programme (FARRIS, 1988), 9 cladograms were obtained, each 25 steps long and with a consistency index (Ci) of 0.88. Two of them (appendix 5) were selected to present hypotheses on the relationship between species of the genus *Opatrinus* DEJEAN. Of the two branches that are clearly visible, one corresponds to the subgenus *Opatrinus* s. str. and the other to *Alaetrinus*. The latter is divided into evolutionary lines (node B, F, H, J, K) formed by groups of species distributed in clearly defined areas (fig. 176).

The relationship (*) of the suggested sister group of species *O. pullus* and *O. ecuadorensis* has not been confirmed by a synapomorphy. Such a character may be discovered when more is known about the larval stages or the bionomics of these species. At present relationships are suggested on the basis of phenotypical similiarity of the two species and also the data pertaining to their geographical distribution (see the zoogeographical analysis).

Six characters: 3, 6, 10, 14, 16 and 17 as apomorphies concern the terminal taxa only.

Homoplasy occurs in the case of three characters: 2 and 4 on cladogram I and 2, 4 and 20 on cladogram II. The widening of the tempora (equal to or wider than the eyes - character 2) in *O. angustus* and *O. ecuadorensis* is a convergence. None of the states of this character can be considered a synapomorphy, which confirms the coefficient "ri" (retention index), its value being 0 for this character. Thus the character is an apomorphy only for terminal taxa.

Discrepancies in the two suggested variants concern mainly the position of *O. moestus*. This species has characters, which can be synapomorphies connecting it both with the *validus* group (bursa copulatrix with spines - character 20b), and the *angustus* group (sides of pronotum parallel on 2/3 length from the base - character 4a). Thus in the first variant *O. moestus* belongs to a monophyletic group together with *O. validus* and *O. acuticollis*. In this case it must be assumed that the hypothetical ancestor (node I) possessed a pronotum with sides parallel on 2/3 length from the base. As a result of further evolutionary changes two lineages were formed, which differ in the structure of their bursa copulatrix (bursa with two sclerites - node J, with small spines - node K). In descendant species of the hypothetical ancestor from node J (*O. girardi* and *O. angustus*) the shape of the pronotum (parallel sides - character 4a) has not changed. However, in two members of the monophyletic group of the hypothetical ancestor from node K (*O. validus* and *O. acuticollis*) the sides of pronotum are rounded (the third species of this group, *O. moestus*, has parallel sides). The above case is one of reversal. Rounded sides of pronotum in *O. validus* and *O. acuticollis* constitute a derived character, not a symplesiomorphy, as in the case of the subgenus *Opatrinus* s. str. or the group *O. pullus* and *O. ecuadorensis*.

In the second variant *O. moestus* belongs to the monophyletic group together with *O. girardi* and *O. angustus*. The hypothetical ancestor (node I) had a bursa copulatrix with small spines. In descendant species of the hypothetical ancestor from node J (*O. validus* and *O. acuticollis*) the underside of the first segment of the mid and the first and second segments of the hind tarsi in females have naked troughs, whereas the apical part of the tegmen of the aedeagus is fused. Group *O. moestus* and *O. girardi* and *O. angustus* are descendents of an ancestor (node K) which had a pronotum with sides parallel on 2/3 from the base. Two of these species (*O. girardi* and *O. angustus*) form a separate monophyletic group (node L). In this case it must be assumed that the first structures in the bursa copulatrix were the spines and the sclerites appeared later. These plates are actually covered with small spines but the development of these structures was reversed, i.e.: sclerites —> spines. It can also be assumed that these were independent processes but in this case the presence of spines in the bursa copulatrix in *O. moestus* (belonging to the group *O. girardi* and *O. angustus*) and in the group *O. validus* and *O. acuticollis* would be a convergence. In my opinion the first cladogram gives the best representation of the phylogenesis of the genus *Opatrinus* DEJEAN.

ZOOGEOGRAPHIC ANALYSIS OF THE GENUS *OPATRINUS* DEJEAN

The tribe *Platynotini* occurs in the New World and Ethiopian Province and the Orient (fig. 177). Some other groups of beetles e.g. *Dorcaschamatini* (*Cerambycidae*), *Phyllophaga*, *Cnemarachis*, *Clemora*, *Holotrichia*, *Brahmina* and *Microtrichia* (*Melolontinae*, *Scarabaeidae*), *Penichrolucaninae* (*Lucanidae*) (RATCLIFFE 1976, 1984); *Rutelini* (*Scarabaeidae*) (JAMESON 1990); *Hiletini* (*Carabidae*) (ERWIN and STORK 1985) are distributed in a similar way.

An attempt to explain this distribution pattern brings forth two theories pertaining to the dispersal of animals in prehistoric times: migration across the Bering Strait and drifting on continental plates after the disintegration of Gondwanaland.

The arguments supporting the theory that the distribution of the *Platynotini* was an effect of the continental drift after the disintegration of Gondwanaland and ruling out the possibility that it was due to the migration of this tribe across the Bering Strait are:

- absence of members of this tribe in south-east Asia (only *Platydendarus javanus* (WIEDEMANN) has a meridional distribution along the mountain ranges of the Indochina, it reaches the Malaysian Peninsula and the Islands of the Sunda Archipelago), moreover the fauna of *Platynotini* distributed on the Indian subcontinent is represented by a relatively large number of taxa on the level of species (69) and genera (10);
- absence of *Platynotini* on the western coast of North and Central America;
- absolute endemism of species and genera of *Platynotini* occurring in Africa, the New World and the Orient;
- close relationships between the genera from Africa and the New World.

The final stage of disintegration of Gondwanaland in the Upper Cretaceous period (about 110 million years ago) led to the isolation of the ancestors of the representatives of the tribe *Platynotini* which we know today (fig. 175). A group which remained in a small area in the north-eastern part of America later gave raise to all the *Platynotini* fauna of the New World.

The suggested phylogenetic system (appendix 5) of the genus *Opatrinus* DEJ. comprises 5 clades (defined by nodes B, F, H, J and K) which correspond to the areas of the present distribution of *Platynotini* in both Americas (fig. 176).

The wingless subgenus *Opatrinus* s.str. occurs in an area similar to its original distribution range (when South America separated from Africa). Representatives of this subgenus occupied the northern part of the continent, from Guyana in the east along the southern coast of the Caribbean Sea to Panama in the west. The group probably reached the Panama Isthmus at the time it was formed - between the middle Oligocene and the early Miocene. At that time the Talamanca Mountain range, which influenced the shape of the islands strung between, what is now south Costa Rica to north Panama, was being formed. During the Miocene these mountains emerged completely and so in the Pliocene (5.7 million years ago) the connection between North America and South America was formed (KANEPS 1979, BOSS and

RATCLIFFE 1985). However, the climate and geophysical conditions in Central America greatly limited the migration of the beetles. Migration was possible only in the case of species of great ecological valence which, climbing mountain slopes, could move north or south along the coast of the Mexican Bay or the Pacific. *O. gibbicollis* (occurring in Panama) was one of the species which were "confined" to this area. In the Pleistocene, in interglacial periods, the Amazonia was covered by the sea, the level of which was then about 50 metres higher than now (HAFFER 1969, VUILLEUMIER 1971). The area of woodlands shrunk considerably leaving a large number of very small refugia in which conditions favoured speciation. The refugia for the subgenus *Opatrinus* s.str. were the Guyana Upland and the foothills of the northern Andes, and thus the group was divided in two branches, whose present distribution is connected with these areas. In the post-Pleistocene the Amazon lowlands were recolonized, both from the north and from the south. In the former case the distribution of *O. clathratus* (fig. 180) is a perfect example - moving south it crossed the Amazon. This species also reached practically all the islands in the Archipelago of the Lesser Antilles. The populations of *O. clathratus* occurring on individual islands, and also on the continent, do not differ significantly. This provides evidence that these areas were colonized relatively recently (in the post-Pleistocene).

The effect of the first "wave" of northward migration of the *Platynotini* is the presence of two species of this tribe in North America. From the late Cretaceous Period to the Oligocene the two Americas were separated by a 1300 km stretch of ocean (RAVEN and AXELROD 1975). Some biogeographical analyses pertaining to the *Coleoptera* (KOHLMANN and HALFFTER 1988) assume the beetles could have migrated between the Americas through the Proto-Antillean Archipelago in the Mesozoic, and later they could have crossed via the islands of Central America (still present in the middle Miocene). These islands, 70-100 km apart, were treated more as a "filter" than a corridor (MATTHEWS 1980). It gave preference to the fauna of the savannas and thorny bushes. The ancestor of *O. minimus* and *O. aciculatus*, which got as far as the southern coast of North America, used this route. During the Pleistocene glaciations (after the transgression of the sea) the area of its distribution was divided by the valley of the lower Mississippi-Missouri. The refugia formed in this way favoured speciation and acquiring typical separateness, thanks to which *O. minimus* and *O. aciculatus* came into existence. In the post-Pleistocene the distribution area of *O. minimus* was greatly extended, especially towards the north (see: geographic variation) (fig. 181). The westward migration of this species led to the crossing of the Mississippi-Missouri and the renewal of its contact with *O. aciculatus*. In my opinion these two species have remained separate and occur sympatrically in the contact zone. However the possibility of overcoming the reproductive isolation and interbreeding cannot be ruled out.

The next "wave" of migration in the pre-Miocene period brought the ancestor of *O. pullus* to Central America. During the Pleistocene glaciations the climatic changes pushed it south, where it survived the unfavourable time of drought in the

refugia to the north and to the south of the Tuxtlas Massif, along the coast of the Mexican Bay or on the Yucatan Peninsula (up to 18° N) (KOHLMANN and HALFFTER 1988). As far as the possibility of spreading of *O. pullus* in the post-Pleistocene is concerned, the high mountain ranges in Mexico, Honduras and Nicaragua constitute both a physical and climatic barrier, and so they form the northern and southern boundary of its distribution area. For this species the migration to islands (the Greater Antilles, the Bermudas) and to adjoining areas on the continent (Florida, Venezuela), separated by the waters of the Gulf of Mexico and the Caribbean Sea, proved to be the most effective (see: geographic variation) (fig. 182). However, because of an ecological barrier (which has not been broken through so far), *O. clathratus* occurs only on the islands of the Archipelago of the Lesser Antilles. St. Croix, one of the westernmost islands within the Lesser Antilles, is the only area where *O. pullus* and *O. clathratus* occur sympatrically.

The ancestor of *O. ecuadorensis* probably originated from the same trunk as that of *O. pullus*. Its southward migration along the Pacific coast ended at the time of the Alpine orogenesis, the effect of which was a further upthrust of the Andes. At present *O. ecuadorensis* occurs in a small area in the coastal lowlands of Equador (fig. 183).

As a result of the interglacial transgression of the sea in the Pleistocene, the distribution of the South American ancestors of the subgenus Alaetrinus was limited to two main refugia: the Andes plateau (*O. angustus* and *O. girardi*) and the south-east coast of South America (*O. acuticollis*, *O. validus* and *O. moestus*). The latter mentioned refugium called Sierra do Mar is considered one of the largest. All the species occurring in this area at present show a tendency to a northward migration, again occupying the Amazonian rainforest (figs 183, 184).

TAXONOMY

Genus *Opatrinus* DEJEAN, 1821 (sensu KOCH 1956).

In 1853 MULSANT and REY identified 3 subgenera in the genus *Opatrinus*:

- *Opatrinus* s. str. with species: *gemallatus* OLIVIER, 1795; *laticollis* LATREILLE, 1833; *anthracinus* MULS. et REY, 1853; *moestus* MULS. et REY, 1853; *notus* SAY, 1825; *niloticus* MULS. et REY, 1853; *setusus* MULS. et REY, 1853;
- *Zidalus* with species *corvinus* MULS. et REY, 1853;
- *Zodinus* with species: *ovalis* MULS. et REY, 1853; *servus* MULS. et REY, 1853; *madagascariensis* MULS. et REY, 1853; *insularis* MULS. et Rey, 1853.

In 1956 KOCH, describing the African species of *Platynotini*, maintained the division of genus *Opatrinus* into three subgenera and gave a new interpretation:

- *Opatrinus* s. str. (*Opatrum clathratum* OLIVIER, 1784 - type species and other New World species),

- *Zidalus* MULS. et REY, 1853 (*corvinus* MULS. et REY, 1853 - type species; *erythraeus* GRIDELLI, 1947; *niloticus* MULS. et REY, 1853; *insularis* MULS. et REY, 1853; *exalatus* KOCH, 1956; *latipes* SAHLB., 1923; *mirabilis* KOCH, 1956);

- *Zodinus* MULS. et REY, 1853 (*servus* MULS. et REY, 1853 - type species; *costulatus* GUÉRIN, 1849; *attenuatus* KLUG, 1833; *setuliger* MULL., 1887).

Species of the genus *Opatrinus* Dej. (sensu MULSANT and REY 1853a, 1853b, GEBIEN 1938) occurring in the New World constitute a monophyletic group (the structure of the elytra puncturation, the emargination of the base of pronotum interrupted in the middle), which should be regarded as a genus. *O. clathratus* (FABRICIUS, 1792), occurring in Central America, is the type species for the genus *Opatrinus* (by monotypy), and thus the name *Opatrinus* DEJEAN should be used for the genus including New World species.

The subgenus *Zidalus* MULSANT et REY should be elevated to the generic rank. It includes 12 African species, 11 of them previously included in the genus *Opatrinus* DEJEAN, and one in the synonymized monotypic genus *Apterozidalus* ARDOIN.

Genus *Opatrinus* DJEA, 1821 sensu novo.

***Opatrinus* DEJEA, 1821**

Opatrinus DEJEAN, 1821: 66.
Opatrinus DEJEAN: STURM 1826: 24; LATREILLE 1829: 19; DEJEAN 1834: 191, 1836: 213; MELSHEIMER 1853: 137; SILFVERBERG 1984: 59.
Opatrinus: CASTELNAU 1840: 209.
Opatrinus LATR. (sic!): BLANCHARD 1845: 14; CROTCH 1873: 106; HENSHAW 1885: 119; REITTER 1904: 51; GEBIEN 1910: 276, 1938: 296; BLACKWELDER 1945: 524; KOCH 1955: 428, 1956: 91, PAPP 1961: 118, ARDOIN 1965: 1315, PEÑA 1966: 436, AALBU and TRIPLEHORN 1985: 272.
Opatrinus DEJEAN, LATREILLE (sic!): MULSANT and REY 1853a: 295; 853b: 70.
Opatrinus (DEJ.) LATR. (sic!): LACORDAIRE 1859: 240.
Hopatrinus (sic!) LATREILLE (sic!): GEMMINGER and HAROLD 1870: 1914; CHAMPION 1885: 123.
Opatrinus MULSANT et REY (sic!): GRIDELLI 1947: 37.

Type species identified by monotypy (DEJEAN 1821): *Opatrum clathratum* FABRICIUS, 1792.

REMARKS

DEJEAN (1821), the first author to use the name *Opatrinus* for the genus, listed the following names: "*Clathratus*., Cayenne", "*Punctatus* DEJ. N..." and "*Perforatus* GYLL. Amer.ins.". Writing "*Clathratus*., Cayenne" he had in mind *Opatrum clathratum* described by FABRICIUS in 1792, which he later confirmed: "*Clathratus* FABR. Cayenne". *Opatrinus punctatus* is a name given by DEJEAN without a description of the species itself (*nomen nudum*) which actually applies to *Opatrinus minimus* (PALISOT DE BEAUVOIS 1805) (MULSANT and REY 1853a: 309). The name *perforatus* (*nomen nudum* used by GYLLENHAL) was applied in 1823 by SAHLBERG in the description of a new species.

STURM (1826), was the only researcher to give the correct information that DEJEAN was the author of the name *Opatrinus*, stressing that *clathratus*, which belongs to this genus, was described by FABRICIUS in the genus *Opatrum* and comes from Cayenne.

In 1829 LATREILLE mentioned the generic name *Opatrinus* with species names: *Blaps clathrata* FABR. and *Platynotus dilatatus*, which were not used by DEJEAN (1821) and *B. punctata* (*nomen nudum*) which is unavailable name. In 1792 FABRICIUS described *Opatrum clathratum* (1792: 90) with typical distribution "Cajennae" and *Blaps clathrata* (1792: 109) with typical distribution "America meridionali", and so *Blaps clathrata* FABR. given by LATREILLE (1829: 19) is not the same species as *clathratus* FABR. mentioned by DEJEAN (1821: 66) together with the genus *Opatrinus*.

BLANCHARD (1845) was the first to erroneously mention LATREILLE as the author of the generic name *Opatrinus*. The error was later repeated by other authors (CROTCH 1873, HENSHAW 1885, GEMMINGER and HAROLD 1870, REITTER 1904, GEBIEN 1910, 1938, BLACKWELDER 1945, KOCH 1955, 1956, PAPP 1961, ARDOIN 1965, PEÑA 1966, AALBU and TRIPLEHORN 1985).

MULSANT and REY (1853a, 1853b) and LACORDAIRE (1859) gave the names of both DEJEAN and LATREILLE with the name *Opatrinus*.

GRIDELLI (1947) gave MULSANT and REY as the authors of the name.

It was only in 1984 that SILFVERBERG correctly stated that DEJEAN was the author of the name *Opatrinus*. This researcher was, however, wrong to consider OLIVIER the author of the type species *Opatrum clathratum* and to give 1791 as the date of its descripton. OLIVIER's work concerning *Opatrum clathratum* was published in 1812 in the second part of vol.8 "Encyclopedie methodique..." and not in 1791 (vol. 5). In addition, this author clearly stated that he meant the species described by FABRICIUS from Cayenne in the work "Entomologia systematica...." vol. 1 page 90.

GEBIEN (1938: 296) designated *clathratus* OLIVIER (see: remarks), (meaning *Opatrinus clathratus* FABRICIUS, 1792), as the type species of the genus *Opatrinus* and gave the following explanation "LATR. nennt als Typus *clathratus* FABR., das ist der typus *Diastolinus*. Er meint offenbar *clathratus* OL.", whereas for the genus *Diastolinus* MULSANT et REY he designated as the type species *clathratus* FABRICIUS, 1792 (patria: Cayenne). In 1859 MULSANT and REY described the genus *Diastolinus*. In the list of species belonging to this genus they listed *Blaps clathrata* described by FABRICIUS (1792: 109) with origin "America meridionale", and not *Opatrum clathratum* FABRICIUS, 1792 (patria "Cajenne"). Thus both designations by GEBIEN (1938: 294, 296) should be considered invalid.

On the basis of the study presented above DEJEAN should be considered the author of the generic name *Opatrinus* and the species *Opatrum clathratum* FABRICIUS, 1792 should be regarded as the type species for this genus identified by monotypy. For the genus *Diastolinus* MULSANT et REY, 1859 I designate *Blaps clathrata* FABRICIUS, 1792 as the type species.

DIAGNOSIS

Species of the genus *Opatrinus* are distinguished by a wide interruption in the middle of the emargination of the base of pronotum (figs 20, 25) and by large, round funnel-shaped punctures forming rows on the elytra so that the elevation of intervals is not uniform (fig. 18) (in populations *O. minimus* inhabiting NE part of the USA punctures in the rows fuse forming shallow, longitudinal, irregular, lenticular cavities); punctures in the rows are connected by shallow narrow furrows (the disc often lacks furrows); areas between the punctures in rows are slightly longitudinally concave or flat; pseudopleura of the elytra is not elevated apically and is in a ventral position (in *O. validus* pseudopleura elevated). In closely related African genera the emargination of the base of the pronotum is complete, the elytra with rows of small punctures placed in deeply cut grooves, thanks to which the intervals are uniformly elevated; pseudopleura of the elytra considerably elevated and in a dorsal position.

DESCRIPTION

Length 7.3-13.7 mm. Body moderately convex, dark brown to black, shiny or with an opaque satin gloss, legs and antennae usually of a lighter colour. Eyes not protruding or slightly protruding beyond the lateral outline of the head, the last four antennal segments clearly expanded (fig. 113), mentum divided into three parts (figs 102, 104-112). Pronotum uniformly elevated, sides sometimes with longitudinal wide troughs, anterior angles protruding, base of pronotum bisinuate, lateral edges emarginated, anterior edge and base emarginated with wide interruption in the middle. Elytra wider than the pronotum, more elevated and slightly expanded posterad, rounded apically. Rows of elytra formed by big round funnel-shaped punctures connected by shallow narrow furrows, the disc often lacks these furrows and then the areas between punctures in the rows are slightly longitudinally concave or flat. In the population of *O. minimus*, inhabiting NE part of the USA, punctures in the rows fuse forming shalow, longitudinal, irregular, lenticular cavities of various length. In posterior part of the elytra rows are connected according to the pattern: 1-9, 2-7, 3-6, 4-5 and 8-free). 1, 3, 5 and 7 intervals of the elytra are wider and often more elevated. Epipleura of the elytra gradually narrows towards the end, slightly wrinkled and finely punctate. Prosternum with anterior emargination. Emargination of the anterior edge of the first abdominal ventrite clearly interrupted in the middle between the metacoxal cavities. Male protarsi considerably expanded. The underside of tarsi covered with thick short yellow hair; the first two metatarsal segments in male and the first prostarsal segment, the first two meso- and matatarsal segments in female with a naked trough in the middle (in *validus* and *acuticollis* the naked trough is in the middle of the first two metatarsal segments in male and in the middle of the first mesotarsal segment and the first two metatarsal segments in female). Ovipositor as in fig. 115 (other *Platynotini* in figs 114, 116, 118, 119). Paraproct elongated, triangular, partially overlapping the coxite, the inner edge with a slanting bacullus. Coxite of four lobes, and narrowing towards the apex; the first lobe (basal) shorter than the second and third, with a transversal bacullus at the base;

fourth lobe considerably shortened, disc-shaped, situated on the outer edge of the anterior, wedge-shaped part of the third plate, club-shaped gonostylus points outwards. Female internal reproductive organs as in fig. 117 (other *Platynotini* in figs 123-125). Single duct of the spermatheca (receptaculum seminis) and a duct of the accessory gland open into bursa copulatrix. Spermatheca multiply forked and twisted forming a ball of a few ducts of diameter smaller than that of the duct of accessory gland. Aedeagus (figs 151-172) consists of tegmen divided into two parts (apical part shorter than basal) and a penis with one pair of laciniae. Apical part of tegmen divided apically into parameres, which can be fused (*validus* and *acuticollis*).

Sexual dimorphism - the last segment of maxillary palpi wider in male, protibia with cavity on the inner side (except in *ecuadorensis*), female elytra more elevated and expanded posterad.

DISTRIBUTION

New World (fig. 179).

KEY TO THE SUBGENERA

1. Tempora wider than eyes (figs 1-4). Hind wings totally reduced. Ratio: metasternal length to length of first abdominal ventrite equal to or smaller than 0.72, ratio: metasternal length between meso- and metacoxal cavities to length of metacoxal cavities equal to or smaller than 0.6. Sides of elytra slightly tucked underneath posterad so that a part of ninth interval (at IV abdominal ventrite) visible from beneath (fig. 9) ..... *Opatrinus* s.str.

-. Tempora of the same width or narrower than eyes (fig. 10-14). Hind wings well developed. Ratio: metasternal length to length of first abdominal ventrite greater than 0.73, ratio: metasternal length between meso- and metacoxal cavities to length of metacoxal cavities exceeding 0.6. Sides of elytra not tucked underneath, all intervals completely visible from above ..... *Alaetrinus*

Subgenus *Opatrinus* s. str.

DIAGNOSIS

All species of this subgenus have completely reduced wings. This character is correlated with shortening of the metasternum (m.l.m./l.f.v. = 0.49-0.72, m.l.c/ l.m.cav. = 0.47-0.57). The sides of elytra slightly tucked underneath posterad, so that a part of the ninth interval (at IV abdominal ventrite) is visible from underneath. Tempora wider than eyes.

DESCRIPTION

Length 7.3-11.8 mm. Surface of head densely and distinctly punctate, tempora wider than eyes. Sides of pronotum rounded, anterior angles acute, lateral edges

crenulate or membranous, base bisinuate, disc of pronotum clearly elevated, relatively wide, clearly visible grooves run along sides, emargination of anterior and posterior edges widely medially interrupted. Elytra strongly convex and slightly dilated posterad, humeri with protruding knob, sides tucked underneath so that a part of ninth interval (at IV abdominal ventrite) is visible from underneath. Rows of elytra formed by large, funnel-shaped punctures connected by narrow sharp furrows always situated on sides and end of elytra; on disc areas between punctures in row punctures sometimes longitudinally concave or flat. Intervals slightly punctate, uniformly elevated; sometimes 1, 3, 5 and 7 more elevated than others. External angle of epipleura of elytra acute at humeri. Pronotum flat in apical part of elytra and in dorsal position. Prosternal process between procoxal cavities clearly emarginated. Mesosternum with deep longitudinal median furrow. Hind wings completely reduced. Metasternum short, emarginated anteriorly, m.l.m./l.f.v. = 0.49-0.72, m.l.c/l.m.cav. = 0.47-0.57.

KEY TO THE SPECIES

1. Lateral edge of pronotum crenulate (figs 38-40). 1, 3, 5 and 7 intervals of elytra more elevated than others. On disc of elytra areas between row punctures flat or slightly longitudinally concave (figs 7, 8). Last abdominal ventrite with a furrow on posterior edge (figs 34, 35). Male mesotibia with apical tooth on the inner side (figs 84, 85) ..... 2.
-. Lateral edge of pronotum simple (figs 39, 41). All intervals of elytra uniformly elevated. On disc of elytra punctures forming rows connected by narrow furrows (figs 5, 6). Last abdominal ventrite without furrow (figs 36, 37). Male mesotibia without tooth (fig. 86) ..... 3.
2. Intervals 1, 3, 5 and 7 uniformly elevated on whole surface of elytra. Puncturation of rows of elytra slightly distorts borders of intervals (fig. 8). Inner side of male profemur with long thick hairs. Male metatibia with apical tooth (fig. 100) ..... *insperatus*
-. Intervals 1, 3, 5 and 7 uniformly elevated, less so on the disc. Clearly visible puncturation of rows of elytra distorts most of elevation of intervals (fig. 7). Inner side of male profemur with short sparse hairs. Male metatibia without apical tooth (fig. 101) ..... *clathratus*
3. Frons finely punctate (fig. 3). Metasternum and abdominal ventrites clearly punctate, distance between punctures equal to or smaller than puncture diameter (fig. 37). Aedeagus as in figs 153, 154 ..... *laticolis*
-. Frons coarsely punctate (fig. 4). Metasternum and abdominal ventrites slightly punctate, distance between punctures greater than 2 x puncture diameter (fig. 36). Aedeagus as in figs 155, 156 ..... *gibbicollis*

Opatrinus (Opatrinus) clathratus (FABRICIUS, 1792)

(Figs 1, 7, 9, 34, 35, 38, 53, 67, 72, 84, 101, 102, 151, 152, 173, 180, 186)

Opatrum clathratum FABRICIUS, 1792: 90.
Opatrum clatratum (sic!) FABR.: HERBST 1793: 219, OLIVIER 1812: 499.
Blaps gemellata OLIVIER, 1795: 9.
Opatrum clathratum fabr.: FABRICIUS 1801: 118, FABRICIUS 1803: 75.
Helops aethiops FABRICIUS, 1801: 162.
Helops aethiops FABR.: FABRICIUS 1803: 57, STURM 1826: 150.
Opatrum clathratum FABR.: SCHÖNHERR 1806: 123.
Blaps gemellata OLIV.: SCHÖNHERR 1806: 147.
Helops aethiops FABR.: SCHÖNHERR 1806: 162.
Opatrinus clathratus: DEJEAN 1821: 66.
Opatrinus clathratus FABR.: STURM 1826: 179, GUÉRIN-MÉNEVILLE 1844: 117.
Opatrinus clathratus FABR.: DEJEAN 1834: 191, DEJEAN 1836: 213.
Opatrinus geminatus ERICHSON, 1848: 565.
Blaps gemellata OLIV.: MULSANT and REY 1853a: 299, 1853b: 74.
Opatrinus gemellatus OLIV.: MULSANT and REY 1853a: 299, 1853b: 74, BURMEISTER 1875: 498, CHAMPION 1896: 6, GEBIEN 1906: 212, 1910: 277, 1938: 296, BLACKWELDER 1945: 524, MARCUZZI 1949: 341, 1950: 106, 1954: 10, 1962: 31, MARCUZZI and D'AGUILAR 1971: 80, MARCUZZI 1977: 22, 1987: 98, 1989: 356.
Opatrum clathratum OLIV. (sic!): MULSANT and REY 1853a: 299 (=*Opatrinus gemellatus* OLIV.), 1853b: 74 (=*Opatrinus gemellatus* OLIV.).
Hopatrinus (sic!) *clathratus* OLIV. (sic!): GEMMINGER and HAROLD 1870: 1915.
Hopatrinus (sic!) *gemellatus* OLIV.: GEMMINGER and HAROLD 1870: 1915.
Hopatrinus (sic!) *geminatus* ER.: GEMMINGER and HAROLD 1870: 1915.
Opatrinus aethiops FABR.: GEBIEN 1906: 212 (=*Opatrinus gemellatus* Oliv.), GEBIEN 1910: 277, 1938: 297.
Opatrinus clathratus OLIV. (sic!): GEBIEN 1906: 212, 1910: 277, 1938: 297.
Opatrinus geminatus ER.: GEBIEN 1906: 212 (=*Opatrinus gemellatus* OLIV.), 1910: 277, 1938: 297.
Opatrinus Gridellii MARCUZZI 1949: 342 **syn. nov.**
Opatrinus gridellii MARCUZZI: MARCUZZI 1950: 105; MARCUZZI 1987: 98, 1989: 356.

Locus typicus: Cayenne (French Guiana).

REMARKS

In 1792, in the work "Entomologia Systematica...." in volume 1 page 90, FABRICIUS describes *Opatrum clathratum* giving "Cajennae" as locus typicus, whereas on page 109 he describes *Blaps clathrata* with locus typicus "America meridionali". The name *Opatrum clathratum* FABRICIUS, 1792 was forgotten because it got confused with the name *Blaps clathrata* FABRICIUS, 1792 used for a species of the genus *Diastolinus* MULSANT et REY, 1859 and the data pertaining to both names (dating and pagination of original descriptions, authorship and type localities) were also confused. This mistake was a result of errors in the works of MULSANT and REY of 1853 and 1859.

MULSANT and REY (1853a, 1853b) erroneously considered OLIVER (1811) to be the author of the name *Opatrum clathratum* (first used for the species described by FABRICIUS in 1792) and treated it as a synonym of *Blaps gemellata* OLIVIER, 1795 (the information that OLIVIER's work about *Opatrum clathratum* was published in 1811 was also wrong). In 1859 these researchers placed *Blaps clathrata* FABRICIUS, 1792

in the newly described genus *Diastolinus*, considering this name to be equivalent to the name *Opatrinus clathratus* used by DEJEAN (1834: 191). From that time on most authors (GEMMINGER and HAROLD 1870, BURMEISTER 1875; CHAMPION 1896; GEBIEN 1906, 1910, 1938; BLACKWELDER 1945; MARCUZZI 1949, 1950, 1954, 1962, 1977, 1987, 1989; MARCUZZI and D'AGUILAR 1971) used the name *gemellata*, OLIVIER 1795.

According to the Zoological Code of Nomenclature the name *Opatrum clathratum* FABRICIUS, 1792 refers to the type of the genus *Opatrinus* DEJEAN, 1821, and the name *Blaps gemellata* OLIVIER, 1795 is its synonym. The names *Helops aethiops* FABRICIUS, 1801 and *Opatrinus geminatus* ERICHSON, 1848 treated earlier by GEBIEN (1906) as synonyms of *Blaps gemellata* Olivier, 1795 have also become synonyms of *Opatrum clathratum* FABRICIUS, 1792.

It must be stressed that the name *Opatrum clathratum* OLIV. does not exist and the name *Blaps clathrata* FABRICIUS, 1792 refers to the type designated for the genus *Diastolinus* MULSANT et REY, 1859 (see remarks on the genus *Opatrinus*).

DIAGNOSIS

This species, like *O. insperatus*, is characterized by clearly crenulate lateral edges of the pronotum and deep emargination of the outer edge of the last abdominal ventrite.

The elevation of intervals 1, 3, 5 and 7 varies - it is less pronounced on the disc of the elytra (in *insperatus* uniform on the whole surface the elytra), clear puncturation of the rows of elytra distorts the greater part of the elevation of intervals (in *insperatus* it distorts only the edges of the intervals), the inner side of the male profemur with short sparse hairs (in *insperatus* the hairs are long and thick), male metatibiae are straight (with apical tooth in *insperatus*).

DESCRIPTION

Length 9.3-11.8 mm. Body dark brown to black, opaque. Puncturation of head as in fig. 1. Mentum as in fig. 102. Pronotum: p.l./p.w. = 0.61-0.72, sides rounded, lateral edges crenulate. Elytra: e.l./e.w. = 1.22-1.37, e.l./p.l. = 1.92-2.40, e.w./p.w. = 1.05-1.17; intervals of elytra clearly elevated, 1, 3, 5 and 7 more than the others; big and deep row punctures considerably distort elevation of intervals, especially on slope of elytra (fig. 7); fourth row consists of 14-23 punctures; areas between row punctures flat or slightly convex on disc with narrow longitudinal depressions on the slope of elytra. Metasternum: m.l.m/l.f.v. = 0.58-0.69, m.l.c./l.m.cav. = 0.47-0.56 (fig. 9). Puncturation of abdominal ventrites as in figs 34, 35. Last abdominal ventrite with deep narrow troughs parallel to outer edge. Male protibia as in figs 53, 67, 72, mesotibia with apical tooth (fig. 84), metatibia straight (fig. 101). Aedeagus: l.e. = 1.45-1.57 mm, l.b.p/l.a.p = 3.40-3.62 (figs 151, 152). Ovipositor: l.o. = 1.8-2.0 mm, l.p./l.c. = 0.92-0.96, l.c./l.f.l. = 5.7-6.2, l.f.l/w.f.l. = 0.32-0.38.

VARIATION

In specimens from Venezuela (Ciudad; Bolvar; Guanare, Los Testigos, Margarita; Morro de Puerto Santo Is., 200 m from mainlands E of Carupano, Suapure) and Brazilia (Obidos, Borba-Rio Madeira, Santeremzinho-Rio Tapajoz, São Sebastião do Uatuma) the pronotum is more elongated (p.l./p.w. = 0.65), the metasternum and the last abdominal ventrite more distinctly punctured, the distance between the punctures equal to or smaller than puncture diameter (fig. 35). In specimens occurring further north (on the continent in French Guiana and on the Lesser Antilles) p.l./p.w. = 0.61-0.66, the metasternum and the last abdominal ventrite slightly punctate, the distance between the punctures greater than puncture diameter.

BIOLOGICAL DATA

Information about the sites where the beetles were collected obtained from labels ("under beach drift", "blacklight trap", "primary forest on sand, pitfall traps", "pampatar", "compost heap", "among pieces of rock", "near crab holes", "at night", "leaf litter cacao plantation", "on banana", "ex sisal bole", "in chicken feed in granary", "in *Diozcorea* sp. stem", "in cow dung") indicates that in the wild the species occurs on sandy and rocky terrain, on beaches, river banks and in woods. It has also been found in chicken food stores and, as a pest, on sugar cane fields. The larvae and adults probably feed on rotting vegetation.

MATERIAL EXAMINED (218 M, 205 F)

BRAZIL: (FMNH) 1 m, 2 f; Amazones (MNHN) 4 m, 4 f; Manaus (NMNH) 2 f; Obidos (MZUSP) 5 m, 4 f; Borba, Amazonas (NMNH) 1 m, 2 f; Para (MNHN) 1 f; Rio Madeira (MZUSP) 2 f; Santaremzinho, Itaitbura (Rio Tapajoz), Estado Para (MZUSP) 1 m, 1 f; São Sebastião do Uatuma (MZUSP) 2 f.

GUYANA: (NMNH) 2 f, "Guyan." (ZMB) 2 f; "Guiana" (ZMK) 1 m.

SURINAM: (TM) 1 m; Lucie riv. Gebied (ZMA) 1 m; Dirkshoop (ZMA) 2 m; Paramaribo (NMNH) 1 m, 3 f.

FRENCH GUIANA: (MNHN) 10 m, 4 f; Env. De Cayenne Morne Ceperou (MNHN) 1 f; Cayenne (ANSP) 2 m, 1 f, (MNHN) 5 m, 1 f, (ZMA) 1 m, 2 f, (ZMH) 1 f, (ZMK) 1 m; Pariacabo (MNHN) 1 f; Passoura (MNHN) 2 m, 3 f; Roches de Kourou (MNHN) 2 m, 2 f; Env. De St-Georges Oyapock (MNHN) 1 m, 1 f.

VENEZUELA: "Venezuela" (MNHN) 1 m, 2 f, (NHMB) 1 m, 1 f, (NHMV) 1 m, 2 f, (TM) 1 f, (ZMB) 1 f, (ZMH) 1 f; Caracas (MNHN) 6 m, 1 f, (NMNH) 1 m, (ZMA) 1 f; Caura River Orinoco (MNHN) 2 f; Cidad Bolivar (CUICI) 19 m, 17 f, (NMNH) 1 m; District Fédéral D'Antimano (MNHN) f; Guanare (CAS) 1 f; Maracaibo (NMNH) 1 f; Morro de Puerto Santo Is., 200 m from mainlands E of Carupano (ZMA) 1 m; San Esteban (MNHN) 2 m, 1 f; Suapure (CUICI) 1 f.

COLOMBIA: "Columb." (ZMB) 3 m, 3 f, (NHMV) 1 m, 1 f, (ZMA) 3 m, (ZMH) 1 m.

WEST INDIES:

Los Frailes: Stat. No 168, La Pecha (ZMA), 1 f. Margarita: Cuera Honda del Rache, Studeste del Valla (ZMA) 1 f; Stat. No 148 (ZMA) 1 m, 3 f.

Los Testigos: Morro de la Iguano (ZMA) 2 m.

Trinidad: (MNHN) 2 m, 2 f, (NMNH) 1 f, (ZMA) 1 m, 1 f; Arima (NMNH) 1 m, 3 f; Arima Valley (CAS) 1 m; Arouca (NMNH) 1 f; Balandra Bay (OSUC) 1 f; Blue Basin (FSCA) 2 f; Arima Ward, Simla (FSCA) 1 m, (OSUC) 1 m; North Wallerfield (FSCA) 1 f; Port of Spain (NMNH) 2 f, (ZMA) 1 f; St. Augustine (ZMA) 12 m, 12 f; St. Joseph (NMNH) 6 m, 6 f; Tunapuna (OSUC) 1 m, 1 f; Mt. St. Benedict (MZUSP) 1 m, 1 f;

Tobago: 1 mi. W of Scarborough (FSCA) 1 f, (ZMA) 1 m, 2 f; S of Airport (ZMA) 16 m, 13 f.

Grenada: Calliste, Point Saline (NMNH) 4 f; Grand Anse (OSUC) 5 m, 5 f; St. George, Point Salines (ZMA) 6 m, 4 f.

Barbados: Bathsheba (NMNH) 1 m, 5 f; Bridgetown (CUICI) 34 m, 18 f, (UCB) 1 m; St. James (RGC) 1 f; Strathmore (NMNH) 1 m.

Bequia: Admiralty Bay (NMNH) 1 f.

Saint Vincent: Georgetown (OSUC) 1 f; Balleisle Hill (OSUC) 1 m; Camden Park 2 m, 4 f (NMNH).

Saint Lucia: (MNHN) 1 f, (NMNH) 2 m; Castries (CUICI) 10 m, 5 f.

Dominica: Clark Hall (MAIC) 1 m, 1 f; Roseau (NMNH) 1 f; St. Paul Mahaut (MAIC) 1 m.

Marie-Galante: (NMNH) 5 m, 1 f; Bonneval (OSUC) 2 m, 2 f.

Guadeloupe: "Guadeloupe" (NHMV) 1 m, (NMNH) 2 m, (ZMK) 1 f, (ZMA) 1 f; Basse-Terre (MAIC) 1 m, 1 f.

Antigua: Boggy Peak (NMNH) 2 f. Montserrat: Plymouth (NMNH) 1 m.

Nevis: (NMNH) 1 f.

St. Croix: (NMNH)5 m, 5 f; Bethlehem, Grassy Pond (NMNH) 1 f; Christiansted, Spring Gut (MAIC) 3 m; Clifton Hill ruins (ZMA) 1 m; Johannson Farm (NMNH) 1 m, 1 f; Strathall (MAIC) 1 m.

Est. Amnaly: (MAIC) 1 m.

JAMAICA: (NMNH) 1 m (intercepted in USA with orchidea).

MEXICO: Irugui (MNHN) 2 m (introduced).

TYPES

Opatrum clathratum FABRICIUS, 1792: holotype (examined), male, "Cayenne", the specimen is deposited in the Zoologisk Museum, Kopenhagen, Denmark.

Opatrinus geminatus ERICHSON, 1848: lectotype (present designation), female, "Guyana, Dr. SCHOMB.; Hist. - Coll. 45 758", the specimen is deposited in the Museum für Naturkunde der Humboldt-Universität, Berlin, Germany.

Helops aethiops FABRICIUS, 1801: not examined, the specimen is probably deposited in the Zoologisk Museum, Kopenhagen, Denmark.

Blaps gemellata OLIVIER, 1795: not examined, the specimen is probably deposited in the Muséum National d'Histoire Naturelle (coll. CHEVROLAT), Paris, France.

Opatrinus gridellii MARCUZZI, 1949: lectotype (present designation), male, "Venezuela, San Fernando de Apure L. Laglaize 5-10.1897, Typus, Museum Paris Coll. R. OBERTHÜR" the specimen is deposited in the Muséum National d'Histoire Naturelle, Paris, France. Paralectotypes: 1 f, "Museum Paris, Venezuela, Etat De Guarico, La Cruz-Rubiera M.GRISOL 1925, Décembre"; 2 m, "Museum Paris, Venezuela, Apure F. GEAY 33-96"; 1 m, 3 f, "Museum Paris, Venezuela, Llanos F.GEAY 33-96"; 2 m, 4 f, "Museum Paris, Venezuela, Haut Apure Palmarito (rive droite) GRISOL 1924"; 3 m, 2 f "Museum Paris, Venezuela, Etat D'Apure San Fernando de Apure Mayeul Grisol 1923"; 1 f, "Venezuela, San Fernando de Apure L. LAGLAIZE 5-10.1897, Museum Paris Coll. R.OBERTHÜR", specimens are deposited in the Muséum National d'Histoire Naturelle, Paris, France.

DISTRIBUTION

(Data from literature are marked with an asterisk) (fig. 180).

Brazil, French Guiana, Surinam, Guyana, Venezuela, Colombia, Los Frailes, Margarita, Los Testigos, Trinidad, Tobago, Grenada, Bequia, Moustique*, Union*, Barbados, Saint Vincent, Saint Lucia, Martinique*, Dominica, Les Saintes, Marie-Galante, Guadeloupe, Antigua, Mont Serrat, Nevis, St. Kitts*, St. Croix, Est. Amnaly, Jamaica, Mexico (possibly introduced).

Opatrinus (*Opatrinus*) *insperatus* sp. nov.

(Figs 2, 8, 40, 54, 66, 71, 85, 100, 187)

Name derivation: Latin *insperatus* - unexpected, surprising; name chosen arbitrarily.

Terra typica: Guiana (historical name, at present it is divided into three countries: French Guiana, Suriname, Guyana).

DIAGNOSIS

See diagnosis of *O. clathratus* (FABRICIUS, 1972).

DESCRIPTION

Length 10.5 mm. Body nearly black, opaque. Puncturation of head as in fig. 2. Pronotum (fig. 40): p.l./p.w. = 0.73, sides rounded, lateral edges crenulate. Elytra: e.l/e.w. = 1.43, e.l./p.l. = 2.23, e.w./p.w. = 1.13; intervals of elytra clearly elevated, 1, 3, 5 and 7 more than others (uniformly on the whole surface of elytra); puncturation of rows of elytra regular and moderately deep; it slightly distorts edges of intervals (fig. 8); fourth row consists of 20 punctures; areas between row punctures with shallow longitudinal depressions, deeper on slope of elytra. Metasternum: m.l.m/l.f.v. = 0.72, m.l.c./l.m.cav. = 0.53. Last abdominal ventrite with deep narrow

trough parallel to outer edge. Male pro- and mesotibia as in figs 54, 66, 71, 85; metatibia with apical tooth (fig. 100). Both male and female reproductive apparatus like in *clathratus*. Aedeagus: l.e. = 1.67 mm, l.b.p./l.a.p. = 4.53.

MATERIAL EXAMINED (2 M)

Holotype, male, "Guiana, LANSBERG", the specimen is deposited in the Zoologisk Museum, Kopenhagen, Denmark; paratype, male, "Museum Paris, coll. De Marseul 1890", "*Opatrinus*, La GUAYRA", deposited in the Muséum National d'Histoire Naturelle, Paris, France.

DISTRIBUTION

Guiana (hist.) and Venezuela.

Opatrinus (*Opatrinus*) *laticolis* (LATREILLE, 1833)

(figs 3, 5, 37, 41, 153, 154, 188)

Pedinus laticolis LATREILLE, 1833: 66.

Opatrinus laticollis [sic!] LATREILLE: DEJEAN 1834: 192, 1836: 213. *Opatrinus laticollis* [sic!] LATREILLE: MULSANT and REY, 1853a: 301, 1853b: 76; GEBIEN 1910: 277, 1938: 297; BLACKWELDER 1945: 524. *Hopatrinus* [sic!] *laticollis* [sic!] LATREILLE: GEMMINGER and HAROLD , 1870: 1915.

Terra typica: subtropical area of South America (evident from the title of the paper).

DIAGNOSIS

This species, like *gibbicollis*, has simple lateral edges of the pronotum and the last abdominal ventrite is not emarginated.

It differs from *gibbicollis* in the following characters: puncturation of the metasternum and abdominal ventrites - distance between punctures is smaller than double puncture diameter (in *gibbicollis* greater than double puncture diameter) and the structure of male genitalia.

DESCRIPTION

Length 8.8-9.5 mm. Body dark brown to nearly black, slightly shiny. Puncturation of head as in fig.3. Pronotum: p.l./p.w. = 0.64-0.69, lateral edge simple (fig. 41). Elytra: e.l/e.w. = 1.20-1.28, e.l/p.l. = 1.94-2.14, e.w./p.w. = 1.07-1.14; intervals of elytra uniformly elevated on the whole surface of elytra, only intervals 3, 5 and 7 slightly protrude beyond posterior part of elytra; fourth row of elytra consists of 24-27 punctures; areas between row punctures with deep longitudinal troughs connecting punctures (fig. 5). Metasternum: m.l.m./l.f.v. 0.49-0.51, m.l.c./l.m.cav. = 0.55-0.57. Puncturation of abdominal ventrites as in fig. 37. Last abdominal ventrite not emarginated. Structure of male tibia similar to that in *gibbicollis*. Male genitalia as in fig. 153, 154. Aedeagus: l.e. = 1.35-1.42, l.b.p./l.a.p. = 3.11. Ovipositior: l.o. = 1.7 mm, l.p./l.c. = 0.94, l.c./l.f.l. = 6.5, l.f.l./w.f.l. = 0.34.

MATERIAL EXAMINED (6 M, 6 F)

"Nova Granada" (ZMA) 2 m, 2 f, (ZMB) 1 m, (TMB) 1 m.

COLOMBIA: Columbia (ZMK) 1 f; Colombia (IRSNB) 1 m, 3 f; "Gebirge G.La Garita" (TMB) 1 m.

TYPE

Pedinus laticolis LATREILLE, 1833: holotype (examined), female "*laticolis*, LATREILLE, Colombie", the specimen is deposited in the Muséum National d'Histoire Naturelle, coll. CHEVROLAT, Paris, France.

DISTRIBUTION

Nova Granada (Hist.), Colombia.

Opatrinus (Opatrinus) gibbicollis MULSANT et REY, 1853

(Figs 4, 6, 36, 39, 57, 65, 73, 86, 115, 117, 127, 128, 130-134, 136, 138-141, 144, 145, 155, 156, 180, 189)

Opatrinus gibbicollis MULSANT et REY, 1853a: 303; MULSANT et REY, 1853b: 78.
Hopatrinus (sic!) *gibbicollis* MULSANT et REY: GEMMINGER and HAROLD 1870: 1915;
Opatrinus gibbicollis MULSANT et REY: GEBIEN 1910: 277, 1938: 297; BLACKWELDER 1945: 524.

Terra typica: Colombia.

DIAGNOSIS

See diagnosis of *O. laticolis* (LATREILLE, 1833).

DESCRIPTION

Adult: length 6.0-9.2 mm. Body dark brown to nearly black, slightly shiny. Puncturation of head as in fig. 4. Pronotum: p.l/p.w. = 0.59-0.62, lateral edges simple fig. 39. Elytra: e.l./e.w. = 1.08-1.16, e.l/p.l = 2.02-2.11, e.w./p.w. = 1.06-1.15; intervals of elytra uniformly elevated (3, 5 and 7 slightly protruding posteriorly); fourth row consists of 20-25 punctures; row punctures connected by narrow deep furrows (fig. 6). Metasternum: m.l.m./l.f.v. = 0.55-0.60, m.l.c./l.m.cav. = 0.50-0.56. Puncturation of abdominal ventrites as in fig. 36. Last abdominal ventrite not emarginated. Male protibia as in figs 57, 65, 73, mesotibia without apical tooth (fig. 86). Aedeagus (figs 155, 156): l.e. = 1.32-1.35 mm, l.b.p./l.a.p. = 3.58. Ovipositor (figs 115-117): l.o. = 1.7 mm, l.p./l.c. = 0.93, l.c./l.f.l. = 5.4-6.0, l.f.l./w.f.l. = 0.38.

DESCRIPTION OF LARVA

Length of described specimen 9.2 mm, width 0.9 mm, width of head capsule 0.6 mm. Microscope preparations were made from the smallest larva, the other two specimens are much larger: length 15.8 mm and 10.9 mm, width 1.4 mm and 0.9 mm, width of head capsule 1.2 and 0.8 mm respectively.

Body subcylindrical, narrowing posterad (figs 127, 128), colour light amber, head, pronotum and IX abdominal tergite darker.

Head convex above, 0.9 times longer than wide; front straight; side margins rounded; epistomal edge (darker at antennal insertion) with two setae, a third seta situated above eye cavity consisting of two ocelli, transverse groove with three joined ocelli close to side, two long setae situated in the posterior part of the head capsule (figs 132, 133). Clypeus trapezoidal, length at base 0.4 width, with four long setae (fig. 141). Labrum transverse, length c. 0.5 width, with two long setae on disc and another two on lateral edge; along anterior margin three lanceolate setae on each side, joined medially by much smaller ones. Epipharynx with long, sharply triangular, posterad directed process of tormae; inner processes developed as strongly sclerotized teeth; posteriorly, among them a group of eight sensory punctures; in the centre of disc two thick short spines above which a row of five small sensory punctures is situated; in the middle, just at anterior edge, six sensory spots (in two longitudinal rows); all described structures are surrounded by rows of small bristle-like processes. Antennae originating from a large articulating membrane; the second antennomere c. 2.5 times longer than the first, narrowing towards base, apex dilated with the ring-shaped main sensorium; the third antennomere very small, with a long apical seta in the centre, surrounded by three shorter setae (fig. 134). Mandibles as in figs 138, 140. Maxilla and labium as in figs 144, 145, inner surface of mala densely covered with thick bristles, hypopharynx with trapezoidal sclerite furnished with three sharp processes on anterior edge and numerous very small sharp processes.

Pronotum longer than mesonotum and metanotum, about as long as the first abdominal segment, furnished with two pairs of setae situated laterally at anterior and posterior edges; sides of mesonotum and metanotum with one pair of setae at anterior edge and two pairs of setae at posterior edge; two spiracles situated in anterior part on sides of mesosternum, about twice as big as abdominal ones.

Fore legs longer and stronger than mid and hind ones; inner side of trochanter furnished with 2 strongly sclerotized, apically rounded tubercles; anterior margin of femur with four tubercles, between first and second of them a long seta; ventral surface of tibiotarsus with three tubercles; claw about twice shorter than tibiotarsus, with two strong spines at base (fig. 136).

Shape of tergites of first seven abdominal segments - nearly square, slightly longer than wide; VIII segment longer than others; IX segment shorter than others, triangular with rounded apex, furnished with four spines, situated apically at equal distances from each other (figs 130, 131).

Biological data

Adult beetles and larvae were found in detritus covering the ground in old tropical forests. The species found in Honolulu is reported to have been introduced with the roots of the plant "brassavolasa".

MATERIAL EXAMINED (83 M, 88 F)

PANAMA: Altos de Maje (OSUC) 1 m; Barro Colorado Is. (NMNH) 67 m, 69 f, (OSUC) 2 m, 1 f, (UCB) 1 m, 1 f, (CAS) 1 f; Bruja Point (NMNH) 1 m; Cristobal (CAS) 1 m; Palo Seco Road to Fort Kobbe Beach 5 mts (NMNH) 3 m, 2 f; Paraiso (NMNH) 1 m, 2 f; Peari Is. San Jose (NMNH) 5 m, 10 f; Tabogilla Id. (NMNH) 1 f;

COLOMBIA: (ZMK) 1 f.

HAWAII: Honolulu (NMNH) 1 m (introduced from Panama with roots of "brassavolasa").

Three larvae from PANAMA, Barro Colorado Is., (19/2-9/3 1975, rotten flwrs), collected by J. F. LAWRENCE using Berlese funnels, not reared.

TYPE

Opatrinus gibbicollis MULSANT et REY, 1853: holotype (examined), male, "*Gibbosus* DEYROL.; *Opatrinus gibbicollis*; Colomb., GOUDOT; Type", the specimen is deposited in the Muséum National d'Histoire Naturelle, Paris, France.

DISTRIBUTION (FIG. 180)

Panama, Colombia, Hawaii (Honolulu) - introduced.

Subgenus *Alaetrinus* subgen. nov.

Name derivation: arbitrary combination of letters.

Type species: *Tenebrio pullus* SAHLBERG, 1823: 16.

DIAGNOSIS

Species of this subgenus have tempora narrower than eyes (wider in *Opatrinus* s. str.), the outer angle of the epipleura of elytra is right angle at the humeri (acute in *Opatrinus* s. str.), wings are fully developed (completely reduced in *Opatrinus* s. str.), the metasternum is elongated (m.l.m./l.f.v. is greater than 0.73, m.l.c./l.m.cav. greater than 0.6 (the metasternum in *Opatrinus* s. str. is considerably shorter - m.l.m./l.f.v. equal to or smaller than 0.72, m.l.c./l.m.cav. equal to or smaller than 0.6), all the intervals of elytra are well visible from above (in *Opatrinus* s. str. sides of elytra are slightly tucked underneath so that a part of the ninth interval at IV abdominal ventrite is visible from underneath).

DESCRIPTION

Length of body 7.3-13.7 mm. Tempora narrower than eyes. Elytra elongated, moderately elevated, humeri without protruding knob. Rows of elytra formed by large funnel-shaped punctures connected on slope by narrow deep furrows; on disc areas between punctures usually longitudinally concave or flat. All intervals of elytra completely visible from above, slightly punctate, uniformly elevated - some-

times 1, 3, 5 and 7 more so than others. Outer angle of epipleura of elytra is a right angle at humeri. Pseudopleura flat in apical part of elytra and in dorsal position (in *validus* considerably elevated and in ventral position). Prosternal process between procoxal cavities clearly emarginated (in *acuticollis* emargination not visible in the middle); mesosternum with deep longitudinal furrow in the middle; wings fully developed (this character is correlated with length of metasternum - m.l.m./l.f.v. = 0.75-1.08, m.l.c./l.m.cav. = 0.80-1.45).

KEY TO THE SPECIES

1. Pronotum widest at base, sides narrowing anterad (figs 28, 30); on whole surface of elytra row punctures connected by narrow longitudinal grooves, sometimes punctures fuse forming shallow lenticular depressions of various length (fig. 181) ..... 2.
-. Pronotum widest in median or anterior part, sides rounded or nearly parallel (figs 20-25); on disc of elytra areas between punctures flat or slightly elevated, at back and on sides narrow longitudinal grooves (fig. 18) ..... 3.
2. Pronotum with longitudinal wide troughs along lateral edges (fig. 28); sides of prosternum with wide longitudinal depressions (fig. 29) ..... *aciculatus*
-. Pronotum uniformly elevated, often with slight depressions at lateral edges (fig. 30); sides of prosternum flat or with shallow narrow troughs situated near edges (fig. 31) ..... *minimus*
3. Genae wider than eyes (figs 11, 12) ..... 4.
-. Genae narrower than eyes (figs 10, 13, 14) ..... 5.
4. Mesosternum between mesocoxal cavities flat or slightly elevated, emargination of anterior edge metasternal process interrupted medially (fig. 46); sides of pronotum rounded (fig. 24) ..... *ecuadorensis*
-. Mesosternum between mesocoxal cavities with clearly visible longitudinal depression, emargination of anterior edge of metasternal process complete (fig. 45); sides of pronotum nearly parallel on 4/5 length (fig. 25) ..... *angustus*
5. Emargination of anterior edge of metasternal process medially interrupted (fig. 47); apical part of tegmen of aedeagus with longitudinal suture in middle (figs 169, 171) ..... 6.
-. Emargination of anterior edge of metasternal process complete (fig. 44); apical part of tegmen of aedeagus with two parameres (figs 159, 163, 167) ..... 7.
6. Prosternal process emarginated (fig. 48); pseudopleura of elytra elevated in apical part and in ventral position (fig. 42); last abdominal ventrite with apical emargination (fig. 50) ..... *validus*
-. Prosternal process not emarginated (fig. 32); pseudopleura of elytra flat in apical part and in dorsal position (fig. 43); last abdominal ventrite not emarginated (fig. 49) ..... *acuticollis*
7. Upper surface of body shiny; sides of pronotum rounded (fig. 21); prosternum clearly punctate, sometimes punctures fuse forming irregular furrows; male protibia gradually expanding towards apex (figs 62, 74) ..... *pullus*

-. Upper surface of body opaque or with satin gloss; sides of pronotum nearly parallel on 2/3 length (figs 20, 23); prosternum slightly punctate, punctures small, round, clearly separated; male protibia considerably medially expanded (figs 60, 61) ..... 8.

8. Hairs covering body fine, hardly visible, hairs on head as in fig. 16; elytra opaque, median expansion of male protibia not-cleft (figs 61, 69); bursa copulatrix with small spines (fig. 120) ..... *moestus*

-. Hairs covering body relatively long and thick, hairs on head as in fig. 15; elytra with satin gloss; median expansion of male protibia sinuate (figs 60, 68); bursa copulatrix with two sclerotized plates ..... *girardi*

Opatrinus (Alaetrinus) minimus (Palisot de Beauvois, 1805)

(Figs 14, 30, 31, 51, 58, 64, 76, 77, 88, 111, 112, 157, 158, 181, 190)

Tenebrio minimus Palisot de Beauvois, 1805: 164.
Opatrum notum Say, 1826: 237, 1835: 187;
Opatrinus minimus: Chevrolat 1852: 636 (=*Opatrum notum* Say).
Opatrinus notus Say: Melsheimer 1853: 137; Mulsant and Rey 1853a: 309, 1853b: 84; Le Conte, 1859: 75; Horn 1870: 348; Crotch 1873: 106; Henshaw 1885: 119.
Hopatrinus (sic!) *minimus* Beauv.: Gemminger and Harold 1870: 1915.
Opatrinus minimus Beauv.: Gebien 1910: 277, 1938: 296; Papp 1961: 119.

Terra typica: USA.

Diagnosis

This species is similar to *aciculatus*. The shape of pronotum is trapezoidal - the greatest width is at the base or just before it, the sides gradually narrowing anterad. Intervals of elytra 1, 3, 5 and 7 are more elevated than the others, on the whole surface of elytra row punctures are connected by narrow longitudinal grooves (apart from the population of *minimus* in the nothern part of the distribution area).

The characters that distinguish it from *aciculatus* are: depth of the depressions running along the pronotum sides (deep longitudinal troughs in *aciculatus*) and the elevation of the sides of prosternum which are flat, sometimes with shallow longitudinal impressions running along the lateral edges (deep troughs in *aciculatus*).

Description

Adult: length 7.3-11.7 mm. Body dark brown to black, moderately shiny. Head clearly punctate on frons, distance between punctures smaller than their diameter, puncturation of clypeus finer and sparser (fig. 14), lateral contour of eye not protruding. Mentum as in fig. 111, 112. Pronotum trapezoidal; p.l./p.w. = 0.52-0.66; greatest width at base; sides nearly parallel up to 1/3 from base, then abruptly narrowing anterad (fig. 30); anterior angles acute, clearly protruding; disc of pronotum uniformly elevated, sometimes with shallow longitudinal depression at lateral edges; anterior angles are right angles, pointing towards back; pronotum

puncturation dense and clearly visible, on disc punctures slightly elongated. Elytra: e.l./e.w. = 1.10-1.45, e.l./p.l. = 2.17-2.88, e.w./p.w. = 1.05-1.33; fourth row of elytra consists of 15-24 punctures or 10-15 longitudinal depressions. Sides of prosternum flat, sometimes with shallow narrow troughs along lateral edges (see: geographic variation). Prosternal process emarginated (fig. 31). Metasternum: m.l.m./l.f.v = 0.84 - 0.93; m.l.c./l.m.cav. = 0.90-1.00. Male protibia with longitudinal trough on inner side (figs 58, 64, 76), mesotibia with apical tooth (figs 77, 88). Aedeagus: l.e. = 1.40-1.61 mm, l.b.p./l.a.p. 4.54-4.83 (figs 157, 158). Ovipositor; l.o. = 1.54-1.81 mm, l.p./l.c. = 0.93-0.97, l.c./l.f.l = 5.75-6.11, l.f.l/w.f.l. = 0.31-0.37.

GEOGRAPHIC VARIATION

The elytral structure of this species varies clinally with latitude. In the south of the USA the beetles have intervals 1, 3, 5 and 7 clearly elevated and deep round regular row punctures, situated in clearly visible longitudinal troughs (as in *aciculatus*). These characters change northwards. In the northern part of the distribution area the intervals are uniformly elevated and considerably flatenned, the row punctures of the elytra fuse into ellyptically elongated shallow depressions of various lengths (fig. 181).

In populations from Texas (Galveston, College Station, Brazos, Anahuae, Harris, Willis, Smith Point, Houston) and Alabama (Langdale, Castleberry) the punctures covering mentum (fig. 112) and abdominal ventrites are much bigger and deeper. Specimens from Texas (Victoria, College Station), Louisiana (Olivier, Johns'n's B'y'u, Rapides Parish, Alexandria, Pouchatoula, Baton Rouge, Tallulah, St. James, Phoenix, Pineville, Hart, New Orlean), Missouri (Dexter) and Tennessee (Memphis) have narrow troughs along sides of pronotum and prosternum. This character makes them more similar to *aciculatus* which would suggest that interbreeding on the borders of distribution areas is possible. However, the stability (or rather the narrow range of variability) in the structure of pronotum (deep troughs along edges) and elytra (clearly elevated intervals) and clearly defined distribution area allow treating them as separate species. The data obtained from the examined material suggest that only in two locations in Texas (Victoria, College Station) *minimus* and *aciculatus* occur sympatrically, however, the specimens were not collected at the same time. A definite answer to the question whether crossbreeding between these species takes place will be possible only on the basis of experimental work. Even if crossbreeding is experimentally confirmed, it will not prove that what we are dealing with is only a variation manifested by a division of the species into groups of phenotypes. In my opinion, crossbreeding between *aciculatus* and *minimus* is possible, but only as an effect of the rejoining of areas of distribution of these species, which is mainly due to the rapid dispersal of *minimus*.

DESCRIPTION OF LARVA

The great similarity of the morphological structure of the larvae of *O. minimus* and *O. aciculatus* made it impossible to find diagnostic characters

which would make it possible to distinguish earlier developmental stages of these species.

Size of the largest larva: length 23.9 mm, width 2.3mm, width of head capsule 1.70 mm.

Frequency of occurence of different number of spines on profemur.

number of spines	4	5	6	7	8
number of legs	8	2	0	1	1

Frequency of occurence of different number of spines on protibiotarsus.

number of spines	4	5
number of legs	3	9

Small number of specimens (6 larvae) did not allow statistical analysis and drawing general conclusions. However, the observed number of spines on the profemur (4-8) and protibiotarsus (4-5) in larvae of *O. minimus* confirm the conclusions from research on the variation of legs in larvae of *O. aciculatus*.

DESCRIPTION OF PUPA

Length 10.8-11.6 mm. Morphological structure very similar to that of pupae of *O. aciculatus*. Distinctive shape of pronotum makes it possible (as in adult forms) to distinguish these species.

BIOLOGICAL DATA

Adult forms are found throughout the year; however, light amber to light brown specimens occur from April to August (also in *aciculatus*). They were caught in a scoop, attracted by light and obtained from sieving boxes. They occur in sandy soils, under stones, fallen tree trunks, in organic remains (pig dung, rotting fungi), in undergrowth, between roots, on dry grass, under bark of trees (*Pinus* sp., *Quercus* sp., *Eucalyptus grandis*) and on plants (*Castanea dentata*, *Crataegus* sp., *Melilotus alba*, *Plantago aristata*, *Persea americana*, *Quercus virginiana*, pepper, tomato), and also on cotton and strawberry plantations. *O. minimus* has been reported by U.S. Food & Drug Administration (FDA) as a species introduced e.g. from Avery Is. (Louisiana) to Fontana, San Bernar Co. (California), in soil with Sphagnum sp.; from Missouri to Sacramento.

Breeding more developed stages of larvae and observing wear and colour of cuticula in adult specimens provide data on the basis of which conclusions about the developmental cycle of the species can be drawn. Adult specimens appear from April to August. Copulation and egg laying probably take place when the beetles have

completed supplementary feeding. Larvae and probably most of the adult beetles survive the winter. In early summer mature larvae and a small number of imagines of the previous generation are observed. The pupal stage lasts about 10 days, after which beetles of the new generation appear. As the area of distribution of *minimus* is considerably extended meridionally, the developmental cycle of this species displays differences depending on the climate.

MATERIAL EXAMINED (965 M, 1037 F)

CUBA: (ZMK) 1 f, (TMB) 1 m.

MEXICO: (ZMA) 1 m.

USA: "Nord America" (DEI) 2 m, 2 f, (NHMB) 1 m, 3 f, (ZMK) 1 m, 1 f; "Am. bor." (NHMV) 3 m, 4 f, (TM) 1 m, 1 f, (TMB) 4 m, 2 f, (ZMK) 4 m, 3 f, (ZMA) 5 m, 5 f, (ZMH) 4 m; "Am. bor., White Mount" (DEI) 1 f; "Et. Unis" (TMB) 2 m; "Am. sept." (MIZPAN) 1 m, 4 f, (ZMK) 1 f; "Carolina" (ZMH) 1 m.

California: San Bernar Co., Fontana (CDAE) 1 m [in quarantine from Avery Is., LA]; Sacramento (CDAE) 1 f [quarantine from Missouri]; Hullville (FMNH) 1 m.

Texas: (ANSP) 1 m, (CMP) 1 m, 1 f, (DEI) 1 f, (MNHN) 1 m, 2 f; Bay City (NMNH) 1 m; Brazos Co.: (CNCI) 1 m, 2 f, (NMNH) 3 f; Chambers Co, Anahuac (TAMU) 2 f; College Station (CAS) 2 m, 7 f, (TAMU) 15 m, 12 f; Edna (NMNH) 2 f; Elkhart (TAMU) 1 m, 2 f; Galveston Co.: (FSCA) 2 f, (CNCI) 1 f, 1 m, (NMNH) 1 m, 6 f, (TAMU) 1 f, Friend Swood, 2 mi NE (UCB) 9 m, 16 f; Hardin Co. Silsbee (FMNH) 2 m, 1 f; Harris Co. (TAMU) 1 m; Houston (FSCA) 1 m, 4 f, (NMNH) 2 f; Liberty (TAMU) 1 m; Longview (NMNH) 1 f; Nacogdoches Co, Nacogdoches (TAMU) 1 f; Orange Co.: Bridge City (CNCI) 1 f, Orange (NMNH) 1 f; Otey (FSCA) 1 m; Rivers (DEI) 1 m, 4 f; Robertson Co., Camp Creek 8 mi SE (TAMU) 1 f; San Houston Nat. Forest (TAMU) 1 f; Seabrook (CAS) 2 f; Smith Point (NMNH) 2 m, 3 f; Tyler Co., Dam B-Camp. Cove (TAMU) 1 m; Victoria (NMNH) 3 m, 2 f; Waco, Environs (RLAC) 1 f; Wellisville (CNCI) 1 m; Willis (NMNH) 2 f.

Oklahoma: Latimer Co. (FSCA) 5 m, 1 f; Muskogee Co. Dirty Creek, 3 mi. W. of Webbers Falls (FMNH) 1 f.

Kansas: (DEI) 1 m; Labette Co.: Oswego (NMNH) 1 m, 1 f; Lawrence (CAS) 1 f; Leavenworth (TM) 1 m; Pot. Co. (FSCA) 1 f.

Louisiana: (CMP) 3 m, 2 f, (CUICI) 1 m; (DEI) 1 m; (NMNH) 3 m; (TMB) 3 m; (ZMH) 1 f; (CAS) 1 f; Algiers (NMNH) 1 f; Baton Rouge Parish (NMNH) 2 m, 12 f, (OSUC) 2 m; Crowley (CAS) 1 f;Fort Pike (TM) 1 m; Goodhope (NMNH) 1 m; Gueydan (NMNH) 8 f; Harahan: (UAIC) 1 m, Jefferson Par. (FMNH) 2 f; Hart (CAS) 3 m, 6 f, (MCZ) 1 f; Iennings (CAS) 1 m; Johns'n's B'y'u (NMNH) 1 m, 2 f; Lafayette (FSCA) 5 m, 4 f, (NMNH) 1 m; Lake Arthur (UAIC) 1 m; Morgan Cy (NMNH) 1 m; New Orleans (ANSP) 1 m, 5 f, (CAS) 5 m, 2 f, (FMNH) 13 m, 34 f, (SEMC) 1 m, 1 f; N. Iberia (NMNH) 1 f; Norco, Pouchatoula (NMNH) 2 m, 3 f; St. Charles Pr. (FMNH) 1 f; Olivier (NMNH) 3 m, 1 f; Phoenix (NMNH) 2 m, 1 f; Pineville (NMNH) 1 m, 4 f; Rapides Parish, Alexandria (TAMU) 1 f, (NMNH) 4 m, 3 f; St. James LA 4 f; Tallulah (NMNH) 3 m, 9 f.

Arkansas: Beebe (NMNH) 1 f; Blytheville (RLAC) 1 f; Clay Co. (NMNH) 1 m, 1 f; Desha Co. (SEMC) 1 f; Hope (CUICI) 2 m, 5 f; Hot Springs (CAS) 1 f; Imboden (FMNH) 1 m, 1 f; Jackson Co., Tupelo 1 f; Knob Hill Rch, Ozark Mt. S (CAS) 1 m; Little Rock (FSCA) 1 m, 2 f; Mena (CUICI) 1 m, 1 f; Newton Co. 2 mi S of Ponen Highway 43 (NMNH) 1 m; Pine Blu (NMNH) 1 f.

Missouri: (TMB) 3 m; Aldrich (CUICI) 1 f; Christian Co. Hiway AA near James River (NMNH) 1 f; Columbia (FSCA) 1 m; Greene Co., Willard (ANSP) 1 m, (CAS) 1 f; Jackson Co., (TAMU) 2 m, 2 f; Laclede Co. (FSCA) 1 m; Mt. Grove (NMNH) 1 f; Neosho (UAIC) 1 f; Randolph Co., Moberly 1 mi E (TAMU) 1 m, 1 f; St. Joseph (NMNH) 1 m; St. Louis Co.: (NMNH) 1 f, Babler Park (NMNH) 3 f, Creve Coeur Lake (CUICI) 2m, 2 f; Stoddard Co., Dexter 2.8 mi NE, Holly Preserve (TAMU) 1 f.

Illinois: (CMP) 2 m, 2 f, (CNCI) 1 f; Alexander Co., Mc Clure (CNCI) 1 m, 3 f; Gorhana (UAIC) 1 m, (CAS) 1 f; Havana, Devil's Hole (CAS) 1 m; Mason Co., Mason State Forest (CNCI) 1 f; Meredosia (CAS) 1 m; Sanibold (TM) 2 m; Topeka (CNCI) 4 m, (CAS) 1 m, 1 f;

Indiana: Stanke Co. Bassl (FMNH) 1 f; Terre Haute (NMNH) 3 m, 3 f.

Mississippi: (CNCI) 2 m, (NMNH) 1 f; Bond (CAS) 1 m; Ft. Adams (NMNH) 1 f; Hinds Co., Raymond (FMNH) 1 m; Holly Sp. (NMNH) 1 m; Leakesville (CUICI) 1 f; Lucedale (CAS) 6 m, 5 f, (CUICI) 26 m, 23 f, (NMNH) 1 m, (TM) 1 m; Ocean Spring (CAS) 1 m, 1 f, (CUICI) 3 m, (NMNH) 1 m; Vicksburg (UCB) 3 m.

Alabama: (CMP) 1 m; Blount Spgs (CMP) 1 m, 1 f; Castleberry (NMNH) 4 m, 11 f; Chambers Co. Langdale (NMNH) 2 m; Chilton Co. Clanton (NMNH) 2 m; Leroy (CUICI) 1 m, 1 f; Mobile (CAS) 7 m, 11 f, (CUICI) 4 m, 2 f, (FSCA) 2 m, 1 f, (NMNH) 6 f; Mt. Vernon (CUICI) 1 f; Wadley (NMNH) 1 f.

Florida: "Florida" (ANSP) 1 m, 1 f, (CUICI) 1 m, 2 f, (CMP) 5 m, 7 f, (NHMB) 1 f, (NMNH) 1 m, 3 f; Alachua Co.: (CUICI) 3 m, 2 f, 3 miles East of Micanopy (FSCA) 3 m, 4 f; Anclote River, Elfers (FSCA) 3 m, 1 f; Arbuckle Creek (FSCA) 1 m; Arcadia (CUICI) 1 f, (CNCI) 1 f; Baynton (CMP) 2 m, (NMNH) 1 m, 2 f; Belle Glade (FSCA) 1 m, 1 f; Big Pine Key (RLAC) 1 m, (FSCA) 3 m, 1 f, (TAMU) 1 m, 1 f; Biscayne (NMNH) 3 f; Boca Raton (FSCA) 1 m; Manatee Co., Bradenton (FSCA) 1 f, (CNCI) 2 f; Brevard Co., Melbourne (CAS) 1 f, (FSCA) 1 m, (NMNH) 1 f; Brooksville (FSCA) 2 f; Broward Co. (FSCA) 1 m, Deerfield Beach (UAIC) 1 m; Canal Point (CUICI) 2 f, (CAS) 1 f; Capron (NMNH) 6 m, 4 f; Century (NMNH) 1 f; Chiefland (NMNH) 1 m; Citrus Co.: (FSCA) 1 f, (NMNH) 1 f, Holder (NMNH) 1 f; City (FSCA) 6 m, 2 f; Clarksville (CNCI) 1 f; Clewiston (RLCA) 1 f; Clevland (CMP) 1 m, 1 f; Collier Co.: Corkscrew Wwamp (FSCA) 1 f, Seminole State Park (FSCA) 2 f; Crescent City (NMNH) 1 f; Crew Coll (CUICI) 4 m, 3 f; Cutler (NMNH) 1 m, 2 f; Dade Co.: (UAIC) 1 f, Matheson Hammock (FSCA) 2 m, 1 f, Miami (FSCA) 1 m, 1 f, (CMP) 2 m, 7 f, (CUICI) 1 f, (ANSP) 5 m, 7 f, (CNCI) 3 m, 10 f, (CAS) 9 m, 4 f, Monkey Inn. (FSCA) 1 f; Davis (FSCA) 1 m, 1 f; Daytona (CNCI) 4 m, (NMNH) 1 f; De Funiak Spr. (CNCI) 1 m; De Soto Co., Arcadia (FSCA) 1 f; Dixie Co., 3.5 mi. N. Old Town (FSCA) 1 f; Duck Keys (FSCA) 2 m; Dunedin (CUICI) 2 m, 8 f, (TAMU) 1 m; Eau Gallie (CUICI) 1 m; Enterprise

(CUICI) 1 f, (CAS) 1 m, 3 f, (NMNH) 3 m, 4 f; Franklin Co.: (CNCI) 1 m, 1 f, Cape San Blas Apalachicola, 20 mi W (UCB) 2 f, St. George Is. (FSCA) 1 f; Fruitland Park (CNCI) 1 m; Ft. Pierce (FSCA) 1 m, 2 f; Ft. Myers (DEI) 1 m, (NMNH) 1 m, 1 f; Ft. Walton (MIZPAN) 1 m, 1 f, (CNCI) 1 m, 1 f; Gainesville (FSCA) 24 m, 23 f, (CUICI) 2 m, 1 f, (NMNH) 1 m; Gastings (CUICI) 1 m; Glades Co., 1 mi. S. Palmdale (FSCA) 2 f; Grescent City (NMNH) 1 m; Groveland (FSCA) 1 f; Gulf Hammock (CNCI) 1 f; Hastings (CAS) 1 f, (NMNH) 1 m, (TM) 1 f; Hialeoh (NMNH) 2 f; Highlands Co. 5 km W Lorida (NMNH) 1 m, 1 f; Highlands Co.: Archibold Biol. Sta. (NMNH) 1 f, Sebring (FSCA) 6 m, 8 f; Highlands Hamm., State Park (FSCA) 2 m, 3 f, (CUICI) 1 m, 1 f; Homestead (FSCA) 2 m; Immokalee (CUICI) 2 m, 1 f; Interlachen (CNCI) 1 f; Jacksonville (NMNH) 2 m, 2 f; Jefferson Co. (FSCA) 4 m, 9 f; Kissimmee Riv. (NMNH) 4 m, 3 f; Key Largo (FSCA) 3 m, 6 f; Key West (FSCA) 1 m, (CMP) 1 m, 1 f, (CAS) 2 f; La Belle (CUICI) 1 m, 4 f, (CAS) 1 m; Lake Co. 11 km. NE Paisley (NMNH) 1 m, 3 f; Lakeland (CAS) 1 f, (CNCI) 1 m; Lake Placid (FSCA) 1 m, (CUICI) 3 m, 12 f, (CNCI) 3 m, (CAS)1 f;; Lake Wamberg (CUICI) 1 f; Lake Worth (CUICI) 1 f, (FSCA) 1 m, (CMP) 2 m, 3 f; Largo (CAS) 1 f; Lauderdale (CAS) 1 f; Liberty Co.: Hosford (NMNH) 1 f, Torreya State PK (FSCA) 1 m, 6 km NW Rock Bluff, Torreya St. Pk. (NMNH) 2 m, 3 f; Long Pine Key (CNCI) 1 f; Lutz (CMP) 2 m, 3 f; Madison Co., Kridu (FSCA) 1 f; Manatee Co., Bradenton (FSCA) 2 m, Oneco (CUICI) 3 m; Marion Co. (CMP) 1 m, 4 f; Matecumbe Key (FSCA) 1 m; Merrift (FSCA) 1 m; Miami Beach (NMNH) 10 m, 10 f; Monroe Co.: Cape Sable (FSCA) 1 f, Everglades Natl. Pk. (FSCA) 1 f, Key Vaca (FSCA) 1 f; Moore Haven (CMP) 1 f, (NMNH) 1 f; Morgan Cy. (NMNH) 2 f; Naples (CUICI) 8 m, 17 f; No Name Key (NMNH) 1 m, 2 f; Ochopee (FSCA) 1 m, 1 f; Okeechobee, 6 mi S. (CUICI) 1 m; Orlando (CAS) 14 m, 10 f; Palm Beach. Co.: (CAS) 2 m, (NMNH) 2 f, Royal Palm Bch. (FSCA) 1 m, 1 f; Glades Co., Palmdale (CUICI) 1 f, Venuso Palmdale (NMNH) 1 m, 3 f; Palmetto (FSCA) 2 m, 2 f; Paradise Key (CNCI) 1 m; Plantation Key (FSCA) 4 m, 1 f; Punta Gorda (CAS) 1 f, (NMNH) 1 m, 1 f; Quincy (FSCA) 1 f; Sand Pt. (NMNH) 14 m, 9 f; Sanford (NMNH) 1 m, 5 f; Sanibel Id. (CUICI) 8 m, 3 f; Sarasota Co., Myakka Riv. St. Pk. (CUICI) 5 m, 8 f, (FSCA) 2 m, 1 f; Sebastian (NMNH) 2 m, 1 f; Smyrna N (CAS) 1 m; St. Augustine (CUICI) 2 m, 2 f, (FSCA) 1 m, 5 f, (CNCI) 1 f; St. Johns Co. (FSCA) 1 f; St. Lucie (FSCA) 2 m; St. Petersburg (CUICI) 1 m; Stemper (CMP) 1 m; Sufar Loaf Key (NMNH) 1 f; Tampa (CMP) 2 m, 4 f, (CAS) 1 m; Tavernier (OSUC) 4 m, 4 f; Venice (FSCA) 2 m, 2 f; Volusia Co.: (FSCA) 1 m, 5km SW Daytona Beach (NMNH) 1 f, Westgate (CNCI) 1 m, 2 f; Wakulla Springs Tallhassee (MIZPAN) 2 m, 4 f; Walton Co. (FSCA) 1 m; Winter Garden (FSCA) 3 m, 1 f; Zolf O Spgs (FSCA) 1 m, 2 f.

Georgia: (CAS) 1 f, (CMP) 2 f, (DEI) 1 m; Atlanta (NMNH) 1 m, 1 f; Camden Co. St. Marys, at Crooked River (NMNH) 2 m, 1 f; Richmond Co., Ft. Gordon (CDAE) 1 m, (RLAC) 1 f; Savannah (CNCI) 1 m, 1 f; Spring Creek (TM) 1 m; Tallulah Ealls (RLAC) 1 m; Murray Co., Fort Mtn. State Park (FSCA) 1 m; Spring Creek (CAS) 1 f.

Tennessee: (CMP) 2 f, (CDAE) 1 m, 1 f; Claiborne Co., Speedwell (OSUC) 2 f; Crabtree (CUICI) 1 m; Cuba (FSCA) 1 m; Cumberland Co., Grassy Cove (UAIC) 1 f; Deer Lodge (CAS) 1 m; Elmwood (TMB) 2 m, 2 f, (CAS) 1 m; Knoxville (FSCA) 2 f, (CNCI) 1 m, 3 f; Nashville (NMNH) 2 m, 2 f; Shelby Co.: (NMNH) 2 f, Memphis (TAMU) 1 m, (CDAE) 2 f, (OSUC) 1 m; Tiptonville (FSCA) 1 f.

Kentucky: Henderson (CUICI) 1 m, 1 f, (CNCI) 1 m, 1 f; Indiana Dunes (FDA) 1 m; Norton (CMP) 4 m, 1 f, (UAIC) 1 f; Louisville (CUICI) 1 f; Otter Creek, valley bei Fort Knox (NMNH) 1 m.

South Carolina: Allendale, 9 mi S (CNCI) 1 m, 1 f; Florence (NMNH) 1 m; Horry Co. Conway 3 m (NMNH); Meredith (UAIC) 1 m; Pickens Co., Clemson (TAMU) 1 m, 3 f, Clemson College (CNCI) 1 m, 1 f; Sumter (FSCA) 1 f; Wedgefield (FSCA) 1 m, 3 f.

North Carolina: (CUICI) 1 m, 1 f; Asheville (MCZ) 1 f; Balsam (NMNH) 1 f; Black Mts. (CAS) 1 m; Cape Fear (NMNH) 1 f; Care Co. Buxton (NMNH) 2 m; Caswell Co. Pelham (NMNH) 1 f; Chapel Hill (CUICI) 2 m; Colombia (NMNH) 1 m; Columbus Co.: Lake Waccamaw (NMNH) 1 m, Tabor City (NMNH) 1 f; Cumberland Co.: 12 km S Fayetteville at Dunn's Creek (NMNH) 1 f, 3 km S Wade (NMNH) 1 m; Dave Co., Kill Devil Hills (FSCA) 2 m; Edenton (CMP) 1 f; Edgecombe Co. Old Sparta 12 km S Tarboro at Tar River (NMNH) 9 m, 9 f; Faison (CNCI) 1 m; Ft. Fisher, Kure Beach (CUICI) 1 m; Greensboro (NMNH) 1 f; Highlands (NMNH) 1 m; Lake Drummond (NMNH) 1 m, 1 f; Little Switzerland (NMNH) 1 f; Mt. Sterlng (CUICI) 2 f; Raleigh (CDAE) 1 f, (CNCI) 1 m, 3 f, (FSCA) 1 f, (TM) 1 f; Robeson Co. 10 km SW Fairmont (NMNH) 1 m, 1 f; Sampson Co. 6 km NW Clinton (NMNH) 1 f; Southern Pines (CAS) 1 f, (CNCI) 1 m, 1 f, (CUICI) 2 m, (NMNH) 2 m, 2 f; Swan Quarter (NMNH) 1 f; Tryon (CNCI) 2 f, (MCZ) 1 m, (NMNH) 1 m, 1 f ; Waccaman Lake (CUICI) 1 f, (CNCI) 2 f; Wilm`gton (CUICI) 1 m.

Virginia: Accomack Co. Cincoteague (NMNH) 2 f; Bluemont (NMNH) 1 m; Caroline Co. Bowies Pond. 6 km NW Bowling Green (NMNH) 1 f; Chain Bridde (NMNH) 2 f; Charles City Co. Roxbury (NMNH) 1 f; Cobham (CUICI) 1 f; Fairfax Co.: (CAS) 1 m, 1 f, Lincolnia (NMNH) 1 f; Falls Church (NMNH) 3 f; Fauq. Co. (NMNH) 1 m, 2 f; Fredrkbg (NMNH) 1 f; Great Falls (NMNH) 1 m, 2 f; Ivy (CAS) 1 f; Montgomery Co.: (NMNH) 1 m, Ironto, shale barren 4 km NW Elliston (NMNH) 1 f, 1 m; Mt. Vernon (NMNH) 1 f; Nelson Co.: (NMNH) 2 f; New Kent Co.: Lanexa at Chickahominy River (NMNH) 2 m, 1 f, 2 km S Providence Forge at Chickahominy River (NMNH) 1 m, 1 f; Norfolk (NMNH) 1 f; Roanoke (DEI) 1 m, 1 f; St. Louis (TM) 1 m; Surrey Co. 5 km NE Waverly at Blackwater River (NMNH) 2 f; Sussex Co. 8 km S. Stony Creek at Nottoway River (NMNH) 2 m, 2 f; Westmoreland Co. Westmoreland St. Park 3 km NE Baynesville (NMNH) 2 m, 1 f; Winchester (NMNH) 1 m, 1 f.

West Virginia: Barbour Co., Philippi (CMP) 2 m, 2 f; Cheat Mts. (CMP) 1 m, 5 f; Clay Co., Clay (CMP) 1 f; Kearneysville (NMNH) 1 m, 3 f; Lewic Co., Jackson`s Mill (CMP) 1 f; Morgan Co. 3 km W. Brekeley Springs (NMNH) 2 m; Morgantown (CMP) 2 m, 3 f; Pocahontas Co. (CMP) 5 m, 8 f.

Ohio: Adams Co. (OSUC) 1 m, 3 f; Franklin Co., Blendon Woods (FSCA) 1 m; Georgeville (CUICI) 3 m, 1 f; Highland Co., Paint T. (OSUC) 1 m; Hocking Co. (FSCA) 1 m, 2 f; Holmes Co., Prairie T. (OSUC) 1 m, 1 f; Gambler (FSCA) 1 f; Newark (NMNH) 1 f; Ross Co.: (NMNH) 2 m, 1 f.

Pennsylvania: (MIZPAN) 2 f, (MZLU) 1 m, (ZMK) 4 m, 2 f, (ZMH) 1 f; Allegheny Co. (CMP) 2 m, 2 f, (CUICI) 1 m, 1 f; Berks Co. (NMNH) 1 f; Castle Rock (NMNH) 2 m, 2 f; Charleroi (ANSP) 1 m, 1 f; Crisp (CMP) 1 f; Dauphin Co. (CAS) 1 m, 1 f; Essington (NMNH) 1 m; Fayette Co. (CUICI) 5 m, 1 f; Germantown (ZMK) 2 f, (ANSP) 3 m, 3 f, (CAS) 1 f; Glenolden (NMNH) 1 m, 1 f; Jeanette (CMP) 37 m, 23 f; Lancaster Co. (CNCI) 2 m, 1 f; Lawndale (CAS) 1 m, 3 f, (NMNH) 2 f; L. Merion (NMNH) 1 f; Mt. Moriah (NMNH) 1 f; Philadelphia (NMNH) 1 f; Pittsburg (CMP) 63 m, 59 f, (ANSP) 1 f; Rockville (CMP) 1 f, (CAS) 3 m, 10 f; Washington Co. (CMP) 67 m, 47 f; Westmor Co. (CMP) 1 f.

District of Columbia: (CMP) 2 m, 1 f; Hamilton Hill (NMNH) 1 m,; Rock Creek (NMNH) 2 m, 5 f; Washington (NMNH) 4 m, 4 f.

Maryland: (CMP) 1 m, 4 f; Baltimore Co. (CNCI) 1 m, 1 f, (CAS) 1 m; Balto. Co. Lake Roland, Robert E. Lee Park (NMNH) 1 m, 1 f; Beltsville (CNCI) 2 m, 1 f, (NMNH) 1 m, 1 f; Calvert Co. Port Republic Scientist Cliffs (NMNH) 1 m; College Park (FSCA) 1 m; Funkstown (NMNH) 1 m, 2 f; Great Falls (NMNH) 1 m; Hagerstown (NMNH) 8 m, 5 f; Marshall Hall (NMNH) 1 f; Meyersville (NMNH) 1 m; Montg. Co. near Great Falls, Billy Goat Trail along Potomac River (NMNH) 1 m; Plum Point (NMNH) 2 f; Plummers (NMNH) 2 m, 4 f; Point of Rocks (FSCA) 1 f; Prince Georges Co.:(NMNH) 1 f, Oxon Hill (NMNH) 1 m; St. Marys Co.: Dameron (NMNH) 2 m, 1 f, Point Lookout (NMNH) 4 f;; Talbot Co.: 3 km SE Easton, Seth Forest (NMNH) 1 f, McDaniel, Wades Pt. (NMNH) 1 f, Wittman (NMNH) 1 m, 1 f; Williamsport (NMNH) 2 m, 2 f.

New Jersey: (CUICI) 5 m, 2 f, (NMNH) 1 m; Anglesea (NMNH) f; Arlington (NMNH) 2 m, Hudson (NMNH) 2 m, 2 f; Atsion (CAS) 1 f; Avenel (CUICI) 1 m, (DEI) 2 f, (UAIC) 3 m, 1 f, (CNCI) 2 m, 1 f, (CAS) 2 m, 2 f; Bergen Co. (NMNH) 1 m, 3 f; Boonton (NMNH) 2 m, 1 f; Burlington Co.: (CAS) 1 m, Whites Bog (NMNH) 1 f; Caasville (FSCA) 1 f; Clementon (NMNH) 3 m; Egg Harbor (CAS) 1 m; Emerson (CUICI) 1 m; Haddon (CNCI) 1 m, 2 f; Hillsdale (CNCI) 1 m; Lakehurst (CNCI) 1 f, (CUICI) 1 m; M. Beach (NMNH) 1 f; Medford Lakes (CUICI) 1 m, 1 f; Oradell (CUICI) 1 f; Pinewald (CUICI) 1 m; Prospertown (CNCI) 1 f; Rahway (CAS) 1 m; Rancocas Park (NMNH) 1 f.

Connecticut: Cornwall (CUICI) 6 m, 3 f, (CNCI) 2 f, (CAS) 1 m; Lyme (NMNH) 1 m; Marlboro (CMP) 1 m; South Windsor (NMNH) 1 m; Stamford (CMP) 1 f, (NMNH) 1 m.

Massachusetts: (CAS) 1 m; Wilbraham (NMNH) 1 f.

Delaware: Fenwick Is. (OSUC) 1 m; Newark (FSCA) 1 m; Saaford (OSUC) 1 m.

New York: (ZMK) 5 m, 1 f, (CMP) 1 f, (NMNH) 3 m, 4 f, (TM) 1 f, (ZMH) 2 m, 2 f; Greene Co. (CMP) 4 m, 2 f; Hillsdale (CAS) 1 f; Long Island (NMNH) 5 f; Mosholu (FSCA) 1 f; Niagara (MZLU) 2 m, 2 f; Peekskill (CAS) 2 m, 1 f;

Southfields (CMP) 1 m; Suffolk Co. Wildwood St. Pk. (NMNH) 1 f; West Point (NMNH) 7 m, 13 f; White Plains (CAS) 2 m, 2 f.

CANADA: (ZMK) 3 f.

6 larvae, 2 pupae, 4 the last larval skin, 3 adults (1 male, 2 females) associated with larvae:

MARYLAND: Talbot Co., 3 km SE Easton (Seth Forest), 3 August 1986, W. E. STEINER, J. M. HILL, J. M. SWEARINGEN, collrs. (1 larwa); Worcester Co., Pocomoke City, 20 August 1990, W. E. STEINER, J. M. HILL collrs., (under leaf litter in partial shade of trees and shrubs; dry sandy soil) (3 larvae, 3 adults - 1 male, 2 females);

VIRGINIA: Montg. Co., Ironto, 4 km NW Elliston, 8 August 1988, W.E. STEINER, J. M. SWEARINGEN collrs., (shale barren) (2 larvae); Surrey Co., 5 km NE Waverley at Blackwater River, 19 June 1983, W. E. STEINER, A. GERBERICH, J. BOYD collrs., (1 pupa, 2 the last larval skin);

NORTH CAROLINA: Edgecombe Co., 12 km S Tarboro at Tar River, 19 June 1983, W. E. STEINER, A. GERBERICH, J. BOYD collrs., (1 pupa, 2 the last larval skin).

TYPE

Tenebrio minimus PALISOT DE BEAUVOIS, 1805: not examined, the specimen is probably deposited in Muséum National d'Histoire Naturelle (coll. CHEVROLAT), Paris, France.

Opatrum notum SAY, 1826: the specimen was destroyed with SAY's collection.

DISTRIBUTION (FIG. 181)

Cuba, Mexico, USA, (California - introduced, Texas, Oklahoma, Kansas, Louisiana, Arkansas, Missouri, Illinois, Indiana, Mississippi, Alabama, Florida, Georgia, Tennessee, Kentucky, South Carolina, North Carolina, Virginia, West Virginia, Ohio, Pennsylvania, District of Colombia, Maryland, New Jersey, Connecticut, Massachusets, Delaware, New York), Canada.

Opatrinus (Alaetrinus) aciculatus LE CONTE, 1859

(Figs 26-29, 110, 129, 135, 137, 142, 143, 146-148, 181, 191)

Opatrinus aciculatus LE CONTE, 1859: 75.
Hopatrinus (sic! *aciculatus* LEC.: GEMMINGER and HAROLD 1870: 1914.
Opatrinus aciculatus LEC.: HORN 1870: 349; CROTCH 1873: 106; HENSHAW 1885: 119; GEBIEN 1910: 276, 1938: 296; PAPP 1961: 119.

Terra typica: Texas (USA).

DIAGNOSIS

See diagnosis of *O. minimus* (PALISOT DE BEAUVOIS, 1805).

DESCRIPTION

Adult: length 7.3-11.7 mm. Body dark brown to black, moderately shiny. Head clearly punctate on frons (distance between punctures smaller than their diameter), puncturation of clypeus finer and sparser. Lateral contour of eyes not protruding. Mentum as in fig.110. Pronotum (fig.28) trapeizodal; p.l./p.w. = 0.53-0.62; greatest width at base or just before it; sides nearly parallel up to 2/3 from base, then abruptly narrowing anterad; anterior angles acute, clearly protruding; disc of pronotum uniformly elevated; sides with deep longitudinal troughs along edge; posterior angles right; puncturation of pronotum dense and clearly visible, on disc punctures ellyptical, rounded at sides. Elytra; e.l./e.w. = 1.22-1.40, e.l/p.l = 2.16-2.83, e.w./p.w. = 1.01 - 1.15; intervals 1, 3, 5 and 7 more elevated than others; elytral rows with deep, round, regular punctures situated in well visible wide troughs; fourth row of elytra consists of 18-29 punctures. Prosternum with deep longitudinal troughs along lateral edges (fig. 29). Prosternal process emarginated. Metasternum: m.l.m./l.f.v. = 0.75-0.84, m.l.c./l.m.cav. = 0.80-0.93. Structure of male tibia as in *minimus*. Aedeagus: l.e. = 1.42-1.52 mm, l.b.p./l.a.p. = 4.65-4.84. Ovipositor: l.o. = 1.64-1.84 mm, l.p./l.c. = 0.94-0.98, l.c./l.f.l. = 5.67-6.15, l.f.l./w.f.l. = 0.31-0.38.

GEOGRAPHIC VARIATION

Puncturation of the abdominal ventrites is moderate. In specimens from Texas (Dallas, Ft.Worth, College Station, Mesquite) and Oklahoma (Ardmore, Murray Co.) the punctures are very large, deep and dense, which is best visible on the last ventrite (figs 26, 27).

DESCRIPTION OF LARVA

Size of the smallest (probably the first instar) and the largest (the last instar) larva: length 8.9 mm and 22.6 mm, width 0.7 mm and 2.3 mm, width of head capsule 0.58 mm and 1.85 mm respectively.

Colour, general structure of body, structure of head capsule, mouth parts and ninth abdominal segment nearly identical as in the larvae of *O. gibbicollis*. The characters that distinguish these two species are chetotaxy of abdominal tergites and structure of antennae.

Antenna as in fig. 135, second antennomere 1.2 x longer than the first. Abdominal tergites with specific pattern (fig. 148) formed by darker and more opaque patches; arrangement of dorsal and lateral setae as in the diagram (fig. 129), larvae of earlier instars have two additional lateral setae (X), one at each anterior edge of pronotum and posterior edge of mesonotum. Spiracles 2.5 x longer than wide, walls of vestibule covered on inner side with short very thick hair (figs 142, 143). Structure of fore legs similar to *O. gibbicollis* (fig. 137), claw 2 x shorter than tibiotarsus, with two thick spines at base. On inner side of trochanter - two spines (this number is constant, unlike the number of spines on femur and trochanter). In the 26 examined specimens (4 larvae had 1 fore leg each) in 11 the number of spines differed between legs and was between 3-7 on femur and 2-6 on tibiotarsus. In studies on variation each leg was treated as a separate unit.

Frequency of occurence of different number of spines on profemur.

number of spines	3	4	5	6	7
number of legs	5	14	22	6	1

avg = 4.7 std = 0.02

Frequency of occurence of different number of spines on protibiotarsus.

number of spines	2	3	4	5	6
number of legs	4	11	30	2	1

avg = 3.7 std = 0.02

The above tables suggest, that the most probable number of spines which can be encountered is: 5 on profemur and 4 on protibiotarsus. This combination occurred in the case of 14 legs (out of 48 examined); in 5 larvae on both legs. In larvae in earlier developmental stages 2-3 spines on the protibiotarsus and 3-4 on the profemur were most common. The greatest number of spines (5-6 on the tibiotarsus and 6-7 on the profemur) occurred only in larvae in the last developmental stage.

Because of its variation the number of spines occurring on the profemur and the protibiotarsus in larvae of *O. aciculatus* and *O. minimus* (see the description of the larva) can be used as a quantitative diagnostic character only to a limited extent.

DESCRIPTION OF PUPA

Pupa libera (figs 146, 147). Length 9.2-13.2 mm. Body longitudinally oval, white, naked. Upper surface of body slightly convex, lower slightly concave. Head not visible from above, antennae with rings of fine spines. Pronotum with well visible characters specific for adult forms. Wing insertions protrude beyond hind legs partially covering them. Sides of tergites of I-VII abdominal segment with lobe-like expansions. Lateral edges of lobes furnished with short spines. On apex of ninth segment - urogomphi.

BIOLOGICAL DATA

Adult forms, as in *minimus*, occur throughout the year. Individuals, which are not fully coloured, can be found from April to August. According to the data on the labels, imagines were caught on river banks, on seaside beaches, cotton fields, in cow dung, on roots of plants and on cacti. Numerous pecimens were intercepted from Mexico (Matamoros, Tamps, Monterrey) to the USA (Brownsville, Laredo, Progresso) with plants (*Hibiscus esculentus*, *Atriplex caneacera*, *Okra* sp., "okra abelmozchus escullentus", *Sorghum* sp., orchid).

MATERIAL EXAMINED (161 M, 229 F)

MEXICO: (NMNH) 2 f, (ZMB) 1 f; Goemno (NMNH) 1 f; Matamoros, Tamps (NMNH) 3 f; Monterrey (NMNH) 1 m, 3 f; Rio Bravo (NMNH) 2 f; Tamaulipas (NMNH) 1 f.

USA: "America" (TMB) 1 m.

California: Los Angeles Co. (FSCA) 1 m, 1 f; (CMP) 1 f.

New Mexico: Carlsbad (CUICI) 1 m, 1 f; Eddy Co., Artesia (CAS) 1 f.

Texas: (ANSP) 1 f, (CMP) 6 m, 5 f, (CUICI) 2 m; (DEI) 1 m, 2 f, (MNHN) 1 m, 2 f, (NMNH) 4 m, 6 f, (TMB) 1 m, (ZMA) 4 m, 1 f; Alice (NMNH) 1 f; Bay City (CMP) 1 m; Bee Co., Papalote (CAS) 2 f; Bexar Co.: (NMNH) 1 m, 3 f, San Antonio (CAS) 5 m, 2 f, (TAMU) 1 m, 1 f, (UCB) 1 m, 3 f; Cameron Co.: Audubon Preserve, Sabal Palm Grove (FSCA) 1 m, 1 f, Brownsville (CMP) 1 m, 3 f,(CUICI) 2 f, (NMNH) 20 m, 16 f; College Station (TAMU) 2 m; Colorado Co.: Columbus (FMNH) 4 f; Corpus Christi, Welderwild Ref. (CNCI) 4 m, 2 f; Cristal City (IMLA) 2 f; Dallas (CAS) 1 m, (MCZ) 1 m, Dallas (NMNH) 2 f; Del Rio (NMNH) 1 m, 3 f; Dimmit Co.: (TAMU) 1 m, 1 f; Duval Co.: 1.5 mi W San Diego (NMNH) 1 f; Eagle Pass (TAMU) 1 m; Edna (NMNH) 2 f; Ft. Hood (CUICI) 1 m, 1 f; Fuller (NMNH) 4 m; Hidalgo Co.: (OSUC) 1 m, 2 f, Bentsen Rio Grande St. Pk. (CNCI) 2 m, 1 f, (EGRC) 3 f, (FSCA) 3 m, (NMNH) 1 m, 2 f, Weslaco (CNCI) 1 f; (OSUC) 1 f, (TAMU) 1 m; Jackson Co. (NMNH) 4 m; Kendall Co.: Boerne (Cascade Caverns) (NMNH) 1 m, 2 f; Kerrville Co.: (CNCI) 2 m, 1 f, (NMNH) 1 m, 1 f; Kinney Co., Bracketsville 6 mi E (CUICI) 2 m, 2 f; Kleberg Co., Kingsville (CUICI) 4 m, 4 f, (NMNH) 9 m, 21 f, (TAMU) 1 f; Laredo (CNCI) 1 m, (NMNH) 6 m, 8 f; Lee Co., Fedor (CMP) 1 f; Lexington (CNCI) 1 m, 5 f; Lk. Corpus Cristi St. Pk. (CNCI) 1 f; Macdona (CAS) 2 m; Mc Lennan Co., Waco Environs (RLAC) 1 m; Mesquite (NMNH) 2 m, 1 f; Mission (TAMU) 1 f; New Braunfels (CAS) 1 f; Podre Isl. (NMNH) 1 f; Rocky Springs (CNCI) 1 f; San Diego (NMNH) 1 m 3 f; San Patricio Co.: (TAMU) 1 m, 1 f; 12 km NE Sinton, Welder Wildlife Refuge (NMNH) 1 f; Starr Co., Falcon St. Pk. (TAMU) 1 m; Travis Co., Austin (CAS) 1 f, (FSCA) 1 m; Trio ST. Pk. (ZMK) 2 m, 1 f; Uvalde (NMNH) 1 f; Valveide Co.: Del Rio (CAS) 1 m, 1 f; Waskom (TAMU) 1 m, 1 f; Welder Wildlife (CNCI) 4 m, 8 f; Wichita Co.: Wichita Falls (CAS) 1 f, (NMNH) 1 m, 1 f, Wichita Nat'l Forest (CAS) 2 m, 1 f, Wichita Mts. (NMNH) 2 m, 2 f; Victoria (NMNH) 9 m, 19 f; Williamson Co.: (TAMU) 1 m, Taylor (TAMU) 2 m, 1 f; Zapata Co.: Lake Falcon State Park (CNCI) 1 m, 1 f; Zavalla Co.: Nueces Riv (NMNH) 1 f.

Oklahoma: Ardmore (UAIC) 1 m, 8 f; Comanche Co. 32 km WNW Lawton (Wichita Mts. Refuge) (NMNH) 6 m, 3 f; Ft. Sill (FSCA) 6 m, 2 f; Kingfisher (ANSP) 1 m; Murray Co. (CAS) 1 f; Norman (NMNH) 1 f; Tulsa (CUICI) 2 f, (NMNH) 8 m, 14 f.

Kansas: Argonia (NMNH) 1 f, Sedgwick Co. (UCB) 1 f.

32 larvae, 13 pupae, 2 the last larval skins and 6 adults (4 m, 2 f):

TEXAS: Cameron Co., Brownsville, 14 July 1981, coll. W. E. STEINER.

TYPE

Opatrinus aciculatus LE CONTE, 1859: holotype (examined), female, "*O. aciculatus* LEC., Texas, Type, LINDHEIMER", the specimen is deposited in the Museum of Comparative Zoology, Harvard University, Cambridge, USA.

DISTRIBUTION (FIG. 181)

Mexico, USA (California - introduced, New Mexico, Texas, Oklahoma, Kansas).

Opatrinus (Alaetrinus) pullus (SAHLBERG, 1823)

(Figs 21, 44, 55, 62, 74, 78, 89, 108, 159, 160, 182, 185, 192)

Tenebrio pullus SAHLBERG, 1823: 16.
Opatrinus pullus SCHÖN. (sic!): STURM 1826: 179; DEJEAN 1834: 192, 1836: 213.
Opatrinus anthracinus MULSANT et REY, 1853a: 304, 1853b: 79; LE CONTE 1859: 75; GEBIEN 1910: 277 (=*Opatrinus pullus* SAHLB.), 1928: 112.
Hopatrinus (sic!) *anthracinus* MULS. et REY: GEMMINGER and HAROLD: 1870: 1914; CHAMPION 1885: 123.
Hopatrinus (sic!) *pullus* SCHÖN. (sic!): GEMMINGER and HAROLD 1870: 1914.
Diastolinus anthracinus MULS.: FAIRMAIRE 1905: 299.
Opatrinus pullus SAHLB.: GEBIEN 1910: 277, 1938: 297; BLACKWELDER 1945: 524; PAPP 1961: 119; MARCUZZI 1962: 23, 32; ARDOIN 1977: 390; HILBURN and GORDON 1989: 691.
Opatrinus puertoricensis MARCUZZI, 1977: 23, 1987: 98; **syn. nov.**

Terra typica: Jamaica.

DIAGNOSIS

This species, like ecuadorensis, has rounded sides of pronotum, whereas the structure of elytra makes it more similar to *moestus* and *ecuadorensis*.

The following characters clearly distinguish it from *ecuadorensis* and *moestus*: pronotum with rounded sides (nearly parallel in *moestus*), clearly punctate and wrinkled sides of prosternum (lightly punctate in *moestus*); head narrowing behind the eyes so that the genae are narrower than eyes (wider in *ecuadorensis*); the very shiny and naked body (moderately shiny and visibly hairy underneath in *ecuadorensis*, opaque in *moestus*); shape of mentum; male profemur gradually expanding towards apex (considerably expanded medially in *moestus*, in *ecuadorensis* straight); male mesotibia with an apical tooth (no tooth in *ecuadorensis*).

DESCRIPTION

Length 8.4-11.9 mm. Body dark brown to black, very shiny. Head clearly punctate on frons (distance between punctures equal or smaller than their diameter), puncturation of clypeus finer and sparser. Lateral contour of eyes does not protrude. Head behind eyes narrow, so that eyes are wider than genae. Mentum as in fig. 108. Pronotum (fig. 21) uniformly elevated; p.l./p.w. = 0.60-0.68; sides clearly rounded, widest in the middle; anterior angles acute, slightly rounded at apex; base bisinuate; posterior angles are nearly right angles; puncturation of pronotum dense and clearly

visible, punctures on disc - round, distance between punctures equal to their diameter, punctures on sides ellyptical and denser. Elytra: e.l./e.w. = 1.29-1.43, e.l./p.l. = 2.35-2.67, e.w./p.w. 1.14-1.26; intervals of elytra flat, slightly elevated at apex, finely punctate, distance between punctures equal to 4-5 puncture diameters; rows of elytra with deep round regular punctures, denser at apex; areas between punctures in rows on disc - flat, at suture and on apex with very narrow longitudinal troughs connecting punctures; fourth row of elytra consists of 18-29 punctures. Prosternum clearly punctate, sides wrinkled. Mesosternum with longitudinal median trough posteriorly (fig. 44). Metasternum emarginated anteriorly, m.l.m./l.f.v. = 0.94-1.00; m.l.c./l.m.cav. = 0.91-1.00. Puncturation of abdominal ventrites fine, distance between punctures equal to 2-3 puncture diameters. Male protibia with longitudinal depression on inner side (figs 55, 62, 74), mesotibia with blunt apical tooth (figs 78, 89). Aedeagus: l.e = 1.52-1.66 mm, l.b.p./l.a.p. = 4.05-4.20 (figs 159, 160). Ovipositor: l.o. = 1.55-1.96 mm, l.p./l.c. 0.94-0.98, l.c./l.f.l. = 5.89-6,37, l.f.l./w.f.l. = 0.32-0.35.

GEOGRAPHIC VARIATION

Data from the Food and Drug Administration in the Smithsonian Institute in Washington indicate that *O. pullus* is often intercepted from its natural distribution area (Guatemala, Belize, Jamaica, St. Croix) to the USA (Brownsville TX, Miami FLA, New Orleans LA, Rhinelander WISC., Baltimore MD) with plants (bromeliads, orchids, *Brassavola nodosa*). However information about a male and a female of *O. pullus* introduced from Peru to Miami in Florida should be considered wrong. Sites in Venezuela and in Florida have not been confirmed yet. Beyond doubt, humans are mainly responsible for spreading beetles of this species (this would be the simplest explanation for its occurence on the Bermudas). The probability of the beetles from Central America becoming adapted to the natural conditions and the climate in Venezuela or in Florida is very high. Both sites are on the coast and are situated relatively near the area of distribution of the described species (fig. 182). It is very likely that we are witnessing an expansion of the distribution area.

In 1977 MARCUZZI described a new species of the genus *Opatrinus* on the basis of studies on specimens from Puerto Rico and Jamaica, and called it *puertoricensis*. An analysis of the available material suggests that *O. puertoricensis* MARCUZZI is a synonym of the widely dispersed *O. pullus* SAHLBERG. The variation in the body size of *O. pullus* in correlation with its distribution has been presented in fig. 195 (in the analysis the pronotum length was used). The small number of specimens and incomplete data on the collecting sites of some populations made it impossible to conduct a detailed statistical analysis and to draw conclusions about the origin and variation of this species. Differences in size may result from "the founder effect" or the effect of environmental factors connected with the conditions in the area occupied by this species. Studies on the variation of the body size in species of the genera *Eusattus* and *Coelus* (*Coleoptera, Tenebrionidae*) (DOYEN 1976, DOYEN and ROGERS 1984) show that the most important enviromental factor explaining the

variation is the temperature. The possibility of establishing a correlation between body size and geographic latitude and altitude, at which the studied population occurs, is an example of utilizing indirect factors. In the case of beetles occurring in sands or on sands on seaside beaches and river banks, the factor explaining body size variation is the kind of substratum - the vegetation growing on it, the salinity and the distance from the waterline (DOYEN 1976). A general analysis of the variation of body size in *O. pullus* and a lack of qualitative differences between particular populations rule out the possibility of their forming a separate subspecies.

BIOLOGICAL DATA

Representatives of this species were found under stones, fallen tree trunks, a metal box, they were also caught at night attracted by light.

MATERIAL EXAMINED (449 M, 423 F)

USA: Florida: (CAS) 1 m, Monroe Co., Key West (FSCA) 4 m, 1 f; Maryland, Baltimore (MCZ) 1 m.

MEXICO: (DEI) 1 m, 1 f, (IRSNB) 2 m, (MZLU) 1 m, (TMB) 3 m, 2 f, (ZMB) 6 m, 7 f, (ZMK) 3 m, 3 f, (NHMV) 1 f; Camp. Haltunchen (NMNH) 1 m; Chiapas Prov.: (PAS) 1 m, 1 f, Dos Amates (CNCI) 6 m, 5 f, Palenque (CAS) 1 f, (CNCI) 6 m, 8 f, San Carlos (IZPAS) 1 f, Simojovel, 3 mi N. (CNCI) 1 m; Isla Mujeres, Quintana Roo (NMNH) 1 m, 1 f; San Miguel (NMNH) 2 f, 1 m; Tabasco Prov.: Cardenas, 5 km E. (UCB) 2 f, Frontera (CNCI) 1 m, 1 f, La Chontalpa (NMNH) 3 m, Rio Puyacatengo (NMNH) 1 m, San Juan Bautista (IRSNB) 1 m; Veracruz Prov.: (ZMH) 2 m, 1 f, Cordoba (CAS) 5 m, 3 f, (ZMA) 1 m, 1 f, (ZMB) 1 f, (ZMK) 3 m, 7 f, Fortin de las Flores (OSUC) 1 f, Jalapa (IRSNB) 1 f, Lake Catemaco (CNCI) 1 m, 2 f, Montepio, 8 mi N. Sonte-comapan (CNCI) 1 f, Orizaba, S. E. Citlaltepetl (CAS) 1 f; Yucatan Prov.: (IRSNB) 2 m, 2 f, (NHMV) 1 f, (ZMK) 3 m, 1 f, Merida (ANSP) 3 m, (CAS) 2 m, (DEI) 1 m, (NHMV) 1 m, 2 f, (NMNH) 2 m, 3 f, (ZMA) 6 f, (ZMB) 4 m, 1 f.

BELIZE: "B. Hond" (MNHN) 4 m, 2 f; "Br. Honduras, Manatee" (TM) 1 m; (TMB) 1 f; (NMNH) 20 m, 12 f.

GUATEMALA: (CNCI) 1 m, (NMNH) 1 m, (ZMA) 1 m; New Orleans (NMNH) 1 f; Senahu (MIZPAN) 2 f; Uaxactu, El Peten (NMNH) 1 m.

HONDURAS: (ZMA) 1 m; L. Yojoa (UCB) 1 m, 1 f; Garmelina (NMNH) 1 f; Siguatepeque (UCB) 1 m; Taladro (UCB) 1 f.

CUBA: (IRSNB) 3 m, (NHMB) 2 m, (NHMV) 1 f, (PAS) 2 m, 3 f, (ZMA) 1 m, 2 f, (ZMB) 5 m, 2 f, (ZMK) 2 m, 3 f; Baca Ciega, Habana (MIZPAN) 1 m; Cabanas (NMNH) 7 m, 6 f; Cayamas (NMNH) 4 m; Christobal (ZMA) 1 f; Guanajay (NMNH) 17 m, 5 f; Habana (CMP) 4 m, 7 f, (MIZPAN) 3 m, 2 f, (TMB) 7 m, 6 f, (ZMB) 9 f; Holguin (TMB) 2 m, 1 f; Jatibonico (NMNH) 2 f; Lago del Tesoro Guama, Zapata (MIZPAN) 1 f; La Havane (MNHN) 2 m, 8 f; La Laquida (ZMA) 1 m; La Movida (ZMA) 1 m; Mariel (NMNH) 1 m; Matanzas (MIZPAN) 1 f; Palpite (2 km NE) Zapata Swamp (NMNH) 87 m, 77 f; Playa Tarava, Habana (TMB) 4 m,

1 f; San Antonio de los Banos (NMNH) 3 m, 4 f; San Jose de las Lajas, Habana (MIZPAN) 1 m; Santa Clara (NMNH) 1 m; Santa Maria del Mar, Habana (MIZPAN) 3 m; Santiago de Las Vegas, Habana (NMNH) 5 m, 3 f, (MIZPAN) 12 m, 12 f; San Vincente, Pinardel Rio (NMNH) 1 f; Sierra de Amate, Habana (TMB) 2 m, 2 f; Trinidad (DEI) 10 m, 13 f; Vinates, Pinar del Rio (TMB) 1 m.

JAMAICA: (NHMV) 1 m, 1 f, (NMNH) 1 f; Balaclava (NMNH) 1 f; Black R. (NMNH) 1 f; Kingston, Liguanea Plain (ANSP) 2 m, 2 f, (NMNH) 5 m, 5 f; Mandev'le (NMNH) 1 f; Montego Bay (NMNH) 1 m, (OSUC) 1 f; Pt. Antonio (NMNH) 1 m; Parrish Manchester (FSCA) 1 f; St. Ann Par., Walkers Wood (MAIC) 2 f; St. And. Irish Town (FSCA) 1 f; St. Elizabeth Par., Oracabasa (MAIC) 1 f; St. James Par., Montego Baj near airport (NMNH) 4 m, 4 f; St. Mary Par., Munro College (MAIC) 1 m, 2 f; Trelawny, Parish, Duncans (NMNH) 2 f.

DOMINICAN REPUBLIC: (NMNH) 1 m.

PUERTO RICO: (NMNH) 1 m, 1 f; Fortuna (OSUC) 3 m, 3 f; Guanica For. Reserve (MAIC) 9 m 12 f; Isla Maguey, Parguera (NMNH) 2 m, 2 f; Isla Verde (NMNH) 2 m; Laguna Cartagena (NMNH) 2 f, 1 m; La Parguera (CNCI) 2 m, 1 f, (OSUC) 1 m, 2 f; Mayaquez (NMNH) 32 m, 37 f, (OSUC) 3 m, 3 f, (RLAC) 3 m, 2 f, (TM) 8 m, 3 f, (UAIC) 14 m, 3 f, (UCB) 14 m, 7 f; Montana (NMNH) 1 m; San German (FSCA) 1 m, 1 f; San Juan (NMNH) 3 m.

VIRGIN ISLANDS: St. Croix: (NMNH) 1 m, 1 f, Christiansted, Spring Gut (MAIC) 1 f, Sprat Holl (CDAE) 1 m, 2 f, (MAIC) 1 m, 1 f; St. Thomas (MAIC) 1 m.

BERMUDA: (CAS) 1 m, 1 f, (CNCI) 2 f, (CUICI) 4 m, 3 f, (NMNH) 1 m, 3 f, (UCB) 5 m, 6 f; Harrington, Sound (ANSP) 6 m, 4 f; Long Bird Island (FMNH) 1 m, 10 f; Sharks Hola (ANSP) 2 m, 2 f; St. George (NMNH) 1 m, (ZMK) 1 m, 2 f.

VENEZUELA: Aragua, Rancho Grande, 1100 m, (NMNH) 3 m, 4 f.

PERU: (NMNH) 1 m, 1 f.

TYPES

Tenebrio pullus SAHLBERG, 1823: not examined, the specimen is probably deposited in Zoological Museum, Helsinki, Finland.

Opatrinus anthracinus MULSANT et REY, 1853: lectotype (present designation), male, "Mexico; Type MULSANT, *anthracinus*; *Opatrinus anthracinus* MULS., Mex.Et.Unis.Cuba; Mexico, coll. R. OBERTHÜR ex coll. DEYROLLE", the specimen is deposited in the Muséum National d'Histoire Naturelle Paris, France; paralectotypes, 5 females, "Mexico, coll. R. OBERTHÜR ex coll. DEYROLLE" and female "Cuba, coll. R. OBERTHÜR ex coll. DEYROLLE" specimens are deposited in the Természetudomanyi Muzeum, Budapest, Hungary.

Opatrinus puertoricensis MARCUZZI,1977: holotype (not examined), paratype, male, "*Opatrinus puertoricensis* MARCUZZI, 1977; 016; 6.V.1973, P. W. HAMMOLINCK; Jamaica, No 016 Long Mountain near Kingston", the specimen is deposited in the Természetudomanyi Muzeum, Budapest, Hungary.

DISTRIBUTION

Mexico (coast of the Mexican Bay), Guatemala, Belize, Honduras, Cuba, Jamaica, Dominican Republic, Puerto Rico, Virgin Islands (St.Croix, St.Thomas), USA (Florida, Key West, Maryland - intercepted), Bermudas, Venezuela.

Opatrinus (Alaetrinus) ecuadorensis sp. nov.

(Figs 24, 46, 105, 161, 162, 183, 193)

Name derivation: after terra typica.
Terra typica: Ecuador.

DIAGNOSIS

In this species, as in *angustus*, the genae are wider than the eyes, whereas the shape of pronotum and the structure of elytra are similar to those in *pullus*.

The sides of pronotum in *ecuadorensis* are rounded (in *angustus* they are nearly parallel), the mesosternum is flat posteriorly or slightly convex in the middle (with a longitudinal trough in *angustus*), the anterior edge of the metasternum is not emarginated (emarginated in *angustus*), the genae are wider than the eyes (narrower in *pullus*), the body is moderately shiny, with clearly visible hair on the underside (very shiny and naked in *pullus*).

DESCRIPTION

Length 7.7-8.9 mm. Body dark brown to black, moderately shiny, very hairy on underside. Head clearly punctate on the frons, distance between punctures smaller than their diameter, puncturation of clypeus finer and sparser (fig. 11). Lateral contour of eyes not protruding. Genae wider than eyes. Mentum as in fig. 105. Pronotum (fig. 24) uniformly elevated; p.l./p.w. = 0.64-0.66; greatest width in the middle; sides of pronotum clearly rounded, anterior angles acute, base bisinuate, posterior angles are nearly right angles; puncturation of pronotum dense and clearly visible, distance between punctures smaller than their diameter, on disc puncturation sparser. Elytra: e.l./e.w. = 1.28-1.36, e.l./p.l. = 2.36-2.50, e.w./p.w. 1.17-1.20; intervals of elytra flat, slightly elevated at apex, clearly punctate, distance between punctures equal about to 2.0-2.5 puncture diameter; intervals 1, 3, 5 and 7 wider and less elevated than others; rows of elytra with deep round regular punctures, denser at apex; on disc areas between row punctures - flat, suture and at apex - with narrow longitudinal troughs connecting punctures; fourth row of elytra consists of 19-24 punctures. Mesosternum - flat at back or slightly convex in middle (fig. 46). Anterior edge of metasternum between mesocoxal cavities - not emarginated; m.l.m./l.f.v. = 0.90-0.97, m.l.c./l.m.cav.= 0.96-1.00. Puncturation of abdominal ventrites - fine, distance between punctures equal to 2-3 puncture diameters. Male protarsi wider than female protarsi, width of third segment in males equal to 1.2-1.3 mm, in females 0.9-1.0 mm. Male protibia straight, mesotibia slightly expanded at apex. Aedeagus: l.e. = 1.45-1.54 mm, l.b.p./l.a.p. = 4.00-4.05 (figs 161, 162). Ovipositor: l.o. = 1.55-1.72 mm, l.p./l.c. = 0.95-0.98, l.c./l.f.l. = 5.62-6.42, l.f.l./w.f.l. = 0.32-0.37.

MATERIAL EXAMINED (17 M, 25 F)

Holotype: male, "Palmar (Ecuad.), R. HAENSCH S.", the specimen is deposited in the Muzeum i Instytut Zoologii Polskiej Akademii Nauk, Warsaw, Poland.

Paratypes: "Archidona (Ecuad.), R. HAENSCH S. (MIZPAN) 1 f; "Arenillas Equateur M. DE MATHAN 1891, Muséum Paris Coll. R. OBERTHÜR" (MNHN) 1 m, 1 f; "Ecuador: Pichin, Tinalandia, 2.11.1983, Leg. L. HUGGERT" (MZLU) 1 m, 2 f; "Ecuador: Pichin, Tinalandia, 800 m, 7.11.1983, Leg. L. HUGGERT" (MZLU) 1 f; "Ecuador: Pichin, Rio Palenque, 4.11.1983, Leg. L. HUGGERT; *Opatrinus moestus* Muls, Det. Julio FERRER 1985" (MZLU) 1 m, 1 f; "Ecuador, Los Rios, Quevedo, VII.1977" (HBC) 2 m, 2 f; "Balzapamba (Ecuad.), R. HAENSCH S." (MIZPAN) 1 f, (ZMA) 1 m, 2 f; "Ecuador: 15 mi. S. Santa Rosa, El Oro, I-23-1955; E. I. SCHLINGER & E. S. ROSS collectors" (CAS) 1 f; "Ecuador, 20 mi. NE. of Santa Elena, Guayas, I-29-55; E. I. SCHLINGER & E. S. ROSS collectors" (CAS) 2 m, 1 f; "Ecuador: Pichilingue, Los Rios, II-2-1955; E. I. SCHLINGER & E. S. ROSS collectors" (CAS) 1 m, 1 f; "Ecuador, Babahoyo, R. LEYS & H. J. VALLENDUUK; 47 km S de Santa Domingo, Rio Palenque, 250 m, 21.VII.1983" (ZMA) 1 f; "Ecuador, Mus. Hauschild., 12-9-1914; 150; *Opatrinus moestus* MULS. Det. Julio FERRER, 1984" (ZMK) 1 m; "Equateur Loja Abbé Gaujon, Museum Paris ex Coll. R.OBERTHÜR" (MNHN) 2 m, 4 f; "Pichincha, Ecuador, 18 km Sto. Domingo, on pinneaples, IV-4-85, J. ESCOBAR", "113" (NMNH) 1 f; "Pichincha, Ecuador, 18 km Sto. Domingo, on pinneaples, IV-4-85, J. ESCOBAR", "115", "85.5228" (NMNH) 1 f; "Pichincha, Ecuador, 18 km Sto. Domingo, on pinneaples, IV-4-85, J. ESCOBAR", "114" (NMNH) 1 m; "Pichilingue, Ecuador, 3.3.1977", "black light, 79.443" (NMNH) 2 f; "Pichilingue, Ecuador, 16.XI.1977", "black light, 79.443" (NMNH) 1 f; "Pichilingue, Ecuador, 16.XI.1977", "black light, 79.443" (NMNH) 1 m; "ex Ecuador via Charleston S.C., on banana, 53-3565" (NMNH) 1 f; "ex Ecuador via Charleston S.C., 53-3132" (NMNH) 1 m; "Guaya., Ecuad.", "Banana, 3/30/53", "SDFor. 3113" (NMNH) 1 m; "Ecuador, El Corazón, distr. Cotopaxi, 9.12.1994, leg. P. Węgrzynowicz" (PWC) 1 m.

DISTRIBUTION (FIG. 183)

Ecuador.

Opatrinus (Alaetrinus) angustus BURMEISTER, 1875

(Figs 12, 18, 25, 33, 45, 56, 63, 75, 79, 87, 98, 104, 113, 122, 165, 166, 183, 194)

Opatrinus angustus BURMEISTER, 1875: 499.
Diastolinus quadricollis FAIRMAIRE, 1905: 299; GEBIEN 1910: 275; BLACKWELDER 1945: 524 **syn. nov.**
Opatrinus quadricollis F.: GEBIEN 1938: 297; KASZAB 1969: 128.
Opatrinus angustus BURM.: GEBIEN 1910: 276, 1938: 297; BLACKWELDER 1945: 524.

Locus typicus: Santa Fé (Argentina).

DIAGNOSIS

This species is similar to *ecuadorensis* (genae wider than eyes) and to *moestus* and *stingi* (sides of pronotum nearly parallel). As in *stingi* the bursa copulatrix is furnished with two sclerites.

The character that distinguishes *angustus* from *ecuadorensis* is the shape of pronotum (in *ecuadorensis* the sides are rounded). The structure of mentum and the clearly visible puncturation of the median part of prosternum distinguish it from *moestus*, the expansion of genae just behind the eyes and the shape of male protibia - from *moestus* and *girardi*.

DESCRIPTION

Length 10.5-10.8 mm. Body dark brown to black, opaque. Head clearly punctate on frons (distance between punctures smaller than their diameter), puncturation of clypeus finer and sparser. Lateral contour of eyes not protruding. Genae wider than eyes (fig. 12). Mentum as in fig. 104. Pronotum uniformly elevated, p.l./p.w. = 0.65-0.68 (fig. 250); sides of pronotum parallel up to 4/5 length from base, narrowing anterad, anterior angles acute, base bisinuate, posterior angles are nearly right angles; puncturation of pronotum dense and clearly visible, distance between punctures smaller than their diameter, on disc puncturation sparser. Elytra: e.l./e.w. 1.35-1.43, e.l./p.l. = 2.59-2.71, e.w./p.w. = 1.21-1.24; intervals of elytra flat, slightly elevated at apex; clearly punctate, distance between punctures equal to about 2.5-3.0 puncture diameter; rows of elytra with deep round regular punctures, denser at apex; on disc area between row punctures flat, at suture and at apex with narrow longitudinal troughs connecting punctures (fig. 18); fourth row of elytra consists of 23-26 punctures. Prosternum clearly punctate, puncturation finer and sparser on process between procoxal cavities (fig. 33). Mesosternum with longitudinal median trough posteriorly (fig. 45). Metasternum: m.l.m./l.f.v. = 1.05-1.08, m.l.c./l.m.cav. = 1.36-1.45. Puncturation of abdominal ventrites fine, distance between punctures equal to 1.5-2.0 puncture diameter. Male protibia with longitudinal depression on inner side (figs 56, 63, 75), mesotibia - slightly expanded with small apical tooth (figs 79, 87). Aedeagus: l.e. = 1.80-1.86 mm, l.b.p./l.a.p. = 4.00-4.08 (figs 165, 166). Ovipositor: l.o. = 1.85-1.90 mm, l.p./l.c. = 0.85-0.92, l.c./l.f.l. = 5.86-5.94, l.f.l./w.f.l. = 0.37-0.39. Bursa copulatrix furnished with two longitudinal sclerotised plates (fig. 122).

MATERIAL EXAMINED (21 M, 50 F)

ARGENTINA: Chaco Austral, AU N. D'Icano (MNHN) 1 f; Chaco De Santiago Del Estero: Rio Salado (NMNH) 1 f, (MNHN) 9 f, Bords Du Rio Salado, La Palisa Del Bracho 25 Kil. N. O. D'Icano (MNHN) 3 m, 10 f, Troncal 40 Kil. O. De Salavina (MNHN) 1 f, Barrancas (MNHN) 1 m, Rio Dulce (MNHN) 2 f; Prov. Ahue Rios (TMB) 1 m; Prov. Chaco, Resistencia, 23.XII.1965 (TMB) 2 f; Prov. Jujuy, Capital, I.1978, (HBC) 1 m; Prov. de Santa Fé, Las Garzas (MNHN) 1 m, Bords Du Rio Las Garzas, 25 Kil. A. L'O. D'Ocampo (MNHN) 1 f;; Prov. Santa Fé, between

Santa Fé and Reconquista, 23.XII.1965 (TMB) 1 m; Santa Fé, Rosario (TM) 1 m; Tucuman (NMNH) 1 f.

BOLIVIA: Region amazonica, Magdalena, 15.VI.50, (HBC) 1 f;

PARAGUAY: (ZMK) 1 m; Galatea (ZMK) 1 f; Paraguay Central (MNHN) 1 m.

BRAZIL: (MIZPAN) 1 m, (ZMA) 1 f; Guairui (NMNH) 3 f; Pelotas, Rio Grande do Sul (NMNH) 2 m, 3 f; Prov. Matto-Grosso (MNHN) 4 m, 10 f; Rio Janeiro (MNHN) 1 f; St. Catharina (ZMB) 1 m.

TYPES

Opatrinus angustus BURMEISTER, 1875: lectotype (present designation), male, "Sta. Fé, Syntypus, *Opatrinus angustus* BURMEISTER, 1875"; paralectotypes, male and female, "Sta. Fé, Syntypus, *Opatrinus angustus* BURMEISTER, 1875", specimens are deposited in the Museo Argentino de Ciencias Naturales "Bernardino Rivadavia", Buenos Aires, Argentina.

Diastolinus quadricollis FAIRMAIRE, 1905: lectotype (present designation), female, "Argentina, Prov. Salta C. BRUCH; Type; *Diastolinus quadricollis* FAIRM.; Museum Paris, 1905 coll. Léon FAIRMAIRE", the specimen is deposited in the Muséum National d'Histoire Naturelle, Paris, France.

DISTRIBUTION (FIG. 183)

Argentina, Bolivia, Paraguay, Brazil.

Opatrinus (*Alaetrinus*) *girardi* sp. nov.

(Figs 13, 15, 23, 60, 68, 80, 91, 95, 96, 109, 147, 167, 168)

Name derivation: in honour of Dr. Claude GIRARD.

Locus typicus: Bucaramanga (Colombia).

DIAGNOSIS

The shape of pronotum in this species resembles that in *moestus* and *angustus* and the structure of elytra is similar to the structure in *pullus* and *acuticollis*. The prosternum is finely punctate as in *acuticollis* and *moestus*. The presence of two sclerites in the bursa copulatrix makes this species similar to *angustus*.

The following characters: nearly parallel or only slightly rounded sides of pronotum (clearly rounded in *pullus* and *acuticollis*), finely punctate sides of pronotum (clearly punctate and wrinkled in *pullus*), genae narrower than eyes (wider in *angustus*), moderately shiny elytra (opaque in *moestus*), thick and long hair on the body (hardly visible in *moestus*), sinuate median expansion on male protibia (clearly expanded straight tibia in *moestus*; gradual expansion towards apex in *pullus* and *acuticollis*) clearly distinguish this species from others.

DESCRIPTION

Length 9.5-10.9 mm. Body dark brown to black with long hair (clearly visible in depressions, on convex surfaces - usually worn off) (fig. 15), upper side opaque, elytra sometimes slightly shiny, underside shiny. Head clearly punctate on frons (distance between punctures smaller than their diameter), puncturation of clypeus finer and sparser. Lateral contour of eyes slightly protruding, eyes wider than genae (fig. 13). Mentum as in fig. 109. Pronotum uniformly elevated, p.l./p.w. = 0.67-0.69, widest at front (fig. 23); sides of pronotum nearly parallel up to 2/3 length from base (sometimes very slightly rounded), anterior part slightly expanded and rounded; base of pronotum bisinuate, posterior angles are nearly right angles, anterior angles apically rounded; puncturation of pronotum moderate, punctures round, distance between punctures equal to 1-2 puncture diameter. Elytra: e.l./e.w. = 1.43-1.48, e.l./p.l. = 2.54-2.83, e.w./p.w. = 1.17-1.28; intervals of elytra flat, slightly elevated at apex, finely punctate, distance between punctures equal to 3-4 puncture diameter; rows of elytra with deep round regular punctures, dense at apex; on disc areas between row punctures flat, at suture and at apex with narrow longitudinal troughs connecting punctures; fourth row of elytra consisting of 26-30 punctures. Sides of prosternum finely and sparsely punctate, in the middle puncturation hardly visible. Mesosternum with longitudinal median trough posteriorly. Metasternum: m.l.m./l.f.v. = 0.95-0.98, m.l.c./l.m.cav. = 1.09-1.20. Puncturation of abdominal ventrites fine, distance between punctures equal to 2-3 puncture diameter. Male protibia clearly expanded in middle and at base, with longitudinal depression on inner side (figs 60, 68), mesotibia with apical tooth (figs 80, 91), metatibia as in figs 95, 96. Aedeagus: l.e. = 1.92 mm, l.b.p./l.a.p. = 4.05 (figs 167, 168). Ovipositor: l.o. = 2.00 mm, l.p./l.c. = 0.94, l.c./l.f.l. = 5.33, l.f.l./w.f.l. = 0.43. Bursa copulatrix furnished with two longitudinal sclerotised plates.

MATERIAL EXAMINED (7 M, 9 F)

Holotype: male, "XI/XII. 1968, Bucaramanga, Colombie, Ph. GENTY leg.", the specimen is deposited in the Muséum National d'Histoire Naturelle, Paris, France.

Paratypes: "XI/XII. 1968, Bucaramanga, Colombie, Ph. GENTY leg." (MNHN) 3 m, 3 f; (MIZPAN) 1 m, 1 f; "XI. 1969, Bucaramanga, Colombie, Ph. GENTY leg." (MNHN) 1 f; "ex Colombia at Tampa, 2830", "12.V.87, 87.4840", "*O. luederwaldti* GEB. 1928" (NMNH) 1 m; "Colombia at Miami", "IX-6-66, HBSMITH, 66-24715" (MIZPAN) 1 m; "Colombia, V-28-63, JOHNSON, DODY & DOZIER Colrs.", "Stowaway, Miami Fla., 24076, 63-13420" (NMNH) 3 f, (MIZPAN) 1 f.

DISTRIBUTION

Colombia.

Opatrinus (Alaetrinus) moestus MULSANT et REY, 1853

(Figs 16, 20, 61, 69, 81, 90, 94, 97, 107, 120, 121, 163. 164, 183, 195)

Opatrinus moestus MULSANT et REY, 1853a: 307, 1853b: 82; LE CONTE 1859: 75; GEBIEN 1910: 277, 1938: 297; BLACKWELDER 1945: 524; PAPP 1961: 119.
Hopatrinus (sic!) *moestus*: GEMMINGER and HAROLD 1870: 1915; CHAMPION 1885: 123.
Opatrinus Lüderwaldti GEBIEN, 1928: 112, 1938: 297 **syn. nov.**
Opatrinus lüderwaldti GEB.: BLACKWELDER 1945: 524; MARCUZZI 1949: 343.
Opatrinus luederwaldti GEB.: KULZER 1963: 410.

Terra typica: Brazil.

DIAGNOSIS

This species is similar to *angustus* and *girardi* (shape of pronotum) and to *pullus* and *acuticollis* (structure of elytra). It has the same kind of puncturation of the prosternum as *acuticollis* and *girardi*.

The following characters: nearly parallel or only slightly rounded sides of pronotum (clearly rounded in *pullus* and *acuticollis*), finely punctate sides of pronotum (clearly visible puncturation and wrinkled in *pullus*), genae narrower than eyes (wider in *angustus*), the upper side of body opaque (moderately shiny to very shiny in *acuticollis* and *pullus*), the shape of mentum, clearly medially expanded male protibia (gradually expanded towards apex in *pullus* and *acuticollis*) clearly distinguish *moestus* from *angustus*, *pullus* and *acuticollis*.

DESCRIPTION

Length 9.9-10.3 mm. Body black, opaque, moderately hairy (fig. 16). Head clearly punctate on frons (distance between punctures equal to 0.5-1.0 puncture diameter), puncturation of clypeus finer and sparser. Lateral contour of eyes not protruding. Head behind eyes narrow so that width of eyes exceeds that of genae. Mentum as in fig. 107. Pronotum uniformly elevated, p.l./p.w. 0.62-0.68, widest anteriorly (fig. 20); sides of pronotum nearly parallel up to 2/3 length from base (sometimes slightly rounded), in anterior part slightly narrowed and rounded; base of pronotum bisinuate, posterior angles are nearly right angles, anterior angles rounded at apex; puncturation of pronotum moderate, punctures round, distance between them equal to 1-2 puncture diameter. Elytra: e.l./e.w. = 1.28-1.43, e.l./p.l. = 2.48-2.69, e.w./p.w. = 1.16-1.23; intervals of elytra flat, slightly elevated at apex, finely punctate, distance between punctures equal to 3-4 puncture diameter; rows of elytra with deep round regular punctures, denser at apex; on disc areas between row punctures flat, at suture and at apex with narrow longitudinal troughs connecting punctures; fourth row of elytra consists of 22-25 punctures. Sides of prosternum sparsely and finely punctate, in the middle puncturation hardly visible. Mesosternum with longitudinal median trough posteriorly. Metasternum: m.l.m./l.f.v. = 0.88-1.00, m.l.c./l.m.cav. = 0.88-1.00. Puncturation of abdominal ventrites fine, distance between punctures equal to c. 1-2 puncture diameter. In males protarsi clearly

expanded, protibia with clearly visible median expansion (figs 61, 69), mesotibia with large tooth just before apex (figs 81, 90), metatibia as in figs 94, 97. Aedeagus: l.e. = 1.79-1.85 mm, l.b.p./l.a.p. = 3.50-3.98 (figs 163, 164). Ovipositor: l.o. = 1.80-1.90 mm, l.p./l.c. = 0.94-0.98, l.c./ l.f.l. 5.35-5.47, l.f.l./w.f.l = 0.38-4.00. Bursa copulatrix furnished with fine spines (figs 120, 121).

MATERIAL EXAMINED (35 M, 32 F)

BRAZIL: (DEI) 1 m, (FMNH) 1 m, (MNHN) 2 m, (NHMB) 1 m, (NHMV) 2 m, 3 f, (TMB) 1 m, (ZMA) 3 m, 8 f, (ZMB) 2 m, (ZMH) 2 m, 1 f; Bahia (MIZPAN) 1 m, 1 f; Caraguatatuba, São Paulo (MZUSP) 4 m, 1 f; Etat De São Paolo (MNHN) 3 m, 2 f; Ilha da Queimada Grande, S o Paulo (MZUSP) 1 m; Ilha de S. Sebastião (MZUSP) 1 f; Novofriburgo (ZMH) 1 m; Parahyba, Rio do Squire (ZMA) 3 m, 4 f; Rive droite du Parahyba (MNHN) 1 m; Rio de Janeiro (ICCM) 1 m, 2 f, (MIZPAN) 1 f; Rio Piracicaba (MNHN) 3 m, 4 f.

CHILE: Chili, Aabe (ZMH) 1 m.

TYPES

Opatrinus moestus MULSANT et REY, 1853: lectotype (present designation), female, "*moestus*, Type MULSANT; Brasil, coll. OBERTHÜR ex coll. DEYROLLE", the specimen is deposited in the Muséum National d'Histoire Naturelle, Paris, France; paralectotype, female, "*moestus*, Type Mulsant; Brasil, coll. OBERTHÜR ex coll. DEYROLLE", the specimen is deposited in the Természetudomanyi Muzeum, Budapest, Hungary.

Opatrinus luederwaldti Gebien, 1928: lectotype (present designation), male, "S. Paulo, Ilka dos Alcatrazes, X.20, LÜDERWALDT; Type!, No/344; 20.233; *Opatrinus Lüderwaldti* GEB.", the specimen is deposited in the Museum G. Frey, Tutzing, Germany; paralectotypes, female, "S. Paulo, Ilka dos Alcatrazes, X.20, LÜDERWALDT; Type!, No/344; 20.233; *Opatrinus Lüderwaldti* GEB.", the specimen is deposited in Museum G. Frey, Tutzing, Germany) and female "20.233, S o Paulo, Ilka Alcatrazes, Lüderwaldt leg.; *Opatrinus Lüderwaldti*, Typo!, H. GEBIEN det.; cotipo", the specimen is deposited in the Museu de Zoologia da Universidade de Sao Paulo, Sao Paulo, Brasil.

DISTRIBUTION (FIG. 183)

Brazil, Chile.

Opatrinus (Alaetrinus) acuticollis (FAIRMAIRE, 1905) bona sp.

(Figs 10, 22, 32, 43, 47, 49, 59, 70, 82, 92, 106, 171, 172, 184, 196)

Diastolinus acuticollis FAIRMAIRE, 1905: 299; GEBIEN 1910: 274; BLACKWELDER 1945: 524.
Opatrinus validus Burm.: GEBIEN 1938: 297 (=*Opatrinus acuticollis* FAIRM.).

Terra typica: Misiones (Argentina).

DIAGNOSIS

This species is similar to *validus* (shape of pronotum, structure of elytra, fusing of the apical part of tegmen of aedeagus) and to *pullus* and *moestus* (see the diagnosis of these species).

O. acuticollis is distinguished by the lack of emargination of the median part of the prosternal process (emarginated in *validus*), a flat and dorsally situated (in the apical part) edge of pseudopleura of elytra (elevated and ventrally situated in *validus*), lack of emargination of the last abdominal ventrite (with delicate apical emargination in *validus*).

DESCRIPTION

Length 8.4-11.9 mm. Body dark brown to black, moderately shiny. Head clearly punctate on frons, distance between punctures equal to 0.5-1.0 puncture diameter, puncturation of clypeus finer and sparser. Lateral contour of eyes not protruding. Head behind eyes narrow so that eye width exceeds that of genae (fig. 10). Mentum as in fig. 106. Pronotum uniformly elevated, p.l./p.w. = 0.66-0.69; sides of pronotum clearly rounded, widest in middle, anterior angles acute, slightly rounded at apex, base bisinuate, posterior angles are nearly right angles (fig. 22); puncturation of pronotum moderate, punctures round, distance between them equal to 1-2 puncture diameter. Elytra: e.l./e.w. = 1.46-1.56, e.l./p.l. = 2.66-2.77, e.w./p.w. = 1,17 - 1.21; intervals of elytra flat, slightly elevated at apex, finely punctate, distance between punctures equal to 4-5 puncture diameter; rows of elytra with deep, round, regular punctures, denser at apex; on disc areas between row punctures flat, at suture and at apex with narrow longitudinal troughs connecting punctures; fourth row of elytra consists of 22-28 punctures. Margin of pseudopleura of elytra in apical part flat and situated dorsally (fig. 43). Sides of prosternum clearly punctate, distance between punctures equal to 1-2 puncture diameter; in the middle puncturation finer and sparser, distance between punctures equal to 2-3puncture diameter. Emargination of prosternal process medially interrupted (fig. 32). Mesosternum with longitudinal median trough posteriorly (fig. 47). Emargination of anterior edge of metasternum medially interrupted; m.l.m./l.f.v. = 0.92-0.97, m.l.c./l.m.cav. = 1.23-1.35. Puncturation of abdominal ventrites fine, distance between punctures equal to 2-3 puncture diameter. Last ventrite not emarginated (fig. 49). In male protarsi clearly expanded; underside of first two segments of male metatarsi, underside of first segment of meso- and first two segments of metatarsi in female with naked median trough. In male protibia slightly expanded with longitudinal depression on inner side (figs 59, 70), mesotibia with thick hair on inner margin and with apical tooth (figs 82, 92). Aedeagus: l.e. = 2.70-3.00 mm, apical part without median slit, l.b.p./l.a.p. = 4.00-4.40 (figs 171, 172). Ovipositor: l.o. = 2.00-2.15 mm, l.p./l.c. = 0.95-0.98, l.c./l.f.l. = 4.73-5.27, l.f.l./w.f.l = 0.38-0.40. Spermatheca short (as in *validus*).

MATERIAL EXAMINED (35 M, 49 F)

ARGENTINA: Misiones: (MHNG) 1 m, Iguazu (HBC) 1 m, 2 f, Pasadas

(NMNH) 1 f, Env. De San-Ignacio, Villa Lutecia (MNHN) 2 f, Rio-Parana (MNHN) 6 f, Haut-Parana, San-Ignacio-Missions (MNHN) 1 f.

BRAZIL: "Germania, Brasil" (ZMA) 1 m; "Hist.-Coll. 45761, Brasil" (ZMB) 3 m, 3 f; Aracataca, Magdalena Colombia (ANSP) 1 f; Bahia (TMB) 1 m, 1 f, (ZMA) 4 m, 3 f; Goias: Blumenau (ZMA) 1 f; Faz. Cachoeirinha, Jatai (MZUSP) 1 f, R. Saia Velha, 30 km S Brasilia (NMNH) 1 m; Mato Grosso: Barra do Tapirape (CAS) 6 m, 2 f, (FMNH) 1 f, Goias side Rio Araguaia, 3 km S. Barra do Tapirape (CAS) 5 m, 4 f; Minas Gerais do Brasil: Pouso Alegre (MZUSP) 1 f; Para Belem (CAS) 2 f; Riberao Preto (Fac Medicina) (MZUSP) 1 m, 1 f; Rio Grande do Sul: (FMNH) 3 m, 1 f, Sao Leopoldo (MZUSP) 1 f; Sto. Augusto (CISC) 1 f; Santa Catarina: Nova Teutonia (CISC) 4 m, 6 f, (MZUSP) 1 m, 2 f; Ridge above Seara, S. Catarina 600 m (CAS) 2 f; Tres Lagoas, MT, marg. esq. rio Sucuriu, Faz. Canaa (MZUSP) 1 f; S o Paulo: Guatapara (MZUSP) 2 m, 2 f.

TYPE

Diastolinus acuticollis FAIRMAIRE, 1905: lectotype (present designation), male, "Argentina, Gob. Misiones, II.1893, C. BRUCH; Type; *Diastolinus acuticollis* FAIRM.; Museum Paris, Collection Léon FAIRMAIRE, 1906", the specimen is deposited in the Muséum National d'Histoire Naturelle, Paris, France.

DISTRIBUTION (FIG. 184)

Argentina (Misiones), Brazil (Rio Grande do Sul, Santa Catarina, Serra do Mar, São Paulo, Goias, Mato Grosso, Minas Gerais do Brasil, Bahia, Acre, Para).

Opatrinus (Alaetrinus) validus BURMEISTER, 1875

(Figs 42, 48, 50, 83, 93, 99, 126, 169, 170, 184, 197)

Opatrinus validus BURMEISTER, 1875: 499; GEBIEN 1910: 277, 1928: 112, 1938: 297; BLACKWELDER 1945: 524; MARCUZZI 1977: 24, 1987: 99.

Locus typicus: Tucumán (Argentina).

DIAGNOSIS

See diagnosis *O. acuticollis* (FAIRMAIRE, 1905).

DESCRIPTION

Length 12.5-15.3 mm. Body nearly black to black, moderately shiny. Head clearly punctate on frons, distance between punctures smaller than their diameter; puncturation of clypeus finer and sparser. Lateral contour of eyes not protruding. Head behind eyes narrow so that eye width exceeds that of genae. Pronotum uniformly elevated, p.l./p.w. = 0.67-0.70; sides of pronotum clearly rounded, widest at 2/3 length, anterior angles acute, slightly rounded at apex, base bisinuate, posterior angles are nearly right angles; puncturation of pronotum moderate, punctures round, distance between them smaller than their diameter. Elytra: e.l./e.w. =

1.40-1.46, e.l./p.l. = 2.51-2.73, e.w./p.w. = 1.25-1.29; intervals of elytra flat, slightly elevated at apex, finely punctate, distance between punctures equal to 3-4 puncture diameter; rows of elytra with deep round regular punctures, denser at apex; on disc areas between row punctures flat, at suture and at apex with narrow longitudinal troughs connecting points. Fourth row of elytra consists of 19-26 punctures. Margin of pseudopleura of elytra in apical part elevated and situated ventrally (fig. 42). Sides of prosternum clearly punctate, sometimes slightly wrinkled, in the middle puncturation finer and sparser. Prosternal process completely emarginated (fig. 48). Emargination of anterior edge of metasternum between posterior coxal cavities interrupted in the middle, m.l.m/ l.f.v = 0.79-0.90, m.l.c./l.m.cav. = 1.02-1.08. Puncturation of abdominal ventrites fine, distance between punctures equal to c. 1-2 puncture diameter. Last abdominal ventrite with delicate apical emargination (fig. 50). In male protarsi clearly expanded, underside of first two segments of male metatarsi, in female first segment of meso- and two first segments of metatarsi with naked median trough. In male protibia slightly expanded with longitudinal depression on inner side, mesotibia with thick hair on inner margin with apical tooth (figs 83, 93), metatibia as in fig. 99. Aedeagus: l.e. = 3.50-3.90 mm, apical part without median slit, l.b.p./l.a.p. = 4.25-4.46 (figs 169, 170). Ovipositor: l.o. = 2.10-2.70 mm, l.p./l.c = 0.89-0.97, l.c./l.f.l. = 4.85-5.83, l.f.l./w.f.l = 0.35-0.46. Spermatheca as in fig. 126.

MATERIAL EXAMINED (74 M, 47 F)

ARGENTINA: Buenos Aires (RGC) 1 m; Buenos Aires, Balneario Municipal, Baradero (NMNH) 1 m; Buenos Aires, San Fernando (NMNH) 1 m, 1 f; Clorinda, Formosa (TMB) 3 m, 1 f, (ZMA) 1 f; Chaco De Santa Fé, Las Garzas, Bords Du Rio Las Garzas, 25 Kil. A L'O. D'Ocampo (MNHN) 1 m; Chaco de Santiago Del Estero: Rio Salado (NMNH) 3 m, Bords Du Rio Salado, Environs D'Icano (MNHN) 18 m, 11 f, Bords Du Rio Salado, Environs D'Icano, Mistol Paso (MNHN) 2 m, Bords Du Rio Salado, La Palisa Del Bracho 25 Kil. N.-O. D'Icano (MNHN) 8 m, 1 f, Barrancas Banados, De Rio Dulce 80 Kil. O. D'Icano (MNHN) 1 m, 1 f; Eldorado, Missiones (MHNG) 1 f; Gran Chaco, Rio Tapenaco (MNHN) 1 m, 1 f, (TM) 1 m; Province De Corrientes (MNHN) 3 m; Santa Cruz De La Sierra (MNHN) 1 m.

BRAZIL: (ZMA) 1 m; "Germania, Brasil" (ZMA) 1 m, 1 f; Riacho del Oro (ZMK) 1 m, 3 f; Prov. Matto-Grosso (MNHN) 6 m, 3 f; Salobra, Mato Grosso (MZUSP) 1 m;

BOLIVIA: Beni Prov., Chacobo Indian Village on Rio Benicito (FMNH) 1 f; Cuatro Ojos (NMNH) 1 m; Limon, Dep. Sta. Cruz (NMNH) 1 f;

PARAGUAY: (DEI) 1 m, 2 f, (ZMA) 3 m, 2 f; "Paraguay Central" (MNHN) 5 m, 6 f; Asuncion (ICCM) 3 m, 3 f; Conception (TMB) 1 m, 1 f; San Luis, Reimoser (NHMV) 3 m, 4 f.

URUGUAY: M. Video (TMB) 1 f.

SOUTH AMERICA: "Summis andis, GUERIN" (ZMH) 1 m; "La Plata" (ZMA) 1 f.

TYPE

Opatrinus validus BURMEISTER, 1875: lectotype (present designation), male, "Tucuman, Typus, *Opatrinus validus* BURMEISTER 1875", the specimen is deposited in the Museo Argentino de Ciencias Naturales "Bernardino Rivadavia", Buenos Aires, Argentina.

DISTRIBUTION (FIG. 184)

Brazil, Paraguay, Argentina, Uruguay.

SPECIES EXCLUDED FROM THE GENUS *OPATRINUS* DEJEAN

Selinus menouxi MULSANT et REY, 1853

Selinus menouxi MULSANT et REY 1853a: 322, 1853b: 97.
Opatrinus Sayi HORN, 1870: 349; CROTCH 1873: 106; HENSHAW 1885: 119 **syn. nov.**
Opatrinus sayi HORN: GEBIEN 1910: 277, 1938: 415; PAPP 1961: 119.

Terra typica: Kansas (USA).

Examining the holotype *of Opatrinus sayi* HORN showed that it is *Selinus menouxi* MULSANT et REY, 1853, an African species of the tribe *Platynotini*.

TYPE

Opatrinus sayi HORN 1870: holotype (examined), male, "KS, 3974 Holotype, *O. Sayi* HORN", the specimen is deposited in the Museum of Comparative Zoology, Agassiz Museum, Harvard University, Cambridge, MA USA.

Blapstinus striatus GUÉRIN, 1826

Blapstinus striatus GUÉRIN in: DUPERREY 1826: Tab. IV, fig. 12; GUÉRIN, 1832: 315.
*Opatrinus striatus*GUÉRIN: GUÉRIN 1832: 99; GEBIEN 1910: 277, 1938: 297; BLACKWELDER 1945: 524; PEÑA 1966: 436.
Hopatrinus [sic!] *striatus* GUÉR.: GEMMINGER and HAROLD 1870:1915.

Terra typica: Chile.

This species was first presented in the DUPERREY atlas from 1826 (pl. IV, fig. 12 a, b, c, d, e) and GUÉRIN was given as the author of the name. In 1832 GUÉRIN gave a description of this species (with reference to pl. IV, fig. 12 a, b, c, d, e from 1826) under the name *Opatrinus striatus*. In the same work (GUÉRIN 1832), in the list of species on page 315 the name *Blapstinus striatus* GUÉRIN is mentioned. Both the description of 1832 and the figures in the atlas of 1826 show that the species does not belong to the genus *Opatrinus* DEJEAN.

TYPE

Blapstinus striatus GUÉRIN 1826: not examined, the specimen is probably deposited in the Muséum National d'Histoire Naturelle, Paris, France.

SPECIES INCERTAE SEDIS

Opatrinus blanchardi GEBIEN, 1910

Opatrinus laticollis BLANCHARD, 1853: GEBIEN 1910: 276.
Opatrinus blanchardi GEBIEN, 1910: 276 nom. nov., 1938: 297.

Terra typica: Timor.

TYPE

Opatrinus laticollis BLANCHARD, 1853: not examined, the specimen is probably deposited in the Muséum National d'Histoire Naturelle, Paris, France.

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APPENDIX 1.

List of species of the genus *Zidalus* MULSANT et REY, 1853 **stat. nov.**

1. *corvinus* (MULSANT et REY), 1853)
   var. *pinheyi* KOCH, 1956
2. *erythraeus* (GRIDELLI, 1939)
3. *exalatus* (KOCH, 1956)
4. *insularis* (MULSANT et REY, 1853)
   subsp. *somalicus* GRIDELLI, 1947
5. *latipes* (SAHLBERG, 1823)
   subsp. *tanaensis* GRIDELLI, 1947
6. *mirabilis* (KOCH, 1956)
7. *niloticus* (MULSANT et REY, 1853)
   subsp. *angulicollis* FAIRMAIRE, 1887
   subsp. *zolotarevskyi* ESPANOL, 1943
8. *royi* (ARDOIN, 1965)
9. *attenuatus* (KLUG, 1833)
   subsp. *bottegoi* GRIDELLI, 1947
10. *costulatus* (GUÉRIN, 1849)
11. *servus* (MULSANT et REY, 1853)
12. *setuliger* (MUELLER, 1887)
    subsp. *camerunensis* GRIDELLI, 1947

APPENDIX 2.

List of species of the genus *Opatrinus* DEJEAN, 1821 sensu novo

Subgenus *Opatrinus* s. str.

1. *clathratus* (FABRICIUS, 1792)
   =*gemellatus* (OLIVIER, 1795)
   =*aethiops* (FABRICIUS, 1801)
   =*geminatus* (ERICHSON, 1848)
   =*gridellii* MARCUZZI, 1949 **syn. nov.**
2. *gibbicollis* MULSANT et REY, 1853
3. ***insperatus* sp. nov.**
4. *laticolis* LATREILLE, 1833

Subgenus ***Alaetrinus*** **subgen. nov.**

5. *aciculatus* LE CONTE, 1859
6. *acuticollis* (FAIRMAIRE, 1905) **bona sp.**
7. *angustus* BURMEISTER, 1875
   =*quadricollis* (FAIRMAIRE, 1905) **syn. nov.**
8. ***ecuadorensis* sp. nov.**
9. *minimus* (PALISOT DE BEAUVOIS, 1805)
   =*notus* (SAY, 1827)
10. *moestus* MULSANT et REY, 1853
    =*luederwaldti* GEBIEN, 1928 **syn. nov.**
11. *pullus* (SAHLBERG, 1823)
    =*anthracinus* MULSANT et REY, 1853
    =*puertoricensis* MARCUZZI, 1977 **syn. nov.**
12. ***girardi* sp. nov.**
13. *validus* BURMEISTER, 1875

APPENDIX 3.

Key to the known larvae of *Platynotina* (modified from SCHULZE 1964):

1. Body fairly soft, uniformly ivory, cuticule of pronotum and the last two nota without any markings; claw of fore leg shorter than tibiotarsus ..... 2.
-. Body fairly sclerotized, anterior and posterior part darker than middle; cuticule of pronotum and the last two nota with pores, white spots and impressions; claw of fore leg about as long as tibiotarsus or a little shorter. ..... 4.
2. Claw of fore leg 1/3 shorter than tibiotarsus; no setae on first seven abdominal tergites; spine of ninth abdominal notum not equidistant .....
   ..... *Quadrideres femineus* (LESNE)
-. Claw of fore leg twice shorter than tibiotarsus; first seven abdominal tergites furnished with a pair of setae situated just before posterior margin; spine of ninth abdominal notum at equal distances ..... 3.
3. Second segment of antenna about 2.5 x longer than first .....
   ..... *Opatrinus gibbicollis* MULSANT et REY
-. Second ment of antenna about 1.2 x longer than first .....
   ..... *Opatrinus aciculatus* LE CONTE,
   Opatrinus minimus (PALISOT DE BEAUVOIS)
4. Dark patterns on surface of head, pronotum and IX abdominal tergite clearly visible; small, white spots on IX abdominal tergite; spines on inner margin of trochanter and femur of fore legs lanceolate, distal part projecting freely; setose

elevation of mandible lighter and less sclerotized than anterior part; epicranial area next to gula brown, posterior tentorial pit forming a vertical slit .... *Bantodemus zulu* KOCH

-. Patterns on surface of head, pronotum and IX abdominal tergite indistinct; large pores on IX abdominal tergite; spines on inner margin of trochanter and femur of fore legs fused in basal part; setose elevation of mandible brown, as much sclerotized as anterior part; epicranial pit forming a deep, triangular groove ..... *Zophodes fitzimonsi* KOCH

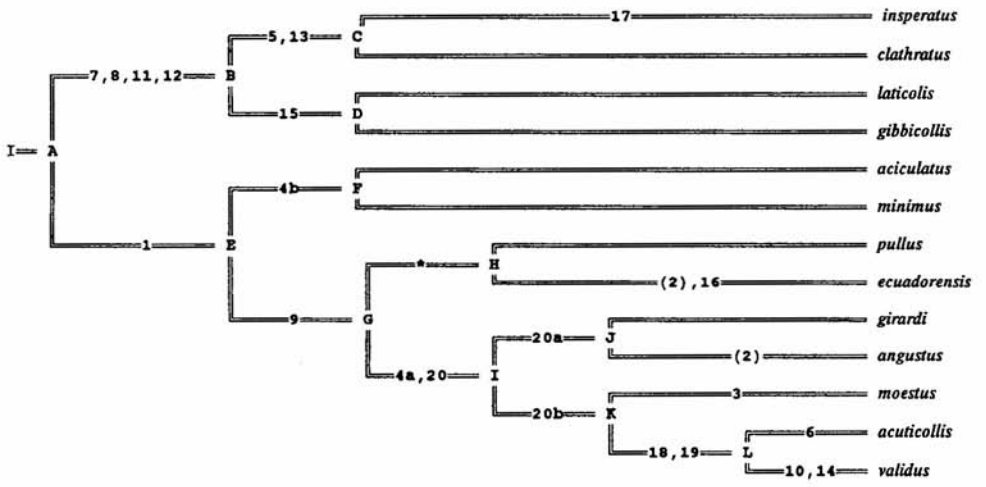
APPENDIX 4.

Character state matrix.

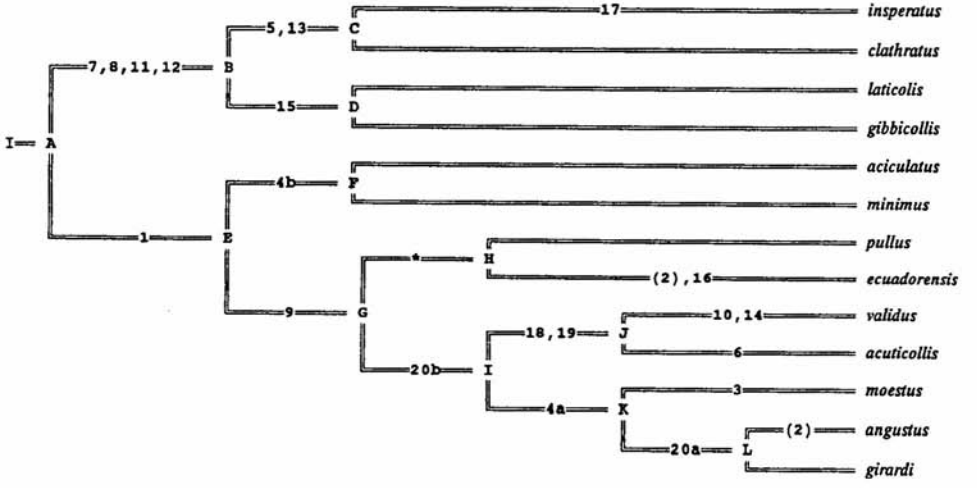
character	1		3		4b		6		8		10		12		14		16		18		20a	
		2		4a		5		7		9		11		13		15		17		19		20b
species																						
aciculatus	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
acuticollis	1	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	1	1	0	1
angustus	1	1	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0
clathratus	0	0	0	0	0	1	0	1	1	0	0	1	1	1	0	0	0	0	0	0	0	0
ecuadorensis	1	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0
gibbicollis	0	0	0	0	0	0	0	1	1	0	0	1	1	0	0	1	0	0	0	0	0	0
insperatus	0	0	0	0	0	1	0	1	1	0	0	1	1	1	0	0	0	1	0	0	0	0
laticolis	0	0	0	0	0	0	0	1	1	0	0	1	1	0	0	1	0	0	0	0	0	0
minimus	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
moestus	1	0	1	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1
pullus	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
girardi	1	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0
validus	1	0	0	0	0	0	0	0	0	1	1	0	0	0	1	0	0	0	1	1	0	1

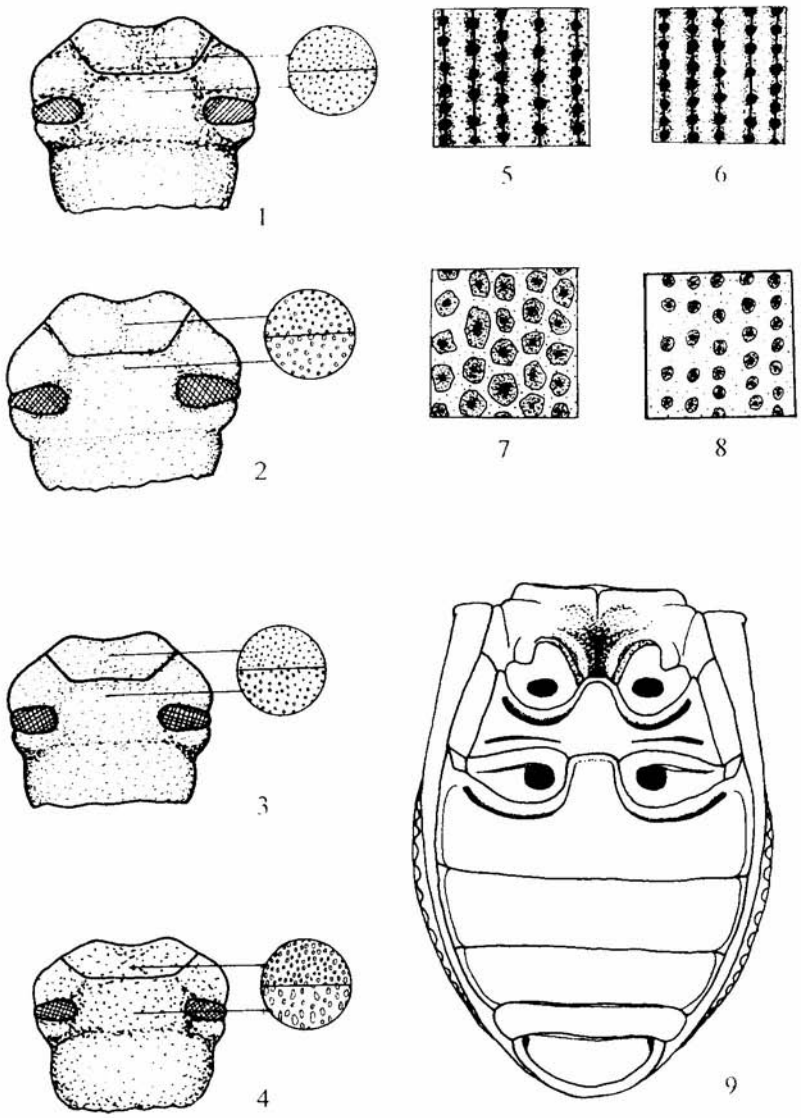
APPENDIX 5.

Cladogram I.

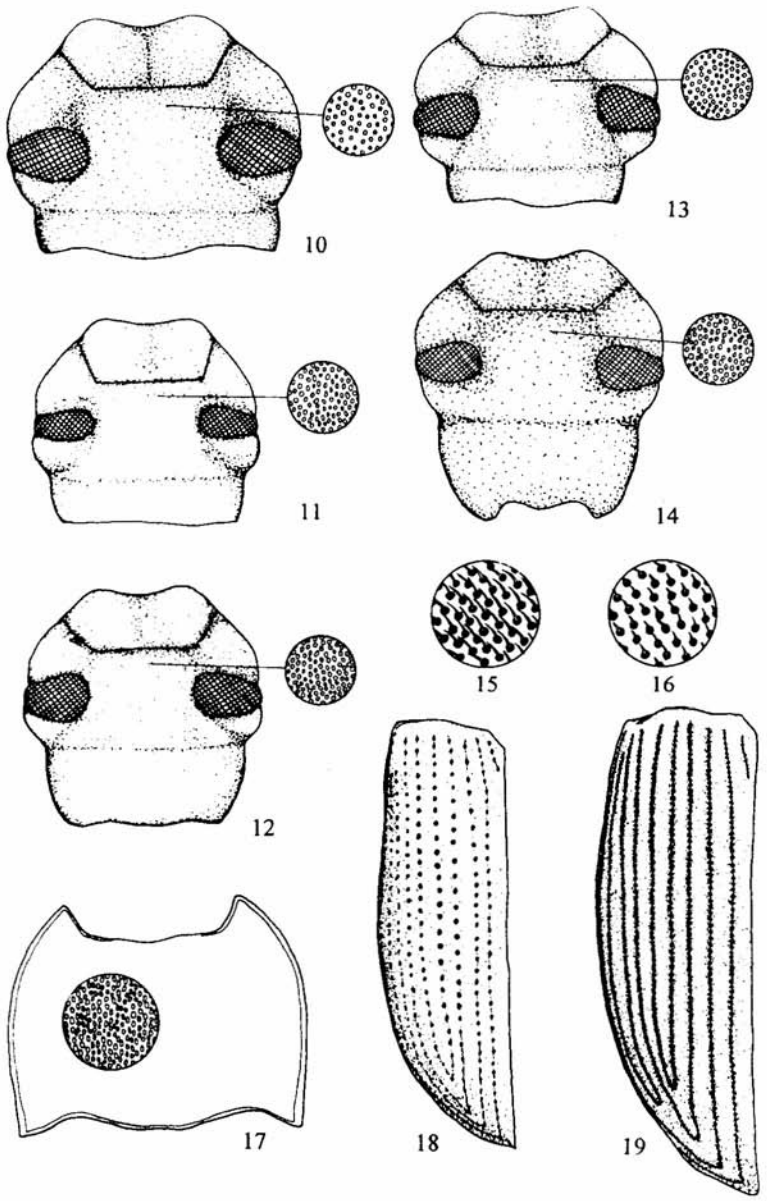


Cladogram II.

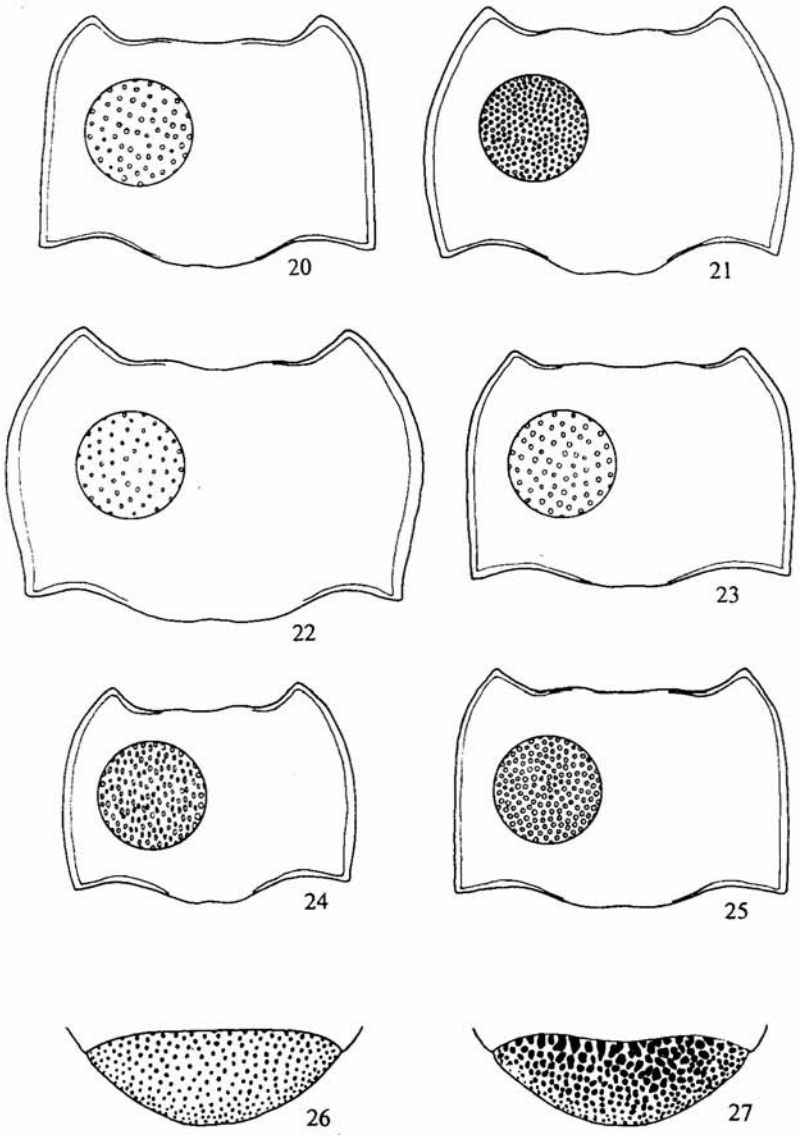




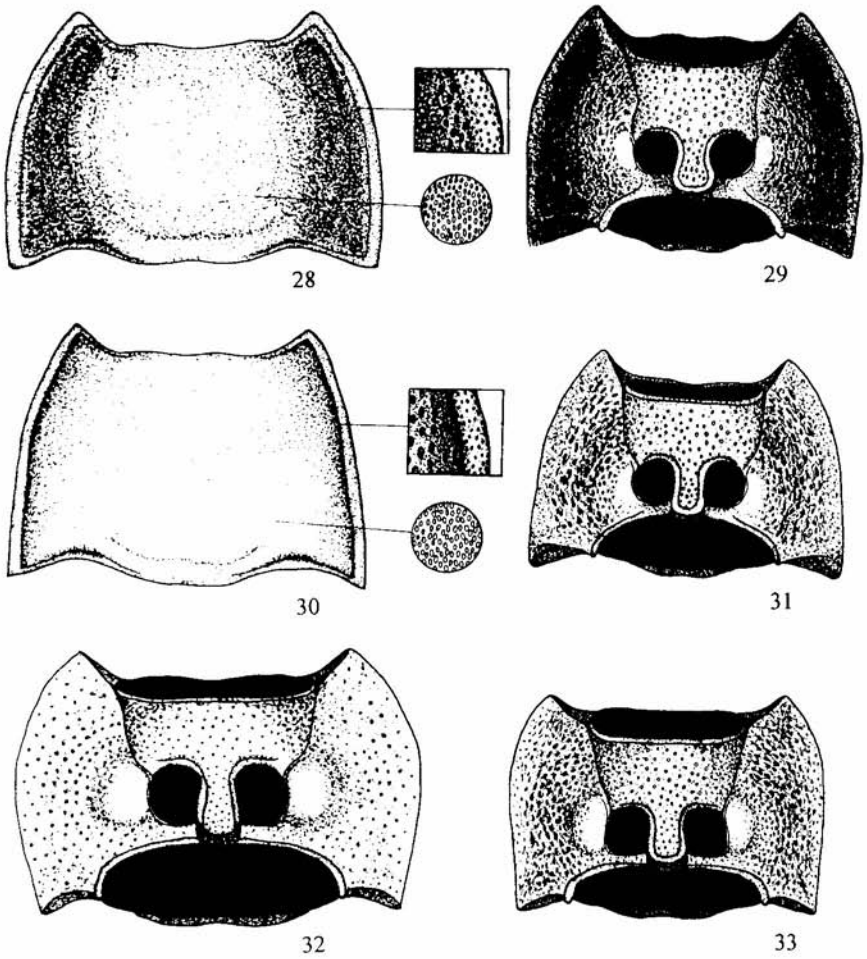
1-4 - head: 1 - *Opatrinus clathratus*, 2 - *O. insperatus*, 3 - *O. laticolis*, 4 - *O. gibbicollis*. 5-8 - punctation of the rows of elytra: 5 - *O. laticolis*, 6 - *O. gibbicollis*, 7 - *O. clathratus*, 8 - *O. insperatus*. 9 - meso-, metasternum and abdomen of *O. clathratus*



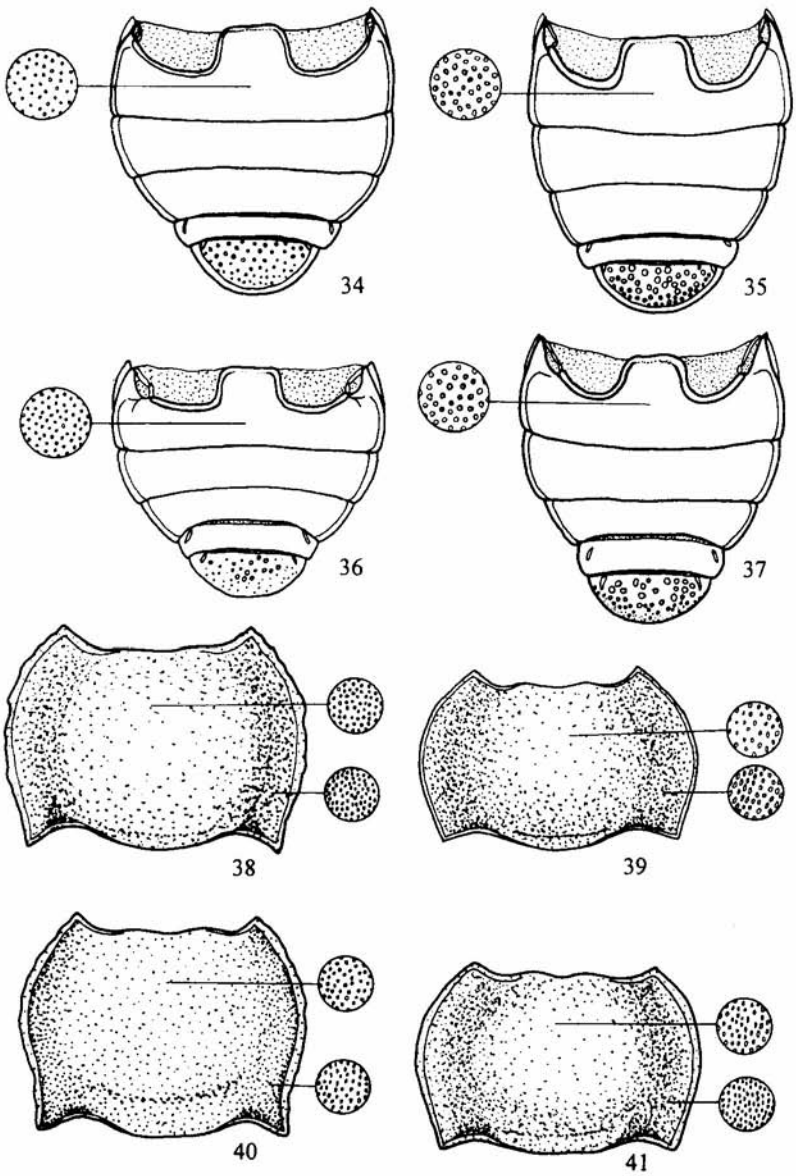
10-14 - head: 10 - *Opatrinus acuticollis*, 11 - *O. ecuadorensis*, 12 - *O. angustus*, 13 - *O. girardi*, 14 - *O. minimus*. 15-16 - hair on head: 15 - *O. girardi*, 16 - *O. moestus*. 17 - pronotum of *Zidalus latipes*. 18-19 - elytron: 18 - *O. angustus*, 19 - *Z. latipes*



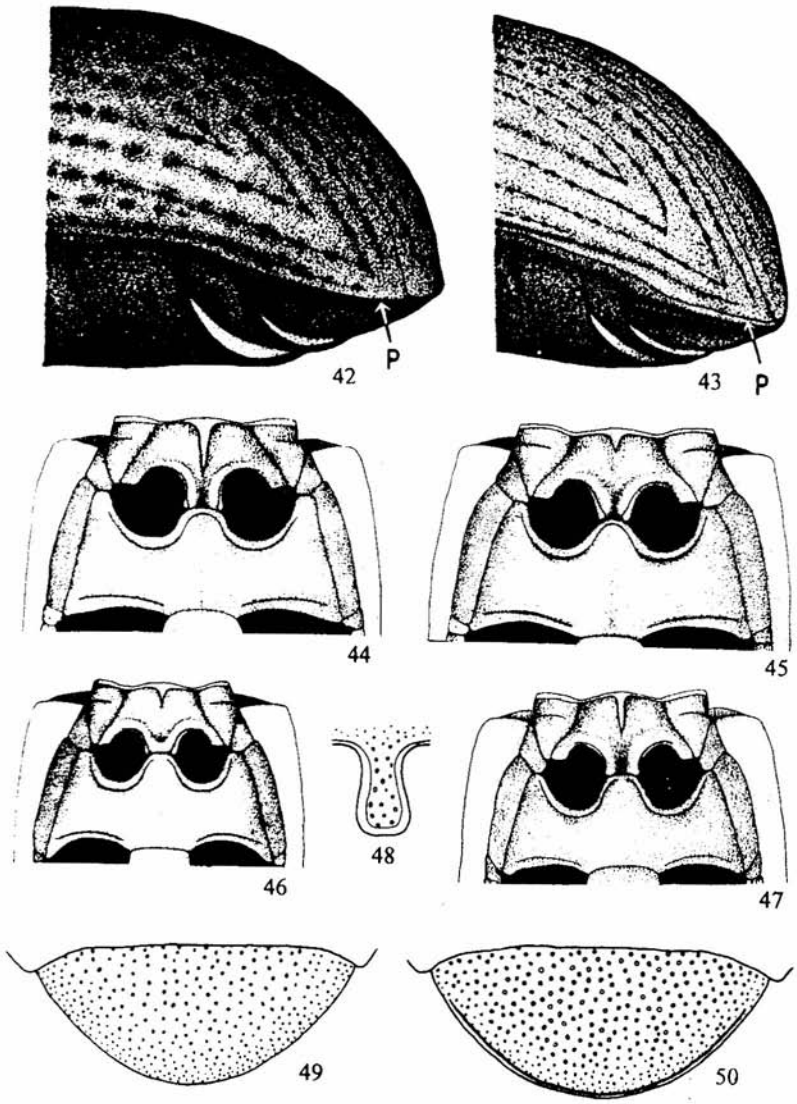
20-25 - pronotum: 20 - *Opatrinus moestus*, 21 - *O. pullus*, 22 -*O. acuticollis*, 23 - *O. girardi*, 24 - *O. ecuadorensis*, 25 - *O. angustus*. 26-27 - puncturation of the last abdominal ventrite of *O. aciculatus*: 26 - typical form, 27 - population from Ft. Worth (Texas)



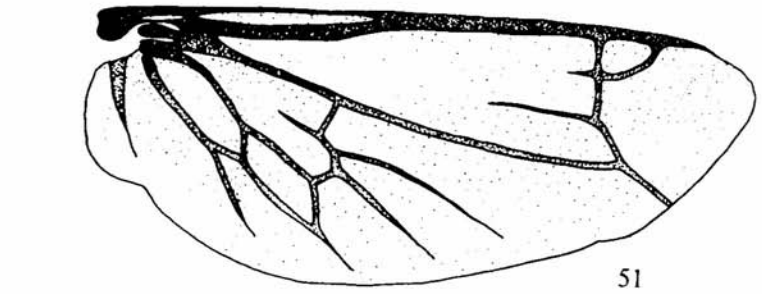
28-29 - *Opatrinus aciculatus*: 28 - pronotum, 29 - prosternum. 30-31 - *O. minimus*: 30 - pronotum, 31 - prosternum. 32-33 - prosternum: 32 - *O. acuticollis*, 33 - *O. angustus*

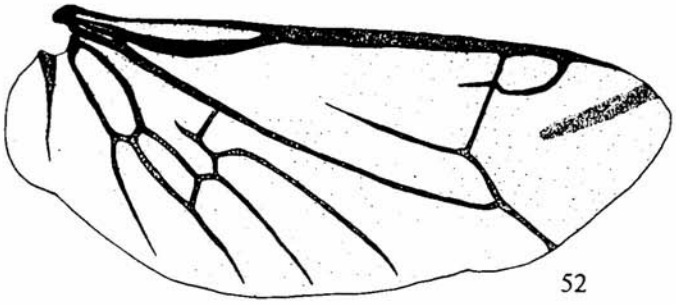


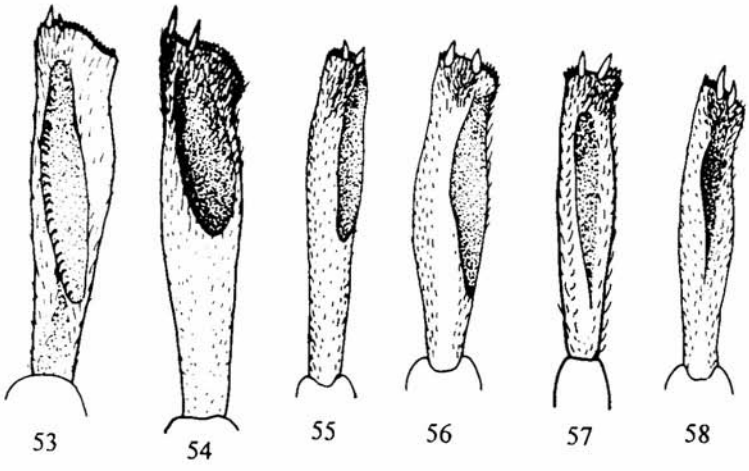
34-37 - abdominal ventrites: 34 - *Opatrinus clathratus*, typical form, 35 - *O. clathratus*, population from Venezuela, 36 - *O. gibbicollis*, 37 - *O. laticolis*. 38-41 - pronotum: 38 - *O. clathratus*, 39 - *O. gibbicollis*, 40 - *O. insperatus*, 41 - *O. laticolis*



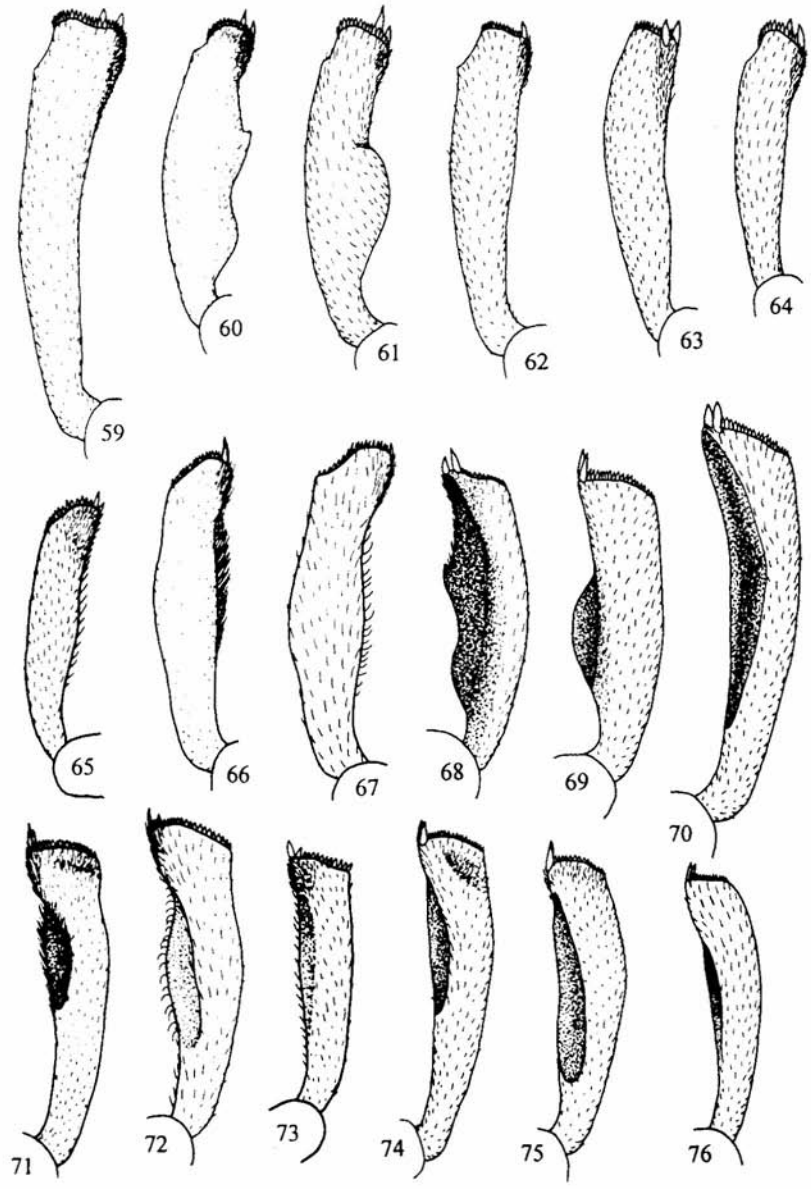
42-43 pseudopleura of elytra (P): 42 - *Opatrinus validus*, 43 - *O. acuticollis*. 44-47 - meso- and metanotum: 44 - *O. pullus*, 45 - *O. angustus*, 46 - *O. ecuadorensis*, 47 - *O. acuticollis*. 48 -prosternal process of *O. validus*. 49-50 last abdominal ventrite: 49 - *O. acuticollis*, 50 - *O. validus*



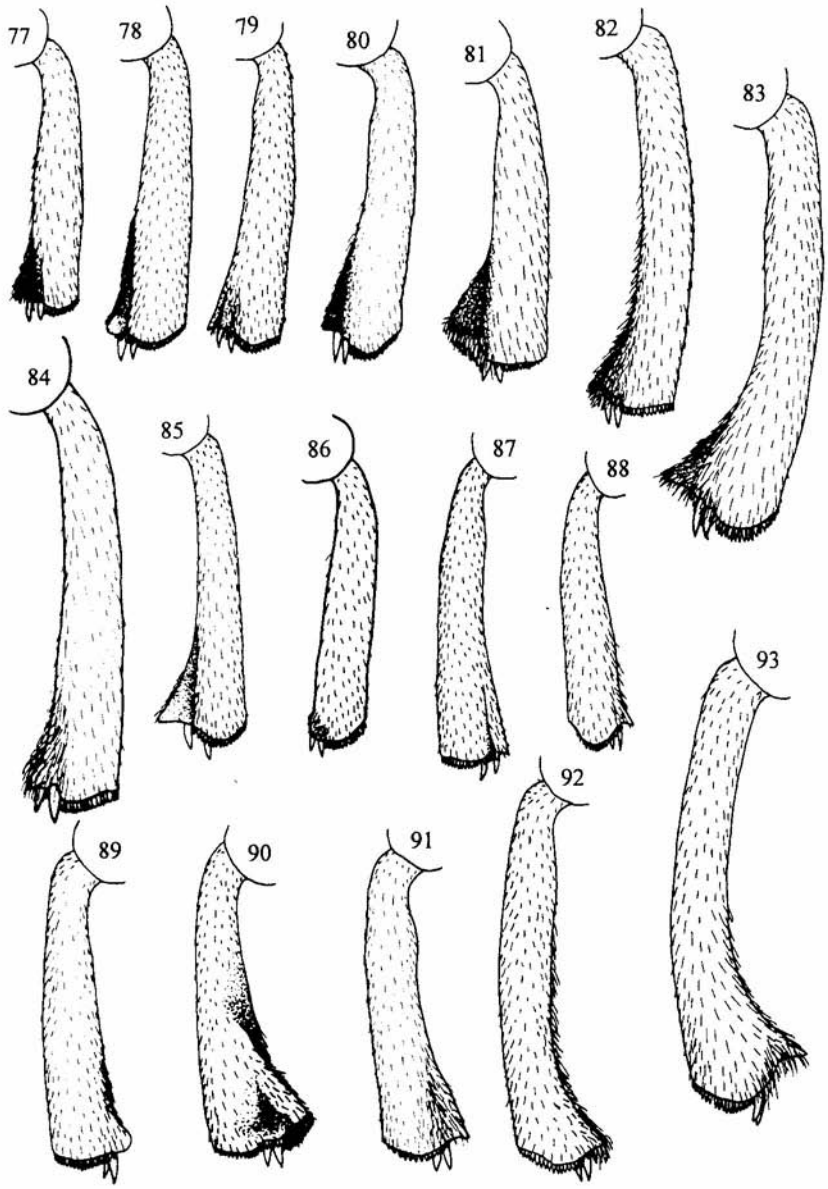




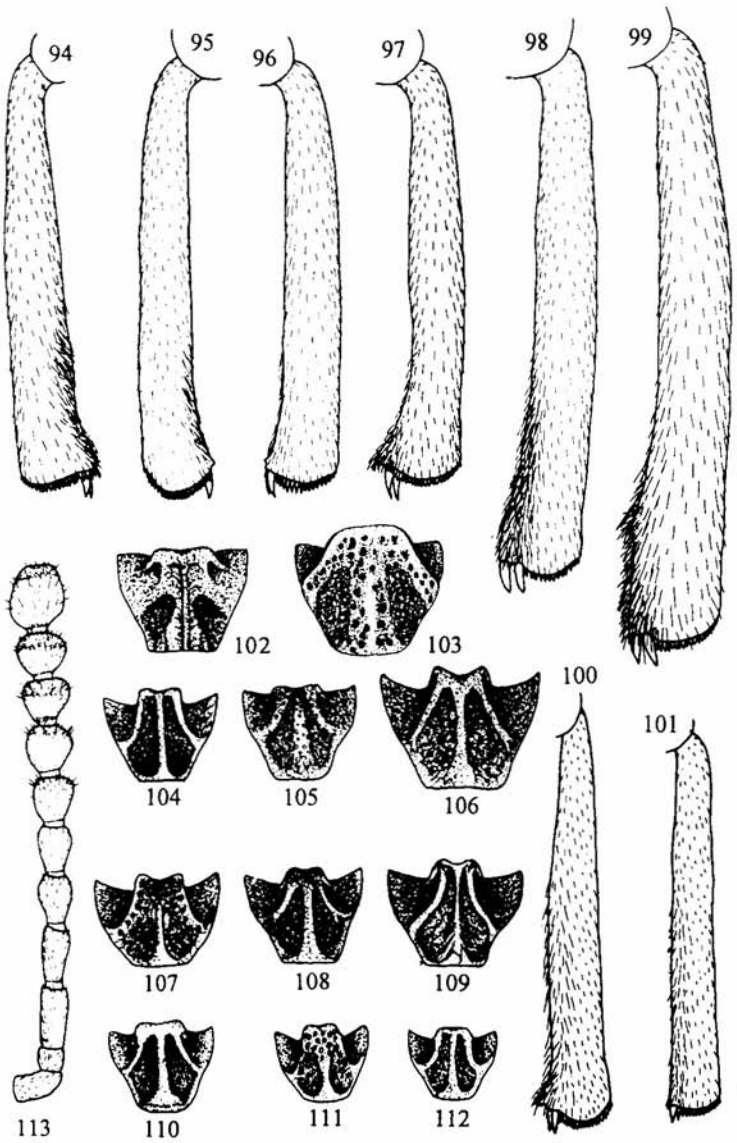
51-52 - wings: 51 - *Opatrinus minimus*, 52 - *Zidalus latipes*. 53-58 - male protibia, lateroventral view: 53 - *O. clathratus*, 54 - *O. insperatus*, 55 - *O. pullus*, 56 - *O. angustus*, 57 - *O. gibbicollis*, 58 - *O. minimus*



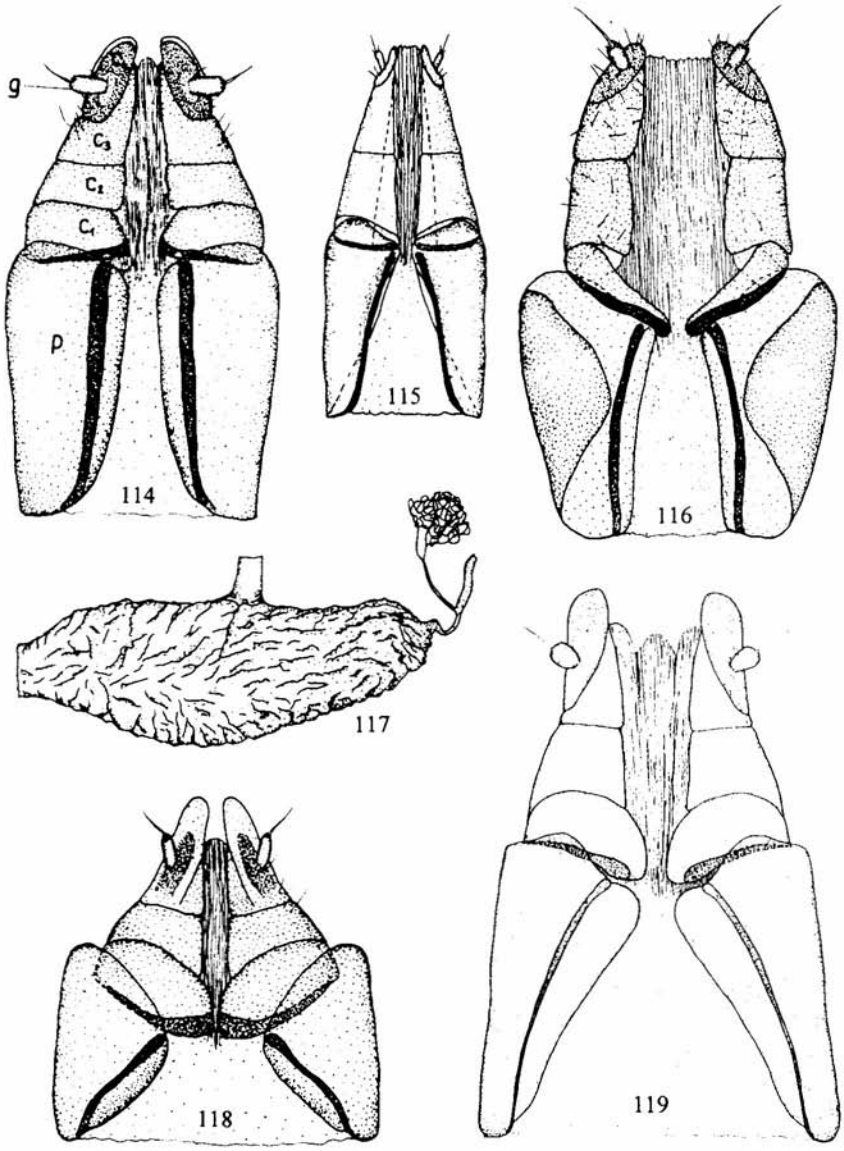
59-67 - male protibia, dorsal view: 59 - *Opatrinus acuticollis*, 60 - *O. girardi*, 61 - *O. moestus*, 62 - *O. pullus*, 63 -*O. angustus*, 64 - *O. minimus*, 65 - *O. gibbicollis*, 66 - *O. insperatus*, 67 - *O. clathratus*. 68-76 male protibia, ventral view: 68 - *O. girardi*, 69 - *O. moestus*, 70 - *O. acuticollis*, 71 - *O. insperatus*, 72 - *O. clathratus*, 73 - *O. gibbicollis*, 74 - *O. pullus*, 75 - *O. angustus*, 76 - *O. minimus*



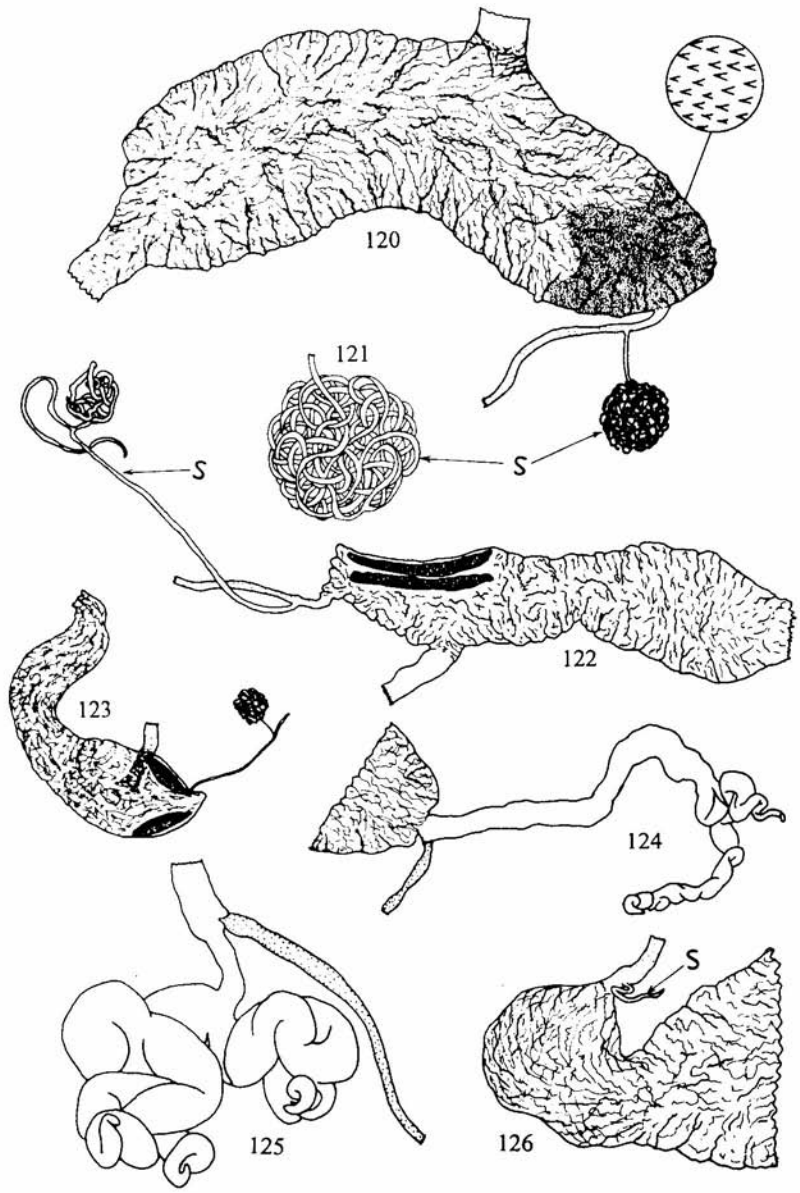
77-86 - male mesotibia, ventral view: 77 - *Opatrinus minimus*, 78 - *O. pullus*, 79 - *O. angustus*, 80 - *O. girardi*, 81 - *O. moestus*, 82 - *O. acuticollis*, 83 - *O. validus*, 84 - *O. clathratus*, 85 - *O. insperatus*, 86 - *O. gibbicollis*. 87-93 - male mesotibia, dorsal view: 87 - *O. angustus*, 88 - *O. minimus*, 89 - *O. pullus*, 90 - *O. moestus*, 91 - *O. girardi*, 92 - *O. acuticollis*, 93 - *O. validus*



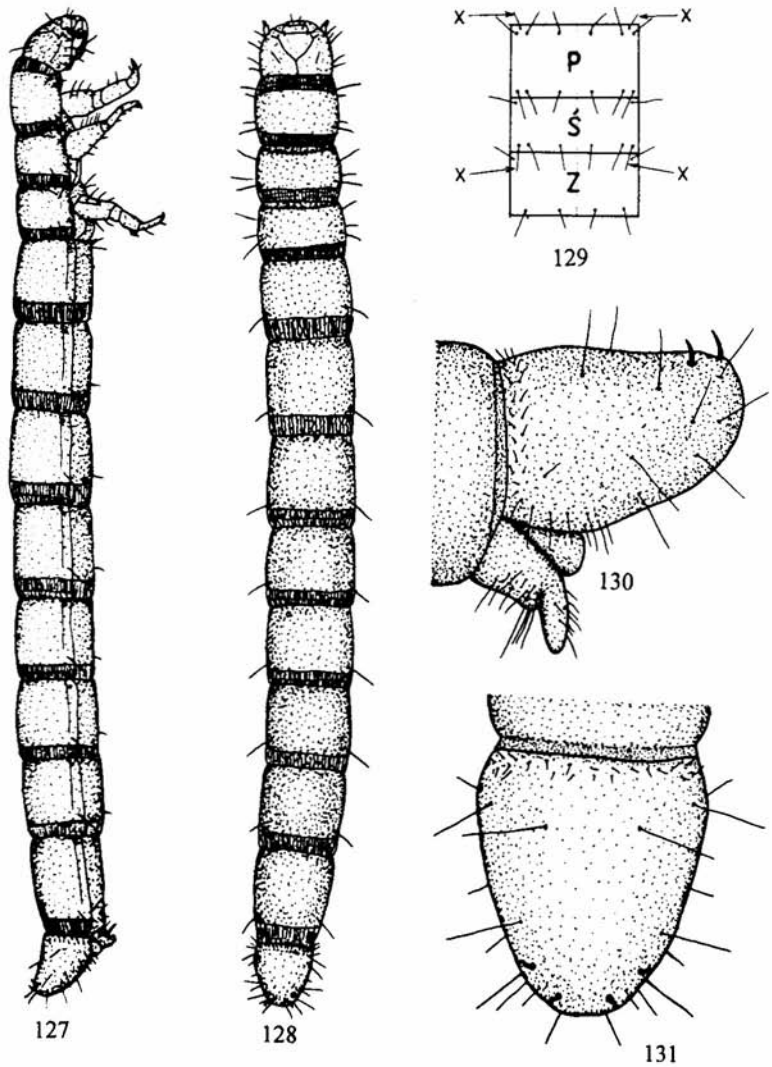
94-95 - male metatibia, ventral view: 94 - *Opatrinus moestus*, 95 - *O. girardi*. 96-101 - male metatibia, dorsal view: 96 - *O. girardi*, 97 - *O. moestus*, 98 - *O. angustus*, 99 - *O. validus*, 100 - *O. insperatus*, 101 - *O. clathratus*. 102-112 - mentum: 102 - *O. clathratus*, 103 - *Z. latipes*, 104 - *O. angustus*, 105 - *O. ecuadorensis*, 106 - *O. acuticollis*, 107 - *O. moestus*, 108 - *O. pullus*, 109 - *O. girardi*, 110 - *O. aciculatus*, 111 - *O. minimus*, typical form, 112 - *O. minimus*, population from Brazos (Texas). 113 - antenna, *O. angustus*



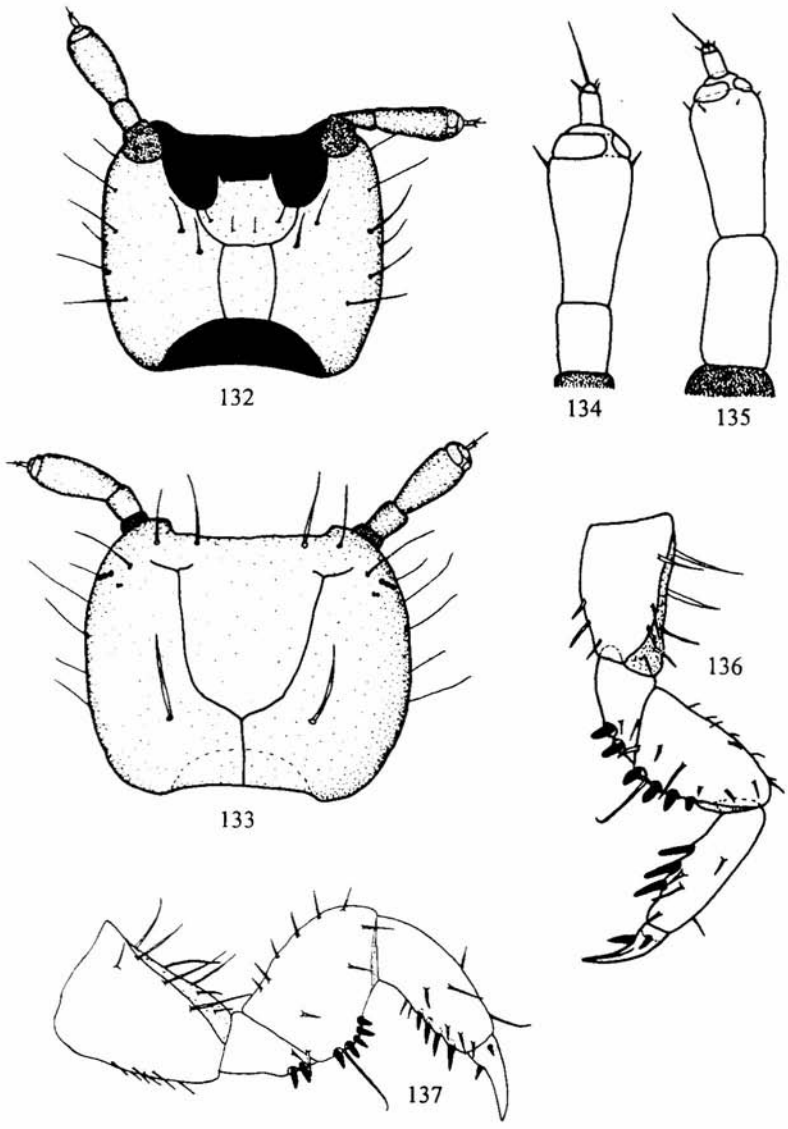
114-116, 118-119 - ovipositor: 114 - *Anchophthalmus variabilis* (C1, C2, C3, C4 - lobes of coxite, G - gonostylus, P -paraproct), 115 - *O*patrinus *gibbicollis*, 116 - *Zidalus latipes*, 117 - *O. gibbicollis*, primary bursa copulatrix and spermatheca, 118 - *Schelodontes mannerheimi*, 119 - *Platynotus punctatipennis*



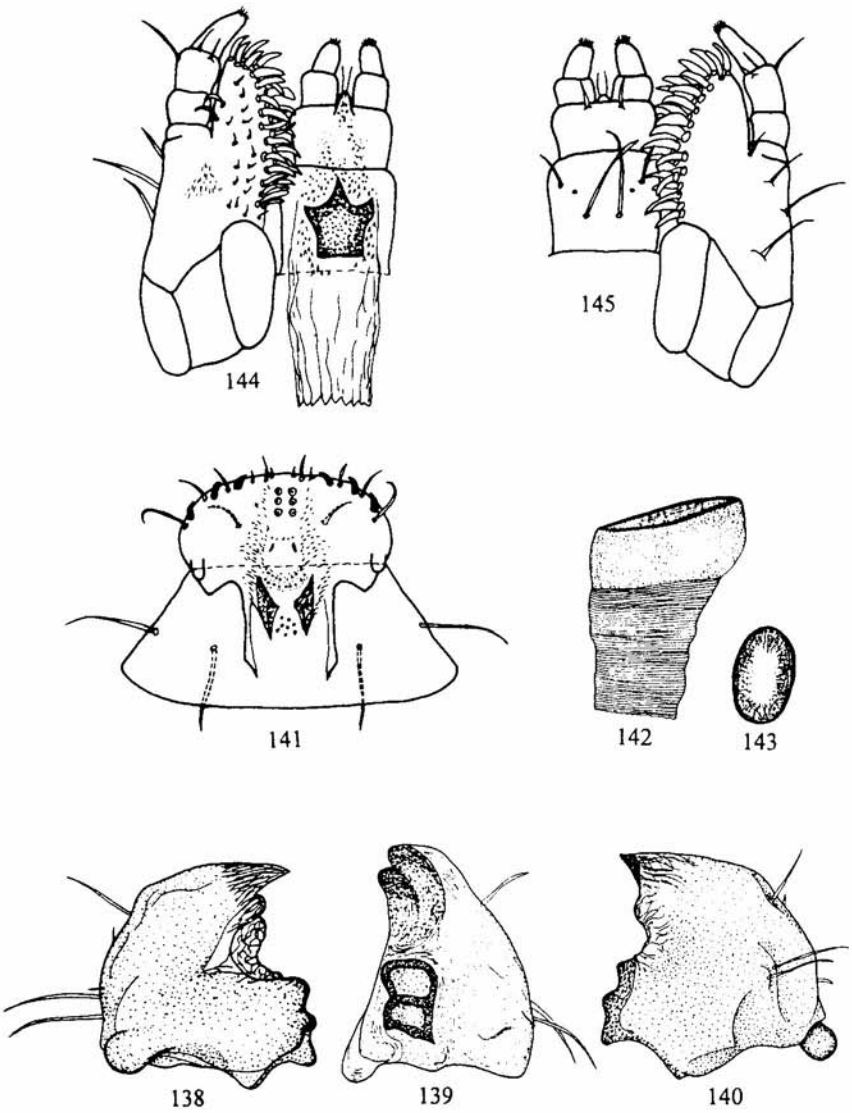
120-121 - *Opatrinus moestus*: 120 - primary bursa copulatrix and spermatheca (S), 121 - spermatheca. 122-123 - primary bursa copulatrix and spermatheca: 122 - *O. angustus*, 123 - *Zidalus latipes*. 124-125 - spermatheca: 124 - *Anchophthalmus variabilis*, 125 -*Platynotus punctatipennis*. 126 - *O. validus*, part of primary bursa copulatrix and spermatheca



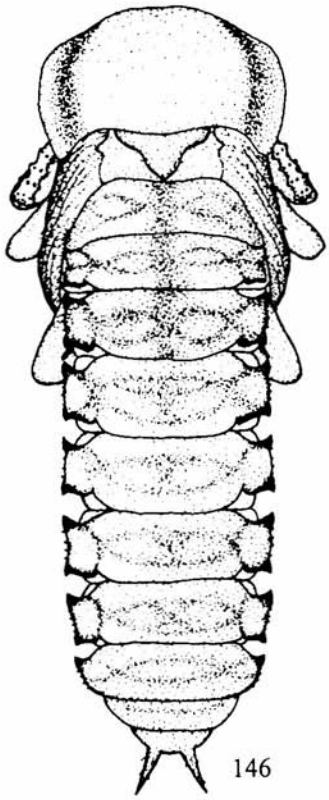
127-128 - larva of *Opatrinus gibbicollis*: 127 - lateral view, 128 - dorsal view. 129 - larva of *O. aciculatus*, chetotaxy of tergites of pro- (P), meso- (S) and metathorax (Z), additional lateral setae in larvae of erlier instars (X). 130-131 - *O. gibbicollis*, IX abdominal segment: 130 - lateral view, 131 - dorsal view

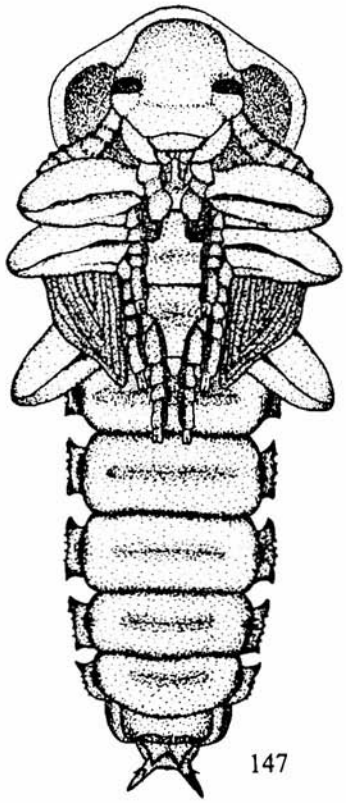


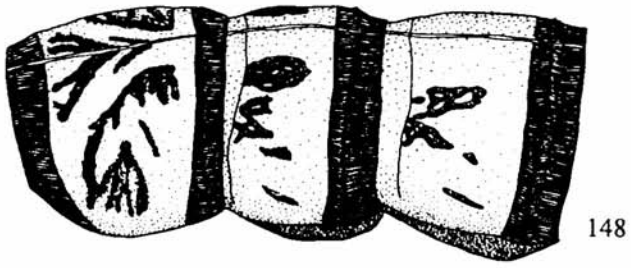
132-133 - larva of *Opatrinus gibbicollis*, head capsule: 132 - ventral view, 133 - dorsal view. 134-135 - larval antennae: 134 - *O. gibbicollis*, 135 - *O. aciculatus*. 136-137 - larval fore leg: 136 - *O. gibbicollis*, 137 - *O. aciculatus*



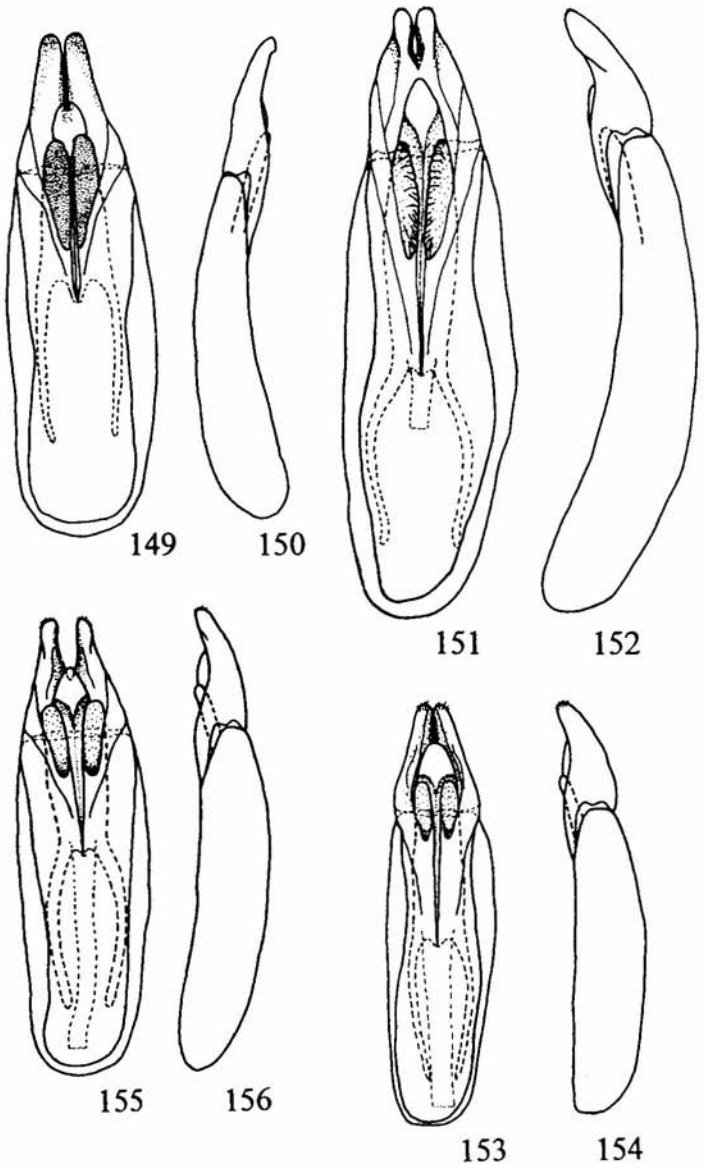
138-140 - larva of *Opatrinus gibbicollis*, left mandible: 138 - dorsal view, 139 - lateroventral view, 140 - ventral view. 141 -larva of *O. gibbicollis*, labrum. 142-143 - larva of *O. aciculatus*, spiracle: 142 - lateral view, 143 - dorsal view. 144-145 - larva of *O. gibbicollis*, maxilla and labium: 144 - dorsal view, 145 - ventral view



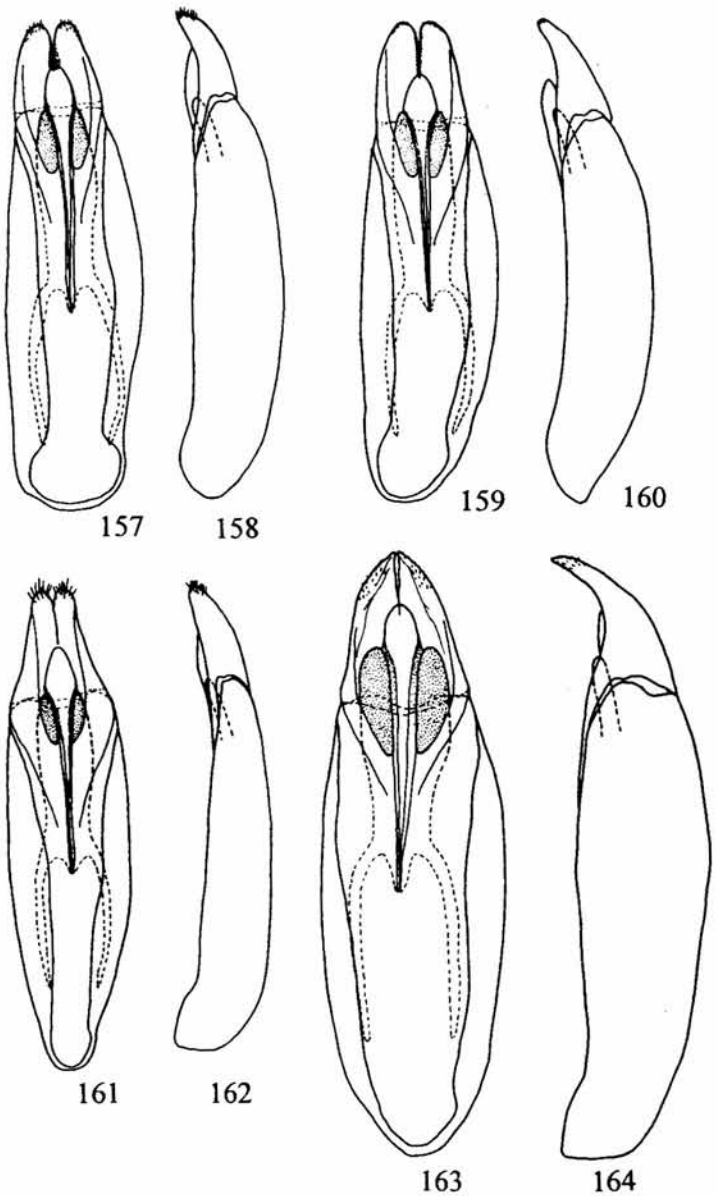




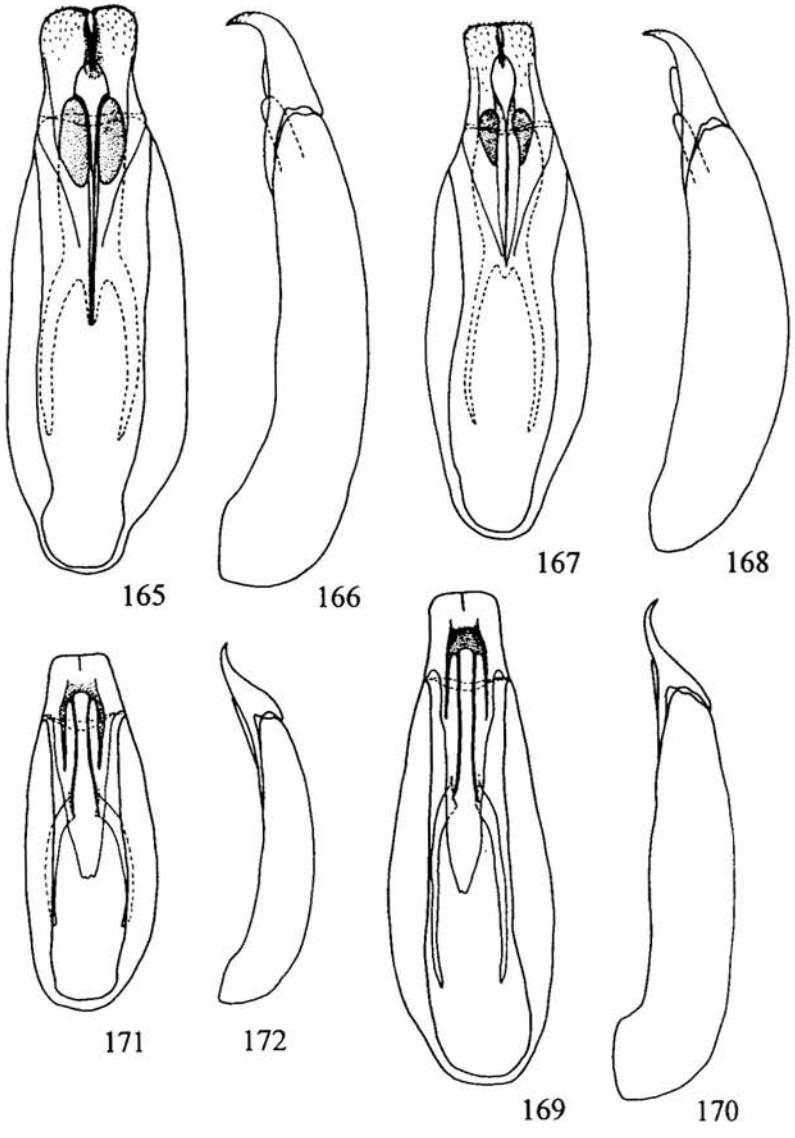
146-147 - pupa of *Opatrinus aciculatus*: 146 - dorsal view, 147 - ventral view. 148 - larva of *O. aciculatus*, thorax



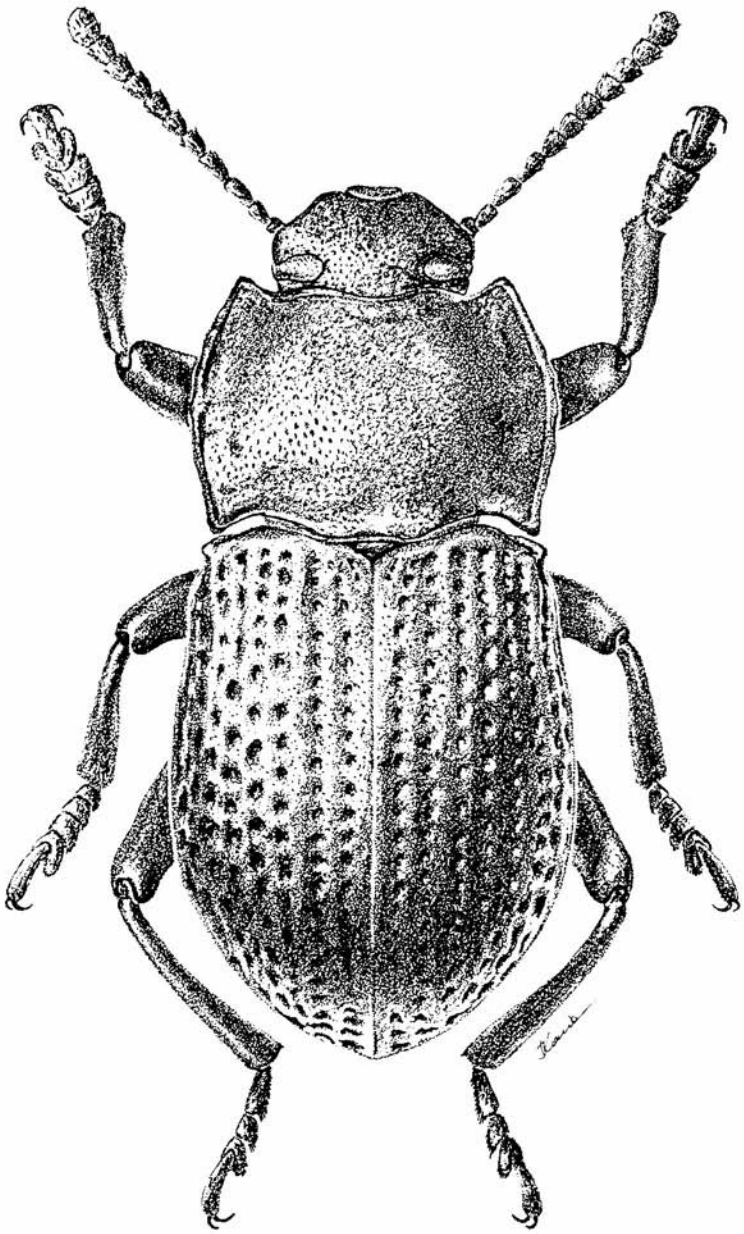
149-156. Aedeagus, ventral and lateral view: 149-150 - *Zidalus royi*, 151-152 - *Opatrinus clathratus*, 153-154 - *O. laticolis*, 155-156 - *O. gibbicollis*



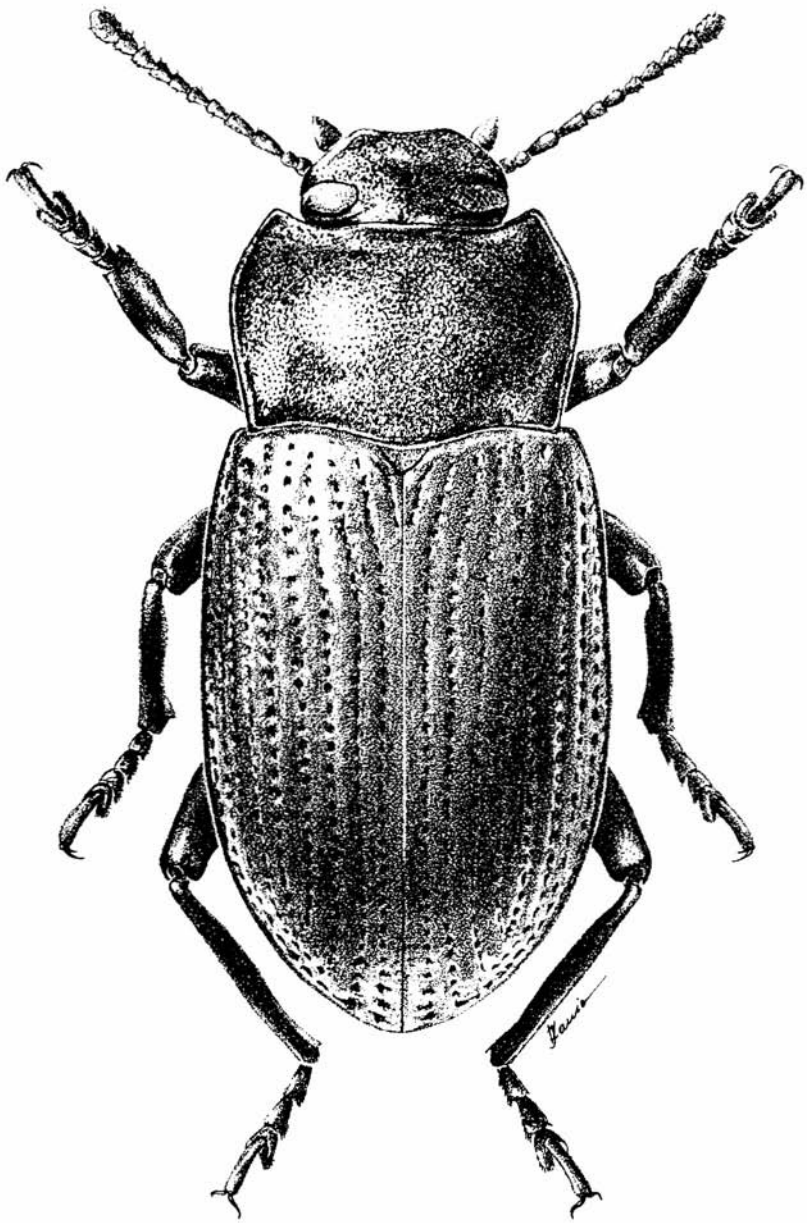
157-164. Aedeagus, ventral and lateral view: 157-158 - *Opatrinus minimus*, 159-160 - *O. pullus*, 161-162 - *O. ecadorensis*, 163-164 - *O. moestus*



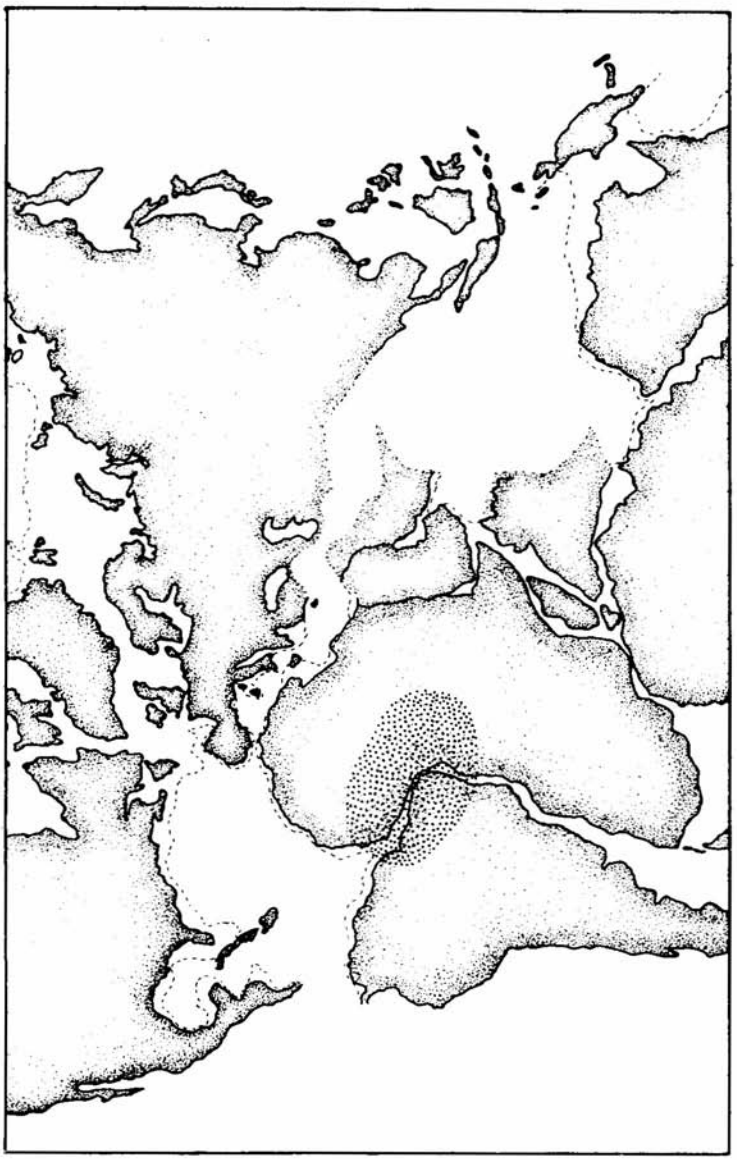
165-172. Aedeagus, ventral and lateral view: 165-166 - *Opatrinus angustus*, 167-168 - *O. girardi*, 169-170 - *O. validus*, 171-172 - *O. acuticollis*



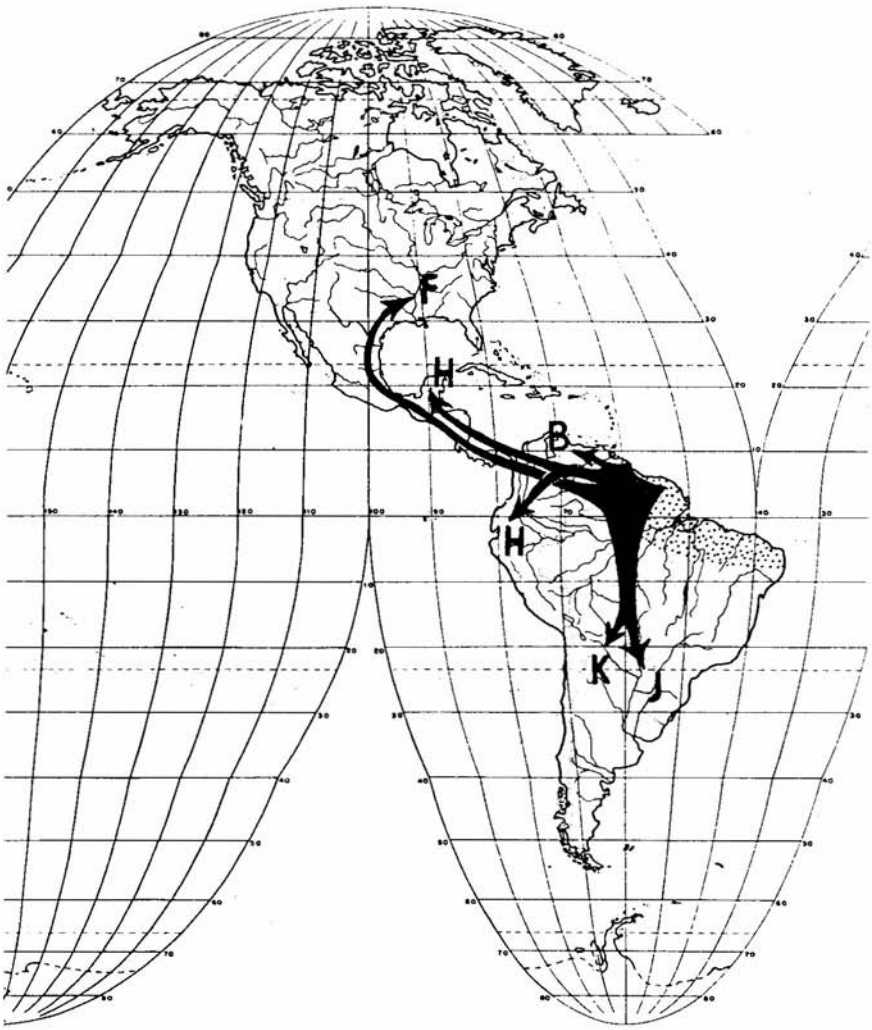
173. *Opatrinus clathratus*, female



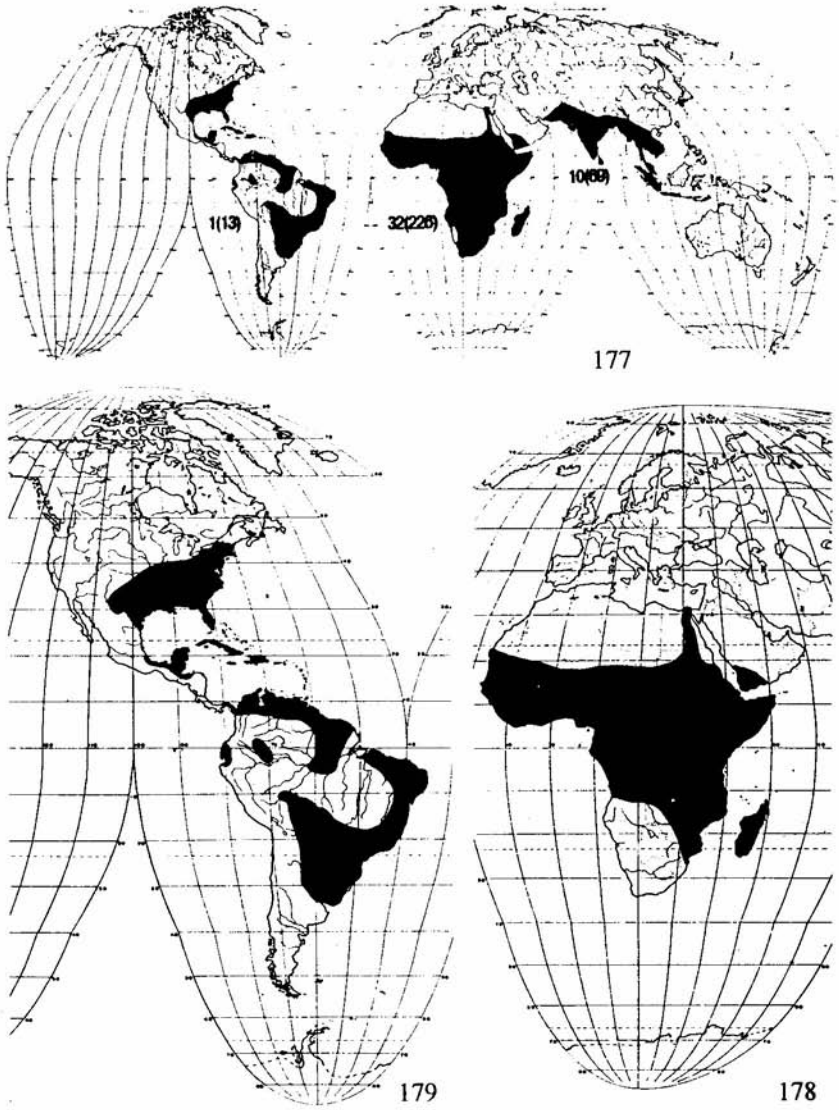
174. *Opatrinus girardi*, male



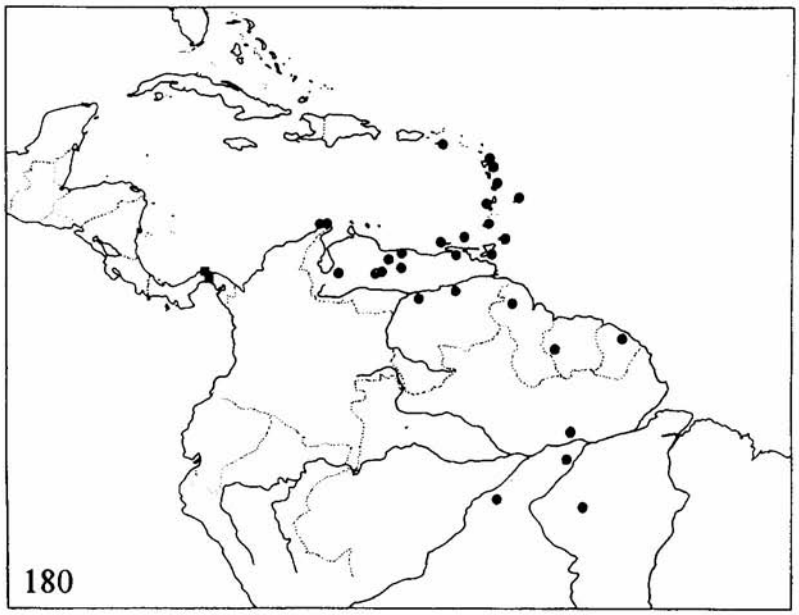
175. Hypothetical distribution area of Afrobrazilian ancestors of *Platynotini* in the Upper Cretaceous

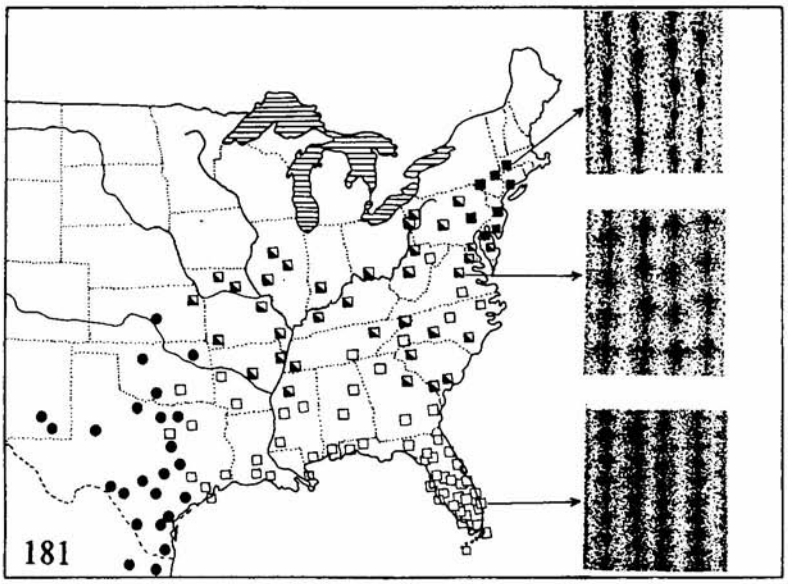


176. Migration routes of ancestors of the genus *Opatrinus* in the New World; B, F, H, J, K - evolutionary lines (see: Appendix 5, cladogram I)

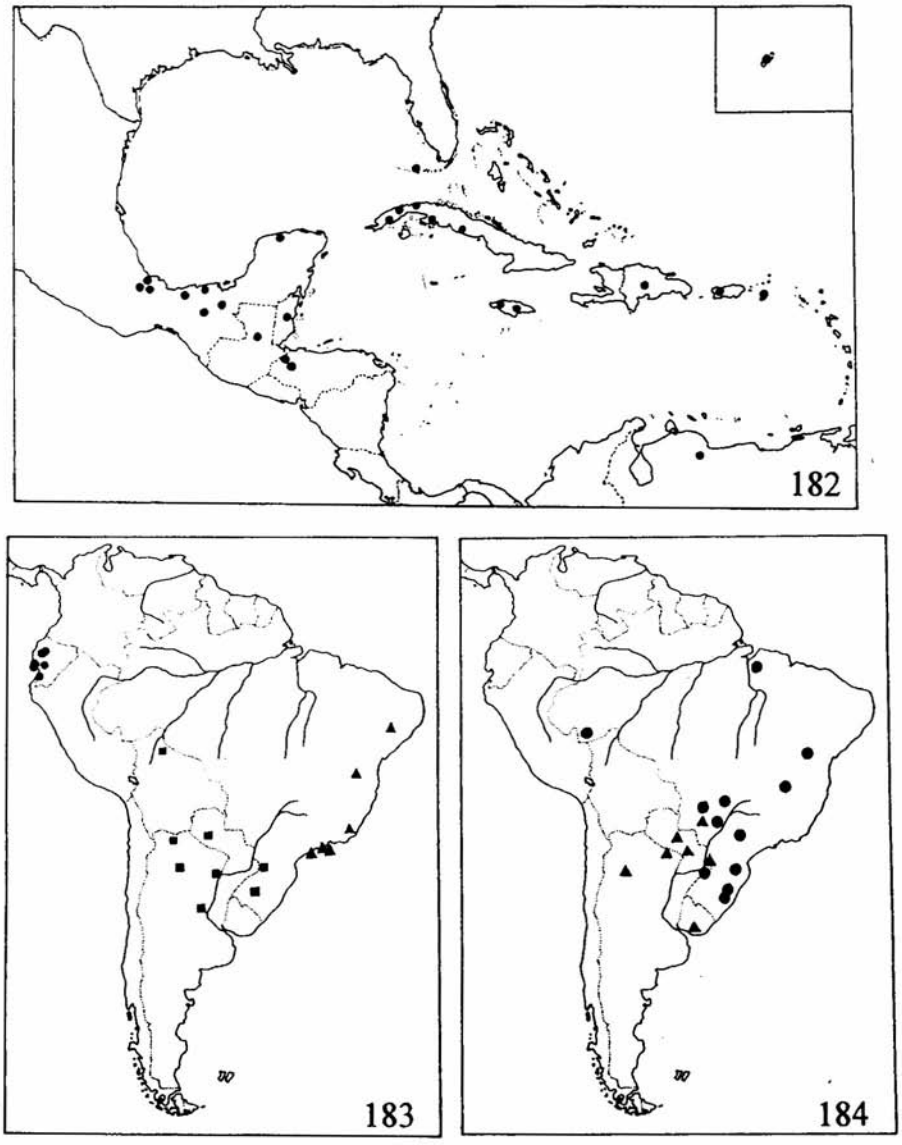


177. Distribution of the tribe *Platynotini* in the World; number of genera and species (in parenthesis) next to each continent. 178. Distribution of the genus *Zidalus*. 179. Distribution of the genus *Opatrinus*

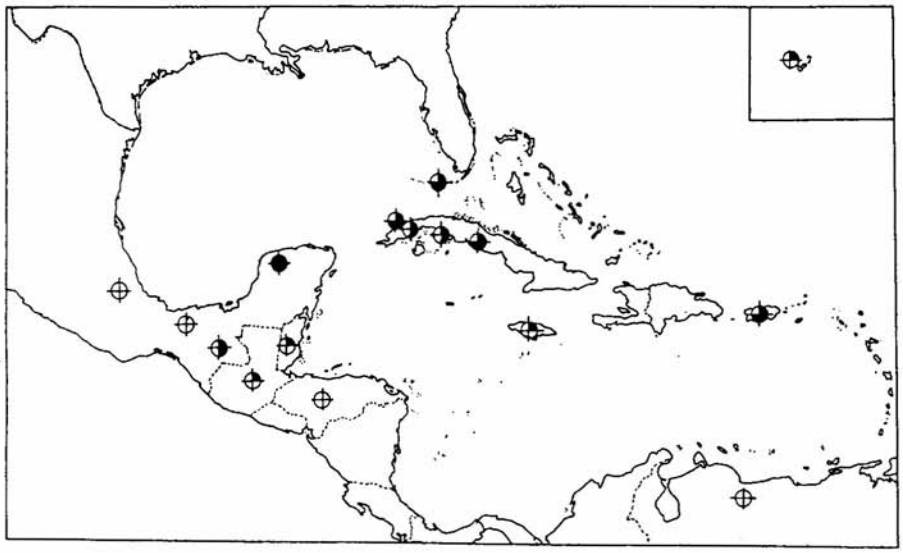




180. Distribution of *Opatrinus clathratus* (circle) and *O. gibbicollis* (square). 181. Distribution of *O. minimus* (squares - variation of elytral rows) and *O. aciculatus* (circle)

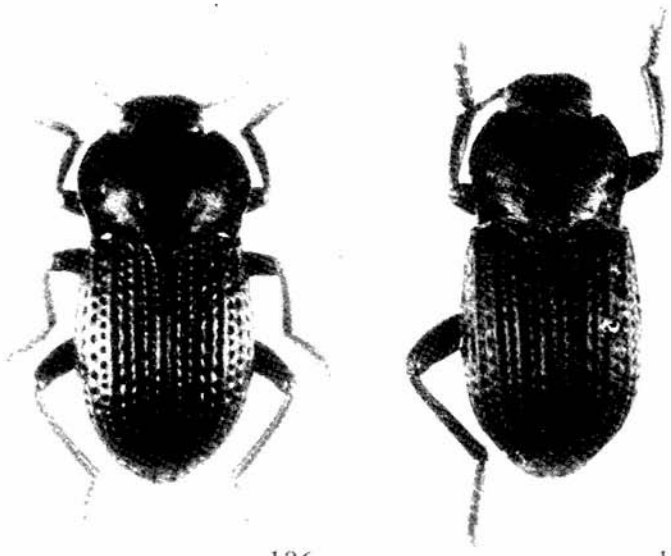


182. Distribution of *Opatrinus pullus*. 183. Distribution of *O. ecuadorensis* (circle), *O. angustus* (square) and *O. moestus* (triangle). 184. Distribution of *O. validus* (triangle) and *O. acuticollis* (circle)



185. Variation of the pronotal length in males of *Opatrinus pullus*

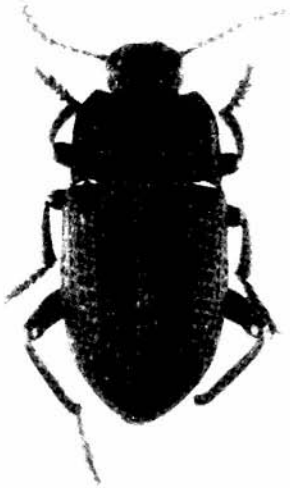
	n	avg	std
VENEZUELA	3	2.16	.05
MEXICO, Tabasco	5	2.19	.06
HONDURAS	3	2.21	.09
MEXICO, Veracruz	10	2.22	.08
BELIZE	19	2.32	.08
BERMUDA	7	2.32	.10
JAMAICA	12	2.34	.11
GUATEMALA	4	2.41	.06
MEXICO, Chiapas	6	2.45	.10
CUBA, Zapata	10	2.47	.10
CUBA, Guanajay	17	2.54	.09
PUERTO RICO	19	2.56	.11
CUBA, Cabanas	7	2.57	.14
FLORIDA	5	2.64	.08
CUBA, Trinidad	5	2.67	.11
MEXICO, Yucatan	7	2.78	.13



186 187

188 189

186-189. 186 - *Opatrinus clathratus*, 187 - *O. insperatus*, 188 - *O. laticolis*, 189 - *O. gibbicollis*



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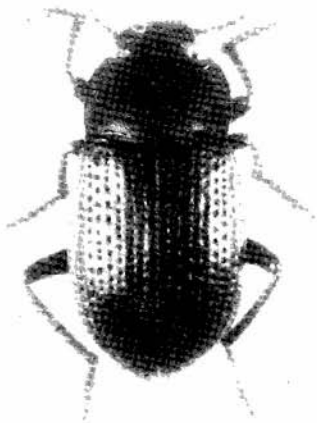

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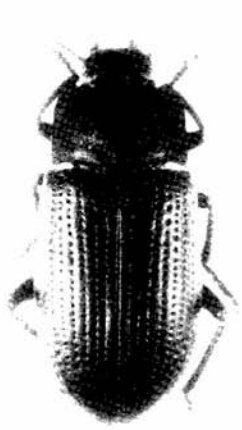
190-193. 190 - *Opatrinus minimus*, 191 - *O. aciculatus*, 192 - *O. pullus*, 193 - *O. ecuadorensis*



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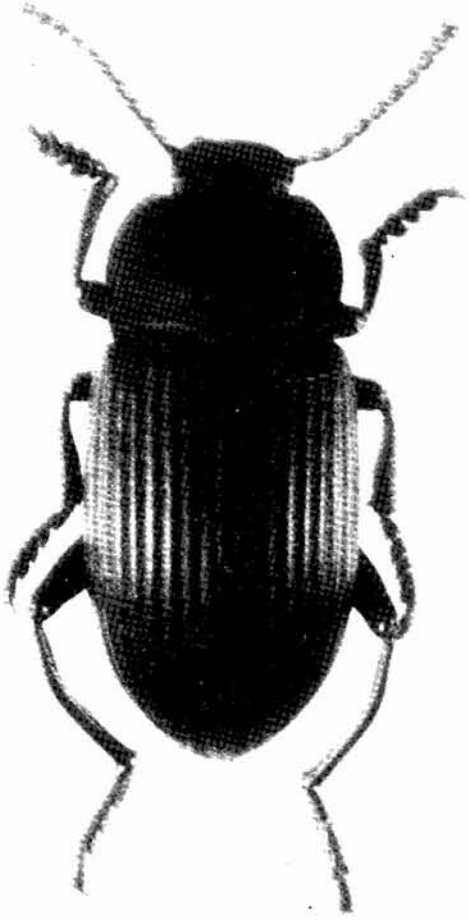
194-198. 194 - *Opatrinus angustus*, 195 - *O. moestus*, 196 - *O. acuticollis*, 197 - *O. validus*



198. *Zidalus latipes*