Revision of the Palearctic Species of the Myrmecophilous Genus *Pella* (Coleoptera, Staphylinidae, Aleocharinae)

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Abstract A biosystematic study of the Palearctic species of the myrmecophilous genus *Pella* (Coleoptera, Staphylinidae, Aleocharinae, Lomechusini, Myrmedoniina) is presented. The adult morphology of *Pella* is investigated into details in comparison with several other taxa of the Lomechusini. *Pella* is taxonomically revised, and is arranged as a distinct genus. *Myrmelia*, *Pellochromonia* and *Lepla*, formerly treated as subgenera of *Zyras*, are synonymized with *Pella*. Forty-one species including 15 new species (*Pella horii*, *P. kidaorum*, *P. cooterorum*, *P. jelineki*, *P. schillhammeri*, *P. kinomurai*, *P. primorskyiana*, *P. hlavaci*, *P. iberica*, *P. kishimotoi*, *P. coreana*, *P. plutenkoi*, *P. intermedia*, *P. masakoae*, *P. zhoui*) are recognised in the genus, arranged into 16 species-groups and redescribed/described with bionomical and host ant information. The following junior synonymies are proposed: *Zyras* (*Pella*) *micropterus* (=*P. jureceki*), *Z.* (*P.*) *almaatensis* (=*P. bohaci*), and *Z.* (*P.*) *esau* (=*P. cinctipennis*). Seven species are excluded from *Pella*, newly assigned to the other genera/subgenera and redescribed. They are: *Zyras* (*Zyras*) *coloratus*, *Z.* (*Z.*) *iridescens*, *Z.* (*Z.*) *quasar*, *Z.* (*Glossacantha*) *ceylonicus*, *Z.* (*G.*) *reelsi*, *Myrmoecia urartu*, and *Dvorakatheta wrasei* (n. gen.). Life cycles and behaviour of the Japanese species of *Pella* are shortly reported based on the field and laboratory observations.

INTRODUCTION

The myrmecophilous beetle genus *Pella* Stephens, 1835, belonging to the subtribe Myrmedoniina of the tribe Lomechusini (family Staphylinidae, subfamily Aleocharinae) is represented by about 30 named species described from the Palearctic region. They are about 3.5 to 7.0 mm in long and associated with ants of the genera *Lasius* Fabricius, 1804; *Formica* Linnaeus, 1758; *Tapinoma* Foerester, 1850; *Liometopum* Mayr, 1861; and *Crematogaster* Lund, 1831. Most of them are inquilines of *Lasius* (*Dendrolasius*) ants. Several species have been known as scavengers in hosts' nests or predators on host workers (Yasumatsu, 1937; Kistner, 1972; Hölldobler *et al.*, 1981).

Pella beetles have been studied by several researchers from different points of view, especially because of their myrmecophily. However, our current knowledge of *Pella* mainly consists of scattered descriptive works. On the other hand, myrmecophilous insects have recently been attractting attention of researchers as material for studies on host-inquiline relationships and coevolution, and works using modern methods have been published (Axen, 2000; Elmes *et al.*, 1999; Akino, 2002; Fraser *et al.*, 2002; Schönrogge *et al.*, 2002; Pierce *et al.*, 2002, etc.). Because the *Pella* beetles are among the commonest myrmecophiles in their distributional areas,

they are very useful for the study of biology of myrmecophily. A comprehensive systematic study of the beetles, therefore, would contribute to forward the study of myrmecophily, and the present study has been carried out in this perspective, dealing with morphology, taxonomy and bionomics of the *Pella* beetles.

MATERIALS AND METHODS

Material from Institutions and Private Collections

The majority of species of *Pella* were originally described without details useful for distinguishing them, especially among closely related species. Therefore, examination of type series is necessary for reliable identification. Fortunately, the type specimens of most *Pella* species were accessible through loans or visits to museums or personal collections.

Most of the other specimens examined were collected by some colleagues and myself. In addition, an amount of unidentified material from areas to which I was unable to have access for this study was supplied from some institutional or personal collections.

Depositories of the type specimens examined and the other specimens studied are as follows.

Institutions:

BMNH — The Natural History Museum, London (M. Brendell).
CNC — Canadian National Collection of Insects, Agriculture and Agri-food Canada, Ottawa, Ontario (A. Davies).
CNU — Department of Biology, Chungnam National University, Daejeon (K.-J. Ahn).
DEI — Deutsches Entomologisches Institut, Müncheberg (L. Zerche).
EEEU — Laboratory of Environmental Entomology, Ehime University, Matsuyama (N. Ohbayashi, M. Sakai).
HUM — The Hokkaido University Museum, Sapporo (M. Ôhara).
IBSS — Institute of Biology and Soil Science, Vladivostok (V. Kuznetsov).
IRSNB — Institut Royal des Sciences Naturelles de Belgique, Bruxelles (D. Drugmand).
IZAS — Institute of Zoology, Academia Sinica, Beijing (H.-Z. Zhou).
MHNG — Muséum d'Histore Naturelle, Genève (G. Cuccodoro).
MHNL — Muséum d'Histore Naturelle, Lyon (M. Virgile).
MNHN — Muséum national d'Histore Naturelle, Paris (T. Deuve).
NHMW — Naturhistorisches Museum Wien (H. Schillhammer).
NHRS — Naturhistoriska riksmuseet, Stockholm (B. Viklund).
NMEG — Naturkundemuseum Erfurt, Erfurt (M. Hartmann).
NMP — Národní Muzeum v Praze (J. Jelínek).
MNV — Museo Civico di Storia Naturale di Verona (A. Zanetti).
NSMT — National Science Museum, Tokyo-to (S. Nomura).
SCM — Sagamihara City Museum, Sagamihara (H. Moriya).
SEHU — Systematic Entomology, Hokkaido University, Sapporo (K. Yoshizawa).
TUA — Tokyo University of Agriculture, Atsugi, Kanagawa (S. Okajima).
ZMHB — Museum für Naturkunde der Humboldt-Universität, Berlin (M. Uhlig, J. Frisch).

Private collections:

cAss — Volker Assing (Hannover, Germany).
cDvor — Miroslav Dvořák (Praha, Czech Republic).
cHlav — Peter Hlaváč (Košce, Slovakia).
cMar — Munetoshi Maruyama (Tokyo-to, Japan).
cRoug — Guilliame de Rougemont (Londinières, France).
cSch — Michael Schülke (Berlin, Germany).

Material whose depository is not indicated belongs to my collection (cMar), SEHU, HUM and NSMT, or non-type material of common species that are represented by more than 50 specimens in the present study. Paratypes of some new species to be described in this paper and identified specimens of common Japanese species will be distributed to the collections above.

Specimen Data

Specimen data is in many cases not followed the original spellings written on label but corrected for more precise and detailed data. But in the case of type material, and in the case of old specimens, *e.g.*, which was collected before the beginning of 1900's and was historically important, the original spellings on the label were transcribed.

All the types of *Pella* described by Gravenhorst (1802, 1806) and Märkel (1842, 1845) deposited in ZMHB are labelled not any detailed data but a catalogue number. However, more detailed data are separately described in "Catalog. General. Musei Zoologici Berolinen" housed in the museum, and based on which actual data are transcribed in square brackets in Type material.

All the type specimens studied in the present paper are labelled, "HOLOTYPE [or, SYNTYPE, LECTOTYPE, PARALECTOTYPE, PARATYPE] *Myrmedonia*…[name of species, author and year in the original description] det. Maruyama, 200.. [year of examination]".

Collecting

I investigated more than 120 nests of *Lasius* ants in Japan (Hokkaidô, Honshû, Shikoku), Korea, the Russian Far East and Slovakia, and collected about 7,000 specimens of *Pella*.

Pella beetles are usually abundant in the hosts' nests, above all in the nests of the main host ants *Lasius* (*Dendrolasius*) spp. They also walk around the nests and columns (see, Chapter 3). Therefore, the most effective collecting method is to sift dead leaves around the nest and columns using a sieve and a white tray. Beetles dropped on the white tray should immediately be aspirated. Another method, which was sometimes adopted, is pitfall traps that were set around the nest by the use of plastic cups. Beetles collected were transferred to a tube with a piece of cotton paper and a small quantity of ethyl acetate and were left in the tube for half a day. The killed insects were mounted each on a piece of paper card. Some beetles were kept alive for rearing.

Dissecting and Drawing

Dried or ethanol-preserved specimens were used for morphological observations. Dissection was made for observation of mouthparts and genital parts (abdominal terminalia), and dried specimens were softened before dissection by warming (60°C, 30–60 min.) each in a small ceramic bowl (2.5 cm in diameter) with a small amount of water.

Then the specimens were dissected in water under a high magnification stereomicroscope

(Olympus SZ-40, ×6.7–80). Eighth to 10th abdominal segments were removed and dissected for most specimens.

Mouthparts of some specimens were dissected: a sharp needle was thrust into the gular plate posterior to the mentum to destroy the muscular attachment of the mouthparts and to remove the mentum, labium, labrum, and maxilla from the head.

These body parts were soaked in warm 5–8% solution of potassium chloride (60°C, 20–60 min), cleaned in 30% ethanol (5 min) and dehydrated in 99% ethanol (5 min). When necessary, mouthparts were stained in a warm mixture of acetic fuchsine (5%) and lactic acid (60°C, 60–120 min) before cleaning. The dehydrated material was mounted in Euparal (Chroma-Gesellschaft) on a slide glass card, which was pinned under the insect from which the parts were removed (Maruyama, 2004).

Spermatheca was drawn in water before mounting in Euparal because it was usually transshaped by the osmotic pressure of the medium.

A transmission microscope (Olympus BH2, ×20–600, with a drawing device, or ocular mesh) was used for observations of microstructures and line drawings.

Drawing of forebody and antenna of each species was made under the stereomicroscope above-mentioned by the use of ocular mesh set in eyepiece. For drawings of antenna, 1st and 2nd segments were drawn in dorsal view, and 3rd to 11th segments were drawn in lateral view.

Symbiotic Hosts

Symbiotic hosts were mostly identified by myself and some by V. Assing, F. Ito and K. Kinomura. The scientific names of ants generally follow Bolton (1995), but those of *Dendrolasius* ants follows Radchenko (2005) and Maruyama (2005). *Lasius* (*Dendrolasius*) *fuji* was formerly recognised as the eastern Palearctic population of *Las.* (*D.*) *fuliginosus*, and was erroneously assigned to "*Las.* (*D.*) *nipponensis*" by Espadaler *et al.* (2001).

The species name of symbiotic hosts are abbreviated in "Type material" and "Other material" as follows: *FP*, *Formica pratensis* Retzius, 1783; *LCAF*, *Lasius* (*Cautolasius*) *flavus* (Fabricius, 1782); *LCHU*, *Las.* (*Chthonolasius*) *umbratus* (Nylander, 1846); *LCH*, *Las.* (*Ch.*) sp.; *LDC*, *Las.* (*Dendrolasius*) *capitatus* (Kuznetsov-Ugamsky, 1927); *LDFJ*, *Las.* (*D.*) *fuji* Radchenko, 2005; *LDFL*, *Las.* (*D.*) *fuliginosus* (Latreille, 1798); *LDN*, *Las.* (*D.*) *nipponensis* Forel, 1912; *LDO*, *Las.* (*D.*) *orientalis* Karawajew, 1912; *LDS*, *Las.* (*D.*) *spathepus* Wheeler, 1910a; *LL*, *Las.* (*Lasius*) sp.; *LLB*, *Las.* (*Lasius*) *brunneus* (Latreille, 1798); *LLJ*, *Las.* (*Las.*) *japonicus* Santschi, 1941; *LM*, *Liometopum microcephalum* (Panzer, 1798); *TE*, *Tapinoma erraticum* (Latreille, 1798).

Terminology and Abbreviations

Terminology of morphology used in this study follows Blackwelder (1936), Sawada (1970a, 1972, 1974), Yosii & Sawada (1976), Naomi (1987a, 1987b, 1988a, 1988b, 1988c, 1988d, 1989a, 1989b, 1989c, 1989d, 1990, 1997) and Hanley (2002). Numbers of setae, macrosetae, pores, and campaniform sensilla are confined to one body side, except for the pseudopores of the prementum and the pores of the medial pore field of epipharynx.

All measurements in the text are given in millimetres, and the following abbreviations are used for measurements: AL, antennal length; BL, body length, approximate whole length; EL, eye length, major axis; ELL, elytral length; ELW, elytral width; FBL, fore body length, from apex of clypeus to posterior margin of elytra; HL, head length, from apex of clypeus to the posterior

margin of head capsule, except for preocciput; HTL, length of hind tibia; HW, head width; PL, pronotal length; PW, pronotal width.

Collecting methods are abbreviated as follows: fit, flight interception trap; pt, pitfall trap; tt, truck trap.

Rearing

Rearing was made, above all, for observing immature stages in ant-free environment. Some beetles were reared with ant colonies (without queen) for observing their behaviour in the presence of ants. The reared beetles belong to *Pella humeralis*, *P. funesta*, *P. comes*, *P. socia*, *P. kidaorum*, *P. japonica*, *P. kinomurai*, *P. lugens*, *P. masakoae*, *P. spreta*, *P. laticollis*, and *P. indiscreta*.

Five to ten adult beetles were kept in a plastic box (L18 cm×W9 cm×H4.5 cm), which was bedded with mixture of peat moss and soil for gardening and provided with some small pieces of tree bark on the soil as shelters for beetles. The peat moss was used for preventing fungus growth and keeping moisture of the soil. The box was placed in room air temperature (18–25°C). Both adults and larvae were fed with dead worker ants of *Lasius* (*Dendrolasius*) *fuji* or *L.* (*D.*) *spathepus*, which had been preserved in a freezer.

CHAPTER 1. MORPHOLOGY

This chapter describes the general external morphology of the adult *Pella* beetle in comparison with other lomechusine species.

The tribe Lomechusini is composed of two subtribes the Lomechusina and Myrmedoniina, and more than 200 genera and subgenera from throughout the world (Maruyama, in prep.). In the Myrmedoniina the following species have been examined: *Zyras* (s. lat.) spp., *Pedinopleurus* spp., *Diplopleurus* spp., *Tetrabothrus* spp., *Orphnebius* spp., *Drusilla* spp., *Amaurodera* spp. and *Apteranillus* spp.; in the Lomechusina: *Lomechusa* spp., *Lomechusoides* spp. and *Xenodusa* spp. These species are referred to only by their generic names when character states are almost same within each of the genera. Other species lacking tribal status are all members of the Lomechusini.

In the subfamily Aleocharinae, only a few works which study detailed morphology of whole body are known. The present study is expected to be one of the frameworks of morphological study of the Aleocharinae.

General Structure

Body shape

The body shape (Fig. 1) in *Pella* species is slender or somewhat robust, more or less depressed above, and medium to large sized among aleocharine taxa. The body shape is highly generalised in spite of its myrmecophily, i.e., non-limuloid, non-myrmecoid and lacking trichome or large secretary gland, and thus it is not very different from that of free-living aleocharines living in soil or under bark. However, somewhat wide pronotum in *Pella* species is common to many myrmecophilous aleocharines and indicative of their myrmecophily, though it is homoplastic states sometimes observed in non-myrmecophilous aleocharines, *e.g.*, *Aleochara* spp. and *Oxypoda* spp.

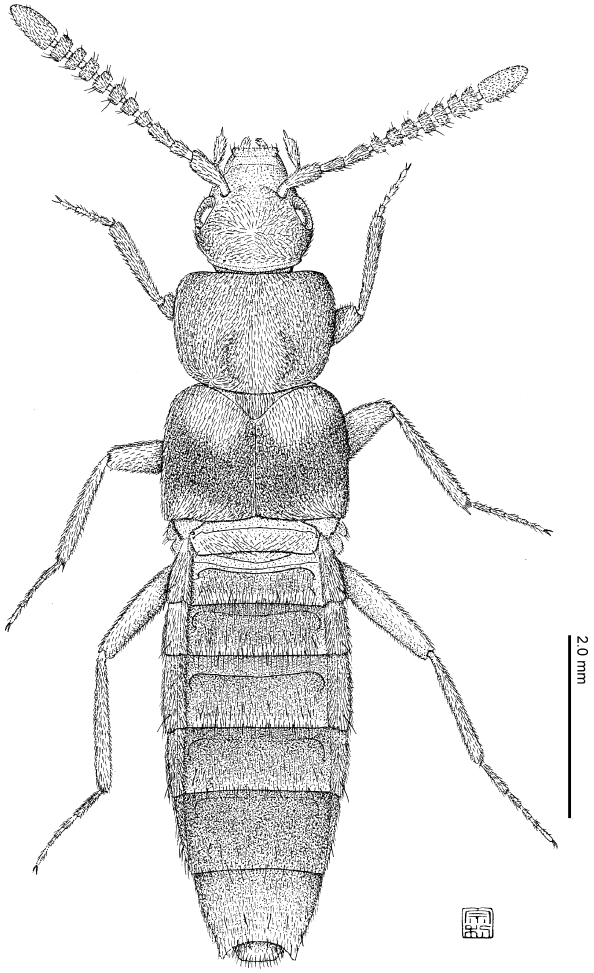

Fig. 1. *Pella limbata* (Paykull). Habitus.

Colour

The ground colour in *Pella* species is usually pale brown to black, but exceptionally the pronotum of *P. ruficollis* is reddish orange. In colour or colour pattern, the members of the *funesta* group and *P. ruficollis* are very similar to their host ants, *Lasius* (*Dendrolasius*) spp. and *Liometopum microcephalum*, respectively. Most ants have been known to secret repellent substances or to be capable of stinging against enemies, and most predacious animals avoid ants (Blum & Herman, 1978). Thus, it has been suggested that these colour patterns are their Batesian mimicry to the host ants, and it was currently proven by experiments using a predator of ants, *Hyla japonica* Günther, 1858 (Japanese tree-frog) (Taniguchi *et al.*, 2005).

Body hairs

The body of *Pella* species is covered mainly with two kinds of hairs, the seta and the macroseta, which can be clearly distinguished. The seta is white or yellow, narrower than the macroseta and usually recumbent. The macroseta is black, stout and suberect. However, in the *coreana* group, the macrosetae are poorly differentiated from the setae in length and colour.

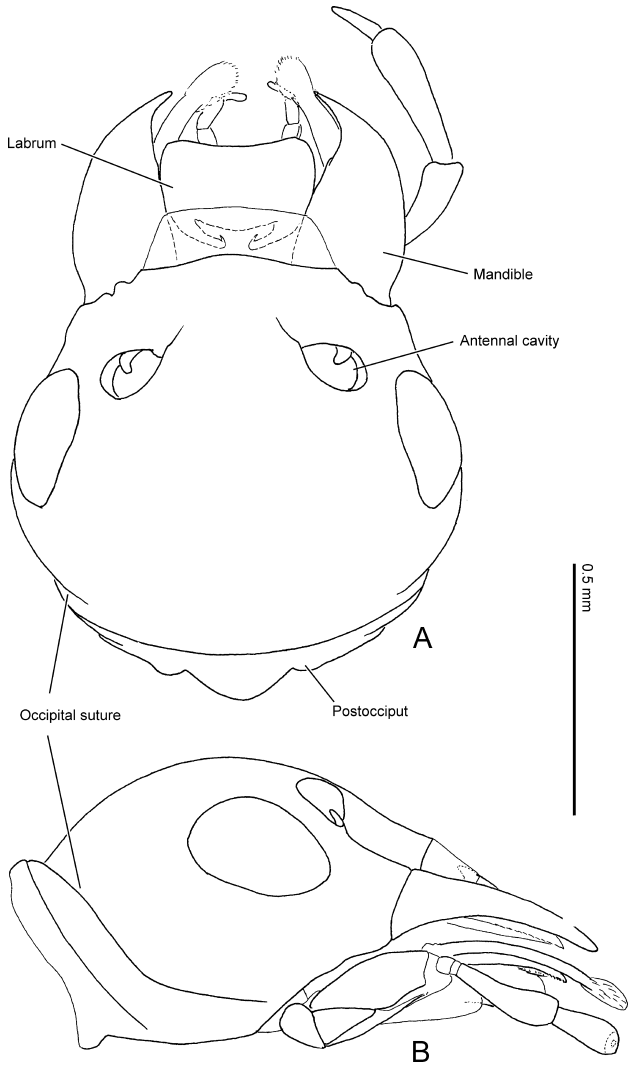

Fig. 2. *Pella limbata* (Paykull). — A, Head, dorsal view; B, head, lateral view.

Some kinds of secondary hairs are observed on the surface of hindwing, the scutoscutellar suture (Fig. 8 B) and the apex of female 8th sternite (Fig. 11 H) in some species, and they are referred to as pubescence or sensory setae.

Head

Head capsule

The head capsule (Figs. 2A, 2B, 3A) in *Pella* species is almost circular in dorsal and ventral views, wider than long, and convex dorsally around middle or posterior part. These states are commonly observed in most lomechusines and other aleocharines. In some species, head capsule is depressed above, especially in male.

Occipital suture. The occipital suture (Figs. 2 A, 2 B, 3 A) is well developed in *Pella* and

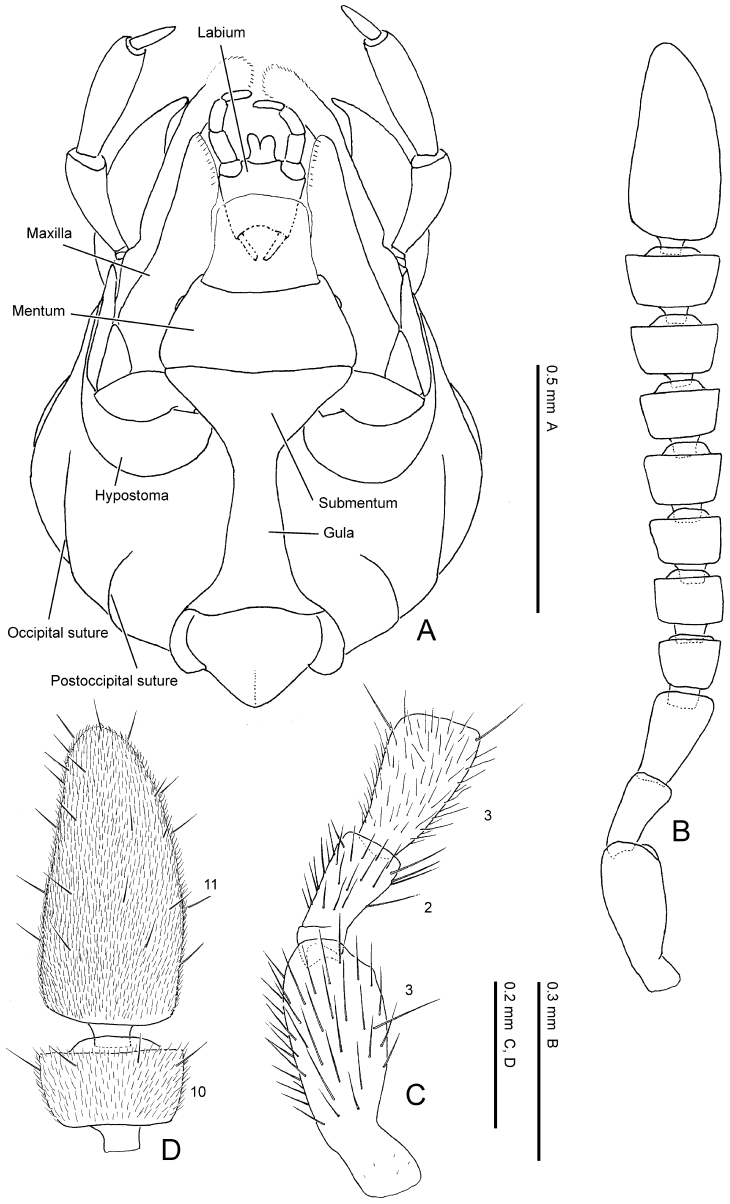

Fig. 3. *Pella limbata* (Paykull).—A, Head, ventral view; B, antenna, dorsal view; C, 1st to 3rd segments of antenna, dorsal view; D, 10th and 11th segments of antenna, dorsal view.

extends from the ventro-lateral part of the head to near the posterior articulation of the hypostoma. This character state is observed in most aleocharine tribes.

Postoccipital suture. The postoccipital suture (Figs. 2 A, 3 B) is in a generalised state in *Pella* species as in most aleocharines, and "neck" is not observed. In some genera of the Myrmedoniina, *e.g.*, *Drusilla, Tetrabothrus* and *Orphnebius*, postoccipital suture is strongly constricted to form a "neck".

Eyes

The compound eye (Figs. 2 A, 2 B) in *Pella* species is dorsolateral, tending to be situated on the anterior part of the head, and 0.29–0.48 times as long as the head width. Small setae appear among the facets. These states are common to most aleocharines.

The size of the eye is variable with species and is taxonomically informative.

The eye size probably depends on diurnal, nocturnal or day-and-night activity. While the species of *Pella* having smaller eyes (<0.4 times head width), *e.g.*, the species of the *humeralis* group and the *funesta* group, are active day and night, the species having larger eyes (>0.40 times head width), *e.g.*, the species of the *lugens* group and the *spreta* group, appeared to be nocturnal in my field observations. The large-eyed species of the Lomechusini, *e.g.*, *Zyras* spp., *Pedinopleurus* spp., *Tetrabothrus* spp. and *Drusilla* spp. are often attracted to light traps, and this suggests that they are also nocturnal.

Antennae

The antennae (Figs. 3 B–3 D) in *Pella* are usually shorter than the combined length of head, pronotum and elytra, except in *P. comes* (longer) and *P. rambouseki* (almost the same in length) and more or less depressed dorsoventrally. Fourth to 10th segments (Fig. 3 B) are usually wider than long and subquadrate in lateral view. Their surfaces are covered with setae and macrosetae, the setae becoming sparser and smaller toward the apex (Figs. 3 C, 3 D). These states are common to most aleocharines.

Relative lengths of antennal segments, especially those of 1st to 3rd segments and the 11th are useful to diagnose species. Usually the 1st segment is the longest but sometimes the 11th is longer than it.

Mouthparts

Labrum

The labrum (Fig. 4 A) is relatively generalised in structure in *Pella* species. It is submembranous around the antero-medial part (sometimes also around the lateral margins). The surface is densely covered with pseudopores except in the lateral area and with 10–12 setae around the apical half.

Epipharynx

The epipharynx (Fig. 4 B) in *Pella* is generalised in structure. The number of lateral setae is normally 5, and these are situated on the mesolateral part of the epipharynx. The medial sensory field have 80–90 pores, and the lateral field is covered with several pores irregularly among scale-like sculptures.

Mandibles

The mandibles in *Pella* species (Figs. 5 A, 5 B) are simple in shape and lack mola or any pubescent patch. However, they are slightly asymmetric, and the right mandible has a small tooth around the middle of the inner margin.

Maxilla

The maxilla in *Pella* species (Fig. 5 C) is generalised in shape as in most aleocharines, except for the elongated galea.

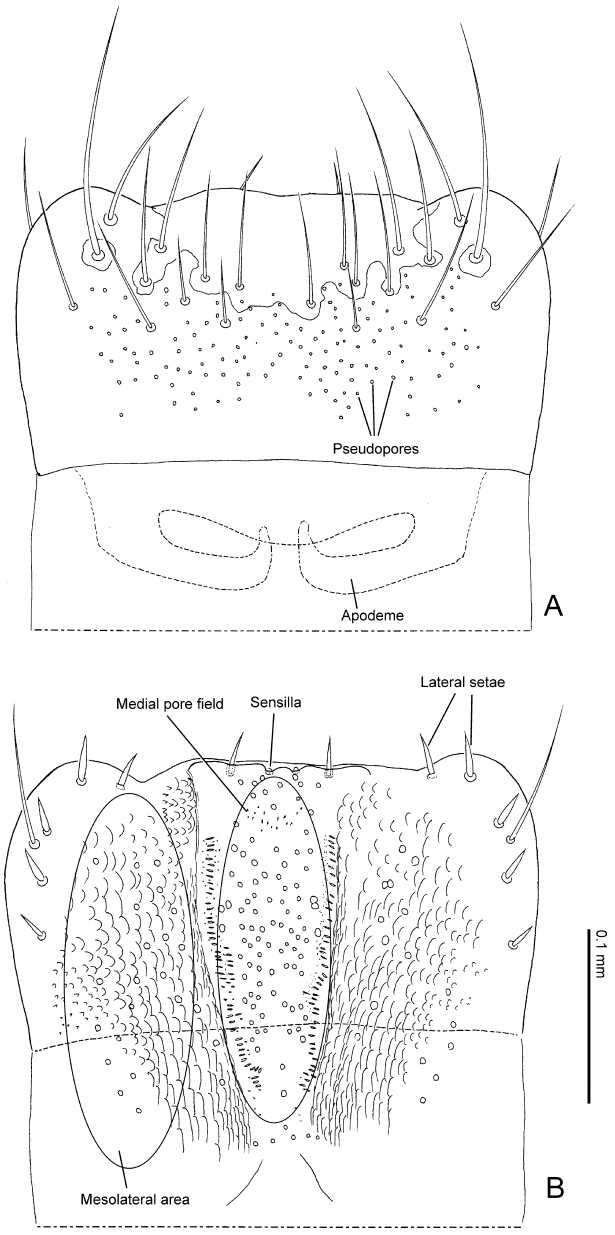

Fig. 4. *Pella limbata* (Paykull).—A, Labrum, dorsal view; B, epipharynx (labrum, adoral view).

The elongated galea is unique to the Lomechusini and has been considered to be an autapomorphy of the tribe, though the maxilla is much shortened in the Lomechusina as in other aleocharines, and this is considered to be a secondary shortening probably due to their myrmecophilous behaviour (Maruyama, in prep.).

Mentum

The general shape of the mentum in *Pella* species (Fig. 5 D) is trapeziform, and the anterior and posterior margins are completely truncate. The surface of the disc is densely covered with

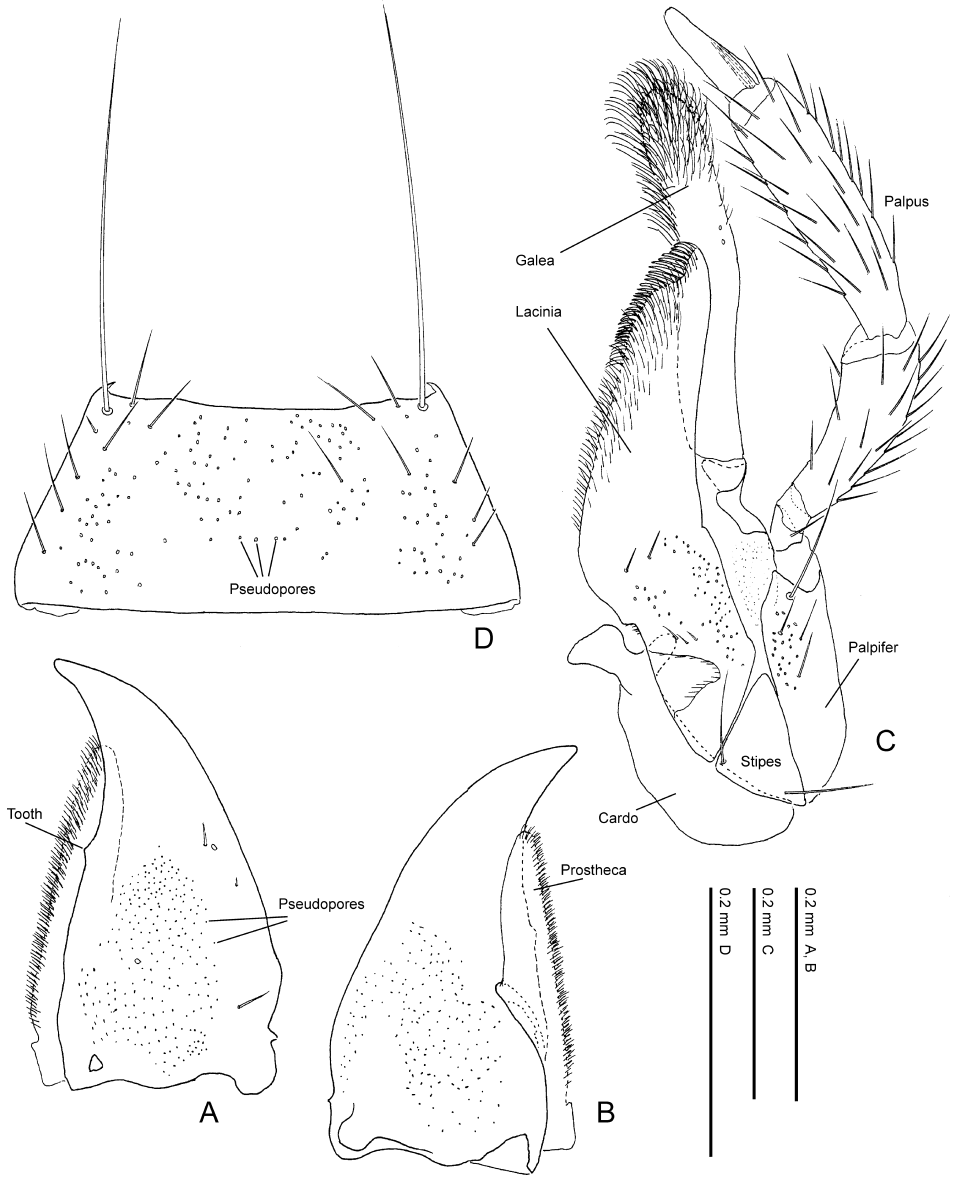

Fig. 5. *Pella limbata* (Paykull). — A, Right mandible, dorsal view; B, ditto, ventral view; C, maxilla, ventral view; D, mentum, ventral view.

pseudopores except for the lateral area.

Labium

The structure of labium is highly diversified in the Myrmedoniina, and this is phylogenetically most informative character. Comparative morphology among lomechusine genera is provided in the following lines.

Prementum, *antero-medial margin.* The antero-medial margin is shallowly emarginate in *Pella* species (Fig. 6 A). In the Myrmedoniina, the depth and shape of the emargination is various

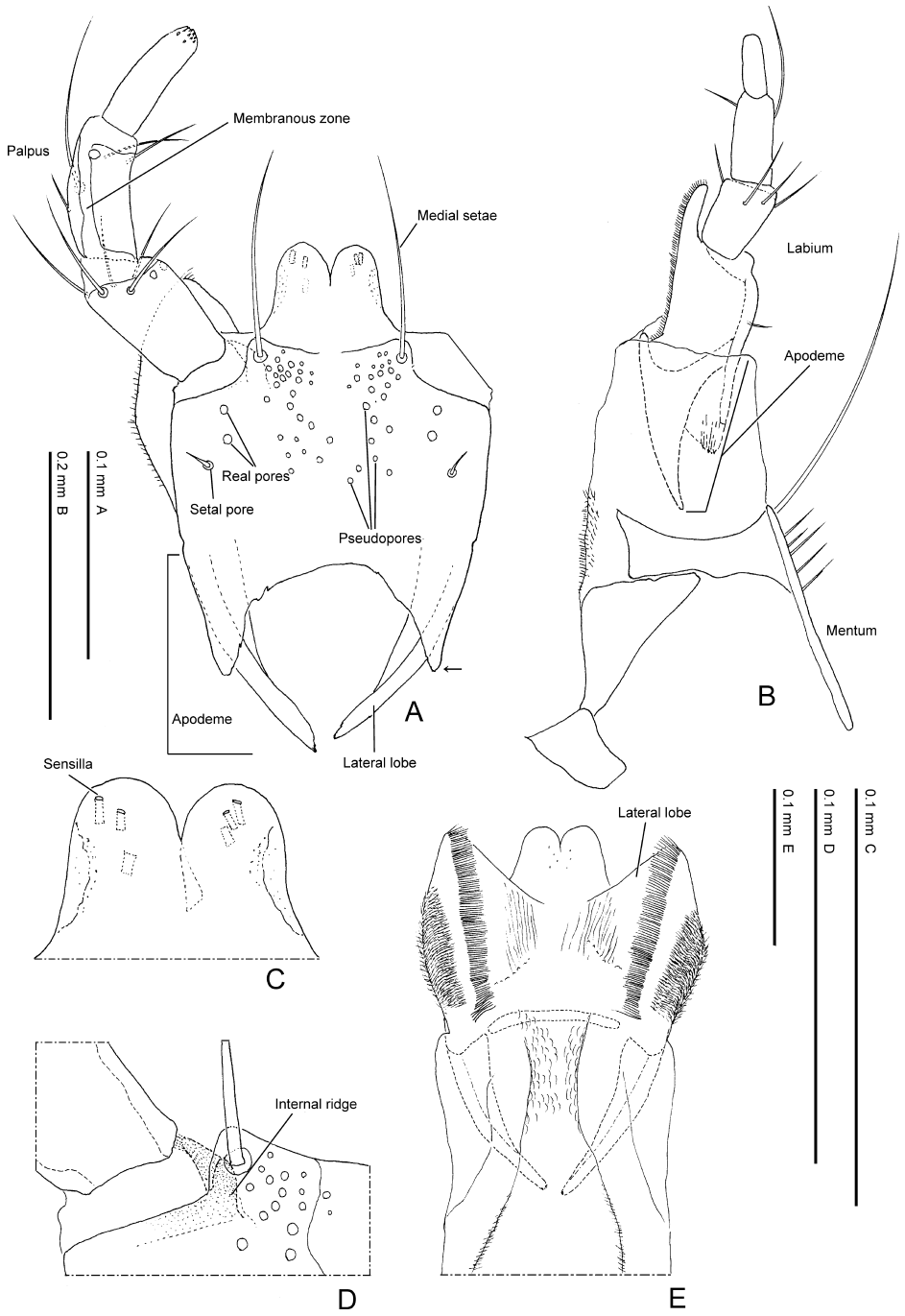

Fig. 6. *Pella limbata* (Paykull).—A, Labium, ventral view; B, mentum and labium, lateral view; C, ligula, ventral view; D, antero-lateral part of prementum, ventral view; E, hypopharynx (labium, adoral view).

according to species.

Prementum, pseudopores. Location: the pseudopores are located around the antero-medial area of prementum in *Pella* species (Fig. 6 A). Most lomechusine species are in the same state as *Pella*.

Number: the number of pseudopores occurring around the antero-medial area is about 30–50 in *Pella* species (Fig. 6A). Most lomechusines are similar to *Pella* species, but the members of *Myrmoecia* and some species of *Orphnebius* completely lack pseudopores.

Size: the pseudopores in *Pella* are large and only slightly smaller than real pores. The pseudopores of the lomechusines examined are smaller than a half of real pore in diameter.

Prementum, *real pores.* Two real pores are located on the mesolateral area of the prementum in *Pella* species (Fig. 6 A). This state is common to most lomechusines and other aleocharines. In contrast, *Diplopleurus* sp., *Tetrabothrus* spp. and members of the Lomechusina have extra real pores, 3, 4 and 4 or 5 in total, respectively.

Prementum, *setal pore.* One setal pore occurs in the mesolateral area of the prementum in most aleocharines. That in *Pella* species (Fig. 6 A) is located slightly anteriorly, and this state is common to most lomechusines. The setal pore is located around the middle of the prementum in *Zyras* (*Trachydonia*) sp., *Zyras* (*Rhynchodonia*) sp. and *Pedinopleurus* sp.

Prementum, *medial seta*. A pair of medial setae are present at the antero-medial apex of the prementum in all lomechusines.

Prementum, *internal ridge.* Length: a pair of internal ridges are located at the backside of the prementum in the Aleocharinae. Those in *Pella* species (Fig. 6 D) are very small and only recognised around the backside of each medial seta, and a similar condition is observed also in *Myrmoecia* species. The length of the internal ridge is various in the Lomechusini. The ridge in most lomechusines is about 1/2 to 5/6 as long as the prementum, and in *Diplopleurus* sp. very long, extending to the postero-medial projection of the apodeme.

Shape: the internal ridge in most lomechusines is almost straight, but that in *Diplopleurus* spp., *Tetrabothrus* spp. and *Zyras* (*Zyras*) spp. is bifid anteriorly.

Apodeme. Lateral lobes (suspensoria): the general shape of the lateral lobe can be divided into the following two basic types in the Lomechusini: 1) not completely fused with the premental disc and visible in ventral view; 2) completely fused with the premental disc and invisible in ventral view. *Pella* (Fig. 6 A) belongs to the type 1). The type 2) is limited to all members of the Lomechusina and part of the Myrmedoniina.

Base of prementum: the base of the prementum is roundly emarginate postero-medially and its lateral part is projected in *Pella* species (Fig. 6 A: arrow). The round emargination is observed in most lomechusines and some other tribes. The round margin is serrate, dentate or projected in some species of *Drusilla*, *Zyras* (*Zyrastilbus*) sp. and *Myrmoecia* spp. In contrast, the projection of *Diplopleurus* spp., *Tetrabothrus* spp. and *Zyras* (*Zyras*) spp. bears the internal ridges. This state is commonly observed in most aleocharines.

Palpus. General shape: the labial palpus in *Pella* species (Fig. 6 A) is 3-segmented, and the 2nd segment is almost as long as the 1st. The palpus in all species of the Lomechusini is 3-segmented, but usually the 2nd segment is shorter than the 1st. In the species of the Lomechusina, the 1st segment is much longer than the combined 2nd and 3rd, while it is shorter than the latter in the other species of the Lomechusini.

Membranous zone: the second segment of the labial palpus in *Pella* species bears a membranous zone (Fig. 6 A) on the ventrolateral area. This state is commonly observed in the Myrmedoniina and probably unique for the subtribe.

Setae: the seta *a* (Sawada, 1972) is situated near the apex of the 1st segment in *Pella* species. This state is also observed in *Myrmoecia* spp., *Orphnebius* spp. and *Tetrabothrus* spp.

Ligula. General shape: the ligula in *Pella* species (Figs. 6 A, 6 C) is bilobed, and the apex of each lobe is rounded. It is various in general shape in the Lomechusini. The ligulae of most species are bilobed and similar to that of *Pella* species, but those of *Diplopleurus* sp., *Zyras* (*Zyrastilbus*) *adesi* and some species of *Drusilla* are elongated and much longer than wide, and that of *Zyras* (*Trachydonia*) sp. is mount-shaped and only apically notched. The ligula in the species of the Lomechusina is very short, much wider than long and more or less flattened at the apex.

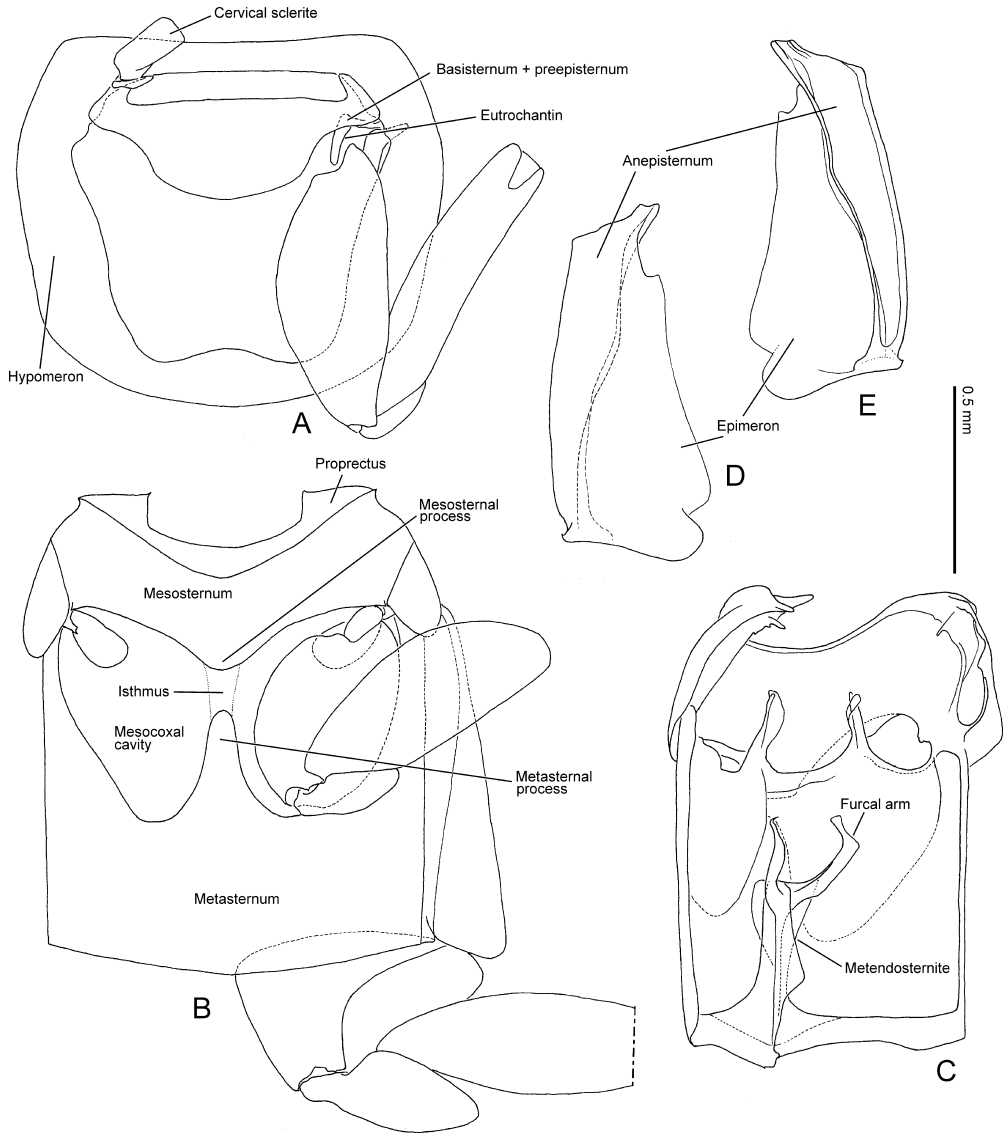

Fig. 7. *Pella limbata* (Paykull). — A, Prothorax, ventral view; B, meso- and metathoraces, ventral view; C, meso- and metasterna, internal view; D, anepisternum and epimeron of metathorax, internal, dorso-lateral view; E, ditto, internal view.

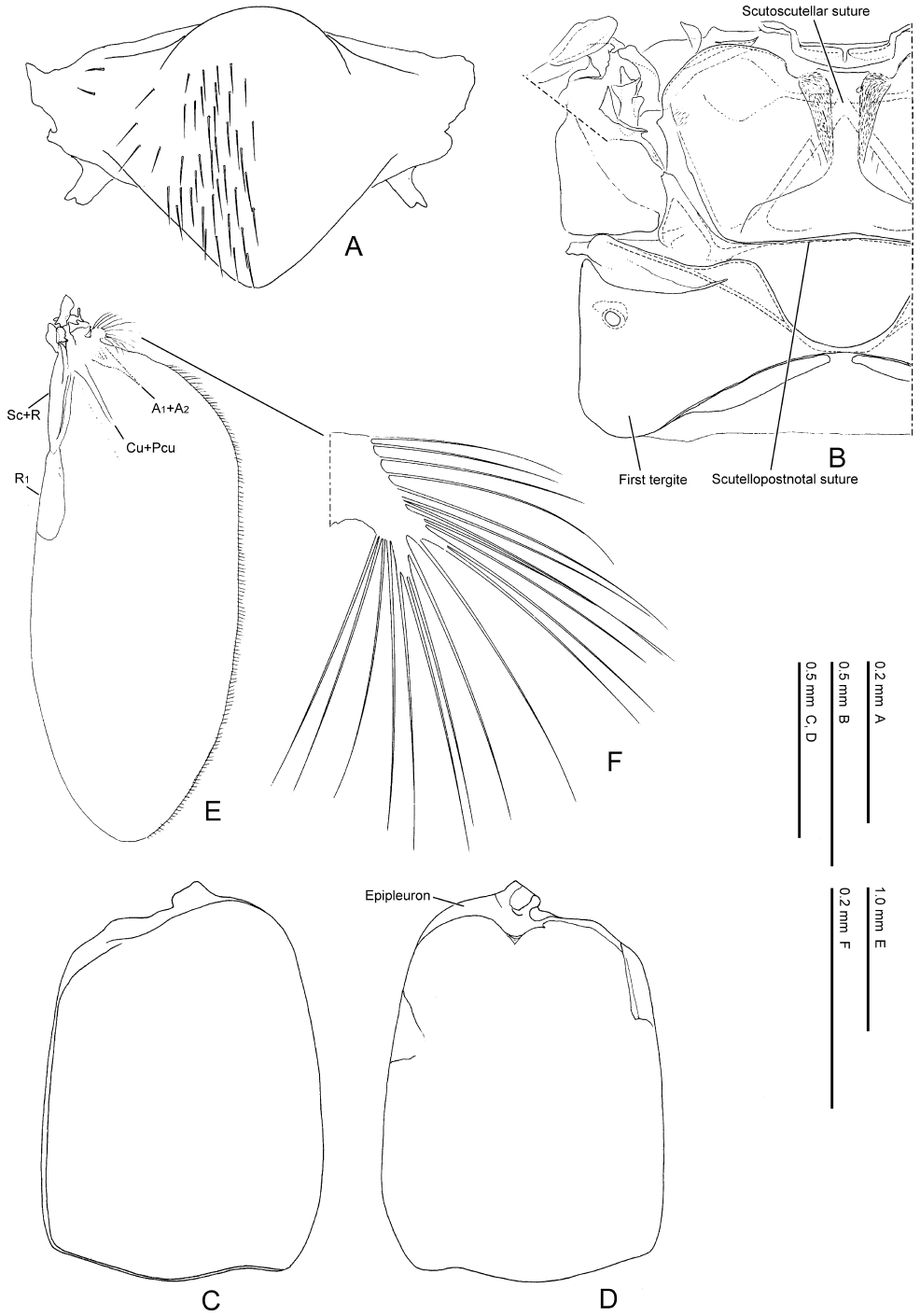

Fig. 8. *Pella limbata* (Paykull). — A, Scutellum, dorsal view; B, metanotum and 1st abdominal tergite, dorsal view; C, right elytron, dorsal view; D, ditto, ventral view; E, left hind wing, dorsal view; F, flabellum.

Apical setae, presence and number: the members of *Pella* has no seta at the apex of ligula (Figs. 6 A, 6 C), except for the presence of 3 campaniform sensilla at the apex of each lobe. The absence of setae is also observed in *Myrmoecia* spp. but the members of this genus even lack sockets. Most lomechusines, as well as most aleocharines, have 4 apical setae on each lobe. *Diplopleurus* spp. and *Tetrabothrus* spp. have 3 setae on each lobe.

Surface: the surface of the ligula is smooth in *Pella* species. In contrast, that of *Zyras* (*Trachydonia*) sp. is covered with minute granular sensilla.

Hypopharynx. A row of setae appears along the inner margin of the hypopharynx in *Pella* species (Fig. 6 E). This state is commonly observed in most lomechusines.

Thorax

Pronotum

In *Pella* species, the pronotum is subquadrate, subtrapeziform or elliptical in dorsal view, and more or less flattened. The disc is weakly punctured or covered with microreticulations, and moderately to densely and uniformly covered with setae. Macrosetae are present along the posterior to lateral margins, and the number is useful in diagnosing species.

The general shape is various by species and very important in recognising *Pella* species at the first glance.

The structure of the pronotum is various in the Lomechusini. In the Myrmedoniina, the general structure is the same as in *Pella* species but the punctulation and the density of setae are very various by species. In most species of *Zyras*, pronotal disc is coarsely punctured and sparsely covered with erect and stout setae. In the *canaliculata* group of *Drusilla*, the disc is granulate-punctured and densely covered with stout setae. In contrast, the structure of pronotum is highly modified in the Lomechusina, in which the pronotum is distinctly depressed or caved mesally and very finely granulate-punctured.

Elytra

The elytra are subparallel-sided. The inner to posterior margin is more or less margined. The surface is similar to that of the pronotum but with setae becoming sparser apicad. Macrosetae are present along the shoulder to the lateral margin and their number is used for diagnosing species.

Hind wing

The hind wing is entire in *Pella* species. The veins are weakly sclerotized and very obscure, but generalised as in most aleocharines. In contrast, some species of *Drusilla*, *Tetrabothrus*, *Amaurodera* and *Zyras*, and all species of *Apteranillus* are brachypterous and flightless.

Meso- and metathoraces

In *Pella*, the mesocoxal cavity is widely separated, and the metasternum is longer than mesosternum. These states are typical of the Lomechusini and well characterise the tribe. In most species of the Myrmedoniina, apex of the mesosternal process is rounded, but in some species of the Myrmedoniina and all species of the Lomechusina it is widely truncated.

Legs

The legs are generalised in *Pella* (Figs. 9 A–9 C) as in many other free-living species of the Aleocharinae, and the apices of the tibiae bear a ctenidium as in the other Myrmedoniina species.

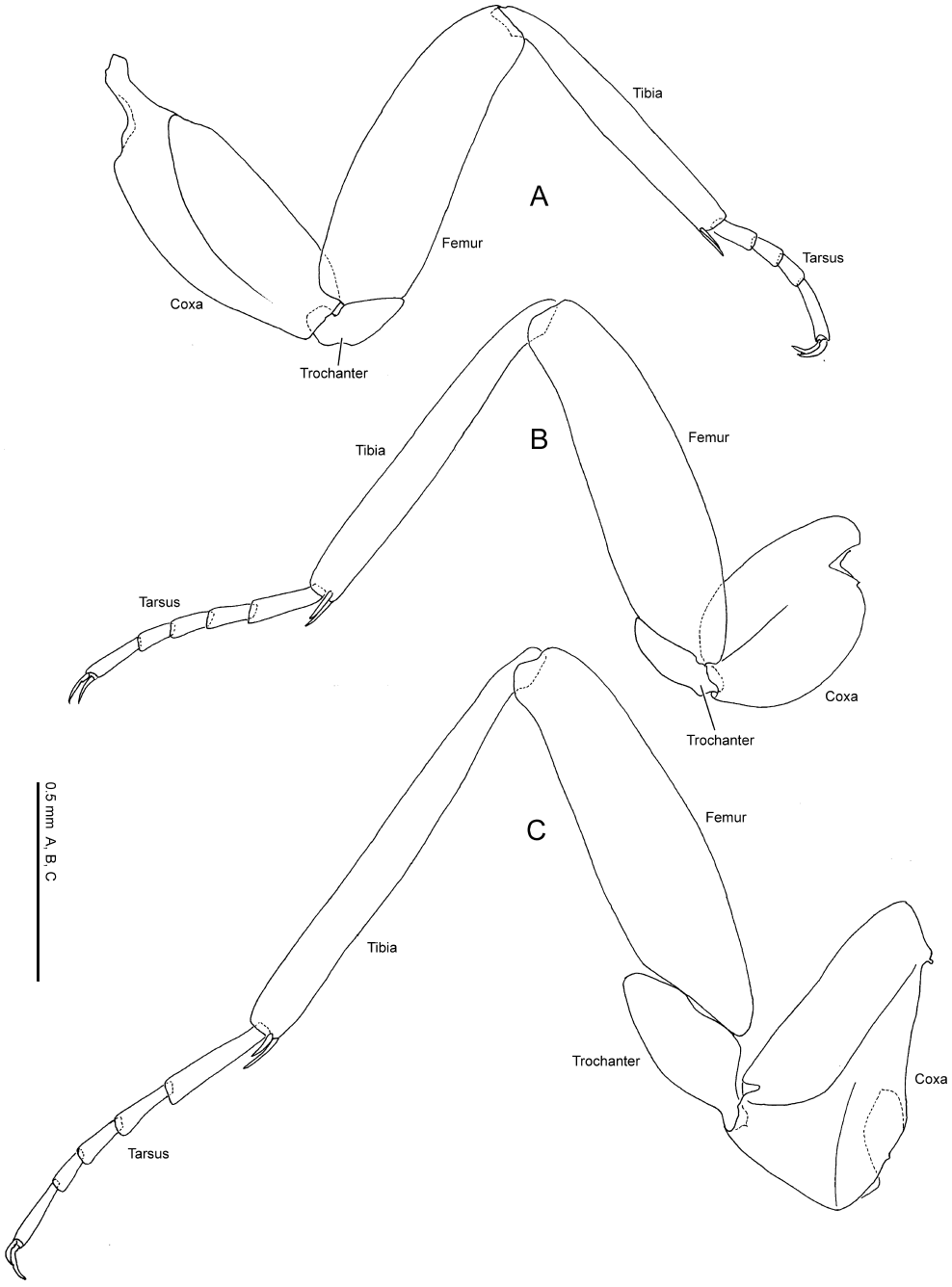

Fig. 9. *Pella limbata* (Paykull).—A, Foreleg; B, midleg; C, hindleg. A–C, left side, ventral view.

Each femur bears a groove from near base to apex alongside the posterior margin to receive tibia when legs are squeezed together.

Abdomen

Abdominal segments

General shape. In *Pella*, the abdomen (Figs. 10 A, 10 B) is highly generalised in shape, and its outline is subparallel-sided in dorsal view. However, *P. excepta* and *P. maura* have small projections on the 3rd and 6th abdominal tergites. Many species of the Myrmedoniina bear projections on male abdominal tergites or paratergites.

Eighth tergite. The 8th tergite is narrowed posteriad, truncated or emarginate at the apex which is crenate or dentate (Figs. 10 A, 11 A, 11 C, 11 E, 11 F). The general shape and number of macrosetae covering the surface are useful in diagnosing the species. Basal projection of the apodeme of the male (Fig. 11 E) is usually longer than that of the female (Fig. 11 F).

Eighth sternite. The 8th sternite is narrowed posteriad, rounded or truncated at the apex in *Pella* species (Figs. 10 B, 11 B, 11 D, 11 G, 11 H). The general shape and number of macrosetae covering the surface are useful for diagnosing the species. The 8th sternite is larger in the male than in the female. The apical setae in the female (Fig. 11 H) are longer and thicker than in the male (Fig. 11 G), and in some species the female apical setae are spindle-shaped and flattened. Minute pubescence appears along the apical margin (Fig. 11 H) in the females of most species.

Ninth tergite. The 9th tergite (Figs. 12 A, 16 A) covers the aedeagus or vagina from the dorsal to the ventral side in *Pella* species, and this state is common to most aleocharines. The lateral lobes of the male 9th tergite (Fig. 12 A) is long and asymmetric in *Pella* species as well as in most aleocharines.

Ninth sternite. The male 9th sternite (Figs. 12 B, 12 C) is oblong oval in Pella species, and its apodeme is submembranous. The apex of the male 9th (Fig. 12 C) sternite is truncated or rounded, bearing a pair of macrosetae and 20–30 setae. The left side (ventral view) of the 9th sternite is connected with the 9th tergite in the male, and the aedeagus emerges out from the right side of the 9th sternite (Fig. 12 D). The female 9th sternite (Figs. 16 B, 16 C) is fused with the 9th tergite except around the apex (Fig. 16 C), which bears about 20 setae. These states are common to most aleocharines. The surface is covered with many setae and some macrosetae.

Tenth tergite. The 10th tergite in *Pella* species (Figs. 12 A, 16 A) is almost pentagonal and truncated or rounded at the apex. The surface is densely covered with setae, which become sparser apicad.

These states are common to most aleocharines. The setose state is various by species in the Lomechusini.

Male genitalia

Median lobe of aedeagus. The aedeagal median lobe in *Pella* species (Figs. 13 A–13 E, 14 A–14 E) is mainly composed of the basal capsule and the apical lobe. The compressor plate (Fig. 13 C) is partly or completely covered by the basal capsule. The dorsal bridge ("athetine bridge", sensu Seevers, 1978) is present. These structures are commonly observed in the Lomechusini. The distal crests (Figs. 13 C–13 E) are well developed and is fused with their sides in *Pella* species. The general shape is one of the most important characters in diagnosing species.

The inner sac is a tubular structure and evaginate as shown in Figs. 14 D, 14 E. In my observations of some couples of *Pella* beetles killed during copulation, the apical part of the apical lobe is inserted to the vagina from the ventral split line of the 9th sternite, and then the inner sac of aedeagus is evaginated in the vagina. A pair of the longitudinal bands is folded internally at the apical opening of the median lobe, and they cover the dorsal face of the inner sac in the pos-

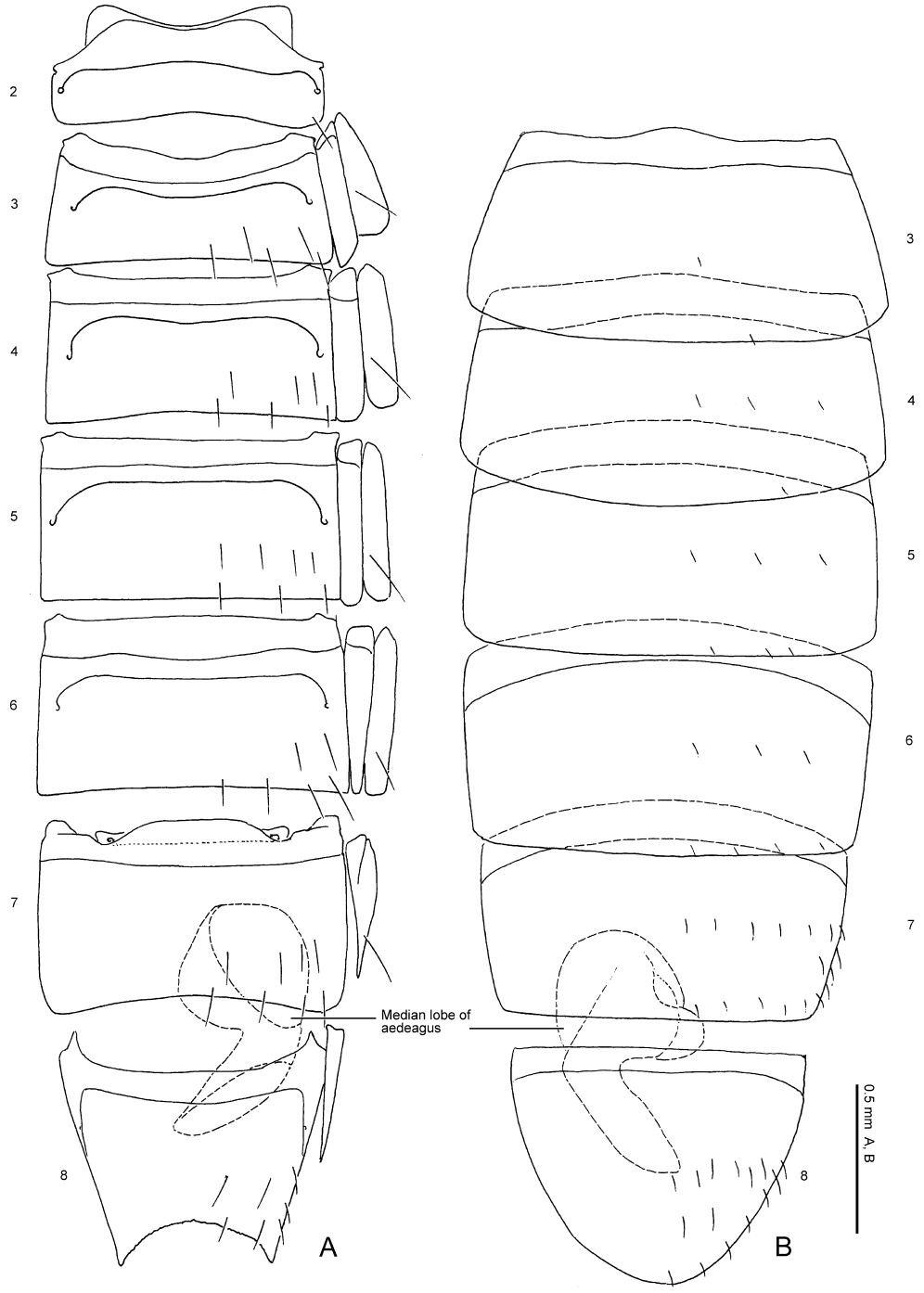

Fig. 10. *Pella limbata* (Paykull).—A, Second to 8th tergites and paratergites, male, dorsal view; B, 3rd to 8th sternites, male, ventral view. A, B, abdominal segments, location of aedeagus indicated.

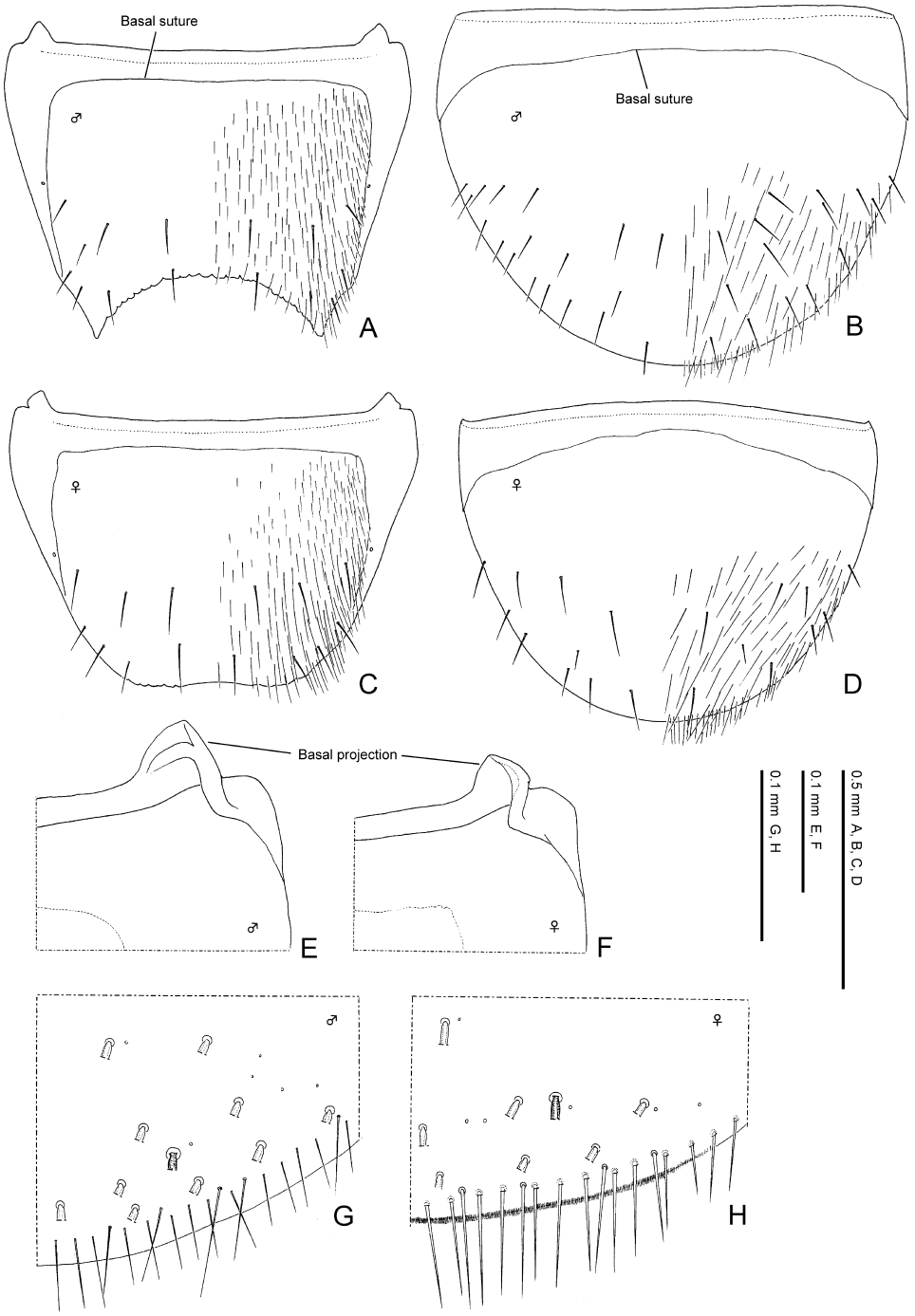

Fig. 11. *Pella limbata* (Paykull).—A, Eighth tergite, male, dorsal view; B, 8th sternite, male, ventral view; C, 8th tergite, female, dorsal view; D, 8th sternite, female, ventral view; E, antero-lateral part of 8th tergite, male, internal view; F, ditto, female; G, apical part of 8th sternite, male, dorsal view; H, ditto, female. A–H, abdominal segments.

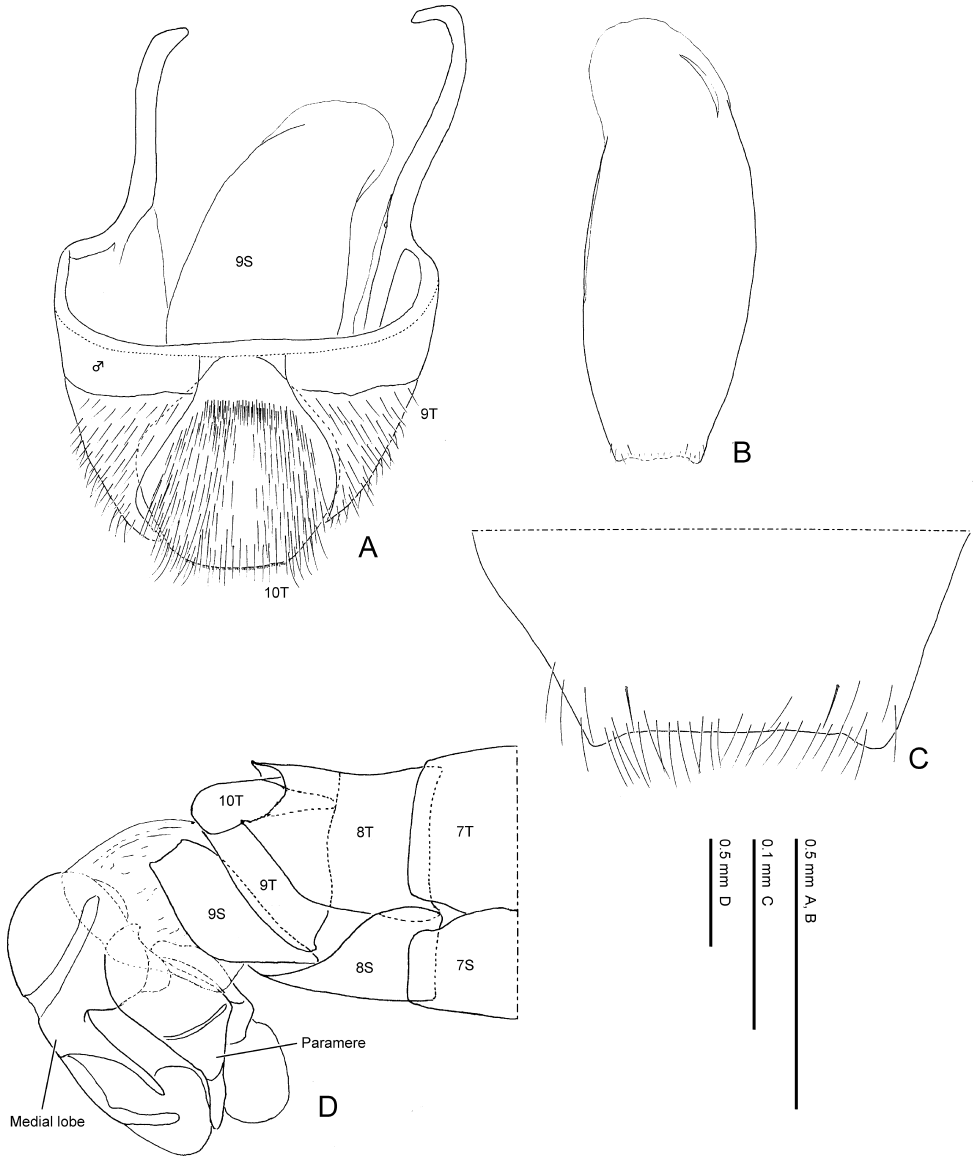

Fig. 12. *Pella limbata* (Paykull). — A, Ninth and 10th tergites, dorsal view; B, 9th sternite, ventral view; C, ditto, apical part; D, 7th to 10th segments in dorso-lateral view, aedeagus emerged out from between lateral sides of 9th tergite and sternite. A–D, male abdominal segments. Abbreviations: T, tergite; S, sternite.

ture of evagination. The surface of the inner sac is covered with minute pubescence and projections.

The copulatory piece (Figs. 13 F, 13 G) is very various according to species and important in discriminating allied species. It is not exposed when the inner sac is evaginated (Figs. 14 D, 14 E), and its dorsal part is covered with pubescence or spines.

Paramere. The paramere of aedeagus in *Pella* species (Figs. 15 A–15 D) is generalised in structure as in most aleocharines, in which it is attached to the median lobe as shown in Figs. 15 C, 15 D and composed of the condylite, paramerite and velum. The paramerite bears an apical

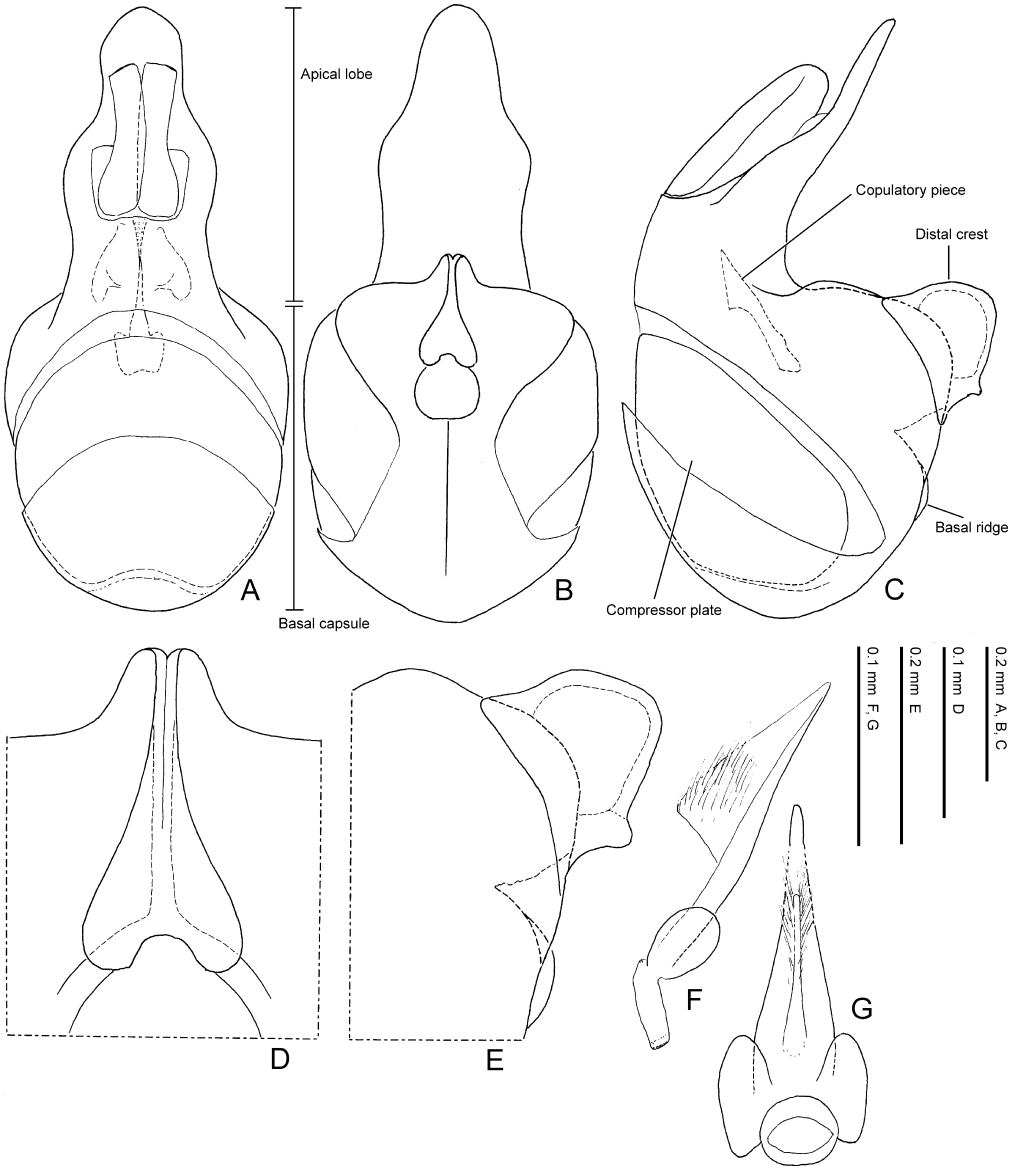

Fig. 13. *Pella limbata* (Paykull). — A, Median lobe of aedeagus, dorsal view; B, ditto, ventral view; C, ditto, lateral view; D, ditto, distal crest, dorsal view; E, ditto, lateral view; F, copulatory piece, lateral view; G, ditto, dorsal view.

lobe, with 4 setae around the apex. The apical lobe in *Pella* species is relatively long, exceeding the apex of the velum.

Female genitalia

Vagina. The vagina of *Pella* species (Fig. 16 A) is generalised in structure as in most aleocharines. The vaginal plate is weakly sclerotized, and its size is various probably in accordance with the size of the inner sac of aedeagus. The spermathecal duct is attached at the dorsal surface of the end of the vagina.

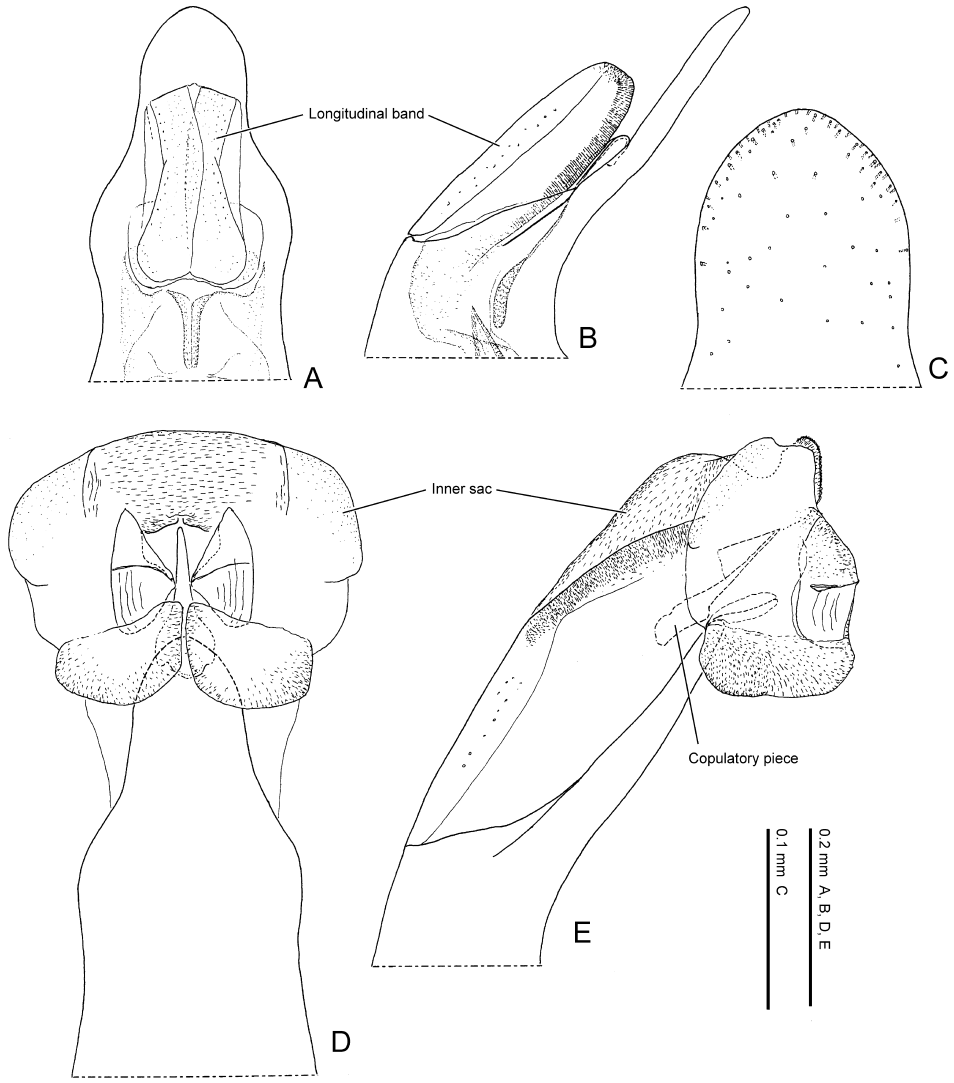

Fig. 14. *Pella limbata* (Paykull). — A, Apical lobe of median lobe of aedeagus, dorsal view; B, ditto, lateral view; C, ditto, around apex, ventral view; D, evaginated inner sac of median lobe, ventral view; E, ditto, lateral view.

Spermatheca. The spermatheca in *Pella* species (Figs. 16 A, 16 D–16 F) is simplified and mainly composed of two parts: basal part and apical part. The basal part is attached to the spermathecal duct at its base, and sometimes its inner wall is wrinkled. The apical part is attached to the spermathecal gland and more or less notched at its connection with the latter. The inner wall is sparsely to densely wrinkled.

The general shape of the spermatheca is various by species and very important in diagnosing species.

Although the spermatheca in most lomechusines are generalised as in *Pella*, that in the species of *Zyras* (*Zyras*), *Diplopleurus* and *Tetrabothrus* are coiled many times.

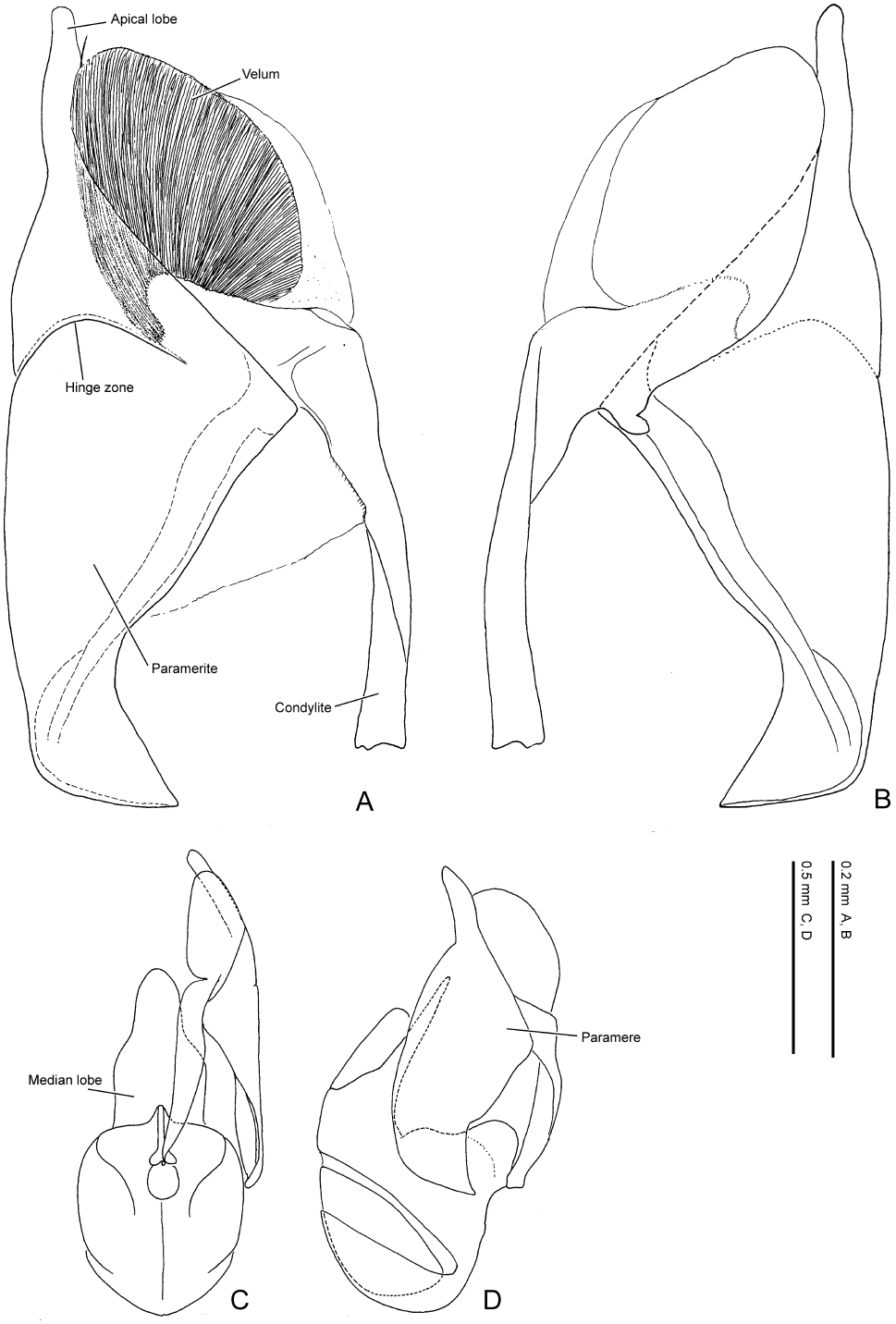

Fig. 15. *Pella limbata* (Paykull).—A, Paramere of aedeagus, lateral view; B, ditto, far side; C, position of paramere on median lobe, ventral view; D, ditto, lateral view.

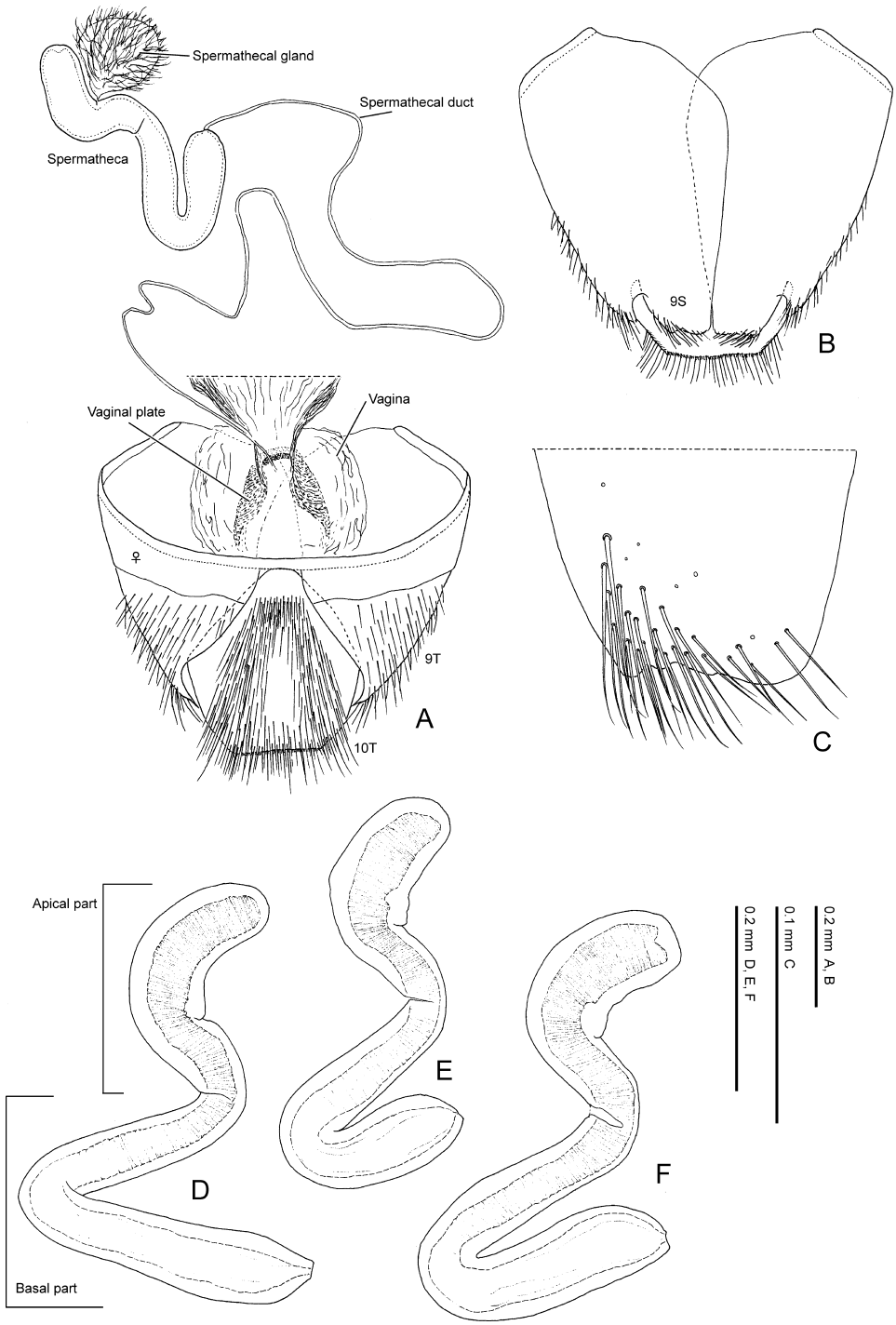

Fig. 16. *Pella limbata* (Paykull).—A, Ninth and 10th tergites, dorsal view, and spermatheca; B, 9th tergite and sternite, ventral view; C, 9th sternite, apical part, ventral view; D–F, spermathecae. A–C, female abdominal segments. Abbreviations: T, tergite; S, sternite.

CHAPTER 2. TAXONOMY

The identities of several *Pella* species are ambiguous or largely confused. For example, *P. laeviceps* (Eppelsheim), *P. barbara* (Fairmaire), *P. excepta* (Mulsant & Rey) and *P. maura* (Fauvel), all described from the western Palearctic region, have been neither recorded nor redescribed since the original descriptions published more than a century ago. Judging from the original descriptions, the affiliation of several species described from southern Asia and Caucasia are apparently doubtful. Faunistic studies of *Pella* have well been done only in a few regions, *e.g.*, Central Europe (Ganglbauer, 1895; Reitter, 1909; Lohse, 1974, 1989, etc.) and the Russian Far East (Dvořák, 1981). The present study also deals with material from poorly investigated areas in the Palearctic region, namely South Europe, North Africa, Turkey, Caucasia and East Asia. I have discovered 15 undescribed species from these areas.

In this chapter I will revise the Palearctic species of *Pella* taxonomically. Recently some species of the genus have been found in the Nearctic region, and they are separately revised by Klimaszewski *et al.* (2005). Detailed descriptions of these undescribed species and redescriptions of all the named species including above-mentioned ambiguous species are given. Because reliable identification to *Pella* species is important to their ecological and behavioural studies of myrmecophily, this study would contribute much to biological study of *Pella*.

Brief History of Taxonomic Study of *Pella*

In this paper, I synonymize *Myrmelia* Mulsant & Rey, 1873b; *Pellochromonia* Reitter, 1909; and *Lepla* Tottenham, 1939, with *Pella*, which are formerly arranged as the subgenera of the genus *Zyras* Stephens, 1835.

The genus *Pella* was erected by Stephens (1835) to accommodate four British species of the genus *Aleochara* without designation of the type species. Later, Westwood (1838) designated *Staphylinus limbatus* Paykull, 1789, as the type species of *Pella*, and added two species to the genus, which had been arranged as members of *Aleochara* by Stephens (1835).

Erichson (1837) established the genus *Myrmedonia* to accommodate several *Aleochara* and *Bolitochara* species without designation of the type species. Duponchel (1841) designated *Staphylinus canaliculatus* (=*Drusilla canaliculata*) as the type species of *Myrmedonia*. However, Thomson (1859) was unconscious of Duponchel's (1841) work and designated *Aleochara humeralis* (=*P. humeralis*) as the type species of *Myrmedonia*. After that, under the influence of Thomson (1859), many species of *Pella* were described under *Myrmedonia* in the 1860's to the 1920's. *Myrmedonia* is actually a junior synonym of *Drusilla* Leach, 1819.

Mulsant and Rey (1873b) established the subgenus *Myrmelia* for *Myrmedonia excepta* Mulsant & Rey, 1861.

Reitter (1909) regarded *Pella* as a subgenus of the genus *Myrmedonia* and established a new subgenus *Pellochromonia* for *Myrmedonia ruficollis* Grimm, 1845.

Fenyes (1920) regarded *Pella* as a subgenus of the genus *Zyras* Stephens, 1835, together with *Myrmedonia* (sensu Mulsant & Rey, 1873a), *Pellochromonia* and *Myrmelia* and referred several species to each of them, which were described merely under *Myrmedonia*. Bernhauer and Scheerpeltz (1926) and Scheerpeltz (1934) in their catalogue almost followed Fenyes' (1920) list.

Tottenham (1939) established *Lepla* for the species, that had been included in *Myrmedonia* (sensu Mulsant & Rey, 1873a), and designated *Myrmedonia lugens* Gravenhorst, 1806 as the type species.

Kistner (1972) again raised *Pella* to the generic rank. However, current works (Lohse, 1974, 1989; Likovský, 1993; Smetana, 2004, etc.) did not follow Kistner's view and regarded *Pella* as a subgenus of *Zyras*. Lohse (1972, 1989) is one of the most important identification guides of the Aleocharinae, and many researchers, not only in Central Europe but also in other countries of the Palearctic region, follow his arrangement.

Dvořák (1981) revised the *Pella* species of East Asia, but he misidentified some species and overlooked one species.

Gürlich (1981) recognised *Pella* as a distinct genus on the basis of the examinations of the chaetotaxy of abdominal macrosetae. However, he examined only the type species of the genus, and the chaetotaxy of abdominal macrosetae is highly homoplastic among lomechusine genera.

Descriptions

Tribe **Lomechusini** Fleming, 1821

Lomechusidae Fleming, 1821: 49 [type genus: *Lomechusa* Gravenhorst, 1806].
Myrmedoniini Ganglbauer, 1895: 196 [type genus: *Myrmedonia* Erichson, 1837].—Seevers, 1978: 151.

Diagnosis. The Lomechusini has not been well defined, but it can be distinguished from the other tribes of Aleocharinae by a combination of the following character states: 1) galea elongate; 2) metasternal process longer than mesosternal process; 3) tarsal formula: 4–5–5; 4) ventral bridge of aedeagal median lobe present; 5) compressor plate of aedeagal median lobe covered by a plate, which extends from the bottom of the basal capsule.

Subtribe **Myrmedoniina** Thomson, 1867

Myrmedoniides Thomson, 1867: 209 [type genus: *Myrmedonia* Erichson, 1837].
Myrmedoniia Sharp, 1883: 170 [type genus: *Myrmedonia* Erichson, 1837].
Myrmedoniates Mulsant & Rey, 1873a: 34 [type genus: *Myrmedonia* Erichson, 1837].
Zyrini Bradley, 1930: 83 [type genus: *Zyras* Stephens, 1835].
Zyrasini Jeannel & Jarrige, 1949: 304 [type genus: *Zyras* Stephens, 1835].
Bolitocharinae Hatch, 1957: 146 [type genus: "*Bolitochara*" Westwood, 1838].
Myrmedoniinea Seevers, 1978: 18 [type genus: *Myrmedonia* Erichson, 1837].

Diagnosis. The Myrmedoniina has not yet been well defined and is estimated as a paraphyletic group (Maruyama, in prep.). However, it is distinguishable from the other subtribe of the Lomechusini, the Lomechusina, by the following character states: 1) galea elongate; 2) ligula evidently bifid; 3) trichome absent on 3rd to 5th abdominal segments.

Genus ***Pella*** Stephens, 1835

Pella Stephens, 1835: 434 (description, genus) [type species: *Staphylinus limbatus* Paykull, 1789, fixed by Westwood (1838)].—Ganglbauer, 1895: 116 (subgenus of "*Myrmedonia*", list).—Reitter, 1909: 42 (subgenus of "*Myrmedonia*", description).—Fenyes, 1920: 296 (subgenus of *Zyras*, description).—Bernhauer & Scheerpeltz, 1926: 694 (subgenus of *Zyras*, list).—Kistner, 1972: 150 (distinct genus, description).—Lohse, 1974: 224 (subgenus of *Zyras*, description).—Gürlich, 1981: 211–212 (distinct genus, chaetotaxy).

"*Myrmedonia*": Thomson, 1859: 255 (description).—Mulsant & Rey, 1873a: 50 (description).—Ganglbauer, 1895: 116 (description).—Reitter, 1909: 43 (key).—Fenyes, 1920: 297 (subgenus of *Zyras*, description).—Bernhauer & Scheerpeltz, 1926: 694 (subgenus of *Zyras*, list).

Myrmelia Mulsant & Rey, 1873b: 152 (subgenus of "*Myrmedonia*", description) [type species: *Myrmedonia excepta* Mulsant & Rey, 1861, by monotypy].—Ganglbauer, 1895: 116 (subgenus of "*Myrmedonia*", list).—Fenyes, 1920:

299 (subgenus of *Zyras*, description).—Bernhauer & Scheerpeltz, 1926: 694 (subgenus of *Zyras*, list). **N. syn.**

Pellochromonia Reitter, 1909: 43 (subgenus of "*Myrmedonia*", description) [type species: *Myrmedonia ruficollis* Grimm,1845, by monotypy].—Fenyes, 1920: 298 (subgenus of *Zyras*, description).—Bernhauer & Scheerpeltz, 1926: 694 (subgenus of *Zyras*, list).—Lohse, 1974: 226 (subgenus of *Zyras*, description). **N. syn.**

Lepla Tottenham, 1939: 226 (new name for "*Myrmedonia*" sensu Mulsant & Rey, 1874) [type species: *Aleochara lugens* Gravenhorst, 1802, fixed by Tottenham, 1939].—Gürlich, 1981: 211 (distinct genus, chaetotaxy). **N. syn.**

Distribution. Holoarctic region (except for tundra, desert or non-forest areas).

Diagnosis. The following character states are considered to be basal autapomorphies of the genus *Pella* (Maruyama, in prep.): 1) ligula without setae but with sensilla; 2) 2nd segment of labial palpus almost the same as the 1st in width. In addition, *Pella* can be distinguished from the other genera of the tribe Lomechusini by a combination of the following character states: 1) body 3.4–7.0 mm in length; 2) head almost circular in dorsal view; 3) head without "neck"; 4) head with occipital suture; 5) eyes 0.35–0.56 times as long as head width; 6) antenna generalised, but slightly depressed; 7) pronotum and elytra densely or moderately covered with setae; 8) pronotal and elytral surfaces smooth or with fine reticulations, without granulation or rugose punctulation; 9) hind wings entire; 10) paratergite generalised, without projection; 11) 10th tergite densely covered with setae except for mesal area; 12) aedeagus simplified, pear-shaped or oval in ventral view.

Description. Body (Fig. 1). Slender or somewhat robust, subparallel-sided. Body length: 3.4–7.0 mm; fore body: 1.6–3.9 mm. Ground colour pale brown to black, or reddish orange.

Head. Head capsule (Figs. 2 A, 2 B, 3 A) almost circular. Occipital suture (Figs. 2 A, 2 B, 3 A) present, dorsally crossing hind part of head, continuing onto ventral side, and terminating on each side near posterior articulation of hypostoma; surface covered with setae. Eyes (Figs. 2 A, 2 B) oval in lateral view, more or less prominent, 0.35–0.56 times as long as head width; small setae present among facets. Antennae (Figs. 3 B–3 D) generalised in shape, almost as long as head and pronotum combined, more or less flattened dorsoventrally; setae on surface becoming denser and smaller apicad; 4th to 10th segments slightly dilated apicad or subparallel-sided, well margined postero-laterally; each segment with erect black setae, those on 3rd to 10th segments forming a row around apical rim; 11th segment oval to elongate oval.

Mouthparts. Labrum (Figs. 4 A, 4 B) much wider than long (W/L, 1.8–2.1), truncate or slightly emarginate antero-medially, submembranous around antero-medial area; surface covered with 100–130 pseudopores except on posterior and lateral areas; apodeme roundly projected postero-medially, with lateral arm gently curved. Epipharynx (Fig. 4 B); medial sensory field with 80–90 pores and 50–80 grain-like sensory pores laterally; each mesolateral area irregularly with 10–15 pores among round projections; 5 pairs of lateral setae stout, about five times as long as wide. Mandibles somewhat asymmetric; right mandible (Figs. 5 A, 5 B) with a small tooth (Fig. 5 A) at middle of inner margin; 2 or 3 small setae present laterally; mesal areas of dorsal and ventral surfaces covered with numerous pseudopores; prostheca obtuse at apex, its inner margin densely pubescent. Maxilla (Fig. 5 C): cardo generalised, almost elliptical in ventral view, with 40–50 pseudopores. Stipes small, triangular, with 2 setae at base, without pseudopores. Palpifer triangular in lateral view, with a large seta, several small setae and 15–20 pseudopores near apex. Lacinia with 50–60 pores and 5 or 6 setae medially; apical inner margin with a row of setae forming a comb; surface of around comb densely pubescent; subgalea small, much smaller than last segment of maxillary palpus; galea long, about six times as long as wide, slightly curved at middle, with some pores near apex, densely pubescent apically. Maxillary palpus without pseudopores; 1st segment very small, with 1 seta; 2nd segment gently curved, and much dilated

apically; 3rd segment longest, slightly longer than 2nd, almost straight; 4th segment small, conical. Mentum (Fig. 5 D) trapeziform; posterior and anterior margins truncate; around antero-lateral corner with a long seta; surface densely covered with pseudopores, with several setae laterally. Labium (Figs. 3 A, 6 A–6 E): prementum (Fig. 6 A) with 2 real pores and 1 setal pore mesolaterally, and 40–50 medial pseudopores, which are relatively large and dense around the medial setae; internal ridge (Fig. 6 D) very small, its length less than 1/8 that of prementum; apodeme (Fig. 6 A) with postero-medial margin roundly emarginate, and its lateral part acutely projected (Fig. 6 A: arrow); lateral lobe of apodeme (Fig. 6 A) gently curved, pointed apically. Ligula (Figs. 6 A, 6 C) bilobed and each lobe rounded apically; apical setae absent, but 3 sockets present. Labial palpus (Figs. 6 A, 6 B) with 1st segment shortened and as long as 2nd; 2nd segment notched from base to apex, forming a membranous zone. Hypopharynx (Fig. 6 E) without apical seta; medial sensory field with small ridges around apex and scale-like sculptures near base.

Thorax. Pronotum (Figs. 1, 7 A) subtrapeziform, subquadrate or elliptical, much wider than long (PW/PL, 1.21–1.60); disc well margined, somewhat convex but more or less flattened above; surface moderately to densely covered with setae uniformly. Cervical sclerites (Fig. 7 A) generalised, rectangular in lateral and ventral view. Basisternum + preepisternum (Fig. 7 A) generalised, but lacking transverse suture. Scutellum (Fig. 8 A) generalised, its apex somewhat rounded. Anepisternum and epimeron (Figs. 7 D, 7 E) of metasternum completely fused; anepisternum narrowed posteriad; epimeron subtriangular, widened posteriad. Metanotum (Fig. 8 B) weakly sclerotized; scutoscutellar suture with a pubescent patch along inner margin; transscutal suture obscure; scutoscutella generalised, triangular; scutelopostnotal suture almost straight. Mesosternum (Fig. 7 B) with process short, slightly projected posteriad, rounded at apex. Metaepimeron (Fig. 7 B) small, semicircular. Metasternum (Fig. 7 B) large, three times longer than metasternum; process well developed, narrowed apicad, its apex somewhat rounded. Metendosternite (Fig. 7 C) generalised; basal stalk convex dorsad, angled; furcal arm gently curved ventrad. Elytra (Figs. 8 C, 8 D) without epiplural suture, more or less margined from shoulder through inner margin to posterior margin; surface almost uniformly covered with setae, which are slightly denser apicad. Hind wing (Figs. 8 E, 8 F) with its venation highly obscure; Sc+R, R_1, Cu+Pcu and A_1+A_2 present, very weakly sclerotized; surface uniformly and moderately pubescent, with minute pubescence along posterior margin; flabellum (Fig. 8 F) with about 20 processes.

Legs. General shape as in Figs. 9 A–9 C. Coxae: fore coxa well developed, slightly shorter than fore femur, ventrally with a suture; mid coxa generalised, with a short suture ventrally; hind coxa subtriangular, rounded laterally. Trochanters: fore and mid trochanters small, subconical; hind trochanter rounded at apex. Femora stout, flattened, gently curved near apex. Tibiae dilated apicad from base to around apical 1/3; each apical margin with a ctenidium and 2 stout setae. Tarsi generalised; empodium with a pair of setae.

Abdomen. First segment (Fig. 8 B): tergite weakly sclerotized, with anterior margin deeply emarginate. Second segment (Fig. 10 A): tergite with posterior margin weakly emarginate, its postero-lateral corner rounded. Third to 6th segments (Figs. 10 A, 10 B): tergites with posterior margins almost straight; dorsolateral plates rectangular except that of 6th segment evidently narrowed posteriad; sternite with surface moderately to densely covered with setae. Seventh segment (Figs. 10 A, 10 B): tergite with a pair of gland openings at base; lateral plates fused, narrowed posteriad, pointed at apex. Eighth abdominal segment (Figs. 10 A, 10 B, 11A–11 H): tergite with basal suture curved laterally and continuing apicad or weakened around lateral sides; sternite with basal suture reaching lateral sides or weakened around lateral area. Ninth abdominal segment (Figs. 12 A, 16 A): tergite with surface densely covered with setae. Tenth abdominal seg-

ment (Figs. 12 A, 16 A) with surface densely covered with setae except in mesal area; setae becoming sparser and longer apicad.

Male characters. Head slightly depressed above; setae on dorsal surface denser and longer than in female. Eighth tergite (Figs. 11 A, 11 E) with basal projection of apodeme (Fig. 11 E) more or less larger than in female; posterior margin (Fig. 11 A) dentate or crenate. Eighth sternite (Figs. 11 B, 11 G) larger than in female; macrosetae more numerous than in female; apical sensory setae (Fig. 11 G) smaller than in female; apical margin lacking minute pubescence. Lateral projections of apodeme of 9th tergite (Fig. 12 A) asymmetrical; right projection longer than the left. Ninth sternite (Figs. 12 B, 12 C) oblong oval; apical margin more or less truncate; surface covered with setae, with a pair of macrosetae near posterior margin; left lateral margin attaching to tergite (Fig. 12 D). Aedeagus (Figs. 13 A–13 G, 14 A–14 E, 15 A–15 D): median lobe (Figs. 12 A–12 E, 14 A–14 E, 15 C, 15 D) with basal capsule bulbous; distal crests (Figs. 13 D, 13 E) fused on their sides, more or less projected; copulatory piece (Figs. 13 F, 13 G) small to medium-sized, pubescent or dentate dorsally, not exposed when inner sac evaginated; paramere (Figs. 15 A–15 D) with condylite almost straight; hinge zone distinct; apical lobe of paramerite short, sometimes exceeding apex of velum; velum densely ridged.

Female characters. Head slightly depressed above, less depressed than in male; setae on dorsal surface sparser and shorter than in male. Eighth tergite (Figs. 11 C, 11 F) with lateral projection of apodeme (Fig. 11 F) smaller than in male; posterior margin (Fig. 11 C) crenate but weaker than in male and its crenate margin narrower than in male. Eighth sternite (Figs. 11 D, 11 H) smaller than in male; macrosetae less numerous than in male; apical sensory setae (Fig. 11 H) larger than in male, sometimes spindle-shaped and flattened; apical margin (Fig. 11 H) sometimes margined with minute pubescence. Ninth sternite (Figs. 16 B, 16 C) with posterior margin truncate; surface around posterior margin covered with setae. Vagina (Fig. 16 A) with vaginal plate weakly sclerotized. Spermatheca (Figs. 16 A, 16 D–16 F) large, as long as or longer than 10th tergite, clearly divided into basal and apical parts; spermathecal duct (Fig. 16 A) short, 3–5 times as long as spermatheca; spermathecal gland (Fig. 16 A) attaching to about middle of apical part.

Comments. *Pella* has been regarded as a subgenus of *Zyras* by authors but is recognised as a good genus in this study. *Pella* is a monophyletic group and far related to *Zyras* (*Zyras*) as a result of phylogenetic analysis of the Lomechusini (Maruyama, in prep.).

I herewith synonymize *Myrmelia*, *Pellochromonia* and *Lepla* with *Pella*, which are also previously regarded as subgenera of *Zyras*. This view is based on the adult external structure of all the known species of these genera/subgenera, there having been found no important difference of generic or subgeneric value.

As a result of type material examinations, it has been found that several species formerly regarded as members of *Pella* (or *Lepla*) cannot be affiliated to the genus. They are: *Zyras* (*Pella*?) *coloratus* Cameron, 1939; *Z.* (*P.*) *ceylonicus* Cameron, 1939; *Z.* (*P.*) *urartu* Iablokoff-Khnzoryan, 1962; *Z.* (*L.*) *iridescens* (Sawada, 1970b); *Z.* (*P.*) *wrasei* Dvořák, 1988; *Z.* (*P.*) *quasar* Dvořák, 1996; and *Z.* (*P.*) *reelsi* Pace, 1998a. These species are transferred to other genera (or tribe) and redescribed at the foot of this chapter.

Check List of the Genus *Pella*

The *limbata* group

Pella limbata (Paykull, 1789)

Staphylinus divisus Marsham, 1802
Aleochara laevis Gravenhorst, 1802

P. horii Maruyama, n. sp.

The *similis* group

P. similis (Märkel, 1845), n. comb.

The *humeralis* group

P. humeralis (Gravenhorst, 1802), n. comb.

P. laeviceps (Eppelsheim, 1880), n. comb.

The *funesta* group

P. funesta (Gravenhorst, 1806), n. comb.
Aleochara crassicornis Stephens, 1832
Myrmedonia atrata Heer, 1839

P. comes (Sharp, 1874)

P. socia (Sharp, 1874)

P. rambouseki (Bernhauer, 1929), n. comb.

P. jureceki (Dvořák, 1981), n. comb.
Zyras (*Pella*) *micropterus* Pace, 1998a, n. syn.

P. kidaorum Maruyama, n. sp.

P. cooterorum Maruyama, n. sp.

The *barbara* group

P. barbara (Fairmaire, 1863), n. comb.

P. leonhardi (Bernhauer, 1912), n. comb.

P. jelineki Maruyama, n. sp.

The *erratica* group

P. erratica (Hagens, 1863), n. comb.
Myrmedonia mustela Rottenberg, 1870
Myrmedonia Ehlersi Eppelsheim, 1884b

The *schillhammeri* group

P. schillhammeri Maruyama, n. sp.

The *kinomurai* group

P. kinomurai Maruyama, n. sp.

P. primorskyiana Maruyama, n. sp.

The *hlavaci* group

P. hlavaci Maruyama, n. sp.

The *cognata* group

P. cognata (Märkel, 1842), n. comb.

P. iberica Maruyama, n. sp.

P. japonica (Sharp, 1888)

P. kishimotoi Maruyama, n. sp.

The *ruficollis* group

P. ruficollis (Grimm, 1845), n. comb.
Myrmedonia fernandi Fairmaire, 1855

The *coreana* group

P. coreana Maruyama, n. sp.

P. plutenkoi Maruyama, n. sp.

The *excepta* group

P. excepta (Mulsant & Rey, 1861), n. comb.

P. maura (Fauvel, 1898), n. comb.
Myrmedonia Ragusae Ragusa, 1921
P. kuluensis (Cameron, 1939), n. comb.
P. bohaci (Dvořák, 1984), n. comb.
Zyras (*Pella*) *almaatensis* Pace, 2002, n. syn.
P. cinctipennis (Eppelsheim, 1884), n. comb.
Zyras (*Pella*) *esau* Dvořák, 1984, n. syn.

The *lugens* group
P. lugens (Gravenhorst, 1802), n. comb.
P. beijingorum (Pace, 1998), n. comb.
P. intermedia Maruyama, n. sp.
P. masakoae Maruyama, n. sp.

The *spreta* group
P. spreta (Sharp, 1888), n. comb.
P. zhoui Maruyama, n. sp.

The *laticollis* group
P. laticollis (Märkel, 1845), n. comb.
P. hampei (Kraatz, 1862), n. comb.
P. indiscreta (Sharp, 1888), n. comb.

Incertae sedis
P. pumila (Fiori, 1914), n. comb.

Key to the Species Groups of the Genus *Pella*

1. Eleventh antennal segment long, longer than 7th to 10th segments combined. ..... 2.
— Eleventh antennal segment short to medium, shorter than 7th to 10th segments combined. ... . 3.
2. Body bicoloured; pronotum reddish orange; pronotal hypomeron fully visible in lateral view; posterior margin of 8th tergite not crenate nor dentate, almost straight; macrosetae on 8th abdominal segment clearly differentiated from setae. .....*ruficollis* group.
— Body unicoloured, pale brown; pronotal hypomeron partly visible in lateral view, its visible part less than 3/5 of pronotal length; posterior margin of 8th tergite crenate; macrosetae on 8th abdominal segment clearly differentiated from setae. .....*coreana* group.
3. Pronotal hypomeron invisible, or only slightly and narrowly visible in lateral view (its visible length less than 0.4 times as long as pronotum). ..... 4.
— Pronotal hypomeron clearly visible in lateral view (its visible length more than 0.5 times as long as pronotum). ..... 6.
4. Body almost unicoloured. .....*laticollis* group.
— Body evidently tricoloured; black in ground colour; elytra yellow but blackish brown around postero-lateral corner, or black but with yellow; legs reddish brown. ..... 5.
5. Eyes large and prominent, its length about 0.45–0.48 times as long as head width; lateral areas of pronotum well convex above; pronotal surface roughly punctured. .....*spreta* group.
— Eyes medium to large in size, its length less than 0.42 times as long as head width; lateral areas of pronotum flattened; pronotal surface finely punctured. .....*lugens* group.
6. Antennae and legs yellow. .....*schillhammeri* group.
— Antennae and legs reddish brown to black. ..... 7.

7. Pronotum with postero-lateral corners, evidently narrowed posteriad, more or less parallel-sided posteriorly. ..... 8.
— Pronotum completely rounded postero-laterally to posteriorly, not forming postero-lateral corners. .....10.
8. Elytra bicoloured, with a maculation at antero-lateral margin; posterior margin of male 8th sternite truncate; copulatory piece of aedeagal median lobe widened apicad and widely truncate at apex. .....*humeralis* group.
— Elytra unicoloured; posterior margin of male 8th sternite rounded; copulatory piece of aedeagal median lobe narrowed apicad and not truncate at apex. ..... 9.
9. Body medium to large: 5.0–6.6 mm. .....*funesta* group.
— Body small: 3.3–4.1 mm. .....*barbara* group (part).
10. Pronotum widest around middle, more than 1.48 times as wide as long . .....*hlavaci* group.
Pronotum widest anteriorly, less than 1.46 times as wide as long. .....11.
11. Body small: 3.3–4.1 mm, almost unicoloured. .....12.
— Body medium to large: 3.7–6.2 mm, bicoloured. .....13.
12. Eleventh antennal segment almost as long as 1st segment. .....*barbara* group (part).
— Eleventh antennal segment evidently shorter than 1st segment. .....*erratica* group.
13. Antero-lateral areas of pronotum strongly curved ventrad; hypomeron partly visible in lateral view, its visible length less than 0.6 times as long as pronotum; pronotal surface sparsely to moderately covered with setae; distal crest of aedeagal median lobe roundly projected. .....*excepta* group.
— Antero-lateral areas of pronotum weakly curved ventrad; hypomeron fully visible in lateral view, its visible length more than 0.7 times as long as pronotum; pronotal surface densely covered with setae; distal crest of aedeagal median lobe gently projected, or weakly projected. .....14.
14. Male 8th sternite almost as long as that of female; apical lobe of aedeagal median lobe much narrowed in ventral view and acutely curved ventrad at base; copulatory piece of aedeagal median lobe aciculate around apex in ventral view. .....*limbata* group.
— Male 8th sternite evidently longer than that of female; apical lobe of aedeagal median lobe gradually narrowed apicad and slightly curved ventrad or almost straight; copulatory piece of aedeagal median lobe rounded, truncated or pointed at apex and not aciculate in ventral view. .....15.
15. Legs almost uniformly reddish brown; abdomen with around posterior margin of 3rd to 5th abdominal segments reddish brown. .....*kinomurai* group.
— Legs reddish yellow to yellowish brown, around apical 1/2 of femora darker; abdomen with most areas of 3rd to 5th abdominal segments yellowish brown. .....16.
16. Eleventh segment of antenna almost as long as 1st segment; apical lobe of aedeagal median lobe much shorter than basal capsule, gently narrowed apicad and pointed at apex in lateral view; apical part of spermatheca without outer projection. .....*similis* group.
— Eleventh segment of antenna much shorter than 1st segment; apical lobe of aedeagal median lobe almost as long as basal capsule, subparallel-sided around middle and obtuse at apex in lateral view; apical part of spermatheca with outer projection. .....*cognata* group.

Comments. In distinguishing the species of *Pella* examinations of aedeagus or spermatheca are often indispensable, because most other characters used in identification are rather quantitative. It is better to refer first to the figures of aedeagus or spermatheca.

The *limbata* Group

Species included. *Pella limbata*, *P. horii*.

Distribution. European subregion, Mediterranean subregion, Manchurian subregion.

Diagnosis. Species of the *limbata* group may be characterised by a combination of the following character states: 1) eye length 0.32–0.34 times as long as head width; 2) 11th antennal segment longer than the 1st; 3) pronotum with postero-lateral corners; 4) pronotum 1.18–1.35 times as wide as long; 5) pronotum widest anteriorly; 6) pronotal hypomeron fully visible in lateral view; 7) elytra with yellowish brown maculations around antero-lateral and postero-lateral corners; 8) inner and posterior margins of elytra weakly margined; 9) male 8th sternite not longer than in female and almost the same in size; 10) posterior margin of 8th tergite crenate; 11) posterior margin of male 8th sternite rounded; 12) lateral projection of apodeme of male 8th tergite not evidently longer than that of female; 13) macrosetae of 8th abdominal segment generalised in length, exceeding the posterior margin of the segment; 14) postero-medial margin of female 8th sternite with minute pubescence; 15) apical lobe of aedeagal median lobe curved ventrad at base in lateral view; 16) distal crests of aedeagus well developed, projected semicircularly in lateral view; 17) copulatory piece of aedeagal median lobe aciculate around apex in dorsal view.

Comments. The *limbata* group can be regarded as a monophyletic group by character states: the apical lobe of the aedeagal median lobe is curved ventrad at the base in lateral view; it is much narrowed at base in ventral view; the copulatory piece of the aedeagal median lobe is aciculate around the apex in dorsal view. These states are unique within the genus and not observed in the other species of the Lomechusini. Thus, these states are considered to be autapomorphies of the species-group. This species-group may possibly be allied to the *similis* group and the *cognata* group in resemblance of the shape of male 8th sternite, which is relatively widely emarginate posteriorly.

Symbiotic hosts. *Lasius* (*Lasius*) spp., *L.* (*Cautolasius*) *flavus*, *L.* (*Dendrolasius*) *fuliginosus*.

Key to the Species of the *limbata* Group

— Eyes smaller, 0.32–0.33 times as long as head width; pronotum wider, 1.28–1.35 times as wide as long; posterior margin of male 8th tergite deeply and roundly emarginate, and its lateral corner projected; apical lobe of aedeagal median lobe shorter than apical part. Distribution: Europe. .....*P. limbata*.

— Eyes larger, 0.33–0.34 times as long as head width; pronotum narrower, 1.18–1.25 times as wide as long; posterior margin of male 8th tergite weakly emarginate, and its lateral corner slightly rounded; apical lobe of aedeagal median lobe longer than apical part. Distribution: Asia. .....*P. horii*.

Pella limbata (Paykull, 1789)

(Figs. 1–17)

Staphylinus limbatus Paykull, 1789: 54 (original description).—Stephens, 1832: 162 (*Aleochara*, description).—Erichson, 1837: 288 (*Myrmedonia*, description).—Mulsant & Rey, 1873a: 55 (*Myrmedonia*, description).—des Gozis, 1886: 12 (*Pella*, list).—Ganglbauer, 1895: 123 (*Myrmedonia* (*Pella*), key, description).—Fenyes, 1918: 24 (*Pella*, list); Reitter, 1909: 43 (*Myrmedonia* (*Pella*), key).—Fenyes, 1920: 297 (*Zyras* (*Pella*), list).—Bernhauer & Scheerpeltz, 1926: 701 (*Zyras* (*Pella*), list).—Scheerpeltz, 1934: 1659 (*Zyras* (*Pella*), list).—Kistner, 1972: 150 (*Pella*, description).—Lohse, 1974: 225 (*Zyras* (*Pella*), key).—Gürlich, 1981: 211 (*Pella*, chaetotaxy).—Likovský, 1993: 59

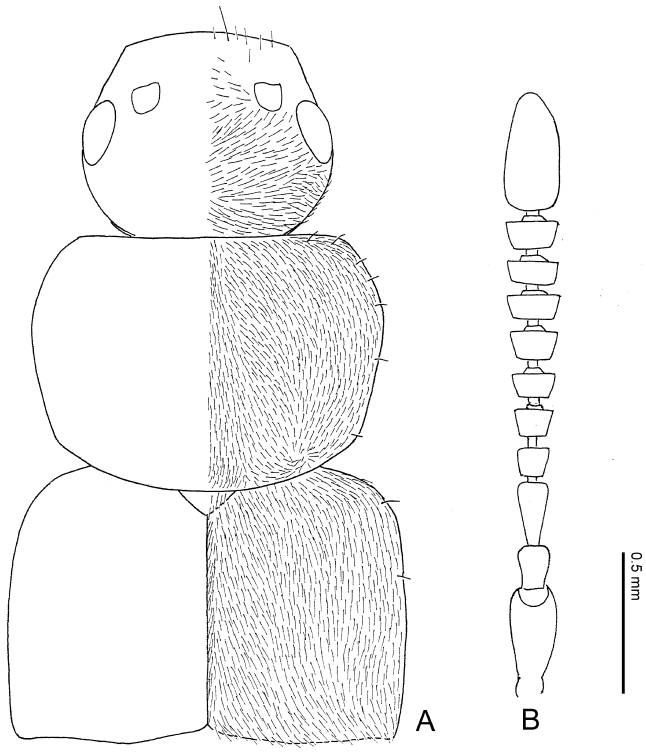

Fig. 17. *Pella limbata* (Paykull). — A, Fore body, dorsal view; B, right antenna.

(*Zyras* (*Pella*), list). — Smetana, 2004: 461 (*Zyras* (*Pella*), list).

Staphylinus divisus Marsham, 1802: 510 (original description). — Stephens, 1832: 162 (*Aleochara*, list). — Fenyes, 1920: 297 (synonym of *limbata*, list). — Bernhauer & Scheerpeltz, 1926: 701 (synonym of *limbata*, list). — Smetana, 2004: 461 (synonym of *limbata*, list).

Aleochara laevis Gravenhorst, 1802: 95 (original description). — Mulsant & Rey, 1873a: 55 (synonym of *limbata*, list). — des Gozis, 1886: 12 (*Pella*, list). — Ganglbauer, 1895: 123 (synonym of *limbata*, list). — Fenyes, 1920: 297 (synonym of *limbata*, list). — Bernhauer & Scheerpeltz, 1926: 701 (synonym of *limbata*, list). — Smetana, 2004: 461 (synonym of *limbata*, list).

Type material. *Staphylinus limbatus*. Syntypes: **Sweden**: 1♂, 2♀♀, (without label, pinned) (NHRS).

Staphylinus divisus. Not examined. Type locality: Great Britain.

Aleochara laevis. Syntype: **Germany**: 1♀, "♀ laevis Gr. ["Berolin" (=Berlin, Germany)]" (pinned) (ZMHB).

Type locality. Sweden.

Other material. **Austria**: 1 ex., Wien, Breit; 2 exs., Donauauen, Breit. **Czech Republic**: 4 exs., Ostrava, Moravia, 11 IV 1980, L. Klíma; 1 ex., Chuchle, Bohemia, 10 IV 1944, Souček; 1 ex., Cějč, Moravia, 9 V 1988, Jůta; 1 ex., same data but, 1 VI 1988; 1 ex., Sárka, Praha, Roubal; 5 exs., Vysoká, Bohemia, 26 III 1950, A. Smetana (CNC); 1 ex., Hradao, Bohemia, 19 III 1949, A. Smetana (CNC); 1 ex., Hlvbočepy, 23 VI 1935, Kul (CNC); 1 ex., Bohemia, Celákovice, 21 III 1945, J. Král; 3 exs., Chuchle, Bohemia, 10 IV 1944, Souček (CNC); 1 ex., Hradec, Bohemia, 4 VIII 1944, Souček (CNC); 1 ex., same data but, 8 IV 1944, Souček (CNC); 2 exs., same data but, 9 IV 1944, Souček (CNC); 2 exs., Kukleny, Bohemia, 23 IV 1947, A. Smetana (CNC); 2

exs., same data but, 8 V 1947, A. Smetana (CNC); 3 exs., Silesia, Radvanice, 28 V 1963, P. Nohel (CNC). **Germany**: 5 exs., Schneverdingen, Soltau, Luneburger, Niedersachsen, V 2001, V. Assing (pt); 1 ex., Von Heidelberg, W. Heinz, Wilhelmsfeld, 25 IV 1963; 1 ex., Umg. Halberstadt, 7 V 1982, H. D. Briagmann; 1 ex., Berlin–Treptow, Sdl. Daheim, Ruderalflur, BF, 16 IV–22 V 1994, ABT 3, Uhlig; 1 ex., Baden–Württemberg, Kaiserstuhl mts., NW Freiburg, VII 1981, Kobel–Lamparski (unbaited pt); 1 ex., Mesobrometum, Steinberg, S Hildesheim, D. Niedersachsen, 1 V 1997, Bodenfalle; 2 exs., northern Thuringia, 2 V 1917, Petry (*LCAF*); 1 ex., same data but, 3 V 1908 (*LLB*). **Slovakia**: 1 ex., Boï-naplav Latonic, 11 III 1995, P. Hlaváč; 1 ex., Streda n. B., 8 V 1989, M. Kuboň; 4 exs., Kůty, 27 III 1992, M. Kuboň; 1 ex., Mitra, VI 1930, Roubal (CNC).

Distribution. European subregion, Mediterranean subregion. EUROPE: Austria, Belgium, Bosnia Herzegovina, Czech Republic, Denmark, Estonia, Finland, France, Great Britain, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Netherlands, Norway, Poland, Russia (North, Central and South European territories), Slovakia, Spain, Sweden, Switzerland.

Diagnosis. *Pella limbata* is closely similar to *P. horii* in general appearance and colour, but easily distinguished from the latter by the emargination on posterior margin of male 8th tergite much deeper and the presence of a depression on male pronotal disc. These two species are locally isolated. Among the sympatric species, *Pella limbata* is similar to *P. similis* and *P. cognata* in general appearance, but in addition to the diagnostic characters above distinguished from *P. similis* by the larger body, and from *P. cognata* by the apical lobe of aedeagal median lobe gradually narrowed apicad.

Redescription. Body (Fig. 1) slender. Brown in ground colour; antennae, mouthparts, legs, 2nd to 4th abdominal segments and around posterior margins of 5th to 7th abdominal segments reddish yellow; elytron with yellow maculations around antero-lateral and postero-lateral corner; rarely elytra and abdomen uniformly brown. Head (Figs. 2 A, 2 B, 3 A, 17 A) widest just behind eyes; surface smooth, moderately covered with setae; setae rather long, almost as long as those on pronotum and elytra; length of eyes 0.32–0.33 times as long as head width. Antennae (Figs. 3 C, 3 D, 17 B) shorter than head, pronotum and elytra combined; 1st segment long, almost as long as 2nd and 3rd combined; 2nd segment about 2/3 as long as 3rd; 3rd segment about 2/3 as long as 1st; 4th and 5th segments almost as long as wide; 6th to 10th segments wider than long; 11th segment slightly longer than 1st; approximate relative lengths of segments from basal to apical: 30 : 13 : 18 : 7 : 7 : 7 : 7 : 6 : 7.5 : 8.5 : 32. Pronotum (Fig. 17 A) 1.28–1.35 times as wide as long, widest around anterior 1/4, narrowed posteriorly; postero-lateral corner rounded; surface finely punctured, densely covered with setae, with 6 macrosetae along lateral margin. Scutellum with surface rugosely punctured and moderately covered with setae. Elytra (Fig. 17 A) slightly broadened posteriorly; surface finely punctured, densely covered with setae, with 4 or 5 small macrosetae laterally. Legs moderate in length; hind tibia 0.96–1.01 times as long as elytra; approximate relative lengths of tarsal segments from basal to apical: 9 : 9 : 8 : 14.5 in fore tarsus; 15 : 10 : 8 : 7 : 12 in mid tarsus; 14.5 : 12.5 : 10 : 8 : 15 in hind tarsus. Abdomen subparallel-sided, slightly wider than elytra, widest around 5th and 6th segments; surface moderately punctured; 3rd to 5th tergites densely covered with setae; 6th tergites densely covered with setae but basal area moderately covered with small setae; 7th tergite sparsely covered with minute setae; 8th tergite (Figs. 11 A, 11 C) with 7 (rarely 8) macrosetae; 9th tergite with 2 or 3 macrosetae, which are poorly differentiated from other setae; 10th tergite with posterior margin rounded, with 1 macroseta.

Male: Postero-medial part of pronotal disc with a circular depression; 8th tergite (Fig. 11 A) with posterior margin roundly and deeply emarginated, its emarginate apex weakly crenate; 8th sternite (Fig. 11 B) with 15–19 macrosetae; 9th sternite with posterior margin slightly emarginated. Aedeagus (Figs. 12 A–12 E, 13 A–13 E) somewhat gourd-shaped in ventral view; apical lobe curved ventrad at base in lateral view, much narrowed at base, broadened at middle and rounded at apex in ventral view; basal ridge weakly convex; copulatory piece of inner sac as in Figs. 13 F, 13 G. Paramere (Figs. 15 A, 15 B) with apical lobe of paramerite narrowed apically, about 1/3 as long as condylite.

Female: Pronotum without depression; 8th tergite (Fig. 11 C) with posterior margin slightly truncate; 8th sternite (Fig. 11 D) with 8–10 macrosetae; sensory setae of 8th sternite generalised, similar to other setae in shape. Spermatheca (Figs. 16 D–16 F) curved three times, somewhat M-shaped; basal part 1.2–1.4 times as long as apical part, acutely curved at middle, its inner wall sparsely wrinkled around apex; apical part weakly curved, its inner wall entirely and densely wrinkled.

Measurements. BL, 4.8–6.3; FBL, 2.4–2.8; HL, 0.69–0.79; HW, 0.80–0.88; EL, 0.262–0.293; AL, 1.73–2.11; PL, 0.84–0.96; PW, 1.01–1.25; ELL, 0.94–1.04; ELW, 1.33–1.37; HTL, 0.95–1.00.

Bionomics. *Pella limbata* is commonly collected from under dead leaves around the nest of *Lasius* (*Dendrolasius*) *fuliginosus*, but no detailed information on ant-association of this species has yet been reported. The life cycle of *P. limbata* is unknown, but the larvae were collected in July. This suggests that the life cycle of *P. limbata* is different from those of the investigated *Pella* species described in Chapter 3.

Symbiotic hosts. *Lasius* (*Lasius*) *brunneus*, *L.* (*Cautolasius*) *flavus*, *L.* (*Dendrolasius*) *fuliginosus*.

Pella horii Maruyama, n. sp.

(Figs. 18–20)

"*Myrmedonia similis*": Sharp, 1888: 291 (misidentification, record from Japan).

Type material. Holotype: **Japan**: ♂, "Hebi-numa, Teshio-gawa, Teshio-chô, Hokkaidô, 9 VII 1992, S. Hori leg." (pt) (HUM).

Paratypes: **Japan**: Hokkaidô: 17 exs., Rebun-tô, 15 VII 1991, N. Yasuda (pt); 2 exs., Sarobetsugen'ya, 9 VI 1991, N. Yasuda (pt); 2 exs., same data but, 11 VIII 1991; 14 exs., Hebi-numa, Teshio-gawa, Teshio-chô, 9 VII 1992, S. Hori (pt); 1 ex., Onnenai, Tsurui-mura, Akan-gun, 22 VI 1993, Y. Hirama; 4 exs., same data but, 27 VI 1993; 2 exs., same data but, 2 VI 1994; 1 ex., Kinashibetsu-kaigan, Otobetsu-chô, 2 IX 1995, Y. Hirama; 2 exs., Iwaobetsu, Shari-chô, 3 VIII 1989, K. Haga; 4 exs., Ishikari-gawa, Kamikawa-chô, 2 VI 1994, N. Yasuda (pt); 2 exs., same data but, 1 VIII 1994; 4 exs., same data but, 21 VII 1997; 1 ex., Karikachi-tôge, Shintoku-chô, 24 VI 1993, K. Miyashita; 1 ex., Shiomi, Mukawa-chô, 17 IX 2001, S. Hori; 1 ex., Kaitaku-kinenkan, Nopporo-shinrin-kôen, Ebetsu-shi, 17–24 V 2000, S. Hori (fit); 1 ex., Hyakumatsu-zawa, Sapporo-shi, 1 VI 1998, K. Mizota *et al.* (pt); 1 ex., same data but, 7 VII 1998; 1 ex., same data but, 14 VII 1998; 1 ex., same data but, 19 VIII 1998; 8 exs., Hamataiki, Taiki-chô, 7 VII 1993, S. Hori (pt); 2 exs., Horokayantô-numa, Taiki-chô, 7 VII 1993, S. Hori (pt); 9 exs., same data but, 29 VII 1993; 3 exs., same data but, 29 VIII 1993; 17 exs., same data but, 12 VI 1994; 1 ex., Ôtsu-shitchi, Toyokoro-chô, 7 VII 1993, S. Hori (pt); 1 ex., Shibetsu-gawa, Shibetsu-chô, 25–28 VI 2001, H. Yoshitomi; 1 ex., Shirogane-onsen, Biei-chô, 11 VIII 1997, T. Matsumoto; 1 ex., Hi-

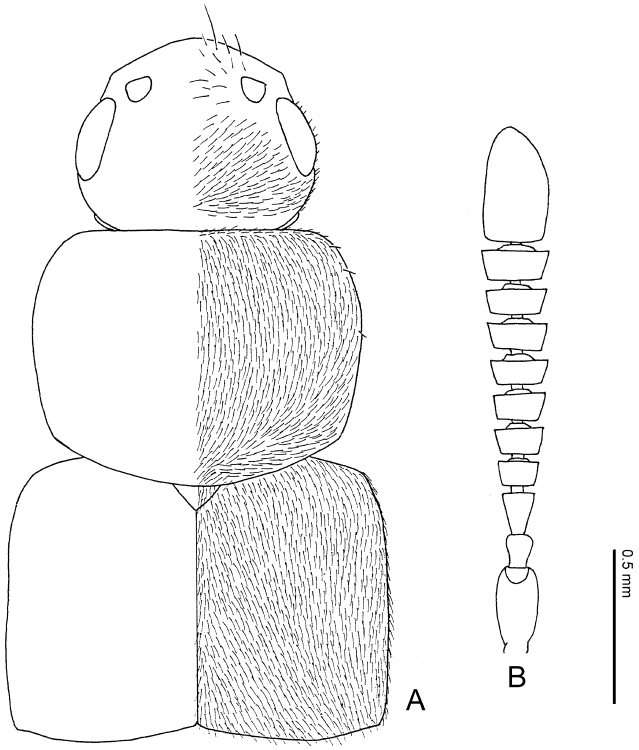

Fig. 18. *Pella horii* Maruyama, n. sp. — A, Fore body, dorsal view; B, right antenna.

gashiyama, Esashi-chô, 15 V 1999, S. Hori; 6 exs., Motoyama, Esashi-chô, 15 V 1999, K. Sasaki. Honshû: 1 ex., Funakawa, Oga-shi, Akita-ken, 26–27 V 1992, S. Saito; 1 ex., Kamuro, Kaneyama-chô, Yamagata-ken, 26 V 1998, A. Ohkawa; 1 ex., Hirasawa-rindô, Hinoemata-mura, Fukushima-ken, 21 V 1988, K. Haga (in a fallen tree of *Fagus serratus*); 1 ex., Shinano-gawa, Ushigashima, Kawaguchi-chô, Niigata-ken, 30 IV 1995, K. Haga (under accumulated leaves on sandy riverside); 1 ex., Kazakari-tôge, Hinohara-mura, Tokyo-to, 6 VI 1982, H. Saitoh; 1♀, "Miya (written underside of paper card specimen glued on)/Miyanoshita. Miyanoshita, Hokone-chô, Kanagawa-ken/Japan., G. Lewis., 1910-320./Myrmedonia similis" (recorded as "*Myrmedonia similis*" by Sharp (1888)) (BMNH).

Type locality. Teshio-chô, Hokkaidô, Japan.

Distribution. Manchurian subregion. ASIA: Japan (Hokkaidô, Honshû).

Etymology. Dedicated to Mr. Shigehisa Hori (Historical Museum of Hokkaidô, Japan) for his invaluable contributions to the faunistic study in Hokkaidô, and he is a collector of most part of the type series.

Diagnosis. As Sharp (1888) misidentified *Pella horii* as "*P. similis*", these two species are closely similar to each other, but *P. horii* is distinguished from *P. similis* by the gourd shape of aedeagus and the shorter basal part of the spermatheca. These two species are locally isolated. *Pella horii* is also similar to *P. limbata* in general appearance and shape of aedeagus, but easily distinguished from the latter by the weakness of emargination at the apex of male 8th tergite, which is very deeply emarginate in *P. limbata*, and the absence of depression in male pronotum. These are locally isolated. Among the sympatric species *Pella horii* is most similar to *P. japonica*

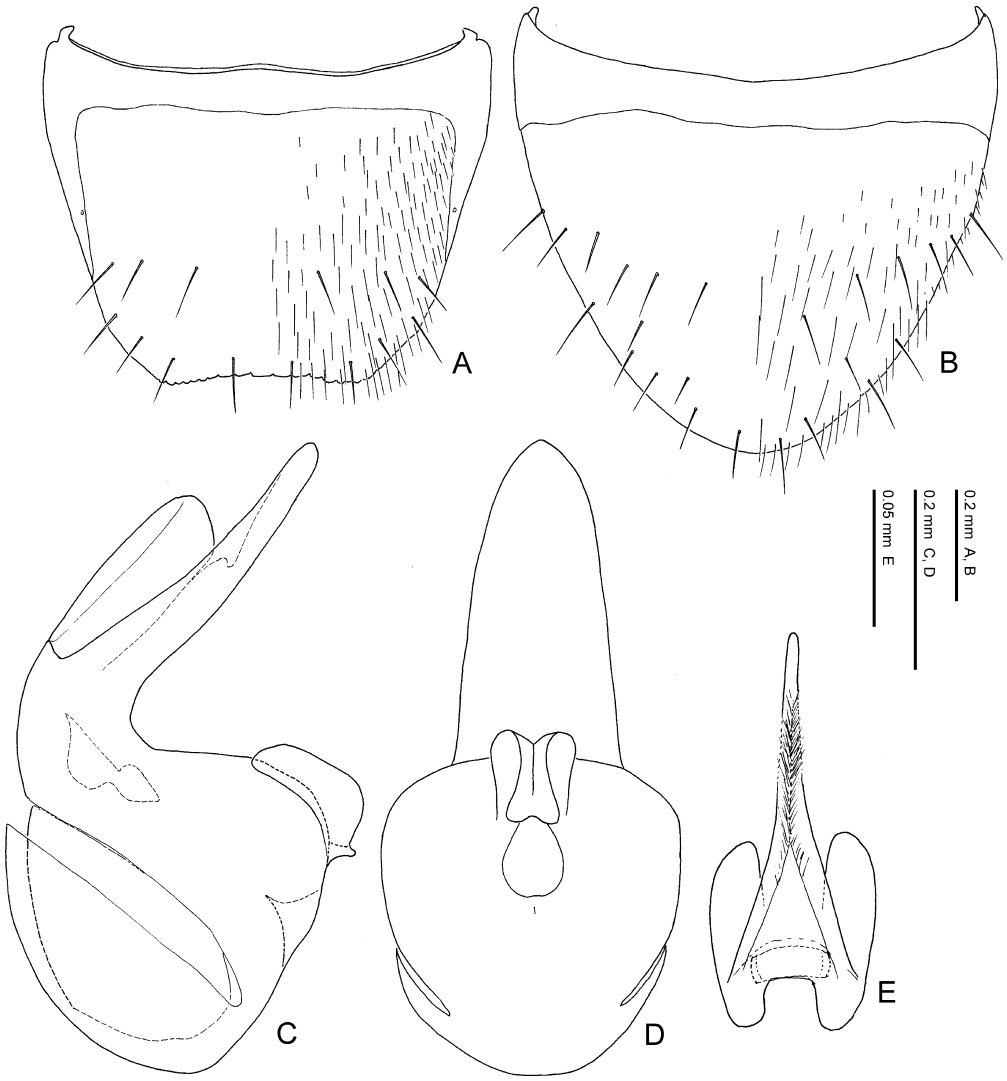

Fig. 19. *Pella horii* Maruyama, n. sp. — A, Eighth abdominal tergite, dorsal view; B, 8th abdominal sternite, ventral view; C, median lobe of aedeagus, lateral view; D, ditto, ventral view; E, copulatory piece, dorsal view.

in general appearance but is distinguished from the latter by the smaller body and the 11th antennal segment longer than the 1st.

Description. Body slender. Brown in ground colour; antennae, mouthparts, legs, and around posterior margins of 3rd to 7th abdominal segments reddish yellow; elytra with reddish yellow maculation on mesal area of each elytron; sometimes abdomen uniformly brown. Head (Fig. 18 A) widest just behind eyes; surface smooth, moderately covered with setae; setae rather long, almost as long as those on pronotum and elytra; length of eyes 0.33–0.34 times as long as head width. Antennae (Fig. 18 B) shorter than head, pronotum and elytra combined; 1st segment long, almost as long as 2nd and 3rd combined; 2nd segment slightly shorter than 3rd; 3rd segment about 1/2 as long as 1st; 4th to 10th segments wider than long; 11th segment evidently longer than 1st; approximate relative lengths of segments from basal to apical: 25 : 11 : 12 : 6 : 6 :

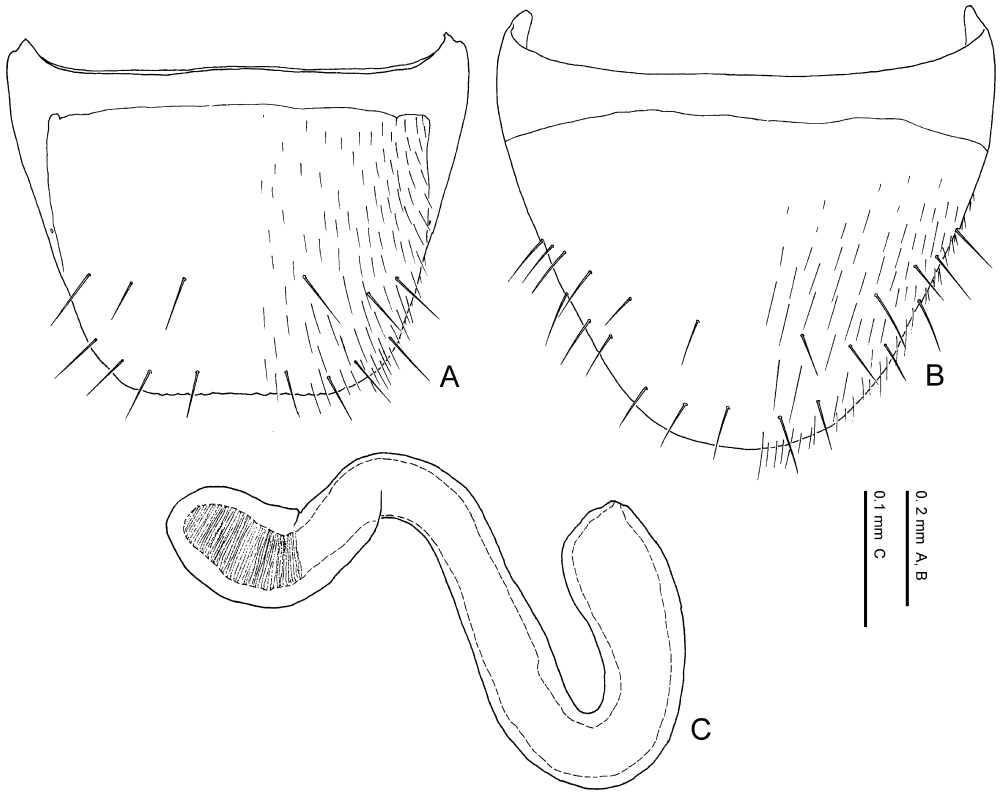

Fig. 20. *Pella horii* Maruyama, n. sp. — A, Eighth abdominal tergite, dorsal view; B, 8th abdominal sternite, ventral view; C, spermatheca. Female.

5.5 : 6 : 5.5 : 6 : 7 : 30. Pronotum (Fig. 18 A) 1.18–1.25 times as wide as long, widest around anterior 1/4, narrowed posteriorly; postero-lateral corner rounded; surface finely punctured, densely covered with setae, with 9 or 10 macrosetae along lateral margin. Scutellum with surface reticulated and moderately covered with setae. Elytra (Fig. 18 A) slightly broadened posteriorly; surface finely punctured, densely covered with setae, with 2 or 3 small macrosetae laterally. Legs moderate in length; hind tibia 097–0.98 times as long as elytra; approximate relative lengths of tarsal segments from basal to apical: 7 : 7 : 6.5 : 13 in fore tarsus; 9.5 : 5.5 : 5 : 5 : 7.5 in mid tarsus; 19 : 10 : 8 : 7.5 : 12.5 in hind tarsus. Abdomen subparallel-sided, slightly wider than elytra, widest around 4th and 5th segments; surface smooth; 3rd to 6th tergites very sparsely covered with minute setae medially, with long setae along each posterior margin; 7th tergite sparsely covered with minute setae; 8th tergite (Figs. 19 A, 20 A) with 7 macrosetae; 9th tergite with 4 macrosetae; 10th tergite with posterior margin rounded, with 4 macrosetae.

Male: Eighth tergite (Fig. 19 A) with posterior margin slightly emarginate, its emarginate apex weakly crenate; 8th sternite (Fig. 19 B) with 11–13 macrosetae; 9th sternite with posterior margin slightly emarginate. Aedeagus (Figs. 19 C, 19 D) somewhat gourd shaped; apical lobe curved ventrad at base in lateral view, much narrowed at base and rounded at apex in ventral view; basal ridge absent; copulatory piece of inner sac as in Fig. 19 E. Paramere with apical lobe of paramerite slightly narrowed apically and obtuse at apex, about 1/3 as long as condylite.

Female: Eighth tergite (Fig. 20 A) with posterior margin truncate, its truncate apex weakly crenate; 8th sternite (Fig. 20 B) with 10–13 macrosetae; sensory setae of 8th sternite generalised,

similar to other setae in shape. Spermatheca (Fig. 20 C) curved three times, somewhat M-shaped; basal part about twice as long as apical part, acutely curved just before middle, narrowed apicad; apical part weakly curved, its inner wall of apical part densely wrinkled from apex to around apical 1/2.

Measurements. BL, 4.3–5.4; FBL, 2.1–2.4; HL, 0.63–0.68; HW, 0.73–0.78; EL, 0.252–0.261; AL, 1.58–1.73; PL, 0.80–0.85; PW, 1.00–1.05; ELL, 0.89–0.95; ELW, 1.15–1.29; HTL, 0.88–0.93.

Bionomics. Most specimens examined from Hokkaidô were collected by pitfall traps, but in two occations two specimens were collected from nests of *Lasius* (*Cautolasius*) *flavus*. All the localities lie in open fields or wetlands near lakes, and *Lasius flavus* prefers such environment. Therefore, *Lasius flavus* is most probably a symbiotic host of *Pella horii*. Further field investigation into *Pella horii* will confirm host ant. No information was available for the life cycle and the immatures of this species.

Symbiotic host. *Lasius* (*Cautolasius*) *flavus*.

The ***similis*** Group

Species included. *Pella similis*.

Distribution. European subregion, Mediterranean subregion.

Diagnosis. Species of the *similis* group may be characterised by a combination of the following character states: 1) eye length 0.34–0.35 times as long as head width; 2) 11th antennal segment slightly shorter than the 1st; 3) pronotum with posterior margin completely rounded, not forming corners postero-laterally; 4) pronotum 1.28–1.39 times as wide as long; 5) pronotum widest anteriorly; 6) pronotal hypomeron fully visible in lateral view; 7) elytron with oblique yellowish brown maculation around antero-lateral corner to postero-medial area; 8) inner and posterior margins of elytra weakly margined; 9) male 8th sternite longer than in female and almost the same in size; 10) posterior margin of 8th tergite crenate; 11) posterior margin of male 8th sternite rounded; 12) lateral projection of apodeme of male 8th tergite not evidently longer than that of female; 13) macrosetae of 8th abdominal segment generalised in length, exceeding the posterior margin of the segment; 14) postero-medial margin of female 8th sternite without minute pubescence; 15) apical lobe of aedeagal median lobe gently curved ventrad in lateral view; 16) distal crests of aedeagus generalised, projected, pointed at apex in lateral view; 17) copulatory piece of aedeagal median lobe dilated apicad and tridentate at apex in dorsal view.

Comments. The *similis* group is a monotypical species-group. This species-group may possibly be allied to the *limbata* group and the *cognata* group in resemblance of the shape of male 8th sternite, which is relatively widely emarginate posteriorly.

Symbiotic hosts. *Lasius* (*Dendrolasius*) *fuliginosus*, *Liometopum microcephalum*.

Pella similis (Märkel, 1845), n. comb.

(Figs. 21–23)

Aleochara similis Märkel, 1845: 200 (original description).—Mulsant & Rey, 1873a: 58 (*Myrmedonia*, description).—des Gozis, 1886: 12 (*Pella*, list).—Ganglbauer, 1895: 123 (*Myrmedonia* (*Pella*), key, description).—Reitter, 1909: 43 (*Myrmedonia* (*Pella*), key).—Fenyes, 1920: 297 (*Zyras* (*Pella*), list).—Bernhauer & Scheerpeltz, 1926: 705 (*Zyras* (*Pella*), list).—Scheerpeltz, 1934: 1659 (*Zyras* (*Pella*), list).—Lohse, 1974: 225 (*Zyras* (*Pella*), key).—Likovský, 1993: 59 (*Zyras* (*Pella*), list).—Smetana, 2004: 461 (*Zyras* (*Pella*), list).

Type material. Syntypes: **Germany**: 1♂, "*similis* Mark* Saxon. in nid. Form. fuliginos.

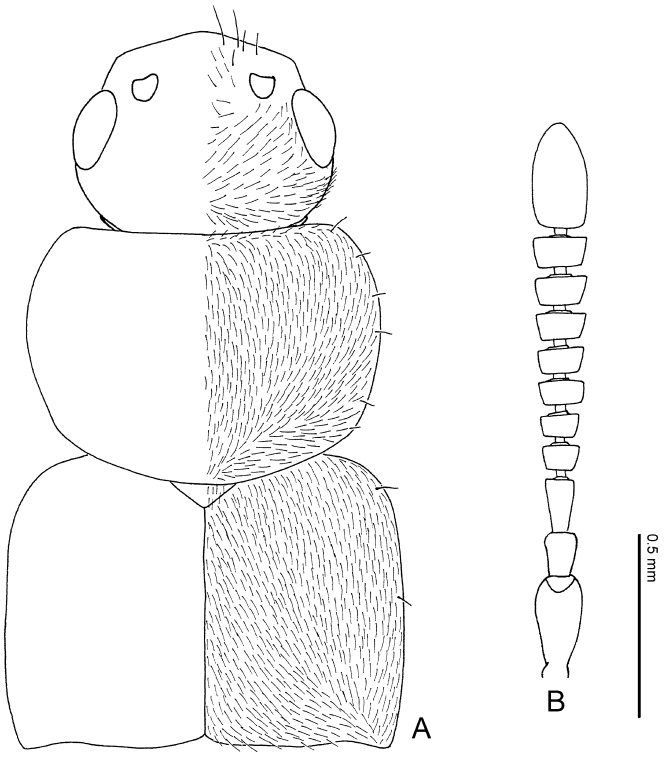

Fig. 21. *Pella similis* (Märkel). — A, Fore body, dorsal view; B, right antenna.

Märkel ["Saxon. mont., Märk" (= mountainous area of Saxonia, Germany, F. Märkel leg.)]"; 1♂, [ditto].

These are deposited in ZMHB.

Type locality. Saxonia, Germany.

Other material. **Austria**: 1♂, 1♀, Opcina-Basoviz, Triestiner, Karst, 21–28 IV 1921, Moczarski (*LDFL*) (cMar, ex NHMW); 1 ex., Wien, Mariabuin, Skalitzky (*LDFL*) (NMP); 2♂♂, Styria [Steiermark], Reitter (BMNH). **Bulgria**: 1♂, 1♀, Trevna, V–VI 1912 M. Hilf (cMar, ex NHMW); locality not specified: 1 ♂, 3♀♀, (BMNH). **Czech Republic**: 1 ex., Vtrané, Bohemia, 6 IV 1916, F. Rambousek (*LDFL*) (NMP); 1 ex., Čejč, Moravia, 26 III 1992, Kuboň; 1 ex., Bohemia, Kunětic. Hora, 27 IV 1947, A. Smetana (CNC); Bohemia, Chlum u Třeb., VI 1916 (CNC). **Germany**: 1♂, 1♀, Mesobromentum, Steinberg, Hildesheim, Niedersachen, 2 VII 1997, V. Assing. **Italy**: 2♂♂, 1♀, Angelo, Gargano, IV 1907, A. Kniz (NMP). **Slovakia**: Turdošovce, 1–3 V 1986, Jůsa; 1 ex., Kováčov, 1 V 1955, A. Smetana (CNC); 2 exs., Kamen. most, 3 V 1955, A. Smetana (CNC). **Turkey**: 1♂, 1♀, Yaylasi (alt. 1500 m), 30 km W. Baskonus, Kahramanmaras, 28 IV 2004, Brachat & Meybohm (cAss). **Yugoslavia**: 1♂, 1♀, Brus, Kopaonik, VII 1910, F. Rambousek (*LDFL*) (NMP).

Distribution. European subregion, Mediterranean subregion. EUROPE: Austria, Belgium, Bosnia Herzegovina, Croatia, Czech Republic, France, Germany, Hungary, Italy, Netherlands, Poland, Portugal, Romania, Slovakia, Russia (South European territory), Switzerland, Turkey, Yugoslavia. New to Turkey.

Diagnosis. *Pella similis* is most similar to *P. horii* in general appearance but distinguished from the latter by the oval shape of aedeagus and the longer basal part of the spermatheca. These

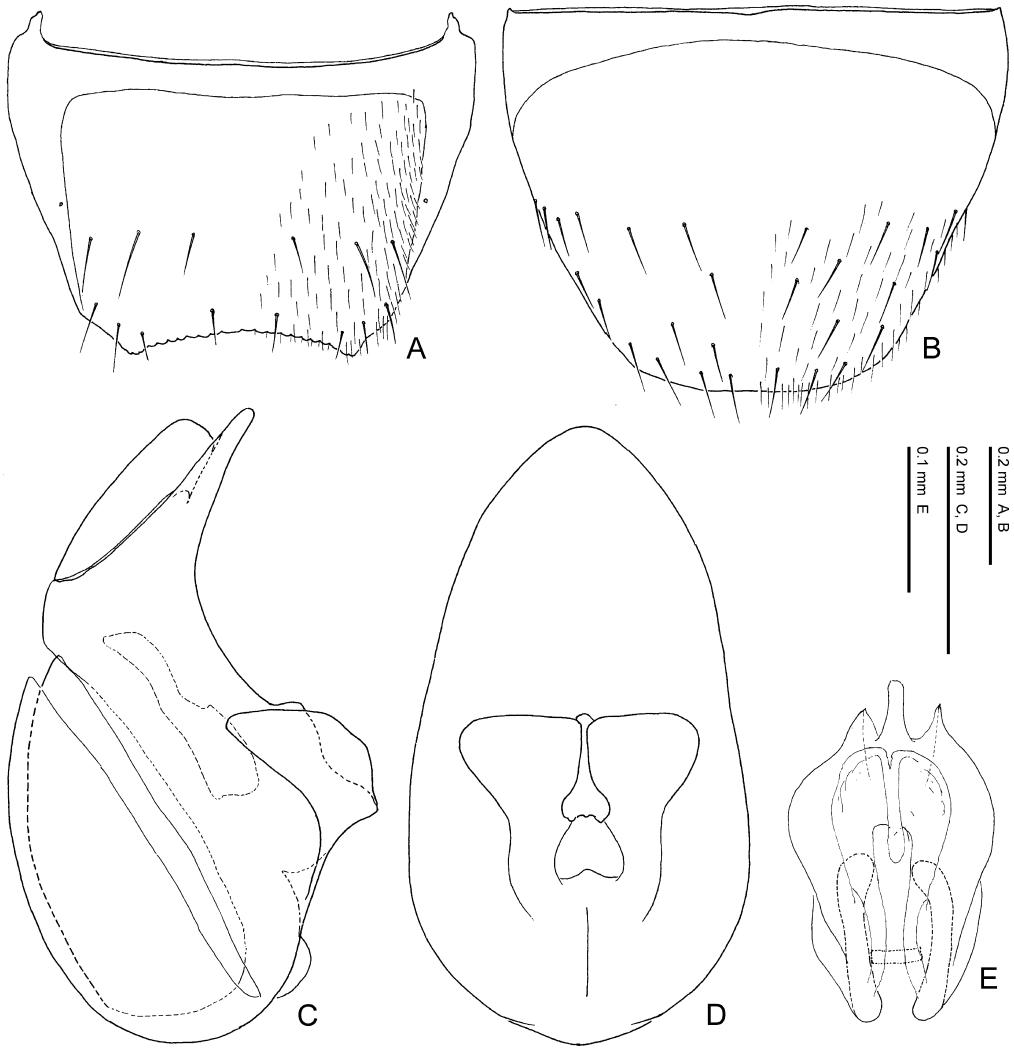

Fig. 22. *Pella similis* (Märkel). — A, Eighth abdominal tergite, dorsal view; B, 8th abdominal sternite, ventral view; C, median lobe of aedeagus, lateral view; D, ditto, ventral view; E, copulatory piece, dorsal view. Male.

two species are locally isolated. Among the sympatric species, *Pella similis* is similar to *P. limbata* and *P. cognata* but distinguished from *P. limbata* by the diagnostic characters above and the smaller body, and from *P. cognata* by the above spermathecal structure, the smaller body and the shorter apical lobe of aedeagal median lobe.

Redescription. Body slender. Brown in ground colour; antennae, mouthparts, legs slightly paler; elytron with oblique yellowish brown maculation around antero-lateral corner to postero-medial area; reddish brown around posterior margins of 3rd to 5th abdominal segments; sometimes abdomen uniformly brown. Head (Fig. 21 A) widest just behind eyes; surface smooth, densely covered with setae, which are rather long, almost as long as those on pronotum and elytra; length of eyes 0.34–0.35 times as long as head width. Antennae (Fig. 21 B) shorter than head, pronotum and elytra combined; 1st segment long, longer than 2nd and 3rd combined; 2nd segment slightly shorter than 3rd; 3rd segment about 1/2 as long as 1st; 4th segment almost as long

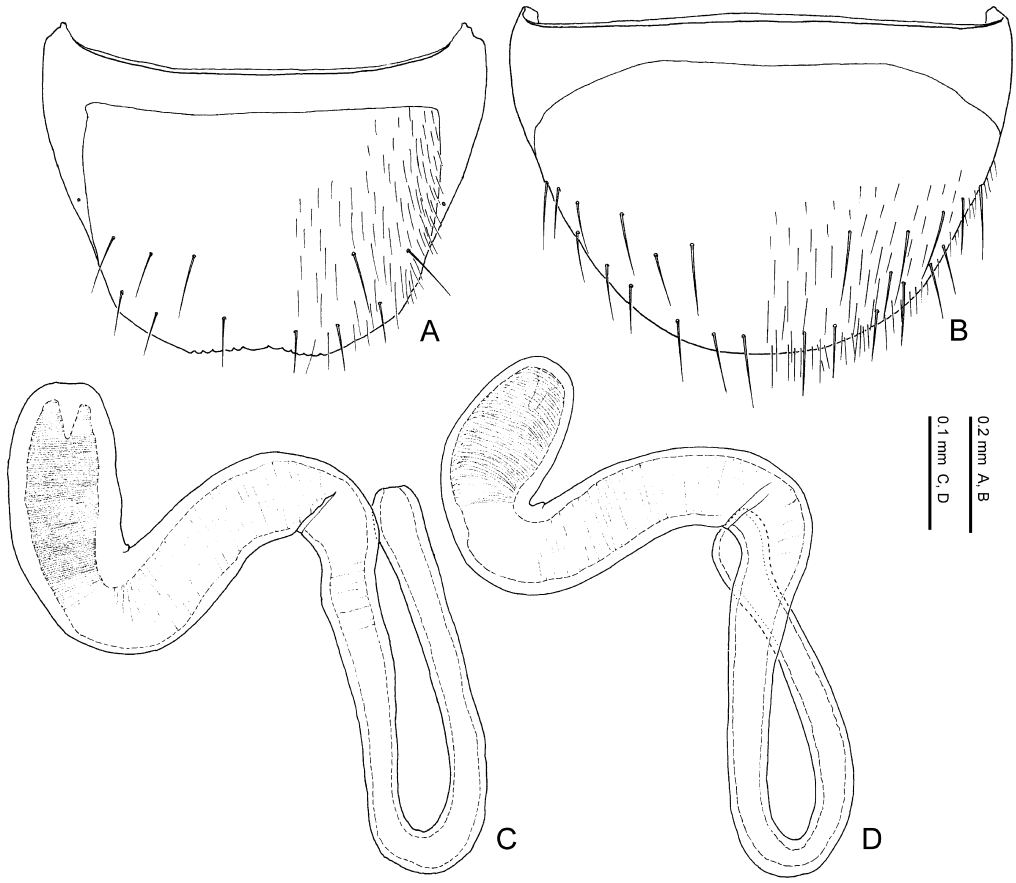

Fig. 23. *Pella similis* (Märkel).—A, Eighth abdominal tergite, dorsal view; B, 8th abdominal sternite, ventral view; C, D, spermathecae. Female.

as wide; 5th to 10th segments wider than long; 11th segment slightly shorter than 1st; approximate relative lengths of segments from basal to apical: 25 : 10 : 12 : 6 : 6.5 : 6.5 : 6 : 6.5 : 7 : 8 : 23. Pronotum (Fig. 21 A) variable in shape, about 1.28–1.39 times wider than long, widest around anterior 1/5 to 1/4, narrowed posteriorly; posterior margin rounded; surface finely punctured, densely covered with setae, with 7–10 macrosetae along lateral margin; a macroseta at anterior angle evidently longer than others. Scutellum with surface smooth and densely covered with setae. Elytra (Fig. 21 A) slightly broadened posteriorly; surface finely punctured, densely covered with setae, with 3 or 4 small macrosetae laterally. Legs moderate in length; hind tibia 0.9 times as long as elytra; approximate relative lengths of tarsal segments from basal to apical: 5 : 4 : 4 : 7.5 in fore tarsus; 11 : 7 : 7 : 6 : 10 in mid tarsus; 16 : 9 : 8.5 : 8 : 12 in hind tarsus. Abdomen subparallel-sided, slightly wider than elytra, widest around 4th and 5th segments; 3rd to 6th tergites very sparsely covered with minute setae medially, with long setae along each posterior margin; 7th tergite sparsely covered with minute setae; 8th tergite (Figs. 22 A, 23 A) with 7 (rarely 5 or 6) macrosetae; 9th tergite with 4 macrosetae; 10th tergite with posterior margin rounded, with 4 macrosetae.

Male: Eighth tergite (Fig. 22 A) with posterior margin slightly emarginate, its emarginate apex weakly crenate; 8th sternite (Fig. 22 B) with 15–17 macrosetae; 9th sternite with posterior

margin truncate. Aedeagus (Figs. 22 C, 22 D) oval in ventral view; apical lobe slightly curved ventrad and pointed at apex in lateral view, rounded at apex in ventral view; basal ridge small and rounded; copulatory piece of inner sac as in Fig. 22 E. Paramere with apical lobe of paramerite subparallel-sided and slightly pointed at apex, somewhat shorter than condylite.

Female: Eighth tergite (Fig. 23 A) with posterior margin slightly emarginate and crenate; 8th sternite (Fig. 23 B) with 11–13 macrosetae; sensory setae of 8th sternite generalised, similar to other setae in shape. Spermatheca (Figs. 23 C, 23 D) curved 3 times; basal part slightly longer and much narrower than apical part, acutely curved at middle, and its base sometimes touched its apex; apical part dilated apically, acutely curved just after middle, its inner wall wrinkled from apex to around apical 1/3.

Measurements. BL, 4.8–5.3; FBL, 2.2–2.5; HL, 0.64–0.68; HW, 0.74–0.80; EL, 0.259–0.278; AL, 1.55–1.68; PL, 0.71–0.78; PW, 0.98–1.08; ELL, 0.86–1.00; ELW, 1.12–1.28; HTL, 0.87–0.91.

Comments. Distinct intraspecific variations in the shape of pronotum are observed in this species, *e.g.* it is widest around anterior 4/5 in some specimens, though it is widest around anterior 3/4 in most specimens. Since shape of pronotum is one of the most important characters for identifying *Pella* species, several specimens deposited in museums are misidentified with other *Pella* species, *e.g.*, *P. limbata*, *P. cognata* and *P. erratica*.

Bionomics. This species is associated with *Lasius* (*Dendrolasius*) *fuliginosus* and *Liometopum microcephalum*, and is collected around the nest. Rare species (Sharp, 1888; Franc, 1992). No information was available for the life cycle and the immature stages.

Symbiotic hosts. *Lasius* (*Dendrolasius*) *fuliginosus*, *Liometopum microcephalum*.

The ***humeralis*** Group

Species included. *Pella humeralis*, *P. laeviceps*.

Distribution. European subregion, Mediterranean subregion.

Diagnosis. Species of the *humeralis* group may be characterised by a combination of the following character states: 1) eye length 0.35–0.38 times as long as head width; 2) 11th antennal segment shorter than the 1st; 3) pronotum with postero-lateral corners; 4) pronotum 1.28–1.41 times as wide as long; 5) pronotum widest anteriorly; 6) pronotal hypomeron fully visible in lateral view; 7) elytron with yellowish brown maculation around antero-lateral corner to mesal area; 8) inner and posterior margins of elytra weakly margined; 9) male 8th sternite longer than in female; 10) posterior margin of 8th tergite crenate; 11) posterior margin of male 8th sternite truncate; 12) lateral projection of apodeme of male 8th tergite evidently longer than that of female; 13) macrosetae of 8th abdominal segment generalised in length, exceeding the posterior margin of the segment; 14) postero-medial margin of female 8th sternite without minute pubescence; 15) apical lobe of aedeagal median lobe almost straight in lateral view; 16) distal crests of aedeagus well developed, projected, angled at middle of ventral margin in lateral view; 17) copulatory piece of aedeagal median lobe more or less truncate at apex in dorsal view.

Comments. The two species of the *humeralis* group are considered to be a sister group by the close similarity in many morphological points including aedeagal structure. However, no autapomorphy could be found in this species-group. This species-group may possibly be allied to the *funesta* group in resemblance of body shape and aedeagal structure.

Symbiotic hosts. *Formica* (*Formica*) *rufa* group, *Lasius* (*Dendrolasius*) *fuliginosus*, *L.* (*L.*) spp.

Key to the Species of the *humeralis* Group

— Brown in ground colour; posterior margin of male 8th tergite truncate at apex; pronotum wider, 1.32–1.41 times as wide as long; apical part of spermatheca curved at middle. Distribution: Europe, Balkan, Caucasia, Siberia. .....*P. humeralis*.

— Pale brown in ground colour; pronotum narrower, 1.30–1.33 times as wide as long; posterior margin of male 8th tergite rounded at apex; apical part of spermatheca almost straight. Distribution: Caucasia. .....*P. laeviceps*.

Pella humeralis (Gravenhorst, 1802), n. comb.

(Figs. 24–26)

Aleochara humeralis Gravenhorst, 1802: 90 (original description).—Stephens, 1832: 163 (*Aleochara*, description).—Erichson, 1837: 287 (*Myrmedonia*, description).—Mulsant & Rey, 1873a: 64 (*Myrmedonia*, description).—des Gozis, 1886: 12 (*Pella*, list).—Ganglbauer, 1895: 122 (*Myrmedonia* (*Pella*), key, description).—Reitter, 1909: 43 (*Myrmedonia* (*Pella*), key).—Fenyes, 1920: 297 (*Zyras* (*Pella*), list).—Bernhauer & Scheerpeltz, 1926: 699 (*Zyras* (*Pella*), list).—Scheerpeltz, 1934: 1655 (*Zyras* (*Pella*), list).—Lohse, 1974: 225 (*Zyras* (*Pella*), key).—Likovský, 1993: 59 (*Zyras* (*Pella*), list).—Smetana, 2004: 461 (*Zyras* (*Pella*), list).

Type material. Syntypes: **Germany**: 1♀, "5249/*humeralis* Gr.* [Berolin (= Berlin, Germany)]" (pinned); 1♂, 3♀♀, [ditto] (without label, pinned); 1♂, "Var. Suecia Schüpp" ["Suec. Schüpp." (= Switzerland, Schüppel leg.)] (pinned).

These are deposited in ZMHB.

Type locality. Berlin, Germany; Switzerland.

Other material. **Austria**: 2 exs. (larvae), Falkert (alt. 1600 m), Gurktaler Alpen, Kärnten, Austria, 24 VII 1991, V. Assing; 2 exs., Petzen Ct., Ttaventa, VII 1953, Mandl Jakob; 2 exs., Tullnerbach, Scheerpeltz; 3 exs., Hochobir (alt. 1600 m), Kärnten, 15 VI 1965, A. Smetana (CNC); 7 exs., Hochobir (alt. 1900–2000 m), Kärnten, 20 VI 1965, A. Smetana (CNC); 2 exs., Gbertilliach, Lesachtal, 17 VI, A. Smetana (CNC). **Bulgaria**: 11 exs., 1400–1900 m Rodopi mts., Černatica-Goljam, Persenk, 24 VI 1996, M. Kuboň; 1ex., Rila mts., Kolarov (Belmeken) mt., 2000–2400 m, 25 VI 1996, M. Kuboň; 3 exs., 1700 m, Pirin, 11 VIII 1949, M. Kuboň; 1 ex., SW-Bulg. Rila, Geb, Südl. Brovec, 1800 m, 19 VI 1988, Zerche & Behne; 3 exs., Rila, Govedarci, 1200–1500 m, 2–4 VII 1987, M. Kuboň; 1 ex., Pirin, Popinol., 8–9 VI 1989, Jůza. **Czech Republic**: 5 exs., Nový Jičin, Moravia, 30 IV 1988; 3 exs., Hradec, Bohemia, 3 IV 1947, A. Smetana (CNC); 5 exs., Lovoš, Bohemia, 22 V 1956, Středohořf (CNC); 1 ex., Sumava, H. Krilda KS, Bohemia, 13 IX 1960, Hůrka (CNC); 1 ex., Antiegel (alt. 1200–1250 m), Šumeva, Bohemia, 2. VI 1960, Hůrka (CNC); 1 ex., same data but, alt. 1180–1200 m (CNC). **Finland**: 2 exs., Lken, Kemijarai, VI 1995; 1 ex., Sewenz, Davos, Pilafus, VIII 1989, Fng. Kubinast. **Germany**: 2 exs., Perleberg, Karstadt, Brandenburg, 20 VII 1998, Sprick (pt); 2 exs., Trübenbruch, Schönhauser Damm, Sachsen-Anhalt, V 1998, Sprick (pt); 1 ex., Schönfließ b., Berlin, Mark Brandenburg, 17 IV 1987; 2 exs., Berlin, winter 1981/82, Schulze & Uhlig; 2 exs., Branden–Württemberg, Kaiserstuhl mts., NW Freiburg, IV 1981, Kobel-Lamparski (unbaited pt). **Slovakia**: 1 ex., Vys. Tatry Tatr. Lomnica, 5 VII 1947, A. Smetana (CNC); 9 exs., Dolina mnichovskeho potoka, Bardejov, 10 V 2001, M. Maruyama (*FFP*); 3 exs., Slov. or. Prešov solné j., 31 V 1986, Bulirsch; 1 ex., Košice-Bankov, 10 IV 1994, P. Hlavác; 1 ex., Horvce-preosev pri, 10 III. 1995, T. Lackner (*LDFL*); 3 exs., Vyšlapán ze zamokřeného trávníku, Snineké rybníky, Snine, 17 VI 1991, L. Klíma; 1 ex., same data but, 28 V 1990, L. Klíma; 1 ex., Malé Trakany, Písčito-bcoreanatý břeh Tisy, 10 IV 1990, L. Klíma. **Turkey**: Mengen, Bolu, 8 V 2001, I. Smatana. **Kazakhstan**: 57 exs.,

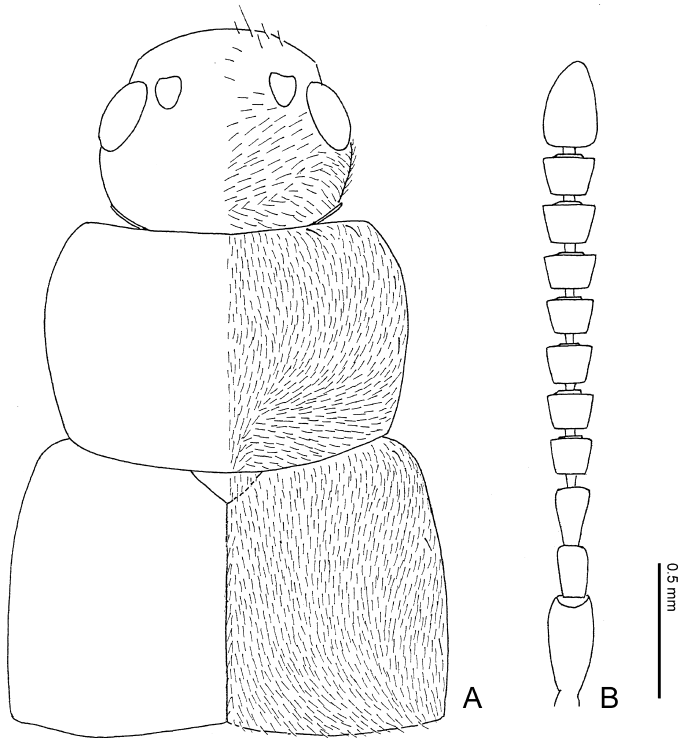

Fig. 24. *Pella humeralis* (Gravenhorst). — A, Fore body, dorsal view; B, right antenna.

Sarymsakty riv. (alt. 1800–2200 m), Sarymsakty mt. reg., southern Altai, 22–26 VI 2000; 16 exs., Soldatovo vil., Bukhtarma riv., southern Altai, 21 VI 1998; 41 exs., Katon-Karagai vil. (alt. 100 m), Bukhtarma riv., southern Altai, 20 VI 1999. **Russia** (**West Siberia**): 1♂, Sotonikovo vil., Ulan-ude env., Burjatia reg., West Siberia, 4 VI 1991.

Distribution. European subregion, Mediterranean subregion. EUROPE: Austria, Belgium, Bosnia Herzegovina, Bulgaria, Belarus, Croatia, Czech Republic, Denmark, Estonia, Finland, France, Great Britain, Germany, Georgia, Hungary, Italy, Latvia, Lithuania, Luxembourg, Netherlands, Poland, Romania, Russia (North and Central European Territories), Slovakia, Sweden, Switzerland, Turkey, Uraine. ASIA: Russia (East and West Siberia). New to Turkey.

Diagnosis. *Pella humeralis* is similar to *P. laeviceps* in general appearance but dustinguished from the latter by the darker colour, the wider pronotum and the aedeagus having narrower apical lobe and the spermatheca having curved apical part. Among the sympatric species, this species may be easily distinguished from the other species by the larger body and the distinct colour.

Redescription. Body slender. Brown in ground colour; antennae, mouthparts and legs reddish brown; elytron with yellowish brown maculation around antero-lateral corner to mesal area; 3rd to 5th abdominal segments reddish brown; sometimes abdomen uniformly brown. Head (Fig. 24 A) widest just behind eyes; surface smooth, densely covered with setae; setae short, stout and recumbent, somewhat longer than those on pronotum and elytra; length of eyes 0.36–0.37 times as long as head width. Antennae (Fig. 24 B) shorter than head, pronotum and elytra combined; 1st segment somewhat shorter than 2nd and 3rd combined; 2nd segment shorter than 3rd; 3rd segment about 2/3 as long as 1st; 4th segment slightly longer than wide; 5th and 6th segments al-

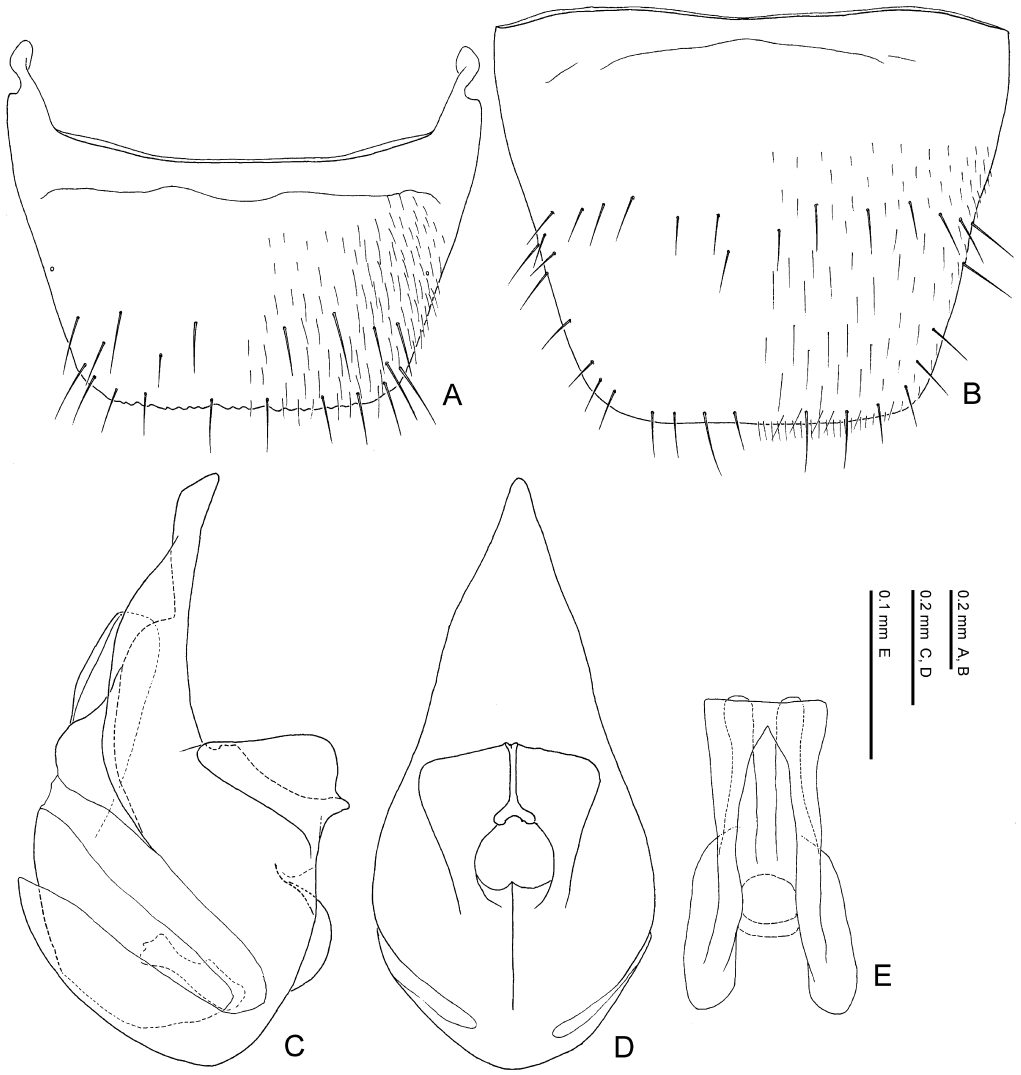

Fig. 25. *Pella humeralis* (Gravenhorst).—A, Eighth abdominal tergite, dorsal view; B, 8th abdominal sternite, ventral view; C, median lobe of aedeagus, lateral view; D, ditto, ventral view; E, copulatory piece, dorsal view. Male.

most as long as wide; 7th to 10th segments wider than long; 11th segment much shorter than 1st; approximate relative lengths of segments from basal to apical: 32 : 16 : 20 : 11 : 10: 10 : 11 : 10 : 11 : 11 : 27 Pronotum (Fig. 24 A) 1.32–1.41 times as wide as long, widest around anterior 1/5, narrowed posteriorly; postero-lateral corner rounded; disc with circular depression postero-medially; surface finely punctured, densely covered with stout setae, with 6 or 7 macrosetae along lateral margin; a macroseta at anterior angle evidently longer than others. Scutellum with surface smooth and densely covered with setae. Elytra (Fig. 24 A) slightly broadened posteriorly; surface finely punctured, densely covered with long setae, with 3 or 4 small macrosetae laterally. Legs long; hind tibia 1.16–1.20 times as long as elytra; approximate relative lengths of tarsal segments from basal to apical: 7.5 : 8 : 8 : 15 in fore tarsus; 18 : 13 : 10 : 8 : 13 in mid tarsus; 29 : 16 : 13 :

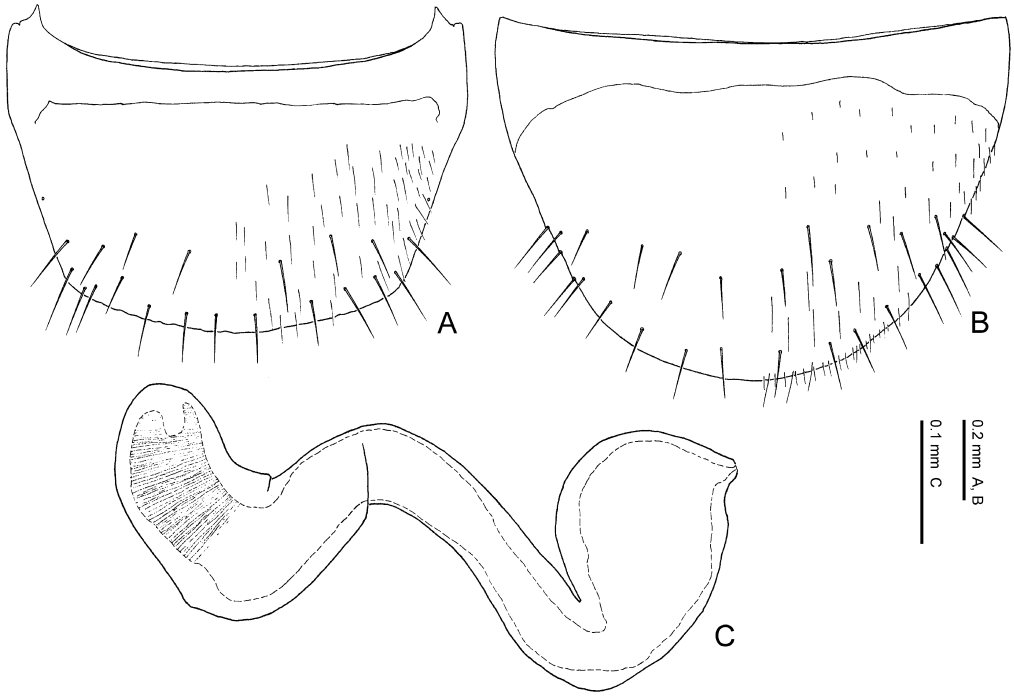

Fig. 26. *Pella humeralis* (Gravenhorst). — A, Eighth abdominal tergite, dorsal view; B, 8th abdominal sternite, ventral view; C, spermatheca. Female.

10 : 16 in hind tarsus. Abdomen expanded, 1.1 times as wide as elytra, widest around 4th and 5th segments; surface smooth; 3rd to 6th tergites very sparsely covered with minute setae medially, with long setae along each posterior margin; 7th tergite almost glabrous except lateral area covered with minute setae; 8th tergite (Figs. 25 A, 26 A) with 10 (rarely 11 or 12) macrosetae; 9th tergite with 4 macrosetae; 10th tergite with posterior margin rounded, with 4 macrosetae.

Male: Eighth tergite (Fig. 25 A) much shorter than 8th sternite, with posterior margin truncate, its truncate apex weakly crenate; 8th sternite (Fig. 25 B) with posterior margin truncate, with 16–21 macrosetae; 9th sternite with posterior margin slightly convex medially. Aedeagus (Figs. 25 C, 25 D) amygdaloid in ventral view; apical lobe almost straight in lateral view, pointed at apex in lateral and ventral views; basal ridge well developed and rounded; copulatory piece of inner sac as in Fig. 25 E. Paramere with apical lobe of paramerite subparallel-sided and obtuse at apex, about 1/3 as long as condylite.

Female: Eighth tergite (Fig. 26 A) with posterior margin rounded and weakly crenate; 8th sternite (Fig. 26 B) with 13–16 macrosetae; sensory setae of 8th sternite generalised, similar to other setae in shape. Spermatheca (Fig. 26 C) curved 3 times, somewhat M-shaped; basal part about twice as long as apical part, bulbous around base, curved at right angle at middle, narrowed apicad; apical part slightly dilated apicad, gently curved, its inner wall densely wrinkled from apex to around apical 2/5.

Local variation. *Pella humeralis* is the most widespread species among the known *Pella* species, and its distribution stretches from Northern Europe, through Southern Europe, Turkey and Caucasia, to southeastern Siberia. Small local variations have been observed among specimens from these localities. The aedeagal median lobe of specimens from Northern and Central

Europe are characterised by the pointed apical lobe, and it is apparently longer than in the specimens from the other distributional areas. The length of apical lobe tends to become shorter toward the eastern distributional areas.

Measurements. BL, 5.8–7.3; FBL, 2.8–3.1; HL, 0.81–0.85; HW, 0.90–0.98; EL, 0.290–0.355; AL, 2.45–2.65; PL, 0.96–1.01; PW, 1.28–1.35; ELL, 1.13–1.33; ELW, 1.50–1.75; HTL, 1.36–1.55.

Bionomics. *Pella humeralis* is associated with species of *Formica* (*Formica*) *rufa* group and *Lasius* (*Dendrolasius*) *fuliginosus* and collected around their nests. This species is common, and usually dominant myrmecophile in hosts' nests.

Symbiotic hosts. *Formica* spp. (the *rufa* group: *F. rufa*, *F. pratensis*, etc.), *Lasius* (*Dendrolasius*) *fuliginosus*.

Pella laeviceps (Eppelsheim, 1880), n. comb.

(Figs. 27–29)

Myrmedonia laeviceps Eppelsheim, 1880: 459 (original description).—Fenyes, 1920: 297 (*Zyras* (*Pella*), list).—Bernhauer & Scheerpeltz, 1926: 700 (*Zyras* (*Pella*), list).—Smetana, 2004: 461 (*Zyras* (*Pella*), list).

Type material. Syntypes: **Azerbaijan**: 1♀ "Kaukas Leder Alexanderhilf/.6/c. Eppelsh. Steind. d./laeviceps, Epp. Verh. zool. bot. Ges. Wien, 1879, p. 259/TYPUS"; 1♂ "♂ (written on paper card specimen glued on)/Kaukas, Leder, Suram/c. Eppelsh., Steind. d./laeviceps/TYPUS"; 1♂ "Kaukas Leder Michailow von Suram/c. Eppelsh. Steind. d./laeviceps/laeviceps Epp det. Bernhauer".

These are deposited in NHMW.

Type locality. Alexanderhilf and Suram, Azerbaijan.

Other material. **Armenia**: 1 ex., Vedi, Khosrov reserve, 30 V 1988, M. Kalashyan (cMar); 1♂ "Caucasus Meskisches Geb. Leder, (Reitter)" (MNHN). **Azerbaijan.** 1 ex., "Caucas. Occ. Circassien Leder. Reitter c. Epplish. Steind" (cMar). **Georgia**: 1♂ "Caucasus Abastuman Leder. (Reitter)" (NHMW); 1♀, same data (MNHN); 1 ex., Picunda, 27 VI 1969, M. Dvořák (cMar); 1ex., Zohneti (Tbilisi) (alt. 800 m), 1–10 VI 1987, D. Wrase & M. Schülke (cMar). **Russia** (**South European territory**): 2♂♂, 2♀♀ "Caucas. occ. Circassien [Cherkessk], Leder, Reitter" (NHMW, NMP); 1♂, "Ca. b. Teberda VI. 912 Roubal" (NMP).

Distribution. European subregion, Mediterranean subregion. EUROPE: Armenia, Azerbaijan, Georgia, Russia (South European territory). New to Armenia. This species is probably confined to the Caucasia.

Diagnosis. *Pella laeviceps* is similar to *P. humeralis* in general appearance but distinguished from the latter by the evidently paler colour, the narrower pronotum, the aedeagus having wider apical lobe and the spermatheca having straight apical part. These two species are locally isolated.

Redescription. Body slender. Pale brown in ground colour; antennae, mouthparts, legs, and 3rd to 5th abdominal segments paler; elytron with yellowish brown maculation around antero-lateral corner. Head (Fig. 27 A) widest just behind eyes; surface smooth, moderately covered with setae; setae rather long, almost as long as those on pronotum and elytra; length of eyes 0.38–0.39 times as long as head width. Antennae (Fig. 27 B) shorter than head, pronotum and elytra combined; 1st segment long, almost as long as 2nd and 3rd combined; 2nd segment shorter than 3rd; 3rd segment about 3/5 as long as 1st; 4th segment as long as wide; 5th to 10th segments wider than long; 11th segment slightly shorter than 1st; approximate relative lengths of segments

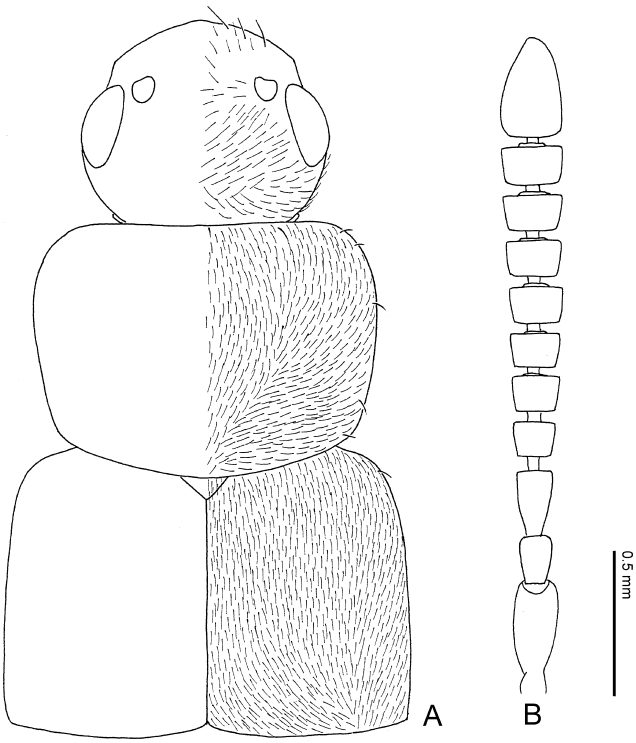

Fig. 27. *Pella laeviceps* (Eppelsheim). — A, Fore body, dorsal view; B, right antenna.

from basal to apical: 30 : 13 : 18 : 9 : 9 : 9.5 : 10 : 8 : 9 : 10 : 29. Pronotum (Fig. 27 A) 1.28–1.33 times as wide as long, widest around anterior 1/5, narrowed posteriorly; postero-lateral corner rounded; surface smooth, densely covered with setae, with 2 or 3 macrosetae around antero-lateral margin; a macroseta at anterior angle evidently longer than others. Scutellum with surface smooth and moderately covered with setae. Elytra (Fig. 27 A) slightly broadened posteriorly; surface smooth, densely covered with setae, with 3 or 4 small macrosetae laterally. Legs somewhat short; hind tibia 0.84–0.88 times as long as elytra; approximate relative lengths of tarsal segments from basal to apical: 8 : 8 : 7.5 : 13 in fore tarsus; 16 : 11 : 9 : 8 : 11 in mid tarsus; 26 : 12 : 11 : 10 : 12 in hind tarsus. Abdomen expanded, 1.1 times as wide as elytra, widest around 4th and 5th segments; surface smooth; 3rd to 5th tergites almost glabrous except for a row of long setae along each posterior margin; 6th and 7th tergites almost glabrous; 8th tergite (Figs. 28 A, 29 A) with 8 (rarely 9) macrosetae; 9th tergite with 4 macrosetae; 10th tergite with posterior margin rounded, with 4 macrosetae.

Male: Eighth tergite (Fig. 28 A) much shorter than 8th sternite, with posterior margin rounded and weakly crenate; 8th sternite (Fig. 28 B) with posterior margin truncate, with 20–23 macrosetae; 9th sternite with posterior margin slightly convex medially. Aedeagus (Figs. 28 C, 28 D) amygdaloid in ventral view; apical lobe almost straight in lateral view, pointed at apex in lateral and ventral views; basal ridge well developed and rounded; copulatory piece of inner sac as in Fig. 28 E. Paramere with apical lobe of paramerite subparallel-sided and obtuse at apex, about 1/3 as long as condylite.

Female: Eighth tergite (Fig. 29 A) with posterior margin rounded and weakly crenate; 8th sternite (Fig. 29 B) with 14–16 macrosetae; sensory setae of 8th sternite generalised, similar to

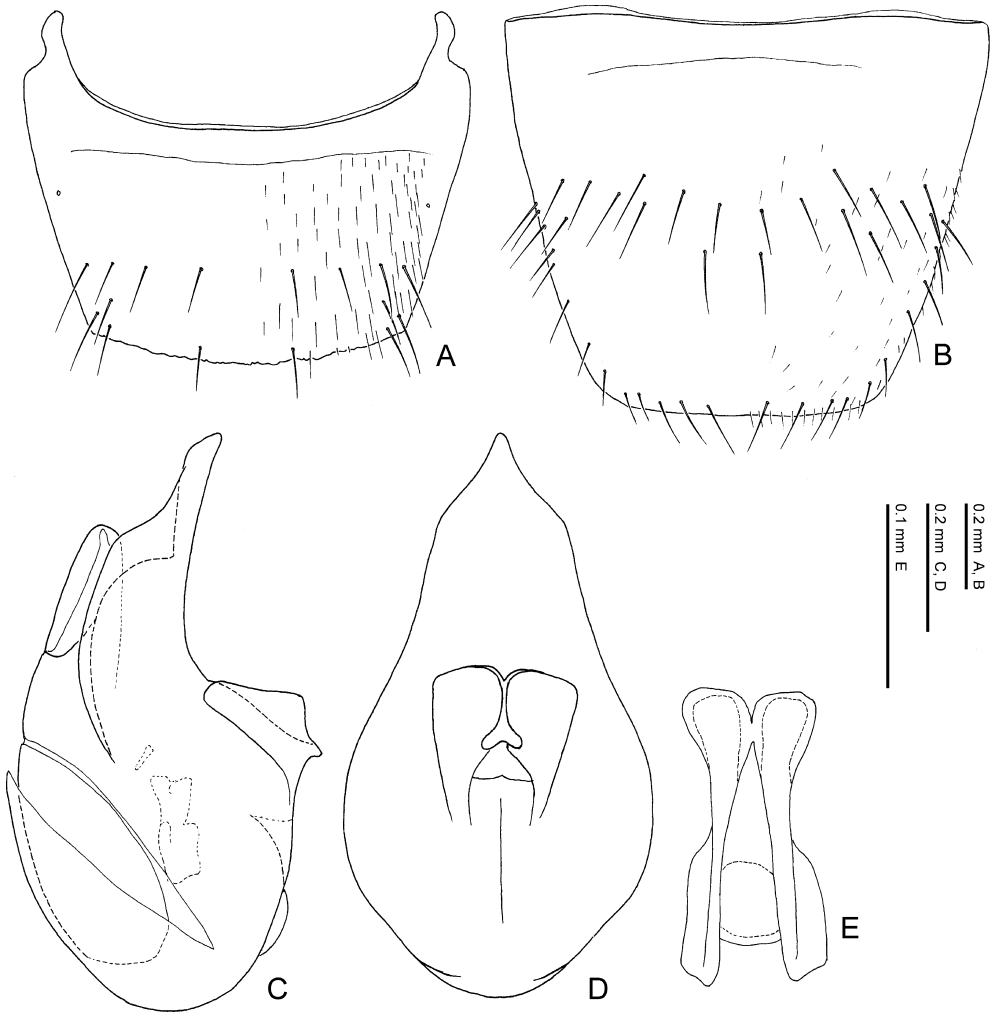

Fig. 28. *Pella laeviceps* (Eppelsheim).—A, Eighth abdominal tergite, dorsal view; B, 8th abdominal sternite, ventral view; C, median lobe of aedeagus, lateral view; D, ditto, ventral view; E, copulatory piece, dorsal view. Male.

other setae in shape. Spermatheca (Fig. 29 C) curved once, somewhat L-shaped; basal part 2.0–2.5 times as long as apical part, bulbous around base, curved at right angle, narrowed apicad; apical part dilated apicad, its inner wall densely wrinkled from apex to around apical 1/3.

Measurements. BL, 5.3–6.1; FBL, 2.5–2.8; HL, 0.73–0.77; HW, 0.76–0.85; EL, 0.299–0.331; AL, 2.08–2.25; PL, 0.79–0.90; PW, 1.06–1.18; ELL, 0.99–1.08; ELW, 1.30–1.43; HTL, 1.10–1.26.

Bionomics. No host information has been recorded. However, in Georgia, M. Dvořák collected this species from a nest of *Lasius* sp., which is closely similar to *L.* (*L.*) *emarginatus* Olivier, 1792 (Dvořák, pers. comm.).

Symbiotic host. *Lasius* (*Lasius*) cf. *emarginatus*.

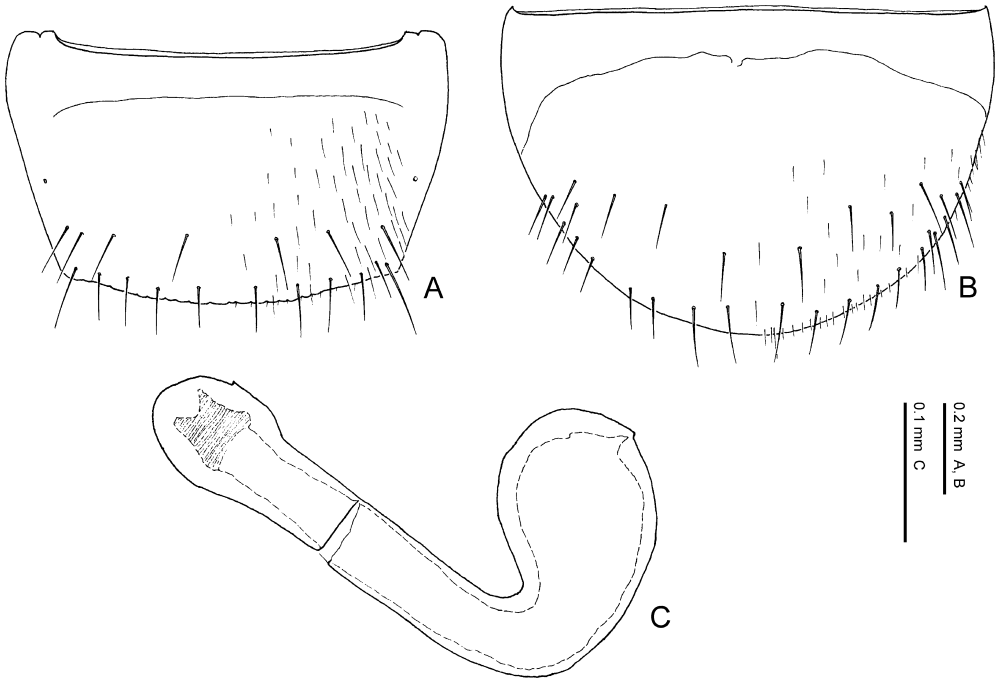

Fig. 29. *Pella laeviceps* (Eppelsheim).—A, Eighth abdominal tergite, dorsal view; B, 8th abdominal sternite, ventral view; C, spermatheca. Female.

The ***funesta*** Group

Species included. *Pella funesta*, *P. comes*, *P. socia*, *P. rambouseki*, *P. jureceki*, *P. kidaorum*, *P. cooterorum*.

Distribution. European subregion, Mediterranean subregion, Manchurian subregion.

Diagnosis. Species of the *funesta* group may be characterised by a combination of the following character states: 1) eye length 0.29–0.33 times as long as head width; 2) 11th antennal segment longer than the 1st; 3) pronotum with postero-lateral corners; 4) pronotum 1.21–1.46 times as wide as long; 5) pronotum widest anteriorly; 6) pronotal hypomeron fully visible in lateral view; 7) elytra almost unicoloured, blackish brown to brown; 8) inner and posterior margins of elytra weakly margined; 9) male 8th sternite longer than in female; 10) posterior margin of 8th tergite crenate or dentate; 11) posterior margin of male 8th sternite rounded; 12) lateral projection of apodeme of male 8th tergite evidently longer than that of female; 13) macrosetae of 8th abdominal segment generalised in length, exceeding the posterior margin of the segment; 14) postero-medial margin of female 8th sternite with minute pubescence; 15) apical lobe of aedeagal median lobe gently curved ventrad or almost straight in lateral view; 16) distal crests of aedeagus well developed, projected, angled or rounded around middle of ventral margin in lateral view; 17) copulatory piece of aedeagal median lobe variable in shape, narrowed apicad in dorsal view.

Comments. No autapomorphy could be found in the *funesta* group, but the members are very similar to each other in general appearance, above all in almost uniformly black and slender body.

Symbiotic hosts. *Lasius* (*Dendrolasius*) spp.

Key to the Species of the *funesta* Group

1. Pronotum (1.38–1.46) times as wide as long. ..... 2.
— Pronotum (1.21–1.33) times as wide as long. ..... 3.
2. Body black, shining; pronotum almost quadrate, its anterior and posterior corners well angled. Distribution: Japan. .....*P. socia*.
— Body blackish brown, slightly matted; pronotum subtrapeziform, its anterior and posterior corners more or less rounded. Distribution: China (Beijing Shi), Korea, Russia (Far East). .. ..*P. jureceki*.
3. Male 8th tergite much shorter than 8th sternite, its posterior margin widely rounded and slightly crenate; apical part of spermatheca as long as basal part. Distribution: Europe. ....*P. funesta*.
— Male 8th tergite almost as long as 8th sternite, its posterior margin truncate and more or less dentate; apical part of spermatheca shorter than basal part. Distribution: Asia. ..... 4.
4. Body large: 5.9–6.6 mm; antenna long, longer than head, pronotum and elytra combined; apical lobe of aedeagal median lobe curved ventrad; sensory setae of female 8th sternite generalised. Distribution: Japan. .....*P. comes*.
— Body small to medium: 4.4–5.3 mm; antenna shorter than or as long as head, pronotum and elytra combined; apical lobe of aedeagal median lobe almost straight; sensory setae of female 8th sternite flattened. ..... 5.
5. Antenna almost as long as head, pronotum and elytra combined; basal part of spermatheca five times as long as apical part. Distribution: Korea, Russia (Far East). .....*P. rambouseki*.
— Antenna much shorter than head, pronotum and elytra combined; basal part of spermatheca about twice as long as apical part. ..... 6.
6. Apical lobe of aedeagal median lobe slightly sinuate; apical part of spermatheca without outer projection. Distribution: Japan. .....*P. kidaorum*.
— Apical lobe of aedeagal median lobe almost straight; apical part of spermatheca with an outer projection. Distribution: China (Beijing Shi, Yunnan Sheng). .....*P. cooterorum*.

Pella funesta (Gravenhorst, 1806), n. comb.

(Figs. 30–32)

Aleochara funesta Gravenhorst, 1806: 168 (original description).—Stephens, 1832: 163 (*Aleochara*, description).—Erichson, 1837: 287 (*Myrmedonia*, description).—Mulsant & Rey, 1873a: 62 (*Myrmedonia*, description).—des Gozis, 1886: 12 (*Pella*, list).—Ganglbauer, 1895: 122 (*Myrmedonia* (*Pella*), key, description).—Reitter, 1909: 43 (*Myrmedonia* (*Pella*), key).—Fenyes, 1920: 297 (*Zyras* (*Pella*), list).—Bernhauer & Scheerpeltz, 1926: 698 (*Zyras* (*Pella*), list).—Scheerpeltz, 1934: 1653 (*Zyras* (*Pella*), list).—Lohse, 1974: 225 (*Zyras* (*Pella*), key).—Likovský, 1993: 59 (*Zyras* (*Pella*), list).—Smetana, 2004: 461 (*Zyras* (*Pella*), list).

Aleochara crassicornis Stephens, 1832: 113 (original description).—Fenyes, 1920: 297 (synonym of *funesta*, list).—Bernhauer & Scheerpeltz, 1926: 701 (synonym of *funesta*, list).—Smetana, 2004: 461 (synonym of *funesta*, list).

Myrmedonia atrata Heer, 1839: 309 (original description).—Mulsant & Rey, 1873a: 63 (synonym of *funesta*, list).—des Gozis, 1886: 12 (*Pella*, list).—Ganglbauer, 1895: 122 (synonym of *funesta*, list).—Fenyes, 1920: 297 (synonym of *funesta*, list).—Bernhauer & Scheerpeltz, 1926: 701 (synonym of *funesta*, list).—Smetana, 2004: 461 (synonym of *funesta*, list).

Type material. *Aleochara funesta*. Syntypes: **Germany**: 1♀, “5253/funesta Gr. [“Berolin” (=Berlin, Germany)]” (pinned); 1 ex., [ditto] (without label 2nd to 10th abdominal segments missing, pinned); 1♀, [ditto] (without label, pinned).

These are deposited in ZMHB. According to “Catalog. General. Musei Zoologici Berolinen”

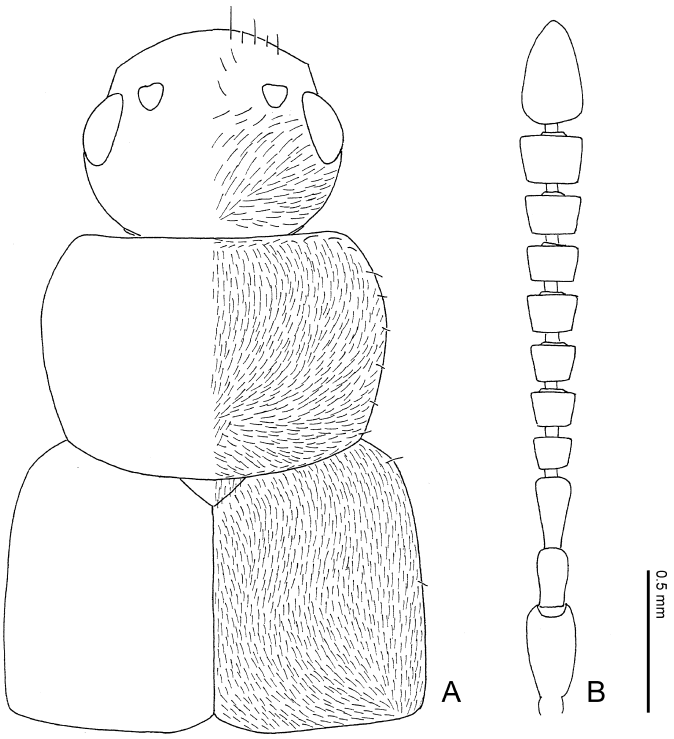

Fig. 30. *Pella funesta* (Gravenhorst). — A, Fore body, dorsal view; B, right antenna.

ten syntypes should exist in the type series, but only three specimens were found in ZMHB.

Aleochara crassicornis. Not examined. Type locality: Great Britain.

Myrmedonia atrata. Not examined. Type locality: Switzerland.

Type locality. Berlin, Germany.

Other material. **Austria**: 2 exs., Lainzer, Tiergarten, 30 VI 1949, O. Scheerpeltz (*LDFL*). **Bulgaria**: 2 exs., Trevna, V–VI 1912, M. Hilf. **Croatia**: 2♀♀, 1 km E Marušići, Felsmoos, Coline, 26 VI 1981, V. Puthz. **Czech Republic**: 1 ex., Novỳ Jićĺí, Moravia, 30 IV 1988, Kuboň; 1 ex., Nymburk, Bohemia, 1958, J. Havelka (CNC); 2 exs., Hradec, Bohemia, 3 IV 1947, A. Smetana (CNC); 1 ex., Lovoš, Bohemia, 22 V 1956, Středohořf. **Germany**: 1♂, 1♀, Kaiserstuhl mts., Badenwürttenberg, NW Freiberg, IV 1981, Kobel-Lamparski (pt). **Slovakia**: 1♂, Plešivec, 15 VI 1955, A. Smetana; 1♀, Lešt, VII, 1955, A. Smetana; 1 ex., Horovce, 11 VI 1994, P. Hlaváč; 1 ex., Kováčov, 20 VII 1963, A. Smetana (CNC); 1 ex., Ruská Poruba, 4 VIII 1956, A. Smetana (CNC); 2 exs., Ruská Poruba, 12 IX 1956, A. Smetana.

Distribution. European subregion, Mediterranean subregion. EUROPE: Austria, Belgium, Bosnia Herzegovina, Bulgaria, Belarus, Croatia, Czech Republic, Denmark, Finland, France, Great Britain, Germany, Georgia, Hungary, Italy, Latvia, Luxembourg, Netherlands, Norway, Poland, Romania, Russia (North, Central and South European territories), Slovakia, Sweden, Switzerland, Ukraine. NORTH AFRICA: Algeria.

Diagnosis. *Pella funesta* is the largest species in the *funesta* group, and well characterised by the male 8th tergite much shorter than sternite. Among the sympatric species, this species may be easily distinguished by the uniformly black ground colour.

Redescription. Body slender. Black in ground colour; antennae, mouthparts, legs slightly

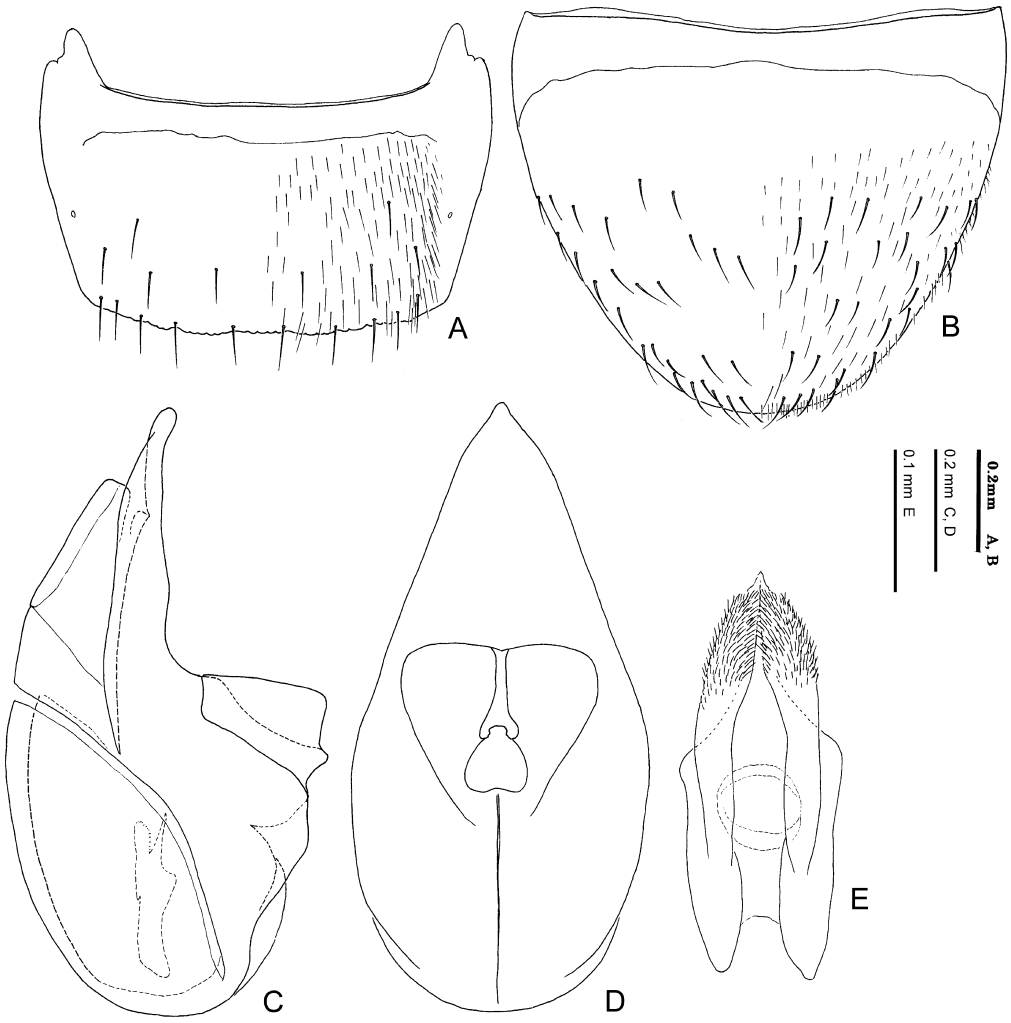

Fig. 31. *Pella funesta* (Gravenhorst). — A, Eighth abdominal tergite, dorsal view; B, 8th abdominal sternite, ventral view; C, median lobe of aedeagus, lateral view; D, ditto, ventral view; E, copulatory piece, dorsal view. Male.

reddish brown to brown. Head (Fig. 30 A) slightly depressed above, wider than long; surface smooth, moderately covered with setae; setae rather long, longer than those on pronotum and elytra in length; length of eyes 0.32–0.33 times as long as head width. Antennae (Fig. 30 B) shorter than head, pronotum and elytra combined a; 1st segment long, almost as long as 2nd and 3rd combined; 2nd segment about 3/4 as long as 3rd; 3rd segment about 4/7 as long as 1st; 4th to 8th segments almost as long as wide; 9th to 10th segments slightly wider than long; 11th segment much shorter than 1st; approximate relative lengths of segments from basal to apical: 34 : 15 : 20 : 10 : 10.5 : 11 : 11 : 11 : 11.5 : 12 : 29. Pronotum (Fig. 30 A) 1.29–1.31 times as wide as long, widest around anterior 1/4, slightly constricted posteriorly; postero-lateral corner rounded; surface finely punctured, densely covered with setae, with 7 or 8 macrosetae along lateral margin. Scutellum with surface finely punctured, moderately covered with setae. Elytra (Fig. 30 A) slightly broadened posteriorly; surface finely punctured, densely covered with setae, with 4 or 5 small

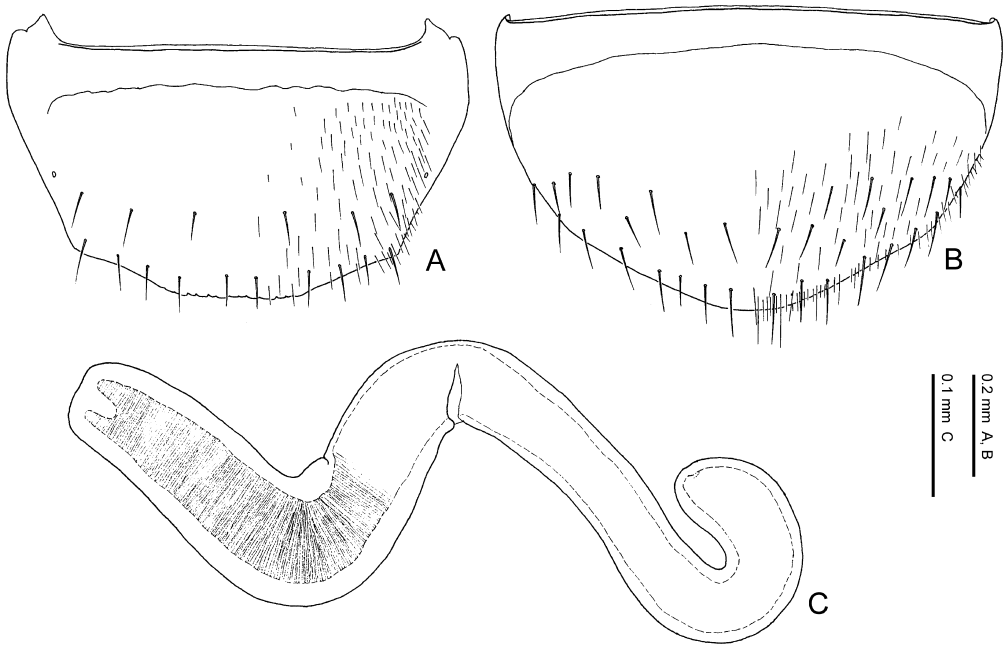

Fig. 32. *Pella funesta* (Gravenhorst). — A, Eighth abdominal tergite, dorsal view; B, 8th abdominal sternite, ventral view; C, spermatheca. Female.

macrosetae laterally. Legs long; hind tibia 1.19–1.21 times as long as elytra; approximate relative lengths of tarsal segments from basal to apical: 10.5 : 8 : 8 : 14 in fore tarsus; 18 : 11.5 : 10 : 8 : 11.5 in mid tarsus; 29 : 15 : 11.5 : 10 : 15 in hind tarsus. Abdomen expanded, 1.1 times wider than elytra, widest around 5th and 6th segments; surface smooth; 3rd to 6th tergites glabrous except for a row of setae along each posterior margin; 7th tergite almost glabrous except lateral area covered with setae; 8th tergite (Figs. 31 A, 32 A) with 8 (rarely 9) macrosetae; 9th tergite with 4 macrosetae; 10th tergite with posterior margin truncate, with 4 macrosetae.

Male: Eighth tergite (Fig. 31 A) with posterior margin rounded; 8th sternite (Fig. 31 B) with 28–30 macrosetae; 9th sternite with posterior margin slightly convex medially. Aedeagus (Figs. 31 C, 31 D) amygdaloid in ventral view; apical lobe almost straight in lateral view, pointed at apex in lateral and ventral views; basal ridge well developed, reaching near bottom of basal capsule; copulatory piece of inner sac as in Fig. 31 E. Paramere with apical lobe of paramerite parallel-sided, rounded apically, about 1/4 as long as condylite.

Female: Eighth tergite (Fig. 32 A) with posterior margin slightly truncate; 8th sternite (Fig. 32 B) with 15–17 macrosetae; sensory setae of 8th sternite generalised, similar to other setae in shape. Spermatheca (Fig. 32 C) curved three times; basal part almost as long as apical part, acutely curved near base, slightly dilated apicad; apical part curved at right angle at middle, its inner wall densely wrinkled from apex to around apical 2/3.

Measurements. BL, 5.6–6.6; FBL, 2.6–2.9; HL, 0.78–0.83; HW, 0.88–0.90; EL, 0.282–0.300; AL, 2.28–2.50; PL, 0.88–0.93; PW, 1.15–1.20; ELL, 1.08–1.10; ELW, 1.45–1.48; HTL, 1.29–1.33.

Bionomics. This species is associated with *Lasius* (*Dendrolasius*) *fuliginosus* and collected around the nest. Common species (Franc, 1992).

Symbiotic host. *Lasius* (*Dendrolasius*) *fuliginosus*.

Pella comes (Sharp, 1874)

(Figs. 33–35)

Myrmedonia comes Sharp, 1874: 10 (original description).—Bernhauer & Scheerpeltz, 1926: 696 (*Zyras* (*Pella*), list).—Fenyes, 1920: 297 (*Zyras* (*Pella*), list).—Kistner, 1972: 154 (*Pella*, description).—Dvořák, 1981: 54 (*Zyras* (*Pella*), key).—154: Shibata, 1985: 320 (*Pella*, description).—Smetana, 2004: 461 (*Zyras* (*Pella*), list).

Type material. Syntypes: **Japan**: 1♂, "TYPE (red round curator label)/Japan (yellow round paper)/Japan. G. Lewis./Sharp Coll. 1905-313./Myrmedonia comes Type D.S./SYNTYPE (blue round curator label)"; 3♀♀ (two are glued on same paper card), "Japan (yellow round paper)/Japan. G. Lewis./Sharp Coll. 1905-313.".

These are deposited in BMNH.

Type locality. Japan (no other information).

Other material. Japan: Honshû: 6 exs., Tamagawa, Tazawako-machi, Akita-ken, 12–13 VI 1999, M. Sano (*LDFJ*); 1 ex., Gosho-ko, Morioka-shi, Iwate-ken, 13–14 VI 1999, M. Sano (*LDFJ*); 4 exs., Narugo-onsen, Naruko-machi, Miyagi-ken, 14–17 VI 1999, M. Sano (*LDO*); 10 exs., Aobayama, Sendai-shi, Miyagi-ken, 22 IX 2001, M. Maruyama (*LDN*); 5 exs., Yukiwari-bashi, Nishigô-mura, Fukushima-ken, 29 VII 2000, T. Kobayashi (*LDC*); 12 exs., Yahiko-yama, Nishikambara-gun, Niigata-ken, 4 V 1993, M. Nishikawa (*LDN*); 3 exs., Tamugi, Tôkamachi-shi, Niigata-ken, 18 IV 1998, T. Kishimoto; 1 ex., Mizuhiki, Tateiwa-mura, Minamiaizu-gun, Fukushima-ken, 12 VI 2004, H. Kamezawa (*LDFJ*); 25 exs., Aoyagidaira, Kuriyama-mura, Tochigi-ken, 1 IX 1999, T. Kobayashi (*LDS*); 9 exs., same data but, 29 VIII 1999, T. Kobayashi (*LDS*); 17 exs., Tobiyama-jôshi, Utsunomiya-shi, Tochigi-ken, 17 VI 1998, M. Maruyama (*LDFJ*); 1 ex., same data but, 17–18 VI 1998; 2 exs., Mizuhono, Utsunomiya-shi, Tochigi-ken, 17–18 VI 1998, M. Maruyama (*LDS*); 11 exs., Sayado, Môka-shi, Tochigi-ken, 15 VI 2000, T. Kobayashi & H. Obata (*LDFJ*); 2 exs., 4 km NW Onioshidashi, Gumma-ken, 18–21 VII 1980, A. Smetana & Z. Smetana (CNC); 26 exs., Nakano, Shôwa-machi, Kitakatsushika-gun, Saitama-ken, 4 V 2003, H. Kamezawa (*LDFJ*); 4 exs., Kuroishi-jinja (Kumai), Hatoyama-machi, Saitama-ken, 29 IV 2000, S. Arai (*LDS*); 3 exs., Shiroishi-tôge, Higashichichibu-mura, Saitama-ken, 20 VI 1999, S. Arai (*LDFJ*); 1 ex., Akigase-kôen (alt. 50 m), Saitama-shi, Saitama-ken, 8 V 2001, H. Sugaya (*LDFJ*); 4 exs., Sugaya, Ranzan-machi, Saitama-ken, 13 VII 1998, K. Toyoda (*LDS*); 2 exs., Shôgun-sawa, Ranzan-machi, Saitama-ken, 25 IV 1999, K. Toyoda (*LDS*); 8 exs., Takao-san (alt. 450 m), Hachiôji-shi, Tokyo-to, 1 VII 1998, M. Maruyama (*LDS*); 23 exs., same data but, 4 VII 1998; 9 exs., same data but, 4 VI 2001; 9 exs., same data but, 22 VII 2003; 1 ex., Shiroyama-kôen, Inagi-shi, Tokyo-to, 21 V 2004, A. Yoshida (*LDFJ*); 1 ex., same data but, 12 VI 2004; 3 exs., same data but, 13 VI 2004; 4 exs., same data but, 26 VI 2004; 1♂, "Tokio [Tokyo-to]", 25–27 IX 1881, G. Lewis (BMNH); 10 exs., Aoba-chô, Chiba-shi, Chiba-ken, 24 VI 1998, M. Maruyama (*LDS*); 3 exs., Ikuta-ryokuchi, Kawasaki-shi, Kanagawa-ken, 13 IV 2002, K. Matsumoto (*LDFJ*); 2 exs., Masukata-yama, Kawasaki-shi, Kanagawa-ken, 23 VI 1995, K. Kawada (*LDS*); 1♂, "Bukenji [Bukenji, Yokohama-shi, Kanagawa-ken]", G. Lewis (no other data) (BMNH); 1♂, "Yokohama [Yokohama-shi, Kanagawa-ken]", G. Lewis (no other data) (BMNH); 1 ex., Mikage, Tsukui-machi, Kanagawa-ken, 14 IV 1979, R. Kiryu (SCM); 15 exs., Jimmuji, Zushi-shi, Kanagawa-ken, 20 VI 2003, M. Maruyama; 1 ex., Fukazawa-jûnimagari, Nakamaru, Nagasaka-chô, Kitakoma-gun, Yamanashi-ken, 6 VI 2004, M. Maruyama (*LDFJ*); 1 ex., Nagasakakamijô, Nagasaka-chô, Kitakoma-gun, Yamanashi-ken, 6 VI 2004, M. Maruyama (*LDS*); 2 exs., Shôbuzawa, Futaba-chô, Kitakoma-gun, Yamanashi-ken, 6 VI 2004, M. Maruyama (*LDFJ*); 5 exs., Ômukawa-keikoku, Hakushû-machi, Yamanashi-ken, 11 VII 2004, S. Nomura

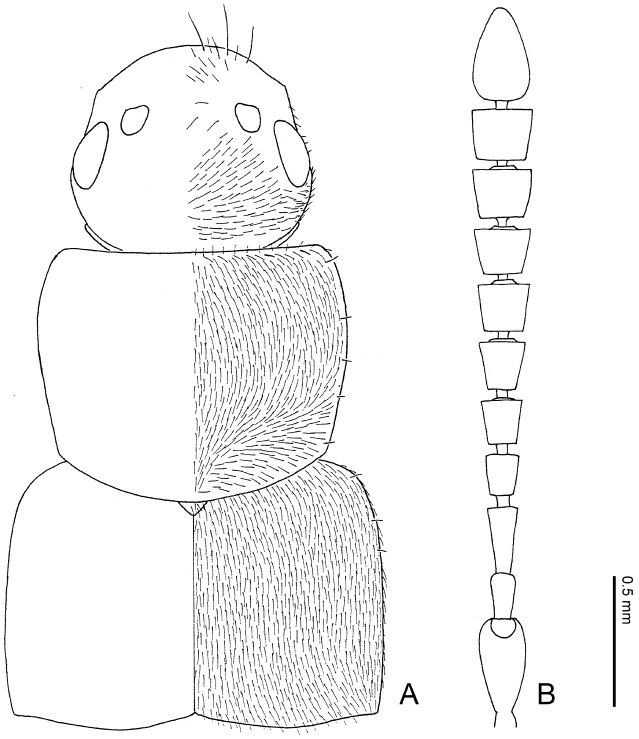

Fig. 33. *Pella comes* (Sharp). — A, Fore body, dorsal view; B, right antenna.

(*LDFJ*); 1♀, "Seba [Seba, Shiojiri-shi, Nagano-ken]", 30 VII 1881, G. Lewis (BMNH); 2 exs., Misuzu, Ina-shi, Nagano-ken, 18 IX 2000, T. Kobayashi (*LDFJ*); 3 exs., Tenryu-chô, Ina-shi, Nagano-ken, 22 VII 1958, Y. Hayashi (*LDS*); 4 exs., Ôkubo, Komoro-shi, Nagano-ken, 29–30 IV 2001, H. Kamezawa (*LDFJ*); 5 exs., Shaka-shindo, Haku-san, Ishikawa-ken, 30 VII–2 VIII 2002, H. Hoshina (pt); 30 exs., same data but, 2–22 VIII 2002; 1 ex., Hinogawa-dani, Imajô-chô, Fukui-ken, 18 VI 1981, Y. Hayashi; 12 exs., Ogamigô (alt. 800 m), Shôkawa-mura, Gifu-ken, 5–6 VIII 1998, M. Maruyama (*LDS*); 1 ex., Kamiichi, Yoshino-chô, Nara-ken, 27 VII 1980, M. Yasui; 1♀, "Kobe [Kôbe-shi, Hyôgo-ken]", 28 VI 1881, G. Lewis (BMNH); 1 ex., Gôkei, Sôja-shi, Okayama-ken, 16 V 1993, T. Ito; 1 ex., Urahikimi, Shimane-ken, 6 VI 1988, S. Nomura (*LDS*); 1 ex., Tokusa, Atô-chô, Yamaguchi-ken, 24 IV 1988, S. Nomura. Shikoku: 5 exs., Fujio-jinja, Takamatsu-shi, Kagawa-ken, 31 V 2001, F. Itô, M. Maruyama & Y. Kamite (*LDS*); 1 ex., same data but, 1 VI 2001 (*LDFJ*); 1 ex., Usa-jinja, Nagao-chô, Kagawa-ken, 31 V 2001, F. Itô, M. Maruyama & Y. Kamite (*LDS*); 1 ex., Daisen-zan, Kotonami-chô, Kagawa-ken, 1 VI 2001, F. Itô & M. Maruyama (*LDC*); 1 ex., Koyama, Miki-chô, Kagawa-ken, 1 VI 2001, F. Itô & M. Maruyama (*LDS*); 9 exs., Atago-yama, Kotohira-chô, Kagawa-ken, 1 VI 2001, F. Itô, M. Maruyama & Y. Kamite (*LDS*). Kyûshû: 1♂, "Japan, Gokayama, Chikuzen [Gokayama, Nakagawa-chô, Fukuoka-ken], 14. VII. 1936" (BMNH); locality not specified: 1♂, Japan, G. Lewis (no other data) (BMNH); 1♀, "I, Japan/15. 5." (no other data) (BMNH); 1 ex., Tsubaki-yama, Saga-ken, 2 X 1977, H. Ohishi.

Distribution. Manchurian subregion. ASIA: Japan (Honshû, Shikoku, Kyûshû). This species is most probably confined to Honshû, Shikoku and Kyûshû, Japan.

Diagnosis. *Pella comes* is similar to *P. rambouseki*, *P. kidaorum* and *P. cooterorum* in gen-

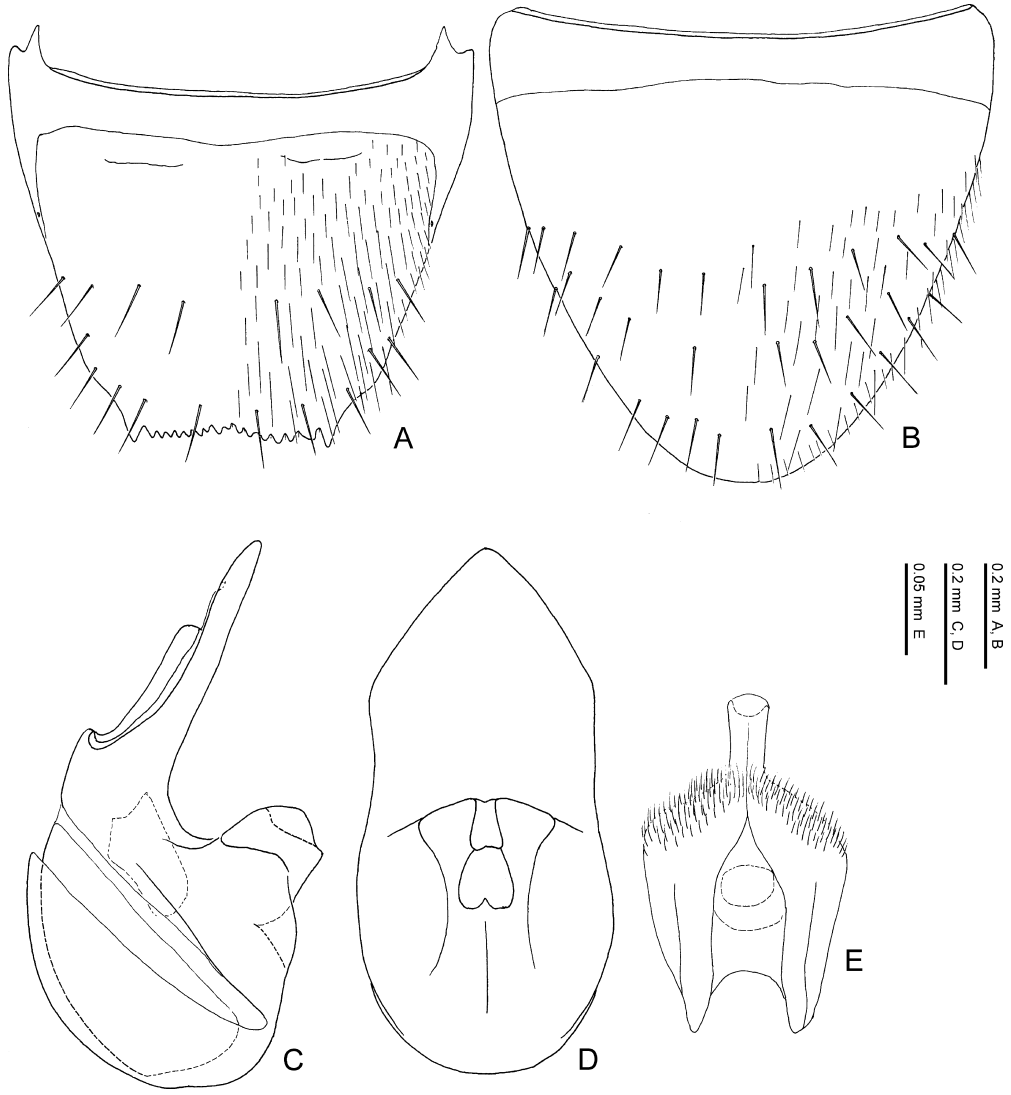

Fig. 34. *Pella comes* (Sharp).—A, Eighth abdominal tergite, dorsal view; B, 8th abdominal sternite, ventral view; C, median lobe of aedeagus, lateral view; D, ditto, ventral view; E, copulatory piece, dorsal view. Male.

eral appearance and colour but can be distinguished from the latter three by the larger body, the longer antennae, the narrower pronotum and the oval aedeagus. These four species are locally isolated. Among the sympatric species, *Pella comes* is somewhat similar in colour to *P. socia* but distinguished from it by the larger body and the pronotal corners not distinctly angled.

Redescription. Body slender. Black in ground colour; antennae, mouthparts, legs reddish brown to brown. Head (Fig. 33 A) widest just behind eyes; surface smooth, moderately covered with setae; setae moderate in length, as long as those on pronotum and elytra; length of eyes 0.29–0.30 times as long as head width. Antennae (Fig. 33 B) almost as long as head, pronotum and elytra combined; 1st segment slightly shorter than 2nd and 3rd combined; 2nd segment about 2/3 as long as 3rd; 3rd segment about 3/5 as long as 1st; 4th to 7th segments slightly longer than wide; 8th and 9th segments almost as long as wide; 10th segment slightly wider than long; 11th

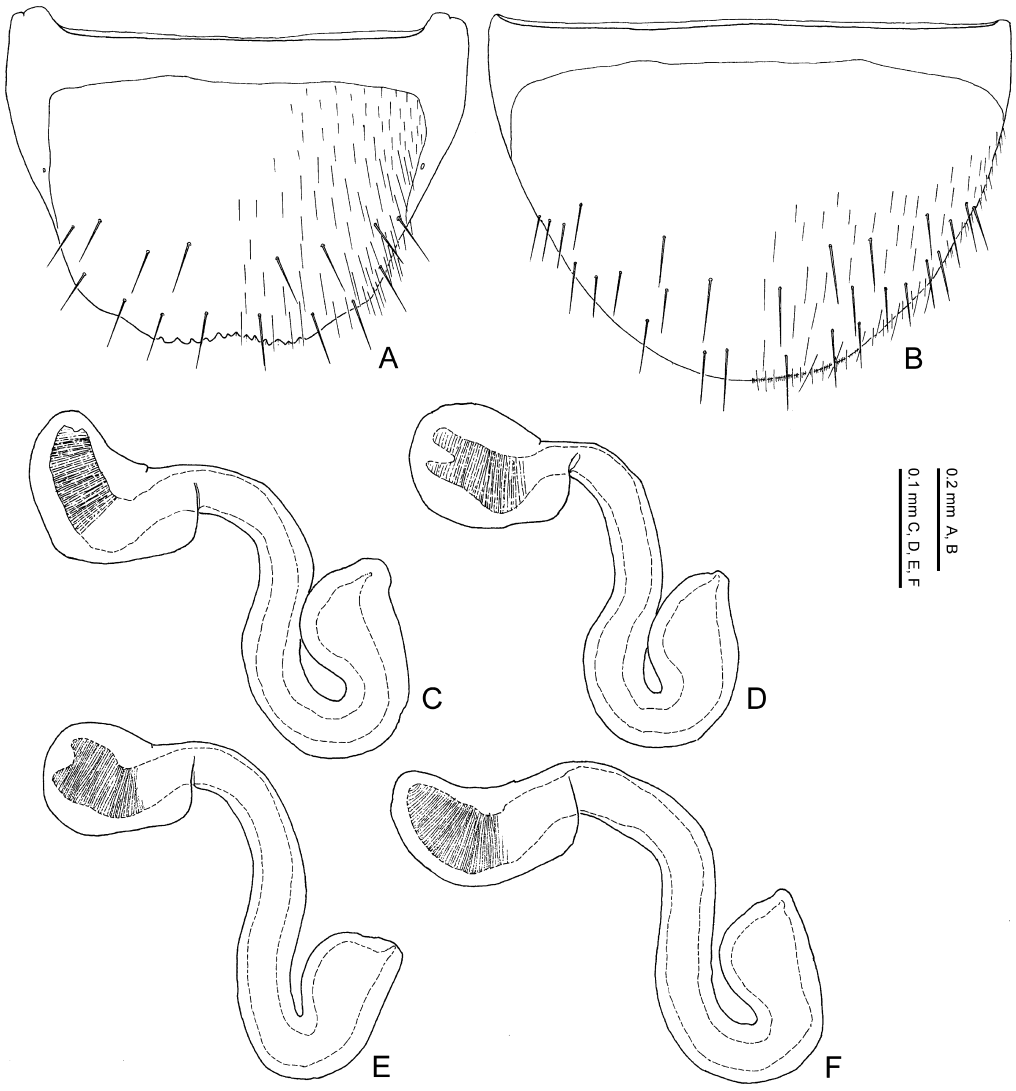

Fig. 35. *Pella comes* (Sharp). — A, Eighth abdominal tergite, dorsal view; B, 8th abdominal sternite, ventral view; C–F, spermathecae. Female.

segment much shorter than 1st; approximate relative lengths of segments from basal to apical: 35 : 14 : 23 : 13.5 : 14 : 14 : 13 : 13 : 13 : 12 : 22.5. Pronotum (Fig. 33 A) 1.21–1.29 times as wide as long, widest around anterior 1/5, evidently constricted posteriorly; lateral margins subparallel-sided near base; postero-lateral corner weakly angled; surface finely punctured, moderately covered with setae, with 7 or 8 macrosetae along lateral margin. Scutellum with surface finely punctured, densely covered with setae. Elytra (Fig. 33 A) subparallel-sided; surface finely punctured, densely covered with setae, with 6 or 7 small macrosetae laterally. Legs very long; hind tibia 1.35–1.48 times as long as elytra; approximate relative lengths of tarsal segments from basal to apical: 12 : 8 : 7 : 15 in fore tarsus; 19 : 10 : 9 : 7 : 12 in mid tarsus; 33 : 12 : 11 : 10 : 14 in hind tarsus. Abdomen expanded, 1.1 times wider than elytra, widest around 5th and 6th segments; surface smooth; 3rd to 6th tergites glabrous except for a row of setae along each posterior margin;

7th tergite almost glabrous except posterior and lateral areas; 8th tergite (Figs. 34 A, 35 A) with 8 (rarely 9) macrosetae; 9th tergite with 4 macrosetae; 10th tergite with posterior margin truncate, with 4 macrosetae.

Male: Eighth tergite (Fig. 34 A) with posterior margin truncate, its truncate apex dentate; 8th sternite (Fig. 34 B) with 16–18 macrosetae; 9th sternite with posterior margin truncate. Aedeagus (Figs. 34 C, 34 D) oblong-oval in ventral view; apical lobe curved ventrad and pointed at apex in lateral view, subparallel-sided in basal 1/2 and angulated at apex in ventral view; basal ridge weakly convex, invisible in lateral view; copulatory piece of inner sac as in Fig. 34 E. Paramere with apical lobe of paramerite parallel-sided, rounded apically, about 1/4 as long as condylite.

Female: Eighth tergite (Fig. 35 A) with posterior margin slightly emarginate, weakly dentate around emarginate apex; 8th sternite (Fig. 35 B) with 14–16 macrosetae; sensory setae of 8th sternite generalised, similar to other setae in shape. Spermatheca (Figs. 35 C–35 F) curved two or three times; basal part three times as long as apical part, somewhat bulbous around base, acutely curved, sometimes its basal part touching its middle; apical part straight or gently curved, its inner wall densely wrinkled from apex to around apical 1/2.

Measurements. BL, 5.5–6.2; FBL, 2.5–2.7; HL, 0.76–0.89; HW, 0.89–0.95; EL, 0.273–0.281; AL, 2.57–2.80; PL, 0.92–1.03; PW, 1.20–1.25; ELL, 0.93–1.10; ELW, 1.31–1.56; HTL, 1.38–1.49.

Bionomics. This species is commonly collected from colonies of *Lasius* (*Dendrolasius*) spp. and widely distributed from lowlands to mountainous zones in Honshû, Shikoku and Kyûshû.

Symbiotic hosts. *Lasius* (*Dendrolasius*) *fuji*, *L.* (*D.*) *spathepus*, *L.* (*D.*) *orientalis*, *L.* (*D.*) *nipponensis*, *L.* (*D.*) *capitatus*.

Pella socia (Sharp, 1874)

(Figs. 36–38)

Myrmedonia socius [sic!] Sharp, 1874: 10 (original description).—Fenyes, 1920: 297 (*Zyras* (*Pella*), list).—Bernhauer & Scheerpeltz, 1926: 705 (*Zyras* (*Pella*), list).—Kistner, 1972: 154 (*Pella* "*socius* [sic!]", comment).—Dvořák, 1981: 54 (*Zyras* (*Pella*), key).—Shibata, 1985: 320 (*Pella* "*socius* [sic!]", description).—Smetana, 2004: 461 (*Zyras* (*Pella*), list).

Type material. Syntypes: **Japan**: 1♂, "♂ (written on paper card specimen glued on)/Type (red round curator label)/Japan (yellow paper)/Japan. G. Lewis./Sharp Coll. 1905-313./Myrmedonia socius. Type D.S./SYN-TYPE (blue round curator label)"; 1♀, "♀/Japan (yellow paper)/Japan. G. Lewis./Sharp Coll. 1905-313./SYN-TYPE (blue round curator label)".

These are deposited in BMNH.

Type locality. Japan (no other information).

Other material. Japan: Hokkaidô: 13 exs., Himenuma, Rishiri-tô, 4 IX 1990, T. Kishimoto (pt); 3 exs., Hebi-numa, Teshio-gawa, Teshio-chô, 9 VII 1992, S. Hori (pt); 12 exs., Makoi, Shari-chô, 27–29 V 2001, Y. Kida (*LDFJ*); 2 exs., Mukôengaru, Engaru-chô, 25 V 2000, Y. Kida; 78 exs., Taihei, Maruseppu-chô, 29–31 V 2000, Y. Kida (*LDFJ*); 3 exs., same data but, 11–12 VIII 2000; 23 exs., same data but, 2–3 VI 2000, Y. Kida; 7 exs., same data but, 16–17 VI 2000, Y. Kida; 26 exs., Nosaki, Bihoro-chô, 23 VI 2001, Y. Yamaga (*LDC*); 10 exs., Makoi, Shari-chô, 28 V 2000, Y. Kida; 1 ex., Akkeshi, Nemuro-shi, 30 VI 1996, Y. Hirata; 1 ex., Kaitaku-kinenkan, Nopporo-shinrin-kôen, Ebetsu-shi, 20 IV 2003, S. Hori (*LDFJ*); 29 exs., Ôsawaguchi, Nopporo-shinrin-kôen, Ebetsu-shi, 31 V 1999, M. Maruyama (*LDFJ*); 1 ex., same

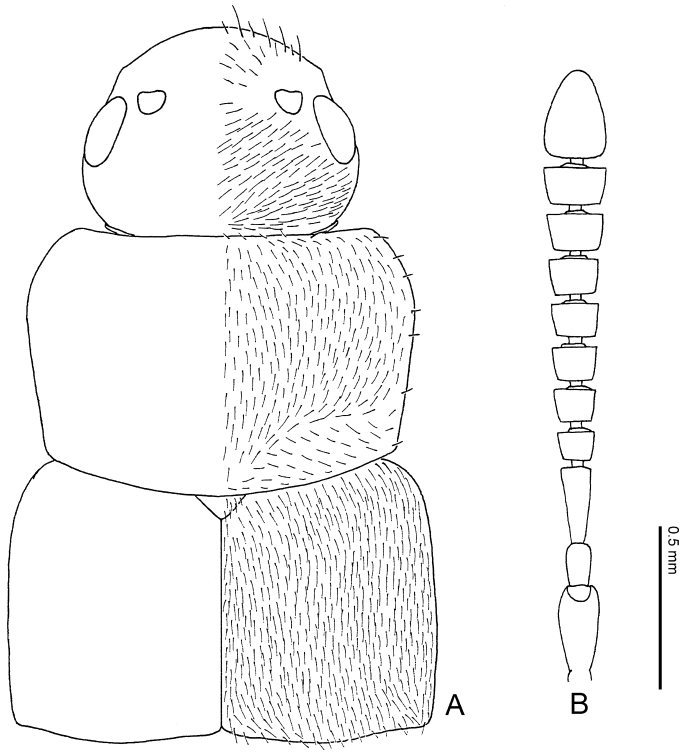

Fig. 36. *Pella socia* (Sharp).—A, Fore body, dorsal view; B, right antenna.

data but, 9 V 2000; 2 exs., same data but, 4 V 2001; 1 ex., same data but, 16–19 VI 2001, S. Hori; 1 ex., Shibumbetsu, Nopporo-shinrin-kôen, Ebetsu-shi, 9 V 2000, M. Maruyama (*LDFJ*); 14 exs., same data but, 11 V 2000 (*LDFJ*); 1 ex., same data but, 18 V 2000 (*LDFJ*); 61 exs., Tomambetsu, Nopporo-shinrin-kôen, Ebetsu-shi, 4 V 2000, M. Maruyama (*LDS*); 49 exs., same data but, 11 V 2000 (*LDS*); 5 exs., same data but, 21 V 2000 (*LDFJ*); 1 ex., same data but, 18 V 2000 (*LDS*); 17 exs., Hitsujigaoka, Sapporo-shi, 25 VII 1998, M. Maruyama (*LDFJ*); 2 exs., same data but, 21 VI 1998 (*LDS*); 4 exs., same data but, 20 V 1999; 4 exs., same data but, 18 V 2000; 1 ex., Hakken-zan, Sapporo-shi, 31 V 2001, M. Maruyama (*LDFJ*); 6 exs., Kannon-zawa, Sapporo-shi, 1 VI 2001, M. Maruyama (*LDFJ*); 4 exs., Asari, Otaru-shi, 1 IX 1998, K. Sugisima (*LDFJ*); 24 exs., Yûtoku, Ôtaki-mura, 24 VIII 2001, M. Maruyama (*LDFJ*); 17 exs., Akagawa, Hakodate-shi, 15 VIII 1992, M. Nishikawa (*LDFJ*). Honshû: 9 exs., Mizuhiki, Tateiwa-mura, Minamiaizu-gun, Fukushima-ken, 12 VI 2004, H. Kamezawa (*LDFJ*); 2 exs., Yukiwari-bashi, Nishigô-mura, Fukushima-ken, 29 VII 2000, T. Kobayashi (*LDC*); 1 ex., Kashi-onsen, Nishigô-mura, Fukushima-ken, 16 VI 1998, M. Maruyama (*LDFJ*); 8 exs., Tobiyama-jôshi, Utsunomiya-shi, Tochigi-ken, 17 VI 1998, M. Maruyama (*LDFJ*); 10 exs., Shimokomoriya, Môka-shi, Tochigi-ken, 6 VII 1999 (*LDFJ*); 13 exs., Sayado, Môka-shi, Tochigi-ken, 15 VI 2000, T. Kobayashi & H. Obata (*LDFJ*); 3 exs., Kami-imai, Hosaka-chô, Nirasaki-shi, Yamanashi-ken, 15 VIII 2000, T. Kobayashi; 1 ex., Nakano, Shôwa-machi, Kitakatsushika-gun, Saitama-ken, 14 IV 2002, H. Kamezawa (*LDFJ*); 3 exs., same data but, 25 V 2003; 3 exs., Shiroishi-tôge, Higashichichibu-mura, Saitama-ken, 9 V 1999, K. Toyoda (*LDS*); 2 exs., same data but, 17 VI 1999; 7 exs., same data but, 20 VI 1999, S. Arai; 3 exs., Minoyama, Minano-chô, 15 VII 2000, K Toyoda (*LDS*); 1

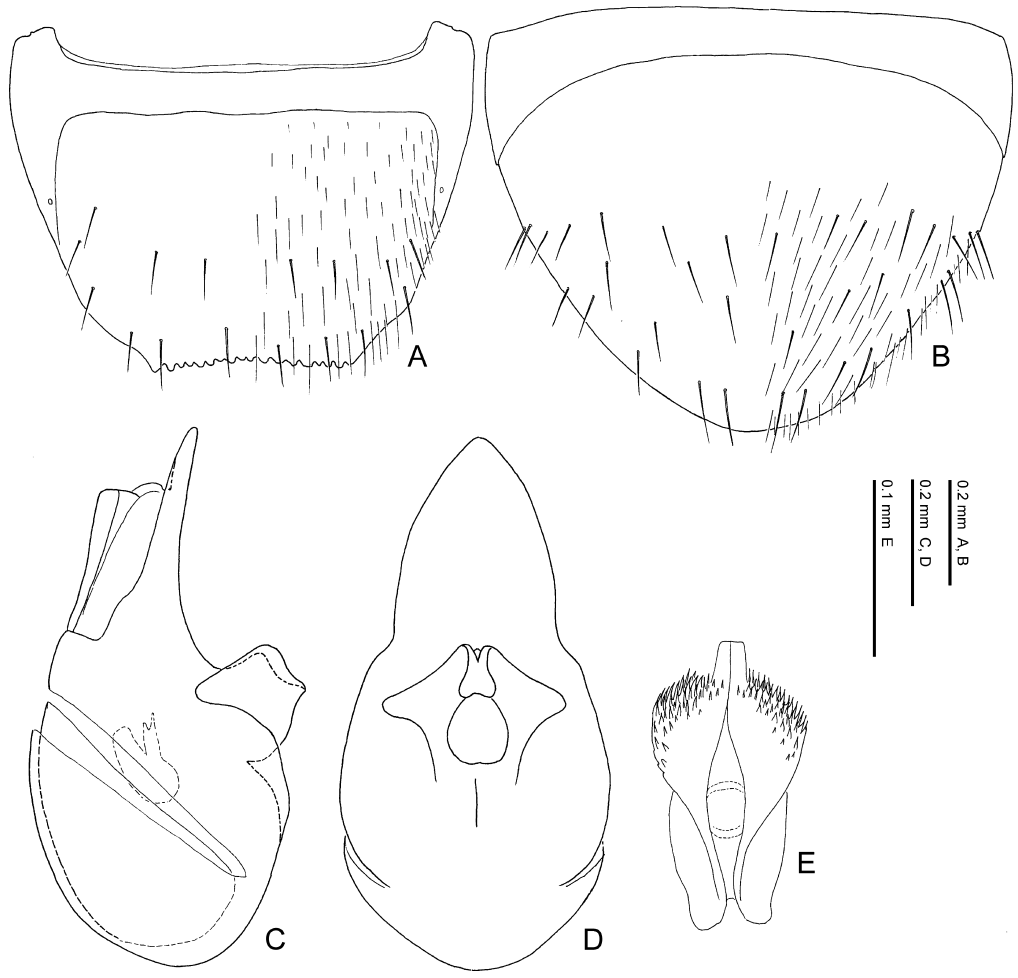

Fig. 37. *Pella socia* (Sharp). — A, Eighth abdominal tergite, dorsal view; B, 8th abdominal sternite, ventral view; C, median lobe of aedeagus, lateral view; D, ditto, ventral view; E, copulatory piece, dorsal view. Male.

ex., Tokigawa, Kamagata, Ranzan-machi, Saitama-ken, 22 IV 1999, K. Toyoda (*LDFJ*); 2 exs., Shioyama, Kamagata, Ranzan-machi, Saitama-ken, 17 VI 2000, K. Toyoda (*LDFJ*); 2 exs., Shôgun-sawa, Ranzan-chô, Saitama-ken, 25 IV 1999, K. Toyoda (*LDS*); 24 exs., Takao-san (alt. 450 m), Hachiôji-shi, Tokyo-to, 1 VII 1998, M. Maruyama (*LDS*); 13 exs., same data but, 4 VII 1998; 11 exs., same data but, 4 VI 2001; 4 exs., Shiroyama-kôen, Inagi-shi, Tokyo-to, 23 V 2004, A. Yoshida (*LDFJ*); 3 exs., same data but, 13 VI 2004; 1 ex., same data but, 26 VI 2004; 1 ex., same data but, 11 VI 2004; 5 exs., Azeta, Sakura-shi, Chiba-ken, 20 VI 1998, M. Maruyama (*LDS*); 2 exs., same data but, 23–24 VI 1998; 9 exs., Masukata-yama, Kawasaki-shi, Kanagawa-ken, 23 VI 1995, K. Kawada (*LDS*); 1 ex., Mikage, Tsukui-machi, Kanagawa-ken, 14 IV 1979, R. Kiryu (SCM); 4 exs., Fukazawa-jûnimagari, Nakamaru, Nagasaka-chô, Kitakoma-gun, Yamanashi-ken, 6 VI 2004, M. Maruyama (*LDFJ*); 2 exs., Nagasakakamijô, Nagasaka-chô, Kitakoma-gun, Yamanashi-ken, 6 VI 2004, M. Maruyama (*LDS*); 1 ex., Misuzu, Ina-shi, Nagano-ken, 18 IX 2000, T. Kobayashi (*LDFJ*); 9 exs., Ôkubo, Komoro-shi, Nagano-ken, 29–30 IV 2001, H. Kamezawa (*LDFJ*). Shikoku: 3 exs., Fujio-jinja, Takamatsu-shi, Kagawa-ken, 31 V 2001, F. Itô,

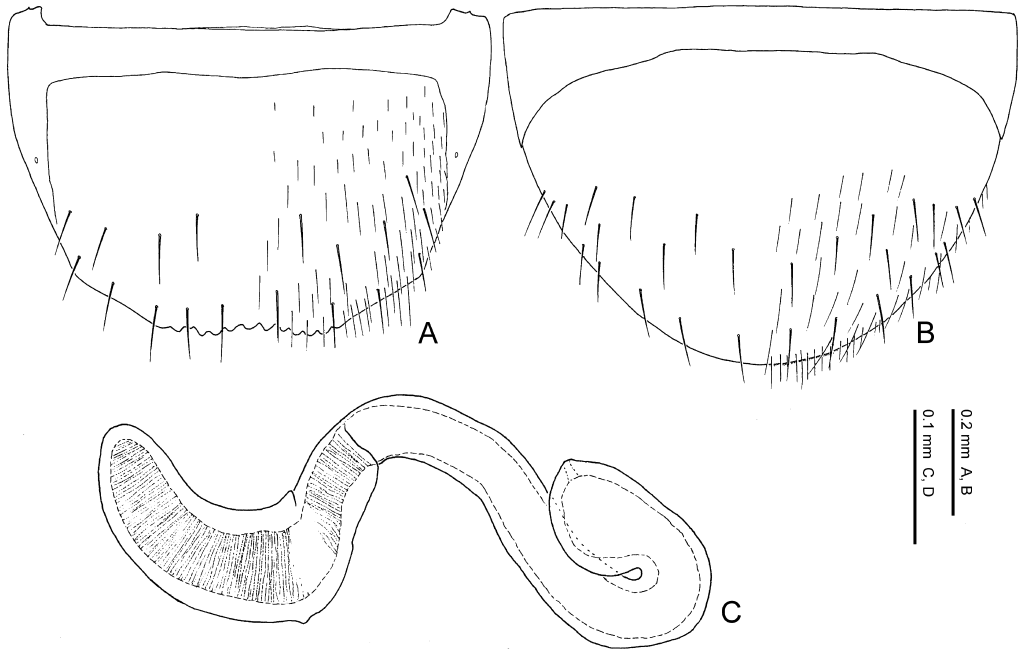

Fig. 38. *Pella socia* (Sharp). — A, Eighth abdominal tergite, dorsal view; B, 8th abdominal sternite, ventral view; C, spermatheca. Female.

M. Maruyama & Y. Kamite (*LDS*); 2 exs., Ôtaki-san, Shionoe-chô, Kagawa-ken, 2 VI 2001, M. Maruyama & Y. Kamite (*LDS*). Kyûshû: 1♂, "Nagasaki [Nagasaki-shi, Nagasaki-ken]", 13 II–21 IV 1881, G. Lewis (no other data) (BMNH); locality not specified: 1♂, 2♀♀, "Japan" G. Lewis (no other data) (BMNH).

Distribution. Manchurian subregion. ASIA: Japan (Hokkaidô, Honshû, Shikoku, Kyûshû). This species is most probably confined to Japan.

Diagnosis. *Pella socia* may be easily distinguished from the other species of *Pella* by the pronotum distinctly quadrate. Among the sympatric species in Hokkaidô, *Pella socia* is similar to *P. kidaorum* in body colour and general shape of pronotum but distinguished from it by the pronotal setation sparser, the pronotal corners well angled and the apical lobe of aedeagal median lobe not sinuate. In the other regions, Honshû, Shikoku and Kyûshû, *P. socia* is similar in body colour to *P. comes* but easily distinguished from the latter by the pronotal shape and setation above and the smaller body.

Redescription. Body slender, shining. Black in ground colour; antennae, mouthparts, legs reddish brown to brown. Head (Fig. 36 A) widest just behind eyes; surface smooth, moderately covered with setae; setae moderate in length, longer than those on pronotum and elytra; length of eyes 0.30–0.31 times as long as head width. Antennae (Fig. 36 B) shorter than head, pronotum and elytra combined; 1st segment slightly shorter than 2nd and 3rd combined; 2nd segment about 2/3 as long as 3rd; 3rd segment about 3/5 as long as 1st; 4th to 7th segments slightly longer than wide; 8th and 9th segments almost as long as wide; 10th segment slightly wider than long; 11th segment much shorter than 1st; approximate relative lengths of segments from basal to apical: 26 : 12 : 15 : 9.5 : 9.5 : 9.5 : 9.5 : 9.5 : 10 : 11 : 20. Pronotum (Fig. 36 A) quadrate, 1.43–1.46 times as wide as long, widest around anterior 1/4, slightly narrowed posteriorly; postero-lateral corner angled; surface finely punctured, moderately covered with setae, with 5 or 6 macrosetae along

lateral margin. Scutellum with surface finely punctured, densely covered with setae. Elytra (Fig. 36 A) slightly widened posteriorly; surface finely punctured, densely covered with setae, with 3 or 4 small macrosetae laterally. Legs long; hind tibia 1.12–1.17 as long as elytra; approximate relative lengths of tarsal segments from basal to apical: 7 : 6.5 : 6 : 13 in fore tarsus; 12 : 8.5 : 8 : 7 : 11.5 in mid tarsus; 19 : 11 : 9.5 : 8 : 12 in hind tarsus. Abdomen expanded, as wide as elytra, widest around 4th and 5th segments; surface smooth; 3rd to 6th tergites glabrous except for a row of setae along each posterior margin; 7th tergite almost glabrous except for posterior and lateral areas; 8th tergite (Figs. 37 A, 38 A) with 8 (rarely 9) macrosetae; 9th tergite with 4 macrosetae; 10th tergite with posterior margin slightly rounded, with 4 macrosetae.

Male: Eighth tergite (Fig. 37 A) with posterior margin truncate, its truncate apex dentate; 8th sternite (Fig. 37 B) with 17–19 macrosetae; 9th sternite with posterior margin slightly convex medially. Aedeagus (Figs. 37 C, 37 D) somewhat gourd-shaped in ventral view; apical lobe almost straight and pointed in lateral view, narrowed at base and rounded at apex in ventral view; basal ridge small and very weakly convex, invisible in lateral view; copulatory piece of inner sac as in Fig. 37 E. Paramere with apical lobe of paramerite parallel-sided, rounded apically, about 1/4 as long as condylite.

Female: Eighth tergite (Fig. 38 A) with posterior margin slightly emarginateand dentate around emarginate apex; 8th sternite (Fig. 38 B) with 14–15 macrosetae; sensory setae of 8th sternite generalised, similar to other setae in shape. Spermatheca (Fig. 38 C) curved three times; basal part somewhat longer than apical part, acutely curved near base; apical part gently curved, its inner wall densely wrinkled except around basal 4/5.

Measurements. BL, 4.8–5.7; FBL, 2.1–2.3; HL, 0.70–0.72; HW, 0.78–0.81; EL, 0.240–0.249; AL, 1.73–1.98; PL, 0.79–0.83; PW, 1.12–1.21; ELL, 0.85–0.92; ELW, 1.23–1.31; HTL, 1.00–1.03.

Bionomics. *Pella socia* is commonly collected from colonies of *Lasius* (*Dendrolasius*) spp. and distributed mountainous zones in Hokkaidô, Honshû, Shikoku and Kyûshû.

Symbiotic hosts. *Lasius* (*Dendrolasius*) *fuji*, *L.* (*D.*) *spathepus*, *L.* (*D.*) *nipponensis*, *L.* (*D.*) *orientalis*, *L.* (*D.*) *capitatus*.

Pella rambouseki (Bernhauer, 1929), n. comb.

(Figs. 39–41)

Zyras rambouseki Bernhauer, 1929: 192 (original description). — Scheerpeltz, 1934: 1658 (*Zyras*, subgenus status not specified, list). — Dvořák, 1981: 54 (*Zyras* (*Pella*), key). — Smetana, 2004: 461 (*Zyras* (*Pella*), list).

Type material. Syntypes: **Russia** (**Far East**): 1♂, "♂/As. or. 919 Vladivostok Dr. Jureček/Zyras rambouseki Brh. det. Dr. Rambousek/Dr. Rambousek comparavit. 31. V. 1929/ex coll., Scheerpeltz/COTYPUS Zyras Rambouseki Bernhauer." (NHMW); 1♂, "Sibir. or. Ussuri Vladivostok Dr. Jureček 1919/COTYPUS/Zyras Rambouseki Bh./rambouseki Brnh*" (ZMHB).

Type locality. Vladivostok, Russia.

Other material. **Korea**: 1 ex., Jeonglyeon-chi, San'nae-myeon, Cheonlabuk-do, 12 VII 1991, S. Nomura; 5 exs., Janggoksa, Chilgab-san, Cheongyang-gun, Chungnam, 23 VI 2000, M. Maruyama (*LDFJ*) (cMar, CNU); 2 exs., Oso-san, Sangdam-ri, Kwangchon-up, Hongsung-gun, Chungnam, 19–21 VI 1999, U.-S. Hwang & H.-J. Kim (pit) (cMar, CNU); 2 exs., Donghwag-sa, Gyeryongsan, Chungnam, 12 VI 1999, U.-S. Hwang (CNU). **Russia** (**Far East**): 5 exs., 70 km E Vladivostok, Anisimovka, Khabarovskyi Krai, 5 VI 1993, L. Zerche (*LDO*) (DEI); 2 exs., "Vladivostok, Sibri. or., Ussuria, Asia or., IV. 1919, Št. Jureček" (cDvor); 1♀, Prwnaja-

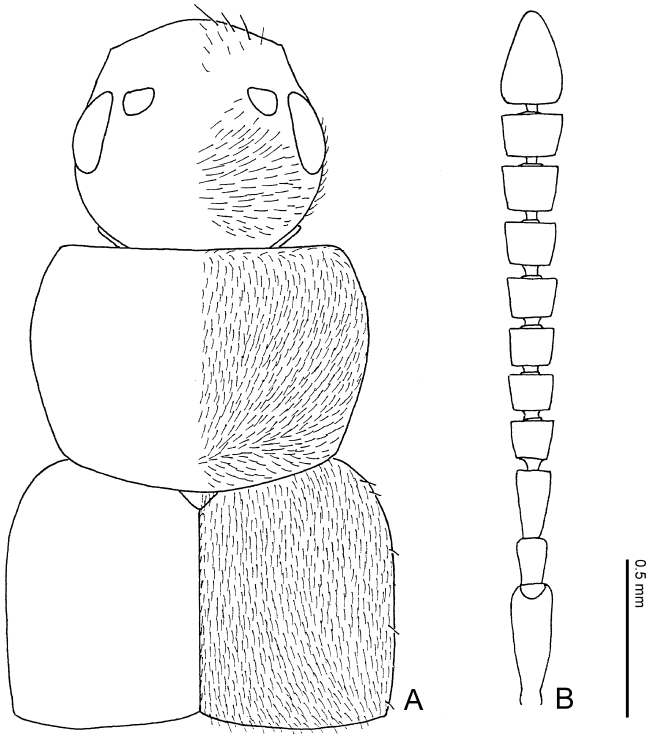

Fig. 39. *Pella rambouseki* (Bernhauer). — A, Fore body, dorsal view; B, right antenna.

Rjetschkam Tales, Vladivostok, 1918–1920, H. Farieb (NHMW); 4 exs., Kaimanovka, Ussuryisk, Primorskyi Krai, 27 V 2005, M. Maruyama (*LDFJ*); 2 exs., Kamenushka, Ussuryisk, Primorskyi Krai, 22 VII 1990, A. Putz; 1 ex., Venedivnovo, Tschermye Gory, Primorskyi Krai, 1–3 VIII 1990, A. Putz; 2 exs., Bukhta Vityaz, Poluostrov Gamov, Khasanskyi, Primorskyi Krai, 30 V 2005, M. Maruyama (*LDFJ*); 5 exs., same data but, 31 V 2005, M. Maruyama (*LDO*).

Distribution. Manchurian subregion. ASIA: Korea, Russia (Far East).

Diagnosis. *Pella rambouseki* is similar to *P. comes*, *P. kidaorum* and *P. cooterorum* in general appearance and colour but easily distinguished from the latter three by the smaller body and the basal part of spermatheca very long. These four species are locally isolated. Among the sympatric species, *P. rambouseki* is somewhat similar to *P. jureceki* in general appearance but distinguished from it by the spermathecal structure above, the body more shining, the longer antennae, the narrower pronotum and the apical lobe of aedeagal median lobe without a pair of projections in the ventro-lateral areas.

Redescription. Body slender. Black in ground colour; antennae, mouthparts, legs reddish brown to brown. Head (Fig. 39 A) widest just behind eyes; surface smooth, moderately covered with setae; setae short, as long as those on pronotum and elytra; length of eyes 0.31–0.33 times as long as head width. Antennae (Fig. 39 B) almost as long as head, pronotum and elytra combined; 1st segment slightly shorter than 2nd and 3rd combined; 2nd segment about 5/7 as long as 3rd; 3rd segment about 3/5 as long as 1st; 4th to 9th segments almost as long as wide; 10th segment slightly wider than long; 11th segment slightly shorter than 1st; approximate relative lengths of segments from basal to apical: 28.5 : 12.5 : 17 : 10 : 10 : 10 : 10 : 10 : 10 : 11 : 25.5. Pronotum (Fig. 39 A) 1.30–1.33 times as wide as long, widest around anterior 1/6, narrowed pos-

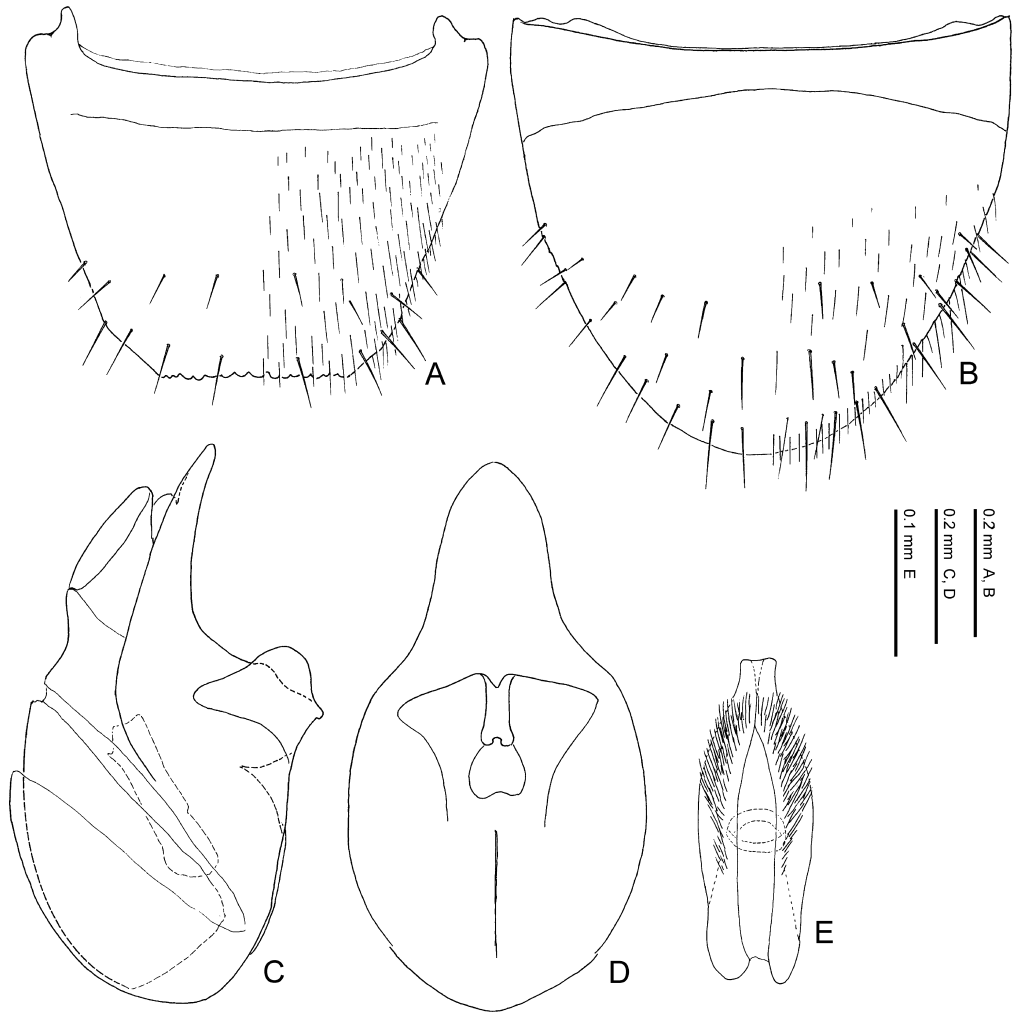

Fig. 40. *Pella rambouseki* (Bernhauer). — A, Eighth abdominal tergite, dorsal view; B, 8th abdominal sternite, ventral view; C, median lobe of aedeagus, lateral view; D, ditto, ventral view; E, copulatory piece, dorsal view. Male.

teriorly; postero-lateral corner rounded; surface finely punctured, densely covered with setae, with 5 or 6 macrosetae along lateral margin. Scutellum with surface finely punctured, densely covered with setae. Elytra (Fig. 39 A) subparallel-sided; surface finely punctured, densely covered with setae, with 6 or 7 small macrosetae laterally. Legs very long; hind tibia 1.26–1.31 times as long as elytra; approximate relative lengths of tarsal segments from basal to apical: 11 : 7.5 : 7 : 14 in fore tarsus; 18 : 9 : 7 : 6.5 : 11 in mid tarsus; 26 : 11 : 9 : 8 : 11 in hind tarsus. Abdomen expanded, 1.12 times wider than elytra, widest around 5th and 6th segments; surface smooth; 3rd to 6th tergites glabrous except for a row of setae along each posterior margin; 7th tergite almost glabrous except posterior and lateral areas; 8th tergite (Figs. 40 A, 41 A) with 8 (rarely 7 or 9) macrosetae; 9th tergite with 4 macrosetae; 10th tergite with posterior margin rounded, with 4 macrosetae.

Male: Eighth tergite (Fig. 40 A) with posterior margin truncate, its truncate apex weakly den-

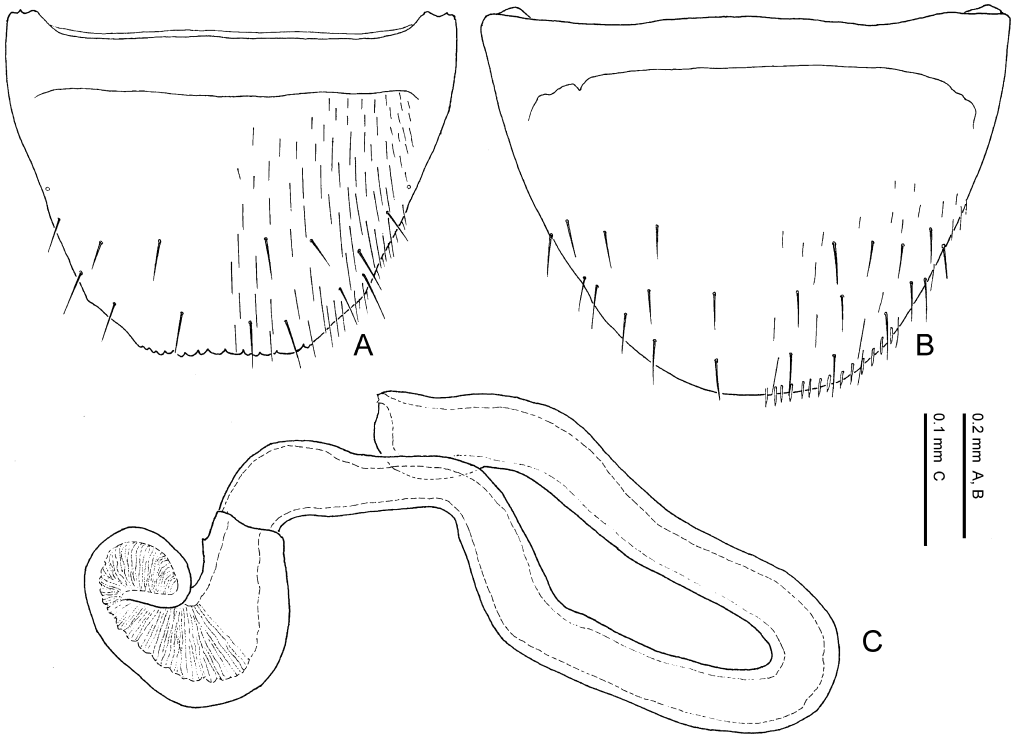

Fig. 41. *Pella rambouseki* (Bernhauer). — A, Eighth abdominal tergite, dorsal view; B, 8th abdominal sternite, ventral view; C, spermatheca. Female.

tate; 8th sternite (Fig. 40 B) with 18–20 macrosetae; 9th sternite with posterior margin slightly convex medially. Aedeagus (Figs. 40 C, 40 D) somewhat gourd-shaped in ventral view; apical lobe slightly curved ventrad and pointed apically in lateral view, narrowed at base and somewhat rounded at apex in ventral view; basal ridge weakly convex; copulatory piece of inner sac as in Fig. 40 E. Paramere with apical lobe of paramerite parallel-sided, rounded apically, about 1/3 as long as condylite.

Female: Eighth tergite (Fig. 41 A) with posterior margin truncate, its truncate apex crenate; 8th sternite (Fig. 41 B) with 10–12 macrosetae; sensory setae of 8th sternite spindle-shaped and flattened. Spermatheca (Fig. 41 C) anfractuous; basal part long, more than five times as long as apical part, acutely curved at middle; apical part acutely curved near apex, its inner wall densely wrinkled from apex to around apical 2/3.

Measurements. BL, 4.6–5.1; FBL, 2.1–2.4; HL, 0.66–0.73; HW, 0.73–0.80; EL, 0.244–0.58; AL, 1.80–2.01; PL, 0.73–0.79; PW, 0.96–1.03; ELL, 0.84–0.92; ELW, 1.05–1.13; HTL, 1.06–1.21.

Bionomics. *Pella rambouseki* is collected from colonies of *Lasius* (*Dendrolasius*) spp. This species is commonly collected in lowlands to mountainous zones in Korea and the Russian Far East, but much less frequent than a sympatric species *P. jureceki*.

Symbiotic hosts. *Lasius* (*Dendrolasius*) *fuji*, *L.* (*D.*) *spathepus*, *L.* (*D.*) *nipponensis*, *L.* (*D.*) *orientalis*.

Pella jureceki (Dvořák, 1981), n. comb.

(Figs. 42–44)

Zyras (*Pella*) *jureceki* Dvořák, 1981: 55 (original description).—Smetana, 2004: 461 (*Zyras* (*Pella*), list).
Zyras (*Pella*) *micropterus* Pace, 1998a: 976 (original description).—Smetana, 2004: 461 (*Zyras* (*Pella*), list). **N. syn.**

Type material. *Zyras* (*Pella*) *jureceki*. Paratypes: **Russia** (**Far East**): 1♂, "Asia or., Ussuria, Sibir. or. 4/1919 VLADIVOSTOK Dr. Št. Jureček lgt./PARATYPUS/Zyras (Pella) jureceki Dvořák ,81" (cDvor); 1♀, same but "ALLOTYPES" (cDvor); 1♂, "Sibir. or. Ussuri Vladivostok Dr. Jureček 1919/PARATYPUS/Zyras (Pella) jureceki Dvořák ,81" (NMP).

Zyras (*Pella*) *micropterus*. Holotype: **China** (**Beijing Shi**): ♂, "CHINA Beijing [Xiaolongmen, Beijing Shi, China (according to the original description)], 1100–1500 m, 1. VII. 1993, G. de Rougemont/Zyras micropterus sp. n. det. R. Pace 1995/HOLOTYPUS Zyras micropterus m. det. R. Pace 1995" (MHNG).

Type locality. Vladivostok, Primorskyi Krai, Russia.

Other material. **China**: 4♂♂, 2♀♀, 77 exs., Xiaolongmen (alt. 1400 m), Dongling, Yanshan, Beijing, 15–16 VI 2001, P. Hlaváč & J. Cooter (*LDFJ*) (IZAS, cMar, cHlav). **Korea**: 19 exs., Janggoksa, Chilgab-san, Cheongyang-gun, Chungnam, 23 VI 2000, M. Maruyama (*LDFJ*) (cMar, CNU). **Russia** (**Far East**): 8 exs., 10 km N Boitsovo, 20 km N Bikin (alt. 200 m), Khabarovskyi Krai, 27 V 1993, L. Zerche (*LDN*); 1 ex., 10 km SW Samarka, 70 km N Chuguyevka (alt. 300 m), Gordeyevskaya, 29 V 1993, L. Zerche; 28 exs., Kaimanovka, Ussuryisk, Primorskyi Krai, 27 V 2005, M. Maruyama (*LDFJ*); 5 exs., same data but, 28 V 2005, M. Maruyama (*LDN*); 3 exs., same data but, 28 V 2005, M. Maruyama (*LDO*); 4 exs., Ka-

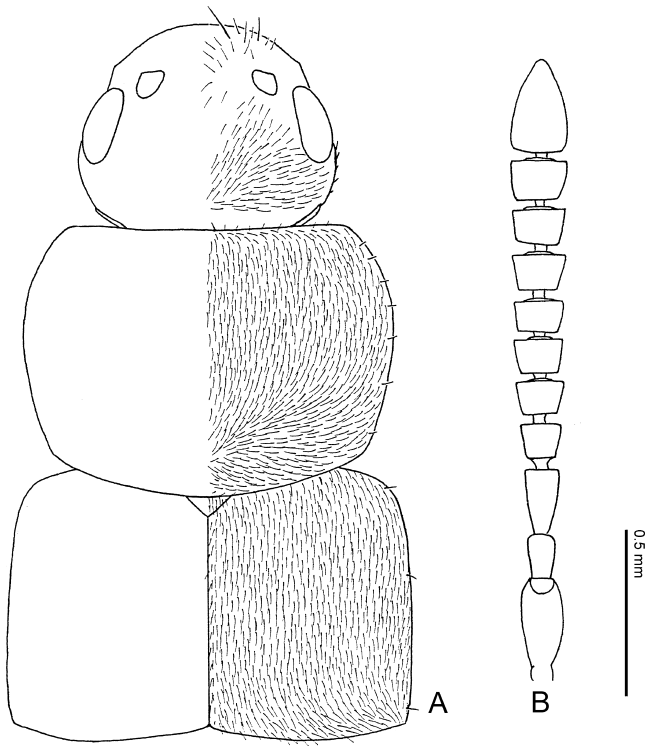

Fig. 42. *Pella jureceki* (Dvořák).—A, Fore body, dorsal view; B, right antenna.

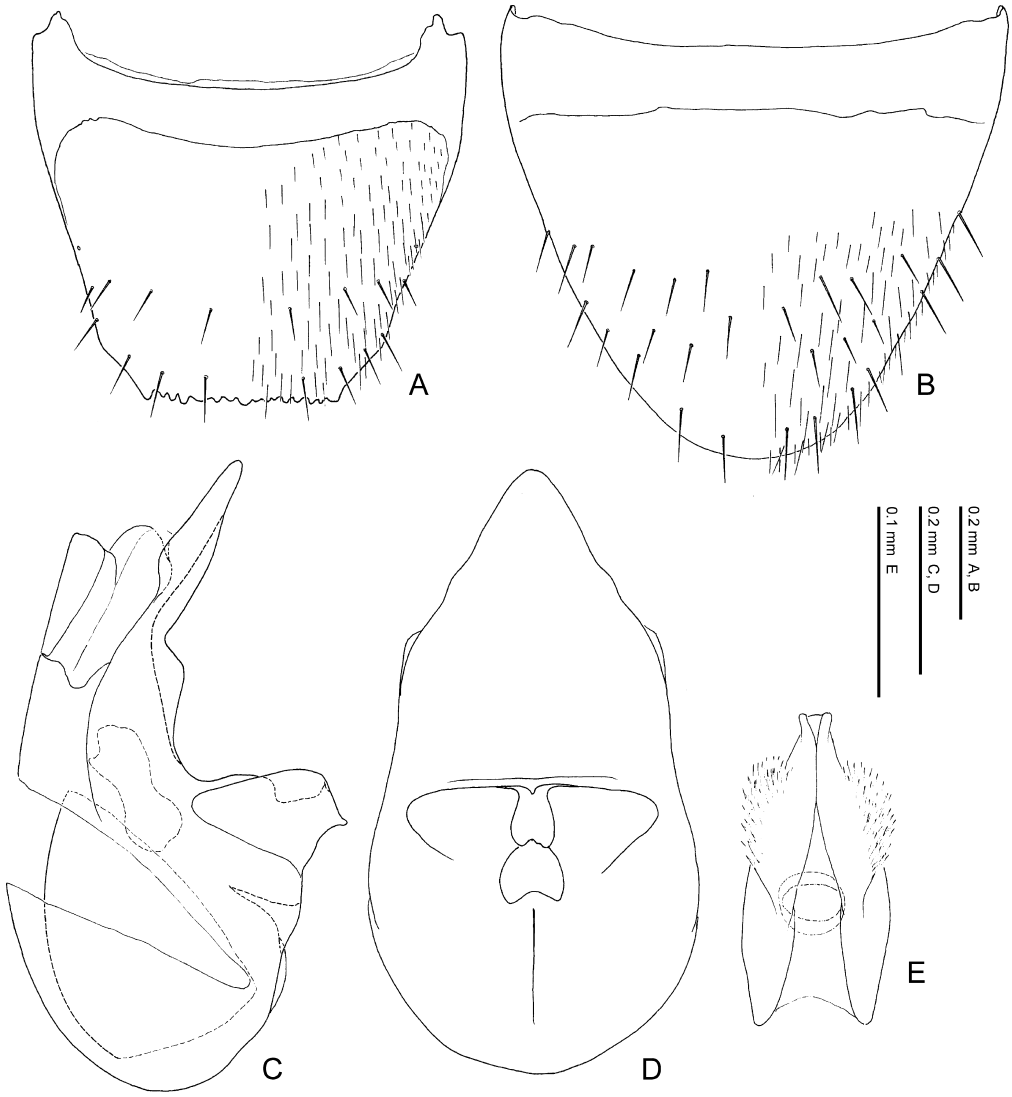

Fig. 43. *Pella jureceki* (Dvořák).—A, Eighth abdominal tergite, dorsal view; B, 8th abdominal sternite, ventral view; C, median lobe of aedeagus, lateral view; D, ditto, ventral view; E, copulatory piece, dorsal view. Male.

menushka, Ussuryisk, Primorskyi Krai, 28 V 2005, M. Maruyama (*LDFJ*); 13 exs., Bukhta Vityaz, Poluostrov Gamov, Khasanskyi, Primorskyi Krai, 29 V 2005, M. Maruyama (*LDFJ*); 14 exs., same data but, 30 V 2005; 1 ex., same data but, 31 V 2005, M. Maruyama (*LDO*); 80 exs., same data but, 31 V 2005, M. Maruyama (*LDFJ*); 42 exs., same data but, 31 V 2005, M. Maruyama (*LDN*); 1 ex., Kravtzovka, Nadezhdinskyi, Primorskyi Krai, M. Maruyama (*LDFJ*); 1 ex., Okeanskaya,Vladivostok, Primorskyi Krai, 1 VI 2005, M. Maruyama (*LDN*); 1 ex., Arsenev, Primorskyi Krai, VII 1991, Stiba.

Distribution. Manchurian subregion. ASIA: China (Beijing Shi), Korea, Russia (Far East).

Diagnosis. *Pella jureceki* may be easily distinguished from the other species of the *funesta* group by the somewhat paler colour and the apical lobe of aedeagal median lobe with a pair of projections in the ventro-lateral areas. Among the sympatric species in China and the Russian Far

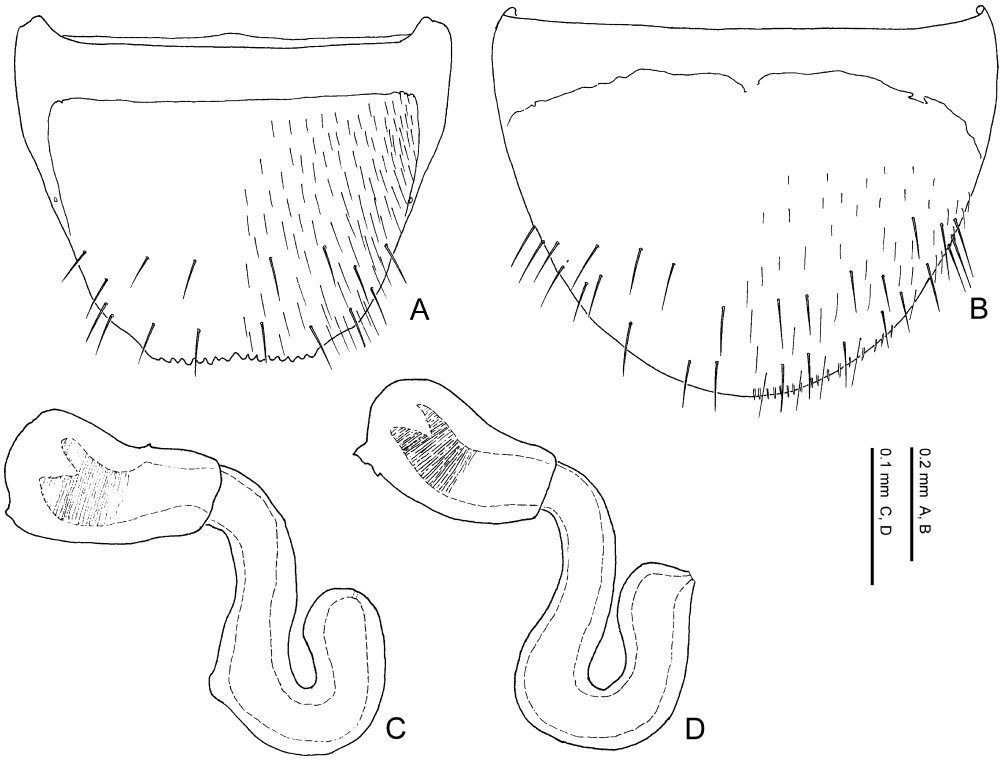

Fig. 44. *Pella jureceki* (Dvořák). — A, Eighth abdominal tergite, dorsal view; B, 8th abdominal sternite, ventral view; C, D, spermathecae. Female.

East, *Pella jureceki* is similar to *P. rambouseki*, *P. cooterorum* and *P. hlavaci* in general appearance, but is distinguished from *P. rambouseki* by the shorter antennae and the shorter spermatheca, from *P. cooterorum* by the diagnostic character states above, the less shining body surface, the wider pronotum and the outer projection of apical part of spermatheca smaller, and from *P. hlavaci* by the above spermathecal structure, the presence of pronotal postero-lateral corner and the shorter and apically dilated apical part of spermatheca. In the other regions, Korea and the Russian Far East, *Pella jureceki* is somewhat similar to *P. rambouseki* in general appearance but distinguished from the latter by the aedeagal structure diagnosed above, the paler colour, the wider pronotum and the shorter basal part of spermatheca.

Redescription. Body slender. Blackish brown in ground colour; antennae, mouthparts, legs and abdomen reddish brown to brown; around posterior margin of 3rd to 5th abdominal segments pale brown. Head (Fig. 42 A) widest just behind eyes; surface finely reticulated, densely covered with setae; setae short, as long as those on pronotum and elytra; length of eyes 0.32–0.33 times as long as head width. Antennae (Fig. 42 B) shorter than head, pronotum and elytra combined; 1st segment slightly shorter than 2nd and 3rd combined; 2nd segment about 5/7 as long as 3rd; 3rd segment about 3/5 as long as 1st; 4th to 9th segments almost as long as wide; 10th segment slightly wider than long; 11th segment much shorter than 1st; approximate relative lengths of segments from basal to apical: 29 : 11 : 19.5 : 7.5 : 7.5 : 7.5 : 7.5 : 7 : 7.5 : 8 : 18.5. Pronotum (Fig. 42 A) 1.38–1.41 times as wide as long, widest around anterior 1/4, narrowed posteriorly; postero-lateral corner rounded; surface roughly reticulated among punctures, densely covered with setae,

with 3 or 4 small macrosetae along lateral margin. Scutellum with surface finely punctured, densely covered with setae. Elytra (Fig. 42 A) subparallel-sided; surface finely punctured, reticulated among punctures, densely covered with setae, with 6 or 7 small macrosetae laterally; macrosetae poorly differentiated from setae. Legs long; hind tibia 1.22–1.25 times as long as elytra; approximate relative lengths of tarsal segments from basal to apical: 9.5 : 7 : 6 : 10.5 in fore tarsus; 13.5 : 8 : 8 : 7 : 10 in mid tarsus; 22 : 10 : 9 : 7.5 : 13.5 in hind tarsus. Abdomen expanded, 1.09 times wider than elytra, widest around 4th and 5th segments; surface weakly reticulated; 3rd sparsely covered with setae; 4th to 6th tergites glabrous except for a row of setae along each posterior margin; 7th tergite sparsely covered with minute setae; 8th tergite (Figs. 43 A, 44 A) with 8 (rarely 9) macrosetae; 9th tergite with 4 macrosetae; 10th tergite with posterior margin slightly emarginate, with 4 macrosetae.

Male: Eighth tergite (Fig. 43 A) with posterior margin truncate, its truncate apex dentate; 8th sternite (Fig. 43 B) with 13–15 macrosetae; 9th sternite with posterior margin slightly emarginate. Aedeagus (Figs. 43 C, 43 D) amygdaloid in ventral view; apical lobe slightly curved ventrad and pointed apically in lateral view, subparallel-sided in basal 1/2 and pointed at apex in ventral view, its ventrolateral sides with a pair of projections; basal ridge weakly convex; copulatory piece of inner sac as in Fig. 43 E. Paramere with apical lobe of paramerite parallel-sided, rounded apically, about 1/2 as long as condylite.

Female: Eighth tergite (Fig. 44 A) with posterior margin truncate, its truncate apex dentate; 8th sternite (Fig. 44 B) with 13–15 macrosetae; sensory setae of 8th sternite spindle-shaped and flattened. Spermatheca (Figs. 44 C, 44 D) curved twice, S-shaped; basal part about 2–2.5 times as long as apical part, acutely curved around basal 1/3 and gently curved apicad; apical part almost straight, its inner wall densely wrinkled from apex to around apical 1/3.

Measurements. BL, 4.5–5.6; FBL, 2.1–2.3; HL, 0.69–0.73; HW, 0.78–0.81; EL, 0.254–0.261; AL, 1.80–1.97; PL, 0.73–0.83; PW, 1.03–1.14; ELL, 0.76–0.88; ELW, 1.11–1.25; HTL, 0.95–1.08.

Bionomics. *Pella jureceki* is very common in its distributional range.

Symbiotic hosts. *Lasius* (*Dendrolasius*) *fuji*, *L.* (*D.*) *nipponensis*, *L.* (*D.*) *orientalis*.

Pella kidaorum Maruyama, n. sp.

(Figs. 45–47)

Type material. Holotype: **Japan**: ♂, "Taihei, Maruseppu-chô, Hokkaidô, Japan, 29–31 V 2000, Y. Kida leg." (*LDFJ*) (HUM).

Paratypes: **Japan**: Hokkaidô: 1 ex., Himenuma, Rishiri-tô, 9 VII 1977, S. Naomi; 63 exs., same data but, 4 IX 1990, T. Kishimoto (pt); 99 exs., Hebi-numa, Teshio-gawa, Teshio-chô, 9 VII 1992, S. Hori (pt); 5 exs., Esaushi-yama, Kamikawa-chô, 8 VIII 1985, N. Yasuda (pt); 1 ex., Mukôengaru, Engaru-chô, 25 VI 2000, Y. Kida; 4 exs., Makoi, Shari-chô, 28 VI 2000, Y. Kida (*LDFJ*); 7 exs., same data but, 27–29 V 2001; 1 ex., Nosaki, Bihoro-chô, 23 VI 2001, Y. Yamaga (*LDC*); 1 ex., Kashiwagaoka, Bihoro-chô, 23 VI 2001, Y. Yamaga; 3 exs., Ochiishi, Nemuro-shi, 24–27 VIII 1993, K. Miyashita; 4 exs., Kombumori, Nemuro-shi, 26 IX 2000, H. Sugaya; 8 exs., Tôbaru, Nemuro-shi, 28 IX 2000, H. Sugaya (*LDFJ*); 38 exs., Taihei, Maruseppu-chô, 29–31 V 2000, Y. Kida (*LDFJ*); 7 exs., same data but, 2–3 VI 2000; 8 exs., same data but, 16–17 VI 2000; 1 ex., same data but, 11–12 VIII 2000; 2 exs., same data but, 17 VIII 2000; 1 ex., same data but, 19–21 VIII 2000; 29 exs., same data but, 25 VIII 2000, M. Maruyama; 2 exs., Onnenai, Tsurui-mura, 2 VI 1994, Y. Hirama; 9 exs., Midorigaoka-kôen, Kitami-shi, 17 VI 2001, M. Maruyama;

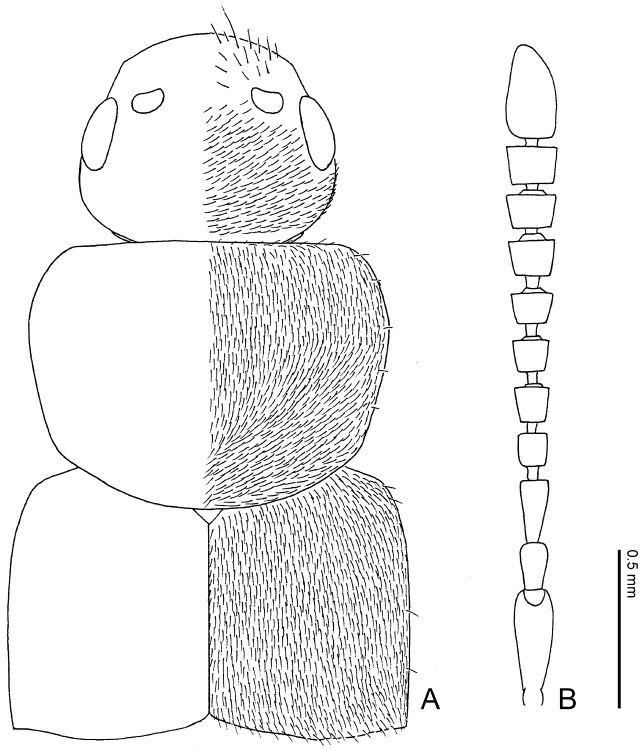

Fig. 45. *Pella kidaorum* Maruyama, n. sp.—A, Fore body, dorsal view; B, right antenna.

4 exs., Kamiotoineppu, Otoineppu-mura, 15–23 VII 1997, S. Hori (pt); 3 exs., Kaitaku-kinenkan, Nopporo-shinrin-kôen, Ebetsu-shi, 20 IV 2003, S. Hori (*LDFJ*); 2 exs., Ôsawaguchi, Nopporo-shinrin-kôen, Ebetsu-shi, 31 V 1999, M. Maruyama (*LDFJ*); 23 exs., Shibumbetsu, Nopporo-shinrin-kôen, Ebetsu-shi, 11 VI 2000, M. Maruyama (*LDFJ*); 1 ex., same data but, 18 VI 2000; 14 exs., Tomambetsu, Nopporo-shinrin-kôen, Ebetsu-shi, 4 VI 2000, M. Maruyama (*LDS*); 3 exs., same data but, 11 VI 2000; 1 ex., same data but, 23 IX 2000, H. Sugaya; 3 exs., Hitsujigaoka, Sapporo-shi, 25 VII 1998, M. Maruyama (*LDS*); 9 exs., same data but, 21 VI 1998 (*LDO*); 10 exs., Hyakumatsu-zawa, Sapporo-shi, 24 VIII 2001, M. Maruyama & H. Sugaya (*LDO*); 3 exs., Kannon-zawa, Sapporo-shi, 31 V 2002, M. Maruyama (*LDFJ*); 61 exs., same data but, 7 VIII 2002; 1 ex., Moiwa-yama, Sapporo-shi, 16 VI 1983, Y. Hirano; 1 ex., Maru-yama, Sapporo-shi, 6 VI 1998, M. Maruyama (*LDFJ*); 1♀, "Sapporo [Sapporo-shi]", 5–16 VIII 1880, G. Lewis ("*Myrmedonia*, comes var., Sapporo. Japan Lewis", written on paper card specimen glued on) (BMNH); 6 exs., Asari, Otaru-shi, 1 IX 1998, K. Sugisima (*LDFJ*); 17 exs., Yutoku, Ôtaki-mura, 24 VIII 2001, M. Maruyama & H. Sugaya (*LDO*).

Type locality. Maruseppu-chô, Hokkaidô, Japan.

Distribution. Manchurian subregion. ASIA: Japan (Hokkaidô). This species is most probably confined to Hokkaidô, Japan.

Etymology. Dedicated to Mr. Yasunari Kida (Maruseppu Town Insectarium, Hokkaidô, Japan) and his wife Mrs. Yuriko Yamaga (Bihoro Museum, Hokkaidô, Japan) for their contribution to the study on ants and myrmecophilous insects in eastern Hokkaidô.

Diagnosis. *Pella kidaorum* is most similar to *P. cooterorum* in general appearance and

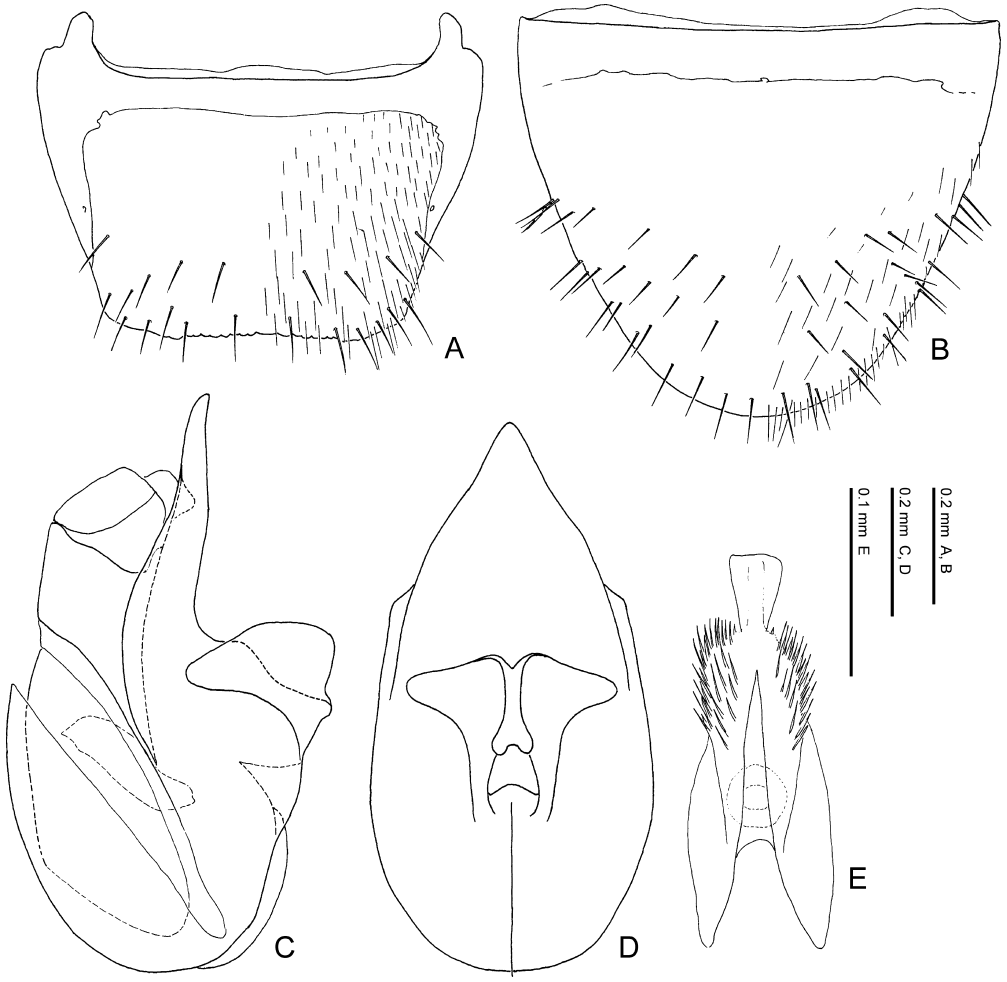

Fig. 46. *Pella kidaorum* Maruyama, n. sp.—A, Eighth abdominal tergite, dorsal view; B, 8th abdominal sternite, ventral view; C, median lobe of aedeagus, lateral view; D, ditto, ventral view; E, copulatory piece, dorsal view. Male.

shape of genitalia, but is distinguished from the latter by the apical lobe of aedeagus slightly curved and the spermatheca lacking outer projection. Among the sympatric species *Pella kidaorum* is most similar to *P. socia* in general appearance but distinguished from the latter by the pronotal setation denser, the pronotal corners not distinctly angled and the apical lobe of aedeagal median lobe slightly sinuate.

Discription. Body slender. Black in ground colour; antennae, mouthparts and legs reddish brown to brown; around posterior margins of 3rd to 5th abdominal segments pale brown. Head (Fig. 45 A) widest just behind eyes; surface finely reticulated, densely covered with setae; setae short, as long as those on pronotum and elytra; length of eyes 0.29–0.30 times as long as head width. Antennae (Fig. 45 B) shorter than head, pronotum and elytra combined; 1st segment shorter than 2nd and 3rd combined; 2nd segment about 5/8 as long as 3rd; 3rd segment about 2/3 as long as 1st; 4th segment slightly longer than wide; 5th and 6th segments as long as wide, 7th to 9th segments almost as long as wide; 10th segment slightly wider than long; 11th segment much

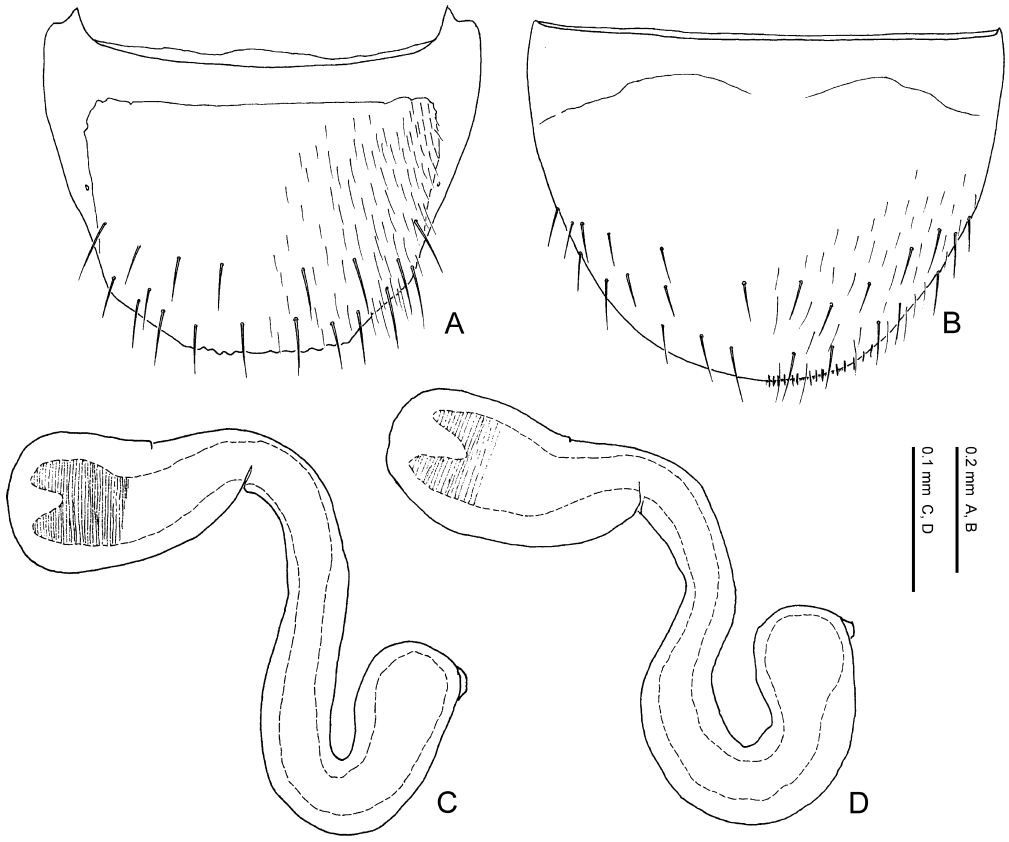

Fig. 47. *Pella kidaorum* Maruyama, n. sp. — A, Eighth abdominal tergite, dorsal view; B, 8th abdominal sternite, ventral view; C, D, spermathecae. Female.

shorter than 1st; approximate relative lengths of segments from basal to apical: 28 : 12.5 : 17 : 11 : 10 : 10 : 10 : 9.5 : 9 : 10.5 : 20.5. Pronotum (Fig. 45 A) 1.25–1.30 times as wide as long, widest around anterior 1/4, narrowed posteriorly; postero-lateral corner rounded; surface finely reticulated among punctures, densely covered with setae, with 7 or 8 small macrosetae along lateral margin. Scutellum with surface finely punctured, densely covered with setae. Elytra (Fig. 45 A) subparallel-sided; surface finely punctured, reticulated among punctures, densely covered with setae, with 6 or 7 small macrosetae laterally. Legs very long; hind tibia 1.27–1.35 times as long as elytra; approximate relative lengths of tarsal segments from basal to apical: 11. : 7.5 : 6.5 : 10 in fore tarsus; 19 : 10.5 : 8 : 6 : 10 in mid tarsus; 29 : 10 : 9 : 7.5 : 11 in hind tarsus. Abdomen expanded, 1.07 times wider than elytra, widest around 4th and 5th segments; surface weakly reticulated; 3rd sparsely covered with setae; 4th to 6th tergites glabrous except for a row of setae along each posterior margin; 7th tergite glabrous except for lateral areas sparsely covered with minute setae; 8th tergite (Figs. 46 A, 47 A) with 10 (rarely 9 or 11) macrosetae; 9th tergite with 4 macrosetae; 10th tergite with posterior margin slightly emarginate, with 4 macrosetae.

Male: Eighth tergite (Fig. 46 A) with posterior margin truncate, its truncate apex weakly crenate; 8th sternite (Fig. 46 B) with 23–25 macrosetae; 9th sternite with posterior margin roundly emarginate. Aedeagus (Figs. 46 C, 46 D) tear shaped in ventral view; apical lobe slightly sinuate in ventral view, pointed at apex in lateral and ventral views; basal ridge well developed, reaching

bottom of basal capsule; copulatory piece of inner sac as in Fig. 46 E. Paramere with apical lobe of paramerite dilated apicad, rounded at apex, about 1/3 as long as condylite.

Female: Eighth tergite (Fig. 47 A) with posterior margin truncate, its truncate apex weakly crenate; 8th sternite (Fig. 47 B) with 12–14 macrosetae; sensory setae of 8th sternite spindle-shaped and flattened. Spermatheca (Figs. 47 C, 47 D) curved twice, S-shaped; basal part about 2–2.5 times as long as apical part, acutely curved around basal 1/3 and gently curved apicad; apical part almost straight, its inner wall densely wrinkled from apex to around apical 1/3.

Measurements. BL, 4.9–5.5; FBL, 2.3–2.5; HL, 0.73–0.74; HW, 0.83–0.88; EL, 0.244–0.257; AL, 2.08–2.15; PL, 0.88–0.92; PW, 1.12–1.19; ELL, 0.85–0.98; ELW, 1.15–1.35; HTL, 1.20–1.25.

Bionomics. *Pella kidaorum* is commonly collected from colonies of *Lasius* (*Dendrolasius*) spp. and widely distributed in Hokkaidô. A specimen of *Pella kidaorum* was collected near a nest of *Formica japonica* once for all (Kida, pers. comm.), but this association is probably accidental.

Symbiotic host. *Lasius* (*Dendrolasius*) *fuji*, *L.* (*D.*) *spathepus*, *L.* (*D.*) *nipponensis*, *L.* (*D.*) *orientalis*, *L.* (*D.*) *capitatus*.

Pella cooterorum Maruyama, n. sp.

(Figs. 48–50)

Type material. Holotype: **China** (**Beijing Shi**): ♂, "Xiaolongmen (1400 m), Dongling Yan-shan Beijing CHINA, 15–16 VI 2001, Hlaváč & Cooter leg." (*LDFJ*) (IZAS).

Paratypes: 4♂♂, 2♀♀, 13 exs., same data as holotype (IZAS, cMar, cHlav); **China** (**Yunnan Sheng**): 5 exs., Diaolin, 100 km W. Kunming, 2–22 VI 1993, E. Jendek & O. Šauša (NHMW, cMar).

Type locality. Xiaolongmen, Beijing Shi, China.

Distribution. Manchurian subregion. ASIA: China (Beijing Shi, Yunnan Sheng).

Etymology. Dedicated to Mr. Jonathan Cooter (Hereford, United Kingdom), a collector of the type series, and his family.

Diagnosis. *Pella cooterorum* is most similar to *P. kidaorum* in general appearance and shape of genitalia, but is distinguished from the latter by the apical lobe of aedeagus almost straight and the spermatheca having outer projection. Among the sympatric species *Pella cooterorum* is somewhat similar to *P. jureceki* in general appearance but distinguished from the latter by the darker colour, the body surface more shining, the narrower pronotum, the apical lobe of aedeagal median lobe without a pair of projections on the ventro-lateral areas and the outer projection of apical part of spermatheca larger.

Description. Body slender. Black in ground colour; antennae, mouthparts and legs reddish brown to brown; around posterior margin of 3rd to 5th abdominal segments pale brown. Head (Fig. 48 A) widest just behind eyes; surface finely reticulated, densely covered with setae; setae short, as long as those on pronotum and elytra; length of eyes 0.30–0.32 times as long as head width. Antennae (Fig. 48 B) shorter than head, pronotum and elytra combined; 1st segment shorter than 2nd and 3rd combined; 2nd segment about 5/8 as long as 3rd; 3rd segment about 2/3 as long as 1st; 4th segment slightly longer than wide; 5th and 6th segments as long as wide, 7th to 9th segments almost as long as wide; 10th segment slightly wider than long; 11th segment much shorter than 1st; approximate relative lengths of segments from basal to apical: 30 : 12.5 : 16 : 9 : 9 : 8 : 9 : 9 : 10 : 10.5 : 22. Pronotum (Fig. 48 A) 1.23–1.30 times as wide as long, widest around anterior 1/5, narrowed posteriorly; postero-lateral corner rounded; surface finely punctured, finely

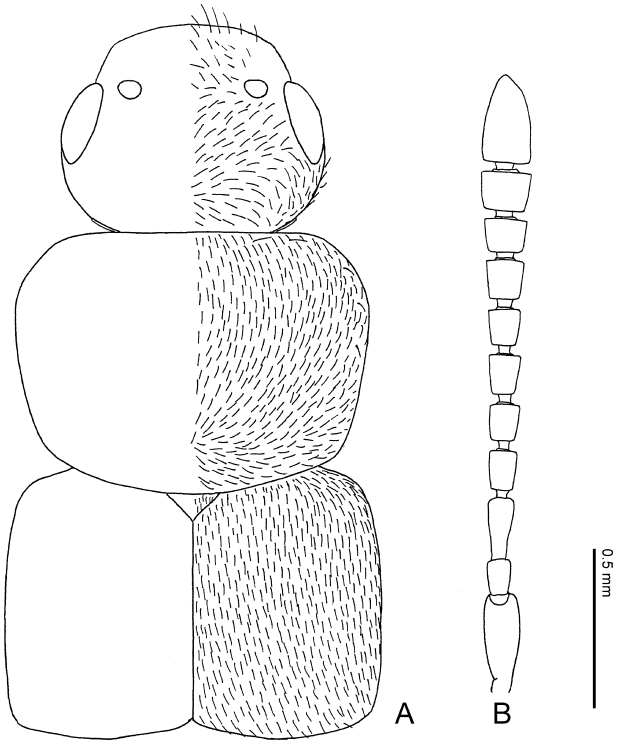

Fig. 48. *Pella cooterorum* Maruyama, n. sp. — A, Fore body, dorsal view; B, right antenna.

reticulated among punctures, densely covered with setae, with 7 or 8 small macrosetae along lateral margin. Scutellum with surface finely punctured, densely covered with setae. Elytra (Fig. 48 A) subparallel-sided; surface finely punctured, reticulated among punctures, densely covered with setae, with 6 or 7 small macrosetae laterally. Legs very long; hind tibia 1.35–1.36 times as long as elytra; approximate relative lengths of tarsal segments from basal to apical: 9 : 8 : 6 : 13 in fore tarsus; 18 : 9 : 8 : 7 : 12 in mid tarsus; 22.5 : 12 : 10 : 8.5 : 12.5 in hind tarsus. Abdomen expanded, 1.09 times wider than elytra, widest around 6th and 7th segments; surface weakly reticulated; 3rd sparsely covered with setae; 4th to 6th tergites glabrous except for a row of setae along each posterior margin; 7th tergite glabrous except for lateral areas sparsely covered with minute setae; 8th tergite (Figs. 49 A, 50 A) with 10 (rarely 9 or 11) macrosetae; 9th tergite with 4 macrosetae; 10th tergite with posterior margin slightly rounded, with 4 macrosetae.

Male: Eighth tergite (Fig. 49 A) with posterior margin truncate, its truncate apex weakly crenate; 8th sternite (Fig. 49 B) with 20–23 macrosetae; 9th sternite with posterior margin slightly emarginate. Aedeagus (Figs. 49 C, 49 D) amygdaloid in ventral view; apical lobe almost straight, pointed at apex in lateral and ventral views; basal ridge well developed, reaching near bottom of basal capsule; copulatory piece of inner sac as in Fig. 49 E. Paramere with apical lobe of paramerite dilated apicad, rounded at apex, about 1/3 as long as condylite.

Female: Eighth tergite (Fig. 50 A) with posterior margin somewhat truncate, its truncate apex weakly crenate; 8th sternite (Fig. 50 B) with 12–14 macrosetae; sensory setae of 8th sternite spindle-shaped and flattened. Spermatheca (Figs. 50 C–50 E) curved three times; basal part about 1.5–2.0 times as long as apical part, acutely curved around basal 1/3 and gently curved apicad; apical part with outer projection, slightly curved, its inner wall densely wrinkled from apex to

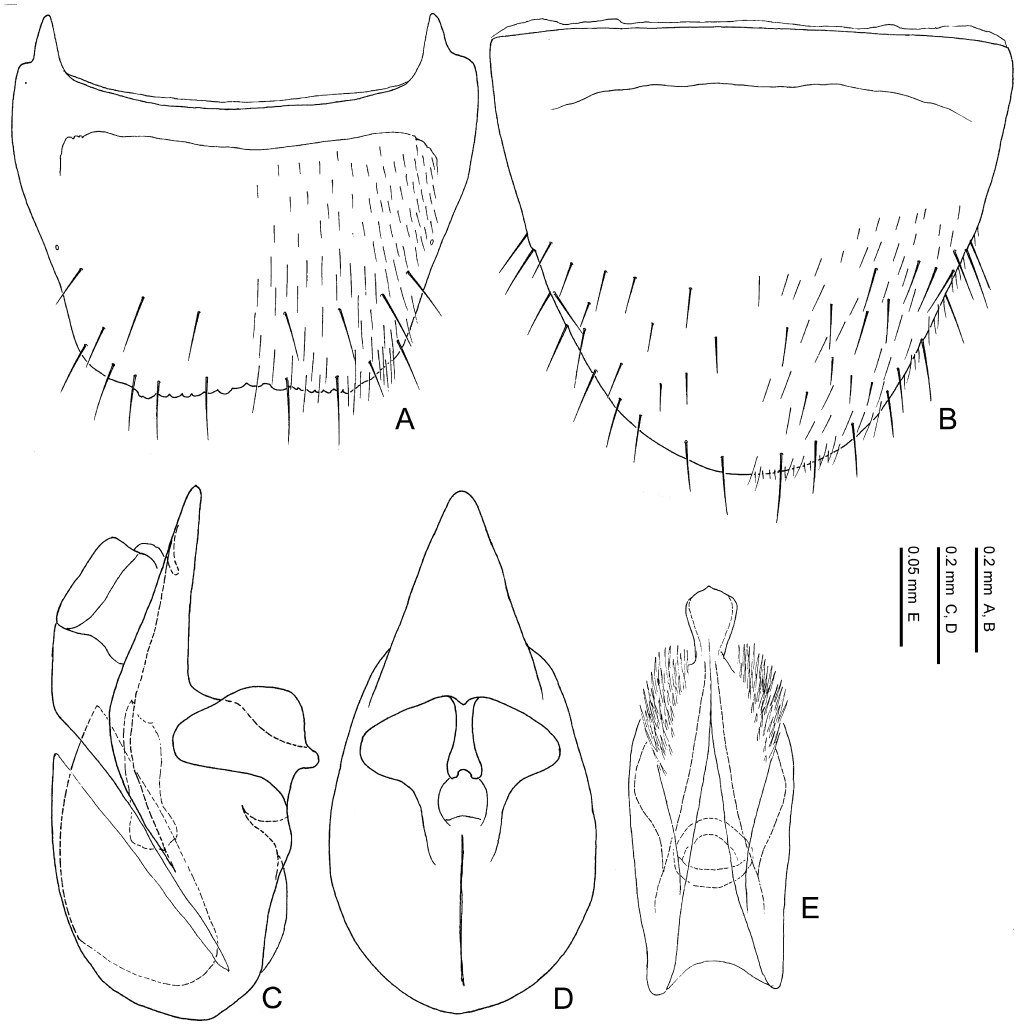

Fig. 49. *Pella cooterorum* Maruyama, n. sp.—A, Eighth abdominal tergite, dorsal view; B, 8th abdominal sternite, ventral view; C, median lobe of aedeagus, lateral view; D, ditto, ventral view; E, copulatory piece, dorsal view. Male.

around apical 1/2.

Measurements. BL, 5.0–5.2; FBL, 2.3–2.5; HL, 0.70–0.73; HW, 0.78–0.80; EL, 0.243–0.256; AL, 2.02–2.05; PL, 0.81–0.83; PW, 1.03–1.08; ELL, 0.84–0.90; ELW, 1.12–1.25; HTL, 1.13–1.23.

Bionomics. The type series of *Pella cooterorum* from Beijing Shi were collected by sifting dead leaves accumulated around a colony of *Lasius* (*Dendrolasius*) *fuji* nested at a hollow of old tree. The type series were captured with the myrmecophilous staphylinid beetles *Pella jureceki*, *P. hlavaci*, *P. beijingorum*, *P. zhoui*, *Zyras* (*Zyras*) sp., *Homoeusa chinensis* Pace, 1999, *Thiasophila* sp., *Batristilbus monstrotibialis* Hlaváč, Sugaya & Zhou, 2002, and *Tmesiphorus* sp. (Hlaváč, pers. comm.).

Symbiotic host. *Lasius* (*Dendrolasius*) *fuji*.

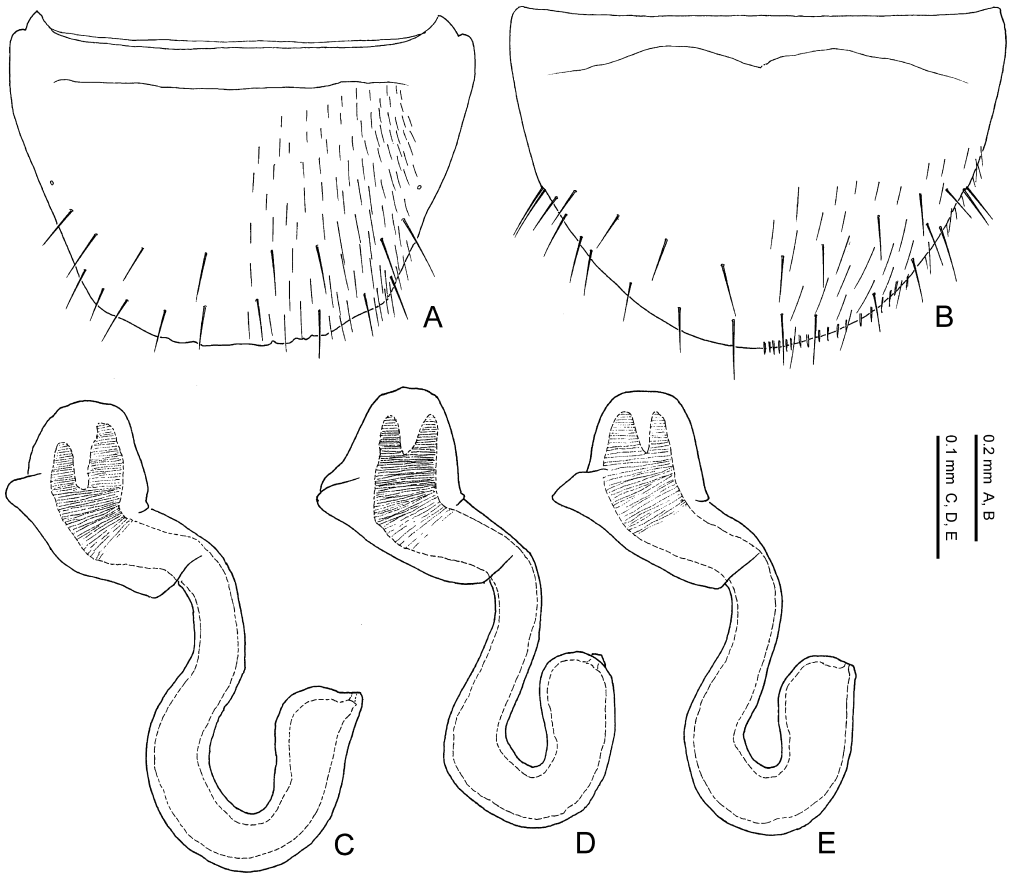

Fig. 50. *Pella cooterorum* Maruyama, n. sp. — A, Eighth abdominal tergite, dorsal view; B, 8th abdominal sternite, ventral view; C–E, spermathecae. Female.

The ***barbara*** Group

Species included. *Pella barbara*, *P. leonhardi*, *P. jelineki*.

Distribution. Mediterranean subregion.

Diagnosis. Species of the *barbara* group may be characterised by a combination of the following character states: 1) eye length 0.29–0.35 times as long as head width; 2) 11th antennal segment almost as long as, or longer than 1st; 3) pronotum with postero-lateral corners; 4) pronotum 1.25–1.35 times as wide as long; 5) pronotum widest anteriorly; 6) pronotal hypomeron fully visible in lateral view; 7) elytra almost unicoloured, blackish brown; 8) inner and posterior margins of elytra weakly margined; 9) male 8th sternite longer than in female; 10) posterior margin of 8th tergite crenate; 11) posterior margin of male 8th sternite rounded; 12) lateral projection of apodeme of male 8th tergite not evidently longer than that of female; 13) macrosetae of 8th abdominal segment generalised in length, exceeding the posterior margin of the segment; 14) postero-medial margin of female 8th sternite with out minute pubescence; 15) apical lobe of aedeagal median lobe gently curved ventrad in lateral view; 16) distal crests of aedeagus well developed, projected semicircularly in lateral view; 17) copulatory piece of aedeagal median lobe spindle-shaped in dorsal view.

Comments. The *barbara* group may possibly be allied to the *funesta* group in resemblance of general appearance. However, the members of this species-group are also similar to *Pella erratica* in general appearance, small body and shape of spermatheca, and the members of the *excepta* group in general structure of aedeagal median lobe.

Symbiotic host. Unknown.

Key to the Species of the *barbara* Group

1. Third to 6th tergites densely covered with setae, their setae overlapping each other; 8th abdominal tergite with more than 10 macrosetae in female. .....*P. barbara*.
— Third to 6th tergites moderately to sparsely covered with setae, their setae not overlapping each other; 8th abdominal tergite with less than 8 macrosetae in female. .....2.
2. Postero-lateral corners of pronotum well angled; pronotum and elytra densely covered with setae as in Fig. 54 A. .....*P. leonhardi*.
— Postero-lateral corners of pronotum rounded; pronotum and elytra strongly densely covered with setae as in Fig. 56 A. .....*P. jelineki*.

Pella barbara (Fairmaire, 1863), n. comb.

(Figs. 51–53)

Myrmedonia barbara Fairmaire, 1863: 638 (original description).—Bernhauer & Scheerpeltz, 1926: 695 (*Zyras* (*Pella*), list).—Fenyes, 1920: 297 (*Zyras* (*Myrmedonia* s. str.), list).—Smetana, 2004: 461 (*Zyras* (*Pella*), list).

Type material. Syntype: **Algeria**: sex?, “barbara Fairm type/R.I.Sc.N.B. 17.819 Coll. A.

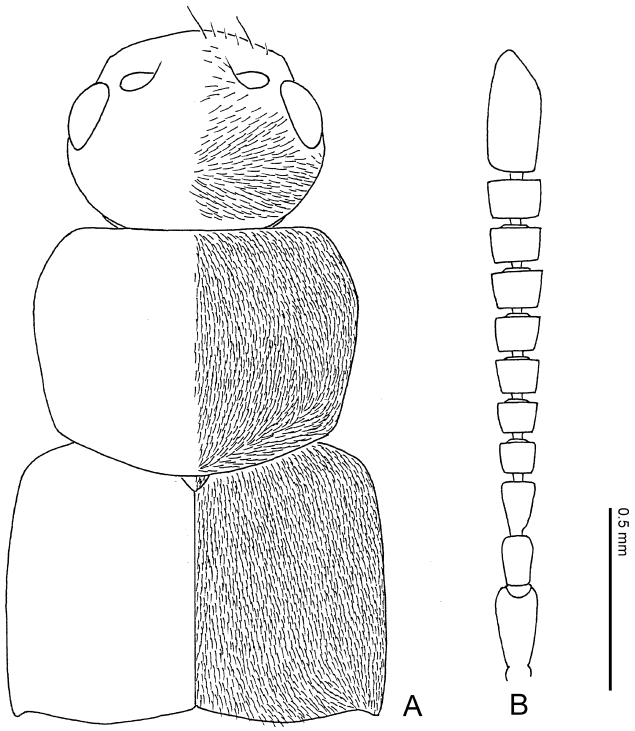

Fig. 51. *Pella barbara* (Fairmaire).—A, Fore body, dorsal view; B, right antenna.

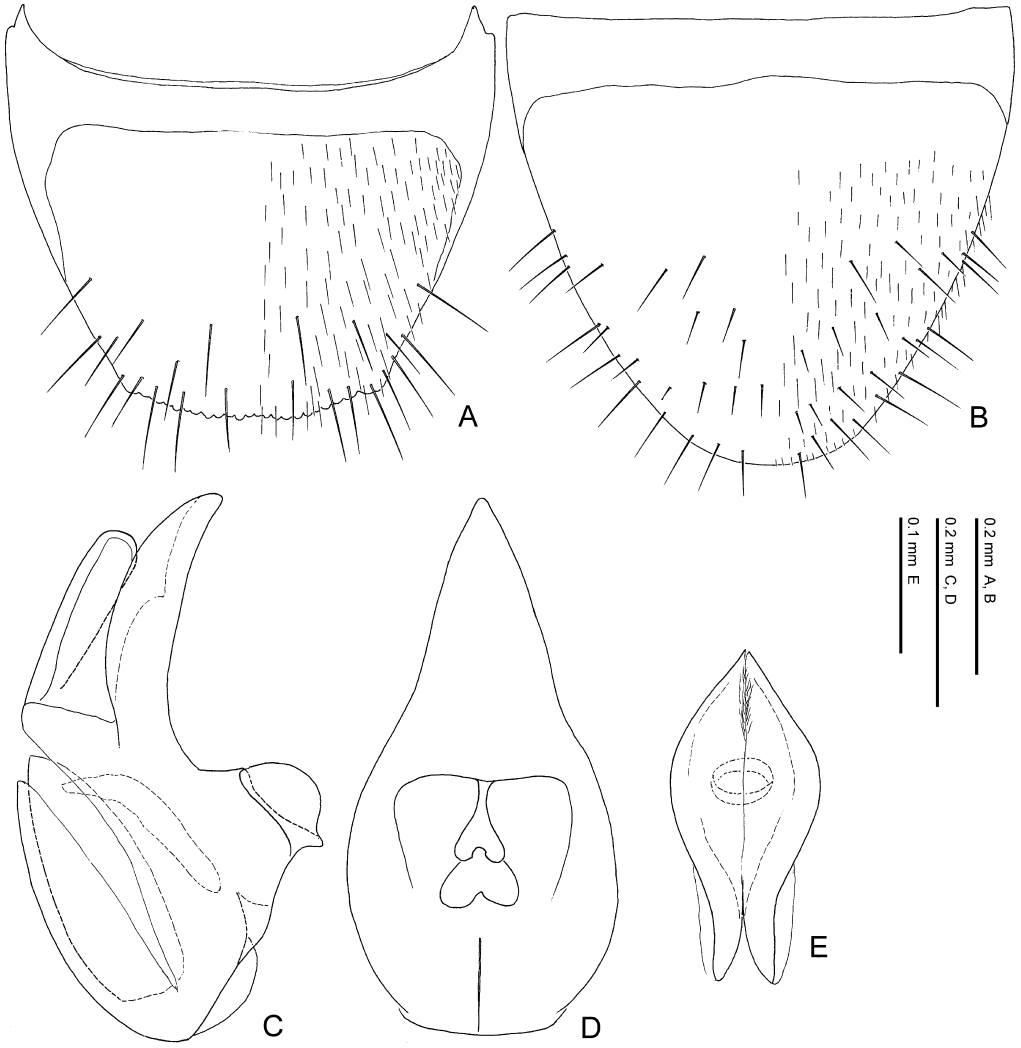

Fig. 52. *Pella barbara* (Fairmaire).—A, Eighth abdominal tergite, dorsal view; B, 8th abdominal sternite, ventral view; C, median lobe of aedeagus, lateral view; D, ditto, ventral view; E, copulatory piece, dorsal view. Male.

Fauvel M. barbara" (abdomen missing) (IRSNB).

Other material. Algeria: 1♂, "Bône" (NHMW); 1♂, same data (IRSNB); 1♂, "Bône Philipperille/Philipperille à Horn (IRSNB); 1♀, "Philipperille" (IRSNB); 1♀, "Oran) Tlemcan Dr. Normand-3" (IRSNB); 1♀, "Sud-algèrien Bou Saada 25/29–v–1954 G. Fagel/G. Fagel barbarus Fairm." (IRSNB); 2♂♂, 1♀, no data (IRSNB).

Type locality. Bône, Algeria.

Distribution. Mediterranean subregion. NORTH AFRICA: Algeria.

Diagnosis. *Pella barbara* is similar to *P. leonhardi* and *P. jelineki* in general appearance, but may be easily distinguished from them by the 3rd to 6th abdominal tergites densely covered with setae. This species is somewhat similar to the species of the *funesta* group in general appearance and colour but distinguished from them by the smaller body and the 11th antennal segment almost as long as, or longer than the 1st. The distribution is overlaps with that of *Pella er-*

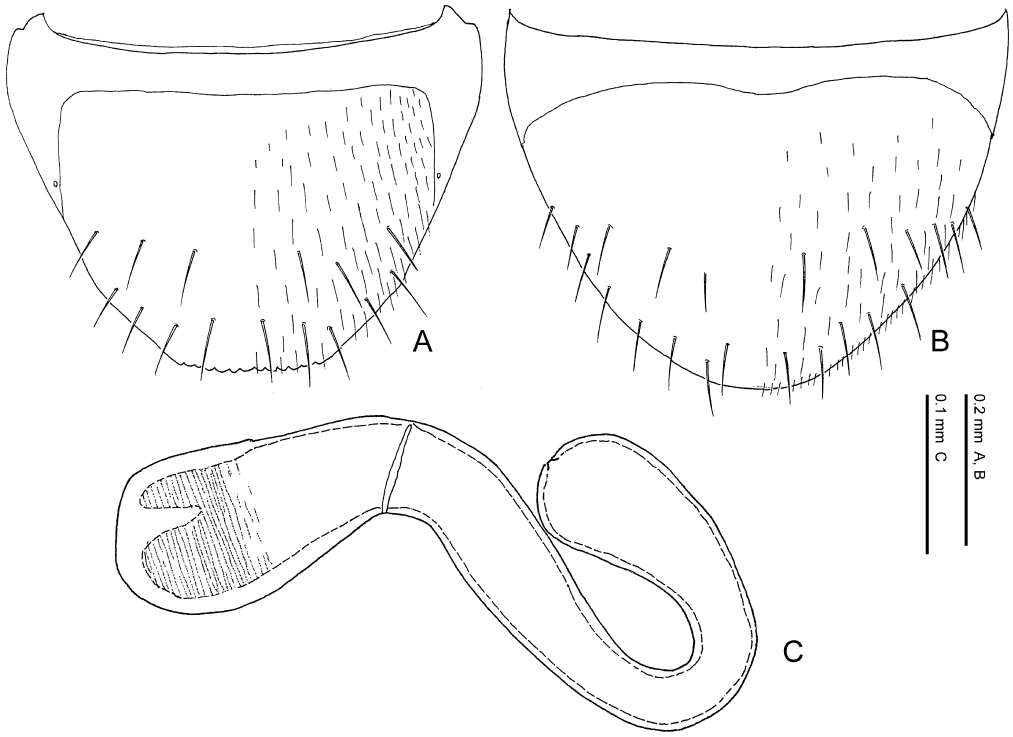

Fig. 53. *Pella barbara* (Fairmaire). — A, Eighth abdominal tergite, dorsal view; B, 8th abdominal sternite, ventral view; C, spermatheca. Female.

ratica, but *P. barbara* may be easily distinguished from *P. erratica* by the 3rd to 6th tergite densely covered with setae and the length of the 11th antennal segment mentioned above.

Redescription. Body slender. Blackish brown in ground colour; antennae, mouthparts and legs reddish brown. Head (Fig. 51 A) slightly depressed above, wider than long; surface smooth, moderately covered with setae; setae rather long, as long as those of elytra in length; length of eyes 0.29–0.30 times as long as head width. Antennae (Fig. 51 B) shorter than head, pronotum and elytra combined; 1st segment long, longer than 2nd and 3rd combined; 2nd segment about 4/5 as long as 3rd; 3rd segment about 1/3 as long as 1st; 4th to 10th segments slightly wider than long; 11th segment almost as long as 1st; approximate relative lengths of segments from basal to apical: 24 : 8 : 6.5 : 7 : 8 : 8.5 : 8 : 8.5 : 8 : 9 : 23.5. Pronotum (Fig. 51 A) 1.30–1.35 times as wide as long, widest around anterior 1/5, constricted posteriorly; lateral margins subparallel-sided near base; postero-lateral corner weakly angled; surface densely covered with setae, with 7 or 8 minute macrosetae along lateral margin. Scutellum with surface finely punctured, moderately covered with setae. Elytra (Fig. 51 A) slightly broadened posteriorly; surface finely punctured, densely covered with setae, with 2 or 3 small macrosetae laterally. Legs rather long; hind tibia 1.09–1.10 as long as elytra; approximate relative lengths of tarsal segments from basal to apical: 6 : 5.5 : 5.5 : 10 in fore tarsus; 9.5 : 6.5 : 5 : 4.5 : 10 in mid tarsus; 19 : 9.5 : 8 : 8 : 11 in hind tarsus. Abdomen subparallel-sided, slightly wider than elytra, widest around 5th segment; surface moderately punctured; 3rd to 6th tergites densely covered with setae; 7th tergite moderately covered with minute setae; 8th tergite (Figs. 52 A, 53 A) with 6–11 macrosetae; 9th tergite with 6 macrosetae; 10th tergite with posterior margin rounded, with 5 macrosetae.

Male: Eighth tergite (Fig. 52 A) with posterior margin rounded and crenate; 8th sternite (Fig. 52 B) with 23 or 24 macrosetae; 9th sternite with posterior margin truncate. Aedeagus (Figs. 52 C, 52 D) amygdaloid in ventral view; apical lobe slightly curved ventrad and pointed at apex in lateral view, slightly narrowed at base and pointed at apex in ventral view; basal ridge well developed, reaching near bottom of basal capsule; copulatory piece of inner sac as in Fig. 52 E. Paramere with apical lobe of paramerite parallel-sided, rounded apically, as long as condylite.

Female: Eighth tergite (Fig. 53 A) with posterior margin somewhat rounded, its rounded apex minutely dentate; 8th sternite (Fig. 53 B) with 11 or 12 macrosetae; sensory setae of 8th sternite generalised, similar to other setae in shape. Spermatheca (Fig. 53 C) curved three times; basal part about 2.5 times as long as apical part, slightly bulbous around base, acutely curved around basal 2/5; apical part dilated apicad, much broader than basal part, its inner wall densely wrinkled from apex to around apical 2/5.

Measurements. BL, 3.7–4.1; FBL, 1.8–1.9; HL, 0.54–0.59; HW, 0.62–0.68; EL, 0.183–0.198; AL, 1.39–1.60; PL, 0.60–0.69; PW, 0.81–0.89; ELL, 0.74–0.79; ELW, 0.96–1.05; HTL, 0.81–0.86.

Bionomics and symbiotic host. No information.

Pella leonhardi (Bernhauer, 1912), n. comb.

(Figs. 54, 55)

Zyras leonhardi Bernhauer, 1912: 110 (original description).—Fenyes, 1920: 297 (*Zyras* (*Myrmedonia* s.str.), list).—Bernhauer & Scheerpeltz, 1926: 700 (*Zyras* (*Pella*), list).—Smetana, 2004: 461 (*Zyras* (*Pella*), list).

Type material. Syntype: **Italy** (**Sicilia**): 1♀, "Sicilia 1906 Monte Cola O. Leonhard 12. 4.

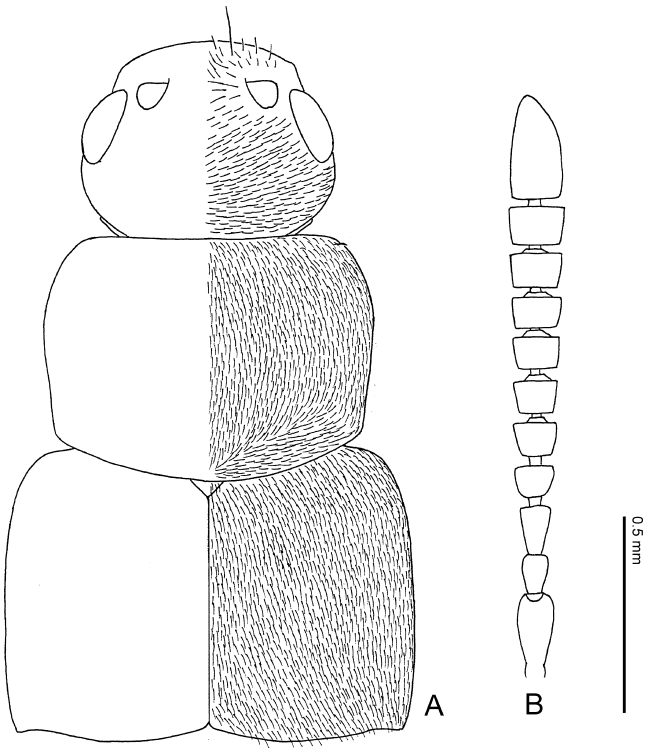

Fig. 54. *Pella lenhardi* (Bernhauer).—A, Fore body, dorsal view; B, right antenna.

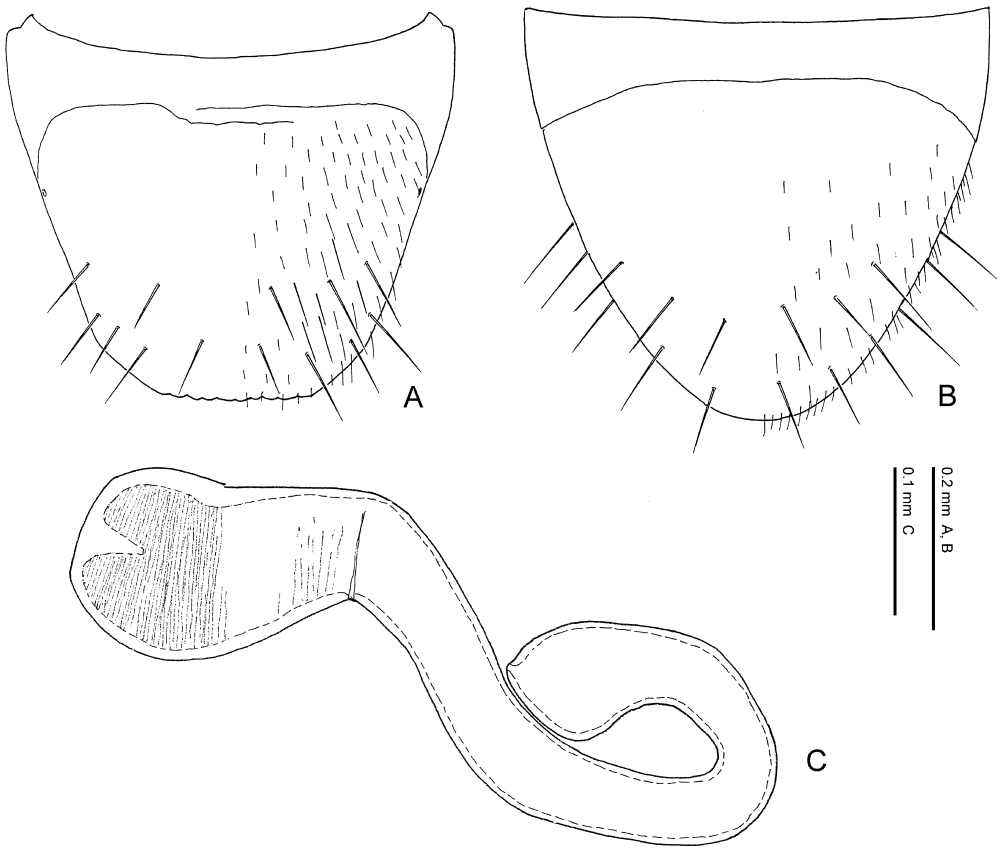

Fig. 55. *Pella lenhardi* (Bernhauer). — A, Eighth abdominal tergite, dorsal view; B, 8th abdominal sternite, ventral view; C, spermatheca. Female.

ges./Syntypus/Zyras Leonhardi Bernhauer/Zyras Leonhardi Bh./Coll. DEI Eberswalde/VIDIT R. Pace 1986" (DEI).

Type locality. Monte Cola, Sicilia, Italy.

Other material. Not examined.

Distribution. Mediterranean subregion. EUROPE: Italy (Sicilia).

Diagnosis. *Pella leonhardi* is closely similar to *P. barbara* and *P. jelineki* in general appearance, but distinguished from *P. barbara* by the well angled pronotum and the sparser setae on the 3rd to 6th abdominal tergites, from *P. jelineki* by the well angled pronotum and the sparser setae on the head, pronotum and elytra. This species is somewhat similar to the species of the *funesta* group in general appearance and colour, but is distinguished from the them by the smaller body and the 11th antennal segment longer than the 1st. The distribution overlaps with that of *Pella erratica*, but *P. leonhardi* may be easily distinguished from *P. erratica* by the postero-lateral corners of pronotum well angled and the antennal structure mentioned above.

Redescription. Body slender. Blackish brown in ground colour; antennae, mouthparts and legs reddish brown. Head (Fig. 54 A) slightly depressed above, wider than long; surface smooth, moderately covered with setae; setae rather long, almost as long as those of elytra in length; length of eyes 0.37 times as long as head width. Antennae (Fig. 54 B) shorter than head, pronotum and elytra combined; 1st segment long, almost as long as 2nd and 3rd combined; 2nd seg-

ment about 5/6 as long as 3rd; 3rd segment about 1/2 as long as 1st; 4th to 10th segments slightly wider than long; 11th segment much longer than 1st; approximate relative lengths of segments from basal to apical: 19.5 : 9.5 : 11 : 6 : 6 : 7 : 6.5 : 6.5 : 6.5 : 7 : 23.5. Pronotum (Fig. 54 A) 1.25 times as wide as long, widest around anterior 1/4, constricted posteriorly; lateral margins subparallel-sided near base; postero-lateral corner weakly angled; surface densely covered with setae, with 7 or 8 minute macrosetae along lateral margin. Scutellum with surface finely punctured, moderately covered with setae. Elytra (Fig. 54A) slightly broadened posteriorly; surface finely punctured, densely covered with setae, with 2 or 3 small macrosetae laterally. Legs moderate in length; hind tibia 1.02 times as long as elytra; approximate relative lengths of tarsal segments from basal to apical: 5.5 : 4.5 : 5 : 8 in fore tarsus; 9.5 : 8 : 5 : 5 : 10 in mid tarsus; 5 : 8 : 6 : 7 : 10 in hind tarsus. Abdomen subparallel-sided, slightly narrower than elytra, widest around 5th segment; surface moderately punctured; 3rd to 6th tergites moderately to sparsely covered with setae; 7th tergite sparsely covered with minute setae; 8th tergite (Fig. 55 A) with 6 or 7 macrosetae; 9th tergite with 6 macrosetae; 10th tergite with posterior margin rounded, with 5 macrosetae.

Male unknown.

Female: Eighth tergite (Fig. 55 A) with posterior margin somewhat truncated, its truncated apex minutely dentate; 8th sternite (Fig. 55 B) with 8 or 9 macrosetae; sensory setae of 8th sternite generalised, similar to other setae in shape. Spermatheca (Fig. 55 C) curved three times; basal part about three times as long as apical part, slightly bulbous around base, acutely curved around basal 1/3; apical part dilated apicad, much broader than basal part, its inner wall densely wrinkled from apex to around apical 1/2.

Measurements. BL, 3.8; FBL, 1.9; HL, 0.55; HW, 0.64; EL, 0.238; AL, 1.46; PL, 0.67; PW, 0.84; ELL, 0.82; ELW, 1.05; HTL, 0.84.

Bionomics and symbiotic host. No information.

Pella jelineki Maruyama, n. sp.

(Figs. 56, 57)

Type material. Holotype: **Tunisia**: ♀, "Tunis El Kef Dr. Normand/Zyras leonhardi Bernh. det. M. Dvořák ,71" (NMP).

Type locality. El Kef [Al Kåf], Tunisia.

Distribution. Mediterranean subregion. NORTH AFRICA: Tunisia.

Etymology. Dedicated to Dr. Josef Jelínek (NMP), a curator of the type depository and a specialist of the Nitidulidae (Coleoptera), for his cooperation in the present study.

Diagnosis. *Pella jelineki* is closely similar to *P. barbara* and *P. leonhardi* in general appearance, but is distinguished from them by the rounded postero-lateral corner of the pronotum, and the denser setae on the head, pronotum and elytra. This species is somewhat similar to the species of the *funesta* group in general appearance and colour but distinguished from them by the smaller body and the 11th antennal segment longer than the 1st. The distribution is overlaps with that of *Pella erratica*, but *P. jelineki* may be easily distinguished from *P. erratica* by the antennal structure above and the denser setae on the head, pronotum and elytra.

Description. Body slender. Pale brown in ground colour; antennae, mouthparts, legs reddish brown. Head (Fig. 56 A) slightly depressed above, wider than long; surface smooth, densely covered with setae; setae rather short, slightly longer than those of elytra in length; length of eyes 0.35 times as long as head width. Antennae (Fig. 56 B) shorter than head, pronotum and elytra combined; 1st segment long, almost as long as 2nd and 3rd combined; 2nd segment about 5/6 as

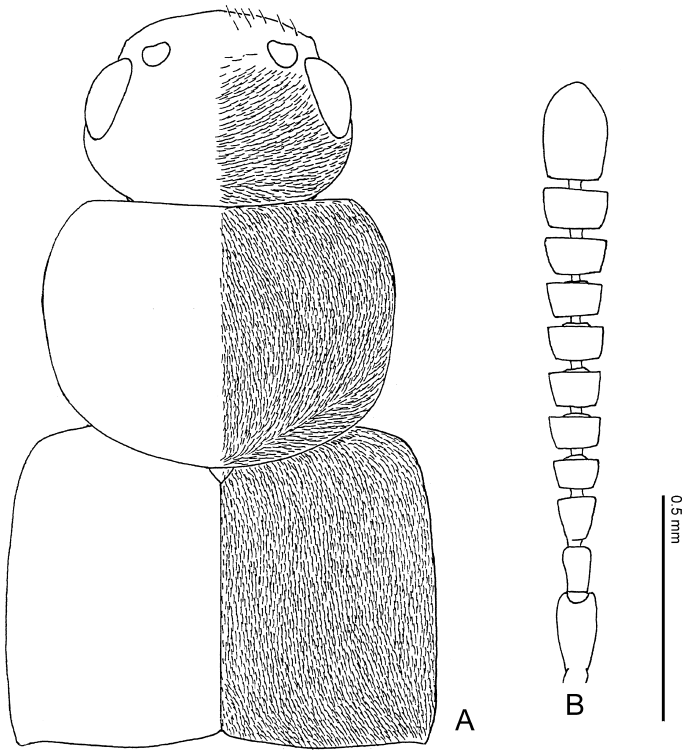

Fig. 56. *Pella jelineki* Maruyama, n. sp. — A, Fore body, dorsal view; B, right antenna.

long as 3rd; 3rd segment about 1/2 as long as 1st; 4th to 10th segments slightly wider than long; 11th segment somewhat longer than 1st; approximate relative lengths of segments from basal to apical: 17 : 7:5 : 9 : 6 : 6 : 6.5 : 6.5 : 6 : 6 : 6.5 : 19. Pronotum (Fig. 56 A) 1.31 times as wide as long, widest around anterior 1/5, slightly constricted posteriorly; postero-lateral corner rounded; surface very densely covered with setae, with 7 or 8 minute macrosetae along lateral margin. Scutellum with surface finely punctured, moderately covered with setae. Elytra (Fig. 56 A) slightly broadened posteriorly; surface finely punctured, very densely covered with setae, with 2 or 3 small macrosetae laterally. Legs moderate in length; hind tibia 0.92 times as long as elytra; approximate relative lengths of tarsal segments from basal to apical: 5.5 : 4.5 : 4.5 : 8.5 in fore tarsus; 7.5 : 6 : 6 : 4.5 : 8.5 in mid tarsus; 12 : 7.5 : 8 : 6.5 : 9.5 in hind tarsus. Abdomen subparallel-sided, slightly narrower than elytra, widest around 5th segment; surface moderately punctured; 3rd to 6th tergites moderately covered with setae; 7th tergite sparsely covered with minute setae; 8th tergite (Fig. 57 A) with 7 macrosetae; 9th tergite with 6 macrosetae; 10th tergite with posterior margin rounded, with 5 macrosetae.

Male unknown.

Female: Eighth tergite (Fig. 57 A) with posterior margin truncated, its truncated apex minutely dentate; 8th sternite (Fig. 57 B) with 9 macrosetae; sensory setae of 8th sternite generalised, similar to other setae in shape. Spermatheca (Fig. 57 C) curved three times; basal part about 2.5 times as long as apical part, slightly bulbous around base, acutely curved around basal 2/5; apical part dilated apicad, much broader than basal part, its inner wall densely wrinkled from apex to around apical 4/7.

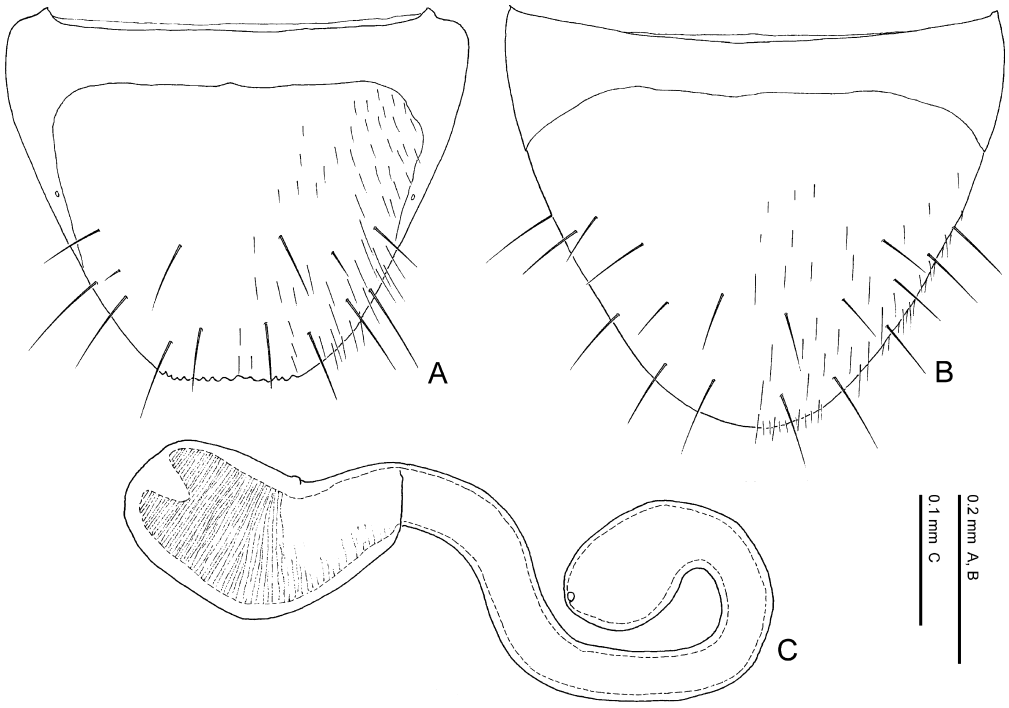

Fig. 57. *Pella jelineki* Maruyama, n. sp.—A, Eighth abdominal tergite, dorsal view; B, 8th abdominal sternite, ventral view; C, spermatheca. Female.

Measurements. BL, 3.5; FBL, 1.6; HL, 0.52; HW, 0.62; EL, 0.219; AL, 1.38; PL, 0.62; PW, 0.81; ELL, 0.8; ELW, 0.99; HTL, 0.73.

Bionomics and symbiotic host. No information.

The ***erratica*** Group

Species included. *Pella erratica*.

Distribution. European subregion, Mediterranean subregion.

Diagnosis. Species of the *erratica* group may be characterised by a combination of the following character states: 1) eye length 0.34–0.37 times as long as head width; 2) 11th antennal segment shorter than the 1st; 3) pronotum with postero-lateral corners; 4) pronotum 1.27–1.35 times as wide as long; 5) pronotum widest anteriorly; 6) pronotal hypomeron fully visible in lateral view; 7) elytra unicoloured, brown; 8) inner and posterior margins of elytra weakly margined; 9) male 8th sternite not longer than in female and almost the same in size; 10) posterior margin of 8th tergite crenate; 11) posterior margin of male 8th sternite rounded; 12) lateral projection of apodeme of male 8th tergite longer than that of female; 13) macrosetae of 8th abdominal segment generalised in length, exceeding the posterior margins of the segment; 14) postero-medial margin of female 8th sternite without minute pubescence; 15) apical lobe of aedeagal median lobe gently curved ventrad in lateral view; 16) distal crests of aedeagus well developed, projected semicircular in lateral view; 17) copulatory piece of aedeagal median lobe almost spindle-shaped and pointed at apex in dorsal view.

Comments. A monotypical species-group. Though its allied species-group has not been found, *Pella erratica* is similar to the members of the *barbara* group in the general appearance

and the small body, but is distinguished from them by the shorter 11th antennal segment.

Symbiotic host. *Tapinoma erraticum*.

Pella erratica (Hagens, 1863), n. comb.

(Figs. 58–61)

Myrmedonia erratica Hagens, 1863: 118 (original description).—Reitter, 1909: 42 (*Myrmedonia* (*Pella*), key).—Bernhauer & Scheerpeltz, 1926: 697 (*Zyras* (*Pella*), list).—Scheerpeltz, 1934: 1653 (*Zyras* (*Pella*), list).—Fenyes, 1920: 297 (*Zyras* (*Pella*), list).—Lohse, 1974: 225 (*Zyras* (*Pella*), key).—1989: 220 (*Zyras* (*Pella*), key).—Likovský, 1981: 167 (*Zyras* (*Pella*), morphology).—Likovský, 1993: 59 (*Zyras* (*Pella*), list).—Smetana, 2004: 461 (*Zyras* (*Pella*), list).

Myrmedonia mustela Rottenberg, 1870: 25 (original description).—Fenyes, 1920: 297 (synonym of *erratica*, list).—Bernhauer & Scheerpeltz, 1926: 697 (synonym of *erratica*, list).—Smetana, 2004: 461 (synonym of *erratica*, list).

Myrmedonia Ehlersi Eppelsheim, 1884b: 365 (original description).—Fenyes, 1920: 297 (synonym of *erratica*, list).—Bernhauer & Scheerpeltz, 1926: 697 (synonym of *erratica*, list).—Smetana, 2004: 461 (synonym of *erratica*, list).

Type material. *Myrmedonia erratica*. Not examined, probably missing (Frisch, pers. comm.).

Myrmedonia mustela. Not examined. Type locality: Sicilia, Italy.

Myrmedonia Ehlersi. Holotype: **Morocco**: ♀, “Maroi/Ehlaersi mihi. Marocco Quedenfeldt/ l’antenne gauche a…[indecipherable] une pression accidentelle/c. Eppelsh. Teind. D./mustela Rottbg/Ehlersi Epp. Berl. ent. Zeit. 1884 p. 365” (NHMW).

Type locality. Germany.

Other material. **Algeria**: 1♂, “Milianah/Syntype/R.I.Sc.N.B. 17.819 Coll. A. Fauvel M. maura” (see, “Type material” of *Pella maura*) (IRSNB); 1♂, “Lalla Marghria algeria” (IRSNB);

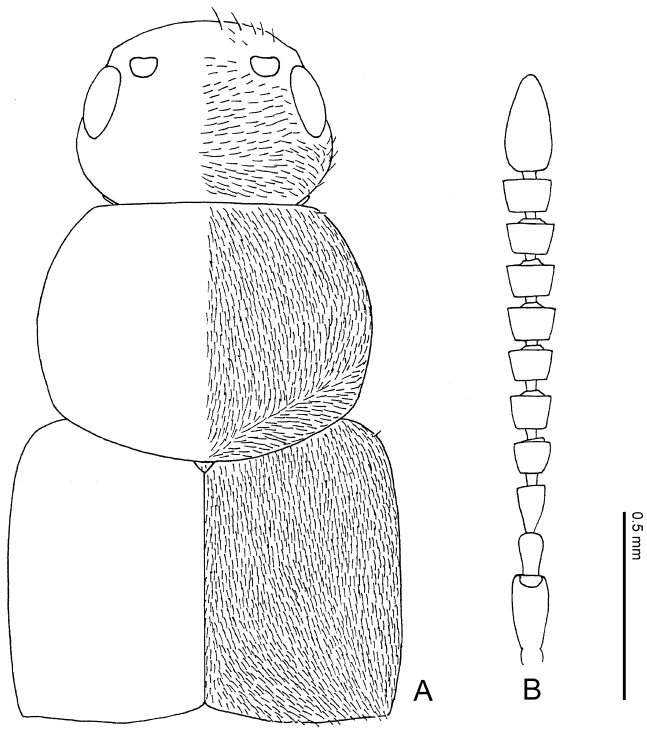

Fig. 58. *Pella erratica* (Hagens).—A, Fore body, dorsal view; B, right antenna.

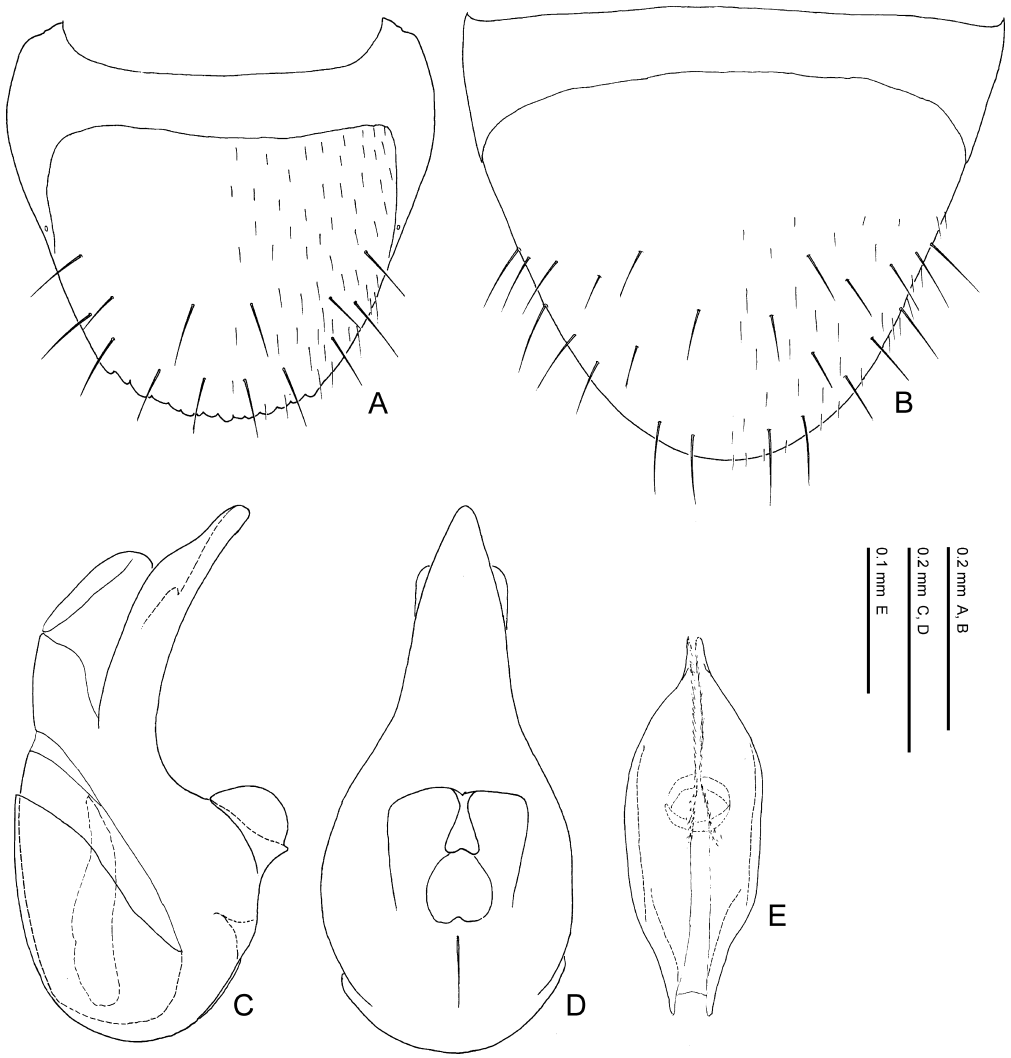

Fig. 59. *Pella erratica* (Hagens).—A, Eighth abdominal tergite, dorsal view; B, 8th abdominal sternite, ventral view; C, median lobe of aedeagus, lateral view; D, ditto, ventral view; E, copulatory piece, dorsal view. Male.

1♂, "Pajares (Esp.)/Larerduse (Algeria)/Ehlersi type Marocco/mustela Rottb."(IRSNB). **Austria**: 1♂, Wien (NHMW); 1♂, Wien, Fauvel (NHMW); 2♂♂, Frauenstein, Mödling, 21 IV 1928, O. Sheerpeltz (NHMW). **Slovakia:** 1♂, Košice, 1925, V. Machulka (NMP). **Greece:** 1 ex., Pelion, Tnessalien (NHMW); **France**: 1♂, "Vauclusa VII Ch. Fagniez/Chasses en auto/Myrmedonia erratica? Hag." (MNHN); 1♀ "Collioure au vol 6 Carcassonne F" (IRSNB). **Tunisia**: 1♂, "T Le Kef, Normand" (NMP). **Morocco**: 1♂, Morocco (NHMW).

Distribution. European subregion, Mediterranean subregion. EUROPE: Austria, Belgium, Bosnia Herzegovina, Czech Republic, France, Germany, Italy (Sicilia), Romania, Slovakia, Spain. NORTH AFRICA: Algeria, Morocco, Tunisia.

Diagnosis. *Pella erratica* may be easily distinguished from the sympatric species by a combination of the body smaller and unicoloured, the apical lobe of aedeagal median lobe gently curved ventrad and the host ant *Tapinoma erraticum*. In body size, it is similar to *Pella barbara*,

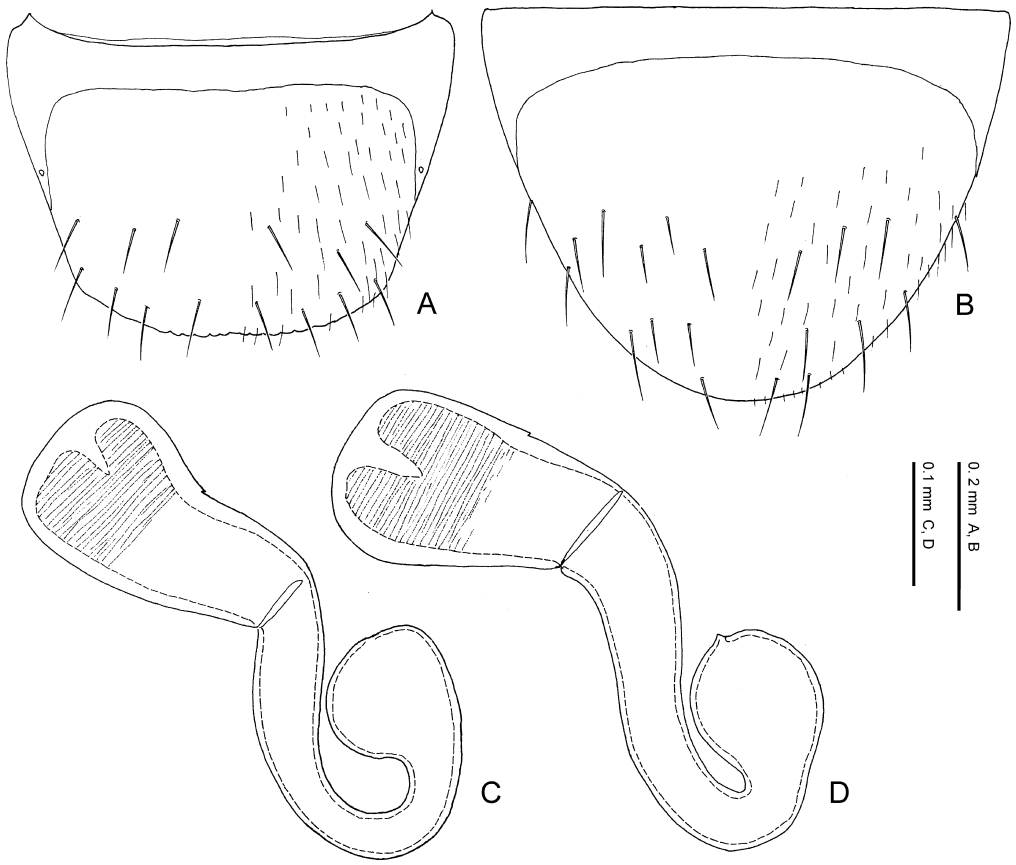

Fig. 60. *Pella erratica* (Hagens). — A, Eighth abdominal tergite, dorsal view; B, 8th abdominal sternite, ventral view; C, D, spermathecae. Female.

but may be easily distinguished from it by the paler body and the 11th antennal segment shorter than the 1st.

Redescription. Body slender. Brown in ground colour; antennae, mouthparts, legs and 3rd to 5th abdominal segments reddish brown. Head (Fig. 58 A) widest just behind eyes; surface finely reticulated, moderately covered with setae; setae short, shorter than those on pronotum and elytra; length of eyes 0.34–0.37 times as long as head width. Antennae (Fig. 58 B) shorter than head, pronotum and elytra combined; 1st segment almost as long as 2nd and 3rd combined; 2nd segment slightly shorter than 3rd; 3rd segment about 1/2 as long as 1st; 4th segment almost as long as wide; 5th to 10th segments wider than long; 11th segment longer than 1st; approximate relative lengths of segments from basal to apical: 16: 7.5 : 8 : 6 : 5 : 5.5 : 6 : 5.5 : 6 : 7 : 19. Pronotum (Fig. 58 A) 1.27–1.35 times as wide as long, widest around middle, narrowed posteriorly; posterior angle rounded; surface finely punctured, finely reticulated among punctures, densely covered with setae, with 10–12 macrosetae along lateral margin. Scutellum with surface finely punctured, densely covered with setae. Elytra (Fig. 58 A) slightly widened apicad; surface finely punctured, reticulated among punctures, densely covered with setae, with 6–8 small macrosetae laterally. Legs moderate in length; hind tibia 0.91–0.99 times as long as elytra; approximate relative lengths of tarsal segments from basal to apical: 5 : 5 : 5 : 14 in fore tarsus; 9 : 8 : 7 : 6 : 9 in mid tarsus; 16 : 9 : 8 : 7.5 : 9 in hind tarsus. Abdomen subparallel-sided, slightly wider than elytra,

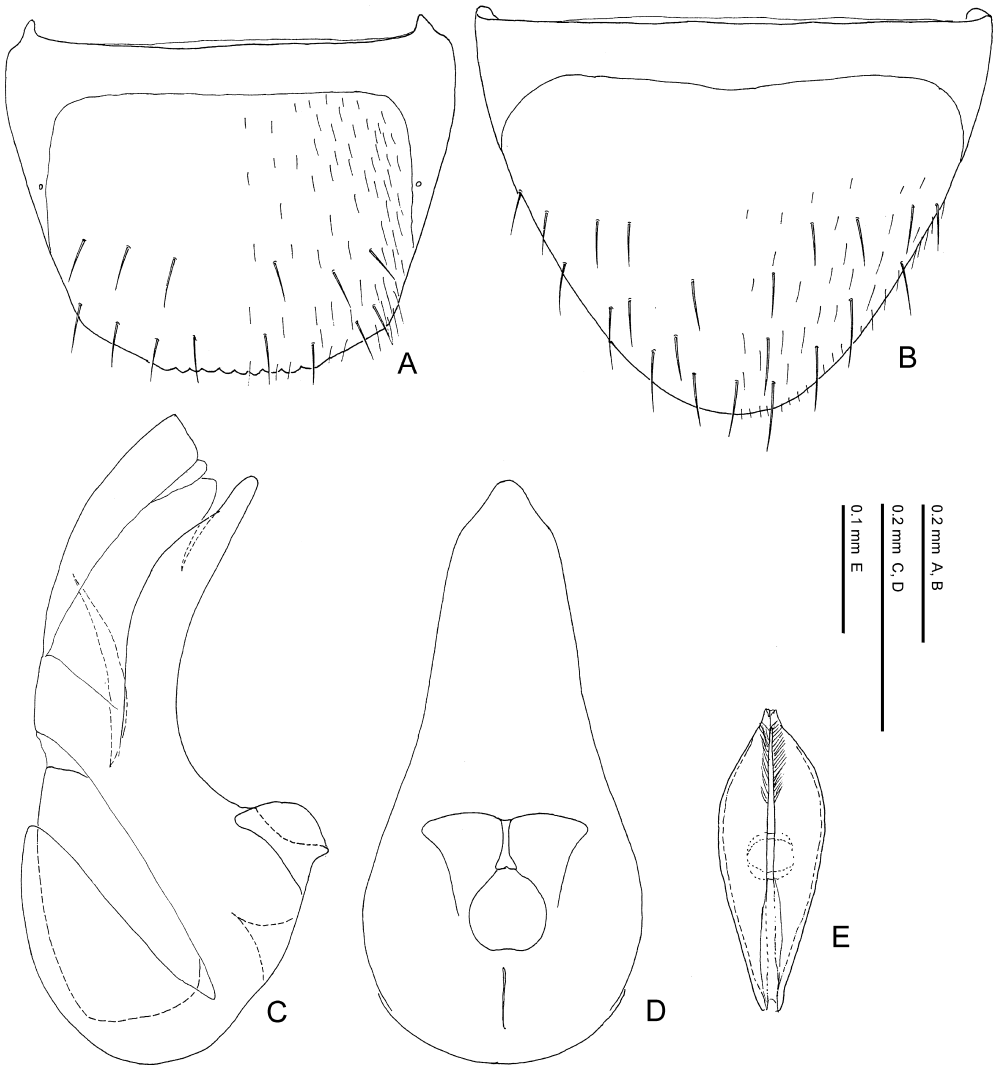

Fig. 61. *Pella erratica* (Hagens).—A, Eighth abdominal tergite, dorsal view; B, 8th abdominal sternite, ventral view; C, median lobe of aedeagus, lateral view; D, ditto, ventral view; E, copulatory piece, dorsal view. Male from Algeria.

widest around 4th and 5th segments; surface smooth; 3rd to 7th tergites sparsely and uniformly covered with minute setae; 8th tergite (Figs. 59 A, 60 A, 61 A) with 7 (rarely 8) macrosetae; 9th tergite with 4 macrosetae; 10th tergite with posterior margin slightly emarginate, with 4 macrosetae.

Male: Eighth tergite (Figs. 59 A, 61 A) with posterior margin rounded or truncated, its apical margin crenate; 8th sternite (Figs. 59 B, 61 B) with posterior margin rounded, with 11 or 12 macrosetae; 9th sternite with posterior margin truncate. Aedeagus (Figs. 59 C, 59 D, 61 C, 61 D) somewhat pear-shaped in ventral view; apical lobe curved ventrad, obtuse at apex in lateral view, pointed at apex in ventral view; basal ridge roundly weakly convex; copulatory piece of inner sac as in Figs. 59 E, 61 E. Paramere with apical lobe of paramerite dilated apicad, rounded at apex, about 1/3 as long as condylite.

Female: Eighth tergite (Fig. 60 A) with posterior margin truncate, its truncate apex minutely dentate; 8th sternite (Fig. 60 B) with 9 macrosetae; sensory setae of 8th sternite generalised, similar to other setae in shape. Spermatheca (Fig. 60 C) curved three times; basal part about 2.5 times as long as apical part, slightly bulbous around base, acutely curved around basal 1/3; apical part dilated apicad, much broader than basal part, its inner wall densely wrinkled from apex to apical 3/5.

Measurements. BL, 3.6–4.1; FBL, 1.7–2.1; HL, 0.50–0.58; HW, 0.56–0.71; EL, 0.210–0.240; AL, 1.32–1.63; PL, 0.57–0.73; PW, 0.76–0.97; ELL, 0.74–0.90; ELW, 1.10–0.90; HTL, 0.68–0.88.

Local variation. *Pella erratica* is widely distributed from Middle Europe, through Southern Europe to North Africa. Local variations are observed in the 8th abdominal tergite and aedeagus. In the population of North Africa, the crenate part of the 8th abdominal tergite is narrower in male (Fig. 61 A), and the distal crest of the aedeagal median lobe is less prominent in lateral view (Fig. 61 C).

Bionomics. *Pella erratica* is known to be associated with *Tapinoma erraticum* and collected from inside host nests, but further biological or behavioural data have not been reported any more. This species has been regarded as one of the rarest beetles in Europe (Franc, 1992; Likovsky, 1981). No information was available for the life cycle of this species.

Symbiotic host. *Tapinoma erraticum*.

The ***schillhammeri*** Group

Species included. *Pella schillhammeri*.

Distribution. Manchurian subregion.

Diagnosis. Species of the *schillhammeri* group may be characterised by a combination of the following character states: 1) eye length 0.39 times as long as head width; 2) 11th antennal segment shorter than the 1st; 3) pronotum with postero-lateral corners; 4) pronotum 1.27 times as wide as long; 5) pronotum widest around middle; 6) pronotal hypomeron fully visible in lateral view; 7) elytra bicoloured, yellow with black maculations around scutellum and postero-lateral corners; 8) posterior margin of 8th tergite crenate; 9) posterior margin of male 8th sternite rounded; 10) macrosetae of 8th abdominal segment generalised in length, exceeding the posterior margins of the segment; apical lobe of aedeagal median lobe gently curved ventrad in lateral view; 14) distal crests of aedeagus well developed, projected semicircularly in lateral view; 15) copulatory piece of aedeagal median lobe almost spindle-shaped and pointed at apex in dorsal view.

Comments. The *schillhammeri* group is a monotypical species-group. This species-group is quite distinct from the other species-groups in general appearance, i.e., *Pella schillhammeri* is not a typical species in comparison with the other *Pella* species in some character states, particularly in the colour and the facies. The general appearance is characterised by the narrower pronotum and the broader elytra, and is somewhat similar to those of the Athetini.

Symbiotic host. Unknown.

Pella schillhammeri Maruyama, n. sp.

(Figs. 62, 63)

Type material. Holotype: **Russia** (**Far East**): ♂, “Seitengraben des Piwnaja-Rjetschka Tales b. Wladiwostok/Myrmoecia spec./Farieb leg. 1918–1920/ex coll. Scheerpeltz” (NHMW).

Type locality. Vladivostok, Primorskyi Krai, Russia.

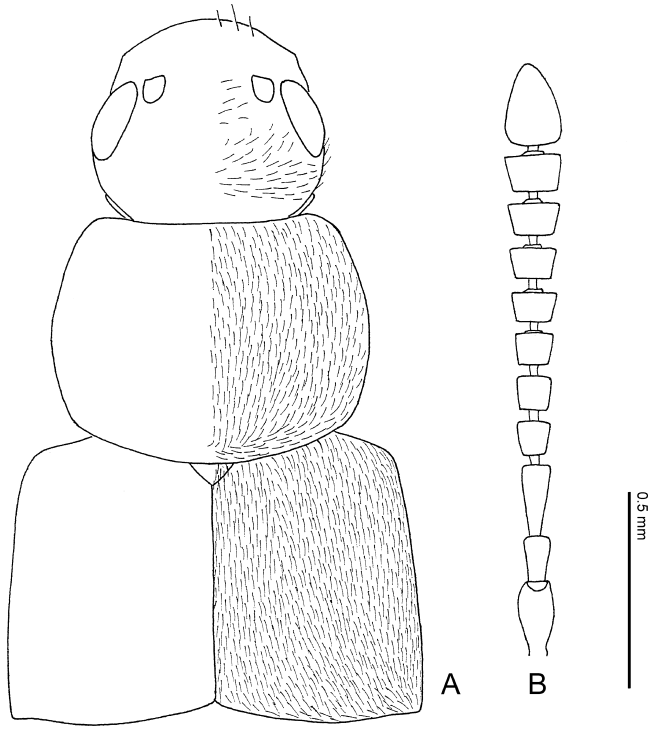

Fig. 62. *Pella schillhammeri* Maruyama, n. sp. — A, Fore body, dorsal view; B, right antenna.

Distribution. Manchurian subregion. ASIA: Russia (Far East).

Etymology. Dedicated to Dr. Harald Schillhammer (NHMW), a curator of the type depository and a specialist of the Staphylininae, for his cooperation in the present study.

Diagnosis. *Pella schillhammeri* may be easily distinguished from the sympatric species by a combination of the smaller body and the narrower pronotum.

Description. Body slender. Brown in ground colour; antennae, mouthparts, legs and posterior margins of 3rd to 5th abdominal segments reddish yellow. Head (Fig. 62 A) widest just behind eyes; surface finely reticulated, sparsely covered with setae; setae short, slightly shorter than those on pronotum and elytra; length of eyes 0.39 times as long as head width. Antennae (Fig. 62 B) shorter than head, pronotum and elytra combined; 1st segment shorter than 2nd and 3rd combined; 2nd segment much shorter than 3rd; 3rd segment about 3/4 as long as 1st; 4th segment almost as long as wide; 5th to 10th segments longer than wide; 11th segment shorter than 1st; approximate relative lengths of segments from basal to apical: 20.5 : 10 : 15 : 7 : 7 : 7 : 8 : 7 : 7 : 7 : 17. Pronotum (Fig. 62 A) 1.27 times as wide as long, widest around middle, narrowed posteriorly; posterior angle rounded; surface roughly punctured, finely reticulated among punctures, densely covered with setae, with 8 or 9 macrosetae along lateral margin. Scutellum with surface finely punctured, densely covered with setae. Elytra (Fig. 62 A) slightly widened apicad; surface finely punctured, reticulated among punctures, densely covered with setae, with 5 or 6 small macrosetae laterally. Legs moderate in length; hind tibia 1.06 times as long as elytra; approximate relative lengths of tarsal segments from basal to apical: 6 : 5.5 : 7 : 9.5 in fore tarsus; 10 : 6 : 6 : 5.5 : 10 in mid tarsus; 16 : 7 : 8 : 7 : 11 in hind tarsus. Abdomen subparallel-sided, slightly narrower than elytra, widest around 4th and 5th segments; surface smooth; 3rd to 7th tergites sparse-

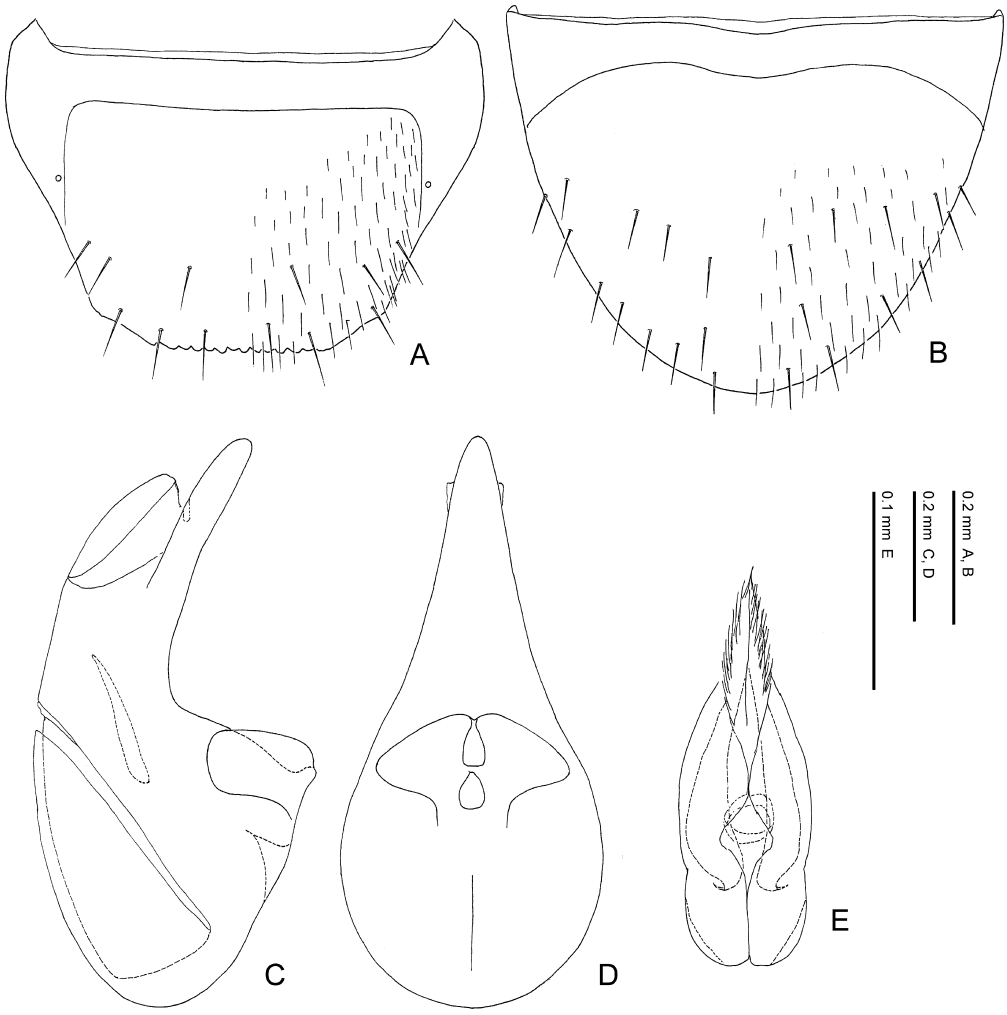

Fig. 63. *Pella schillhammeri* Maruyama, n. sp. — A, Eighth abdominal tergite, dorsal view; B, 8th abdominal sternite, ventral view; C, median lobe of aedeagus, lateral view; D, ditto, ventral view; E, copulatory piece, dorsal view. Male.

ly and uniformly covered with minute setae; 8th tergite (Fig. 63 A) with 6 macrosetae; 9th tergite with 4 macrosetae; 10th tergite with posterior margin slightly emarginate, with 4 macrosetae.

Male: Eighth tergite (Fig. 63 A) with posterior margin truncated, its apical margin crenate; 8th sternite (Fig. 63 B) with posterior margin rounded, with 10–12 macrosetae; 9th sternite with posterior margin truncate. Aedeagus (Figs. 63 C, 63 D) somewhat pear-shaped in ventral view; apical lobe curved ventrad, obtuse at apex in lateral and ventral views; basal ridge roundly and weakly convex; copulatory piece of inner sac as in Fig. 63 E. Paramere with apical lobe of paramerite dilated apicad, rounded at apex, about 1/3 as long as condylite.

Female unknown.

Measurements. BL, 4.1; FBL, 1.9; HL, 0.62; HW, 1.81; EL, 0.239; AL, 1.65; PL, 0.66; PW, 0.84; ELL, 0.78; ELW, 1.09; HTL, 0.83.

Bionomics and Symbiotic host. No information.

The *kinomurai* Group

Species included. *Pella kinomurai*, *P. primorskyiana*.

Distribution. Manchurian subregion.

Diagnosis. Species of the *kinomurai* group may be characterised by a combination of the following character states: 1) eye length 0.37–0.40 times as long as head width; 2) 11th antennal segment shorter than the 1st; 3) pronotum with posterior margin completely rounded, not forming corners postero-laterally; 4) pronotum 1.37–1.46 times as wide as long; 5) pronotum widest anteriorly; 6) pronotal hypomeron fully visible in lateral view; 7) elytra unicoloured, brown; 8) inner and posterior margins of elytra weakly margined; 9) male 8th sternite slightly longer than in female; 10) posterior margin of 8th tergite crenate; 11) posterior margin of male 8th sternite rounded; 12) lateral projection of apodeme of male 8th tergite evidently longer than that of female; 13) macrosetae of 8th abdominal segment generalised in length, exceeding the posterior margin of the segment; 14) postero-medial margin of female 8th sternite without minute pubescence; 15) apical lobe of aedeagal median lobe slightly curved ventrad in lateral view; 16) distal crests of aedeagus not projected or only weakly projected in lateral view; 17) copulatory piece of aedeagal median lobe slender and subparallel-sided around base in dorsal view.

Comments. The *kinomurai* group may possibly be allied to the *funesta* group in resemblance of general appearance, but the body is bicoloured and the pronotum is not narrowed posteriad as in the member of the *funesta* group.

Symbiotic hosts. *Lasius* (*Dendrolasius*) spp.

Key to the Species of the *kinomurai* Group

— Body larger: 5.3–6.5 mm; eyes smaller, 0.37–0.38 times as long as head width; pronotum narrower, 1.37–1.44 times as wide as long; apical lobe of aedeagal median lobe shorter, about 1/2 as long as basal capsule. Distribution: Russia Japan. ..... *P. kinomurai*.

— Body smaller: 5.1 mm; eyes larger, 0.40 times as long as head width; pronotum narrower, 1.47 times as wide as long; apical lobe of aedeagal median lobe longer, 0.8 times as long as basal capsule. Distribution: Japan. (Far East). .....*P. primorskyiana*.

Pella kinomurai Maruyama, n. sp.

(Figs. 64–66)

Type material. Holotype: **Japan**: ♂, "Isshiki, Shoukawa-mura [=Shôkawa-mura] Gifu Pref., JAPAN, 27 IX 2003, K. Kinomura leg." (*LDC*) (NSMT).

Paratypes: **Japan**: Hokkaidô: 1 ex., Himenuma, Rishiri-tô, 4 IX 1990, T. Kishimoto (pt); 1 ex., Taihei, Maruseppu-chô, 16–17 VI 2000, Y. Kida (*LDFJ*); 1 ex., Kaitaku-kinenkan, Nopporo-shinrin-kôen, Ebetsu-shi, 2–8 VIII 2000, S. Hori (fit); 1 ex., same data but, 8–16 VIII 2000; 5 exs., Shibumbetsu, Nopporo-shinrin-kôen, Ebetsu-shi, 18 V 2000, M. Maruyama (*LDFJ*); 1 ex., Tomambetsu, Nopporo-shinrin-kôen, Ebetsu-shi, 4 V 2000, M. Maruyama (*LDFJ*); 1 ex., same data bu, 18 V 2000 (*LDS*); 18 exs., Ôsawaguchi, Nopporo-shinrin-kôen, Ebetsu-shi, 4 V 2000, M. Maruyama (*LDFJ*); 24 exs., Kannnon-zawa, Sapporo-shi, 31 V 2002, M. Maruyama (*LDFL*); 2 exs., same data but, 1 VI 2002. Honshû: 1 ex., Gozaishi-kôsen, Nirasaki-shi, Yamanashi-ken, 18 X 1989, K. Hosoda; 9 exs., Kentô-san, Takasu-mura, Gifu-ken, 27 IX 2001, K. Kinomura (*LDFJ*); 21 exs., Isshiki, Shôkawa-mura, Gifu-ken, 27 IX 2001, K. Kinomura (*LDC*); 1 ex., Bijo-kôgen, Asahi-mura, Gifu-ken, 14 IX 2003, K. Kinomura (*LDFJ*).

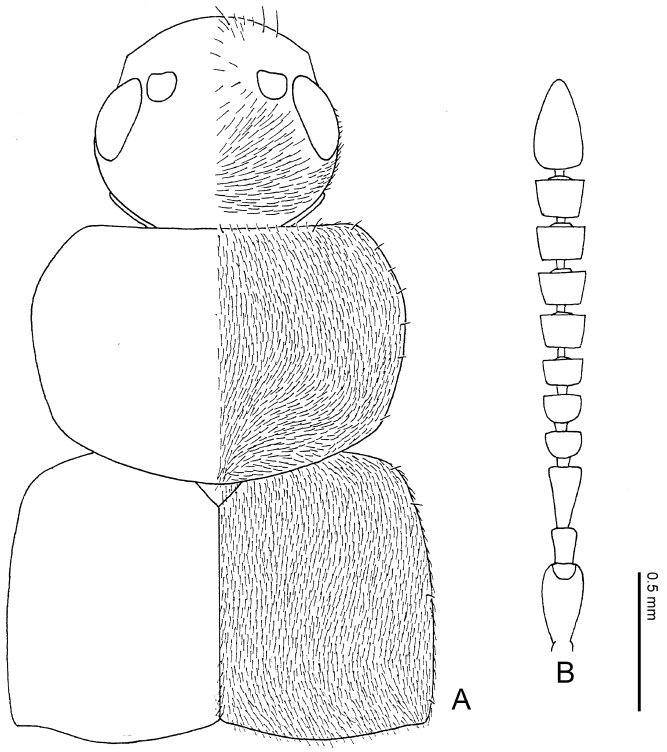

Fig. 64. *Pella kinomurai* Maruyama, n. sp. — A, Fore body, dorsal view; B, right antenna.

Type locality. Gifu-ken, Honshû, Japan.

Distribution. Manchurian subregion. ASIA: Japan (Hokkaidô, Honshû).

Etymology. Dedicated to Mr. Kyoichi Kinomura (Gifu-ken, Japan), a collector of the type series, and a specialist of faunistics and ecology of ants and myrmecophiles in Japan.

Diagnosis. *Pella kinomurai* is closely similar to *P. primorskyiana* in general appearance but distinguished from it by the narrower pronotum and the shorter apical lobe of aedeagal median lobe. This species is also similar to the species of the *cognata* group in general appearance but may be easily distinguished from them by the elytra almost unicoloured, by the apical lobe of aedeagal median lobe almost straight, not curved ventrad and in ventral view somewhat pointed at apex, and by the distal crest of aedeagal median lobe not produced. Among the sympatric species, *Pella kinomurai* is most similar to *P. japonica*, but is distinguished from the latter by the diagnostic characters above and by the 3rd to 5th abdominal segments not paler than the other segments, the posterior emargination of male 8th tergite narrower and the copulatory piece sub-parallel-sided around base. *Pella kinomurai* is also similar to *P. indiscreta* in the body shape but easily distinguished from the latter by the much larger body.

Description. Body slender. Brown in ground colour; antennae, mouthparts, legs, and around posterior margins of 3rd to 5th abdominal segments reddish brown. Head (Fig. 64 A) widest just behind eyes; surface finely reticulated, densely covered with setae; setae short, as long as those on pronotum and elytra; length of eyes 0.37–0.38 times as long as head width. Antennae (Fig. 64 B) shorter than head, pronotum and elytra combined; 1st segment almost as long as 2nd and 3rd combined; 2nd segment about 2/3 as long as 3rd; 3rd segment about 3/5 as long as 1st; 4th to

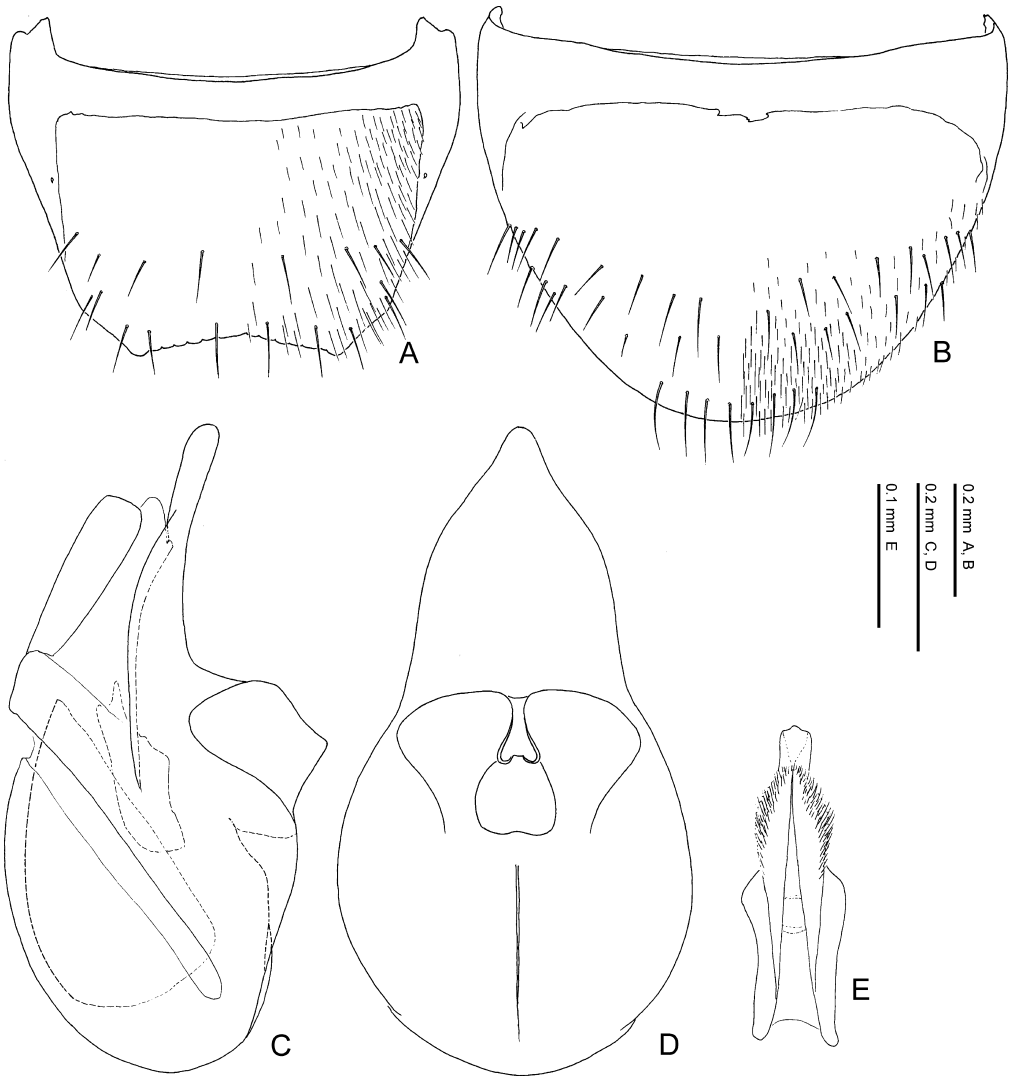

Fig. 65. *Pella kinomurai* Maruyama, n. sp. — A, Eighth abdominal tergite, dorsal view; B, 8th abdominal sternite, ventral view; C, median lobe of aedeagus, lateral view; D, ditto, ventral view; E, copulatory piece, dorsal view. Male.

10th segments wider than long; 11th segment much shorter than 1st; approximate relative lengths of segments from basal to apical: 25 : 11 : 15 : 8 : 8.5 : 8 : 7 : 8 : 9 : 9 : 14. Pronotum (Fig. 64 A) 1.37–1.44 times as wide as long, widest around anterior 1/3, narrowed posteriorly; posterior margin rounded; surface finely punctured, finely reticulated among punctures, densely covered with setae, with 7 or 8 macrosetae along lateral margin. Scutellum with surface finely punctured, densely covered with setae. Elytra (Fig. 64 A) subparallel-sided; surface finely punctured, reticulated among punctures, densely covered with setae, with 6 or 7 small macrosetae laterally. Legs moderate in length; hind tibia 1.04–1.06 times as long as elytra; approximate relative lengths of tarsal segments from basal to apical: 7 : 6 : 6 : 11.5 in fore tarsus; 14.5 : 8.5 : 8 : 6 : 10 in mid tarsus; 24 : 10 : 8.5 : 6 : 10.5 in hind tarsus. Abdomen subparallel-sided, slightly wider than elytra, widest around 4th and 5th segments; surface weakly reticulated; 3rd sparsely covered with setae;

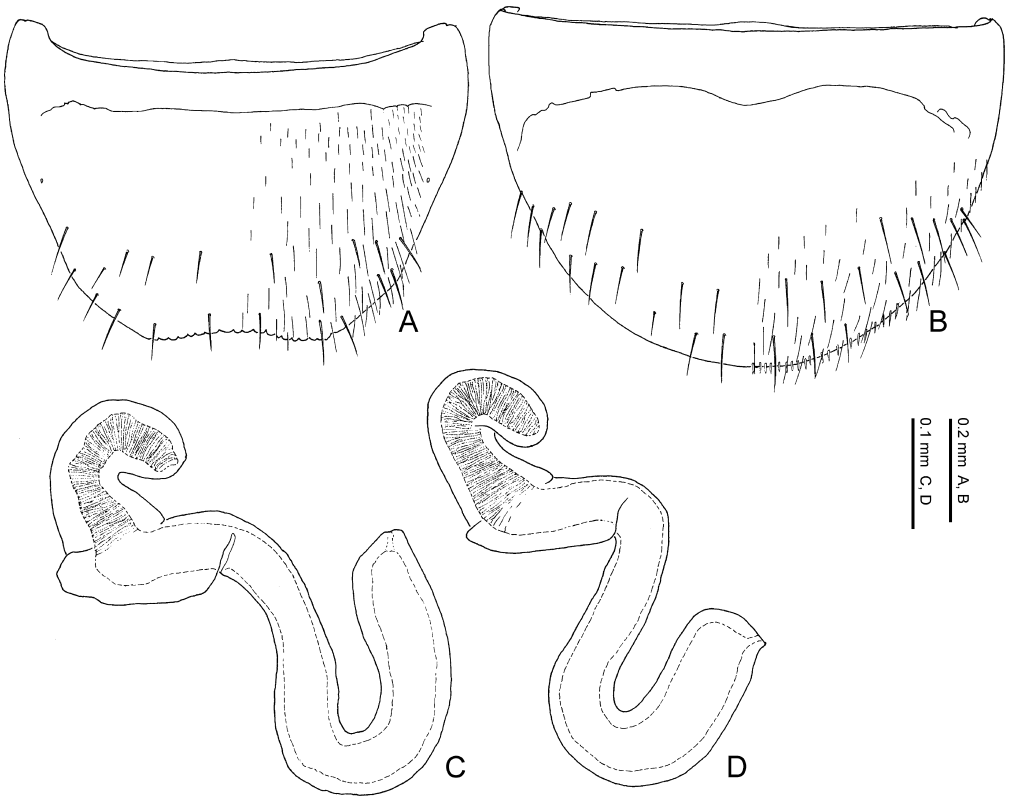

Fig. 66. *Pella kinomurai* Maruyama, n. sp. — A, Eighth abdominal tergite, dorsal view; B, 8th abdominal sternite, ventral view; C, D, spermathecae. Female.

4th to 6th tergites almost glabrous except for a row of setae along each posterior margin; 7th tergite glabrous except for lateral areas sparsely covered with minute setae; 8th tergite (Figs. 65 A, 66 A) with 9 (rarely 10) macrosetae; 9th tergite with 4 macrosetae; 10th tergite with posterior margin rounded, with 4 macrosetae.

Male: Eighth tergite (Fig. 65 A) with posterior margin slightly emarginate; emarginate apex weakly crenate; 8th sternite (Fig. 65 B) with 19–21 macrosetae; 9th sternite with posterior margin truncate. Aedeagus (Figs. 65 C, 65 D) amygdaloid in ventral view; apical lobe slightly curved ventrad, obtuse at apex in lateral and ventral views; basal ridge weakly convex, reaching near bottom of basal capsule; copulatory piece of inner sac as in Fig. 65 E. Paramere with apical lobe of paramerite dilated apicad, rounded at apex, about 1/3 as long as condylite.

Female: Eighth tergite (Fig. 66 A) with posterior margin slightly emarginate; emarginate apex weakly crenate; 8th sternite (Fig. 66 B) with 15–17 macrosetae; sensory setae of 8th sternite spindle-shaped and flattened. Spermatheca (Figs. 66 C, 66 D) curved three times; basal part about 1.5–2.0 times as long as apical part, acutely curved at middle, gently curved and narrowed apicad; apical part acutely curved around apical 1/3, narrowed apicad, its inner wall densely wrinkled from apex to around apical 1/2.

Measurements. BL, 5.3–6.5; FBL, 2.4–2.8; HL, 0.71–0.83; HW, 0.85–0.96; EL, 0.319–0.366; AL, 1.90–2.15; PL, 0.87–1.02; PW, 1.26–1.45; ELL, 1.03–1.18; ELW, 1.40–1.69; HTL, 1.09–1.23.

Bionomics. *Pella kinomurai* is relatively rarely and locally collected from nests of *Lasius* (*Dendrolasius*) *fuji*, *L.* (*D.*) *spathepus* and *L.* (*D.*) *capitatus*.

Symbiotic host. *Lasius* (*Dendrolasius*) *fuji*, *L.* (*D.*) *spathepus*, *L.* (*D.*) *capitatus*.

Pella primorskyiana Maruyama, n. sp.

(Figs. 67, 68)

Type material. Holotype: **Russia** (**Far East**): ♂, "RUSSIA: Primorskyi Krai, Khasanskyi, Pluostrov Gamov, Bukhta Vityaz, 31 V 2005, Maruyama M." (*LDFJ*) (IBSS).

Type locality. Khasanskyi, Primorskyi Krai, Russia.

Distribution. Manchurian subregion. ASIA: Russia (Far East).

Etymology. Named after the type locality.

Diagnosis. *Pella primorskyiana* is closely similar to *P. kinomurai* in general appearance but distinguished from it by the wider pronotum and the longer apical lobe of aedeagal median lobe. This species is also similar to the species of the *cognata* group in general appearance but may be easily distinguished from them by the diagnostic characters of *P. kinomurai* mentioned above.

Description. Body slender. Brown in ground colour; antennae, mouthparts, legs, and around posterior margins of 3rd to 5th abdominal segments reddish brown. Head (Fig. 67 A) widest just behind eyes; surface finely reticulated, densely covered with setae; setae short, as long as those on pronotum and elytra; length of eyes 0.40 times as long as head width. Antennae (Fig. 67 B) shorter than head, pronotum and elytra combined; 1st segment almost as long as 2nd and 3rd combined; 2nd segment about 2/3 as long as 3rd; 3rd segment about 3/5 as long as 1st; 4th to

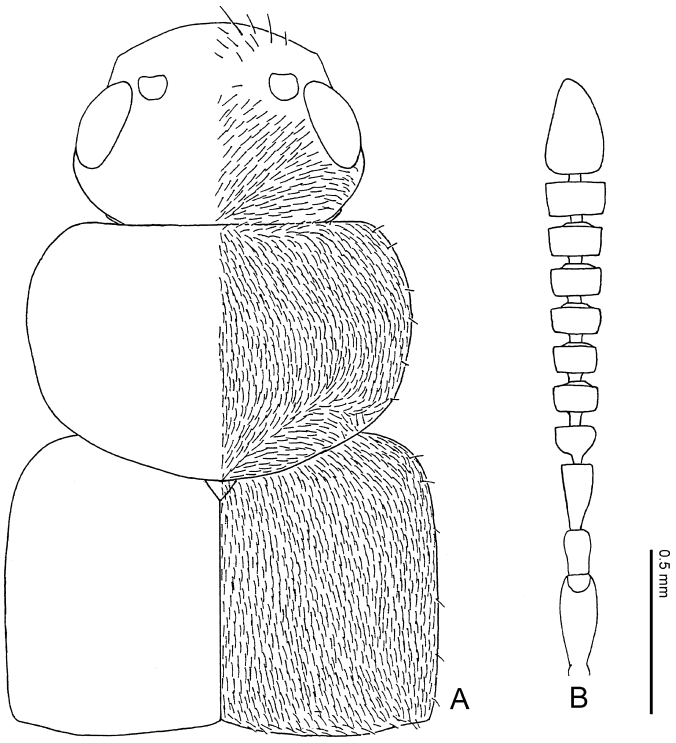

Fig. 67. *Pella primorskyiana* Maruyama, n. sp.—A, Fore body, dorsal view; B, right antenna.

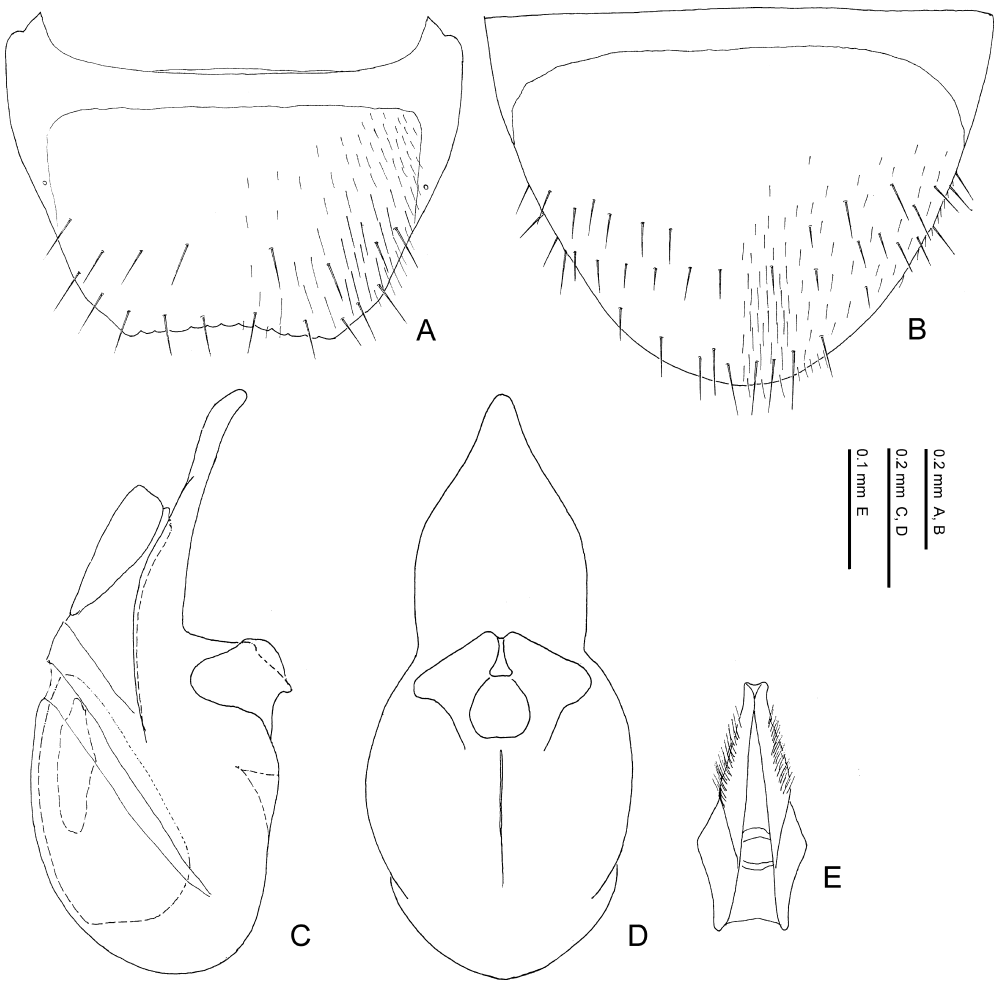

Fig. 68. *Pella primorskyiana* Maruyama, n. sp. — A, Eighth abdominal tergite, dorsal view; B, 8th abdominal sternite, ventral view; C, median lobe of aedeagus, lateral view; D, ditto, ventral view; E, copulatory piece, dorsal view. Male.

10th segments wider than long; 11th segment slightly shorter than 1st; approximate relative lengths of segments from basal to apical: 28 : 11 : 16 : 8 : 8 : 7 : 7 : 7.5 : 7.5 : 8 : 25. Pronotum (Fig. 67 A) 1.46 times as wide as long, widest around anterior 1/3, narrowed posteriorly; posterior margin rounded; surface finely punctured, finely reticulated among punctures, densely covered with setae, with 8 macrosetae along lateral margin. Scutellum with surface finely punctured, densely covered with setae. Elytra (Fig. 67 A) subparallel-sided; surface finely punctured, reticulated among punctures, densely covered with setae, with 6 small macrosetae laterally. Legs moderate in length; hind tibia almost as long as elytra; approximate relative lengths of tarsal segments from basal to apical: 8.5 : 6 : 6 : 11 in fore tarsus; 14 : 9 : 9 : 6 : 11 in mid tarsus; 20 : 10.5 : 9.5 : 7.5 : 11 in hind tarsus. Abdomen subparallel-sided, slightly wider than elytra, widest around 4th and 5th segments; surface weakly reticulated; 3rd tergite sparsely covered with setae; 4th to 6th tergites almost glabrous except for a row of setae along each posterior margin; 7th tergite sparsely covered with small setae; 8th tergite (Figs. 68 A) with 9 macrosetae; 9th tergite with 4 macrose-

tae; 10th tergite with posterior margin rounded, with 4 macrosetae.

Male: Eighth tergite (Fig. 68 A) with posterior margin slightly emarginate; emarginate apex weakly crenate; 8th sternite (Fig. 68 B) with 19–24 macrosetae; 9th sternite with posterior margin truncate. Aedeagus (Figs. 68 C, 68 D) amygdaloid in ventral view; apical lobe slightly curved ventrad, obtuse at apex in lateral and ventral views; basal ridge weakly convex, invisible in lateral view; copulatory piece of inner sac as in Fig. 68 E. Paramere with apical lobe of paramerite dilated apicad, rounded at apex, about 1/3 as long as condylite.

Female unknown.

Measurements. BL, 5.1; FBL, 2.2; HL, 1.53; HW, 0.87; EL, 0.348; AL, 1.92; PL, 0.82; PW, 1.20; ELL, 0.98; ELW, 1.36; HTL, 0.98.

Bionomics. *Pella primorskyiana* was collected from nests of *Lasius* (*Dendrolasius*) *fuji*. Probably, a rare species such as *Pella kinomurai*.

Symbiotic host. *Lasius* (*Dendrolasius*) *fuji*.

The ***hlavaci*** Group

Species included. *Pella hlavaci*.

Distribution. Manchurian subregion.

Diagnosis. Species of the *hlavaci* group may be characterised by a combination of the following character states: 1) eye length 0.32–0.33 times as long as head width; 2) 11th antennal segment shorter than the 1st; 3) pronotum with posterior margin completely rounded, not forming corners postero-laterally; 4) pronotum 1.48–1.52 times as wide as long; 5) pronotum widest at middle; 6) pronotal hypomeron fully visible in lateral view; 7) elytra unicoloured, blackish brown; 8) inner and posterior margins of elytra weakly margined; 9) posterior margin of 8th tergite crenate; 10) macrosetae of 8th abdominal segment generalised in length, exceeding the posterior margins of the segment; 11) postero-medial margin of female 8th sternite without minute pubescence.

Comments. The *hlavaci* group is a monotypical species-group. This species-group may possibly be allied to the *funesta* group in resemblance of general appearance including body colour, but the body is not narrowed posteriad as in the member of the *funesta* group. The shape of pronotum and the shape of the spermatheca are closely similar to those of the *spreta* group.

Symbiotic host. *Lasius* (*Dendrolasius*) *fuji*.

Pella hlavaci Maruyama, n. sp.

(Figs. 69, 70)

Type material. Holotype: **China** (**Beijing Shi**): ♀, "Xiaolongmen (1400 m), Dongling, Yan-shan, Beijing, CHINA, 15–16 VI 2001, Hlaváč & Cooter leg." (*LDFJ*) (IZAS).

Paratypes: 3♀♀, same data as holotype (IZAS, cMar, cHlav).

Type locality. Xiaolongmen, Beijing Shi, China.

Distribution. Manchurian subregion. ASIA: China (Beijing Shi).

Etymology. Dedicated to Mr. Peter Hlaváč (Košice, Slovakia), a collector of the type series, and an eager specialist on the systematics of the Staphylinidae.

Diagnosis. *Pella hlavaci* is similar to *P. jureceki* in general appearance and colour, but is easily distinguished from the latter by the almost elliptical pronotum, and the apical part of spermatheca apically narrowed.

Description. Body robust. Blackish brown in ground colour; antennae, mouthparts, legs,

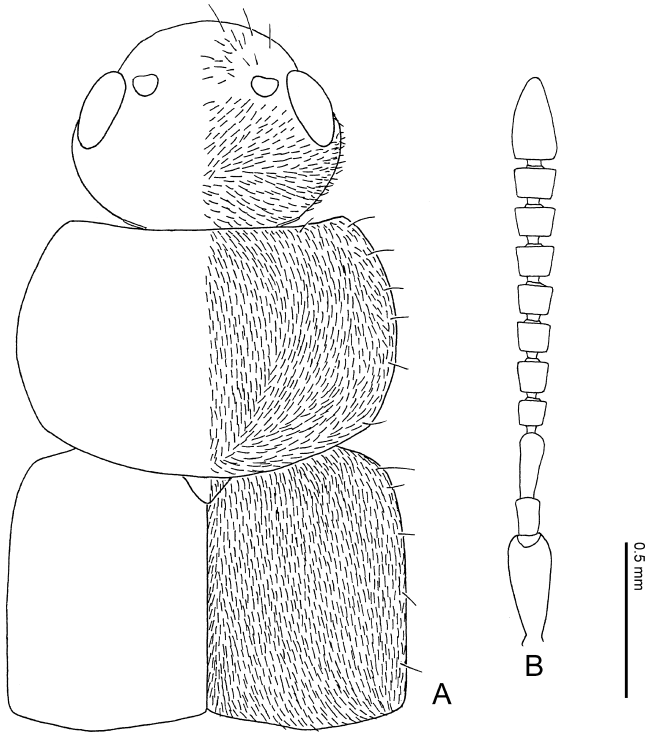

Fig. 69. *Pella hlavaci* Maruyama, n. sp. — A, Fore body, dorsal view; B, right antenna.

and around posterior margins of 3rd to 5th abdominal segments reddish brown. Head (Fig. 69 A) widest just behind eyes; surface finely reticulated, densely covered with setae; setae short, as long as those on pronotum and elytra; length of eyes 0.32–0.33 times as long as head width. Antennae (Fig. 69 B) shorter than head, pronotum and elytra combined; 1st segment much longer than 2nd and 3rd combined; 2nd segment about 1/3 as long as 1st; 3rd segment about 1/2 as long as 1st; 4th to 10th segment slightly wider than long; 11th segment much shorter than 1st; approximate relative lengths of segments from basal to apical: 30 : 9.5 : 15 : 7 : 7 : 6 : 6.5 : 7 : 7.5 : 8 : 20. Pronotum (Fig. 69 A) 1.48–1.52 times as wide as long, widest at middle; posterior margin rounded; surface finely punctured, finely reticulated among punctures, densely covered with setae, with 7 or 8 small macrosetae along lateral margin. Scutellum with surface finely punctured, densely covered with setae. Elytra (Fig. 69 A) subparallel-sided; surface finely punctured, reticulated among punctures, densely covered with setae, with 6 or 7 small macrosetae laterally. Legs long, almost as long as elytra; approximate relative lengths of tarsal segments from basal to apical: 9 : 6.5 : 5.5 : 11 in fore tarsus; 13.5 : 9.5 : 8 : 6.5 : 10 in mid tarsus; 14 : 9 : 8.5 : 7.5 : 11 in hind tarsus. Abdomen expanded, 1.03 times wider than elytra, widest around 6th and 7th segments; surface smooth; 3rd to 6th tergites glabrous except for a row of setae along each posterior margin; 7th tergite glabrous except for lateral areas sparsely covered with minute setae; 8th tergite (Fig. 70 A) with 9 macrosetae; 9th tergite with 4 macrosetae; 10th tergite with posterior margin rounded, with 4 macrosetae.

Male unknown.

Female: Eighth tergite (Fig. 70 A) with posterior margin slightly emarginate, weakly crenate around emarginate apex; 8th sternite (Fig. 70 B) with 11 or 12 macrosetae; sensory setae of 8th

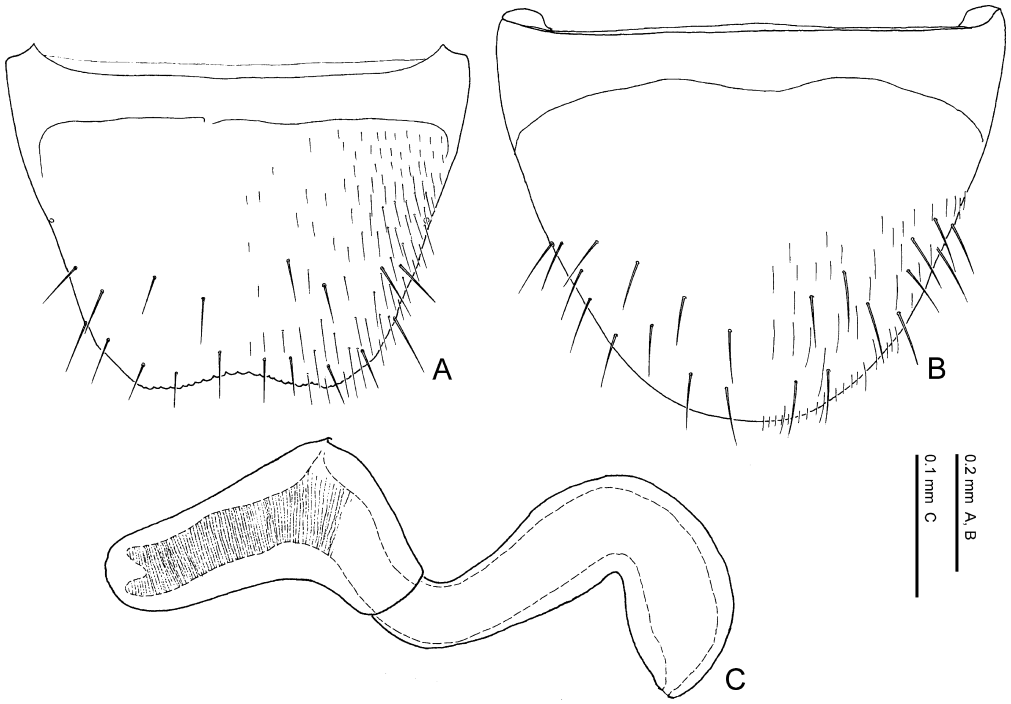

Fig. 70. *Pella hlavaci* Maruyama, n. sp. — A, Eighth abdominal tergite, dorsal view; B, 8th abdominal sternite, ventral view; C, spermatheca. Female.

sternite slightly flattened. Spermatheca (Fig. 70 C) curved three times, M-shaped; basal part about 1.5 times as long as apical part, gently curved just before middle and near apex, narrowed apicad; apical part gently curved, narrowed apicad, its inner wall densely wrinkled from apex to around apical 2/3.

Measurements. BL, 5.5–5.7; FBL, 2.4–2.5; HL, 0.76–0.78; HW, 0.84–0.85; EL, 0.269–0.281; AL, 1.75–1.83; PL, 0.81–0.85; PW, 1.23–1.26; ELL, 0.64–0.98; ELW, 1.38–1.42; HTL, 0.94–1.01.

Bionomics. The type series of *P. hlavaci* were collected from a colony of *Lasius* (*Dendrolasius*) *fuji* together with many other staphylinids (see, Bionomics of *P. cooterorum*).

Symbiotic host. *Lasius* (*Dendrolasius*) *fuji*.

The ***cognata*** Group

Species included. *Pella cognata*, *P. iberica*, *P. japonica*, *P. kishimotoi*.

Distribution. European subregion, Mediterranean subregion, Manchurian subregion.

Diagnosis. Species of the *cognata* group may be characterised by a combination of the following character states: 1) eye length 0.34–0.37 times as long as head width; 2) 11th antennal segment shorter than the 1st; 3) pronotum with posterior margin completely rounded, not forming corners postero-laterally; 4) pronotum 1.25–1.40 times as wide as long; 5) pronotum widest anteriorly; 6) pronotal hypomeron fully visible in lateral view; 7) elytron with yellowish brown maculation around antero-lateral corner to mesal area; 8) inner and posterior margins of elytra weakly margined; 9) male 8th sternite longer than in female; 10) posterior margin of 8th tergite

crenate; 11) posterior margin of male 8th sternite rounded or slightly truncate; 12) lateral projection of apodeme of male 8th tergite evidently longer than that of female; 13) macrosetae of 8th abdominal segment generalised in length, exceeding the posterior margin of the segment; 14) postero-medial margin of female 8th sternite without minute pubescence; 15) apical lobe of aedeagal median lobe curved ventrad, thick and parallel-sided dorsoventrally in lateral view; 16) distal crests of aedeagus well developed, projected, rounded or truncate on ventral margin in lateral view; 17) copulatory piece of aedeagal median lobe more or less pointed at apex in dorsal view.

Comments. The *cognata* group can be regarded as a monophyletic group by an autapomorphy; the apical lobe of aedeagal median lobe is thick and parallel-sided dorsoventrally. This state is unique within the genus and not observed in the other species of the Lomechusini. Thus, this state is considered to be autapomorphy of the species-group. This species-group may possibly be allied to the *similis* group in resemblance of the shape of aedeagus, which is completely oval in ventral view. This species-group also similar to the *limbata* group in the shape of male 8th tergite, which is widely emarginate posteriorly just as in the *similis* group.

Symbiotic hosts. *Lasius* (*Dendrolasius*) spp.

Key to the Species of the *cognata* Group

1. Occiput with a pair of projections medially; apical lobe of aedeagal median lobe longer than basal capsule. Distribution: China (Hunan Sheng). .....*P. kishimotoi*.
— Occiput without projection medially, only somewhat convex dorsally; apical lobe of aedeagal median lobe as long as basal capsule. ..... 2.
2. Eye length 0.32–0.33 times as long as head width; copulatory piece almost circular. Distribution: Japan, Korea, Russia (Far East). .....*P. japonica*.
— Eye length 0.34–0.37 times as long as head width; copulatory piece subparallel-sided from base to middle. Distribution: Europe. ..... 3.
3. Abdominal macrosetae short, those on postero-medial area of 8th tergite exceed the tergal margin about 1/2 in their lengths. Distribution: Central Europe, Balkan. .....*P. cognata*.
— Abdominal macrosetae long, those on postero-medial area of 8th tergite exceed the tergal margin about 2/3 in their lengths. Distribution: Iberian Peninsula. .....*P. iberica*.

Pella cognata (Märkel, 1842), n. comb.

(Figs. 71–73)

Aleochara cognata Märkel, 1842: 142 (original description).—Mulsant & Rey, 1873a: 69 (*Myrmedonia*, description).—des Gozis, 1886: 12 (*Pella*, list).—Ganglbauer, 1895: 122 (*Myrmedonia* (*Pella*), key, description).—Reitter, 1909: 43 (*Myrmedonia* (*Pella*), key).—Fenyes, 1920: 297 (*Zyras* (*Pella*), list).—Bernhauer & Scheerpeltz, 1926: 705 (*Zyras* (*Pella*), list).—Scheerpeltz, 1934: 1651 (*Zyras* (*Pella*), list).—Lohse, 1974: 225 (*Zyras* (*Pella*), key).—Likovský, 1993: 59 (*Zyras* (*Pella*), list).—Smetana, 2004: 461 (*Zyras* (*Pella*), list).

"*Aleochara funesta*": Heer, 1839: 308 (misidentification, description).—Ganglbauer, 1895: 122 (synonym of *cognata*, list).—Fenyes, 1920: 297 (synonym of *cognata*, list).

Type material. Syntypes: **Germany**: 1 ex. "5250/cognata Märk, Saxon. mont. Märk ["Saxon. mont. Märk." (=mountainous area of Saxonia, Germany, F. Märkel leg.)]" (head, prothorax and 3rd to 10th abdominal segments missing, pinned); 1 ex. [ditto] (3rd to 10th abdominal segments missing, pinned).

These are deposited in ZMHB.

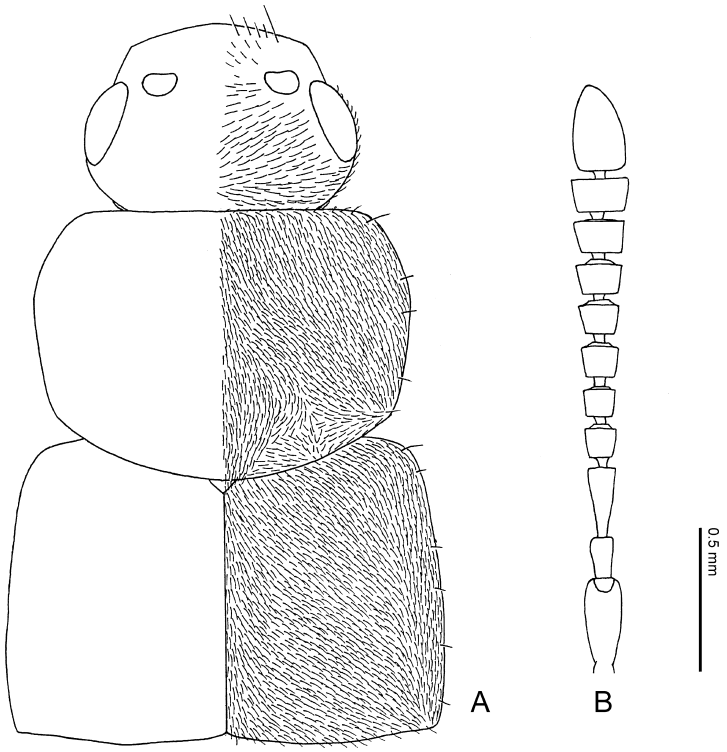

Fig. 71. *Pella cognata* (Märkel).—A, Fore body, dorsal view; B, right antenna.

Type locality. Saxonia, Germany.

Other material. **Austria**: 2 exs., Mark, Chorin, 22 IV 1916; 4 exs., Lainzer, Tiergarten, 30 VII 1949, O. Scheerpeltz (LDFL); 2 exs., Trübenbruch, Schönhauser Damm, Sachsen-Anhalt, V 1998, Sprick (pt); 1 ex., Koschute Aue 1300m, 13 VI 1965, A. Smetana. **Bulgaria**: 1 ex., Senokos, 20km E Tolbuchin, 4 V–19 VI 1987, Penev. **Czech Republic**: 1 ex., Hradec, Bohemia, 30 III 1947, A. Smetana; 1♂, 1♀, 23 exs., same data but, 3 IV 1947, A. Smetana; 2 exs., Říčany, Bohemia, 27 III 1948, P. Říha; 2 exs., Chlum u Třeb., Bohemia, VI 1910, J. Niedl. **Greece**: 1 ex., Kastanea, Kalambaka, Pindos, 28 III 1997, A. Riedal. **Italy**: 1 ex., Montecchia, Verona, 22 II 1974, A. Zanetti (LDFL) (MNV). **Slovakia**: 7 exs., Ruská Poruba, 4 VIII 1956, A. Smetana; 5 exs., same data but, 12 IX 1956; 5 exs., same data but, 17 IX 1956.

Distribution. European subregion, Mediterranean subregion. EUROPE: Austria, Belgium, Bosnia Herzegovina, Belarus, Croatia, Czech Republic, Denmark, Finland, France, Great Britain, Germany, Georgia, Hungary, Italy, Latvia, Lithuania, Netherlands, Norway, Poland, Romania, Russia (North European territory), Slovakia, Sweden, Switzerland, Ukraine.

Diagnosis. *Pella cognata* is similar to the other species of the *cognata* group in general appearance, but can be distinguished from them by the copulatory piece parallel-sided around base. The species of the *cognata* group are locally isolated. Among the sympatric species *P. cognata* is similar to *P. limbata* and *P. similis* in general appearance, but is distinguished from *P. limbata* by the postero-lateral corner of male 8th tergite not projected, the apical lobe of aedeagal median lobe gradually narrowed apicad in ventral view and the apical part of spermatheca with outer projection, and from *P. similis* by the spermathecal structure above, the apical lobe of aedeagal

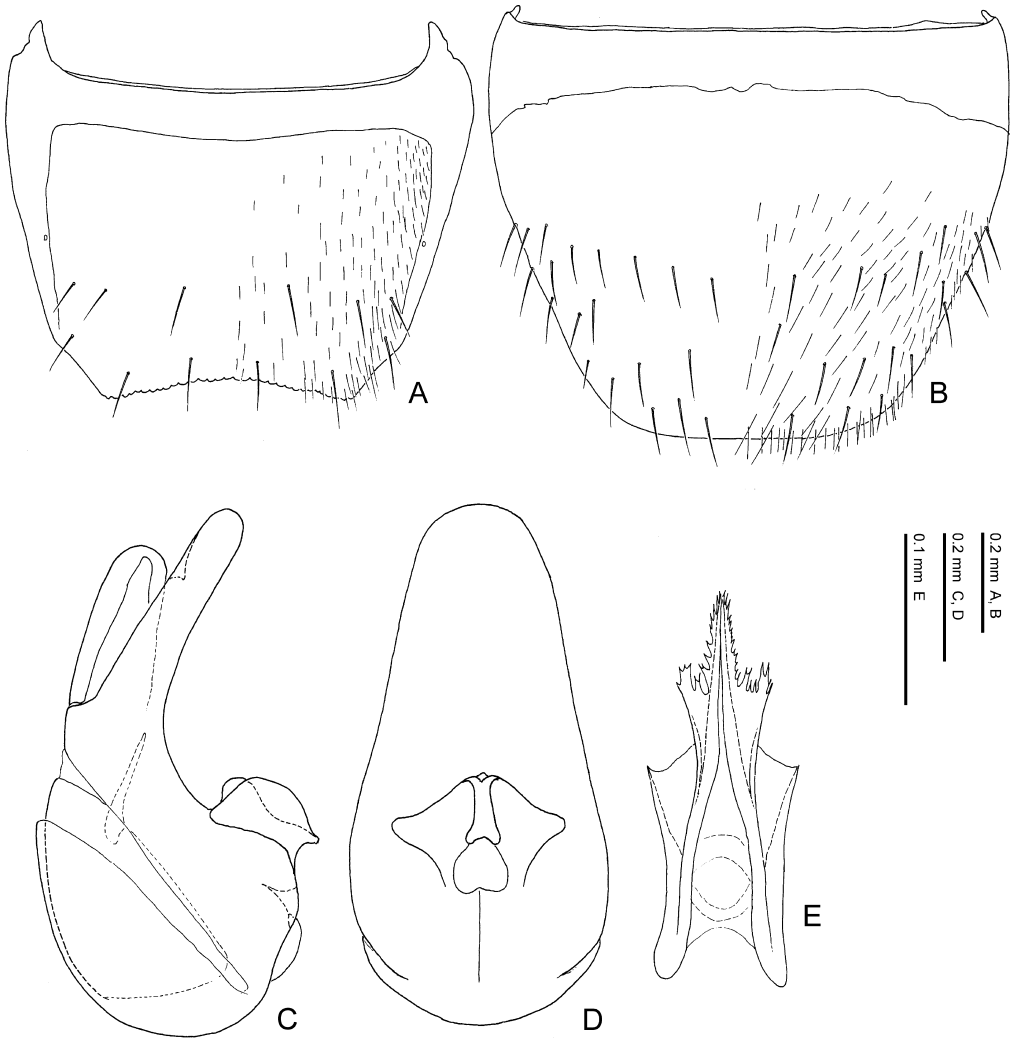

Fig. 72. *Pella cognata* (Märkel).—A, Eighth abdominal tergite, dorsal view; B, 8th abdominal sternite, ventral view; C, median lobe of aedeagus, lateral view; D, ditto, ventral view; E, copulatory piece, dorsal view. Male.

median lobe longer and the basal part of spermatheca much longer.

Redescription. Body slender. Reddish brown in ground colour; antennae, mouthparts, around antero-lateral corner to mesal area of each elytron, legs and 3rd to 5th abdominal segments paler. Head (Fig. 71 A) widest at middle of eyes; surface finely reticulated, densely covered with setae; setae short, as long as those on pronotum and elytra; length of eyes 0.36–0.37 times as long as head width. Antennae (Fig. 71 B) shorter than head, pronotum and elytra combined; 1st segment evidently shorter than 2nd and 3rd combined; 2nd segment about 1/2 as long as 1st; 3rd segment about 2/3 as long as 1st; 4th and 5th segments almost as long as wide; 6th to 10th segments wider than long; 11th segment much shorter than 1st; approximate relative lengths of segments from basal to apical: 30.5 : 15 : 19 : 8.5 : 8 : 8 : 8.5 : 7 : 8 : 9 : 22.5. Pronotum (Fig. 71 A) 1.35–1.40 times as wide as long, widest around anterior 1/5, narrowed posteriorly; posterior margin rounded; surface finely punctured, finely reticulated among punctures, densely covered with

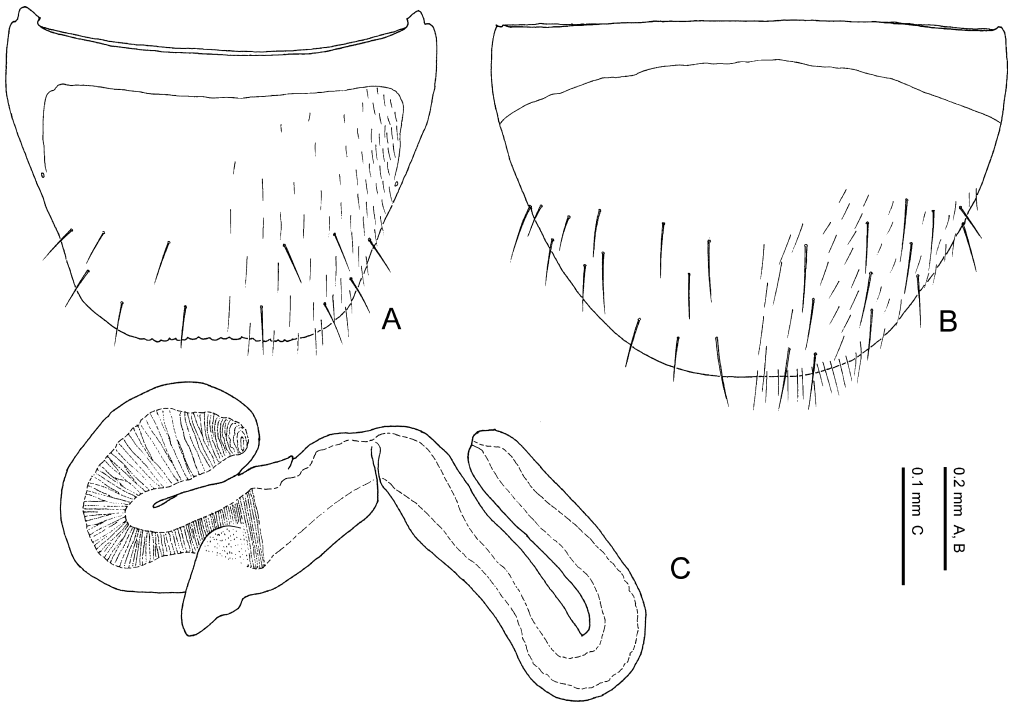

Fig. 73. *Pella cognata* (Märkel).—A, Eighth abdominal tergite, dorsal view; B, 8th abdominal sternite, ventral view; C, spermatheca. Female.

setae, with 10–12 macrosetae along lateral margin. Scutellum with surface finely punctured, densely covered with setae. Elytra (Fig. 71 A) subparallel-sided; surface finely punctured, reticulated among punctures, densely covered with setae, with 6–8 small macrosetae laterally. Legs moderate in length; hind tibia 1.06–1.08 times as long as elytra; approximate relative lengths of tarsal segments from basal to apical: 9.5 : 6 : 6 : 13 in fore tarsus; 12.5 : 10 : 8.5 : 7 : 12.5 in mid tarsus; 20 : 11 : 9.5 : 8.5 : 14.5 in hind tarsus. Abdomen subparallel-sided, slightly narrower than elytra, widest around 4th and 5th segments; surface weakly reticulated; 3rd to 5th tergites glabrous except for a row of setae along each posterior margin; 6th and 7th tergites sparsely and uniformly covered with minute setae; 8th tergite (Figs. 72 A, 73 A) with 6 macrosetae; 9th tergite with 3 setae; 10th tergite with posterior margin slightly emarginate, with 3 setae.

Male: Eighth tergite (Fig. 72 A) with posterior margin slightly emarginate, its emarginate apex weakly crenate; 8th sternite (Fig. 72 B) with posterior margin truncate, with 18–20 macrosetae; 9th sternite with posterior margin truncate. Aedeagus (Figs. 72 C, 72 D) oval in ventral view; apical lobe curved ventrad, obtuse at apex in lateral view, rounded at apex in ventral view; basal ridge roundly convex; copulatory piece of inner sac as in Fig. 72 E. Paramere with apical lobe of paramerite dilated apicad, rounded at apex, about 1/5 as long as condylite.

Female: Eighth tergite (Fig. 73 A) with posterior margin truncate; truncate apex weakly crenate; 8th sternite (Fig. 73 B) with 12–13 macrosetae; sensory setae of 8th sternite generalised, almost the same as the other setae in shape. Spermatheca (Fig. 73 C) curved three times; basal part almost as long as apical part, acutely curved around middle, slightly dilated apicad; apical part acutely curved around apical 2/5, narrowed apicad, its inner wall densely wrinkled from apex to around apical 2/3.

Measurements. BL, 5.2–5.8; FBL, 2.6–2.8; HL, 0.75–0.78; HW, 0.90–0.95; EL, 0.329–0.341; AL, 2.06–2.08; PL, 0.89–0.96; PW, 1.25–1.30; ELL, 1.08–1.10; ELW, 1.43–1.52; HTL, 1.11–1.13.

Bionomics. *Pella cognata* is collected from nests of *Lasius* (*Dendrolasius*) *fuliginosus* in Europe relatively rarely and locally (France, 1992).

Symbiotic host. *Lasius* (*Dendrolasius*) *fuliginosus*.

Pella iberica Maruyama, n. sp.

(Figs. 74–76)

Type material. Holotype: **Spain**: ♂, "E. Andalusien (MA), Sierra de Palmitera, SO Ronda, 900 m, 24 III 1994 Assing 13" (cAss).

Paratypes: **Spain**: 2♀♀, "Espagne: Castille Puerto de Bejar 800–1400 m V–VI 1957 G. Fagel/G. Fagel det.. cognata Märk." (IRSNB).

Type locality. Sierra de Palmitera, Andalusia, Spain.

Distribution. Mediterranean subregion. EUROPE: Spain. Probably confined to the Iberian Peninsula.

Etymology. Named after the Iberian Peninsula, in which lies the type locality.

Diagnosis. *Pella iberica* is similar to the other species of the *cognata* group in general appearance but can be distinguished from them by the macrosetae and setae of the body evidently longer, particularly on the pronotum, elytra, and 8th tergite and sternite. The species of the *cognata* group are locally isolated. This species can be distinguished from the sympatric species by the diagnostic character states of the *cognata* group above, especially the aedeagal shape.

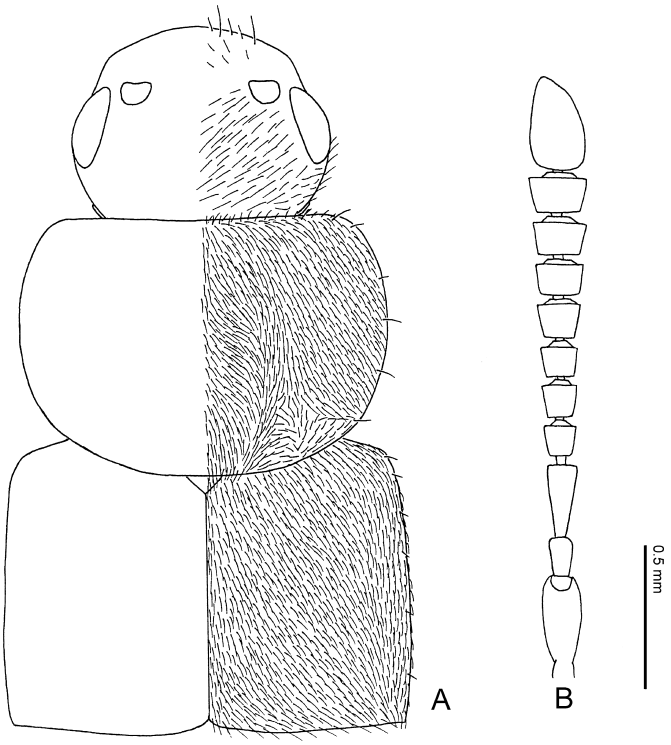

Fig. 74. *Pella iberica* Maruyama, n. sp. — A, Fore body, dorsal view; B, right antenna.

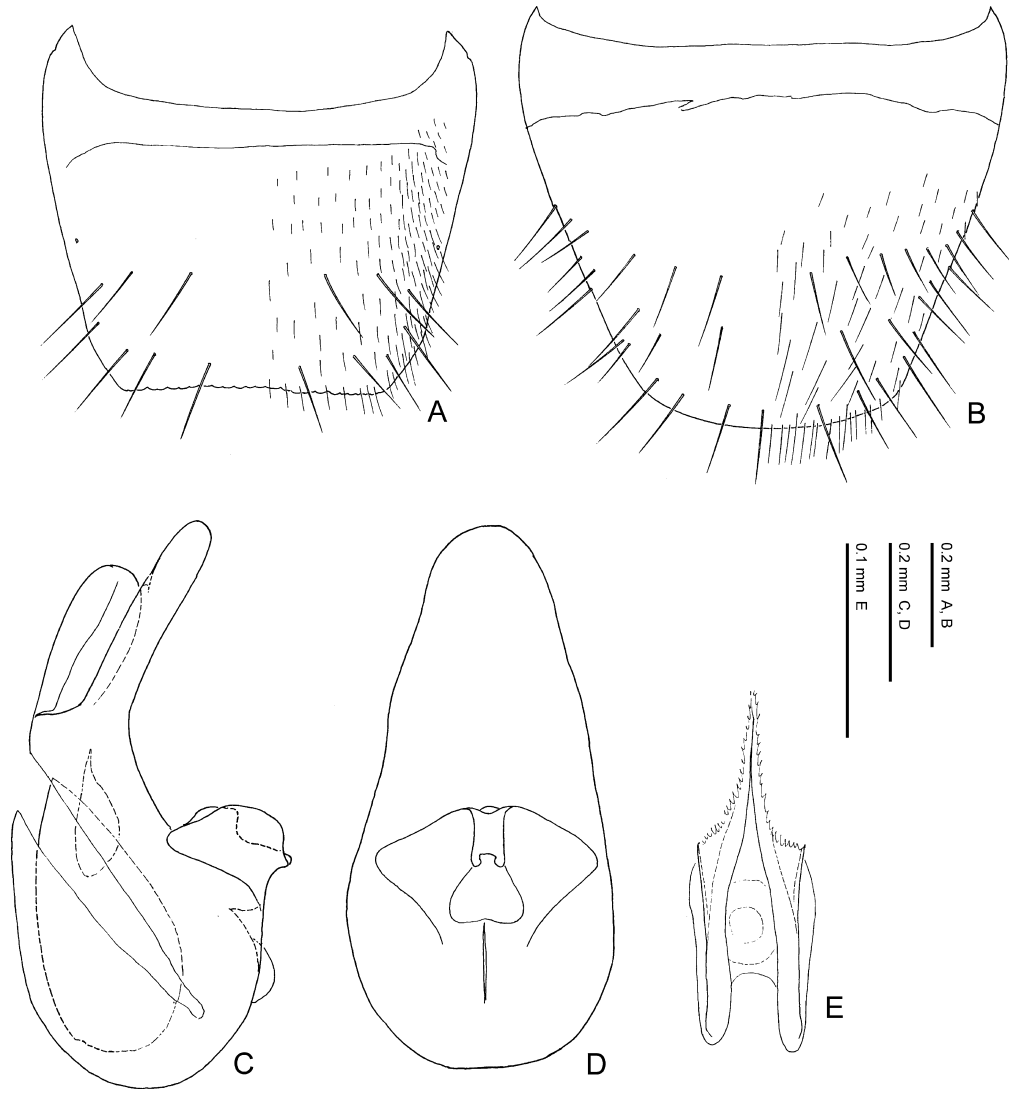

Fig. 75. *Pella iberica* Maruyama, n. sp. — A, Eighth abdominal tergite, dorsal view; B, 8th abdominal sternite, ventral view; C, median lobe of aedeagus, lateral view; D, ditto, ventral view; E, copulatory piece, dorsal view. Male.

Description. Body slender. Brown in ground colour; antennae, mouthparts, around anterolateral corner to mesal area of each elytron, legs, and around posterior margins of 3rd to 5th abdominal segments reddish brown. Head (Fig. 74 A) widest just behind eyes; surface finely reticulated, densely covered with setae; setae long, as long as those on pronotum and elytra; length of eyes 0.34–0.35 times as long as head width. Antennae (Fig. 74 B) shorter than head, pronotum and elytra combined; 1st segment slightly shorter than 2nd and 3rd combined; 2nd segment about 2/3 as long as 3rd; 3rd segment about 3/5 as long as 1st; 4th to 6th segments almost as long as wide; 7th to 10th segments wider than long; 11th segment as long as 1st; approximate relative lengths of segments from basal to apical: 29.5 : 12.5 : 18 : 7 : 7 : 6 : 7.5 : 6.5 : 6.5 : 8.5 : 29.5. Pronotum (Fig. 74 A) 1.26–1.36 times as wide as long, widest around anterior 1/5, narrowed posterior-

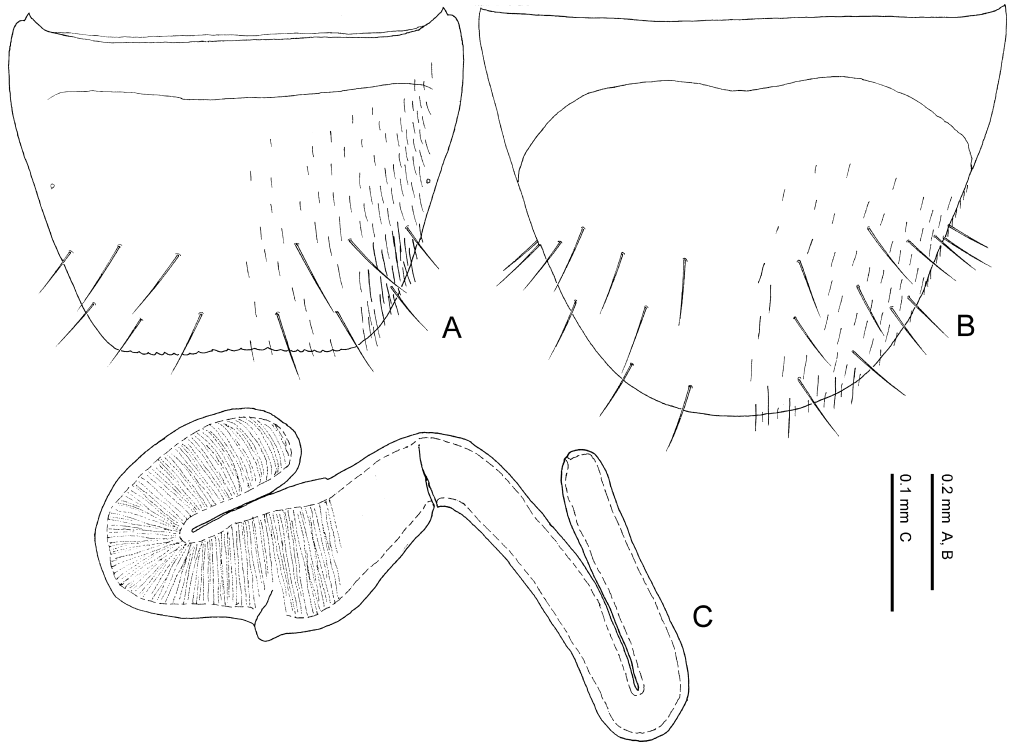

Fig. 76. *Pella iberica* Maruyama, n. sp. — A, Eighth abdominal tergite, dorsal view; B, 8th abdominal sternite, ventral view; C, spermatheca. Female.

ly; posterior margin rounded; surface finely punctured, finely reticulated among punctures, densely covered with long setae, with 8 or 9 macrosetae along lateral margin. Scutellum with surface finely punctured, densely covered with setae. Elytra (Fig. 74 A) slightly widened apicad; surface finely punctured, reticulated among punctures, densely covered with long setae, with 6–8 small macrosetae laterally. Legs moderate in length; hind tibia 0.98–0.99 times as long as elytra; approximate relative lengths of tarsal segments from basal to apical: 6 : 5.5 : 5 : 12 in fore tarsus; 10 : 7 : 6 : 6 : 12.5 in mid tarsus; 15 : 9.5 : 9.5 : 7.5 : 12 in hind tarsus. Abdomen subparallel-sided, slightly narrower than elytra, widest around 4th and 5th segments; surface weakly reticulated; 3rd to 7th tergites glabrous except for a row of setae along each posterior margin; 8th tergite (Figs. 75 A, 76 A) with 7 (rarely 8) macrosetae; 9th tergite with 3 macrosetae; 10th tergite with posterior margin slightly emarginate, with 4 macrosetae.

Male: Eighth tergite (Fig. 75 A) with posterior margin slightly emarginate, its emarginate apex crenate; 8th sternite (Fig. 75 B) with posterior margin rounded, with 18 macrosetae; 9th sternite with posterior margin slightly emarginate. Aedeagus (Figs. 75 C, 75 D) oval in ventral view; apical lobe curved ventrad, obtuse at apex in lateral view, rounded at apex in ventral view; basal ridge roundly convex; copulatory piece of inner sac as in Fig. 75 E. Paramere with apical lobe of paramerite dilated apicad, rounded at apex, 1/4 as long as condylite.

Female: Eighth tergite (Fig. 76 A) with posterior margin truncate; truncate apex weakly crenate; 8th sternite (Fig. 76 B) with 11–13 macrosetae; sensory setae of 8th sternite generalised, almost the same as the other setae in shape. Spermatheca (Fig. 76 C) curved three times; basal part almost as long as apical part, acutely curved around middle, slightly dilated apicad; apical part

acutely curved around apical 2/5, narrowed apicad, its inner wall densely wrinkled from apex to around apical 2/3.

Measurements. BL, 5.1–5.5; FBL, 2.3–2.5; HL, 0.75–0.76; HW, 0.90–0.91; EL, 0.315–0.319; AL, 1.95–2.02; PL, 0.93–0.94; PW, 1.17–1.28; ELL, 1.01–1.10; ELW, 1.46–1.53; HTL, 0.99–1.09.

Bionomics and symbiotic host. No information was available. Since all the other species of the *cognata* group are associated with *Lasius* (*Dendrolasius*) spp., and since *L.* (*D.*) *fuliginosus* is distributed around the type locality, *P. iberica* is probably associated with this ant species.

Pella japonica (Sharp, 1888)

(Figs. 77–79)

Myrmedonia cognata var.?: Sharp, 1874: 10 (record from Japan, comments).

Myrmedonia cognata var. *japonica* Sharp, 1888, 290 (original description).—Bernhauer & Scheerpeltz, 1926: 696 (variety of *Zyras* (*Pella*) cognatus, list).—Kistner, 1972: 153 (*Pella*, distinct species, "*Pella japonicus* [sic!]", description).—Smetana, 2004: 461 (*Zyras* (*Pella*), subspecies of *cognata*, list).

Type material. Syntypes: **Japan**: 1♀, "Japan. G. Lewis. 1910-320./cognatus var?? probably n. sp./japonicus Sharp/SYN-TYPE (blue round curator label)"; 1♀, "Bukenji (written underside of paper card specimen glued on)/Bukenji/Japan. G. Lewis./Sharp Coll. 1905-313./Myrmedonia cognata var. japonica Japan. Lewis/SYN-, TYPE (blue round curator label)"; 1♂, "Bukenji (written underside of paper card specimen glued on)/Bukenji/Japan. G. Lewis. 1910-320./SYN-TYPE (blue round curator label)"; 1♂, "Bukenji/Japan. G. Lewis. 1910-320./SYN-TYPE (blue round curator label)"; 3♀♀ (two are mounted on same paper card), "Bukenji (written underside of paper card specimen glued on)/Bukenji/Japan. G. Lewis./Sharp Coll. 1905-313./SYN-TYPE (blue round curator label)"; 1♀, "Bukenji 5/4/80 (written underside of paper card specimen glued on)/Yokohama. 20. III.–14. IV. 80./Japan. G. Lewis. 1910-320./Myrmedonia, congata var."; 1♀, "*Myrmedonia* congata var. Sapporo. Japan. Lewis. (written on paper card specimen glued on)/Japan. G. Lewis./Sharp Coll. 1905-313."; 1♂, "16. 6. 8 (probably, 16. 6. 1880) (written underside of paper card specimen glued on)/Kashiwagi. 15. VI–24. VI 81./Japan. G. Lewis. 1910-320."; 1♂, "2/6/81 (written underside of paper card specimen glued on)/Nagasaki., 22. V–3. VI 81/Japan. G. Lewis. 1910-320."; 1♂, "14. 4. 80 (written underside of paper card specimen glued on)/Nagasaki. 13. II.–21. IV. 81/Japan. G. Lewis. 1910-320.".

These are deposited in BMNH.

Type locality. Sapporo (Hokkaidô), Yokohama (Honshû), or Nagasaki (Kyûshû), Japan.

Other material. **Japan**: Hokkaidô: 1 ex., Himenuma, Rishiri-tô, 4 IX 1990, T. Kishimoto (pt); 2 exs., Sarobetsu-gen'ya, 9 VII 1991, N. Yasuda (pt); 9 exs., Hebi-numa, Teshio-gawa, Teshio-chô, 9 VII 1992, S. Hori (pt); 63 exs., Makoi, Shari-chô, 27–29 V 2001, Y. Kida (*LDFJ*); 1 ex., Nijibetsu-rindô, Yoroushi, Nakashibetsu-chô, 7 VIII 1992, K. Miyashita; 1ex., Onnenai-rindô, Tsurui-mura, Akan-gun, 29 VII 1994, Y. Hirama; 1 ex., Shibetsu-gawa, Shibetsu-chô, 25–28 VI 2001, H. Yoshitomi; 1 ex., Taishô, Kitami-shi, 11 V 1992, T. Katô; 23 exs., Esaushi-san, Kamikawa-chô, 8 VIII 1985, N. Yasuda (pt); 1 ex., Ishikari-gawa, Kamikawa-chô, 2 VI 1994, N. Yasuda (pt); 2 exs., Taihei, Maruseppu-chô, 11–12 VIII 2000, Y. Kida (*LDFJ*); 1 ex., same data but, 19–21 VIII 2000; 6 exs., Makoi, Shari-chô, 28 V 2000, Y. Kida (*LDFJ*); 1 ex., Apoi-dake, Samani-chô, 13 VII 1995, N. Yasuda (pt); 1 ex., Kimontô, Taiki-chô, 7 VII 1993, S. Hori; 3 exs., Kamiotoineppu, Otoineppu-mura, 15–23 VII 1997, S. Hori (pt); 3 exs., Kaitaku-ki-

nenkan, Nopporo-shinrin-kôen, Ebetsu-shi, 20 IV 2003, S. Hori (*LDFJ*); 9 exs., Tomambetsu, Nopporo-shinrin-kôen, Ebetsu-shi, 4 V 2000, M. Maruyama (*LDS*); 5 exs., same data but, 11 V 2000; 4 exs., same data but, 11 V 2000 (*LDFJ*); 8 exs., same data but, 18 V 2000 (*LDS*); 14 exs., Ôsawaguchi, Nopporo-shinrin-kôen, Ebetsu-shi, 31 V 1999, M. Maruyama (*LDFJ*); 2 exs., same data but, 4 V 2000; 2 exs., same data but, 9 V 2000, H. Sugaya (*LDFJ*); 7 exs., Shibumbetsu, Nopporo-shinrin-kôen, Ebetsu-shi, 11 V 2000 (*LDFJ*); 2 exs., Hitsujigaoka, Sapporo-shi, 21 VI 1998, M. Maruyama (*LDS*); 1 ex., Kannon-zawa, Sapporo-shi, 1 VI 2001, H. Sugaya (*LLJ*); 4 exs., same data but, 1 VI 2002, M. Maruyama (*LDFJ*); 3 exs., same data but, 31 V 2002; 2 exs., Moiwa-yama (520 m alt.), Sapporo-shi, 27 VII 1991, A. Smetana; 3 exs., Asari, Otaru-shi, 1 IX 1998, K. Sugisima (*LDFJ*); 4 exs., Akagawa, Hakodate-shi, 15 VIII 1992, M. Nishikawa (*LDFJ*). Honshû: 1 ex., Matamatsu, Yomogita-mura, Aomori-ken, 9 VI 1999, H. Uyama (pt); 1 ex., Haguro-yama, Yomogita-mura, Aomori-ken, 11 VI 1999, H. Uyama (pt); 1 ex., Gosho-ko, Morioka-shi, Iwate-ken, 13–14 VI 1999, M. Sano (*LDFJ*); 1 ex., Kuzakai, Kawai-mura, Iwate-ken, 9 VII 1980, K. Ogata; 1 ex., Tamugi, Tokamachi-shi, Niigata-ken, 18 IV 1998, T. Kishimoto; 5 exs., Ochinomizu, Tôkamachi-shi, Niigata-ken, 18 IV 1998, T. Kishimoto (*LDFJ*); 1 ex., Sasagamine, Myôkô-san, Niigata-ken, 14–15 VI 1980, S. Naomi; 72 exs., Tobiyama-jôshi, Utsunomiya-shi, Tochigi-ken, 17 VI 1998, M. Maruyama (*LDFJ*); 118 exs., Shimokomoriya, Môka-shi, Tochigi-ken, 6 VII 1999, M. Maruyama (*LDFJ*); 34 exs., Mizuhono, Môka-shi, Tochigi-ken, 17–18 VI 1998, M. Maruyama (*LDS*); 16 exs., Sayado, Môka-shi, Tochigi-ken, 15 VI 2000, T. Kobayashi & H. Obata (*LDFJ*); 1 ex., 4 km NW Onioshidashi, Gunma-ken, 18–21 VII 1980, A. & Z. Smetana; 3 exs., Nakano, Shôwa-machi, Kitakatsushika-gun, Saitama-ken, 17 VI 2001, H. Kamezawa (*LDFJ*); 4 exs., Chichibu-kôgen-bokujô, Higashichichibu-mura, Saitama-ken, 3 IV 1999, K. Toyoda (*LDFJ*); 4 exs., Sugaya, Ranzan-machi, Saitama-ken, 13 VII 1998, K. Toyoda (*LDS*); 5 exs., Shioyama, Kamagata, Ranzan-machi, Saitama-ken, 17 VI 2000, K. Toyoda (*LDFJ*); 1 ex., Jômine-san, Chichibu-shi, Saitama-ken, 22 IV 1999, K. Toyoda (*LDS*); 1 ex., Hashidate-gawa (alt. 500 m), Chichibu-shi, 17 VII 1999, K. Toyoda (*LDS*); 1 ex., Shinjuku-ku, Tokyo-to, 14 VII 1984, S. Kubota; 2 exs., Takao-san (alt. 450 m), Hachiôji-shi, Tokyo-to, 4 VII 1998, M. Maruyama (*LDS*); 39 exs., Shiroyama-kôen, Inagi-shi, Tokyo-to, 12 VI 2004, A. Yoshida (*LDFJ*); 1 ex., same data but, 13 VI 2004; 1 ex., same data but, 26 VI 2004; 1 ex., same data but, 27 VI 2004; 2 exs., same data but, 4 VII 2004; 15 exs., Aoba-chô, Chiba-shi, Chiba-ken, 24 VI 1998, M. Maruyama (*LDS*); 63 exs., Dan'ya, Chiba-shi, Chiba-ken, 27–31 V 1997, M. Maruyama (*LDS*); 11 exs., Azeta, Sakura-shi, Chiba-ken, 20 VI 1998, M. Maruyama (*LDS*); 4 exs., same data but, 23–24 VI 1998; 4 exs., Shigena, Tateyama-shi, Chiba-ken, 3 IV 1998, S. Naomi (sifting leaf litter); 2 exs., Masukata-yama, Kawasaki-shi, Kanagawa-ken, 23 VI 1995, K. Kawada (*LDS*); 1 ex., Mikage, Tsukui-machi, Kanagawa-ken, 14 IV 1979, R. Kiryu (SCM); 10 exs., Jimmuji, Zushi-shi, Kanagawa-ken, 20 VI 2003, M. Maruyama (*LDS*); 1 ex., Hirata-rindô, Isehara-shi, Kanagawa-ken, 8 IV 2001, S. Arai (*LCH*); 1 ex., Shiroishi-sawa, Yamakita-chô, Kanagawa-ken, 21 V 2000, S. Nagashima; 1 ex., Oppama, Yokosuka-shi, Kanagawa-ken, 8–9 IV 2000, T. Shimada; 1 ex., Sengokubara, Hakone-machi, Kanagawa-ken, 24 IV 1997, M. Maruyama (*LCAF*); 3 exs., Kamiimai, Hosaka-chô, Nirasaki-shi, Yamanashi-ken, 6 VI 2004, M. Maruyama (*LDFJ*); 1 ex., Ogasawara, Akeno-mura, Kitakoma-gun, Yamanashi-ken, 6 VI 2004, M. Maruyama (*LDS*); 8 exs., Fukazawa-jûnimagari, Nakamaru, Nagasaka-chô, Kitakoma-gun, Yamanashi-ken, 6 VI 2004, M. Maruyama (*LDFJ*); 1 ex., Nagasakakamijô, Nagasaka-chô, Kitakoma-gun, Yamanashi-ken, 6 VI 2004, M. Maruyama (*LDS*); 1 exs., Hino, Nagasaka-chô, Kitakoma-gun, Yamanashi-ken, 6 VI 2004, M. Maruyama (*LDC*); 2 exs., Shobuzawa, Futaba-chô, Kitakoma-gun, Yamanashi-ken, 6 VI 2004, M. Maruyama (*LDFJ*); 1 exs., Shôyakuji, Akeno-

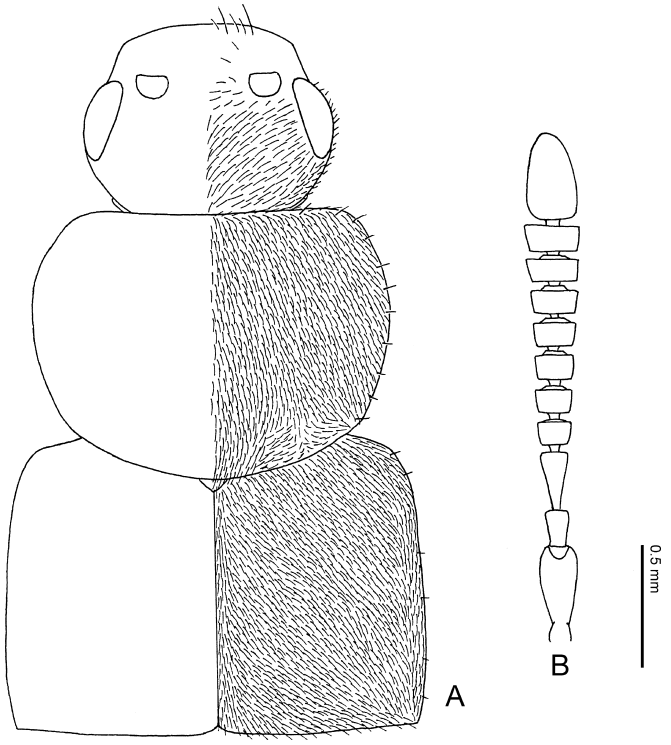

Fig. 77. *Pella japonica* (Sharp). — A, Fore body, dorsal view; B, right antenna.

mura, Kitakoma-gun, Yamanashi-ken, 6 VI 2004, M. Maruyama (*LDN*); 3 exs., Kamikandori, Akeno-mura, Kitakoma-gun, Yamanashi-ken, 6 VI 2004, M. Maruyama (*LDFJ*); 24 exs., Shakashindô, Haku-san, Ishikawa-ken, 30 VII–2 VIII 2002, H. Hoshina (pt); 1 ex., Ichinose-tôge, Shiramine-mura, Ishikawa-ken, 7–22 VI 2003, K. Nakata (fit); 96 exs., same data but, 2–22 VIII 2002; 1 ex., Ôshiba-yama, Fukui-shi, Fukui-ken, 3 V 1978, H. Sasaji; 1 ex., Hakusan-superrindô, Shirakawa-mura, Gifu-ken, 5 VII 1997, Y. Takai; 26 exs., Ogamigô (alt. 800 m), Shôkawa-mura, Gifu-ken, 5–6 VIII 1998, M. Maruyama (*LDS*); 2 exs., Hirakura, Misugi-mura, Ichishi-gun, Mie-ken, 25 V 1964, Y. Miyake; 1 ex., Mizuho-chô, Kyôto-fu, 11 V 1978, Y. Hayashi (*LL*); 1 ex., Daigo-yama, Kyôto-shi, Kyôto-fu, 17 IV 1994, T. Ito; 1 ex., Minoo-shi, Ôsaka-fu, 7 IV 1958, Y. Hayashi; 1 ex., Kôya-san, Kôya-chô, Wakayama-ken, 1 V 1985, T. Ito; 2 exs., Urahiki-mi, Shimane-ken, 6 VI 1988, S. Nomura (*LDS*); 2 exs., Daisen, Tottori-ken, 22 V 1985, S. Nomura; 1 ex., Tokusa, Atô-chô, Yamaguchi-ken, 24 IV 1988, S. Nomura. Shikoku: 1 ex., Kotsuzan, Tokushima-ken, 29 IV 1979, M. Yoshida; 2 exs., Minokoshi, Tsurugi-san, Tokushima-ken, 3 V 1969, M. Yoshida; 1 ex., Tsurugi-san, Tokushima-ken, 5 IV 1968, M. Sakai (EEEU); 1 ex., Sugitate, Matsuyama-shi, Ehime-ken, 27 VI 1970, M. Tomokuni (EEEU); 1 ex., Saragamine, Ehime-ken, 4 VII 1959, M. Miyatake (EEEU). Kyûshû: 1♀, "Japan, Gokayama, Chikuzen [Gokayama, Nakagawa-chô, Fukuoka-ken]", 14 VII 1936, K. Yasumatsu (BMNH); 20 exs., Hikosan, Fukuoka-ken, 7 VII 1983, Y. Sawada. **Korea**: 47 exs., Oso-san, Sangdam-ri, Kwangchon-up, Hongsung-gun, Chungnam, 19–21 VI 1999, U.-S. Hwang & H.-J. Kim (pt) (cMar, CNU); 1 ex., Surak, Daedunsan, Beolgok-myeon, Nansan, Chungnam, 2–10 V 2000, U.-S. Hwang, S.-J. Park & H.-J. Kim (pt) (cMar, CNU); 1 ex., Chôndong, Sobaek-san, Tangyang-gun, Kyôngbuk, 8–9 V 1999, U.-S. Hwang & H.-J. Kim (CNU); 4 exs., Janggoksa, Chilgab-san,

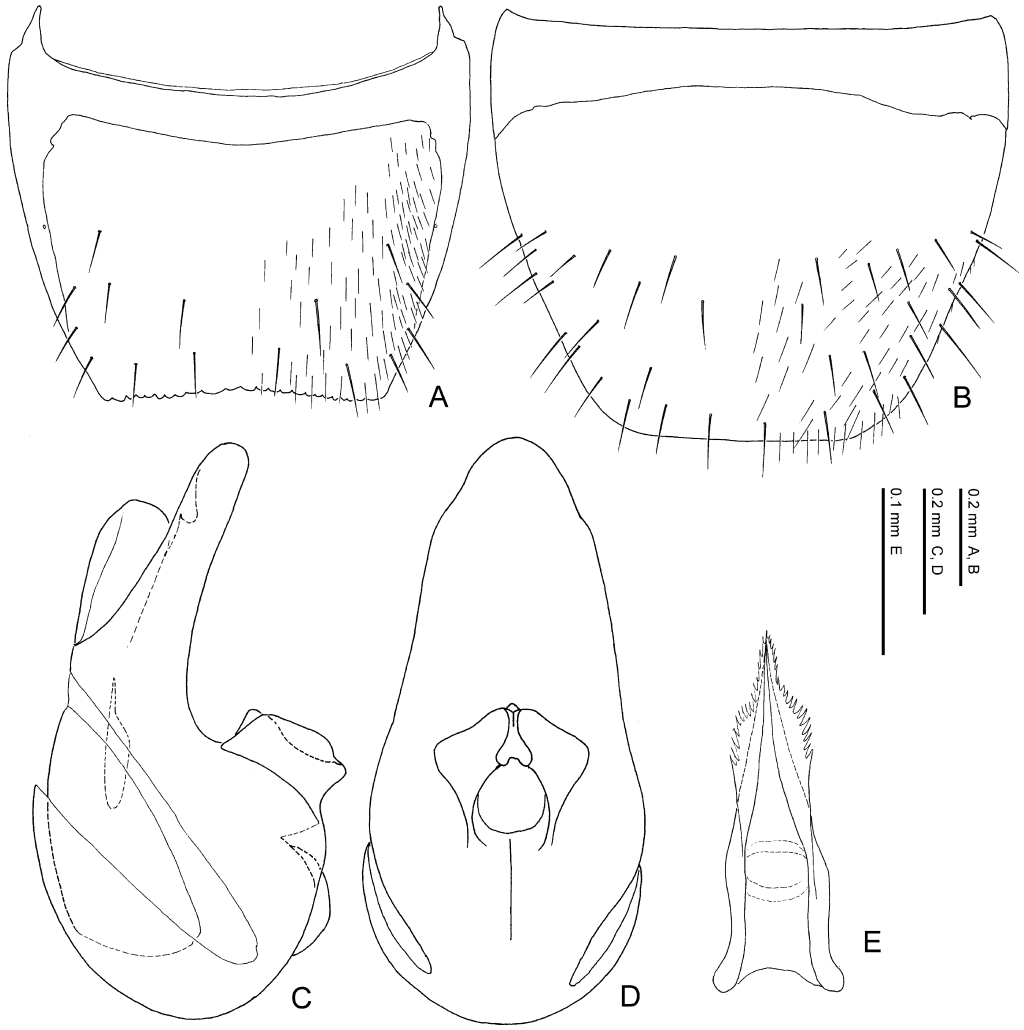

Fig. 78. *Pella japonica* (Sharp).—A, Eighth abdominal tergite, dorsal view; B, 8th abdominal sternite, ventral view; C, median lobe of aedeagus, lateral view; D, ditto, ventral view; E, copulatory piece, dorsal view. Male.

Cheongyang-gun, Chungnam, 23 VI 2000, M. Maruyama (*LDFJ*) (cMar, CNU). **Russia** (**Far East**): Kaimanovka, Ussuryisk, Primorskyi Krai, 27 V 2005, M. Maruyama (*LDFJ*); 2 exs., Bukhta Vityaz, Poluostrov Gamov, Khasanskyi, Primorskyi Krai, 30 V 2005, M. Maruyama (*LDFJ*); 1 ex., same data but, 31 V 2005; 21 exs., Azajsanovka, Kraskino, Primorskyi Krai, 13–16 VII 1992, Snizek; 2 exs., "Seitengraben des Prwnaja-Rjetschka Tales b. Wladiwostok/H. Farieb leg. 1918–1920" (NHMW).

Distribution. Manchurian subregion. ASIA: Japan (Hokkaidô, Honshû, Shikoku, Kyûshû), Korea, Russia (Far East). New to Korea and Russia.

Diagnosis. *Pella japonica* is closely similar to the other species of the *cognata* group in general appearance but can be distinguished from them by the larger body, shorter antennae, and the shape of the pronotum. The species of the *cognata* group are locally isolated. Among the sympatric species, this species can easily be distinguished from the others species by the 3rd to 5th abdominal segments evidently paler than the other segments (reddish brown).

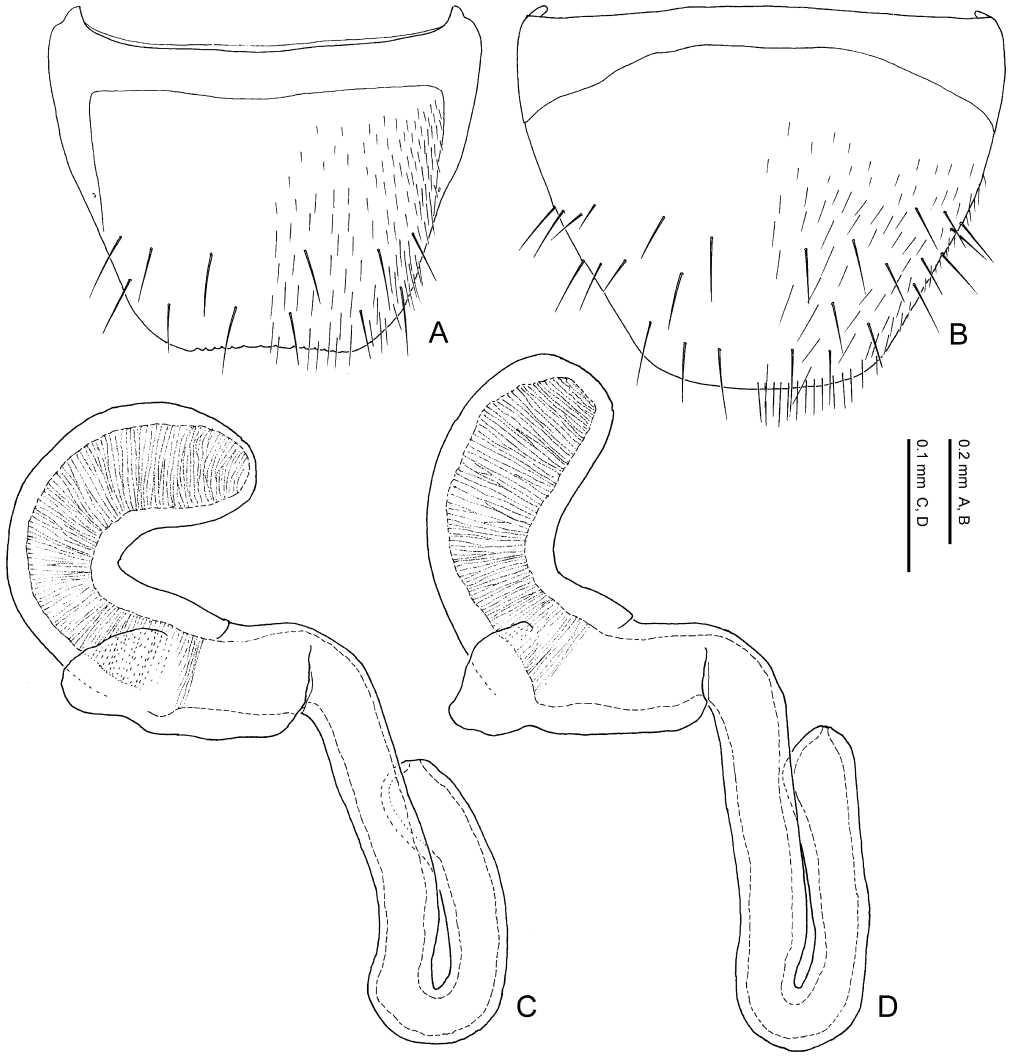

Fig. 79. *Pella japonica* (Sharp).—A, Eighth abdominal tergite, dorsal view; B, 8th abdominal sternite, ventral view; C, D, spermathecae. Female.

Redescription. Body slender. Blackish brown in ground colour; antennae, mouthparts, around antero-lateral corner to mesal area of each elytron, legs and 3rd to 5th abdominal segments reddish brown. Head (Fig. 77 A) widest just behind eyes; surface finely reticulated, densely covered with setae; setae short, as long as those on pronotum and elytra; length of eyes 0.32–0.33 times as long as head width. Antennae (Fig. 77 B) shorter than head, pronotum and elytra combined; 1st segment longer than 2nd and 3rd combined; 2nd segment about 2/3 as long as 3rd; 3rd segment about 3/5 as long as 1st; 4th segment slightly longer than wide; 5th segment almost as long as wide; 6th to 10th segments wider than long; 11th segment much shorter than 1st; approximate relative lengths of segments from basal to apical: 33.5 : 12 : 19 : 9 : 7.5 : 7 : 8 : 8 : 9 : 10 : 27.5. Pronotum (Fig. 77 A) 1.28–1.34 times as wide as long, widest around anterior 1/3, narrowed posteriorly; posterior margin rounded; surface finely punctured, finely reticulated among punctures, densely covered with setae, with 10–12 macrosetae along lateral margin. Scutellum with surface

finely punctured, densely covered with setae. Elytra (Fig. 77 A) slightly widened apicad; surface finely punctured, reticulated among punctures, densely covered with setae, with 6–8 small macrosetae laterally. Legs moderate in length; hind tibia 0.93–0.99 times as long as elytra; approximate relative lengths of tarsal segments from basal to apical: 9 : 7 : 7.5 : 13.5 in fore tarsus; 14.5 : 10 : 10 : 8.5 : 13 in mid tarsus; 18 : 12 : 11.5 : 9.5 : 14 in hind tarsus. Abdomen subparallel-sided, slightly narrower than elytra, widest around 4th and 5th segments; surface weakly reticulated; 3rd to 5th tergites glabrous except for a row of setae along each posterior margin; 6th and 7th tergites sparsely and uniformly covered with minute setae; 8th tergite (Figs. 78 A, 79 A) with 7 (rarely 8) macrosetae; 9th tergite with 3 macrosetae; 10th tergite with posterior margin slightly emarginate, with 4 macrosetae.

Male: Eighth tergite (Fig. 78 A) with posterior margin slightly emarginate, its emarginate apex weakly crenate; 8th sternite (Fig. 78 B) with posterior margin truncate, with 18–20 macrosetae; 9th sternite with posterior margin slightly emarginate. Aedeagus (Figs. 78 C, 78 D) oval in ventral view; apical lobe curved ventrad, obtuse at apex in lateral view, rounded at apex in ventral view; basal ridge roundly convex; copulatory piece of inner sac as in Fig. 78 E. Paramere with apical lobe of paramerite dilated apicad, rounded at apex, 1/4 as long as condylite.

Female: Eighth tergite (Fig. 79 A) with posterior margin slightly emarginate, its emarginate apex weakly crenate; 8th sternite (Fig. 79 B) with 12–13 macrosetae; sensory setae of 8th sternite generalised, almost same as other setae in shape. Spermatheca (Figs. 79 C, 79 D) curved three times; basal part almost as long as apical part, acutely curved around middle, slightly dilated apicad; apical part acutely curved around middle, narrowed or slightly dilated apicad, its inner wall densely wrinkled from apex to around apical 2/3.

Measurements. BL, 5.5–6.2; FBL, 2.7–2.8; HL, 0.81–0.85; HW, 0.95–1.04; EL, 0.301–0.343; AL, 1.90–2.12; PL, 0.96–1.04; PW, 1.29–1.36; ELL, 1.10–1.20; ELW, 1.46–1.56; HTL, 1.09–1.12.

Bionomics. This species is commonly collected from colonies of *Lasius* (*Dendrolasius*) spp. and widely distributed from lowlands to mountainous zones in Hokkaidô, Honshû, Shikoku and Kyûshû. This species is sometimes collected from colonies of the other subgenera of *Lasius*, but it may be accidental.

Symbiotic hosts. *Lasius* (*Dendrolasius*) *fuji*, *L.* (*D.*) *spathepus*, *L.* (*D.*) *nipponensis*, *L.* (*D.*) *capitatus*.

Pella kishimotoi Maruyama, n. sp.

(Figs. 80–82)

Type material. Holotype: **China** (**Hunan Sheng**): ♂, "Dahong-cun (1030 m), Da'an Xiang, Longshan, Hunan Sheng, China, T. Kishimoto leg." (NSMT).

Paratypes: 27 exs., same data as holotype; 15 exs., same data as holotype but, Yûki Imura (*LDS*) (NSMT, TUA, IZAS, cMar).

Type locality. Da'an Xiang, Longshan, Hunan Sheng, China.

Distribution. Manchurian subregion. ASIA: China (Hunan Sheng).

Etymology. Dedicated to Dr. Toshio Kishimoto (Japan Wildlife Research Centre, Tokyo-to, Japan), a collector of the type series, and a specialist of the Aleocharinae.

Diagnosis. *Pella kishimotoi* is similar to the other species of the *cognata* group in general appearance, but can be distinguished from them by the apical lobe of aedeagal median lobe narrower in ventral view and longer. The species of the *cognata* group are locally isolated. No sym-

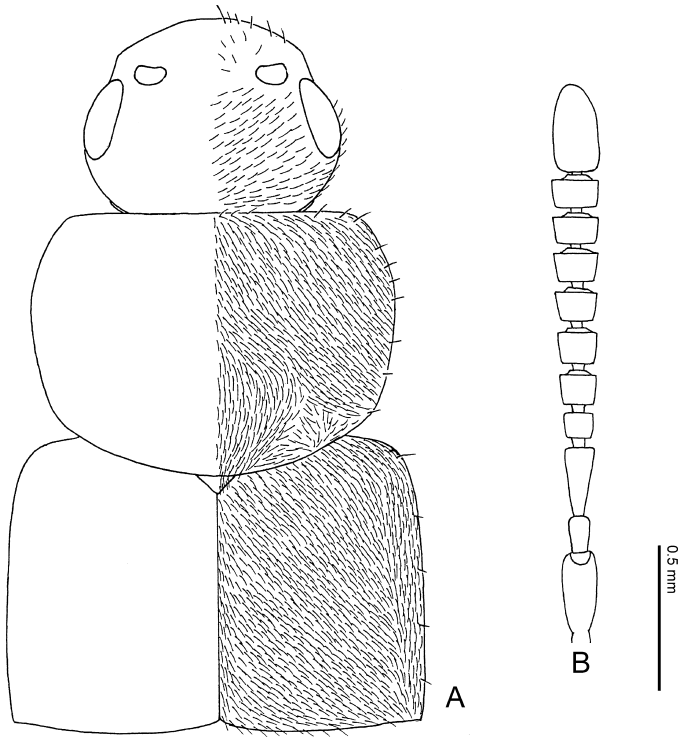

Fig. 80. *Pella kishimotoi* Maruyama, n. sp.—A, Fore body, dorsal view; B, right antenna.

patric species have been known.

Description. Body slender. Blackish brown in ground colour; antennae, mouthparts, around antero-lateral corner of each elytron, legs and 3rd to 5th abdominal segments reddish brown; around antero-lateral corner of each elytron with yellow maculation. Head (Fig. 80 A) widest just behind eyes; surface finely reticulated, densely covered with setae; setae short, as long as those on pronotum and elytra; length of eyes 0.34–0.36 times as long as head width. Antennae (Fig. 80 B) shorter than head, pronotum and elytra combined; 1st segment longer than 2nd and 3rd combined; 2nd segment about 2/3 as long as 3rd; 3rd segment about 3/5 as long as 1st; 4th segment slightly longer than wide; 5th segment almost as long as wide; 6th to 10th segments wider than long; 11th segment much shorter than 1st; approximate relative lengths of segments from basal to apical: 32 : 11 : 17 : 7 : 7 : 7 : 7.5 : 7 : 8 : 10 : 26. Pronotum (Fig. 80 A) 1.25–1.37 times as wide as long, widest around anterior 1/3, narrowed posteriorly; posterior margin rounded; surface finely punctured, finely reticulated among punctures, densely covered with setae, with 11 or 12 macrosetae along lateral margin. Scutellum with surface finely punctured, densely covered with setae. Elytra (Fig. 80 A) slightly widened apicad; surface finely punctured, reticulated among punctures, densely covered with setae, with 6–8 small macrosetae laterally. Legs somewhat short; hind tibia 0.86–0.94 times as long as elytra; approximate relative lengths of tarsal segments from basal to apical: 7 : 6 : 6 : 12 in fore tarsus; 10.5 : 9 : 7 : 6.5 : 11.5 in mid tarsus; 12 : 6 : 6 : 5 : 10 in hind tarsus. Abdomen subparallel-sided, slightly narrower than elytra, widest around 4th and 5th segments; surface weakly reticulated; 3rd to 5th tergites glabrous except for a row of setae along each posterior margin; 6th and 7th tergites sparsely and uniformly covered with minute setae; 8th tergite (Figs. 81 A, 82 A) with 7 (rarely 8) macrosetae; 9th tergite with 3 macrosetae; 10th tergite

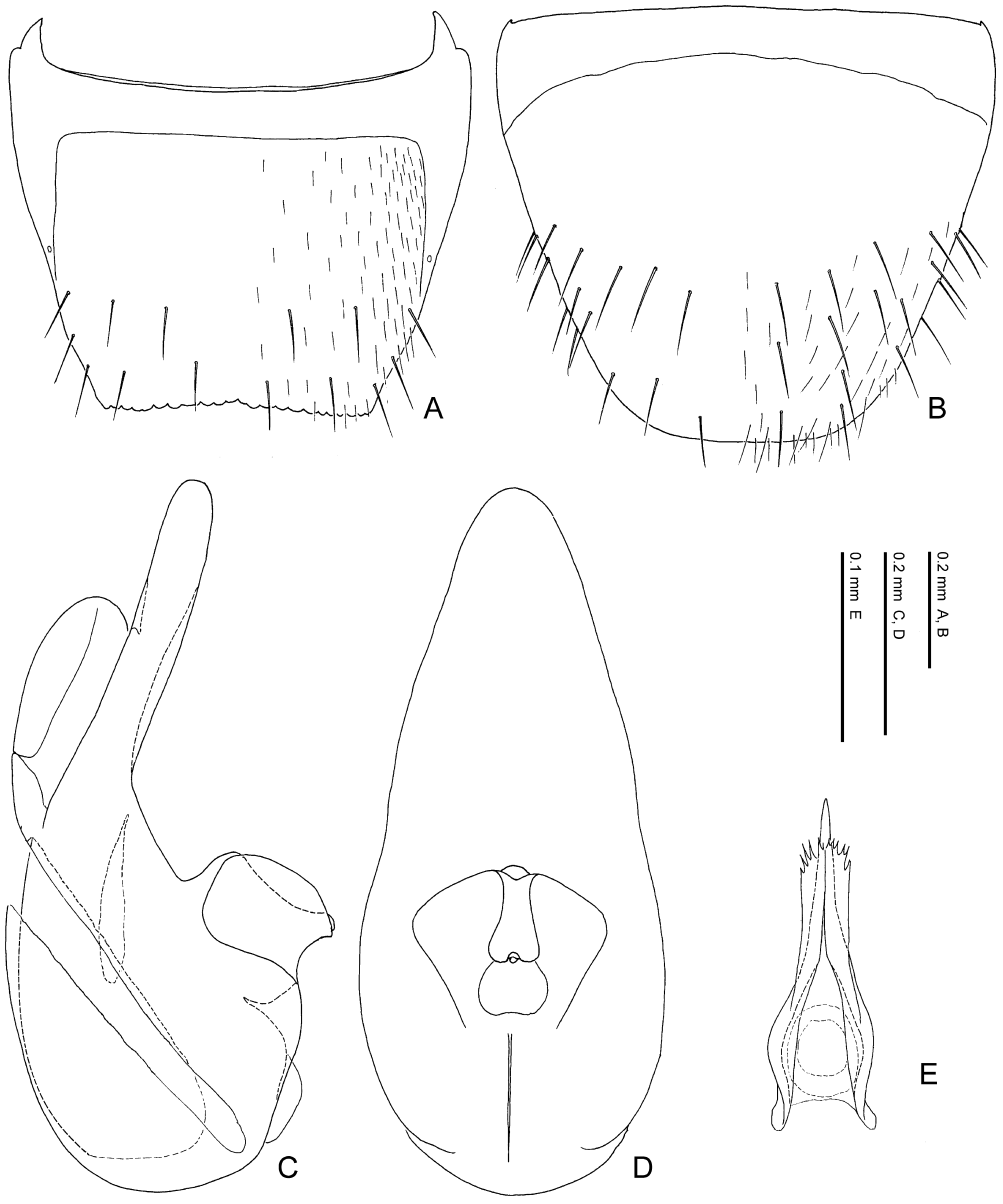

Fig. 81. *Pella kishimotoi* Maruyama, n. sp. — A, Eighth abdominal tergite, dorsal view; B, 8th abdominal sternite, ventral view; C, median lobe of aedeagus, lateral view; D, ditto, ventral view; E, copulatory piece, dorsal view. Male.

with posterior margin slightly emarginate, with 4 macrosetae.

Male: Eighth tergite (Fig. 81 A) with posterior margin slightly emarginate, its emarginate apex weakly crenate; 8th sternite (Fig. 81 B) with posterior margin rounded, with 15–17 macrosetae; 9th sternite with posterior margin slightly emarginate. Aedeagus (Figs. 81 C, 81 D) oval in ventral view; apical lobe curved ventrad, obtuse at apex in lateral view, rounded at apex in ventral view; basal ridge roundly convex; copulatory piece of inner sac as in Fig. 81 E. Paramere with apical lobe of paramerite dilated apicad, rounded at apex, 1/4 as long as condylite.

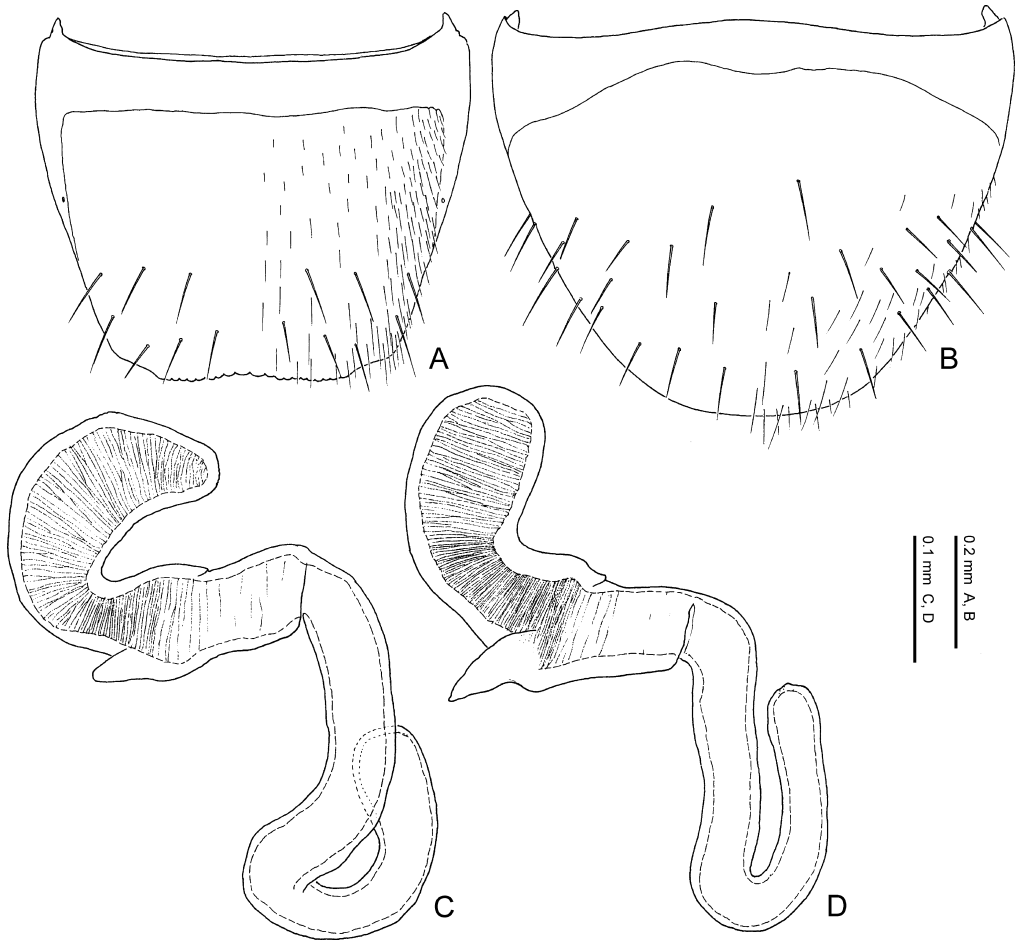

Fig. 82. *Pella kishimotoi* Maruyama, n. sp. A, 8th abdominal tergite, dorsal view; B, 8th abdominal sternite, ventral view; C, D, spermathecae. Female.

Female: Eighth tergite (Fig. 82 A) with posterior margin slightly emarginate, its emarginate apex weakly crenate; 8th sternite (Fig. 82 B) with 14 or 15 macrosetae; sensory setae of 8th sternite generalised, almost the same as the other setae in shape. Spermatheca (Figs. 82 C, 82 D) curved three times; basal part almost as long as or slightly longer than apical part, acutely curved around basal 1/3, slightly dilated apicad; apical part acutely or gently curved around middle, narrowed or slightly dilated apicad, its inner wall densely wrinkled from apex to around apical 4/5.

Measurements. BL, 4.8–5.9; FBL, 2.4–2.9; HL, 0.68–0.79; HW, 0.81–0.92; EL, 0.290–0.310; AL, 1.53–1.78; PL, 0.84–0.95; PW, 1.15–1.29; ELL, 0.96–1.14; ELW, 1.32–1.49; HTL, 0.90–0.98.

Bionomics. The type locality of *Pella kishimotoi* is a secondary deciduous forest situated at the back of a small village in Longshan Xiang, northwestern Hunan Sheng (alt. 1,030 m). The specimens were collected from the trails of *Lasius* (*Dendrolasius*) *spathepus* with other myrmecophilous staphylinids, *Drusilla yunnanensis* Pace, 1993, *D. watanabei* Maruyama & Kishimoto, 2002, *D. dendrolasii*, Maruyama & Kishimoto, 2002.

Symbiotic host. *Lasius* (*Dendrolasius*) *spathepus*.

The ***ruficollis*** Group

Species included. *Pella ruficollis*.

Distribution. European subregion, Mediterranean subregion.

Diagnosis. Species of the *ruficollis* group may be characterised by a combination of the following character states: 1) eye length 0.30–0.31 times as long as head width; 2) 11th antennal segment longer than the 1st; 3) pronotum with posterior margin completely rounded, not forming corners postero-laterally; 4) pronotum 1.34–1.44 times as wide as long; 5) pronotum widest anteriorly; 6) pronotal hypomeron fully visible in lateral view; 7) elytron with yellowish brown zone along inner and posterior margins; 8) inner and posterior margins of elytra weakly margined; 9) male 8th sternite longer than in female; 10) posterior margin of 8th tergite not crenate nor dentate, almost straight; 11) posterior margin of male 8th sternite rounded; 12) lateral projection of apodeme of male 8th tergite not evidently longer than that of female; 13) macrosetae of 8th abdominal segment generalised in length, exceeding the posterior margin of the segment; 14) postero-medial margin of female 8th sternite without minute pubescence; 15) apical lobe of aedeagal median lobe almost straight and curved ventrad near apex in lateral view; 16) distal crests of aedeagus well developed, projected, pointed at apex in lateral view; 17) copulatory piece of aedeagal median lobe subparallel-sided from base to middle and gently narrowed apicad in dorsal view.

Comments. The *ruficollis* group is a monotypical species-group. This species-group may be allied to the *coreana* group in resemblance of general appearance except for its colour, especially the head convex posteriorly and the long 11th antennal segment. This species-group is very unusual in the genus for the poor sexual dimorphism of abdominal tergites.

Symbiotic host. *Liometopum microcephalum*.

Pella ruficollis (Grimm, 1845), n. comb.

(Figs. 83–85)

Myrmedonia ruficollis Grimm, 1845: 126 (original description).—Mulsant & Rey, 1873a: 72 (*Myrmedonia*, description).—des Gozis, 1886: 12 (*Pella*, list).—Ganglbauer, 1895: 123 (*Myrmedonia* (*Pella*), key, description).—Reitter, 1909: 43 (*Myrmedonia* (*Pellochromonia*), key).—Fenyes, 1920: 298 (*Zyras* (*Pellochromonia*), list).—Bernhauer & Scheerpeltz, 1926: 704 (*Zyras* (*Pellochromonia*), list).—Scheerpeltz, 1934: 1659 (*Zyras* (*Pellochromonia*), list).—Lohse, 1974: 226 (*Zyras* (*Pellochromonia*), key).—Likovský, 1993: 59 (*Zyras* (*Pellochromonia*), list).—Smetana, 2004: 461 (*Zyras* (*Pellochromonia*), list).

Myrmedonia fernandi Fairmaire, 1855: 309 (original description).—Mulsant & Rey, 1873a: 73 (synonym of *ruficollis*, list).—des Gozis, 1886: 12 (*Pella*, list).—Ganglbauer, 1895: 123 (synonym of *ruficollis*, list).—Reitter, 1909: 43 (synonym of *ruficollis*, list).—Fenyes, 1920: 298 (synonym of *ruficollis*, list).—Bernhauer & Scheerpeltz, 1926: 704 (synonym of *ruficollis*, list).—Smetana, 2004: 461 (synonym of *ruficollis*, list).

Type material. *Myrmedonia ruficollis*. Not found.

Myrmedonia fernandi. Holotype: **Italy**: sex?, “Fernandi Type Naples/Salermes” (IRSNB).

Type locality. Berlin, Germany.

Other material. **Croatia**: Zagreb, 23 IV 1917, Hochetlinger (LM) (NMP). **Italy**: 2 exs., Son Basilio, Murgien, Paganetti; 2 exs., Grottaglie, Murgien, Paganetti (cMar, ex NHMW); 2 exs., Grottaglie, Murgien, Paganetti (cMar, ex NHMW); 4 exs., S. Basilio, Puglia Italia, 9 V 1989, F. Angelini (MNV). Italy (Sicilia): 1 ex., Sicilia, Schramm (no other data) (NMP). **Slovakia**: 1 ex., Jur pri Bret., 19 V 1963, M. Dvořák (LM) (cMar, ex cDov); 1 ex., Bratislava, 10 V 1986, I. Rychlík (cMar, ex cHlav).

Distribution. European subregion, Mediterranean subregion. EUROPE: Austria, Bulgaria,

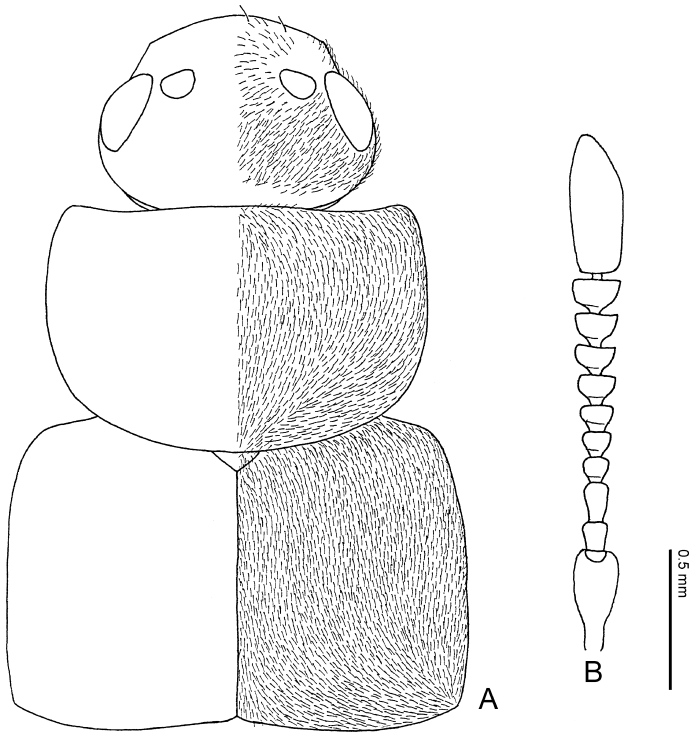

Fig. 83. *Pella ruficollis* (Grimm). — A, Fore body, dorsal view; B, right antenna.

Croatia, France, Greece, Hungary, Italia, Macedonia, Romania, Slovakia, Turkey.

Diagnosis. *Pella ruficollis* can easily be distinguished from all the other species of *Pella* by the peculiar body colour, specially the reddish orange pronotum.

Redescription. Body robust. Blackish brown in ground colour; antennae, mouthparts and legs reddish brown; pronotum reddish orange; elytron with yellowish brown zone along inner and posterior margins; around posterior margins of 3rd to 5th abdominal segments yellowish brown. Head (Fig. 83 A) widest at middle of eyes, convex posteriorly; surface smooth, densely covered with setae; setae short, as long as those on pronotum and elytra; length of eyes 0.30–0.31 times as long as head width. Antennae (Fig. 83 B) shorter than head, pronotum and elytra combined; 1st segment much longer than 2nd and 3rd combined; 2nd segment slightly longer than 3rd; 3rd segment about 1/3 as long as 1st; 4th to 10th segments wider than long; 11th segment much longer than 1st; approximate relative lengths of segments from basal to apical: 29 : 11 : 10 : 6.5 : 6 : 6 : 7 : 7 : 8 : 8.5 : 36. Pronotum (Fig. 83 A) 1.34–1.44 times as wide as long, widest around middle, narrowed posteriorly; posterior margin rounded; surface smooth, densely covered with setae, with 11 or 12 small macrosetae along lateral margin. Scutellum with surface smooth, densely covered with setae. Elytra (Fig. 83 A) slightly widened apicad; surface smooth, densely covered with setae, with 6–8 small macrosetae laterally. Legs short; hind tibia 0.77–0.79 times as long as elytra; approximate relative lengths of tarsal segments from basal to apical: 11 : 8 : 6.5 : 12 in fore tarsus; 15 : 9.5 : 7.5 : 7 : 12 in mid tarsus; 20 : 10 : 9 : 8 : 12.5 in hind tarsus. Abdomen subparallel-sided, almost as wide as elytra, widest around 4th and 5th segments; surface smooth; 3rd to 6th tergites densely covered with setae; 7th tergite sparsely and uniformly covered with minute setae; 8th tergite (Figs. 84 A, 85 A) with 9 (rarely 8) macrosetae; 9th tergite with 5 macrosetae; 10th

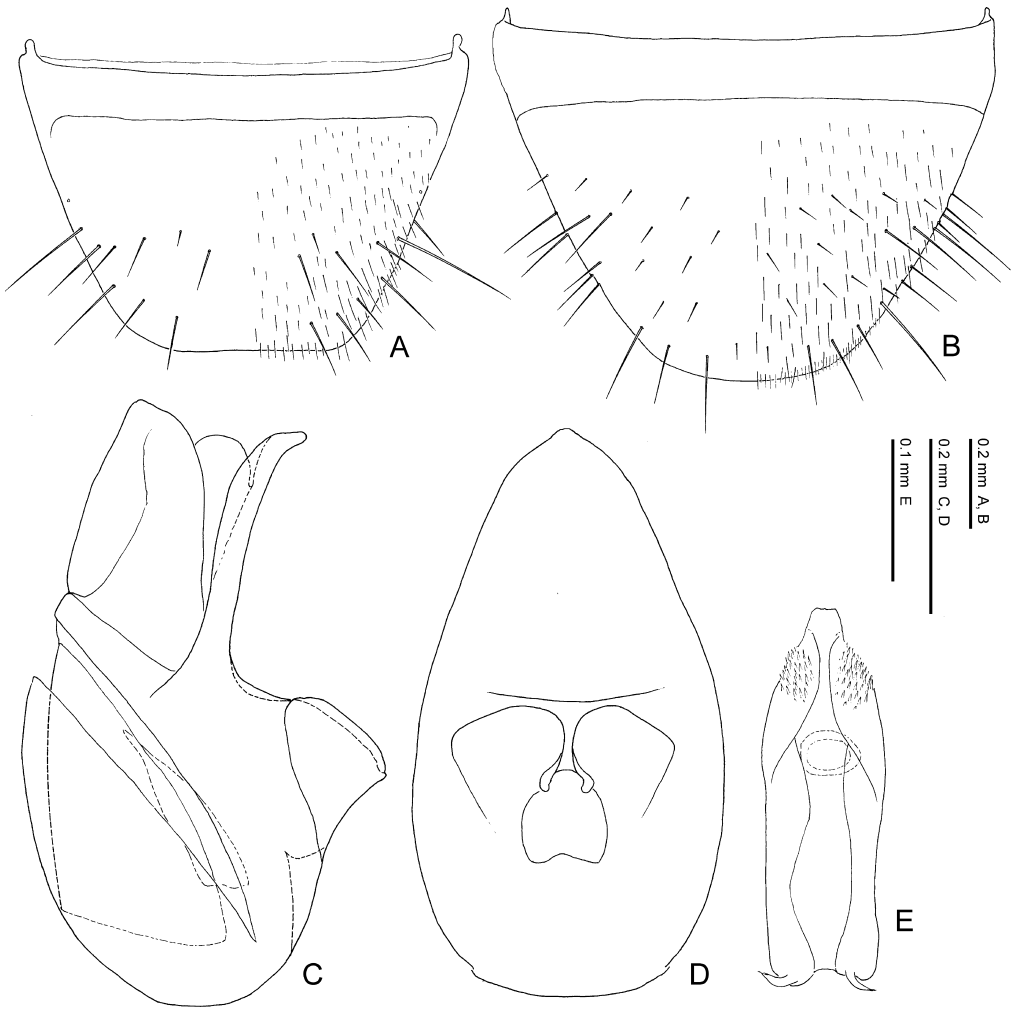

Fig. 84. *Pella ruficollis* (Grimm). — A, Eighth abdominal tergite, dorsal view; B, 8th abdominal sternite, ventral view; C, median lobe of aedeagus, lateral view; D, ditto, ventral view; E, copulatory piece, dorsal view. Male.

tergite with posterior margin slightly truncate, with 4 macrosetae.

Male: Eighth tergite (Fig. 84 A) with posterior margin truncate; 8th sternite (Fig. 84 B) with posterior margin rounded, with 21–25 macrosetae; 9th sternite with posterior margin truncate. Aedeagus (Figs. 84 C, 84 D) oval in ventral view; apical lobe curved ventrad near apex, pointed at apex in lateral view, slightly pointed at apex in ventral view; basal ridge absent; copulatory piece of inner sac as in Fig. 84 E. Paramere with apical lobe of paramerite dilated apicad, rounded at apex, about 1/3 as long as condylite.

Female: Eighth tergite (Fig. 85 A) with posterior margin truncate; 8th sternite (Fig. 85 B) with 17–19 macrosetae; sensory setae of 8th sternite spindle-shaped, flattened. Spermatheca (Fig. 85 C) curved three times; basal part about 10 times as long as apical part, slightly bulbous around base, acutely curved around basal 1/3; apical part dilated apicad, its inner wall densely wrinkled from apex to around apical 2/3.

Measurements. BL, 5.2–6.0; FBL, 2.5–2.7; HL, 0.70–0.81; HW, 0.99–1.06; EL, 0.311–

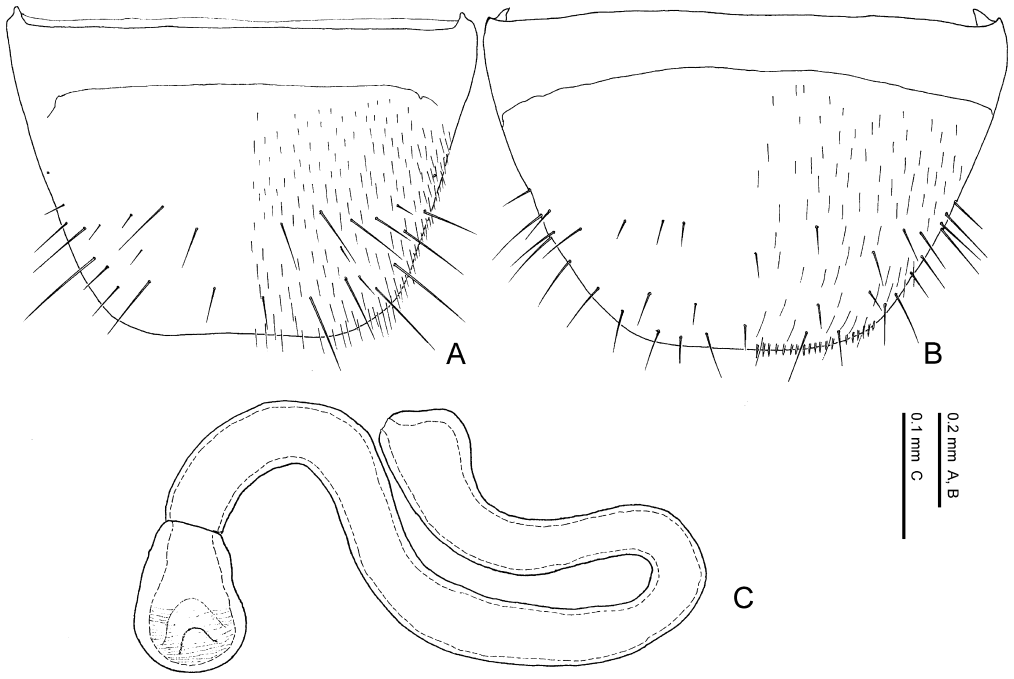

Fig. 85. *Pella ruficollis* (Grimm). — A, Eighth abdominal tergite, dorsal view; B, 8th abdominal sternite, ventral view; C, spermatheca. Female.

0.318; AL, 1.78–1.95; PL, 0.89–1.01; PW, 1.34–1.44; ELL, 1.14–1.23; ELW, 1.58–1.81; HTL, 0.88–0.98.

Bionomics. *Pella ruficollis* is collected from nests of *Liometopum microcephalum* sometimes together with *P. hampei*. This species occurs very locally and rarely in Central Europe probably due to rarity of the host ants. This species is very similar to the host ant in coloration and probably a Batesian mimic. Although the profile of defence substances of *Liometopum microcephalum* is unknown, this ant probably has repellent taste against predator. No information was available for the life cycle and the immature stages of this species.

Symbiotic host. *Liometopum microcephalum*.

The ***coreana*** Group

Species included. *Pella coreana*, *P. plutenkoi*.

Distribution. Manchurian subregion.

Diagnosis. Species of the *coreana* group may be characterised by a combination of the following character states: 1) eye length 0.30–0.33 times as long as head width; 2) 11th antennal segment shorter than the 1st; 3) pronotum with posterior margin completely rounded, not forming corners postero-laterally; 4) pronotum 1.48 times as wide as long; 5) pronotum widest around middle; 6) pronotal hypomeron partly visible in lateral view, its visible length less than 3/5 times as long as pronotal length; 7) elytra unicoloured, chestnut brown; 8) inner and posterior margins of elytra weakly margined; 9) posterior margin of 8th tergite crenate; 10) macrosetae of 8th abdominal segment short, which not exceed the posterior margin of the segment; 11) postero-medial margin of female 8th sternite with minute pubescence.

Comments. The *coreana* group may be allied to the *ruficollis* group in resemblance of general appearance except for its colour, particular the head convex posteriorly and the long 11th antennal segment. This species-group may be easily distinguished from the other species-groups by the short macrosetae of 8th abdominal segments, which do not exceed the posterior margins of the segments. This character state may be an autapomorphy of this species-group.

Symbiotic host. Unknown.

Key to the Species of the *coreana* Group

— Antennae longer than pronotal width; basal part of spermatheca longer and curved twice. Distribution: Korea. .....*P. coreana*.

— Antennae shorter than pronotal width; basal part of the spermatheca shorter and curved once. Distribution: Russia (Far East). .....*P. plutenkoi*.

Pella coreana Maruyama, n. sp.

(Figs. 86, 87)

Type material. Holotype: **Korea**: ♀, "Korea: Seoul, Nowon, Sanggye-dong, Mt. Suraksan, 14 IV 1988, T. S. Kim" (CNU).

Type locality. Seoul, Korea.

Distribution. Manchurian subregion. ASIA: Korea.

Etymology. Named after the type locality.

Diagnosis. *Pella coreana* is most similar to *P. plutenkoi* in general appearance and shape of

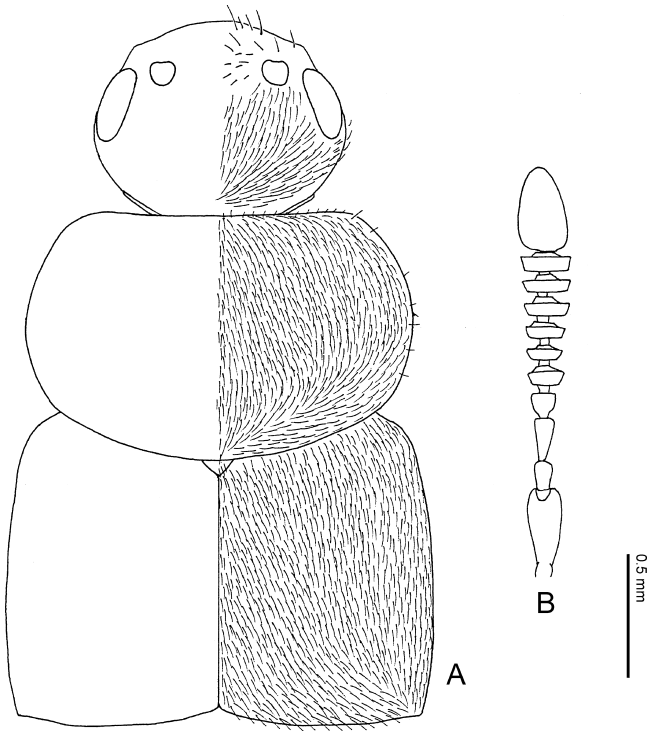

Fig. 86. *Pella coreana* Maruyama, n. sp.—A, Fore body, dorsal view; B, right antenna.

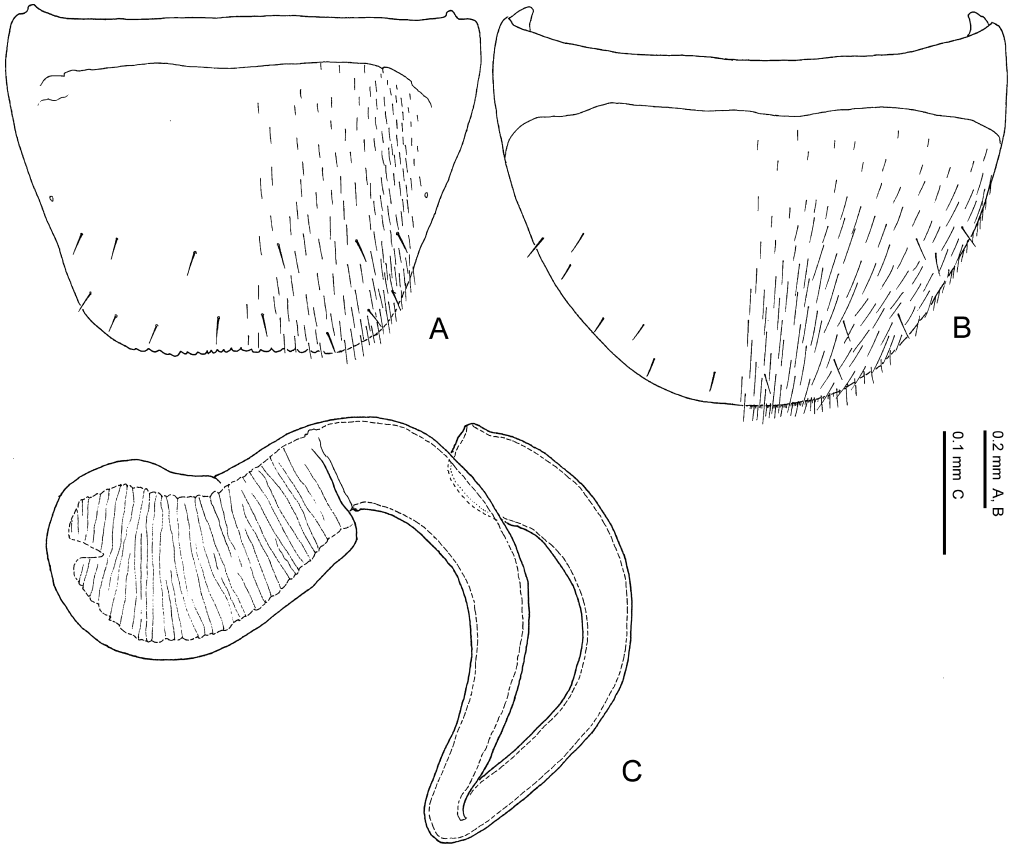

Fig. 87. *Pella coreana* Maruyama, n. sp.—A, Eighth abdominal tergite, dorsal view; B, 8th abdominal sternite, ventral view; C, spermatheca. Female.

spermatheca, but is distinguished from the latter by the longer antennae, which are longer than the pronotal width, and by the basal part of the spermatheca longer and curved three times. Among the sympatric species, *Pella coreana* may be easily distinguished by the 11th antennal segment longer than the combined length of 7th to 10th antennal segments.

Description. Body robust. Pale brown in ground colour; head slightly darker; 3rd to 7h tergites brown except around posterior margins. Head (Fig. 86 A) widest just behind eyes, convex posteriorly; surface smooth, densely covered with setae; setae moderate in length, as long as those on pronotum and elytra; length of eyes 0.30 times as long as head width. Antennae (Fig. 86 B) shorter than head, pronotum and elytra combined; 1st segment much longer than 2nd and 3rd combined; 2nd segment as long as 3rd; 4th to 10th segments wider than long; 11th segment shorter than 1st; approximate relative lengths of segments from basal to apical: 32.5 : 14 : 14 : 6.5 : 6 : 4 : 5 : 4.5 : 5 : 6 : 30. Pronotum (Fig. 86 A) 1.48 times as wide as long, widest around middle; posterior margin rounded; surface finely punctured, finely reticulated among punctures, densely covered with setae, with 9 or 10 small macrosetae along lateral margin. Scutellum with surface smooth, densely covered with setae. Elytra (Fig. 86 A) slightly widened apicad; surface finely punctured, finely reticulated among punctures, densely covered with setae, with 4 or 5 small macrosetae laterally. Legs short; hind tibia 0.86 times as long as elytra; approximate relative lengths of tarsal segments from basal to apical: 10 : 6 : 7 : 14 in fore tarsus; 10 : 9 : 8 : 8 : 11.5

in mid tarsus; 16 : 10 : – : – : – in hind tarsus. Abdomen subparallel-sided, almost as wide as elytra, widest around 4th and 5th segments; surface finely reticulated; 3rd tergite glabrous except for a row of setae along posterior margin; 4th to 7th tergites sparsely and uniformly covered with minute setae; 8th tergite (Fig. 87 A) with 7 macrosetae; 9th tergite with 5 macrosetae; 10th tergite with posterior margin slightly truncate, with 4 macrosetae; macrosetae on tergites poorly differentiated from other setae.

Male unknown.

Female: Eighth tergite (Fig. 87 A) with posterior margin truncate, its truncate apex minutely dentate; 8th sternite (Fig. 87 B) with 7 macrosetae; sensory setae of 8th sternite generalised, similar to the other setae in shape. Spermatheca (Fig. 87 C) curved three times; basal part about 4.5 times as long as apical part, slightly bulbous around base, gently curved at basal 1/4, and acutely curved around middle; apical part dilated apicad, much broader than basal part, its inner wall completely and moderately wrinkled.

Measurements. BL, 6.6; FBL, 3; HL, 0.88; HW, 1.07; EL, 0.325; AL, 1.80; PL, 1.08; PW, 1.60; ELL, 1.35; ELW, 1.86; HTL, 1.15.

Bionomics and symbiotic host. No information.

Pella plutenkoi Maruyama, n. sp.

(Figs. 88, 89)

Type material. Holotype: **Russia** (**Far East**): ♀, "RUSSIA: Primorie/S Artyom town env., 100–300 m Ozemyi Kluyich riv. 20. IV.–30. V. 1976 leg. A. Plutenko/Coll. M. Schulke Berlin Ankauf A. Plutenko Oktober 2002" (cSch).

Type locality. Artyom, Primorskyi Krai, Russia.

Distribution. Manchurian subregion. ASIA: Russia (Far East).

Etymology. Dedicated to Mr. Andrey Vital'evich Plutenko (Smolensk, Russia), collector of the holotype, and a specialist of the Carabidae.

Diagnosis. *Pella plutenkoi* is most similar to *P. coreana* in general appearance and shape of spermatheca, but is distinguished from the latter by the shorter antennae, which are shorter than the pronotal width, and the basal part of the spermatheca shorter and curved once. Among the sympatric species, *Pella plutenkoi* may be easily distinguished by the 11th antennal segment longer than the combined length of 7th to 10th antennal segments.

Description. Body robust. Pale brown in ground colour; head slightly darker; mesal areas of 3rd to 6th tergites brown. Head (Fig. 88 A) widest just behind eyes, convex posteriorly; surface smooth, densely covered with setae; setae moderate in length, as long as those on pronotum and elytra; length of eyes 0.33 times as long as head width. Antennae (Fig. 89 A) shorter than head, pronotum and elytra combined , shorter than pronotal width; 1st segment much longer than 2nd and 3rd combined; 2nd segment as long as 3rd; 4th to 10th segments wider than long; 11th segment shorter than 1st; approximate relative lengths of segments from basal to apical: 29.5 : 10 : 12 : 6 : 5 : 4 : 4.5 : 4 : 4 : 5 : 28. Pronotum (Fig. 88 A) 1.48 times as wide as long, widest around middle; posterior margin rounded; surface finely punctured, finely reticulated among punctures, densely covered with setae, with 9 or 10 small macrosetae along lateral margin. Scutellum with surface smooth, densely covered with setae. Elytra (Fig. 88 A) slightly widened apicad; surface finely punctured, finely reticulated among punctures, densely covered with setae, with 4 or 5 small macrosetae laterally. Legs short; hind tibia 0.83 times as long as elytra; approximate relative lengths of tarsal segments from basal to apical: 8 : 6.5 : 6 : 12.5 in fore tarsus; 11 : 9 : 7.5 : 7.5 :

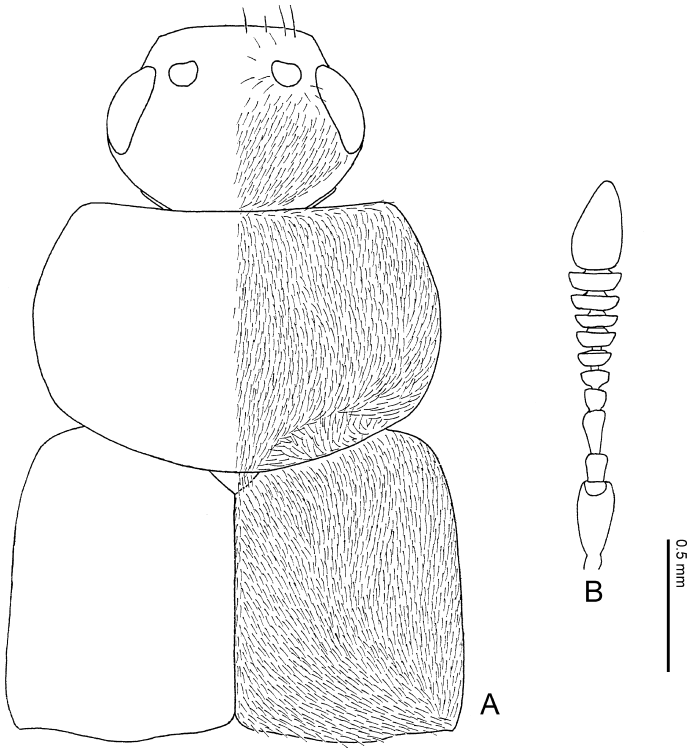

Fig. 88. *Pella plutenkoi* Maruyama, n. sp. — A, Fore body, dorsal view; B, right antenna.

11 in mid tarsus; 15 : 10 : 9.5 : 9 : 11 in hind tarsus. Abdomen subparallel-sided, almost as wide as elytra, widest around 4th and 5th segments; surface finely reticulated; 3rd tergite glabrous except for a row of setae along posterior margin; 4th to 7th tergites sparsely and uniformly covered with minute setae; 8th tergite (Fig. 89 A) with 7 or 8 macrosetae; 9th tergite with 5 macrosetae; 10th tergite with posterior margin slightly truncate, with 4 macrosetae; macrosetae on tergites poorly differentiated from other setae.

Male unknown.

Female: Eighth tergite (Fig. 89 A) with posterior margin widely emarginate, its truncate apex minutely dentate; 8th sternite (Fig. 89 B) with 7 macrosetae; sensory setae of 8th sternite generalised, similar to other setae in shape. Spermatheca (Fig. 89 C) curved two times; basal part about three times as long as apical part, slightly bulbous around base, acutely curved around middle; apical part dilated apicad, much broader than basal part, its inner wall completely and moderately wrinkled.

Measurements. BL, 6.3; FBL, 2.9; HL, 0.81; HW, 1.01; EL, 0.338; AL, 1.48; PL, 1.05; PW, 1.55; ELL, 1.28; ELW, 1.73; HTL, 1.08.

Bionomics and symbiotic host. No information.

The ***excepta*** Group

Species included. *Pella excepta*, *P. maura*, *P. kuluensis*, *P. bohaci*, *P. cinctipennis*.

Distribution. Mediterranean subregion.

Diagnosis. Species of the *excepta* group may be characterised by a combination of the fol-

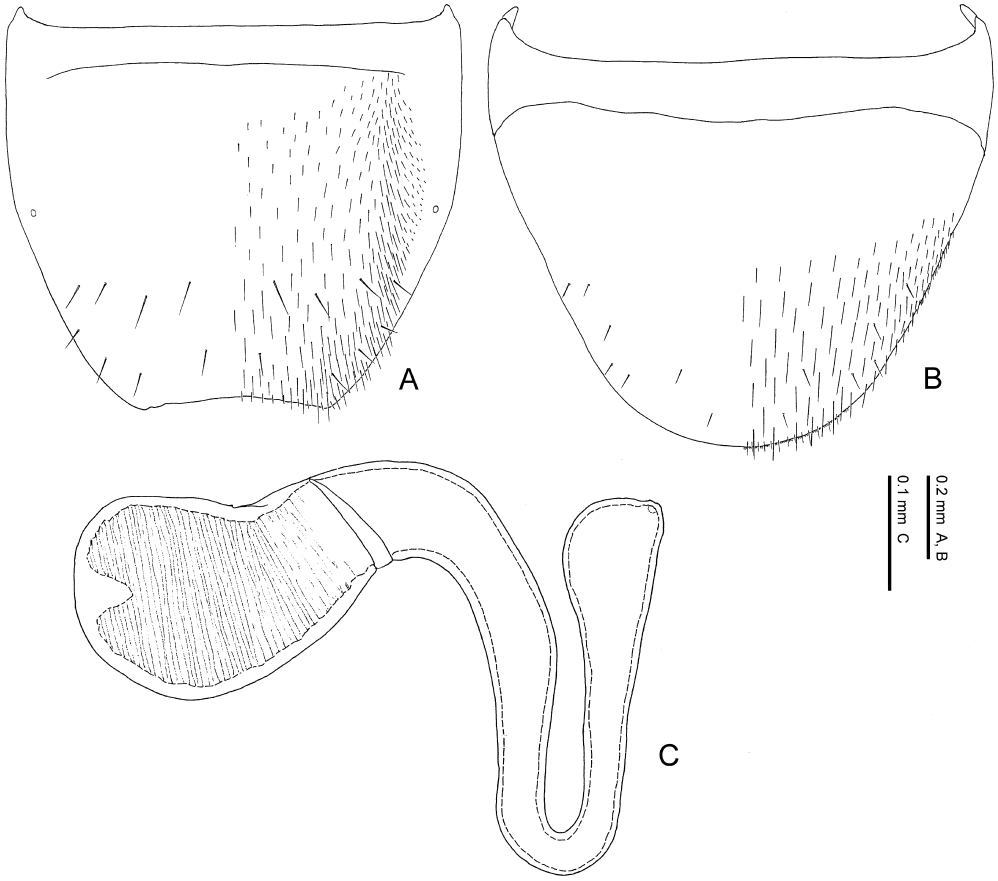

Fig. 89. *Pella plutenkoi* Maruyama, n. sp.—A, Eighth abdominal tergite, dorsal view; B, 8th abdominal sternite, ventral view; C, spermatheca. Female.

lowing character states: 1) eye length 0.34–0.37 times as long as head width; 2) 11th antennal segment variable in length, longer to shorter than the 1st; 3) pronotum with posterior margin completely rounded, not forming corners postero-laterally; 4) pronotum 1.28–1.43 times as wide as long; 5) pronotum widest anteriorly or around middle; 6) pronotal hypomeron partly visible in lateral view, its visible length less than 3/5 times as long as pronotal length; 7) unicoloured, yellowish brown to blackish brown; 8) inner and posterior margins of elytra distinctly margined; 9) male 8th sternite longer than in female; 10) posterior margin of 8th tergite crenate; 11) posterior margin of male 8th sternite rounded; 12) lateral projection of apodeme of male 8th tergite evidently longer than that of female; 13) macrosetae of 8th abdominal segment generalised in length, exceeding the posterior margin of the segment; 14) postero-medial margin of female 8th sternite without minute pubescence; 15) apical lobe of aedeagal median lobe gently curved ventrad in lateral view; 16) distal crests of aedeagus well developed, projected semicircularly in lateral view; 17) copulatory piece of aedeagal median lobe slender, subparallel-sided or spindle-shaped in dorsal view.

Comments. The *excepta* group can be regarded as a monophyletic group by autapomorphies: the apical lobe of aedeagal median lobe more or less elongate, constricted at base and pointed at apex in lateral view, and the body surface relatively sparsely covered with setae. These

states are unique within the genus and not observed in the other species of the Lomechusini. Thus, these character states are considered to be autapomorphies of this species-group. No allied species-group could be inferred. Although the large eyes and the pronotal shape are somewhat similar to the *spreta* group, these states are considered to be homoplastic.

Symbiotic hosts. *Crematogaster* spp.

Key to the Species of the *excepta* Group

1. Body large: BL: 5.1–5.8 mm, FBL: 2.2–2.6 mm; pronotum with a circular depression postero-medially in male; 3rd and 4th tergites with minute projection postero-medially in male. Distribution: South Europe, North Africa. ..... 2.
— Body medium to small: BL: 3.7–4.8 mm, FBL: 1.7–2.2; pronotum without a circular depression postero-medially in male; 3rd and 4th tergites without minute projection postero-medially in male. Distribution: Turkey, Central Asia, Pakistan. ..... 3.
2. Body reddish brown; posterior margin of male 8th tergite truncate and bisinuate; apical lobe of aedeagal median lobe gently curved apicad. Distribution: France, Spain. ..... *P. excepta*.
— Body blackish brown; posterior margin of male 8th tergite rounded and quadrisinuate; apical lobe of aedeagal median lobe much narrowed near apex and curved ventrad. Distribution: Italy (Sicilia), Morocco. .....*P. maura*.
3. Eleventh antennal segment much longer than 1st. Distribution: Pakistan. .....*P. kuluensis*.
— Eleventh antennal segment shorter than or as long as 1st. Distribution: Turkey, Central Asia. 4
4. Body smaller: BL: 3.7–4.2 mm, FBL: 1.7–1.8 mm; pronotum wider, 1.37–1.43 times as wide as long; 8th tergite with 7 macrosetae; apical lobe of aedeagal median lobe almost as long as basal capsule; basal part of spermatheca spherical at base. .....*P. cinctipennis*.
— Body larger: BL: 4.4–4.8 mm, FBL: 1.4–1.6 mm; pronotum narrower, 1.26–1.36 times as wide as long; 8th tergite with 6 macrosetae; apical lobe of aedeagal median lobe much longer than basal capsule; basal part of spermatheca slightly dilated around base. ....*P. bohaci*.

Pella excepta (Mulsant & Rey, 1861), n. comb.

(Figs. 90–92)

Myrmedonia excepta Mulsant & Rey, 1861: 113 (original description).—Mulsant & Rey, 1873a: 86 (*Myrmedonia* (*Myrmelia*), description).—Ganglbauer, 1895: 120 (*Myrmedonia* (*Myrmelia*), key, description).—Bernhauer & Scheerpeltz, 1926: 697 (*Zyras* (*Myrmelia*), list).—Scheerpeltz, 1934: 1653 (*Zyras* (*Myrmelia*), list).—Fenyes, 1920: 299 (*Zyras* (*Myrmelia*), list).—Smetana, 2004: 460 (*Zyras* (*Myrmelia*), list).

Type material. Syntype: **France**: ♂, "♂/Coll. C. REY 1884 Muséum de Lyon" (MHNL).

Type locality. Marseille, France (after the original description).

Other material. **France**: 1♂, "Mont. Alaric Aude." (NMP); 1♀ "Joug de l'Aigle (val) 1.146" (MNHN); 1♂, "St-Michel-l'Obs. (B.-A.) C. Dufay 8. 50" (MNHN); 1♀ "excepta Rey/ex type" (MNHN); 1♂, "France Avril/Myrmedonia excepta Rey ♂" (IRSNB); 1♀, "Hyèus/ Carthagène/excepta Rey ex typ. ♀" (IRSNB). **Spain**: 1♂, "Hispania Umb. v. Madrid/Zyras exceptus Rey" (NHMW); 1♀, N-Hang, Sierra de Alhamilla, Andalusia, 20 III 1994, V. Assing (cAss).

The female specimens labeled "ex type" deposited in IRSNB and MNHN are actually not a

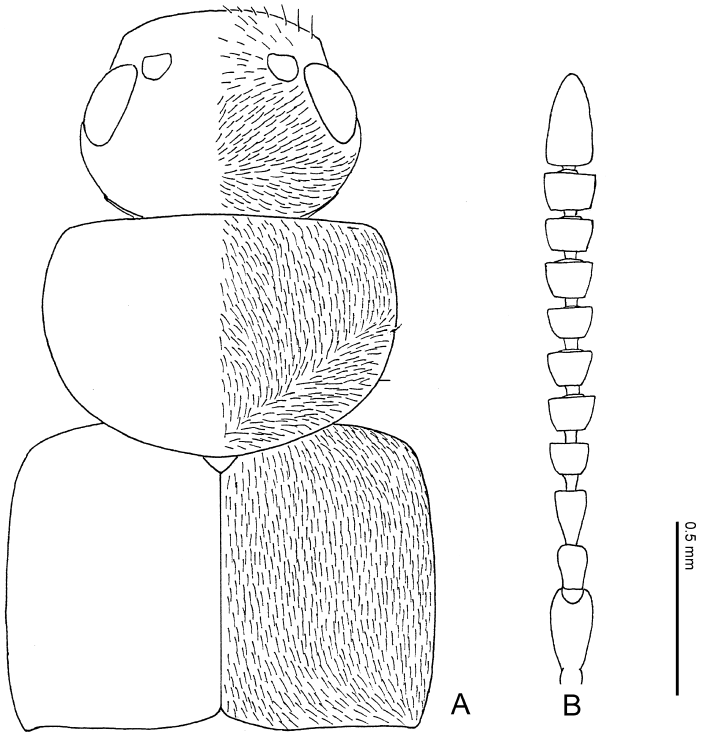

Fig. 90. *Pella excepta* (Mulsant & Rey). — A, Fore body, dorsal view; B, right antenna.

part of the type series, since the type series are represented by only male material (Mulsant & Rey, 1861). Moreover, in their redescription of this species, Mulsant and Rey (1873a) commented "♀. Nous est inconnue".

Distribution. Mediterranean subregion. EUROPE: France, Spain.

Diagnosis. *Pella excepta* is closely similar to *P. maura* in general appearance, but is distinguished from the latter by the body reddish brown and the apical lobe of aedeagal median lobe shorter. These two species are locally isolated. No sympatric species have been recorded.

Redescription. Body slender. Reddish brown in ground colour; head, antennae, mouthparts, pronotum, elytra and legs paler. Head (Fig. 90 A) widest just behind eyes; surface smooth, moderately covered with setae; setae moderate in length, as long as those on pronotum and elytra; length of eyes 0.35–0.36 times as long as head width. Antennae (Fig. 90 B) shorter than head, pronotum and elytra combined; 1st segment slightly longer than 2nd and 3rd combined; 2nd segment slightly shorter than 3rd; 3rd segment about 1/2 as long as 1st; 4th to 10th segments wider than long; 11th segment shorter than 1st; approximate relative lengths of segments from basal to apical: 25.5 : 11 : 13.5 : 8 : 8.5 : 8 : 8 : 8.5 : 7.5 : 7.5 : 22.5. Pronotum (Fig. 90 A) 1.38–1.41 times as wide as long, widest around anterior 1/6, narrowed posteriorly; posterior margin rounded; surface smooth, moderately covered with setae, with 7 or 8 macrosetae along lateral margin. Scutellum with surface smooth, moderately covered with setae. Elytra (Fig. 90 A) slightly widened apicad; surface smooth, moderately covered with setae, with 3 or 4 small macrosetae laterally. Legs moderate in length; hind tibia 0.90–0.99 times as long as elytra; approximate relative lengths of tarsal segments from basal to apical: 6 : 5 : 4.5 : 12 in fore tarsus; 8 : 8 : 6 : 5 : 10.5 in mid tarsus; 13 : 8 : 7.5 : 6.5 : 11.5 in hind tarsus. Abdomen subparallel-sided, slightly narrower than elytra, widest

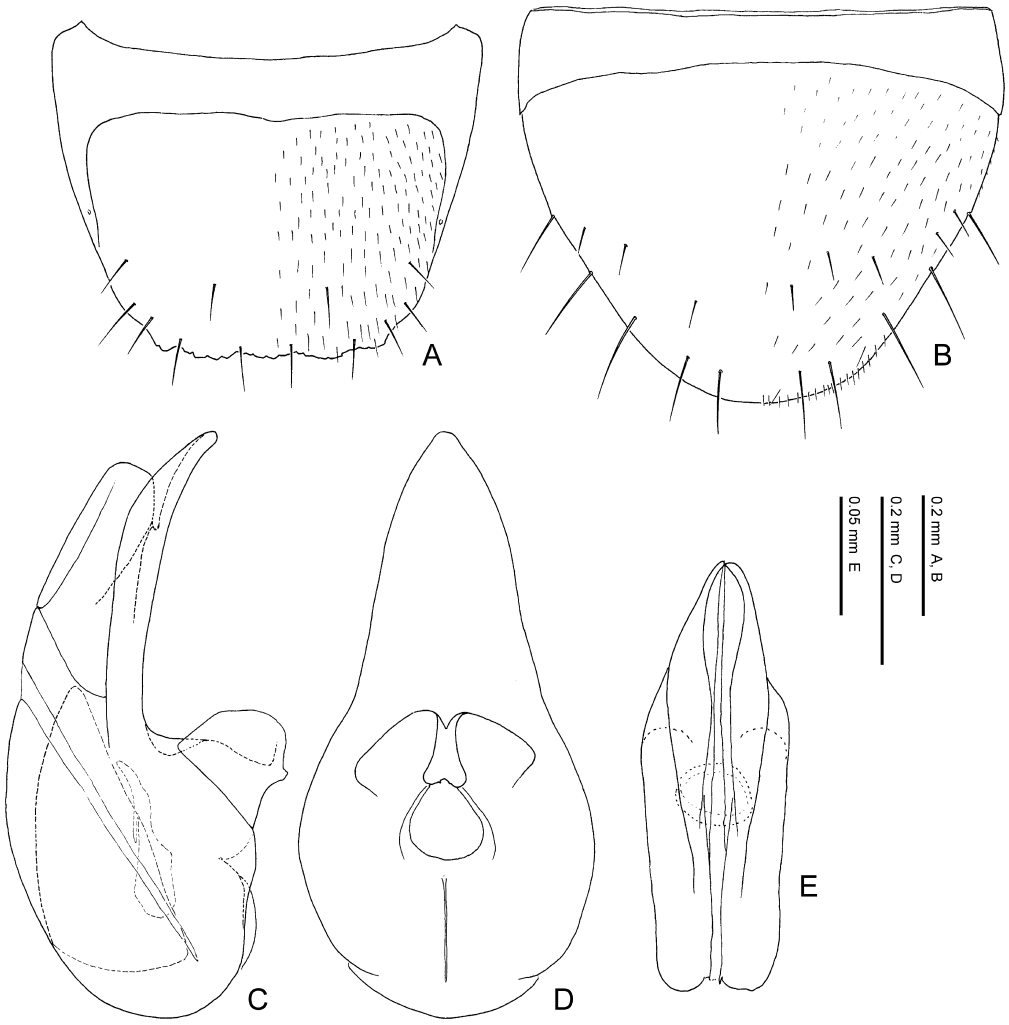

Fig. 91. *Pella excepta* (Mulsant & Rey).—A, Eighth abdominal tergite, dorsal view; B, 8th abdominal sternite, ventral view; C, median lobe of aedeagus, lateral view; D, ditto, ventral view; E, copulatory piece, dorsal view. Male.

around 4th and 5th segments; 3rd and 4th tergites with minute projection postero-medially; 7th tergite with a ridge postero-medially which is about 1/2 as long as 7th tergite; surface smooth; 3rd to 7th tergites sparsely and uniformly covered with setae; 8th tergite (Figs. 91 A, 92 A) with 6 macrosetae; 9th tergite with 3 macrosetae; 10th tergite with posterior margin slightly emarginate, with 3 macrosetae.

Male: Eighth tergite (Fig. 91 A) with posterior margin somewhat truncate, its truncate apex slightly bisinuate and crenate; 8th sternite (Fig. 91 B) with posterior margin rounded, with 8–10 macrosetae; 9th sternite with posterior margin truncate. Aedeagus (Figs. 91 C, 91 D) somewhat pear-shaped in ventral view; apical lobe curved ventrad near apex, pointed at apex in lateral view, obtuse at apex in ventral view; basal ridge roundly convex; copulatory piece of inner sac as in Fig. 91 E. Paramere with apical lobe of paramerite dilated apicad, rounded at apex, 1/4 as long as condylite.

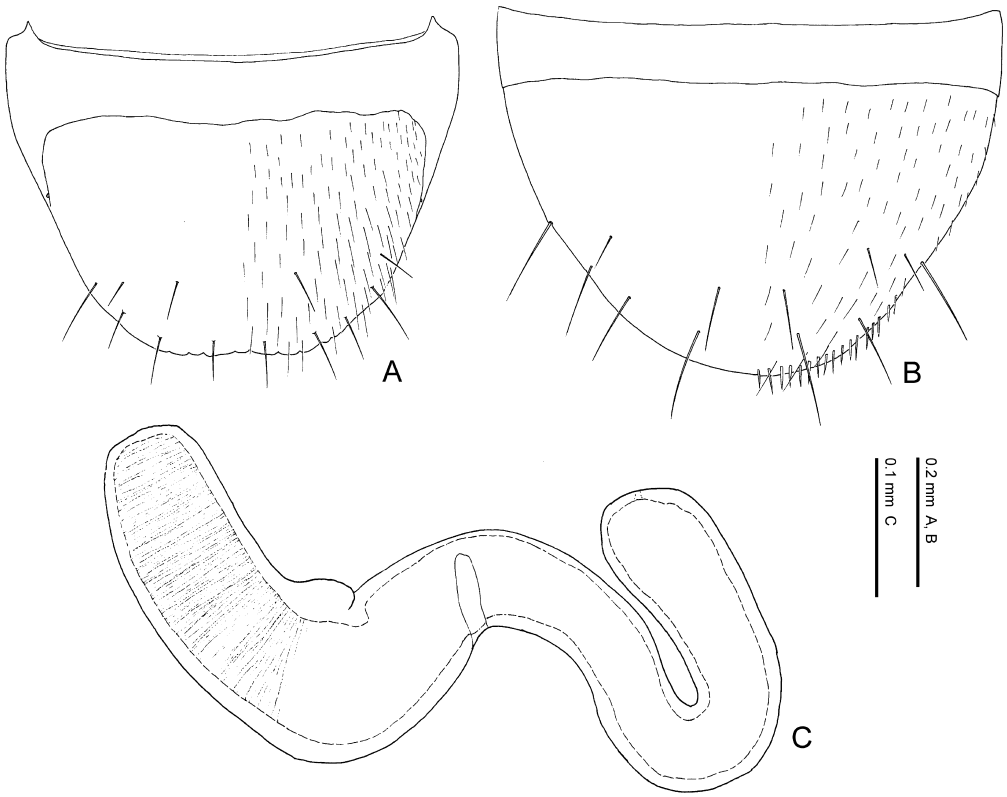

Fig. 92. *Pella excepta* (Mulsant & Rey). — A, Eighth abdominal tergite, dorsal view; B, 8th abdominal sternite, ventral view; C, spermatheca. Female.

Female: Eighth tergite (Fig. 92 A) with posterior margin slightly truncate, its truncate apex crenate; 8th sternite (Fig. 92 B) with 6 macrosetae; sensory setae of 8th sternite spindle-shaped, flattened. Spermatheca (Fig. 92 C) curved three times; basal part almost slightly longer than apical part, acutely curved around middle; apical part gently curved around basal 1/3, narrowed apicad, its inner wall densely wrinkled from apex to around apical 3/5.

Measurements. BL, 5.1–5.2; FBL, 2.2–2.3; HL, 0.61–0.65; HW, 0.81–0.82; EL, 0.286–0.298; AL, 1.75–1.80; PL, 0.74–0.75; PW, 1.03–1.04; ELL, 0.87–0.91; ELW, 1.19–1.22; HTL, 0.81–0.86.

Bionomics. The type series of *P. excepta* were collected with ants at root of a tree (Mulsant & Rey, 1861), but the ant species was not specified.

Symbiotic host. Unknown.

Pella maura (Fauvel, 1898), n. comb.

(Figs. 93–95)

Myrmedonia maura Fauvel, 1898: 110 (original description). — Fenyes, 1920: 299 (*Zyras* (*Myrmelia*), list). — Bernhauer & Scheerpeltz, 1926: 701 (*Zyras* (*Myrmelia*), list). — Smetana, 2004: 461 (*Zyras* (*Myrmelia*), list).

Myrmedonia Ragusae Ragusa, 1921: 88 (original description, as "*Myrmedonia Ragusae* Bernhauer"). — Bernhauer & Scheerpeltz, 1926: 701 (synonym of *maura*). — Smetana, 2004: 461 (synonym of *maura*).

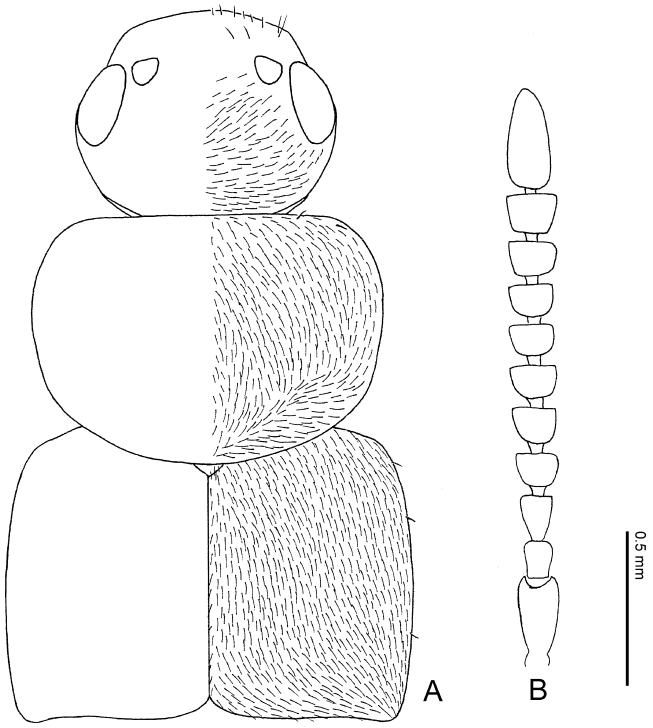

Fig. 93. *Pella maura* (Fauvel). — A, Fore body, dorsal view; B, right antenna.

Type material. *Myrmedonia maura*. Not examined.

Myrmedonia Ragusae. Holotype: **Italy** (**Sicilia**): ♂, "Sicilia/Myrmedonia Ragusae Bh. Type" (NMP).

I examined a specimen labelled "Milianah", the type locality of *Myrmedonia maura*, and it was identified as a syntype of *M. maura* by Dr. D. Drugmand of IRSNB. However, the specimen did not fit with the description of this species in some features, particularly in body length, and I did not regard it as syntype of *Myrmedonia maura*. It was *Pella erratica*, and its data is described in "Other material" of *P. erratica*.

Type locality. Milianah, Algeria.

Other material. **Italy** (**Sicilia**): 1♂, "Sicilia M. Alto E. Ragusa" (MNHN); 1♀, "M. Alto Sicilia" (MNHN); 1♂, "ITALIE Madonia/Zyras Ragusae/ex coll. Bettinger". **Morocco**: 1♀, "Midelt Hoher Atlas Marokko/Sadostl. von Azrou Hochsteppe/unfer einem Stein./leg. Dr. R. Ebner 2. VI. 1930/maurus ?? Fauv." (NHMW).

Distribution. Mediterranean subregion. EUROPE: Italy (Sicilia); NORTH AFRICA: Morocco.

Diagnosis. *Pella maura* is closely similar to *P. excepta* in general appearance but distinguished from the latter by the body blackish brown and the apical lobe of the aedeagal median lobe longer. These two species are locally isolated. *Pella maura* can be distinguished from the sympatric species by the presence of the abdominal projections and ridge in male.

Redescription. Body slender. Blackish brown in ground colour; head, antennae, mouthparts, pronotum, elytra, legs reddish brown. Head (Fig. 93 A) widest just behind eyes; surface smooth, moderately covered with setae; setae moderate in length, as long as those on pronotum

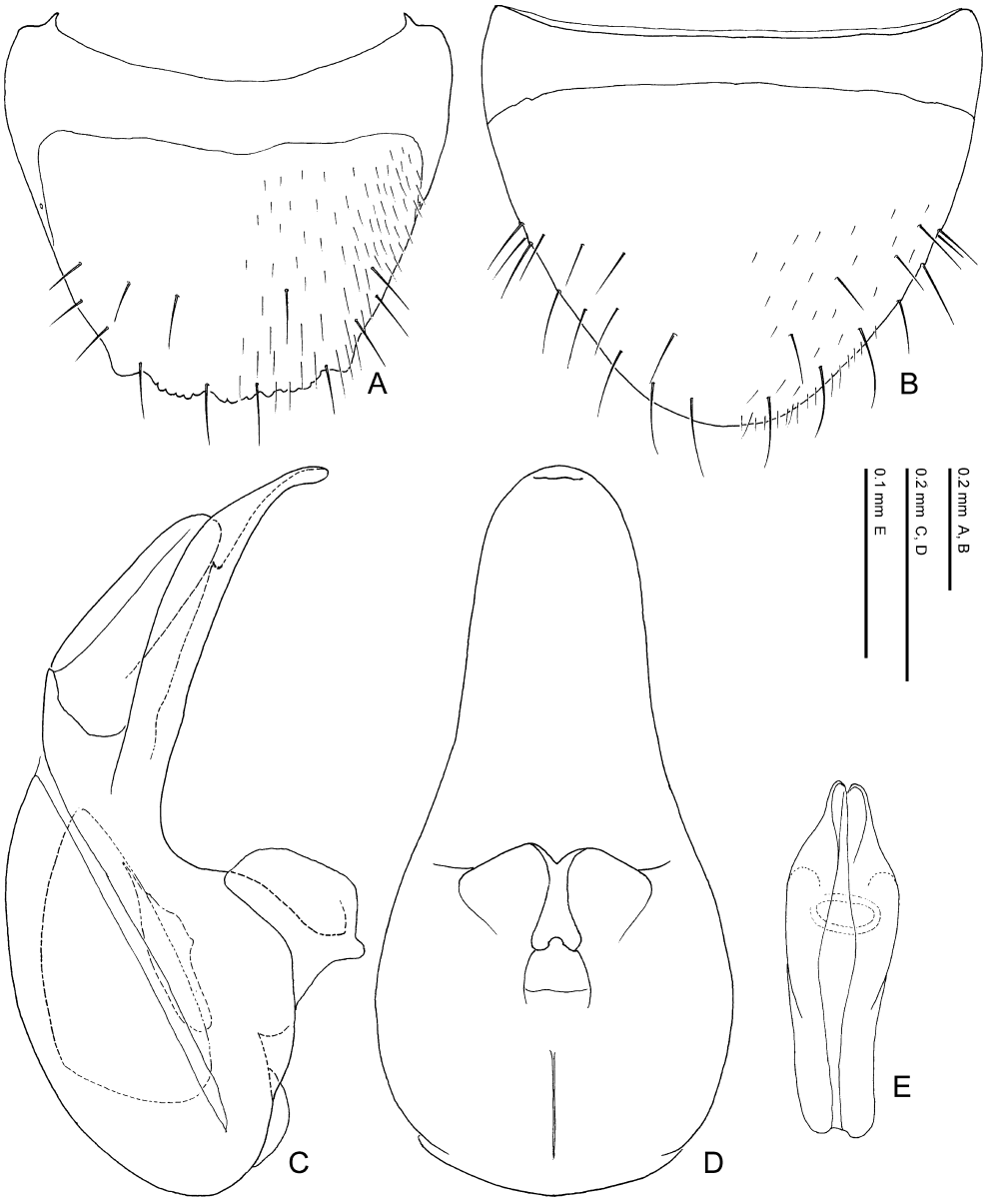

Fig. 94. *Pella maura* (Fauvel).—A, Eighth abdominal tergite, dorsal view; B, 8th abdominal sternite, ventral view; C, median lobe of aedeagus, lateral view; D, ditto, ventral view; E, copulatory piece, dorsal view. Male.

and elytra; length of eyes 0.34–0.35 times as long as head width. Antennae (Fig. 93 B) shorter than head, pronotum and elytra combined; 1st segment slightly longer than 2nd and 3rd combined; 2nd segment slightly shorter than 3rd; 3rd segment about 1/2 as long as 1st; 4th to 10th segments wider than long; 11th segment shorter than 1st; approximate relative lengths of segments from basal to apical: 25 : 10.5 : 7.5 : 7 : 9 : 9 : 9 : 9.5 : 8.5 : 27. Pronotum (Fig. 93 A) 1.40–1.41 times as wide as long, widest around anterior 1/5, narrowed posteriorly; posterior margin rounded; surface smooth, moderately covered with setae, with 7 or 8 macrosetae along lateral margin. Scutellum with surface smooth, moderately covered with setae. Elytra (Fig. 93 A) slight-

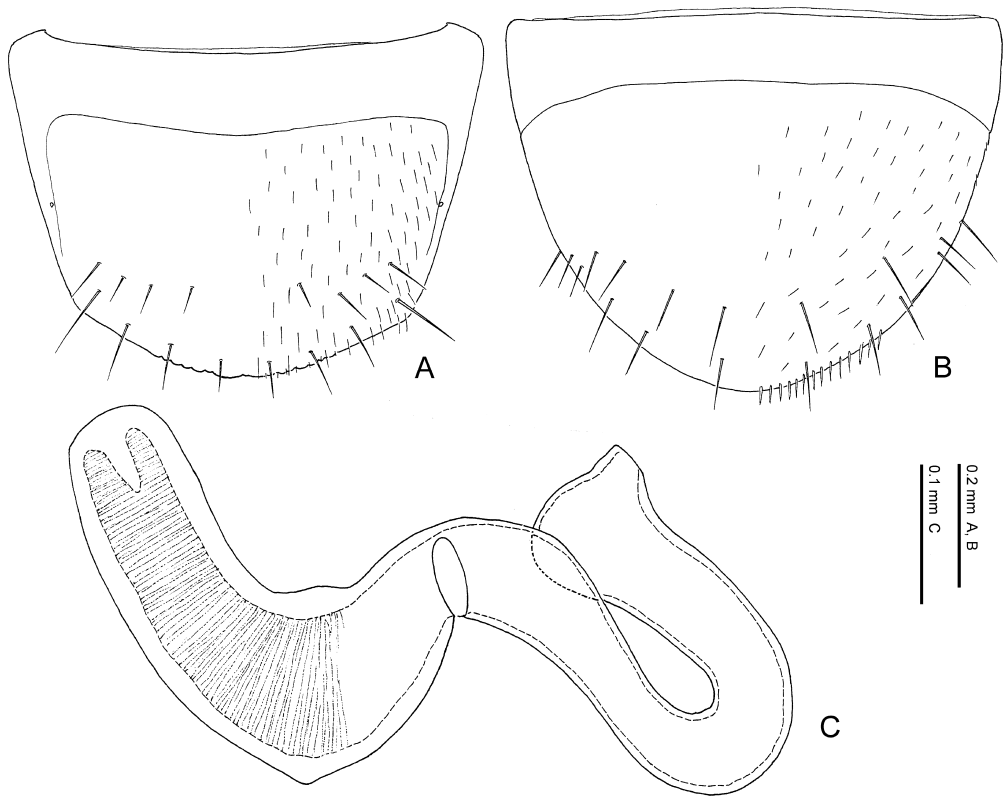

Fig. 95. *Pella maura* (Fauvel). — A, Eighth abdominal tergite, dorsal view; B, 8th abdominal sternite, ventral view; C, spermatheca. Female.

ly widened apicad; surface smooth, moderately covered with setae, with 3 or 4 small macrosetae laterally. Legs moderate in length; hind tibia 0.95–0.98 times as long as elytra; approximate relative lengths of tarsal segments from basal to apical: 5 : 5 : 4.5 : 14 in fore tarsus; 10 : 9 : 7 : 5 : 12 in mid tarsus; 16 : 12 : 10 : 7 : 13 in hind tarsus. Abdomen subparallel-sided, slightly narrower than elytra, widest around 4th and 5th segments; 3rd and 4th tergites with minute projection postero-medially; 7th tergite with ridge postero-medially which is about 1/2 as long as 7th tergite; surface smooth; 3rd to 7th tergites sparsely and uniformly covered with setae; 8th tergite (Figs. 94 A, 95 A) with 6 or 7 macrosetae; 9th tergite with 3 macrosetae; 10th tergite with posterior margin slightly emarginate, with 3 macrosetae.

Male: Eighth tergite (Fig. 94 A) with posterior margin somewhat rounded, its apex slightly quadrisinuate and dentate; 8th sternite (Fig. 94 B) with posterior margin rounded, with 11–13 macrosetae; 9th sternite with posterior margin truncate. Aedeagus (Figs. 94 C, 94 D) somewhat pear-shaped in ventral view; apical lobe curved ventrad near apex, pointed at apex in lateral view, rounded at apex in ventral view; basal ridge roundly convex; copulatory piece of inner sac as in Fig. 94 E. Paramere with apical lobe of paramerite dilated apicad, rounded at apex, 1/4 as long as condylite.

Female: Eighth tergite (Fig. 95 A) with posterior margin rounded, its rounded apex crenate; 8th sternite (Fig. 95 B) with 8–10 macrosetae; sensory setae of 8th sternite spindle-shaped, flattened. Spermatheca (Fig. 95 C) curved three times; basal part almost slightly longer than apical

part, somewhat bulbous around base, acutely curved around middle; apical part gently curved around basal 1/3, narrowed apicad, its inner wall densely wrinkled from apex to around apical 3/5.

Measurements. BL, 5.2–5.8; FBL, 2.4–2.6; HL, 0.68–0.69; HW, 0.87–0.91; EL, 0.302–0.313; AL, 1.90–1.95; PL, 0.81–0.84; PW, 1.14–1.18; ELL, 1.00–1.03; ELW, 1.33–1.40; HTL, 0.98–0.99.

Bionomics and symbiotic host. No information.

Pella kuluensis (Cameron, 1939), n. comb.

(Figs. 96, 97)

Zyras (*Pella*) *kuluensis* Cameron, 1939: 545 (original description).—Smetana, 2004: 461 (*Zyras* (*Pella*), list).

Type material. Holotype: **Pakistan**: ♂, "Type (red round curator label)/Naggar Kulu. Punjab. 5,000 ft. H.G.C. [H.G. Champion]/Z. kuluensis TYPE Cam (BMNH).

Type locality. Naggar, Kulu, Punjab, Pakistan.

Other material. Not examined.

Distribution. Mediterranean subregion. ASIA: Pakistan.

Diagnosis. *Pella kuluensis* is closely similar to *P. bohaci* and *P. cinctipennis* but may be easily distinguished from the latter two by the 11th antennal segment much longer than the 1st. This species is locally isolated from *P. bohaci* and *P. cinctipennis*.

Redescription. Body slender. Brown in ground colour; antennae, posterior margin of pronotum, around posterior margins of 3rd to 5th abdominal paratergites yellowish brown. Head

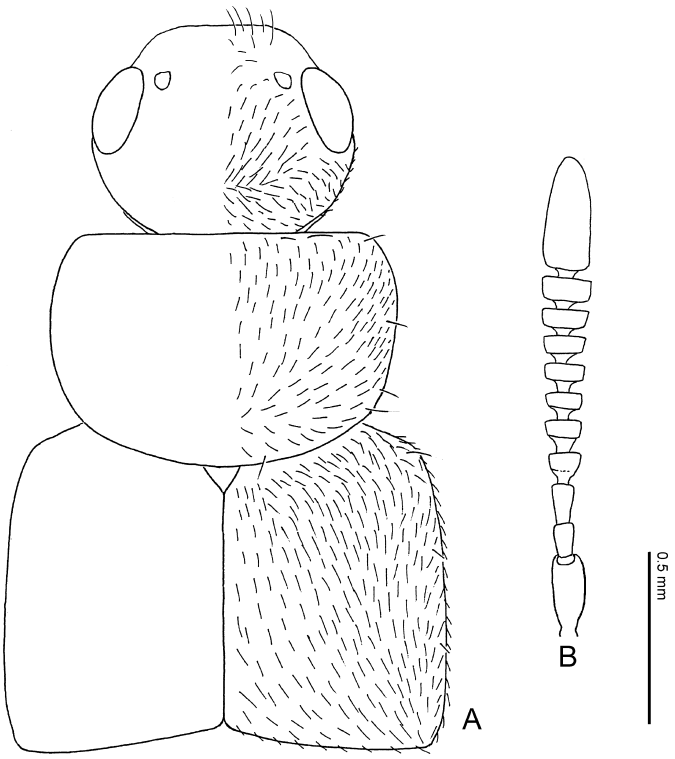

Fig. 96. *Pella kuluensis* (Cameron).—A, Fore body, dorsal view; B, right antenna.

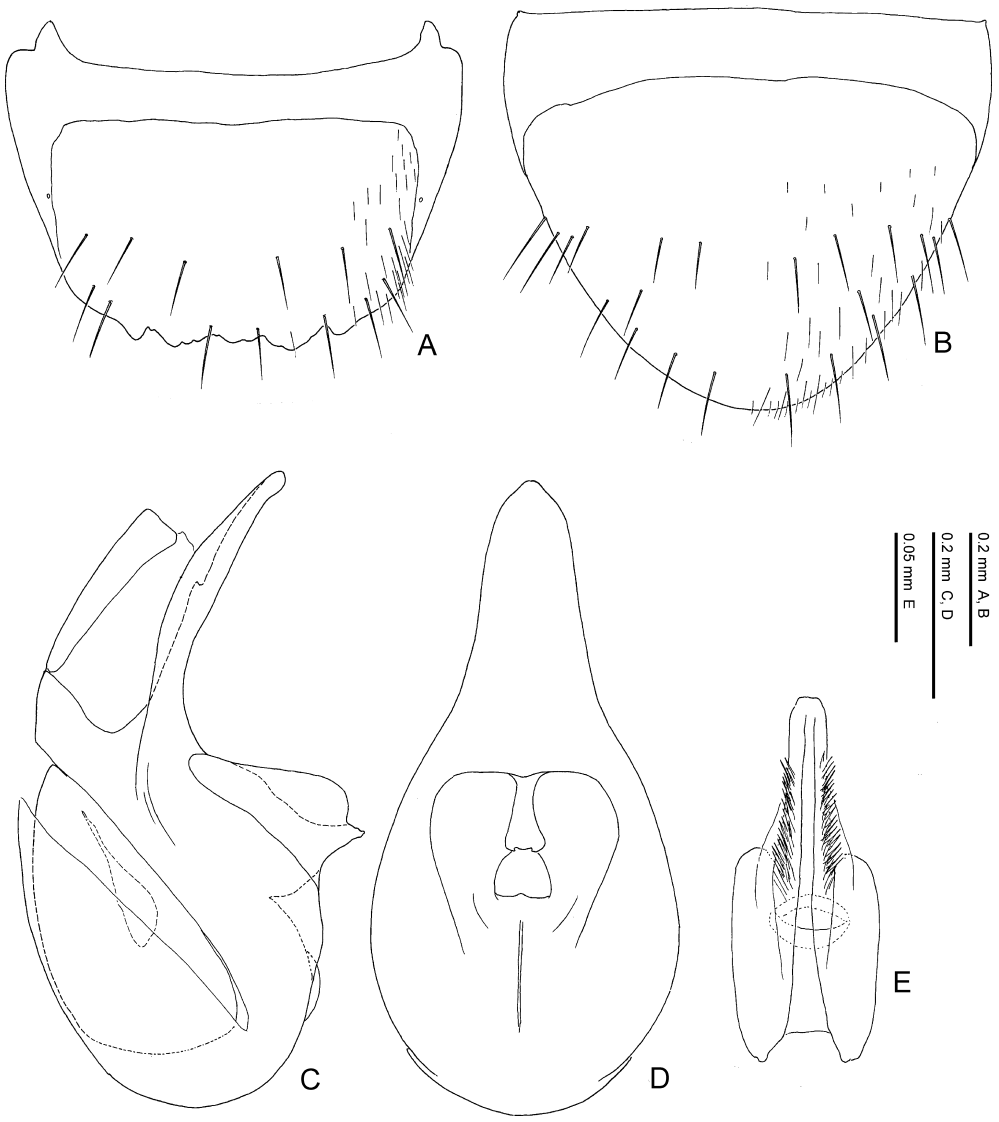

Fig. 97. *Pella kuluensis* (Cameron).—A, Eighth abdominal tergite, dorsal view; B, 8th abdominal sternite, ventral view; C, median lobe of aedeagus, lateral view; D, ditto, ventral view; E, copulatory piece, dorsal view.

(Fig. 96 A) widest just behind eyes; surface smooth, moderately covered with setae; setae moderate in length, as long as those on pronotum and elytra; length of eyes 0.36 times as long as head width. Antennae (Fig. 96 B) shorter than head, pronotum and elytra combined; 1st segment as long as 2nd and 3rd combined; 2nd segment slightly shorter than 3rd; 3rd segment about 1/2 as long as 1st; 4th to 10th segments wider than long; 11th segment as long as 1st; approximate relative lengths of segments from basal to apical: 21 : 9 : 10 : 5.5 : 5 : 4.5 : 5 : 5 : 5 : 5 : 24.5. Pronotum (Fig. 96 A) 1.41 times as wide as long, widest around middle; posterior margin rounded; surface smooth, sparsely covered with setae, with 7 or 8 macrosetae along lateral margin. Scutellum with surface smooth, moderately covered with setae. Elytra (Fig. 96 A) slightly widened apicad; surface smooth, moderately covered with setae, with 4 small macrosetae laterally. Legs moderately

short; hind tibia 0.80 times as long as elytra; approximate relative lengths of tarsal segments from basal to apical: 4.5 : 4.5 : 5 : 10.5 in fore tarsus; 6 : 6 : 6 : 5 : 10.5 in mid tarsus; 10 : 8.5 : 6.5 : 5 : 10 in hind tarsus. Abdomen subparallel-sided, slightly narrower than elytra, widest around 5th and 6th segments; surface smooth; 3rd to 7th tergites glabrous except around a row of setae posterior margin; 8th tergite (Fig. 97 A) with 6 (sometimes 7) macrosetae; 9th tergite with 3 macrosetae; 10th tergite with posterior margin slightly emarginate, with 4 macrosetae.

Male: Eighth tergite (Fig. 97 A) with posterior margin somewhat rounded, its apex slightly quadrisinuate and weakly crenate; 8th sternite (Fig. 97 B) with posterior margin rounded, with 14–16 macrosetae; 9th sternite with posterior margin truncate. Aedeagus (Figs. 97 C, 97 D) somewhat pear-shaped in ventral view; apical lobe curved ventrad in lateral view, pointed at apex in lateral and ventral views; basal ridge roundly convex; copulatory piece of inner sac as in Fig. 97 E. Paramere with apical lobe of paramerite dilated apicad, rounded at apex, 1/4 as long as condylite.

Female unknown.

Measurements. BL, 4.6; FBL, 2.2; HL, 0.64; HW, 0.79; EL, 0.287; AL, 1.38; PL, 0.73; PW, 1.03; ELL, 0.96; ELW, 1.29; HTL, 0.78.

Bionomics and symbiotic host. No information.

Pella bohaci (Dvořák, 1984), n. comb.

(Figs. 98–100)

Zyras (*Pella*) *bohaci* Dvořák, 1984: 195 (original description). — Smetana, 2004: 461 (*Zyras* (*Pella*), list).
Zyras (*Pella*) *almaatensis* Pace, 2002: 195 (original description). **N. syn.**

Type material. *Zyras* (*Pella*) *bohaci*. Paratypes: **Uzbekistan**: 1♂, "USSR-Uzbekistan Šafirkan pr. Buchere Kyźy-kum des. J. Bohač legt. IV. 79/PARATYPUS/Zyras (Pella) bohaci sp. n. det. M. Dvořák ,81"; 1♀, same data but, "ALLOTYPUS".

These are part of type series. All the type specimens are deposited in cDvor. Each specimen was pinned with ant specimen.

Zyras (*Pella*) *almaatensis*. Holotype: **Kazakhstan**: ♀, "KASACHSTAN Alma-Ata-Gebiet Pristan Dubins-kaja 550 m NN 43°45′N 80°13′E 15.—18. VI. 1993 leg. V. & A. Lukhtanov/HOLOTYPUS Zyras almaatensis det. R. Pace 2001/Zyras almaatensis n. sp. det. R. Pace 2001" (NMEG).

The shape of the spermatheca in the original description (Pace, 2002) appears to be considerably different from that of *Pella bohaci* illustrated herein. However, the spermatheca of the type mounted on slide, based on which illustration was prepared, was twisted 180-degree with the basal and apical parts.

Other material. **Turkmenistan**: 2♂♂, Tadzen, 12–25 III 1992, Snizek (NHMW, cMar).

Type locality. Buchere, Uzbekistan.

Distribution. Mediterranean subregion. ASIA: Kazakhstan, Turkmenistan, Uzbekistan. New to Kazakhstan.

Diagnosis. *Pella bohaci* is closely similar to *P. kuluensis* and *P. cinctipennis*, but may be easily distinguished from the latter two by the dorsal surface of the body yellowish brown. These three species are locally isolated.

Redescription. Body slender. Brown in ground colour; head, antennae, mouthparts, pronotum, elytra, legs and around posterior margins of 3rd to 5th tergites yellowish brown. Head (Fig. 98A) widest just behind eyes; surface smooth, moderately covered with setae; setae moderate in

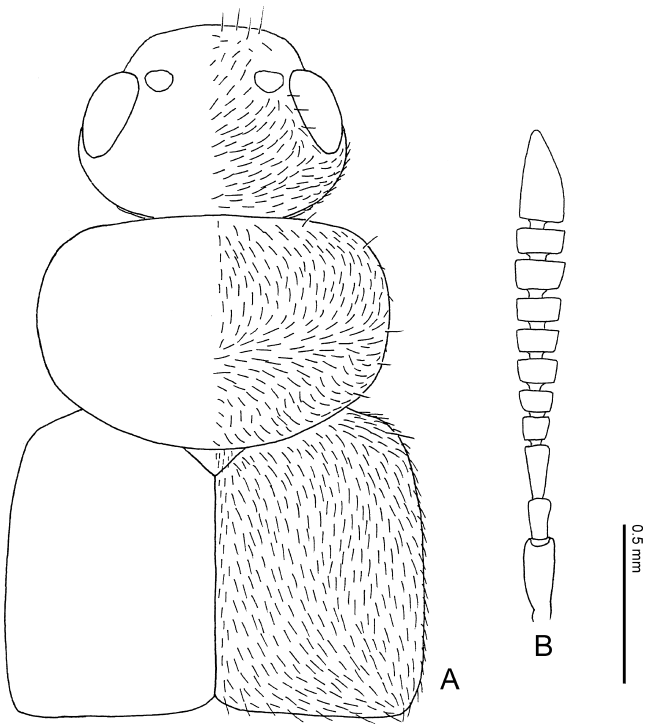

Fig. 98. *Pella bohaci* (Dvořák). — A, Fore body, dorsal view; B, right antenna.

length, as long as those on pronotum and elytra; length of eyes 0.35–0.36 times as long as head width. Antennae (Fig. 98 B) shorter than head, pronotum and elytra combined; 1st segment as long as 2nd and 3rd combined; 2nd segment slightly shorter than 3rd; 3rd segment about 1/2 as long as 1st; 4th to 10th segments wider than long; 11th segment as long as 1st; approximate relative lengths of segments from basal to apical: 21 : 10 : 11 : 5.5 : 6 : 5 : 6 : 5 : 5 : 6 : 21. Pronotum (Fig. 98 A) 1.37–1.43 times as wide as long, widest around anterior 1/4, narrowed posteriorly; posterior margin rounded; surface smooth, sparsely covered with setae, with 7 or 8 macrosetae along lateral margin. Scutellum with surface smooth, moderately covered with setae. Elytra (Fig. 98 A) slightly widened apicad; surface smooth, moderately covered with setae, with 3 or 4 small macrosetae laterally. Legs short; hind tibia 0.83–0.85 times as long as elytra; approximate relative lengths of tarsal segments from basal to apical: 7 : 6 : 6 : 14 in fore tarsus; 9 : 9 : 8 : 7 : 12 in mid tarsus; 12 : 10 : 9 : 7 : 12.5 in hind tarsus. Abdomen subparallel-sided, slightly narrower than elytra, widest around 5th and 6th segments; surface smooth; 3rd to 7th tergites sparsely and uniformly covered with setae; 8th tergite (Figs. 99 A, 100 A) with 6 (sometimes 7) macrosetae; 9th tergite with 3 macrosetae; 10th tergite with posterior margin slightly emarginate, with 3 macrosetae.

Male: Eighth tergite (Fig. 99 A) with posterior margin somewhat truncate, its truncate apex weakly crenate; 8th sternite (Fig. 99 B) with posterior margin rounded, with 14–16 macrosetae; 9th sternite with posterior margin truncate. Aedeagus (Figs. 99 C, 99 D) somewhat pear-shaped in ventral view; apical lobe curved ventrad in lateral view, pointed at apex in lateral and ventral views; basal ridge roundly convex; copulatory piece of inner sac as in Fig. 99 E. Paramere with apical lobe of paramerite dilated apicad, rounded at apex, 1/4 as long as condylite.

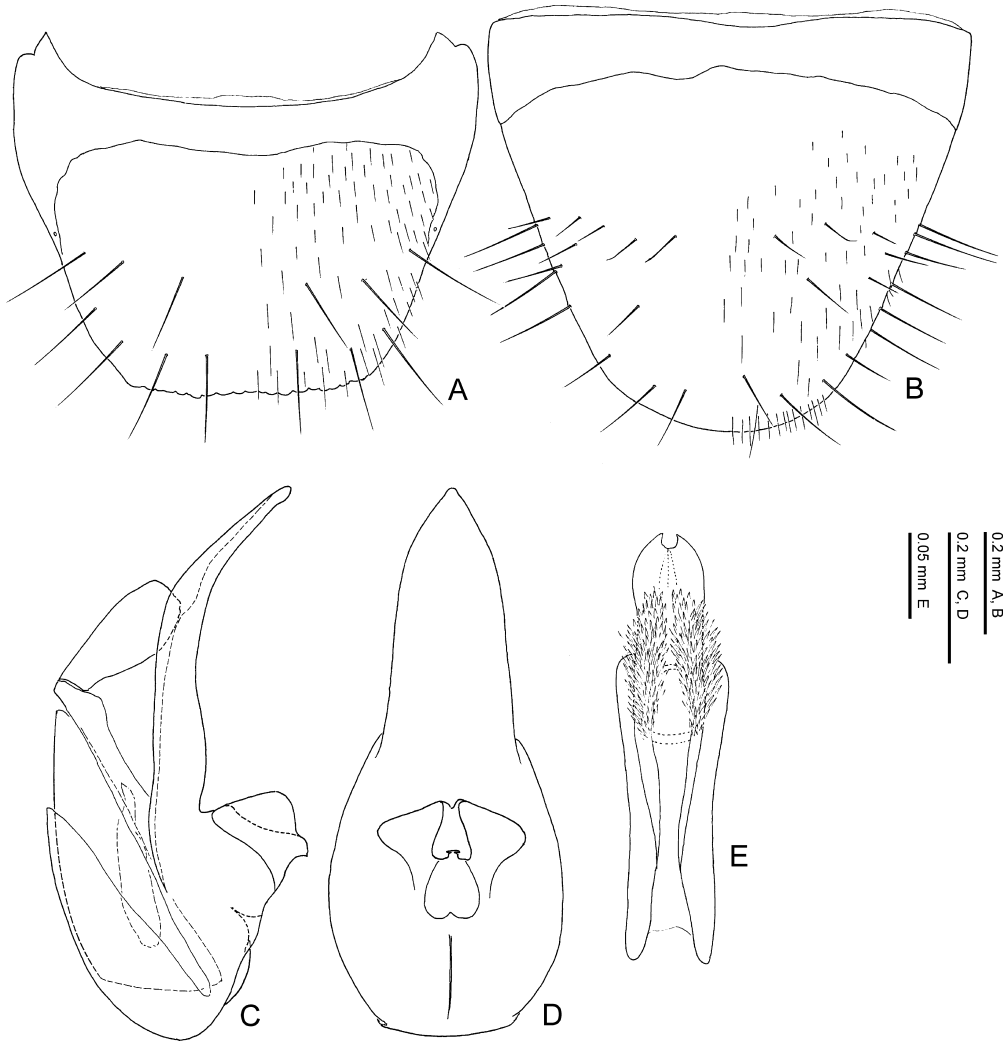

Fig. 99. *Pella bohaci* (Dvořák).—A, Eighth abdominal tergite, dorsal view; B, 8th abdominal sternite, ventral view; C, median lobe of aedeagus, lateral view; D, ditto, ventral view; E, copulatory piece, dorsal view. Male.

Female: Eighth tergite (Fig. 100 A) with posterior margin slightly truncate, its truncate apex crenate; 8th sternite (Fig. 100 B) with 13 or 14 macrosetae; sensory setae of 8th sternite spindle-shaped, flattened. Spermatheca (Fig. 100 C) curved three times; basal part almost as long as apical part, acutely curved around middle, slightly narrowed apicad; apical part gently curved around base, narrowed apicad, its inner wall densely wrinkled from apex to around apical 3/4.

Measurements. BL, 4.4–4.8; FBL, 1.7–1.8; HL, 0.64–0.66; HW, 0.82–0.85; EL, 0.294–0.303; AL, 1.58–1.61; PL, 0.79–0.80; PW, 1.10–1.14; ELL, 0.95–0.99; ELW, 1.31–1.38; HTL, 0.81–0.83.

Bionomics. The type series from Uzbekistan (three specimens) were collected with *Crematogaster* sp. (Dvořák, 1984), but nothing was reported on its association with ants was not referred to any more. The type series of an allied species, *Pella esau*, was also collected with ants of the same genus. This suggests closer associations with the ants rather than merely walking

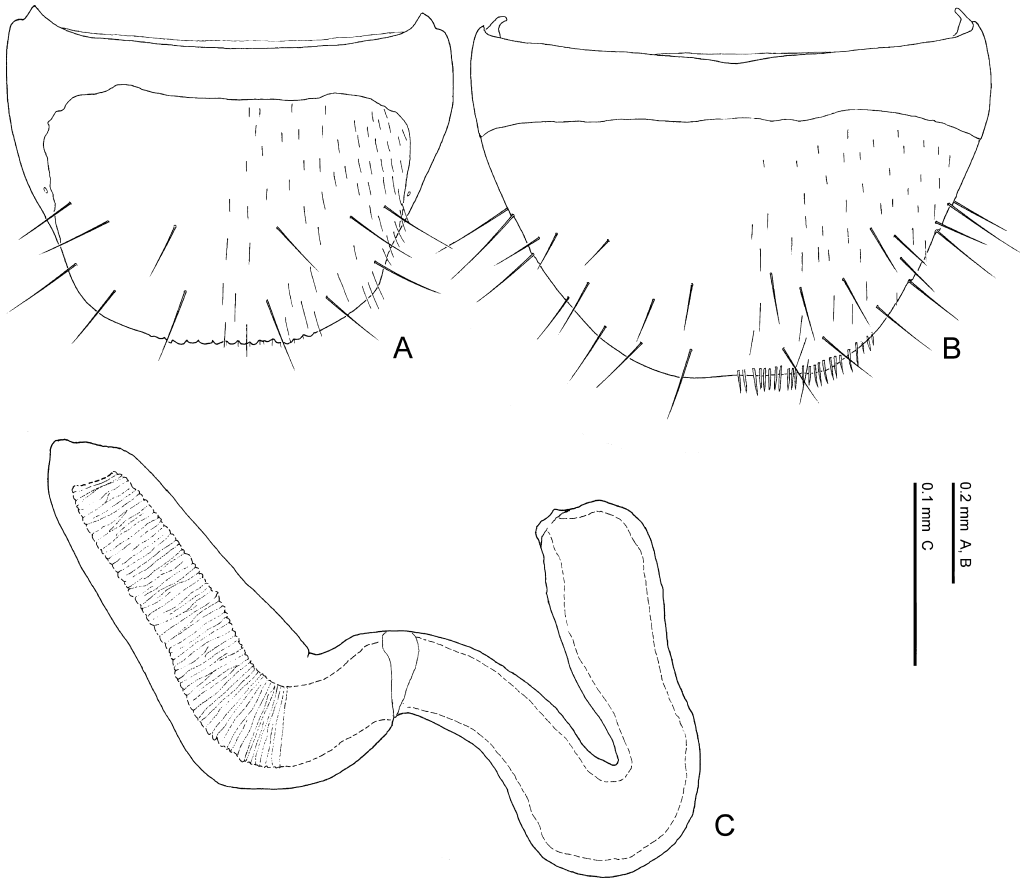

Fig. 100. *Pella bohaci* (Dvořák).—A, Eighth abdominal tergite, dorsal view; B, 8th abdominal sternite, ventral view; C, spermatheca. Female.

around ant colony. Thus, I tentatively regard this ant species as a symbiotic host of *Pella bohaci*. The symbiotic host species is different from that of *Pella esau* which was also collected from Tadjikistan. A paratype colleted from Turkmenia lacks information on the collecting situation.

No information was available for the life cycle of this species.

Symbiotic host. *Crematogaster* (*Crematogaster*) sp.

Pella cinctipennis (Eppelsheim, 1884), n. comb.

(Figs. 101–103)

Myrmedonia cinctipennis Eppelsheim, 1884a: 12 (original description).—Smetana, 2004: 460 (*Zyras* (*Myrmelia*), list). *Zyras* (*Pella*) *esau* Dvořák, 1984: 197 (original description).—Smetana, 2004: 461 (*Zyras* (*Pella*), list). **N. syn**.

Type material. *Myrmedonia cinctipennis*. Holotype: **Azerbaijan**: ♀, "35/Rusano/cinctipennis/c. Eppelsh. Steind. d./cinctipennis Epp. Verh. Naturf. Ver. Brünn Bd. XXII/TYPUS" (NHMW).

Zyras (*Pella*) *esau*. Paratypes: **Tadjikistan**: 1♂, "USSR, Tadjikistan Romit (Dušanbe) 25.–9. 4. 1981. Aldo Olexa lgt./PARATYPUS/Zyras (Pella) esau sp. n. det. M. Dvořák ,81" (cDvor). **Uzbekistan**: 1♀, "USSR, Uzbekistan Aktaš (Taškent) 22. 4. 1980 Aldo Olexa lgt./ALLOTY-

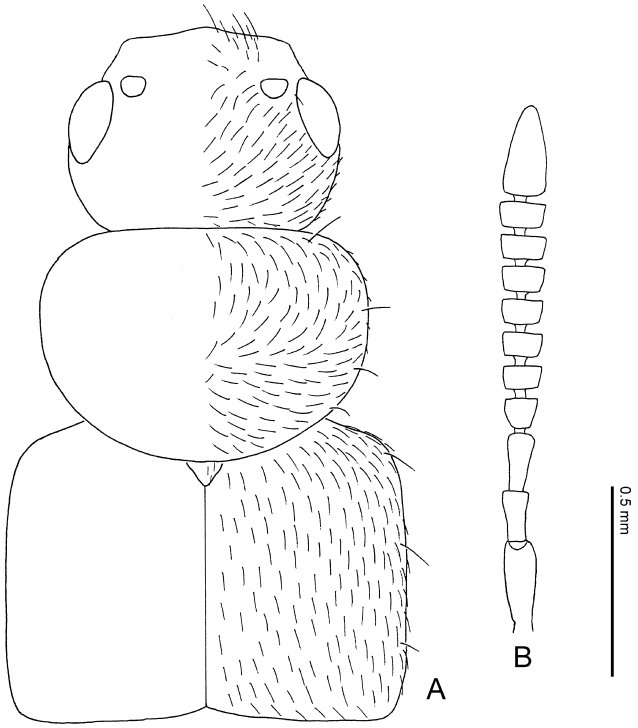

Fig. 101. *Pella cinctipennis* (Eppelsheim). — A, Fore body, dorsal view; B, right antenna.

PUS/Zyras (Pella) esau sp. n. det. M. Dvořák, 81" (cDvor).

These are part of the type series. Most specimens of the type series including the holotype are deposited in cDvor. The male paratype of *Zyras esau* was pinned with an ant specimen.

Other material. **Turkey**: 1♀, pass above Seki (1820 m alt.), 70 km NE Fethiye, Mugla, 7 VII 2002, V. Assing (cAss).

Type locality. Rusano, Azerbaijan.

Distribution. Mediterranean subregion. EUROPE: Turkey; ASIA: Azerbaijan, Tadjikistan, Uzbekistan. New to Turkey.

Diagnosis. *Pella cinctipennis* is closely similar to *P. kuluensis* and *P. bohaci* but may be easily distinguished from the latter two by smaller body.

Redescription. Body slender. Brown in ground colour; antennae, mouthparts, pronotum, elytra and legs reddish brown. Head (Fig. 101 A) widest around middle of eyes; surface smooth, sparsely covered with setae; setae long, slightly longer than those on pronotum and elytra; length of eyes 0.36–0.37 times as long as head width. Antennae (Fig. 101 B) shorter than head, pronotum and elytra combined; 1st segment slightly longer than 2nd and 3rd combined; 2nd segment slightly shorter than 3rd; 3rd segment about 1/2 as long as 1st; 4th to 10th segments wider than long; 11th segment shorter than 1st; approximate relative lengths of segments from basal to apical: 23 : 10 : 11 : 6 : 5 : 5 : 4.5 : 4.5 : 6 : 5.5 : 17. Pronotum (Fig. 101 A) 1.28–1.36 times as wide as long, widest around anterior 1/6, narrowed posteriorly; posterior margin rounded; surface smooth, sparsely covered with setae, with 3 or 4 long macrosetae along lateral margin. Scutellum with surface smooth, moderately covered with setae. Elytra (Fig. 101 A) slightly widened apicad; surface smooth, moderately covered with setae, with 3 or 4 small macrosetae laterally. Legs

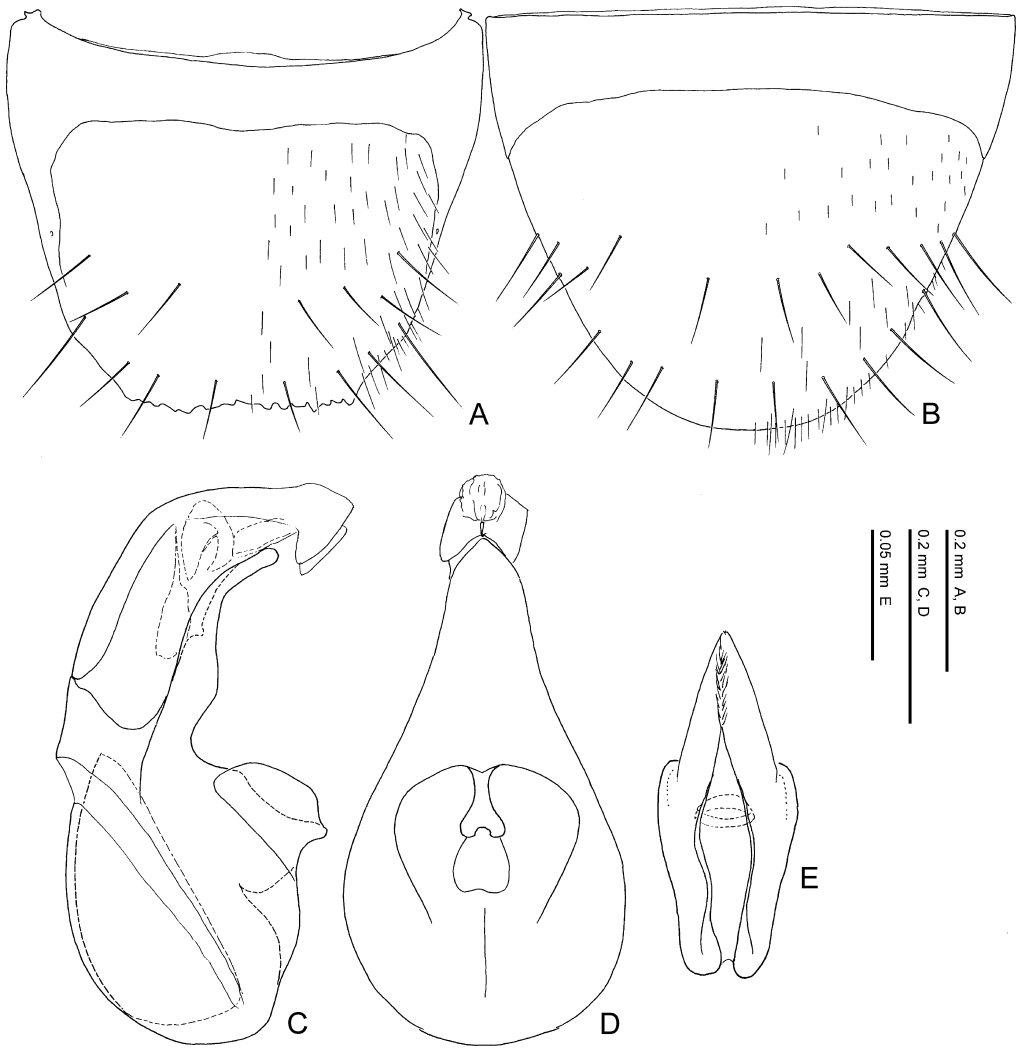

Fig. 102. *Pella cinctipennis* (Eppelsheim). — A, Eighth abdominal tergite, dorsal view; B, 8th abdominal sternite, ventral view; C, median lobe of aedeagus (evaginated), lateral view; D, ditto, ventral view; E, copulatory piece, dorsal view. Male.

short; hind tibia 0.85–0.86 times as long as elytra; approximate relative lengths of tarsal segments from basal to apical: 5 : 4.5 : 4 : 10 in fore tarsus; 6 : 6 : 6 : 5 : 10 in mid tarsus; 10 : 7.5 : 7 : 6 : 11.5 in hind tarsus. Abdomen subparallel-sided, slightly narrower than elytra, widest around 4th and 5th segments; surface smooth; 3rd to 7th tergites sparsely covered with setae; 8th tergite (Figs. 102 A, 103 A) with 7 (sometimes 8) macrosetae; 9th tergite with 3 macrosetae; 10th tergite with posterior margin slightly emarginate, with 3 macrosetae.

Male: Eighth tergite (Fig. 102 A) with posterior margin somewhat truncate, its truncate apex dentate; 8th sternite (Fig. 102 B) with posterior margin rounded, with 10–12 macrosetae; 9th sternite with posterior margin truncate. Aedeagus (Figs. 102 C, 102 D) somewhat pear-shaped in ventral view; apical lobe curved ventrad near apex, pointed at apex in lateral view, obtuse at apex in ventral view; basal ridge weakly convex; copulatory piece of inner sac as in Fig. 102 E. Para-

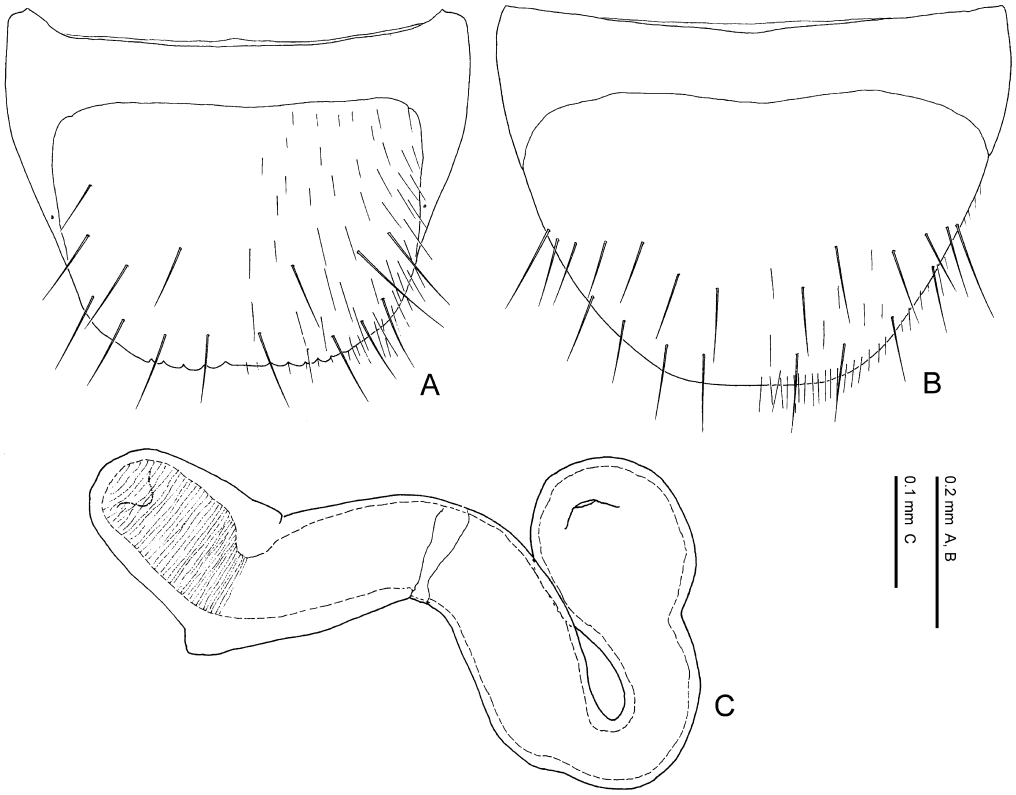

Fig. 103. *Pella cinctipennis* (Eppelsheim). — A, Eighth abdominal tergite, dorsal view; B, 8th abdominal sternite, ventral view; C, spermatheca. Female.

mere with apical lobe of paramerite dilated apicad, rounded at apex, 1/4 as long as condylite.

Female: Eighth tergite (Fig. 103 A) with posterior margin somewhat truncate, its truncate apex weakly crenate; 8th sternite (Fig. 103 B) with 10 or 11 macrosetae; sensory setae of 8th sternite generalised, almost the same as the other setae in shape. Spermatheca (Fig. 103 C) curved three times; basal part almost as long as apical part, bulbous at base, acutely curved around middle, dilated apicad; apical part slightly curved around middle, slightly narrowed apicad, with outer projection, its inner wall densely wrinkled from apex to around apical 2/5.

Measurements. BL, 3.7–4.2; FBL, 1.4–1.7; HL, 0.54–0.58; HW, 0.66–0.70; EL, 0.236–0.260; AL, 1.21–1.28; PL, 0.58–0.63; PW, 0.78–0.83; ELL, 0.74–0.81; ELW, 0.98–1.10; HTL, 0.63–0.70.

Bionomics. A paratype of *Zyras esau* from Tadjikistan was collected with *Crematogaster* sp. (Dvořák, 1984). Although the collector of the type series did not report the behaviour of *Zyras esau* with the *Crematogaster* ants, I tentatively regard this ant species as symbiotic host of this species. No information was available for the life cycle of this species.

Symbiotic host. *Crematogaster* (*Crematogaster*) sp.

The ***lugens*** Group

Species included. *Pella lugens*, *P. beijingorum*, *P. intermedia*, *P. masakoae*.

Distribution. European subregion, Mediterranean subregion, Manchurian subregion.

Diagnosis. Species of the lugens group may be characterised by a combination of the following character states: 1) eye length 0.36–0.42 times as long as head width; 2) 11th antennal segment shorter than the 1st; 3) pronotum with posterior margin completely rounded, not forming corners postero-laterally; 4) pronotum 1.50–1.66 times as wide as long; 5) pronotum widest around middle; 6) pronotal hypomeron invisible in lateral view; 7) elytra bicoloured, yellow with black maculations around scutellum and postero-lateral corners; 8) inner and posterior margins of elytra weakly margined; 9) male 8th sternite longer than in female; 10) posterior margin of 8th tergite crenate; 11) posterior margin of male 8th sternite rounded; 12) lateral projection of apodeme of male 8th tergite not evidently longer than that of female; 13) macrosetae of 8th abdominal segment generalised in length, exceeding the posterior margin of the segment; 14) postero-medial margin of female 8th sternite without minute pubescence; 15) apical lobe of aedeagal median lobe slightly curved ventrad in lateral view; 16) distal crests of aedeagus well developed, projected, rounded on ventral margin in lateral view; 17) copulatory piece of aedeagal median lobe rounded around base and more or less pointed at apex in dorsal view.

Comments. The *lugens* group is probably a monophyletic group in view of the close similarity in the general appearance, *e.g.*, the combination of the tricoloured body and the much transverse pronotum, and in the aedeagal shape with short apical lobe, which is narrowed at base. However, each of these states is homoplastic, and no autapomorphy could be found in the species-group. This species-group is very similar to the *spreta* group in colour but aedeagal structure is quite different. No allied species-group could be inferred.

Symbiotic hosts. *Lasius* (*Dendrolasius*) spp.

Key to the Species of the *lugens* Group

1. Aedeagal median lobe small, shorter than head capsule. ..... 2.
— Aedeagal median lobe small, longer than head capsule. ..... 3.
2. Eyes larger, 0.41–0.42 times as long as head width; posterior margin of male 8th tergite truncate; apical lobe of aedeagal median lobe parallel-sided around base. Distribution: Europe, Balkan, Caucasia. .....*P. lugens*.
— Eyes smaller, 0.36–0.37 times as long as head width; posterior margin of male 8th tergite slightly emarginate; apical lobe of aedeagal median lobe gently narrowed apicad. Distribution: China (Beijing Shi), Japan, Russia (Far East) . .....*P. beijingorum*.
3. Body larger: BL: 5.2–6.3 mm (normally, more than 6.0 mm); FBL: 2.4–2.6 mm; apical lobe of aedeagal median lobe about 1/2 as long as basal capsule. Distribution: Japan, Korea. ....*P. masakoae*.
— Body smaller: BL: 5.3 mm; FBL: 2.3 mm; apical lobe of aedeagal median lobe about 3/5 as long as basal capsule. Distribution: Russia (Far East). .....*P. intermedia*.

Pella lugens (Gravenhorst, 1802), n. comb.

(Figs. 104–106)

Aleochara lugens Gravenhorst, 1802 (original description): 95.—Stephens, 1832: 161 (*Aleochara*, description).—Erichson, 1837: 289 (*Myrmedonia*, description).—Mulsant & Rey, 1873a: 76 (*Myrmedonia*, description).—Ganglbauer, 1895: 123 (*Myrmedonia* (*Pella*), key, description).—Reitter, 1909: 43 (*Myrmedonia* (*Myrmedonia*), key).—Bernhauer & Scheerpeltz, 1926: 701 (*Zyras* (*Myrmedonia*), list).—Scheerpeltz, 1934: 1656 (*Zyras* (*Myrmedonia*), list).—Fenyes, 1920: 297 (*Zyras* (*Myrmedonia*), list).—Lohse, 1974: 226 (*Zyras* (*Pella*), key).—Gürlich, 1981: 211 (*Lepla*, chaetotaxy).—Likovský, 1993: 59 (*Zyras* (*Lepla*), list).—Smetana, 2004: 460 (*Zyras* (*Lepla*), list).

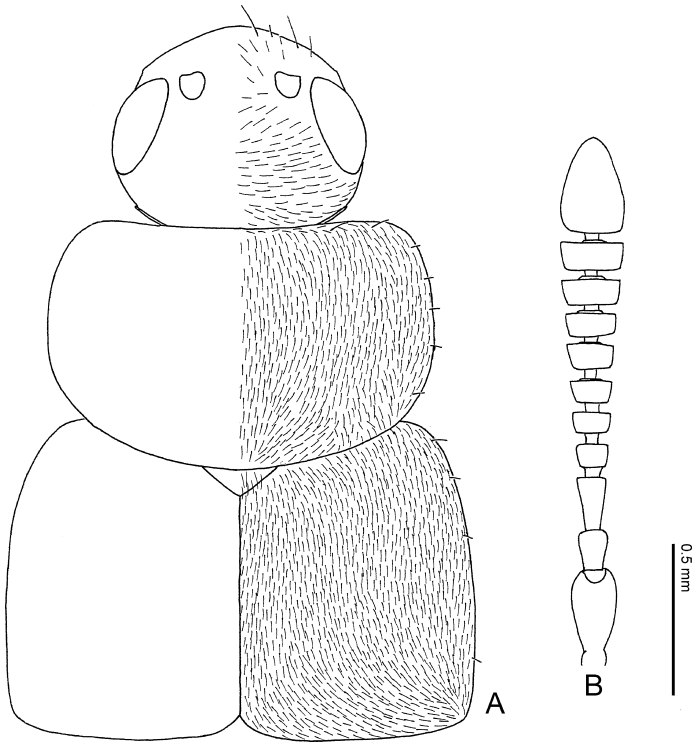

Fig. 104. *Pella lugens* (Gravenhorst). — A, Fore body, dorsal view; B, right antenna.

Type material. Lectotype: **Germany**: designated herewith, ♂, ["Berolin" (=Berlin, Germany)] (without label, pinned).

Paralectotype: 1♀, [ditto] (without label, pinned).

These are deposited in ZMHB.

Comments on lectotype designation. The syntypes of *Aleochara lugens* contain two species, *Pella lugens* and *Pella laticollis* (two of the four syntypes). Thus, the lectotype is herewith designated for a specimen, which is generally recognized as *Pella lugens* in many articles.

Other material. **Armenia**: 1 ex., Nerkin And, Kafan, Syunik, 24 VII 1952, Iablokoff-Khnzoryan; 1 ex., Shagali, Kirovakan, Lori, 2 VI 1949, Iablokoff-Khnzoryan. **Austria**: 1♀, Wien, Breit (no other data); 1♂, Herrmanstadt, 7 VI 1887, Slkalitt; 1♂, Paum Garbenm, 27 V (no other data); 1♀, Neuwalolegg, 24 IV 1904, Luze (*LDFL*). **Bosnia Herzegovina**: 1♀, Ivan Sedio, Pazario, 21 III 1913, J. Fodor. **Czech Republic**: 2♂♂, 2♀♀, Nový Jičín, Moravia, 30 IV 1988, Kuboň (cMar). **Greece**: 4 exs. (2 adults, 2 larvae), Fthiotis (alt. 940 m), Oros, Kallidromo, Lamia, 2 IV 2001, V. Assing; 5 exs., Kastanea, Kalambaka, Pindos, 28 III 1997, A. Riedal. **Slovakia**: 1♂, Teplý vrch, 23 IV 1998, T. Lackner.

Type locality. Berlin, Germany.

Distribution. European subregion, Mediterranean subregion. EUROPE: Armenia, Austria, Belgium, Belarus, Croatia, Czech Republic, Denmark, Finland, France, Great Britain, Germany, Georgia, Greece, Hungary, Italy, Latvia, Lithuania, Luxembourg, Macedonia, Netherlands, Norway, Poland, Romania, Russia (North and Central European Territories), Slovakia, Sweden, Switzerland, Ukraine, Yugoslavia. ASIA: Kazakhstan, Turkmenistan, Uzbekistan. New to Armenia.

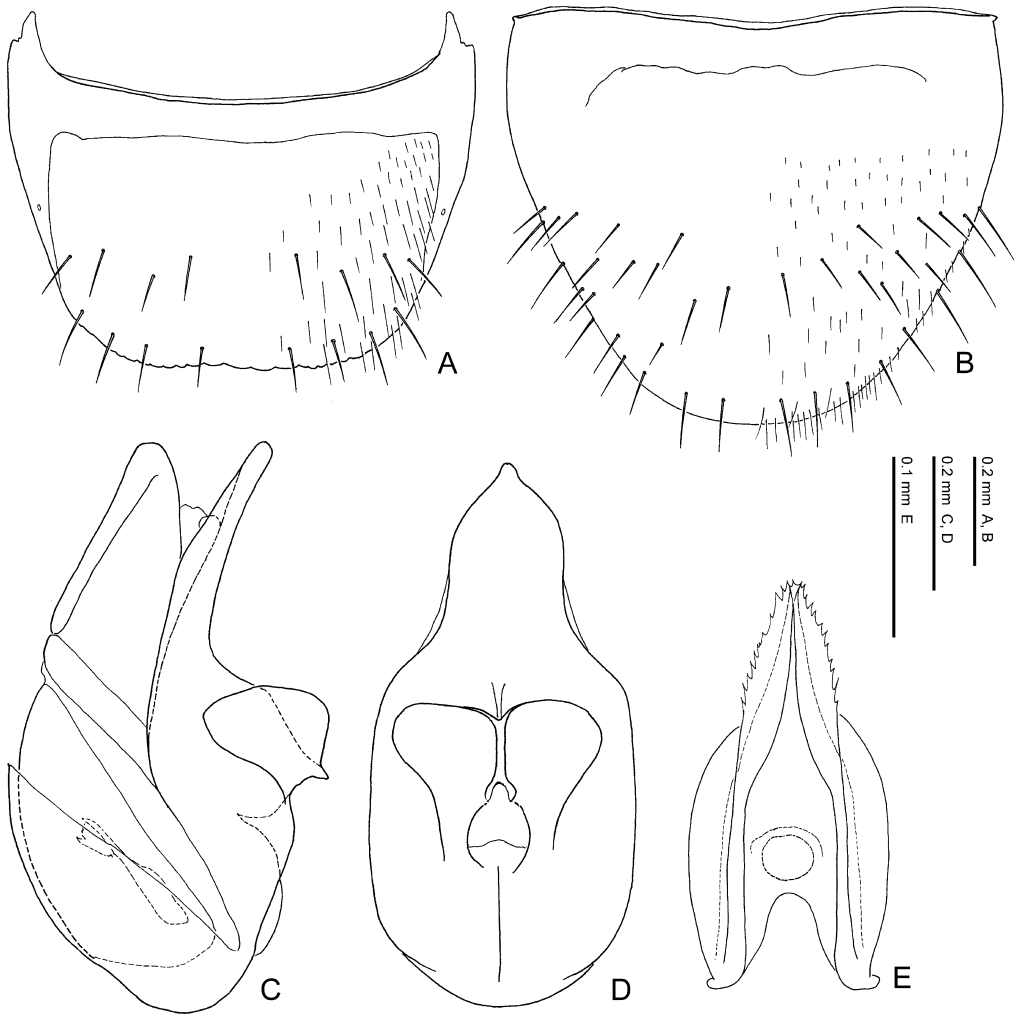

Fig. 105. *Pella lugens* (Gravenhorst). — A, Eighth abdominal tergite, dorsal view; B, 8th abdominal sternite, ventral view; C, median lobe of aedeagus, lateral view; D, ditto, ventral view; E, copulatory piece, dorsal view. Male.

Diagnosis. *Pella lugens* is closely similar to *P. beijingorum*, *P. masakoae* and *P. intermedia* in general appearance but can be distinguished from *P. beijingorum* by the eyes 0.47–0.42 as long as the head width and the apical lobe of the aedeagal median lobe parallel-sided, from *P. masakoae* and *P. intermedia* by the smaller body and the small aedeagus which is much shorter than the head capsule. *Pella lugens* is locally isolated from the other species of the *lugens* group. This species may be easily distinguished from the sympatric species by a combination of the pronotal hypomeron invisible in lateral view and the elytra yellow in ground colour.

Redescription. Body slender. Black in ground colour; antennae, mouthparts, legs, and around posterior margins of 3rd to 6th tergites reddish brown; elytra yellow but with black maculations around scutellum and postero-lateral corners. Head (Fig. 104 A) widest just behind eyes; surface finely reticulated, moderately covered with setae; setae moderately long, longer than those on pronotum and elytra; length of eyes 0.41–0.42 times as long as head width. Antennae

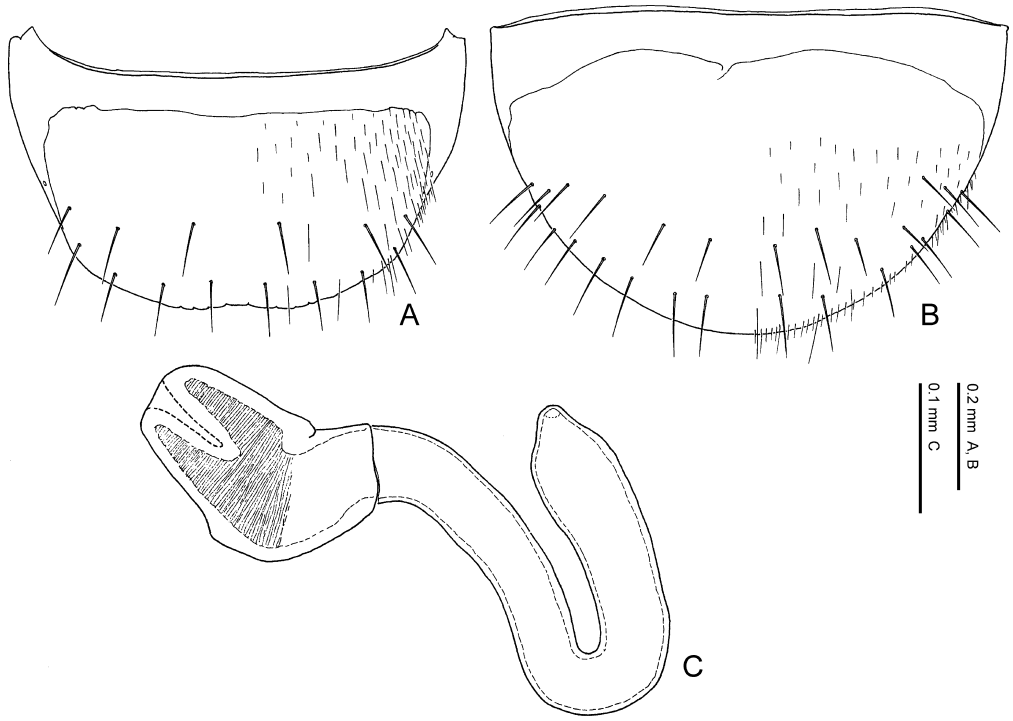

Fig. 106. *Pella lugens* (Gravenhorst). — A, Eighth abdominal tergite, dorsal view; B, 8th abdominal sternite, ventral view; C, spermatheca. Female.

(Fig. 104 B) shorter than head, pronotum and elytra combined; 1st segment as long as 2nd and 3rd combined; 2nd segment about 2/3 as long as 3rd; 3rd segment about 3/5 as long as 1st; 4th to 10th segments wider than long; 11th segment shorter than 1st; approximate relative lengths of segments from basal to apical: 25 : 10 : 15 : 6.5 : 6 : 5.5 : 5.5 : 6 : 6.5 : 7.5 : 22.5. Pronotum (Fig. 104 A) elliptical, 1.50–1.66 times as wide as long, widest just after middle; surface finely punctured, finely reticulated among punctures, densely covered with setae, with 7 or 8 macrosetae along lateral margin. Scutellum with surface smooth, moderately covered with setae. Elytra (Fig. 104 A) widened apicad; surface finely punctured, finely reticulated among punctures, densely covered with setae, with 4 or 5 small macrosetae laterally. Legs short; hind tibia 0.82–0.89 times as long as elytra; approximate relative lengths of tarsal segments from basal to apical: 6 : 6 : 6 : 11.5 in fore tarsus; 11 : 8 : 7 : 6 : 11 in mid tarsus; 17.5 : 10.5 : 9.5 : 7.5 : 12.5 in hind tarsus. Abdomen subparallel-sided, slightly narrower than elytra, widest around 4th and 5th segments; surface smooth; 3rd to 7th tergites sparsely covered with minute setae, with a low of setae along posterior margins; 8th tergite (Figs. 105 A, 106 A) with 7 or 8 macrosetae; 9th tergite with 5 macrosetae; 10th tergite with posterior margin slightly emarginate, with 4 macrosetae.

Male: Eighth tergite (Fig. 105 A) with posterior margin somewhat truncate, its truncate apex crenate; 8th sternite (Fig. 105 B) with posterior margin rounded, with 17–21 macrosetae; 9th sternite with posterior margin rounded. Aedeagus (Figs. 105 C, 105 D) somewhat pear-shaped in ventral view; apical lobe gently curved ventrad in lateral view, pointed at apex in lateral and ventral views; basal ridge roundly convex; copulatory piece of inner sac as in Fig. 105 E. Paramere with apical lobe of paramerite dilated apicad, rounded at apex, about 1/3 as long as condylite.

Female: Eighth tergite (Fig. 106 A) with posterior margin slightly emarginate, its emarginate

apex weakly crenate; 8th sternite (Fig. 106 B) with 13 or 14 macrosetae; sensory setae of 8th sternite generalised, almost the same as the other setae in shape. Spermatheca (Fig. 106 C) curved three times; basal part about 2.5 times as long as apical part, acutely curved around basal 2/5; apical part gently curved around middle, narrowed apicad, its inner wall densely wrinkled from apex to around apical 2/3.

Measurements. BL, 4.3–5.2; FBL, 2.1–2.5; HL, 0.61–0.69; HW, 0.78–0.86; EL, 0.331–0.358; AL, 1.23–1.75; PL, 0.53–0.79; PW, 0.85–1.30; ELL, 0.78–1.10; ELW, 103–1.56; HTL, 0.88–0.96.

Bionomics. In Europe, this species is rather commonly collected from trails *Lasius* (*Dendrolasius*) *fuliginosus* and rarely from around nests of *L.* (*L.*) *brunneus*. Life cycle of this species is probably similar to that of *Pella masakoae*.

Symbiotic host. *Lasius* (*Lasius*) *brunneus*, *L.* (*Dendrolasius*) *fuliginosus*.

Pella beijingorum (Pace, 1998), n. comb.

(Figs. 107–109)

Zyras (*Pella*) *beijingorum* Pace, 1998a: 976 (original description). — Smetana, 2004: 461 (*Zyras* (*Pella*), list).

Type material. Holotype: **China** (**Beijing Shi**): ♀, "CHINA Beijing [Xiaolongmen, Beijing Shi, China (accorinding to the original description)] 1100–1500 m 1. VII. 1993 G. de Rougemont/Zyras beijingensis sp. n. det. R. Pace 1995/HOLOTYPUS Zyras beijingensis m. det. R. Pace 1995" (MHNG).

Other material. **China** (**Beijing Shi**): 1♂, 2♀♀, Xiaolongmen (1400 m), Dongling, Yanshan, Beijing, 15–16 VI 2001, P. Hlaváč & J. Cooter (*LDFJ*) (IZAS, cMar, cHlav). **Japan**: Hokkaidô: 4 exs., Hebi-numa, Teshio-gawa, Teshio-chô, 9 VII 1992, S. Hori (pt); 1♂, 1♀, 18 exs., Nozaki, Bihoro-chô, Hokkaidô, 23 VI 2001, Y. Yamaga (*LDC*); 2 exs., Taihei, Maruseppu-chô, Hokkaidô, 29–31 V 2000, Y. Kida (*LDFJ*); 1 ex., same data but, 16–17 VI 2000; 10 exs., Kamimuri, Maruseppu-chô, Hokkaidô, 6 VI 2004, M. Satô (*LCHU*); 1 ex., Akita, Oketo-chô, 7 V 1992, T. Kato; 1 ex., Mitsumata, Kamishihoro-chô, 22–25 V 1990, K. Haga; 2 exs., same data but, 21 VII 1995, K. Miyashita; 1 ex., Takami, Shizunai-chô, 23 VIII 1993, S. Hori; 2 exs., Shiomi, Mukawa-chô, 17 IX 2001, S. Hori; 1♂, 1♀, Shibumbestu, Nopporo-shinrin-kôen, Ebetsu-shi, 11 V 2000, M. Maruyama (*LDFJ*); 2 exs., Tomambetsu, Nopporo-shinrin-kôen, Ebetsu-shi, 11 V 2000, M. Maruyama (*LDS*); 4 exs., Hakken-zan, Sapporo-shi, 31 V 2002, M. Maruyama. Honshû: 1♀, Uono-gawa, Kawaguchi-machi, Niigata-ken, 30 IV 1995, K. Haga; 1 ex., Nakano, Shôwa-machi, Kitakatsushika-gun, Saitama-ken, 14 IV 2002, H. Kamezawa (*LDFJ*); 6 exs., same data but, 25 V 2003; 1 ex., Isezaki, Môka-shi, Tochigi-ken, 14 VI 2004, M. Maruyama (*LDFJ*). **Russia** (**Far East**): 1♀, Arsenev, Primorskyi krai, 27 V–3 VII 1991 O. Šausa (NHMW); 1♀, "Prwnaja-Rjetschkam Tales, Vladivostok, 1918–1920, H. Farieb" (NHMW); 1 ex., Kaimanovka, Ussuryisk, Primorskyi Krai, 27 V 2005, M. Maruyama (*LL*); 1 ex., Kamenushka, Ussuryisk, Primorskyi Krai, 28 V 2005, M. Maruyama (*LDFJ*); 1 ex., Bukhta Vityaz, Poluostrov Gamov, Khasanskyi, Primorskyi Krai, 31 V 2005, M. Maruyama (*LDFJ*); 4 exs., "Seitengraben des Prwnaja-Rjetschka Tales b. Wladiwostok/H. Farieb leg. 1918–1920" (NHMW).

Distribution. Manchurian subregion. ASIA: China (Beijing Shi), Japan (Hokkaidô, Honshû), Russia (Far East). New to Japan and Russia.

Diagnosis. *Pella beijingorum* is closely similar to *P. lugens*, *P. masakoae* and *P. intermedia* in general appearance but can be distinguished from *P. lugens* by the eyes 0 36–0.37 as long as the head width and the apical lobe of the aedeagal median lobe gently narrowed posteriad, from

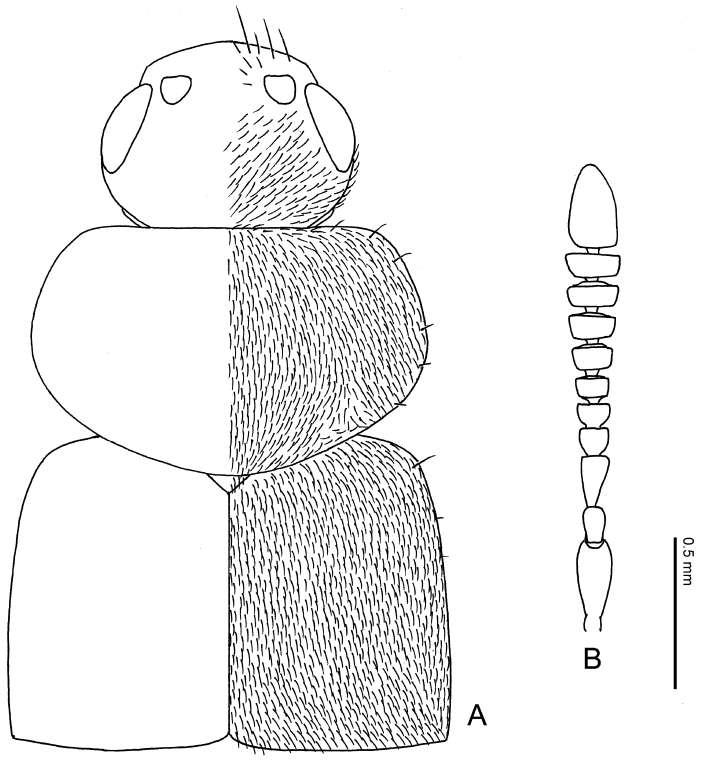

Fig. 107. *Pella beijingorum* (Pace). — A, Fore body, dorsal view; B, right antenna.

P. masakoae and *P. intermedia* by the smaller body and the tiny aedeagus which much shorter than the head capsule. This species is similar in colouration and general appearance to *Pella spreta*, but distinguished from it by the smaller eyes and the wider pronotum.

Redescription. Body slender. Black in ground colour; antennae, mouthparts, legs, and around posterior margins of 3rd to 6th tergites reddish brown; elytra yellow but with black maculations around scutellum and postero-lateral corners. Head (Fig. 107 A) widest just behind eyes; surface finely reticulated, moderately covered with setae; setae moderate long, longer than those on pronotum and elytra; length of eyes 0.36–0.37 times as long as head width. Antennae (Fig. 107 B) shorter than head, pronotum and elytra combined; 1st segment as long as 2nd and 3rd combined; 2nd segment slightly shorter than 3rd; 3rd segment about 1/2 as long as 1st; 4th to 10th segments wider than long; 11th segment longer than 1st; approximate relative lengths of segments from basal to apical: 21 : 10 : 11 : 5.5 : 5 : 4.5 : 4.5 : 4.5 : 5 : 6 : 23. Pronotum (Fig. 107A) elliptical, 1.57–1.64 times as wide as long, widest just after middle; surface finely punctured, finely reticulated among punctures, densely covered with setae, with 7 or 8 macrosetae along lateral margin. Scutellum with surface smooth, moderately covered with setae. Elytra (Fig. 107 A) widened apicad; surface finely punctured, finely reticulated among punctures, densely covered with setae, with 4 or 5 small macrosetae laterally. Legs short; hind tibia 0.81–0.88 times as long as elytra; approximate relative lengths of tarsal segments from basal to apical: 6 : 7 : 5.5 : 12 in fore tarsus; 10 : 8 : 7.5 : 6 : 9.5 in mid tarsus; 15 : 9 : 8 : 7 : 12 in hind tarsus. Abdomen subparallel-sided, slightly narrower than elytra, widest around 4th and 5th segments; surface smooth; 3rd to 7th tergites sparsely covered with minute setae, with a low of setae along posterior margins; 8th

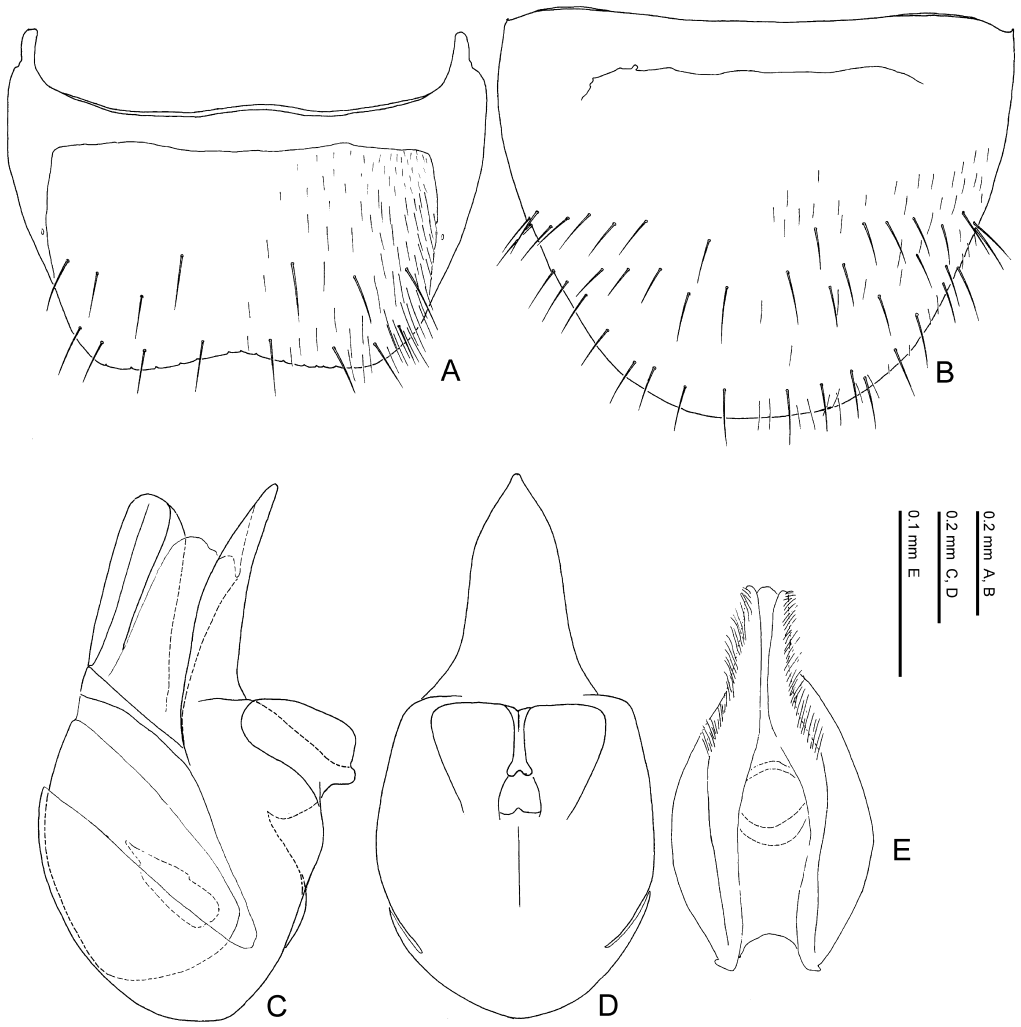

Fig. 108. *Pella beijingorum* (Pace). — A, Eighth abdominal tergite, dorsal view; B, 8th abdominal sternite, ventral view; C, median lobe of aedeagus, lateral view; D, ditto, ventral view; E, copulatory piece, dorsal view. Male.

tergite (Figs. 108 A, 109 A) with 7 or 8 macrosetae; 9th tergite with 5 macrosetae; 10th tergite with posterior margin slightly emarginate, with 4 macrosetae.

Male: Eighth tergite (Fig. 108 A) with posterior margin somewhat emarginate, its emarginate apex crenate; 8th sternite (Fig. 108 B) with posterior margin rounded, with 21–23 macrosetae; 9th sternite with posterior margin rounded. Aedeagus (Figs. 108 C, 108 D) somewhat pear-shaped in ventral view; apical lobe gently curved ventrad in lateral view, pointed at apex in lateral and ventral views; basal ridge roundly convex; copulatory piece of inner sac as in Fig. 108 E. Paramere with apical lobe of paramerite dilated apicad, rounded at apex, about 1/3 as long as condylite.

Female: Eighth tergite (Fig. 109 A) with posterior margin slightly emarginate, its emarginate apex weakly crenate; 8th sternite (Fig. 109 B) with 13 or 14 macrosetae; sensory setae of 8th sternite generalised, almost the same as the other setae in shape. Spermatheca (Figs. 109 C–109 F) curved three times; basal part about 2.5 times as long as apical part, acutely curved

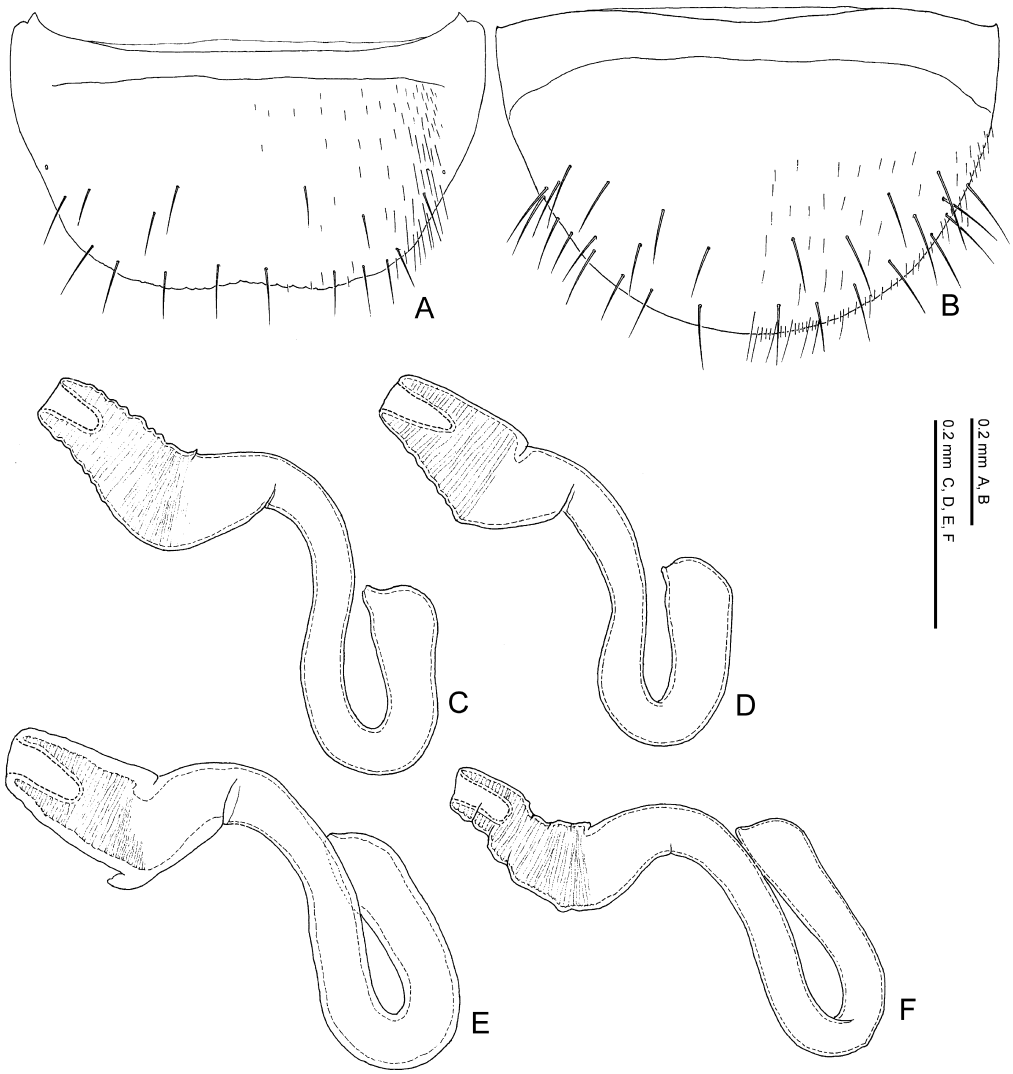

Fig. 109. *Pella beijingorum* (Pace). — A, Eighth abdominal tergite, dorsal view; B, 8th abdominal sternite, ventral view; C–F, spermathecae (F, teneral). Female.

around basal 2/5; apical part gently curved around middle, narrowed apicad, its inner wall densely wrinkled from apex to around apical 2/3, rarely with outer projection.

Measurements. BL, 4.4–5.1; FBL, 2.2–2.4; HL, 0.58–0.64; HW, 0.72–0.83; EL, 0.264–0.314; AL, 1.31–1.61; PL, 0.68–0.75; PW, 1.11–1.23; ELL, 0.93–1.08; ELW, 1.28–1.45; HTL, 0.78–0.88.

Bionomics. In Japan, this species is relatively rare and has been collected from colonies of *Lasius* (*Dendrolasius*) *fuji*, *L.* (*D.*) *spathepus* and *L.* (*D.*) *capitatus*. Some individuals were collected from a nest of *Lasius* (*Chthonolasius*) sp. in Hokkaidô together with *Pella masakoae*, and one individual was collected from a nest of *L.* (*L.*) cf. *platythorax* Seifert, 1991, in Primorskyi Krai, on one occasion, respectively. Life cycle of this species is probably similar to that of *Pella masakoae*.

Symbiotic hosts. *Lasius* (*Lasius*) sp., *L.* (*Chthonolasius*) *umbratus.*, *L.* (*Dendrolasius*) *fuji*,

L. (*D.*) *spathepus*, *L.* (*D.*) *capitatus*.

Pella intermedia Maruyama, n. sp.

(Figs. 110, 111)

Type material. Holotype: **RUSSIA** (**Far East**): ♂, "RUSSIA: Primorskyi Krai, Nadezhdunskyi, Kravtzovka, 1 VI 2005, Maruyama M." (*LDFJ*) (IBSS).

Type locality. Nadezhdunskyi, Primorskyi Krai, Russia.

Distribution. Manchurian subregion. ASIA: Russia (Far East).

Etymology. Named for the intermediate body size between the eastern Palearctic species of the *lugens* group, *Pella beijingorum* and *P. masakoae*.

Diagnosis. *Pella intermedia* is closely similar to *P. masakoae* in general appearance and large aedeagus, which is much larger than head capsule, but can be distinguished from the latter by the smaller body and the longer apical lobe of aedeagal median lobe. This species is also similar to *Pella lugens* and *P. beijingorum* in general appearance but can be distinguished from the latter by the much larger body and large aedeagus. This species can be easily distinguished from the sympatric species by a combination of the following character states: the body large, the elytra yellow in ground colour, and the legs reddish brown.

Description. Body slender. Dark brown in ground colour; antennae, mouthparts, legs, and around posterior margins of 3rd to 5th tergites reddish brown; elytra with around antero-lateral corners yellowish brown. Head (Fig. 110 A) widest around middle of eyes; surface finely reticulated, moderately covered with setae; setae moderately long, longer than those on pronotum and

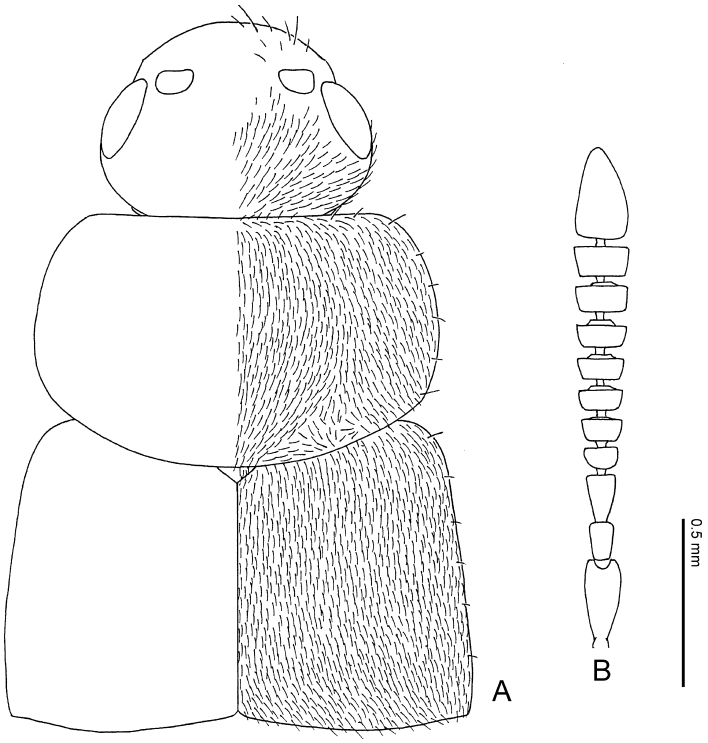

Fig. 110. *Pella intermedia* Maruyama, n. sp.—A, Fore body, dorsal view; B, right antenna.

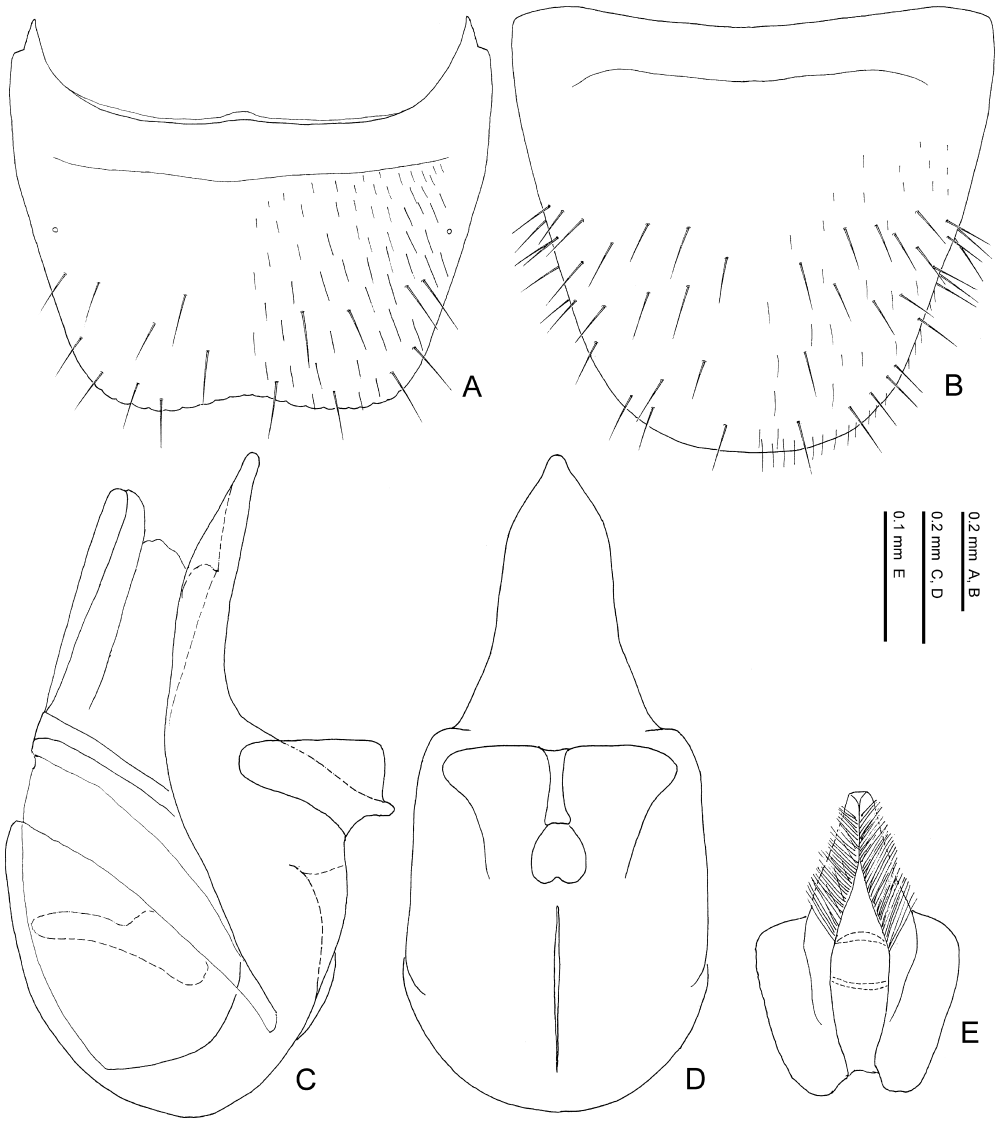

Fig. 111. *Pella intermedia* Maruyama, n. sp.—A, Eighth abdominal tergite, dorsal view; B, 8th abdominal sternite, ventral view; C, median lobe of aedeagus, lateral view; D, ditto, ventral view; E, copulatory piece, dorsal view. Male.

elytra; length of eyes 0.37 times as long as head width. Antennae (Fig. 110 B) shorter than head, pronotum and elytra combined; 1st segment longer than 2nd and 3rd combined; 2nd segment about 4/5 as long as 3rd; 3rd segment shorter than 1/2 of 1st; 4th to 10th segments wider than long; 11th almost as long as 1st; approximate relative lengths of segments from basal to apical: 24 : 9 : 11 : 6 : 5.5 : 5.5 : 6 : 6 : 6 : 7.5 : 23. Pronotum (Fig. 110 A) elliptical, 1.62 times as wide as long, widest just after middle; surface finely punctured, finely reticulated among punctures, densely covered with setae, with 7 or 8 macrosetae along lateral margin. Scutellum with surface smooth, moderately covered with setae. Elytra (Fig. 110 A) widened apicad; surface finely punctured, finely reticulated among punctures, densely covered with setae, with 6 or 7 small macrose-

tae laterally. Legs short; hind tibia 0.84 times as long as elytra; approximate relative lengths of tarsal segments from basal to apical: 5 : 5.5 : 5.5 : 11 in fore tarsus; 10 : 7 : 6 : 5.5 : 12 in mid tarsus; 17 : 10 : 8.5 : 7.5 : 12 in hind tarsus. Abdomen subparallel-sided, slightly narrower than elytra, widest around 4th and 5th segments; surface smooth; 3rd to 7th tergites almost glabrous except for a row of setae along posterior margins; 9th tergite with 3 macrosetae; 10th tergite with posterior margin slightly emarginate, with 4 macrosetae.

Male: Eighth tergite (Fig. 111 A) with posterior margin somewhat emarginate, its emarginate apex crenate, with 8 or 9 macrosetae; 8th sternite (Fig. 111 B) with posterior margin rounded, with 23–25 macrosetae; 9th sternite with posterior margin rounded. Aedeagus (Figs. 111 C, 111 D) somewhat pear-shaped in ventral view; apical lobe almost straight in lateral view, pointed at apex in lateral and ventral views; basal ridge roundly convex; copulatory piece of inner sac as in Fig. 111 E. Paramere with apical lobe of paramerite dilated apicad, rounded at apex, about 1/3 as long as condylite.

Female unknown.

Measurements. BL, 5.3; FBL, 2.3; HL, 0.68; HW, 0.84; EL, 0.308; AL, 1.51; PL, 0.77; PW, 1.26; ELL, 1.01; ELW, 1.4; HTL, 0.85.

Bionomics. Only the male holotype has been known. The type locality is an old secondary forest of *Abies* and *Quercus* trees, and the specimen was collected from the trials of *Lasius* (*Dendrolasius*) *fuji* together with *Pella jureceki* and *Homoeusa* spp.

Symbiotic host. *Lasius* (*Dendrolasius*) *fuji*. Probably most sympatric species of *Dendrolasius*.

Pella masakoae Maruyama, n. sp.

(Figs. 112–114)

Type material. Holotype: **Japan**: ♂, "Takao-san, Hachiôji-shi, Tokyo, JPN, 4 VI 2001, Maruyama-M. leg./ex colony of *Lasius spathepus*, det. Maruyama, 2002" (*LDS*) (NSMT).

Paratypes: **Japan**: Hokkaidô: 1 ex., Himenuma, Rishiri-tô, 4 IX 1990, T. Kishimoto (pt); 1 ex., Makoi, Shari-chô, 28 V 2000, Y. Kida (*LDFJ*); 1 ex., same data but, 20 VI 2000 (*LCH*); 1 ex., same data but, 27–29 V 2001 (*LDFJ*); 3 exs., same data but, 24 VI 2002; 2 exs., same data but, 27 VI 2002; 2 exs., Miwa, Koshimizu-chô, 28 VII 2001, S. Kawahara (*LDC*); 1 ex., Taihei, Maruseppu-chô, 19–21 VIII 2000, Y. Kida (*LDFJ*); 8 exs., Kamimuri, Maruseppu-chô, Hokkaidô, 6 VI 2004, M. Satô (*LCHU*); 2 exs., Kamiotoineppu, Otoineppu-mura, 15–23 VII 1997, S. Hori (pt); 1 ex., Inasato, Hobetsu-chô, 9 V 2004, S. Hori (tt); 32 exs., Tomambetsu, Nopporo-shinrin-kôen, Ebetsu-shi, 11 V 2000, M. Maruyama (*LDS*); 21 exs., same data but, 18 V 2000; 1 ex., same data but, 18 V 2000 (*LDFJ*); 2 exs., Kaitaku-kinenkan, Nopporo-shinrin-kôen, Ebetsu-shi, 1–10 V 2000, S. Hori (fit); 1 ex., same data but, 17–24 V 2000; 1 ex., same data but, 24–31 V 2000; 2 exs., same data but, 11–19 VII 2000; 2 exs., same data but, 19–26 VII 2000; 1 ex., same data but, 26 VII–2 VIII 2000; 1 ex., same data but, 31 V 2000 (tt); 1 ex., same data but, 20 IV 2003 (*LDFJ*); 5 exs., Ôsawaguchi, Nopporo-shinrin-kôen, Ebetsu-shi, 4 V 2000, M. Maruyama (*LDFJ*); 1 ex., same data but, 9 V 2000 (*LDFJ*); 2 exs., Hitsujigaoka, Sapporo-shi, 25 VII 1998, M. Maruyama (*LDS*); 1 ex., same data but, 21 IX 1998; 1 ex., Hakkenzan, Sapporo-shi, 12–14 VII 2001, H. Sugaya (fit); 7 exs., same data but, 31 V 2002, M. Maruyama (*LDFJ*); 28 exs., same data but, 1 VI 2002; 2 exs., Kannon-zawa, Sapporo-shi, I VI 2002, M. Maruyama (*LDFJ*). Honshû: 14 exs., Takao-san (alt. 450 m), Hachiôji-shi, Tokyo-to, 4 VI 2001, M. Maruyama (*LDS*); 1 ex., Tanzawa, Kanagawa-ken, 14 VI 1986, M. Tao; 1 ex., Gozaishi-

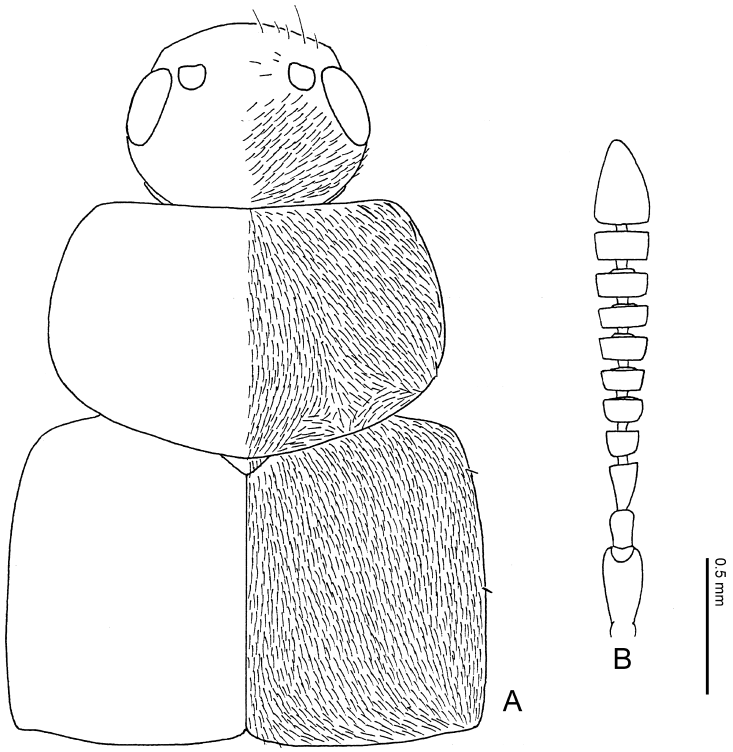

Fig. 112. *Pella masakoae* Maruyama, n. sp. — A, Fore body, dorsal view; B, right antenna.

kôsen, Nirasaki-shi, Yamanashi-ken, 18 V 1990, K. Hosoda; 1 ex., Kamiimai, Hosaka-chô, Nirasaki-shi, 6 VI 2004, M. Maruyama (*LDFJ*); 1 ex., Fukazawa-jûnimagari, Nakamaru, Nagasaka-chô, Kitakoma-gun, Yamanashi-ken, 6 VI 2004, M. Maruyama (*LDFJ*). Shikoku: 1 ex., Ôtaki-san, Shionoe-chô, Kagawa-ken, 2 VI 2001, M. Maruyama & Y. Kamite (*LDS*). **Korea**: 1♂, Chŏndong, Sobaek-san, Tangyang-gun, Kyŏngbuk Prov., 7–9 V 1999, U.-S. Hwang & H.-J. Kim (fit) (CNU).

Type locality. Takao-san, Hachiôji-shi, Tokyo-to, Japan.

Distribution. Manchurian subregion. ASIA: Japan (Hokkaidô, Honshû, Shikoku), Korea.

Etymology. Dedicated to my grandmother Masako Maruyama, who passed away in Tokyo-to, when I was finishing my Ph. D. thesis.

Diagnosis. *Pella masakoae* is closely similar to *P. intermedia* in general appearance and large aedeagus, which is much larger than head capsule, but can be distinguished from the latter by the larger body and the shorter apical lobe of aedeagal median lobe. This species is also similar to *Pella lugens* and *P. beijingorum* in general appearance but can be distinguished from the latter by the much larger body and huge aedeagus. This species can be easily distinguished from the sympatric species by a combination of the following character states: the body large, the elytra yellow in ground colour, and the legs reddish brown.

Description. Body slender. Black in ground colour; antennae, mouthparts, legs, and around posterior margins of 3rd to 5th tergites reddish brown; elytra yellow but with black maculations around scutellum and postero-lateral corners. Head (Fig. 112 A) widest around middle of eyes; surface finely reticulated, moderately covered with setae; setae moderately long, longer than

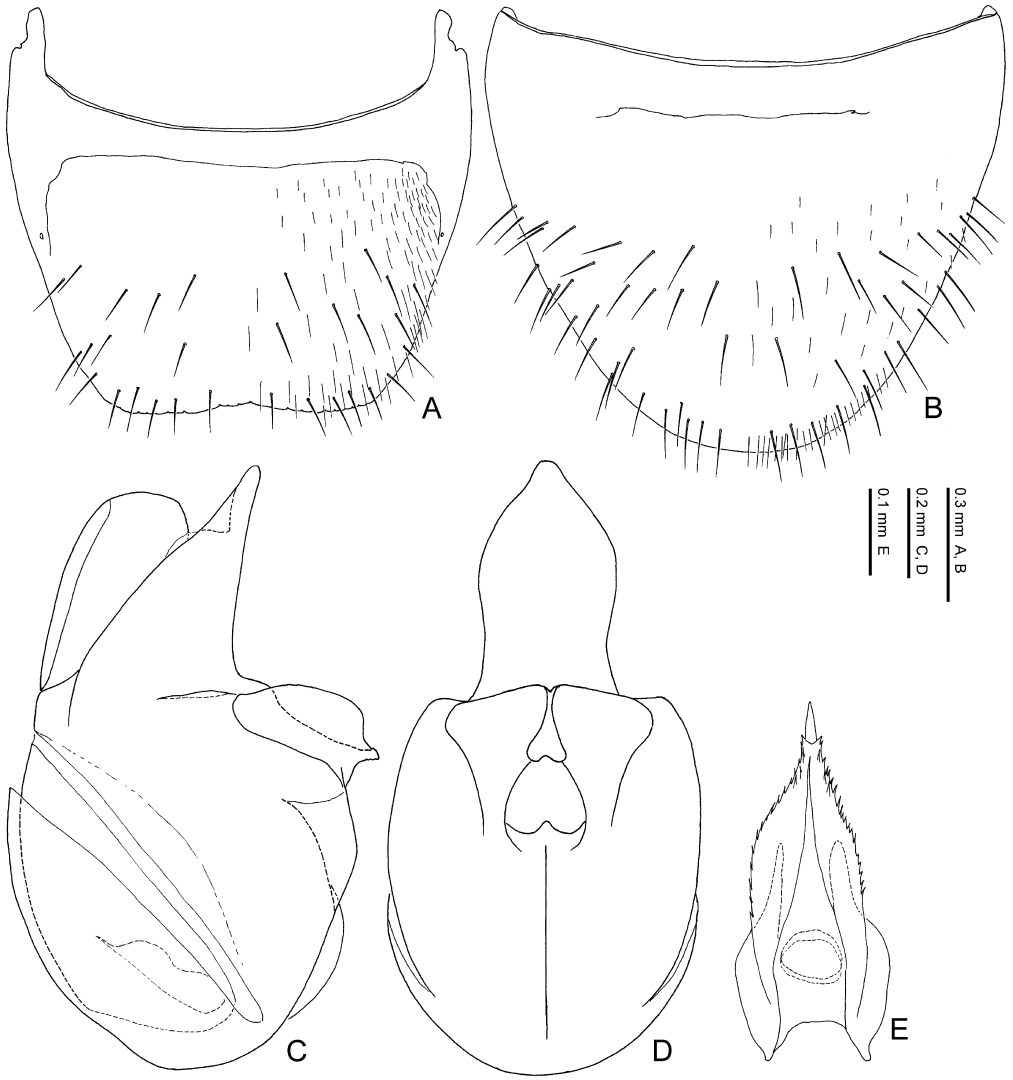

Fig. 113. *Pella masakoae* Maruyama, n. sp. — A, Eighth abdominal tergite, dorsal view; B, 8th abdominal sternite, ventral view; C, median lobe of aedeagus, lateral view; D, ditto, ventral view; E, copulatory piece, dorsal view. Male.

those on pronotum and elytra; length of eyes 0.39–0.40 times as long as head width. Antennae (Fig. 112 B) shorter than head, pronotum and elytra combined; 1st segment longer than 2nd and 3rd combined; 2nd segment about 2/3 as long as 3rd; 3rd segment longer than 1/2 of 1st; 4th to 10th segments wider than long; 11th segment shorter than 1st; approximate relative lengths of segments from basal to apical: 31 : 11 : 17.5 : 8.5 : 7 : 6 : 6.5 : 7 : 7.5 : 9 : 27. Pronotum (Fig. 112 A) elliptical, 1.51–1.60 times as wide as long, widest just after middle; surface finely punctured, finely reticulated among punctures, densely covered with setae, with 7 or 8 macrosetae along lateral margin. Scutellum with surface smooth, moderately covered with setae. Elytra (Fig. 112 A) widened apicad; surface finely punctured, finely reticulated among punctures, densely covered with setae, with 4 or 5 small macrosetae laterally. Legs short; hind tibia 0.88–0.91 times as long

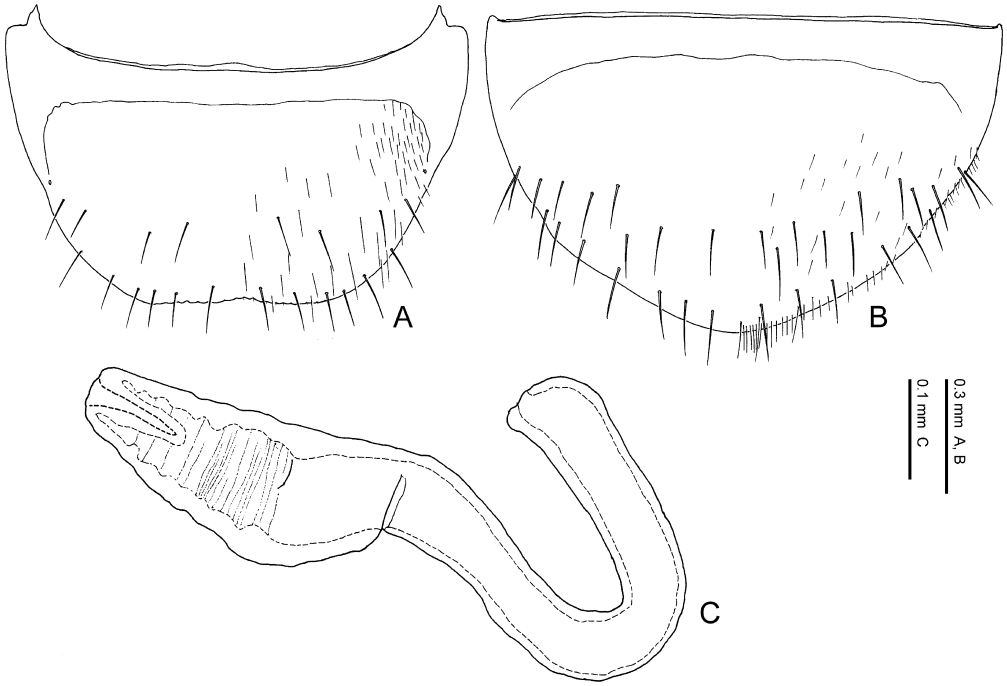

Fig. 114. *Pella masakoae* Maruyama, n. sp. — A, Eighth abdominal tergite, dorsal view; B, 8th abdominal sternite, ventral view; C, spermatheca. Female.

as elytra; approximate relative lengths of tarsal segments from basal to apical: 6 : 6 : 6 : 11.5 in fore tarsus; 11 : 8 : 7 : 6 : 11.5 in mid tarsus; 20 : 12 : 10 : 8.5 : 11.5 in hind tarsus. Abdomen subparallel-sided, slightly narrower than elytra, widest around 4th and 5th segments; surface smooth; 3rd to 7th tergites almost glabrous except for a row of setae along posterior margins; 9th tergite with 5 macrosetae; 10th tergite with posterior margin slightly emarginate, with 4 macrosetae.

Male: Eighth tergite (Fig. 113 A) with posterior margin somewhat emarginate, its emarginate apex crenate, with 15 macrosetae; 8th sternite (Fig. 113 B) with posterior margin rounded, with 27–31 macrosetae; 9th sternite with posterior margin rounded. Aedeagus (Figs. 113 C, 113 D) somewhat pear-shaped in ventral view; apical lobe slightly curved ventrad in lateral view, pointed at apex in lateral and ventral views; basal ridge roundly convex; copulatory piece of inner sac as in Fig. 113 E. Paramere with apical lobe of paramerite dilated apicad, rounded at apex, about 1/5 as long as condylite.

Female: Eighth tergite (Fig. 114 A) with posterior margin slightly emarginate, its emarginate apex weakly crenate, with 10 macrosetae; 8th sternite (Fig. 114 B) with 16 or 17 macrosetae; sensory setae of 8th sternite generalised, almost the same as the other setae in shape. Spermatheca (Fig. 114 C) curved twice; basal part about twice as long as apical part, roundly curved around middle; apical part narrowed apicad, its inner wall sparsely wrinkled from apex to around apical 2/5.

Measurements. BL, 5.2–6.3; FBL, 2.4–2.6; HL, 0.71–0.75; HW, 0.86–0.93; EL, 0.342–0.367; AL, 1.70–1.89; PL, 0.81–0.93; PW, 1.28–1.47; ELL, 1.15–1.26; ELW, 1.63–1.80; HTL, 1.01–1.15.

Bionomics. This species is relatively rarely collected from nests of *Lasius* (*Dendrolasius*) spp., but sometimes many individuals are found in one nest. Several specimens were collected

also from nests of *Lasius* (*Chthonolasius*) *umbratus* in Hokkaidô together with *Pella beijingorum*.

Symbiotic hosts. *Lasius* (*Dendrolasius*) *fuliginosus*, *L.* (*D.*) *spathepus*, *L.* (*Chthonolasius*) *umbratus*.

The ***spreta*** Group

Species included. *Pella spreta*, *P. zhoui*.

Distribution. Manchurian subregion.

Diagnosis. Species of the *spreta* group may be characterised by a combination of the following character states: 1) eye length 0.45–0.48 times as long as head width; 2) 11th antennal segment shorter than the 1st; 3) pronotum with posterior margin completely rounded, not forming corners postero-laterally; 4) pronotum 1.51–1.56 times as wide as long; 5) pronotum widest around middle; 6) pronotal hypomeron invisible in lateral view; 7) elytra with yellow maculations around antero-lateral and postero-lateral corners; 8) inner and posterior margins of elytra weakly margined; 9) male 8th sternite longer than in female; 10) posterior margin of 8th tergite crenate; 11) posterior margin of male 8th sternite rounded; 12) lateral projection of apodeme of male 8th tergite evidently longer than that of female; 13) macrosetae of 8th abdominal segment generalised in length, exceeding the posterior margin of the segment; 14) postero-medial margin of female 8th sternite without minute pubescence; 15) apical lobe of aedeagal median lobe almost straight in lateral view; 16) distal crests of aedeagus well developed, projected, rounded on ventral margin in lateral view; 17) copulatory piece of aedeagal median lobe gently narrowed apicad and more or less rounded at apex in dorsal view.

Comments. The *spreta* group is probably a monophyletic group in view of the close similarity in the general appearance, *e.g.*, a combination of the tricoloured body and the completely elliptical pronotum, and in the aedeagal shape with straight apical lobe. However, each of these states is homoplastic, and no autapomorphy could be found in the species-group. This species-group is very similar to the *lugens* group in colour but aedeagal structure is quite different. No allied species-group could be inferred.

Symbiotic hosts. *Lasius* (*Dendrolasius*) spp.

Key to the Species of the *spreta* Group

— Pronotum 1.51–1.55 times as wide as long; posterior margin of male 8th tergite almost truncate and only slightly emarginate medially, and its lateral corner not projected; apical lobe of aedeagal median lobe about 4/5 as long as basal capsule. Distribution: Japan. ....*P. spreta*.

— Pronotum 1.55–1.56 times as wide as long; posterior margin of male 8th tergite almost widely emarginate, and its lateral corner somewhat projected; apical lobe of aedeagal median lobe about 1/2 as long as basal capsule. Distribution: China (Beijing Shi), Russia (Far East). .....*P. zhoui*.

Pella spreta (Sharp, 1888), n. comb.

(Figs. 115–117)

Myrmedonia spreta Sharp, 1888: 291 (original description).—Bernhauer & Scheerpeltz, 1926: 705 (*Zyras* (*Myrmedonia*), list).—Dvořák, 1981: 54 (*Zyras* (*Pella*), key).—Smetana, 2004: 461 (*Zyras* (*Pella*), list).

Type material. Lectotype: **Japan**: designated herewith, ♂, "Myrmedonia spreta Type D.S. Sapporo. Japan. Lewis (written on paper card specimen glued on)/SYN-TYPE (blue round curator label)/Type (red round curator label)/Sapporo 5. VIII.–16. VIII. 80./Japan. G. Lewis./Sharp Coll. 1905-313." (BMNH).

Paralectotype: **Japan**: 1♂, "Myrmedonia spreta D.S., Sapporo. Japan. Lewis (written on paper card specimen glued on)/SYN-TYPE (blue round curator label)/Type (red round curator label)/Sapporo 5. VIII.–16. VIII. 80./Japan. G. Lewis., 1910-320" (BMNH).

Type locality. Sapporo-shi, Hokkaidô, Japan.

Comments on lectotype designation. In the present study, I was unable to examine all of the type series. According to the original description, the remaining syntypes include material from "Hakodate" (Hakodate-shi, Hokkaidô) other than from Sapporo, though the number of specimens was not noted. However, any specimen labelled "Hakodate" was not found in BMNH (M. Brendell, pers. comm.) and the other museums I have contacted. On the other hand, in Hokkaidô, *Pella spreta* is often collected together with *P. beijingorum* and *P. masakoae* that are very similar to *P. spreta* in general appearance and usually difficult to distinguish from one another without dissection of genitalia. Sharp (1888) did not dissect the specimens. Therefore, there is a possibility that unexamined portion of the type series include specimen of *Pella beijingorum* or *P. masakoae*. For this reason I designate herewith the lectotype of "*Myrmedonia spreta*" for the stability of the scientific name.

Other material. **Japan**: Hokkaidô: 3 exs., Makoi, Shari-chô, 27–29 V 2001, Y. Kida (*LDFJ*); 2 exs., Asahi, Koshimizu-chô, 10 XII 1992, S. Kawahara; 4 exs., Nosaki, Bihoro-chô, 23 VI 2001, Y. Yamaga (*LDC*); 2 exs., Taihei, Maruseppu-chô, 16–17 VI 2000, Y. Kida (*LDFJ*);

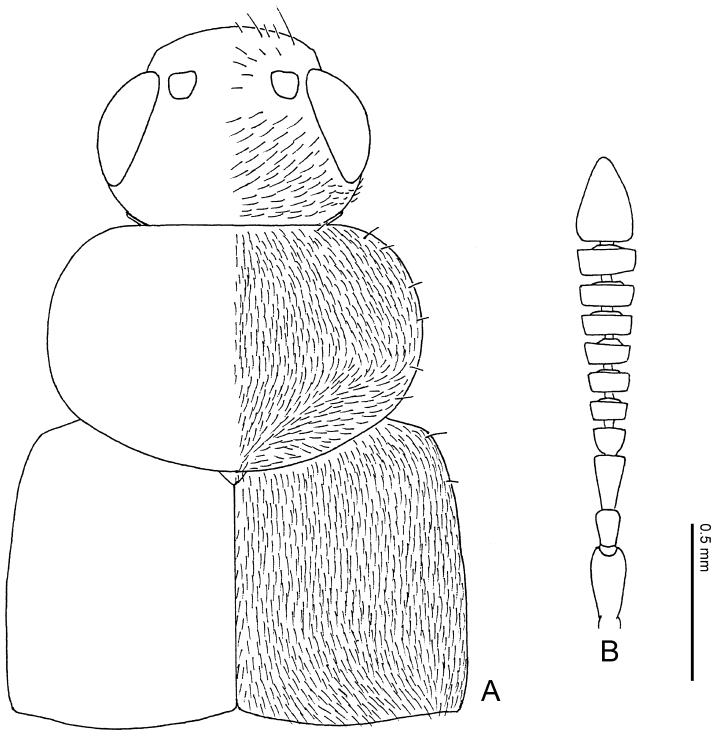

Fig. 115. *Pella spreta* (Sharp).—A, Fore body, dorsal view; B, right antenna.

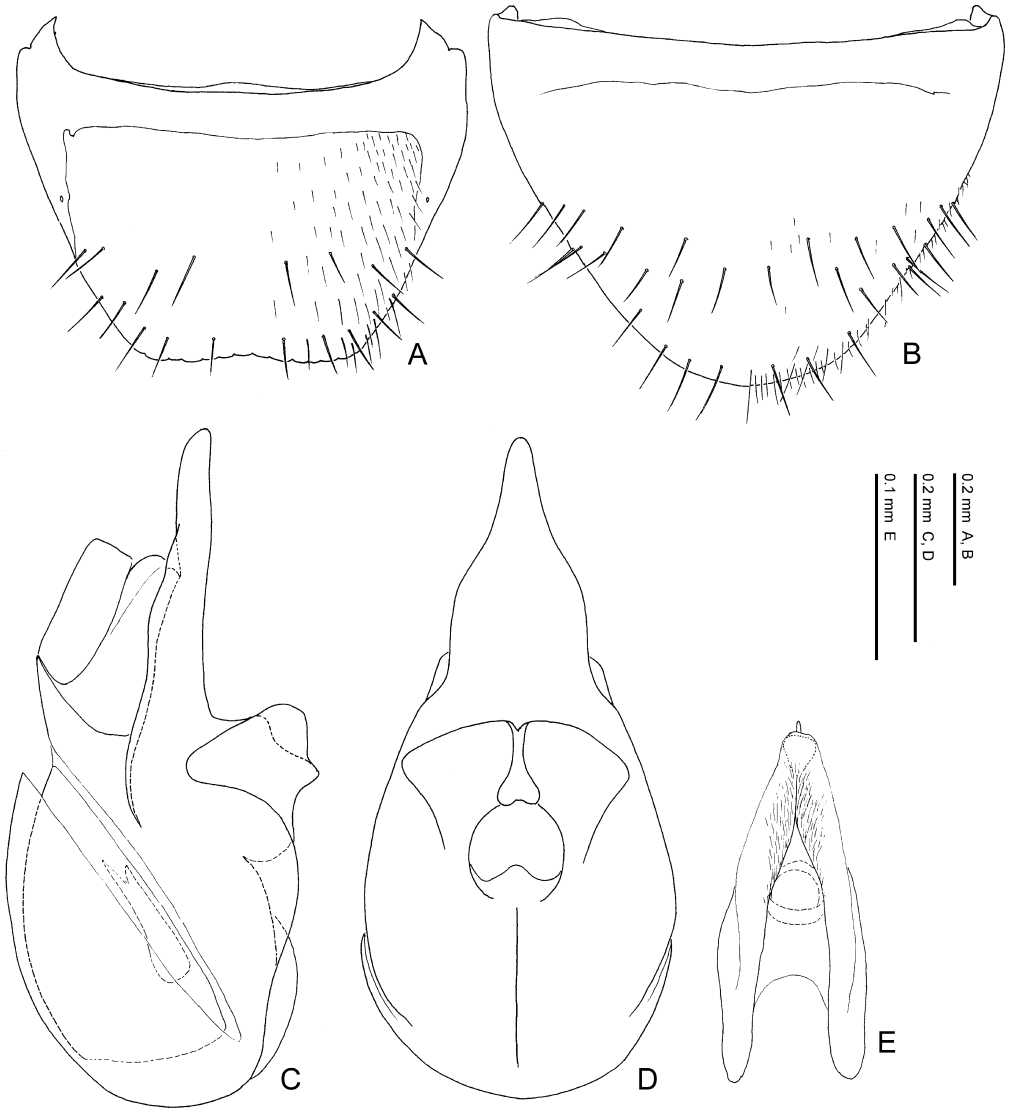

Fig. 116. *Pella spreta* (Sharp).—A, Eighth abdominal tergite, dorsal view; B, 8th abdominal sternite, ventral view; C, median lobe of aedeagus, lateral view; D, ditto, ventral view; E, copulatory piece, dorsal view. Male.

1 ex., same data but, 19–21 VIII 2000; 16 exs., Ôsawaguchi, Nopporo-shinrin-kôen, Ebetsu-shi, 4 V 2000, M. Maruyama (*LDFJ*); 1 ex., same data but, 16–19 VI 2001, S. Hori; 18 exs., Tomambetsu, Nopporo-shinrin-kôen, Ebetsu-shi, 11 V 2000, M. Maruyama (*LDS*); 12 exs., same data but, (*LDFJ*); 12 exs., same data but, 18 V 2000 (*LDS*); 20 exs., Hitsujigaoka, Sapporo-shi, 21 IX 1998, M. Maruyama (*LDS*); 2 exs., same data but, 18 V 2000 (*LDS*); 21 exs., Hakken-zan, Sapporo-shi, 31 V 2002, M. Maruyama (*LDFJ*); 42 exs., same data but, 1 VI 2002; 11 exs., Chitosegawa, Rankoshi, Chitose-shi, 18 VII 2000, T. Itô & A. Ohkawa (light trap); 1 ex., Horokappugawa, Raikishi, Shakotan-chô, 7 VII 1996, M. Ôhara (*LDFJ*); 1 ex., Akagawa, Hakodate-shi, 15 VIII 1992, M. Nishikawa (*LDFJ*). Honshû: 17 exs., Mizuhiki, Tateiwa-mura, Minamiaizu-gun, Fukushima-ken, 12 VI 2004, H. Kamezawa (*LDFJ*); 1 ex., Kashi-onsen Nishigô-mura, Fukushi-

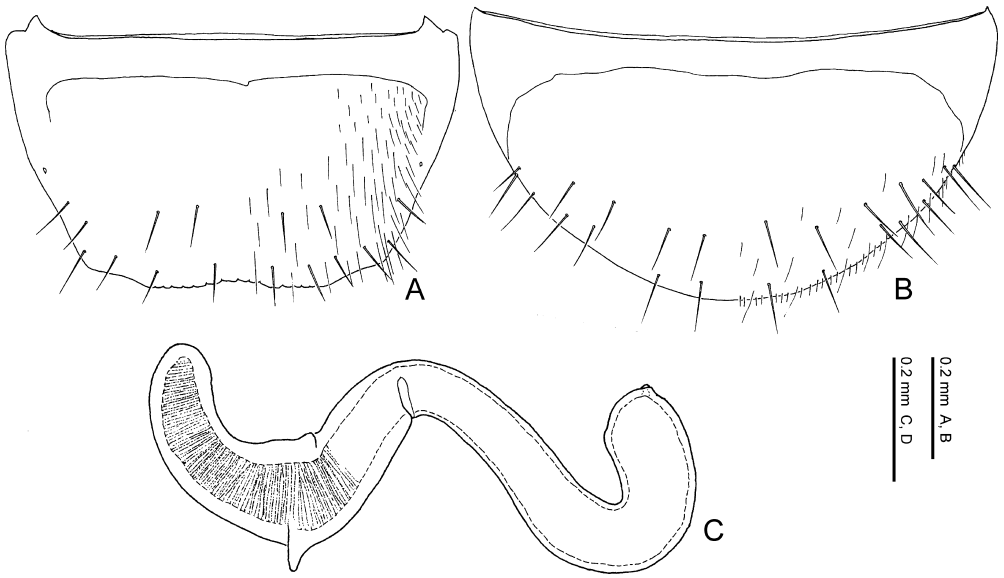

Fig. 117. *Pella spreta* (Sharp).—A, Eighth abdominal tergite, dorsal view; B, 8th abdominal sternite, ventral view; C, spermatheca. Female.

ma-ken, 16 VI 1998, M. Maruyama (*LDFJ*); 1 ex., Shimokomoriya, Môka-shi, Tochigi-ken, 6 VII 1999, M. Maruyama (*LDFJ*); 1 ex., Daiyûzan, Hakone-machi, Kanagawa-ken, 27 VIII 1982, Y. Shibata (*LDFJ*) (SCM); 1 ex., Fukazawa-jûnimagari, Nakamaru, Nagasaka-chô, Kitakoma-gun, Yamanashi-ken, 6 VI 2004, M. Maruyama (*LDFJ*); 1 ex., Misuzu, Ina-shi, Nagano-ken, 18 IX 2000, T. Kobayashi (*LDFJ*); 1 ex., Sasabe, Kawanishi-shi, Hyôgo-ken, 16 VIII 2001, N. Inahata.

Distribution. Manchurian subregion. ASIA: Japan (Hokkaidô, Honshû).

Diagnosis. *Pella spreta* is very similar to *P. zhoui* in general appearance, but is distinguished from the latter by the apical lobe of aedeagal median lobe as long as basal capsule and much longer than that of *P. zhoui* and by the slightly wider pronotum. These two species are locally isolated. Among the sympatric species, *Pella spreta* is similar in colouration and general appearance to *P. beijingorum* and *P. masakoae*, but is distinguished from *P. beijingorum* by the larger eyes and the narrower pronotum and from *P. masakoae* by the smaller body.

Redescription. Body slender. Black in ground colour; antennae, mouthparts, legs, and around posterior margins of 3rd to 6th tergites reddish brown; elytra yellow but with black maculations around scutellum and postero-lateral corners. Head (Fig. 115 A) widest around middle of eyes; surface finely reticulated, moderately covered with setae; setae moderate in length, as long as those on pronotum and elytra; length of eyes 0.46–0.48 times as long as head width. Antennae (Fig. 115 B) shorter than head, pronotum and elytra combined; 1st segment almost as long as 2nd and 3rd combined; 2nd segment slightly shorter than 3rd; 3rd segment about 3/5 as long as 1st; 4th to 10th segments wider than long; 11th segment shorter than 1st; approximate relative lengths of segments from basal to apical: 25 : 11 : 14.5 : 7 : 7 : 6.5 : 6.5 : 6.5 : 6.5 : 7.5 : 23. Pronotum (Fig. 115 A) elliptical, 1.51–1.55 times as wide as long, widest around middle; posterior margin rounded; surface roughly punctured, finely reticulated between punctures, moderately covered with setae, with 6 or 7 macrosetae along lateral margin. Scutellum with surface smooth, sparsely covered with setae. Elytra (Fig. 115 A) slightly widened apicad; surface smooth, moderately covered

with setae, with 5 or 6 small macrosetae laterally. Legs short; hind tibia 0.85–0.90 times as long as elytra; approximate relative lengths of tarsal segments from basal to apical: 5 : 5 : 5.5 : 11.5 in fore tarsus; 10.5 : 8 : 7 : 6 : 9.5 in mid tarsus; 21 : 9.5 : 8 : 7 : 11 in hind tarsus. Abdomen subparallel-sided, somewhat wider than elytra, widest around 5th and 6th segments; surface smooth; 3rd to 7th tergites sparsely covered with minute setae and with a row of long setae along posterior margins; 8th tergite (Figs. 116 A, 117 A) with 8 or 9 macrosetae; 9th tergite with 4 macrosetae; 10th tergite with posterior margin slightly rounded, with 4 macrosetae.

Male: Eighth tergite (Fig. 116 A) with posterior margin somewhat emarginated, its emarginate apex crenate; 8th sternite (Fig. 116 B) with posterior margin rounded, with 15–17 macrosetae; 9th sternite with posterior margin rounded. Aedeagus (Figs. 116 C, 116 D) somewhat pear-shaped in ventral view; apical lobe almost straight in lateral view, pointed at apex in lateral and ventral views; basal ridge roundly convex extending to near bottom of basal capsule; copulatory piece of inner sac as in Fig. 116 E. Paramere with apical lobe of paramerite dilated apicad, rounded at apex, about 1/2 as long as condylite.

Female: Eighth tergite (Fig. 117 A) with posterior margin slightly emarginate, its emarginate apex weakly crenate; 8th sternite (Fig. 117 B) with 11 or 12 macrosetae; sensory setae of 8th sternite generalised, almost the same as the other setae in shape. Spermatheca (Fig. 117 C) curved three times, somewhat M-shaped; basal part slightly longer than apical part, curved around basal 1/3, slightly narrowed apicad; apical part gently curved around middle, narrowed apicad, its inner wall densely wrinkled from apex to around apical 3/4, with outer projection.

Measurements. BL, 4.5–5.5; FBL, 2.0–2.4; HL, 0.63–0.73; HW, 0.85–0.64; EL, 0.412–0.444; AL, 1.63–1.68; PL, 0.78–0.88; PW, 1.15–1.33; ELL, 0.99–1.18; ELW, 1.38–1.58; HTL, 0.90–1.01.

Bionomics. This species is associated with *Lasius* (*Dendrolasius*) spp. While this species is commonly collected in Hokkaidô, normally rare in Honshû. This species is considered to be nocturnal and often collected by light trap.

Symbiotic hosts. *Lasius* (*Dendrolasius*) *fuji*, *L.* (*D.*) *spathepus*, *L.* (*D.*) *capitatus*.

Pella zhoui Maruyama, n. sp.

(Figs. 118–120)

Type material. Holotype: **China** (**Beijing Shi**): ♂, "Xiaolongmen (1400 m), Dongling, Yan-shan, Beijing, CHINA, 15–16. VI 2001, Hlaváč & Cooter leg." (*LDFJ*) (IZAS).

Paratype: 1♂, same data as holotype (cMar). **Russia** (**Far East**): 1 ex., Kaimanovka, Ussuryisk, Primorskyi Krai, 27 V 2005, M. Maruyama (*LDFJ*) (cMar); 2exs., same data but, 28 V 2005, M. Maruyama (*LDN*) (cMar, cHlav); 1 ex., Bukhta Vityaz, Poluostrov Gamov, Khasanskyi, Primorskyi Krai, 31 V 2005, M. Maruyama (*LDFJ*) (cMar).

Type locality. Xiaolongmen, Beijing Shi, China.

Distribution. Manchurian subregion. ASIA: China (Beijing Shi), Russia (Far East).

Etymology. Dedicated to Dr. Hong-zhang Zhou (IZAS) for his effort for permission of the collecting trip in China conducted by P. Hlaváč and J. Cooter.

Diagnosis. *Pella zhoui* is similar to *P. spreta* in general appearance, but is distinguished from the latter by the narrower pronotum, the apical lobe of aedeagal median lobe about 1/2 as long as basal capsule and much shorter than that of *P. spreta* and by the slightly narrower pronotum. These two species are locally isolated. Among the sympatric species, *Pella zhoui* is similar in colour and general appearance to *P. beijingorum* but may be easily distinguished from it by the

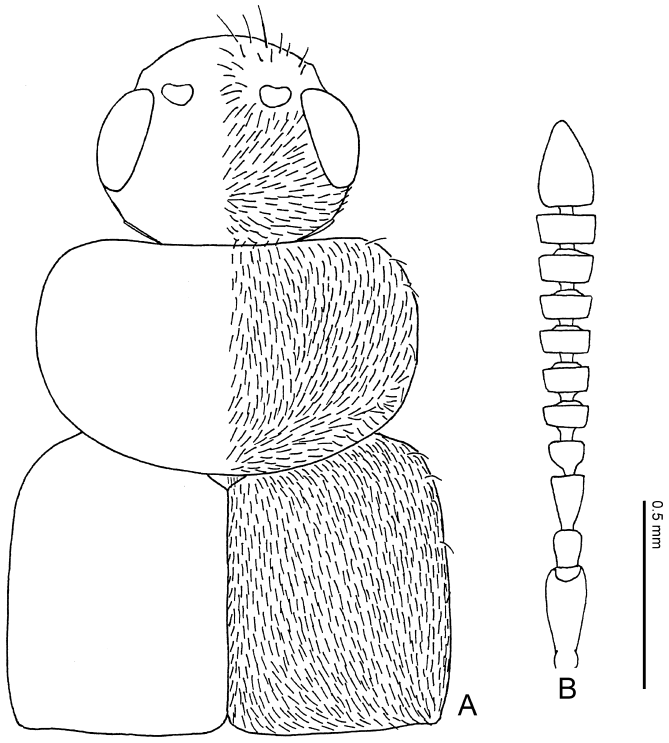

Fig. 118. *Pella zhoui* Maruyama, n. sp.—A, Fore body, dorsal view; B, right antenna.

narrower pronotum.

Diagnosis. Body slender. Black in ground colour; antennae, mouthparts, legs, and around posterior margins of 3rd to 6th tergites reddish brown; elytra yellow but with black maculations around scutellum and postero-lateral corners. Head (Fig. 118 A) widest around middle of eyes; surface finely reticulated, moderately covered with setae; setae moderate in length, as long as those on pronotum and elytra; length of eyes 0.45–0.46 times as long as head width. Antennae (Fig. 118 B) shorter than head, pronotum and elytra combined; 1st segment slightly longer than 2nd and 3rd combined; 2nd segment slightly shorter than 3rd; 3rd segment about 1/2 as long as 1st; 4th to 10th segments wider than long; 11th segment shorter than 1st; approximate relative lengths of segments from basal to apical: 23 : 9.5 : 12 : 6.5 : 6 : 5.5 : 5.5 : 5.5 : 6.5 : 7 : 21. Pronotum (Fig. 118 A) elliptical, 1.55–1.56 times as wide as long, widest around middle; posterior margin rounded; surface roughly punctured, finely reticulated between punctures, moderately covered with setae, with 6 or 7 macrosetae along lateral margin. Scutellum with surface smooth, sparsely covered with setae. Elytra (Fig. 118 A) slightly widened apicad; surface smooth, moderately covered with setae, with 5 or 6 small macrosetae laterally. Legs short; hind tibia as long as elytra; approximate relative lengths of tarsal segments from basal to apical: 7 : 5 : 4.5 : 9.5 in fore tarsus; 11.5 : 6 : 5 : 4.5 : 8.5 in mid tarsus; 20 : 8 : 7 : 5.5 : 9.5 in hind tarsus. Abdomen subparallel-sided, somewhat wider than elytra, widest around 5th and 6th segments; surface smooth; 3rd to 7th tergites sparsely covered with minute setae and with a row of long setae along posterior margins; 8th tergite (Figs. 119 A, 120 A) with 8 or 9 macrosetae (10 in left in holotype); 9th tergite with 4 macrosetae; 10th tergite with posterior margin slightly rounded, with 4 macrosetae.

Male: Eighth tergite (Fig. 119 A) with posterior margin widely emarginated, its emarginate

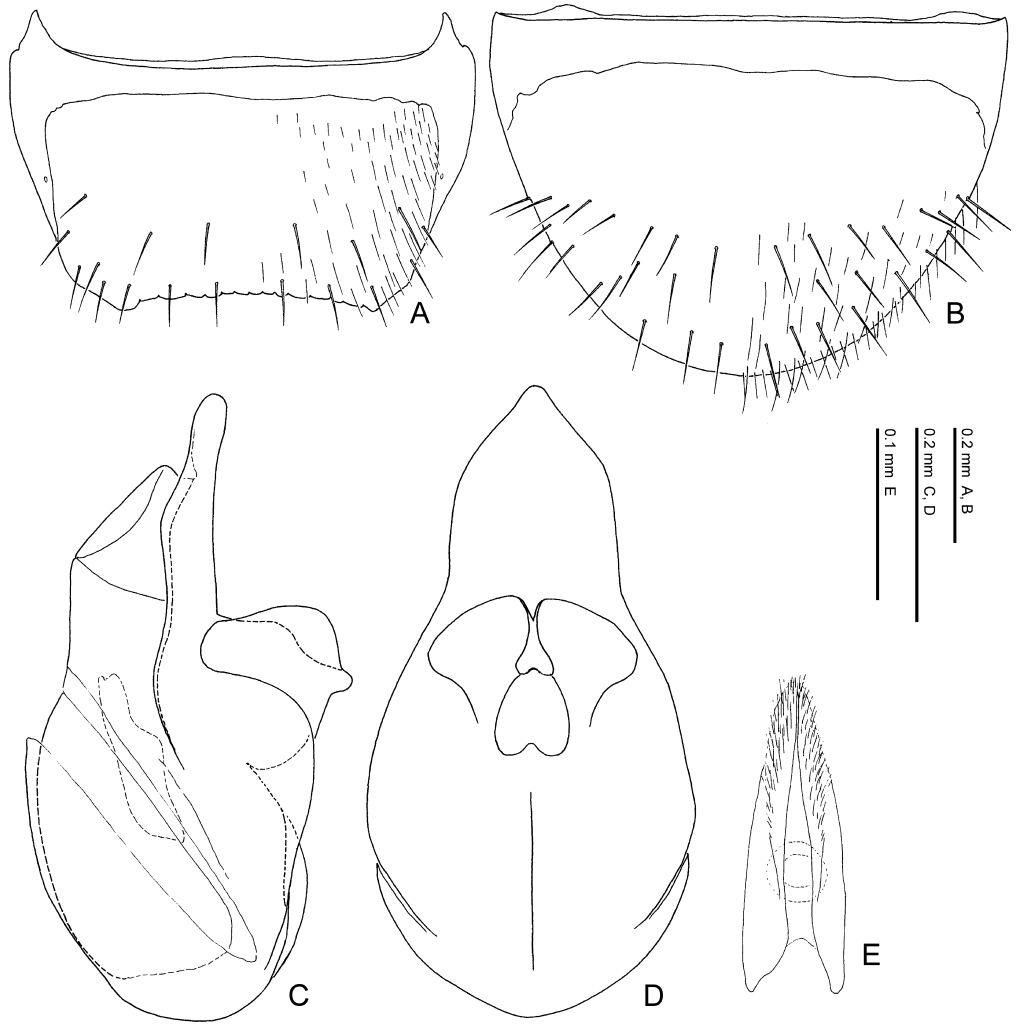

Fig. 119. *Pella zhoui* Maruyama, n. sp.—A, Eighth abdominal tergite, dorsal view; B, 8th abdominal sternite, ventral view; C, median lobe of aedeagus, lateral view; D, ditto, ventral view; E, copulatory piece, dorsal view. Male.

apex crenate; 8th sternite (Fig. 119 B) with posterior margin rounded, with 15–17 macrosetae; 9th sternite with posterior margin rounded. Aedeagus (Figs. 119 C, 119 D) somewhat pear-shaped in ventral view; apical lobe almost straight in lateral view, somewhat pointed at apex in lateral and ventral views; basal ridge roundly convex extending to near bottom of basal capsule; copulatory piece of inner sac as in Fig. 119 E. Paramere with apical lobe of paramerite dilated apicad, rounded at apex, about 1/2 as long as condylite.

Female: Eighth tergite (Fig. 120 A) with posterior margin slightly emarginate, its emarginate apex weakly crenate; 8th sternite (Fig. 120 B) with 11 or 12 macrosetae; sensory setae of 8th sternite generalised, almost the same as the other setae in shape. Spermatheca (Fig. 120 C) curved three times, somewhat M-shaped; basal part slightly longer than apical part, curved around basal 1/3, slightly narrowed apicad; apical part gently curved around middle, narrowed apicad, its inner wall densely wrinkled from apex to around apical 3/4, with outer projection.

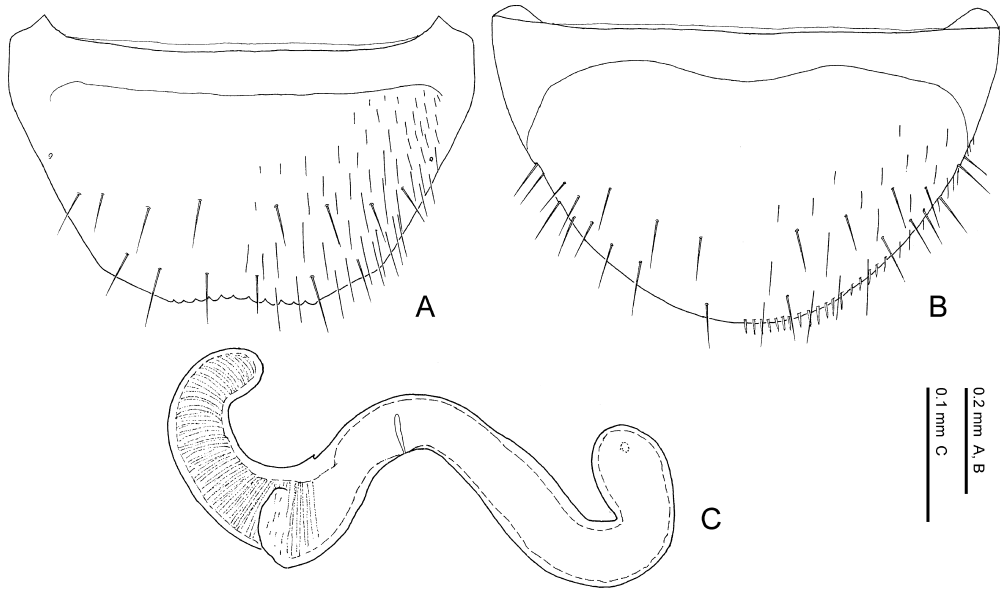

Fig. 120. *Pella zhoui* Maruyama, n. sp.—A, Eighth abdominal tergite, dorsal view; B, 8th abdominal sternite, ventral view; C, spermatheca. Female.

Measurements. BL, 4.8–5.3; FBL, 2.0–2.3; HL, 0.60–0.65; HW, 0.81–0.83; EL, 0.369–0.381; AL, 1.58–1.59; PL, 0.70–0.74; PW, 1.10–1.15; ELL, 1.94–1.00; ELW, 1.31–1.36; HTL, 0.81–0.84.

Bionomics. The type series of *Pella zhoui* from China were collected from a colony of *Lasius* (*Dendrolasius*) *fuji* together with many other staphylinids (see, bionomics of *P. cooterorum*).

Symbiotic hosts. *Lasius* (*Dendrolasius*) *fuji*, *L.* (*D.*) *nipponensis*.

The ***laticollis*** Group

Species included. *Pella laticollis*, *P. hampei*, *P. indiscreta*.

Distribution. European subregion, Mediterranean subregion, Manchurian subregion.

Diagnosis. Species of the *laticollis* group may be characterised by a combination of the following character states: 1) eye length 0.35–0.44 times as long as head width; 2) 11th antennal segment shorter than the 1st; 3) pronotum with posterior margin completely rounded, not forming corners postero-laterally; 4) pronotum 1.42–1.57 times as wide as long; 5) pronotum widest around middle; 6) pronotal hypomeron invisible in lateral view; 7) elytra unicoloured, reddish brown to blackish brown; 8) inner and posterior margins of elytra weakly margined; 9) male 8th sternite longer than in female; 10) posterior margin of 8th tergite crenate; 11) posterior margin of male 8th sternite rounded; 12) lateral projection of apodeme of male 8th tergite evidently longer than that of female; 13) macrosetae of 8th abdominal segment generalised in length, exceeding the posterior margins of the segment; 14) postero-medial margin of female 8th sternite without minute pubescence; 15) apical lobe of aedeagal median lobe slightly curved in lateral view; 16) distal crests of aedeagus developed, projected, rounded or truncate on ventral margin in lateral view; 17) copulatory piece of aedeagal median lobe gently narrowed apicad and more or less pointed at apex in dorsal view.

Comments. The *laticollis* group is probably a monophyletic group in view of the close

similarity in the general appearance, *e.g.*, a combination of the unicoloured body and the completely elliptical pronotum. However, each of these states is homoplastic, and no autapomorphy could be found in the species-group. This species-group is very similar to the *spreta* group in the pronotal shape but aedeagal structure is quite different. No allied species-group could be found.

Symbiotic hosts. *Lasius* (*Dendrolasius*) spp., *Liometopum microcephalum*.

Key to the Species of the *laticollis* Group

1. Body smaller: BL: 3.3–4.3 mm; FBL: 1.7–2.0 mm; dorsal bridge of aedeagal median lobe very long, much longer than apical lobe; basal part of spermatheca longer than apical part. Distribution: Japan. .....*P. indiscreta*.
— Body larger: BL: 3.7–4.8 mm; FBL: 1.7–2.2 mm; dorsal bridge of aedeagal median lobe short as in most *Pella* species; basal part of spermatheca as long as apical part. Distribution: Europe. ..... 2.
2. Reddish brown to blackish brown in ground colour; antennae slender, 5th segment almost as long as wide; pronotum and elytra more or less matted; 8th sternite with 19–22 macrosetae. Distribution: Europe. Symbiotic host: *Lasius fuliginosus*. .....*P. laticollis*.
— Pale brown to reddish brown in ground colour; antennae thick, clavate, 5th segment much wider than long; pronotum and elytra evidently shining; 8th sternite with 13–19 macrosetae. Distribution: Europe. Symbiotic host: *Liometopum microcephalum*. .....*P. hampei*.

Pella laticollis (Märkel, 1845), n. comb.

(Figs. 121–123)

Aleochara laticollis Märkel, 1845: 203 (original description).—Mulsant & Rey, 1873a: 81 (*Myrmedonia*, description).—Ganglbauer, 1895: 124 (*Myrmedonia* (*Pella*), key, description).—Reitter, 1909: 43 (*Myrmedonia* (*Myrmedonia*), key).—Fenyes, 1920: 298 (*Zyras* (*Myrmedonia*), list).—Bernhauer & Scheerpeltz, 1926: 700 (*Zyras* (*Myrmedonia*), list).—Scheerpeltz, 1934: 1655 (*Zyras* (*Myrmedonia*), list).—Lohse, 1974: 226 (*Zyras* (*Pella*), key).—Likovský, 1993: 59 (*Zyras* (*Lepla*), list).—Smetana, 2004: 460 (*Zyras* (*Lepla*), list).

Type material. Syntypes: **Germany**: 1♂, "5258/laticollis Märk Saxon. mont. Märk ["Saxon. mont., Märk." (=mountainous area of Saxonia, Germany, F. Märkel leg.)]" (glued on triangle paper card); 3♂♂, 2♀♀, [ditto] (without label, glued on triangle paper card).

These are deposited in ZMHB.

Type locality. Saxonia, Germany.

Other material. Bulgaria: 1 ex., Rodopi mts, Černatica-Goljam, Persenk, 1400–1900 m, 24 VI 1996, M. Kuboň; 1 ex., Senokos 20 km W Silistra, 17 VI–11 VII 1987, Penev. **Czech Republic**: 22 exs., Nový, Jičín, Moravia, 30 IV 1988, M. Kuboň; 2 exs., Soběšile, Moravia, 29. IX 1991, P. Ph; 1 ex., Bfaclav-Lacná, Morovia, 11 IV 1981, Jonis. **Germany**: 3 exs., Lainzer, Tiergarten, 30 VII 1949, O. Scheerpeltz (*LDFL*); 1 ex., Laxenburg, O. Scheepeltz; 1 ex., Eberswalde-Finow, Märk Brandenburg, 16 IV 1990, Zerche; 1 ex., Baden–Württemberg, Kaiserstuhl mts., NW Freiburg, VII 1981, Kobel-Lamparski (unbaited pt); 1 ex., Gartow, Wendland, Niedersachsen, 22 V 1988 (*LDFL*). **Slovakia:** 1 ex., Viničky-preosevpri 11 III 1995, P. Hlaváč (*LDFL*).

Distribution. European subregion, Mediterranean subregion. EUROPE: Austria, Belgium, Bosnia Herzegovina, Bulgaria, Croatia, Czech Republic, Denmark, Estonia, Finland, France, Great Britain, Germany, Hungary, Italy, Latvia, Luxembourg, Netherlands, Norway, Poland, Ro-

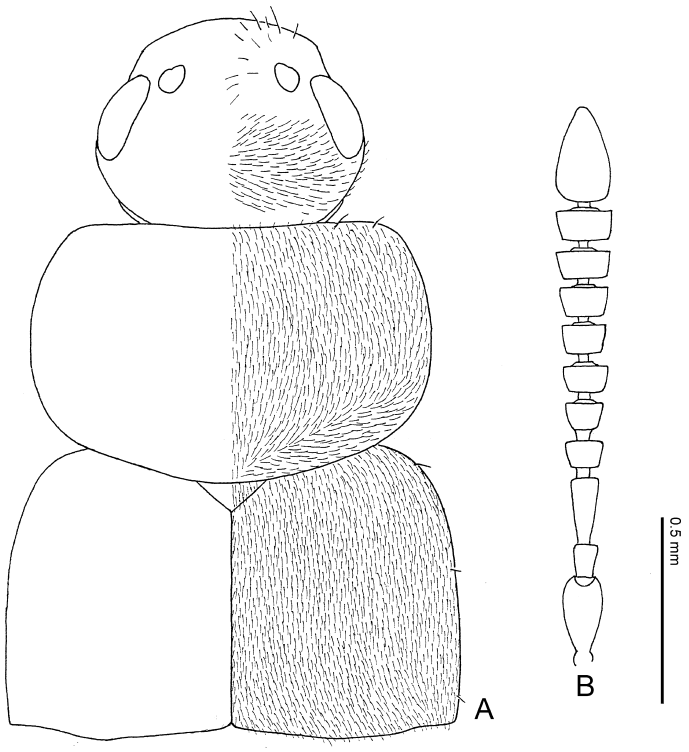

Fig. 121. *Pella laticollis* (Märkel). — A, Fore body, dorsal view; B, right antenna.

mania, Russia (North and Central European Territories), Slovakia, Sweden, Switzerland, Ukraine. New to Bulgaria.

Diagnosis. *Pella laticollis* is very similar to *P. hampei* not only in general appearance but also in genitalia, but can be distinguished from the latter by the slightly darker colour, the more matted body surface, the thinner antennae, and the number of macroseta of 8th sternite: 19–22. Host ant species is different, and this species is associated with *Lasius* (*Dendrolasius*) *fuliginosus*. Among the other sympatric species, *Pella laticollis* is somewhat similar to *P. lugens* in the wide pronotum but may be easily distinguished from the latter by the smaller body and the unicoloured elytra.

Redescription. Body slender. Reddish brown to blackish brown in ground colour; antennae, mouthparts, legs, and around posterior margins of 3rd to 6th tergites reddish paler. Head (Fig. 121 A) widest around middle of eyes; surface finely reticulated, moderately covered with setae; setae moderate in length, longer than those on pronotum and elytra; length of eyes 0.35–0.36 times as long as head width. Antennae (Fig. 121 B) shorter than head, pronotum and elytra combined; 1st segment almost as long as 2nd and 3rd combined; 2nd segment slightly shorter than 3rd; 3rd segment about 1/2 as long as 1st; 4th to 10th segments wider than long; 11th segment shorter than 1st; approximate relative lengths of segments from basal to apical: 24 : 9.5 : 13.5 : 7.5 : 6.5 : 6 : 6 : 6 : 6 : 6.5 : 21. Pronotum (Fig. 121 A) elliptical, 1.48–1.57 times as wide as long, widest around middle; posterior margin rounded; surface finely reticulated, moderately covered with setae, with 6 or 7 macrosetae along lateral margin. Scutellum with surface smooth, moderately covered with setae. Elytra (Fig. 121 A) slightly widened apicad; surface smooth, moderately

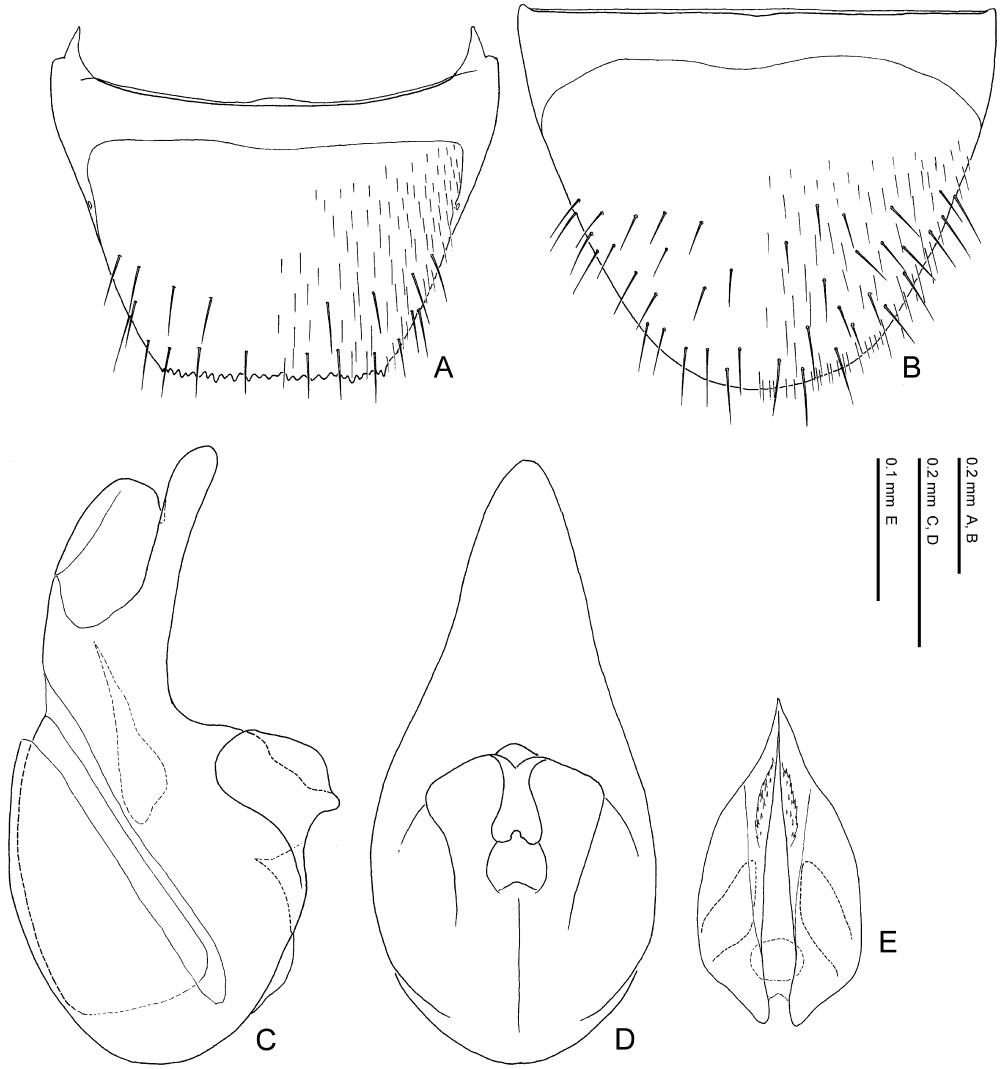

Fig. 122. *Pella laticollis* (Märkel). — A, Eighth abdominal tergite, dorsal view; B, 8th abdominal sternite, ventral view; C, median lobe of aedeagus, lateral view; D, ditto, ventral view; E, copulatory piece, dorsal view. Male.

covered with setae, with 5 or 6 small macrosetae laterally. Legs short; hind tibia 0.88–0.89 times as long as elytra; approximate relative lengths of tarsal segments from basal to apical: 6 : 5 : 5 : 9.5 in fore tarsus; 7 : 6.5 : 6 : 5 : 8.5 in mid tarsus; 17 : 9 : 7.5 : 7 : 11 in hind tarsus. Abdomen subparallel-sided, somewhat wider than elytra, widest around 5th and 6th segments; surface smooth; 3rd to 7th tergites sparsely covered with minute setae and with a row of long setae along posterior margins; 8th tergite (Figs. 122 A, 123 A) with 9 (sometimes 10 or 11) macrosetae; 9th tergite with 4 macrosetae; 10th tergite with posterior margin slightly rounded, with 4 macrosetae.

Male: Eighth tergite (Fig. 122 A) with posterior margin truncate, its apex dentate; 8th sternite (Fig. 122 B) with posterior margin rounded, with 20–22 macrosetae; 9th sternite with posterior margin slightly emarginated. Aedeagus (Figs. 122 C, 122 D) somewhat pear-shaped in ventral view; apical lobe slightly curved ventrad in lateral view, obtuse at apex in lateral and ventral

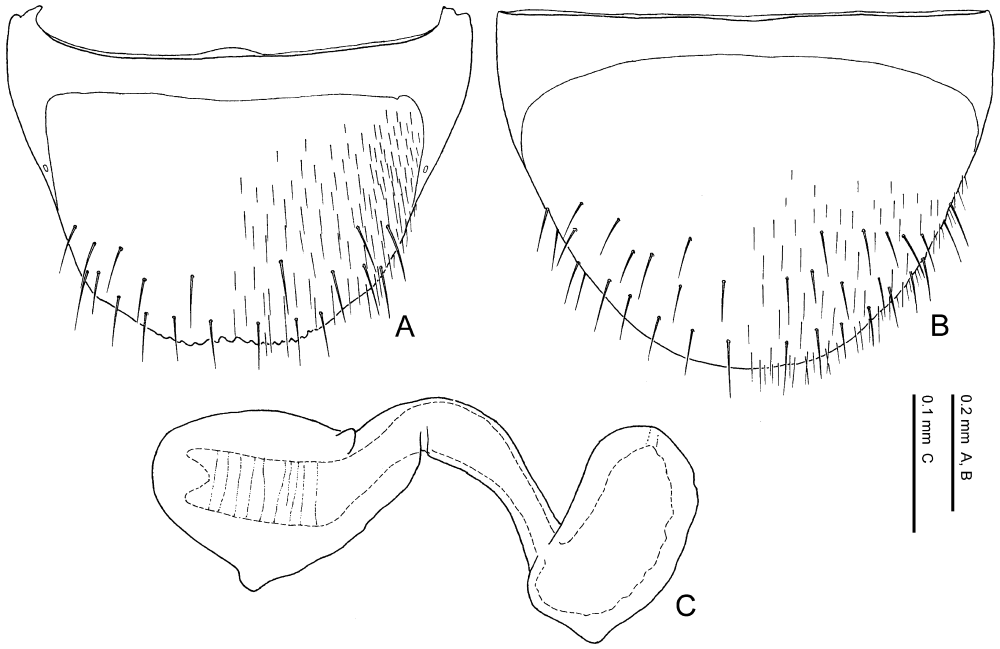

Fig. 123. *Pella laticollis* (Märkel). — A, Eighth abdominal tergite, dorsal view; B, 8th abdominal sternite, ventral view; C, spermatheca. Female.

views; basal ridge roundly convex, extending to near bottom of basal capsule; copulatory piece of inner sac as in Fig. 122 E. Paramere with apical lobe of paramerite dilated apicad, rounded at apex, about 1/3 as long as condylite.

Female: Eighth tergite (Fig. 123 A) with posterior margin slightly emarginatemedially, around its emarginate apex weakly dentate; 8th sternite (Fig. 123 B) with 19–21 macrosetae; sensory setae of 8th sternite generalised, almost same as other setae in shape. Spermatheca (Fig. 123 C) curved three times; basal part slightly longer than apical part, bulbous around base, curved and narrowed around middle; apical part gently curved around middle, dilated apicad, its inner wall sparsely wrinkled from apex to around apical 3/5, with outer projection.

Measurements. BL, 4.0–4.8; FBL, 1.7–2.2; HL, 0.60–0.66; HW, 0.69–0.78; EL, 0.253–0.269; AL, 1.43–1.55; PL, 0.72–0.75; PW, 1.07–1.16; ELL, 0.83–0.91; ELW, 1.21–1.30; HTL, 0.73–0.81.

Bionomics. This species is associated with *Lasius* (*Dendrolasius*) *fuliginosus* and is common (Franc, 1992).

Symbiotic host. *Lasius* (*Dendrolasius*) *fuliginosus*.

Pella hampei (Kraatz, 1862), n. comb.

(Figs. 124–126)

Myrmedonia Hampei Kraatz, 1862: 267 (original description). — Ganglbauer, 1895: 124 (*Myrmedonia* (*Pella*), key, description). — Fenyes, 1920: 298 (*Zyras* (*Myrmedonia*), list). — Bernhauer & Scheerpeltz, 1926: 699 (*Zyras* (*Myrmedonia*), list). — Lohse, 1974: 226 (*Zyras* (*Pella*), key); 1989: 220 (*Zyras* (*Pella*), key). — Likovský, 1993: 59 (*Zyras* (*Lepla*), list). — Smetana, 2004: 460 (*Zyras* (*Lepla*), list).

Type material. Syntypes: **Croatia**: 1♀, "Croat./Hampe/Coll. Kraatz/Syntypus/Hampei

mihi Croat. Hampe/Dtsch. Entomol. Institut Berlin/Coll. DEI Eberswalde"; 2♂♂, "Hampei Krtz Croatia Hampe/Syntypus/D.E.I. coll. Vo Heyden/Coll. DEI Eberswalde".

These are deposited in DEI.

Type locality. Croatia.

Other material. **Bulgaria**: 1♀, St. Ivan, Sofia, 3 VIII 1908, F. Rambousek (NMP). **Croatia**: Reitter (no other data) (cMar); 1♂, "Hampei Kr., Croatia, Kraatz/c. Eppelsh. Steind. d." (NHMW); 1♀, "Hampei Croatia Schauffs/c. Eppelsh. Steind. d./Hampei Kraatz Berl. Zeit., 1862. p. 267" (NHMW); 1♂, "Hampei Krtz Croatia Miller/D.E.I. coll. Vo Heyden/Coll. DEI Eberswalde" (DEI); 1 ex., "Croatia Apfelbeck/Hampei Kr." (NHMW); 1 ex., "Croatia/Hampe/hampei Kr." (NHMW). **Hungary**: 1 ex., "c. Eppelsh. Steind. d./Hampei Kr. Hungar. Geb. Dr. Chyici." (NHMW); 1 ex., "c. Eppelsh. Steind. d./Hampei Hungar" (NHMW). **Yugoslavia**: 1♂, Topčider, Beograd, VI 1910, F. Rambousek (NMP).

Distribution. European subregion, Mediterranean subregion. EUROPE: Albania, Austria, Bulgaria, Croatia, Czech Republic, Greece, Hungary, Slovakia, Yugoslavia. New to Bulgaria.

Diagnosis. *Pella hampei* is very similar to *P. laticollis* not only in general appearance but also in genitalia, but can be distinguished from the latter by the slightly paler colour, the more shining body surface, the clavate antennae, and the number of macroseta of 8th sternite 13–19. Host ant species is differentiated, and this species is associated with *Liometopum microcephalum*. Among the other sympatric species, *Pella hampei* is somewhat similar to *P. lugens* in the wide pronotum but may be easily distinguished from the latter by the smaller body and the unicoloured elytra. *Pella lugens* is associated with *Lasius* (*Dendrolasius*) *fuliginosus*.

Redescription. Body slender. Pale brown to reddish brown in ground colour; antennae,

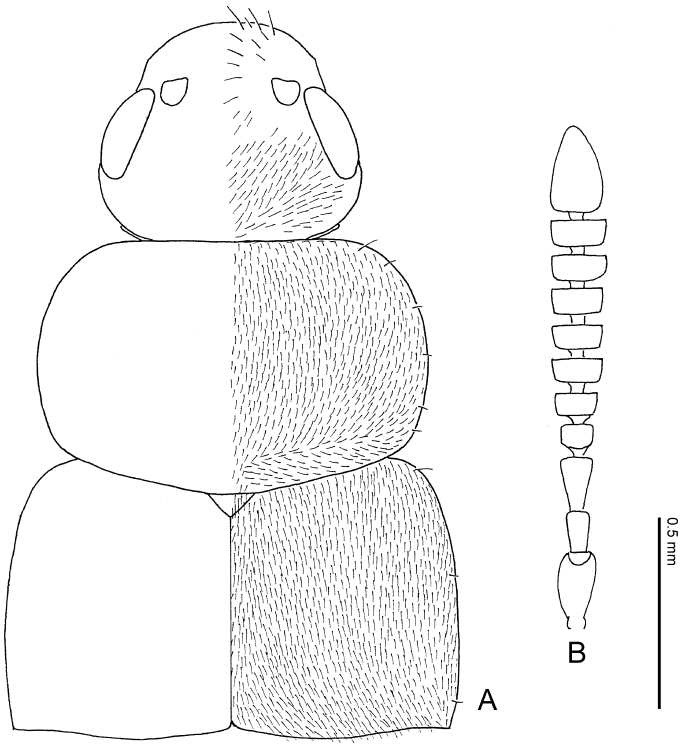

Fig. 124. *Pella hampei* (Kraatz).—A, Fore body, dorsal view; B, right antenna.

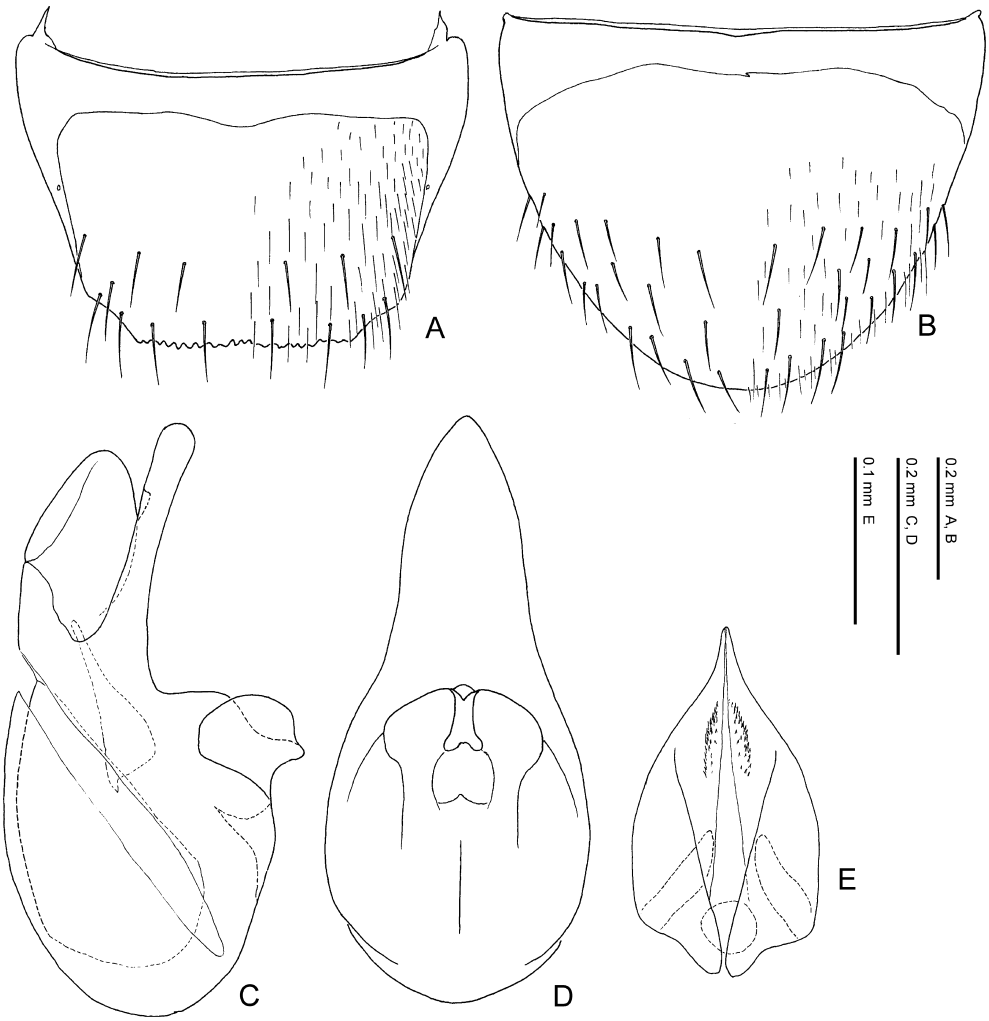

Fig. 125. *Pella hampei* (Kraatz). — A, Eighth abdominal tergite, dorsal view; B, 8th abdominal sternite, ventral view; C, median lobe of aedeagus, lateral view; D, ditto, ventral view; E, copulatory piece, dorsal view. Male.

mouthparts, legs, and around posterior margins of 3rd to 6th tergites reddish paler. Head (Fig. 124 A) widest around middle of eyes; surface finely reticulated, moderately covered with setae; setae moderate in length, longer than those on pronotum and elytra; length of eyes 0.43–0.44 times as long as head width. Antennae (Fig. 124 B) shorter than head, pronotum and elytra combined; 1st segment almost as long as 2nd and 3rd combined; 2nd segment slightly shorter than 3rd; 3rd segment about 1/2 as long as 1st; 4th to 10th segments wider than long; 11th segment shorter than 1st; approximate relative lengths of segments from basal to apical: 20 : 8.5 : 11.5 : 5.5 : 5.5 : 5.5 : 5.5 : 5 : 5 : 6 : 19. Pronotum (Fig. 124 A) elliptical, 1.54–1.61 times as wide as long, widest around middle; posterior margin rounded; surface finely reticulated, moderately covered with setae, with 6 or 7 macrosetae along lateral margin. Scutellum with surface smooth, moderately covered with setae. Elytra (Fig. 124 A) slightly widened apicad; surface smooth, moderately covered with setae, with 5 or 6 small macrosetae laterally. Legs short; hind tibia 0.82–0.86 times as long as elytra; approximate relative lengths of tarsal segments from basal to apical: 6 : 5 : 4.5 :

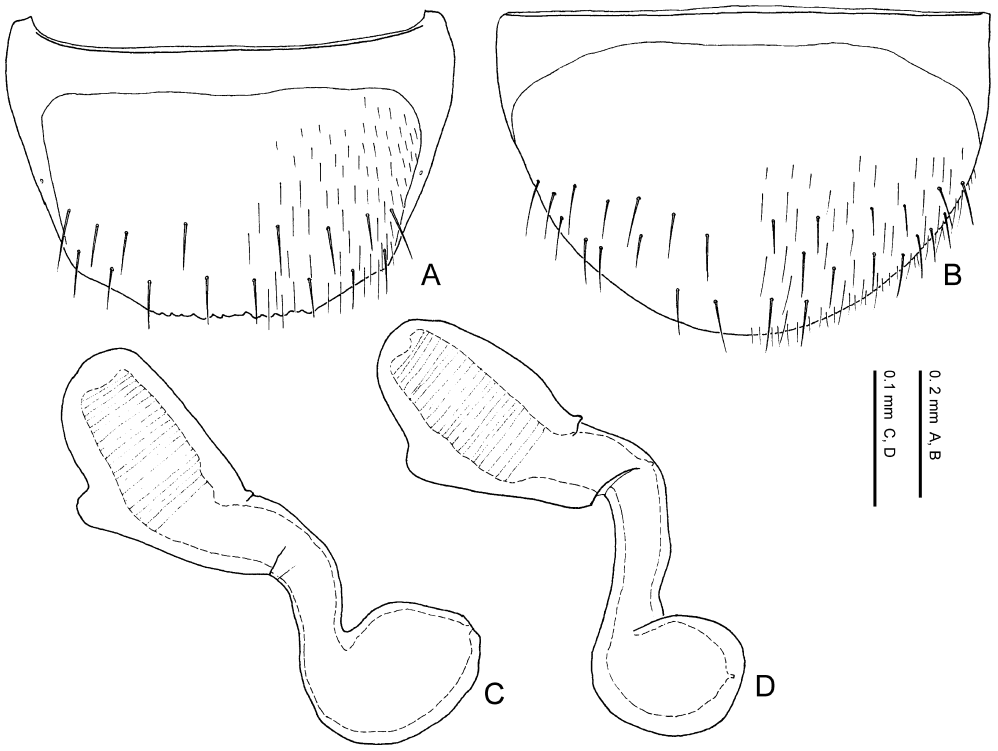

Fig. 126. *Pella hampei* (Kraatz). — A, Eighth abdominal tergite, dorsal view; B, 8th abdominal sternite, ventral view; C, D, spermathecae. Female.

9.5 in fore tarsus; 10 : 6 : 5 : 5 : 9 in mid tarsus; 17 : 9 : 7 : 6.5 : 10 in hind tarsus. Abdomen subparallel-sided, somewhat wider than elytra, widest around 5th and 6th segments; surface smooth; 3rd to 7th tergites sparsely covered with minute setae and with a row of long setae along posterior margins; 8th tergite (Figs. 125 A, 126 A) with 8 (sometimes 7) macrosetae; 9th tergite with 4 macrosetae; 10th tergite with posterior margin slightly rounded, with 4 macrosetae.

Male: Eighth tergite (Fig. 125 A) with posterior margin truncate, its apex dentate; 8th sternite (Fig. 125 B) with posterior margin rounded, with 18 or 19 macrosetae; 9th sternite with posterior margin slightly emarginated. Aedeagus (Figs. 125 C, 125 D) somewhat pear-shaped in ventral view; apical lobe slightly curved ventrad in lateral view, obtuse at apex in lateral and ventral views; basal ridge roundly convex extending to near bottom of basal capsule; copulatory piece of inner sac as in Fig. 125 E. Paramere with apical lobe of paramerite dilated apicad, rounded at apex, about 1/3 as long as condylite.

Female: Eighth tergite (Fig. 126 A) with posterior margin truncate or slightly emarginate medially, its apex weakly dentate; 8th sternite (Fig. 126 B) with 13–15 macrosetae; sensory setae of 8th sternite generalised, almost the same as the other setae in shape. Spermatheca (Figs. 126 C, 126 D) curved three times; basal part slightly longer than apical part, bulbous around base, curved and narrowed around middle; apical part gently curved around middle, dilated apicad, its inner wall sparsely wrinkled from apex to around apical 3/5, with outer projection.

Measurements. BL, 3.7–4.0; FBL, 1.8–1.9; HL, 0.57–0.60; HW, 0.69–0.70; EL, 0.249–0.265; AL, 1028–1.38; PL, 0.67–0.69; PW, 1.04–1.08; ELL, 0.80–0.83; ELW, 1.20–1.22; HTL, 0.66–0.71.

Bionomics. This species is collected from nests of *Liometopum microcephalum* usually together with *Pella ruficollis*. This species occurs very locally and rarely in Central Europe probably because of rarity of the host ants (Franc, 1992).

Symbiotic host. *Liometopum microcephalum*.

Pella indiscreta (Sharp, 1888), n. comb.

(Figs. 127–129)

Myrmedonia indiscreta Sharp, 1888: 291.—Fenyes, 1920: 298 (*Zyras* (*Myrmedonia*), list).—Bernhauer & Scheerpeltz, 1926: 700 (*Zyras* (*Myrmedonia*), list).—Smetana, 2004: 461 (*Zyras* (*Pella*), list).

Type material. Syntypes. **Japan**: 1♀, "Myrmedonia indiscreta Type D.S. Japan 31. VII. 1881. Lewis./Type (red round curator label)/Shimonosuwa 31. 7. 81./Japan. G. Lewis./Sharp Coll., 1905-313/SYN-TYPE" (BMNH); 1♀, "Sap (written underside of paper card specimen glued on)/Sapporo. 5. VIII.–16. VIII. 80./Japan. G. Lewis./Sharp Coll. 1905-313" (BMNH).

Other material. Japan: Hokkaidô: 1♂, 1♀, 37 exs., Nozaki, Bihoro-chô, 23 VI 2001, Y. Yamaga (*LDC*); 1♂, Hitsujigaoka, Sapporo-shi, 21 IX 1998, M. Maruyama (*LDS*); 4 exs., Kannon-zawa, Sapporo-shi, 31 V 2002, M. Maruyama (*LDFJ*); 2 exs., Akagawa, Hakodate-shi, 15 VIII 1992, M. Nishikawa (*LDFJ*) (cMar). Honshû: 30 exs., Aobayama, Sendai-shi, Miyagi-ken, 22 IX 2001, M. Maruyama (*LDN*); 2 exs., Kinshû-ko, Yuda-machi, Waga-gun, Iwate-ken, 19 V 2004, H. Kamezawa (*LDFJ*); 2 exs., Yukiwari-bashi, Nishigô-mura, Fukushima-ken, 29 VII 2000, T. Kobayashi (*LDC*); 2♂♂, 2♀♀, 6 exs., Aoyagidaira, Kuriyama-mura, Tochigi-ken, 1 IX 1999, T. Kobayashi (*LDN*); 5 exs., Tobiyama-jôshi, Môka-shi, Tochigi-ken, 17 VI 1998, M. Maruyama (*LDFJ*); 6 exs., Shimokomoriya, Utsunomiya-shi, Tochigi-ken, 6 VII 1999, M. Maruyama (*LDFJ*); 1 ex., Akebono, Shibukawa-shi, Gumma-ken, 1 VII 2004, T. Watanabe (cWat); 3 exs., Nakano, Shôwa-machi, Kitakatsushika-gun, Saitama-ken, 4 V 2003, H. Kamezawa (*LDFJ*); 2 exs., same data but, 25 V 2003; 1 ex., Tokigawa, Kamagata, Ranzan-machi, Saitama-ken, 22 IV 1999, K. Toyoda (*LDFJ*); 4 exs., Akigase-kôen, Urawa-shi, Saitama-ken, 19 V 2000, H. Sugaya (*LDFJ*); 3 exs., Daiyûzan, Hakone-machi, Kanagawa-ken, 31 VIII 1982, Y. Shibata (*LDFJ*) (SCM); 1 ex., Fukazawa-jûnimagari, Nakamaru, Nagasaka-chô, Kitakoma-gun, Yamanashi-ken, 6 VI 2004, M. Maruyama (*LDFJ*); 1 ex., Kamikandori, Akeno-mura, Kitakoma-gun, Yamanashi-ken, 6 VI 2004, M. Maruyama (*LDFJ*); 1 ex., Jôyama, Matsumoto-shi, Nagano-ken, 12–13 VII 1998, M. Maruyama (*LDN*). Shikoku: 1 ex., Ôtaki-san, Shionoe-chô, Kagawa-ken, 2 VI 2001, M. Maruyama & Y. Kamite (*LDS*).

Type locality. Shimonosuwa, Nagano-ken, or Sapporo-shi, Hokkaidô, Japan.

Distribution. Manchurian subregion. ASIA: Japan (Hokkaidô, Honshû, Shikoku).

Diagnosis. *Pella indiscreta* is similar to *P. laticollis* and *P. hamepei* in general appearance, but is distinguished from the latter two by the evidently smaller body and the dorsal bridge of aedeagal median lobe longer. *Pella indiscreta* and the latter two are locally isolated. Among the sympatric species *Pella indiscreta* is somewhat similar to *P. kinomurai* in general appearance but distinguished from the latter by the much smaller body.

Redescription. Body slender. Pale brown to reddish brown in ground colour; antennae, mouthparts, legs, and around posterior margins of 3rd to 6th tergites reddish paler. Head (Fig. 127 A) widest around middle of eyes; surface finely reticulated, densely covered with setae; setae moderate in length, longer than those on pronotum and elytra; length of eyes 0.39–0.42 times as long as head width. Antennae (Fig. 127 B) shorter than head, pronotum and elytra combined; 1st segment almost as long as 2nd and 3rd combined; 2nd segment slightly shorter than 3rd; 3rd seg-

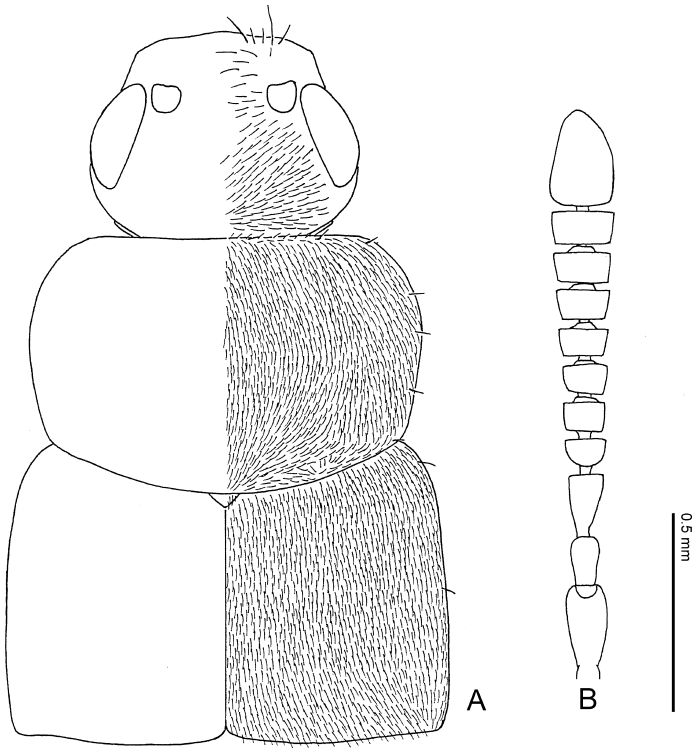

Fig. 127. *Pella indiscreta* (Sharp). — A, Fore body, dorsal view; B, right antenna.

ment about 1/2 as long as 1st; 4th to 10th segments wider than long; 11th segment shorter than 1st; approximate relative lengths of segments from basal to apical: 21.5 : 9.5 : 13 : 6.5 : 6.5 : 5.5 : 6 : 6 : 6.5 : 7 : 19.5. Pronotum (Fig. 127 A) elliptical, 1.42–1.50 times as wide as long, widest around middle; posterior margin rounded; surface finely reticulated, densely covered with setae, with 4 or 5 macrosetae along lateral margin. Scutellum with surface smooth, moderately covered with setae. Elytra (Fig. 127 A) slightly widened apicad; surface smooth, densely covered with setae, with 3 or 4 small macrosetae laterally. Legs moderate in length; hind tibia 0.92–0.97 times as long as elytra; approximate relative lengths of tarsal segments from basal to apical: 6 : 5 : 4.5 : 9.5 in fore tarsus; 10 : 8 : 7 : 5.5 : 9 in mid tarsus; 18 : 11 : 8.5 : 5.5 : 11.5 in hind tarsus. Abdomen subparallel-sided, somewhat wider than elytra, widest around 5th and 6th segments; surface smooth; 3rd to 7th tergites sparsely covered with minute setae and with a row of long setae along posterior margins; 8th tergite (Figs. 128 A, 129 A) with 8 (sometimes 7) macrosetae; 9th tergite with 4 macrosetae; 10th tergite with posterior margin slightly rounded, with 4 macrosetae.

Male: Eighth tergite (Fig. 128 A) with posterior margin truncate, its apex dentate; 8th sternite (Fig. 128 B) with posterior margin rounded, with 14–17 macrosetae; 9th sternite with posterior margin slightly emarginated. Aedeagus (Figs. 128 C, 128 D) elongate pear-shaped in ventral view; apical lobe slightly curved ventrad in lateral view, obtuse at apex in lateral and ventral views; dorsal bridge very long; basal ridge roundly convex, extending near bottom of basal capsule; copulatory piece of inner sac as in Fig. 128 E. Paramere with apical lobe of paramerite dilated apicad, rounded at apex, about 1/3 as long as condylite.

Female: Eighth tergite (Fig. 129 A) with posterior margin truncate or slightly emarginate me-

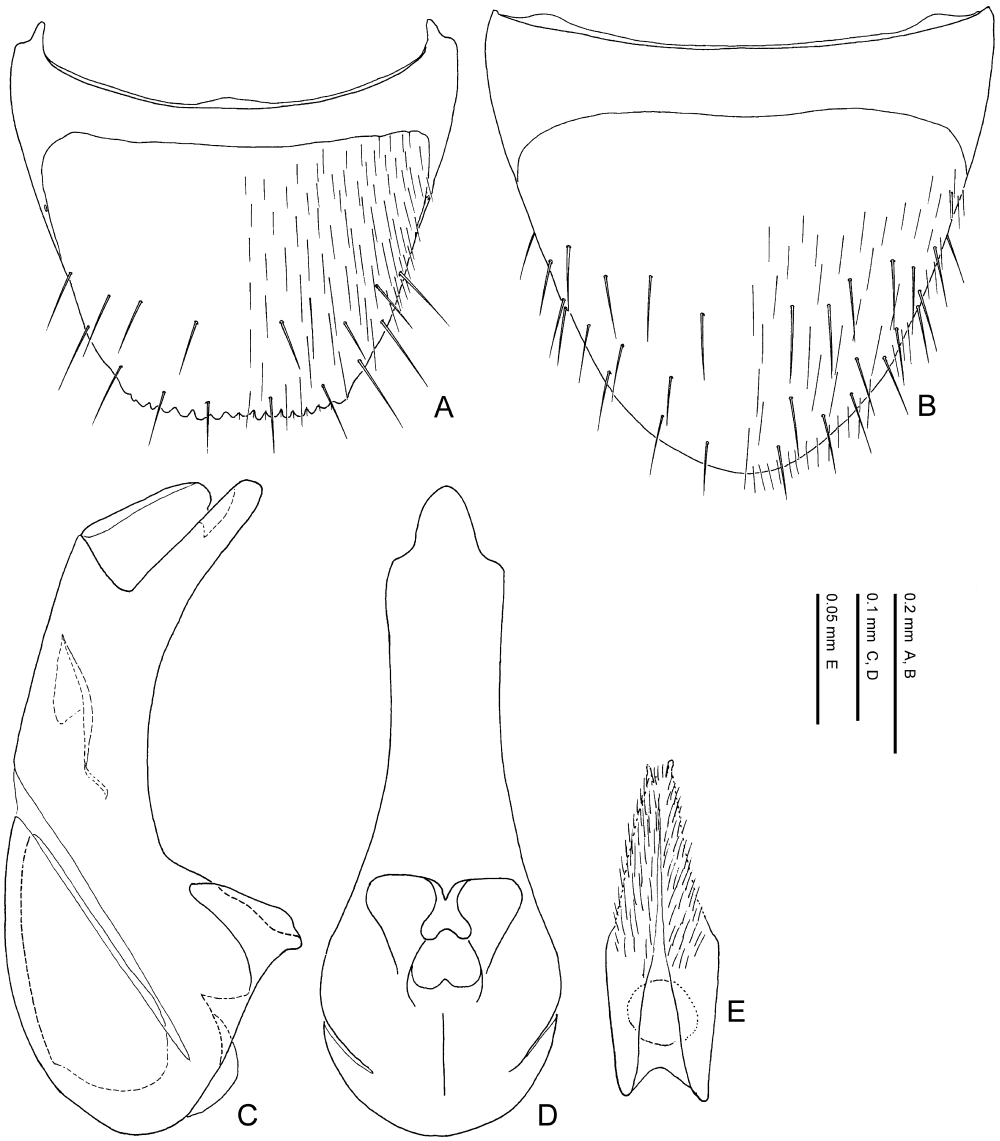

Fig. 128. *Pella indiscreta* (Sharp).—A, Eighth abdominal tergite, dorsal view; B, 8th abdominal sternite, ventral view; C, median lobe of aedeagus, lateral view; D, ditto, ventral view; E, copulatory piece, dorsal view. Male.

dially, its apex weakly dentate; 8th sternite (Fig. 129 B) with 11 or 12 macrosetae; sensory setae of 8th sternite generalised, almost the same as the other setae in shape. Spermatheca (Fig. 129 C) curved three times; basal part about twice as long as apical part, slightly bulbous around base, curved near base, its inner wall moderately wrinkled; apical part gently curved around base, dilated apicad, its inner wall densely wrinkled from apex to around apical 3/4.

Measurements. BL, 3.3–4.3; FBL, 1.7–2.0; HL, 0.55–0.60; HW, 0.65–0.68; EL, 0.254–0.288; AL, 1.32–1.55; PL, 0.70–0.65; PW, 0.93–1.00; ELL, 0.71–0.81; ELW, 1.02–1.13; HTL, 0.66–0.79.

Bionomics. This species is collected from nests of *Lasius* (*Dendrolasius*) spp. mainly from July to October (see, also Life cycle). Four ant species are known as the symbiotic hosts of this

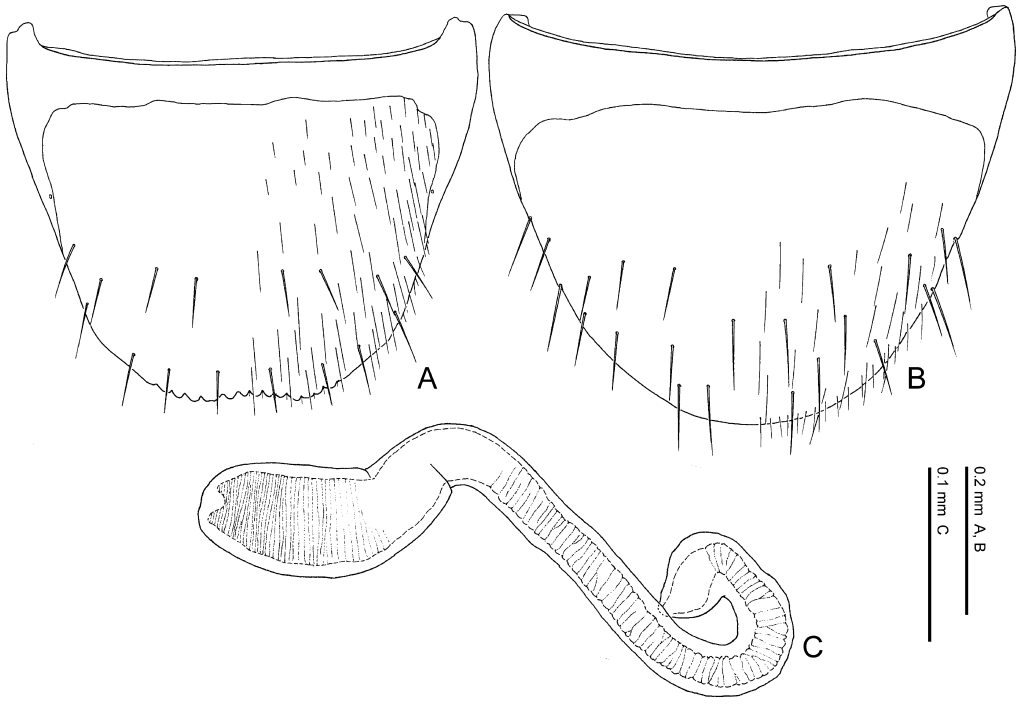

Fig. 129. *Pella indiscreta* (Sharp). — A, Eighth abdominal tergite, dorsal view; B, 8th abdominal sternite, ventral view; C, spermatheca. Female.

species, but very rare in colonies of *Lasius* (*Dendrolasius*) *fuji* and *L.* (*D.*) *spathepus*. In contrast, a number of specimens were collected from colonies of *L.* (*D.*) *nipponensis* and *L.* (*D.*) *capitatus*. Thus, this species is considered to have more or less host preference to *Lasius* (*Dendrolasius*) *nipponensis* and *L.* (*D.*) *capitatus*.

Symbiotic hosts. *Lasius* (*Dendrolasius*) *fuji*, *L.* (*D.*) *spathepus*, *L.* (*D.*) *nipponensis*, *L.* (*D.*) *capitatus*.

Incertae Sedis

Pella pumila (Fiori, 1914), n. comb.

Zyras pumilus Fiori, 1914: 105 (original description). — Bernhauer & Scheerpeltz, 1926: 703 (list). — Smetana, 2004: 461 (*Zyras* (*Pella*), list).

Type material. Not examined.

Type locality. Bosco (Perugia), Umbria, Italy.

Comments. Unfortunately, the type material of this species was not found. After Fiori (1914), the type specimen was collected from a nest of *Liometopum microcephalum* in Italy together with *Pella ruficollis* and *P. laticollis*, and this species was similar to *P. cognata*. These suggest that this species is most probably a junior synonym of *Pella similis,* which is sometimes collected from a nest of *Liometopum microcephalum* and considerably similar to *P. cognata* in general appearance. Moreover, the original description fits well with that of *Pella similis*.

The Species that should be Excluded from *Pella*

Genus *Zyras* Stephens, 1835

Zyras Stephens, 1835: 430 (original naming without description) [type species: *Aleochara haworthi* Stephens, 1832, by monotypy].—Fenyes, 1920: 293 (description).—Bernhauer & Scheerpeltz, 1926: 693 (list).—Scheerpeltz, 1934: 1648 (list).

Subgenus *Zyras* Stephens, 1835

Zyras Stephens, 1835: 430 [type species: *Aleochara haworthi* Stephens, 1832].—Thomson, 1860: 258 (list).—Mulsant & Rey, 1873a: 35 (list).—Reitter, 1909 (description): 42.—Bernhauer & Scheerpeltz, 1926: 694 (list).—Scheerpeltz, 1934: 1650 (list).

Comments. Although the subgenus *Zyras* of the genus *Zyras* has not been well defined, the following three species are considered to belong to the subgenus because of their close relationship with the type species, *Zyras haworthi*, in the following character states: body shining, without microsculpture; body irregularly covered with small setae; 1st segment of labial palpus much longer than 2nd; ligula long, with minute setae at apex; pronotum coarsely punctured; pronotum sparsely covered with long setae.

Many species of this subgenus are known in southern Asia. However, most of them were briefly described and have not been redescribed. Thus, precise systematic position of the species redescribed in the present study could not be determined at present.

Zyras (*Zyras*) *coloratus* Cameron, 1939, n. assignment

(Figs. 130–131)

Zyras (*Pella*?) *coloratus* Cameron, 1939: 545 (original description).—Smetana, 2004: 461 (*Zyras* (*Pella*), list).

Type material. Syntypes: **India**: 1♀, "Dehra Dun, Dr. M. Cameron, 8–8, 1921/Z., coloratus, Cam, TYPE/SYNTYPE (blue round curator label)" (BMNH); 1♀, "Dehra Dun, Dr. M. Cameron, 9–9, 1922/N. GEN/SYNTYPE (blue round curator label)" (BMNH).

Type locality. Dehra Dun, India.

Other material. Not examined.

Distribution. Oriental region: Indian subregion. ASIA: India.

Diagnosis. Among the examined species of the genus *Zyras*, *Z. coloratus* is considered to be closely allied to *Z. pictus* (Sharp, 1874) described from Japan and some species widely distributed in Southeast Asia in general appearance and punctulation of body surface but can be distinguished from the latter species by the clavate antennae, the larger head which is only slightly narrower than the pronotum and the macrosetae of the pronotum, elytra and abdomen much shorter.

Redescription. Body slender, slightly matted. Reddish brown in ground colour; pronotum, elytra, legs, and 2nd to 4th and base of 5th abdominal segments yellow. Head (Fig. 130 A) widest at eyes; surface smooth, moderately covered with setae; setae moderate in length, as long as those on pronotum and elytra; eyes prominent and its length 0.46–0.48 times as long as head width. Antennae (Fig. 130 B) clavate, shorter than head, pronotum and elytra combined; 1st segment slightly longer than 2nd and 3rd combined; 2nd segment slightly longer than 3rd; 3rd segment about 1/2 as long as 1st; 4th to 10th segments wider than long; 11th segment shorter than 1st; approximate relative lengths of segments from basal to apical: 19 : 9.5 : 8.5 : 3.5 : 3 : 3.5 : 3.5 : 3.5 : 4 : 4 : 15. Pronotum (Fig. 130A) subtrapeziform, 1.19–1.28 times as wide as long, widest

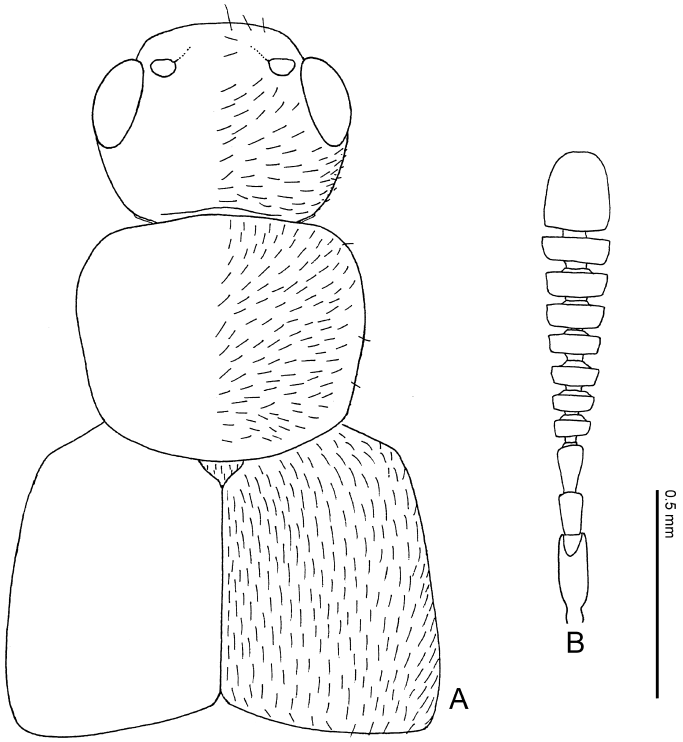

Fig. 130. *Zyras* (*Zyras*) *coloratus* Cameron. — A, Fore body, dorsal view; B, right antenna.

around anterior 1/5, narrowed posteriorly; posterior margin rounded; surface sparsely covered with setae and punctures, with 7 or 8 macrosetae along lateral margin. Scutellum with surface smooth, with 2 or 3 setae. Elytra (Fig. 130 A) gently widened apicad; surface moderately covered with setae and punctures, with 4 or 5 small macrosetae laterally. Legs moderate in length; hind tibia 0.91–0.92 as long as elytra; approximate relative lengths of tarsal segments from basal to apical: 3 : 4 : 4 : 12 in fore tarsus; 6 : 5 : 5 : 4.5 : 10 in mid tarsus; 12 : 8 : 7 : 6 : 10 in hind tarsus. Abdomen subparallel-sided, slightly narrower than elytra, widest around 5th and 6th segments; surface smooth on 2nd to 7th tergites and finely punctured on 8th tergite; 3rd to 6th tergites sparsely and uniformly covered with minute setae, except a row of long setae along posterior margin; 7th tergite moderately covered with long setae; 8th tergite (Fig. 131 A) with 9 or 10 macrosetae; 9th tergite with 6 or 7 macrosetae; 10th tergite with posterior margin slightly rounded, with 3 macrosetae.

Male unknown.

Female: Eighth tergite (Fig. 131 A) with posterior margin slightly rounded; 8th sternite (Fig. 131 B) slightly emarginate postero-medially, with 7 macrosetae; sensory setae of 8th sternite spindle-shaped, flattened. Spermatheca (Figs. 131 C, 131 D) with duct coiled about 10 times around base and coiled once near apex; basal part and apical part gently curved around middle, dilated apicad.

Measurements. BL, 3.9–4.3; FBL, 1.6–1.8; HL, 0.50–0.53; HW, 0.61–0.63; EL, 0.152–0.161; AL, 1.19–1.25; PL, 0.59–0.60; PW, 0.71–0.75; ELL, 0.74–0.75; ELW, 1.00–0.96; HTL, 0.67–0.69.

Bionomics. No information.

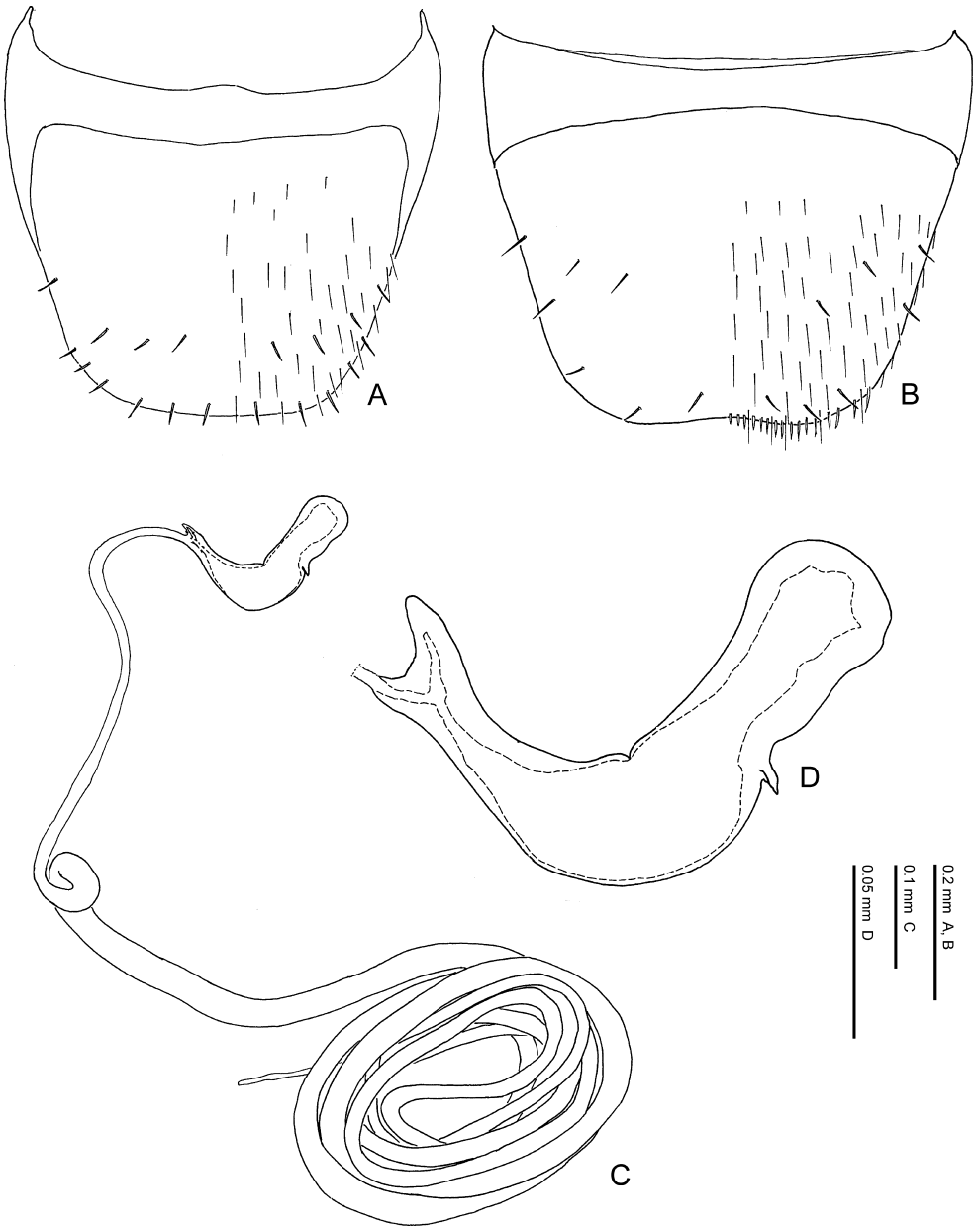

Fig. 131. *Zyras* (*Zyras*) *coloratus* Cameron.—A, Eighth abdominal tergite, dorsal view; B, 8th abdominal sternite, ventral view; C, spermatheca; D, apex of spermatheca. Female.

Zyras* (*Zyras*) *iridescens (Sawada, 1970), n. assignment

Bolitochara iridescens Sawada, 1970b: 49 (original description).—Gürlich, 1981: 211 (*Lepla*, chaetotaxy).—Smetana, 2004: 460 (*Zyras* (*Lepla*), list).

Comments. This species was originally described from Japan under the genus *Bolitochara* (Sawada, 1970b), and at that time, *Bolitochara* was assigned by authors to the members of *Zyras*. Gürlich (1981) regarded this species as a member of the genus *Lepla* based on chaetotaxy of the

abdomen in referring the original description. However, this species is typically a member of *Zyras*, and is closely allied to the type species of the genus *Zyras*: *Z. haworthi*.

This species will be redescribed in a revision of the Japanese species of the genus *Zyras* (Maruyama, in prep.).

Zyras* (*Zyras*) *quasar Dvořák, 1996, n. assignment

(Figs. 132, 133)

Zyras (*Pella*) *quasar* Dvořák, 1996: 6 (original description).

Type material. Holotype: **Vietnam**: ♂, "Vietnam 20–30. 12. 1980 Taj Nguen [Thái Nguyên] Bud Lioj 65 km N Ankche A Pokarzvekij legit./HOLOTYPE/Zyras quasar sp. n., det. M. Dvořák, 90" (cDvor).

Type locality. Thái Nguyên, Bud Lioj, Vietnam.

Other material. Not examined.

Distribution. Oriental region: Indo-Chinese subregion. ASIA: Vietnam.

Diagnosis. *Zyras quasar* may be distinguished from the other species of the genus by a combination of the following character states in addition to aedeagal shape: 1) body almost uniformly reddish brown; 2) pronotal disc with surface smooth; 3) depressions of 3rd to 6th tergites with a row of punctures.

Redescription. Body slender, shining. Reddish brown in ground colour; antennae darker; mouthparts, around antero-lateral corners of elytra, legs and paratergites paler. Head (Fig. 132 A) widest at eyes; surface smooth, sparsely covered with setae; setae long, as long as those on

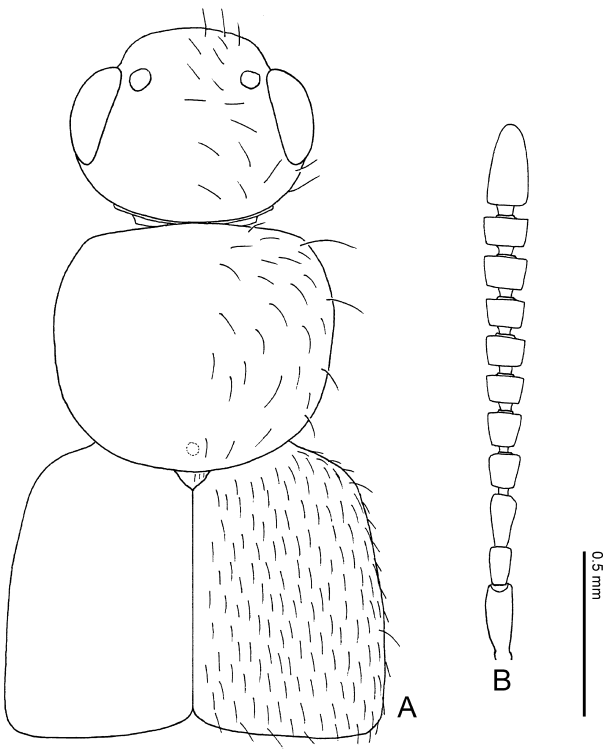

Fig. 132. *Zyras* (*Zyras*) *quasar* Dvořák.—A, Fore body, dorsal view; B, right antenna.

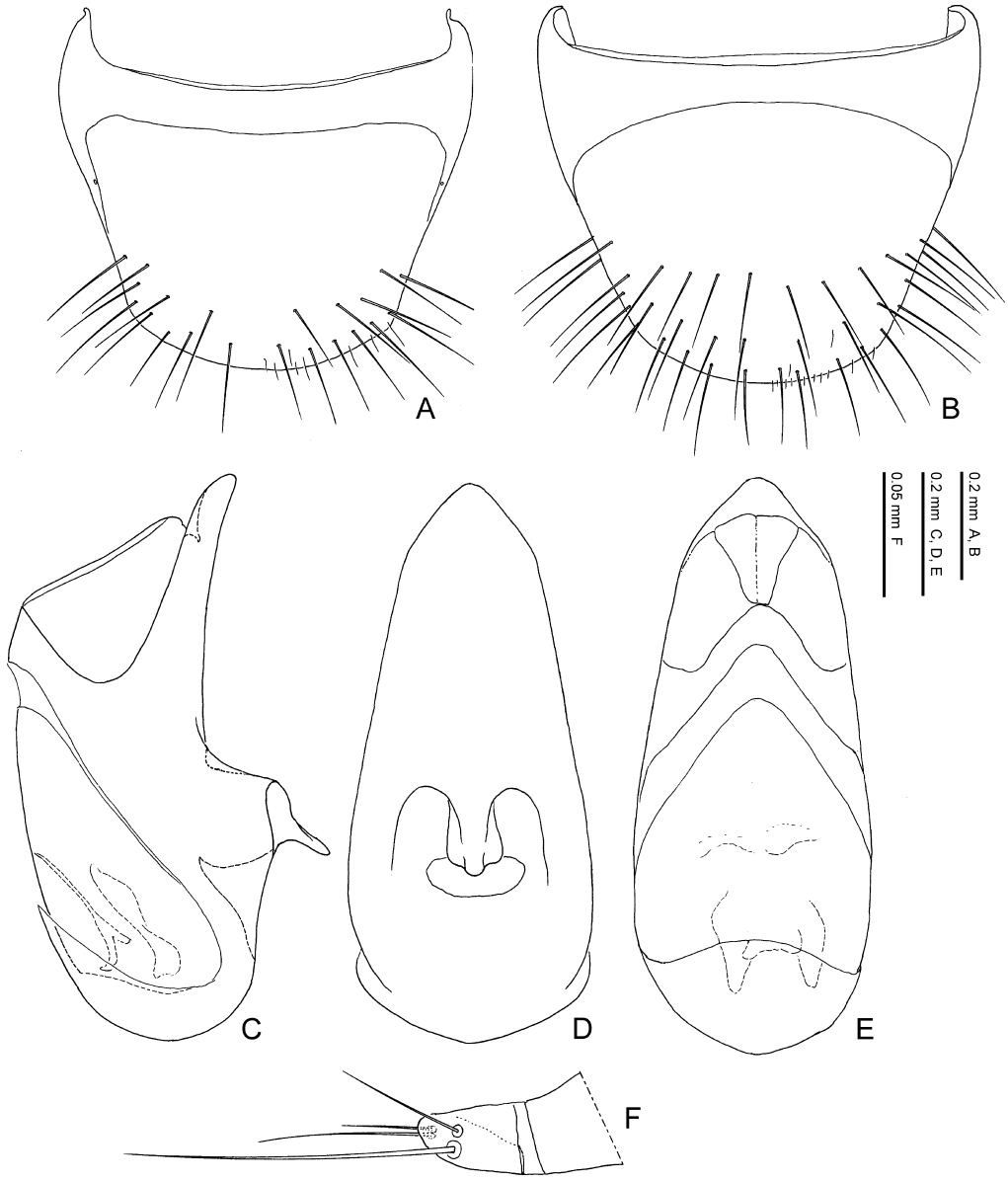

Fig. 133. *Zyras* (*Zyras*) *quasar* Dvořák. — A, Eighth abdominal tergite, dorsal view; B, 8th abdominal sternite, ventral view; C, median lobe of aedeagus, lateral view; D, ditto, ventral view; E, ditto, dorsal view; F, apical lobe of paramere, lateral view. Male.

pronotum and elytra; eyes prominent, large, its length 0.45 times as long as head width. Antennae (Fig. 132 B) slender, shorter than head, pronotum and elytra combined; 1st segment slightly shorter than 2nd and 3rd combined; 2nd segment slightly shorter than 3rd; 3rd segment about 1/2 as long as 1st; 4th to 7th segments as long as wide; 8th to 10th segments slightly wider than long; 11th segment shorter than 1st; approximate relative lengths of segments from basal to apical: 22 : 11 : 12 : 8 : 7.5 : 7 : 7 : 7 : 7 : 7.5 : 21. Pronotum (Fig. 132 A) almost circular, 1.14 times as wide as long, widest around anterior 1/5, narrowed posteriorly; posterior margin rounded; surface

smooth, sparsely covered with long and suberect setae, with 5 or 6 macrosetae along lateral margin. Scutellum with surface roughly punctured, about 10 setae. Elytra (Fig. 132 A) gently widened apicad; surface moderately punctured and covered with long setae, with 4 or 5 macrosetae laterally. Legs moderate in length; hind tibia 1.10 times as long as elytra; approximate relative lengths of tarsal segments from basal to apical: 4.5 : 6 : 5 : 13.5 in fore tarsus; 10 : 8 : 5.5 : 5 : 11.5 in mid tarsus; 20.5 : 9.5 : 8 : 7 : 14 in hind tarsus. Abdomen subparallel-sided, slightly narrower than elytra, widest around 4th and 5th segments; surface smooth, except a row of punctures on depression of 3rd to 6th tergites and punctures around base of 7th tergite; 8th tergite (Fig. 133 A) with 11 macrosetae; 9th and 10th abdominal segments missing in the holotype.

Male: Eighth tergite (Fig. 133 A) with posterior margin rounded; 8th sternite (Fig. 133 B) with posterior margin rounded, with 18–22 macrosetae. Aedeagus (Figs. 133 C–133 E) oval in ventral view; apical lobe slightly curved ventrad, somewhat pointed at apex in lateral view, obtuse at apex in ventral view; basal ridge absent. Paramere with apical lobe of paramerite dilated apicad, rounded at apex, 1/4 as long as condylite.

Female unknown.

Measurements. BL, 5.1; FBL, 2.2; HL, 0.6; HW, 0.73; EL, 0.329; AL, 1.67; PL, 0.77; PW, 0.93; ELL, 0.89; ELW, 1.16; HTL, 0.98.

Comments. Since the middle of the 1980's, many species of *Zyras* have been described from southern Asia by Pace (1984a, 1984b, 1985, 1986, 1990, 1992, 1993, 1998a, 1998b, 1999, 2000). Dvořák (1996) did not compare his type of *Zyras quasar* with any species of *Zyras* of later description since he misidentified this species as a member of *Pella*. Pace only briefly described many species often on the basis of female material alone, though identification of species of the subgenus *Zyras* is usually very difficult without referring punctulation of body and structure of aedeagus. Thus, precise systematic position and validity of this species is unknown at present.

Only the holotype has been known. The sex of the holotype was indicated as female in the original description (Dvořák, 1996), but in fact it was a male. The specimen is considerably damaged, and the 9th and 10th abdominal segments are missing. The aedeagus is in a bad condition, somewhat spoiled, and the copulatory is invisible externally.

Bionomics. No information.

Subgenus ***Glossacantha*** Gemminger & Harold, 1868

Acanthoglossa Motschulsky, 1859: 88 (original description, preoccupied name) [type species: *Acanthoglossa badia* Motschulsky, 1859: 89, by monotypy].

Glossacantha Gemminger & Harold, 1868: 519 (replacement name for preoccupied *Acanthoglossa*).—Fenyes, 1920: 276 (distinct genus, description).—Bernhauer & Scheerpeltz, 1926: 694 (subgenus of *Zyras*, list).—Scheerpeltz, 1934: 1649 (subgenus of *Zyras*, list).—Cameron, 1939: 518 (description, as subgenus of *Zyras*).

Diagnosis. *Glossacantha* has not been well defined but can be distinguished from the other genera/subgenera of the Lomechusini by a combination of the following character states: 1) maxillary palpus elongate; 2) 2nd segment of maxillary palpus depressed; 3) lateral lobe of premental apodeme rounded at apex; 4) 1st antennal segment depressed dorsoventrally; 5) 2nd to 11th antennal segments depressed laterally; 6) 4th to 10th antennal segments evidently widened apicad, somewhat triangular.

Comments. *Glossacantha* has been regarded as a subgenus of the genus *Zyras*. However, *Zyras* is considered to be a polyphyletic group (Maruyama, in prep.), and *Glossacantha* is far related to it. Therefore, *Glossacantha* could be regarded as a distinct genus. However, I was not

able to examine all the species known in *Glossacantha*, and tentatively arranged it as a subgenus of *Zyras* in the present study.

In my preliminary research on the subgenera of *Zyras*, most of them should be synonymized and amalgamated with other genera. For example, no important differences of subgeneric value have been found among the subgenera *Glossacantha*, *Diaulaconia* Bernhauer, 1928, and *Taprodonia* Cameron, 1939. Moreover, they are quite distantly related to *Zyras* (*Zyras*). Thus, it is appropriate to regard *Glossacantha* (the oldest subgenus) as a distinct genus, and in the future the other subgenera should be synonymized with it.

Many similar problems remain in the taxonomy of the Lomechusini. The entire tribe needs revision on a worldwide basis.

Zyras* (*Glossacantha*) *ceylonicus Cameron, 1939, n. assignment

(Figs. 134, 135)

Zyras (*Pella*) *ceylonicus* Cameron, 1939: 544 (original description).

Type material. Syntypes: **Sri Lanka**: 1♀, "SYN-TYPE (blue round curator label)/Kandy Ceylon/M. Cameron Bequest. B. M. 1955-147./Z. ceylonicus TYPE Cam." (BMNH); 1♀, SYN-TYPE (blue round curator label)/Ceylon/Sharp Coll 1905-313./1119 : Ceylon (round label, written on two faces)/Z. ceylonicus Cam./near but not M. planaticollis Kr."

These are deposited in BMNH.

Other material. Not examined.

Type locality. Kandy, Sri Lanka.

Distribution. Oriental region: Ceylonese subregion. ASIA: Sri Lanka.

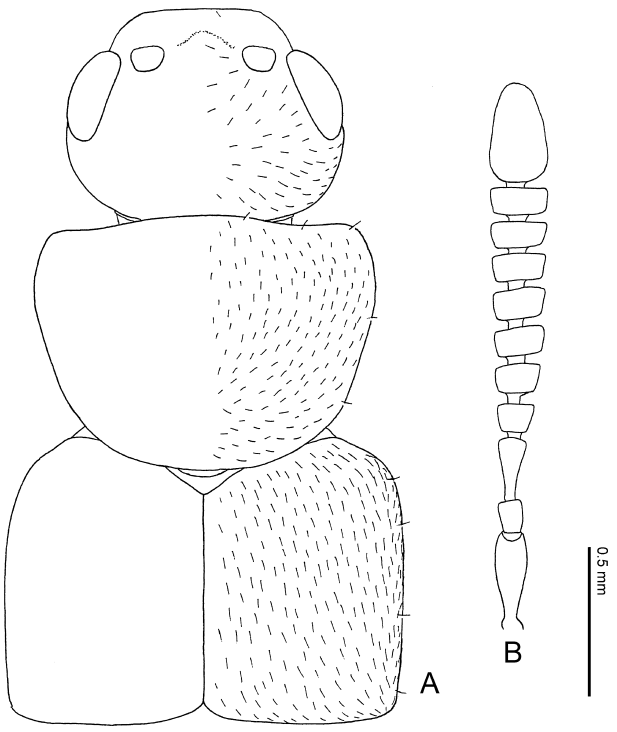

Fig. 134. *Zyras* (*Glossacantha*) *ceylonicus* Cameron.—A, Fore body, dorsal view; B, right antenna.

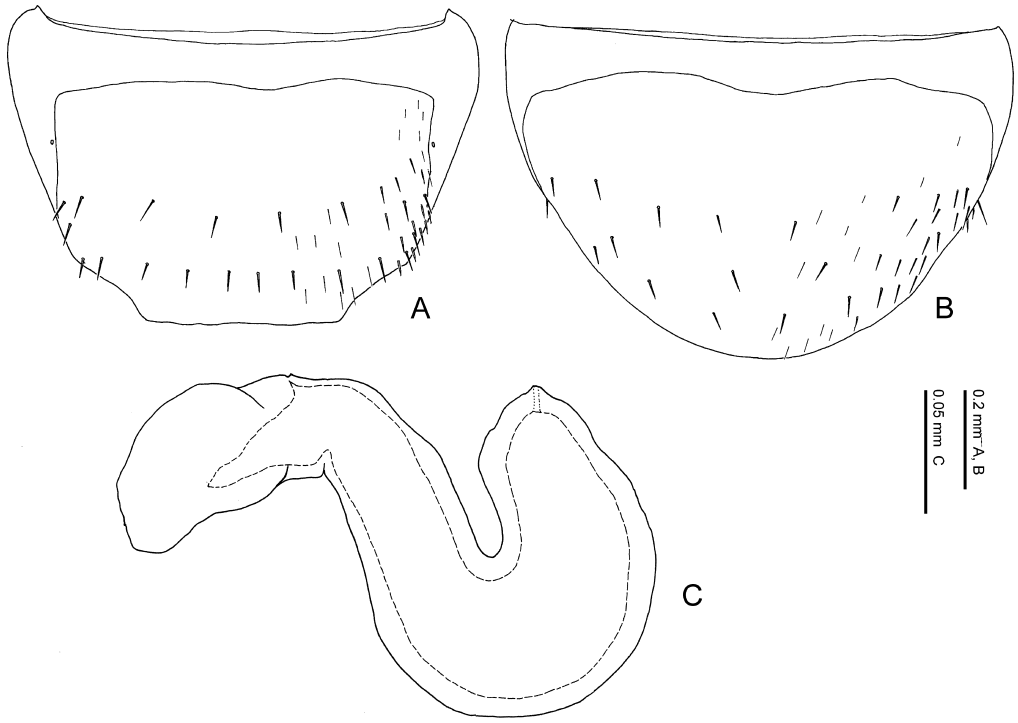

Fig. 135. *Zyras* (*Glossacantha*) *ceylonicus* Cameron. — A, Eighth abdominal tergite, dorsal view; B, 8th abdominal sternite, ventral view; C, spermatheca. Female.

Diagnosis. *Zyras* (*Glossacantha*) *ceylonicus* is closely allied to *Z.* (*G.*) *beckeri* Scheerpeltz, 1963, originally described from "Bengalore" [Bangladesh], but can be distinguished from the latter by the antero-lateral angle of the pronotum more prominent and the setae on the pronotum and elytra much shorter.

Redescription. Body slender. Reddish brown in ground colour; inner and posterior margins of elytron, around posterior margin of 3rd to 5th abdominal segments yellow; abdomen darker. Head (Fig. 134 A) widest just behind eyes; surface finely reticulated, sparsely covered with setae; setae short, slightly longer than those on pronotum and elytra; length of eyes 0.36 times as long as head width. Antennae (Fig. 134 B) shorter than head, pronotum and elytra combined; 1st segment slightly as long as 2nd and 3rd combined; 2nd segment slightly shorter than 3rd; 3rd segment about 1/2 as long as 1st; 4th to 10th segments wider than long; 11th segment shorter than 1st; approximate relative lengths of segments from basal to apical: 23 : 10 : 13 : 8 : 8.5 : 8 : 7.5 : 8 : 8.5 : 8 : 21.5. Pronotum (Fig. 134 A) semicircular, 1.20–1.25 times as wide as long, widest just behind anterior margin, narrowed posteriorly; posterior margin rounded; surface reticulated, sparsely covered with setae, much sparser than on head, without macrosetae; hypomeron fully visible in lateral view. Scutellum with surface rugose, moderately covered with setae. Elytra (Fig. 134 A) subparallel-sided; surface reticulated, sparsely covered with setae, almost the same as on head in density, without macrosetae. Legs moderate in length; hind tibia 0.96–1.02 times as long as elytra; approximate relative lengths of tarsal segments from basal to apical: 9 : 8 : 8 : 15.5 in fore tarsus; 12 : 11 : 7 : 6 : 15 in mid tarsus; 20 : 11 : 9 : 8.5 : 17 in hind tarsus. Abdomen subparallel-sided, slightly narrower than elytra, widest around 4th and 5th segments; surface finely reticulated; 3rd to 7th tergites sparsely and uniformly covered with minute setae; 8th tergite (Fig.

135 A) with 10 macrosetae; setae on lateral areas of 8th tergite thick and poorly differentiated from macrosetae; 9th tergite with 3 macrosetae; 10th tergite with postero-medial margin minutely projected, with 5 or 6 macrosetae.

Male unknown.

Female: Eighth tergite (Fig. 135 A) with posterior margin truncate; 8th sternite (Fig. 135 B) with 10 or 11 macrosetae, without sensory setae. Spermatheca (Fig. 135 C) curved twice; basal part about 2.5 times as long as apical part, acutely curved around middle, slightly narrowed apicad; flattened at apex.

Measurements. BL, 5.9–6.3; FBL, 2.5–2.6; HL, 0.77–0.78; HW, 0.95–0.96; EL, 0.346–0.351; AL, 1.80–1.93; PL, 0.90–0.93; PW, 1.1–1.1; ELL, 0.98–1.08; ELW, 1.39–1.43; HTL, 1.00–1.04.

Bionomics. No information.

Zyras* (*Glossacantha*) *reelsi Pace, 1998, n. assignment

(Figs. 136–138)

Zyras (*Pella*) *reelsi* Pace, 1998a: 973 (original description). — Smetana, 2004: 461 (*Zyras* (*Pella*), list).

Type material. Holotype: **China** (**Hongkong**): ♂, "Hong Kong Shek Kwu Chao 3. VII. 96 U.V. light G. T. Reels/Zyras reelsi sp. n. det. R. Pace 1996/HOLOTYPUS Zyras reelsi mihi det. R. Pace 1996" (MHNG).

Paratypes: **China** (**Hongkong**): 1♂, 3♀♀, "Hong Kong Beaufort 1. V 96, G. T. Reels leg./PARATYPI Zyras reelsi det. R. Pace 96" (cMar, ex cRoug).

Other material. Not examined.

Type locality. Shek Kwu Chao, Hongkong, China.

Distribution. Oriental region: Indo-Chinese subregion. ASIA: China (Hongkong).

Diagnosis. *Zyras* (*Glossacantha*) *reelsi* is most similar in general appearance to *Z.* (*G.*) *reversus* Cameron, 1939, but is distinguished from the latter by the projections of 3rd tergite and paratergite reaching the posterior margin of 4th tergite and the absence of ridge on postero-medial area of 7th tergite.

Redescription. Body slender. Brown in ground colour; pronotum, elytra, legs, and posterior margins of 3rd to 7th abdominal segments reddish brown. Head (Fig. 136 A) widest just behind eyes; surface finely reticulated, sparsely covered with setae; setae moderate in length, as long as those on pronotum and elytra; eyes very large, prominent, its length 0.45–0.46 times as long as head width. Antennae (Fig. 136 B) shorter than head, pronotum and elytra combined; 1st segment slightly longer than 2nd and 3rd combined; 2nd segment slightly shorter than 3rd; 3rd segment about 1/2 as long as 1st; 4th to 10th segments wider than long; 11th segment shorter than 1st; approximate relative lengths of segments from basal to apical: 41 : 14 : 21 : 12 : 12 : 12 : 11 : 11 : 11 : 11 : 25. Pronotum (Fig. 136 A) subtrapeziform, 1.15–1.21 times as wide as long, widest just behind anterior margin, narrowed posteriorly; posterior margin rounded; surface finely reticulated, moderately covered with short setae, with 8 or 9 macrosetae along lateral margin. Scutellum with surface smooth, without setae. Elytra (Fig. 136 A) slightly widened apicad; surface finely reticulated, moderately covered with setae, with about 15 macrosetae laterally. Legs moderate in length; hind tibia 0.98–1.01 times as long as elytra; approximate relative lengths of tarsal segments from basal to apical: 9 : 11 : 9 : 21 in fore tarsus; 15 : 12 : 10 : 9 : 18 in mid tarsus; 20 : 16 : 13 : 12 : 22 in hind tarsus. Abdomen subparallel-sided, slightly narrower than elytra, widest around 3rd segment; surface smooth, sparsely punctured and covered with setae; 9th ter-

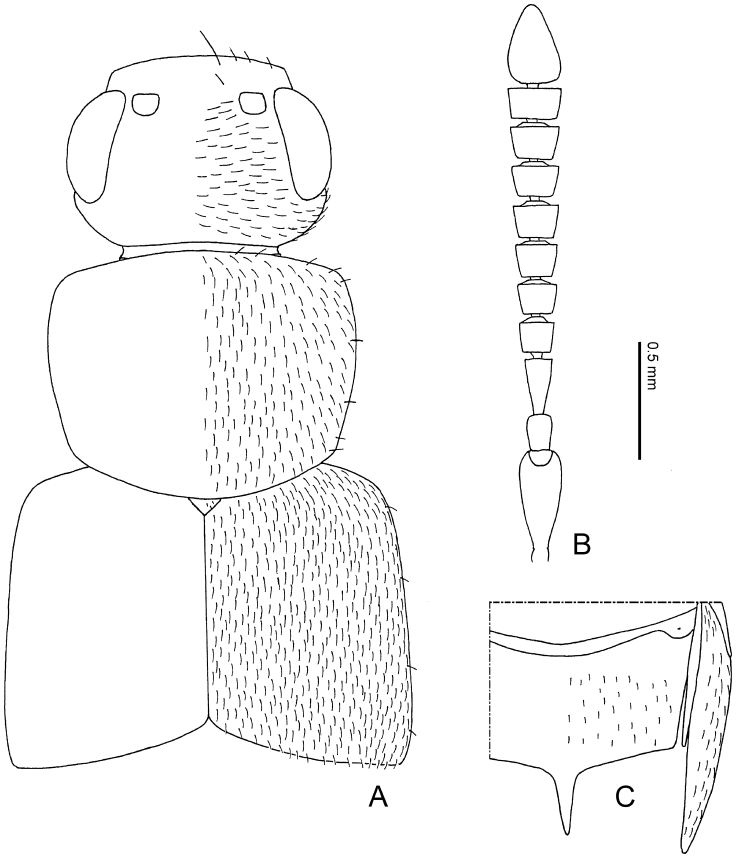

Fig. 136. *Zyras* (*Glossacantha*) *reelsi* Pace.—A, Fore body, dorsal view; B, right antenna; C, 3rd tergite and paratergite. Male.

gite with 8 macrosetae; 10th tergite with posterior margin slightly emarginate, with 10 macrosetae.

Male: Third tergite (Fig. 136 C) with a long postero-medial projection; 3rd paratergite (Fig. 136 C) acutely produced and its apex reaching posterior margin of 4th tergite; 8th tergite (Fig. 137 A) with posterior margin moderately emarginate, with a pair of granula on postero-medial area and 10 macrosetae; 8th sternite (Fig. 137 B) with posterior margin rounded, with 15–17 macrosetae; 9th sternite with posterior margin truncate. Aedeagus (Figs. 137 C, 137 D) elongate oval in ventral view; apical lobe almost straight, obtuse at apex in lateral and ventral views; basal ridge absent; copulatory piece of inner sac as in Figs. 137 C, 137 D. Paramere with apical lobe of paramerite narrowed apicad, obtuse at apex, about 1/2 as long as condylite.

Female: Third abdominal segment generalised; 8th tergite (Fig. 138 A) with posterior margin slightly emarginate; 8th sternite (Fig. 138 B) with 15–17 macrosetae; apical margin with a row of minute pubescence. Spermatheca (Fig. 138 C) gently curved; basal part three times as long as apical part, bulbous around base, narrowed apicad; apical part almost straight, narrowed apicad.

Measurements. BL, 5.9–6.5; FBL, 3.1–3.2; HL, 0.82–0.83; HW, 1.13–1.16; EL, 0.51–0.53; AL, 2.24–2.35; PL, 1.07–1.10; PW, 1.27–1.30; ELL, 1.30–1.35; ELW, 1.63–1.67; HTL, 1.28–1.40.

Bionomics. The type series of *Zyras* (*Glossacantha*) *reelsi* were collected by UV light trap

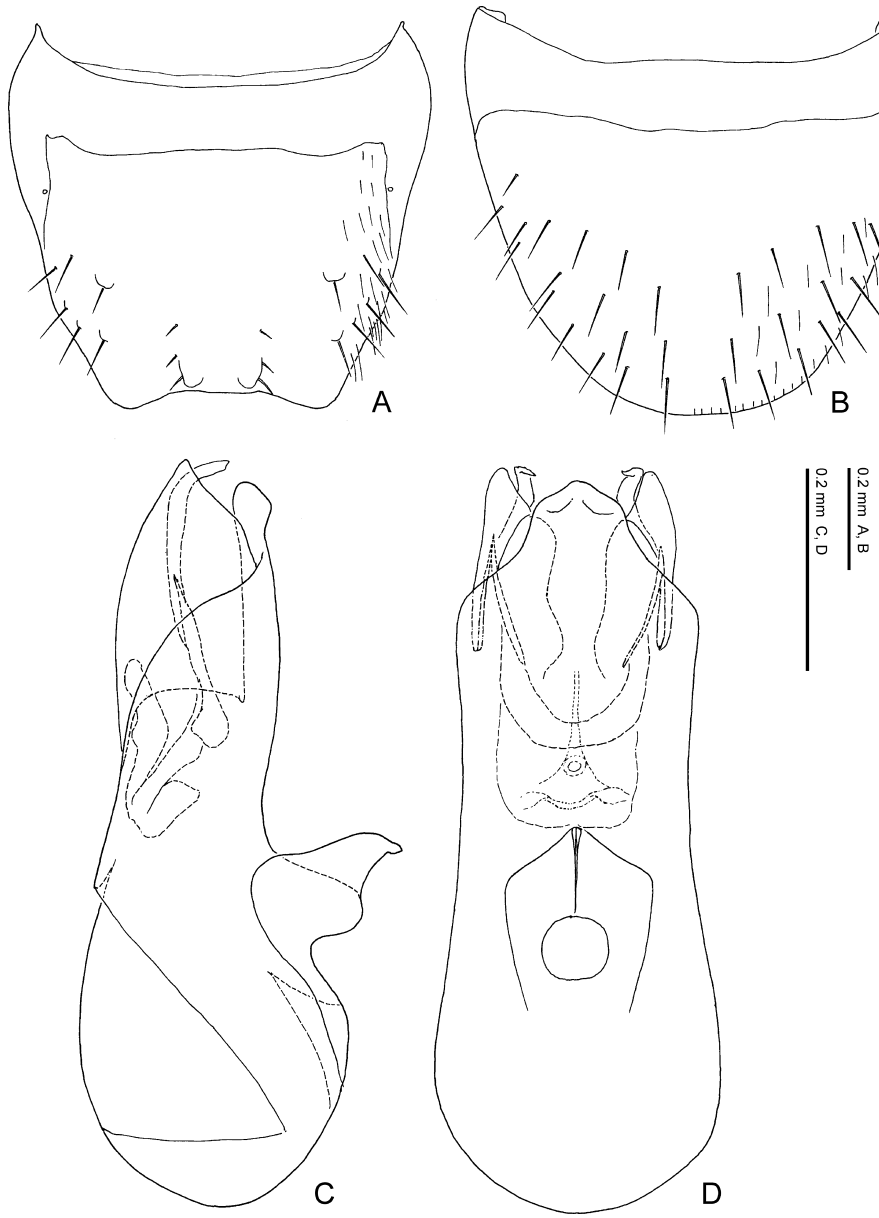

Fig. 137. *Zyras* (*Glossacantha*) *reelsi* Pace. — A, Eighth abdominal tergite, dorsal view; B, 8th abdominal sternite, ventral view; C, median lobe of aedeagus, lateral view; D, ditto, ventral view. Male.

(Pace, 1998), but nothing is known about their habitat. The male specimen of the paratypes, which collected in May, is not fully mature, while the other specimens collected on the same day are well mature. This suggests the multivoltine life cycle of this species.

Genus ***Myrmoecia*** Mulsant & Rey, 1874

Myrmoecia Mulsant & Rey, 1874: 98 (original description) [type species: *Myrmedonia tuberiventris* Fairmaire, 1855, fixed by Mulsant & Rey (1874)]. — Fenyes, 1920: 293 (subgenus of *Zyras*, description). — Bernhauer & Scheerpeltz,

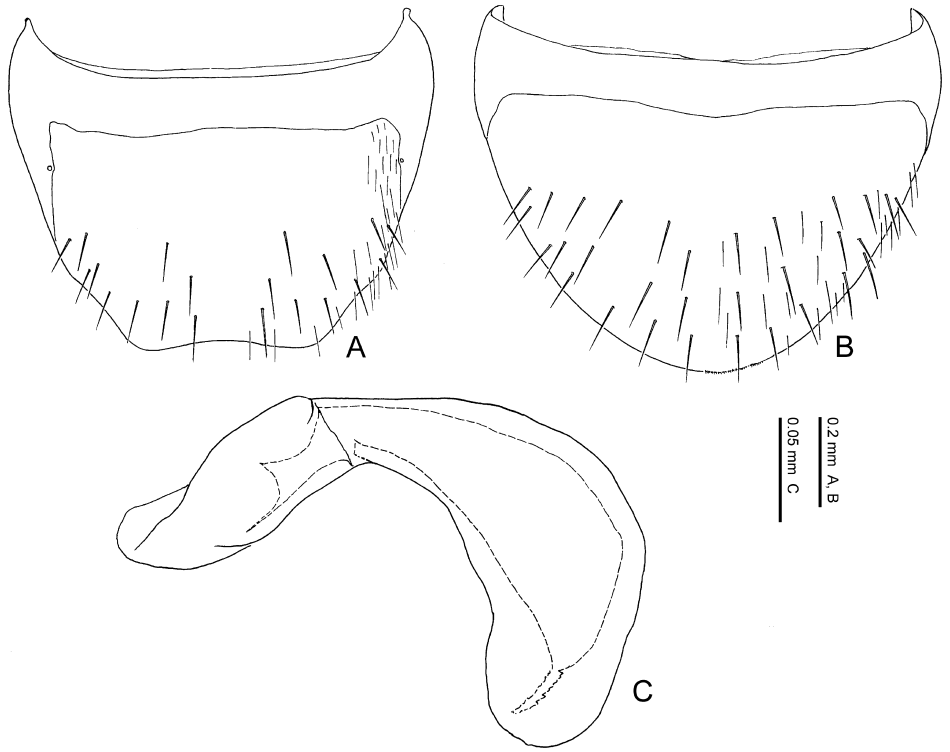

Fig. 138. *Zyras* (*Glossacantha*) *reelsi* Pace. — A, Eighth abdominal tergite, dorsal view; B, 8th abdominal sternite, ventral view; C, spermatheca. Female.

1926: 694 (subgenus of *Zyras*, list). — Scheerpeltz, 1934: 1649 (subgenus of *Zyras*, list). — Lohse, 1974: 226 (subgenus of *Zyras*, description). — Lohse, 1989: 220 (distinct genus). — Smetana, 2004: 459 (distinct genus, list).

Comments. The genus *Myrmoecia* has not been well defined, and is considered to be closely allied to *Pella* (Maruyama, in prep.). The members of the genus are somewhat similar to those of *Pella* in general appearance, but they are easily distinguished from *Pella* species by the monilliform antennae, the narrower pronotum, and the pointed apex of the metasternal process.

Myrmoecia urartu (Iablokoff-Khnzoryan, 1962), n. comb.

Zyras (*Pella*) *urartu* Iablokoff-Khnzoryan, 1962: 111 (original description). — Smetana, 2004: 462 ("incertae sedis", list).

Type material. Unfortunately, the type material was not available for my examnation. The holotype is support to have been deposited in the Institute of Zoology, Laboratory of Entomology National Academy of Sciences of the Republic of Armenia.

Type locality. Urartu fortress, near Nor-Aresh, Yerevan, Armenia.

Other material. Not examined.

Distribution. European subregion, Mediterranean subregion. EUROPE: Armenia.

Comments. In referring to the figure of the whole body in the original description (Iablokoff-Khnzoryan, 1962), I have concluded that this species is evidently a member of *Myrmoecia* and is closely allied to *M. rigida* (Erichson, 1839).

Bionomics. The type specimen of this species was collected from a desert zone of the Arax riverside where no vegetation was found (Iablokoff-Khnzoryan, 1962).

Tribe **Athetini** Casey, 1910

Athetae Casey, 1910: 2 [type genus: *Atheta* Thomson, 1858].

Diagnosis. The Athetini has not yet been well defined, but it can be distinguished from the other tribes of the Aleocharinae by a combination of the following character states: 1) head without occipital suture; 2) base of prementum with a projection postero-medially; 3) galea and lacinia shortened; 4) apex of the 1st segment of labial palpus obliquely truncated; 5) ligula without setae; 6) tarsi segmented 4–5–5; 7) ventral bridge of aedeagal median lobe (athetine bridge) present.

Genus ***Dvorakatheta*** Maruyama, n.

Type species. *Zyras* (*Pella*) *wrasei* Dvořák, 1988.

Etymology. A combination of "Dvorak", the author of the type species, and "Atheta", the type genus of the tribe Athetini. Gender feminine.

Diagnosis. *Dvorakatheta* may be differentiated from the other genera of the Athetini by a combination of the following character states; 1) larger body (ca. 6.0 mm); 2) head much wider than long, as wide as pronotum; 3) labial palpus widely separated; 4) 8th abdominal segment widened posteriad in male; 5) aedeagal median lobe bifid at apex. The bifid apex of the aedeagal median lobe suggests close relationship to the genus *Nepalota* Pace, 1987, but *Dvorakatheta* is clearly distinguished from it by the size and general shape of the body, the wider head, and the 8th abdominal segment widened in male.

Description. Body. Slender, subparallel-sided and flattened. Body length; 5.9–6.1 mm; 2.4–2.5 mm (from apex of clypeus to posterior margin of elytra). Colour dark brown to black.

Head. Head capsule (Fig. 139 A) large, much wider than long, as wide as pronotum. Occipital suture absent; surface covered with setae. Eyes oval in lateral view, slightly prominent, its length 0.38 times as long as head width; small setae present among facets. Antennae filiform, longer than combined head and pronotum, not flattened dorsoventrally; setae covering surface becoming denser and smaller apicad; 4th to 10th segments evidently dilated apicad, much longer than wide, well margined postero-laterally; each segment with erecting black setae; 11th segment elongate oval.

Mouthparts. Labrum much wider than long (W/L, 3.07), considerably emarginate antero-medially, submembranous around antero-medial area; surface covered with about 100 pseudopores except postero-lateral area; apodeme roundly projected postero-medially, with lateral arm acutely curved and projected laterad. Epipharynx with medial sensory field with 40–50 pores and about 70 grain-like sensory pores laterally; each mesolateral area randomly with 10–15 pores among round projections; 5 pairs of lateral setae stout, about 10 times as long as wide. Mandibles asymmetric; right mandible with a large tooth at middle of inner margin; left mandible moderately emarginate at middle of inner margin; 2 or 3 small setae present laterally; mesal areas of dorsal surface with about 10 pseudopores mesally; ventral surface scattered with about 30 pseudopores around base; prostheca obtuse at apex, its inner margin densely pubescent. Maxilla: Cardo generalised, almost elliptical in ventral view, with about 80 pseudopores. Stipes large, triangular, with 2 setae at base, with about 5 pseudopores. Palpifer triangular in lateral view, with a large seta, several small setae and 15–20 pseudopores near apex. Lacinia prominent at middle of inner margin, with 10 pores and 5 or 6 setae medially; apical inner margin with a low of setae forming a comb; surface around comb densely pubescent; subgalea small, much smaller than last segment

of maxillary palpus; galea long, about four times as long as wide, slightly curved, with some pores near apex, densely pubescent apically. Maxillary palpus without pseudopores; 1st segment very small, with 1 seta; 2nd segment gently curved, and much dilated apically; 3rd segment the longest, almost as long as 2nd, almost straight; 4th segment elongate, conical. Mentum (Fig. 140 A) trapeziform; posterior and anterior margins truncate; around antero-lateral corner with 1 seta; surface sparsely covered with pseudopores except in mesal and lateral areas, with some setae laterally. Labium (Fig. 140 B): prementum (Fig. 140 B) with 2 real pores and 1 setal pore mesolaterally, about 60 medial pseudopores and 15–20 mesolateral pseudopores; internal ridge (Fig. 141 B) entire, its length about 2/3 as long as prementum; apodeme (Fig. 140 B) with postero-medial margin roundly emarginate; lateral lobe of apodeme (Fig. 140 B) gently curved, pointed apically. Ligula (Fig. 140 B) bilobed and each lobe rounded apically; apical setae absent, but three sockets present. Labial palpus (Fig. 140 B) widely separated; 1st segment twice as long as 2nd, obliquely truncate at apex; 2nd the shortest. Hypopharynx (Fig. 140 B) without apical seta; medial sensory field with small ridges around apex and scale-like sculptures near base.

Thorax. Pronotum (Fig. 139 A) subtrapeziform (PW/PL, 1.42); disc well margined, somewhat convex but more or less flattened above; surface densely covered with setae uniformly; hypomera visible in lateral view. Mesosternum with process long, pointed at apex. Metasternum with process slightly prominent, its apex completely rounded. Elytra without epiplural suture, margined from inner margin to posterior margin; surface almost uniformly covered with setae but slightly denser apicad. Hind wing entire.

Legs. Coxae: fore coxa well developed, slightly shorter than fore femur, with suture ventrally; mid coxa generalised, with short suture ventrally; hind coxa subtriangular, rounded laterally. Trochanters: fore and mid trochanters small, subconical; hind trochanter rounded at apex. Femora stout, flattened, gently curved near apex. Tibiae dilated apicad from base to around apical 1/4; each apical margin with ctenidium and 2 stout setae. Tarsi generalised; empodium with pair of setae.

Abdomen. Third to 6th segments: tergite with posterior margins almost straight; dorsolateral plates rectangular; sternite with surface densely covered with setae. Seventh segment with lateral plates fused, narrowed posteriad, pointed at apex. Eighth abdominal segment (Figs. 141 A, 141 B): tergite with basal suture curved laterally and continued apicad; sternite with basal suture reaching lateral sides. Ninth abdominal segment: tergite with surface densely covered with setae. Tenth abdominal segment with surface densely covered with setae uniformly.

Male characters. Head depressed above. Eighth tergite (Fig. 141 A) widened apicad, with lateral projection of apodeme (Fig. 141 A) long; posterior margin (Fig. 141 A) rounded. Eighth sternite (Fig. 141 B) widened apicad; Lateral projections of apodeme of 9th tergite symmetrical; Ninth sternite elongate oval; apical margin rounded; surface covered with setae and a pair of macrosetae near posterior margin. Aedeagus (Figs. 100 C–100 E): median lobe (Figs. 141 C, 141 D) bifid at apex; basal capsule somewhat bulbous; distal crests (Figs. 141 C, 142 D) fused from side to side, large, much projected; copulatory piece (Fig. 141 E) very large, about 1/2 as long as median lobe; paramere (Fig. 140 C) with condylite almost straight, as long as paramerite; hinge zone distinct; apical lobe of paramerite short, curved; velum densely ridged.

Female characters. Female not examined. Eighth tergite narrowed posteriad, its apex roundly emarginate (Dvořák, 1988).

Comments. The genus can be placed in the tribe Athetini by the following character states in addition to the diagnosis of the tribe: 1) mesocoxal cavity narrowly separated; 2) metasternal process very short, much shorter than mesosternal process. These character states are not ob-

served in the Lomechusini, in which the type species was formerly placed.

Dvorakatheta wrasei (Dvořák, 1988), n. comb.

(Figs. 139–141)

Zyras (*Pella*) *wrasei* Dvořák, 1988: 1.—Smetana, 2004: 461 (*Zyras* (*Pella*), list).

Type material. Paratypes: **Tadjikistan**: 2♂♂, "USSR, Tadjikistan Varzob/Hissar/, 19. 7. 1984, 2000 m, D. W. Wrase legit."/PARTYPUS/Zyras wrasei sp. n. det. M. Dvořák ,85 (ZMHB, cDvor).

Type locality. Varzob, Tadjikistan.

Other material. Not examined.

Distribution. Meditrranean subregion. ASIA: Tadjikistan.

Diagnosis. *Dvorakatheta wrasei* may be easily distinguished from the other species of the tribe Athetini by a combination of the larger body and the larger head, which almost as wide as pronotum. This species is somewhat similar in body size and general appearance to the members of the subgenus *Psammostiba* Yosii & Sawada, 1976, of the genus *Atheta* but the head of the latter is generalised and much narrower than the pronotum.

Diagnosis. Body slender. Dark brown to black in ground colour; antennae, mouthparts, pronotum, elytra, and legs paler. Head (Fig. 139 A) widest behind eyes; postocular part swollen

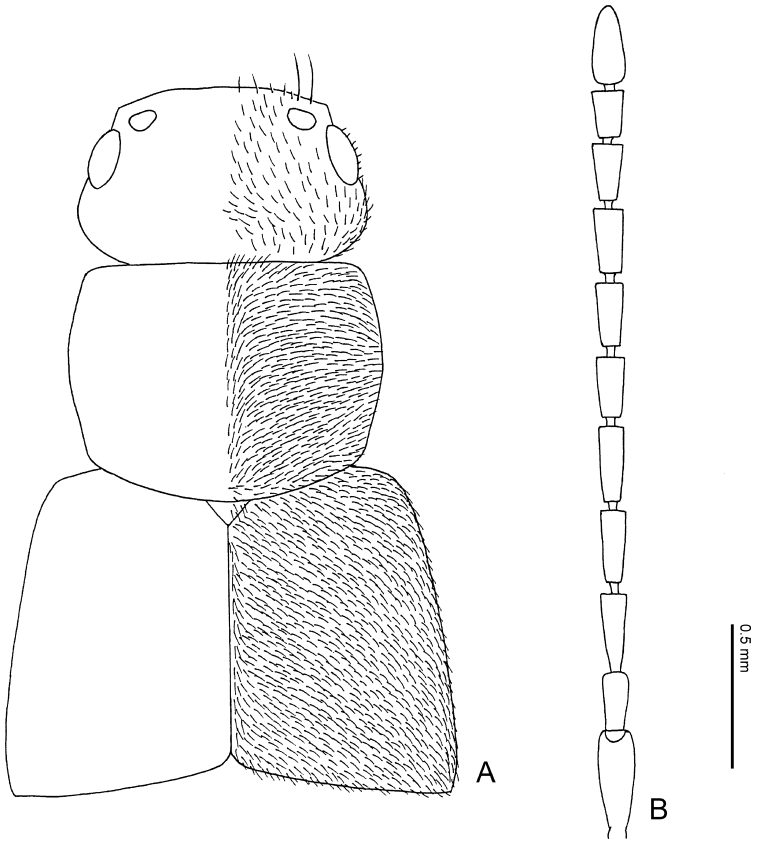

Fig. 139. *Dvorakatheta wrasei* (Dvořák).—A, Fore body, dorsal view; B, right antenna.

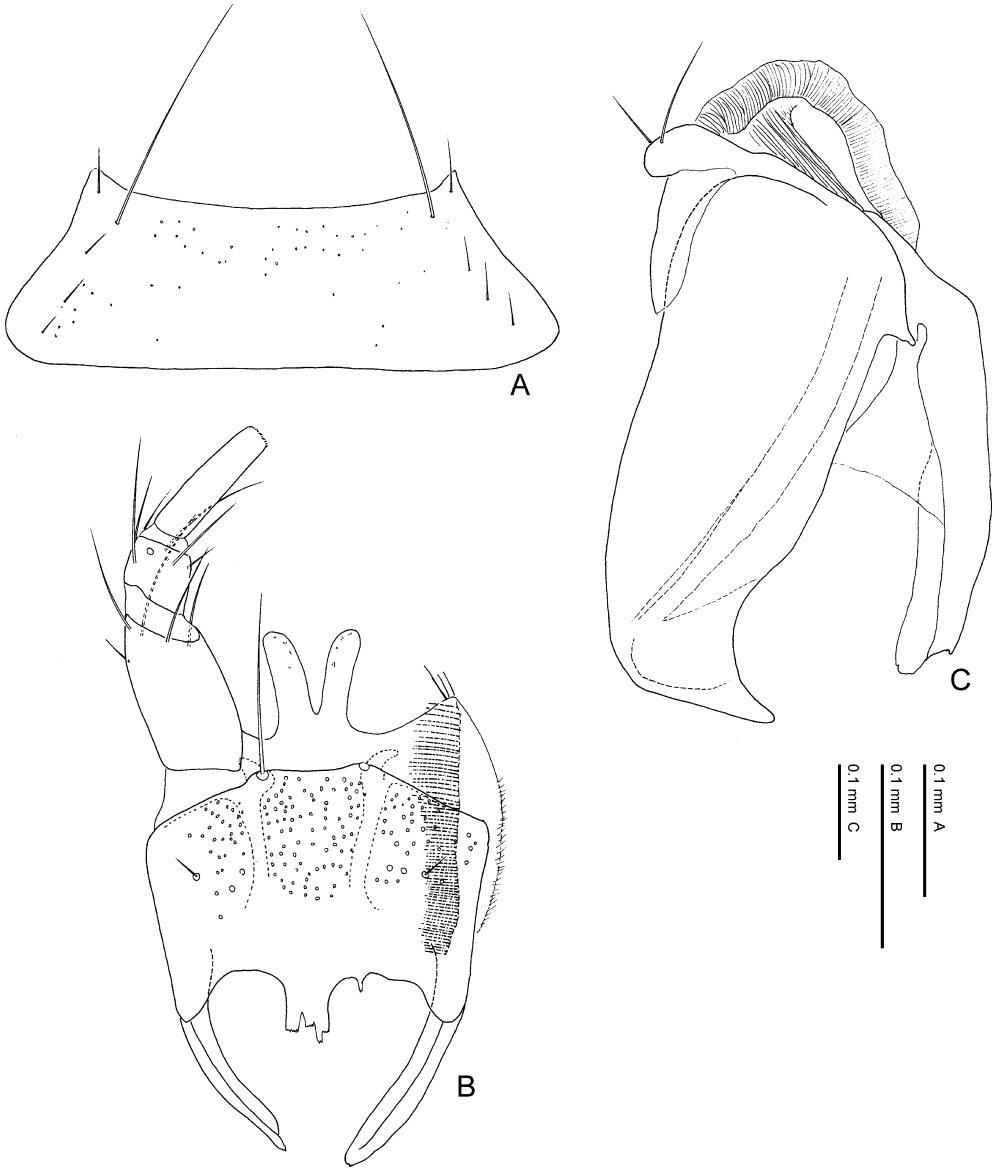

Fig. 140. *Dvorakatheta wrasei* (Dvořák).—A, Mentum, ventral view; B, prementum, ventral view; C, paramere of aedeagus, lateral view.

in dorsal view; surface smooth, moderately covered with setae; setae moderate in length, as long as those on pronotum and elytra; length of eyes 0.26 times as long as head width. Antennae (Fig. 139 B) shorter than head, pronotum and elytra combined; 1st segment much shorter than 2nd and 3rd combined; 2nd segment shorter than 3rd; 3rd segment about 2/3 as long as 1st; 4th to 10th segments 2.1–2.6 times as long as wide; 11th segment shorter than 1st; approximate relative lengths of segments from basal to apical: 32 : 20 : 24 : 19 : 20 : 20 : 18 : 17 : 17 : 15 : 23. Pronotum (Fig. 139 A) subtrapeziform, 1.42 times as wide as long, widest around anterior 1/6, narrowed posteriorly; postero-lateral corner rounded; surface finely punctured, densely covered with setae. Scutellum with surface smooth, moderately covered with setae. Elytra (Fig. 139 A) slightly

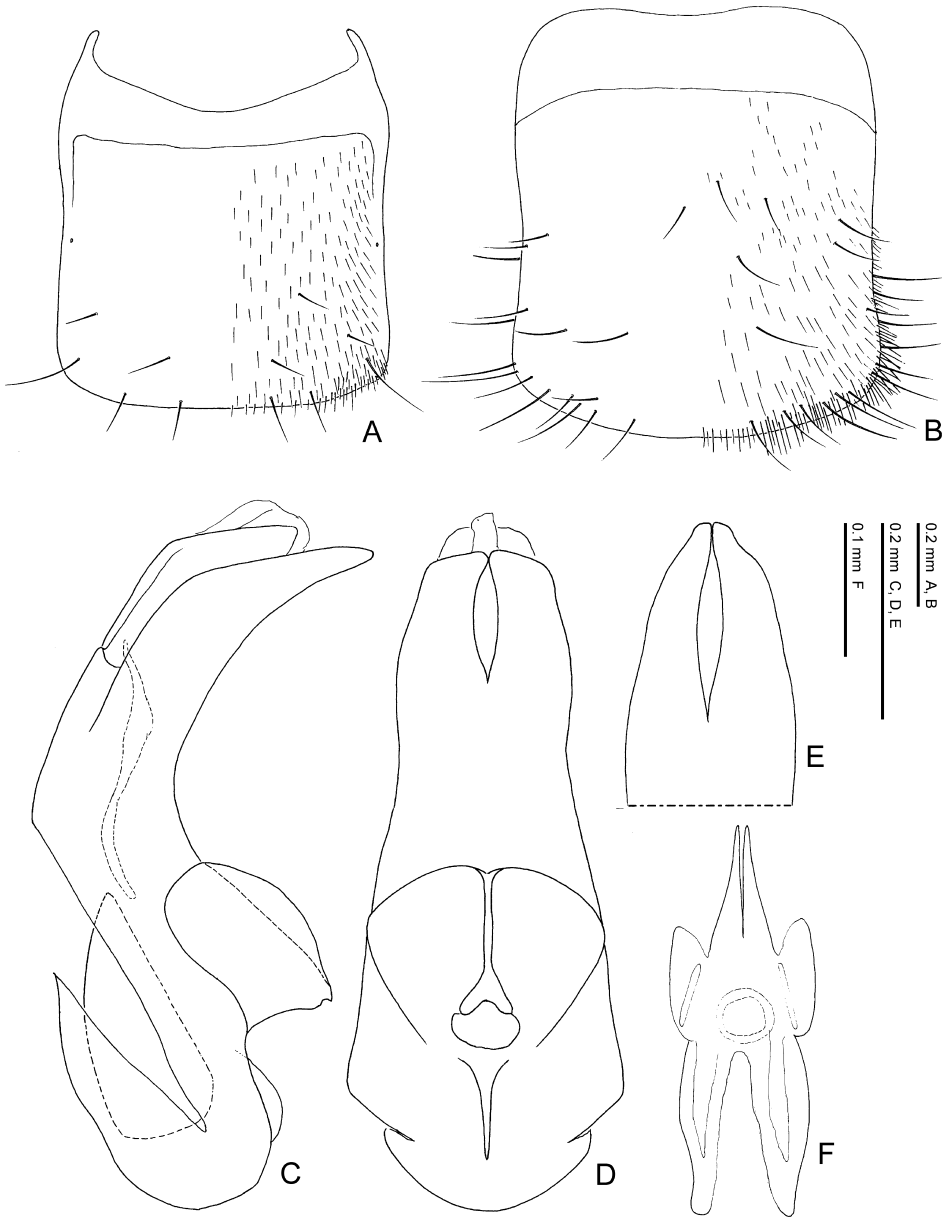

Fig. 141. *Dvorakatheta wrasei* (Dvořák). — A, Eighth abdominal tergite, dorsal view; B, 8th abdominal sternite, ventral view; C, median lobe of aedeagus, inner sac slightly evaginated, lateral view; D, ditto, ventral view; E, ditto, apical part, postero-ventral view; F, copulatory piece, dorsal view. Male.

widened apicad; surface smooth, densely covered with setae. Legs very long; hind tibia 1.44 times as long as elytra; approximate relative lengths of tarsal segments from basal to apical: 5 : 5.5 : 5.5 : 21 in fore tarsus; 7.5 : 8 : 9 : 10 : 18 in mid tarsus; 20 : 18 : 11 : 11 : 21 in hind tarsus. Abdomen subparallel-sided, slightly narrower than elytra, widest around 3rd and 4th segments; surface finely punctured; 3rd to 7th tergites densely and uniformly covered with setae; 8th tergite (Fig. 139 A) with 5 macrosetae; 9th tergite with 4 macrosetae; 10th tergite with posterior margin roundly prominent, with 5 macrosetae.

Male: Eighth tergite (Fig. 141 A) with posterior margin slightly rounded; 8th sternite (Fig. 141 B) with posterior margin rounded, with 21–24 macrosetae; 9th sternite with posterior margin rounded. Aedeagus (Figs. 141 C, 141 D) elongate pear-shaped in ventral view, bifid at apex; apical lobe curved ventrad at middle, pointed at apex in lateral view; basal ridge thick and roundly convex; copulatory piece of inner sac as in Fig. 141 E. Paramere with apical lobe of paramerite dilated apicad, rounded at apex, about 1/8 as long as condylite.

Female: Not examined. Eighth tergite with posterior margin roundly emarginate (Dvořák, 1988).

Measurements. BL, 5.7; FBL, 2.3; HL, 0.70; HW, 1.06; EL, 0.276; AL, 3.19; PL, 0.88; PW, 1.08; ELL, 1.15; ELW, 1.55; HTL, 1.66.

Bionomics. No information.

CHAPTER 3. BIONOMICS

Myrmecophily is one of very remarkable and interesting phenomena in adaptation of animals and has been reported in numerous animal taxa, especially in the class Insecta. Among myrmecophilous insects, the majority of species are members of the Aleocharinae. In addition, their modes of life are diversified: scavengers, symphiles, predators, etc. However, very few myrmecophilous aleocharine life cycle and behaviour have been investigated in sufficient detail. To know the evolutionary patterns of myrmecophilous aleocharines, descriptive data of their life cycles and behaviours are very important.

Hölldobler *et al.* (1981) already reported those of European species of *Pella* in detail, but in my observation, those of the Japanese species are somewhat different from their report in some details, and I found some new information on the bionomics of the *Pella* beetles.

In this chapter, I am going to report life cycles and behaviours of several species of *Pella* (*P. socia*, *P. kidaorum*, *P. kinomurai*, *P. japonica*, *P. beijingorum*, *P. masakoae*, *P. spreta* and *P. indiscreta*) based on my observations both in the field (Sapporo-shi, Hokkaidô) and in the laboratory cultures.

Life Cycle

Life cycles in most species

In late April to early May, a large number of *Pella* beetles belong to *P. socia*, *P. kidaorum*, *P. kinomurai*, *P. beijingorum*, *P. masakoae* and *P. spreta* were found at the entrance of *Dendrolasius* nest in Sapporo. On warmer days in this period, beetles exhibited high flight activity in the laboratory. In the field, beetles were observed to have been attracted to a light trap, and also to have copulated around the entrance to the nest.

In early May, I found the first eggs under the shelters around the field nest. Observations on immature stages were confined to laboratory cultures. Larvae hatched about two days after the oviposition. Two or three days after the hatching, the larvae moulted into the second instar, and further three to four days later, they pupated. Five to seven days after the pupation, young beetles eclosed from their pupae. The beetles stayed in their cocoons for seven to ten days, then their bodies became gradually harder. In the field, the length of each stage may be longer than in the laboratory as far as surmised from the appearance of young beetles.

In early June the mortality of overwintered adults in the laboratory increased. In the field, no

beetle was observed around the middle of June, and in late June to early July the first young beetles appeared above ground. They were weakly stained and not much sclerotized, with the abdomen not expanded as in overwintered adults.

In the field, on cold days (5–10°C) in late September, some beetles were observed under shelters around the nest and a few beetles walking around the nest. In early October, the number of the beetles found around the nest declined markedly and in late October no beetle was observed outside the nest.

In November of 1999, I excavated a nest of *Lasius* (*Dendrolasius*) *spathepus* in Hitsujigaoka, Sapporo-shi. I found many beetles within the nest entrance covered by nest material and in the garbage dump accumulated around the nest entrance. Each beetle was in an elliptical space, with legs squeezed together in "dormance position" expressed by Hölldobler *et al.* (1981). Apparently these beetles were overwintering. Such beetles were also observed in the roots of trees, where trail of ants was observed on warmer days.

Pella japonica and *P. indiscreta* apparently have different life cycles in my field observations as follows.

Pella japonica

Adults of *Pella japonica* appeared in early May to early June and actively copulated. However, they did not lay eggs in this period. My observation of the ovarium in several females showed that the eggs did not grow in this season but fully matured in late August to early September. In spite of my repeated trials to rear *Pella japonica*, I did not observe oviposition and obtained no larvae. No newly eclosed or overwintering adults were found in my field investigations, but many larvae were found in August. All this suggests that this species lays eggs in the summer and overwinters in the stage of larva or pupa.

Pella indiscreta

Newly eclosed adults of *Pella indiscreta* appeared in July, and matured eggs were observed in their ovaria in late August to September. However, I did not observe oviposition and obtained no larvae. Probably this species lays eggs in the autumn to just before the winter and overwinters at the stage of egg, larva or pupa. It may pupate or eclose around late June to July.

Behaviour of Adults

General behaviour

Pella beetles are usually observed walking around the hosts' nests but not observed within nests. They sometimes prey upon host ants (see, Predatory behaviour), but they generally act as scavengers, feeding on dead workers or garbage discarded around the nests. Although the *Dendrolasius* ants essentially feed on aphid or coccid honeydew, they also eat dead insects or earthworms when these are available. Occasionally, in the field, the beetles are observed eating dead caterpillar or earthworm together with ant workers. The *Pella* beetles, therefore, can also be cleptoparasitic.

In the field, two patterns of daily rhythmic activity have been recognized among *Pella* species. While *Pella masakoae* and *P. spreta* are apparently nocturnal, clustering under shelters, *e.g.*, dead leaves or pebbles, in the daytime, *P. comes*, *P. socia*, *P. kidaorum*, *P. kinomurai* and *P. japonica* are active both day and night.

In May to October, the main foraging season, *Dendrolasius* ants travel along trunk trails to

aphid colonies. I saw *Pella* beetles walking along the trails. Although beetles were usually found within a range of 10 m from the nest entrance, those of *Pella comes*, *P. socia*, *P. kidaorum* and *P. japonica* were found at the trail more than 30 m distant from the nest. Akino (2002) verified, by a bioassay, that *P. comes* can follow the trail pheromone of "*Lasius fuliginosus*" (=*Lasius fuji*).

Mating and egg laying

I observed mating behaviour in all species that I reared in the laboratory culture, and confirmed that it was almost the same as in other aleocharines, i.e., "assault style" (Peschke, 1978). The male beetle chases the female and inserts his aedeagus from the side no sooner than catching up with her. Copulation usually takes a few minutes, but in *Pella japonica* it took about 10 minutes. The male beetle of *Pella japonica* is sometimes dragged by the female, inserting his aedeagus.

Eggs were laid under shelters (bark of dead tree) in the laboratory culture. I did not observe oviposition behaviour but the females probably hid under the shelters and laid egg there. They laid 1 egg (rarely 2 eggs) at once and 6–8 eggs in total with an interval of two or three days. I observed the eggs in the field nest three times. They were laid under dead leaf or in the garbage dump in front of the nest.

Predatory behaviour

According to Wasmann (1886, 1920, 1925), all species he had studied, *Pella humeralis*, *P. funesta*, *P. cognata*, *P. similis*, *P. lugens* and *P. laticollis*, prey on ants, especially disabled ants. In contrast, Kolbe (1971) failed to find a predatory behaviour in *Pella humeralis* and concluded that this species primarily fed on dead ants. Yasumatsu (1937) and Kistner (1972) made similar observations as Kolbe (1971) for *Pella comes* and *P. japonica*. However, Hölldobler *et al.* (1981) observed *Pella funesta*, *P. laticollis* and *P. humeralis* living not only as scavengers, feeding on dead or disabled ants and debris discarded by the ants, but also as very effective predators on the ants. In my field and laboratory observations, *Pella comes*, *P. kidaorum* and *P. japonica* also acted as predators.

I frequently witnessed *Pella* beetles hunting *Lasius fuji* and *L. spathepus* workers on the foraging trail in the field. I saw the beetles hunting during the daytime on one occasion, but most frequently in the evening or at night.

The hunting behaviour is almost the same in *Pella comes*, *P. kidaorum* and *P. japonica* in my observations and also agrees with the behaviour of *P. laticollis*, *P. funesta* and *P. humeralis* reported by Hölldobler *et al.* (1981).

When the hunting was successful, the beetles usually tried to drag the prey away from the trail of ants to under dead leaves or dead branches on ground. Hölldobler *et al.* (1981) reported that when beetles were starved for several days and were kept without foods, they occasionally chased each other and sometimes fed on the disabled.

Defence and appeasement behaviour

As reported by Hölldobler *et al.* (1981), when encountering an ant, the beetle flexes the abdomen even more strongly. This behaviour is frequently described in many myrmecophilous staphylinids, especially aleocharines, and is generally considered as a defence response (Wasmann, 1886, 1920; Donisthorpe, 1927; Jordan, 1913; Koblick & Kistner 1965; Kolbe, 1971; Hölldobler *et al.*, 1981). It has been suggested that the beetles discharge secretions from their tergal glands when flexing the abdomen (Kistner & Blum, 1971).

Kistner and Blum (1971) mentioned that *Pella japonica* and possibly also *P. comes* produced citronellal in their tergal glands. In contrast, Hölldobler *et al.* (1981) analysed contents of tergal glands of some European *Pella* species and noted that they "could not find any resemblance of the *Pella* tergal gland secretions to the mandibular gland secretions of *Lasius fuliginosus*". They also found that the *Pella* secretions contained undecane, a hydrocarbon commonly found in the Dufour's glands of ants of the subfamily Formicinae, and surmised that the undecane was an alarm pheromone of *Lasius fuliginosus*.

Behaviour of Larvae

In the field, the larvae are usually found near the entrances or in the garbage dumps of *Dendrolasius* nests. Larvae feeding on dead ants were frequently observed in the laboratory, and hatched larvae immediately start to walk around to search dead ant. When the larvae found a dead ant, they grasped it using their mandibles, walked backwards and attempted to carry it under a shelter or the nook of the rearing box. The larvae crushed their head into a slip between abdominal segments of the dead ant and sucked its body fluid. Their abdomen expanded and became blackish with the ant's body fluid. The larvae particularly preferred dead ants that were placed in room temperature for one or two days after death to fresh dead bodies.

Hölldobler *et al.* (1981) reported that when ants encountered *Pella* larvae, they usually attacked them. The defensive behaviour is similar to that of adults.

The matured second instar larvae burrowed into ground to a depth of 2–3 cm or hid immediately under shelter to make their silk cocoons before pupation.

Discussion

Life cycle

The life cycles of *Pella socia*, *P. kidaorum*, *P. kinomurai*, *P. beijingorum*, *P. masakoae* and *P. spreta* almost agreed with the cycle of the European *P. funesta* reported by Hölldobler *et al.* (1981), and may also be similar to the cycle of some other European species, *P. humeralis*, *P. lugens* and *P. laticollis*, described by some authors (Wasmann, 1886, 1920, 1925; Franc, 1992) and observed by me in the field in southern Slovakia. *Pella japonica* and *P. indiscreta* are different from all of them. Usually, five to eight species of *Pella* are observed in the same nest. For example, in Central Europe, *Pella humeralis*, *P. funesta*, *P. cognata*, *P. lugens* and *P. laticollis* (rarely, also *P. similis*) have been collected from same ant nest, in Japan (Sapporo) *P. kidaorum*, *P. socia*, *P. kinomurai*, *P. japonica*, *P. beijingorum*, *P. masakoae*, *P. spreta* and *P. indiscreta*, and in Beijing *P. jureceki*, *P. cooterorum*, *P. hlavaci*, *P. beijingorum* and *P. zhoui*. Though any competition among the species was not suggested in my field observations, their general behaviour were similar among them. Thus, the difference in life cycle is indicative of seasonal habitat segregation among the species, at least among *P. japonica*, *P. indiscreta* and the others.

The period of each immature stage is remarkably short, i.e., egg (2 days); 1st instar larva (2–3 days); 2nd instar larva (3–4 days); pupa (5–7 days) in the laboratory culture. Therefore, in the minimal length, it takes *Pella* beetles only 12 days to become adult from egg laying. Moreover, two instars were represented in the larval stage of all the observed *Pella* species. As far as known three instars are generally represented in the larval stage of aleocharine beetles, *e.g.*, *Aleochara* (Aleocharini), *Atheta* (Athetini) (Ashe & Watrous, 1984) and *Phanerota* (Homalotini) (Ashe, 1981), and the immature period is 20–25 days. The abbreviation of larval instars in *Pella*

may be related with the short immature period. Although the immature period of most staphylinids have been unknown, this is considered to be very short example.

Behaviour

There are some reports on categorization of myrmecophily based on the behavioural information: Wheeler (1910b) and Kistner (1979) that include five and two kinds of categories, respectively.

The *Pella* beetles have several behavioural aspects. Observations revealed three food habitats of *Pella* beetles: 1) scavenger feeding on dead host workers or ants' garbage; 2) predator upon living ants; 3) cleptoparasite eating ants' booty.

By these behavioural data, *Pella* can be classified into "synecthrans" (persecuted guests) of Wheeler's (1910b) categorisation. The "synecthrans" eat some part of their hosts' colony (the colony member, the brood, or the refuse) and are persecuted by the colony members when they encountered.

In contrast, it is difficult to classify *Pella* beetle into neither "integrated species" nor "non-integrated species" in Kistner's (1979) categorisation. To a stretch point, *Pella* beetles are rather "integrated species" because they are chemically integrated to ant society, *e.g.*, the pheromone following behaviour and the similarity of the cuticular profiles to the host ants (Akino, 2002). However, *Pella* beetles have also aspects of "obligate predators" and "defensive types" in the category "non-integrated species".

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