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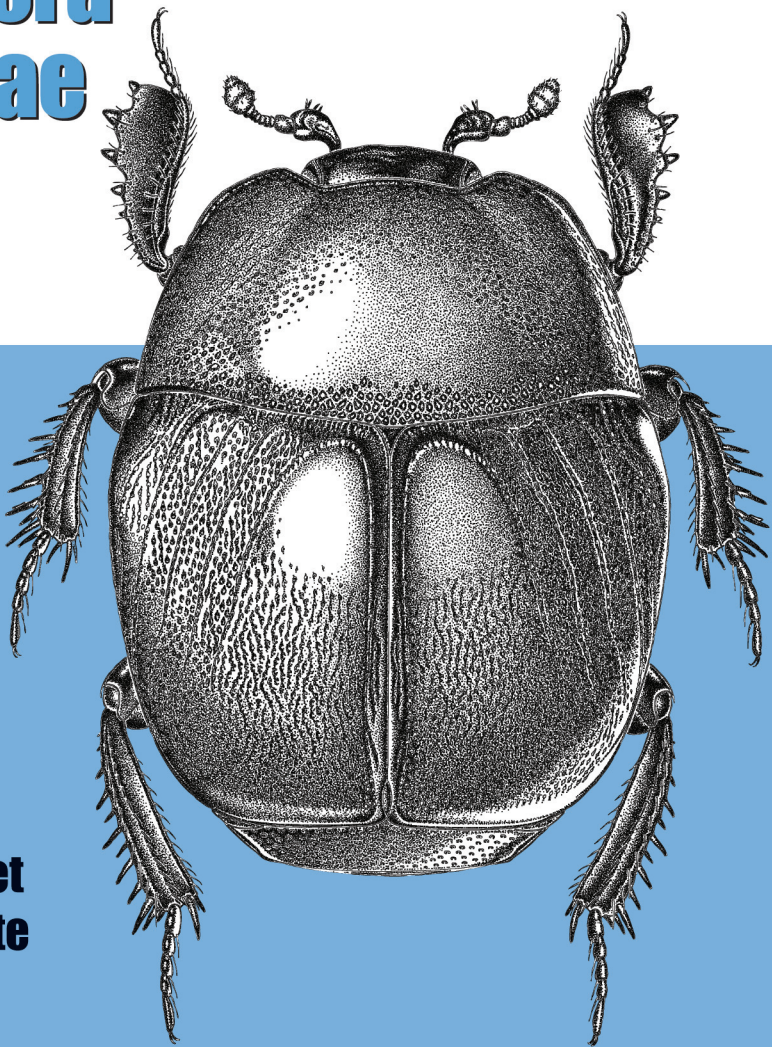
THE INSECTS AND ARACHNIDS OF CANADA

Part 24

Coleoptera Histeridae



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PART 24

Coleoptera Histeridae

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Abstract

This work treats 135 species of Histeridae recorded from Canada as well as 11 that could occur in the country. Seven new species are described: *Acritus depressus* (type locality: Osgoode, Ontario), *Gnathoncus brevisetosus* (type locality: Ottawa, Ontario), *Euspilotus alcyonis* (type locality: Osgoode, Ontario), *Xerosaprinus wenzeli* (type locality: Summerland, British Columbia), *Hypocaccus acorni* (type locality: 11 km. S Empress, Alberta–Saskatchewan border), *Eblisia nigra* (type locality: Rondeau Provincial Park, Ontario), and *Psiloscelis albertensis* (type locality: 20 km NE of Claresholm, Alberta). The following species, previously listed as junior synonyms, are considered valid: *Plegaderus consors* Horn, 1873 [distinct from *P. comonforti* Marseul, 1862], *Teretrius cylindrellus* Casey, 1916 [distinct from *T. montanus* Horn, 1880], *Euspilotus obductus* (J.L. LeConte, 1851) [distinct from *E. insertus* (J.L. LeConte, 1851)], *Xerosaprinus plenus* (J.L. LeConte, 1851) [distinct from *X. lubricus* (J.L. LeConte, 1851)], *Hister paykullii* Kirby, 1837 [distinct from *H. depurator* Say, 1825]. The following names are placed in synonymy: *Saprinus brevicollis* Casey, 1916 [with *Euspilotus detractus* (Casey, 1893)], *Hister albertanus* Casey, 1924 [with *Hister furtivus* J.E. LeConte, 1859], and *Hetaerius carri* Hatch, 1926 [with *Haeterius tristriatus* Horn, 1874]. The following new combination is proposed: *Platysoma bifoveolatum* (Bousquet and Laplante, 1999) [transferred from the genus *Cylistus* Dejean, 1833]. A lectotype is designated for *Plegaderus fraternus* Horn, 1870.

This monograph includes keys to subfamilies, genera, and species studied. For each species, the following is provided: a list of North American synonyms, a selective list of references, a diagnosis and a description, notes on the geographical distribution and data on the habitat. Distribution maps and illustrations of taxonomic characters for a number of species are included, as well as habitus drawings of representative species.

Résumé

Cette étude traite des 135 espèces d'Histeridae répertoriées au Canada ainsi que de 11 autres espèces qui pourraient s'y trouver. On décrit sept nouvelles espèces : *Acritus depressus* (localité-type : Osgoode, Ontario), *Gnathoncus brevisetosus* (localité-type : Ottawa, Ontario), *Euspilotus alcyonis* (localité-type : Osgoode, Ontario), *Xerosaprinus wenzeli* (localité-type : Summerland, British Columbia), *Hypocaccus acorni* (localité-type : 11 km. S Empress, Alberta–Saskatchewan border), *Eblisia nigra* (localité-type : Rondeau Provincial Park, Ontario) et *Psiloscelis albertensis* (localité-type : 20 km NE of Claresholm, Alberta). Les espèces suivantes, auparavant placées en synonymie, sont considérées valides : *Plegaderus consors* Horn, 1873 [distincte de *P. comonforti* Marseul, 1862], *Teretrius cylindrellus* Casey, 1916 [distincte de *T. montanus*

Horn, 1880], *Euspilotus obductus* (J.L. LeConte, 1851) [distincte d'*E. insertus* (J.L. LeConte, 1851)], *Xerosaprinus plenus* (J.L. LeConte, 1851) [distincte de *X. lubricus* (J.L. LeConte, 1851)], *Hister paykullii* Kirby, 1837 [distincte d'*H. depurator* Say, 1825]. Les noms suivants sont placés en synonymie : *Saprinus brevicollis* Casey, 1916 [avec *Euspilotus detractus* (Casey, 1893)], *Hister albertanus* Casey, 1924 [avec *Hister furtivus* J.E. LeConte, 1859] et *Hetaerius carri* Hatch, 1926 [avec *Haeterius tristriatus* Horn, 1874]. On propose la nouvelle combinaison suivante : *Platysoma bifoveolatum* (Bousquet and Laplante, 1999) [transférée du genre *Cylistus* Dejean, 1833]. Un lectotype est désigné pour *Plegaderus fraternus* Horn, 1870.

Le travail comprend des clés de détermination des sous-familles, des genres et des espèces traités. Pour chaque espèce on fournit les informations suivantes : une liste des synonymes nord-américains, une liste sélective de références, une diagnose et une description, des notes sur la répartition géographique et des données sur l'habitat. On inclut également des cartes de répartition géographique et des illustrations de plusieurs caractères taxonomiques de même que des dessins d'habitus d'espèces représentatives.

Acknowledgements

We thank all the persons mentioned in the "Material" section for giving us the opportunity to study the specimens in their collections or under their care. We have greatly appreciated the cooperation of Nicole Berti (MHNP), Martin J.D. Brendell (BMNH), Gloria N. House (USNM), Alfred F. Newton Jr. (FMNH), and Philip D. Perkins (MCZ) for sending type specimens. We acknowledge Rupert L. Wenzel (FMNH), Alexey Tishechkin (LSUC), and Yves Gomy (Nevers, France) for sharing taxonomic information about Histeridae. The manuscript was reviewed by Anthony Davies, John Huber, Jean-François Landry, Alexey Tishechkin, and one anonymous reviewer; they offered many valuable comments that improved the presentation of the text. All the habitus illustrations were done by Go Sato except for *Carcinops pumilio* which was drawn by Roelof Idema.

Introduction

The family Histeridae is one of the most neglected groups of beetles. This is not surprising considering the microhabitats they inhabit. Very secretive, most histerids live in dung, carcasses, decaying vegetable matter, or under the bark of dead or dying trees. Moreover, the vast majority of them do not attract attention because of their small size and dark appearance.

Yet, the group is important ecologically and economically. There are more than 3800 species known worldwide and the vast majority are predaceous. Species associated with dung and carcasses feed mainly on Diptera larvae and contribute to the reduction of noxious fly populations. Those living under the bark of damaged or dead trees prey upon eggs, larvae, and pupae of wood-boring beetles such as scolytids, anobiids, and bostrichids. There are even species that have been used as biological agents against harmful insects. *Plaesius javanus* Erichson, for instance, has been introduced intentionally into the West Indies to control the banana weevil borer, *Cosmopolites sordidus* (Germar) (Curculionidae: Baridinae) (Clausen 1978), and *Teretrius nigrescens* Lewis has been introduced recently into Kenya for the control of the larger grain borer, *Prostephanus truncatus* (Horn) (Bostrichidae) (Hill et al. 2003).

The North American histerid fauna has not been studied extensively. Thomas Say [1787–1834] pioneered the study of American Histeridae; in 1825 he described 23 species, all but two of them in the genus *Hister* Linnaeus. In 1845, John Eatton LeConte [1784–1860], father of the well-known John Lawrence LeConte, published the first monograph dealing with the North American hister beetles; he treated 83 species, which he classified in 13 genera. Many new species were described over the next decades, particularly by the French coleopterist Sylvain A. de Marseul [1812–1890] in his world monograph *Essai monographique sur la famille des histérides* and by John L. LeConte [1825–1883] in several descriptive papers. In 1873, George H. Horn [1840–1897] published an exhaustive synopsis of the Histeridae of the United States in which he recognized 184 species and 21 genera. Thomas L. Casey [1857–1925] worked on many groups of beetles, including North American Histeridae; between 1893 and 1924, he described many new species, several of which would be synonymised later. Over the first decades of the twentieth century, a few authors published scattered works on the Nearctic histerids, including Blatchley, Carnochan, Ross, Hatch, and Wenzel. Wenzel (1962) published a comprehensive generic review of the North American fauna when he wrote a key to the genera and subgenera of Histeridae of the Nearctic Region. Since then, few publications, besides isolated descriptions of new taxa, have dealt with the taxonomy of the North American Histeridae: Hatch (1962) treated the species of the Pacific Northwest; Helava (1978) revised the species of *Onthophilus* Leach; Caterino (1998) revised the species of *Spilodiscus* Lewis and some groups of *Hister* Linnaeus (Caterino 1999*a*, *b*); and Bousquet and Laplante (1999) covered the species of Quebec. Kovarik and Caterino (2001)

recently published a fine updated version of the generic review of the North American histerids.

The purpose of this contribution is to provide a means for the identification of all genera and species of Histeridae known to occur in Canada and to summarize what is currently known concerning their habitat and geographical distribution. Presently 135 species placed in 34 genera are recorded from Canada (see Appendix).

Material

This work is based on the study of about 11 000 specimens from Canada and more than 4000 from the United States of America. The material was borrowed from the following institutions and private collections. The names of the institutions are followed by the names of the curators responsible for the loans.

AMNH: American Museum of Natural History, New York, New York; Lee H. Herman.

BMNH: The Natural History Museum, London, England; Martin J.D. Brendell.

CARR: Collection Bert F. and John L. Carr, Calgary, Alberta [now incorporated within CNC].

CAS: California Academy of Sciences, San Francisco, California; David H. Kavanaugh.

CCCH: Collection Claude Chantal, Varennes, Quebec.

CFL: Insectarium René Martineau, Centre de Foresterie des Laurentides, Québec, Quebec; Georges Pelletier.

CGHI: Gerald J. Hilchie Collection, Edmonton, Alberta.

CINM: Insectarium de Montréal, Montréal, Quebec; André Payette.

CIQ: Collection des Insectes du Québec, Complexe scientifique, Québec, Quebec; Mario Fréchette.

CJAC: John Acorn Collection, Edmonton, Alberta.

CJFR: Collection Jean-François Roch, Longueuil, Quebec.

CLDE: Collection Laurent Desaulniers, Montréal, Quebec.

CLLE: Collection Laurent LeSage, Gatineau, Quebec.

CLPL: Collection Léo-Paul Landry, Notre-Dame-du-Mont-Carmel, Quebec.

CMN: Canadian Museum of Nature, Gatineau, Quebec; François Génier.

CNC: Canadian National Collection of Insects, Arachnids and Nematodes, Ottawa, Ontario.

CPBE: Collection Pierre Bélanger, Québec, Quebec.

CPPA: Collection Pierre Paquin, Montréal, Quebec.

CPTO: Collection Pierre de Tonnancour, Terrasse-Vaudreuil, Quebec.

CRJU: Collection Robert Juan, Lévis, Quebec.

CRVI: Collection Robert Vigneault, Oka, Quebec.

CRWE: Reginald Webster Collection, Charters Settlement, New Brunswick.

CSLA: Collection Serge Laplante, Gatineau, Quebec.

FMNH: Field Museum of Natural History, Chicago, Illinois; Alfred F. Newton, Jr.

ICCM: Insect Collection, Carnegie Museum of Natural History, Pittsburgh, Pennsylvania; Robert L. Davidson.

LEMM: Lyman Entomological Museum and Research Laboratory, McGill University, Sainte-Anne-de-Bellevue, Quebec; Chia-Chi Hsiung.

LSUC: Louisiana State University, Baton Rouge, Louisiana; Cheryl B. Barr.

MCZ: Museum of Comparative Zoology, Harvard University, Cambridge, Massachusetts; Philip D. Perkins.

MHNP: Muséum National d'Histoire Naturelle, Paris, France; Nicole Berti.

MMUM: The Manchester Museum, The University, Manchester, England; Colin Johnson.

MUN: Memorial University of Newfoundland, St. John's, Newfoundland; David J. Larson.

NFRC: Northern Forestry Research Collection, Edmonton, Alberta; James Hammond.

NSMH: Nova Scotia Museum, Halifax, Nova Scotia; Christopher Majka.

ORUM: Collection Ouellet-Robert, Université de Montréal, Montréal, Quebec; Louise Cloutier.

RBCM: Royal British Columbia Museum, Victoria, British Columbia; David C.A. Blades.

ROM: Royal Ontario Museum, Toronto, Ontario; Brad Hubley.

RSM: Royal Saskatchewan Museum, Regina, Saskatchewan; Ronald R. Hooper.

UASM: Strickland Museum, University of Alberta, Edmonton, Alberta; George E. Ball.

UBC: Spencer Entomological Museum, University of British Columbia, Vancouver, British Columbia; Karen M. Needham.

UGC: University of Guelph, Guelph, Ontario; Steve Marshall.

ULQ: Collection de l'Université Laval, Québec, Quebec; Jean-Marie Perron.

UMA: University of Manitoba Collection, Winnipeg, Manitoba; Robert E. Roughley.

UQAC: Collection de l'Université du Québec à Chicoutimi, Chicoutimi, Quebec; André Francoeur.

USNM: National Museum of Natural History, Smithsonian Institution, Washington D.C.; Gloria House.

Methods

For each species treated we provide a list of synonyms as well as a selection of references containing identification keys, descriptions, or useful complementary information. This part is followed by a section entitled "Diagnosis" where we give only the diagnostic character states of the species. Following is the description, which ends with the size range of the species. These measurements were obtained by selecting visually the smallest and the largest specimens among the material studied and measuring them with a millimetric ruler. An overview of the geographic distribution of the species in the world and in Canada is presented and a map is provided. For species recorded from three or fewer localities in Canada we list these localities along with the dates and collector names. Finally, we provide brief information about the habitat requirements of each species.

Line drawings were prepared using a camera lucida attached to a Nikon Optiphot compound microscope and microphotographs with a Philips XL 30 SEM scanning electron microscope at voltages of 2–5 kV.

Anatomy

This section presents a general account of the external morphology of adult Histeridae and gives explanations of the structural terms and expressions used throughout this work. As an aid for the identification of the structures, illustrations showing a dorsal view (Fig. 1) and a ventral view (Fig. 2) of a typical Histerinae, as well as a left lateral view of the pronotum and the elytron of a Histerinae (Fig. 3) and of a Saprininae (Fig. 4), are provided. In the present section, the name of each structure discussed is followed, in parentheses, by the corresponding abbreviation used in Figs. 1–4.

Head. Some species have on the dorsum of the head a *frontal stria* (Fig. 1: frs), which could be entire or interrupted at middle. The section anterior to the stria is the *epistoma* (Fig. 1: ep), while the section posterior to that stria is the *frons* (Fig. 1: fr). When the frontal stria is absent or widely interrupted at the middle, the limits of the epistoma and the frons are uncertain. In such cases we used the term epistoma to designate the section of the head anterior to an imaginary

line between the bases of the antennae and the term frons for the section posterior to this line.

Visually, the antenna is composed of three parts: the scape, which represents the first antennomere; the funicle, which comprises the next seven antennomeres, all more or less of similar dimensions; and the club, formed by the enlarged last three antennomeres. The club is compact and generally covered with dense, short hairs. In most species, it is possible to distinguish a few annuli on the club, which may be more or less straight or bent toward the apex or the base.

We did not use characters from the maxilla or the labium because these structures are often difficult to observe, especially in small species, and of limited aid in discriminating between species of the same genus.

Pronotum. In most species of Histeridae, the pronotum has a fine stria along the anterior and lateral edges, the *marginal stria* (Figs. 1, 3, 4: ms), which defines the anterior and lateral borders. This stria may be interrupted along the anterior margin at the middle or at the level of the eyes, or erased toward the base on the lateral margins. Some species, especially in the subfamily Histerinae, also possess two other striae along the lateral margin of the pronotum. The stria closest to the marginal stria is the *outer lateral stria* (Figs. 1, 3: ols) and the farthest one is the *inner lateral stria*[1] (Figs. 1, 3: ils). These striae may be entire, and extend from near the anterior edge of the pronotum to near the posterior edge, or reduced in length to various extents. If only one stria is present, it is designated as the *lateral stria*.

A few species, such as *Acritus nigricornis*, possess a transverse row of small, elongate tubercles at the base of the pronotum. This structure, which looks like a crenulate line, is the *antescutellar stria*.

Elytra. The inflexed part of the elytron usually has two striae. The stria farthest from the lateral edge, which is called the *marginal stria* (Figs. 3, 4: mse), starts near the base of the elytron in most species. In some species, this stria extends along the apical margin of the elytron. The second stria is the *epipleural stria* (Figs. 3, 4: es) and is located between the lateral edge of the elytron and the marginal stria. Some species possess more than one stria between the lateral edge and the marginal stria.

In most species of Histeridae, the dorsal surface of the elytra bears several striae. The number and the length of these striae vary from one group to another. Starting from the lateral edge, there is the *outer subhumeral stria* (Figs. 1, 3, 4: oss), the *inner subhumeral stria* (Figs. 3, 4: iss), and the *humeral stria* (Figs. 1,

[1]The terms "inner" (related to something below the surface) and "outer" (related to something at the surface) are inappropriate adjectives respectively used for "medial" and "lateral," but since they are universally used in histerid works, no terminological changes are proposed here.

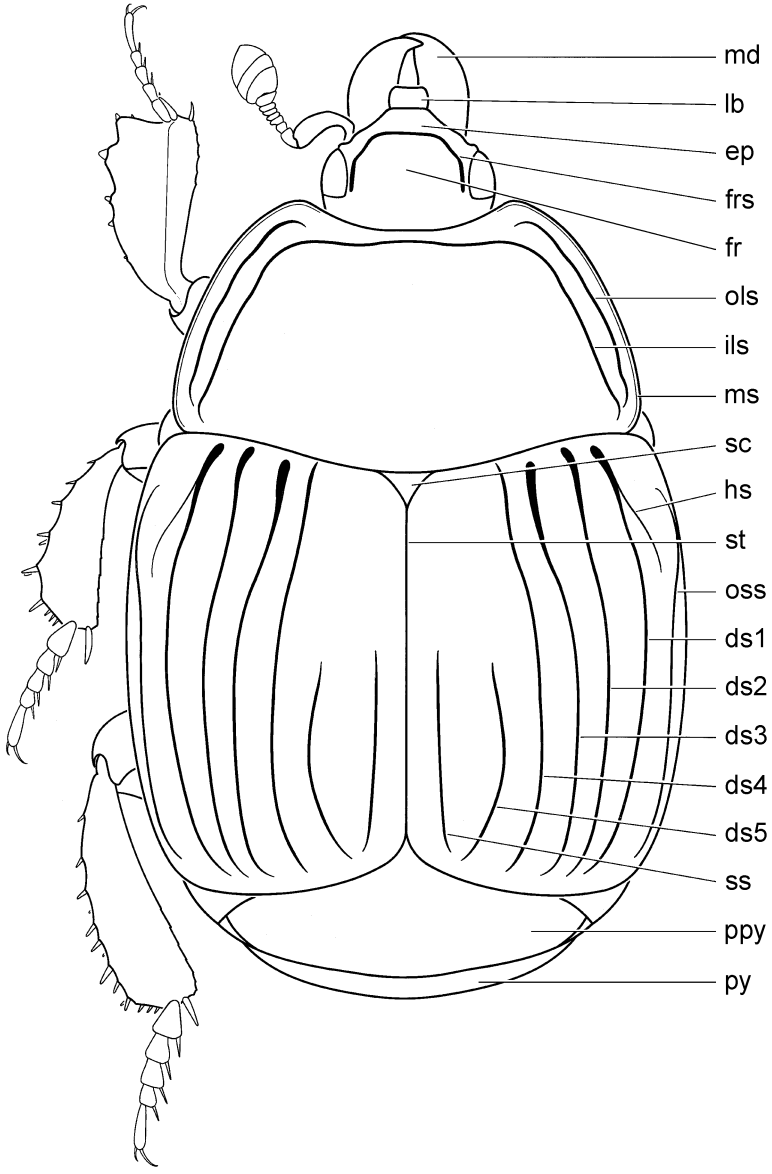


Fig. 1. Diagrammatic dorsal view of a Histeridae (*Margarinotus egregius*, Histerini). ds1, dorsal stria 1; ds2, dorsal stria 2; ds3, dorsal stria 3; ds4, dorsal stria 4; ds5, dorsal stria 5; ep, epistoma; fr, frons; frs, frontal stria; hs, humeral stria; ils, inner lateral stria; lb, labrum; md, mandible; ms, marginal stria; ols, outer lateral stria; oss, outer subhumeral stria; ppy, propygidium; py, pygidium; sc, scutellum; ss, sutural stria; st, suture.

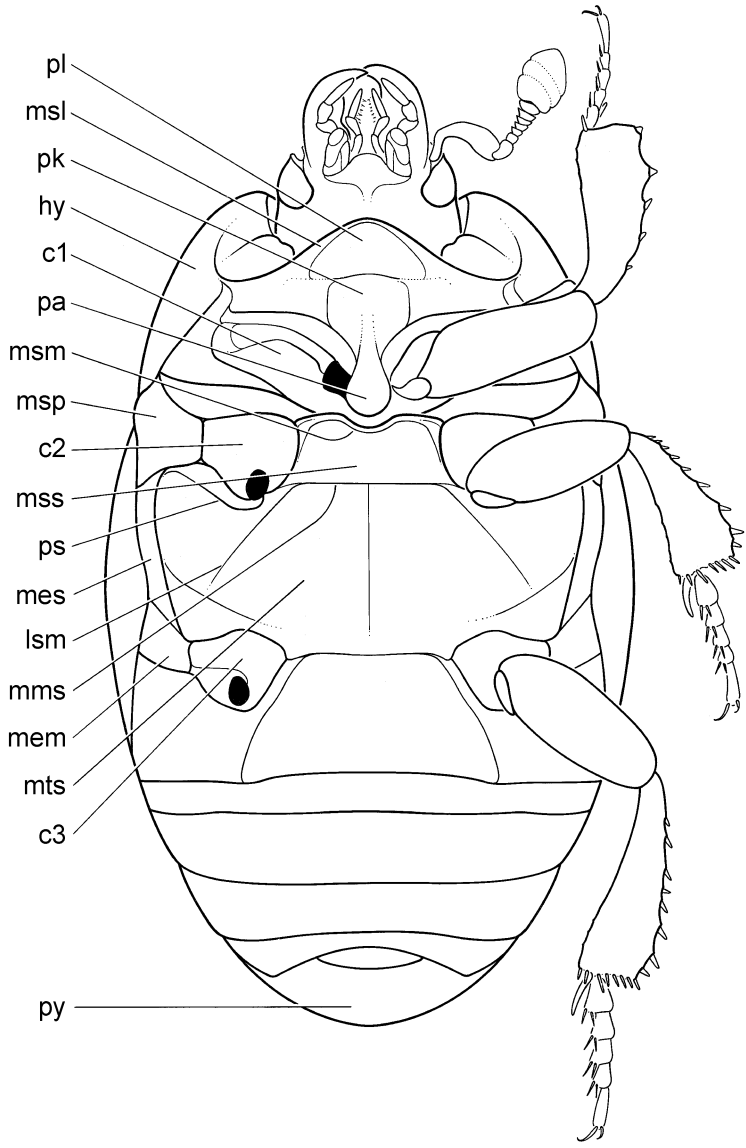


Fig. 2. Diagrammatic ventral view of a Histeridae (*Margarinotus egregius*, Histerini). c1, procoxa; c2, mesocoxa; c3, metacoxa; hy, hypomeron; lsm, lateral stria of metasternum; mem, metepimeron; mes, metepisternum; mms, meso-metasternal suture; msl, marginal stria of prosternal lobe; msm, marginal stria of mesosternum; msp, mesepimeron; mss, mesosternum; mts, metasternum; pa, prosternal apophysis; pk, prosternal keel; pl, prosternal lobe; ps, postcoxal stria; py, pygidium.

3, 4: hs). The last one, if present, is rather short, very fine, usually oblique and restricted to the anterior region of the elytra. These striae are followed by the *dorsal striae* (Figs. 1, 3, 4: ds1–ds5), numbered 1 to 5, and the *sutural stria* (Figs. 1, 3, 4: ss) which, as its name implies, lies close to the suture. In numerous species some of these striae are absent, while in a few species all of them may be absent. These striae are said to be entire when they extend from the base, though not quite attaining the basal edge, to the apical region, without reaching the apical edge. In many instances, some of these striae are erased at one extremity, usually at the base, intermittent (interrupted several times), or reduced to a very short segment or a series of dots. Since it is unusual that all striae are present in a species, their recognition can be difficult, particularly when several of them are missing. Therefore, it is important to become familiar with the position of each stria before using the identification keys. Interestingly, the numbering of the dorsal striae in the Histeridae starts with the most lateral stria, or the one farthest from the suture. In other groups of Coleoptera, the numbering is usually done the opposite way. The fact that in the Histeridae the medial striae are more frequently absent than the lateral striae is apparently at the origin of such numbering arrangement.

The surface of the elytron between dorsal striae 1 and 2 is called interval 1, that between striae 2 and 3 is interval 2, etc. The area between the sutural stria and suture is designated as the sutural interval. In many species of Saprininae, the periscutellar area is smooth or almost so, being covered only with micropunctures or punctules, and contrasts with the surrounding area which is covered with coarser punctures. This smooth periscutellar area is the *mirror*.

Prosternum. This structure is very important in the taxonomy of Histeridae. The central region, which is usually somewhat prominent, is the *prosternal keel* (Fig. 2: pk). Some species possess two pairs of striae on the keel, the *carinal striae*, or internal prosternal striae, located toward the middle, and the *lateral striae*, or external prosternal striae that, as the name implies, are located laterad to the carinal striae. Some species of Saprininae also bear a pair of foveae in the anterior part of the keel, referred to as the *preapical foveae*. The posterior part of the keel, between the anterior coxae, is the *prosternal apophysis* (Fig. 2: pa) and the shape of its apical margin varies from one group to another, being straight in some taxa, rounded or notched in others.

Several species of histerids have a lobe in front of the prosternal keel called the *prosternal lobe* (Fig. 2: pl) that extends laterally. Many species, in particular the majority of the species of Histerini, possess a *marginal stria* (Fig. 2: msl) that borders the anterior edge of the lobe; this stria may be complete or interrupted medially or at the base on each side. Some species also have a notch for the reception of the antennal funicle at rest, lateral to the prosternal keel.

One of the important modifications of the prosternum concerns the position of the *antennal cavity*, where the antennal club is held in repose. This cavity may be located near the anterior angle of the prosternum, and may be open or partial-

ly covered by the lateral extension of the prosternal lobe. In other instances, the cavity lies just in front of the coxa or encroaches on the prosternal keel. Finally, in some species each cavity is located on the hypomeron, which is the inflexed part of the pronotum.

Mesosternum and metasternum. The mesosternum (Fig. 2: mss) of histerid adults is short. It is separated from the metasternum (Fig. 2: mts) by the *meso-metasternal suture* (Fig. 2: mms), which in some species is poorly defined or even absent as in species of *Plegaderus*; we use the term meso-metasternal plate for the structure formed by the fusion of the mesosternum with the metasternal disc. In most species, there is a *marginal stria* (Fig. 2: msm) on the mesosternum that borders the lateral and anterior edges; this stria may be interrupted at the middle or absent along the anterior margin. Laterad to the mesosternum are the meso-coxae (Fig. 2: c2) and the mesepimera (Fig. 2: msp). The lateral region of the mesepimeron fits between the base of the pronotum and the base of the elytron and is visible from above in some species.

In several species, the metasternum possesses a *lateral stria* (Fig. 2: lsm) on each side that may be straight in the posterior region or regularly curved and extended laterally toward the mesepimeral or metepisternal suture. In species with straight lateral stria, the disc of the metasternum is the region mediad to that stria and the lateral portion of the metasternum is the region laterad to that stria. The species of *Platysoma* have two lateral striae on each side. Some species also have a stria that borders the posterior edge of the mesocoxal cavity; this stria is the *postcoxal stria* (Fig. 2: ps). The metasternum is bordered on each side by the metepisternum and posteriorly by the metepimeron and the metacoxa. In some species the metepisternum and the metepimeron bear a lateral longitudinal stria.

Legs. The legs offer a few good taxonomic characters. The number of denticles on the lateral edge of the tibia may vary from species to species; nevertheless this character has been rarely used in this work because their number and size may vary within a species or they may be worn in old specimens. The majority of histerids have on the dorsal face of the protibia a *tarsal groove* where the tarsus is held at rest. The shape of this groove may be taxonomically useful.

Abdomen. The abdomen offers few structural modifications useful in histerid taxonomy except for punctation on the propygidium and pygidium. In a few species, the pygidium bears a marginal stria or groove; in some species the surface shows a network of irregular grooves.

Genitalia. The aedeagus of the male is formed by the tegmen and the median lobe. In histerids, the tegmen is divided into a basal region, called the basal piece, and an apical region formed by the parameres, which are usually fused at the base on the dorsal surface and along their entire length on the ventral surface. In repose, the median lobe is surrounded by the tegmen. In many species, the median lobe is formed by a long, narrow, and poorly sclerotized tube, but in the

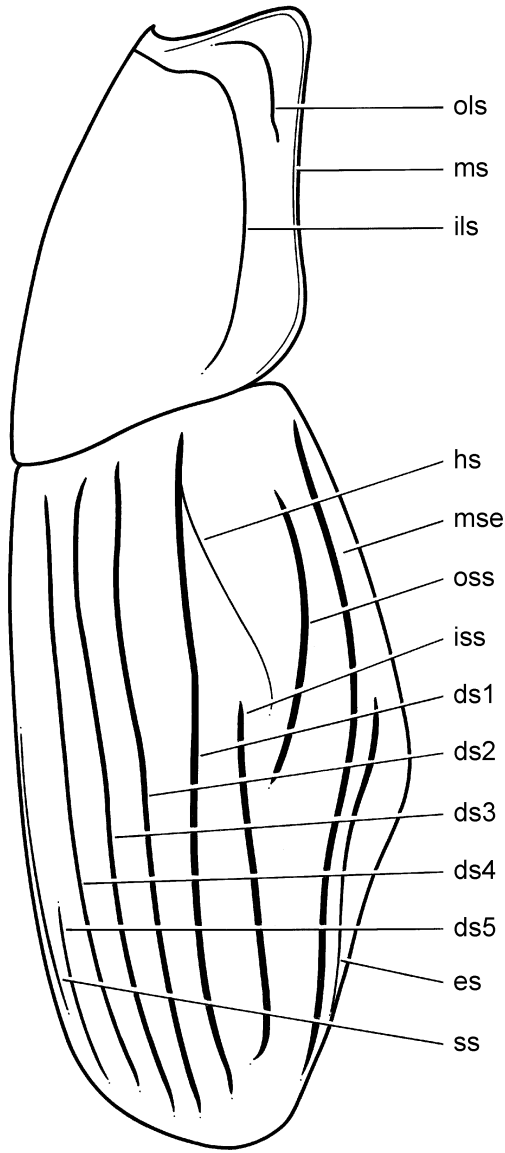


Fig. 3. Diagrammatic lateral view of pronotum and elytron of a Histeridae (*Hister abbreviatus*). ds1, dorsal stria 1; ds2, dorsal stria 2; ds3, dorsal stria 3; ds4, dorsal stria 4; ds5, dorsal stria 5; es, epipleural stria; hs, humeral stria; ils, inner lateral stria; iss, inner subhumeral stria; ols, outer lateral stria; oss, outer subhumeral stria; ms, marginal stria of pronotum; mse, marginal stria of elytron; ss, sutural stria.

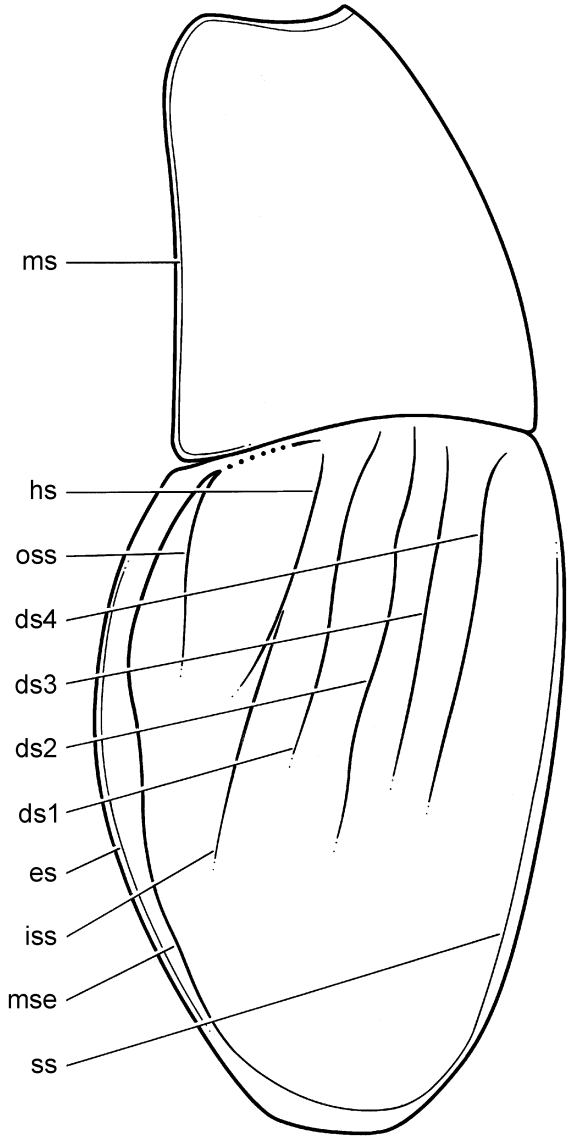


Fig. 4. Diagrammatic lateral view of pronotum and elytron of Saprininae (*Saprinus lugens*). ds1, dorsal stria 1; ds2, dorsal stria 2; ds3, dorsal stria 3; ds4, dorsal stria 4; es, epipleural stria; hs, humeral stria; iss, inner subhumeral stria; oss, outer subhumeral stria; ms, marginal stria of pronotum; mse, marginal stria of elytron; ss, sutural stria.

Histerini it becomes more sclerotized and complex and sometimes bears on the dorsum an armature, the shape of which is often useful for species recognition.

The female genitalia, including the styles and spermatheca, have not been studied in this work. The reader is referred to De Marzo and Vienna (1982*c*) and Ôhara (1994) for a brief overview of the variability of spermatheca in Histeridae.

Surface sculpture. Most structures of histerids are punctate, being covered with punctures (small depressions). In this work the punctation is qualified as fine, moderately fine, intermediate, moderately coarse, and coarse. These qualifying terms are used to establish comparisons between various structures of a species. In many instances, some structures of the body are covered with very small, microscopic punctures; in such cases, the surface is said to be punctulate and these micropunctures are called punctules. The punctures are umbilicate when each has a small protuberance inside and simple when they do not have such a protuberance. The surface of the body may be reticulate, i.e., covered with a network of microlines (microsculpture), or aciculate, i.e., covered with more or less longitudinal microlines like scratches made with a needle.

Systematics

Family HISTERIDAE Gyllenhal, 1808

Description (Adult). The following description is a short listing of the significant and obvious characters used for family recognition. A thorough description of the family is presented by Kovarik and Caterino (2001: 212–214).

Body length ranging from 0.5 to about 25 mm, but usually less than 12 mm. Body ovate to oblong and convex in many species, cylindrical or dorsoventrally flattened in others; cuticle markedly sclerotized; coloration of most species black or dark reddish brown, with metallic lustre in some species (particularly in the subfamily Saprininae), rarely with reddish or orange spots on the elytra; dorsum of body without setae in the vast majority of species. Head hypognathous in most species, prognathous only in few groups, usually retracted into prothorax. Eyes present, except in some troglobitic forms. Antennae rather short, geniculate, usually 11-segmented, positioned under the prothorax in repose; scape relatively long; club compact, 3-segmented. Mandibles stout, protruding, without sexual dimorphism in the vast majority of species. Maxillary palpi 4-segmented; labial palpi 3-segmented. Gular sutures separate throughout their length in some species, but confluent posteriorly in most species. Pronotum often trapezoidal, not narrowed behind, usually punctate, the punctation often coarser laterally and basally than on disc. Elytra more or less truncate behind, exposing the last two abdominal terga (propygidium and pygidium) in the majority of species, sometimes one only (pygidium); disc usually striate but with less than six striae. Fourth

abdominal tergum with medial slit receiving inflexed sutural edge of elytron. Pygidium well developed. Prosternum with antennal cavities located at various places. Mesocoxal cavities well separated. Metasternum wide; metacoxal cavities widely separated. Metepisternum indistinct externally in several groups (possibly due to fusion with metasternum) but distinct in most species treated here. Legs normally short, robust; protibia dentate along lateral edge, with tarsal groove of variable shape and depth in many species; tarsal formula 5-5-5 in most species, 5-5-4 in Acritini; empodium present or not. Abdomen with five visible sterna, first one longer than remaining ones and usually with coxal lines. Median lobe of aedeagus usually narrow, elongate, tubular; parameres fused for most of their length in most taxa and forming an elongate envelope around the median lobe.

Biology. The biology of most histerids is virtually unknown. However, we know that the majority of species are probably predacious as adults and larvae and that they feed mainly on insect larvae and eggs, although adults of some species of *Bacanius*, *Epierus,* and *Caerosternus* have been reported to feed on fungal spores (Kovarik and Caterino 2001). In most species studied, oviposition occurs in the spring and early summer. Recent studies show that larvae go through two instars (Lindner 1967; Summerlin et al. 1989; Kovarik 1995), although three larval instars have been reported for some species (Hinton 1945; Summerlin et al. 1984). In temperate regions, such as southern Canada, there is one generation per year as a rule. The new adults emerge by late summer and fall and overwinter before reproducing.

According to their life style, histerids living in Canada can be separated into five main groups.

(1) Saprophiles, for those that live in dung, carrion, and decaying vegetable matter. These species feed mainly on fly and beetle larvae. Most species of *Margarinotus*, *Hister*, *Atholus,* and many groups of Saprininae are examples of saprophile taxa found in Canada.

(2) Xylophiles, for those that are associated with dead or dying trees. Many of these histerids live under bark and have a flat body. The most spectacular example in Canada is *Hololepta aequalis*, which lives under adherent bark of recently dead or cut trees. Other species of histerids, like those of *Teretrius*, are convex and cylindrical and are found in the galleries of xylophagous beetles. These species feed mainly upon the eggs, larvae, and pupae of scolytids, anobiids, lyctids, bostrichids, and ciids. While some of these species seem to be attracted by the pheromones released by their prey, others seem to be attracted, like scolytids, by substances produced by damaged trees. Members of *Platysoma*, *Platylomalus*, *Paromalus*, and *Plegaderus* also belong to this group.

(3) Psammophiles, for those that live in sandy habitats. These species are found on lake and river banks, and on sea beaches, but also in sand pits and dunes far from water bodies. They feed on small arthropods, particularly beetle and fly

larvae, that live around the roots of arenicolous plants. Species of *Hypocaccus* and *Baeckmanniolus* are typical examples of this group.

(4) Inquilines, for those that inhabit bird and mammal nests. These species feed mainly on larvae and small arthropods found in the nests. Some *Margarinotus* and species of *Dendrophilus* and *Gnathoncus* are examples of this group in Canada.

(5) Myrmecophiles, for those that live in association with ants. The relationships between histerids and ants are still poorly understood. However, we know that some species are nurtured guests (symphiles) whereas others are actively persecuted lodgers. Many symphiles have glands at the base of their trichomes that secrete substances sought after by ants. According to Hinton (1945), the myrmecophile histerids feed mainly on ant eggs, larvae, and pupae. Members of *Psiloscelis* and *Haeterius* are regularly associated with ants in Canada.

Affinities. Several authors, including recently Hansen (1997), believed that Sphaeritidae and Synteliidae are, from a phylogenetic standpoint, the families most closely related to Histeridae, and that these three taxa constitute a monophyletic group. Similarity in the aedeagi of these three groups led Sharp and Muir (1912) to suggest including them in the same family. Crowson (1955) proposed the superfamily Histeroidea to include the three families, but this view is not accepted by everyone. For example, Paulian (1988) included the Sphaeritidae and Synteliidae in the superfamily Hydrophiloidea, whereas the Histeridae were isolated in the superfamily Histeroidea.

In the classification of Lawrence (1982) and Lawrence and Newton (1995), the Histeridae, Synteliidae, and Sphaeritidae were placed with the Hydrophilidae in the superfamily Hydrophiloidea that together with the superfamily Staphylinoidea form the series Staphyliniformia. These authors pointed out that many larval and adult characters confirm that the Hydrophilidae are closely related to the Histeroidea.

Classification. The goal of this section is not to present an overview of the classification of Histeridae proposed to date. Those interested in this topic should refer to Vienna (1980: 43–47) and Ôhara (1994: 9–11). We will only mention that Wenzel (1944) divided the Histeridae into two major groups, the Saprinomorphae (division I), which lack a prosternal lobe, and the Histeromorphae (division II), which have such lobe. He recognized 10 subfamilies: the Chlamydopsinae, Saprininae, Abraeinae, Niponiinae, Trypanaeinae, and Trypeticinae within the Saprinomorphae, and the Haeteriinae, Histerinae, Dendrophilinae, and Tribalinae within the Histeromorphae. This classification has been in use for a long time and was adopted by Mazur (1984) in his first world catalogue of the Histeridae.

This classification was questioned. Crowson (1974) mentioned that larval characters do not corroborate the division into two major groups as proposed by

Wenzel (1944). Furthermore, some of the subfamilies do not seem to represent monophyletic groups (Lawrence and Newton 1995).

Ôhara (1994) wrote a critique of the "Wenzel–Mazur system" from a phylogenetic standpoint and proposed a new classification based on a cladistic analysis of histerid subfamilies. His new classification did not recognize Wenzel's divisions of the family into Saprinomorphae and Histeromorphae. Ôhara recognized 11 subfamilies, namely the Niponiinae, Chlamydopsinae, Onthophilinae, Tribalinae, Histerinae, Haeteriinae, Dendrophilinae, Abraeinae, Saprininae, Trypanaeinae, and Trypeticinae. Mazur (1997) in his recent world catalogue of the Histeridae followed this classification.

Recently, Ślipiński and Mazur (1999) proposed a new classification based on a phylogenetic analysis of 50 taxa using 29 characters. In addition to the Niponiomorphae, which include only the primitive subfamily Niponiinae, they recognize two major groups among the remaining subfamilies: the Abraeomorphae, which have a lateral notch on the prosternum for the reception of the antennal funicle in repose, and the Histeromorphae, which lack such notch. The Abraeomorphae are divided into four subfamilies, the Abraeinae, Saprininae, Dendrophilinae, and Trypanaeinae (including Trypeticinae), while the Histeromorphae include the subfamilies Histerinae, Onthophilinae (including Tribalinae), Chlamydopsinae, and Haeteriinae. Their classification has been followed in the present work.

Subsequent to Ślipiński and Mazur's classification, Caterino and Vogler (2002) investigated the phylogenetic relationships among several groups of Histeridae using adult, larval, and molecular (18S rDNA) data. Their results cast serious doubt on many aspects of Ślipiński and Mazur's classification. In particular, they did not find any evidence to support monophyly of the Abraeomorphae and Histeromorphae, and urged use of the more traditional classification of Mazur (1997) rather than that of Ślipiński and Mazur (1999). Since this book focuses on recognition of the histerid species found in Canada, we did not take a strong interest into the suprageneric classification of the family. We use Ślipiński and Mazur's classification simply because it is the latest proposed. Obviously, changes will eventually be made to the present classification as additional studies cast light on the relationships of the numerous family-group taxa of Histeridae. As an example, one of the interesting hypotheses generated by Caterino and Vogler's work is that ovoid, mainly generalist genera, such as *Onthophilus*, *Anapleus*, and *Dendrophilus* are among the most basal lineages of the family. This is contrary to previous thought that held the cylindrical and subcortical genera *Niponius*, *Trypanaeus*, and *Trypeticus* to be the most primitive Histeridae.

Of the nine subfamilies recognized by Ślipiński and Mazur (1999), six are represented in Canada.

Key to subfamilies of Histeridae found in Canada

1. Prosternum with lateral notch receiving antennal funicle at rest on each side (Figs. 54–60, 153, 167, 177) (Abraeomorphae) 2

– Prosternum without lateral notches (Figs. 186, 195, 205, 219, 220, 224) (Histeromorphae) 4

2 [1]. Prosternum with deep basal groove on each side receiving long apical spine of protibia (Figs. 153, 167, 177). Prosternum with anterior lobe (Figs. 153, 167, 177) . . . . . **Dendrophilinae** [p. 203]

– Prosternum without basal grooves (Figs. 35, 36, 54–60). Prosternum without anterior lobe (Figs. 35, 36, 54–60), except in members of *Bacanius* (Fig. 48) 3

3 [2]. Elytron without striae, except for vague rudiments near base in some species. Antennal cavity not encroaching upon prosternal keel (Figs. 7, 29, 30, 32) . . . . . **Abraeinae** [p. 17]

– Elytron with dorsal or sutural striae or both. Antennal cavity situated next to and encroaching upon prosternal keel in most species (Figs. 54–60). . . . . **Saprininae** [p. 79]

4 [1]. Antennal club subcylindrical, not pubescent in the species treated. Pronotum and elytra or pygidium with setae in the species treated (Figs. 387, 388). . . . . **Haeteriinae** [p. 440]

– Antennal club rounded or oval, pubescent (Figs. 236, 278). Pronotum, elytra, and pygidium without setae in the species treated 5

5 [4]. Labrum without setae (Figs. 256, 257). . . . . **Histerinae** [p. 240]

– Labrum with setae (Fig. 369). . . . . **Onthophilinae** [p. 421]

Clé des sous-familles d'Histeridae représentées au Canada

1. Prosternum marqué de chaque côté d'une entaille latérale recevant le funicule antennaire au repos (Figs 54–60, 153, 167, 177) (Abraeomorphae) 2

– Prosternum sans entailles latérales (Figs 186, 195, 205, 219, 220, 224) (Histeromorphae) 4

2 [1]. Prosternum marqué de chaque côté d'un sillon basal profond recevant la longue épine apicale du protibia (Figs 153, 167, 177). Prosternum pourvu d'un lobe antérieur (Figs 153, 167, 177) . . **Dendrophilinae** [p. 203]

– Prosternum sans sillons basaux (Figs 35, 36, 54–60). Prosternum sans lobe antérieur (Figs 35, 36, 54–60), sauf chez les espèces du genre *Bacanius* (Fig. 48) 3

3 [2]. Élytre sans stries distinctes, sauf de vagues rudiments à la base chez certaines espèces. Cavité antennaire non accolée à la crête prosternale (Figs 7, 29, 30, 32) . . . . . **Abraeinae** [p. 17]

– Élytre orné de stries dorsales et/ou suturale. Cavité antennaire adjacente ou accolée à la crête prosternale chez la plupart des espèces (Figs 54–60) . . . . . **Saprininae** [p. 79]

4 [1]. Massue antennaire subcylindrique, glabre chez les espèces ci-incluses. Pronotum et élytres ou pygidium ornés de soies isolées chez les espèces ci-incluses (Figs 387, 388) . . . . . **Haeteriinae** [p. 440]

– Massue antennaire ronde ou ovale, pubescente (Figs 236, 278). Pronotum, élytres et pygidium sans soies chez les espèces ci-incluses . . . 5

5 [4]. Labre sans soies (Figs 256, 257). . . . . **Histerinae** [p. 240]

– Labre présentant des soies (Fig. 369) . . . . . **Onthophilinae** [p. 421]

Subfamily ABRAEINAE MacLeay, 1819

This subfamily contains small species that can be recognized by the following character states. Antennal insertion visible from above, located near medial edge of eye. Labrum with setae. Elytron without dorsal striae but with vague impressions in some species. Antennal cavity open, located either in front of procoxa or at level of anterior angle of prothorax. Prosternum with or without anterior lobe, with lateral notch for reception of the antennal funicle.

The subfamily Abraeinae as defined by Ślipiński and Mazur (1999) includes the tribes Bacaniini and Anapleini, both formerly placed in the subfamily Dendrophilinae. Overall, the subfamily contains 35 genera and about 530 species that are grouped into seven tribes.

Key to genera of Abraeinae found in Canada

1. Pronotum with longitudinal sulcus on each side connected by transverse sulcus (Figs. 8, 9, 19–22) . . . . . ***Plegaderus*** Erichson [p. 21]

– Pronotum without longitudinal or transverse sulci (Figs. 27, 28) 2

2 [1]. Body cylindrical (Fig. 31), usually more than 1.5 mm long. Posterior edge of prosternal apophysis incised to receive mesosternal projection (Figs. 29, 30, 32). . . . . ***Teretrius*** Erichson [p. 42]

– Body oval or suboval (Fig. 46), usually less than 1.5 mm long. Posterior margin of prosternal apophysis straight, not incised (Figs. 35, 36, 48) 3

3 [2]. Prosternum with anterior lobe (Fig. 48) . . . ***Bacanius*** J.L. LeConte [p. 71]

– Prosternum without anterior lobe (Figs. 35, 36) 4

4 [3]. Protibia broadly expanded apically, apex about 6 times width at base (Fig. 5). Metatarsus with 5 articles . . . . . ***Abraeus*** Leach [p. 19]

– Protibia not broadly expanded apically, apex 2 times width at base or less. Metatarsus with 4 articles. 5

5 [4]. Scutellum indistinct. Epistoma with stria on each side and along anterior edge (Fig. 44) . . . . . ***Aeletes*** Horn [p. 66]

– Scutellum distinct. Epistoma without stria (Fig. 34) . . . . . ***Acritus*** J.L. LeConte [p. 54]

Clé des genres d'Abraeinae représentés au Canada

1. Pronotum orné de sillons longitudinaux latéraux joints par un sillon transverse (Figs 8, 9, 19–22). . . . . ***Plegaderus*** Erichson [p. 21]

– Pronotum sans sillons longitudinaux ou transverse (Figs 27, 28) 2

2 [1]. Corps cylindrique (Fig. 31), généralement de taille supérieure à 1,5 mm. Bord postérieur de l'apophyse prosternale entaillé pour l'insertion de la projection mésosternale (Figs 29, 30, 32). . . . . ***Teretrius*** Erichson [p. 42]

– Corps ovale ou subovale (Fig. 46), généralement de taille inférieure à 1,5 mm. Bord postérieur de l'apophyse prosternale tronqué, sans entaille (Figs 35, 36, 48). 3

3 [2]. Lobe prosternal présent (Fig. 48) . . . . . ***Bacanius*** J.L. LeConte [p. 71]

– Lobe prosternal absent (Figs 35, 36) 4

4 [3]. Protibia fortement élargi à l'apex (largeur à l'apex environ 6 fois celle à la base) (Fig. 5). Métatarse composé de 5 articles. . . . . ***Abraeus*** Leach [p. 19]

– Protibia légèrement élargi à l'apex (largeur à l'apex environ 2 fois celle à la base). Métatarse composé de 4 articles. 5

5 [4]. Scutellum indistinct. Épistome orné d'une strie de chaque côté et le long du bord antérieur (Fig. 44) . . . . ***Aeletes*** Horn [p. 66]

– Scutellum distinct. Épistome sans strie (Fig. 34) . . . . ***Acritus*** J.L. LeConte [p. 54]

Tribe ABRAEINI MacLeay, 1819

This tribe includes about 50 species placed in four genera. Only one genus is found in Canada.

Genus *Abraeus* Leach, 1817

Abraeus Leach, 1817: 76. Type species: *Hister globosus* Hoffmann, 1803 (= *Hister perpusillus* Marsham, 1802), designated by Westwood (1838: 22). Marseul (1856: 577); Bickhardt (1916: 63, 73); Reichardt (1941: 84, 129); Wenzel (1962: 373); Hatch (1962: 254); Halstead (1963: 9); Witzgall (1971: 159, 162); Mazur (1973: 21, 22); Kryzhanovskij and Reichardt (1976: 80, 93); Vienna (1980: 73); Mazur and Zoltán (1980: 5, 12); Mazur (1981: 50, 51); Secq (1997: 149); Kovarik and Caterino (2001: 219, 223); Yélamos (2002: 206, 210).

Members of this genus are very small (body length 1.5 mm or less), and differ from those of other genera of Abraeini found in Canada by the presence of 5, instead of 4, metatarsomeres. The species of *Abraeus* also share the following character states: body oval, without apparent setae; scutellum distinct but small and difficult to observe; prosternum without anterior lobe; meso-metasternal suture present; protibia broadly expanded apically (Fig. 5).

Of the six species included in this genus, five occur in the Palaearctic Region and one is Nearctic. Secq (1997) recognized two subgenera for these species: *Abraeus s.str.* and *Postabraeus* Secq. The North American species belongs to the nominotypical subgenus.

Abraeus bolteri J.L. LeConte, 1880

Fig. 5; Map 5

Abraeus bolteri J.L. LeConte, 1880: 190. Type locality: «San Bernardino [San Bernardino County], Cal[iforni]a» (original citation). Two syntypes (in MCZ) studied. – Hatch (1962: 255); Mazur (1984: 9); Davies (1991: 135); Secq (1997: 152); Mazur (1997: 192).

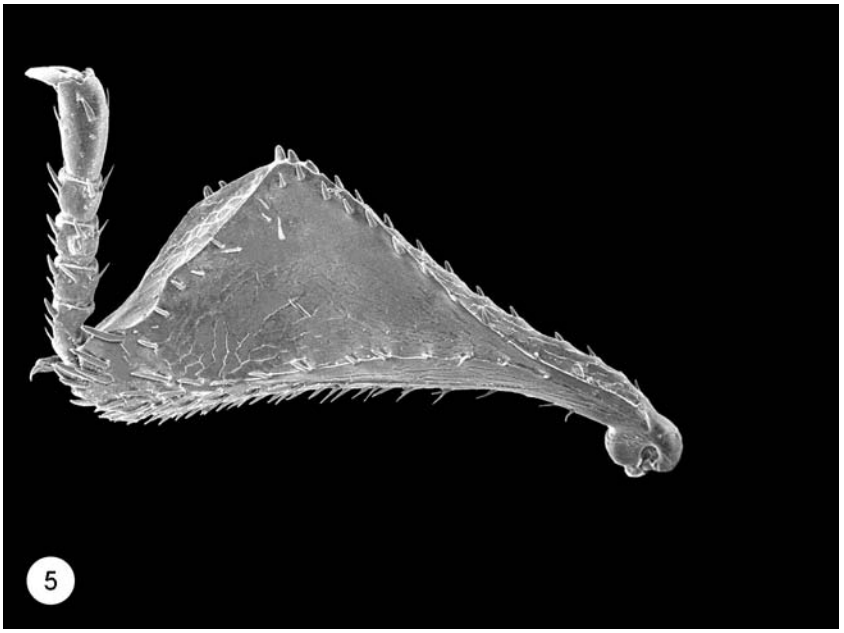


Fig. 5. Protibia and tarsus of *Abraeus bolteri*.

Diagnosis. Most similar to members of *Aeletes* and *Acritus*. In addition to features given in the key to genera of Abraeinae, specimens of *A. bolteri* are recognized from those of *Aeletes* and *Acritus* by the reticulate elytral surface.

Description. Body convex, oval, more or less reddish brown with pronotum slightly paler than elytra. Pronotum moderately finely punctate throughout; base without antescutellar stria. Elytron coarsely punctate, though less so along posterior margin; microsculpture distinct, more so on posterior half. Propygidium and pygidium very finely but rather densely punctate. Prosternum, mesosternum, metasternum, and first abdominal sternum reticulate. Prosternum without carinal striae. Mesosternum without marginal stria. Meso-metasternal suture distant from anterior edge of mesosternum. Metasternal disc moderately coarsely punctate; lateral stria on each side short. Protibia without tarsal sulcus; protarsus resting in narrow gutter along anterior edge of tibia (Fig. 5).

Body length: 1.4–1.5 mm.

Distribution. This species has been reported from California, Washington, and British Columbia (Secq 1997; Mazur 1997). We have only seen two specimens from Canada, both from Alberta (Map 5).

Canadian Records. Alberta. “Tp. 70, Rge. 6, W. 6 Mer”, 12.VII.1979, BF and JL Carr (1, FMNH). “Tp. 70, Rge. 8, W. 6 Mer”, 17.VI.1979, BF and JL Carr

(1, CNC). These places are located, respectively, about 12 km south and 20 km southwest of Grande Prairie in west-central Alberta.

Biology. Both Canadian specimens were collected along the Wapiti River, one under drift wood on sand, the other in flight.

Tribe PLEGADERINI Portevin, 1929

This tribe, characterized among others by the presence of a longitudinal sulcus on each side of the pronotum, is represented worldwide by three genera. One genus is found in North America.

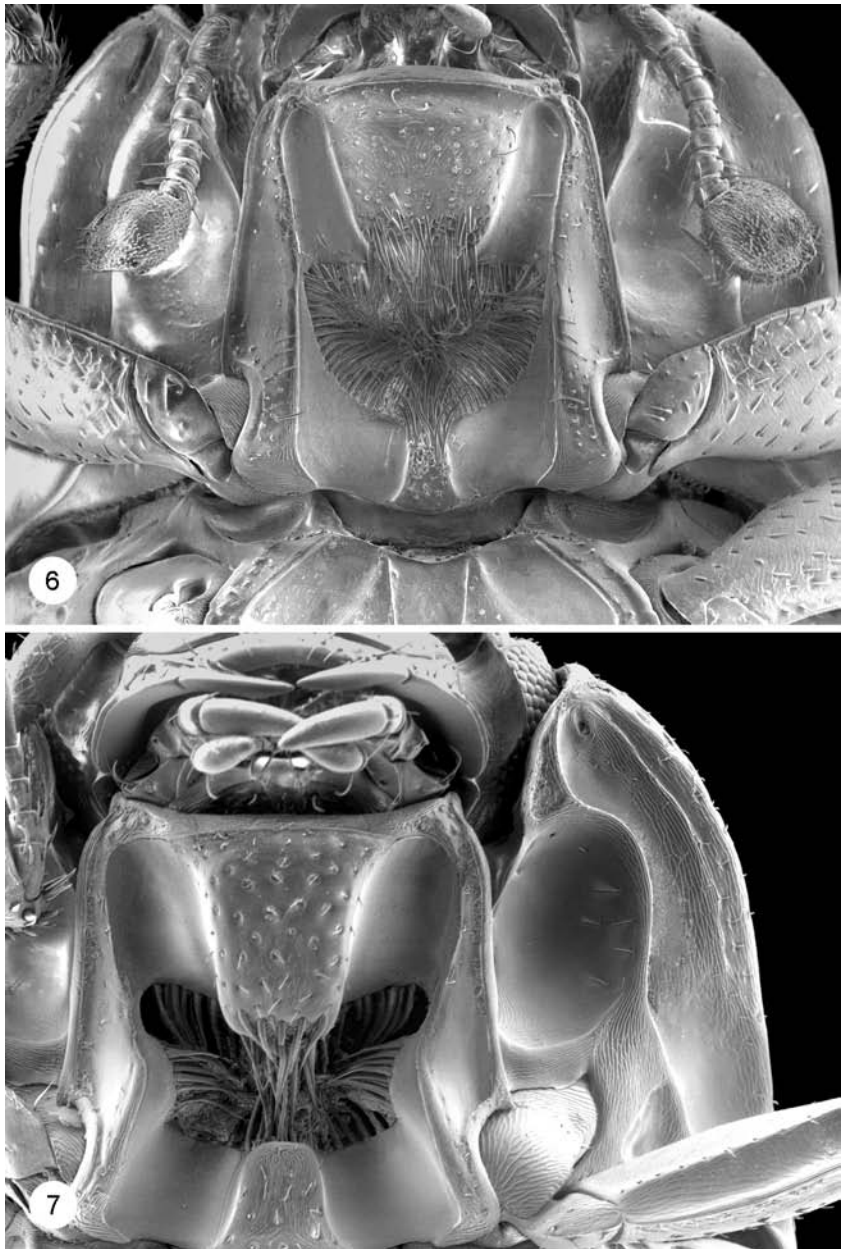
Genus *Plegaderus* Erichson, 1834

Plegaderus Erichson, 1834: 203. Type species: *Hister caesus* Herbst, 1792, designated by Hope (1840: 105). – J.E. LeConte (1845: 79); Marseul (1856: 259); Marseul (1857: 154); Horn (1873: 312, 347); Blatchley (1910: 624); Bickhardt (1916: 62, 67); Germain (1917: 137); Bradley (1930: 95); Reichardt (1941: 83, 97); McGrath and Hatch (1941: 53); Wenzel (1944: 55); Dillon and Dillon (1961: 223); Wenzel (1962: 373); Hatch (1962: 255, 256); Halstead (1963: 6); Hansen (1968: 295, 330); Witzgall (1971: 159, 160); Mazur (1973: 19); Kryzhanovskij and Reichardt (1976: 80, 85); Vienna (1980: 73); Mazur and Zoltán (1980: 5, 15); Mazur (1981: 55); Lohse and Lucht (1989: 93); Secq and Secq (1991: 196); Ôhara (1994: 204); Downie and Arnett (1996: 605); Bousquet and Laplante (1999: 124, 125); Mazur (2001: 20, 27); Kovarik and Caterino (2001: 218, 223); Yélamos (2002: 213).

Members of this genus are readily distinguished by the character states of the pronotum and prosternum. The pronotum bears on each side a longitudinal groove, which delimits the lateral lobe, and in most species a transverse groove is present, dividing the disc into anterior and posterior portions (Figs. 8, 9, 19–22). The prosternum has a large median cavity, edged with dense pubescence, and a deep arched sulcus on each side (Figs. 6, 7, 13–17). The median cavity divides the prosternum into two lobes of which the anterior one is the most developed.

This genus includes more than 25 species found in the New World, particularly from North America, and in the Palaearctic Region, mostly from Europe. The species of *Plegaderus* are classified in two subgenera, *Plegaderus s.str.* and *Hemitrichoderus* Reichardt. All the North American species belong to the nominotypical subgenus. The other subgenus includes only one east Mediterranean species.

Taxonomically, this is one of the most difficult genera in North America. Species discrimination often relies on subtle and relative character states that are difficult to express.



Figs. 6, 7. Prothorax (ventral view) of *Plegaderus*. 6, *P. nitidus*; 7, *P. fraternus*.

Key to the species of *Plegaderus* found in Canada

1. Posterior lobe of prosternum at most minute and feebly protruding (Fig. 6). Elytron aciculate at least laterally (Figs. 10, 11) 2

– Posterior lobe of prosternum well developed, distinctly protruding (Figs. 7, 13–17). Elytron not aciculate 3

2 [1]. Anterior third of lateral lobe of pronotum with punctures as fine as or finer than those on the adjacent area of disc (Fig. 8). Elytral punctures relatively coarse; disc of elytra aciculate even around scutellum (Fig. 10) [East of Rocky Mountains] . . . . . ***P. transversus*** (Say) [p. 26]

– Anterior third of lateral lobe of pronotum with punctures coarser than those on the adjacent area of disc (Fig. 9). Elytral punctures relatively fine; disc of elytra finely aciculate except for large periscutellar area (Fig. 11) [British Columbia]. . . . . ***P. nitidus*** Horn [p. 29]

3 [1]. Punctures on body each bearing a short, trumpetlike, erect seta distinct even at low magnification (Fig. 12). Elytral punctures rather coarse and shallow . . . . . ***P. setulosus*** Ross [p. 30]

– Punctures on body each bearing an inconspicuous or minute, trichoid seta distinct only at high magnification. Elytral punctures finer and deeper. 4

4 [3]. Prosternum with posterior lobe subquadrate, its apex as wide as apex of anterior lobe or almost so (Fig. 13). Meso-metasternal plate quite sparsely punctate, most punctures separated from each other by more than their diameter (Fig. 13) . . . . . ***P. consors*** Horn [p. 32]

– Prosternum with posterior lobe longer than wide, usually tapering anteriorly, trapezoidal or sometimes triangular, its apex narrower than apex of anterior lobe (Figs. 14–17). Meso-metasternal plate more densely punctate, most punctures separated from each other by their diameter or less (Figs. 14–17) 5

5 [4]. Lateral lobe of pronotum wider, with 4 or 5 rows of punctures at level of the transverse groove (Fig. 19). Elytral disc relatively flat . . . . . ***P. sayi*** Marseul [p. 34]

– Lateral lobe of pronotum narrower, with 3 rows of punctures at level of the transverse groove (as in Fig. 20). Elytral disc rather convex. 6

6 [5]. Anterior lobe of prosternum with disc relatively flat, its apex more or less squarely truncate and reaching middle of prosternum (Fig. 15). Distance between prosternal lobes slightly but distinctly shorter than length of posterior lobe (Fig. 15). Meso-metasternal plate relatively densely punctate, most punctures separated by less than 0.75 times their diameter (Fig. 15) . . . . . ***P. molestus*** Casey [p. 42]

– Anterior lobe of prosternum with disc relatively convex, its apex more widely rounded, not quite reaching middle of prosternum (Figs. 16, 17). Distance between prosternal lobes subequal to or longer than length of posterior lobe (Figs. 16, 17). Meso-metasternal plate more sparsely punctate, most punctures separated by more than 0.75 times their diameter (Figs. 16, 17) 7

7 [6]. Punctures on anterior and posterior portions of pronotum coarser and denser, those over lateral half on average slightly coarser than punctures at middle (Fig. 21). Prosternum with anterior lobe shorter, distance between lobes slightly longer than length of posterior lobe (Fig. 16) [Eastern: Maritimes to Saskatchewan]. . . . . . ***P. confusus*** Bousquet and Laplante [p. 37]

– Punctures on anterior and posterior portions of pronotum finer and sparser, those over lateral half on average as fine as or slightly finer than punctures at middle (Fig. 22). Prosternum with anterior lobe slightly longer, distance between lobes subequal to length of posterior lobe (Fig. 17) [Western: British Columbia]. . . ***P. fraternus*** Horn [p. 40]

Clé des espèces du genre *Plegaderus* présentes au Canada

1. Lobe postérieur du prosternum à peine distinct, seulement légèrement soulevé (Fig. 6). Élytres aciculés, au moins sur les marges latérales (Figs 10, 11) 2

– Lobe postérieur du prosternum saillant, distinctement soulevé (Figs 7, 13–17). Élytres non aciculés. 3

2 [1]. Ponctuation sur le tiers antérieur du lobe latéral du pronotum aussi fine que celle sur la région adjacente du disque (Fig. 8). Ponctuation élytrale plutôt grossière; disque de l'élytre fortement aciculé même autour du scutellum (Fig. 10) [espèce répartie à l'est des Rocheuses] . . . . . ***P. transversus*** (Say) [p. 26]

– Ponctuation sur le tiers antérieur du lobe latéral du pronotum plus grossière que celle sur la région adjacente du disque (Fig. 9). Ponctuation élytrale plutôt fine; disque de l'élytre finement aciculé sauf autour du scutellum (Fig. 11) [espèce de Colombie-Britannique] . . . . . ***P. nitidus*** Horn [p. 29]

3 [1]. Points sur le corps portant chacun une courte soie en forme de trompette (Fig. 12). Ponctuation élytrale plutôt grossière et superficielle . . . . . ***P. setulosus*** Ross [p. 30]

– Points sur le corps portant chacun une soie trichoïde très courte, visible seulement à fort grossissement sous un éclairage puissant. Ponctuation élytrale plus fine et profonde 4

4 [3]. Lobe postérieur du prosternum à peu près aussi large que long, son bord antérieur aussi large, ou presque, que le bord postérieur du lobe antérieur (Fig. 13). Plaque méso-métasternale ornée d'une ponctuation plutôt éparse, la majorité des points séparés par une distance supérieure à leur diamètre (Fig. 13) . . . . . ***P. consors*** Horn [p. 32]

– Lobe postérieur du prosternum plus long que large, dans la majorité des cas atténué vers l'extrémité antérieure et de forme trapézoïdale ou encore triangulaire, son bord antérieur plus étroit que le bord postérieur du lobe antérieur (Figs 14–17). Plaque méso-métasternale ornée d'une ponctuation plus dense, la majorité des points séparés par une distance égale ou inférieure à leur diamètre (Figs 14–17) 5

5 [4]. Lobe latéral du pronotum plus large, portant 4 ou 5 rangées de points au niveau du sillon transversal (Fig. 19). Disque des élytres relativement plat. . . . . ***P. sayi*** Marseul [p. 34]

– Lobe latéral du pronotum plus étroit, portant 3 rangées de points au niveau du sillon transversal (comme sur la Fig. 20). Disque des élytres plutôt convexe 6

6 [5]. Lobe antérieur du prosternum plutôt plat et orné d'une ponctuation grossière; bord postérieur du lobe plutôt tronqué, atteignant le milieu du prosternum (Fig. 15). Distance entre les lobes du prosternum légèrement mais distinctement plus courte que la longueur du lobe postérieur (Fig. 15). Plaque méso-métasternale ornée d'une ponctuation plus dense, la majorité des points séparés par une distance inférieure à 0,75 fois leur diamètre (Fig. 15) . . . . ***P. moletus*** Casey [p. 42]

Lobe antérieur du prosternum plutôt convexe et orné d'une ponctuation plus fine; bord postérieur du lobe plus arrondi, n'atteignant pas tout à fait le milieu du prosternum (Figs 16, 17). Distance entre les lobes du prosternum égale ou supérieure à la longueur du lobe postérieur (Figs 16, 17). Plaque méso-métasternale ornée d'une ponctuation plus éparse, la majorité des points séparés par une distance supérieure à 0,75 fois leur diamètre (Figs 16, 17) 7

7 [6]. Ponctuation sur le disque du pronotum plus grossière et plus dense, la majorité des points sur la moitié latérale légèrement plus grossiers que ceux au milieu (Fig. 21). Lobe antérieur du prosternum plus court, distance entre les lobes légèrement plus longue que la longueur du lobe postérieur (Fig. 16) [espèce de l'Est : des Maritimes jusqu'en Saskatchewan]. . . . . ***P. confusus*** Bousquet et Laplante [p. 37]

– Ponctuation sur le disque du pronotum plus fine et plus éparse, la majorité des points sur la moitié latérale de même calibre ou plus fins que ceux au milieu (Fig. 22). Lobe antérieur du prosternum légèrement plus long, distance entre les lobes à peu près égale à la longueur du lobe postérieur (Fig. 17) [espèce de l'Ouest : Colombie-Britannique] . . . . . ***P. fraternus*** Horn [p. 40]

Plegaderus transversus (Say, 1825)

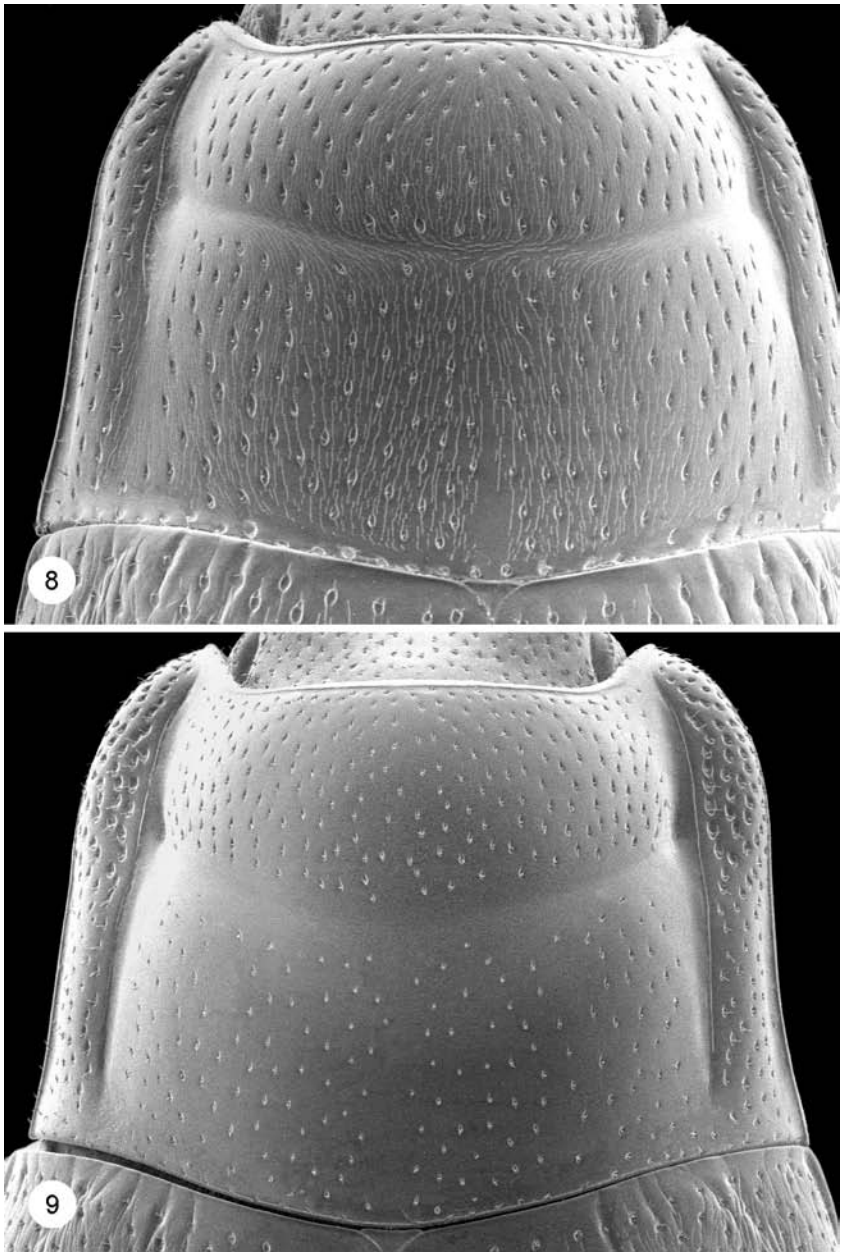
Figs. 8, 10; Map 1

Hister transversus Say, 1825: 45. Type locality: United States of America (inferred from paper title). No syntype studied.

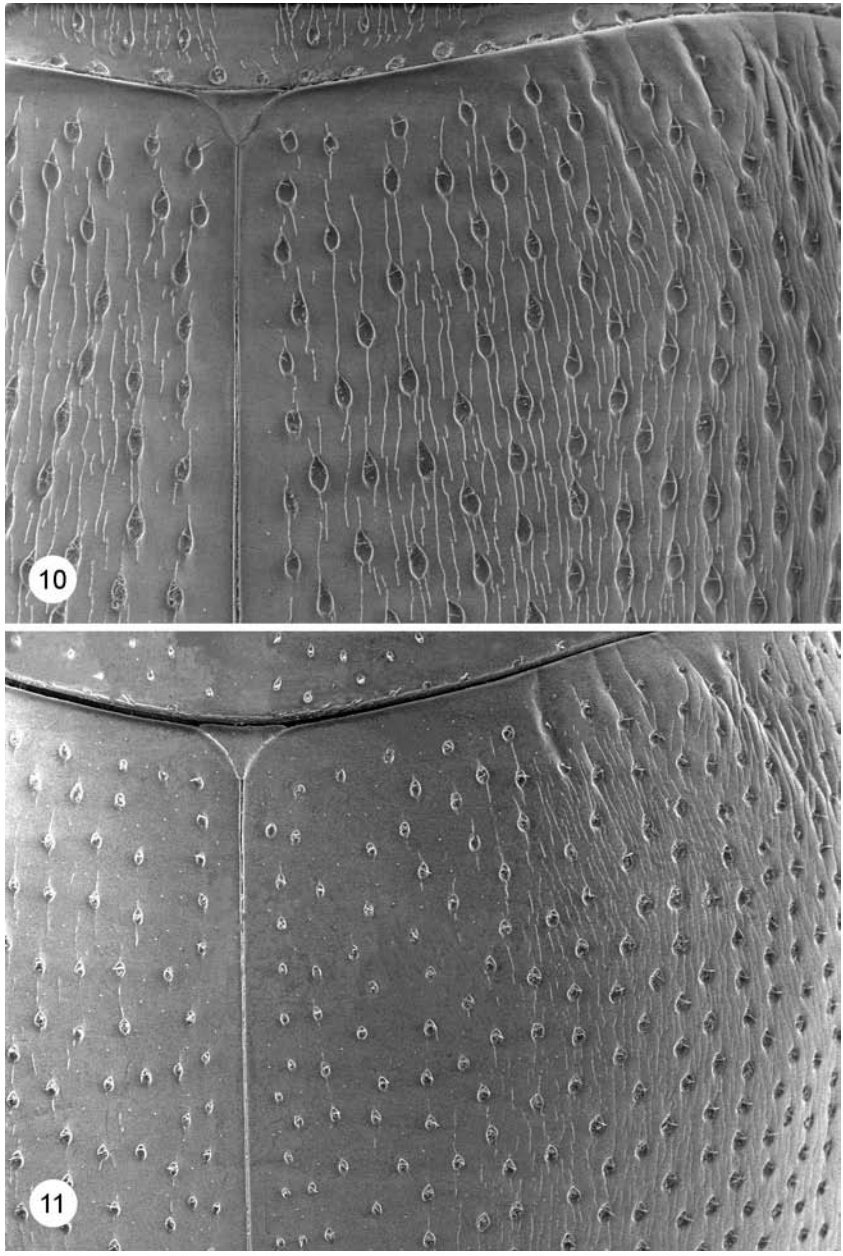
Plegaderus transversus: J.E. LeConte (1845: 80); Marseul (1856: 263, 277); Horn (1870: 142); Horn (1873: 348, 349); Casey (1893: 576); Blatchley (1910: 625); Germain (1917: 138); Dillon and Dillon (1961: 224); Mazur (1984: 14); Davies (1991: 136); Laplante et al. (1991: 43); Downie and Arnett (1996: 605); Mazur (1997: 195); Bousquet and Laplante (1999: 126).

Diagnosis. Distinguished from other species of *Plegaderus* treated, except *P. nitidus*, by the very small posterior lobe of prosternum. Similar to *P. nitidus*, but differs most readily by the features given in the key to species.

Description. Body dark reddish brown dorsally. Pronotum (Fig. 8) with lateral groove evanescent at base; lateral lobe rather narrow, convex, the punctures on anterior third as fine as or finer than those on adjacent area of disc; punctures on disc moderately dense, elongate; surface between punctures aciculate; anterior discal portion distinctly shorter than posterior portion. Elytron with punctures coarser than those on pronotum, more or less droplike; discal surface distinctly aciculate (Fig. 10). Pygidium with dense, moderately coarse punctures separated



Figs. 8, 9. Pronotum of *Plegaderus*. 8, *P. transversus*; 9, *P. nitidus*.



Figs. 10, 11. Elytral periscutellar area of *Plegaderus*. 10, *P. transversus*; 11, *P. nitidus*.

from each other on average by half their diameter or less. Prosternum (as in Fig. 6) with anterior lobe rather convex, sparsely and moderately finely punctate; posterior lobe very small, more or less distinct; distance between lobes clearly longer than length of posterior lobe. Meso-metasternal plate with very sparse, intermediate punctures.

Body length: 1.2–1.6 mm.

Distribution. This species inhabits eastern North America from southwestern Quebec and southern Ontario (Map 1) south to central Florida (AMNH; Peck and Thomas 1998: 30) and Mexico (Mazur 2001: 28).

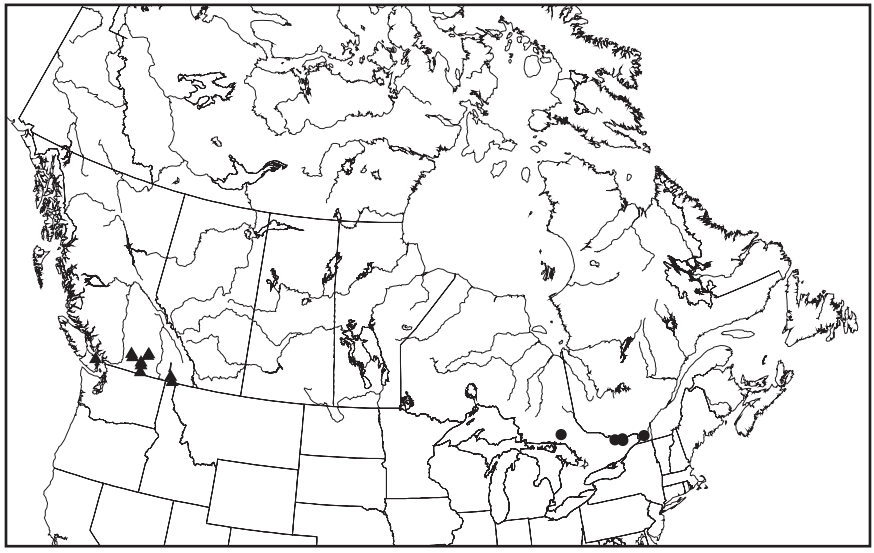
Biology. Found under the bark of dead pines.

Plegaderus nitidus Horn, 1870

Figs. 6, 9, 11; Map 1

Plegaderus nitidus Horn, 1870: 141. Type locality: «Nevada» (original citation). Three syntypes (in MCZ) studied. – Horn (1873: 348, 350); Casey (1893: 576); Hatch (1962: 257); Mazur (1984: 13); Davies (1991: 136); Mazur (1997: 195).

Diagnosis. Very similar to *P. transversus* but distinguished by the features listed below.



Map 1. *Plegaderus transversus* (●) and *P. nitidus* (▲). Canadian collection localities.

Description. Same character states as for *P. transversus* except for the following. Pronotum (Fig. 9) with punctures on anterior third of lateral lobe coarser than those on adjacent area of disc; punctures on disc finer; surface between punctures not or very finely aciculate; anterior discal portion less distinctly shorter than posterior portion. Elytra with punctures finer, surface of disc finely aciculate except for large periscutellar area (Fig. 11). Pygidium with finer punctures separated on average by more than half their diameter. Meso-metasternal plate with punctation much finer.

Body length: 1.5–1.8 mm.

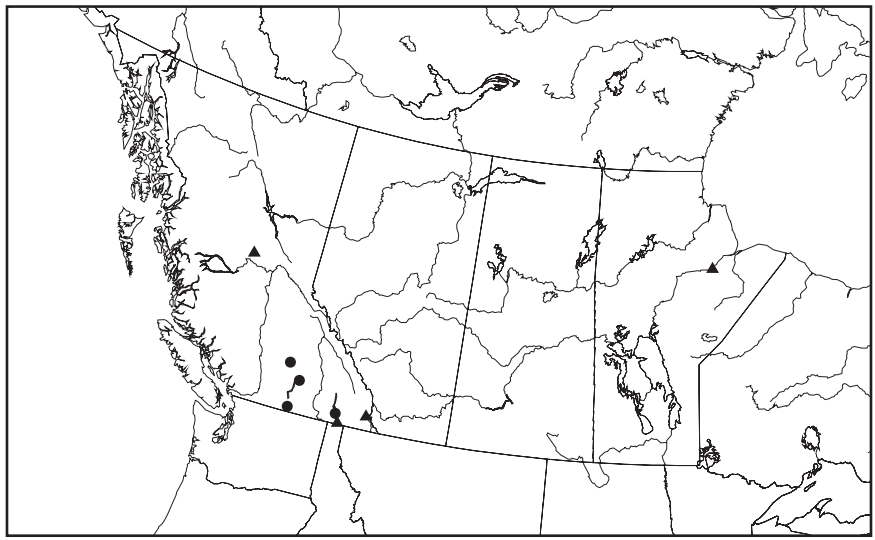
Distribution. This species ranges from southern British Columbia, including Vancouver Island (Map 1), south to California (USNM, Mazur 1997: 195) and Arizona (CNC), east to Montana.

Biology. Found under the bark of dead pines and Douglas-firs. Hatch (1962: 257) mentioned that the species was found "in galleries of Scolytidae."

Plegaderus setulosus Ross, 1938

Fig. 12; Map 2

Plegaderus setulosus Ross, 1938: 50. Type locality: «Hosmer, British Columbia» (original citation). Holotype (in CNC) studied. – Hatch (1962: 257); Mazur (1984: 14); Davies (1991: 136); Mazur (1997: 195).



Map 2. *Plegaderus consors* (●) and *P. setulosus* (▲). Canadian collection localities.

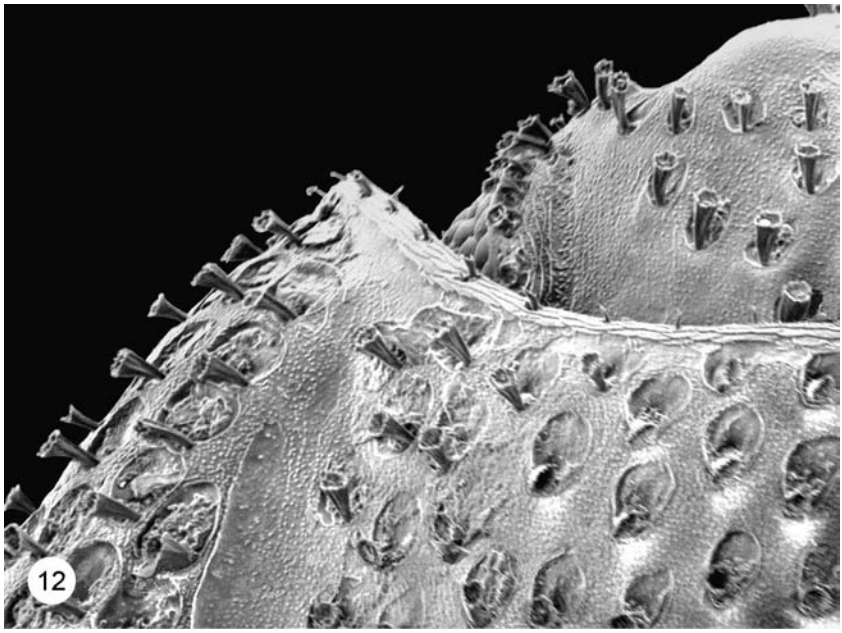


Fig. 12. Setae on body of *Plegaderus setulosus*.

Diagnosis. Distinguished from other species of *Plegaderus* treated here by the short but distinct trumpetlike setae on the body (Fig. 12). In the other *Plegaderus* studied, each puncture bears a very small, almost imperceptible, trichoid seta.

Description. Body reddish brown dorsally, covered with punctures bearing each a short, erect, trumpetlike seta (Fig. 12); surface microtuberculate. Pronotum with lateral groove wide, well defined even at base; lateral lobe rather wide, only slightly convex, the punctures coarse, as coarse as those on adjacent area of disc; punctures on disc rather coarse, round, those on lateral half coarser than those toward middle; surface not aciculate; anterior discal portion only slightly shorter than posterior portion. Elytron with punctures coarser than most of those on pronotum, shallow and round; disc not aciculate. Pygidium with rather coarse punctures, most of them separated on average by less than half their diameter. Prosternum with anterior lobe flat, somewhat truncate apically, the punctures moderately coarse; posterior lobe protruding, subquadrate; distance between lobes smaller than length of posterior lobe. Meso-metasternal plate with coarse punctures, most of them separated on average by about half their diameter.

Body length: 1.2–1.6 mm.

Distribution. The species is presently known from northern Manitoba and British Columbia in Canada (Map 2), and from Idaho (FMNH) and Oregon (Mazur 1997: 195) in the United States.

Biology. The holotype was collected "in the gallery of an ants nest, *Formica* sp., located in the heart of a rotting Douglas Fir log" (Ross 1938: 51); a series of specimens from Creston (UBC) was labelled "on cordwood."

Plegaderus consors Horn, 1873

Fig. 13; Map 2

Plegaderus consors Horn, 1873: 350. Type locality: «Colorado» (original citation). Holotype (in MCZ) studied. – Casey (1893: 575); Hatch (1962: 257); Mazur (1984: 12); Davies (1991: 136).

Plegaderus egenus Casey, 1916: 279. Type locality: «Calaveras Co[unty], California» (original citation). Two syntypes (in USNM) studied. Synonymy established by Mazur (1984: 12).

Diagnosis. Differs from the other species of *Plegaderus* treated here by the subquadrate posterior lobe of prosternum in combination with the sparsely punctate meso-metasternal plate (Fig. 13).

Description. Body rather elongate, reddish brown dorsally. Pronotum with lateral groove wide, well defined even at base; lateral lobe rather wide, only

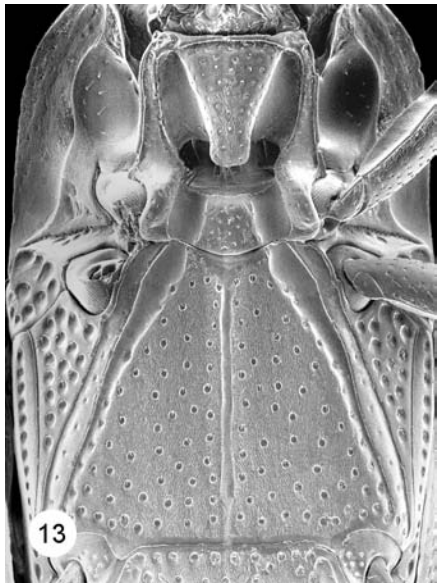
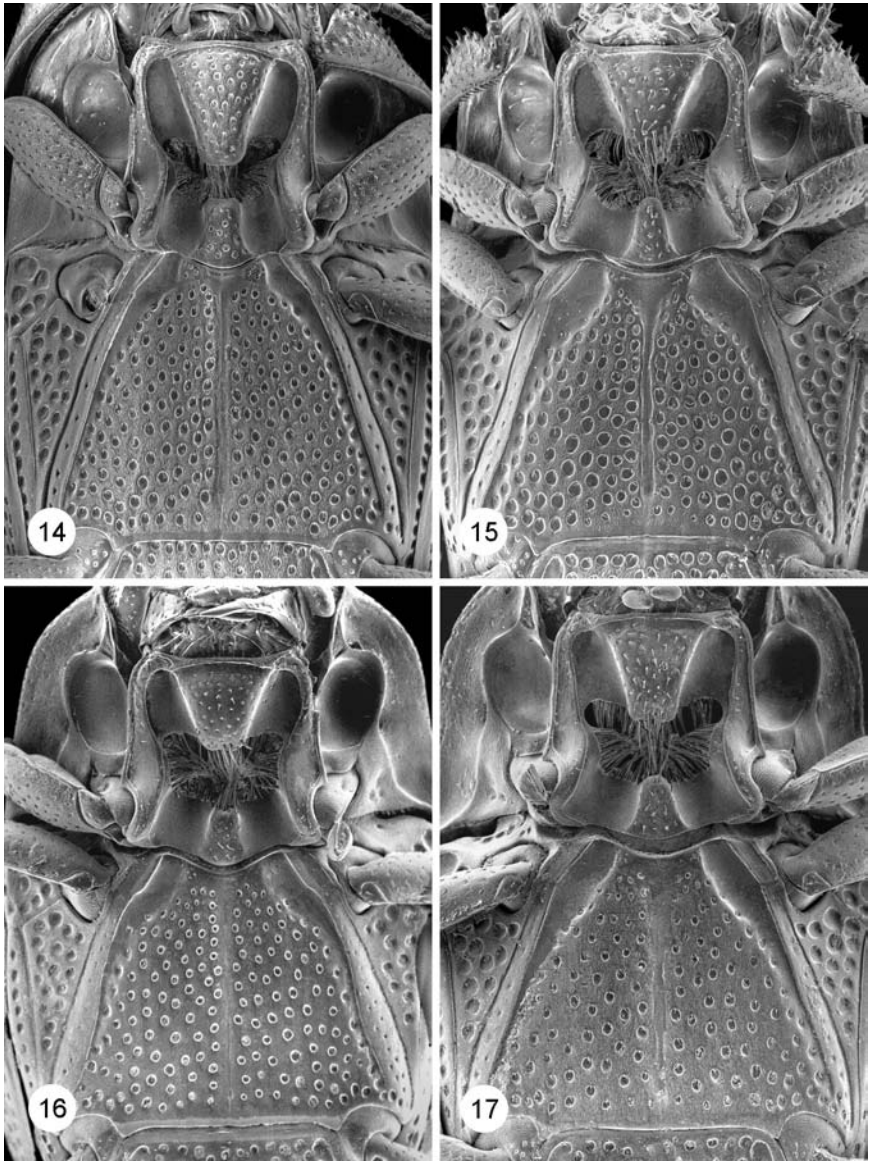


Fig. 13. Thorax (ventral view) of *Plegaderus consors*.



Figs. 14–17. Thorax (ventral view) of *Plegaderus*. 14, *P. sayi*; 15, *P. molestus*; 16, *P. confusus*; 17, *P. fraternus*.

slightly convex; punctures on lateral lobe becoming smaller in posterior half, those on anterior half a little coarser than adjacent punctures on disc; punctures on disc moderately fine, round; surface not aciculate; anterior discal portion only slightly shorter than posterior portion. Elytron with punctures comparatively rather sparse, round; disc not aciculate. Pygidium with moderately coarse punctures, most of them separated on average by less than their diameter. Prosternum (Fig. 13) with anterior lobe long, rather flat, clearly narrowed posteriorly; punctures intermediate; posterior lobe protruding, subquadrate; distance between lobes subequal to length of posterior lobe. Meso-metasternal plate (Fig. 13) with sparse punctures separated on average by more than their diameter.

Body length: 1.3–1.5 mm.

Distribution. This species ranges from southern British Columbia (Map 2) south to Colorado (type locality) and Arizona (CNC).

Biology. Found under the bark of dead pines, especially Ponderosa Pine.

Comments. Mazur (1997: 194) listed *Plegaderus consors* in synonymy with *P. comonforti* Marseul. We have studied a syntype of *P. comonforti*, described from Mexico, and noted that it differs from the specimens of *P. consors* seen by some structural features, including a finer punctation on the meso-metasternal plate and a slightly different shape of the anterior and posterior lobes of the prosternum. Although the differences between the two forms are slight, we believe that both names probably refer to distinct species.

Plegaderus sayi Marseul, 1856

Figs. 14, 18, 19; Map 3

Plegaderus sayi Marseul, 1856: 269. Type locality: «États-Unis» (original citation). One syntype (in MHNP) studied. – Horn (1870: 142); Horn (1873: 348, 349); Casey (1893: 575); Blatchley (1910: 625); Hatch (1962: 256); Mazur (1984: 14); Davies (1991: 136); Laplante et al. (1991: 43); Downie and Arnett (1996: 605); Mazur (1997: 195); Bousquet and Laplante (1999: 126, 128).

Diagnosis. Distinguished from other *Plegaderus* found in Canada by the features given in the key to species. Most similar to *P. molestus*, *P. confusus*, and *P. fraternus*, but differs by the wider lateral lobes of pronotum, each bearing four or five rows of punctures at middle (Fig. 19).

Description. Habitus as illustrated (Fig. 18). Body reddish brown to black dorsally. Pronotum (Fig. 19) with lateral groove well defined even at base, slightly widening basally; lateral lobe wide, only slightly convex, with four or five rows of punctures at middle; punctures round, those on posterior discal portion on average slightly coarser than those on anterior portion; surface between punctures not aciculate; anterior discal portion slightly shorter than posterior portion.

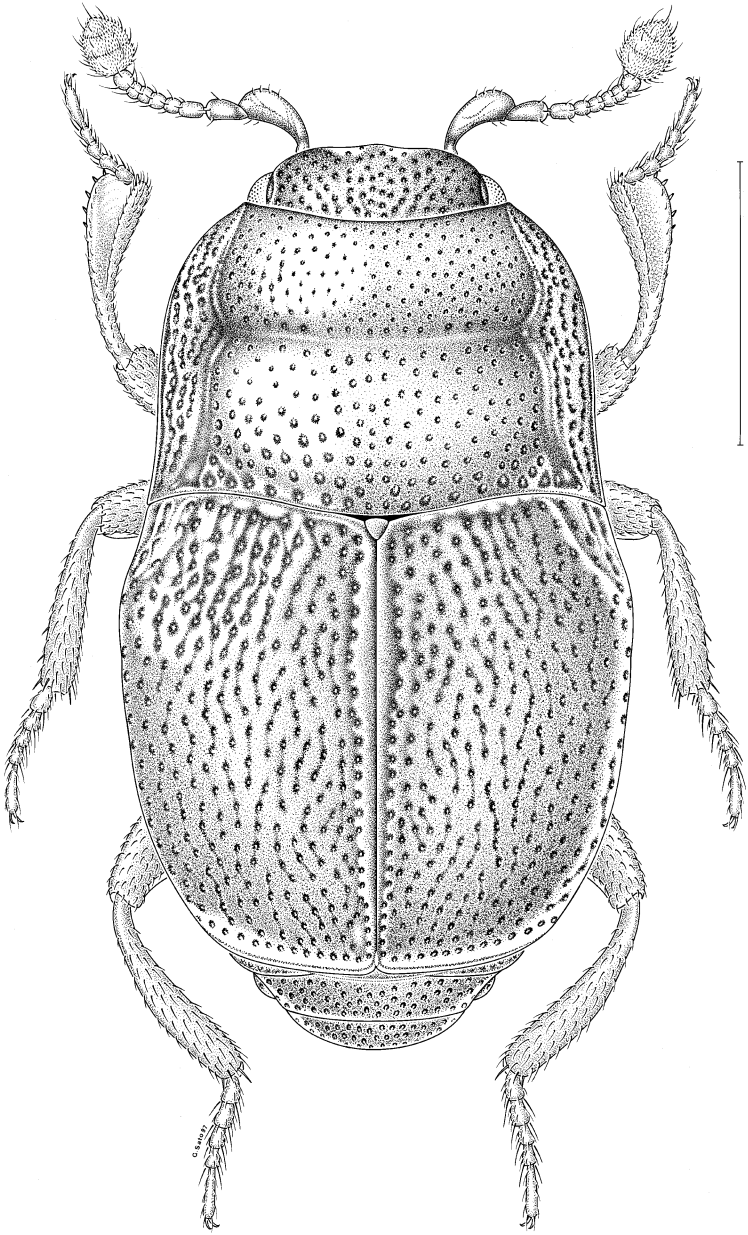
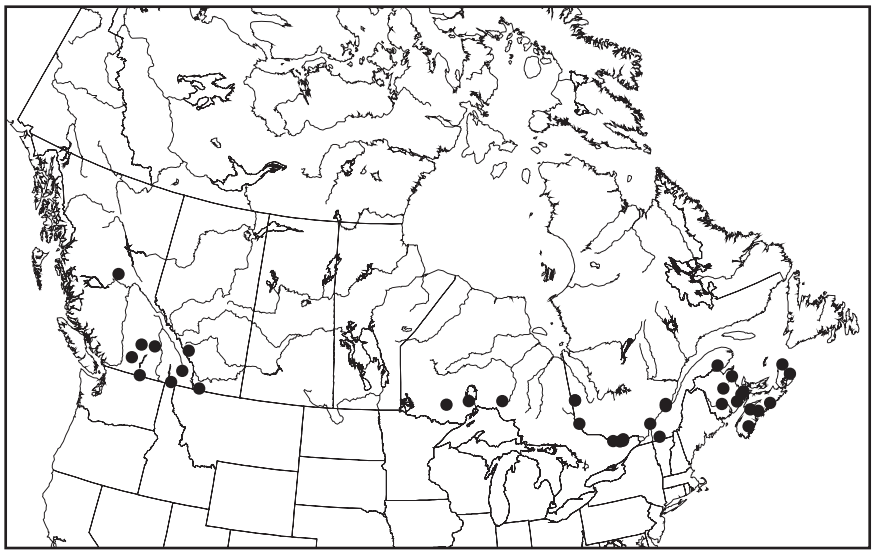


Fig. 18. *Plegaderus sayi*. Habitus. Scale = 0.5 mm.



Map 3. *Plegaderus sayi*. Canadian collection localities.

Elytron with punctures round, as coarse as most of those on posterior portion of pronotum; disc not aciculate. Pygidium with rather coarse punctures on anterior half, most of them separated on average by half their diameter or less. Prosternum (Fig. 14) with anterior lobe long, slightly convex; punctures moderately coarse; posterior lobe protruding, slightly longer than wide, trapezoidal; distance between lobes smaller than length of posterior lobe. Meso-metasternal plate (Fig. 14) with coarse punctures, most of them separated on average by less than 0.75 times their diameter.

Body length: 1.4–1.8 mm.

Distribution. In Canada this species is known from Cape Breton in Nova Scotia to the Lake Superior area in Ontario, and from southwestern Alberta to central British Columbia (Map 3). We have also seen specimens from Maine (USNM), New Hampshire (AMNH, USNM), Massachusetts (USNM), New Jersey, Michigan (USNM), Wisconsin, and Wyoming in the United States. Earlier records of this species are suspect because of the recent discovery of a structurally very similar species in the east, *P. confusus* Bousquet and Laplante.

Biology. Found under the bark of dead pines; one specimen from British Columbia "was taken from *Larix occidentalis*" (Hatch 1962: 256).

Comments. We have studied several of Casey's syntypes of *Plegaderus*, including those of *P. cribratus* (type locality: Veta Pass, Colorado), *P. rigidus* (type locality: Utah), and *P. sulcatus* (type locality: Boulder County, Colorado).