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A Worldwide Revision of *Pemphredon* LATREILLE 1796 (Hymenoptera, Sphecidae)

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Abstract: The entire genus *Pemphredon* LATREILLE is revised for the first time, and 37 species are recognised. Descriptions, illustrations, geographic records, and keys to the identification of the species are provided. One new species is described: *spielleitneri* (USA). The following are newly established synonyms: *tenera* VALKEILA 1972, *coracina* VALKEILA 1972, *nescia* MERISUO 1972 = *austriaca* (KOHL 1888); *fennica* MERISUO 1972 = *baltica* MERISUO 1972; *virginiana* ROHWER 1917 = *foxii* ROHWER 1917; *austriaca* f. *enslini* WAGNER 1932, *platyura* GUSSAKOVSKIJ 1952, *minor* GUSSAKOVSKIJ 1952, *levinota* MERISUO 1972, *nannophyes* MERISUO 1972, *dispar* VALKEILA 1972, *gemina* VALKEILA, 1972, *trichogastor* VALKEILA 1972, *coracina* VALKEILA 1972, ? *sudaorum* TSUNEKI 1977 = *lethifer* (SHUCKARD 1837); *ocellaris* GIMMERTHAL 1836, *concolor* SAY 1824, *tinctipennis* CAMERON 1908 = *lugubris* (FABRICIUS 1793); *laeviceps* GUSSAKOVSKIJ 1932 = *podagrica* CHEVRIER 1870; *pilosus* GIMMERTHAL 1836, *bipartior* W. FOX 1892, *bucharica* GUSSAKOVSKIJ 1952, *scytica* VALKEILA 1972, *punctifer* VALKEILA 1972 = *rugifer* (DAHLBOM 1844); *sedula* MERISUO 1972 = *tridentata* GUSSAKOVSKIJ 1952.

Key Words: Systematics, Hymenoptera, Sphecidae, *Pemphredon*.

Introduction

General: *Pemphredon* is a Holarctic and northern Oriental genus of medium size predatory solitary wasps belonging to the subtribe Pemphredonina. The species tend to be similar and morphologically variable, which often makes it very difficult to distinguish them.

BOHART & MENKE (1976) listed 53 species. In the course of this study 17.818 specimens have been examined and a total of 37 species recognized (6 Holarctic, 13 Palearctic, 11 Nearctic and 7 northern Oriental species), 7 new species (6 of them described in an earlier paper) and 24 new synonyms have been recognized.

Taxonomic History: The genus *Pemphredon* was first described by LATREILLE (1796). KOHL (1890) listed the species known to him and discussed the synonymy. The Nearctic forms have been poorly known until now, as papers by W. FOX (1892) and ROHWER (1917) are badly outdated. BLÜTHGEN (1931), HARTIG (1930, 1931) and WAGNER (1918, 1932) discussed the group known as subgenus *Cemonus* (= *Dineurus* = *Diphlebus*). TSUNEKI (1951) revised the species of Japan and

adjacent regions. DE BEAUMONT (1964) discussed species groups and subgenera of *Pemphredon*. MERISUO & VALKEILA (1972) intended to start a revision of western Palearctic species; they described 17 new species, 13 of which turned out to be synonyms. Unfortunately, they passed away before finishing their work. VALKEILA & LECLERCQ (1972) thought that *rugifer* was a mixture of three species, but I do not agree with them. Since this revision has covered a long period, I published preliminary diagnoses of 6 new species (DOLLFUSS 1993).

Species groups: Most authors divided *Pemphredon* into three subgenera: *Pemphredon* s. s., *Cemonus* JURINE (= *Dineurus* WESTWOOD = *Diphlebus* WESTWOOD) and *Ceratophorus* SHUCKARD. The first two are recognised by the position of recurrent vein (postfurcal in the former and antefurcal in the later). As HARTIG (1931: 82) pointed out, these features may vary. I also found such variation: in *Pemphredon austriaca* and *Pemphredon gennelli*, recurrent vein varies from postfurcal to antefurcal. HARTIG (1931) distinguished devising these two subgenera by the length of flagellomere I: length 3 × width in *Pemphredon* s. s. and length 2 × width in *Cemonus*. DE BEAUMONT (1964) showed that *Pemphredon podagrica* and *Pemphredon beaumonti* neither agree with *Pemphredon* nor with *Cemonus*, if this scheme is applied. He suggested accepting four species groups: 1. *lugubris* group, 2. *podagrica* group, 3. *beaumonti* group, and 4. *rugifera* group.

The monotypic subgenus *Ceratophorus* was undisputed until now. The only included species, *Pemphredon morio*, is characterized by a deep, broad emargination on the anterior clypeal margin, a projecting horn between the antennal sockets and a short petiole. In *bocae*, however, the emargination on the clypeal margin is deep and broader than in *morio*, and *Pemphredon sudai* TSUNEKI has a horn between the antennal sockets. As a result, I cannot find well defined species groups. Future examinations may clear up this matter.

Acknowledgements

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This study was made possible by the material provided by co-operative managers of the following collections and private collectors (abbreviations used in the text are mostly from R.H. ARNETT 1986: The Insect and Spider Collections of the World)

Sources of Material

AEIC: American Entomological Institute, Gainsville, Florida, USA (D. Wahl).

AFZH: University of Helsinki, Department of Agricultural and Forest Zoology, Helsinki, Finland (M. Koponen).

AMNH: American Museum of Natural History, New York, New York, USA (E. L. Quinter).

ANSP: Academy of Natural Sciences of Philadelphia, Philadelphia, Pennsylvania, USA (D. Azuma).

BITF: Université Paul-Sabatier, Laboratoire d'Entomologie, Toulouse, France (J. Bitsch).

BLCU: Utah State University, Bee Biology & Systematics Lab, Logan, Utah, USA (T.L. Griswold).

BMNH: Natural History Museum, London, Great Britain (C.R. Vardy), formerly British Museum (Natural History).

BPBM: Bishop Museum, Honolulu, Hawaii, USA (K. Arakaki).

BSRF: Collection B. Chaubet, ENSA Rennes, France.

CAI: Ministry of Agriculture, Department of Plant Protection, Bet Dagan, Israel (Q. Argaman).

CASC: California Academy of Sciences, San Francisco, California, USA (W.J. Pulawski).

CBH: Collection M. Bur, Rechthalten, Switzerland.

CCJW: Collection F. Creutzburg, Jena-Winzerla, Germany.

CHGF: Collection J. Hamon, Gaillard, France.

CHN: Collection R. Hensen, Utrecht, Netherlands.

CISC: University of California, Essig Museum of Entomology, Berkeley, California, USA (M. Prentice).

CJR: Collection H.J. Jacobs, Ranzin, Germany.

CKWS: Collection K.H. Wickl, Schnaittenbach, Germany.

CNCI: Agriculture Canada, Centre for Land and Biological Resources Research, Ottawa, Ontario, Canada (J. Denis)

CSB: Collection K.H. Schwammberger, Bochum, Germany.

CSCH: Collection M. Schwarz, Linz-Ansfelden, Austria.

CTLC: Collection P. Turner, Litvínov, Czechia.

CUIC: Cornell University, Department of Entomology, Ithaca, New York, USA (E.R. Hoebeke).

CVSD: Collection J. van der Smissen, Bad Schwartau, Germany.

CWGB: Collection R. Wahis, Gembloux, Belgium.

DEFW: University of Minnesota, Department of Entomology, St. Paul, Minnesota, USA (Ph.J. Clausen).

DENH: University of New Hampshire, Department of Entomology, Durham, New Hampshire, USA (D.S. Chandler).

DFEC: State University of New York, College of Environmental Science and Foresty, Syracuse, New York, USA (F.E. Kurczewski).

DEUN: University of Nebraska State Museum, Systematics Research Collections, Lincoln, Nebraska, USA (B.C. Ratcliffe).

DMA: Collection H. Dollfuss, Mank, Austria.

FSAG: Faculté des Sciences Agronomiques de l'Etat, Zoologie Générale et Faunistique, Gembloux, Belgium (J. Leclercq).

FBSE: Collection J.C. Felton, Brighton, England.

FCDA: Fresno County Department of Agriculture, South Maple, Fresno, California, USA (N.J. Smith).

FEF: Collection R. Fonfria, Eygalières, France.

FRLC: Foresty Canada, Forest Insect and Disease Survey, Fredericton, New Brunswick, Canada (G. Smith).

GKD: Collection H.J. Greiler, Karlsruhe, Germany.

GUL: Collection J. Gusenleitner, Linz, Austria.

GUSE: Universidad de Salamanca, Departamento de Zoologia, Salamanca, Spain (S.F. Gayubo).

HNHM: Természettudományi Múzeum Állattára, Budapest, Hungary (J. Papp).

HNSA: Haus der Natur, Salzburg, Austria (M. Schwarz).

HUO: Universität Oldenburg, Fachbereich Biologie, Oldenburg, Germany (V. Haeseler).

HUS: Collection S. Hellqvist, Umea, Sweden.

INHS: Illinois Natural History Survey, Center for Biodiversity, Champaign, Illinois, USA (K.R. Methven).

ISUI: Iowa State University, Insect Collection, Department of Entomology, Ames, Iowa, USA (R.E. Lewis).

KLTA: Collection A. Kofler, Lienz, Austria.

KSUK: Universität Karlsruhe, Zoologisches Institut, Karlsruhe, Germany (K. Schmidt).

LACM: Natural History Museum of Los Angeles County, Los Angeles, California, USA (R.R. Snelling).

LEMQ: Lyman Entomological Museum and Research Laboratory, McGill University, Ste. Anne de Bellevue, Quebec, Canada (C. C. Hsiung).

MCBA: Collection M. Madl, Frauenkirchen, Burgenland, Austria.

MCPM: Milwaukee Public Museum, Invertebrate Zoology, Milwaukee, Wisconsin, USA (G. R. Noonan).

MCZC: Harvard University, Museum of Comparative Zoology, Department of Entomology, Cambridge, Massachusetts, USA (St.P. Cover).

MHNG: Musée d'Histoire Naturelle, Genève, Switzerland (C. Besuchet).

MNHN: Muséum National d'Histoire Naturelle Paris, Entomologie, Paris, France (J.C. Casevitz Weulerse).

MUIC: Mississippi Entomological Museum, Mississippi State, Mississippi, USA (T.L. Schiefer).

MZLS: Musée Zologique, Lausanne, Switzerland (M. Sartori).

MZLU: Museum of Zoology and Entomology, Lund University, Lund, Sweden (R. Danielsson).

NCSU: North Carolina State University Insect Collection, Raleigh, North Carolina, USA (R.L. Blinn).

NDSU: Department of Entomology, University Station, Fargo, North Dakota, USA (G. Fauske).

NEPI: Collection E. Negrisolo, Padova, Italia.

NHMW: Naturhistorisches Museum, Wien, Austria (M. Fischer)

NHRS: Naturhistoriska Riksmuseet, Sectionen för Entomologie, Stockholm, Sweden (K.J. Hedqvist).

NYSM: University of the State of New York, State Education Department, Albany, New York, USA (T.L. McCabe).

OLML: Oberösterreichisches Landesmuseum, Biologiezentrum, Linz, Austria (F. Gusenleitner).

OXUM: Hope Department of Entomology, University Museum, Oxford, England (S. Smith).

PBS: Collection F. Parré, Bad Soden, Germany.

PMAE: Provincial Museum of Alberta, Edmonton, Alberta, Canada (A.T. Finnamore).

PTI: Istituto di Entomologia Agraria e Apicoltura, Università di Torino, Italia (G. Pagliano).

RIB: Collection H. Riemann, Bremen, Germany.

RMNH: Rijksmuseum van Natuurlijke Historie, Leiden, Netherlands (K. van Achterberg).

ROME: Royal Ontario Museum, Department of Entomology, Toronto, Ontario, Canada (D.W. Barr).

SCE: University of Cambridge, Department of Applied Biology, Cambridge, England (S.A. Sorbet).

SEM: Collection Ch. Schmid-Egger, Karlsruhe, Germany.

SEMC: Snow Entomological Museum, University of Kansas, Lawrence, Kansas, USA (R.W. Brooks).

SMDV: Spencer Entomological Museum, University of British Columbia, Vancouver, British Columbia, Canada, (K.M. Needham).

SMNG: Staatliches Museum für Naturkunde, Görlitz, Germany (R. Franke).

SMNS: Staatliches Museum für Naturkunde, Stuttgart, Germany (T. Osten).

TAF: Collection J.C. Teulon, Saint Antoine de Ficalba, France.

TAMU: Texas A & M University, Department of Entomology, College Station, Texas, USA (E.G. Riley).

UCDC: University of California, R. M. Bohart Museum of Entomology, Davis, California, USA (S.L. Heydon).

UCMC: University of Colorado Museum, Entomology Section, Boulder, Colorado, USA (K. Darrow).

UCMS: University of Connecticut, Entomological Collections, Storrs, Connecticut, USA (J.E. O'Donnell).

UCRC: University of California, UCR Entomological Teaching & Research, Riverside, California, USA (S. Frommer).

UICM: University of Idaho, William F. Barr Entomological Museum, Moscow, Idaho, USA (F.W. Merickel).

UMBB: Übersee-Museum Bremen, Bremen, Germany (H. Hohmann).

UMMZ: University of Michigan, Museum of Zoology, Insect Division, Ann Arbor, Michigan, USA (M. O'Brien).

USNM: United States National Museum of Natural History (Smithsonian Institution), Washington D.C. (A.S. Menke).

WCPD: Collection H. Wolf, Plettenberg, Germany.

WSUC: Washington State University, James Entomological Collection, Pullman, Washington, USA (R.S. Zack).

ZIL: Zoological Institute, Academy of Science, St. Petersburg (formerly Leningrad), Russian Federation.

ZMB: Museum für Naturkunde der Humboldt-Universität Berlin, Berlin, Germany (F. Koch).

ZMH: Zoological Museum, Helsinki, Finland (A. Albrecht).

ZMUC: Zoologisk Museum, Kobenhavn, Denmark (O. Lomholdt).

ZMUM: Zoological Museum of the Lomonosov State University, Moscow, Russian Federation (A.V. Antropov).

ZMUT: University of Turku, Zoological Museum, Turku, Finland (S. Koponen).

Genus *Pemphredon* LATREILLE

Gender: feminine (treated as masculine prior to MENKE & BOHART 1979)

Pemphredon LATREILLE 1796: 128 (no species). Type species: *Pemphredon lugubris* (FABRICIUS 1793) [= *Crabro lugubris* FABRICIUS 1793], designated by SHUCKARD 1837: 193.

Cemonus PANZER 1806: 186. Type species: *Sphex unicolor* PANZER 1798 (nec *Sphex unicolor* FABRICIUS 1787) [= *Cemonus rugifer* DAHLBOM 1844], monotypic.

Cemonus JURINE 1807: 213. Type species: "*Cemonus unicolor* F. " [= *Pelopoeus unicolor* of FABRICIUS 1804, = *Sphex unicolor* PANZER 1798 (nec *Sphex unicolor* FABRICIUS 1787), = *Cemonus rugifer* DAHLBOM 1844], designated by SHUCKARD 1837: 199.

Dineurus WESTWOOD 1837: 173. Type species: "*Pemphredon unicolor* LAT. " [= *Pemphredon unicolor* of LATREILLE 1809, = *Sphex unicolor* of JURINE 1807, = *Pelopoeus unicolor* of FABRICIUS 1804, = *Sphex unicolor* PANZER 1798 (nec *Sphex unicolor* FABRICIUS 1787), = *Cemonus rugifer* DAHLBOM, 1844], original designation.

Ceratophorus SHUCKARD 1837: 195. Type species: *Pemphredon morio* VANDER LINDEN 1829, original designation.

Diphlebus WESTWOOD 1840: 81. Type species: *Pelopoeus unicolor* of FABRICIUS 1804 [= *Sphex unicolor* PANZER 1798 (nec *Sphex unicolor* FABRICIUS 1787), = *Cemonus rugifer* DAHLBOM 1844], original designation.

Chevrieria KOHL 1883: 658. Type species: *Pemphredon unicolor* (FABRICIUS 1804) [= *Pelopoeus unicolor* of FABRICIUS 1804 = *Sphex unicolor* PANZER 1798 (nec *Sphex unicolor* FABRICIUS 1787), = *Cemonus rugifer* DAHLBOM 1844], original designation.

Susanowo TSUNEKI 1972: 12. Type species: *Pemphredon sudai* TSUNEKI 1972, original designation.

Morphology

I use the morphological terms of BOHART & MENKE (1976). Characters found valuable in the taxonomy of *Pemphredon* are revived below:

Head: The shape of the anterior clypeal margin is one of the most distinctive characters in *Pemphredon*. In order to examine the clypeal shape it is necessary to remove its setae. The proportion of head width to head length is given for each species (Fig. 1). In most species the frons is punctato-rugose between the eyes, but it is punctate in some. Two species have a projecting horn between the antennal sockets. The length and the shape of the flagellum is also useful for determination. Especially the form of the tyloids in the male flagellum is characteristic and therefore useful for determination. Tyloids are difficult to detect, so good illumination with a magnification of at least 50 × is necessary.

Thorax: The scutal sculpture is a valuable feature in nearly all species, but in some species variation is considerable. The structure of the mesopleuron in front of the midcoxa is useful for species recognition, especially if it is striate as in *lugubris*. The propodeal enclosure is useful when characterizing Nearctic species. Two kind of

ridges can be found in the propodeal enclosure: longitudinal ridges (Fig. 3) and irregular ridges, in some specimens propodeal enclosure is reticulate (Fig. 4 and 5). The shape of the propodeal pad (surrounding the propodeal enclosure) varies from broad and smooth (Fig. 4) to narrow and reticulate (Fig. 5) and is in some species useful for determination. In the males the shape of the basitarsus of midleg (= midbasitarsus) is distinctive in some species. The venation of the forewing is an important feature in *Pemphredon*: the reception of the second recurrent vein can be well beyond the proximal end of the submarginal cell II (postfurcal, see Fig. 8) or before the proximal end of the submarginal cell II (antefurcal see Fig. 6), or interstitial (see Fig. 7). In some species the variation in the recurrent vein is remarkable, in a few specimens the two wings are different, e. g. one vein slightly antefurcal and one interstitial.

G a s t e r : The length of the petiole in proportion to the length of tergum I (Fig. 2) is useful to differentiate between some species. The pygidial plate in females varies from broad to narrow, or is reduced to a sharply projecting keel as in *lugens*. The shape of male genitalia and sternum VIII are useful characteristics for differentiation of similar species. The gonostyle dorsal and lateral are presented in their natural position. Penis valve, volsella and sternum VIII have been dissected, pressed flat between glass-plates and then drawn.

Key to New World Species

♀ ♀

Females of *fischeri* and *shirozui* are unknown.

1. Recurrent vein postfurcal. 2
— Recurrent vein antefurcal or interstitial. 12
2. Propodeal enclosure with longitudinal ridges 3
— Propodeal enclosure irregularly rugose or reticulate 6
3. Anterior clypeal margin semicircularly emarginate (Fig. 38). ..... *rileyi* W. FOX
— Anterior clypeal margin not semicircularly emarginate. 4
4. Anterior clypeal margin distinctly tridentate (Fig. 33). ..... *nearctica* KOHL
— Anterior clypeal margin slightly tridentate (Fig. 13 and 18). 5
5. Anterior clypeal margin protruding and slightly tridentate (Fig. 18). Scutum shiny, anteriorly densely, posteriorly sparsely punctate. ..... *gennelli* (ROHWER)
— Anterior clypeal margin not protruding, only slightly tridentate (Fig. 13). Scutum with irregular curved striation and rugosity, many specimens with fingerprint-like sculpture on each side of the midline ..... *confertim* W. FOX

6. Anterior clypeal margin distinctly tridentate (Fig. 29). Pygidial plate narrow (Fig. 62) ..... *menkei* R. BOHART

— Anterior clypeal margin not distinctly tridentate. Pygidial plate narrow or broad. 7

7. Scutum with broad transverse rugae (Fig. 75). Anterior clypeal margin slightly tridentate (Fig. 37). ..... *pulawskii* DOLLFUSS

— Scutum without broad transverse rugae. Clypeus varying. 8

8. Anterior clypeal margin obtusely angulate and projecting in the middle (Fig. 30 and 31). 9

— Anterior clypeal margin not obtusely angulate. 10

9. Scutum with coarse fingerprint-like sculpture on each side of midline. Pygidial plate broad and flat (Fig. 63) ..... *montana* DAHLBOM

— Scutum shiny, with fine microsculpture and large punctures, which are confluent into slight longitudinal furrows posteriorly. ..... *montanella* DOLLFUSS

10. Anterior clypeal margin slightly tridentate, with subequal teeth; middle tooth raised (Fig. 16). Propodeal pad narrow and rugose. Pygidial plate excavate and delimited with a distinct carina (Fig. 49) ..... *foxii* ROHWER

— Anterior clypeal margin truncate or slightly concave (Fig. 10 and 27). Propodeal pad broad or narrow. 11

11. Pygidial plate narrow and excavate (Fig. 60). Anterior clypeal margin truncate or slightly concave (Fig. 27). Propodeal pad narrow, rugose. Mesopleuron in front of midcoxa in most specimens with transverse rugae. ..... *lugubris* (FABRICIUS)

— Pygidial plate broad (Fig. 43). Anterior clypeal margin truncate (Fig. 10). Propodeal pad broad, with microsculpture. Mesopleuron in front of midcoxa punctate. ..... *baltica* MERISUO

12. Propodeal enclosure longitudinally ridged. 13

— Propodeal enclosure irregularly rugose or reticulate. 14

13. Anterior clypeal margin protruding and slightly tridentate (Fig. 18) .... *gennelli* (ROHWER)

— Anterior clypeal margin broadly emarginate (Fig. 12). ..... *bocae* R. BOHART

14. Anterior clypeal margin semicircularly emarginate (Fig. 39). ..... *rugifer* (DAHLBOM)

— Anterior clypeal margin not semicircularly emarginate. 15

15. Anterior clypeal margin truncate (Fig. 25). ..... *lethifer* (SHUCKARD)

— Anterior clypeal margin slightly tridentate, middle tooth raised (Fig. 19). .. *inornata* SAY

♂ ♂

1. Recurrent vein postfurcal. 2

— Recurrent vein antefurcal or interstitial. 13

2. Propodeal enclosure with longitudinal ridges. 3

— Propodeal enclosure irregularly rugose or reticulate. 7

3. Flagellomeres V and VI distinctly swollen on both sides (Fig. 120).... *fischeri* DOLLFUSS

— Flagellomeres V and VI swollen on one side. 4

4. Flagellomeres with well-defined linear tyloids (Fig. 118 and 139), distinctly swollen. ..5

— Flagellomeres without linear tyloids (Fig. 123 and 136) and only slightly swollen. 6

5. Penis valve see Fig. 207. Digitus of volsella arrounded (Fig. 237). ..... *confertim* FOX

— Penis valve see Fig. 229. Digitus of volsella elongate (Fig. 259). Montain species. .... *rileyi* W. FOX

6. Anterior clypeal margin semicircularly emarginate (Fig. 93). Midbasitarsus slightly dilated distally, in most specimens slightly curved (Fig. 81). ..... *gennelli* (ROHWER)

— Anterior clypeal margin slightly tridentate (Fig. 106). Midbasitarsus slightly bowed in profile and enlarged in distal half (Fig. 80). ..... *nearctica* KOHL

7. Anterior clypeal margin semicircularly emarginate (Fig. 103). ..... *montana* DAHLBOM

— Anterior clypeal margin broadly emarginate or slightly tridentate. 8

8. Flagellomeres with well-defined linear tyloids (Fig. 115, 130 and 134). 9

— Flagellomeres without tyloids (Fig. 122, 132 and 138). 11

9. Flagellomeres IV-VII swollen (Fig. 115). Propodeal pad broad and microstriate. Penis valve distinctiv (Fig. 204). ..... *baltica* MERISUO

— Flagellomeres IV-VII not swollen. Propodeal pad narrow and rugose or broad and smooth..... 10

10. Propodeal pad narrow and rugose. Scutum irregularly scattered. Mesopleuron in front of midcoxa in most specimens with transverse rugae. ..... *lugubris* (FABRICIUS)

— Propodeal pad broad and smooth. Scutum shiny, anteriorly densely punctate, posteriorly sparsely punctate (punctures 2-4 diameters apart). Mesopleuron in front of midcoxa shiny, punctate (punctures 1-2 diameters apart). ..... *montanella* DOLLFUSS

11. Anterior clypeal margin slightly tridentate (Fig. 102). Midbasitarsus slightly bowed in profile, enlarged in distal half. ..... *menkei* R. BOHART

— Anterior clypeal margin broadly emarginate (Fig. 91 and 108). Midbasitarsus straight. 12

12. Scutum anteriorly punctate, in the middle shiny and with broad, transverse ridges (ridges ill defined in some specimens; Fig. 75). Length 7. 0-7. 5 mm .... *pulawskii* DOLLFUSS

— Scutum shiny, coarsely punctate (punctures contiguous to half a diameter apart). Length 7. 5-10.5 mm. ..... *foxii* ROHWER

13. Propodeal enclosure with longitudinal ridges. 14

— Propodeal enclosure irregularly rugose or reticulate. 15

14. Flagellomeres (II)III-VII(VIII) distinctly swollen (Fig. 117). Midbasitarsus straight, gradually enlarged from base (Fig. 82). ..... *bocae* R. BOHART

— Flagellomeres not distinctly swollen (Fig. 123). Midbasitarsus enlarged in distal half (Fig. 81). ..... *gennelli* (ROHWER)

15. Flagellomeres with well-defined tyloids (Fig. 128 and 140). 16

— Flagellomeres without tyloids (Fig. 125 and 141). 17

16. Propodeal pad broad and shiny. ..... *lethifer* (SHUCKARD)

— Propodeal pad narrow and rugose. ..... *rugifer* (DAHLBOM)

17. Flagellomeres only slightly swollen (Fig. 125). Anterior clypeal margin broadly emarginate (Fig. 95). Midbasitarsus straight, gradually enlarged from base. ..... *inornata* SAY

— Flagellomeres (III)IV-VIII(IX) distinctly swollen (Fig. 141). Anterior clypeal margin semicircularly emarginate (Fig. 112). Midbasitarsus enlarged in distal half. ..... *spielleitneri* DOLLFUSS, sp. n.

Key to Old World Species

(Palearctic and northern part of Oriental Region)

♀ ♀

1. Recurrent vein postfurcal. 2

— Recurrent vein antefurcal or interstitial. 17

2. Anterior clypeal margin with broad, deep emargination (Fig. 32). Frons between antennal sockets with well-defined projecting horn. Petiole short (length 0.3-0.5 × length of tergum I). ..... *morio* VANDER LINDEN

— Anterior clypeal margin differently shaped. Frons between antennal sockets without horn (except for the Japanese species *sudai*). Length of petiole in most species more than 0.5 × length of tergum I. 3

3. Pygidial plate with sharply projecting keel (Fig. 59). Anterior clypeal margin distinctly tridentate (Fig. 26). ..... *lugens* DAHLBOM

— Pygidial plate without sharply projecting keel. Anterior clypeal margin of varying shape. 4

4. Anterior clypeal margin angularly protruding mesally (Fig. 30). Scutum with microsculpture and fingerprint-like sculpture on each side of midline. Pygidial plate broad (Fig. 63). ..... *montana* DAHLBOM

— Anterior clypeal margin not angularly protruding mesally. Scutum differently sculptured (only some specimens of *lugubris* with somehow fingerprint-like pattern). Pygidial plate varying. 5

5. Anterior clypeal margin truncate or rounded (Fig. 10, 11 and 27). 6

— Anterior clypeal margin not truncate or rounded. 9

6. Anterior clypeal margin truncate (Fig. 10 and 27). Scutum irregularly rugose or largely punctate. 7

— Anterior clypeal margin protruding, rounded (Fig. 11). Scutum smooth, shiny, with coarse, irregular pit-like depressions. ..... *beaumonti* HELLÉN

7. Scutum with large punctures (diameters equal to 0.3-0.5 × hindocellar diameter). ..... *austriaca* (KOHL)

— Scutum not as large punctate. 8

8. Pygidial plate narrow, excavate (Fig. 60). Mesopleuron in front of midcoxa in most specimens with transverse rugae. Propodeal pad narrow, rugose. Scutum on each side with irregular curved striation and interstitial rugosity. ..... *lugubris* (FABRICIUS)

— Pygidial plate broad, not excavate (Fig. 43). Mesopleuron in front of midcoxa punctate. Propodeal pad broad and microstriate, in some specimens smooth. Scutum dull, with irregular coarse pitted structure and short transverse rugae. ..... *baltica* MERISUO

9. Anterior clypeal margin semicircularly emarginate (Fig. 15, 34 and 40). 10

— Anterior clypeal margin not semicircularly emarginate. 12

10. Frons between antennal sockets with well-defined projecting horn (length of horn equal to diameter of antennal socket; Fig. 40). Japan. ..... *sudai* TSUNEKI

— Frons between antennal sockets without horn. 11

11. Scutum with distinct microsculpture, irregularly punctato-rugose. Pygidial plate narrow, excavate (Fig. 48). Anterior clypeal margin (Fig. 15.) ..... *flavistigma* THOMSON

— Scutum anteriorly with elongate puncures, finely microsculptured (punctures 2 diameters apart), posteriorly nearly smooth, finely and sparsely punctate. Pygidial plate broad (Fig. 67). Anterior clypeal margin (Fig. 34). Pakistan. ..... *oreades* VALKEILA

12. Scutum with large punctures (diameters equal to 0.3-0.5 × hindocellar diameter). ..... *austriaca* KOHL

— Scutum differently sculptured. 13

13. Scutum shiny, with broad, transverse ridges (Fig. 76). Laos. ..... *laotis* DOLLFUSS

— Scutum without broad transverse ridges. 14

14. Anterior clypeal margin broadly, semicircularly emarginate, in the middle of emargination with well defined triangular tooth that is raised apically (Fig. 23). ..... *krombeini* TSUNEKI

— Anterior clypeal margin not broadly, semicircularly emarginate. 15

15. Scutum shiny, anterior part densely punctate, posterior part nearly smooth. Anterior clypeal margin protruding, slightly tridentate, middle tooth raised (Fig. 36). Flagellomere I: length 1.5-2.0 × width. ..... *podagrica* CHEVRIER

— Scutum irregularly punctato-rugose. Anterior clypeal margin differently shaped (Fig. 20 and 22). Flagellomere I: length 2.5-3.0 × width. 16

16. Anterior clypeal margin protruding and slightly emarginate (Fig. 20). Propodeal pad narrow and transversely striate. ..... *japonica* MATSUMURA

— Anterior clypeal margin slightly protruding, obtusely tridentate, somewhat raised mesally (Fig. 22). Propodeal pad broad, smooth. ..... *koreana* TSUNEKI

17. Anterior clypeal margin with broad, deep emargination (Fig. 32). Frons between antennal sockets with well-defined, projecting horn. Petiole short (length 0.2-0.5 × length of tergum I). ..... *morio* VANDER LINDEN

— Anterior clypeal margin only with a small emargination or of other shape. Frons between antennal sockets without a horn. Length of petiole in most species more than 0.2-0.5 × length of tergum I. 18

18. Anterior clypeal margin with small, semicircular emargination (some specimens have a little tooth-like projection in the middle of the emargination, see Fig. 39). .... *rugifer* (DAHLBOM)

— Anterior clypeal margin without small, semicircular emargination. 19

19. Anterior clypeal margin slightly tridentate, middle tooth angularly protruding and convex (Fig. 19), or obtusely angled and flat (Fig. 21). 20

— Anterior clypeal margin not angularly protruding or obtusely angled. 21

20. Anterior clypeal margin slightly tridentate, middle-tooth angularly protruding, convex, and raised (Fig. 19). Scutum shiny, sparsely punctate (punctures 3-4 diameters apart), in most specimens in posterior two-thirds confluent to form shallow longitudinal furrows ..... *inornata* SAY

— Anterior clypeal margin flat, protruding and obtusely angulate (Fig. 21). Scutum shiny, smooth, with sparse but well defined punctures that are 1-5 diameters apart. India. ..... *kashmirensis* DOLLFUSS

21. Anterior clypeal margin broadly emarginate, mesally with short, raised tooth (Fig. 14). Scutum shiny, anteriorly densely and coarsely punctate (punctures transversely and rugosely confluent), posteriorly more sparsely, but conspicuously, coarsely punctate or punctato-rugose. Japan. ..... *diervillae* IWATA

— Anterior clypeal margin rounded, truncate or tridentate. Scutum with different structure. 22

22. Anterior clypeal margin either truncate (Fig. 25) or protruding and rounded (Fig. 17). 23

— Anterior clypeal margin tridentate. 25

23. Anterior clypeal margin truncate (in some specimens slightly tridentate). 24

— Anterior clypeal margin protruding and rounded (Fig. 17). Scutum smooth with only fine, sparse punctatures. Propodeal pad broad. India. ..... *fuscipennis* CAMERON

24. Scutum with large punctures (diameters equal to 0.3-0.5 × hindocellar diameter). .... *austriaca* (KOHL)

— Punctures on scutum not so large. ..... *lethifer* (SHUCKARD)

25. Scutum with large punctures (diameters equal to 0.3-0.5 × hindocellar diameter). .... *austriaca* (KOHL)

— Punctures on scutum not so large. 26

26. Anterior clypeal margin protruding, slightly tridentate (Fig. 28). Morocco. .... *maurusia* VALKEILA

— Anterior clypeal margin not protruding, distinctly tridentate (Fig. 35 and 41) 27

27. Anterior clypeal margin tridentate, teeth of equal length (Fig. 41). Central Asia. .... *tridentata* GUSSAKOVSKIJ

— Anterior clypeal margin tridentate with lateral teeth more developed than middle tooth (Fig. 35). China, Laos, Thailand. ..... *orientalis* VALKEILA

♂♂

Males of *kashmirensis*, *koreana*, *laotis*, *oreades*, *orientalis* and *sudai* are unknown.

1. Recurrent vein postfurcal 2

— Recurrent vein antefurcal or interstitial. 14

2. Anterior clypeal margin with broad, deep emargination, mesally a small tooth (Fig. 105). Frons between antennal sockets with well-defined projecting horn. Petiole short (length 0.3-0.5 × length of tergum I). ..... *morio* VANDER LINDEN

— Anterior clypeal margin without broad and deep emargination. Frons between antennal sockets without horn. Length of petiole in most species more than 0.5 × length of tergum I. 3

3. Midbasitarsus distinctly curved (Fig. 78 and 79). 4

— Midbasitarsus not distinctly curved. 5

4. Midbasitarsus distinctly dilated distally (Fig. 79). Scutum smooth, shiny, and irregularly punctate (punctures 1-4 diameters apart). Penis valve (Fig. 227). .... *podagrica* CHEVRIER

— Basitarsus of midleg slightly dilated distally (Fig. 78). Scutum with microsculpture and punctation (punctures contiguous to 1 diameter apart). Penis valve (Fig. 210). .... *flavistigma* THOMSON

5. Anterior clypeal margin with small, deep emargination (Fig. 103). Scutum with microsculpture, punctato-rugose, posteriorly with fine fingerprint-like sculpture on each side of midline. Flagellum with linear tyloids (Fig. 133). ..... *montana* DAHLBOM

— Anterior clypeal margin differently shaped. 6

6. Anterior clypeal margin protruding, obtusely angled, emarginate (Fig. 96). Flagellum (Fig. 126). Japan. ..... *japonica* MATSUMURA

— Anterior clypeal margin differently shaped. 7

7. Anterior clypeal margin slightly tridentate (Fig. 99). Flagellomeres V-VIII with broad tyloids (Fig. 129). ..... *lugens* DAHLBOM

— Anterior clypeal margin broadly emarginate, or broad-triangularly protruding and mesally emarginate. Flagellomeres without or with well-defined tyloids. 8

8. Anterior clypeal margin broad-triangularly protruding and emarginate in the middle (Fig. 111). Petiole longer than tergum I (length 1.4 × length of tergum I). Taiwan. .... *shirozui* TSUNEKI

— Anterior clypeal margin broadly emarginate. Petiole varying. 9

9. Flagellomeres without well-defined tyloids, only flagellomeres VI-VIII slightly swollen (Fig. 116). Scutum shiny, coarsely punctate (punctures contiguous to half diameter apart). ..... *beaumonti* HELLÉN

— Flagellomeres with well-defined tyloids. Scutum varying. 10

10. Scutum with large punctures (diameters equal to 0.3-0.5 × hindocellar diameter). .... *austriaca* (KOHL)

— Scutum differently sculptured. 11

11. Flagellomeres (II)III-VII(VIII) with well-defined, linear tyloids (Fig. 130). Scutum shiny, with sparse irregular punctation (punctures contiguous to 1 diameter apart), some specimens with rugae. Mesopleuron in front of midcoxa in most specimens with transverse rugae. Propodeal pad narrow, rugose. ..... *lugubris* (FABRICIUS)

— Flagellomeres differently shaped. Scutum differently sculptured. Mesopleuron in front of midcoxa without transverse rugae. Propodeal pad varying. 12

12. Flagellomeres IV-VIII with short, linear tyloids (Fig. 124). Scutum shiny, anteriorly almost densely punctate, mesally sparsely punctate (punctures 2-5 diameters apart), and posteriorly almost densely punctate. Hindtibia with long desist setae. Sternum VIII characteristically shaped (Fig. 274). Laos. ..... *gusenleitneri* DOLLFUSS

— Tyloids longer, see Fig. 115 and 127 . Scutum differently sculptured. 13

13. Scutum with dense, coarse punctation and short transverse rugae. Flagellomeres not swollen (Fig. 127). Penis valve (Fig. 217). Japan. ..... *krombeini* TSUNEKI

— Scutum with microsculpture, finely punctate (punctures 1-2 diameters apart). Propodeal pad broad and smooth, or broad with fine transverse striae. Flagellomeres (III)IV-VII distinctly swollen (Fig. 115). Penis valve characteristically shaped (Fig. 204). ..... *baltica* MERISUO

14. Anterior clypeal margin with broad, deep emargination, mesally with a small tooth (Fig. 105). Frons between antennal sockets with a well-defined projecting horn. Petiole short (length 0.3-0.5 × length of tergum I). ..... *morio* VANDER LINDEN

— Anterior clypeal margin without broad and deep emargination. Frons between antennal sockets without horn. Length of petiole in most species more than 0.5 × length of tergum I. 15

15. Scutum with large punctures (diameters equal to 0.3-0.5 × hindocellar diameter). .... *austriaca* (KOHL)

— Scutum differently sculptured. 16

16. Frons near antennal sockets deeply impressed. Propodeal enclosure longitudinally ridged. Penis valve see Fig. 212 (shape of flagellomere unknown). Afghanistan, northern India and northern Pakistan. ..... *fuscipennis* CAMERON

— Frons near antennal sockets slightly impressed. Propodeal enclosure in most species irregularly rugose. Penis valve differently shaped. 17

17. Flagellomeres without tyloids (Fig. 125), or with broadly rounded tyloids (Fig. 119). 18

— Flagellomeres with sharply marked, narrow tyloids. 19

18. Flagellomeres without tyloids, only flagellomeres (III)IV-VI(VII) slightly swollen (Fig. 125). Scutum smooth, shiny, finely punctate (punctures 1-4 diameters apart). .... *inornata* SAY

— Flagellomeres III-VIII with broadly rounded tyloids (Fig. 119). Scutum shiny, coarsely punctato-rugose. Japan. ..... *diervillae* IWATA

19. Anterior clypeal margin broadly emarginate, mesally with a short tooth (Fig. 113). Petiole longer than tergum I (length 1.4 × length of tergum I). Flagellomere (Fig. 142). Cental Asia. ..... *tridentata* GUSSAKOVSKIJ

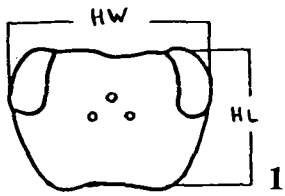
— Anterior clypeal margin broadly emarginate, mesally without a tooth (Fig. 98, 101 and 110). Petiole not longer than tergum I. 20

20. Propodeal pad in most specimens broad and shiny. Flagellomeres III-IX with well defined, linear tyloids, in small specimens tyloids very short (Fig. 128). .... *lethifer* (SHUCKARD)

— Propodeal pad in most specimens narrow and rugose. Flagellomeres (Fig. 131 and 140). 21

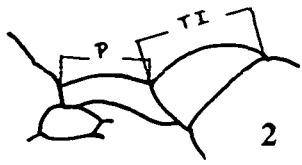
21. Flagellomere III-IX with linear tyloids (Fig. 131). Scutum shiny, anteriorly coarsely, densely punctate (diameter of punctures nearly 0.3 × hindocellar diameter), mesally and posteriorly sparsely punctate (punctures 1 diameter apart). Morocco. Cannot be distinguished from *rugifer* in all cases. ..... *maurusia* VALKEILA

— Flagellomere IV-VIII with well-defined tyloids (Fig. 140). Scutum with coarse punctation (punctures contiguous to 2 diameters apart). ..... *rugifer* (DAHLBOM)



1

headwidth : headlength

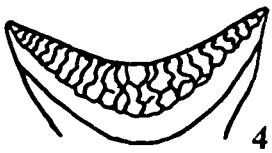


2

petiole :tergumI

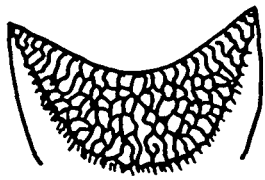
3

longitudinally ridged
pad broad, striate



4

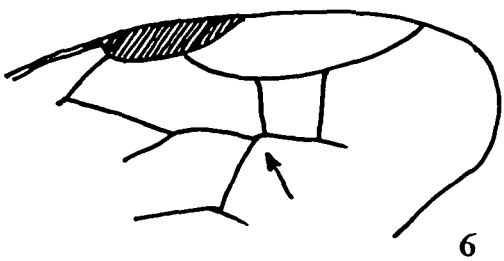
irregular rugose
pad broad, smooth



5

reticulate
pad narrow, rugose

forewing



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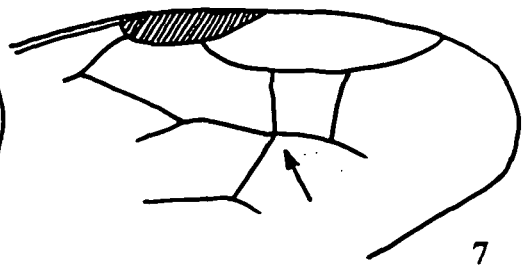
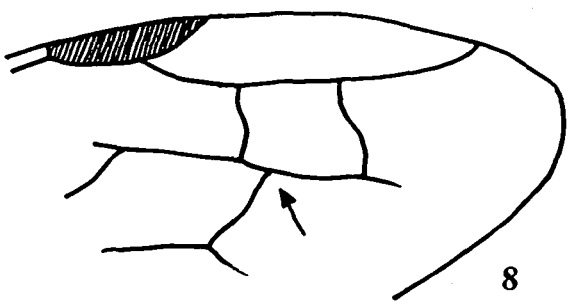
antefurcal



7

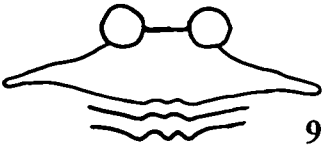
interstitional



8

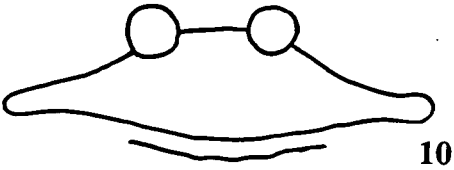
postfurcal

Clypeus — Female



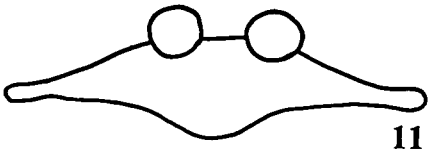
9

austriaca



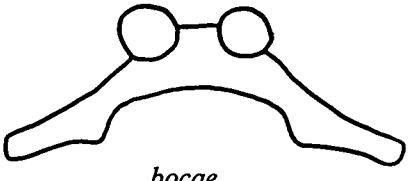
10

baltica



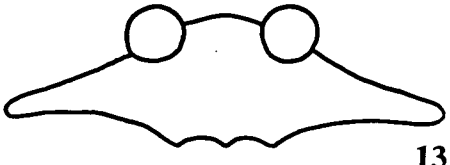
11

beaumonti



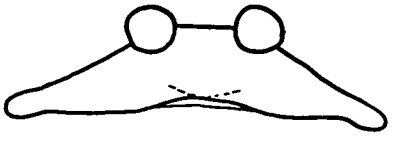
bocae

12



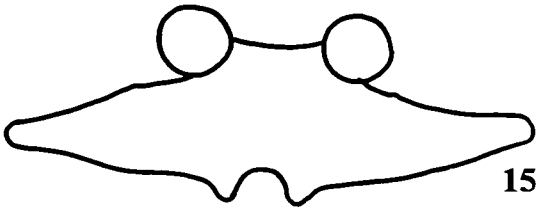
13

confertim



diervillae

14



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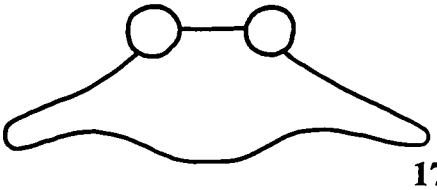
flavistigma



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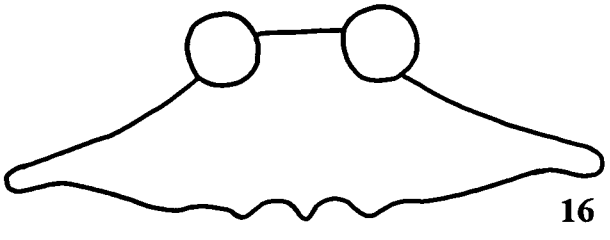
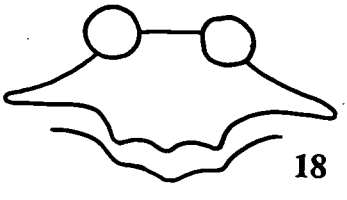
fuscipennis



16

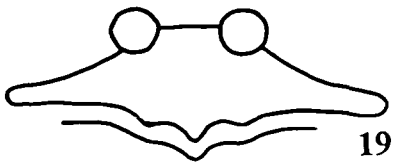
foxii



18

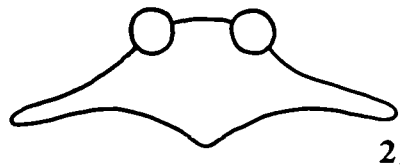
gennelli

Clypeus — Female



19

inornata



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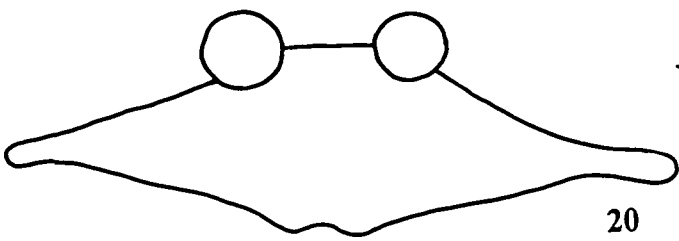
kashmirensis

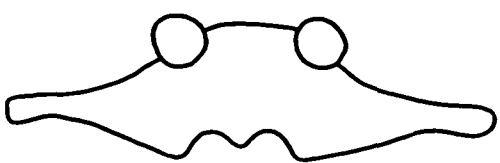


20

japonica

22

koreana



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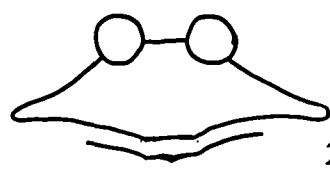
krombeini



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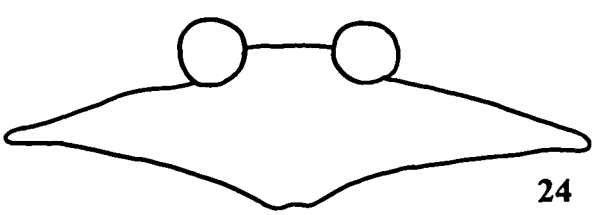
lethifer



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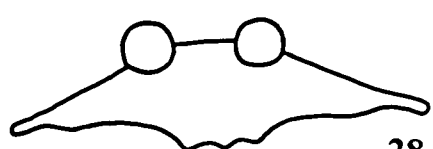
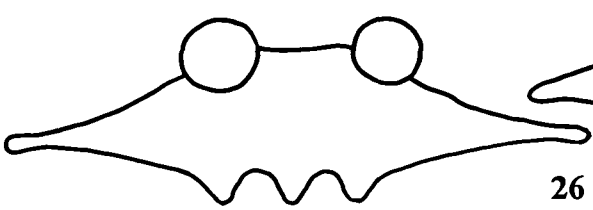
laotis



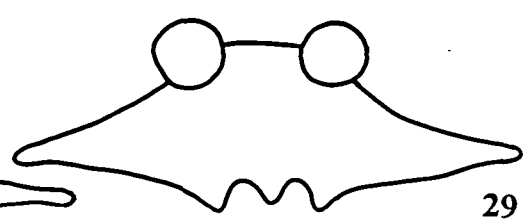
28

maurusia



26

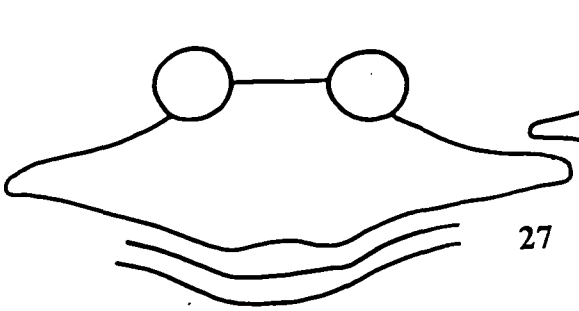
lugens



29

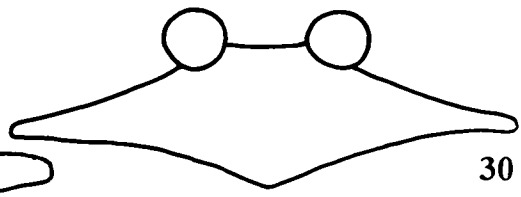
menkei

Clypeus — Female



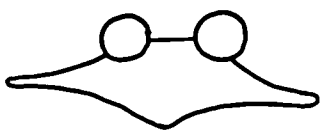
27

lugubris



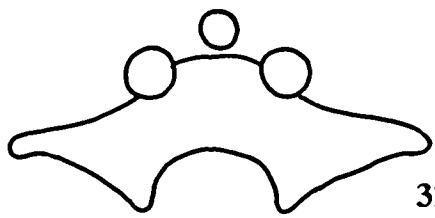
30

montana



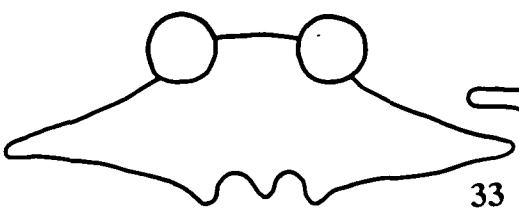
31

montanella



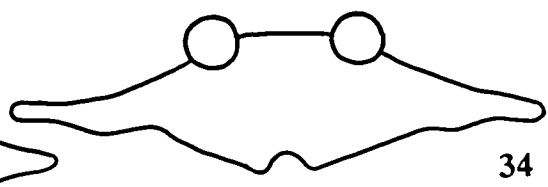
32

morio



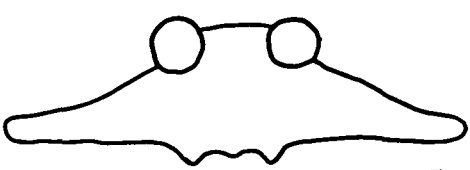
33

nearctica



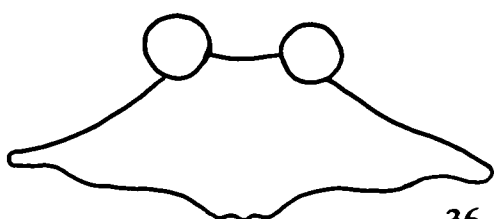
34

oreades



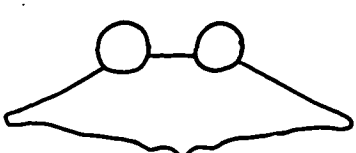
35

orientalis



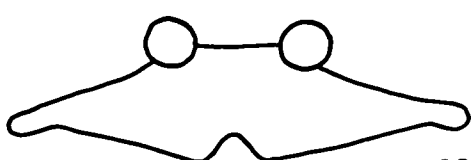
36

podagrica



37

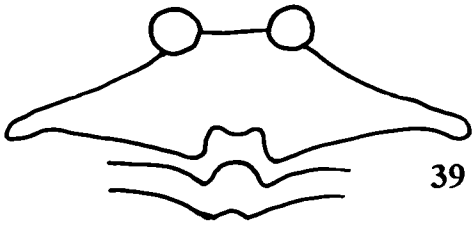
pulawskii



38

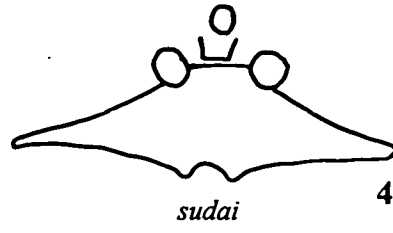
rileyi

Clypeus — Female

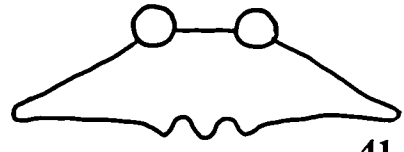


39

rugifer

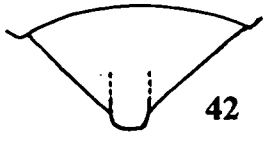


sudai 40



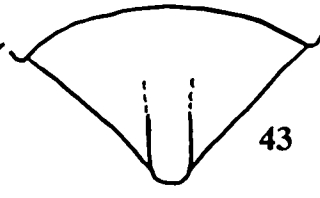
tridentata 41

Pygidial plate



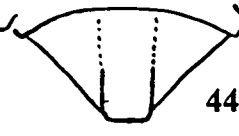
42

austriaca



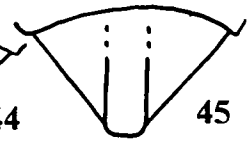
43

baltica



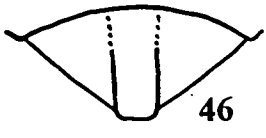
44

beaumonti



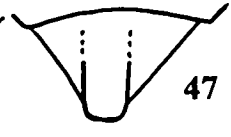
45

bocae



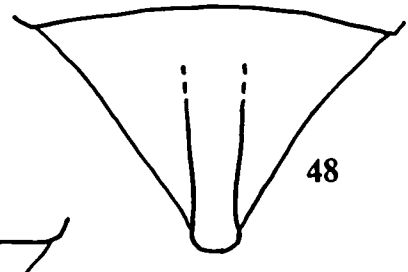
46

confertim



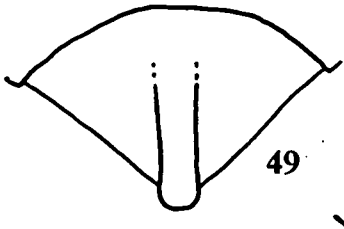
47

diervillae



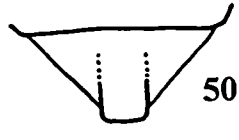
48

flavistigma



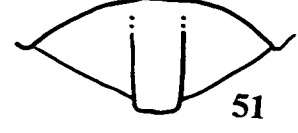
49

foxii



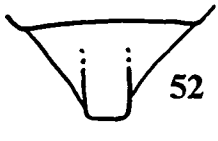
50

fuscipennis



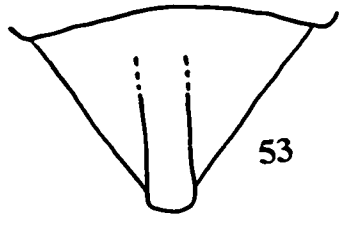
51

gennelli



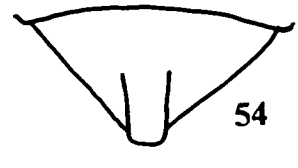
52

inornata



53

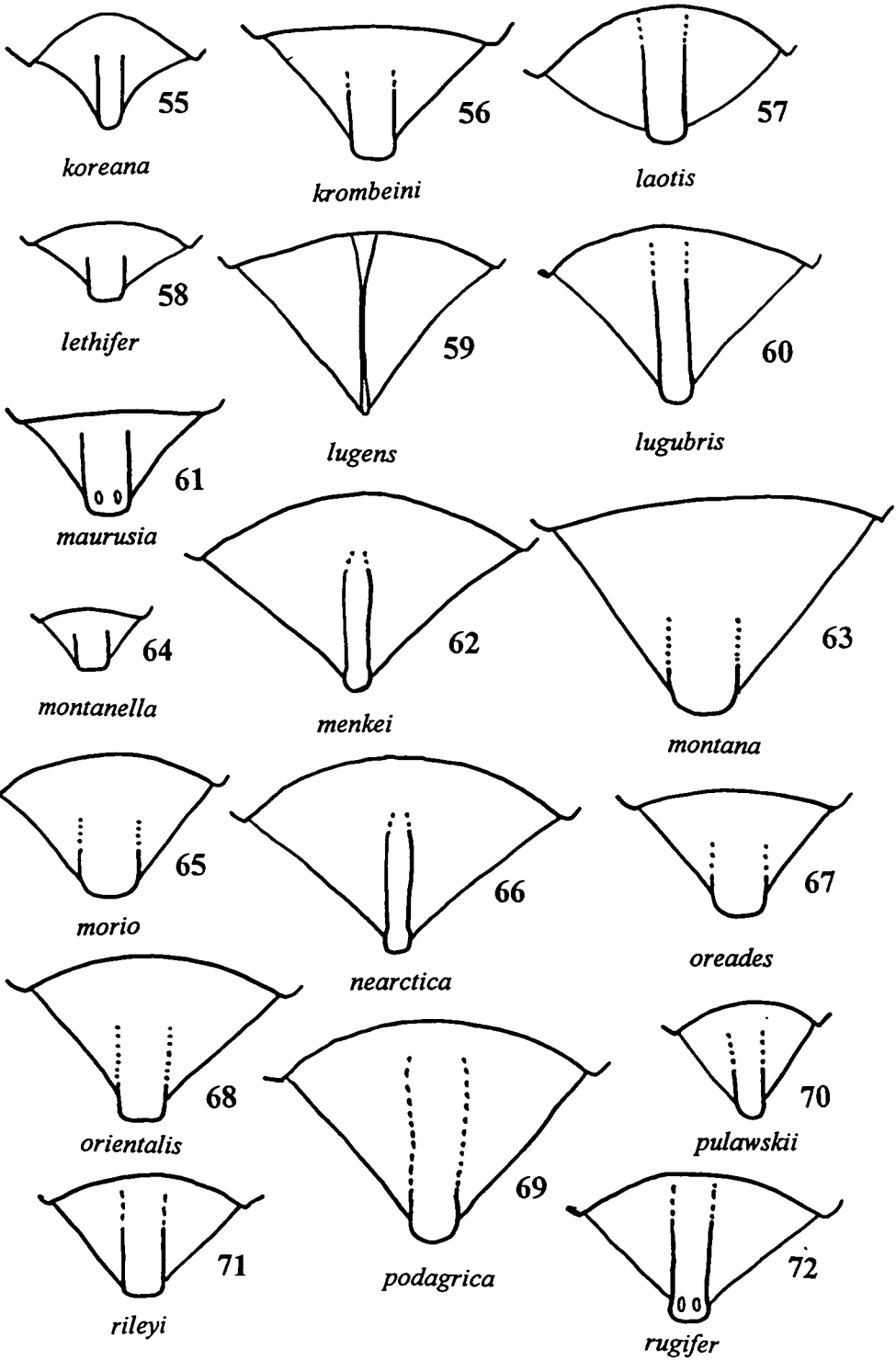
japonica



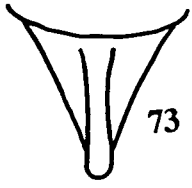
54

kashmirensis

Pygidial plate

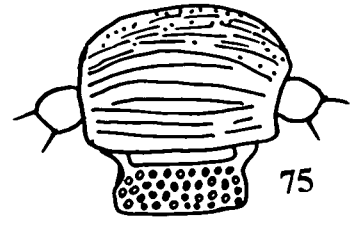


Pygidial plate

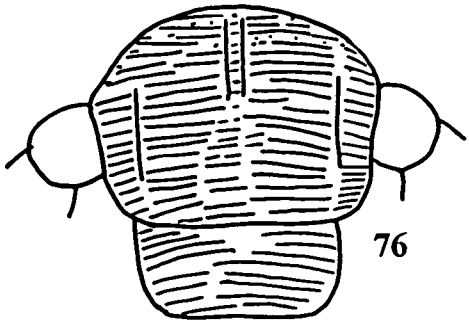


sudai

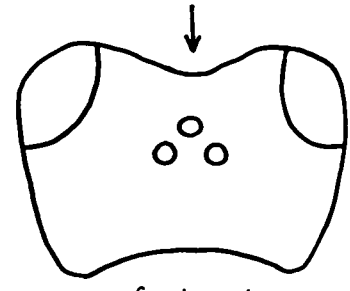
tridentata



pulawskii

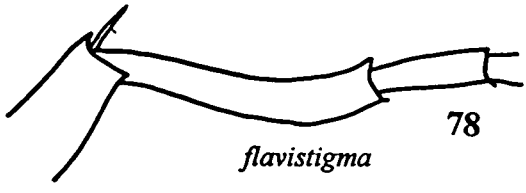


laotis

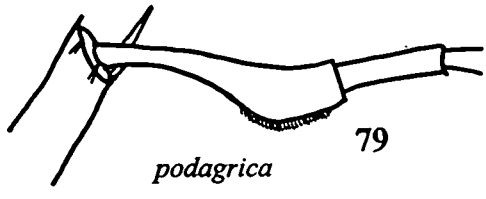


fuscipennis

Basitarsus of midleg

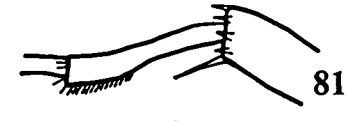


flavistigma

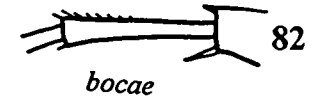


podagrica

nearctica

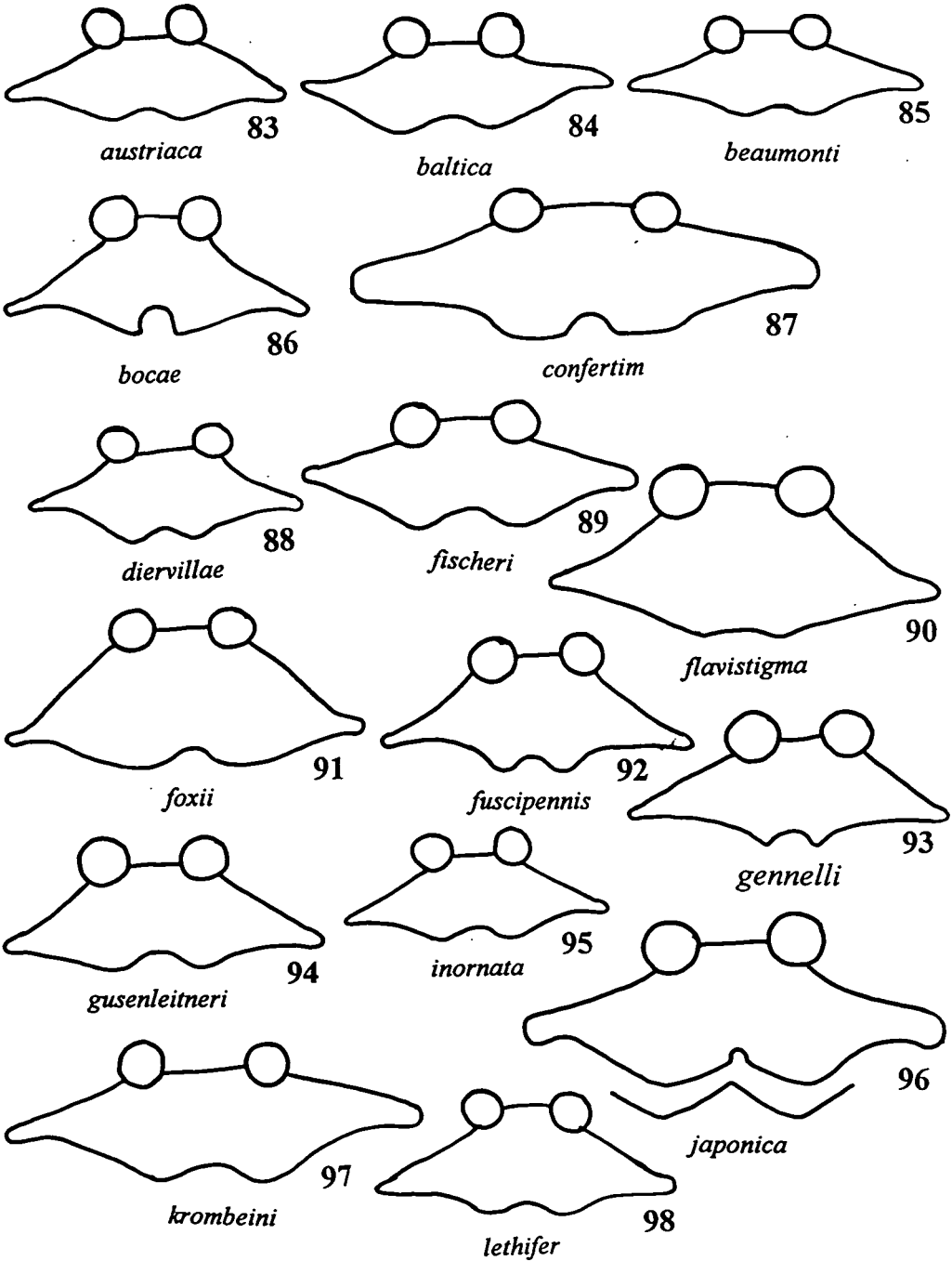


gennelli

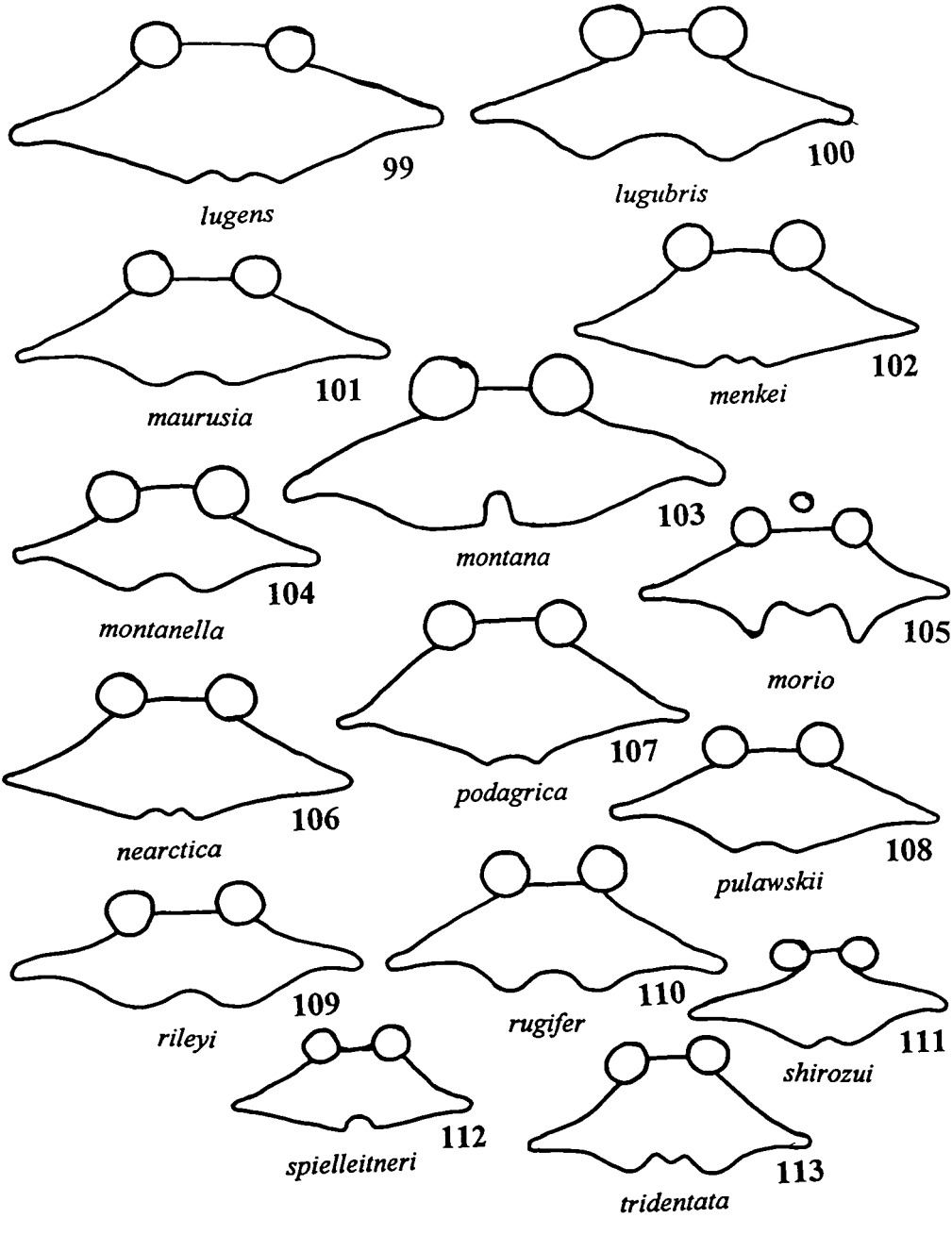


bocae

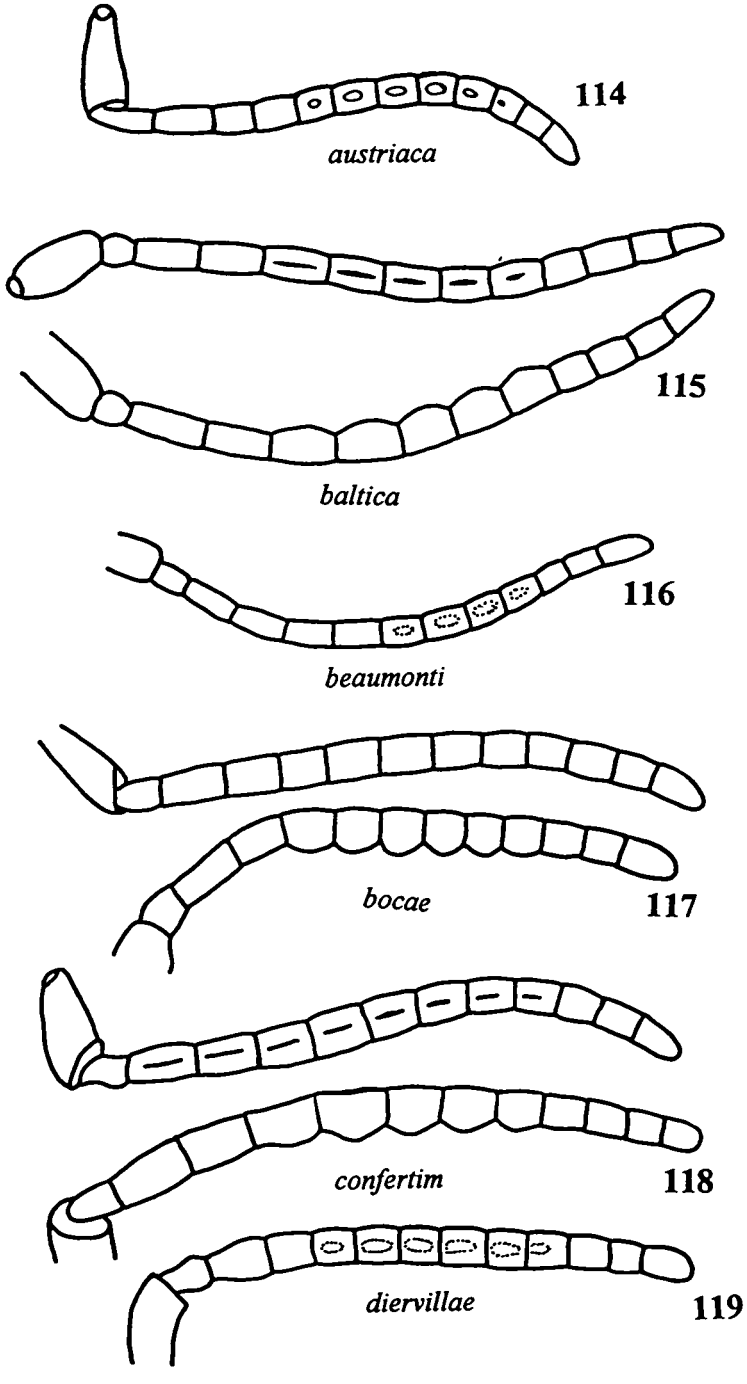
Clypeus — Male



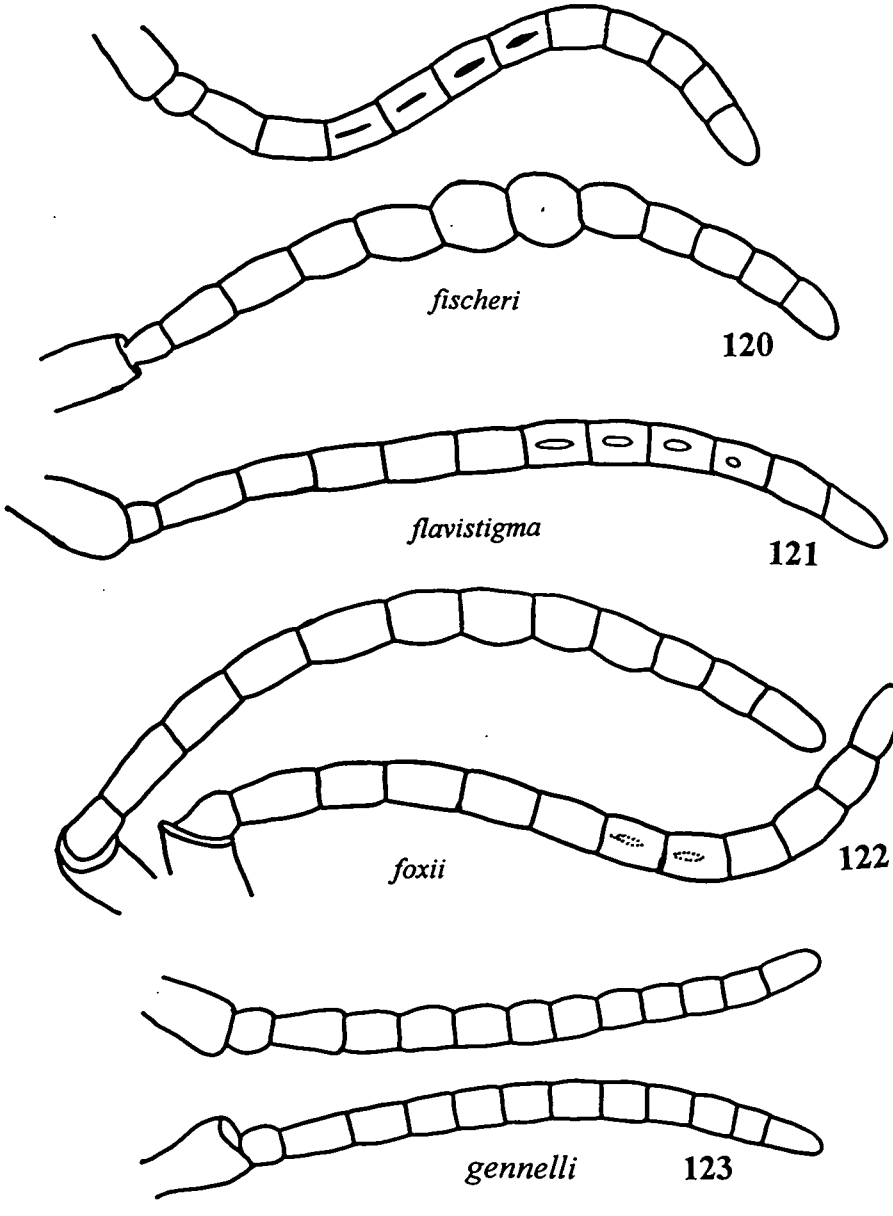
Clypeus — Male



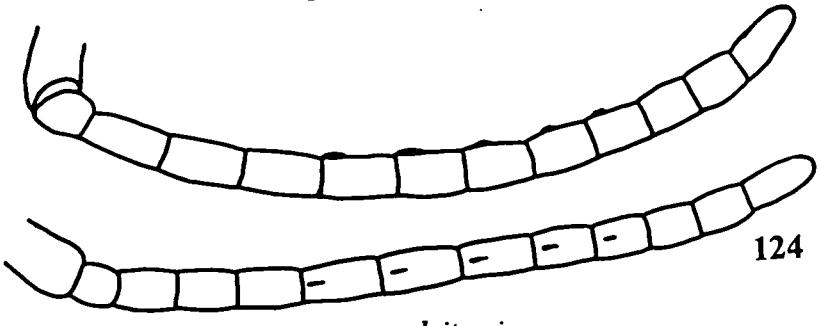
Flagellum — Male



Flagellum — Male

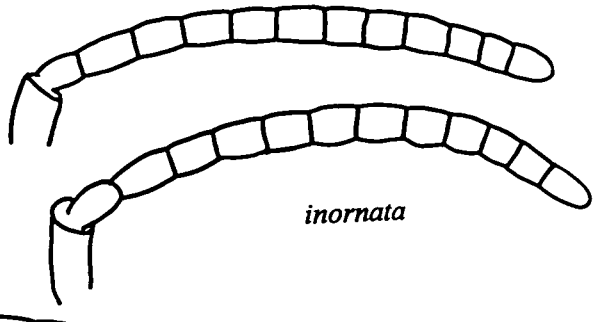


Flagellum — Male



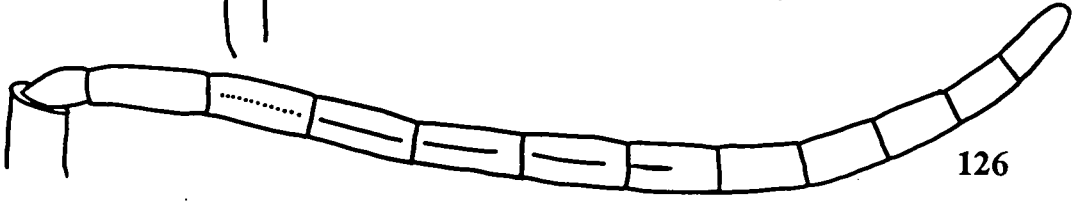
124

gusenleitneri



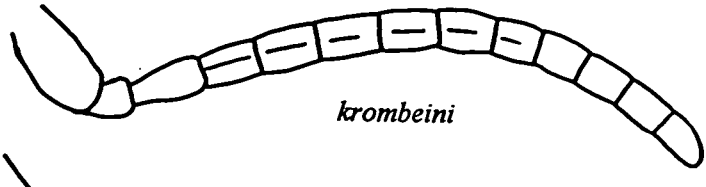
inornata

125



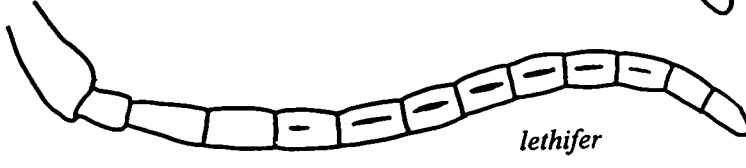
126

japonica



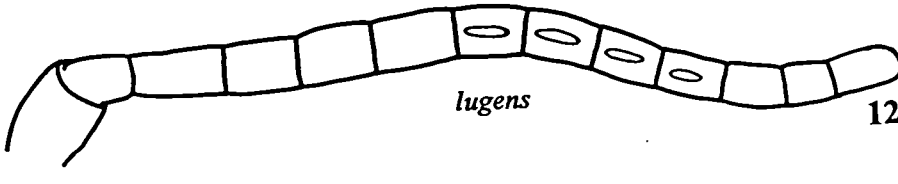
krombeini

127



lethifer

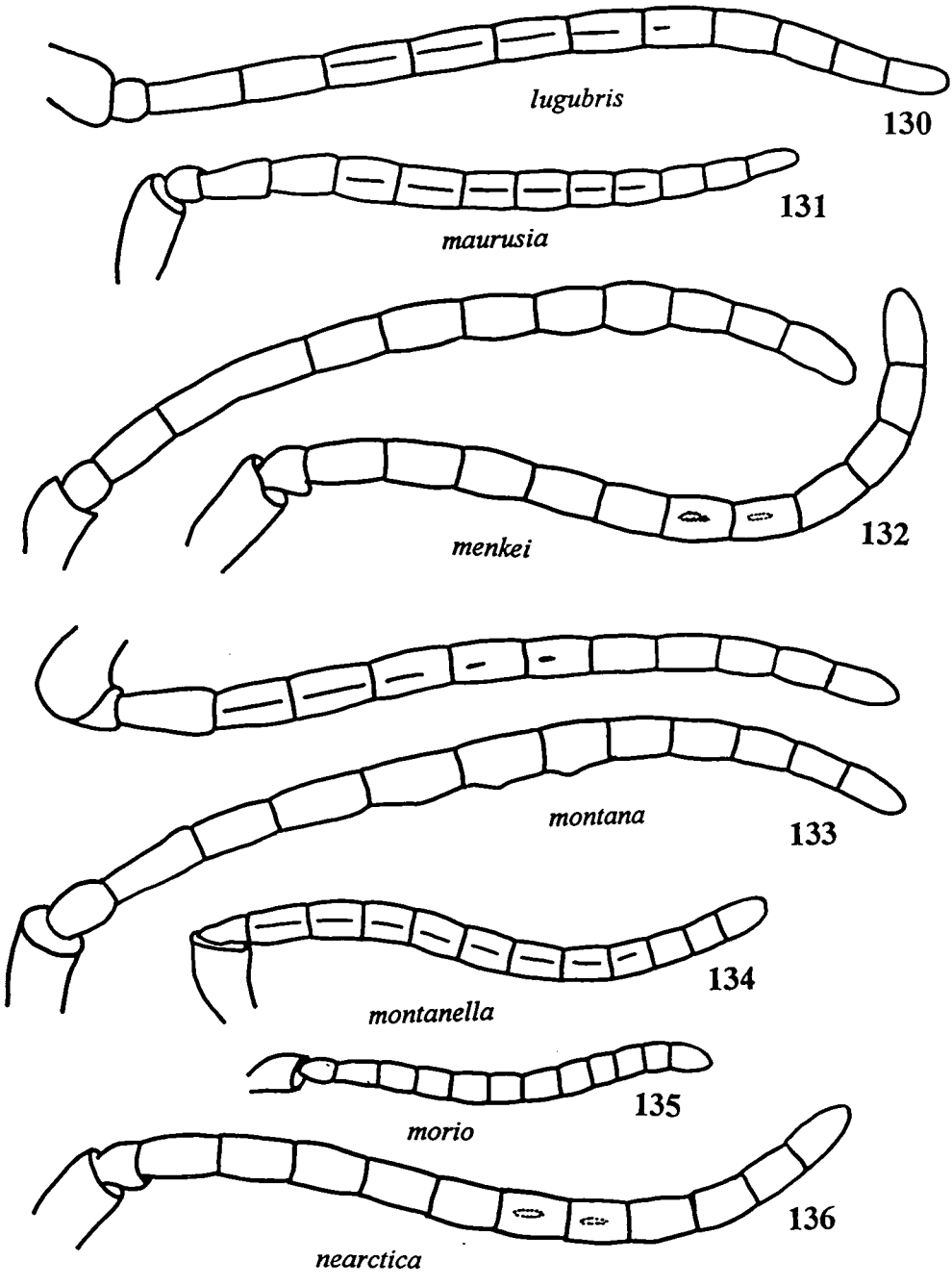
128



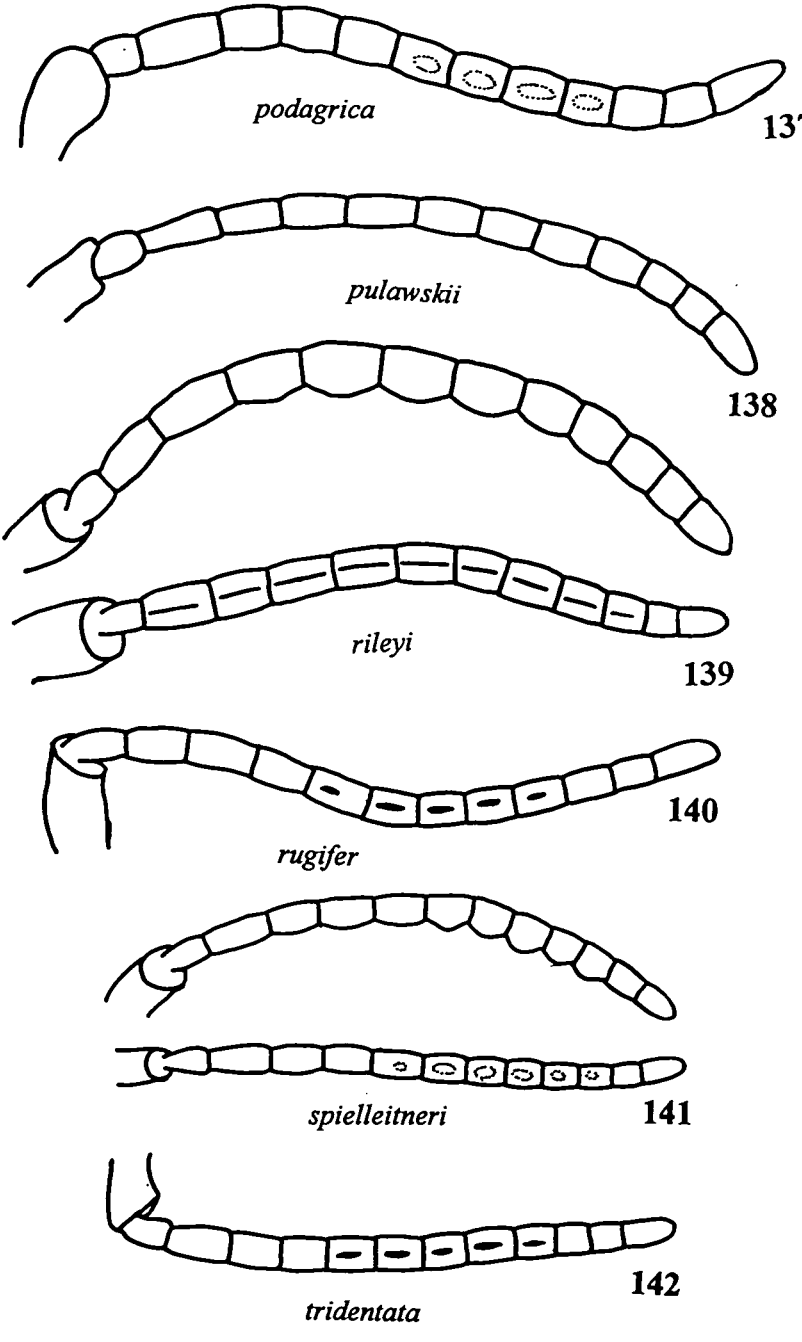
lugens

129

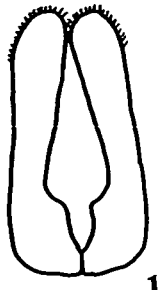
Flagellum — Male



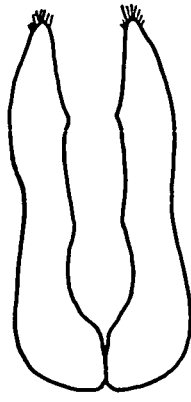
Flagellum — Male



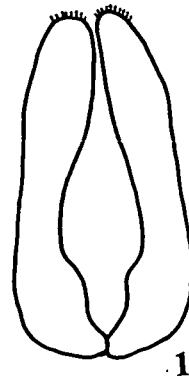
Gonostyle — dorsal



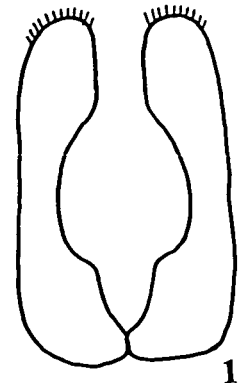
143 *austriaca*



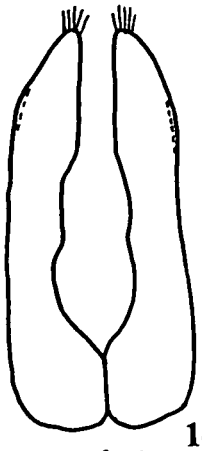
144 *baltica*



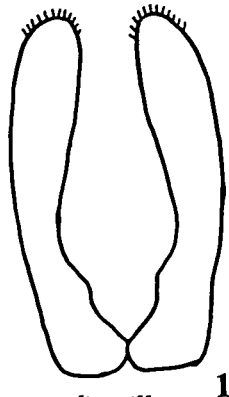
145 *beaumonti*



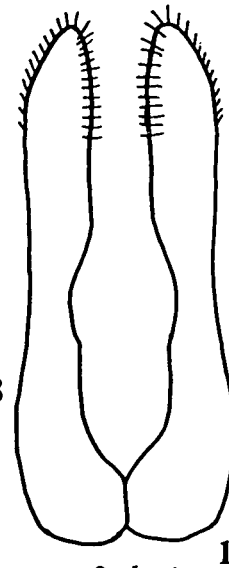
146 *bocae*



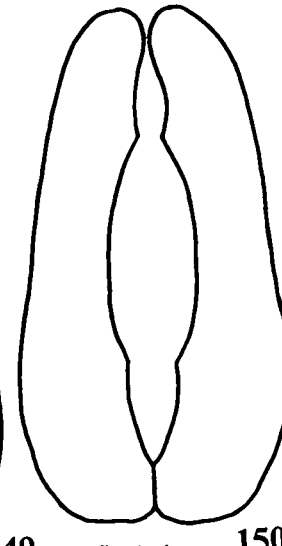
147 *confertim*



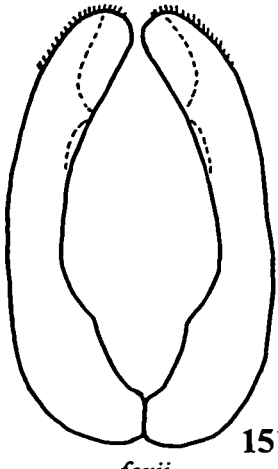
148 *diervillae*



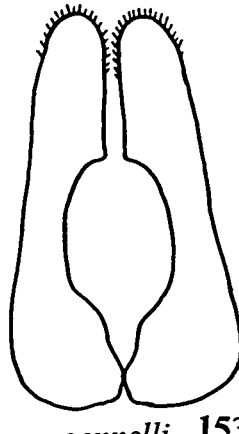
149 *fischeri*



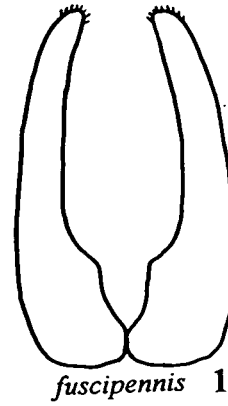
150 *flavistigma*



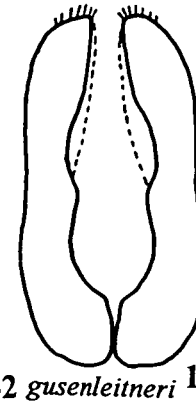
151 *foxii*



153 *gennelli*

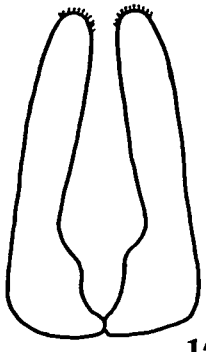


152 *fuscipennis*

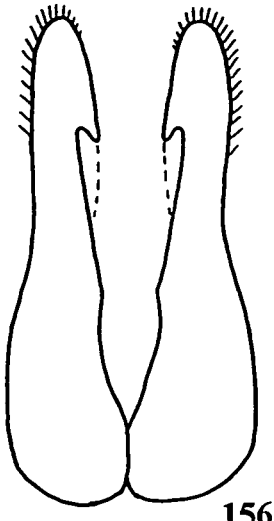


154 *gusenleitneri*

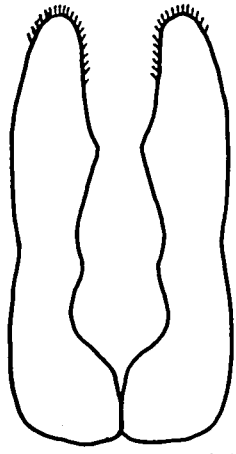
Gonostyle — dorsal



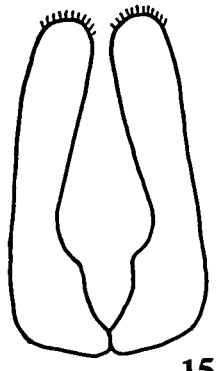
inornata **155**



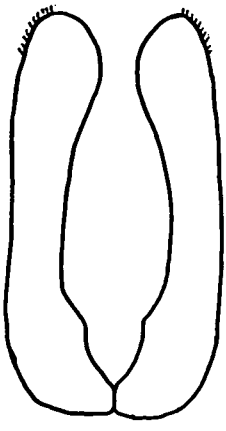
japonica **156**



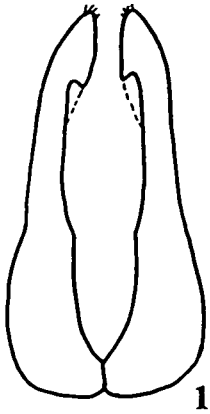
krombeini **157**



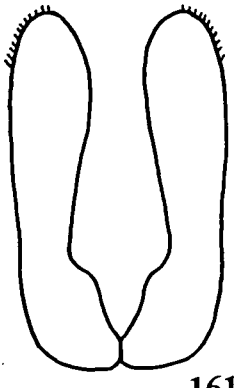
lethifer **158**



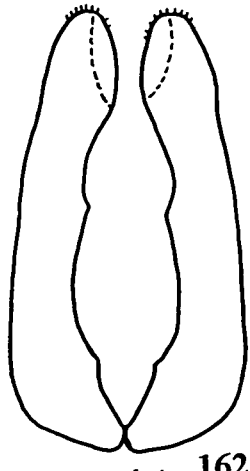
lugens **159**



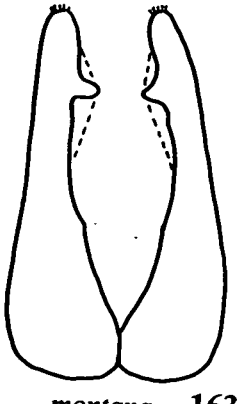
lugubris **160**



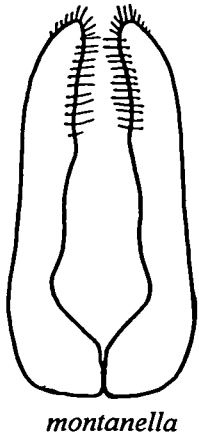
maurusia **161**



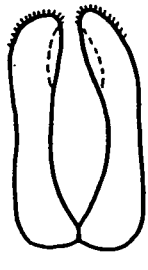
menkei **162**



montana **163**

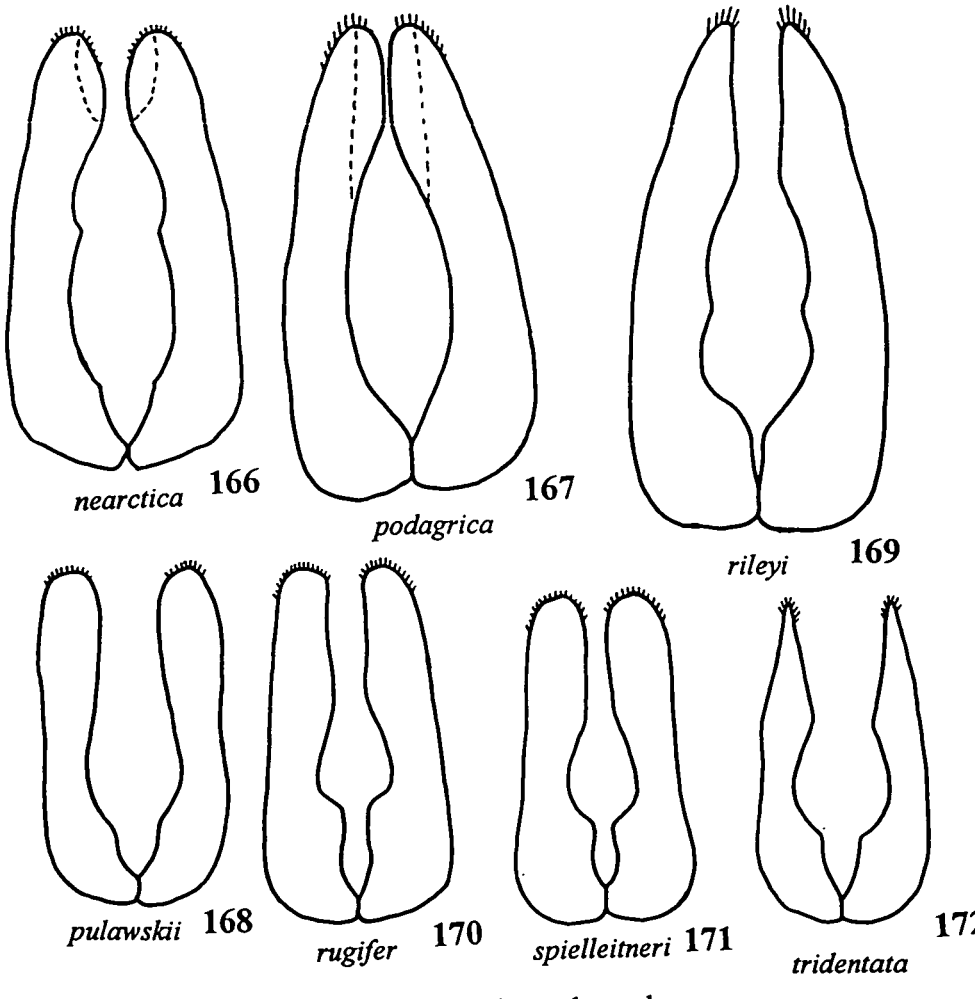


montanella **164**

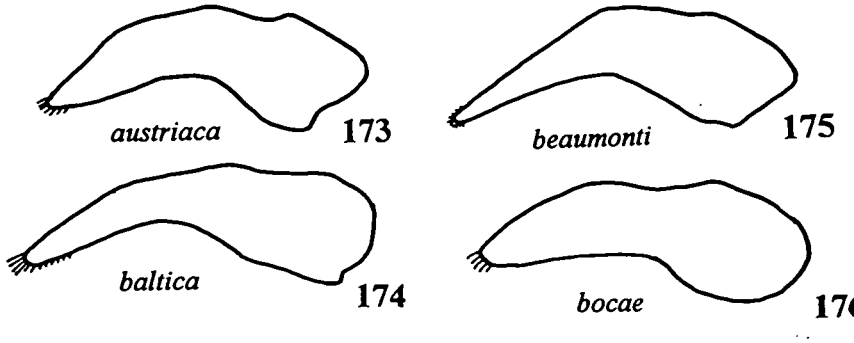


morio **165**

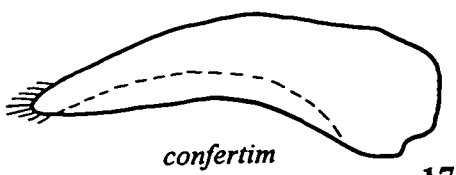
Gonostyle — dorsal



Gonostyle — lateral



Gonostyle — lateral



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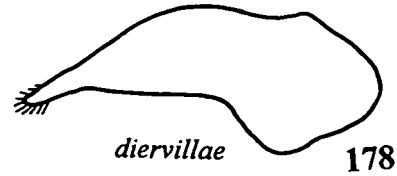

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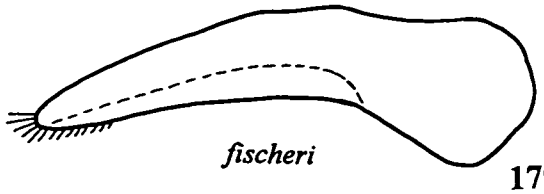

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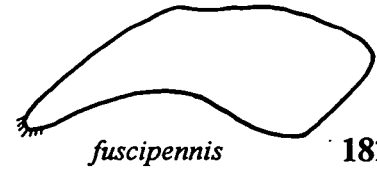

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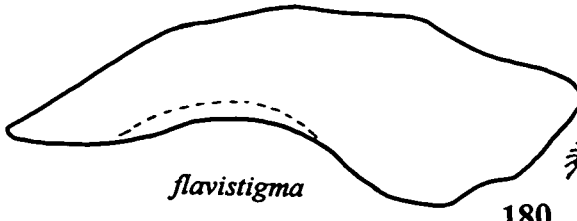

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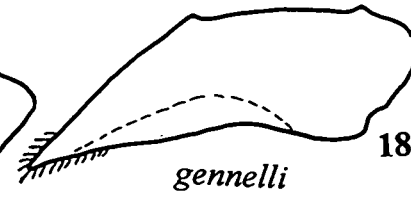

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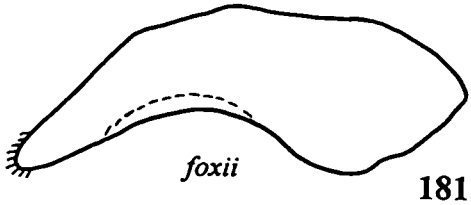

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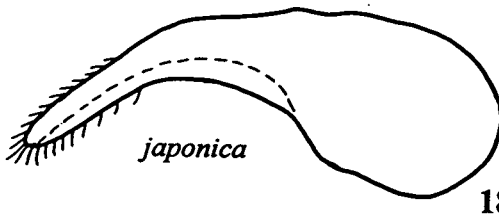
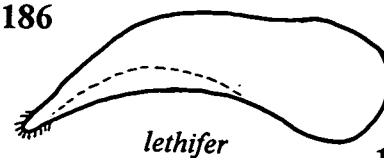


186

185

187



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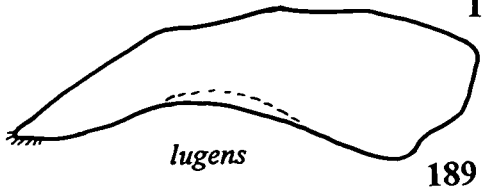

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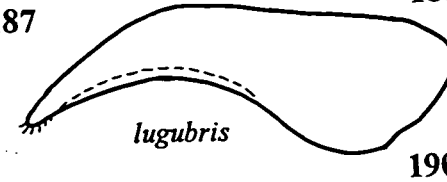

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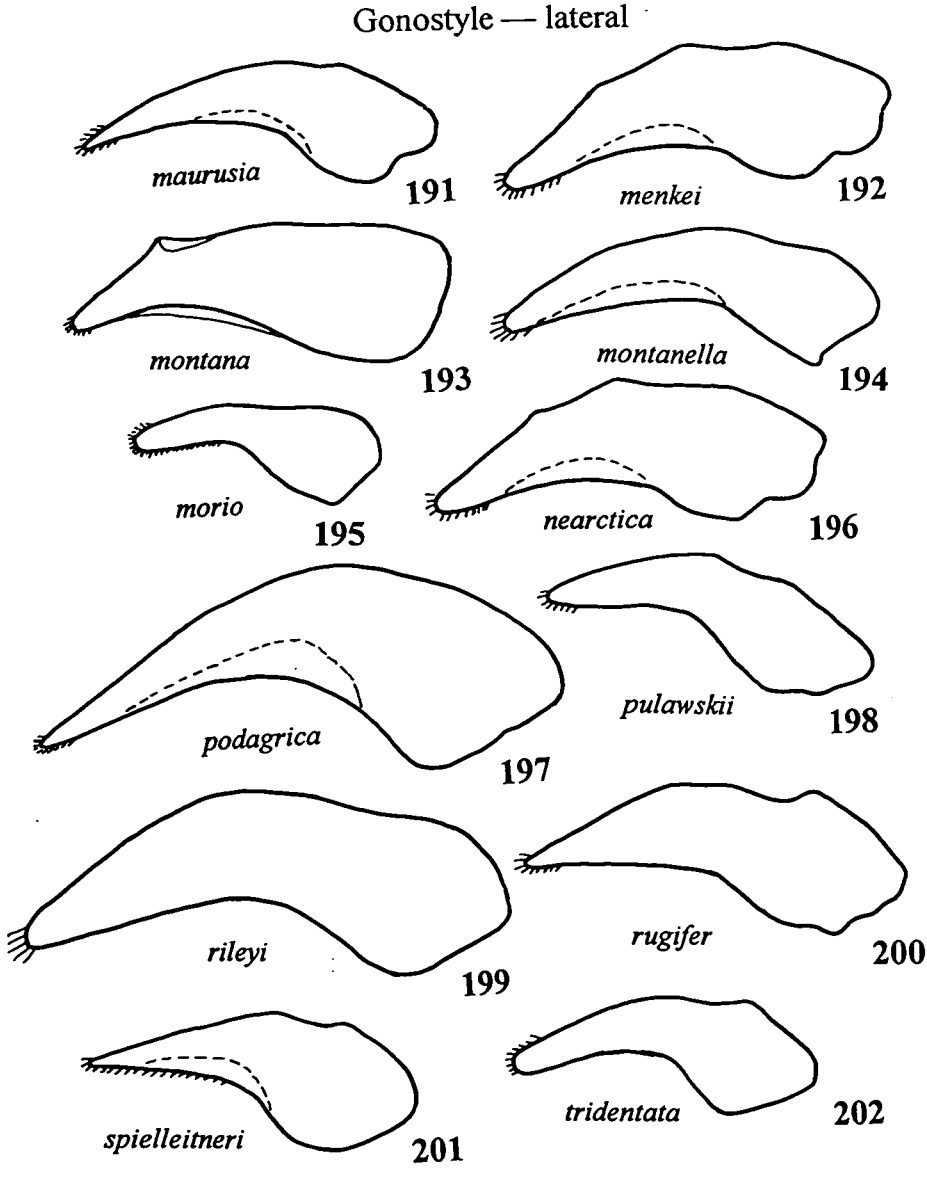
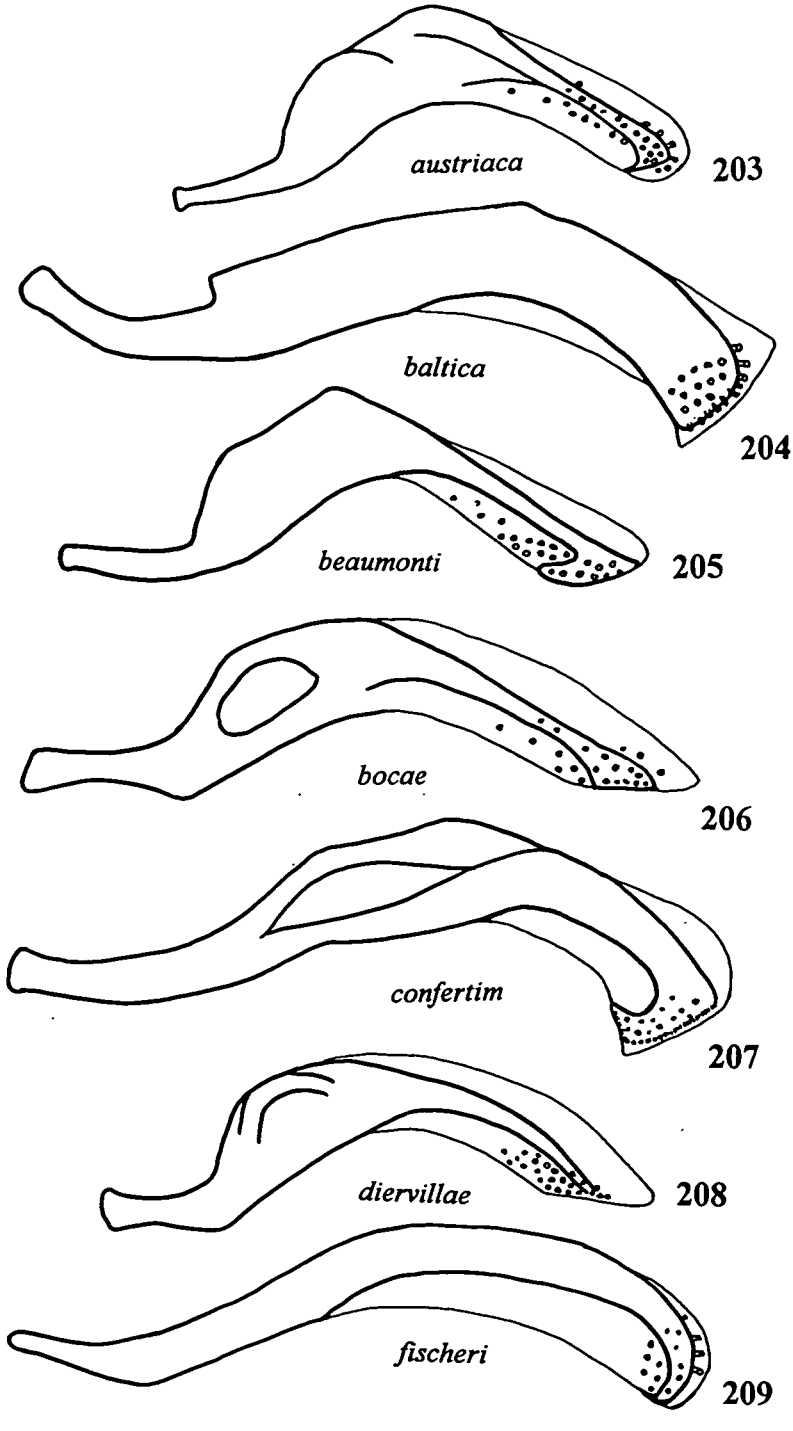
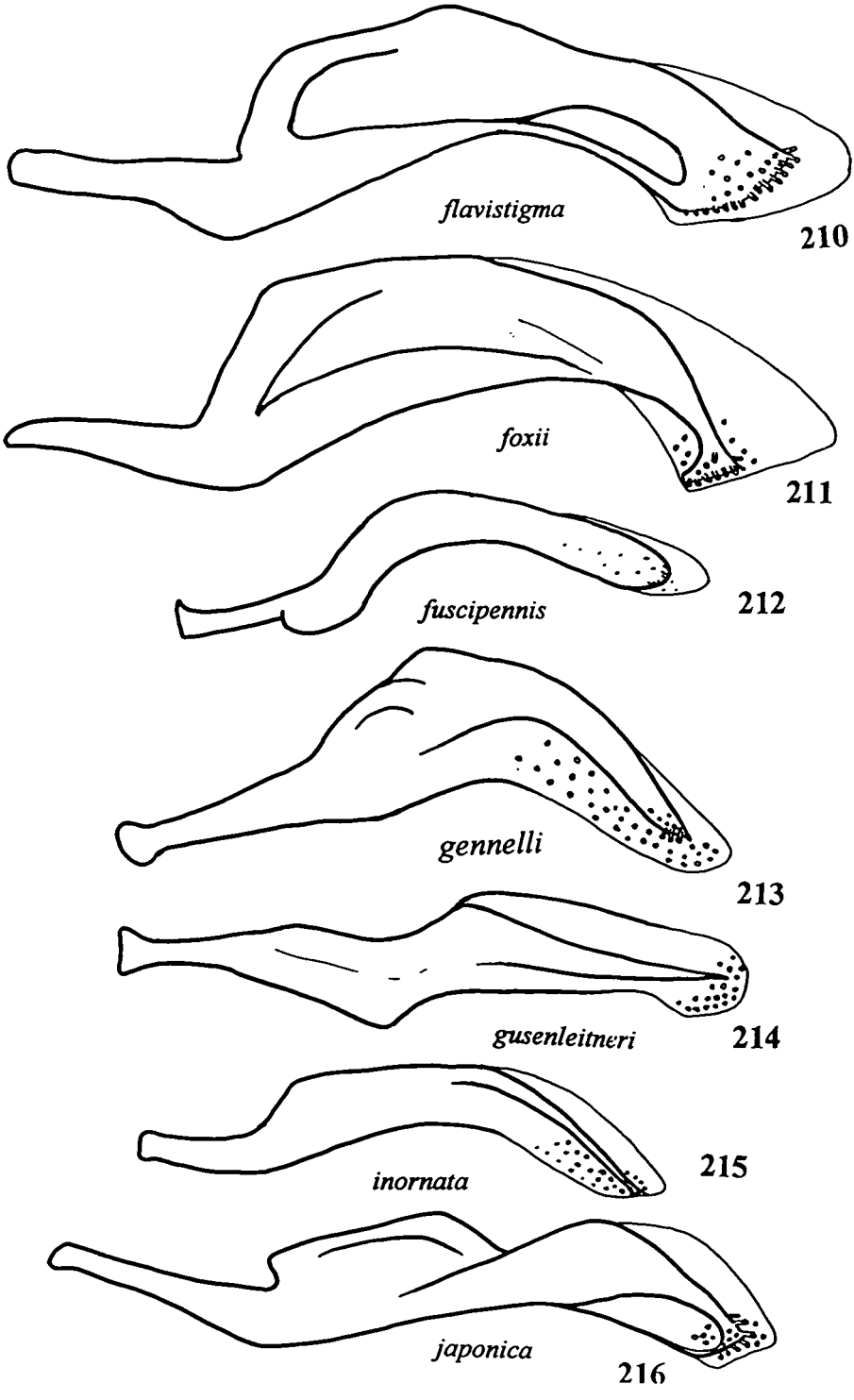


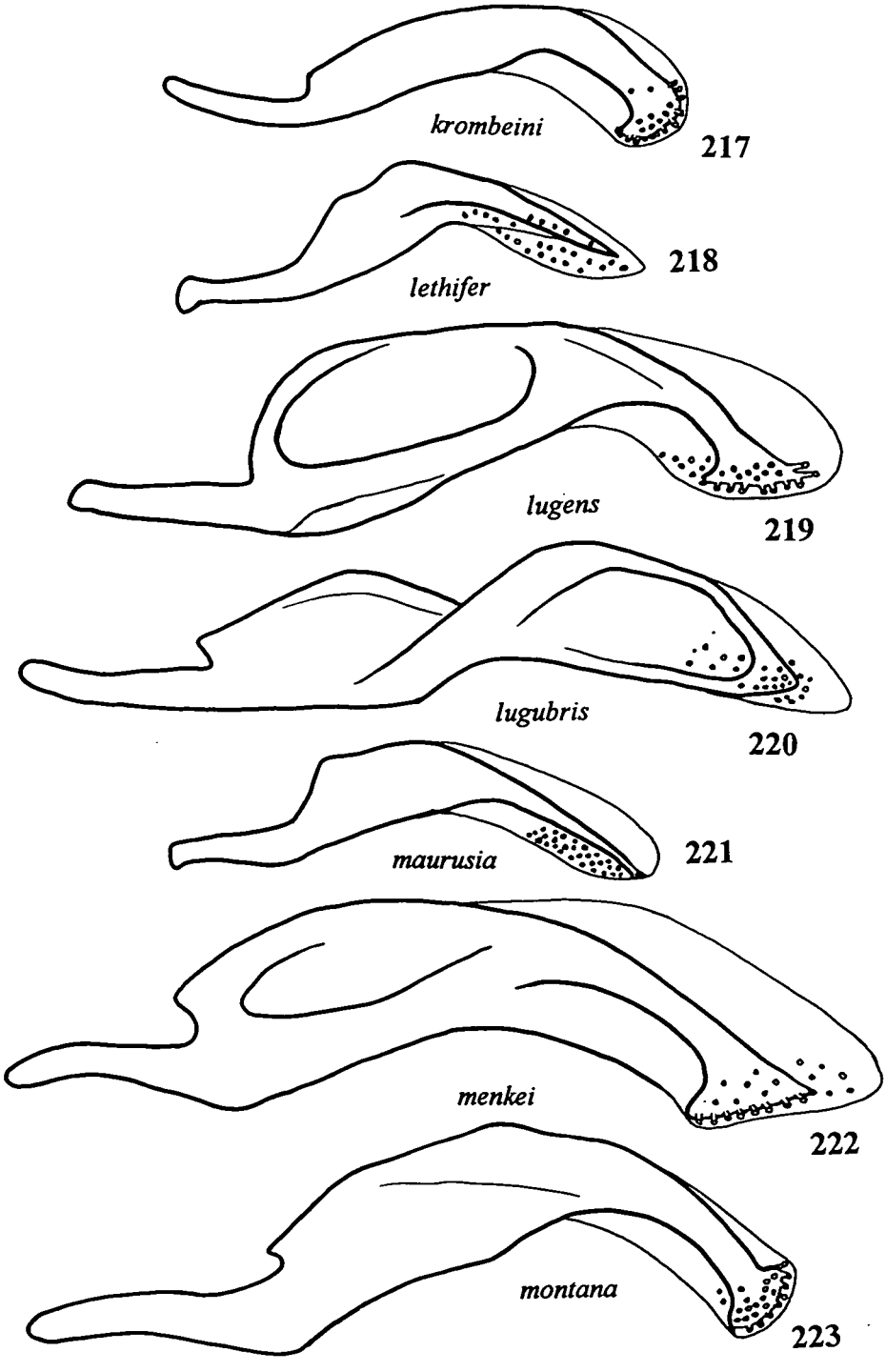
Penis valve

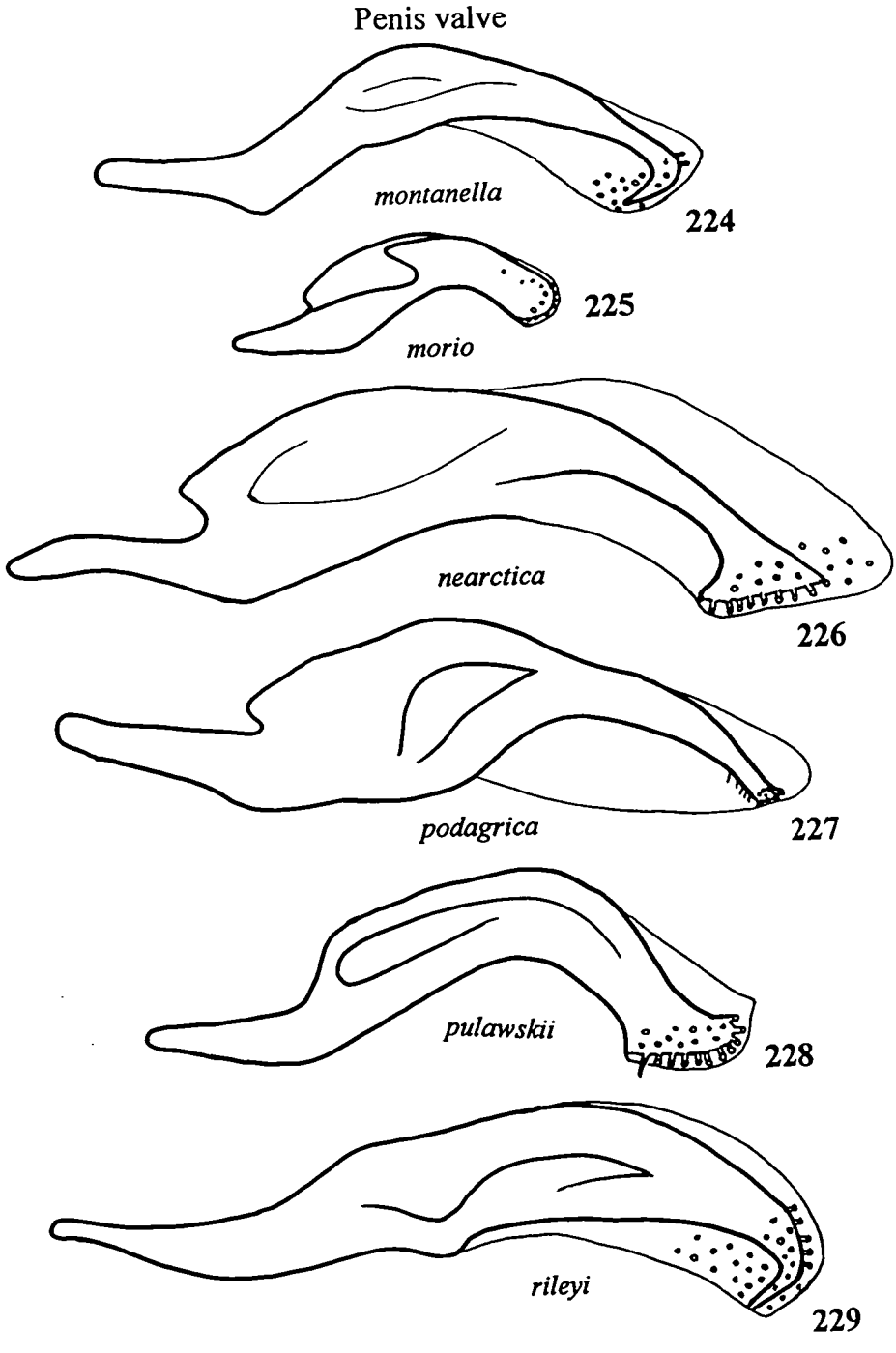


Penis valve

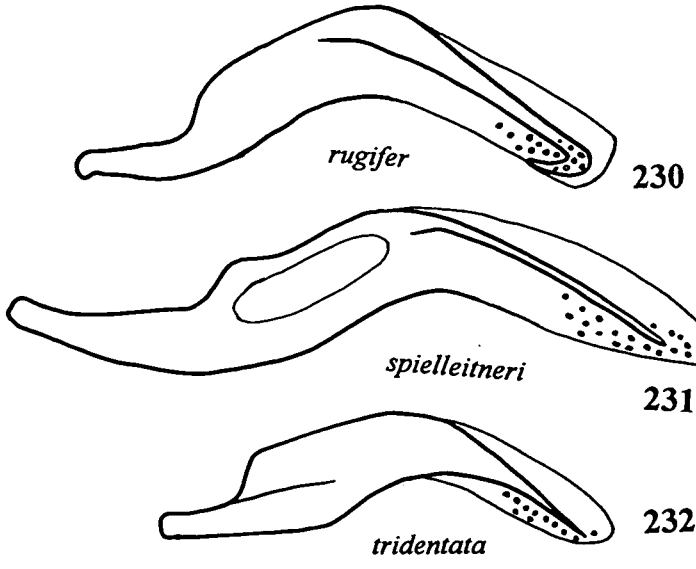


Penis valve

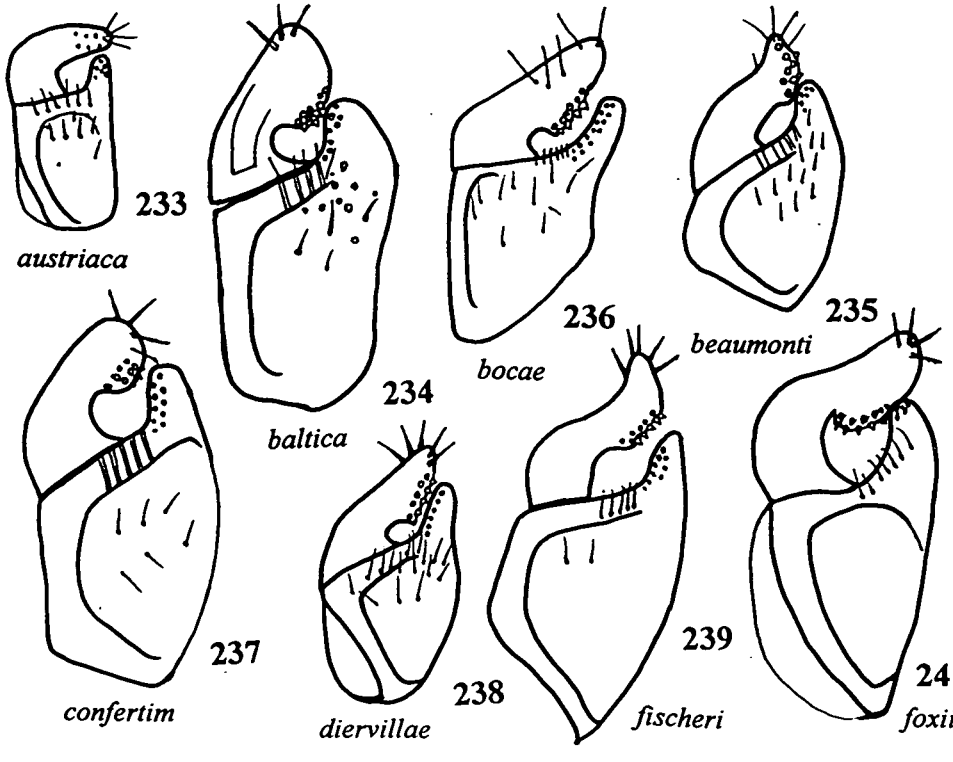




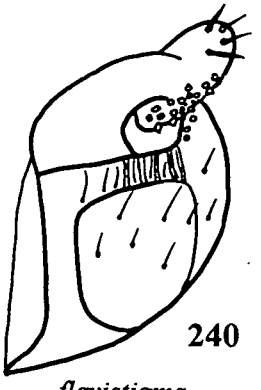
Penis valve



Volsella

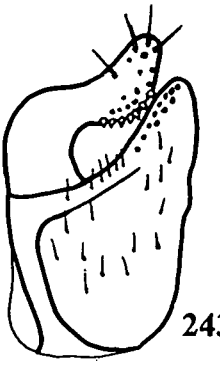


Volsella

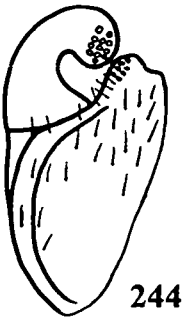


240 *flavistigma*

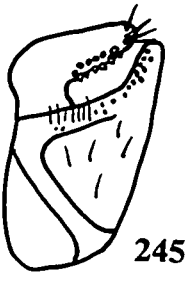
242 *fuscipennis*



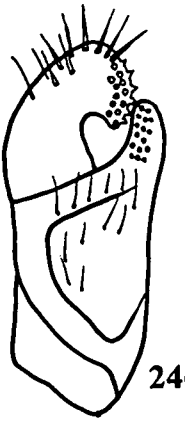
243 *gennelli*



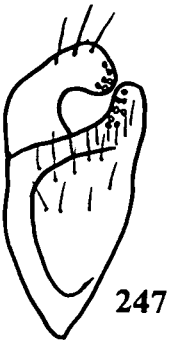
244 *gusenleitneri*



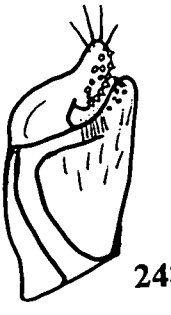
245 *inornata*



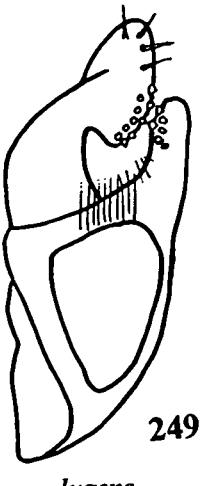
246 *japonica*



247 *krombeini*

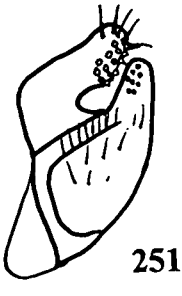


248 *lethifer*

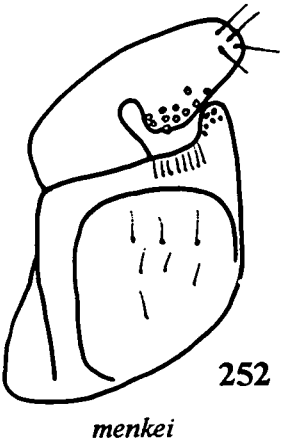


249 *lugens*

250 *lugubris*

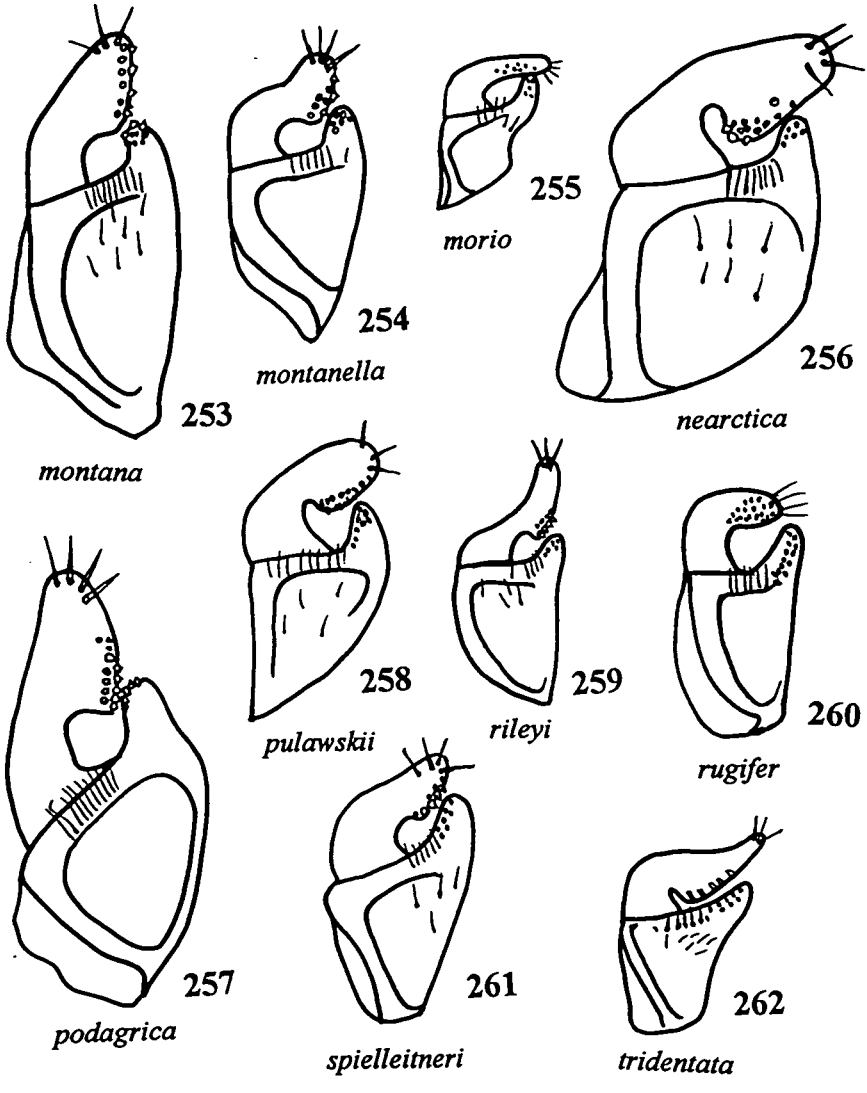


251 *maurusia*

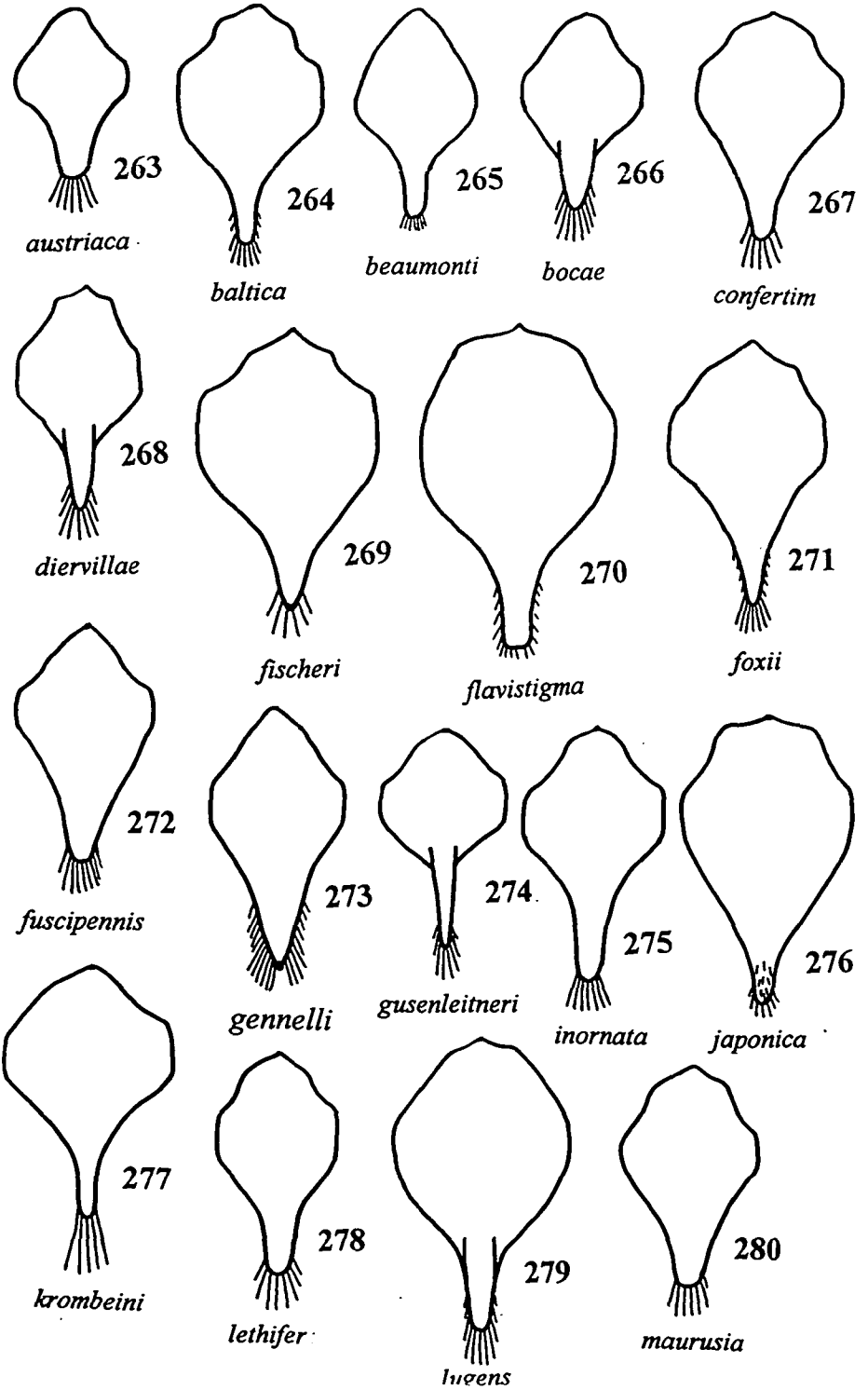


252 *menkei*

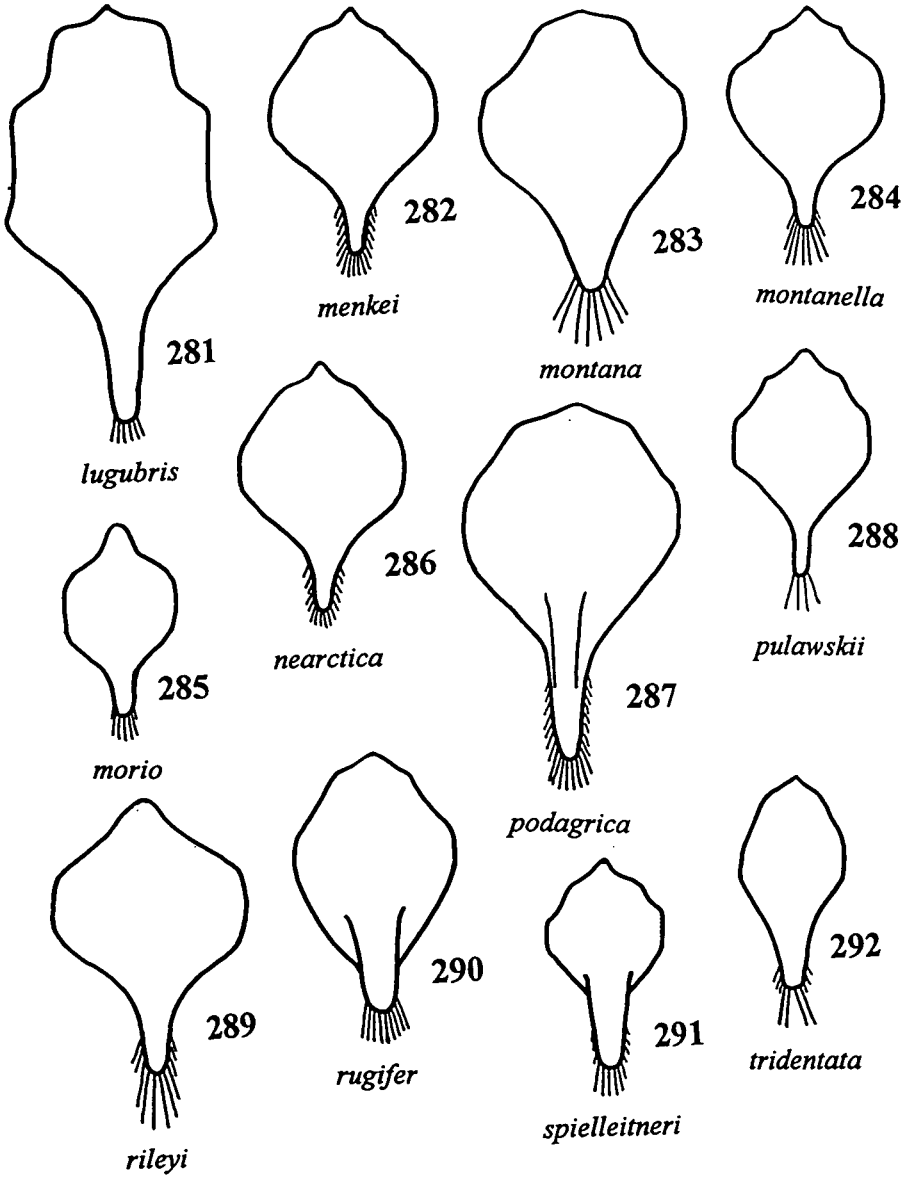
Volsella



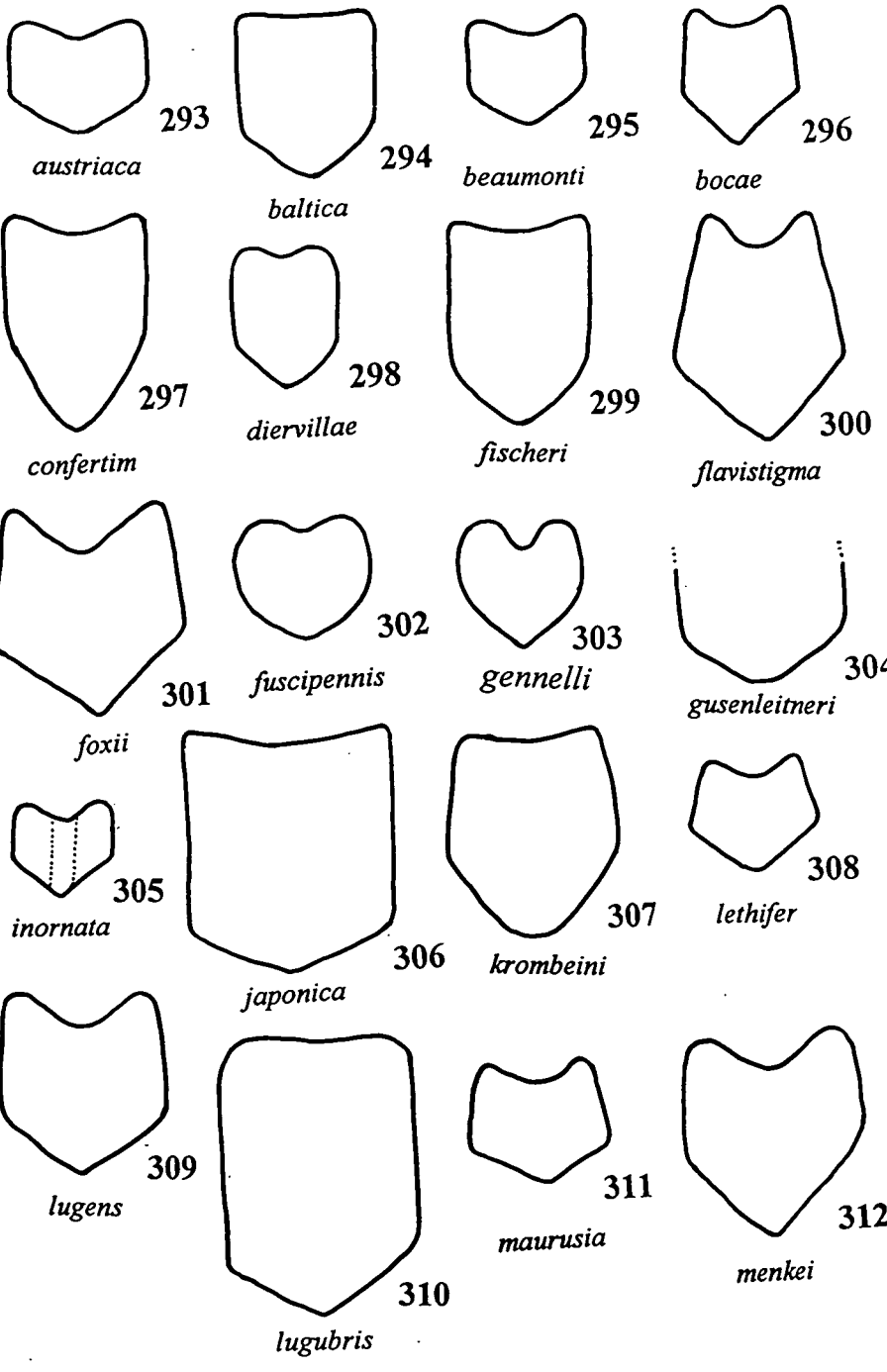
Sternum VIII



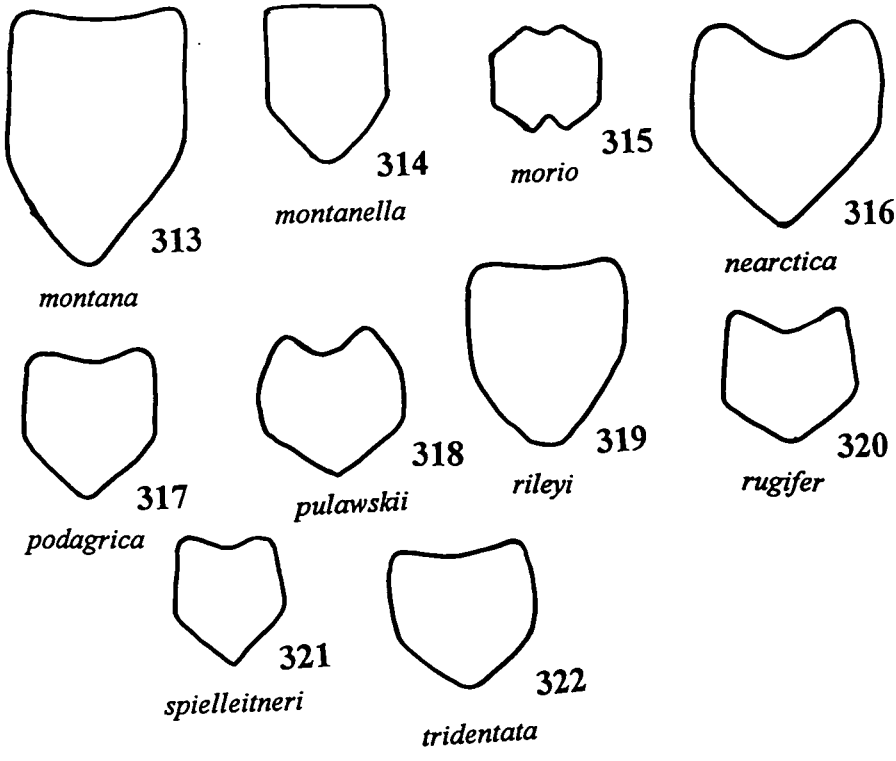
Sternum VIII



Penis valves connecting sclerite



Penis valves connecting sclerite



Descriptions of species

Pemphredon austriaca (KOHL)

Diphlebus austriacus KOHL 1888: 723, ♀♂. Lectotype: ♀, Austria: Wien (NHMW), designated by MERISUO 1972: 9, examined.

Pemphredon tener VALKEILA 1972: 22, ♀. Holotype: ♀, Algeria: Kabylie: no specific locality (USNM), examined. New synonym.

Pemphredon coracinus VALKEILA 1972: 20, ♀. Holotype: ♀, Cyprus: Saettas (FSAG), examined. New synonym.

Pemphredon nescius MERISUO 1972: 23, ♀. Holotype: ♀, Italia: Trieste (NHMW), examined. New synonym.

Diagnosis: *Pemphredon austriaca* differs from all the Palearctic species in having large punctures on scutum (diameters equal to 0.3-0.5 × hindocellar diameter).

Description: Female: Anterior clypeal margin slightly tridentate (Fig. 9). Frons punctato-rugose. Vertex behind ocelli shiny, punctate (punctures contiguous to 2 diameters apart). Head width 1.2-2.0 × length. Flagellomere I: length 1.6-2.0 × width, 1.1-1.2 × length of flagellomere II. Scutum with large punctures (diameters equal to 0.2-0.5 × hindocellar diameter), anteriorly densely, posteriorly sparsely punctate (punctures 0.5 diameter apart). Scutellum similar to scutum sculpture. Metanotum rugose. Mesopleuron in front of midcoxa punctate as in scutum. Propodeal enclosure varying from irregularly ridged to reticulate. Propodeal pad shiny, varying from broad to narrow. Hindtibia with spines. Petiole shorter than tergum I (length 0.5-0.9 × length of tergum I). Pygidial plate flat (Fig. 42). Recurrent vein varying from antefurcal to interstitial, some specimens postfurcal. Submarginal cell II higher than broad. Length 5.0-8.0 mm. Breeds in galls of *Andricus kollari* on *Quercus robur*.

Male: Anterior clypeal margin broadly emarginate (Fig. 83). Frons punctato-rugose. Vertex behind ocelli shiny, distinctly punctate (punctures contiguous to 1 diameter apart). Head width 1.6-2.0 × length. Flagellomeres (III)IV-VIII(IX) with distinctly marked tyloids (Fig. 114). Flagellomere I: length 1.5-2.0 × width, 1.1-1.2 × length of flagellomere II. Scutum with large punctures (diameters equal to 0.3-0.5 × hindocellar diameter), anteriorly densely, posteriorly sparsely punctate (punctures 0.5 diameter apart). Scutellum punctate like scutum. Metanotum rugose. Propodeal enclosure varying from irregularly ridged to reticulate. Propodeal pad narrow. Mesopleuron in front of midcoxa punctate as in scutum. Hindtibia with fine spines. Petiole shorter or equal to tergum I (length 0.7-1.1 × length of tergum I). Recurrent vein varying from antefurcal to interstitial, submarginal cell II higher than broad. Gonostyle dorsal (Fig. 143), lateral (Fig. 173). Penis valve (Fig. 203). Volsella (Fig. 233). Penis valves connecting sclerite (Fig. 293). Sternum VIII (Fig. 263). Length 5.0-9.0 mm.

Variation: Some specimens of *austriaca* have sparse punctation on scutum (punctures half a diameter apart anteriorly, one diameter apart posteriorly). Recurrent vein postfurcal in few specimens. Propodeal pad varying from broad and shiny to narrow and rugose. Anterior clypeal margin in some females as in *lethifer*.

Discussion: Because of the variation in clypeus shape and the position of recurrent vein, *austria* entered more than once in the keys.

Geographic Distribution: Algeria, Cyprus, Europe, Turkey.

Material Examined: 162♀♀, 182♂♂.

Records:

Algeria: 1♀, Kabylie (USNM).

Austria: 103♀♀, 111♂♂ (AFZH, CSB, CSCH, GUL, DMA, HNSA, KSUK, NHMW).
Burgenland: Donnerskirchen; Winden.
Niederösterreich: Baumgarten; Bisamberg; Emmersdorf near Melk; Eniklberg near St. Pölten; Falkenstein near Laa/Thaya; Feuersbrunn near Krems; Mödling; Piesting; Plank/Kamp; Purgstall; St. Pölten; Wien; Wolkersdorf near Mank.
Kärnten: Köstendorf Gailtal; Rosegg; Weißensee Ostufer.
Oberösterreich: Hühnergeschrei.
Salzburg: Glanmoos; Parsch.

Bulgaria: 1♀ (OLML). Slanchev Briag.

Bosnia: 1♀, 1♂ (HNHM). Sarajevo.

Czechia: 2♀♀ (OLML). Sulava near Prague.

Croatia: 2♀♀, 2♂♂ (DMA, KSUK, MNHN). Istria: Rovinj; Tinjan.

Cyprus: 3♂♂ (BMNH, CASC, FSAG). Limassol; Saettas; Trodos Tripylos 1100 m.

France: 16♀♀, 23♂♂ (BITF, CHGF, FSAG, MNHN, RIB, TAF). Arachon; Banyuls; Fon Venzyle; La Clape; Orsay; Pujaudran; Sérignan-plage; St. Antoine de Ficalba; St. Nazai. Aude: Leucate. Drôme: Sederon. Eure-et-Cher: Moleans. Haute Garonne: Toulouse. Herault: Garrigues de Montpellier. Loir-et-Cher: Mondoubleau. Var: Lorgues; Pignans; Tanneron.

Germany: 3♀♀, 9♂♂ (CJR, HUO, KSUK, NHMW, SEM, UMBB). Bad Münster a. St. Rotenfels; Bretten; Gartz/O; Juist ; Karlsruhe; Mühlacker .

Italy: 25♀♀, 22♂♂ (BMNH, CJR, CSCH, DMA, FSAG, MZLS, NEPI, NHMW, PTI, RMNH). Assergi 900 m; Bologna; Lazio M. Pallorosa; Ravenna; San Marino; Sesto Fior. Brescia: Lago di Garda Torri Benaco. Modena: Montetortore; Zocca. Piemonte: Borgomale; Bossolasco; Casalette; Langhe S. Benedetto Belbo; Murrazano. Sardegna: Calasetta; Nuoro. Scettin: Piacenza Mezzano. Sicilia: Pedara Etna; Taormina Venere. Torino: Colino; Torino. Trentino (Süd-Tirol): Ahrntal 1500 m; Puflatsch 1900 m; Ratzes; Waidbruck. Trieste: Duino; Trieste.

Poland: 1♀ (CASC). Wroclaw.

Serbija: 1♀ (HNHM). Kosovo: Pec Pecka Banja.

Spain: 1♀, 2♂♂ (CNCI, GUSE). Gibraltar (Brit.); Santibañez.

Switzerland: 1♀ (NHMW). Genève.

Turkey: 3♀♀, 10 ♂♂ (CHN, DMA, MZLS). Eleskirt Agri 2200 m; Engiz S. L.; Yatgan-Karalti Mugla 800 m. Antalya: Termessos 1000 m. Bitlis: Tatvan-Mus 1200 m. Bursa: Mudanya. Hakkari: Beytüsebab 1400 m; Sat Dag Varegös SW Yüksekova 1700 m. Izmir: N Birgi 800 m.

Pemphredon baltica MERISUO

Pemphredon balticus MERISUO 1972a: 13, ♀♂. Holotype: ♀, Finland: Helsinki (ZMH), examined.

Pemphredon fennicus MERISUO 1972a: 14, ♀. Holotype: ♀, Finland: Suomussalmi Ruthinansalmi (ZMUT), examined. New synonym.

Diagnosis: *Pemphredon baltica* is one of several species in which the recurrent vein is postfurcal, the propodeal enclosure is reticulate, and the propodeal pad is broad and smooth or broad with fine transverse striae. The female of *baltica* differs from *lugubris* in having a broad pygidial plate (Fig. 43), and the mesopleuron in front of midcoxa without transverse striation. The male of *baltica* differs from *lugubris* in swollen flagellomeres (III)IV-VII (Fig. 115), and a characteristically shaped penis valve (Fig. 204).

Description: Female: Anterior clypeal margin truncate (Fig. 10). Frons punctato-rugose. Vertex behind ocelli shiny or dull, punctate (punctures contiguous to 2 diameters apart). Head width 1.6-2.3 × length. Flagellomere I: length 2.0-3.0 × width, 1.1-1.4 × length of flagellomere II. Scutum dull, with irregular, coarse , pitted structure and short transverse rugae. Scutellum anteriorly punctate, posteriorly longitudinally rugose. Metanotum densely punctate. Mesopleuron in front of midcoxa with microsculpture, punctate (punctures contiguous to 2 diameters apart). Propodeal enclosure reticulate. Propodeal pad broad, with microstriae, in some specimens smooth. Hindtibia with spines. Petiole shorter than tergum I (length 0.4-0.7 × length of tergum I). Pygidial plate broad, apically with well defined carina (Fig. 43). Recurrent vein postfurcal. Length 8.0-9.5 mm.

Male: Anterior clypeal margin emarginate (Fig. 84). Frons punctato-rugose. Vertex behind ocelli with microsculpture, punctate (punctures contiguous to 1 diameter apart). Flagellomeres (II)III-VII with linear tyloids, distinctly swollen and light brown beneath (Fig. 115). Head width 1.6-2.0 × length. Flagellomere I: length 1.8-2.3 × width, 1.0-1.1 × length of flagellomere II. Scutum with microsculpture, finely punctate (punctures 1-2 diameters apart). Scutellum anteriorly sparsely punctate, posteriorly punctato-rugose. Metanotum punctato-rugose. Mesopleuron in front of midcoxa with microsculpture, finely punctate (punctures 1 diameter apart). Midbasitarsus slightly bowed in profile. Hindtibia with fine spines. Propodeal enclosure reticulate. Propodeal pad broad and smooth, or broad with fine transverse striae. Petiole shorter than tergum I (length 0.7-0.8 × length of tergum I). Recurrent vein postfurcal, submarginal cell II as broad as high. Gonostyle dorsal (Fig. 144), lateral (Fig. 174). Penis valve (Fig. 204). Volsella (Fig. 234). Penis valves connecting sclerite (Fig. 294). Sternum VIII (Fig. 264). Length 6.5-8.0 mm.

Variation: Propodeal pad varying from smooth and shiny to dull with microstriation.

Discussion: MERISUO (1972b: 93) described the male of *Pemphredon fennica*. I examined this specimen, but the last two terga and sterna with genitalia were lost. He writes that the tyloids of *fennica* are nearly identical with those of *baltica*. When I got this specimen nearly all flagellomeres were lost, so I was not able to decide, whether *fennica* is a synonym of *baltica* or not. Fortunately Mr. Sven Hellqvist, Umea, Sweden, sent me a specimen which he thought to be a male of *fennica*. The specimen was

complete and I was able to dissect its genitalia. The penis valve of *baltica* is characteristically shaped and differs from all other species. The male of Sweden corresponds in all features with the male described by Merisuo and the genitalia are like those of other males of *baltica*. Therefore I think *fennica* is a synonym of *baltica*.

Geographic Distribution: Central- and northern Europe, Canada, United States (Vermont).

Material Examined: 26♀♀, 6♂♂.

Records:

Austria:
Kärnten: Maria Saaler Berg (1♀ CSB).
Niederösterreich: Neunkirchen (1♀ GUL); St. Christophen (1♀ DMA).

Belgium: Guitrode (1♀ AFZH).

Canada:
British Columbia: Stone Mt. Park 3800ft (1♀ AEIC).
New Brunswick: Kouchibougnac (1♀ CNCI).
Northwest Territories: Yellowknife Road N Stock Lake (1♂ CNCI); Kovaluk R. 69°11'N/131°W (1♂ CNCI).
Ontario: Sudbury (1♀ ROME).
Yukon Territory: Dempster HWY mi 87 (1♀ PMAE, 1♀ CNCI).

Croatia: Istria: Rovinj (1♀ KSUK).

Czechia: Karlatejn (1♀ OLML).

Finland: Hämeenlinna (1♂ ZMH); Rymättylä (1♀ AFZH).

France: Orsav Essone (1♀ CHGF).

Germany: Gidehäuser Osnabrück (1♀ CSB); Enzklösterle bei Wildbad. (1♀ KSUK); NSG Mainzer Sand (1♀ KSUK); Segrahn (3♀♀ HUO).

Netherlands: Emmen (1♀ AFZH); Strijbeek Goudberg (1♀ RMNH).

Poland: Szczecin (1♀, 1♂ AFZH).

Sweden: Garnäs Näresbacka (1♂ NHRS); Huddinge Stockholm (1♂ ZMH); Jälltuna Bjornlandet (1♂ HUS).

United States: Vermont: **Essex County:** Route 105 Ferdinand (1♀ CUIC).

Pemphredon beaumonti HELLÉN

Pemphredon beaumonti HELLÉN 1955: 65, ♀. Holotype: ♀, Finland: Sa Taipalsaari (ZMH), examined.

Diagnosis: *Pemphredon beaumonti* is characterized by the following: the recurrent vein is postfurcal, the propodeal enclosure is reticulate, and the propodeal pad is narrow. The female of *beaumonti* differs from the two species *baltica* and *lugubris* in the sculpture of its scutum: dull, with irregular rugae in *lugubris* and *baltica*, and smooth, shiny, with coarse irregular pit-like depressions in *beaumonti*. The male of *beaumonti* is characterized by a shiny and coarsely punctate scutum (punctures contiguous to half a diameter apart). *Pemphredon beaumonti* differs from *rugifer* in flagellomeres without well-defined tyloids.

Description: Female: Anterior clypeal margin protruding and rounded (Fig. 11). Frons punctato-rugose. Vertex behind ocelli shiny, irregularly punctate

(punctures contiguous to 3 diameters apart). Head width 1.6-2.4 × length. Flagellomere I: length 1.9-2.1 × width, 1.0-1.2 × length of flagellomere II. Scutum smooth, shiny, with coarse, irregular pit-like depressions. Scutellum coarsely, densely punctate. Metanotum densely punctate. Mesopleuron in front of midcoxa shiny with coarse, dense punctation. Propodeal enclosure irregularly rugose or reticulate. Propodeal pad narrow with transverse rugae. Hindtibia with spines. Basitarsus of foreleg lateral with long setae (length more than 1 diameter of basitarsus). Petiole shorter than tergum I (length 0.6-0.8 × length of tergum I). Pygidial plate broad with distinct carina (Fig. 44). Recurrent vein postfurcal, submarginal cell higher than broad, or in some specimens as high as broad. Length 7.0-8.5 mm.

Male: Anterior clypeal margin broadly emarginate (fig, 85). Frons punctato-rugose. Vertex behind ocelli shiny, punctate (punctures contiguous to 1 diameter apart). Head width 1.8-2.0 × length. Flagellomeres without distinctly marked tyloids, only flagellomeres VI-VIII slightly swollen (Fig. 116). Flagellomere I: length 2.1-2.3 × width, 1.1-1.2 × length of flagellomere II. Scutum shiny, coarsely punctate (punctures contiguous to 0.5 diameter apart). Scutellum densely, coarsely punctate. Mesopleuron in front of midcoxa shiny, coarsely and densely punctate. Hindtibia with fine spines. Midbasitarsus straight. Propodeal enclosure reticulate. Propodeal pad narrow, rugose. Petiole shorter than tergum I (length 0.8-0.9 × length of tergum I). Recurrent vein postfurcal, submarginal cell II as high as broad. Gonostyle dorsal (Fig. 145), lateral (Fig. 175). Penis valve (Fig. 205). Volsella (Fig. 235). Penis valve connecting sclerite (Fig. 295). Sternum VIII (Fig. 265). Length 7.0-7.5 mm.

Variation: Most specimens of *beaumonti* with narrow propodeal pad, but some with a broader pad. In some males of *beaumonti* recurrent vein only slightly postfurcal.

Geographic Distribution: Finland, France, Sweden, Switzerland.

Material Examined: 9♀♀, 3♂♂.

Records:
Finland: Luumäki (1♀ AFZH). Alandia: Rymättyla (6♀♀, 2♂♂ AFZH).
Sweden: Öl. Höprun Räth. (1♀ AFZH).
Switzerland: Sierre (1♀, 1♂ MZLS).

Pemphredon bocae (R. BOHART)

Cemonus bocae R. BOHART 1993: 218 ♀♂. Holotype ♀: USA: California: Nevada Co. : Boca (UCDC).

Diagnosis: The female of *Pemphredon bocae* is easily identified by the peculiar broad emargination of its anterior clypeal margin (Fig. 12). No species of *Pemphredon* with a clypeus like this has been known until now. The male of *Pemphredon bocae* is quite similar to *gennelli*, but in *bocae* the flagellomeres III-VII are more distinctly swollen (Fig. 117). The midbasitarsus of *bocae* is straight and gradually enlarged

(Fig. 82), yet that of *gennelli* is slightly dilated distally and in most specimens slightly curved (Fig. 81).

Description: Female: Anterior clypeal margin with a peculiar broad emargination (Fig. 12). Frons densely punctate. Vertex behind ocelli shiny, irregularly punctate (punctures contiguous to 3 diameters apart). Head width 1.8-2.0 × length. Flagellomere I: 1.8-2.0 × width, 1.2-1.4 × length of flagellomere II. Scutum shiny, sparsely punctate (punctures 2-4 diameters apart). Scutellum shiny, punctate (punctures 2-4 diameters apart). Metanotum shiny, punctate. Mesopleuron in front of midcoxa shiny, sparsely punctate (punctures 1-2 diameters apart). Propodeal enclosure longitudinally ridged. Propodeal pad broad, shiny. Hindtibia with spines. Petiolus shorter than tergum I (length 0.6-0.8 × length of tergum I). Pygidial plate flat, posteriorly surrounded by a carina (Fig. 45). Recurrent vein antefurcal, submarginal cell II higher than broad. Length 7.0-9.0 mm.

Male: Anterior clypeal margin semicircularly emarginate (Fig. 86). Frons punctate, mesally with rugae. Vertex behind ocelli shiny, sparsely punctate (punctures contiguous to 2 diameters apart). Head width 1.6-2.0 × length. Flagellomeres without distinctly marked tyloids, but flagellomeres (II)III-VII(VIII) distinctly swollen (Fig. 117). Flagellomere I: length 1.7-2.1 × width, 1.2-1.6 × length of flagellomere II. Scutum shiny, sparsely punctate (punctures 1-3 diameters apart). Scutellum shiny, anteriorly sparsely, posteriorly densely punctate. Metanotum densely punctate. Mesopleuron in front of midcoxa shiny, punctate (punctures contiguous to 1 diameter apart). Propodeal enclosure longitudinally ridged. Propodeal pad broad, shiny, in some specimens finely striate. Midbasitarsus straight and gradually enlarged from base (Fig. 82). Hindtibia with spines. Petiolus shorter than tergum I (length 0.7-0.9 × length of tergum I). Recurrent vein antefurcal, submarginal cell II higher than broad. Gonostyle dorsal (Fig. 146), lateral (Fig. 176). Penis valves (Fig. 206). Volsella (Fig. 236). Penis valves connecting sclerite (Fig. 296). Sternum VIII (Fig. 266). Length 6.5-7.5 mm.

Variation: Male: Propodeal enclosure in some specimens short, with fine ridges in the middle and a little irregular.

Geographic Distribution: United States (California, Idaho, Oregon).

Material Examined: 3♀♀, 5♂♂

Records:

United States:

California: **Nevada County:** Sagehen Creek Fld. St. N Truckee (1♀ ROME); Boca (1♂ CASC). **Placer County:** National Forest Granlibakken Ski Res. SW Tahoe City (1♀, 1♂ CASC). **Sierra County:** Sierraville (1♀ UCDC).

Idaho: Cassia County: Elba Basin Pass (1♂ UICM). **Franklin County:** Cub River Canyon (1♂ BLCU).

Oregon: **Klamath County:** Eagle Ridge (1♀ CASC).

Pemphredon confertim W. Fox

Pemphredon confertim W. Fox 1892: 311, ♂. Holotype: ♂, USA: Washington: Easton (USNM), examined.

Pemphredon errans Rohwer 1917a: 99, ♀♂. Holotype: ♀, USA: California: Montery County: no specific locality (USNM), examined. Synonymized with *confertim* by R. Bohart in Bohart & Menke 1976: 181.

Diagnosis: *Pemphredon confertim* is one of the several species in which the recurrent vein is postfurcal, the propodeal enclosure is longitudinally ridged, and the propodeal pad is broad and shiny. Unlike other such species the female of *confertim* has an anterior clypeal margin slightly tridentate (Fig. 13), and a scutum which is irregularly curved striated, in many specimens with fingerprint-like sculpture on each side of the midline. The male of *confertim* is characterized by an anterior clypeal margin semicircularly emarginate (Fig. 87). Flagellomeres (I)II-VII(VIII) with linear tyloids and distinctly swollen beneath (Fig. 118). The males of *confertim* and *rileyi* differ only by the shape of penis valve and volsella. Dissecting the male genitalia is necessary for identification.

Description: Female: Anterior clypeal margin slightly tridentate (Fig. 13). Frons punctato-rugose. Vertex behind ocelli shiny, irregularly punctate (punctures contiguous to 2 diameters apart). Head width 1.7-2.2 × length. Flagellomere I: length 1.9-2.2 × width, 1.1-1.3 × length of flagellomere II. Scutum with irregular curved striation and rugosity, many specimens with fingerprint-like sculpture on each side of midline. Scutellum sparsely punctate, posteriorly longitudinally rugose. Metanotum rugose, in some specimens shiny and sparsely punctate. Mesopleuron in front of midcoxa shiny, coarsely punctate, some specimens with microsculpture, densely punctate. Propodeal enclosure uniform longitudinally ridged. Propodeal pad broad and shiny, in some specimens finely striate. Hindtibia with spines. Petiole distinctly shorter than tergum I (length 0.6-0.8 × length of tergum I). Pygidial plate (Fig. 46). Recurrent vein postfurcal, submarginal cell I broader than high. Length 8.0-10.5 mm.

Male: Anterior clypeal margin semicircularly emarginate (Fig. 87). Frons punctato-rugose. Vertex behind ocelli shiny, coarsely punctate (punctures contiguous to one diameter apart). Head width 1.6-2.4 × length. Flagellomere (I)II-VII(VIII) with sharply marked tyloids and distinctly swollen beneath (Fig. 118). Flagellomere I: length 1.7-2.3 × width, 0.9-1.2 × length of flagellomere II. Scutum shiny, anteriorly densely punctate, posteriorly sparsely punctate (punctures 2-4 diameters apart). Scutellum shiny, sparsely punctate, posterior margin densely rugose. Metanotum densely rugose. Propodeal enclosure longitudinally ridged. Propodeal pad broad, shiny, with fine striae. Mesopleuron in front of midcoxa shiny, densely punctate, in some specimens rugose. Hindtibia with fine spines. Distal half of midbasitarsus enlarged and flattened. Petiole shorter than tergum I (length 0.7-0.9 × length of tergum I). Recurrent vein postfurcal. Gonostyle dorsal (Fig. 147), lateral (Fig. 177). Penis valve (Fig. 207). Volsella

(Fig. 237). Penis valves connecting sclerite (Fig. 297). Sternum VIII (Fig. 267). Length 7.0-10.5 mm.

Variation: Female: The middle tooth in the anterior clypeal margin is in some specimens slightly developed and therefore it resembles a clypeus of *lethifer*. The pygidial plate is in most specimens excavate and surrounded by a distinct carina, which is sometimes spoon like, but there are also specimens with a flat pygidial plate surrounded by a short carina. Male: From a dorsal view the head varies, some specimens have a head which is very narrow in the posterior part. In some specimens the ridges in the middle of propodeal enclosure are a little irregularly rugose.

Geographic Distribution: Western Canada, western USA, northwestern Mexico.

Material Examined: 112♀♀, 212♂♂.

Records:

Canada: 5♀♀ (CNCI, PMAE).
Alberta: Empress
British Columbia: Kelona; Robson; Grand Forks.
Mexico: 1♂ Baja Cal. Norte Sierra San Pedro Martir Mikes Sky Ranch (CASC).

United States: 107♀♀, 211♂♂. (AEIC, AMNH, BLCU, BPBM, CASC, CISC, DEUN, DFEC, LACM, PMAE, UCDC, UCRC, UICM, USNM, WSUC.)
California: Anaheim; Berkeley; Danielle; Davis; Fallen Leaf Lake; Tahoe; Hopk USA Pyramid Ranger Station; Iulian; Los Angeles; Placerville; Santa Barbara; Santa Rosa M. Stanford University San Francisquito. **Alameda County:** Warm Springs; Arroyo Mocho S Livermore. **Calaveras County:** Railroad Flat. **Contra Costa County:** Orinda Cross Road. **El Dorado County:** Echo Lake 2256 m. **Inyo County:** Lone Pine. **Kern County:** Potero SE Maricopa. **Los Angeles County:** Pasadena; Angeles Crest Highway Arroyo Seco 1000 m; Tanbark Flat. **Marin County:** Mill Valley; Alpine Lake. **Madera County:** Fish Camp 6400 ft. **Mono County:** Bridgeport; 7200 ft. **Montery County:** Arroyo Seco Camp. **Napa County:** Rutherford. **Nevada County:** Sagehen Creek. **Plumas County:** Johnsville. **Riverside County:** Ict Deep Creek. Horsethief Creek. 2990 ft. **Santa Clara County:** Stevens Creek Park. **San Joaquin County:** Tracy. **Shasta County:** Burney Hatchet Mt.; Killark Withmore. **Siskiyon County:** Antelope Creek. N Tennant. **Tuolumne County:** Long Barne.
Colorado: Estes Park.
Idaho: Lowman 4000 ft.; Parma 2224 ft.; **Camas County:** Fairfield; Galena Summit N Stanley 8700 ft.. **Kootenai County:** Athol. **Latah County:** Robinson L.
Nevada: **Washoe County.**
Oregon: **Wallowa County:** Imnaha 6980 ft.; French Glenn; Iuntura.
Utah: **Cache County:** Smithfiel. **Emery County:** Head of Sinbad San Rafael Swell 7000 ft. **Wayne County:** Grover. **Weber County:** Riverote.
Washington: Pullman. **Chelan County:** Magela Colockum Research Unit. **Clark County:** Vancouver. **Pierce County:** Clover Creek. **Stevens County:** Deer Lake. **Walla Walla County:** Walla Walla.
Wyoming: Sweetwater Rock Springs.

Pemphredon diervillae IWATA

Pemphredon diervillae IWATA 1933: 45♀. Holotype: ♀ Japan: no specific locality.

Diagnosis: *Pemphredon diervillae* is characterized by the following: the recurrent vein is antefurcal to interstitial, the propodeal enclosure is coarsely reticulate, and the propodeal pad is broad and shiny. The female is characterized by an anterior clypeal margin broadly emarginate and mesally with a short raised tooth (Fig. 14), and a

shiny scutum, rugosely confluent and posteriorly more sparsely punctate. The male of *diervillae* is characterized by a scutum with coarse and dense punctures and broadly rounded tyloids on flagellomeres III-VIII (Fig. 119). *Pemphredon inornata* differs from *diervillae* in lack of tyloids and a smooth and shiny scutum with fine punctation (punctures one to 4 diameters apart).

Description: Female: Anterior clypeal margin broadly emarginate, in the middle of emargination with a short, raised tooth (can be more easily observed from obliquely above than in front; Fig. 14). Frons punctato-rugose. Vertex behind ocelli shiny, irregularly punctate (punctures contiguous to 2 diameters apart). Head width 1.4-2.0 × length. Flagellomere I: length 1.8-2.3 × width, 1.1-1.5 × length of flagellomere II. Scutum shiny, anteriorly densely and coarsely punctate, punctures transversely and rugosely confluent, posteriorly more sparsely but extraordinarily coarsely punctate, or punctato-rugose (punctures contiguous to 1 diameter apart). Scutellum coarsely, densely punctate (punctures contiguous to 1 diameter apart). Metanotum shiny, finely sculptured. Mesopleuron in front of midcoxa shiny, coarsely punctate (punctures contiguous to 0.5 diameter apart). Propodeal enclosure coarsely reticulate. Propodeal pad broad, shiny. Hindtibia with well defined spines. Petiole varying from shorter to equal to tergum I (length 0.6-1.0 × length of tergum I). Pygidial plate broad (Fig. 47). Recurrent vein varying from antefurcal to interstitial, submarginal cell II higher than broad or as high as broad. Length 8.0-9.0 mm.

Male: Anterior clypeal margin broadly emarginate (Fig. 88). Frons punctato-rugose. Vertex behind ocelli shiny, coarsely punctate (punctures contiguous to 1 diameter apart). Head width 1.8-2.0 × length. Flagellomeres III-VIII with broadly rounded tyloids (Fig. 119). Flagellomere I: length 1.7-2.0 × width, 1.1-1.2 × length of flagellomere II. Scutum shiny, coarsely punctato-rugose. Scutellum similar to scutum in sculpture. Mesopleuron in front of midcoxa densely, coarsely punctate. Propodeal enclosure coarsely reticulate. Propodeal pad broad, shiny. Hindtibia with spines. Petiole varying from shorter to equal to tergum I (length 0.8-1.0 × length of tergum I). Recurrent vein varying from antefurcal to interstitial, submarginal cell II higher than broad or as high as broad. Gonostyle dorsal (Fig. 148), lateral (Fig. 178). Penis valve (Fig. 208). Volsella (Fig. 238). Penis valves connecting sclerite (Fig. 298). Sternum VIII (Fig. 268). Length 6.0-7.0 mm.

Variation: I examined one female of *diervillae* with recurrent vein postfurcal.

Geographic Distribution: Japan.

Material Examined: 48♀♀, 8♂♂.

Records:

Japan: 48♀♀, 8♂♂ (BLCU, CASC, LACM, RMNH, USNM).

Honshu: Mt. Haku; Kobe; Kobe Mt. Rokko; Kurokawa N Echigo; Mishima. **Fukui:** Arashi; Jodoii; Katsuyama; Kowashozu; Onoshi; Somayama. **Mokut. Saitama:** Hodosan; Kodama; Konsu; Yorii. **Towada:** Nurukawa. **Yamagda:** Kognchimura.

Hokkaido: Sapporo.

Pemphredon fischeri DOLLFUSS

Pemphredon fischeri DOLLFUSS 1993: 699, ♂. Holotype: ♂, USA: California: Siskiyou Co.: McBride Springs (CASC), examined.

Diagnosis: The male of *Pemphredon fischeri* differs from all other *Pemphredon* in having flagellomeres V-VI distinctly swollen on both sides (Fig. 120). The female is unknown.

Description: Male: Anterior clypeal margin broadly emarginate (Fig. 89). Clypeus flat, densely punctate. Frons punctato-rugose. Vertex behind ocelli shiny, sparsely punctate (punctures contiguous to 2 diameters apart). Head width 2.0-2.1 × length. Flagellomeres V-VI distinctly swollen on both sides; flagellomeres II-VI with linear tyloids (Fig. 120). Flagellomere I: length 1.5-1.7 × width, 0.9-1.1 × length of flagellomere II. Scutum shiny, anteriorly densely, mesally and posteriorly irregularly punctate (punctures contiguous to 4 diameters apart). Scutellum shiny, sparsely punctate (punctures contiguous to 3 diameters apart). Metanotum shiny, punctate. Propodeal enclosure longitudinally ridged. Propodeal pad broad, shiny. Mesopleuron in front of midcoxa shiny, sparsely punctate (punctures contiguous to 2 diameters apart). Hindtibia with fine spines. Petiole shorter than tergum I (length 0.7-0.8 × length of tergum I). Recurrent vein postfurcal, submarginal cell II broader than high. Gonostsyle dorsal (Fig. 149), lateral (Fig. 179). Penis valve (Fig. 209). Volsella (Fig. 239). Penis valves connecting sclerite (Fig. 299). Sternum VIII (Fig. 269). Length 7.0-8.0 mm.

Female: unknown.

Geographic Distribution: United States (California, Idaho).

Examined Material: 3♂♂.

Records:

United States:
California: Siskiyou County: McBride Springs (1♂ Holotype CASC); Julian (1♂ AEIC).
Idaho: Idaho City (1♂ AEIC).

Pemphredon flavistigma THOMSON

Pemphredon flavistigma THOMSON 1874: 192, ♀. Holotype: ♀, Sweden: Smaland Sällsynt (MZLU), examined.

Diagnosis: *Pemphredon flavistigma* is one of several species in which the recurrent vein is postfurcal, the propodeal enclosure is reticulate, and the propodeal pad is broad and transversely striate. The female of *flavistigma* is characterized by an anterior clypeal margin semicircularly emarginate (Fig. 15). *Pemphredon orades* is similar but differs in the following: scutum shiny with fine microsculpture, anteriorly elongate punctate, posteriorly nearly smooth and finely, sparsely punctate, and a pygidial plate

broad (Fig. 67). The male of *flavistigma* is characterized by a midbasitarsus distinctly curved and slightly dilated distally (Fig. 78).

Description: Female: Anterior clypeal margin semicircularly emarginate (Fig. 15). Frons with microsculpture, anterior part punctate, posterior part longitudinally striate. Orbital foveae dull. Vertex behind ocelli with microsculpture, sparsely punctate (punctures 1-3 diameters apart). Head width 1.5-2.2 × length. Flagellomere I: length 2.5-3.0 × width, 1.3-1.5 × length of flagellomere II. Scutum with microsculpture and irregularly punctato-rugose. Scutellum with microsculpture, densely punctate. Metanotum densely punctate. Mesopleuron in front of midcoxa with microsculpture, punctate (punctures 1-2 diameters apart). Propodeal enclosure reticulate. Propodeal pad broad, transversely striate. Hindtibia with spines. Petiole shorter than tergum I (length 0.7-0.9 × length of tergum I). Pygidial plate narrow, excavate (Fig. 48). Recurrent vein postfurcal, submarginal cell II broader than high. Length 11.0-13.5 mm.

Male: Anterior clypeal margin slightly protruding and concave (Fig. 96). Frons punctato-rugose. Vertex behind ocelli with microsculpture, punctate (punctures 1 diameter apart). Head width 1.5-2.0 × length. Flagellomeres VI-VIII(IX) with broad tyloids (Fig. 121). Flagellomere I: length 2.2-2.6 × width, 1.1-1.4 × length of flagellomere II. Scutum with microsculpture, punctate (punctures contiguous to 1 diameter apart). Scutellum with microsculpture, densely punctate. Metanotum densely punctate. Mesopleuron in front of midcoxa with microsculpture (punctures 1 diameter apart). Propodeal enclosure reticulate. Propodeal pad broad, transversely striate. Hindtibia with spines. Midbasitarsus distinctly curved and slightly dilated distally (Fig. 78). Petiole nearly equal to tergum I (length 0.8-1.0 × length of tergum I). Recurrent vein postfurcal, submarginal cell II broader than high. Gonostyle dorsal (Fig. 150), lateral (Fig. 180). Penis valve (Fig. 210). Volsella (Fig. 240). Penis valves connecting sclerite (Fig. 300). Sternum VIII (Fig. 270). Length 9.0-12.0 mm.

Variation: In some males of *Pemphredon flavistigma* scutum is shiny in the middle.

Geographic Distribution: Central and eastern Palearctic.

Material Examined: 33♀♀, 15♂♂.

Records:

Austria: 3♀♀ (KLTA, MZLS, NHMW).
Kärnten: Plöken.
Tirol: **Ost-Tirol:** Virgental Lienz.

Finland: 25♀♀, 5♂♂ (AFZH, MZLS, ZMH). Hammaslethi; Hattula; Luopioinen; Säynäjärvi; Kajana; Kuorevesi; Joutseno Sa.; Pargas; Pärna; Pirkkala; Ruokolethi; Seiskari; Sortavala; Vehkajahti.

Italy: Trentino (Süd-Tirol): Kollern bei Bozen (1♂ NHMW).

Japan: Hokkaido: Jōzankei (3♀♀ USNM); (2♂♂, locality label unreadable, USNM).

Poland: Bialowieza (1♂ ZMB).

Russian Federation: Irkutskaja Angarka (1♂ GUSE); Sortavala (1♂ AFZH).

Sweden: Agvallen Färila (1♀ NHRS); Bergvik (1♂ NHRS); Simons Torp (1♀ AFZH); (3♀♀ locality label unreadable, MZLU).

Pemphredon foxii ROHWER

Pemphredon foxii ROHWER 1917a: 101, ♀. Holotype: ♀, USA: New Jersey: Camden County: no specific locality (USNM), examined.

Pemphredon virginiana ROHWER 1917a: 101, ♀♂. Holotype: ♀, USA: Virginia: Falls Church (USNM), examined. New synonym.

Diagnosis: *Pemphredon foxii* is characterized by the following: the recurrent vein is postfurcal, the propodeal enclosure is irregularly ridged, and the propodeal pad is narrow and rugose. The anterior clypeal margin of the female is tridentate with subequal teeth (Fig. 16). The male of *foxii* is characterized by the flagellomeres without well-defined tyloids, the anterior clypeal margin is broadly emarginate, and the sterna of gaster with setae as long as 2 × hindocellar diameter.

Description: Female: Anterior clypeal margin tridentate with subequal teeth, middle tooth raised (Fig. 16). Frons punctato-rugose. Vertex shiny, irregularly punctate (punctures 1-4 diameters apart). Head width 1.6-2.1 × length. Flagellomere I: length 2.2-2.8 × width, 1.2-1.4 × length of flagellomere II. Scutum coarsely punctato-rugose. Scutellum with close and coarse, in some specimens confluent punctation. Metanotum rugose. Propodeal enclosure irregularly ridged. Propodeal pad narrow, rugose. Mesopleuron in front of midcoxa punctato-rugose, similar to scutum. Hindtibia with spines. Petiolus equal or shorter than tergum I (length 0.7-1.0 × length of tergum I). Pygidial plate excavate, delimited with a distinct carina (Fig. 49). Recurrent vein postfurcal, submarginal cell II broader than high. Length 9.0-11.5 mm.

Male: Anterior clypeal margin broadly emarginate (Fig. 91). Frons punctato-rugose. Vertex behind ocelli with microsculpture, sparsely punctate (punctures contiguous to 2 diameters apart). Head width 1.7-2.2 × length. Flagellomeres without sharply marked tyloids, only flagellomeres VI-VII(VIII) with smooth areas (Fig. 122). Flagellomere I: 1.9-2.3 × width, 1.0-1.3 × length of flagellomere II. Scutum shiny, coarsely punctate, anteriorly densely, posteriorly sparsely (punctures contiguous to 1 diameter apart). Scutellum coarsely punctato-rugose. Metanotum rugose. Propodeal enclosure irregularly ridged. Propodeal pad narrow, rugose. Mesopleuron in front of midcoxa coarsely punctato-rugose. Hindtibia with fine spines. Petiole equal or a little shorter than tergum I (length 0.8-1.0 × length of tergum I). Sterna of gaster with long setae (length of setae about 2 diameters of hindocellus). Recurrent vein postfurcal, submarginal cell II broader than high, or as broad as high. Gonostyle dorsal (Fig. 151), lateral (Fig. 181). Penis valve (Fig. 211). Volsella (Fig. 241). Penis valves connecting sclerite (Fig. 301). Sternum VIII (Fig. 271). Length 7.5-10.5 mm.

Variation: Female: In some specimens the lateral teethes of anterior clypeal margin are poorly developed and hardly to be see. The sculpture of the scutum is various: in some specimens with confluent punctures, in others coarsely rugose, and in some with transverse and longitudinal ridges. Pygidial plate in some specimens narrow

like in *lugubris*. Male: Scutum in some specimens finely but distinctly punctate, others have a large punctation drawn out into longitudinal furrows.

Geographical Distribution: Canada and United States.

Material Examined: 62♀♀, 9♂♂.

Records:

Canada: 15♀♀, 3♂♂.
Alberta: Mildred Lake (1♀ PMAE).
New Brunswick: Kouchibougnac N. P. (6♀♀ CNCI).
Manitoba: Reding Mtn. National Park, E Clear Lake (1♀ PMAE).
Ontario: **Carleton County:** Constance Bay (2♀♀ PMAE). **Lambton County:** Pinery Province Park (1♀ ROME); Almonte (1♀ PMAE); Iroquois Falls (1♀ CNCI); Salines (1♂ CUIC).
Quebec: Duchesuny (1♀ CNCI); Laniel Cage (2♂♂ CNCI).

United States: 47♀♀, 6♂♂.
Arizona: **Cochise County:** W Portal 5400ft (2♀♀ AMNH).
Arkansas: Fayetteville (1♀ UCDC).
Delaware: Dover (1♀ CUIC).
District of Columbia: Washington (6♀♀ USNM).
Florida: **Alachua County:** Austin Cary Gainesville (1♀ UCDC).
Illinois: **Champign County:** Urbana (1♀ DENH).
Maine: Brigton (1♀ CUIC).
Maryland: **Anne Arundel County:** Patuxent (1♀ USNM). **Livingston County:** E. S. George Reserve (1♀ UMMZ). **Mountgomery County:** Colesville (1♀ UCDC); Forest Glenn (1♀ USNM). **Prince Georg's County:** Patuxent Research Station (5♀♀ PMAE); Laurel (1♀ CNCI).
Massachusets: Holliston (3♀♀ MCZC); Cambridge (1♀ MCZC).
Michigan: **Marquette County:** Huron Mountain Club (2♀♀ UMMZ); Detroit (1♀ UCDC).
Minnesota: Pine Island Lake (1♀ DEFW).
Mississippi: **Oktibbeha County:** Starkville (1♀ MUIC).
Missouri: **Wayne County:** Williamsville (1♀ PMAE).
New Mexico: **Taos County:** Hondo Canyon (1♀ MCZC).
New York: **Hamilton County:** Indian Lake (2♀♀ NYSM). **Onondaga County:** Syracuse (1♀ DFEC); Batavia (1♀ USNM); Huntington in Long Island, Kalbfleisch Research Station. (1♀ AMNH); Cranberry Lake (1♀ DFEC).
North Carolina: Farsyth (1♀ NCSU).
Pennsylvania: Hummelstown (1♀ 1♂ USNM; 1♂ UCDC); N Cumberld. (1♂ CUIC).
South Carolina: **Pickens County:** Wattaco (1♀ AEIC). **Montgomery County:** Blacksburg 1000 m (1♀ PMAE). **Westmooreland County:** Westm. State (1♀ USNM); Falls Church (1♂ USNM).

Pemphredon fuscipennis CAMERON

Pemphredon fuscipennis CAMERON 1897: 83, ♀. Holotype: ♀, India: Uttar Pradesh Mussoorie 2330 m (OXUM), examined.

Diagnosis: *Pemphredon fuscipennis* is one of several species in which the recurrent vein is antefurcal, the propodeal enclosure is longitudinally ridged, and the propodeal pad is broad and shiny. Unlike other such species the female of *fuscipennis* is characterized by a smooth scutum with only fine and sparse punctation, and the propodeal pad is unusually broad (including more than a half of propodeal enclosure). The penis valve of male is characteristically shaped (Fig. 212). The shape of flagellum and tyloids is unknown.

Description: Female: Anterior clypeal margin protruding and rounded (Fig. 17). Frons near antennal sockets deeply impressed, punctate. Vertex behind ocelli shiny, sparsely punctate (punctures 1-3 diameters apart). Head width 1.5-1.6 × length. Flagellomere I: length 2.0-2.3 × width, 1.1-1.2 × length of flagellomere II. Scutum smooth, shiny, anteriorly finely punctate, mesally and posteriorly nearly without punctures, only with fine setae. Scutellum similar to scutum. Metanotum densely punctate. Propodeal enclosure with short longitudinal rugae. Propodeal pad unusually broad (including more than a half of propodeal enclosure), smooth, shiny. Mesopleuron in front of midcoxa smooth, shiny and irregularly punctate (punctures contiguous to 2 diameters apart). Hindtibia with spines. Petiole nearly equal to tergum I (length 0.8-1.0 × length of tergum I). Pygidial plate broad (Fig. 50). Recurrent vein antefurcal, submarginal cell II higher than broad. Length 8.0-9.0 mm.

Male: Anterior clypeal margin protruding and broadly emarginate (Fig. 92). Frons near antennal sockets deeply impressed, punctato-rugose. Vertex behind ocelli shiny, punctate (punctures 1-2 diameters apart). Shape of flagellomeres and tyloids unknown. Head width 1.7 × length. Scutum anteriorly and posteriorly densely punctate, mesally irregularly, sparsely punctate (punctures 1-5 diameters apart). Scutellum shiny, punctate (punctures contiguous to 2 diameters apart). Metanotum shiny, slightly rugose. Propodeal enclosure longitudinally ridged. Propodeal pad broad, shiny. Mesopleuron in front of midcoxa shiny, coarsely punctate (punctures contiguous to 1 diameter apart). Hindtibia with fine spines. Recurrent vein antefurcal, submarginal cell II higher than broad. Petiolus nearly as long as tergum I (length 0.9 × length of tergum I). Gonostyle dorsal (Fig. 152), lateral (Fig. 182). Penis valve (Fig. 212). Volsella (Fig. 242). Penis valves connecting sclerite (Fig. 302). Sternum VIII (Fig. 272). Length 8.0 mm.

Discussion: The only male known until now (USNM, det. Valkeila 1971) has lost the flagellum, so I cannot tell anything about it. In case of doubt it is necessary to dissect male genitalia and regard the penis valve, which is characteristically shaped.

Geographic Distribution: Afghanistan, northern India, northern Pakistan (Southern of Himalaya).

Material Examined: 2♀♀, 1♂.

Records:

Afghanistan: NE Petschtal 1200 m (1♀ NHMW).

India: Dehra Dun, U. P. Mussoorie (1♂ USNM).

Pakistan: Hazara Kagan Valley Kagan 2300 m (1♀ KSUK).

Pemphredon gennelli (ROHWER)

Ceratophorus gennelli ROHWER 1910b: 104, ♀. Holotype: ♀ USA: California: Pasadena (USNM), examined.

Ceratophorus grinnelli utahensis ROHWER 1911: 562, ♀. Holotype: ♀ USA: Utah: Beaver Valley (Museum of Brooklyn Institute, New York).

Cemonus giffardi ROHWER 1917b: 246, ♀. Holotype: ♀, USA: California: Alameda County: no specific locality (USNM), examined. Synonymized with *gennelli* by R. BOHART in BOHART & MENKE 1976: 181.

Diagnosis: *Pemphredon gennelli* is characterized by the following: the recurrent vein is antefurcal to interstitial, the propodeal enclosure is longitudinally ridged, and the propodeal pad is broad and shiny, in most specimens finely striate. The anterior clypeal margin of the female is protruding and slightly tridentate (Fig. 18). The male of *genelli* can be recognized by flagellomeres not distinctly swollen (Fig. 123), and a midbasitarsus enlarged in distal one-half (Fig. 81). The male of *bocae* is similar and differs in distinctly swollen flagellomeres (Fig. 117), and a straight midbasitarsus (Fig. 82).

Description: Female: Anterior clypeal margin protruding and slightly tridentate (Fig. 18). Frons punctato-rugose. Vertex behind ocelli shiny, irregularly punctate (punctures contiguous to 2 diameters apart). Head width 1.5-1.8 × length. Flagellomere I: length 1.8-2.3 × width, 1.0-1.4 × length of flagellomere II. Scutum shiny, anteriorly densely punctate, mesally and posteriorly sparsely punctate (punctures 2-4 diameters apart). Scutellum shiny, sparsely punctate (punctures 1-4 diameters apart). Metanotum smooth, shiny. Metapleuron finely striate. Mesopleuron in front of midcoxa shiny, sparsely punctate (punctures 1-2 diameters apart). Propodeal enclosure with close, longitudinal ridges. Propodeal pad broad and shiny, in most specimens finely striate. Hindtibia with spines. Petiole shorter than tergum I (length 0.6-0.9 × length of tergum I). Pygidial plate excavate and delimited by a distinct carina (Fig. 51). Recurrent vein varying from antefurcal to interstitial, in some specimens postfurcal. Submarginal cell II higher than broad. Length 7.0-10.5 mm.

Male: Anterior clypeal margin semicircularly emarginate (Fig. 93). Frons punctato-rugose. Vertex behind ocelli shiny, irregularly punctate (punctures contiguous to 3 diameters apart). Head width 1.5-2.0 × length. Flagellomeres III-VI slightly swollen, but without distinctly delimited tyloids (Fig. 123). Flagellomere I: length 1.6-2.3 × width, 1.1-1.3 × length of flagellomere II. Scutum shiny and irregularly, finely punctate (punctures 1-5 diameters apart). Scutellum shiny, sparsely punctate (punctures 1-3 diameters apart). Metanotum smooth. Mesopleuron in front of midcoxa shiny, sparsely punctate (punctures 1-2 diameters apart). Metapleuron finely striate. Propodeal enclosure longitudinally ridged. Propodeal pad broad, shiny, in most specimens finely striate. Midbasitarsus slightly dilated distally, in most specimens slightly curved (Fig. 81). Hindtibia with short spines, some specimens without spines. Petiole shorter than tergum I (length 0.6-0.8 × length of tergum I). Recurrent vein varying from antefurcal to interstitial, some specimens postfurcal. Submarginal cell II higher than broad, but in some specimens a little broader than high. Gonostyle dorsal (Fig. 153), lateral (Fig. 183). Penis valves (Fig. 213). Volsella (Fig. 243). Penis valves connecting sclerite (Fig. 303). Sternum VIII (Fig. 273). Length 6.5-8.5 mm.

Variation: Usually in this species the recurrent vein varies from antefurcal to interstitial, but approximately one per cent of the specimens examined were postfurcal. Submarginal cell II is in most specimens higher than broad, but in some specimens a little broader than high. Scutum in some specimens with fine microsculpture.

Discussion: R.M. BOHART (1976) used the name *grinnelli* for this species. The correct original spelling is *gennelli* (Article 32(c)(ii)) because the presumed collector, Grinnell, is not mentioned in ROHWER's paper.

Geographic Distribution: South-western Canada, western United States, north-western Mexico.

Material Examined: 276♀♀, 253♂♂

Records:

Canada: 4♀♀, 10♂♂ (CNCI, NHMW). -
British Columbia: Harrison Mills; Nanamo Biol. Station; Robson; Saanich Dist. Vaseaux Lake; Yale.

Mexico: 1♀ (CASC): Baja California Norte Arroyo Salado N San Vincente.

United States: 271♀♀, 243♂♂ (AEIC, BLCU, BPBM; CASC, CISC, CNCI, CUIC, FCDA, LACM, MCZC, MZLU, PMAE, UCDC, UCMC, UCRC, UICM, UMMZ, USNM, WSUC).
California: Claremont; Berkeley; Danville; Fish Canyon; Hopeland; Idyllwild San Jacinto MTS. : Julian; Lake Wohlford; Legett; Mt. Diaboloi; Palo Alto; Pine Valley Mts. Potrero S. D. Co.; San Gabriel Mts.; Pinon Flats; Stan U.; Woodland. **Almedo County:** Lake Chabet Oakland; Pleasawtown. **Amador County:** Tragedy Spring; **Berdo County:** City Creek NE Highland. **Butte County. Contra Costa County:** Danville; Drinda Village. **El Dorado County:** Echo Lake 7400ft; Ice House Road; SE Latrobe. **Fresno County:** Centerviller; Hernoon; Huntington Lake 7000ft; Sanger. **Inyo County:** Big Pine Creek. **Kern County:** Double Mts. **Lake County:** N Fork Cache Creek; Lower Lake. **Lassen County. Los Angeles County:** Alamos Creek S Gorman; Newhall; Pico Canyon Newhall; Sta. Monica Mts.; Westwood. **Marin County:** Alto; Alpine Lake; Blithedale Ridge; Mill Valley; Paradise Beach County Park. **Mendo County:** Ham Pass Road NW Eel River R. S. 4000ft; NW Mendo Pass 4200ft; U. C. Hopland Fld. Station N. H. Q. **Mercedes County:** McConell St. Park. **Mono County:** Bodie; Golden Gate Mine NW Walker 7000ft; Poison Creek NW Bridgeport 8000 ft. **Mountery County:** Arroyo Seco Camp; Indians Guani Station NW Jolon 2100 ft; Soledad. **Napa County:** Pope Valley; Rutherford; Samuel Sp. **Nevada County:** Boca; East Fork Creek 7000 ft; Wolf Mtn. SW Grass Valley 2200 ft; White Cloud Campground. **Riverside County:** Menifee Vly.; Indian Truck Trail S Corona; NE Moreno; Sage; Strawbery Creek 3000 ft; Temecula. **San Benito County:** Pinnacles National Monument. **San Bern County:** Wildwood Canyon Calimesa. **San Diego County:** Oak Grove. **San Mateo County:** Butano State Park SE Pescadero. **Santa Anna County:** Green River Camp. **Santa Clara County:** Alum Rock Park. **Shasta County:** Hat Creek. **Sierra County:** Goldlake; Sardine Lakes. **Siskiyou County:** McBride Springs 1524 m; Mt. Shasta City; Road to Taler Lake 5750 ft; Salmon Trinity Alps 5000 ft. **Solano County:** Green Valley; Summit Mix Canyon. **Stanislaus County:** Del Puerto Canyon Frank Raines Park; **Tehama County. Trinity County:** Carville 2500 ft; Hayfork Rgr. Station 2300 ft; N Coffee Creek R. S. **Tulare County:** Tree Rivers; Wood Lake. **Tuolumne County:** Basin Creek Campground; Tuolumne City. **Yolo County:** Davis; Putah Canyon. **Yuba County:** Sierra Foothfill Field Station N Smartville 1500 ft.
Colorado: **Boulder County. Gunnisou County:** Gothik Rocky Mts. 9470 ft; Schofield Park N Gothik 10360 ft.
Idaho: **Bannock County:** Lava Hot Springs. **Bear Lake County:** Emigration Canyon. **Franklin County:** Mink Creek. **Idaho County:** Whitebird Summit. **Latan County:** Poorman Creek 2700 ft; Lowman 4000 ft. **Oneida County:** Blackfine Canyon; Moscow; Moscow Mts.. **Shoshone County:** Avery.
Newada: **Douglas County:** Kingsbury Gd.. **Washoe County:** Galena Creek; Verdi.

Oregon: Hyatt Reservoir; Selma; Womples Landing Eagle Ridge Klamath L; **Benton County:** Corvallis. **Grant County:** Dale. **Jackson County:** Colestin; Ashland; Fish Lake Medford; Siskiyou. **Lane County. Linn County.**
Utah: **Box Elder County:** Mantua; Willard Basin. **Cache County:** Blacksmith Fork Canyon; Cowley Canyon; Franklin Basin; Green Canyon; Hodges Canyon; Mapletou; W Mendou; Smithfield Canyon; Tony Croove Creek 8100 ft. **Davis County:** Farmington Canyon. **Emery County:** Orange Rgr. Station; Stevens Creek 6900 ft. **Weber County:** N Ogden Peak 9000 ft; Watsach Pass.
Washington: Almonta; Leavensworth; Klickitat; Palouse; Pullman; Wawawal; Wenass; Yakima. **Asotin County:** Field Springs State Park S Anatone. **King County:** Seattle Issaquah. **Levis County:** Mineral. **Pierce County:** Clover Creek; Pleasant Valley; Tacoma. **Walla Walla County:** Walla Walla.
Wyoming: Jenny L. Gr. Tetons.

Pemphredon gusenleitneri DOLLFUSS

Pemphredon gusenleitneri DOLLFUSS 1993: 700, ♂. Holotype: ♂ Laos: Vientiane Province: Phou Kou Khouei, Ban Van Eue (BPBM), examined.

Diagnosis: The male of *Pemphredon gusenleitneri* is characterized by the following unique combination: the recurrent vein is postfurcal, the propodeal enclosure is reticulate, and the propodeal pad is broad and shiny. The flagellomeres IV-VIII have short linear tyloids (Fig. 124), the gonostyle has long setae (Fig. 184), and sternum VIII is characteristically shaped (Fig. 274). The female is unknown.

Description: Male: Anterior clypeal margin broadly emarginate (Fig. 94). Frons punctato-rugose. Vertex behind ocelli shiny, irregularly punctate (punctures contiguous to 2 diameters apart). Head width 2.1 × length. Flagellomeres IV-VIII with short linear tyloids (Fig. 124). Flagellomere I: length 2.0 × width, 1.1 × length of flagellomere II. Scutum shiny, anteriorly nearly densely punctate, mesally sparsely punctate (punctures 2-5 diameters apart), posteriorly nearly densely punctate. Scutellum shiny, irregularly punctate (punctures contiguous to 2 diameters apart). Metanotum shiny, with flat punctation. Mesopleuron in front of midcoxa shiny, coarsely punctate (punctures contiguous to 1 diameter apart). Propodeal enclosure reticulate. Propodeal pad broad, shiny. Petiole as long as tergum I. Hindtibia with long desist setae. Recurrent vein postfurcal, submarginal cell II broader than high. Gonostyle dorsal (Fig. 154), lateral (Fig. 184). Penis valve (Fig. 214). Volsella (Fig. 244). Penis valves connecting sclerite (Fig. 304). Sternum VIII (Fig. 274). Length 7.0 mm.

Female: unknown.

Geographic Distribution: Laos.

Material Examined: Only the holotype.

Pemphredon inornata SAY

Pemphredon inornatus SAY 1824: 339. USA: Pennsylvania: no specific locality (type lost).

Cemonus shuckardi A. MORAWITZ 1864: 460, ♀♂. Type lost. Synonymized with *inornata* by LOMHOLDT 1975: 99

Cemonus dentatus PUTTON 1871: 94, ♀. Holotype: ♀, France: Vosges Remiremont. Synonymized with *inornata* by R. BOHART in BOHART & MENKE 1976: 181. Type lost.

Pemphredon tenax W. FOX 1892: 313, ♀♂. Holotype: ♀, USA: Colorado: no specific locality (ANSP), examined.

Diagnosis: *Pemphredon inornata* is one of several species in with recurrent vein is either antefurcal or interstitial. Unlike other such species the anterior clypeal margin of the female is slightly tridentate, middle-tooth angularly protruding and raised (Fig. 19). The male of *inornata* is characterized by flagellomeres without well-defined tyloids, only slight swellings on flagellomeres (III)IV-VI(VII) (Fig. 125) and a staight midbasitarsus. The Nearctic species *gennelli* differs from *inornata* in a midbasitarsus slightly curved and dilated distally (Fig. 81). The Nearctic species *spielleitneri* differs from *inornata* in distinctly swollen flagellomeres IV-VIII (Fig. 141), in more semicircular emargination of the anterior clypeal margin, and a distal half of midbasitarsus enlarged.

Description: Female: Anterior clypeal margin slightly tridentate, middle-tooth angularly protruding and raised (Fig. 19). Frons punctato-rugose. Vertex behind ocelli shiny, punctate (punctures 1-2 diameters apart). Head width 1.6-2.1 × length. Flagellomere I: 1.6-2.3 × width, 1.2-1.5 × length of flagellomere II. Scutum shiny, sparsely punctate (punctures 3-4 diameters apart), in most specimens in posterior two-thirds drawn out into slight longitudinal furrows. Scutellum similar to scutum sculptured. Metanotum densely punctate. Mesopleuron in front of midcoxa shiny, punctate. (punctures contiguous to 1 diameter apart). Propodeal enclosure irregularly rugose. Propodeal pad broad, shiny. Hindtibia with spines. Petiole shorter than tergum I (length 0.5-0.9 × length of tergum I). Pygidial plate broad (Fig. 52). Recurrent vein varying from antefurcal to interstitial, submarginal cell II higher than broad or as high as broad. Length 6.0-8.5 mm.

Male: Anterior clypeal margin broadly emarginate (Fig. 95). Frons punctato-rugose. Vertex behind ocelli shiny, punctate and slightly rugose (punctures contiguous to 2 diameters apart). Head width 1.6-2.2 × length. Flagellomeres without well-defined tyloids, only with slight swellings on flagellomeres (III)IV-VI(VII) (Fig. 125). Flagellomere I: length 1.6-2.1 × width, 1.1-1.4 × length of flagellomere II. Scutum shiny, finely punctate (punctures 1-4 diameters apart). Scutellum shiny, anteriorly sparsely, posteriorly densely punctate. Metanotum densely punctate. Mesopleuron in front of midcoxa shiny, punctate (punctures 1 diameter apart). Propodeal enclosure irregularly rugose. Propodeal pad broad, smooth. Hindtibia with fine spines. Petiole shorter or equal to tergum I (length 0.8-1.0 × length of tergum I). Recurrent vein varying from antefurcal to interstitial, submarginal cell II higher than broad, or as high as broad. Gonostyle dorsal (155), lateral (Fig. 185). Penis valve (Fig. 215). Volsella (Fig. 245). Penis valves connecting sclerite (Fig. 305). Sternum VIII (Fig. 275). Length 5.0-7.5 mm.

Variation: Male: Anterior clypeal margin varies from broadly to nearly semicircularly emarginate.

Geographic Distribution: Holarctic.

Material examined: 2398♀♀, 2785♂♂

Records:

Albania: 1♀ (NHMW). Vermosa.

Austria: 192♀♀, 485♂♂ (BMNH, CSB, CSCH, CUIC, DMA, GUL, HNSA, KLTA, KSUK, LACM, MCBA, NHMW, OLML, PTI, RMNH).
Burgenland: Andau; Deutschkreuz; Donnerskirchen; Forchtenstein Rosaliengebirge; Frauenkirchen; Hackelsberg; Jois; Marzer Kogel; Mönchhof; Neusiedl/See; Parndorf; Purbach; St. Andrä/Zicksee; Spitzzicken; Wallern; Winden.
Kärnten: Annabrücke; Dietrichstein; Dragnitz/Drau; Egg near Hermagor; Grafenstein; Lavamünd; Karawanken; Klagenfurt; Maria Rain; Maria Saaler Berg; Oberschachern SE Heiligenblut; Pogörisch; Potschach S Hermargor; Radnig N Hermagor; Sonnegg; Thoner Wald; Unterferlach; Waidisch Gries.
Niederösterreich: Baumgarten; Bisamberg; Brühl; Bucklige Welt; Falkenstein near Laa/Thaya; Gaming; Gföhl; Guntramsdorf; Hadres; Hirtenberg; Karlstetten; Kleinreinprechtsdorf; Ottental Kirchberg/Wechsel; Perwarth; Piesting; Purgstall; Retz; Schauboden; Stiefern/Kamp; Scheibbs; St. Anton/Jessnitz; Traismauer; Wien Kahlenberg; Wien Lobau; Wechling; Zehnbach.
Oberösterreich: Ansfelden; Asebach/D.; Baumgarten; Ginzldorf/St. Roman; Gutau; Haid SW Hörsching; Kottenegg; Linz; Linz Kleinmünchen; Linz Plesching; Pulgarn; Rannatal; Reikersdorf E Braunau; Riegl S Allerheiligen; Rutzing/Hörsching; Sattl N Sarmingstein; Sarleinsbach; Schaumburg; Seebach Eferding; Seewalchen; St. Valentin; Traun; Wels; Welserheide; Wiesing Haibach/D..
Salzburg: Kotschachdorf; Puch; Salzburg Parsch; Tamsweg Lasaberg.
Steiermark: Glazan S Kirchbach; Gösting Graz; Großsölk; Hohentauern; Karleiten Maierhof Sulmtal; Oberglanzberg E Leutschach; St. Lorenzen; Traföß Mixnitz.
Tirol: Igls S Innsbruck; Innsbruck; Nikolsdorf; Salvenberg. **Ost-Tirol:** Bichl NW Assling; Lavant; Lienz; St. Johann; Schleiten; Virgental.
Vorarlberg: Bregenz; Feldkirch.

Belgium: 2♀♀, 6♂♂. (FSAG, FSBE, RMNH). Alle; Bredene de Paune; Elsedorn de Haan; Gard SW Nimes; Pierreclos; Retinneterril Hasard; St. Martin d'Entraunes.

Canada: 453♀♀, 355♂♂ (AEIC, AMNH, BLCU, BMNH, BPBM, CASC, CISC, CNCI, CUIC, DEFW, DEUN, LEMQ, MCZC, MZLU, PMAE, ROME, SEMC, SMDV, UMMZ, USNM).
Alberta: Andrew Lake; Blairmore; Bilby; Bistcho Lake Tapawingo Lake; Cardinal River; Castle River Campground; Cataract Creek Campground; Clyde; Cowley; East Morley; Edmonton; Elkwater Park; Empress; Grande Prairie; Gooseberry Lake; Jumping Pd. Creek W Calgary; Laggan; Lake Luise; Lethbridge; Lundbreck; Mac Murray; Pease River; Prospect Mtn. entrance S Cadomin; Spruce Grove; Waterton Lake Nat. Park; Westcastle River; Whitehorn Lift L. Louise 6800ft; Winifred Lake; Writing-on-Stone Nat. Park; Woking.
British Columbia: Abbotsford; Agassiz; Atlin; Blind Bay; Blue Lake Hwy. 07 NW Williams Lake; Bowser; Cache Creek 500 m; Carbonate Columbia River; Cherryville; Chileotin; Deep Bay N Bowser; Field Rocky Mts. 4900ft; Gagnou Road. W Terrace; Ground Hog Basin Bend Country Selkirk Mts.; Harrison Mills; Hazelton; Hollyburn; Howser Mts.; Kleanza Creek E Terrace; Lakelse Lake S Terrace; Liard R. Hotsprings; Merrit; Mile House; Mission City; Ft. Nelson; Oliver; Penticton; Racing River 2400ft; Robson; Rolla; Royal Oak; Ruskin; Shames W Terrace; Shennon Falls; Squamish Diamond Head Trail 3200ft; Stone Mt. Park 3800ft; Summit Lake 4200 Alaska Hwy.; Terrace; Vancouver; Vaseaux; Vernon; White Lake Olivier; Williams Lake.
Manitoba: Angusville; Aweme; Baldur; Carberry; Cedar Lake; Emerson Slade; Horton; Int. Peace Gardens Turtle Mtn. For. Res.; Ninette; W Norgate Riding Mtn. National Park; Onah; Ridge Mt. National Park Dead Ox Creek; Porcupine Forest; SW Shile; The Pas.
New Brunswick: Fredericton; Kouchibouguac; Shediac.
North West Territories: Norman Wells; Ft. McPherson.
Nova Scotia: Cape Breton National Park; Kentville; Lockport; Truro.

Ontario: Almonte; Ancaster; Belleville; Bothwell; Brighton; Carleton Place; Chatterton; Cumberland; Finland; Florence; Ft. Frances; Dresden; Dundas; Gloucester; Griffith; Guelph; Hamilton; Kearney; Kenora; Leitrim; Marmora; Meaford; Midland; Metcalf; Nefton Irwin Inn; North Branch; One Side Lake; Ottawa; Pt. Pelea; Pinewood; Point Pelee; Petawana; Rainy River; Rat Portage; Richmond; Rondeau Province Park; Salines; Shirles Bay; Simcoe; Spencerville; Stiftsville; St. Lawrence Is. Nat. Park Mac Donald Is.; St. Thomas; Thousand Is. Nat. Park Grenadler Is.; Timagami; Toronto; Walpoole Island; Waubamic. **Bruce County:** N Boat Lake. **Carleton County:** Constance Bay. **Essex County:** Point Pelee National Park. **Frontenac County:** Scycraft Campground. **Georgian Bay County:** Lake Cognashene. **Lanarle County:** Middleville-White. **Prince Edward County. York County:** Mississanga.

Quebec: Abbotsford; Aylmer; Dorios; Fairy Lake G. P.; Gatineau Province Park Old Chelesa; Hemmingford; Kingsmere; Lake Memphremagog; Levis Rev. T. W. Fyles; Luskville Falls; Mistassini Post; Montreal; North Hatley; Otter Lake; Queens Park Aylmer; Rigaud; Seven Isle; Shawbridge; St. Anne de Bellevue; St. Lazare; Mt. St. Hiaire; Tremblant Nat. Park. **Kam. County:** Lake Crescense. **St. Johns County.**

Saskatchewan: Big River; Canora; Christopher Lake; Esterhazy; Estevan; Five Lake; Great Deer; Hudson Bay; Kenosee; Melfort; Melgort; Prince Albert; Saskatoon; Scout Lake; St. Victor; White Fox.

Yucon Territories: Campbell; Dawson; Dempster Hwy. mi 87; Minto Landing Territorial Campground; Old Crow Porcupine; Rampart House; Ross River; Snag; Snafu; Tenas Creek N Canol Road; Wolf Creek Whitehorse.

China: 1♀, 2♂♂ (CASC, MCZC). Ertsentientze E Harbin Manchuria; Harbin Manchuria.

Croatia: 1♀, 1♂ (GKD, KSUK). Istria: Rovinj.

Cyprus: 1♂ (BMNH). Limassol.

Czechie: 7♀♀, 28♂♂ (BMNH, CTLC, OLML). Dobris; Celácovice; Chodau; Hostivar; Krusné; Luhacovice; Nové Mesto nad Met. -obore; Pocerady; Radotin; Stürovo; Sulava; Vranov; Zatecká.

Denmark: 1♂ (RMNH). Zealand N Kobenhavn.

Egypt: 1♂ (NHMW). Helouan.

Finland: 164♀♀, 244♂♂ (AFZH, CSCH, ZMH). Antrea; Bergö; Bromarf; Eno; Esbo; Essor; Finby; Bänö; Geta; Hanko; Hailuto; Hausjarvi; Hautola; Heinola; Hiitola; Hoopalahti; Homants; Hyvinkää; Impilaks; Iuari; Ivalo; Joutsa; Joutseno; Kaivalahti; Kajana; Karislojo; Karleby; Karkku; Keuru; Kexholm; Kirjavalaks; Kolatselkä; Kökar; Kotka; Korpo; Koutiolahti; Kouvols; Kuusamo; Lahti; Lankkas; Lappeäranta; Lappo; Lemland; Liperi; Lojo; Luoploinen; Maarianhamina; Mäklin; Metsäpirti; Mustaspari; Nagum; Nagu; Nisiä; Nurmes; Nykyrka; Nysead; Nystad; Ostrob.; Oulu; Paarnajärvi; Pälkäne; Pargas; Parikkala; Perna; Ob Pitsayaara; Pietisjarvi; Porvoon; Rautalampi; Rautajarvi; Rautasalmi; Ruissalo; Saarjärvi; Säkylä Kolva; Salmis; Sammati; Särkisolo; Savitaipale; Säypäjarvi; Siikajoki; Siikajski; St. Michel; St. Rauman; St. Reposaari; Sortavalu; Soutjärvi; Strömfors Vahterpää; Taipalsaari; Tavastia; Thusby; Tikkurila; Tvärminne; Tyrväntö; Uleaborg; Uskela; Vähäkyrö; Ak. Vaaseni; Vehkalahti; Velik; Viborg; Virolahti. **Abo:** Lohja; Turku. **Alandia:** Appelö; Eckerö Skag; Finström; Föglö; Föglö Bänö; Hammarland; Jemala; Jomala; Rymättylä. **Karelia Borealis:** Hamaslahti; Kitee; Soutjarei. **Karelia Orientalis:** Teru. **Nylandia:** Borga; Helsinki. **Tavastia Australis:** Aiolahti; Hämeenlinna; Hattula; Janakkala; Kangasala; Lammi; Pirkkala; Vanaja; Ylojarvi.

France: 178♀♀, 399♂♂ (BITF, BMNH, CHGF, CSB, FEF, FSBE, MNHN, NHMW, RIB, RMNH, TAF). Argentat; Bellegarde; Biaritz; Bois de Suchan; Bouconne; Broût-Vernet; Busséol; Cany Eme; Carboneras Lano; Cônie Eetl; Decize; Dijon; Etrembieres; Eughien S. et O.; Fontaine Kaoul Eetl; Gray; Hautefage; Huelgoat; L'Isle Jourdain; Izien; Laude de Teinte Sourgy-sur-Loire; Lauours; Luigny Eetl; Maleans; Montagne de Lure Cruis Provance; Montlard Près Dijou; Musieges; Nogent le Rotron; Nyons; Odeillo; Palaiseau Esonne; Poissy; Port Donau Plouozee; Risoul; Siguret; Somme; Somme bac-piège; St. Antoine Ficalba; St. Sylvestre-sur-Lot; St. Livrade; Val d'Ajol; Vauxaillou; Vernet les B. **Ain:** Lavours. **Aude:** Preixan; Rouffiac. **Bouches-du-Rhôn:** Marseille. **Côte-d'Or:** Fet du Citeaux; Longchamp; Villebichot. **Côtes-du-Nord:** Tregastel. **Dordogne:** Celles chez Vaudon. **Drôme:** Montauban. **Essonne:** Saclay. **Eure-et-Loir:** Bethonvilliers; Cônie; Châtodeaudun; Douy; Luigny; Marboue; Moleans; Nogent; Pontgouin; St. Christophe; Thiron. **Gard:** Valleraugue. **Hautes-Alpes:** La Chapell-en-Volgaudemar. **Haute-Garonne:** Toulouse. **Haute-Pyrénées:** Arreau. **Haute-Rhin:** Ingersheim; Lautenbachzell; Mulhouse. **Haute-Savoie:** Ambilly; Annemasse; Eloise; Frangy Bossy; Gaillard; Lucinges; Monetier; Passy; Le Sappey; St. Jean-de-Tholome 1300 m; Thouou. **Herault:** Le Soulié. **Indre-et-Loir. Isère:** Chichilianne; Gresse en Vercors; Septembe. **Loir-Atlantique:**

Herbinac. **Loir-et-Cher:** Mondoubleau. **Loiret:** Orleans. **Maine-et-Loir:** Blou. **Manche:** Bolleville. **Nord:** Bray-les-Dunes. **Paris. Pyrénées-Orientales:** Canet-Plage; Prats de Mollo Col de Soous. **Saône-et-Loir:** Savianges. **Savoie:** Yenne Rhône. **Var:** La Môte; La Mole. **Vienne:** Biard.

Germany: 50♀♀, 94♂♂ (BMNH, CCJW, CJR, CKWS, CSB, CSCH, CVSD; GKD, HNHM, KSUK, NHMW, PBS, RIB, SEM, SMNG, UMBB, WCPD). Badra; Bad Muskau; Baden Waldkirch; Bad Schwarzenau; Bamberg; Bremen; Darmstatt; Donstetten Schw. -Alb; Frankfurt; Gotha Wachsenburg; Gr. Lautertal Bichishausen Schwäb-Alb; Greifswald; Gristow; Grötzingen; Groißbach; Grötz KA; Haidhof; Hartheim Südbaden; Hiltersdorf Oberpfalz; Hochstetten; Jena Leutratal; Kaiserstuhl Baden; Kühkopf Oppenheim; Küssaberg B.; Kyffhäuser; Leipzig; Leopoldshaven; Löderburg; Lorch Rhein; Lübeck; Ludwigslust; Mainz; Markgröningen Rotenacker; Merklingen Schw. -Alb; Müllheim Baden Oberrhein; Münster; Neuhaus; Neutras Oberpfalz; Oldenburg; Osnabrück Gildehäuser; Ottmaring Bay.; Pforzheim Nievern-Lattenwal; Plettenberg; Ranzin; Schnaittenbach; Steinfels Oberpfalz; Tiegen B; Uphuser Megren SE Bremen; Usedom; Warnow. **Baden-Württemberg:** Bretten; Buggingen; Enzklösterle Wildbad; Mühlacker Mülhausen; Mühlhausen Lomersheim. **Bayern:** München; München Lockhausen; Stromberg Spielberg. **Hessen:** Lampertheim Mannheim.

Great Britain: 37♀♀, 70♂♂ (BMNH, CNCI, FSBE).
England: Beaulieu Hauts; Berks Windsor Forest; Broxbourne Herts; Byclert; Colchester; Crichel; Easton; Hampsitad; London; London Chariton; New Forest; St. Minver; Surrey Winbledon; Totton SH; Tring HT; Wareham; Wimbladon; Wimborne; Winton. **Devon:** Prignton; Torquay. **Dorset:** Holt; Witchampton. **Kent:** Sittingbourne. **Sommerset:** Sedgemor.
Scotland: Aviemore; Perthus.

Hungary: 7♀♀, 14♂♂ (AEIC, BMNH, CJR, NHMW). Baranya Beremend; Baranya Megye Somberek; Barcz-Darany; Bösarkany; Budapest; Bugac-Puzta; Keszthely; Szeged.

Italy: 34♀♀, 61♂♂ (AEIC, CHN, GUL, GUSE, HNHM, NEPI, NHMW, PTI, RMNH). Basilicata Lago Monticchie; Colli Enganei PD; Lazio Tivoli; Lazio Olmi Caprarola; Liguria S. Bartolomeo Mare; Pizzighettone; Pontegorvo Frosinone; Ravenna; Rosetto Abruzzi; Spalato; Tarvisio; Trieste. **Friuli:** Grado V. Giulia. **Modena:** Zocca Montetortore. **Piemonte:** Lome Sesia Albano Vercellex; San Benedetto Belbo Langhe. **Trentino (Süd-Tirol):** Bozen; Levico; Nals; W Merano 1000 m; Ratzes; Schlerngebiet; Waidbruck. **Veneto:** Castellucco; Masera di Padova; Piave Montello; Tarvisio.

Japan: 5♀♀, 4♂♂ (CASC, PMAE, USNM).
Honshu: Fukui: Hatogayu; Koike.
Hokkaido: Daisetsuzan National Park Tenninko D. M. 800 m; Sounkyo; Wakkanai.

Macedonia: 1♀ (RMNH). Djonovica N Gostifar.

Mongolia: 1♂ (CASC). Bogduul s. Ulan Bator 1400-2000 m.

Mexico: 2♀♀ (CASC, NHMW). Baja California Aguar Caliente (San Carlos) E Maneadero; Oaxaca.

Netherlands: 19♀♀, 51♂♂ (FSBE, PTI, RMNH). Aerdenhout; Den Haag Duindorp; Derinoord; Emmen; Epen; Hopel; Hulhorst; Katwijk; Leiden; Limburg; Maastricht; Nieuwkoop; Zuideinde; Nymegen; Oegstgeest; Putten Gld.; Rheuen Utr.; Rijsirijk; Schiemoonikoog; Ulvenhout N. B.; Wassenaar; Well.

Norway: 1♀, 1♂ (RMNH). Hurdal; Vay Kristiansand.

Poland: 2♀♀, 8♂♂ (BLCU, CASC, NHMW). Bialowieza; Pulawy; Roscislawice in powiat Wolów; Wroclaw.

Portugal: 2♂♂ (BMNH, CASC). Lissabon Jardin Botanico; Porto.

Romania: 1♀ (OLML). Fizer Transylvania.

Russian Federation: 70♀♀, 29♂♂ (AEIC, CASC, CJR, NHMW, OLML, SMNG, ZMUM). Irkutsk; Leningrad Peterhof (= St. Petersbourg); Kazangulovo SW Ufa; Partizanska; Pavlovka Bashkir; Pyatigorsk; Ufa Bashkir; Uzhgorod.

Slovakia: 5♀♀, 3♂♂ (OLML). Cajkov; Král Chlumek; Plesévec-Ardovo; Velky Kamenec.

Slovenia: 2♀♀ (NHMW). Weissenfels Carniolia; Wippach Carniolia.

Spain: 3♀♀, 1♂ (BMNH, GUSE, HNSA). Barcelone; Caldes de Boi Pirineos centr. 1700 m; Huesa Jaca; Mahide; Mozar ZA.

Sweden: 6♀♀, 2♂♂ (AEIC, BMNH, CNCI, HUS). Asl. Asele V Borgsjö; Ekshära Vmld; Lund SK; Messaure; Silvakra Stensoffa SK; Solna Bergshamra Up; Vb. Umea S Stöcksjö; Vb. Hörnefors S Mosjö.

Switzerland: 12♀♀, 15♂♂ (BMNH, CBH, CHGF, HNHM, HNSA, KSUK, MHNG, NHMW, RMNH). Basel; Bramois E Sion; Bonvillars-La Condre Vaud; Freiburg; Nant; Territet. **Genève:** Collonge-Bellerive; Corsier. **Valais:** Pfynwald Sidere; St. Luc 1650 m.

Tajikistan: 5♂♂ (WSUC). Takob.

Turkey: 5♀♀, 5♂♂ (CHN, CSCH, KSUK, NHMW, OLML). Bolu Lake; Ispir Rize 1400 m; Bursa: Bursa. Hakkari: Sat Dag Varegös SW Yüksekova 1700 m.

United States: 1138♀♀, 908♂♂ (AEIC, AMNH, ANSP, BLCU, BMNH, BPBM, CASC, CISC, CNCI, CUIC, DEFW, DENH, DEUN, DFEC, INHS, ISUI, LACM, MCPM, MCZC, MUIC, MZLU, NCSU, NDSU, NHMW, NYSM, PMAE, TAMU, SEMC, UCDC, UCMC, UCMS, UCRC, UICM, UMMZ, USNM, WSUC).

Alaska: Big Delta; Chena Ridge Road W Fairbanks; Fairbanks Ft. Wainwright; Shaw Creek M. 289 Rich Hwy.;

Arizona: Geronimo. **Apache County:** Ft. Apache. **Coconino County:** Flagstaff 7100 ft. **Santa Cruz County:** Patagonia.

California: Berceley; Bishop; Danville; Davis; Felton St. Cruz Mts.; Grass Lake Tahoe; Hadena; Humboldtso Arcata; Lone Pine; Mono Lake; Niles Canyon; Ortega Hwy. Mariana River; Piedmont Oakland; Pomona; Porta Catalo; Rockport; Sacramento; Ukiah; Valyermo; Visalia; Yosemite 4000 ft. **Alameda County:** Piedmont; Wildcat Canyon Road Berceley. **Alpihe County:** Iceberg Meadow 6400ft; Hope. **Contra Costa County:** Cerrito; Orinda. **Del Norte County:** Cresent City; Little Greyback. **El Dorado County:** Echo Lake 7400ft; Ice House Road E Placerville; Schnieder's Coral N Carson Pass 8500 ft. **Humboldt County:** Big Lagooni; Blue Lake; Redwood Creek Redwood Valley N of Hwy 299. **Iuyo County:** NW Bishop; Upper Sage Flat Camp Ground W Big Pine 7400 ft. **Lassen County:** Honey Lake. **Los Angeles County:** Agoura; Angeles Crest Hwy. Arroyo Seco Switzer Station 1000 m; Tapia Park; Van Nuys. **Maine County:** Silverhake. **Marin County:** Novato; Redwood Canyon. **Mercedes County:** Hatfields S Park. **Modoe County:** Lily Lake. **Mono County:** Hilton Creek; Poison Creek NW Bridgeport 8000 ft. **Monterey County:** Arroyo Seco Campground; SW Greenfield Arroyo Seco River; Paraiso Hot Springs SW Soledad. **Nevada County:** Sagehen Creek N Hobart Mills. **Placer County:** E Bear Val.; Carnelian Bay Lake Tahoe; SW Tahoe Nat. Forest Granlibakinsky Res. **Plumas County:** Buck's Lake; Greagle; Johnsville; W Quiney. **San Bernadino County:** Oak Glenn 1500 m; Thurman Plats Picnic Area 1025 m. **San Mateo County:** Searsville Lake. **Shasta County:** Cassel; Hat Creek P. O. **Sierra County:** SW Greagle Lakes Basin Camp Ground 6300ft; Independence Lake; Sierraville; Yuba Pass. **Siskiyou County:** Bartle; McBride Springs 1524 m. **Solano County:** Cordelia. **Stanislaus County:** Modesto. **Tiesa County:** Prospect Valley. **Trinity County:** Carville; N Coffee Creek. **Tulare County:** Rattlesnake Creek 9000 ft. **Ventura County:** Sespe Canyon. **Yolo County:** Mikhorn Ferry; Sacramento.

Colorado: Aspen; Boulder 5500ft; Eckert; Grand Mesa; Lump Gulch Gilpin; Meeker; Morrison; State Bridge N Bond 7000ft; Summit Core Mts. Toponas. **Costilla County:** NE Ft. Garland 8200 ft. **Denver County:** S Denver. **Fremont County:** Canon City. **Gunnison County:** N Gothic 9400 ft. **Larimer County:** W Livermore 1500ft; Pondre Canyon 5200 ft. **Mesa County:** Pinon Mesa 8950 ft. **Mineral County:** Wolf Creek Pass 9500 ft. **Rio Grande County:** Del Norte City Park. **Routt County:** Hayden.

Connecticut: Bethany; Colebrook; Croton; Hartford; Jewett City; Lauternhill; Lime Rock Housatonic St. For.; Prospect; Riverbank E Hartford Ct.; Sommers. **Fairfield County:** New Canaan. **Litchfield County:** Salisbury Twin Lakes.

District of Columbia: Washington.

Georgia: Clayton. **Rabun County:** Satolah.

Idaho: Craters of the Moon Nat. Mon.; Emmet; Idaho Falls Ammon Sand Hills; Krassel; Moscow Mt.; Troy; Wallace. **Ada County:** Kuna. **Bear Lake County:** Ovid. **Banneck County:** Lava Hot Springs. **Bonnir County:** Clark Fork River Darta; Sandpoint. **Canyon County:** Middleton; Nampa. **Custer County:** Challis; Double Springs. **Franklin County:** Cub River Canyon. **Fremont County:** St. Antony. **Latah County:** Moscow. **Lehmi County:** Salmon. **Oneida County:** Black Pine Canyon; Rock Creek; Twin Springs. **Shoshone County:** NW Red Ives R. S. **Twin Falls County:** Buhl; Rock Creek Canyon. **Valley County:** Smith Ferry.

Illinois: Algonquin; Cairo Hoschoe Lake; Mahome; Rockford. **McLean County:** Lake Bloomington.

Indiana: Indiana Dunes St. Park.
Iowa: Ames; County; Sidnay; Sioux City. **Boone County:** Ledges State Park. **Clinton County:** Clinton. **Monona County:** SW Whiting.
Kansas: **Douglas County:** Lawrence. **Pottawatomie County. Riley County:** Manhattan. **Rocks County:** Stockton.
Maine: Casco; Chesterville; Columbia; Katahdin; Saco. **Kennebec County:** Waterville. **York County:** Wells.
Maryland: Hyattsrilla; Laurel; Sereca; Takoma Park. **Calvert County:** Port Republic. **Montgomery County:** SW Ashton; Forest Glenn; Glenn Echo.
Massachusetts: Agawam; Andover; Bedford; Blue Hills Res. Milton; Boston; Cambridge; Chelmsford; Concord; Dorchester; Forest Hills; Holden; Holliston; Iruro; Lexington; Milton; Needham; Petersham; Reading; Roybury; Sommerville; Stony Brook Res.; Terrae; Vinyard Haven Martha's Viney'd; Walpoole; Waltham; Weston; Woods Hole.
Michigan: Byron; Howell; Huron Mts.; Lake Odessa. **Alger County:** Pictured Rocks National Lakesborne **Auenac County. Bay County. Benzie County:** Gauld Mal. Tr. **Cheboygan County:** Ben Foote; Douglas Lake Biol. Station. **Dickson County. Gratiot County. Hongton County. Iron County. Isabella County. Lapeer County:** Deerfield Twp. **Livingstone County:** E. S. George Reserve. **Manistee County. Marquette County:** Huron Mountain Club. **Midland County. Montoala County. Nevayge County. Oceana County. Ontonagon County. Shiawaase County. St. Josef County:** Tamarack Lake. **Washtenaw County:** Ann Arbor.
Minnesota: Byron; Crockston; Dumfries; Eagle Bend; Garrison; Grand Rapids; Ithaca Park; Jenkins; Minneapolis; Mississippi Bluff State Line Houson; Pine River; Plummer; St. Antony Park; Twin Valley; Wahlkon. **Becker County:** SW Detroit Lakes. **Carver County:** Zumbra Heighta. **Clay County:** Moorhead. **Chisago County. Cook County:** Rosebush Twp. **Freeborn County. Houston County. Luis County. Olmsted County. Pope County:** Clacial Lakes. **Ramsey County. Roseau County. Wabasha County:** W Wabasha. **Washington County.**
Missouri: **Boone County:** Columbia. **Greene County:** Springfield. **Wayne County:** Livonia; Williamsville. **St. Lois County:** Tyson Research Station Eureka.
Montana: Glendive. **Madison County:** Cameron.
Nebraska: F. Crow Ranch SW Valentine; Heartwell; Rushville; Silver Creek; Valentine Refuge. **Thomas County:** Halsey.
Nevada: Sparks. **Eureca County:** Eureca. **Humboldt County:** Lye Creek Camp N Paradise Valley 7500 ft. **Lander County:** Big Creek Canyon 7500 ft. **Nye County:** Summit Canyon Toeyabe Ran. **Washoe County:** Verdi.
New Hampshire: S Albert Shaw Hampton; Aurim; Conteocook; Dummer; Hillsbore; Jaffrey; Lakeport; Meredith; Pelham; Wakefield; **Belknap County:** Gilford-Alton. **Coos County:** Pittsburg. **Grafton County. Straf County:** Durham.
New Jersey: Fort Lee; Haddon Hts.; Pitman; Princeton; Ramsey; Vineland.
New Mexico: Benlah; Clouderoft; Springer. **Colfax County:** Ute Park.
New York Batavia; Bath; Beaver Creek McLean Res.; Bemus Pt.; Brookfield; Buffalo; Cold Springs Harbor LI; Cranberry Lake; Elm Lake; Fairhaven; Grand Island; Groton; Hamburg; Hamilton; Honeoye Falls; Huntington For. Newcomb; Kalbfleisch Station Huntington Long Island; Kiamesha; Lancaster; Ludloville; Maryville; Minetto; Newark; New Port; New York Central Park; Nutley; Oliverea Catskills; Orient; Oswego; Pelham; Po'k'psie; Rochester; Sea Cliff; L. Sebago Bear Mt. Park; Selkirkskores St. Park; Staten Island; Taughanie Falls; Whiteface 4000ft; Woodhaven. **Albany County:** Pine Bush; N Rensselaerville Huyck Preserve; **Cattarangus County:** Rock City. **Cayuga County:** Auburn; Fair Haven Beach St. Park; **Clinton County:** Chazy. **Cortland County:** Landers Cor. Bog Willet. **Essex County:** Keene Valley; Wilmington. **Green County:** Stony Clove Creek. **Hamilton County:** E Indian Lake. **Jefferson County:** Southwick Bch. **Lewis County:** Tug Hill Carpenter Road; **Madison County:** Chittenango. **Monroe County:** Mendon Ponds. **Nassau County:** Tobay Beach. **Onondaga County:** Clark Res. State Park; Syracuse. **Orange County:** Southfields. **Oswego County:** Granhy Center; Mallory; Seltkirk Shores St. Park. **Otsego County:** East Worcestor. **Putnam County:** Upper Cranberry Pond N Lake Peakskill. **Rensselaer County:** Brainard. **Saratoga County. Schoarie County:** Schoharie. **Seabugle County:** Cinnamoon Lake. **Sullivan County:** Yankee Lake Wurtsboro. **Tompkins County:** Fall Creek Ithaca; Ithaca; SE Ithaca Reservoir; Six Mile Creek Ithaca; South Hill Marsh Ithaca; Toughannock F. St. Park; Town of Ulysses N Jacksonville, **Warren County:** Pack Dem. Forest; **Wayne County:** Chimney Bluff St. Park. **Wechester Co.:** Lewisboro.
North Carolina: Black Mt.; Pfagah Mt. **Avery County. McDowel County:** 37°00'N/81°30'W.

North Dakota: Bismark; Fargo. **Cass County. Ransom County:** SE McLeod. **Richland County. Rolette County:** Int. Peace Gdns. **Slope County:** Badlands Pshz. **Towner County. Trail County.**
Ohio: **Ashtabula County:** Crooked Creek Farm Hartsgroove. **Ottawa County:** E Harbor. **Summit County.**
Oklahoma: **Cimarron County:** Black Mesa State Park.
Oregon: Airport Salem; Canon Beach Clatson; Corvallis; Elamat Falls; Mt. Hood; Junctura; Klamath Falls; Milton; Steens Mt. 7200 ft. **Benton County:** McDonald Forest NW Corvallis. **Claisop County:** Cannon Beach. **Jackson County:** Grizzly Mts. Road. **Klamath County:** Skookum Mdw. E Chemut. **Tuscarawas County.**
Pennsylvania: Conneaut Lake; NW Davidsburg; Erie; Harrisburg; Meadville; Ono; Presque Isle St. Park; Truemans; Truerrans; Waterford. **Cumberland County:** Mt. Holly Springs.
Rhode Island: Button Woods; Westerly.
South Carolina: N Tigerville.
South Dakota: Custer Black Hills; S Deadwood.
Tennessee: McMinville.
Utah: Benson Ward; Echo; Farmington; Frikview; Green River; Heber; Logan; Mantua; Nabo Creek; Newton; Richfield; Salt Lake City; Tooele; Vernon Creek. **Bow Elder County:** Mantua Devil's Gate; Mantua. **Cache County:** Beaver Mtn.; Blacksmith Fork Canyon; Cowley Canyon; Franklin Basin; Green Canyon; W Hodges Canyon; Logan Canyon 6700ft; Mendon; Mendon Cold Springs; Millville; Paradise; Provo; Tony Crove Creek; Valley View. **Grand County:** La Sal Mtns. Warner Cp. 9500 ft. **Juab County:** Mt. Mebo Red Creek. **Milard County:** Delta. **Rich County:** Garden City; Laketown. **San Juan County:** Dalton Springs Camp W Monticello. **Sevier County:** Richfield. **Summit County:** Kamas Cobble Creek; Riley Canyon; **Toole County:** Loop Camp SW Grantsville 7400 ft. **Utah County:** Aspen Crove; SW Bonanza 5000ft; Mapleton; Provo. **Washington County:** Santa Clara. **Weber County:** Willard Basin.
Vermont: Chittenden Rutland; S Here; Jamaica; Woodstock. **Essex County.**
Virginia: Falls Church; Great Falls; Rossyln; Short Hill Hillsboro. **Fairfax County:** Annendale. **Warren County:** Shenand Nat. Park.
Washington: Arlington; Bothell; Buena; Capalis Beach; Coupeville; Deer Park; Flat-Top Island; Forla; Friday Harbor; Lake Crescent Fairholm; Lopez Island; Lynden; Montesane; Nehcotta; Oyater Bay; Palouse; Mt. Ranier; Rochester; Samish; Spocane; Sprague; Union Elats; Vancouver; Walla Walla; Wawawai; Yakima. **Asotin County:** Field's Spr. St. Park. **Benton County:** West Richland. **King County:** Kirkland. **Kittitas County:** Salmon In Sac. **Klikiton County:** Brooks State Park S Satus Pass. **Mason County:** Lake Cushman. **Pierce County:** Clover Creek; Pleasant Valley; Tacoma. **Skagik County:** Anacortes. **Stephens County:** Chewelah Hwy 395. **Whiteman County:** Pullman; Smooth Hill Pullman.
Wisconsin: **Clarc County:** Worden Township. **Croix County:** North Hudson. **Grant County:** Rutledge; Wyalusing. **Pierce County:** Prescott. **Polk County. Racine County:** Waterford. **Shawang County. Vilas County:** Boulder; Divida. **Whatcom County:** Birch Bay.
Wyoming: Jackson; Jackson Hole Bio. Sta. Moran 6750 ft; Jackson Hole Research Station; Grand Teton National Park 6800 ft; Yellostone National Park. **Albany County. Park County:** Lake Creek Camp SE Cooke City Mont. 7200 ft.

Pemphredon japonica MATSUMURA

Pemphredon japonicum MATSUMURA 1912: 179, ♀. Holotype: ♀, Japan: Honshu: Kyoto, type lost (TSUNEKI 1951: 174).

Diagnosis: *Pemphredon japonica* is characterized by the following: the recurrent vein is postfurcal, the propodeal enclosure is reticulate, and the propodeal pad is narrow. The anterior clypeal margin of the female is protruding and slightly emarginate (Fig. 20). The anterior clypeal margin of the male is protruding and obtuse angled emarginate (Fig. 96).

Description: Female: Anterior clypeal margin protruding and slightly emarginate (Fig. 20). Frons punctato-rugose. Vertex behind ocelli shiny, irregularly punctate (punctures 1-3 diameters apart). Head width 1.5-2.0 × length. Flagellomere I: length 2.5-3.0 × width, 1.1-1.3 × length of flagellomere II. Scutum irregularly punctato-rugose, anteriorly short transverse rugae, posteriorly short longitudinal rugae. Scutellum densely longitudinally rugose. Metanotum rugose. Mesopleuron in front of midcoxa transversely striate. Propodeal enclosure reticulate. Propodeal pad narrow and transversely striate. Hindtibia with well defined spines. Petiole slightly shorter or equal to tergum I (length 0.8-1.0 × length of tergum I). Pygidial plate narrow, excavate and rounded distally (Fig. 53). Recurrent vein postfurcal, submarginal cell II broader than high. Length 10.0-13.5 mm.

Male: Anterior clypeal margin protruding and obtuse angled emarginate (Fig. 96). Frons punctato-rugose. Vertex behind ocelli shiny, irregularly punctate (punctures contiguous to 2 diameters apart). Head width 2.0-2.3 × length. Flagellomeres II-VI with linear tyloids (Fig. 126). Flagellomere I: length 2.4-2.9 × width, 1.0-1.1× length of flagellomere II. Scutum distinctly, irregularly punctate (punctures contiguous to 2 diameters apart). Scutellum densely punctate. Metanotum finely rugose. Mesopleuron in front of midcoxa transversely striate. Hindtibia without spines, only with setae. Propodeal enclosure reticulate. Propodeal pad narrow and rugose, in some specimens broader and shiny. Length of petiole nearly equal to tergum I (length 1.0-1.2 × length of tergum I). Recurrent vein postfurcal, submarginal cell II broader than high. Gonostyle dorsal (Fig. 156), lateral (Fig. 186). Penis valve (Fig. 216). Volsella (Fig. 246). Penis valves connecting sclerite (Fig. 306). Sternum VIII (Fig. 276). Length 8.0-9.0 mm.

Variation: In one specimen of Japan mesopleuron in front of midcoxa was dull and punctate.

Geographic Distribution: Japan, Nepal, Russian Far East (Ussuriysk).

Material Examined: 15♀♀, 5♂♂.

Records:

Japan: Arashi Fukui (1♀ USNM); Fukui (3♂♂ USNM); Hodosan Saitama (1♀ CASC); Hakkoda (1♂ USNM); Koike D. Fukui (1♀, 1♂ USNM); Karuizawa (1♀ ZMH), Towada (1♀ USNM).

Nepal: Kakani 2070 m (6♀♀ BMNH, 1♀ PMAE).

Russian Federation: Ussuriysk (4♀♀ ZMUM).

Pemphredon kashmirensis DOLLFUSS

Pemphredon kashmirensis DOLLFUSS 1993: 702, ♀. Holotype: ♀, India: Kashmir: Srinagar (BMNH), examined.

Diagnosis: The female of *Pemphredon kashmirensis* can be recognized by the following: the recurrent vein is antefurcal, the propodeal enclosure has short longitudi-

nal ridges, and the propodeal pad is broad and shiny. Anterior clypeal margin flat and obtuse angled protruding (Fig. 21). *Pemphredon inornata* differs from *kashmirensis* in anterior clypeal margin convex and tridentate, lateral teeth hardly to be seen and middle tooth angularly protruding and raised (Fig. 19). The male is unknown.

Description: Female: Anterior clypeal margin flat and obtuse angled protruding (Fig. 21). Clypeus shiny with fine punctation. Frons punctato-rugose. Vertex behind ocelli shiny, punctate (punctures 1-2 diameters apart). Head width 1.7 × length. Flagellomere I: length 2.3 × width, 1.3 × length of flagellomere II. Scutum shiny, smooth, with sparse but distinct punctures (punctures 1-5 diameters apart). Scutellum similar to scutum. Metanotum shiny. Mesopleuron in front of midcoxa coarsely punctate (punctures contiguous to 1 diameter apart). Propodeal enclosure with short longitudinal ridges (only holotype examined !). Propodeal pad broad and shiny. Hindtibia with spines. Petiole as long as tergum I. Pygidial plate broad (Fig. 54). Recurrent vein antefurcal, submarginal cell II higher than broad. Length 9.0 mm.

Male: unknown.

Geographic Distribution: India (Kashmir).

Material examined: Only the holotype.

Pemphredon koreana TSUNEKI

Pemphredon koreanus TSUNEKI 1951: 183, ♀. Holotype: ♀, Korea: Shôyôzan (coll. Tsuneki).

Diagnosis: The female of *Pemphredon koreana* can be recognized by the following: the recurrent vein is postfurcal, the propodeal enclosure is coarsely, radiately striate, and the propodeal pad is broad and smooth, the length of flagellomere I 2.5 × width, and the scutum densely and coarsely punctato-rugose. The male is unknown.

Description (TSUNEKI 1951: 183): Female: Anterior clypeal margin slightly protruding, obtusely tridentate and somewhat raised in the middle (Fig. 22). Frons punctato-rugose. Vertex sparsely punctate, shiny. Head width 1.7-1.8 × length. Flagellomere I: length 2.5 × width, 1.2 × length of flagellomere II. Scutum densely and coarsely punctato-rugose, the punctures anteriorly somewhat finer and closer. Scutellum densely, longitudinally punctato-rugose. Mesopleuron finely, densely punctate. Propodeal enclosure coarsely, radiately striate. Propodeal pad broad, smooth. Petiole comparatively short, slightly shorter than hindcoxa and trochanter taken together. Pygidial plate narrow, surface deeply grooved and distinctly carinated on lateral margin (Fig. 55). Recurrent vein postfurcal. Length 11.0-12.5 mm.

Male: unknown.

Discussion: I could obtain no specimen of *Pemphredon koreana* for study. Maybe this species is a variety of *podagrica*.

Geographic Distribution: Korea

Pemphredon krombeini TSUNEKI

Pemphredon krombeini TSUNEKI 1960: 239. Replacement name for *Pemphredon mandibularis* (TSUNEKI, 1951)

Pemphredon mandibularis TSUNEKI 1951: 184, ♀. Holotype: ♀, Japan: Hokkaido Sapporo (coll. Tsuneki). Preoccupied by *Pemphredon mandibularis* CRESSON 1865: 487.

Pemphredon mandibularis TSUNEKI 1959: 107, ♂. Allotype: ♂, Japan: Utsunomiya (USNM), examined.

Diagnosis: *Pemphredon krombeini* can be recognized by the following: the recurrent vein is postfurcal, the propodeal enclosure is reticulate, and the propodeal pad broad and shiny. The anterior clypeal margin of the female is broadly, semicircularly emarginate, mesally with a well-defined triangular tooth, which is raised apically (Fig. 23). The scutum of the male has dense, coarse punctures and short transverse rugae.

Description: Female: Anterior clypeal margin broadly, semicircularly emarginate, in the middle of the emargination a well-defined tooth, raised apically (Fig. 23). Frons punctato-rugose. Vertex behind ocelli shiny, irregularly punctate (punctures contiguous to 2 diameters apart). Head width 1.8 × length. Flagellomere I: length 2.0 × width, 1.3 × length of flagellomere II. Scutum coarsely punctato-rugose. Scutellum similar to scutum. Metanotum densely rugose. Mesopleuron shiny, sparsely punctate (punctures 1 diameter apart). Propodeal enclosure shiny, coarsely reticulate. Propodeal pad broad, smooth. Hindtibia with spines. Petiole shorter than tergum I (length 0.7-0.8 × length of tergum I). Pygidial plate broad (Fig. 56). Recurrent vein postfurcal, submarginal cell II broader than high. Length 7.0-9.5 mm.

Male: Anterior clypeal margin broadly emarginate (Fig. 97). Frons punctato-rugose. Vertex behind ocelli shiny, irregularly punctate (punctures contiguous to one diameter apart). Head width 1.7-1.8 × length. Flagellomere II-VII with linear tyloids (Fig. 127). Flagellomere I: length 2.0 × width, 1.1-1.2 × length of flagellomere II. Scutum with dense, coarse punctures and short transverse rugae. Scutellum coarsely and densely punctate. Metanotum flat sculptured. Mesopleuron in front of midcoxa shiny, punctate (punctures one diameter apart). Propodeal enclosure reticulate. Propodeal pad broad, shiny, nearly smooth. Hindtibia with short, fine spines. Petiole shorter than tergum I (length 0.7-0.8 × length of tergum I). Recurrent vein postfurcal, submarginal cell II as broad as high. Gonostyle dorsal (Fig. 157), lateral (Fig. 187). Penis valve (Fig. 217). Volsella (Fig. 247). Penis valves connecting sclerite (Fig. 307). Sternum VIII (Fig. 277). Length 8.0-10.0 mm.

Geographic Distribution: Japan.

Material Examined: 2♀♀, 2♂♂

Records:

Japan: Honshu: Kodama Saitama (1♀ CASC); Iwaya Fukui (1♀ USNM); Tamba Sasayama (1♂ USNM); Utsunomiya (1♂ USNM).

Pemphredon laotis DOLLFUSS

Pemphredon laotis DOLLFUSS 1993: 701, ♀. Holotype: ♀, Laos: Sayaboury Province Sayaboury (BPBM), examined.

Diagnosis: The females of *Pemphredon laotis* and *pulawskii* differ from all other species of this genus in broad transverse ridges on scutum (Fig. 75 and 76). *Pemphredon laotis* differs from *pulawskii* in longitudinal ridges on the propodeal enclosure and a propodeal pad broad and shiny. The male is unknown.

Description: Female: Anterior clypeal margin protruding (Fig. 24). Frons punctato-rugose. Vertex behind ocelli shiny, coarsely punctate (punctures contiguous to 1 diameter apart). Head width 1.5 × length. Flagellomere I: length 2.4 × width, 1.1 × length of flagellomere II. Scutum shiny with broad transverse ridges (Fig. 76). Scutellum ridged like in scutum. Metanotum shiny, nearly smooth. Mesopleuron in front of midcoxa with coarse, transverse striation. Propodeal enclosure longitudinally ridged. Propodeal pad broad, shiny. Petiole equal to tergum I (length 1.05 × length of tergum I). Pygidial plate narrow, apically excavate and delimited by a carina (Fig. 57). Recurrent vein postfurcal, submarginal cell II broader than high. Trochanter, femora tibiae, middle part of mandibles, maxillary palpes and wing veins are red-brown coloured. Length 10.0 mm.

Male: unknown.

Geographic Distribution: Laos.

Material Examined: Only the holotype.

Pemphredon lethifer (SHUCKARD)

lethifer is both a noun and an adjective, and must be treated as a noun (Article 31 b(i)).

Cemonus lethifer SHUCKARD 1837: 201, ♀♂. Type lost, no locality.

Cemonus strigatus CHEVRIER 1870: 269, ♂. Holotype: ♂, Switzerland: Nyon (MHNG), examined. Synonymized with *lethifer* by BLÜTHGEN 1931: 124.

Cemonus fabricii MÜLLER 1911: 107. Type lost. Synonymized with *lethifer* by WAGNER 1918: 139.

Diphlebus fuscatus WAGNER 1918: 143, ♂. Synonymized with *lethifer* by WAGNER 1931: 38.

Diphlebus littoralis WAGNER 1918: 143, ♀♂. Synonymized with *lethifer* by WAGNER 1931: 38.

Diphlebus neglectus WAGNER 1918: 143, ♂. Synonymized with *lethifer* by WAGNER 1931: 38.

Diphlebus minutus WAGNER 1918: 143, ♂. Synonymized with *lethifer* by WAGNER 1931: 38.

Dineurus austriacus f. enslini WAGNER 1932: 227, ♀. New synonym.

Dineurus lethifer f. confusa WAGNER 1932: 231, ♂. Synonymized with *lethifer* by TSUNEKI 1951: 203.

Dineurus brevipetiolatus WAGNER 1932: 232, ♂. Holotype: ♂, Germany: Berlin (?), is lost.

Pemphredon platyurus GUSSAKOVSKIJ 1952: 214, ♀. Lectotype: ♀, Uzbekistan: Samarkand, Aman Kutan (ZIL), examined. Present designation. New synonym.

Pemphredon minor GUSSAKOVSKIJ 1952: 213, ♀♂. Lectotype: Uzbekistan: Khiva Ravat (ZIL), examined. Present designation. New synonym.

Pemphredon levinotus MERISUO 1972: 18, ♀. Holotype: ♀, Tajikistan: Alau Mountains, Ak-Bosaga 2800 m (ZMUM), examined. New synonym.

Pemphredon nannophyes MERISUO 1972: 17, ♀. Holotype: ♀, Kazakhstan: Alma Ata (ZMUM), examined. New synonym.

Pemphredon dispar VALKEILA 1972: 17, ♀. Holotype: ♀, Morocco: Daiet Aoua (FSAG), examined. New synonym.

Pemphredon geminus VALKEILA 1972: 18, ♀♂. Holotype: ♂, Russian Federation: Daghestan, Tuprozsk (FSAG), examined. New synonym.

Pemphredon trichogastor VALKEILA 1972: 19, ♂. Holotype: ♂, Russian Federation: Daghestan, Tuprozsk (FSAG), examined. New synonym.

Pemphredon coracinus VALKEILA 1972: 20, ♂ only. Paratype: ♂, Cyprus: Yermasoyia (FSAG), examined. New synonym.

? *Pemphredon sudaorum* TSUNEKI 1977: 10, ♀♂. Holotype: ♂, Japan: Panorama-dai, Kami-Isshiki Village, Yamanashi Pref. (coll. Tsuneki). New synonym.

Diagnosis: *Pemphredon lethifer*, a widespread common species, is charactrized by the following: the recurrent vein varying from antefurcal to interstitial, the propodeal enclosure is irregularly rugose, and propodeal pad is broad and shiny. The anterior clypeal margin of the female is truncate (Fig. 25). *Pemphredon austriaca* is similar to *lethifer*, but *austriaca* is characterized by a scutum with large punctures (diameter of punctures equal to 0.3-0.5 × hindocellar diameter). The flagellomeres III-IX of male of *lethifer* have well-defined tyloids (in small specimens tyloids very short).

Description: Female: Anterior clypeal margin truncate (Fig. 25). Frons punctato-rugose. Vertex behind ocelli shiny, punctate (punctures contiguous to 3 diameters apart). Head width 1.4-2.1 × length. Flagellomere I: length 1.4-2.0 × width, 1.0-1.5 × length of flagellomere II. Scutum anteriorly closely, posteriorly irregularly punctate (punctures contiguous to 2 diameters apart). Scutellum punctate (punctures contiguous to 1 diameter apart). Metanotum densely punctate. Mesopleuron in front of midcoxa coarsely punctate (punctures contiguous to 1 diameter apart). Hindtibia with fine spines. Propodeal enclosure shiny, irregularly rugose. Propodeal pad broad, shiny. Petiole shorter than tergum I (length 0.5-0.8 × length of tergum I). Pygidial plate broad, flat (Fig. 58). Recurrent vein varying from antefurcal to interstitial, submarginal cell II higher than broad. Length 5.0-8.5 mm.

Male: Anterior clypeal margin broadly emarginate (Fig. 98). Frons rugose. Vertex behind ocelli shiny, punctate (punctures contiguous to 2 diameters apart). Head width 1.5-2.2 × length. Flagellomeres III-IX with linearly marked tyloids, in small specimens tyloids very short (Fig. 128). Flagellomere I: 1.4-2.0 × width, 1.0-1.3 × length of flagellomere II. Scutum shiny, anteriorly densely, in the middle and posteriorly irregularly punctate (punctures contiguous to 4 diameters apart). Scutellum shiny, more densely punctate than scutum. Metanotum densely punctate. Mesopleuron in front of midcoxa densely, coarsely punctate, rugose in some specimens. Hindtibia with fine spines. Propodeal enclosure irregularly rugose. Propodeal pad broad and shiny. Petiolus shorter or

equal to tergum I (length 0.6-1.0 × length of tergum I). Recurrent vein varying from antefurcal to interstitial, submarginal cell II higher than broad. Gonostyle dorsal (Fig. 158), lateral (Fig. 188). Penis valve (Fig. 218). Volsella (Fig. 248). Penis valves connecting sclerite (Fig. 308). Sternum VIII (Fig. 278). Length 5.0-8.5 mm.

Variation: The long list of synonyms reflects the variability of this species. The shape of head varies and therefore is not suitable to distinguish *lethifer* from other species. In small specimens the propodeal enclosure can be very short and the ridges appear to be longitudinal. Recurrent vein in most specimens antefurcal, in about 10 per cent interstitial, and in some postfurcal. Female: The clypeus is in some specimens slightly concavely emarginate, other specimens can have a very short tooth in the middle of the clypeus (Fig. 25). The punctation on scutum varies in size and shape. Some specimens have a large and dense punctation drawn out into longitudinal furrows. The pygidial plate varies from flat to excavate, the surrounding carina can be very short. Male: The linear tyloids of the flagellomeres are very short in some small specimens and are difficult to detect. Scutum varies from distinctly punctate to fine and sparse punctures. Propodeal pad is narrow in some specimens.

Discussion: Some males of *lethifer* and *rugifer* can be distinguished only with difficulty. The male genitalia of *lethifer* are similar to those of *rugifer* and *austriaca*. I have not been able to study the type of *sudaorum* TSUNEKI, but it seems to be within the variability of *lethifer*. A definitive decision can only be made after an examination of the type. At the moment the locality of types of Tsuneki in unknown.

I used the name "*lethifera*" instead of *lethifer* (DOLLFUSS 1991), but *lethifer* is right.

Geographic Distribution: Holarctic.

Material Examined: 2563♀♀, 3184♂♂.

Records:

Algeria: 4♀♀, 3♂♂ (MNHN, NHMW), Oran; Saida.

Austria: 383♀♀, 721♂♂ (AEIC, BMNH, CBH, CSB, CSCH, DMA, FSAG, GUL, HNHM, HNSA, KLTA, KSUK, LACM, MCBA, NHMW, OLML, RIB, RMNH, UCDC, ZMH)
Burgenland: Apelton; Donnerskirchen; Frauenkirchen; Hackelsberg; Illmitz; Neusiedl; Parndorf; Purbach; Rax Raab-Au; Rohrbach; St. Andrä; Spitzzicken; Wallern; Weiden; Winden; Zitzmannsdorfer Wiesen; Zurndorf.
Kärnten: Faak/See; Ferlach; Feldkirchen; Gödersdorf; Hermagor; Keutschach; Leuchtenholz/Turnersee; Maria Rein; Maria Saal; Müllern; Pogöriach; Presegger See; Rosegg; Sablatnig Moor; St. Jakob; St. Peter/Drau; Schütt; Srejach/ Drau; Sabiarnigi; Velden; Wasserhofen.
Niederösterreich: Bad Vöslau; Baumgarten/March; Bisamberg; Brühl; Eichkogel; Emmersdorf near Melk; Falkenstein E Laa/Thaya; Gaming; Gieshübl; Gösing; Göstling; Guntramsdorf; Hochrieß; Hundsheim; Karlstetten; Kirchberg/Wechsel; Kleinrechtsdorf; Klosterneuburg; Krumbach; Langenlois; Laxenburg; Lunz; Wolkersdorf near Mank; Matzleinsdorf near Melk; Mödling; Neunkirchen; Oberweiden; Perwarth; Petzelsdorf; Piesting; Plank/Kamp; Purgstall; St. Anton/Jessnitz; St. Georgen/Leys; St. Pölten; Schauboden; Sooß; Stiefern/Kamp; Stockerau; Traismauer; Wang; Zehnbach; Zwettl.
Oberösterreich: Abwinden; Albern/Narn; Asten; Bad Zell; Eichberg; Gramastetten; Gutau; Holzöster; Hörsching; Kleinmünchen; Kremsmünster; Linz; Magdalena; Marchtrenk; Ostermiething; Pfennigberg; Pulgarn; St. Leonhard; St. Martin; Sarleinsbach; Schildenberg; Steining; Steyrermühl; Steyregg; Thurnharting; Weisskirchen; Zwettl/Rodl.

Salzburg: Anif; Bergheim; Glan Moos; Glasenbach; Goldegg; Golling; Kritzenberg; Maria Plain; Maxglan; Kritzenberg; Salzburg-Parsch; Salzburg- Kaputzinerberg; Tamsweg; Wals; Zell/See.
Steiermark: Admont; Eibiswald; Frohnleiten; Furtner Teich Mariahof 800 m; Salzertaler Moor; Weitklamm.
Tirol: Innsbruck; Landeck; Lavant; Lienz; Nickoldsdorf; Norbach; Nörsach; Obergurgl; Oberinntal; Obertilliach; Stilfserjoch; Triestach Au.
Vorarlberg: Feldkirch.
Wien: Lobau; Mauer; Sievering; Türkenschanze.

Azores: (To Portugal): 7♀♀, 12♂♂ (CUIC, SEMC, USNM)
Faial: Horta; Pedro Miguel. **Sao Miguel:** Furnas; Ribeira Grande. **St. Maria:** Vila do Porto. **Terceira:** no spezific locality.

Azerbaydzhan: 1♀, 3♂♂ (NHMW), Helenendorf, 1886.

Belgium: 12♀♀, 23♂♂ (FBSE, FSAG, RMNH)
Alpes-Mar. Beaulien; Beyne-H. terril Homvent; Brodene; Cluny; Confaron; Herault Palavas; Herstalterril Bellevue; Huesa Engracia; Lumiere; Maussane; Menton Palavas; Peyresq; Solutré; Valliquières; Vaucluse Le Thor; Vaucluse Vacqueyras; Wenduine.

Bosnia: 3♀♀, 1♂ (NHMW) Herzegovina: no spezific locality.

Bulgaria: 17♀♀, 13♂♂ (BMNH, CCJW, CJR, CTLC, OLML)
Pirin Mts. 1800 m; Primorsko; Rile-Kloster 1150 m; Sandanski; Sofia; Slandov Brjag.

Canada: 51♀♀, 31♂♂ (CNCI, LEMQ, MZLU, PMAE, ROME, USNM)
British Columbia: Blind Bay; Mission Deroche.
New Brunswick: Shediac.
Newfoundland: Agric Exp. Sta. St. Johns.
Nova Scotica: Lockeport; **Kings County:** no specific locality.
Ontario: Aldershot; Almonte; Actinolite; Chatham; Constance Bay; Jordan; Leamingston; Mt. Pleasant; Norman; Ottawa; Point Pelee; Rondeau Park; Thorold; Unionville; Vineland; **York County:** Mississauga.
Prince Edward Island: Souris.
Quebec: Breckenridge; Champlain Lookout; Gatineau Park; Luskville-Falls; Montreal; Old Chelsea; St. Anne de Bellevue; St. Hilaire.

China: 4♀♀, 3♂♂ (BPBM, CASC, MCZC, NHMW),
W. Hupeh, Lichuan Dist., Siu-sa-pa; Manchuria: Harbin; Cheng 31km E of Harbin.

Croatia: 31♀♀, 53♂♂ (CSCH, CWGB, CUL, FSAG, KSUK, NHMW, OLML, PTI, RIB, RMNH) Belvedere; Breznica; Nizopole Pelister Baba 1000 m; Starigrad-Paklencia; Zadar-Sukesany. **Dalmatie:** Arbe; Gravosa; Ille d'Ugljan Preko; Kastel Spari N Split; Kahr; Kotlenice; Metkovic; Metkovic-Neretva; Split. **Istria:** Duino; Hvar Ille; Pula; Rijeka; Rijeka Ucka; Rovinj; Salcano; Zaule. **Krk.**

Cyprus: 6♀♀, 2♂♂ (BMNH, RMNH, SEM, UCDC, ZMH).
Ermi; Kythres; Limassol; Pano Platres; Paphos.

Czechia: 51♀♀, 29♂♂ (BMNH, CJR, CTLC, OLML).
Celákovice; Chodov; Jindrich. Hrad; Kamenice; Kral-Chiumec; Krušné; Moravia Mutience; Moravia Luhacovice; Praha; Praha-Podbaba; Praha-Sedlak; Praha Tiché údoli; Stredohorri; Sturovo-Bel. k.; Sturovo-Zouky; Tisice u Neratovie; Velký Kamenec; Vrsany; Zbraslav.

Denmark: 4♀♀ (RMNH), Jutland, Island Römö, Lakolki; Jutland, Hinerup; Zealand, St. Merlöse, Roskilde.

Finland: 14♀♀, 15♂♂ (AFZH, ZMH)
Äänislinna; Finby; Geta; Holmia; Impilaks; Itä-Karjala; Joutseno; Mäklin; Rajala; Seiskari; St. Michel; Terijoki; V: Nanvo. **Abo:** Lohja; Turku. **Alandia:** Appelö; Lemland. **Tavastia Australis:** Hämeenlinna; Janakkala.

France: 593♀♀, 643♂♂ (BITF, BMNH, CBH, CHGF, CSB, CSCH, CTLC, CWGB, FBSE, FEF, FSAG, KSUK, MHNG, MNHN, NHMW, PTI, RIB, RMNH, SEM, TAF)
Apt; Argeles Lavall; Argent; Bauyuis; Bellegarie; Biarritz; Bizanet; Bêthonvilliers; Bonifacio; Callian; Canet Plage; Capendu; Castellane Verdou; Cartoneras; Dellys; Divonne; Ferrals; Felines; Fontenag Le Fleuvri; Fontgillarde; Frejus; Gondourville; Gray; Isle-Jourdain; Izieur; Izieu; La Clape; Lacrans Aini Lagrasse; La Bruyer; Levignac; Locere Causse Méjean 1000 m; le Tournet; Lognivy-Pouglas; Margerie; Menet; Mentou; Michelbach; Millan; Mount Saleve Prairie Boissée; Montalivet; Natine; Natuée; Nyous; Odeillo; Orsay Essonue; Plougastel; Plouhinec;

Pontgouin Lalivrée; Port Camargue; Roches d'Ongles; Rognac; Russan Gard; Saint- Beat; St. Antoine de Ficalba; Stas Maries de la Mer; S. De Monastir Holeven; Ste Livrade; Senez; Sigonce; Sigureti; Sarge; Somme; Trassapel; Toulon. **Ain:** Lavours; Les Neyrolles. **Alpes-de-Haute-Provence:** Cereste; Lurs; Montagne du Lure Cruis; Ste. Tulle. **Ardèche:** St. Thomé. **Aude:** Embres-s-Castelmaare; Fajac en Val; Lapalme; Leucate; Preixan; Treilles. **Bouches du Rhône:** Arles; Egalieres; Les Baux; Marseille. **Corse:** Bastia; Bonifacio; Calvi la Ravellata; Calenzana; La Penna Solenzarra; Pointe de Revellata; l'Ille Rousse; St. Lucie-de-Porto-V.; Vivario 800 m. **Côte d'Or:** Dijon; Fôret Citeaux. **Dordogne:** Cettes chez Vandon. **Drôme:** Barret-de-Lioure; Dieulefit Fermas; Donzère; Lue en Diois; Montauban. **Eure-et-Loir:** Bethonvilliers; Châteaudun; Conie; Douy; Marboue; Thiron. **Gard:** Nimes. **Gers:** Cologne. **Gironde:** Bordeaux. **Hautes-Alpes:** Briançon; La Chapelle en Valgaudeaar. **Haute-Garonne:** Toulouse. **Haute-Provence:** Foralquier St. Etienne. **Haute-Pyrénées:** Arreau. **Haute-Rhin:** Ingersheim; Mulhouse. **Haute-Saône:** Ports. **Haute-Savoie:** Ambilly; Chamonix; Eloise; Frangy Bossy; Gaillard; Monnetier-Mornex; Musieges; Passy; Vulbeus. **Hérault:** Garrisues de Montpellier. **Isère:** Montbormot; Oytier-St. Oblas; St. Laurent-en-Beaumont Les Miards. **Landes:** St. Girous Plage. **Loir-Atlantique:** La Baule Pouliguen; Nantes. **Loir-et-Cher:** Boursay; Fontaine-Raoul; Mondoubleau Cormenon. **Loiret:** Orleans. **Maine-et-Loir:** Blou. **Nièvre:** Decize. **Paris. Pas-de-Calais:** Fôret de Pas-de-Calais. **Pyrénées-Orientales:** Argeles-sur-Mer; Fontanet 1400 m; Le Bacarès; Le Boulou; Masif de Soredo; Opoul; Torreiles; Tregastel. **Saône-et-Loir:** St. Laurent. **Savoie:** Vulmix; Yenne Rhône. **Seine-et-Marne:** Fontainbleau. **Seine-Maritime:** Ruen. **Var:** Goufaron Notre Dame du Fignier; La Mole; Lorgues; Monauroux; Pignans; Toulou. **Vaucluse:** Bouvieres; Carpentras; Draguineau; Les Imberta Gordes. **Vendée:** Longville Plage. **Vienne. Yvelines:** Versailles.

Germany: 387♀♀, 561♂♂ (BMNH, CCJW, CJR, CKWS, CNCI, CSB, CSCH, CVSD, GKD, HNHM, HNSA, KSUK, NHMW, PBS, PMAE, RIB, RMNH, SEM, SMNG, SMNS, UMBB, WCPD, ZMH)
Apfelstätter Ried NSG; Bad Münster a. St. Rotenfels; Badra; Baldenschweng Allg.; Berlin; Bremen; Bretten; Bruchsal; Buggingen Südbaden; Darmstadt; Dillenburg; Dresden; Eberswalde-Finov; Enzklösterle b. Wildbach; Eppendorf; Feisnechsee NSG; Fränk. Jura; Gelnhausen Hessen; Gildehäuser Osnabruck; Grötzingen; Gründau Hessen; Hartheim Südbaden; Helmshagen; Herbholzheim Südbaden; Hiddensee/Ostsee NSG Neuendorf; Hohendorf; Hohenlohe Öhringen N-Wtt.; Ingelsheim Rheintal; Istein/Rhein; Jena Thür.; Karlsruhe Baden; Karlsruhe Schilfgebiet Schlehert; Küssaberg Dangsetten; Laufen/Salz; Leiska; Leipzig; Lilienthal Kaiserstuhl; Lödenburg; Ludwigsburg; Lübeck; Ludwigslust Menkendorf; Mahrburg Lahn; Meinz Brechenheim; Merklingen Schw. Alb; Müllheim Südbaden; München; Niederspree NSG; Oberschwaben NSG Wurzacher Ried; Oberschwaben NSG Wildes Ried; Oldenburg Holst.; Plettenberg; Ranzin; Rottleben; Schnaittenbach; Siegen; Solingen; Straß bei Laufen Bayern; Usedom; Usedom Paske See; Waren; Wachsenburg Thüring.; Westerheim Schw. Alb; Wittkoppenberg; Wolgast; Zieserberg bei Wolgast. **Baden-Württemberg:** Federsee NSG.; Mühlacker Lomersheim; Mühlacker Mühlhausen; Stromberg Spielberg.

Great Britain: 62♀♀, 57♂♂ (AEIC, BMNH, CNCI, FBCE, FBSE, SCE, SEMC, UCDC)
England: Bricket Wood; Byfleet Sry; Cambridge; Cobham; Corwborrow; Hauts Hurn; Hauts Tottom Colburg; Hengistbury Head; Isle of Man Castletown; Isle of Wight Ventnor; Jersey Island La Haule; Leicester; Levestoft; London; Midox Teddington; Nevin; New Forest; Oxford; Scilly Island St. Mary's St. Minver; Treddington; Wells; Wareharn; Wimborne; Windsor; Withchhampton. **Dorset:** Hampresson Heath; Holt; Longham. **Devon:** Bovery Tracey; Dawlish Warren. **Kent:** Besseleyheath; Deal; Greatstone; Halling; Minster; Nagden; Sittingburne. **Wales:** Gower Penin Oxwich Burrows; Pembs Mynachog.
Scotland: Tulloch N Nethy Bridge. Heilbronn Gelmersbach;

Greece: 24♀♀, 15♂♂ (AFZH, BLCU, BMNH, CSCH, GUL, KSUK, NHMW, RMNH, SEM, WCPD)
Athens; Crete: Heraclion; Corfu; Cyclydes: Paros Parikia Parosperos; Edessa; Epidauros Korfos; Gardiki 1000 m; Menthoni Peloponeş; M. Athos; Monemvasia Peloponeş; Rhodes: Kremasto; Rhodos. Saloniki Thessalien; Zachiorou Peloponeş.

Hungary: 15♀♀, 12♂♂ (BMNH, CJR, CTLC, HNHM, KSUK, NHMW, RMNH, UMBB)
Agasegyháza; Balaton Badacsony; Baranya-megya Somberek; Boroszno; Börzsöny Perőcseny; Budapest; Bugacinagyerdö; B-Széplak Töreki láp; Kiskunhalas; Jászberény; Örkény; Osca; Simontörny; Sukoró; Wifleinsdorf.

Iran: 3♀♀, 3♂♂ (BMNH, FBSE, GUL). Escalera SW Persia; Karadi; Qazvin 1500 m; Teheran.

Israel: 4♀♀, 5♂♂ (CAI). Bet Ouvrin; Echts'el; Echts'ol; Hikheoret; In Hedwa; Mikhmoret; Q. Tarne; Tomer.

Italy: 129♀♀, 229♂♂ (AEIC, BLCU, BMNH, CHGF, CHN, CSB, CSCH, CWGB, GUL, KSUK, NEPI, NHMW, OLML, PBS, PTI, RIB, RMNH, WCPD)
Abruzzi Rona di Meno; Alpi Cozie Lazio; Aquilea Venezia; Assergi; Aurunci Mts. Formia; Autenimia Calabria; Basilicata Lago Montiochio; Basilicata Marateo; Brindisi; Camerata Rom; Catalin; Cargano; Cerrione La Bessa; Euganei Colli Padova; Fondi; Gargano Lago di Garda; Livorno; Molina di Quosa; Monfalcone; Monopoli S Apulia; Napoli; Novarra Vignale; Nova Siri Basilicata; Ospedaletti IM; Paestum S Salerno; Pontegorvo Frosinone; Pompei; Pontecgnano Fajano Campania; Pracchia; Punta Sabbiono Veneto; Roma; Roseto Abruzzi; Scalea; Sutri; Tarvisio; Torino; Trieste; Val di Casies; Valtellina Grossio. **Bologna:** Ronzano; Roncrio. **Calabria:** Grisolia. **Elba:** Rio Marina. **Lazio:** Caprizola; Colli Albani Cecchina; Sasso Furbara. **Liguria:** Noli; Porto Maurizio; S Bartolomeo; Villanova d'Alberga. **Friuli:** Ausa Corno Giulia; Grado Giulia; Interneppo Simeone; Lignano Sabbadoro Giulia; Marano Lagun Giulia; S Georgo Giulia. **Modena:** Zocca. **Piemont:** Bosso Lasco; Ceva; Langhe San Benedetto Belba; Mombaracaro. **Sardegna:** Bosa; Caligari; Nuoro; Passo di Tascusi 1400 m; Santa Teresa Gallura Sassari; Tempio Pausania. **Sicilia:** Alcantara; Cefalu; Lampedursa; Taormina MteVenere; Taormina Naxos; Taormona Sirina; Taormina Ziretto. **Toscana:** Pietrasancta; San Giminiano; Serplano N Abetone. **Trentino (Süd-Tirol):** Bozen; Bozen St. Pauls; Graun W Kurtatsch; Gries; Merano; Radein; Ratzes; Schlerngebiet; Waidbruck; Waldbruck. **Veneto:** Bibione; Fontaniva; Gaioggia; Masera di Padova; Piave; Spilimbergo.

Japan: 23♀♀, 15♂♂ (BLCU, CASC, CNCI, PMAE, RMNH, USNM).
Honshu: Fujisan; Hayakawa N Echigo; Mt. Haku; Morioka; Nikko; Takayama Gumma; Urabandai Fukushima; Yorii Saitama. **Fukui:** Hatogayu. **Kyote:** Seryô-Tôge. **Miyag:** Mt. Aobayama; Rifucho.

Kazakhstan: 4♀♀, 2♂♂ (CASC, OLML)). Alma Ata; Djambul

Kirgiziya: 4♀♀, 5♂♂ (OLML). Fergana Kadamzaj; Frunze Cou Aryk; Bichkek; Kizil-kiya 40°2'N/72°1'E.

Makedonija: 3♀♀ (HNHM, OLML, RMNH). Lake Prespa; Stip; Titov-Velea.

Malta: 3♀♀, 23♂♂ (RMNH). Mdina Rabat. **Gozo:** Marsalforn; Victoria.

Morocco: 3♀♀, 7♂♂ (BMNH, GUL, MNHN, SEM, ZMH). Ainlenh 1700 m; Haut-Atlas Amizmiz; Haut-Atlas N Asni; Haut-Atlas Tichka-Pass 2000 m; Meknés; Tanger.

Netherlands: 60♀♀, 68♂♂ (AFZH, FBSE, RMNH, ZMH)
B-Nassau-Castelre; Den Haag; Derinood; Epen; Esbeek; Gilze-Rijen; Goes; Gondberg; Griendsveen; Haarlem; Hilvarenbek; Hulshorst; Kals; Kosberg; Kruiningen; Leiden; Mechelen; Rheuen; Rooth; Rotterdam; St. Oedenrode; Strijbeek; Udenhout; Ulvenhout N. B.; Walcheren.

Norway: 1♀ (RMNH). Vay Kristansand Ryeu.

Poland: 25♀♀, 23♂♂ (CASC, BLCU, UMBB). Wroclaw; Osota NW Wroclaw.

Portugal: 17♀♀, 21♂♂ (BMNH, CASC, CSCH, GUSE, KSUK, NHMW, RMNH) see also Azores.
AV. Defens de Chaves; Calharlede Benfica; Carrapateira; Lisboa Sobreda; Oreias Lisboa; Porto; San Romao; Viana da Castelo. **Algarve:** Albufeira; Algoz; Bingan; Monchique; Pera; Sagres.

Romania: 8♀♀, 1♂ (HNHM, OLML, UCDC). Aglgea; Bucuresti; Fizer Tanssilvania.

Russian Federation: 10♀♀, 6♂♂ (BMNH, CJR, ZMH, ZMUM). Bashkirskaja Lake Aslikul SW Ufa; Tanganrog; Novobiryuzyak Daghestan; Trozpyepskeya Daghestan; Tuprozsk Daghestan.

Serbija: 6♀♀, 2♂♂ (HNHM, RMNH). CRNA Gero- Ulcinj; Kotor; Petrovac; Djakovica Hrenik Kosovo; Mte Sar Brezovica 1000 m; Pec Pecka Banja.

Slovakia: 7♀♀, 9♂♂ (CTLC, NHMW, OLML). Cajkov; Chotin; Gbelce;Kovácov; Stredo N Bodrog; Sturovo Hegy.

Slovenija: 2♀♀, 3♂♂ (NHMW). Susak; Tolmin.

Spain: 49♀♀, 107♂♂ (BLCU, BMNH, CHN, CNCI, CSCH, CWGB, GUL, GUSE, HNSA, MNHN, NHMW, PTI, RMNH, SEM, UCDC, USNM, WCPD, ZMH)
Albarracin Aragon; Aldeaciprete (SA); Algeciras; Altea Benidorm; Barcelona; Bancs de H. (CC); Becerril de C. (P); Benidorm; Cadaqués; Calella d. Costa (B); Cardovilla (Q); Casanova BU; Dona Santos BU; Ferrandet N Calpe; Fuentas de Nova (P); Fuentespina; Gibraltar; Hervas (CC); Huesca Jaca; Jaraco; Jarandilla de la V.; La Bazana (BA); La Albufera N Valenci; Madrid; Malaga Malaga; Manresa; Monnegre (A); Monzon (P); Murica N Manzarrou; Neila des M. (AV); Pirineos N Solsona Canalda 1300 m; Pirineos Cantrales 1300 m N Sort Espot; Puerto

Castilla (AV); Quemadra BU; Salamanca; Santander Castro Uridales; Tarifa Cadiz; Tarragona; Torredearbarra; Valadolid; Valencia Dehesa; Zagra (V). **Alicante. Avila:** Becedas; Neila des M.; Puerto Castilla. **Bacelona:** Bacelona; Burgillos del C.; Calzadilla de los B.; Reina. **Cadiz:** Puerto de Sta Maria; Tarifa. **Granada:** Granada; Ria Guadalfeo-Tat; Ventas del Molinello; **Málaga:** Buenaofen; Málaga; Torremolinos. **Salamanca:** Bajar; Cantacallo; Estepona Fresnedoso; La Calzada de B.; Montmaya del R.; Penacaba; Santi balue de B.; Valbuena; Valdefuen de la Casa.

Balearic Islands: Mallorca: Puigpuneat. Menorca: no specific locality.

Sweden: 6♀♀, 4♂♂ (MZLU). Halmstad Ostro Stranden Ha.; Sundvik Sk.

Switzerland: 20♀♀, 28♂♂ (CASC; CBH, CSCH, HNSA, MHNG, RMNH)
Cudrafin Vaud; Düdingen (FR); Fribourg (FR); Genève; Plasselb; Suigez; Ticino Contra; Valais Grimentz 1800 m.

Syria: 2♀♀, 3♂♂ (NHMW). Damascus.

Taiwan: 1♂ (BPBM). Fenkihu Chiayi Hsien 1370 m.

Tunisia: 2♂♂ (UCDC, NHMW). Jefna; Tunis.

Turkey: 68♀♀, 82♂♂ (BMNH, CHN, CSCH, DMA, GUL, KSUK, MCBA, OLML, PTI, RMNH, SEM, USNM, WCPD). Agri; Amasya; Ankara Beynam 1000 m; Aksakal Balikesir; Corum; Delibaba Horasan; Gevas Van Gölü; Gümüshane Torul; Halfeti; Kilyos; Sulucan Zor Dag; Van Town; **Adiyaman:** Celik Gölü 900 m; Gölbasi. **Antalya:** Beldibi; Demirtas; Gundagmus 1500 m; W Manargat; Palaz Dagi. **Antakya:** Antakya; Samandag. **Aydin:** Camlik SE Selcuk. **Bitlis:** Ahlat 1750 m; Nemrut Dag 2800 m; Nemrut Dagi Karadut; Tatvan 1750 m. **Bursa:** Bursa; Mudanya. **Diyarbakir:** Diyabakir. **Erzinoan:** Erzinoan. **Erzurum:** Erzurum; *Torum 1700 m.* **Hakkari:** *Beytisebab 1200 m; Essendere; Hakkari 1800 m; Orama 1700 m;* Suvar Halil Pass 2500 m; Semdinli 1700 m; Tanin Pass 2200 m; Yüksekova 1800 m; Yüksekova-Semdili. **Icel:** N Arslanköy; NW Mersin 1600 m. **Kars:** Karakurt 1460 m. **Manisa:** NE Demirci 1000 m. **Marsas:** Develi E Elbistan 1400 m; Göksun. **Mersin:** Silifke Kargican. **Mut:** Sertavul 1300 m. **Nigde:** SE Ulukisla 1800 m. **Tunceli:** Ovacik 1250 m. **Urva:** Halfeti; N Sürüc. **Van:** N Baskale 2700 m; Van 1800 m.

Turkmeniya: 5♀♀, 3♂♂ (OLML). Aschabat W Firyuza; Kopet-Dag S Geok-Tepe; Nebit-Dag NW Jebel.

Ukraina: 1♀ (OLML). **Krym:** Yalta.

United States: 421♀♀, 325♂♂ (AEIC, AMNH, ANSP, BLCU, BMNH, CASC, CISC, CNCI, CUIC, DEFW, DENH, DFEC, FCDA, ISUI, LACM, MCPM, MCZC, MUIC, MZLU, NCSU, NYSM, PMAE, SEMC, UCDC, UCMC, UCMS, UCRC, UICM, UMMZ, USNM, WSUC)
Alabama: **Mariou County:** N Detroit.
California: Berkeley; Davis; Fullerton; Los Angeles; Riverside. **Alpine County:** Iceberg Meadow. **Contra Costa County:** Moraga; Kensington; Orinda Village; West Pittsburg. **Costa County:** El Cerrtio. **Fresno County:** Centerville; Fresno Palm. **Los Angeles County:** La Puente; Long Beach; Sta. Monica Mts.; Van Nuys; Westwood Hills; Soledad Campground. **Marin County:** China Camp State Park NE San Rafael; Mount Tamalpais State Park. **Orange County:** Anaheim; S Laguna. **San Bdn'o County:** S Timoteo Canyon. **San Diego County:** San Diego Chollas Valley. **San Mateo County:** Sansruno W Sneath Lane. **Santa Barbara County:** Summerland. **Santa Clara County:** Alviso; San Jose. **Siskiyou County:** Etna. **Solano County:** Benicia St. Recr. Areal SE Vallejo; Vallejo. **Wayae County:** Wayae. **Yolo County:** Yolo-by-Pass SE Dixon; Putah Creek Davis.
Colorado: Boulder.
Connecticut: Bridgeport; Canaan; Chimunac Area; Colebrook; E Hartfort; West Hartfort; Noank; Prospect.
District Of Columbia: Washington.
Idaho: **Ada County:** Boise. **Blaine County:** Bellevue. **Canyon County:** Marling; Murphy; Nampa; Parma. **Clearwater County:** Elk City. **Franklin County:** Cub R. Canyon. **Latah County:** Moscow. **Nez Perce County:** Lewistongrade. **Oneida County:** Stone. **Owyhee County:** Given Springs. **Twin Falls County:** Kimberly
Illinois: Chicago; Graldwood.
Indiana: **La Grange County:** Topeka. **Parke County:** Turkey Run Park.
Iowa: Ames Bellvue; Des Moines; Iowa City; Vayland. **Boone County:** Ledges State Park; **Clinton County:** Clinton.
Kansas: **Douglas County:** Lawrence.
Maine: Appledore Island; Dryden. **Clay County:** Moorhead. **York County:** Ogunquit.

Maryland: Frederick; Takoma Park. **Montgomery County:** Betheseda; Colesville; Weaton Regional Park.
Massachusetts: Amherst; Bedford; Cambridge; Forest Hills; Gloucester; Greenfield; Holiston; Manomet Poirt; Reading; Waltham.
Michigan: Detroit; Lansing; Lake Odessa Mackinac Is. **Benzie County. Bey County. Cheboyan County:** Douglas Lake. **Delta County:** Portage Bay Campground. **Lapeer County:** Deerfield. **Kent County. Marquette County:** Huron Mountain Club. **Mason County. Muskegon County. Roscommon County. St. Josef County:** Tamarack Lake. **Washtenaw County:** Ann Arbor; Pinckey St. Rec. Area; Saline.
Minnesota: **Ramsey County:** St. Antony Park.
Missouri: Allenton. **Boone County:** Columbia.
New Hampshire: S Albert Shaw Hamptin; Barlett; Gorham; Meredith; Weiys. **Coos County:** Berlin. **Hillshoro County:** Manchester. **Rock County:** Odiorne Pt.; Seabrock back dunes. **Straf County:** NW Durham.
New Jersey: Brigantine; Collinaswood; Englewood; Lindwood; Moorestown; Ramsey. **Burlington County:** Medford Lakes.
New York: Babylon; Bath; Bog Me Lean Res.; Brooklyn; Buffalo; Central Park New York City; Clinton Mts.; Cold Spring Harbor; Copake Falls; Dobbs Ferry; Dunkirk; Ellis Slatenville; Fayetteville; Fairhaven; Ft. Edward; Grand Isd.; Groton; Kalbfleisch Field Research St. Huntington; Lancaster; Lockport; Mattituk; Newport; Niagara Falls; Oliverea; Oswego; Pellham; Rochelle; Sea Cliff; Staten Is.; Woodhaven. **Cayuga County:** Fair Haven Beach St. Park; Auburn. **Dutchess County:** Amenia. **Greene County:** Stony Clove Creek. **Hamilton County:** Indian Lake. **Herkimer County:** Hinkley Reservoir. **Nassau County:** Tobay Beach. **Monroe County:** Mendon Ponds. **Onondaga County:** Syracuse. **Queens County:** Floral Park Long Is.; **Saratoga County. Tioga County:** Willseyville. **Tomkins County:** Danby; Ithaca; South Hill Ithaca.
North Carolina: Aorton Clayton; Henderson; Highlands; Lake View; Oxford; Ralaigh. **McDowel County. Marcon County:** Wayah Bald 5300 ft.
Ohio: Lyons; Sandusky; Tiffin; Wooster. **Ashatabula County:** Crooked Creek Farm N Hartsgroove. **Ottawa County:** E Harbor. **Stark County.**
Oregon: Baker; Juntura. **Curry County:** Denmark; Vale. **Benton County:** Corvallis.
Pennsylvania: Cambridge Spr.; Meadville; Philadelphia; Presque Isle St. Park; Saegertown; Waterford.
South Carolina: Greenville.
Utah: Brigham City; Salt Lake City. **Box Elder County:** Mantua; Snowville; Willard. **Cache County:** Avon; Benson; Cornish; Hyrum Dam; Logan; Millville; Paradise; Providence; Provo; Spring Hollow. **Davis County:** Farmington. **Grand County:** Moab. **Utah County:** Lehi; Mapleton.
Vermont: Chittenden Rutland; Mt. Equinox. **Addison County.**
Virginia: Alexandria; Bethany Brooke Claudeville; Great Falls.
Washington: Bothell; Dallesport; Pulman. **Clallem County:** Port Angelus. **Clarck County:** Vancouver. **Grant County:** Potholes Reservoir St. Park S Moses Lake. **Jeff. County:** Port Townsend. **Pierce County:** Clover Creek; Pleasant Valley; Takoma. **Walla Walla County:** Walla Walla.
Wisconsin: Madison. **Door County. Skaqrt County. Milwaukee County:** Graenicher.
Uzbekistan: 10♀♀, 9♂♂ (CTLC, OLML). Andidian; Czirczik 41°1'N/69°1'E; Samarkand; Yangiabad N Angren; Taskent.

Pemphredon lugens DAHLBOM

Pemphredon lugens DAHLBOM 1843: 76, ♀♂. Holotype: ♀, Sweden: Faxelfven (MZLU), examined.

Diagnosis: The female of *Pemphredon lugens* has unique a pygidial plate with a sharply projecting keel (Fig. 59). The male of *lugens* can be recognized by an anterior clypeal margin slightly tridentate (Fig. 99) and flagellomeres V-VIII with broad tyloids (Fig. 129).

Description: Female: Anterior clypeal margin distinctly tridentate (Fig. 26). Frons punctato-rugose. Vertex behind ocelli shiny, sparsely punctate (punctures 1-3 diameters apart). Head width 1.4-2.2 × length. Flagellomere I. length 2.5-2.8 × width, 1.2-1.5 × length of flagellomere II. Scutum shiny, some specimens with microsculpture, anteriorly densely punctate, posteriorly sparsely and elongately punctate (punctures 1-2 diameters apart). Scutellum shiny, elongalely punctate (punctures 1-2 diameters apart). Metanotum finely rugose. Mesopleuron in front of midcoxa with microsculpture, punctate (punctures 1 diameter apart). Propodeal enclosure reticulate, in some specimens lateral longitudinally ridged. Propodeal pad transversely striate. Hindtibia with spines. Petiole distinctly shorter than tergum I (length 0.3-0.6 × length of tergum I). Pygidial plate with sharply projecting longitudinal keel (Fig. 59). Recurrent vein postfurcal, submarginal cell II broader than high. Length 7.5-11.5 mm.

Male: Anterior clypeal margin slightly tridentate (Fig. 99). Frons punctato-rugose. Vertex behind ocelli shiny, sparsely punctate (punctures 1-2 diameters apart). Head width 1.5-2.3 × length. Flagellomeres (IV)V-VIII with broad tyloids (Fig. 129). Flagellomere I: length 1.9-2.5 × width, 1.1-1.4 × length of flagellomere II. Scutum shiny, punctate (punctures contiguous to 1 diameter apart). Scutellum shiny, punctato-rugose. Metanotum finely rugose. Mesopleuron in front of midcoxa with microsculpture, punctate (punctures 1 diameter apart). Propodeal enclosure in the middle reticulate, lateral longitudinally ridged. Propodeal pad broad, transversely striate. Hindtibia with spines. Petiole distinctly shorter than tergum I (length 0.4-0.7 × length of tergum I). Recurrent vein postfurcal, submarginal cell II broader than high. Gonostyle dorsal (Fig. 159), lateral (Fig. 189). Penis valve (Fig. 219). Volsella (Fig. 249). Penis valves connecting sclerite (Fig. 309). Sternum VIII (Fig. 279). Length 7.5-10.5 mm.

Variation: Female: Propodeal pad in one female from France broad and shiny. Male: In some specimens middle tooth of anterior clypeal margin short and therefore hardly to be seen.

Geographic Distribution: Europe, Turkey.

Material Examined: 502♀♀, 321♂♂.

Records:

Albania: 2♂♂ (HNHM). Mts Gyalica Lums 1600 m.

Austria: 137♀♀, 112♂♂ (BMNH, CASC, CSB, CSCH, DMA, GUL, HNSA, KLTA, LACM, NHMW, OLML, RMNH, SEM).
Kärnten: Heiligenblut; Hollenburg; Förlach E Hermargor; Maria Saaler Berg; Nötsch a. D.; Osternig; Plöken; Treßdorfer Alm.
Niederösterreich: Aggsbach; Bisamberg; Breitenseee N Gmünd; Brühl; Dürrenstein; Emmersdorf near Melk; Feichsen; Gaming; Gaming Neuhaus; Grünbach bei Rappottenstein; Hochrieß; Heiligenkreuz; Karlstetten; Kirchberg/Pilach; Krumbach; Lilienfeld Muckenkogel 1100 m; Maria Langegg; Plank/K.; Piesting; Purgstall; Perwarth; Oberweiden; Retz; Schlagerboden; Semmering; St. Anton/Jessnitz; St. Christofen; St. Georgen/Leis; Wang Ewixengraben.
Oberösterreich: Eisenhut; Gallneukirchen; Gründberg; Hörsching; Kaltenleutgebern; Kefermarkt; Linz; Lobenstein; Mußbach bei Haibach/D.; Plesching; Schiltenberg; St. Valentin; Walding.
Salzburg: Ferleiten; Salzburg Parsch; Tamsweg.

Steiermark: Demmerkogel/Sausal; Gesäuse; Mariazell Hoher Student 1430 m; Ramsau bei Schladming; Weitzklamm.
Tirol: Hopfgarten; Iselsberg; Lienz Ost-Tirol; Obergurgl 2000 m; Staniske; Trins; Weiherburg bei Ainet.
Vorarlberg: Brand; Tschütsch.

Belgium: 1♀ (FSAG). Houffalize Tavigny.

Bulgaria: 1♀ (CTLC). Rilskiy Monastyr.

Croatia: 2♀♀ (CSCH, GKD). Ochrid; **Istria:** Rovinj.

Czechie: 19♀♀, 16♂♂ (BMNH, CJR, CTLC, GUSE, NHMW, OLML). Dobris; Kamenice; Nymburk; Sázawa; Vranov. **Bohemia:** Chodan; Krusné; Kysice Unbolt; **Moravia:** Buchlor; Luhacovice.

Finland: 168♀♀, 116♂♂ (AFZH, ZMH). Aland Lemland; Anttola; Björneborg; Ekenäs; Esbo; Finby; Geta; Föglö; Haapavesi; Hautskär; Hitola; Hoplax; Ilomantsi; Janakkala; Joutsa; Joutseno; Kankaanpää; Kajana; Karislojo; Karjalohja; Kastavi; Karstula; Kaskö; Kirjavalahti; Kirjavalaks; Kivennapa; Koli; Korpo; Kuopio; Kvevlax; Kymmene; Lahti; Lankkas; Lapinijärvi; Lavansaari; Lojo; Loppi; Mikkelin; Naantali; Nagu Högsar; Pälkäne; Pälkjarvi; Pärna; Pargas; Pelkosenniemi; Perkkala; Pyhäjarvi; Rautasalmi; Rovaniemi; Ruhtinassalm; Ruokolax; Sakkola; Salmis; Säräsniemi; Siltala Istm. Car; Simpele; Seiskari; Sortavala; Sotkamo; Suappertuna; Suomussalmi; Suursaari; Talpalsaari; Täcktom; Tampere; Tenala; Terijoki; Tuusula; Tvärminne; Vehmersalmi; Viipuri; Virolahti; Vuorikylä; Wiitasaari; Yläpe. **Abo:** Lohja. **Alandia:** Eckerö; Finström; Hammarland; Jomala; Rymättylä; Saltvik. **Karelia Borealis:** Hammaslahti. **Nylandia:** Helsinki. **Satakunta:** Loimaa. **Tavastia Australis:** Aiolahti; Hattula; Hämeenlinna; Kangasala; Luopioinen Soyajärvi; Pirkkala; Vanaja; Ylöjärvi.

France: 69♀♀, 32♂♂ (BITF, CHGF, CWGB, FEF, FSAG, KSUK, MNHN, RMNH). Avignon; F. de Bouconne; Broût-Vernet; Cologne; Eqat 1750 m; La Clape; Landres; Lez; Lujandran; Malzieu; Melles; Messignes; Messigny; Nievre Bouvrai; C. de l'Ourtigas; Orèdon M. Pyr.; Pujandran; Sauvessanges; St. Beat; St. Antoine; Voges 900 m. **Ardèche:** St. Thomé. **Côte d'Or:** Marsamray. **Haute-Savoie:** Frangy Bossy. **Isère:** Gresse en Vercors. **Paris. Pyrénées-Orientales:** Valle d'Err. **Seine-Maritime:** Canteleu. **Vaucluse:** Chavai Blanc Cavallou. **Var:** Vus.

Germany: 58♀♀, 19♂♂ (CCJW, CJR, CKWS, CSB, GKD, KSUK, MNHN, PBS, SEM, RIB, UMBB, ZMB). Altmühltal; Baden SE Bremen; Balderschwang; Berka/Wipper; Berlin; Brunau-Packebusch; Dessau; Frankfurt/M.; Gomadingen Mayrbach Schw. Alb; Greilswald; *Grötzingen Reithol*; *Haidhof*; *Haidweiher*; *Hartmannshof* Oberpfalz; *Heumaden*; *Hirschwald*; Irlbach; Jena; Karlsruhe; Klein Schmöllen NSG.; Kreth; Ludwigslust Menkendorf; Mainz; Marburg/Lahn; Markgrönningen; Mertenberg; Münster; Rastatt/B.; Scheibenberg Gaggenau-Hörden Nordbaden; Schirmer Buckow; Schnaittenbach.

Greece: 1♀ (GUL). Olympos.

Hungary: 2♀♀ (CTLC). Örkény.

Italy: 14♀♀, 6♂♂ (KSUK, NHMW, PBS, PTI, RMNH). Valtellina Grossio. **Piemonte:** Angrogna S. Benedetto Belbo; Borgomale; ***Trentino (Süd-Tirol):*** *Bozen*; *Seis a Schlern*; St. Ulrich Grödental; Radein; Ratzes.

Norway: 1♀ (RMNH). Oppland Lom-Lila.

Poland: 2♀♀, 3♂♂ (CASC, MNHN, UCRC, ZMB). Bialowieza; Bromberg; Osola pow Trzebnica; Warzawa; Wrozlaw.

Romania: 1♀ (CTLC). Bucium.

Russian Federation: 1♀, 1♂ (ZMH, ZMUM). Salmi.

Slowakia: 1♀ (OLML). Kralowany.

Slovenija: 1♀ (PBS). Krajnska gara.

Spain: 1♀ (GUSE). Moraña.

Sweden: 12♀♀, 8♂♂ (HUS, NHRS, ZLU). Ang. Sidensjö SV Ödsbybodarna; Flinktorp; Karböle Helsingland; Limortrask Farön Gtl.; Munksund;Nb. Boden SV Unbyn; Öjebyn; Stangale Gotl.; Vb. Umea N Flurmark.

Switzerland: 10♀♀, 4♂♂ (CBH, CTLC, KSUK, MHNG, NHMW, OXUM). Berisal; Genève; Freiburg; Pessey; Randa bei Zermatt; Val d'Anniviers; Visp (Hotee) 1200 m; Valais Sidera 1500 m.

Turkey: 1♀, 1♂ (AFZH, BMNH). Ankara Kavaklidere; Ulundag.

Pemphredon lugubris (FABRICIUS)

Crabro lugubris FABRICIUS 1793: 302. Lectotype: ♀, Germany: Halae Saxonum (ZMUC), examined. Designated by K. Faester.

Pemphredon concolor SAY 1824: 339. Canada: North West Territories (type lost). New synonym.

Pemphredon ocellaris GIMMERTHAL 1836: 448. Neotype: ♀, Austria: Niederösterreich: Mannersdorf (NHMW). Present designation. New synonym.

Pemphredon luctuosus SHUCKARD 1837: 197, ♂. Lectotype: ♂, England: Battersea Fields (BMNH), examined. Present designation.

Pemphredon morio CRESSON 1865: 486, ♀, nec VANDER LINDEN 1829: 82. Holotype: ♀, no specific locality (ANSP), examined.

Pemphredon cressoni DALLA TORRE 1897: 356, ♀.

Pemphredon provancheri DALLA TORRE 1897: 359, ♀.

Pemphredon tinctipennis CAMERON 1908: 234, ♀. Holotype: ♀, USA: Arizona: no specific locality (BMNH), examined. New synonym.

Pemphredon shawii ROHWER 1917a: 100, ♂. Holotype: ♂, USA: New Hampshire: Hampton (USNM), examined. Synonymized with *concolor* SAY, by R. BOHART in BOHART & MENKE 1976: 181.

Pemphredon pacificus GUSSAKOVSKIJ 1932: 8, ♀♂. Holotype: ♀, Russian Federation: Kamtschatka Elisovo (NHRS), examined. Synonymized with *lugubris* by LOMHOLDT 1975: 89.

Diagnosis: *Pemphredon lugubris* is one of several species in which the recurrent vein is postfurcal, the propodeal enclosure is reticulate, and the propodeal pad is narrow and rugose. The female of *lugubris* can be recognized by the following: the anterior clypeal margin is truncate, slightly convex or slightly concave (Fig. 27), the scutum on each side has irregular curved striation and interstitial rugosity, and the pygidial plate is narrow and excavate (Fig. 60). *Pemphredon baltica* differs from *lugubris* in a broad pygidial plate (Fig. 43). The male of *lugubris* can be recognized by an anterior clypeal margin broadly emarginate (Fig. 100), the flagellomeres III-VII with linear tyloids (Fig. 130), and the gonostyle dorsal characteristically shaped (Fig. 160). The male of *montana* differs from *lugubris* in a small semicircular emargination on anterior clypeal margin (Fig. 103). The male of *baltica* differs from *lugubris* in the shape of penis valve (Fig. 204).

Description: Female: Anterior clypeal margin truncate, slightly convex or slightly concave (Fig. 27). Frons punctato-rugose. Vertex behind ocelli with fine microsculpture, irregularly punctate (punctures 1-2 diameters apart). Head width 1.6-2.1 × length. Flagellomere I: length 2.0-3.0 × width, 1.1-1.5 × length of flagellomere II. Scutum on each side with irregular curved striation and interstitial rugosity. Scutellum coarsely punctato-rugose. Metanotum rugose. Mesopleuron in front of midcoxa in most specimens with transverse striation. Propodeal enclosure reticulate. Propodeal pad narrow, rugose. Hindtibia with spines. Petiole shorter or slightly longer than tergum I (length 0.8-1.3 × length of tergum I). Pygidial plate narrow, apically excavate and delimited by a sharp carina (Fig. 60). Recurrent vein postfurcal, submarginal cell II broader than high. Length 8.0-13.0 mm.

Male: Anterior clypeal margin broadly emarginate (Fig. 100). Frons longitudinally punctato-rugose. Vertex behind ocelli with coarse, elongate punctation (punctures contiguous to 1 diameter apart). Head width 1.6-2.1 × length. Flagellomeres (II)III-VII(VIII) with well-defined linear tyloids (Fig. 130). Flagellomere I: length 2.0-2.8 × width, 1.0-1.3 × length of flagellomere II. Scutum shiny, with sparse irregular punctation (punctures contiguous to 1 diameter apart), some specimens with rugae. Scutellum and metanotum like scutum sculptured. Mesopleuron in front of midcoxa in most specimens with transverse striation. Propodeal enclosure reticulate. Propodeal pad narrow, rugose. Hindtibia without spines. Petiole shorter or equal to tergum I (length 0.8-1.1 × length of tergum I). Recurrent vein postfurcal, submarginal cell II broader than high. Gonostyle dorsal characteristically shaped (Fig. 160), lateral (Fig. 190). Penis valve (Fig. 220). Volsella (Fig. 250). Penis valves connecting sclerite (Fig. 310). Sternum VIII (Fig. 281). Length 7.5-10.5 mm.

Variation: Female: In Palearctic specimens anterior clypeal margin varies from slightly convex to truncate, only in a few specimens concave, in Nearctic specimens it varies from slightly concave to truncate (Fig. 27). Scutum in some specimens anteriorly with transverse rugae and posteriorly with fingerprint-like structure. In some specimens propodeal pad broad and finely sculptured. Male: Scutum in some specimens nearly as in female.

Discussion: KOHL (1890: 50) already mentioned *lugubris* as a Holarctic species, but he did not synonymize it with *concolor* because of the insufficient description of SAY.

Geographic Distribution: Holarctic.

Material Examined: 1423♀♀, 431♂♂

Records:

Austria: 314♀♀, 116♂♂ (BMNH, CSB, CSCH, DMA, GUL, HNSA, KLTA, LACM, NHMW, OLML, RMNH, UMBB).
Kärnten: Dietrichstein; Karawanken Bodental; Klagenfurt; Polodniger Alm S Hermagor; St. Martin Silberberg SO Noreia 1000 m.
Niederösterreich: Dornbach; Emmersdorf near Melk; Gaming; Göstling; Haag; Herrenbaumgarten; Kaltenleutgebern; Leithagebirge; Lunz; Mannersdorf; Perwarth; Piesting; Plank/Kamp; Purgstall; Scheibbs; St. Christofen; St. Georgen/Leys; St. Pölten Waizendorf; Wien; Wien Mauer; Wipassing.
Oberösterreich: Aschach; Fischdorf; Gallneukirchen; Gutau; Gramastetten; Kremsmünster; Linz; Pasching; Steyrermühl; Wildberg N Linz.
Salzburg: Badgastein; Imberg; Maxglan; Salzburg-Parsch; Tamsweg 1050 m; Unken.
Steiermark: Admont; Fischbach Ofenluger 1000 m; Fladnitz/Raab; Großsölk; Johnsbachtal; Mariahof E Oberndorf 1000 m.
Tirol: Arntal 800 m; Hopfgarten; Inntal; Innsbruck; Itter; St. Leonhard/K.; **Ost-Tirol:** Dölsach Lienz; Gönach; Lavant; Lienz; Maria Trost; Nußdorf; Obertilliach; Silien; Triestacher Au.
Vorarlberg: Bregenz.

Belgium: 1♀ (FSAG). Retinneteril Hasard.

Bosnia: 1♂ (RMNH). Rijeka.

Bulgaria: 1♀ (OLML). Slancev Briag.

Canada: 76♀♀, 22♂♂ (AEIC, BPBM, CNCI, LEMQ, PMAE, ROME, SMDU).
Alberta: Bilby; Bitcho Lake Tapawingo Lodge; Calgary Jumping Pd. Creek; Cardinal Riv. rec. area; George Lake W Edmonton; Kanakis For. Exp. Sta. Seebe; Waterton; Writing-on-Stone.

British Columbia: Alaska Hwy mi 392 Summit Lake 4500 ft; Cowichan Lake; Dean River; Mt. McLean; Mt. Hevelstoke Natl. Park 6300 ft; Mt. Revelstoke; Pink Mtn. S. Ft. Nelson; Robson; Sawmill Creek Wycliffe; Steelhead; Stone Mt. Park 3800ft; Terrace.
Newfoundland: Agric. Exp. Sta. St. Johns; South Branch.
Nova Scotia: Cape Breton Lone Shielding; MacKenzie Mt.
Ontario: Aylmer West; Constance Bay; Hamilton; Hastings; Kearney; Ottawa; Rondeau Park; Toronto; Vineland St.
Quebec: Atymen Queens Park; Gatineau Park King Mt.; Hemmingford; Hull; Laniel; Montreal; Mt. Cartier 3000 ft; Mt. St. Hillaire; St. Anne de Bellevue; St. Jean Pinslake C. P.; Old Chelson King Mount. 1150 ft; Tadoussac. **Montmorency County:** Mare du Sault Laurentides Park 2550 ft. **Kamm County:** Parke Reserve 950 ft. **St. Johns County.**
Yucon Territories: Alaska Hwy Km 1706; Carcoross; Dawson; Dempster Hwy mi 87; Klondike Hwy km 566; Rampart House; Simpson Lake.

Croatia: 1♀ (NHMW). No specific locality.

Czechie: 32♀♀, 4♂♂ (BMNH, NHMW, OLML). Chodau; Dobris; Kotzen; Lednice Moravia; Roblia; Sedlice; Sulava.

Danmark: 2♀♀, 1♂ (PTI, RMNH). Jutland Hinerup; Nordsjaelland.

Finland: 183♀♀, 76♂♂ (AFZH, BMNH, CSCH, HNHM, MZLU, ZMH).
Aland; Bergö; Bjoneborg; Esbo Kolperä; Ekenäs; Esbo Löfö; Geta; Gushave; Finby; Hanko; Haapavesi; Haukilampi; Hiitola; Hirvensalo; Pk. Ilomantsi; Iuari Valo; Jouteno; Junga; Kangarlampi; Karstula; Kaskö; Kirkkonummi; Karkku; Kölar Idö; Karislojo; Kökar; Kuopio; Kyrkslätt; Kynstätt; Lankkas; Lappland Kalmankaltio; Lavansaari; Lemland; Lumparland; Mustasaari; Nagu; Notham; Nurmes; Nystad; U. Oulunkylä; Parikkala; Pärna; Pälkjarvi; Pargas; Pk. Pielisjarvi Koli; Pisavaara; Pomarkku; Porvoon; V. Perniö; Rautasalmi; Rautus; Runsala; Ruissalo; Ruhtinassalmi; Saarijarvi; Säkylä Kolva; St. Repossari; Sotkamo Aarreniemi; Souniemi; Siikajoki Tanvo; Tampere; Ik. Terijoki; Tvärminne; Uleaborg; Unkuniemi; Viipuri. **Abo:** Turku. **Alandia:** Appelö; Eckerö Storby; Eckerö Skag; Finström; Hammarland; Jomala; Rymättylä; Vihti. **Karelia Borealis:** Hammaslahti; Kitee. **Karelis Orientalis:** Aunus; Soutjarvi; Vaaseni. **Nylandia:** Borga; Helsinki. **Satakunta:** Loimaa. **Tavastia Australis:** Aitolahti; Hämeenlinna; Hattula; Kangasala; Lammi; Luopionen Saynäjärvi; Pirkkala; Somero; Tyrväntö; Ylöjärvi.

France: 197♀♀, 65♂♂ (BITF, CASC, CHGF, DMA, FBCE, FEF, MNHN, RMNH, TAF).
Aisne Menkhurel; Allos; Arfons; St. Antoine; Bergerac; Canterets; Chartrettes; Cologue; Esbarres; Espère; Essone Lardys; Fréjus; Hautefage; Izieu; Isle Jourdain; Manestaing; Marhane; Mellas; Messingny; Montagne d'Lure Lanzon Cruis Provence; Nerac; Nievre Bouvras Lavage; Noblecourt; Nogaro; Palaiseau Edonne; Rocamadour Lot; Rouillou; St. Beat; Le Tournet; Tregurtel; Troyes; St. Ps. Ubaye. **Aisne:** Monthurel. **Aude:** Preixan. **Bouches-du-Rhône:** Marseille. **Côte d'Or:** Dijon; Forêt-Citeaux; Gevrey; Saussy; Seurre. **Eure-et-Loir:** Châteaudun; Luigny; Marboue. **Haute-Garonne:** Toulouse. **Haute-Savoie:** Arcine; Ballaison; Frangy Bossy; Gaillard; Monetier; LeSappey. **Indre-et-Loir:** Cinais; La Roche Clermoult. **Isère:** St. Laureat-en-Beaumont. **Loire:** Doiziex; Epinac. Saône. **Loiret:** Orleans. **Lot:** Rocamadour. **Paris. Var:** Pignaus. **Yvelines:** Vaux Versailles.

Germany: 96♀♀, 24♂♂ (CSCH, CJR, CKWS, CSB, GKD, HOU, KSUK, NHMW, PBS, PMAE, RIB, RMNH, SEM, SMNG, UMBB, ZMB).
Baltrun. Berlin; Bremen; Czorneboh; Erzgebirge; Döl. Heide; Fallersleben; Gildenhäuser Osnabrück; Greilswald Ranzin; Grötzingen; Jena; Kreuzberg; Liepnietz See; Löbauer Berg; Luhe; Ludwigslust Menkendorf; Matzlesberg; Neudorf; Neutras; Odenwald Erbach-Roßbach; Schamach bei Treuchtlingen Fränk. Jura; Schnaittenbach; Stuttgart; Usedom Paske; Vilshofen; Wolgast Zernitz; Wiesbaden Flössenheim. **Baden-Württemberg:** Heidelberg; Karlsruhe; Mühlacker; Oberstenberg; Stuttgart; **Bayern:** München. **Hessen:** Gelnhausen. **Oberpfalz:** Dammelsdorf; Großschönbrunn; Haidhof; Kugelhof; Vikhofen.

Great Britain: 124♀♀, 29♂♂ (AEIC, ANSP, BMNH, CNCI, FBSE, OXUM, USNM).
Ashton Wold Oundle; Aviemore; Bricket Wood; Bristol Ashton Park Sommerset; Cambs Cambridge; Cambs Monks Wood; Colchesten Byfleet; Enfield Hilly Fields Middlesex; Elstree; Gloucester; Hampstead; Hastings; Hitchin Hearts; Inglestone; Kinlochewe; Laxton; Leicester; Leighton Buzzard Grawshay; Mill Hill D.; Nethy Bridge P. H.; New Forest; SA Morden; Northants Spratton; St. Minver; H. T. St. Pauls Waldern; L. Raynes Park; Teddington; Tarrant Monkton Dorset; Thetford Norfolk Mundford; Wells; Westend; Wareham; H. U. Woodwalton. **Devon:** Northam. **Dorset:** Canford Ph.; Tarrant Monkton. **Kent:** Shoreham; Sittingbourne. **Isle of Wight:** St. Lawrence. **Somerset:** Bristol Ashton Park.

Hungary: 3♀♀, 1♂ (BMNH, CJR, CNCI, NHMW). Baranya Megye Somberek; Budapest; Szentendre.

Iran: 2♀♀ (GUL, NHMW). Assalem 1300 m.

Italy: 8♀♀, 5♂♂ (GUL, NHMW, PBS, PTI, RMNH).
Babbie Pellice; Torino; Torre Pellice; Trieste. **Piemonte:** Bagholo; San Benedetto Belbo; Lusernetta; S. Piette Va Lemina; **Sicilia:** Canania. **Trentino (Süd-Tirol):** Bozen; Gais W Andrian; Obersirmian SW Nals; Radin; Ratzes; Schlerngebiet.

Japan: 5♀♀, 1♂ (AEIC, CASC, NHMW, USNM). Mt. Aizu-Koma Honshu; Mt. Haku 2000 m; Hakkoda; Kamikochi; Sapporo; Insula Etorofu.

Kirgiziya: 1♀ (CTLC). Ten Sam Mte. Kirg.

Luxembourg: 1♀, (RMNH). Kantenbach

Macedonia: 1♀ (HNHM). Mts. Calicia Lake Prespa Otesevo 100 m.

Mexico: 2♀♀ (NHMW). Oxaca.

Mongolia: 1♀ (CASC). Chentej NO Ulan Bator 2000 m.

Netherlands: 31♀♀, 4♂♂ (FBCE, FSBE, RMNH, PTI). Den Haag; Eyserbos; Hulhurst; Landg de Vennet Nunspeet; Linschoten Kockepausbos; Maastricht; Melisant; Nijmegen Hees; Oegtgeest; Ostende; Putten; Rijswijk; Waasenaar; Wageningen.

Norway: 2♀♀, 1♂ (RMNH). Oppland Lom-Lila.

Poland: 1♀, 1♂ (CASC). Sulów; Roscislawice near Wolow.

Romania: 2♀♀, (BMNH, HNHM). Bucarest; Dobrugea.

Russian Federation: 60♀♀, 14♂♂ (AEIC, CJR, CTLC, GUSE, NHMW, NHRS, ZMH, ZMUM).
Frunse Ala-Artscha 2500 m Asia centr.; SW Altai N Katanaa 1000 m; Irkutzk; Kashkarantsa; Kamtschatka; Moscow; Taganrog; Transkauk. Helenendorf; Ussuriyska.

Serbije: 1♀, 1♂ (HNHM, RMNH). Kosovo Mts. Sa. Brezovica 1000 m; Ljubicevo Pozarevac.

Slovakia: 1♀, 1♂ (CTLC, OLML). Harmonie; Velka Fatra near Borisovo.

Slovenija: 1♂ (KSUK). Postojna Radok.

Spain: 3♀♀ (GUSE). Horcajo (SA); Navacarus Salamanca; Valdetuents (SA).

Sweden: 21♀♀, 5♂♂ (AEIC, AFZH, BMNH, HUS, MZLU, NHRS). Borgholm ÖL.; Sö. Gälö Stegsholm; Gorland Visby Hort; Hall Enslov Arni; Halltorps hage ÖL.; Kalmarsund Jungfrun; Kullaberg SK.; Mall Fjaras; Messaure; Silvakra.; Up. Solna Bergshamra; Upl; Vb. Burea S Övre Bäck; Vb. Särvar Bomyrsjön SV Ivorsboda.

Switzerland: 10♀♀, 2♂♂ (CSASC, BMNH, CHGF, MHNG, MZLS, NHMW). Cudrefin Canton de Vaud; Entlebuch Graben Mätteli Canton Luzern 800 m; Genève Cologny Sierre; Wallis; Vitznan.

Turkey: 2♀♀, 1♂(BMNH, DMA, OLML). Bebek; Göreme; Hakkari Sat Dag. Varegös SW Yüksekova 1700 m.

United States: 240♀♀, 55♂♂ (AEIC, AMNH, ANSP, BLCU, BMNH, BPBM, CASC, CISC, CNCI, CUIC, DEFW, DENH, DFEC, ISUI, LACM, LEMQ, MCPM, MCZC, NCSU, NYSM, PMAE, ROME, UCDC, UCMC, UCMS, UCRC, UICM, UMMZ, USNM, WSUC).
Alaska: Bremner Rivers; Brooks Lake; Fairbanks Ft. Wainwright; Katmai National Monument; Isabel Pass Richardson Hwy mi 206 2900ft; Kenal Pen. Cooper Landing Rt.; Mc Kinley Nat. Park Camp Denali; Matanuska; Moon Lake Alaska Hwy DC-1331; Shaw Creek Richards Hwy Tompson Pass; Tsaina R.; Valdez.
Arizona: San Francisco W Side 9000 ft.
California: Crescent City; Yosemite Park Glac. PT Road. **El Dorado County:** Echo Lake 2256 ft. **Plumas County:** Buck's Lake. **Sierra County:** Webber Lake 2056 m. **Toulumne County:** Sonora Pass.
Colorado: Meeker.
Connecticut: Storrs.
District Of Columbia: Washington.
Georgia: **White County:** Chattahoochee Ntl. Forest N Robertson.
Idaho: Moscow Mt.; Sandpoint; Galena Summit N Stanley 8700 ft. **Valley County:** Lick Creek Summit.
Illinois: **Champaign County:** Mohamet Hastwoods.
Maine: Dryden; Chimney Pond Mt. Kathadin; Baxter Peak Mt. Kathadin; Mt. Kathadin Basin 4000ft; Mt. Blue Weld; Saco.
Maryland: Patuxent Ref. Bowie; Plummer Island. **Montgomery County:** Glen Echo; Colesville. **Prince Georg's County.**

Massachusetts: Boston; Cambridge; Cohasset; Forest Hills; Hadley; Holliston; Lexington; Petersham.
Michigan: Ann Arbor. **Livingstone County:** George Reserve. **Marquette County:** Huron Mountain Club; Sect Tup. Rug. **Menominee County:** Ceder River. **St. Josef County:** Tamarock Lake.
Minnesota: **Clay County:** Moorhead. **Ramsay County.**
Montana: **Glacier County:** Kiowa.
New Hampshire: Bretton Woods; Hampton; Jackson; Pinkham Notch; Pitsburg Deer Mtn.; Shaw. **Carr County:** Wonalaucet 1900 ft. **Coos County:** East Inlet Dam. **Straf County:** SW Durham.
New Jersey: Englewood; Palisades; Princetown.
New Mexico: James Cayon Sacramento Mts. 8600 ft. **Taos County:** Hondo Canyon.
New York: Allegany St. Park; Batavia; Innwood; Ithaca; Karner; Ludloville; Powder Mills; Taghanik Ithaca; Thomson. **Albany County:** Rensselaerville Huck Preserve; Pine Bush. **Catarangus County:** Rock City. **Cortland County:** Heiberg Forest; Labrador Lake. **Essex County:** Mt. Mac Intyre Top; Foot Clif Mt. 3000 ft. **Hamilton County:** Indian Lake. **Lewis County:** County road. **Onondaga County:** Syracuse. **Ulster County:** Cherrytown Kerhoukson.
North Carolina: Highlands. **McDowell County:** FIT.
Pensylvania: Fairview; Philadelphia; Ligonier Powdermill Nature Reserve. **Pike County.**
South Carolina: Cleveland. **Anderson County:** Pendleton.
Tennessey: Smoky Mts. N. C. Newbubd Cape 5000 ft. **Sevier County:** Great Smokies Nat. Park.
Utah: Unita Mts. **Box Elder County:** Clear Creek; Mantua Devil's Gate; Willard Peak 9000 ft. **Cache County:** Beavert Mt. Logan Canyon; W Hodges Canyon; Logau Canyon Turner; Tony Grove. **Garfield County:** Boulder Mtn. **Grand County:** La Sal Mtns. **Juab County:** Red Creek Mt. Nebo. **Wash. County:** Upper Deep Creek. **Weber County:** Willard Basin. **Summit County:** Ledgetork Camp.
Vermont: Chittenden Rutland.
Virginia: **Fairfax County:** Annandale. **Page County:** Shenandoa N. P. Big Meadow 1300 m.
Washington: **Garf County:** Misery Spr. S Pomeroy. **Muson County:** Lake Cushman.
Wisconsin: Paradise Mt. Rainier. **Milwaukee County.**

Pemphredon maurusia VALKEILA

Pemphredon maurusius VALKEILA 1972: 21, ♀♂. Holotype: ♀, Morocco: Marrakech (ZMH), examined.

Diagnosis: *Pemphredon maurusia* can be recognized by the following: the recurrent vein is either antefurcal or interstitial, and the propodeal enclosure is reticulate. The female of *maurusia* has an anterior clypeal margin protruding and slightly tridentate (Fig. 28). The female of *tridentata* differs from *maurusia* in a distinctly tridentate anterior clypeal margin (Fig. 41). The female of *orientalis* differs from *maurusia* in an anterior clypeal margin tridentate, but lateral teeth more developed than mesal tooth (Fig. 35). The male of *Pemphredon maurusia* is similar to *rugifer* and I cannot find characteristic features to differ them in all cases.

Description: Female: Anterior clypeal margin protruding and slightly tridentate (fig, 28). Frons punctato-rugose. Vertex behind ocelli shiny, irregularly, distinctly punctate (punctures 1-4 diameters apart). Head width 1.6-1.7 × length. Flagellomere I: length 1.7-1.8 × width, 1.0-1.1 × length of flagellomere II. Scutum shiny, anteriorly densely and coarsely punctate, mesally and posteriorly sparsely, irregularly

punctate (punctures 1-5 diameters apart), punctures drawn out into longitudinal furrows at the posterior. Scutellum shiny, coarsely and sparsely punctate (punctures contiguous to 2 diameters apart). Metanotum densely, coarsely punctate. Mesopleuron in front of midcoxa coarsely, densely punctate. Propodeal enclosure reticulate. Propodeal pad broad, shiny. Hindtibia with spines. Petiole equal to tergum I. Pygidial plate (Fig. 61). Recurrent vein varying from antefurcal to interstitial, submarginal cell II higher than broad. Length 8.0 mm.

Male: Anterior clypeal margin broadly emarginate (Fig. 101). Frons punctato-rugose. Vertex behind ocelli shiny, irregularly punctate (punctures contiguous to 1 diameter apart). Head width 1.6 × length. Flagellomeres III-IX with linear tyloids (Fig. 131). Flagellomere I: length 2.0 × width, 1.1 × length of flagellomere II. Scutum shiny, anteriorly coarsely, densely punctate (diameters equal to 0.3 × hindocellar diameter), mesally and posteriorly sparsely punctate (punctures 1 diameter apart). Scutellum densely punctate. Metanotum dull, rugose. Mesopleuron in front of midcoxa densely punctate. Propodeal enclosure reticulate. Propodeal pad narrow, rugose. Petiole equal to tergum I. Hindtibia with spines. Gonostyle dorsal (Fig. 161), lateral (Fig. 191). Penis valve (Fig. 221). Volsella (Fig. 251). Penis valves connecting sclerite (Fig. 311). Sternum VIII (Fig. 280). Length 7.5 mm.

Geographic Distribution: Morocco.

Material Examined: 1♀, 1♂.

Records:

Morocco: Hote Atlas Asni-Imil 1150-1800 m (1♀ RMNH); Aknoul (1♂ FSAG, det. Valkeila).

Pemphredon menkei R. BOHART

Pemphredon menkei R. BOHART 1993: 220, ♀♂. Holotype: ♀, USA: Maryland: Montgomery Co.: Colesville (UCDC).

Diagnosis: Females and males of *Pemphredon menkei* differ from *nearctica* only in a reticulate propodeal enclosure.

Description: Female: Anterior clypeal margin sharply tridentate (Fig. 29). Frons punctato-rugose. Vertex behind ocelli shiny, sparsely punctate (punctures 1-2 diameters apart). Head width 1.5-2.1 × length. Flagellomere I: length 2.2-2.5 × width, 1.2-1.3 × length of flagellomere II. Pronotum lateral finely striate. Scutum with fine microsculpture, anteriorly closely, posteriorly sparsely punctate (punctures 1-3 diameters apart). Scutellum with microsculpture, anteriorly sparsely, posteriorly densely punctate. Metanotum punctate. Mesopleuron in front of midcoxa with microsculpture, sparsely punctate (punctures 1-2 diameters apart). Propodeal enclosure reticulate. Propodeal pad broad, shiny, in some specimens with longitudinal microstriae, dull. Hindtibia with well defined spines. Petiolus shorter than tergum I (length 0.5-0.8 × length of

tergum I). Pygidial plate narrow and excavate (Fig. 62). Recurrent vein postfurcal, submarginal cell II broader than high. Length 8.0-10.5 mm.

Male: Anterior clypeal margin slightly tridentate (Fig. 102). Frons coarsely punctato-rugose. Vertex behind ocelli shiny, with fine microsculpture and irregularly, sparsely punctate (punctures contiguous to 3 diameters apart). Head width 1.7-2.1 × length. Flagellomeres without distinctly delimited tyloids, only flagellomeres VI-VII(VIII) slightly swollen (Fig. 132). Flagellomere I: length 1.9-2.2 × width, 1.0-1.2 × length of flagellomere II. Pronotum lateral finely striate. Scutum anteriorly with microsculpture, densely punctate, posteriorly shiny, sparsely punctate (punctures 1-2 diameters apart). Scutellum anteriorly sparsely punctate, posteriorly punctato-rugose. Metanotum punctato-rugose. Mesopleuron in front of midcoxa with microsculpture, sparsely punctate (punctures 1 diameter apart). Propodeal enclosure reticulate. Propodeal pad in most specimens broad, shiny and finely striate, in some specimens narrow. Midbasitarsus slightly bowed in profile and enlarged in distal half as in *nearctica* (Fig. 80). Hindtibia with spines. Petiolus shorter than tergum I (length 0.7-0.9 × length of tergum I). Recurrent vein postfurcal, submarginal cell II broader than high. Gonostyle dorsal (Fig. 162), lateral (Fig. 192). Penis valve (Fig. 222). Volsella (Fig. 252). Penis valves connecting sclerite (312). Sternum VIII (Fig. 282). Length 7.0-9.0 mm.

Variation: Female: Scutum in some specimens with distinct microsculpture and dull, in others with fine microsculpture and shiny. Male: Middle tooth of anterior clypeal margin is in some specimens short, therefore the emargination appears undivided.

Discussion: R.M. BOHART, (1993: 220) separated *Pemphredon menkei* from *Pemphredon nearctica* KOHL. These species are very similar, they only differ in the shape of the propodeal enclosure: longitudinally ridged in *nearctica* and irregularly rugose in *menkei*. *Pemphredon nearctica* occurs in western Canada and western USA and seems to be a mountain species, *menkei* occurs in Eastern Canada and Eastern USA and so I thought *menkei* to be a subspecies of *nearctica*. However, a few specimens were found in Alaska and Yucon Territories. Some of them had a propodeal enclosure between longitudinally ridged and reticulate. I cannot decide whether they are *nearctica* or *menkei*. But the most specimens can clearly be separated in this two forms and are clearly separated geographically.

Geographic Distribution: Eastern Canada (Yucon Territories), Eastern United States, Alaska,

Material Examined: 143♀♀, 23♂♂

Records:

Canada: 57♀♀, 8♂♂ (CASC, CISC, CNCI, CUIC, PMAE, ROME)
Manitoba: Hogson Life Table Plot; W Stockton.
North West Territories: Norman Wells; Road Stock Lake.
New Brunswick: Caraquet; Fundy National Park; Kouchibouguac National Park;
Newfoundland: South Branch.

Ontario: W Almonte; Constance Bay; Hamilton; Ottawa; Rush Biv. Province Park SE Kenors; Tillsonburg. **Carleton County:** Stiftsville; Elmira; Cors; Bortops. **Lambton County:** Kenora Dist.; Pinery Province.
Quebec: Gatinau Park Luksville Falls.
Yucon Territories: Enginer Creek Dempster Hwy.; Minto Landing; Rampart House.
United States: 86♀♀, 15♂♂ (AEIC, AMNH, CISC, CNCI, CUIC, DEFW, DENH, DFEC, LACM, MCZC, NYSM, PMAE, UMMZ, USNM).
Alaska: Chena Riv. Rec. Area E Fairbanks; Robertson R. Al Hwy 335; Matanuska; Big Delta.
District Of Columbia: Washington.
Illinois: **Mason County:** Sand Ridge St. Forest.
Maine: Brigton; Dryden.
Maryland: Beltsville; Fatuxent Ref. Bowie. **Prince Georg's County:** Patuxent Research Station.
Massachusetts: Chelmsford; Bedford; Provincetown; Cambridge.
Michigan: **Alger County:** Pictured Rock National Lakeshore. **Cheboygan County:** Douglas Lake Biol. Station. **Dickinson County. Iran County. Livingston County:** E. S. George Reserve. **Marquette County:** Huron Montain Club. **St. Josef County:** Tamarack Lake. **Washtenaw County:** Ann Arbor; Stinchfield Woods.
Minnesota: Bemidiji.
New Hampshire: Lee; Pittsburg; Stinson Lake. **Rock County:** SW Durham. **Straf County:** Spruce Hole SW Durham.
New Jersey: Greenwood Lake; West Lebanon.
New York: Ithaca; Big Moose; Old Forge; Kalbfleisch Research Station Huntington Lake. **Albany County:** Pine Bush. **Hamilton County:** Browns Tract bog; Indian Lake. **Levis County:** Tug Hills. **Oneida County:** Verona Beach. **Onondaga County:** Syracuse. **Oswego County:** Mallory; Selkirk Shores State Park. **Ulster County:** Cherrtown NNW Kerhoukson.
Pennsylvania: **York County:** NW Davidsburg.
South Carolina: Cleveland.
Virginia: **Fairfax County:** Annandale.

Pemphredon montana DAHLBOM

Pemphredon montanus DAHLBOM 1845: 262, ♀♂. Lectotype: ♀, Sweden: Faxälven (MZLU), examined. Designated by K. Faester.

Pemphredon angularis W. FOX 1892: 310, ♀♂. Holotype: ♀, USA: New Hampshire, no specific locality (ANSP), examined.

Diagnosis: *Pemphredon montana* is one of several species in which the recurrent vein is postfurcal, the propodeal enclosure is reticulate, and the propodeal pad is transversely striate. The female of *montana* can be recognized by an anterior clypeal margin angularly protruding mesally (Fig. 30), the scutum with fingerprint-like sculpture on each side of the midline, and a broad pygidial plate (Fig. 63). The male of *montana* can be easily recognized by an anterior clypeal margin with a small and deep emargination (Fig. 103).

Description: Female: Anterior clypeal margin angularly protruding mesally (Fig. 30). Frons punctato-rugose. Vertex behind ocelli with microsculpture, sparsely punctate (punctures 1-2 diameters apart). Head width 1.6-2.2 × length. Flagellomere I: length 2.3-2.9 × width, 1.2-1.4 × length of flagellomere II. Scutum with microsculpture, large punctures, posteriorly with dense fingerprint-like sculpture on each side of midline. Scutellum punctato-rugose. Metanotum rugose. Mesopleuron in front of midcoxa with microsculpture, sparsely punctate, no coarse transverse striation as in

lugubris. Propodeal enclosure reticulate. Propodeal pad transversely striate. Hindtibia with spines. Petiole shorter or equal to tergum I (length 0.5-1.0 × length of tergum I). Pygidial plate broad (Fig. 63). Recurrent vein postfurcal, submarginal cell II broader than high. Length 8.5-11.5 mm.

Male: Anterior clypeal margin with a small, deep emargination (Fig. 103). Frons longitudinally punctato-rugose. Vertex behind ocelli with microsculpture, finely punctate (punctures 1-2 diameters apart). Head width 1.8-2.3 × length. Flagellomeres II-VI(VII) slightly swollen, with linear tyloids (Fig. 133). Flagellomere I: length 2.2-3.2 × width, 1.1-1.3 × length of flagellomere II. Scutum with microsculpture, punctato-rugose, posteriorly with fine fingerprint-like sculpture on each side of midline. Scutellum with longitudinal rugae. Metanotum rugose. Mesopleuron in front of midcoxa with microsculpture, no transverse striation as in *lugubris*. Propodeal enclosure reticulate. Propodeal pad dull, transversely ridged. Hindtibia with fine spines. Midbasitarsus straight. Petiole shorter or equal to tergum (length 0.6-1.0 × length of tergum I). Recurrent vein postfurcal, submarginal cell II broader than high. Gonostyle dorsal (Fig. 163), lateral (Fig. 193). Penis valve (Fig. 223). Volsella (Fig. 253). Penis valves connecting sclerite (Fig. 313). Sternum VIII (Fig. 283). Length 7.5-11.0 mm.

Variation: Female: Propodeal enclosure is variable in structure from reticulate to nearly longitudinally ridged.

Geographic Distribution: Holarctic species of northern and mountain areas.

Examined Material: 687♀♀, 85♂♂.

Records:

Austria: 108♀♀, 13♂♂ (BMNH, CSB, CSCH, DMA, GUL, HNSA, KLTA, KSUK, LACM, NHMW, OLML, PBS, RIB, RMNH, UCDC).
Kärnten: Döbriach; Karnische Alpen; Lessachtal; Mölltal; Osternig; Raibl; Viktring; Waidisch bei Ferlach.
Niederösterreich: Dornbach; Emmersdorf near Melk; Erlaufboden; Gaming Dreieckberg; Gaming Neuhaus; Göstling Hochkar; Gresten Schadneramt; Hainfeld; Lunz; Ostrong; Puchenstuben Gösing; Rohr am Gebirge; St. Anton/Jessnitz; St. Georgen/Leys; St. Christofen; Wang.
Oberösterreich: Aisttal bei Prandegg; Gründberg; Hirschbach/M.; Hochlantsch-Gipfel; Innerbreitenau; Neumarkt NE Furtner Teich; Niedere Tauern; Tragöss; Waldschenke; Zellhof Bad Zell; Zeissberg bei Freistadt.
Salzburg: Ferleiten; Goldegg; Maxglan; Parsch; Rauris Bodeshaus 1850 m; Sallfelden; Tamsweg; Tauern Kar-Alm.
Steiermark: Admont; Aflenz; Furtnersteg; Gross-Sölk; Leoben; Mariazell; Mariazell Hoher Student 1430 m; Neumarkt; Ramsau bei Schladming.
Tirol: Iseltal Upeischlach; Kals; Kirchberg Ochsenalm; Lavant; Lienz; Lengberg near Lienz; Nußdorf near Lienz; Oblas; Obertilliach; Scharnitz Karwendelgebirge; St. Johann; St. Jakob near Lienz; Stubaital; Zettersfeld near Lienz.
Vorarlberg: Ittenberg; Lech; Zams.

Canada: 117♀♀, 13♂♂ (AEIC, BMNH, CASC, CISC, CNCI, DEFW, FRLC, LEMQ, MCZC, PMAE, ROME, SMDV, UCDC).
Alberta: Bistcho Lake; Calgary; Elkwater Lake; Jasper Nat. Park; Waterton Lakes.
British Columbia: Apen Crove; Atlin 2200 ft; Dean River; Fernie; Galiano; Hazelton; Keremeos Orofine 4000 ft; Mt. Revelstoke; W Prineton; Robson; Stanley; Salmon Arm; Sawmill Creek Wycliffe 6050 ft; Squamish Diamond Head Trail 3200 ft; Stone Mt. Park 3800ft; Terrace; Vancouver; Wellington.

New Brunswick: Kouchibougiac National Park; **Queens County:** Cumberland Bay.
New Foundland: Agric Exp. St. St. Johns; South Branch.
Nova Scotia: Baddeck; Fire Tower; Kentville. Turo. **Kings County.**
Manitoba: Aweme; The Pas.
Ontario: Almonte. **Carleton County:** Constance Bay; Hamilton; Iroquois Falls; Bigelow Macdiarmid; Macdiarmid; Ottawa; Pinery Province Park. **Lambdon County:** Rush Biv. Province Park SE Kenora; Sudbury; Timagami.
Prince Edward Island.
Quebec: Cap. Chat.; Duchesnay; Gatineau Park; Laniel; Levis; Parke Reserve Kam. Co.; Shawbridge.
Saskatchewan: Pike Lake.
Yucon Territories: Dempster Hwy mi 87, 4500 ft; Eagle R. Dempster Hwy; Engineer

Czechie: 14♀♀ (CTLC, NHMW, OLML). Bor u Skutce; Calákovice; Bobis; Krusné h. Albrechtice-Most env.; Mseno; Sumny dûl Krusné hory; Prachatitz; Schlesien Meltsch.

Finland: 150♀♀, 17♂♂ (AFZH, ZMH). Borga; Esbo; Evo; Finby; Förglö; Haapavesi; Joutsa; Joutseno; Kajaani; Kamar; Kangasala; Karkku; Karuna; Karttula; Karislojo; Karjalohia Lohjantaipale; Keuru; Kirjavalkas; Kittilä; Kodisjoki; Korsbergea; Kuopio; Kuusame Oulanka; Kuru; Kyrsdmo; Kyrkslätt; Lammi; Lankkas; Lappusiata; Lavansaan; Lavia; Lemland; Lojo; Lormaa; Lopp; Mantyharju; Maarianhamina Ytternas; Mäklin; Metsärpirti; Muuruvesi; Myrskyis; Nilnga; Paanajarvi; Pitkasaari; Pisavaara; Porvoon; Rajala Saimakanal; Rautalampi; Raurasalmi; Rovaniemi Ruhtinassalmi; Ruovesi; Salla Kutsa; Satta; Siikajoki; Sotkamo; Suomussalmi; Suoniemi; Tamerf.; Ulcaborg; Urjala; Vanaja; Vehkolahti; Virolahti; Vuonkylä; Vuorikylä. **Alandria:** Appelö; Hammarland; Jomala; Saltvik. **Karelia Borealis:** Hammaslahti. **Nylandia:** Pernaja. **Sakunta:** Suoniemi. **Tavastia Australis:** Aiolahti; Hämeenlinna; Hattula; Janakkala; Kangasala; Lupoioinen; Pälkäne; Pirkkala; Urlaja; Vanaja; Ylöjarvi.

France: 26♀♀ (BITF, CHGF, MNHN). Aiguilles Queyras; Cauterets Potiau 975 m; **Haute-Garonne:** Bouty. **Haute-Savoie:** Le Grenairon 1500 m; Samoens 1300 m; **Haute-Pyrénées:** Orédon. **Isère:** St. Laurent-en-Beaumont. **Savoie:** Poisey-Nancroi.

Germany: 16♀♀, 3♂♂ (BMNH, CJR, CKWS, CSB, KSUK, SMNG, ZMB). Albesich bei Münster; Balderschwang; Böhmerwald Schwarzer See 1040 m; Damelsdorf; Enzkösterle bei Wildbach/Schww.; Haidhof; Hann. Münden; Harz; Klein Schmölen NSG; Leisten; Matzlesberg; Schnaittenbach; Ulm/Donau.

Italy: 5♀♀, 12♂♂ (KSUK, NHMW, PBS, RMNH). **Trentino (Süd-Tirol):** Bozen; Grödental; Kollern bei Bozen; Schlerngebiet; Val Selva.

Japan: 3♀♀, 1♂ (USNM, ZMH). Hokkaido: Jözankei; Kaributo; Sounkyo.

Norway: 2♀♀ (RMNH). Oppland Lom Lia.

Poland: 2♀♀ (BMNH, CASC). Carpatians Pieniny Mts.; Wroclaw.

Russian Federation: 11♀♀, 1♂ (GUSE, NHMW, ZMUM). Irkut; Irkudskaja Obl. Nitsch Neudinsk; Tansbaik. Beresovka b. Werchne-Udinsk; Ussuriysk.

Slovenija: 4♀♀ (PBS). Krajuska gaal; Podkoren.

Sweden: 18♀♀, 2♂♂ (AEIC, HUS, MZLU, NHRS, ZMB). AsL.; Asele SE Basarmyran; As. Fjälltuna Bjornlandet; Jtl. Hammerelal; Häls Loos; Iste Hille; Lu. Lpm. Aktse; Jmtl. Offerdal; Messaure; Nb. Ranea; Norbottan Boden Lulea Elf; Sm. Agunnaryd Nockarp; Sthlm. Rindö; Vb. Degerfors; Vb. Burträsk Avaborg.

Switzerland: 10♀♀, 1♂ (BMNH, CTLC, KSUK, NHMW, OXUM, RMNH, ZMH). Beisal; Randa bei Zermatt; Saasthal; **Valais:** Grimentz; La Sage Val d'Hèrena 1700 m; Riederalpe; Verbier; Ayer S Sidera 1500 m.

United States: 201♀♀, 22♂♂ (AEIC, AMNH, BLCU, BMNH, CASC, CISC, CNCI, CUIC, DENH, DFEC, ISUI, LACM, MCPM, MCZC, NCSU, NDSU, NYSM, PMAE, UCDC, UCMC, UCRC, UICM, UMMZ, USNM, WSUC).
Alaska: Chena Hot Springs; Fairbanks.
Arizona: Colorado City.
California: Giang Forest; Lake Tahoe 6225 ft; Mammoth; **El Dorado County:** Echo Lake 2256 ft; Echo Summit. **Nevada County:** Sagehen Creek. **Placer County:** Lake Forest. **Siskiyou County:** Headwaters S Fork Salmonriver: **Trinity County:** Mtn. Mdw. Rch. Head Coffee Creek 5100 ft. **Toulumne County:** Bumble Bee; Sonora Pass; Strawberry Deadman Creek 9400 ft.

Colorado: Allens Park; Estes Park 9000ft; Gilpindo Lump Gulch; Gould; Longs Park Inn 9000 ft; Steambord Springs 6800 ft. **Boulder County:** Science Lodge; Nederland; Durango.
Connecticut: E Hartford.
District Of Columbia: Washington.
Idaho: Cub River Canyon Fkln Co.; Rock Creek Research Station Sawtooth N. F.; Waha; Wallace; **Kotenai County:** Athol. **Latah County:** Moscow; Moscow Mts.; Robinson. **Shoshone County:** Averny.
Maine: Augusta; De Boulie Mt.; Onto.
Maryland: Mays; **Prince Georg's County:** Patuxent Research Station.
Massachusetts: Bedford; Boston; Brookline; Forest Hills; Meirose Hlps. Fxw.; Sherborne.
Michigan: **Marquette County:** Huron Montain Club. **Washtenaw County:** Ann Arbor.
Minnesota: Itaska Park. **Lake County:** Basswood.
Montana: **Lake County:** Lakeside. **Park County:** Soda Buttle Camp Cook City. **Ravalli County:** Darby.
Newada: **Nye County:** Pine Creek Canyon Toquima Range.
New Hampshire: Durham. **Carr County:** Wonalancet. **Caroll County:** Union. **Coos County:** East Inlet Dam.
New Mexico: **Rio Arriba County:** Jarosaspring SW Coyote 8600 ft.
New York: Babylon; Ithaca; Kalbfleisch Research Station Huntington Long Island; Ludoville; Sea Oliff. **Albany County:** Pinbush. **Dutches County:** Amenia.
North Carolina: Highlands 3800 ft; **Wake County.**
North Dakota: **Rolette County:** Peace Gtns.
Oregon: Crater Lake N. F.; Klamath Falls Algoma; Marshfield; Rhododendron. **Harney County:** Antelope Mt. 6500 ft. **Jackson County:** Colestin.
Pennsylvania: Pittsburg.
Utah: Duchene Winta Mts.; Logan. **Cache County:** Blacksmith Fork Canyon; Beaver Mt. *Logan Canyon; Green Canyon; Tonygroove Ict.; W. Hodgers Canyon.* **Davis County:** *Farmington* Canyon. **Iron County:** Deer Valey. **Juab County:** Mt. Nebo Red Creek. **Rich County:** Logan Canyon Summit. **Weber County:** Willard Peak 8000ft; Willard Basin.
Virginia: **Mountgomery County:** Blacksburg 1000 m; Colesville.
Washington: Friday Harbor; Lake Ann Trail Okanogan Natl. F.; Pullman; Paradise Val Ranier National Park. **Stevens County:** Deer Lake Chewelah.
Wisconsin: **Manitowa County.**
Wyoming: Grand Teton Nat. Park 6700ft; Huckleberry Hot Springs Teton Nat. Forest; Old Faithful Yellostone Park.

Pemphredon montanella DOLLFUSS

Pemphredon montanella DOLLFUSS 1993: 698, ♀. Holotype: ♀, USA: Arizona: Cohise Co.: S. W. R. S. 5 *mi* W Portal (AMNH), *examined.*

Diagnosis: *Pemphredon montanella* can be recognized by the following: the recurrent vein is postfurcal, the propodeal enclosure is reticulate, and the propodeal pad is broad and shiny. The female has a shiny scutum with fine microsculpture and large punctures confluent into slight longitudinal furrows posteriorly. The flagellomeres II-VIII of males of *montanella* with linear tyloids. *Pemphredon lethifer* differs from *montanella* only in a recurrent vein antefurcal to interstitial.

Description: Female: Anterior clypeal margin obtusely angulate and protruding mesally (Fig. 31). Clypeus shiny, sparsely punctate. Frons with microsculpture and punctato-rugose. Vertex behind ocelli shiny, irregularly punctate (punctures 1-2 diameters apart). Head width 1.9-2.0 × length. Flagellomere I: length 1.7-2.0 × width, 1.1-1.2 × length of flagellomere II. Scutum shiny with fine microsculpture and large dense or almost dense punctation, punctures confluent into slight longitudinal furrows

posteriorly. Scutellum similar to scutum punctate. Metanotum punctate. Propodeal enclosure reticulate. Propodeal pad broad, shiny. Mesopleuron in front of midcoxa similarly sculptured as in scutum. Petiole slightly shorter than tergum I (length 0.8-0.9 × length of tergum I). Hindtibia with spines. Recurrent vein postfurcal, submarginal cell II broader than high. Pygidial plate broad and flat (Fig. 64). Length 7.0-8.5 mm.

Male: Anterior clypeal margin emarginate (Fig. 104), and sparsely punctate (punctures 1-2 diameters apart). Frons densely punctate. Vertex behind ocelli shiny, punctate (punctures 1 diameter apart) and with slight transverse rugae. Head width 2.0-2.7 × length. Flagellomeres II-VIII with linear tyloids (Fig. 134). Flagellomere I: length 1.6-1.7 × width, 1.0-1.1 × length of flagellomere II. Scutum shiny, anteriorly densely punctate, posteriorly sparsely punctate (punctures 2-4 diameters apart). Scutellum shiny, sparsely punctate (punctures 3-4 diameters apart). Metanotum shiny, punctate. Propodeal enclosure reticulate. Propodeal pad broad, shiny. Mesopleuron in front of midcoxa shiny, punctate (punctures 1-2 diameters apart). Petiole equal to tergum I. Recurrent vein postfurcal, submarginal cell II broader than high. Gonostyle dorsal (Fig. 164), lateral (Fig. 194). Penis valve (Fig. 224). Volsella (Fig. 254). Penis valves connecting sclerite (Fig. 314). Sternum VIII (Fig. 284). Length 6.0-7.0 mm.

Geographic Distribution: Northern Mexico, United States (Arizona).

Material Examined: 2♀♀, 3♂♂.

Records:

Mexico: **Chihuaha:** Majalca Road 6000ft 35 mi NW Chihuahua (1♂ CNCI).

United States:

Arizona: Portal Rustler Park (1♀ CNCI); Prescott (2♂♂ USNM). **Cochise County:** W. Portal 5400ft (1♀ AMNH).

Pemphredon morio VANDER LINDEN

Pemphredon morio VANDER LINDEN 1829: 82, ♀. Holotype: ♀, Belgium: Bruxelles (type lost).

Ceratophorus anthracinus F. SMITH 1851: 126, ♀. Lectotype: ♀, England: Devonshire: no specific locality (OXUM), examined. Designated by K. Faester.

Pemphredon carinatus THOMSON 1870: 236, ♀. Lectotype: ♀, Sweden: Sällsyut (MZLU), examined. Designated by K. Faester. Synonymized with *anthracinus* by FAESTER 1951: 452.

Pemphredon clypealis THOMSON 1870: 236, ♀♂. Lectotype: ♀, Sweden: Äfven (MZLU), examined. Designated by K. Faester. Synonymized with *morio* by DOLLFUSS 1991: 62.

Pemphredon intermedius TSUNEKI 1951: 186, ♀♂. Holotype: ♀, Japan: Sapporo (USNM), examined. Synonymized with *morio* by R. BOHART in BOHART & MENKE 1976: 182.

Diagnosis: *Pemphredon morio* is characterized by the following easily notable features: anterior clypeal margin with a deep emargination, on each side delimited by a rounded tooth (Fig. 32 and 105), the frons between antennal sockets with a well-defined projecting horn and a length of petiole 0.2-0.5 × length of tergum I.

Description: Female: Anterior clypeal margin with a deep emargination, on either side delimited by a rounded tooth (Fig. 32). Labrum large projecting like a tongue. Mandible narrow, bidentate. Frons between antennal sockets with a well-defined projecting horn. Frons punctato-rugose. Vertex behind ocelli shiny, sparsely punctate (punctures one diameter apart). Head width 1.6-2.7 × length. Flagellomere I: length 1.2-1.8 × width, 0.9-1.3 × length of flagellomere II. Scutum shiny, sparsely punctate (punctures 1-2 diameters apart). Scutellum smooth, shiny. Metanotum shiny, irregularly punctate. Mesopleuron in front of midcoxa shiny with fine microsculpture and sparse punctation (punctures 2 diameters apart). Propodeal enclosure reticulate. Propodeal pad broad, shiny. Hindtibia with spines. Petiole short (length 0.2-0.5 × length of tergum I). Pygidial plate broad (Fig. 65). Recurrent vein varying from postfurcal to interstitial, submarginal cell II higher than broad. Length 4.0-9.5 mm.

Male: Anterior clypeal margin with a deep emargination and a small tooth in the middle of the emargination, and delimited by a rounded tooth on each side (Fig. 105). Mandible narrow, tridentate. Labrum large, projecting like a tongue. Frons between antennal sockets with a well-defined projecting horn. Frons punctato-rugose. Vertex behind ocelli shiny, punctate (punctures 1 diameter apart). Head width 2.0-2.2 × length. Flagellomeres without tyloids (Fig. 135). Flagellomere I: length 1.4-2.0 × width, 1.0-1.4 × length of flagellomere II. Scutum shiny, sparsely punctate (punctures 2 diameters apart). Scutellum smooth, shiny. Metanotum shiny, punctate. Mesopleuron in front of midcoxa smooth, shiny and sparsely punctate (punctures 2 diameters apart). Propodeal enclosure reticulate. Propodeal pad broad, shiny. Hindtibia with short spines. Petiole short (length 0.3-0.5 × length of tergum I). Recurrent vein varying from postfurcal to interstitial, submarginal cell II higher than broad. Gonostyle dorsal (Fig. 165), lateral (Fig. 195). Penis valve (Fig. 225). Volsella (Fig. 255). Penis valves connecting sclerite (Fig. 315). Sternum VIII (Fig. 285). Length 4.0-7.5 mm.

Variation: Dr. O. Lomholdt, Kobenhavn, Danmark, has kindly sent me 22 females and 16 males of *Pemphredon morio* reared from the same piece of timber. The body length of this females varied from 5.0-7.5 mm, and those of males from 4.0-6.5 mm. There were also males with a reduced projecting horn between antennal sockets, in one male there was only a scar instead of a horn.

Geographic Distribution: Palearctic.

Material Examined: 320♀♀, 129♂♂.

Records:

Austria: 59♀♀, 28♂♂ (CASC, CSB, CSCH, DMA, GUL, HNSA, KLTA, LACM, NHMW, OLML, RIB).
Burgenland: Winden/See.
Kärnten: Afritzer See 800 m; Lessachtal; Viktring.
Niederösterreich: Bisamberg; Dornbach; Emmersdorf near Melk; Hinterbrühl; Hochrieß; Perwarth; Purgstall Schauboden; Scheibbs Hochkogelberg; Schneeberg; St. Pölten Eniklberg; Weitra; Wien Lobau; Wien Mauer.
Oberösterreich: Albern/Naarn; Dörnbach bei Linz; Innerbreitenau; Linz Plesching; Linz St. Martin.
Salzburg: Salzburg Parsch.

Steiermark: Admont; Gross-Sölk; Krottendorf SE Weiz; Mariazell; St. Andrä Sausal. Tirol: Scharnitz Karwendelgebirge; Wilder Kaiser. **Ost-Tirol:** Lienz; Matrei; Nußdorf.

Belgium: 3♀♀, 1♂ (FSAG). Boendael; Embourg; Sauventière Baudecet; Soumagne.

Czechie: 17♀♀, 8♂♂ (CTLC, NHMW, OLML). Dobris; Drahor; Kruäné; Krusné hory; Kynlvart; Meltsch; Pisecný vrch; Vranow; Vesely;Zatecká.

Danmark: 22♀♀, 16♂♂ (ZMUC). Nordsjaelland Stenille NV Kobenhavn.

Great Britain: 54♀♀, 19♂♂ (BMNH, FBSE, OXUM). Black-Heath; Byfleet Mortimer; Cobham; Colchester; Efail Isaf; Hampshire; Harwood; Hastings; London; Mildenhall; Mill Hill; New Forest; Oxhott; Porchester; Surrey; Wimborne; Wicken. **Essex. Hauts:** Baulien; Calshot; Romsey Awbridge; Winchester. **Kent:** Arlesfood; Bleau; Chatenden; Randal Wood. **Sussex:** Frant.

Finland: 61♀♀, 22♂♂ (AFZH, MZLU, ZMH). Basserge; Borgä; Finby; Joutseno; Kalvola; Karjalohja; Karislojo; Kemin; Kouvoia; Korsberga; Kuusame; Lappeerauta; Lapinlahti; Leppävirta Lohja; Lemläälä; Maarianhamina; Metsäpirtti; Naantali; Pärna; Pälkäne; Pielsjarvi; Pyhäjarvi; Rautavaara; Rovaniemi; Runsala; Rovaniemi; Saarijarvi; Säkisato; Somaro; Sortavala; Tampere; Uskela; Virrat. **Abo:** Turku. **Alandia:** Appelö; Eckerö; Jonala. **Karelia Borealis:** Hammaslahti. **Nylandia:** Helsinki. **Satakunta:** Loimaa. **Tavastia Australis:** Aiolahti; Hämeenlinna; Hattula; Kangasala; Pirkkala; Vanaja; Ylojärvi.

France: 28♀♀, 6♂♂ (BITF, CHGF, MNHN). Châteaudun St. Jean; Engliseu-les-Bains; Marboué; Marestain; Miramonti; Preixan; Tence (H. L.); Toulouse; Tournet. **Haute-Savoie:** Frangy Bossy. **Eure-et-Loir:** St. Christophe.

Germany: 41♀♀, 10♂♂ (CCJW, CJR, CKWS, GKD, HUO, KSUK, NHMW, RIB, SEM, SMNG, UMBB, ZMB). Aken/E.; Balderschwang; Blankenburg Thüringen; Bremen; Enzklösterle bei Wildbad Schww.; Erzgebirge; Forfim Neckermann; Halle/Saale; Jena Zwaetzen; Lohe/M.; Löderbauer Berg; Lütjenburg Hünengrab; Mainz; Menkendorf; Mühlacker BW Lomersheim; Neumühlen Verden/A.; Oldenburg; Schnaittenbach Haidhof; Usedom Paske; Vilshofen Knadlarn; Wurzen Sa.

Hungary: 2♀♀, 2♂♂ (HNHM). Kivenar; Mátraháza; Ör Sz. Mikl's Sajo; Szliács.

Italy: 3♀♀, 2♂♂ (CHGF, PTI). Aoste Courmayeur Val Veni. **Piemonte:** Ceva; Condove; Langhe San Benedetto Belbo; Rovasenda.

Japan: 2♀♀, 3♂♂ (USNM). Sapporo.

Kazakhstan: 1♂ (CASC). Alma Ata (Medeo).

Netherlands: 1♀ (RMNH). Chaam Huisdreef.

Poland: 2♀♀, 5♂♂ (CASC, ZMB). *Lososiowice near Wolów; Misdroy; Nizhniyaya Kuriya W* Perm.

Russian Federation: 2♀♀ (CASC, HNHM). Kamai SE Kungur; Tompa.

Slovakia: 1♀ (OLML). Moldava.

Slovenija: 1♀ (PBS). Podkoren.

Sweden: 14♀♀, 5♂♂ (AEIC, HUS, MZLU, NHRS). Bastas; Messaure; Ög. Simonstorp; Sm. Östrakoröberga; Bl. Rödeby; Visby Gotland; Vb. Umea Salomonsbesök; Vb. Savar SV Ivarsboda.

Switzerland: 5♀♀, 1♂ (BMNH, CBH, KSUK, RMNH). Ayer S Sidera 1500 m; Freiburg; **Valais:** Geimen-Blatker 1000 m;La Sage 1700 m; N Verbier 6000 ft.

Turkey: 2♀♀ (CHN, DMA). **Hakkari:** Sat Dag Varegös SW Yüksekova 1700 m; **Van:** Van 1800 m.

Pemphredon nearctica KOHL

Pemphredon nearctica KOHL 1890: 55, ♀♂. Lectotype: ♀, USA: Nevada: Morrison (NHMW), examined. Present designation.

Pemphredon cockerelli ROHWER 1909: 103, ♀. Holotype: ♀, USA: Colorado: Florissant (USNM). Synonymized with *nearctica* by R. BOHART in BOHART & MENKE 1976: 182.

Diagnosis: *Pemphredon nearctica* is one of several species in which the recurrent vein is postfurcal, the propodeal enclosure is longitudinally ridged, and the propodeal pad is broad, and in most specimens finely striate. The female of *nearctica* can be easily recognised within the Nearctic species by an anterior clypeal margin distinctly tridentate (Fig. 33). The flagellomeres of males of *nearctica* are without well-defined tyloids (Fig. 136), and the midbasitarsus is slightly bowed in profile and enlarged in distal half (Fig. 80).

Description: Female: Anterior clypeal margin distinctly tridentate (Fig. 33). Frons punctato-rugose. Vertex behind ocelli shiny, sparsely punctate (punctures one to two diameters apart). Head width 1.6-2.1 × length. Flagellomere I: length 2.3-2.5 × width, 1.2-1.4 × length of flagellomere II. Pronotum lateral finely striate. Scutum with fine microsculpture, anteriorly closely, posteriorly sparsely punctate (punctures 1-3 diameters apart). Scutellum with microsculpture, anteriorly sparsely, posteriorly densely punctate. Metanotum punctate. Mesopleuron in front of midcoxa with microsculpture and sparsely punctate (punctures 1-2 diameters apart). Propodeal enclosure longitudinally ridged. Propodeal pad broad, shiny, in some specimens with microsculpture, dull. Hindtibia with well defined spines. Petiole shorter than tergum I (length 0.5-0.8 × length of tergum I). Pygidial plate narrow, excavate (Fig. 66). Recurrent vein postfurcal, submarginal cell II broader than high. Length 9.0-10.5 mm.

Male: Anterior clypeal margin slightly tridentate (Fig. 106). Frons coarsely punctato-rugose. Vertex behind ocelli shiny, with fine microsculpture and irregularly sparsely punctate (punctures contiguous to 3 diameters apart). Head width 1.7-2.1 × length. Flagellomeres without well-defined tyloids (Fig. 136), only flagellomeres VI-VII(VIII) slightly swollen. Flagellomere I: length 2.0-2.2 × width, 1.0-1.2 × length of flagellomere II. Pronotum lateral finely striate. Scutum anteriorly with microsculpture and densely punctate, posteriorly shiny and sparsely punctate (punctures 1-2 diameters apart). Scutellum anteriorly sparsely punctate, posteriorly punctato-rugose. Metanotum punctato-rugose. Mesopleuron in front of midcoxa with microsculpture and sparsely punctate (punctures 1 diameter apart). Propodeal enclosure longitudinally ridged. Propodeal pad broad and shiny, in most specimens finely striate. Midbasitarsus slightly bowed in profile and enlarged in distal half (Fig. 80). Hindtibia with spines. Petiole shorter than tergum I (length 0.7-0.9 × length of tergum I). Recurrent vein postfurcal, submarginal cell II broader than high. Gonostyle dorsal (Fig. 166), lateral (Fig. 196). Penis valve (Fig. 226). Volsella (Fig. 256). Penis valves connecting sclerite (Fig. 316). Sternum VIII (Fig. 286). Length 7.5-9.5 mm.

Variation: Female: Scutum in some specimens with distinct microsculpture and dull, in others with fine microsculpture and shiny. Male: Middle tooth of anterior clypeal margin in some specimens short, therefore the emargination appears undivided.

Discussion: *Pemphredon menkei* is very similar to *nearctica*. The two species differ only in the shape of the propodeal enclosure: longitudinally ridged in *nearctica* and irregularly rugose in *menkei*. This is a bit problematic. In some specimens propodeal enclosure is intermediate. *Pemphredon nearctica* is a mountain species and occurs only in Western Canada and Western USA. Nearly all examined specimens of *menkei* occur in Eastern Canada and Eastern USA and therefore I thought *menkei* to be a subspecies of *nearctica*. However, a few specimens were found in Alaska and Yucon territories. Therefore it would be better to treat *menkei* as a species, looking forward to further research to clear up this problem.

Geographic Distribution: Western Canada, western United States.

Material Examined: 94♀♀, 73♂♂.

Records:

Canada: 16♀♀, 5♂♂ (AMNH, CNCI, CISC, DEFW, PMAE).
Alberta: Bilby; Cardinal Riv. rec. area; Johnston Canyon 4700 ft.
British Columbia: Diamond Head Trail Garibaldi Park; Lac La Hache; Mt. Revelstone National Park 2500 ft; Vernon Pender Harbor Hotel Lake; Robson; Trinity Valley.

United States: 78♀♀, 68♂♂ (AEIC, AMNH, ANSP, BLCU, BMNH, CASC, CISC, CNCI, CUIC, DEUN, LACM, MCZC, NHMW, ROME, SEMC, UCDC, UICM, USNM, WSCU).
Arizona: Flagstaff 9400 ft.
California: **El Dorado County:** Ice House Reservoir; Echo Lake 7400 ft. **Fresno County:** Huntington Lake 7000 ft: **Iuyo County:** Whitney Portal. **Modoc County:** Wly Lake. **Mono County:** Blanco's Coral White Mt. 10000ft; Cottonwood Creek; Leavitt Meadow 7200ft; Mono Lake; Toms Place Rock Creek Campground 2195 m. **Nevada County:** Hebart Mills Saghen; Saghen Creek; Saghen Creek Fld. St. N Truckey. **Placer County:** Bayview Camp Lake Tahoe; Tahoe; Tahoe National Forest Granlibakkeu Ski Res. SW Tahoe. **Sierra County:** Yuba Pass; Independance Lake; Weber Lake. **Siskiyou County:** Poker Flat NW Happy Camp 5040 ft; Road to Taler Lake S Sawers 5700 ft. **Trinity County:** Carville. **Toulumne County:** Cow Creek NE Strawberry; Sonora Pass 8000ft; Angora Peak 8025 ft.
Colorado: **Chaffee County:** Chalk Creek W Natrop; Montrose. **Gunison County:** Gothic Rocky Mt. Birl. Lab. 9470ft; Doolithle Ranch Mt. Evans 9800ft; Nederland Science Lodge 9500 ft.
Idaho: Stanley; Moscow Mt. **Fremont County:** Lookost Pass. **Lemhi County:** Meadow Lake W Gilmore.
Nebraska: Chadron.
Nevada: Morrison; Mt. Rose 6500 ft.
New Mexico: **Cibola County:** Diener Canyon S Bluewater Lake 8450 ft.
Oregon: Grater Lake; Pinehurst; Talifate Westar 5000 ft. **Lake County:** Middle Fork Crooked Creek Warner Mts.
Utah: **Box Elder County:** Mantua Devills Gate; Willard Peak 9000 ft. **Cache County:** Franklin Basin; Logan Canyon; Tony Grove Creek. **Juab County:** Mt. Nebo Loop. **Salt Lake County:** Parleys Canyon. **Summit County:** Henry's Fork Park. 9600 ft; Slope Unita Mts. near Shingle Campground 7525 ft. **Weber County:** Willard Basin.
Washington: **Pierce County:** Pleasant Valley.

Pemphredon oreades VALKEILA

Pemphredon oreades VALKEILA 1972: 12, ♀. Holotype: ♀, West-Pakistan: Murree 2330 m (FSAG), examined.

Diagnosis: The female of *Pemphredon oreades* can be recognized by the following: the recurrent vein is postfurcal, the propodeal enclosure is anteriorly with short

irregular rugae and posteriorly finely striate, not margined, and the propodeal pad is broad and shiny. *Pemphredon oreades* differs from *flavistigma* in the sculpture of scutum, which is in *oreades* nearly smooth and sparsely punctate, and in *flavistigma* irregularly punctato-rugose. *Pemphredon oreades* differs from *lugubris, montana* and *japonica* in the shape of anterior clypeal margin (Fig. 34) and structure of scutum. *Pemphredon oreades* differs from *podagrica* in the shape of anterior clypeal margin, which is in *podagrica* slightly tridentate, and the shape of pygidial plate, which is in *podagrica* narrow and in *oreades* broad. *Pemphredon oreades* differs from *koreana* in the shape of clypeus, which is in *koreana* slightly tridentate, in the structure of scutum, which is in *koreana* punctato-rugose, and in pygidial plate, which is in *koreana* narrow. The male is unknown.

Description: Female: Anterior clypeal margin semicircularly, nearly triangularly emarginate (Fig. 34). Frons punctate (punctures 1 diameter apart). Vertex behind ocelli smooth, shiny, irregularly and sparsely punctate (punctures 1-5 diameters apart). Head width 1.8 × length. Flagellomere I: length 2.6 × width, 1.1 × length of flagellomere II. Scutum shiny with fine microsculpture, anteriorly elongately punctate (punctures 2 diameters apart), posteriorly nearly smooth, finely and sparsely punctate. Scutellum shiny with fine microsculpture, anteriorly without punctures, posteriorly punctate. Metanotum shiny, punctate. Mesopleuron in front of midcoxa shiny with fine microsculpture, punctate. Propodeal enclosure anteriorly with short irregular rugae, posteriorly finely striate and not margined. Propodeal pad broad, shiny. Hindtibia with spines. Petiole longer than tergum I (length 1.2 × length of tergum I). Pygidial plate broad (Fig. 67). Recurrent vein postfurcal, submarginal cell II somewhat broader than high. Length 9.5 mm.

Male: unknown.

Variation: Nothing can be said about variation, I only examined the holotype.

Discussion: Maybe the male described by TSUNEKI (1966: 14) as *Pemphredon shirozui* belongs to *oreades*.

Geographic Distribution: Pakistan.

Pemphredon orientalis VALKEILA

Pemphredon orientalis VALKEILA 1972: 19, ♀. Holotype: ♀, China: Guangdong Guangzhou (USNM), examined.

Diagnosis: The female of *Pemphredon orientalis* is characterized by the following: the recurrent vein either antefurcal or interstitial, the propodeal enclosure is somewhat reticulate on basis, posteriorly longitudinally ridged. The anterior clypeal margin is tridentate with lateral teeth more developed than middle tooth (Fig. 35). *Pemphredon orientalis* differs from *austriaca* in the shape of clypeus and more sparsely punctation on scutum. *Pemphredon maurusia* differs from *orientalis* in the ante-

rior clypeal margin more protruding and slightly tridentate (Fig. 28). The male is unknown.

Description: Female: Anterior clypeal margin tridentate with lateral teeth more developed than middle tooth (Fig. 35). Frons punctato-rugose. Vertex behind ocelli shiny and irregularly, distinctly punctate (punctures contiguous to 2 diameters apart). Head width 1.5-1.8 × length. Flagellomere I: length 2.0-2.2 × width, 1.2-1.4 × length of flagellomere II. Scutum shiny, anteriorly coarsely, densely punctate, posteriorly coarsely and sparsely punctate (punctures 1-2 diameters apart). Scutellum shiny, anteriorly coarsely and sparsely punctate, posteriorly densely punctate (punctures like in scutum). Metanotum densely punctate. Mesopleuron in front of midcoxa coarsely, densely punctate. Propodeal enclosure somewhat reticulate on basis, posteriorly longitudinally ridged. Propodeal pad broad, finely striate, in some specimens narrow. Hindtibia with spines. Petiole approximately equal to tergum I (length 0.8-1.1 × length of tergum I). Pygidial plate broad (Fig. 68). Recurrent vein varying from antefurcal to interstitial, submarginal cell II higher than broad. Length 8.5-9.5 mm.

Male: unknown.

Geographic Distribution: China, Laos, Thailand.

Material Examined: 2♀♀.
Records:
Laos: **Sayaboury**: Sayaboury (1♀ BPBM).
Thailand: Buriram Vil. 9, Salangpan Lamplairmat (1♀ UCRC).

Pemphredon podagrica CHEVRIER

Pemphredon podagricus CHEVRIER 1870: 268, ♀♂. Lectotype: ♂, Switzerland: Nyon (MHNG), examined. Present designation.

Pemphredon laeviceps GUSSAKOVSKIJ 1932: 7, ♀. Holotype: ♀, Russian Federation: Vladivostok Tigrovaya (NHRS), examined. New synonym.

Diagnosis: *Pemphredon podagrica* is one of the several species in which the recurrent vein is postfurcal, the propodeal enclosure is reticulate, and the propodeal pad is broad and smooth or finely striate. The female of *podagrica* can be recognized by an anterior clypeal margin somewhat protruding and slightly tridentate, middle tooth raised (Fig. 36), and shiny scutum, anterior part densely punctate, posterior part nearly smooth. *Pemphredon podagrica* differs from *japonica* in the shape of clypeus and structure of scutum, which is in *japonica* coarsely sculptured. The female of *flavistigma* differs from *podagrica* in having an anterior clypeal margin semicircularly emarginate (Fig. 15). The female of *beaumonti* differs from *podagrica* in having a protruding and rounded anterior clypeal margin (Fig. 11). The male of *podagrica* is easily to recognize by the shape of midbasitarsus (Fig. 79).

Description: Female: Anterior clypeal margin somewhat protruding and slightly tridentate, middle-tooth raised (Fig. 36). Frons finely punctate (punctures contiguous to 1 diameter apart). Vertex behind ocelli shiny, sparsely punctate (punctures 2-5 diameters apart). Head width 1.5-2.0 × length. Flagellomere I: length 1.5-2.0 × width, 1.1-1.4 × length of flagellomere II. Scutum shiny, anterior part densely punctate, posterior part nearly smooth. Scutellum shiny, sparsely punctate (punctures 1-3 diameters apart). Metanotum punctate. Mesopleuron in front of midcoxa shiny, punctate (punctures 1-2 diameters apart). Propodeal enclosure reticulate. Propodeal pad broad, smooth or finely striate. Hindtibia with spines. Petiole shorter than tergum I (length 0.6-0.8 × length of tergum I). Pygidial plate narrow, apically rounded, excavate (Fig. 69). Recurrent vein postfurcal, submarginal cell II broader than high. Length 9.0-11.5 mm.

Male: Anterior clypeal margin protruding (Fig. 107). Frons densely punctate. Vertex behind ocelli shiny and sparsely punctate (punctures 1-3 diameters apart). Head width 1.5-2.0 × length. Flagellomeres without well-defined tyloids, only flagellomeres V-VIII slightly swollen (Fig. 137). Flagellomere I: length 1.6-2.0 × width, 1.0-1.3 × length of flagellomere II. Scutum shiny, irregularly punctate (punctures 1-4 diameters apart). Scutellum densely punctate. Metanotum rugose. Mesopleuron in front of midcoxa shiny, sparsely punctate (punctures 2-3 diameters apart). Propodeal enclosure reticulate. Propodeal pad broad with fine striae, in some specimens nearly smooth. Midbasitarsus distinctly curved and dilated distally (Fig. 79). Hindtibia with spines. Sterna II-IV with long setae (length 0.5 × length of midbasitarsus). Petiole shorter than tergum I (length 0.5-0.8 × length of tergum I). Recurrent vein postfurcal, submarginal cell II broader than high. Gonostyle dorsal (Fig. 167), lateral (Fig. 197). Penis valve (Fig. 227). Volsella (Fig. 257). Penis valve connecting sclerite (Fig. 317). Sternum VIII (Fig. 287). Length 8.0-12.0 mm.

Variation: In one specimen of Switzerland the recurrent vein is interstitial.

Geographic Distribution: Palearctic.

Material Examined: 23♀♀, 62♂♂.

Records:

Andorra: no specific locality 1♂ (ZMH).

Austria: 14♀♀, 32♂♂ (AFZH, CSB, CSCH, HNSA, KLTA, LACM, MHNG, NHMW, OLML).
Kärnten: Victring.
Niederösterreich: Piesting.
Oberösterreich: Hörsching; Linz-Ebelsberg; Linz-Haslgraben; Linz-Traun; Linz Urfahr;Windischgarsten.
Salzburg: Glasenbach; Salzburg Parsch.
Tirol: **Ost-Tirol:** Dölsach ; Nußdorf.

France: 1♀, 12♂♂ (CHGF, MNHN).
Broût-Vernet. **Haute-Savoie:** Gaillard. **Isère:** Pare Guy Pape Grenoble; St. Laurent-en-Beaumont Les Miards.

Germany: 3♀♀, 3♂♂ (AFZH, CSB, UMBB, ZMB).
Bodensdorf; Freyburg; Freiburg i. Br.; Thuringia; Waseneiler Kaiserstuhl.

Italy: 1♀, (PTI). **Piemonte:** Giagione (TO).

Japan: 2♀♀, 5♂♂ (CASC, USNM). Saitama Honshu Mt. Jyomine; Sapporo.
Romania: 1♂ (CJR). Brasov Timpa 1000 m.
Russian Federation: 1♀ (NHRS). Vladivostok Tigovaja.
Serbija: 1♂ (HNHM). **Kosovo:** Mts. Sar Brezovica 1000 m.
Switzerland: 1♀, 7♂♂ (MHNG, MZLS, NHMW, OXUM). Bex; Burgdorf; Genève; Vaud Bousseus.

Pemphredon pulawskii DOLLFUSS

Pemphredon pulawskii DOLLFUSS 1993: 696, ♀♂. Holotype: ♀, USA: Virginia: Faifax Co.: Near Annendale (USNM), examined. Allotype: ♂, USA: New Jersey: Burlington Co.: Lebanon St. For. (MCZC), examined.

Diagnosis: *Pemphredon pulawskii* differs from all Nearctic species in having the broad transverse ridges on the scutum (Fig. 75). The female of the Oriental species *Pemphredon laotis* differs from *pulawskii* in having longitudinal ridges on the propodeal enclosure and a shiny pad surrounding it.

Description: Female: Anterior clypeal margin with small teeth, some specimens only with short tooth mesally (Fig. 37). Frons punctato-rugose. Vertex shiny, irregularly sparsely punctate (punctures contiguous to 3 diameters apart). Head width 1.5-2.3 × length. Flagellomere I: length 1.9-2.3 × width, 1.0-1.3 × length of flagellomere II. Scutum shiny, with broad transverse ridges (Fig. 75), anteriorly punctate. Scutellum coarsely, densely punctato-rugose. Metanotum densely punctato-rugose. Propodeal enclosure coarsely reticulate. Propodeal pad narrow, coarsely rugose. Mesopleuron in front of midcoxa with fine microsculpture and flat broad transverse ridges, or reticulately rugose. Hindtibia with spines. Petiole shorter than tergum I (length 0.6-0.8 × length of tergum I). Pygidial plate broad, distally excavate and surrounded by a distinct carina (Fig. 70). Recurrent vein postfurcal, submarginal cell II broader than high or equal. Length 7.0-9.0 mm.

Male: Anterior clypeal margin slightly emarginate (Fig. 108). Frons punctato-rugose. Vertex behind ocelli shiny, irregularly punctate (punctures contiguous to 2 diameters apart). Head width 1.6-2.0 × length. Flagellomeres without well-defined tyloids (Fig. 138). Flagellomere I: length 1.9-2.1 × width, 1.1-1.2 × length of flagellomere II. Scutum anteriorly punctate, mesally shiny and with broad transverse ridges as in female, but more flat. Scutellum coarsely, densely punctate. Metanotum rugose. Propodeal enclosure reticulate. Propodeal pad narrow, in most specimens rugose. Mesopleuron in front of midcoxa shiny, with dense coarse punctation. Hindtibia with spines. Midbasitarsus straight and gradually enlarged from base. Petiole shorter than tergum I (length 0.6-0.8 × length of tergum I). Recurrent vein postfurcal, submarginal cell II broader than high or equal. Gonostyle dorsal (Fig. 168), lateral (Fig. 198). Penis valve (Fig. 228). Volsella (Fig. 258). Penis valves connecting sclerite (Fig. 318). Sternum VIII (Fig. 288). Length 7.0-7.5 mm.

Variation: The transverse ridges on scutum are evanescent in some specimens.

Geographic Distribution: Canada (Ontario), United States.

Material Examined: 38♀♀, 11♂♂.

Records:

Canada: 1♀. Ontario: Calabogie (1♀ PMAE).

United States: 37♀♀, 11♂♂.

Arkansas: **Yell County:** NE Danville (1♂ MUIC).
District Of Columbia: Rock Creek-Park (1♀ USNM); Washington (1♀ USNM).
Georgia: Stone Mt. (1♀ UCDC); **Richmond County:** Ft. Gordon (1♀ UCDC).
Maine: **York County:** West Lebanon (1♀ DENH).
Maryland: **Montgomery County:** Great Falls (1♀ UCDC). **Prince Georg's County:** Patuxent Research Station (1♀ PMAE)
Massachusetts: Boston (3♀♀ CASC); Sagamore (1♀ MCZC); Walpole (1♀ MCZC); Woods Hole (1♀ MCZC).
Michigan: Iron River (1♀ AEIC). **Cheboygan County:** Douglas Lake Biol. Station (1♀ UMMZ). **Marquette County:** Huron Montain Club (1♀ UMMZ).
Nebraska: Nehawka (7♀♀ 9♂♂ DEUN).
New Hampshire: **Straf County:** NE Durhan (2♀♀ DENH).
New York: Ithaca (1♀ MCZC, 1♀ AMNH); Kalbfleisch Research Station Huntigton (5♀♀ AMNH). **Albany County:** Pine Bush (1♀ NYSM).
North Carolina: **Wake County:** (1♀ AEIC).
Virginia: **Fairfax County:** Fort Munt (1♀ CASC).

Pemphredon rileyi W. Fox

Pemphredon rileyi W. Fox 1892: 310, ♀♂. Holotype: ♀, USA: California: Placer County: no specific locality (USNM), examined.

Diagnosis: *Pemphredon rileyi* can be recognized by the following: the recurrent vein is postfurcal, the propodeal enclosure is longitudinally ridged, and the propodeal pad is broad and shiny, in some specimens finely striate. The female of *rileyi* is characterized by having an anterior clypeal margin deeply emarginate (Fig. 38), and the scutum shiny with shallow punctures and law irregular wrinkles. The male of *rileyi* can be recognized by the following: the anterior clypeal margin is broadly emarginate (Fig. 109), the flagellomeres I-VII(VIII) have linear tyloids, and the flagellomeres II-VII are swollen beneath (Fig. 139). The length of the flagellomere I is equal to flagellomere II. The males of *rileyi* and *confertim* are similar, they only differ in the shape of penis valve (Fig. 229) and volsella (Fig. 259). Dissecting the male genitalia is necessary for identification.

Description: Female: Anterior clypeal margin deeply emarginate (Fig. 38). Frons punctato-rugose. Vertex behind ocelli shiny, sparsely punctate (punctures 1-3 diameters apart). Head width 1.6-2.0 × length. Flagellomere I: length 2.0-2.5 × width, 1.1-1.4 × length of flagellomere II. Scutum shiny with shallow punctures and law irregular wrinkles. Scutellum shiny, with shallow punctures (punctures 2-4 diameters apart). Metanotum shiny, punctate. Propodeal enclosure longitudinally ridged. Propodeal pad broad, shiny, in some specimens finely striate. Mesopleuron in front of midcoxa with microsculpture, sparsely punctate (punctures 2-4 diameters apart). Hindtibia with spines. Petiole distinctly shorter than tergum I (length 0.5-0.7 × length

of tergum I). Pygidial plate excavate, surrounded by a distinct carina (Fig. 71). Recurrent vein postfurcal, submarginal cell II broader than high. Length 8.0-9.5 mm.

Male: Anterior clypeal margin broadly emarginate (Fig. 109). Frons punctato-rugose. Vertex behind ocelli with microsculpture, coarsely punctate (punctures contiguous to 2 diameters apart). Head width 1.6-2.4 × head length. Flagellomeres I-VII(VIII) with linear marked tyloids and flagellomeres (II)III-VII distinctly swollen beneath (Fig. 139). Flagellomere I: length 1.6-2.1 × width, 0.9-1.0 × length of flagellomere II. Scutum shiny, anteriorly densely punctate, posteriorly sparsely punctate (punctures 1-3 diameters apart). Scutellum sparsely punctate (punctures 2-3 diameters apart). Metanotum shiny, punctate. Propodeal enclosure longitudinally ridged. Propodeal pad broad, shiny, some specimens with fine microscopic striae. Mesopleuron in front of midcoxa with microsculpture and shallow punctures. Hindtibia with spines. Distal half of midbasitarsus enlarged and flattened. Petiole shorter than tergum I (length 0.6-0.8 × length of tergum I) Recurrent vein postfurcal, submarginal cell II broader than high. Gonostyle dorsal (Fig. 169), lateral (Fig. 199). Penis valve (Fig. 229). Volsella (Fig. 259). Penis valves connecting sclerite (Fig. 319). Sternum VIII (Fig. 289). Length 7.0-8.5 mm.

Variation: Female: Some specimens have a fine fingerprint-like sculpture on each side of the midline of the scutum.

Geographic Distribution: Western Canada, western United States.

Material examined: 56♀♀, 14♂♂.

Records:

Canada: British Columbia: Vancouver Is., Mesache Lake (1♀ PMAE).

United States: 55♀♀, 11♂♂ (AMNH, BLCU, BMNH, CASC, CISC, CNCI, CUIC, ISUI, LACM, MCZC, SEMC, UCDC, UICM, WSUC).

Arizona: Flagstaff, San Francisco Mtns. 4400 ft.

California: **El Dorado County:** Echo Lake 7550 ft. **Mono County:** Blanco's Coral White Mt. 10000 ft; Sonora Pass. **Montery County:** Arroyo Seco Camp. **Nevada County:** Sagehen Creek. **Sierra County:** Sierra Buttes . **Tulare County:** Coyote Creek. **Toulumne County:** Mdw. R. S. Yosemite National Park; Sonora Pass 9226 ft.; Strawberry Deadman Creek 9400 ft.

Colorado: Longs Pk. Inn 9000 ft. Nederland Science Lodge 9500 ft. Mt. Manitou. Mt Evans Timberlin II 7000 ft. Mt. Evans 14000 ft. **Alamosa County:** Great Sand Dunes. **Larimer County:** Big Thomson River 7800 ft; Cirquive Meadons 10000 ft.

Idaho: **Custer County:** Bonanza. **Franclin County:** Cub River Canyon. **Latah County:** Robinson Lake. **Lehmi County:** Meadow Lake W Gilmore. Moscow Mt.

Montana: Fairlakes.

Oregon: Crater Lake. Lake Wallowa. **Yamhill County:** Williamson St. Park.

Utah: **Cache County:** Beavert Mt. Logan Canyon; Blacksmith Fork Canyon; Green Canyon. **Emery County:** Orange Olsens Rs. **Rich County:** Sum Canyon. **Weber County:** Willard Basin.

Washington: Lopez Island. Coupeville. Pullman. **Kittitas County:** Fish Lake.

Wyoming: Grand Teton National Park 6700 ft. Togwotee Pass 9600 ft. Yellostone National Park Mt. Washburn. Yellostone National Park 6900 ft. Medicine Bow N. **Sweetwater County.**

Pemphredon rugifer (DAHLBOM)

rugifer is both a noun and an adjective, and must be treated as a noun (Article 31 b(i))

Pemphredon rugifer DAHLBOM 1844: 256, ♀♂. Lectotype: ♀, Germany: Glogau, now: Poland: Głogów (MZLU), examined. Designated by Blüthgen 1931.

Sphex unicolor PANZER 1798, (*Crabro*, in error, plate only), nom. praeocc.

Cemonus pilosus GIMMERTHAL 1836: 436. Neotype: ♀, Austria: Niederösterreich: Purgstall (NHMW). Present designation. New synonym.

Cemonus wesmaeli MORAWITZ 1864: 459, ♀♂. Lectotype: ♀, Russian Federation: St. Petersbourg (ZIL). Designated by W. J. Pulawski (VALKEILA & LECLERCQ 1972: 696). Synonymized with *rugifer* by DOLLFUSS 1991: 62.

Pemphredon lethifer of THOMSON 1870: 234, ♀♂, nec SHUCKARD 1837.

Pemphredon bipartior W. FOX 1892: 313, ♀. Holotype: ♀, USA: Texas: no specific locality (USNM), examined. New synonym.

Pemphredon harbecki ROHWER 1910a: 170, ♀. Holotype: ♀, USA: New Jersey: Trenton (USNM), examined. Synonymized with *bipartior* by R. BOHART in BOHART & MENKE 1976: 180.

Pemphredon scoticus PERKINS 1929: 55, ♀. Holotype: ♀, Scotland (type depository unknown). Synonymized with *wesmaeli* by VALKEILA & LECLERCQ 1972: 696.

Cemonus solivagus BONDROIT 1931: 35, ♀. Holotype: ♀, Belgium: Uccle.

Pemphredon bucharicus GUSSAKOVSKIJ 1952: 215, ♀. Holotype: ♀, Russian Federation: Sagyr-Dasht (ZIL), examined. New synonym.

Pemphredon mortifer VALKEILA 1972b: 697, ♀♂. Holotype: ♀, Russian Federation: Karelian Isthmus: Metsäpirtti Vaskela (ZMUT), examined. Synonymized with *rugifer* by DOLLFUSS 1991: 62.

Pemphredon scyticus VALKEILA 1972a: 15, ♀♂. Holotype: ♀, Russian Federation: Taganrog (ZMH), examined. New synonym.

Pemphredon punctifer VALKEILA 1972a: 16, ♀. Holotype: ♀, Russian Federation: Khabarovsk: Alexandrowsk (ZMUM), examined. New synonym.

Diagnosis: *Pemphredon rugifer* can be recognized by the following: the recurrent vein is either antefurcal or interstitial, the propodeal enclosure is reticulate. The female of *rugifer* is characterized by having an anterior clypeal margin semicircularly emarginate (Fig. 39). The male of *Pemphredon rugifer* is similar to *lethifer*. Most specimens differ in a propodeal pad narrow and reticulate, but I am not able to distinguish *rugifer* from *lethifer* in all cases.

Description: Female: Anterior clypeal margin semicircularly, variably emarginate (Fig. 39). Frons punctato-rugose. Vertex behind ocelli shiny, irregularly punctate (punctures contiguous to 2 diameters apart). Head width 1.-2.0 × length. Flagellomere I: length 1.5-2.3 × width, 1.0-1.4 × length of flagellomere II. Scutum with coarse punctation, anteriorly densely, posteriorly sparsely punctate (punctures 1 diameter apart). Scutellum anteriorly sparsely punctate (punctures 1 diameter apart), posteriorly densely punctate. Metanotum densely punctate. Mesopleuron in front of

midcoxa reticulate. Propodeal enclosure reticulate. Propodeal pad broad, shiny. Hindtibia with spines. Petiole shorter than tergum I (length 0.6-0.9 × length of tergum I). Pygidial plate (Fig. 72). Recurrent vein varying from antefurcal to interstitial, submarginal cell II higher than broad. Length 6.5-10.0 mm.

Male: Anterior clypeal margin broadly emarginate (Fig. 110). Frons punctato-rugose. Vertex behind ocelli shiny, punctate (punctures contiguous to 2 diameters apart). Head width 1.6-2.0 × length. Flagellomeres IV-VIII with well-defined tyloids (Fig. 140). Flagellomere I: length 1.5-2.3 × width, 1.0-1.4 × length of flagellomere II. Scutum anteriorly densely, coarsely punctate, posteriorly sparsely punctate (punctures contiguous to 2 diameters apart). Scutellum densely, coarsely punctate. Metanotum densely, coarsely punctate. Mesopleuron in front of midcoxa reticulate. Propodeal enclosure reticulate. Propodeal pad narrow, reticulate. Hindtibia with spines. Petiole equal or shorter than tergum I (length 0.7-1.2 × length of tergum I). Recurrent vein varying from antefurcal to interstitial, submarginal cell II higher than broad. Gonostyle dorsal (Fig. 170), lateral (Fig. 200). Penis valve (Fig. 230). Volsella (Fig. 260). Penis valves connecting sclerite (Fig. 320). Sternum VIII (Fig. 290). Length 7.0-9.5 mm.

Variation: Female: The emargination of anterior clypeal margin of *rugifer* varies from shallow to deep, and in some specimens there is a little tooth-like projection in the middle of the emargination. Puntation on scutum varies: some specimens are quite densely and coarsely punctate, others are more sparsely punctate. I have seen some specimens with a recurrent vein slightly postfural. Male: In many specimens of *rugifer* are the tyloids light-brown in others they are black.

Discussion: In some males of *rugifer* the propodeal pad is broad and shiny and in this case I cannot differ them from *lethifer*.

I used the name "*rugifera*" instead of *rugifer* (DOLLFUSS 1991), but *rugifer* is right.

Geographic Distribution: Holarctic.

Material Examined: 684♀♀, 292♂♂.

Records:

Algerie: 1♀ (NHMW). Oran.

Austria: 83♀♀, 69♂♂ (CASC, CSCH, CSB, DMA, GUL, HNSA, KLTA, LACM, MCBA, NHMW, OLML, PBS).

Burgenland: Apetlon; Illmitz, Jois; Neusiedl/See; Winden.

Kärnten: Annabrücke; Bösenlacken bei Feldkirchen; Dietrichstein; Ferlach; Finkenstein; Haimach; Lauchenholz/Turnersee; Maria Saaler Berg; Maria Rain; Rauschele See 450 m; Skarbin; St. Jakob; St. Martin; St. Niklas; Thoner Wald; Waidisch Gries.

Niederösterreich: Angern; Bisamberg; Breitensee N Gmünd; Brühl; Dürrenstein; Emmersdorf near Melk; Eisenreichs N Pfaffenschlag; Gaming; Hochrieß; Mödling; Neunkirchen; Oberweiden; Piesting; Plank; Plankenstein near Mank; Purgstall; Scheibbs; St. Christofen; St. Pölten Eniklberg; Wang Ewixengraben; Wien; Wien Türkenschanze.

Oberösterreich: Aschach/D.; Bad Hall; Dürnberg; Gutau; Gallneukirchen; Hirthof-Zell near Zellhof; Hörsching; Hörndl N Tarsdorf; Hühnergeschrei; Kleinmünchen; Linz; Marchtrenk; Rottenegg Mühlviertel; Sarleinsbach; Steyrermühl; St. Leonhard Stampfental; Zeissberg bei Freistadt.

Salzburg: Radstadt/Pongau; Salzburg Parsch; Zell/See.

Steiermark: Stubenberg; Weyer.

Tirol: **Ost-Tirol:** Lienz; St. Johann.
Vorarlberg: Feldkirch.

Belgium: 1♀ (FSAG). Xhendelesse.

Bulgaria: 10♀♀ (OLML). Slancev Briag.

Canada: 15♀♀ (CNCI, LEMQ, PMAE).
Ontario: Bothwell; Hamilton; Rondeau Prov. Park. **Carleton County:** Stiftsville.
Quebec: Gatineau Park; St. Anne de Bellevue.

China: 2♀♀, 1♂ (CUIC, MCZC). Chengtu Sze Chuan; Harbin Manchuria.

Croatia: 3♀♀, 1♂ (AFZH, CSCH, CWGB, NHMW). Fl. Mirna Istria; Insula Hvar; Ile d'Ugljan Presco; Samobor bei Zagreb.

Cyprus: 1♂ (BMNH). Limassol.

Czechia: 27♀♀, 11♂♂ (BMNH, CTLC, NHMW, OLML, PTI). Chodau; Chotin; Dobris; Gbelce; Kamenice; Kunefická hora; Macek; Nové Mesto nad Met. -obora Lustinec-Macek; Nitra-Kalv; Nuzice; Prachatitz; Ces stredohory Pisecný vrch; Praha-Podaba; Prust; Polabi travcicky; Pouzdrany; Sturovo; Sulava; Telivka-Sedleco; Valemin; Vranow; Zatecká tabule Stroupec.

Finland: 113♀♀, 40♂♂ (AFZH, CSCH, MNHN, ZMH, ZMUT) Borga; Borga; Botha; Esbo; Finy; Forres; Föglö; Hanko; Hailnoto; Hirvensala; Hogland; Hoplax; Hyvinkaä; Jomala; Karjamin; Karislojo; Karjalohja; Kemin; Kenjärvi; Kirkkoäumi; Konvola; Koivisto; Kuopio; Kuusamo; Kristinestad; Kyrkslätt; Lahti; Lavansaari; Lojo; Metsäpirtti; Nagu; Nystad; Pargas; Parikkala; Perna; Porvoon; Rantasalmi; Seinkari; Siilinjärvi; Sortavala; Sotkamo; Suonenjoki; St. Andre; St. Michael; Sa: Taipalsaari; Tenhola; Terijoki; Tvärminne; Uskela; Virolahti. **Abo:** Rymättylä; Turku. **Alandia:** Appelö; Eckerö; Hammarland; Jomala; Lemland; Vihti. **Nylandia:** Helsinki. **Tavastia Australis:** Hämeenlinna; Hattula; Janakkala; Kangasala; Pälkäne; Pirkkala; Vanaja.

France: 161♀♀, 70♂♂ (BITF, BMNH, CHGF, CWGB, FEF, FSAG, KSUK, MNHN, PTI, RIB, RMNH, TAF). Aumont; Banyls; Bellegarde; Bergerac; Brout-Vernet Allier; Castelmare Basses Alpes; Canterets; Casterino 1500 m; Cologne; Les Cordonness; Les Angles; Evreux; Félines; Leucate; Lurs Provence; Minerdois Laure; Miramont; Mondoubleau La Motte; Praia de Cavocito; Saint Beat; St. Antoine de Ficalba; Sigouce. **Alpes-de-Haute-Provence:** Le Coubdour; Foralquier St. Etienne. **Ardeche:** St. Thomé. **Aude:** Pleury. **Corse:** Bonifacio; Calvi; Vivaria 800 m. **Côte d'Or:** Dijon. **Drôme:** Dieulefit; Sederon. **Eure-et-Loir:** Aigneville Châteaudun; **Gard:** Valleraugue. **Haute-Garonne:** Toulouse. **Haute-Savoie:** Frangy Bossy; Gaillard. **Herault:** Montpelier. **Isère:** Chichiliane. **Loir-et-Cher:** Mondoubleau la Motte. **Pyrénées-Orientales:** Alenya Agonillade de la Mer. **Var:** Nans le Pins.

Georgia: 4♀♀ (OLML). Svanetis Mestia 1600 m.

Germany: 40♀♀, 46♂♂ (AFZH, BMNH, CCJW, CJR, CKWS, CSB, GKD, GUL, HNHM, HUO, KSUK, PBS, RIB, SEM, NHMW, UMMZ). Altdorf Oberpfalz; Altensteig Schww.; Bad Münster St. Rotenfels; Bochum; Bremen; Dahn; Dehlitz bei Weissenfels; Enzklösterle bei Wildbad Schww.; Etzenricht; Frankfurt; Gildehäuser; Großschönbrunn; Haidhof; Haidweiher; Hartheim Südbaden; Hinterweidenthal; Jena; Juist; Karlsruhe; Küssaberg/B.; Kyffhäuser; Langeoog; Leipzig; Lorch/Rhein; Lörrach Schopfheim Südbaden; Ludwigsburg; Lütjenburg; Mainzer Sand; Mühlacker Lomersheim BW.; Mühlbach Nord MD.; Neuersdorf; Norderney; Oldenburg; Ranzin; Schambach bei Treuchtlingen; Steinfels Oberpfalz; Strassfurt; Thannmühle; Usedom Paske; Wangerooge; Weiherhammer; Westerheim Schw. Alb.

Great Britain: 14♀♀, 9♂♂ (BMNH).
England: Totton.
Scotland: Aviemore; Tulloch Nethy Bridge.

Greece: 1♀ (DMA). Makrinoros-Gebirge Golf von Arta 600-950 m.

Hungary: 4♀♀, 1♂ (CTLC, MNHN, NHMW). Kl. Schützen; Jakobsdorf; Örkény; Sajóvárkony.

Iran: 1♂ (GUL). Zoshk Shandiz W Mashad 1600-2000 m.

Italy: 10♀♀, 15♂♂ (DMA, NEPI, NHMW, PTI, RMNH). Antonimina Paganetti; Aquileja; Bologna Renzano; Colli Enganei Montegrotto Terne. **Friuli:** Ausa-Corno; Grade Giulia; San Giorgo Giulia. **Lazio:** Sassa Furbara. **Piemonte:** Ceva; Murazzano. **Sicilia:** Etna 1500 m. **Trentino (Süd-Tirol):** Bozen; Grado Levico; Schlerngebiet; Waidbruck. **Venetia:** Torre Zuino.

Japan: 1♀, 2♂♂ (USNM). Sapporo.

Kazakhstan: 3♀♀ (CASC, OLML). Alma Ata.

Netherlands: 6♀♀, 5♂♂ (FBSE, RMNH). Den Haag; Putten; Ulvenhout N. B. Rakens.

Poland: 1♀, 2♂♂ (CASC). Lososiowice near Wolów; Osola near Trzebnica;Wroclaw.

Portugal: 2♀♀ (BMNH). Arrabida Lissabon.

Russian Federation: 11♀♀, 3♂♂ (CASC, ZMH, ZMUM). Caucasus Teberda; Irkutskaja Obl. Okr. Angarska; Lazarewskoye NW Sochi; Moscow; Taganrog; Ussuriysk.

Slovenija: 1♀ (KSUK). Begunije Postojna.

South Korea: 1♀ (USNM). Locality labbel unreadable.

Spain: 21♀♀, 4♂♂ (AFZH, BLCU, BMNH, DMA, GUSE, RMNH). La Bazama; S. Bartdume de Be. 1150 m; Los Banios; Cubo del Vino (ZA); Estepona (Magala); Jarilla (CC); Juneiana; Madrid; Palemia; Toledo; Torre de Melgarejo; Torremolinos. **Avilo:** Vallesperino Zapardiel de la Ribera. **Salamanca:** Fuente de B.; Kadeacipertz 850 m; Sandestello 880 m. **Teruel:** Alborrazin 1200 m; Bronchales; Sierra d'Alborazin Nogueta 1600 m.

Sweden: 4♀♀, 1♂ (HUS, MZLU). Sandön; Skapafors; Vb. Umea Baggböle; Vb. Umea Gran; Vb. Umea Rönnbäcksberget.

Switzerland: 17♀♀, 4♂♂ (CSCH, CBH, DMA, HNSA, KSUK, LACM, NHMW, RMNH). Freiburg. **Genève:** Collonge-Bellerive; Genève. **Valais:** Pfinnwald Sidera 540 m; Lenk Pfinnwald 640 m; Sierre 550 m.

Turkey: 8♀♀, 3♂♂ (CSCH, CHN, DMA, GUL, KSUK). Besehir; Gümüshane Torul 1000 m; Hisarcik; Kiyos. **Bitlis:** Tatwan. **Bursa:** Bursa. **Hakkari:** Oramar 1700 m; Sat Dag Varegös SW Yüksekova 1700 m; Ulundere 1400 m; Varegös Mt. Sat 1650 m.

United States: 118♀♀, 2♂♂ (AEIC, AMNH, BMNH, CASC, CNCI, CUIC, DEFW, DENH, LACM, MCZC, MUIC, PMAE, UCDC, UCMS, UMMZ, USNM, WSUC).
Arkansas: Montaine Pine L. Quachita St. Park.
District Of Columbia: Washington.
Florida: **Alachne County:** Gainsville. **Franklin County:** Apalachocola National Forest Write Lake.
Georgia: **McIntosh County:** Sapelo Island. **Rabun County:** Pine Mountain.
Illinois: Alonguin; Dongola.
Louisiana: Lake Bistineau Park Webster Parish.
Maryland: Plumers Island. **Montgomery County:** Colesville; Glenn Echo; Ashton. **Prince Georg's County:** Patuxent Res. St.
Massachusetts: Reading.
Michigan: Lake Odessa **Lake County:** Big Bass Lake. **Livingstone County:** E. S. George Reserve. **Kent Co. Marquette County:** Huron Montain Club. **St. Josef County:** Tamarack; Klinger Lake.
Mississippi: A. McIutosh Agr. Col. **Oktibbeha County:** Starkville. **Winston County:** Nanhi Waia.
Missouri: Williamsville. **Boone County:** Columbia. **St. Louis County:** Tyson Research Station Eureca. **Warren County:** Warrenton.
New Hampshire: Moultonborow. **Rock County:** Seabrook. **Straf County:** W Durham.
New Jersey: Alpine; Palisades. **Monmouth County:** N Freehold. **Ocean County:** Lahaway.
New York: Ithaca; Ludlowville. **Dutches County:** Amenia. Long Island: Kalbfleisch Res. Sta. Huntington; Cold Spring Harbor.
North Carolina: Highlands 3800 ft. **Cumberland County:** Fort Bragg.
Pennsylvania: Lexington Natchez Trace.
South Carolina: McClellanville. **Pickens County:** Clemson Cherrys Crossing.
Tennessee: Knoxville.
Vermont: Waterbury.
Virginia: Alexandria; Falls Church; Glenncaryln; Great Falls.

Pemphredon shirozui TSUNEKI

Pemphredon shirozui TSUNEKI, 1966: 14, ♂. Holotype: ♂, Taiwan (Formosa): Sunkang Nantou Hsien (Kyushu University).

Diagnosis: (TSUNEKI 1966: 14) The male of *Pemphredon shirozui* is characterized by the following: the propodeum is broadly, sculptureless and glittering; the flagel-

lomeres IV-VIII have tyloids and sterna III-VI have particular tufts of long setae. *Pemphredon shirozui* differs from *podagrica* and *flavistigma* in a midbasitarsus not curved. *Pemphredon shirozui* differs from *japonica* in the shape of anterior clypeal margin and structure of propodeal pad, which is in *japonica* narrow and rugose. *Pemphredon krombeini* differs from *shirozui* in having dense, coarse punctures and short transverse rugae on scutum. *Pemphredon gusenleitneri* differs from *shirozui* in an anterior clypeal margin broadly emarginate, the length of flagellomere I 2.0 × width, and a petiole as long as tergum I. The female is unknown.

Description: (TSUNEKI 1966: 14) Male: Anterior clypeal margin broad-triangularly protruding and emarginate in the middle (Fig. 111). Frons densely punctate. Vertex behind ocelli punctate (punctures 1-2 diameters apart). Head width 1.5 × length. Flagellomeres IV-VIII with tyloids (polished swellings on the under side, occupying the whole length of flagellomere, except on VIII). Flagellomere I: length 2.7 × width. Scutum finely, sparsely punctate. Scutellum like scutum. Mesopleuron in front of midcoxa with fine and sparse punctures. Propodeal enclosure reticulate. Propodeal pad smooth and polished. Petiole longer than tergum I (length 1.4 × length of tergum I). Recurrent vein postfurcal. Sterna III-VI with particular tufts of long setae. Length 9.0 mm.

Female: unknown.

Discussion: Maybe *Pemphredon shirozui* is the male, which belongs to the female of *Pemphredon oreades*.

Geographic Distribution: Taiwan.

***Pemphredon spielleitneri* DOLLFUSS sp. n.**

Etymology: The name of the species is given in honour of my colleague Mag. Dr. Johannes Spielleitner, Oberstufenrealgymnasium St. Pölten, Austria.

Diagnosis: The male of *Pemphredon spielleitneri* is similar to *inornata*. It differs only in distinctly swollen flagellomeres IV-VIII (Fig. 141), more semicircular emargination of anterior clypeal margin and distal half of midbasitarsus enlarged. The female is unknown.

Description: Male: Anterior clypeal margin semicircularly emarginate (Fig. 112). Clypeus densely punctate. Frons punctato-rugose. Vertex behind ocelli shiny, sparsely punctate (punctures 1-2 diameters apart), in some specimens with fine transverse rugae. Head width 1.8-2.1 × length. Flagellomeres without distinctly marked tyloids, flagellomeres (III)IV-VIII(IX) distinctly swollen (Fig. 141). Flagellomere I: length 2.0-2.2 × width, 1.2-1.5 × length of flagellomere II. Scutum shiny, anteriorly densely, mesally and posteriorly sparsely punctate (punctures 3 diameters apart). Scutellum anteriorly shiny, smooth, posteriorly densely, coarsely

punctate. Metanotum densely punctato-rugose. Propodeal enclosure reticulate. Propodeal pad broad, shiny. Mesopleuron in front of midcoxa shiny, punctate (punctures contiguous to 2 diameters apart). Midbasitarsus enlarged in distal half. Hindtibia with spines. Petiole shorter than tergum I (length 0.8-0.9 × length of tergum I). Recurrent vein varying from antefurcal to interstitial. Gonostyle dorsal (Fig. 171), lateral (Fig. 201). Penis valve (Fig. 231). Volsella (Fig. 261). Penis valves connecting sclerite (Fig. 321). Sternum VIII (Fig. 291). Length 5.5-7.0 mm.

Female: unknown.

Variation: Some specimens have distinctly swollen, tyloid-like tubercles on flagellomeres VI-VIII.

Geographic Distribution: United States.

Material Examined: 9♂♂.

Records: Holotype: ♂, USA: Washington D. C., VII 2.1947 leg. D. Shapirio (USNM).

United States: 8♂♂.

Minnesota: **Houston County:** (1♂ DEFW).
Missouri: Columbia (1♂ USNM).
New Jersey: South Senville (1♂ CUIC).
New York: Bear Mtn. (2♂♂ USNM).
Pensylvania: **Del. County:** Adele (1♂, USNM).
Virginia: Arlington (1♂ USNM). **Prince William County:** NE Thorofare Cap (1♂ CASC).

Country unknown: Nuntington, L. I. (1♂ USNM).

Pemphredon sudai TSUNEKI

Pemphredon sudai TSUNEKI 1972: 12, ♀. Holotype: ♀, Japan: Yamanashi Pref., Mt. Kanayama Masutomi-spa, (coll. Tsuneki).

Diagnosis (TSUNEKI 1972: 12): The female of *Pemphredon sudai* is characterized by the following: the recurrent vein is postfurcal, the propodeal enclosure is reticulate, and the propodeal pad is finely and closely striate. *Pemphredon sudai* differs from *lugubris, japonica, montana, flavistigma, podagrica, koreana* and *oreades* in having a projecting horn mesally of frons between antennal sockets. The male is unknown.

Description: (TSUNEKI 1972: 12) Female: Anterior clypeal margin slightly bidentate and between the teeth deeply roundly emarginate (Fig. 40). Frons between antennal sockets with a well defined projecting horn (length of the horn equal to diameter of antennal socket). Upper frons from anterior ocellus below longitudinally impressed, the impression first broad, soon narrow and becomes shallow. Frons closely punctate. Vertex behind ocelli sparsely punctate (punctures two to three diameters apart). Head width 1.6 × length. Flagellomere I: length 3.0 × width (in the narrowest view). Scutum irregularly punctato-rugose similar to *lugubris*. Scutellum longitudinally punctato-rugose. Mesopleuron in front of midcoxa sparsely punctate. Propodeal enclo-

sure reticulate as in *lugubris*. Propodeal pad finely and closely striate. Petiole approximately as long as hindbasitarsus. Pygidial plate narrow (Fig. 73). Recurrent vein postfurcal. Length 9.5 mm.

Male: unknown.

Discussion: I could obtain no specimen of this species for study.

Geographical Distribution: Japan.

Pemphredon tridentata GUSSAKOVSKIJ

Pemphredon tridentatus GUSSAKOVSKIJ 1952: 212, ♀♂. Syntype: ♀, Tajikistan: Chiwa (ZIL), examined.

Pemphredon sedulus MERISUO 1972: 16, ♀. Holotype: ♀, Tajikistan: Ramit (ZMUM), examined. New synonym.

Diagnosis: *Pemphredon tridentata* can be recognized by the following: the recurrent vein either antefurcal or interstitial, the propodeal enclosure is irregularly rugose, and the propodeal pad is narrow. The female of *tridentata* is characterized by having an anterior clypeal margin distinctly tridentate (Fig. 41). The male of *tridentata* is similar to *lethifer* but it differs in the shape of the anterior clypeal margin (Fig. 113), more coarse punctation on the scutum, and a petiole longer than tergum I.

Description: Female: Anterior clypeal margin distinctly tridentate (Fig. 41). Frons punctato-rugose. Vertex behind ocelli shiny, irregularly punctate (punctures contiguous to 2 diameters apart). Head width 1.4-1.6 × length. Flagellomere I: 1.6-2.0 × width, 1.1-1.2 × length of flagellomere II. Scutum smooth, shiny and coarsely punctate, anteriorly densely, posteriorly irregularly, sparsely punctate (punctures contiguous to 3 diameters apart). Scutellum shiny, coarsely irregularly punctate (punctures contiguous to 2 diameters apart). Metanotum rugose. Mesopleuron in front of midcoxa punctate (diameter of punctures nearly equal to diameter of hindocellus). Propodeal enclosure irregularly rugose. Propodeal pad narrow but shiny. Hindtibia with well defined spines. Petiole nearly equal to tergum I (length 0.9-1.1 × length of tergum I). Pygidial plate broad, surrounded by a carina (Fig. 74). Recurrent vein varying from antefurcal to interstitial, submarginal cell II higher than broad. Length 8.0-9.5 mm.

Male: Anterior clypeal margin broadly emarginate with a short tooth in the middle of emargination (Fig. 113). Frons punctato-rugose. Vertex behind ocelli shiny, coarsely punctate (punctures contiguous to 2 diameters apart). Head width 1.7 × length. Flagellomeres (III)IV-VIII with well-defined tyloids (Fig. 142). Flagellomere I: length 1.9 × width, 1.0 × length of flagellomere II. Scutum shiny and irregularly, coarsely punctate (Punctures contiguous to 1 diameter apart). Scutellum densely, coarsely punctate. Metanotum rugose. Mesopleuron in front of midcoxa coarsely and densely punctate. Propodeal enclosure irregularly rugose. Propodeal pad narrow, shiny. Hindtibia with spines. Petiole longer than tergum I (length 1.4 × length of tergum I; only one speci-

men examined). Recurrent vein antefurcal, submarginal cell II higher than broad. Length 7.0 mm.

Geographic Distribution: Central Asia (Kazakhstan, Tajikistan, Uzbekistan).

Material examined: 2♀♀, 2♂♂.

Records:

Kazakhstan: Khrebet Karatau 70°E, 42°40'N 3500 ft (1♀ BMNH). Khiwa (1♂ ZIL).

Uzbekistan: Chatkalskiy Mts., Mt. Bolsoj Cimgan 1800 m (1♀ CTLC); Yangikichlak 100km NW Djizak 40°3'N/66°9'E (1♂ OLML).

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