

## Revisions of Nearctic Tersilochinae V. Genera *Allophroides* Horstmann and *Gelanes* Horstmann (partim)

(Hymenoptera, Ichneumonidae)

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Horstmann, K. 2013. Revisions of Nearctic Tersilochinae V. Genera *Allophroides* Horstmann and *Gelanes* Horstmann (partim) (Hymenoptera, Ichneumonidae). *Spixiana* 36(2): 227–261.

The Nearctic species of *Allophroides* Horstmann and of *Gelanes* Horstmann were undescribed until now. In this paper, all known species of *Allophroides* (six species) and thirteen species of *Gelanes* are included in keys and described as new: *Allophroides flavilabris*, *A. granulatus*, *A. laevipleuris*, *A. obscurus*, *A. salicicola*, *A. tenuicauda*, *Gelanes brevicornis*, *G. clavicornis*, *G. flavopictus*, *G. frontalis*, *G. incisus*, *G. intermedius*, *G. montanus*, *G. nigrinus*, *G. pleroneurae*, *G. punctipleuris*, *G. punctulatus*, *G. rarus* and *G. striatus*. Information on hosts and on some aspects of the life history is given for *Gelanes brevicornis*, *G. flavopictus*, *G. pleroneurae* and *G. punctipleuris*.

### Introduction

The two genera treated in this paper are closely related, and Townes (1971: 36 f.) had included both in *Allophroides*. In both genera the petiole of the 1<sup>st</sup> gastral segment is relatively short and the postpetiole is long, the glymmae thus being situated slightly in front of, and the spiracles being situated slightly behind, the middle of the segment (Townes 1971: 34, Horstmann 1981: 7). The other characters mentioned by Townes (length of the foveate groove, width of the clypeus) are somewhat variable within the genera. The Nearctic species of *Allophroides* and *Gelanes* differ by the following characters:

*Allophroides*: Temple finely or distinctly granulate, a fine punctation hardly or not at all visible. Tarsal claws hooked, each with one small sub-basal tooth and with the apical tooth long, slender and almost straight (Fig. 4). Postpetiole striate or granulate-strigose anteriorly and medially (Figs 7, 16, 28, 37, 49, 58).

*Gelanes*: Temple with fine or distinct punctation on a smooth or finely granulate background. Tarsal claws evenly bent and evenly attenuated, without subbasal teeth (Fig. 67). Postpetiole smooth or with very fine sculpture, at most granulate anteriorly (Figs 70, 111).

Other characters mentioned by Horstmann (1981: 11) are variable within the Nearctic species of these genera. An additional distinguishing character might be the host range. Whereas *Gelanes* species are often collected on Pinaceae, where some parasitize larvae of Xyelidae (Symphyta) feeding in strobili of *Pinus* or in buds and shoots of *Abies* (Khalaim & Blank 2011; this paper), several *Allophroides* species have been collected on *Salix*.

### Material and methods

In general, terminology follows Townes (1969: 36 ff.). Some additional characters used for the differentiation of species are defined in the second part of the present

\* The entire collection Horstmann is located in the Bavarian State Collection of Zoology in Munich after the sad demise of Prof. Dr. Klaus Horstmann on 30 July 2013. Requests should be sent to the following address: Zoologische Staatssammlung München, Sektion Hymenoptera, Münchhausenstr. 21, 81247 München, Germany.

series of revisions (Horstmann 2010). Three indices are defined: the frontal index is the ratio of the shortest distance between the inner margins of the eyes (width of frons) to the longest distance between the outer contours of the eyes (width of head); the ocellar index is the ratio of the shortest distance between the eye and the lateral ocellus to the longest diameter of the lateral ocellus; the malar space index is the ratio of the shortest distance between the rim bordering the mandibular groove and the eye (= malar space) to the basal width of a mandible.

The recent studies were supported by loans of material by A. M. R. Bennett (Canadian National Collection of Insects, Agriculture and Agri-Food Canada, Ottawa, Canada), G. R. Broad (Department of Entomology, Natural History Museum, London, U.K.), D. G. Furth and R. R. Kula (Systematic Entomology Laboratory, Smithsonian Institution, Washington, USA), P. T. Oboyski (Essig Museum of Entomology, University of California, Berkeley, USA), S. R. Shaw (Insect Museum, University of Wyoming, Laramie, USA), D. B. Wahl (American Entomological Institute, Gainesville, USA) and R. A. Wharton (Department of Entomology, Texas A & M University, College Station, USA). R. R. Kula and D. R. Smith (Systematic Entomology Laboratory, Smithsonian Institution, Washington, USA) sent copies of some notes from Hopkins' card file and Baker's notebook at the Washington museum. In addition, D. R. Smith provided me with some papers on Symphyta. M. R. Shaw (National Museums of Scotland, Edinburgh, U.K.) assisted me with the English language. I am indebted to them all.

#### Abbreviations of depositories

AEI	American Entomological Institute, Gainesville (including Dasch collection)
BER	Essig Museum of Entomology, University of California, Berkeley
CAM	Museum of Comparative Zoology, Harvard University, Cambridge (Mass.)
FRA	Department of Entomology, California Academy of Sciences, San Francisco
HOR	Coll. K. Horstmann, Würzburg
LAN	Department of Entomology, Michigan State University, East Lansing
LAR	Insect Museum, University of Wyoming, Laramie
NHM	Department of Entomology, Natural History Museum, London
OTT	Canadian National Collection of Insects, Agriculture and Agri-Food Canada, Ottawa
TEX	Department of Entomology, Texas A & M University, College Station (Texas)
WAH	Coll. D. B. Wahl, Gainesville
WAS	Systematic Entomology Laboratory, Smithsonian Institution, Washington (D.C.)

## Taxonomy

### *Allophroides* Horstmann

*Allophroides* Horstmann, 1971. Type species: *Porizon boops* Gravenhorst, 1829.

*Allophroides* is a small genus, which was described by Horstmann (1971: 52f.). The diagnosis by Townes (1971: 36f.) also includes *Gelanes* Horstmann. Described species occur in the Palaearctic region and were revised by Horstmann (1971: 54f.) and Khalaim (2007: 569). The Nearctic species are undescribed. The specimens are inconspicuous, small and mostly blackish. Two of the six species treated here appear to be rather widely distributed. Three species are known from only one female and one additional species is known from only one locality. Probably a considerable number of species are still undetected.

No host record is known for any *Allophroides* species. In Europe, *A. platyurus* (Strobl) has been collected at catkins on *Salix* (Strobl 1904: 100, Schmidt et al. 2010: 71), and also three Nearctic species are labelled as having been collected on *Salix* (*A. granulatus*, *A. salicicola*, *A. tenuicauda*). Apparently the species are univoltine, with a flight period in spring (exception: *A. flavilabris*). The unidentified species parasitizing *Pleroneura* spp. and *Xyela* spp. (Xyelidae, Symphyta) and attributed to *Allophroides* by Carlson (1979: 692) and Ohmart & Dahlsten (1979: 884f.) belong to *Gelanes*.

The following character states apply to all *Allophroides* species discussed here and are not repeated in the descriptions: Head 1.2–1.3 times as wide as high. Apex of clypeus rounded, blunt, with a transverse row of bristles. Glossa 0.3–0.5 times as long as the width of the clypeus. Genal carina low. Thorax short, 1.8–2.1 times as long as the width of the mesoscutum. Epomia obliterated. Prepectal carina low, bent forwards dorsally. Hind tibia distinctly longer than hind femur. Hind basitarsus 0.4–0.5 times as long as hind tibia. Longer hind tibial spur almost straight or slightly curved distally, about 0.3 times as long as the basitarsus. Tarsal claws hooked, each with one small subbasal tooth and with the apical tooth long, slender and almost straight (Figs 4, 13, 25, 34, 46, 55). Intercubitus of front wing distinctly basad of the 2<sup>nd</sup> recurrent vein (Figs 5, 14, 26, 35, 47, 56). First brachial cell closed at its lower distal corner (but the postnervulus interrupted by a narrow bulla). Nervellus slightly reclivous. Basal area of propodeum not replaced by a keel. Petiole with distinct striae laterally. Glymma distinct, situated at the posterior edge of the petiole, connected with the ventrolateral furrow of the postpetiole (Figs 8,

17, 29, 38, 50, 59). Postpetiole rounded dorsally, with divergent lateral contours. In the female, thyridium obliterated and thyridial depression as a narrow transverse furrow (Figs 7, 16, 28, 37, 49, 58). In the male, thyridial depression triangular, wider than long or about as long as wide (Figs 21, 42, 63).

### Key to females

1. Ovipositor sheath 1.2–1.6 times as long as the 1<sup>st</sup> gastral tergite. .... 2.
  - Ovipositor sheath 1.8–2.3 times as long as the 1<sup>st</sup> gastral tergite. .... 3.
2. Temple and mesopleurum distinctly granulate, dull. Ovipositor rather stout, with a distinct and deep dorsal emargination subapically and with an indistinct tooth in front of this emargination (Fig. 18). .... *granulatus* spec. nov.
  - Temple and mesopleurum finely granulate, distinctly shining. Ovipositor slender, with a shallow rounded dorsal emargination subapically (Fig. 30). .... *laevipleuris* spec. nov.
3. Temple finely granulate, shining. Clypeus yellow medially and ventrally. Flagellum yellowish proximally, yellowish brown medially and distally. Legs yellowish, the mid and hind coxae brown. .... *flavilabris* spec. nov.
  - Temple distinctly granulate, dull. Clypeus dark brown or black. Flagellum and legs darker. ... 4.
4. Flagellum with 14–15 segments. Ovipositor rather stout, with a deep and rather narrow dorsal emargination subapically (Fig. 39). .... *obscurus* spec. nov.
  - Flagellum with 11–13 segments. Ovipositor slender, abruptly narrowed subapically, its tip thin (Figs 51, 60). .... 5.
5. Temples almost not constricted behind the eyes (Fig. 43), Foveate groove as a distinct short furrow (Fig. 45). .... *salicicola* spec. nov.
  - Temples distinctly constricted behind the eyes (Fig. 52). Foveate groove obliterated, replaced by some very fine striae (Fig. 54). .... *tenuicauda* spec. nov.

### Provisional key to the males of three species

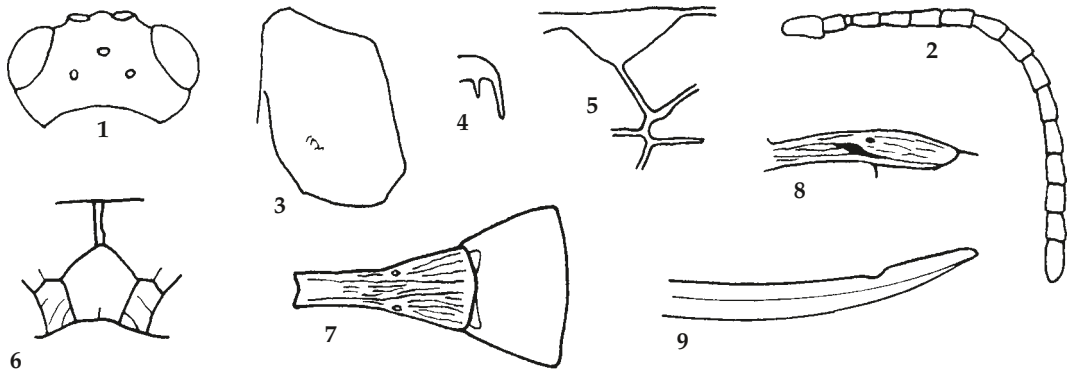
1. Frontal index 0.31–0.32 (Figs 61, 62). Postpetiole distinctly striate anteriorly and medially (Fig. 63). .... *tenuicauda* spec. nov.
  - Frontal index 0.17–0.27 (Figs 19, 20, 40, 41). Postpetiole with fine striae or granulate-strigose anteriorly, very finely granulate or smooth medially (Figs 21, 42). .... 2.

2. Frontal index 0.17–0.20 (Figs 19, 20). .... *granulatus* spec. nov.
  - Frontal index 0.24–0.27 (Figs 40, 41). .... *?obscurus* spec. nov.

### *Allophroides flavilabris* spec. nov.

**Holotype** (w): "Saskatoon, Sask., 27-VIII-1948, J. R. Vockeroth" (Saskatchewan, Canada) (OTT).

**w:** Body length 2.4 mm. Temples distinctly constricted behind the eyes, 0.75 times as long as the width of an eye, tangential lines on eyes and temples intersect on the basal area of propodeum (Fig. 1). Face 1.05 times as wide as the frons. Frontal index 0.51. Ocellar index 2.3. Malar space index 0.65. Mandibular teeth about equal. Clypeus 0.8 times as long as the face, 3.2 times as wide as long, slightly rounded, finely granulate and with few punctures dorsally, with few punctures on a smooth background medially and subventrally. Face and frons granulate, dull, without punctation. Vertex finely granulate. Temple finely granulate, shining, a very fine punctation hardly discernible. Flagellum with 13 segments, slightly clavate, 1<sup>st</sup> segment 2.2 times, 2<sup>nd</sup> segment 2.0 times, median segment 1.6 times, penultimate segment 1.3 times as long as wide, last segment not conspicuously enlarged (Fig. 2). Pronotum finely granulate dorsolaterally, a very fine punctation hardly discernible, with few fine striae in the anterior groove. Mesoscutum with fine dispersed punctures on a smooth background dorsally-anteriorly and sublaterally, distinctly granulate and dull without punctures dorsally-posteriorly in front of the prescutellar furrow. Notaulus as a shallow groove, extending to 0.3 the length of the mesoscutum. Prescutellar furrow with distinct fine striae. Scutellum bordered by carinae on the anterior 0.4, granulate. Mesopleurum finely granulate, somewhat shining, speculum very finely granulate and with fine dispersed punctures. Foveate groove as a small wrinkled depressed area (Fig. 3). Mesosternum with fine dispersed punctures on a smooth background. Metapleurum finely granulate, a very fine punctation hardly discernible. Hind femur 3.2 times as long as high. Pterostigma 2.0 times as long as wide (Fig. 5). Metacarpus reaching 0.15 the distance from radial cell to the tip of wing. Basal area of propodeum about four times as long as wide, bordered by carinae laterally, 0.7 times as long as the petiolar area. Dorsolateral area smooth centrally, very finely granulate at the edges, with very fine dispersed punctures. Petiolar area about as long as wide, rounded anteriorly, flat, granulate and with fine wrinkles (Fig. 6). Propodeal spiracle separated



**Figs 1-9.** *Allophroides flavilabris* spec. nov. (♀). 1. Head, top view. 2. Antenna. 3. Mesopleurum. 4. Hind tarsal claw. 5. Pterostigma and areolet. 6. Propodeum, top view. 7. 1<sup>st</sup> and 2<sup>nd</sup> gastral tergites, top view. 8. 1<sup>st</sup> gastral segment, side view. 9. Ovipositor, side view.

from the pleural carina by 1.5 times its diameter, the spiracular carina broad. Petiole distinctly striate dorsally and laterally, with dorsolateral carinae. Postpetiole almost completely striate, only the narrow posterior edge smooth. 1<sup>st</sup> sternite reaching the spiracles (Figs 7, 8). Gaster clavate posteriorly. Ovipositor about 2.8 times, ovipositor sheath 1.8 times as long as the 1<sup>st</sup> tergite. Ovipositor stout, slightly bent upwards proximally, somewhat more bent upwards distally, with a shallow rounded dorsal emargination subapically, without teeth ventrally (Fig. 9).

Measurements of the holotype: Body 2.4 mm long. Head 0.61 mm wide. Thorax 0.89 mm long, 0.47 mm wide (mesoscutum). Front wing 2.2 mm long. 1<sup>st</sup> gastral tergite 0.44 mm long. Postpetiole 0.20 mm long, 2.2 mm wide. 2<sup>nd</sup> tergite 0.25 mm long, about 0.4 mm wide. Ovipositor sheath 0.80 mm long. Ovipositor about 1.22 mm long.

Colour: Black. Palpi, mandible (teeth light brown), clypeus medially and ventrally, scape, pedicellus, three basal flagellar segments and tegula yellowish. Flagellum yellowish brown medially and distally. Legs light yellowish red, mid and hind coxae marked with dark brown basally and medially. Pterostigma medium brown. Gaster behind the 1<sup>st</sup> tergite dark brown, the tergites tinged with yellow posteriorly.

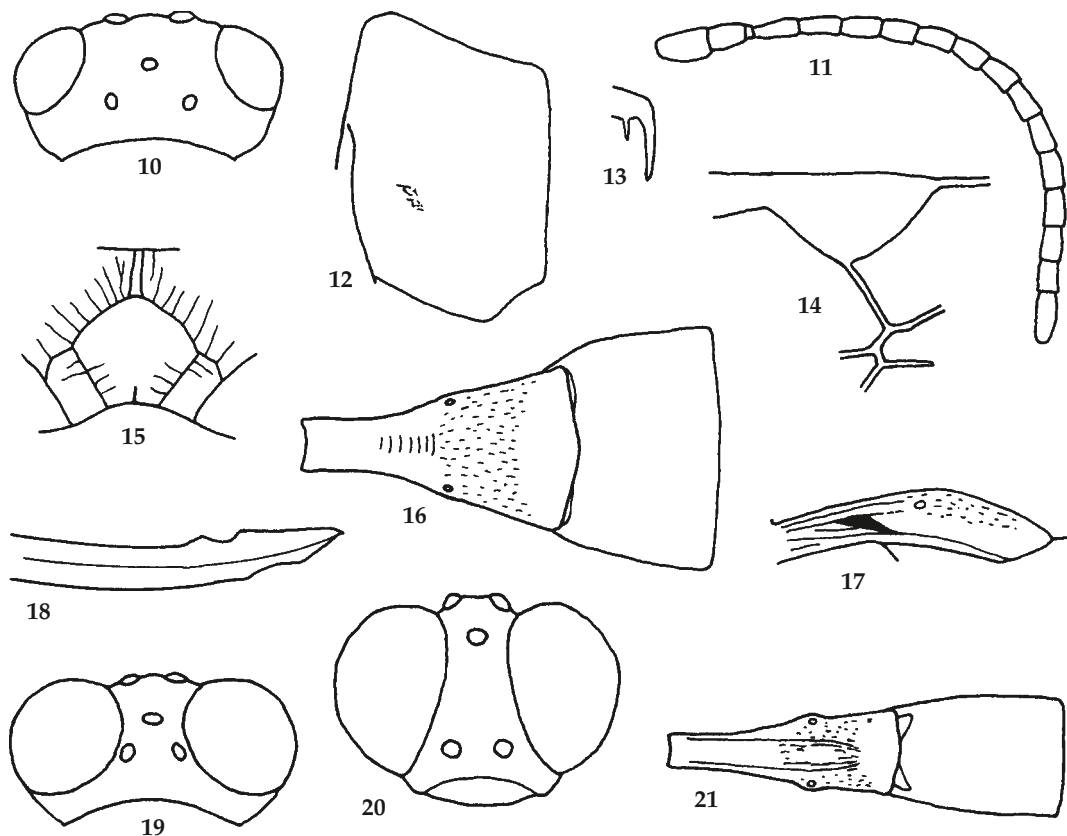
**M:** unknown.

*Allophroides granulatus* spec. nov.

**Holotype** (♀): “Colo 1858”, “Foothills 6 mi. w. Ft. Collins, Colo., iv-25-1896”, “Coll. CF Baker” (Colorado, USA) (WAS). – **Paratypes** (9 ♀♀, 4 ♂♂): Canada: Alberta: Edmonton (AED). USA: Colorado: Ft. Collins (HOR, WAS); Kansas: Riley Co. (AED);

Massachusetts: Chelsia Beach (CAM); Michigan: Midland Co. (AED); North Carolina: Lake Maltamuskeet (AED); Utah: Parowan Canyon, on *Salix* (WAS). Flight period: iv-v.

**w:** Body length 3.0–3.5 mm. Temples distinctly constricted behind the eyes, 0.65 times as long as the width of an eye, tangential lines on eyes and temples intersect on the postscutellum (Fig. 10). Face 1.1 times as wide as the frons. Frontal index 0.52. Ocellar index 1.75. Malar space index 0.9. Upper mandibular tooth slightly the longer. Clypeus 0.9 times as long as the face, 3.4 times as wide as long, rounded, granulate and with few punctures dorsally, with few punctures on a smooth background medially and subventrally. Head (except clypeus) granulate, dull, without discernible punctures. Flagellum with 13–14 segments, slightly clavate, 1<sup>st</sup> segment 2.3 times, 2<sup>nd</sup> segment 2.0 times, median segment 1.4 times, penultimate segment 1.2 times as long as wide, last segment not conspicuously enlarged (Fig. 11) (in small specimens flagellum somewhat stouter). Pronotum granulate dorsolaterally, with fine striae in the anterior groove. Mesoscutum with fine dispersed punctures on a finely granulate or smooth background dorsally-anteriorly and sublaterally, distinctly granulate and dull without punctures dorsally-posteriorly in front of the prescutellar furrow. Notaulus as a shallow groove, extending to 0.2 the length of the mesoscutum. Prescutellar furrow with distinct fine striae. Scutellum bordered by carinae on the anterior 0.3, finely granulate and with fine dispersed punctures. Mesopleurum granulate and dull. Foveate groove as a small shallow groove, with few short wrinkles (Fig. 12). Mesosternum with fine dispersed punctures on a smooth background. Metapleurum granulate. Hind femur 3.9 times as long as high. Pterostigma 1.9 times as long as wide (Fig. 14). Metacarpus



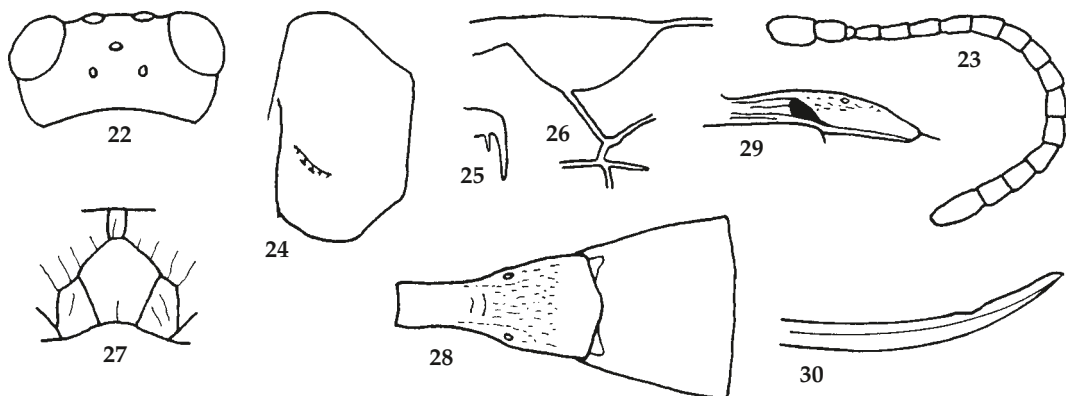
Figs 10- 21. *Allophroides granulatus* spec. nov. 10- 18. ♀. 10. Head, top view. 11. Antenna. 12. Mesopleurum. 13. Hind tarsal claw. 14. Pterostigma and areolet. 15. Propodeum, top view. 16. 1<sup>st</sup> and 2<sup>nd</sup> gastral tergites, top view. 17. 1<sup>st</sup> gastral segment, side view. 18. Ovipositor, side view. 19-21. ♂. 19. Head, top view. 20. Head, front view. 21. 1<sup>st</sup> and 2<sup>nd</sup> gastral tergites, top view.

reaching 0.2 the distance from radial cell to the tip of wing. Basal area of propodeum about five times as long as wide, bordered by carinae laterally (these sometimes indistinct), 0.6 times as long as the petiolar area. Dorsolateral area granulate and dull, with longitudinal wrinkles posteriorly. Petiolar area 0.9 times as long as wide, rounded anteriorly, flat, granulate and with very fine wrinkles (Fig. 15). Propodeal spiracle separated from the pleural carina by three times its diameter, the spiracular carina narrow. Petiole flat or slightly depressed dorsally, with fine wrinkles, with distinct dorsolateral carinae, distinctly striate laterally. Postpetiole finely striate or granulate-strigose anteriorly and medially, smooth posteriorly. 1<sup>st</sup> sternite not reaching the spiracles (Figs 16, 17). Gaster clavate posteriorly. Ovipositor 2.1-2.2 times, ovipositor sheath 1.2 times as long as the 1<sup>st</sup> tergite. Ovipositor rather stout, slightly bent upwards proximally and medially, somewhat more

bent upwards distally, with a distinct rather short dorsal emargination subapically and an indistinct tooth in front of that emargination, with two indistinct ventral teeth subapically (Fig. 18).

Measurements of the holotype: Body 3.5 mm long. Head 0.86 mm wide. Thorax 1.44 mm long, 0.75 mm wide (mesoscutum). Front wing 3.1 mm long. 1<sup>st</sup> gastral tergite 0.71 mm long. Postpetiole 0.33 mm long, 0.47 mm wide. 2<sup>nd</sup> tergite 0.38 mm long, 0.71 mm wide. Ovipositor sheath 0.86 mm long. Ovipositor 1.55 mm long.

Colour: Black. Palpi dark brown. Mandible dark brown proximally, reddish brown distally. Clypeus blackish, sometimes tinged with reddish brown ventrally. Antenna black. Tegula yellowish brown. Legs light reddish brown, coxae brown or dark brown (sometimes only the hind coxa brownish). Pterostigma light brown or medium brown, with whitish corners basally and apically. Gaster behind



Figs 22–30. *Allophroides laeviplus* spec. nov. (♀). 22. Head, top view. 23. Antenna. 24. Mesopleurum. 25. Hind tarsal claw. 26. Pterostigma and areolet. 27. Propodeum, top view. 28. 1<sup>st</sup> and 2<sup>nd</sup> gastral tergites, top view. 29. 1<sup>st</sup> gastral segment, side view. 30. Ovipositor, side view.

the 1<sup>st</sup> tergite blackish. Rarely antenna, thorax, propodeum and gaster tinged with brown.

**M:** Eyes large. Temples strongly constricted behind the eyes, 0.35 times as long as the width of an eye, tangential lines on eyes and temples intersect on the middle of the mesoscutum. Face 2.1 times as wide as the frons. Frontal index 0.17–0.20 (Figs 19, 20). Ocellar index 0.2. Malar space index 0.7. Flagellum with 13 segments, slightly clavate, 1<sup>st</sup> segment 2.4 times, 2<sup>nd</sup> segment 2.0 times, median segment 1.5 times, penultimate segment 1.4 times as long as wide. 1<sup>st</sup> gastral tergite 3.5 times as long as wide. Postpetiole with fine striae anteriorly, finely granulate medially, smooth posteriorly. 2<sup>nd</sup> tergite about as long as wide. Thyridial depression about as long as wide (Fig. 21) (variable). Coxae, trochanters and trochantelli blackish. Femora tinged with black basally. In other characters similar to the ♀. In two cases, ♀♀ and ♂♂ were collected at the same localities (Ft. Collins, Colorado; Riley Co., Kansas).

**Remark:** The holotype and three paratypes (2 ♀♀, 1 ♂) were swept from *Symphoricarpos* (Caprifoliaceae), *Ribes* (in bloom) (Grossulariaceae) and *Salix* blooms (Salicaceae) (Baker's notebook, WAS).

#### *Allophroides laeviplus* spec. nov.

**Holotype** (♀): "Indian Head, Sask., 21. IV. 1925, J. J. deGryse" (Saskatchewan, Canada) (OTT).

**w:** Body length 2.8 mm. Temples moderately constricted behind the eyes, 0.8 times as long as the width of an eye, tangential lines on eyes and temples intersect on the postpetiole (Fig. 22). Face 1.15 times as wide as the frons. Frontal index 0.49. Ocellar index

2.2. Malar space index 0.8. Upper mandibular tooth slightly the longer. Clypeus 0.8 times as long as the face, 2.6 times as wide as long, distinctly rounded and with a few punctures dorsally, almost flat, smooth and with few fine punctures medially and subventrally. Face finely granulate, the central swelling very finely granulate, a very fine punctation hardly visible. Frons and vertex granulate, dull. Temple finely granulate, shining, with very fine punctures. Flagellum with 14 segments, slightly clavate, 1<sup>st</sup> segment 1.9 times, 2<sup>nd</sup> segment 1.9 times, median segment 1.7 times, penultimate segment 1.15 times as long as wide, last segment slightly enlarged (Fig. 23). Pronotum finely granulate dorsolaterally, with fine striae in the anterior groove. Mesoscutum with fine dispersed punctures on a smooth background dorsally-anteriorly and sublaterally, finely granulate dorsally-posteriorly in front of the prescutellar furrow. Notaulus as a very shallow groove, extending to 0.2 the length of the mesoscutum. Prescutellar furrow with fine short striae. Scutellum bordered by carinae on the anterior 0.3, with fine punctures on a very finely sculptured background. Mesopleurum finely granulate, shining, the central area almost smooth, with fine dispersed punctures. Foveate groove as a shallow furrow, with fine wrinkles (Fig. 24). Mesosternum with very fine punctures on a smooth background. Metapleurum finely granulate. Hind femur 4.1 times as long as high. Pterostigma 1.9 times as long as wide (Fig. 16). Metacarpus reaching 0.35 the distance from radial cell to the tip of wing. Basal area of propodeum 1.7 times as long as wide, covered with some longitudinal striae, 0.36 times as long as the petiolar area. Dorsolateral area very finely granulate and with longitudinal striae. Petiolar area about as long as wide, rounded anteriorly, flat, covered with fine wrinkles, shining (Fig. 27). Propodeal spiracle

separated from the pleural carina by its diameter, the spiracular carina narrow. Petiole flat or slightly depressed dorsally, with fine wrinkles, with distinct dorsolateral carinae, distinctly striate laterally. Postpetiole finely granulate-strigose anteriorly, the posterior 0.4 smooth. 1<sup>st</sup> sternite not reaching the spiracles (Figs 28, 29). Gaster clavate posteriorly. Ovipositor 2.5 times, ovipositor sheath 1.6 times as long as the 1<sup>st</sup> tergite. Ovipositor slightly bent upwards proximally and medially, more strongly bent upwards distally, with a shallow rounded dorsal emargination subapically, without teeth ventrally (Fig. 30).

Measurements of the holotype: Body 2.8 mm long. Head 0.68 mm wide. Thorax 1.00 mm long, 0.53 mm wide (mesoscutum). Front wing 2.7 mm long. 1<sup>st</sup> gastral tergite 0.50 mm long. Postpetiole 0.24 mm long, 0.25 mm wide. 2<sup>nd</sup> tergite 0.31 mm long, 0.30 mm wide. Ovipositor sheath 0.79 mm long. Ovipositor 1.26 mm long.

Colour: Head dark brown, thorax, propodeum and gaster reddish brown. Palpi and mandible brownish. Clypeus black. Antenna blackish. Tegula yellowish brown. Pterostigma light brown. Legs light reddish brown. Posterior gastral tergites tinged with black dorsally.

**M:** unknown.

#### *Allophroides obscurus* spec. nov.

**Holotype** (♀): "Robson, B. C., III.29.1939, H. R. Foxlee" (British Columbia, Canada) (AEI). – **Paratypes** (6 ♀♀): Canada: Alberta: Glynde (AEI); British Columbia: Robson (AEI, HOR, OTT); Ontario: Marmora (OTT). USA: New York: Connecticut Hill, Tompkins Co. (AEI). Flight period: iii–iv.

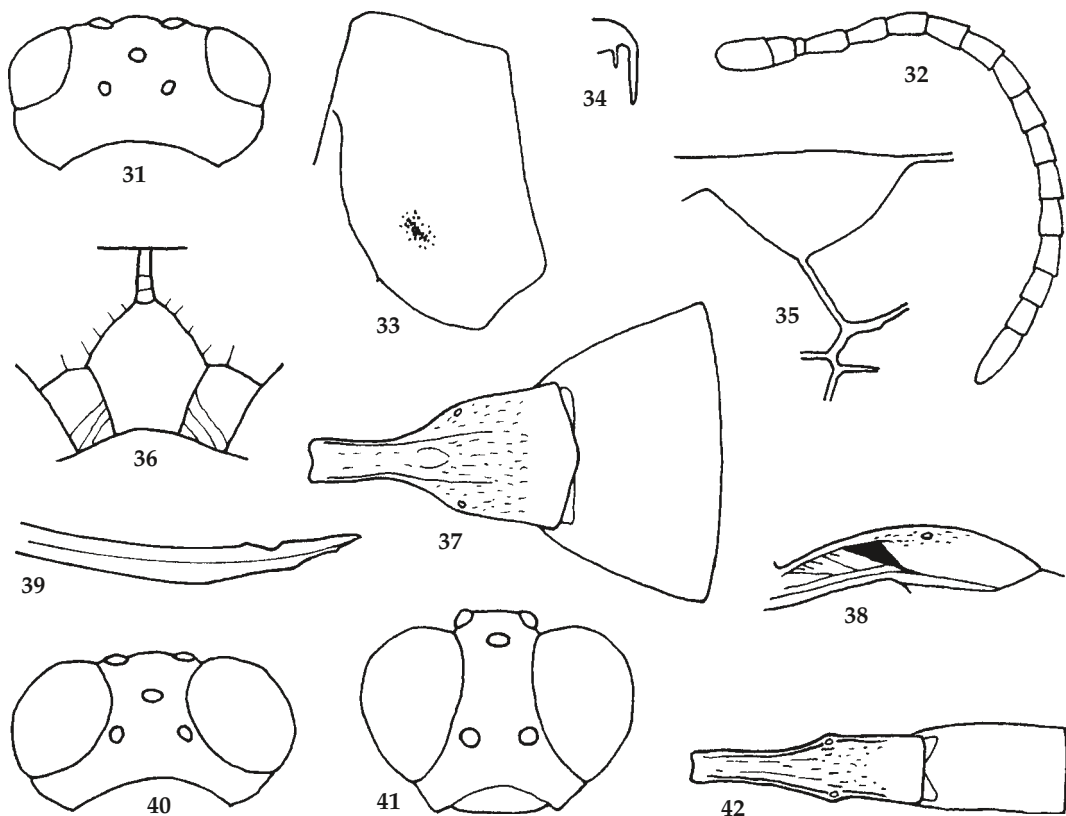
**w:** Body length 3.5–4.0 mm. Temples almost not constricted behind the eyes, 0.9 times as long as the width of an eye, tangential lines on eyes and temples intersect behind the tip of the gaster (Fig. 31). Face 1.2 times as wide as the frons. Frontal index 0.48. Ocellar index 1.9. Malar space index 1.0. Upper mandibular tooth slightly the longer. Clypeus as long as the face, 3.1 times as wide as long, rounded dorsally, finely granulate and with few punctures, almost flat medially and subventrally, with few punctures on a smooth background, rather sharp-edged ventrally. Head (except clypeus) granulate and dull. Flagellum with 14 segments, almost filiform, 1<sup>st</sup> segment 2.6 times, 2<sup>nd</sup> segment 2.1 times, median segment 1.5 times, penultimate segment 1.3 times as long as wide, last segment not enlarged (Fig. 32). Pronotum granulate and dull dorsolaterally, with fine short striae in the anterior groove. Mesoscutum with fine dispersed punctures on a finely granulate or smooth

background dorsally-anteriorly and sublaterally, distinctly granulate and dull without punctures dorsally-posteriorly in front of the prescutellar furrow. Notaulus as a shallow groove, extending to 0.2 the length of the mesoscutum. Prescutellar furrow with fine striae. Scutellum bordered by carinae on the anterior 0.7–0.8, granulate. Mesopleurum granulate, slightly shining. Foveate groove as a shallow indistinct groove, coarsely granulate, without wrinkles or with some very fine wrinkles (Fig. 33). Mesosternum finely granulate, shining. Metapleurum granulate and with fine wrinkles. Hind femur 4.1 times as long as high. Pterostigma 2.0 times as long as wide (Fig. 35). Metacarpus reaching 0.3 the distance from radial cell to the tip of wing. Basal area of propodeum 2–3 times as long as wide, bordered by carinae laterally, about half as long as the petiolar area, covered with wrinkles. Dorsolateral area granulate, with rather long wrinkles laterally and posteriorly. Petiolar area about as long as wide, rounded anteriorly, almost flat, granulate and dull (Fig. 36). Propodeal spiracle separated from the pleural carina by 2–3 times its diameter, the spiracular carina narrow. Petiole slightly depressed dorsally, finely granulate and with fine wrinkles, with strong dorsolateral carinae, with longitudinal striae and/or irregular wrinkles laterally. Postpetiole with striae or granulate-strigose anteriorly, the posterior 0.2–0.3 smooth. 1<sup>st</sup> sternite not reaching the spiracles (Figs 37, 38). 2<sup>nd</sup> tergite very finely granulate anteriorly. Gaster slightly compressed posteriorly. Ovipositor 3.1–3.3 times, ovipositor sheath 2.0–2.2 times as long as the 1<sup>st</sup> tergite. Ovipositor slightly bent upwards proximally and medially, somewhat more bent upwards distally, with a rather short and deep dorsal emargination subapically, with two indistinct teeth ventrally (Fig. 39).

Measurements of the holotype: Body 3.8 mm long. Head 0.88 mm wide. Thorax 1.44 mm long, 0.69 mm wide (mesoscutum). Front wing 3.5 mm long. 1<sup>st</sup> gastral tergite 0.72 mm long. Postpetiole 0.31 mm long, 0.38 mm wide. 2<sup>nd</sup> tergite 0.38 mm long, 0.49 mm wide. Ovipositor sheath 1.44 mm long. Ovipositor about 2.4 mm long.

Colour: Black. Palpi brownish. Mandible blackish proximally, reddish brown distally. Tegula dark brown. Pterostigma medium brown, the basal and apical corners whitish. Distal parts of the femora reddish brown. Tibiae and tarsi dark yellowish red.

**M** [correctly associated]: Eyes large. Temples strongly constricted behind the eyes, 0.44 times as long as the width of an eye, tangential lines on eyes and temples intersect on the postscutellum. Face about 1.7 times as wide as the frons. Frontal index 0.24–0.27 (Figs 40, 41). Ocellar index 0.2–0.3. Malar space



**Figs 31-37.** *Allothroides obscurus* spec. nov. (♀). 31. Head, top view. 32. Antenna. 33. Mesopleurum. 34. Hind tarsal claw. 35. Pterostigma and areolet. 36. Propodeum, top view. 37. 1<sup>st</sup> and 2<sup>nd</sup> gastral tergites, top view. 38. 1<sup>st</sup> gastral segment, side view. 39. Ovipositor, side view.

**Figs 40-42.** *Allothroides ?obscurus* spec. nov. (♂). 40. Head, top view. 41. Head, front view. 42. 1<sup>st</sup> and 2<sup>nd</sup> gastral tergites, top view.

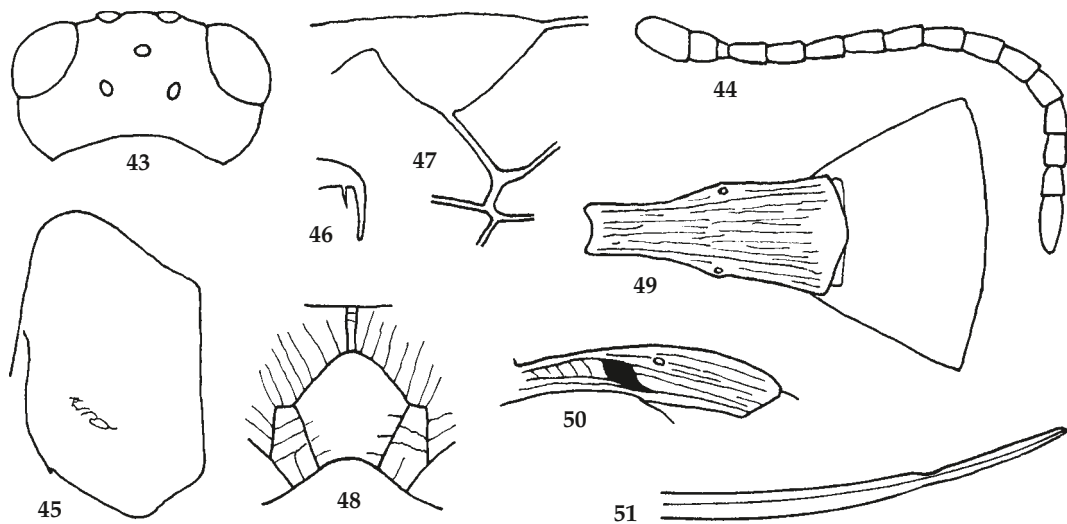
index 0.5. Flagellum with 14 segments, filiform, 1<sup>st</sup> segment 2.1 times, 2<sup>nd</sup> segment 1.7 times, median segment 1.6 times, penultimate segment 1.3 times as long as wide. 1<sup>st</sup> gastral tergite 3.1 times as long as wide. Postpetiole with fine striae or granulate-strigose anteriorly, finely granulate medially, smooth posteriorly. 2<sup>nd</sup> tergite about 1.5 times as long as wide. Thyridial depression wider than long (Fig. 42). In other characters similar to the ♀, but without clear evidence that it belongs to the same species [3 ♂♂ Edmonton, Alberta (HOR, OTT, WAS); 4 ♂♂ Midland Co., Michigan (LAN)].

***Allothroides salicicola* spec. nov.**

**Holotype** (♀): "Matanuska Alask, May 7 1945, Exp. Station, J. C. Chamberlin" (Alaska, USA), "willow catkin" (WAS).

**w:** Body length 3.1 mm. Temples moderately constricted behind the eyes, 0.8 times as long as the width of an eye, tangential lines on eyes and temples intersect on the postpetiole (Fig. 43). Face 1.15 times as wide as the frons. Frontal index 0.52. Ocellar index 2.0. Malar space index 0.7. Mandibular teeth about equal. Clypeus 0.8 times as long as the face, 3.3 times as wide as long, rounded dorsally, finely granulate and with few punctures, almost flat and smooth medially and subventrally, with few punctures. Head (except clypeus) granulate and dull. Flagellum with 13 segments, slightly clavate, 1<sup>st</sup> segment 2.0 times, 2<sup>nd</sup> segment 2.0 times, median segment 1.6 times, penultimate segment 0.95 times as long as wide, last segment slightly enlarged (Fig. 44). Pronotum granulate dorsolaterally, with distinct striae in the anterior groove. Mesoscutum with fine rather dense punctures on a smooth background dorsally-anteriorly and sublaterally, distinctly granulate and





Figs 43–51. *Allophroides salicicola* spec. nov. (♀). 43. Head, top view. 44. Antenna. 45. Mesopleurum. 46. Hind tarsal claw. 47. Pterostigma and areolet. 48. Propodeum, top view. 49. 1<sup>st</sup> and 2<sup>nd</sup> gastral tergites, top view. 50. 1<sup>st</sup> gastral segment, side view. 51. Ovipositor, side view.

dull without punctures dorsally-posteriorly in front of the prescutellar furrow. Notaulus as a shallow indistinct groove, extending to 0.3 the length of the mesoscutum. Prescutellar furrow with fine short striae. Scutellum bordered by carinae on the anterior 0.8, finely granulate and with very fine punctures. Mesopleurum granulate, slightly shining. Foveate groove as an indistinct furrow, with few fine wrinkles, about 0.3 times as long as the mesopleurum (Fig. 45). Mesosternum with fine rather dense punctures on a smooth background. Metapleurum granulate-strigose. Hind femur 3.9 times as long as high. Pterostigma 1.7 times as long as wide (Fig. 47). Metacarpus reaching 0.4 the distance from radial cell to the tip of wing. Basal area of propodeum 2.5 times as long as wide, bordered by carinae laterally, about half as long as the petiolar area. Dorsolateral area granulate and with longitudinal striae. Petiolar area 0.9 times as long as wide, rounded anteriorly, almost flat, granulate (Fig. 48). Propodeal spiracle separated from the pleural carina by 1.5 times its diameter, the spiracular carina rather wide. Petiole flat dorsally, with distinct striae dorsally and laterally, with dorsolateral carinae. Postpetiole almost completely striate, a small posterior area smooth. 1<sup>st</sup> sternite not reaching the spiracles (Figs 49–50). Gaster clavate posteriorly. Ovipositor 3.0 times, ovipositor sheath 2.0 times as long as the 1<sup>st</sup> tergite. Ovipositor slender, slightly bent upwards proximally and medially, somewhat more bent upwards distally, abruptly narrowed subapically, its tip thin (Fig. 51).

Measurements of the holotype: Body 3.1 mm

long. Head 0.79 mm wide. Thorax 1.30 mm long, 0.71 mm wide (mesoscutum). Front wing 3.1 mm long. 1<sup>st</sup> gastral tergite 0.63 mm long. Postpetiole 0.27 mm long, 0.35 mm wide. 2<sup>nd</sup> tergite 0.36 mm long, about 0.7 mm wide. Ovipositor sheath 1.22 mm long. Ovipositor 1.88 mm long.

Colour: Black. Palpi brownish. Mandible blackish, the teeth reddish brown. Tegula dark brown. Pterostigma light brown, the basal and apical corners whitish. Trochantelli and femora dark brown, the femora marked with reddish brown distally. Tibiae and tarsi dark yellowish red.

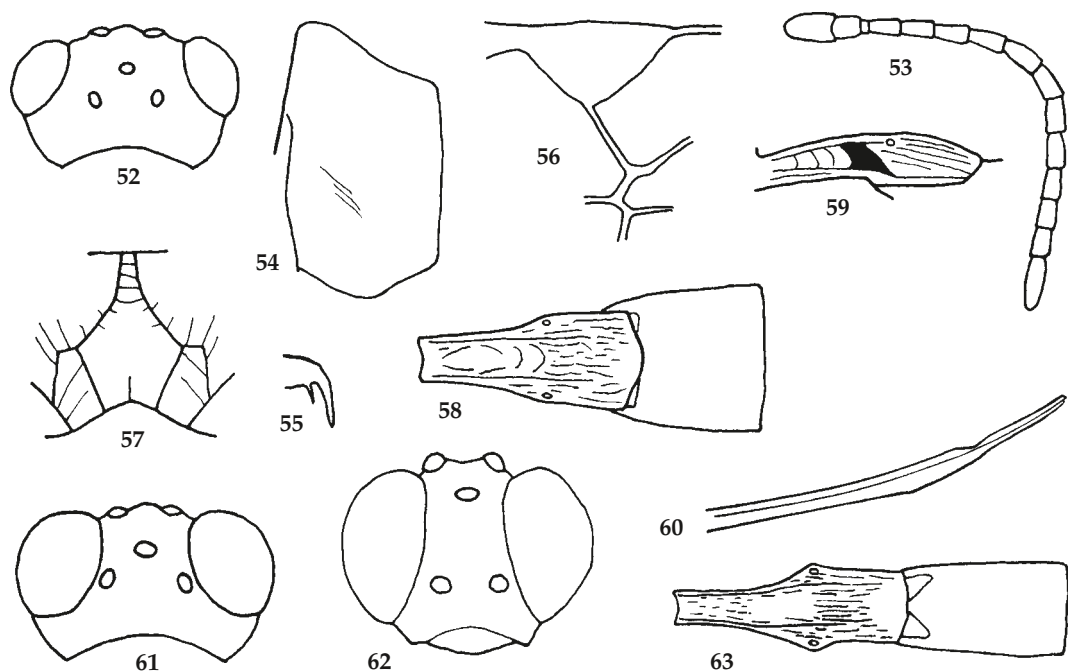
**M:** unknown.

**Taxonomic remark:** *A. salicicola* is similar to *A. acutatus* Khalaim from the eastern Palaearctic region. The latter differs by: Mesoscutum granulate and dull. Foveate groove obliterated. Ovipositor sheath 1.5 times as long as the 1<sup>st</sup> gastral tergite (according to the description by Khalaim 2007: 569).

#### *Allophroides tenuicauda* spec. nov.

**Holotype** (♀): “North Fork Pass, Ogilvie Mts. Y. T., 4100’, 17.6.1962, R. E. Leech” (Yukon, Canada), “On *Salix*” (OTT). – **Paratypes** (1 ♀, 2 ♂♂) collected at the same locality, 10.6. and 12.6.1962 (HOR, OTT).

**w:** Body length 2.7–3.0 mm. Temples distinctly constricted behind the eyes, 0.8 times as long as the width of an eye, tangential lines on eyes and temples intersect on the postscutellum (Fig. 52). Face 1.1 times



**Figs 52–63.** *Allophroides tenuicauda* spec. nov. 52–60. ♀. 52. Head, top view. 53. Antenna. 54. Mesopleurum. 55. Hind tarsal claw. 56. Pterostigma and areolet. 57. Propodeum, top view. 58. 1<sup>st</sup> and 2<sup>nd</sup> gastral tergites, top view. 59. 1<sup>st</sup> gastral segment, side view. 60. Ovipositor, side view. 61–63. ♂. 61. Head, top view. 62. Head, front view. 63. 1<sup>st</sup> and 2<sup>nd</sup> gastral tergites, top view.

as wide as the frons. Frontal index 0.48. Ocular index 1.8. Malar space index 0.75. Upper mandibular tooth slightly the longer. Clypeus about as long as the face, 3.0 times as wide as long, slightly rounded, finely granulate and with few punctures dorsally, with a few punctures on a smooth background, medially and subventrally. Head (without clypeus) granulate and dull, face slightly shining. Flagellum with 12 segments, slightly clavate, 1<sup>st</sup> segment 2.4 times, 2<sup>nd</sup> segment 1.9 times, median segment 1.4 times, penultimate segment 1.2 times as long as wide (Fig. 53). Pronotum granulate dorsolaterally, with fine long striae in the anterior groove. Mesoscutum with fine dispersed punctures on a finely granulate or smooth background dorsally-anteriorly and sublaterally, distinctly granulate and dull without punctures dorsally-posteriorly in front of the prescutellar furrow. Notaulus as a shallow groove, extending to 0.25 the length of the mesoscutum. Prescutellar furrow with fine striae. Scutellum bordered by carinae on the anterior 0.7, granulate. Mesopleurum finely granulate, slightly shining, speculum strongly shining. Foveate groove almost obliterated, replaced by a few fine striae or wrinkles (Fig. 54). Mesosternum with fine dispersed punctures on a smooth background. Metapleurum granulate. Hind femur 4.0 times as

long as high. Pterostigma 1.8 times as long as wide (Fig. 56). Metacarpus reaching 0.35 the distance from radial cell to the tip of wing. Basal area of propodeum twice as long as wide, bordered by carinae laterally, about half as long as the petiolar area, covered with wrinkles. Dorsolateral area finely granulate, shining, with fine longitudinal striae. Petiolar area about as long as wide, more or less rounded anteriorly (the carina separating the petiolar area from the basal area indistinct in the holotype, distinct in the paratype ♀), flat, granulate (Fig. 57). Propodeal spiracle separated from the pleural carina by 3–4 times its diameter, the spiracular carina narrow. Petiole slightly depressed dorsally, covered with striae and wrinkles dorsally and laterally, with strong dorsolateral carinae. Postpetiole almost completely covered with fine striae, a small area smooth posteriorly. 1<sup>st</sup> sternite not reaching the spiracles (Figs 58–59). Gaster clavate posteriorly. Ovipositor 3.1 times, ovipositor sheath 2.1 times as long as the 1<sup>st</sup> tergite. Ovipositor slender, almost straight proximally and medially, slightly bent upwards distally, abruptly narrowed subapically, its tip thin (Fig. 60).

Measurements of the holotype: Body 3.0 mm long. Head 0.74 mm wide. Thorax 1.13 mm long, 0.60 mm wide (mesoscutum). Front wing 2.8 mm

long. 1<sup>st</sup> gastral tergite 0.55 mm long. Postpetiole 0.25 mm long, 0.30 mm wide. 2<sup>nd</sup> tergite 0.35 mm long, 0.39 mm wide. Ovipositor sheath 1.13 mm long. Ovipositor 1.70 mm long.

Colour: Black. Palpi yellowish brown. Mandible black proximally, reddish brown distally. Tegula dark brown. Pterostigma medium brown, the basal and apical corners whitish. Coxae, trochanters and trochantelli dark brown or blackish. Femora dark brown, marked with reddish brown distally (to a variable extent), Tibiae and tarsi yellowish brown.

**M:** Eyes large. Temples distinctly constricted behind the eyes, 0.6 times as long as the width of an eye, tangential lines on eyes and temples intersect on the scutellum. Face 1.4 times as wide as the frons. Frontal index 0.31–0.32 (Figs 61, 62). Ocellar index 0.2. Malar space index 0.5. Flagellum with 13 segments, short, slightly attenuated, 1<sup>st</sup> segment 2.5 times, 2<sup>nd</sup> segment 2.1 times, median segment 1.9 times, penultimate segment 1.2 times as long as wide. 1<sup>st</sup> gastral tergite 3.2 times as long as wide. Postpetiole distinctly striate anteriorly and medially, the posterior 0.2–0.4 smooth. 2<sup>nd</sup> tergite about 1.7 times as long as wide. Thyridial depression about as long as wide (Fig. 63). In other characters similar to the ♀.

**Taxonomic remark:** *A. tenuicauda* is similar to *A. acutatus* Khalaim from the easter Palaearctic region. The latter differs by: Mesoscutum granulate and dull. Ovipositor sheath 1.5 times as long as the 1<sup>st</sup> gastral tergite (according to the description by Khalaim 2007: 569).

### *Gelanes* Horstmann

*Gelanes* Horstmann, 1981. Type species: *Thersilochus fuscus* Holmgren, 1860.

*Gelanes* is a Holarctic genus, which was described by Horstmann (1981: 10f.) and re-described by Khalaim & Blank (2011: 155f.). In the Palaearctic region, a moderate number of species occur, which were revised by Khalaim (2002) and Khalaim & Blank (2011). In the Nearctic region, *Gelanes* is species-rich, with probably more than 40 species, all of them undescribed. In this paper, several species or species groups of *Gelanes* are treated: (a) nine species, in which the eyes of the males are enlarged and the frons is narrowed (a character state not known in Palaearctic species), and in which the antennae of the females are short and clavate, with less than 17 flagellar segments (these species being similar to *Allophroides* species in general appearance); (b) two species, in which the antennae of the females are

rather short and clavate too, but in which the eyes of the males are not enlarged (*G. flavopictus*, *G. punctipleuris*); (c) one species, in which the eyes of both sexes are enlarged, but in which the antennae are rather long and filiform (*G. punctulatus*); (d) one species quite different from the others, which is described here because it is associated with unusual hosts and therefore should receive a name (*G. pleroneurae*).

Several species treated here are associated with Pinaceae. Three species have been reared from *Xyela* spp. on *Pinus* (*G. brevicornis*, *G. flavopictus*, *G. punctipleuris*), and one species was found ovipositing in larvae of *Pleroneura* spp. on *Abies* (*G. pleroneurae*). One additional species has been collected on *Pinus* (*G. intermedius*), another on *Pseudotsuga* (*G. striatus*). But no specimen of the rather common species *G. clavicornis* is labelled as having been collected on any plant species; therefore the host range of this species might be different. Apparently all species are univoltine, with a flight period in spring or early summer.

The following character states apply to all *Gelanes* species discussed here and are not repeated in the descriptions: Head 1.2–1.3 times as wide as high. Apex of clypeus rounded, blunt, with a transverse row of bristles. Glossa 0.3–0.5 times as long as the width of the clypeus. Genal carina low. Thorax short, 1.8–2.1 times as long as the width of the mesoscutum. Epomia obliterated. Prepectal carina low, bent forwards dorsally. Hind tibia distinctly longer than hind femur. Hind basitarsus 0.4–0.5 times as long as hind tibia. Longer hind tibial spur almost straight or slightly curved distally, about 0.3 times as long as the basitarsus. Tarsal claws evenly curved and evenly attenuated, without a subbasal tooth (Fig. 67). Intercubitus of front wing distinctly basad of the 2<sup>nd</sup> recurrent vein. First brachial cell closed at its lower distal corner (but the postnervulus interrupted by a narrow bulla). Nervellus vertical or slightly reclivous. Basal area of propodeum not replaced by a keel. Petiole with distinct striae laterally. Glymma distinct, situated at the posterior edge of the petiole, connected with the ventrolateral furrow of the postpetiole. Postpetiole rounded dorsally, with divergent lateral contours. In the female, thyridium obliterated and thyridial depression as a narrow transverse furrow (exception: *G. incisus*). In the male, thyridial depression triangular, wider than long or about as long as wide. Ovipositor usually with a shallow dorsal emargination subapically, with a narrow dorsal furrow in front of this emargination and with a small tooth on either side of this furrow (in lateral view, usually only one tooth being visible) (Fig. 72) (exceptions: *G. incisus*, *G. punctipleuris*).

## Key to the females treated in this paper

(Provision is also made for females of species not included.)

1. Flagellum with 13–16 segments (rarely with 17 segments). ..... 2.
  - Flagellum with at least 17 segments (specimens with 17 flagellar segments should be tried in both halves of the couplet). ..... 3.
2. Ovipositor with a narrow dorsal incision subapically (Figs 113, 159). ..... 3.
  - Ovipositor with a shallow rather broad dorsal emargination subapically, usually with a very small tooth in front of this emargination (Fig. 72). ..... 4.
3. Ocellar index 1.3 (Fig. 106). Petiole about 1.4 times as wide as high, slightly concave and almost smooth dorsally, with few striae and some wrinkles laterally (Figs 111, 112). .....
  - ..... *incisus* spec. nov.
  - Ocellar index 1.7–1.9 (Fig. 152). Petiole about 1.2 times as wide as high, slightly convex and with fine striae dorsally, with distinct striae laterally (Figs 157, 158). ..... *punctipleuris* spec. nov.
4. Mesopleurum granulate, often with additional fine wrinkles, usually dull, rarely finely granulate and somewhat shining, a punctation hardly or not at all discernible. .... 5.
  - Mesopleurum with fine or distinct punctures on a finely granulate or smooth background, the punctures always discernible, or mesopleurum smooth or almost smooth. .... 6.
5. Flagellum with 13–15 segments. Mandible and clypeus marked with reddish brown. Head and thorax reddish brown or dark brown. Coxae reddish brown or brown. ....
  - ..... *brevicornis* spec. nov.
  - Flagellum with 15–17 segments. Mandible and clypeus marked with yellow. Lateral part of pronotum yellowish red, often thorax and propodeum completely yellowish red. Fore and mid coxae yellow, hind coxa yellowish red. ....
    - ..... *flavopictus* spec. nov.
6. Clypeus marked with dark brown or black ventrally, yellowish red or reddish brown dorsally (same colour as the face), rarely clypeus almost completely black or almost completely reddish brown (these specimens being difficult to distinguish). Mesopleurum finely granulate and with fine dispersed punctures (often appearing only granulate or only punctate, depending on the angle of incidence of the light; a distinctive character). ..... *clavicornis* spec. nov.
- Clypeus completely reddish brown, or reddish brown dorsally and yellowish ventrally, or black (in *G. nigrinus*). Mesopleurum often distinctly punctate on a finely granulate or smooth background. .... 7.
7. Ovipositor sheath 3.6–4.9 times as long as the 1<sup>st</sup> gastral tergite. Flagellum with 15–16 segments. .... 8.
  - Ovipositor sheath 1.9–2.8 times as long as the 1<sup>st</sup> gastral tergite. .... 10.
8. Head, thorax, propodeum and gaster black, clypeus marked with brown ventrally or ventrolaterally, anterior gastral tergites tinged with dark brown. Ovipositor sheath 4.5–4.7 times as long as the 1<sup>st</sup> gastral tergite. ....
  - ..... *nigrinus* spec. nov.
  - Head, thorax, propodeum and gaster predominantly reddish brown or brown. Clypeus reddish brown, sometimes yellowish ventrally (in *G. montanus*). .... 9.
9. Frons granulate and dull laterally, finely granulate and somewhat shining medially, a very fine punctation hardly discernible. Clypeus yellowish red or reddish brown, often marked with dark brown centrally. Ovipositor sheath 4.2–4.9 times as long as the 1<sup>st</sup> gastral tergite. ....
  - ..... *frontalis* spec. nov.
  - Frons with distinct fine punctures, sometimes with an additional fine granulation laterally. Clypeus reddish brown dorsally (same colour as the face), yellowish ventrally. Ovipositor sheath 3.6–3.8 times as long as the 1<sup>st</sup> gastral tergite. .... *montanus* spec. nov.
10. Flagellum with 16–17 segments. Clypeus reddish brown dorsally, yellowish red medially and ventrally. Pronotum with a yellowish mark in the dorsal posterior corner. Mesopleurum finely granulate and with distinct rather dense punctures, sometimes with additional fine wrinkles. Ovipositor sheath 2.3–2.4 times as long as the 1<sup>st</sup> gastral tergite. .... *intermedius* spec. nov.
- Flagellum with 14–15 segments. Pronotum reddish brown, not marked with yellowish in the dorsal posterior corner. .... 11.
11. Clypeus reddish brown dorsally (same colour as the face), light yellow ventrally. Petiolar area of propodeum with distinct transverse wrinkles in the posterior half. Mesopleurum with distinct rather dense punctation on a finely granulate or wrinkled background. Foveate groove rather

- long, for the greater part covered with longitudinal striae (Fig. 185). Ovipositor sheath 2.8 times as long as the 1<sup>st</sup> gastral tergite. .... *striatus* spec. nov.
- Clypeus reddish brown. Petiolar area of propodeum finely sculptured, with some fine irregular wrinkles. .... 12.
12. Mesopleurum with fine dispersed punctures on a very finely granulate background. .... *brevicornis* spec. nov. Var.
- Mesopleurum with fine dispersed punctures on a smooth background. Ovipositor sheath 2.7–2.8 times as long as the 1<sup>st</sup> gastral tergite. .... *rarus* spec. nov.
13. Face 1.3–1.4 times as wide as the frons (Fig. 161). Flagellum with 23 segments. Transverse carina of propodeum replaced by several wrinkles laterally (Fig. 165). Ovipositor sheath 5.7–5.8 times as long as the 1<sup>st</sup> gastral tergite. .... *punctulatus* spec. nov.
- Face at most 1.1 times as wide as the frons. ... 14.
14. Mesopleurum with fine or distinct dispersed punctures on a smooth background. Foveate groove very slightly depressed, usually small, covered with fine wrinkles and/or fine dorsoventral striae, sometimes almost obliterated (Fig. 146). Ovipositor 2.5 times, ovipositor sheath 1.5 times as long as the 1<sup>st</sup> gastral tergite. .... *pleroneurae* spec. nov.
- Mesopleurum granulate or punctate on a granulate background, and/or foveate groove as a distinct transversely striate furrow or a row of pits, and/or ovipositor distinctly longer ..... other species not treated in this paper

**Provisional key to the males with enlarged eyes and a narrow frons**

(Males of the other species will be keyed out in another paper.)

1. Flagellum with 21 segments. Frontal index 0.25 (Figs 169, 170). Mesopleurum with fine dispersed punctures on a smooth or finely sculptured background. .... *punctulatus* spec. nov.
  - Flagellum with 15–17 segments. .... 2.
2. Frontal index 0.37–0.39 (Figs 122, 123). Petiole about 1.3 times as wide as high, almost flat dorsally, with distinct striae (Fig. 124). .... *intermedius* spec. nov.
  - Frontal index 0.15–0.30. Petiole about 1.1 times as wide as high, convex dorsally, at most with few fine striae. .... 3.

3. Mesopleurum granulate and usually dull, rarely finely granulate and shining, a punctation hardly or not at all discernible. Temple 0.3 times as long as the width of an eye. Frontal index 0.20–0.30 ..... *brevicornis* spec. nov.
  - Mesopleurum with a finely granulate or smooth background, shining, with fine dispersed punctures, or almost smooth, a punctation hardly discernible. .... 4.
4. Temples strongly constricted behind the eyes, 0.3 times as long as the width of an eye (Figs 84, 103). .... 5.
  - Temples less strongly constricted behind the eyes, 0.42–0.5 times as long as the width of an eye (Figs 141, 180). .... 6.
5. Frontal index 0.15–0.18 (Figs 84, 85). .... *clavicornis* spec. nov.
  - Frontal index 0.21 (Figs 103, 104). .... *?frontalis* spec. nov.
6. Mesoscutum finely granulate and finely punctate in front of the prescutellar furrow. .... *clavicornis* spec. nov. Var.
  - Mesoscutum with fine dispersed punctures on a smooth background. .... 7.
7. Foveate groove at least half as long as the mesopleurum, covered with fine striae (about as in fig. 135). .... *nigrinus* spec. nov.
  - Foveate groove as a short row of pits, about 0.3 times as long as the mesopleurum (about as in fig. 174). .... *?rarus* spec. nov.

***Gelanes brevicornis* spec. nov.**

**Holotype** (♀): “Takoma Pk., Md., IV.25, 1943, H. & M. Townes” (Maryland, USA) (AEL). – **Paratypes** (172 ♀♀, 55 ♂♂): Canada: Alberta: Elkwater Park (OTT); British Columbia: Atlin (HOR, OTT), Hixon (OTT); Ontario: Constance Bay (OTT), Limerick Forest, Spencerville (NHM, OTT); Quebec: Laniel (OTT), Kazabazua (OTT). USA: Colorado: Niwot Ridge, Ward, 11,700' (OTT); District of Columbia: Anacostia (WAS), Washington (WAS); Florida: Columbia Co. (WAS), Gainesville (AEL); Maryland: Bowie (AEL, OTT), Cabin John Bridge (WAS), Colesville (OTT), Hollywood, St. Mary's Co. (AEL), Hughesville (AEL, WAS), Meadowood, Colesville (HOR, WAS), Takoma Park (AEL, HOR), Upper Marlboro (OTT); Michigan: Mackinac Co. (LAN), Roscommon (AEL); Minnesota: Bena (OTT); New York: Ithaca (OTT); North Carolina: Raleigh (AEL); South Carolina: Greenville (AEL); Texas: Big Creek Scenic Area, San Jacinto Co. (TEX); Virginia: Alexandria (WAS), Barcroft (WAS), Clifton (WAS), Falls Church (WAS), Meadows of Dan (AEL), Mountain Lake Biological Station (AEL),

Rosslyn (WAS), Vienna (WAS); Wyoming: Dubois, Fremont Co. (TEX). Flight period: iii–vii, with a distinct peak in iv–v.

**w:** Body length 2.5–3.0 mm. Temples distinctly constricted behind the eyes, 0.7 times as long as the width of an eye, tangential lines on eyes and temples intersect on the postscutellum (Fig. 64). Face 1.1 times as wide as the frons. Frontal index 0.50. Ocellar index 1.6. Malar space index 1.05. Mandibular teeth about equal. Clypeus 0.8 times as long as the face, 3.6 times as wide as long, convex and with fine punctures on a smooth background dorsally, flat and smooth medially and subventrally. Face, frons and vertex with very fine dispersed punctures on a finely granulate background, vertex sometimes with a smooth background. Temple with fine dispersed punctures on a smooth background. Flagellum with 13–14 segments (rarely 15 segments), clavate, 1<sup>st</sup> segment 2.8 times, 2<sup>nd</sup> segment 1.5 times, median segment 1.6 times, penultimate segment 1.0 times as long as wide, last segment enlarged (Fig. 65). Pronotum granulate dorsolaterally, with short striae in the anterior groove. Mesoscutum with fine dispersed punctures, for the greater part finely granulate (rarely with a smooth background), distinctly granulate in front of the prescutellar furrow. Notaulus as a shallow groove, extending to 0.3 the length of the mesoscutum. Prescutellar furrow with distinct striae. Scutellum bordered by carinae on the anterior 0.4, finely punctate on a finely sculptured background. Mesopleurum distinctly granulate, dull, often with additional fine wrinkles. Foveate groove as an indistinct short groove, covered with wrinkles, sometimes with additional fine striae (Fig. 66), sometimes longer or almost obliterated. Mesosternum with very fine dispersed punctures on a finely granulate or smooth background. Metopleurum granulate and dull. Hind femur 3.4 times as long as high. Pterostigma 1.9 times as long as wide (Fig. 68). Metacarpus reaching 0.3 the distance from radial cell to the tip of wing. Basal area of propodeum small, slightly longer than wide, with distinct lateral carinae, about 0.2 times as long as the petiolar area (variable). Dorsolateral area with fine dispersed punctures on a finely granulate background, slightly shining. Petiolar area 1.4 times as long as wide, narrowly rounded anteriorly, flat, granulate (Fig. 69). Propodeal spiracle separated from the pleural carina by 1.5–2.0 times its diameter, the spiracular carina narrow. Petiole convex or flat dorsally, smooth or with few fine striae, with fine dorsolateral carinae, with distinct striae laterally. Postpetiole smooth or with very fine sculpture. 1<sup>st</sup> sternite reaching the spiracles (Figs 70, 71). Gaster clavate posteriorly. Ovipositor 3.0–3.5 times, ovipositor sheath 2.1–2.7 times as long as the 1<sup>st</sup> tergite.

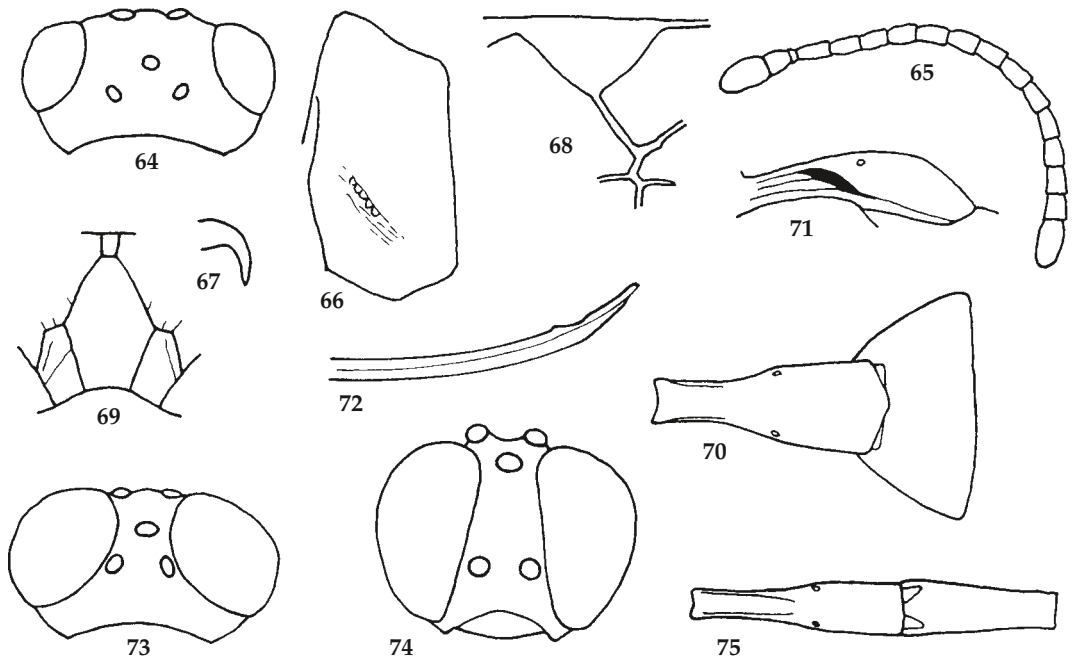
Ovipositor slightly bent upwards proximally and medially, more strongly bent upwards distally, with a shallow rather broad dorsal emargination subapically, usually with a very small tooth in front of this emargination, without teeth ventrally (Fig. 72).

Measurements of the holotype: Body 2.9 mm long. Head 0.81 mm wide. Thorax 1.13 mm long, 0.61 mm wide (mesoscutum). Front wing 2.7 mm long. 1<sup>st</sup> gastral tergite 0.60 mm long. Postpetiole 0.31 mm long, 0.28 mm wide. 2<sup>nd</sup> tergite 0.31 mm long, 0.30 mm wide. Ovipositor sheath 1.41 mm long. Ovipositor 1.88 mm long.

Colour: Head, thorax and propodeum reddish brown or dark brown, head often tinged with black dorsally. Palpi and mandible (teeth reddish brown) yellowish red. Clypeus completely reddish brown, or reddish brown dorsally and dark brown ventrally, rarely reddish brown dorsally and yellowish ventrally. Antenna reddish brown or dark brown, darkened distally. Tegula yellowish red. Pterostigma light brown or medium brown. Legs yellowish red or reddish brown, mid coxa, hind coxa, hind trochanter, proximal parts of mid and hind femora often tinged with brown. Gaster blackish, 1<sup>st</sup> segment and anterior part of 2<sup>nd</sup> tergite often tinged with brown.

**m:** Eyes large. Temples strongly constricted behind the eyes, 0.3 times as long as the width of an eye, tangential lines on eyes and temples intersect on the posterior half of the mesoscutum or the scutellum. Face about 1.8 times as wide as the frons. Frontal index 0.20–0.30 (Figs 73, 74). Ocellar index 0.2 (ocellus almost touching the eye). Malar space index 0.2. Flagellum with 15–16 segments, filiform, 1<sup>st</sup> segment 2.5 times, 2<sup>nd</sup> segment 1.7 times, median segment 1.6 times, penultimate segment 1.5 times as long as wide, last segment not enlarged. 1<sup>st</sup> gastral tergite 4.4 times as long as wide. Postpetiole smooth. 2<sup>nd</sup> tergite about three times as long as wide. Thyridial depression triangular, as long as wide or slightly longer than wide (Fig. 75). Gaster compressed posteriorly. Head (antenna included), thorax, propodeum and gaster blackish, the anterior or median gastral tergites often tinged with brown (to a variable extent). Clypeus blackish, or blackish dorsally and brown ventrally, or rarely blackish dorsally and yellowish brown ventrally. Tegula brownish or blackish. In other characters similar to the ♀. ♀♀ and ♂♂ were often collected at the same localities

**Variation:** In a few ♀♀ and ♂♂, the mesopleurum is finely granulate and shining. The differentiation of these specimens from other species is uncertain. In 92 ♀♀, the ovipositor sheath is 3.2–3.8 times as long as the 1<sup>st</sup> gastral tergite (in contrast to 2.1–2.7 times in the nominate morph). Many of these were collected at the same localities as ♀♀ with a shorter ovipositor,



Figs 64-75. *Gelanes brevicauda* spec. nov. 64-72. ♀. 64. Head, top view. 65. Antenna. 66. Mesopleurum. 67. Hind tarsal claw. 68. Pterostigma and areolet. 69. Propodeum, top view. 70. 1<sup>st</sup> and 2<sup>nd</sup> gastral tergites, top view. 71. 1<sup>st</sup> gastral segment, side view. 72. Ovipositor, side view. 73-75. ♂. 73. Head, top view. 74. Head, front view. 75. 1<sup>st</sup> and 2<sup>nd</sup> gastral tergites, top view.

but a series of 11 ♀♀ collected while ovipositing in staminate buds of *Pinus virginiana* all belong to the morph with a longer ovipositor. In addition, the distribution of this morph apparently is restricted to the eastern provinces and states [Canada: Quebec: Kazabazua (OTT). USA: Alabama: Killen (WAS); Maryland: Bowie (OTT, WAS), Colesville (OTT), Hughesville (AEI, WAS), Millington (OTT), Takoma Park (AEI, HOR), Upper Marlboro (OTT); Pennsylvania: Manchester (OTT); South Carolina: Greenville (AED); Virginia: Alexandria (WAS), Barcroft (WAS), Clifton (WAS), Falls Church (WAS), Rosslyn (WAS), Vienna (WAS)]. Therefore, the status of this morph is unknown and the specimens are not included in the type series.

**Hosts:** *Xyela* spp. (Hymenoptera, Xyelidae) on *Pinus*. The hosts are univoltine. The host larvae feed in spring in male strobili of *Pinus* spp., drop to the ground, build earthen cells in the soil, in which they hibernate, pupate in late winter, and the new adults emerge in early spring (Burdick 1961). The parasitoids oviposit in the host larvae in the staminate buds, probably kill their hosts in winter, pupate, and the new adults emerge about at the same time as the hosts (in Florida i-ii). A few hosts and parasitoids

develop and emerge one year later (Ebel 1966). In one experiment, Ebel collected strobili from *Pinus elliottii* Engelm., and kept the *Xyela* larvae under natural conditions. 80 sawflies emerged, about half of which were determined at a species level: about 40 specimens of *Xyela pini* Rohwer and one specimen of *X. bakeri* Konow. In the same experiment, 64 parasitoids emerged and were sent to the Washington museum, where 61 specimens belonging to *Gelanes* are preserved: *G. brevicornis* (3 ♀♀, 2 ♂♂), *G. flavopictus* (25 ♀♀), *G. ?flavopictus* (3 ♂♂), *G. punctipleuris* (14 ♀♀, 11 ♂♂) and *G. spec. nov.* (to be described in another paper) (3 ♀♀). In two other experiments, Ebel collected strobili from *Pinus palustris* Mill., reared few specimens of *Xyela bakeri* Konow and *X. minor* Norton (in about equal numbers, exact numbers not given) and eight parasitoids, six of which were found in the Washington museum: *Gelanes brevicornis* (2 ♂♂), *G. punctipleuris* (2 ♀♀, 1 ♂) and *G. spec. nov.* (1 ♀) (data compiled from Ebel 1966, labels of the parasitoid specimens, and notes in Hopkins' card file, WAS). ♀♀ of *G. brevicornis* were frequently collected on *Pinus banksiana* Lamb., *P. virginiana* Mill. and undetermined *Pinus* species, some of these caught on staminate buds while searching for hosts or inserting their ovipositors into the buds (NHM, OTT, WAS).

*Gelanes clavicornis* spec. nov.

**Holotype** (♀): “Smoky Jack Camp, Yosemite Pk, Cal., July 23 '48, HM&G Townes” (California, USA) (AEI).

– **Paratypes** (67 ♀♀, 7 ♂♂): Canada: Alberta: Elkwater (OTT), Island Lake, Coleman (OTT), Waterton (OTT), Whitehorn Lift, Lake Louise, 6800' (OTT); British Columbia: Anarchist Mountain, Osoyoos (OTT), Crownsnest (HOR, OTT), Sawmill Lake, Oliver (OTT); Yukon: Whitehorse (OTT). USA: Alaska: White Pass Trail, Skagway (FRA); California: Julian (AEI, HOR), Knox Mountain, Modoc Co. (WAS), Leewining (AEI), Sagehen Creek, Nevada Co. (WAH), Smoky Jack Camp, Yosemite Park (AEI), Sonora Pass, 8000' (AEI), Westwood (OTT); Colorado: Estes Park (AEI); Oregon: Lake-of-the-Woods (AEI), Ochoco Creek (AEI), Pinehurst (AEI), Selma (AEI); Utah: Strawberry Daniel's Pass (AEI). Flight period: v–vii.

**w:** Body length 2.5–3.5 mm. Temples moderately constricted behind the eyes, 0.5 times as long as the width of an eye, tangential lines on eyes and temples intersect on the postpetiole (Fig. 76). Face 1.15 times as wide as the frons. Frontal index 0.48. Ocellar index 1.6. Malar space index 0.9. Upper mandibular tooth slightly the longer. Clypeus 0.9 times as long as the face, 3.7 times as wide as long, convex dorsally, with few punctures on a smooth background, flat and smooth medially and subventrally. Face, frons and vertex with fine dispersed punctures on a finely granulate background, vertex partly with a smooth background. Temple with fine dispersed punctures on a smooth background, outer orbits not punctate. Flagellum with 14–15 segments (rarely with 16 or 17 segments), clavate, 1<sup>st</sup> segment 2.2 times, 2<sup>nd</sup> segment 1.8 times, median segment 1.6 times, penultimate segment 1.2 times as long as wide, last segment enlarged (Fig. 77). Pronotum with fine rather dense punctures on a finely granulate or smooth background dorsolaterally, with fine long striae in the anterior groove. Mesoscutum for the greater part with fine dispersed punctures on a smooth background, the background finely granulate in front of the prescutellar furrow. Notaulus as a shallow groove, extending to 0.25 the length of the mesoscutum. Prescutellar furrow with fine striae. Scutellum bordered by carinae on the anterior 0.3, with fine punctures on a smooth background. Mesopleurum finely granulate and with fine dispersed punctures (often appearing only granulate or only punctate, depending on the angle of incidence of the light). Foveate groove as a wrinkled furrow, extending over 0.3–0.7 of the length of the mesopleurum (Fig. 78). Mesosternum with fine dispersed punctures on a smooth background. Metapleurum with fine dispersed punctures on a finely granulate or smooth background. Hind femur 3.2 times as long as high. Pterostigma 1.9 times as long as wide

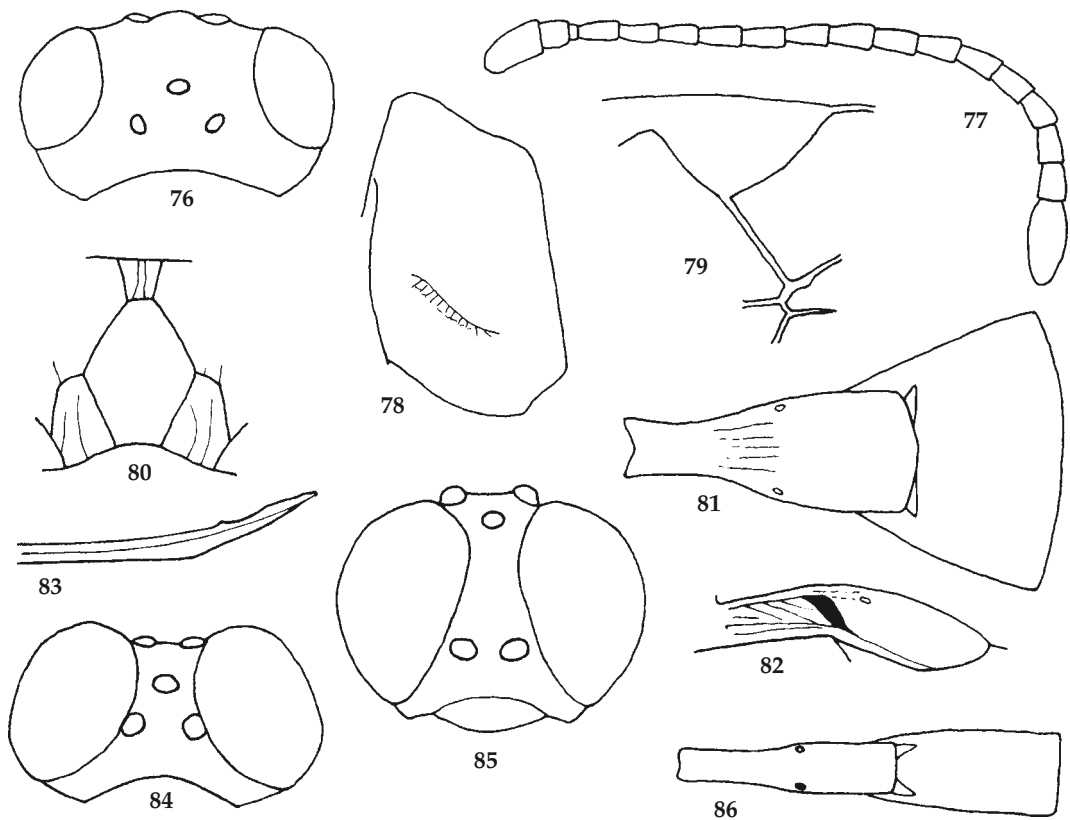
(Fig. 79). Metacarpus reaching 0.3 the distance from radial cell to the tip of wing. Basal area of propodeum rectangular or trapezoid, as long as wide or wider than long, with lateral carinae, 0.3 times as long as the petiolar area. Dorsolateral area with fine dispersed punctures on a very finely granulate background. Petiolar area 1.4 times as long as wide, rounded anteriorly, slightly convex, finely granulate and with fine wrinkles (Fig. 80). Propodeal spiracle separated from the pleural carina by 1.0–1.5 times its diameter, the spiracular carina narrow. Petiole almost flat or slightly concave dorsally, almost smooth or with fine striae, with distinct dorsolateral carinae, with striae laterally, sometimes partly with irregular wrinkles. Postpetiole for the greater part smooth, sometimes slightly sculptured anteriorly. 1<sup>st</sup> sternite not reaching the spiracles (Figs 81, 82). Gaster clavate posteriorly. Ovipositor 2.8–4.6 times, ovipositor sheath 1.8–3.6 times as long as the 1<sup>st</sup> tergite. Ovipositor slightly bent upwards proximally and medially, more strongly bent upwards distally, with a shallow rather broad dorsal emargination subapically, with a very small tooth in front of this emargination, without teeth ventrally (Fig. 83).

Measurements of the holotype: Body 3.5 mm long. Head 0.96 mm wide. Thorax 1.37 mm long, 0.72 mm wide (mesoscutum). Front wing 3.4 mm long. 1<sup>st</sup> gastral tergite 0.71 mm long. Postpetiole 0.36 mm long, 0.33 mm wide. 2<sup>nd</sup> tergite 0.38 mm long, 0.71 mm wide. Ovipositor sheath 2.12 mm long. Ovipositor 2.75 mm long.

Colour: Head, thorax and propodeum dark reddish brown or dark brown (rarely light reddish brown). Palpi brownish. Mandible (teeth dark brown) yellowish red. Scape often tinged with brown ventrally. Clypeus marked with brown or black ventrally, yellowish red or reddish brown dorsally and/or laterally, rarely the dark ventral mark small or almost lacking, rarely the clypeus completely black. Tegula and legs yellowish red, mid and hind coxa and hind trochanter (rarely also the proximal parts of the femora) tinged with brown. Pterostigma light brown. Gaster dark brown or blackish, the 1<sup>st</sup> segment (rarely also the 2<sup>nd</sup> tergite) tinged with brown.

**m:** Eyes large. Temples strongly constricted behind the eyes, 0.30 times as long as the width of an eye, tangential lines on eyes and temples intersect on the prescutellar furrow. Face about 2.8 times as wide as the frons. Frontal index 0.14–0.18 (Figs 84, 85). Lateral ocellus touching the eye. Malar space index 0.15. Flagellum with 16–17 segments, filiform, 1<sup>st</sup> segment 2.4 times, 2<sup>nd</sup> segment 1.8 times, median segment 1.7 times, penultimate segment 1.6 times as long as wide, last segment not enlarged. Sometimes





Figs 76- 86. *Gelanes clavicornis* spec. nov. 76- 83. ♀. 76. Head, top view. 77. Antenna. 78. Mesopleurum. 79. Pterostigma and areolet. 80. Propodeum, top view. 81. 1<sup>st</sup> and 2<sup>nd</sup> gastral tergites, top view. 82. 1<sup>st</sup> gastral segment, side view. 83. Ovipositor, side view. 84- 86. ♂. 84. Head, top view. 85. Head, front view. 86. 1<sup>st</sup> and 2<sup>nd</sup> gastral tergites, top view.

mesopleurum with very fine dispersed punctures on a smooth background. In small specimens foveate groove almost obliterated. Basal area of propodeum 1.0-1.5 times as long as wide, often covered with longitudinal wrinkles. 1<sup>st</sup> gastral tergite 4.1 times as long as wide. Postpetiole smooth, sometimes with a small median longitudinal furrow. 2<sup>nd</sup> tergite about twice as long as wide. Thyridial depression triangular, as long as wide or longer than wide (Fig. 86). Gaster compressed posteriorly. Head (clypeus included), thorax and propodeum black. Tegula brown or marked with brown. Coxae and trochanters blackish. Sometimes trochantelli and base of femora tinged with black. Gaster blackish or tinged with brown, often the 1<sup>st</sup> segment blackish and the 2<sup>nd</sup> tergite tinged with brown. In other characters similar to the ♀. In several cases, ♀♀ and ♂♂ were collected at the same locality.

**Variation:** The length of the ovipositor varies rather evenly over a large range (see above). In 5 ♀♀ the ovipositor is even longer, the ovipositor sheath being 4.1-4.8 times as long as the 1<sup>st</sup> gastral tergite [localities: Alberta: Elkwater Park (HOR, OTT), Waterton (OTT); British Columbia: Crownsnest (OTT), Saskatchewan: Cypress Hills (OTT)]. In 2 ♂♂ the eyes are less strongly enlarged, the temple is 0.42-0.46 times as long as an eye and the frontal index amounts to 0.21-0.25 [localities: Alberta: Waterton (OTT); California: Sonora Pass, 8000' (AED)]. Most of these specimens were collected at the same sites as specimens of the nominate morph. They are not included in the type series.

*Gelanes flavopictus* spec. nov.

**Holotype** (♀): "Fla. Columbia Co., II-10-60, B. H. Ebel, Coll." (Florida, USA), "ex larvae *Xyela* spp. mainly *X. pini* Roh. from ♂ strobili *Pinus elliottii*", "Hopkins US. 45714 (b), 62.5808" (WAS). – **Paratypes** (85 ♀♀): Canada: Ontario: Limerick Forest, Spencerville (OTT), Simcoe (OTT); Quebec: Kazabazua (NHM, OTT). USA: Florida: Columbia Co. (HOR, WAS); Maryland: Bowie (OTT, WAS), Cabin John (WAS), Colesville (HOR, OTT), Hughesville (WAS), Meadowood, Colesville (HOR, WAS), Millington (OTT), Upper Marlboro (OTT), Takoma Park (AEI); Michigan: Roscommon (AEI); Mississippi: Agricultural Experimental Station, State College (WAS); Pennsylvania: Manchester (OTT); Texas: Bastrop State Park (TEX); Virginia: Alexandria (WAS), Barcroft (WAS), Clifton (WAS), Falls Church (WAS). Flight period: ii–vi, with a peak in iv.

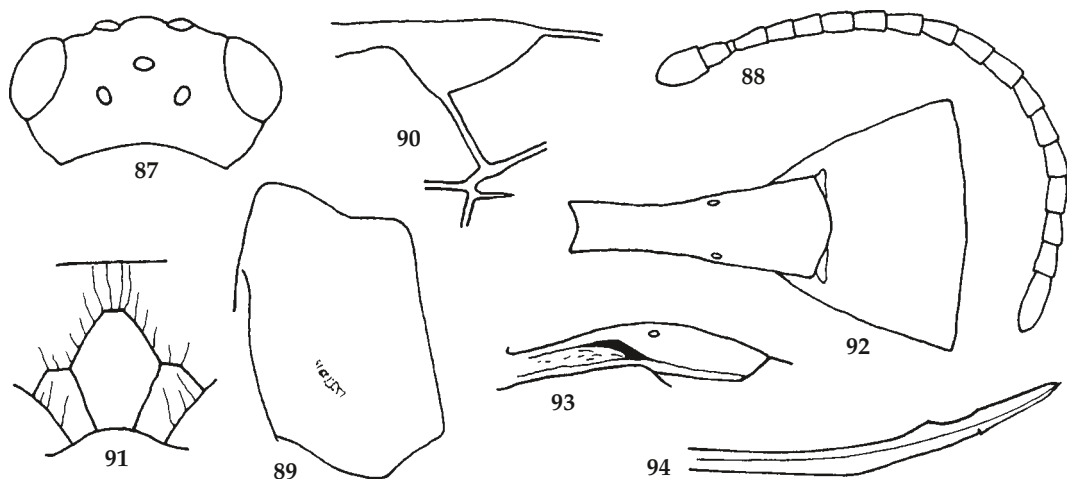
**w:** Body length 3.0–3.5 mm. Temples strongly constricted behind the eyes, 0.7 times as long as the width of an eye, tangential lines on eyes and temples intersect on the scutellum (Fig. 87). Face as wide as the frons. Frontal index 0.55. Ocellar index 1.6–1.8. Malar space index 1.05. Mandibular teeth about equal. Clypeus 0.8 times as long as the face, 3.6 times as wide as long, rather flat, with fine punctures on a finely granulate or smooth background dorsally, smooth subventrally. Face and frons distinctly granulate and with very fine punctures. Vertex and temple with fine dispersed punctures on a finely granulate background, slightly shining. Flagellum with 16 segments (rarely with 15 or 17 segments), slightly clavate, 1<sup>st</sup> segment 2.4 times, 2<sup>nd</sup> segment 1.3 times, median segment 1.4 times, penultimate segment 1.3 times as long as wide, last segment not much enlarged (Fig. 88). Pronotum granulate and dull dorsolaterally, with fine striae in the anterior groove. Mesoscutum granulate and dull, with fine dispersed punctures (sometimes punctures hardly discernible). Notaulus as a shallow groove, extending to 0.2 the length of the mesoscutum. Prescutellar furrow with fine striae. Scutellum bordered by carinae on the anterior 0.2, finely granulate and with fine punctures. Mesopleurum granulate and dull, with additional very fine wrinkles, a punctuation not discernible. Foveate groove as a rather indistinct wrinkled furrow, about 0.25 times as long as the mesopleurum (sometimes almost obliterated) (Fig. 89). Mesosternum with fine punctures on an almost smooth background, shining. Metapleurum granulate and with fine wrinkles, dull. Hind femur 3.6 times as long as high. Pterostigma 2.0 times as long as wide (Fig. 90). Metacarpus reaching 0.5 the distance from radial cell to the tip of wing. Basal area of propodeum 1.5–2.0 times as long as wide, with distinct or indistinct lateral carinae, 0.35 times as

long as the petiolar area. Dorsolateral area granulate, slightly shining, with longitudinal wrinkles. Petiolar area 1.3 times as long as wide, flat, granulate, without transverse wrinkles (Fig. 91). Propodeal spiracle separated from the pleural carina by its diameter, the spiracular carina narrow. Petiole almost flat and very finely granulate dorsally, with fine dorsolateral carinae, with fine striae laterally. Postpetiole finely granulate anteriorly, smooth posteriorly. 1<sup>st</sup> sternite almost reaching the spiracles (Figs 92, 93). Gaster clavate posteriorly. Ovipositor 2.7–3.7 times, ovipositor sheath 1.9–2.9 times (rarely 3.3 times) as long as the 1<sup>st</sup> tergite. Ovipositor slightly bent upwards proximally and medially, more strongly bent upwards distally, with a shallow rather broad dorsal emargination subapically, with a very small tooth in front of this emargination, with few very fine teeth ventrally (Fig. 94).

Measurements of the holotype: Body 3.3 mm long. Head 0.82 mm wide. Thorax 1.22 mm long, 0.66 mm wide (mesoscutum). Front wing 2.8 mm long. 1<sup>st</sup> gastral tergite 0.64 mm long. Postpetiole 0.31 mm long, 0.30 mm wide. 2<sup>nd</sup> tergite 0.33 mm long, about 0.6 mm wide. Ovipositor sheath 1.5 mm long. Ovipositor 2.0 mm long.

Colour: Head (ocellar triangle darkened), thorax, propodeum and gaster yellowish red or light reddish brown, sometimes head tinged with dark brown dorsally, sometimes mesoscutum, mesopleurum, mesosternum, metapleurum and propodeum marked with dark brown. Palpi, mandible (teeth dark brown), clypeus, scape, pedicellus, tegula and legs yellowish, hind coxa yellowish red. Flagellum yellowish proximally, brownish distally. Pterostigma light brown or medium brown. Sometimes the posterior gastral tergites marked with dark brown.

**m** [?correctly associated]: Eyes almost not enlarged. Temples strongly constricted behind the eyes, 0.75 times as long as the width of an eye, tangential lines on eyes and temples intersect on the scutellum. Face about as wide as the frons. Frontal index 0.52. Ocellar index 1.3. Malar space index 0.5. Flagellum with 18–19 segments, filiform, 1<sup>st</sup> segment 1.8 times, 2<sup>nd</sup> segment 1.3 times, median segment 1.6 times, penultimate segment 1.3 times as long as wide, last segment small. Mesoscutum for the greater part with fine dispersed punctures on a finely granulate and shining background, distinctly granulate and dull in front of the prescutellar furrow. Mesopleurum finely granulate and with fine punctures dorsally, distinctly granulate and with fine wrinkles ventrally. Basal area of propodeum half as long as petiolar area. 1<sup>st</sup> gastral tergite 3.0 times as long as wide. Postpetiole with very fine sculpture, with slightly divergent lateral contours. 2<sup>nd</sup> tergite about as long



**Figs 87- 94.** *Gelanes flavopictus* spec. nov. (♀). 87. Head, top view. 88. Antenna. 89. Mesopleurum. 90. Pterostigma and areolet. 91. Propodeum, top view. 92. 1<sup>st</sup> and 2<sup>nd</sup> gastral tergites, top view. 93. 1<sup>st</sup> gastral segment, side view. 94. Ovipositor, side view.

as wide. Thyridial depression triangular, about as long as wide. Gaster compressed posteriorly. Colour almost as in the ♀, but frons and vertex dark brown, mesoscutum und propodeum marked with dark brown, petiole tinged with brown. In other characters similar to the ♀. These ♂♂ were collected at the same localities as ♀♀ cited above as paratypes [4 ♂♂: Florida: Columbia Co. (see labels of holotype) (HOR, WAS); Maryland: Bowie (OTT)].

**Taxonomic remark:** *G. flavopictus* is similar to a still undescribed species. The latter differs by: Flagellum with 17-19 segments. Ovipositor with a rather narrow dorsal notch subapically. Both species were collected on *Pinus* and reared from *Xyela* species at the same localities. The ♂♂ described above might just as well belong to the undescribed species.

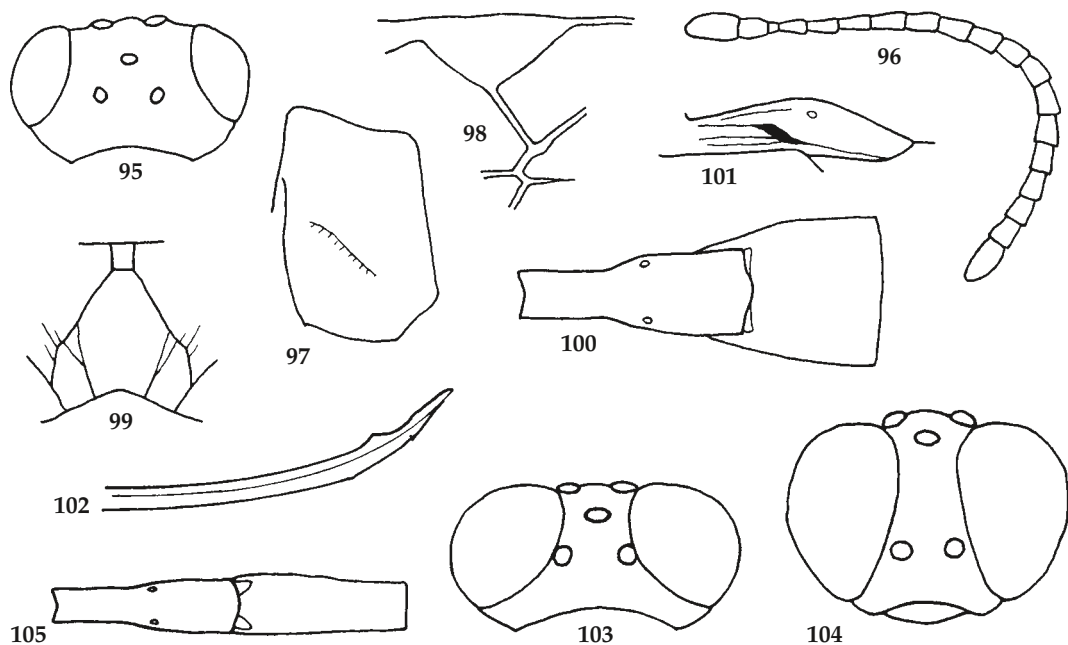
**Hosts:** *Xyela* spp. on *Pinus* (see note under *G. brevicornis*). ♀♀ of *G. flavopictus* were frequently collected on *Pinus virginiana* Mill. and undetermined *Pinus* species (HOR, OTT, WAS).

#### *Gelanes frontalis* spec. nov.

**Holotype** (♀): "Spring Br., Pa., IV.30 -1945, H. K. Townes" (Pennsylvania, USA) (AEI). - **Paratypes** (8 ♀♀): Canada: Ontario: Ottawa (NHM); Quebec: Avers Cliff, Magog (OTT). USA: Maine: Presque Isle (WAS); New York: Ithaca (WAS); Pennsylvania: Spring Bridge (AEI). Flight period: iv-vi.

**w:** Body length 3 mm. Temples distinctly constricted behind the eyes, 0.6 times as long as the width of an

eye, tangential lines on eyes and temples intersect on the postscutellum (Fig. 95). Face 1.1 times as wide as the frons. Frontal index 0.50. Ocellar index 1.8. Malar space index 0.9. Lower mandibular tooth slightly the longer. Clypeus as long as the face, 2.9 times as wide as long, slightly convex and with fine punctures on a smooth background dorsally, flat and smooth medially and subventrally. Face for the greater part granulate, finely granulate and somewhat shining on the central swelling, a very fine punctation hardly visible. Frons distinctly granulate laterally, finely granulate and somewhat shining medially, a fine punctation hardly visible. Vertex and temple with very fine punctures on a smooth background. Flagellum with 15-16 segments, clavate, 1<sup>st</sup> segment 2.3 times, 2<sup>nd</sup> segment 1.7 times, median segment 1.7 times, penultimate segment as long as wide, last segment enlarged (Fig. 96). Pronotum with fine striae dorsolaterally, finely granulate in the dorsal posterior corner. Mesoscutum for the greater part with fine dispersed punctures on a smooth background, finely punctate on a granulate background in front of the prescutellar furrow. Notaulus as a slightly depressed wrinkled groove, extending to 0.3 the length of the mesoscutum. Prescutellar furrow with striae. Scutellum bordered by carinae on the anterior 0.25, with fine dispersed punctures on a smooth background. Mesopleurum with very fine dispersed punctures on a very finely granulate or smooth background, distinctly granulate below the foveate groove. Foveate groove as a narrow wrinkled furrow, 0.3-0.5 times as long as the mesopleurum (Fig. 97). Mesosternum with fine dispersed punctures on a smooth back-



**Figs 95- 102.** *Gelanes frontalis* spec. nov. (♀). 95. Head, top view. 96. Antenna. 97. Mesopleurum. 98. Pterostigma and areolet. 99. Propodeum, top view. 100. 1<sup>st</sup> and 2<sup>nd</sup> gastral tergites, top view. 101. 1<sup>st</sup> gastral segment, side view. 102. Ovipositor, side view.

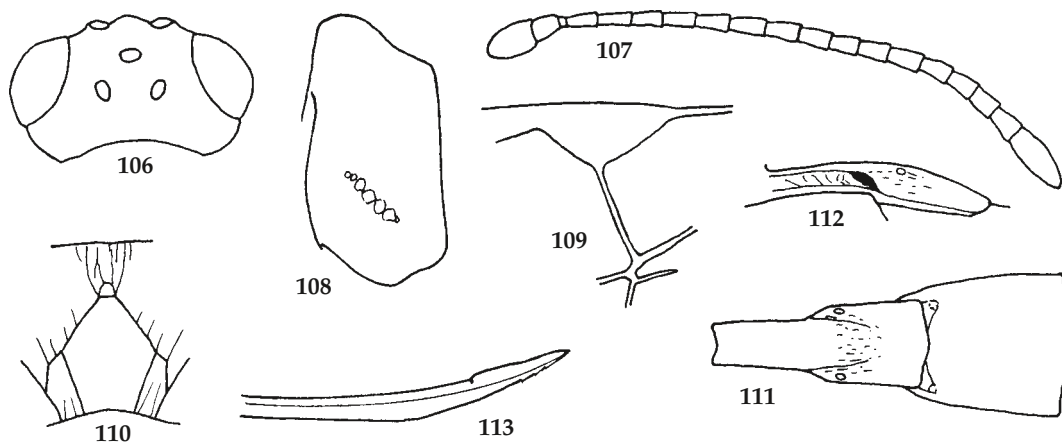
**Figs 103- 105.** *Gelanes ?frontalis* spec. nov. (♂). 103. Head, top view. 104. Head, front view. 105. 1<sup>st</sup> and 2<sup>nd</sup> gastral tergites, top view.

ground. Metapleurum with fine dispersed punctures on an almost smooth or smooth background. Hind femur 3.8 times as long as high. Pterostigma 2.1 times as long as wide (Fig. 98). Metacarpus reaching 0.4 the distance from radial cell to the tip of wing. Basal area of propodeum about as long as wide or longer than wide, 0.25 times as long as the petiolar area, with lateral carinae. Dorsolateral area with very fine dispersed punctures on a smooth background, partly without punctures. Petiolar area 1.3 times as long as wide, flat, very finely granulate and with fine wrinkles (Fig. 99). Propodeal spiracle separated from the pleural carina by twice its diameter, the spiracular carina narrow. Petiole flat or slightly concave and smooth dorsally, with distinct dorsolateral carinae, with fine striae laterally. Postpetiole smooth. 1<sup>st</sup> sternite reaching the spiracles (Figs 100, 101). Gaster clavate-compressed posteriorly. Ovipositor 5.5-6.2 times, ovipositor sheath 4.2-4.9 times as long as the 1<sup>st</sup> tergite. Ovipositor slightly bent upwards proximally and medially, distinctly bent upwards distally, with a shallow rather broad dorsal emargination subapically, with a very small tooth in front of this emargination, with very fine teeth ventrally (Fig. 102).

Measurements of the holotype: Body 2.9 mm long. Head 0.76 mm wide. Thorax 1.05 mm long, 0.57 mm wide (mesoscutum). Front wing 2.6 mm long. 1<sup>st</sup> gastral tergite 0.57 mm long. Postpetiole 0.29 mm long, 0.27 mm wide. 2<sup>nd</sup> tergite 0.35 mm long, about 0.4 mm wide. Ovipositor sheath 2.5 mm long. Ovipositor 3.2 mm long.

**Colour:** Head, thorax and propodeum reddish brown or dark brown, head tinged with black dorsally. Sometimes head completely blackish. Palpi, Mandible (teeth reddish brown), clypeus, tegula and legs yellowish or yellowish red. Clypeus often with a dark mark centrally, rarely clypeus almost completely blackish. Scape and pedicellus marked with yellowish red ventrally or completely yellowish. Flagellum dark brown. Pterostigma light brown. 1<sup>st</sup> and 2<sup>nd</sup> gastral segments reddish brown, posterior tergites dark brown or blackish.

**M** [?correctly associated]: Eyes large. Temples strongly constricted behind the eyes, 0.25 times as long as the width of an eye, tangential lines on eyes and temples intersect on the centre of the mesoscutum. Face 1.7 times as wide as the frons. Frontal index 0.22. Lateral ocellus touching the eye (Figs 103, 104). Frons distinctly granulate and dull laterally,



**Figs 106- 113.** *Gelanes incisus* spec. nov. (♀). 106. Head, top view. 107. Antenna. 108. Mesopleurum. 109. Pterostigma and areolet. 110. Propodeum, top view. 111. 1<sup>st</sup> and 2<sup>nd</sup> gastral tergites, top view. 112. 1<sup>st</sup> gastral segment, side view. 113. Ovipositor, side view.

finely granulate and shining medially. Malar space index 0.14. Flagellum with 16 segments, filiform, 1<sup>st</sup> segment 2.6 times, 2<sup>nd</sup> segment 1.7 times, median segment 1.7 times, penultimate segment 1.3 times as long as wide, last segment small. 1<sup>st</sup> gastral tergite 3.9 times as long as wide. Postpetiole smooth. 2<sup>nd</sup> tergite strongly compressed, about twice as long as wide. Thyridial depression triangular, about as long as wide (Fig. 105). Gaster compressed posteriorly. Head (clypeus included), antenna, thorax and propodeum black. Palpi dark brown. Mandible reddish brown apically. Scape and pedicellus tinged with reddish brown ventrally. Tegula brown. Legs yellowish red, coxae and trochanters tinged with dark brown. Bases of femora tinged with brown. Gaster blackish, 2<sup>nd</sup> and 3<sup>rd</sup> tergites yellowish red, genital clasper yellowish brown. In other characters similar to the ♀, but without clear evidence that it belongs to the same species [1 ♂: Kinburn, Ontario (NHM)].

#### *Gelanes incisus* spec. nov.

**Holotype** (♀): "Wyoming: Fremont Co., 25 mi NW Dubois, VI-22-1988, R. Wharton" (TEX). – **Paratypes**: 2 ♀♀ with the same data (HOR, TEX).

**w:** Body length 2.8–3.0 mm. Temples distinctly constricted behind the eyes, 0.6 times as long as the width of an eye, tangential lines on eyes and temples intersect on the propodeum (Fig. 106). Face 1.1 times as wide as the frons. Frontal index 0.52. Ocellar index 1.3. Malar space index 1.0. Lower mandibular tooth slightly the longer. Clypeus 0.9 times as long as the face, 3.4 times as wide as long, slightly convex and with few punctures dorsally, almost flat and

smooth subventrally. Head punctate on a smooth background. Face with fine rather dense punctures. Frons, vertex and temple with very fine dispersed punctures, outer orbit without punctures. Flagellum with 16 segments, clavate, 1<sup>st</sup> segment 2.6 times, 2<sup>nd</sup> segment 1.9 times, median segment 1.3 times, penultimate segment 1.1 times as long as wide, last segment enlarged (Fig. 107). Thorax punctate on a smooth background. Pronotum with fine dispersed punctures dorsolaterally, with fine striae in the anterior groove. Mesoscutum with fine dispersed punctures. Notaulus as a depressed wrinkled groove, extending to 0.25 the length of the mesoscutum. Prescutellar furrow with distinct striae. Scutellum bordered by carinae on the anterior 0.3, with fine punctures. Mesopleurum with fine dispersed punctures. Foveate groove as a wrinkled furrow, about 0.4 times as long as the mesopleurum (Fig. 108). Mesosternum with very fine dispersed punctures. Metapleurum with fine dispersed punctures centrally, with wrinkles anteriorly and ventrally. Hind femur 3.1 times as long as high. Pterostigma 2.3 times as long as wide (Fig. 109). Metacarpus reaching 0.6 the distance from radial cell to the tip of wing. Basal area of propodeum 1.5–2.0 times as long as wide, either with distinct lateral carinae or replaced by an area of several longitudinal wrinkles, about half as long as the petiolar area. Dorsolateral area with fine dispersed punctures on a smooth background dorsally, with longitudinal wrinkles laterally and posteriorly. Petiolar area 1.2 times as long as wide, rounded anteriorly, flat, covered with fine irregular wrinkles (Fig. 110). Propodeal spiracle separated from the pleural carina by 1.0 times its diameter, the spiracular carina narrow. Petiole about 1.4 times as

wide as high, slightly depressed and almost smooth dorsally, with distinct dorsolateral carinae, with few striae and fine irregular wrinkles laterally. Postpetiole with fine sculpture anteriorly, smooth posteriorly. 1<sup>st</sup> sternite almost reaching the spiracles (Figs 111, 112). Thyridial depression triangular, slightly wider than long (somewhat variable), thyridium sometimes indicated. Gaster clavate posteriorly. Ovipositor 3.3–3.7 times, ovipositor sheath 2.2–2.6 times as long as the 1<sup>st</sup> tergite. Ovipositor slightly bent upwards proximally and medially, distinctly bent upwards distally, with a very small dorsal incision subapically, with very fine teeth ventrally (Fig. 113).

Measurements of the holotype: Body 2.8 mm long. Head 0.75 mm wide. Thorax 1.07 mm long, 0.60 mm wide (mesoscutum). Front wing 2.4 mm long. 1<sup>st</sup> gastral tergite 0.57 mm long. Postpetiole 0.27 mm long, 0.25 mm wide. 2<sup>nd</sup> tergite 0.35 mm long, about 0.4 mm wide. Ovipositor sheath 1.26 mm long. Ovipositor 1.9 mm long.

Colour: Head, thorax and propodeum dark brown or black. Palpi, mandible (teeth reddish brown), median and ventral parts of clypeus and tegula yellow. Scape, pedicellus and legs yellowish red, mid and hind coxae brownish basally, hind femur sometimes tinged with brown basally. Flagellum reddish brown proximally, dark brown distally. Pterostigma light brown. Gaster blackish, 1<sup>st</sup> and 2<sup>nd</sup> segments tinged with reddish brown.

**M:** unknown.

#### *Gelanes intermedius spec. nov.*

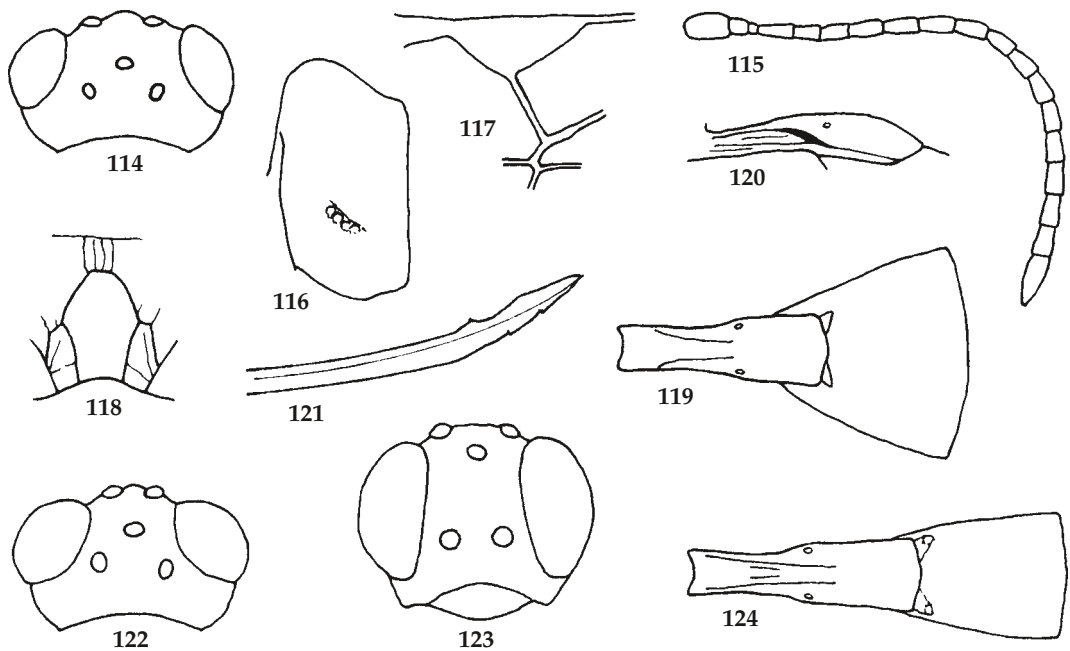
**Holotype** (♀): “Kazabazua, Que., 6.VI.56” (Quebec, Canada), “Collector W. R. M. Mason”, “Taken on pines.” (OTT). – **Paratypes:** 2 ♀♀, 2 ♂♂ collected at the same locality, 6.VI.1956 and 21.V.1959 (HOR, OTT).

**w:** Body length 2.7–2.9 mm. Temples distinctly constricted behind the eyes, 0.7 times as long as the width of an eye, tangential lines on eyes and temples intersect on the postscutellum (Fig. 114). Face as wide as the frons. Frontal index 0.44. Ocellar index 1.6. Malar space index 0.8. Upper mandibular tooth slightly the longer. Clypeus 0.7 times as long as the face, 3.7 times as wide as long, slightly convex and with some punctures dorsally, almost flat and smooth medially and subventrally. Face and frons granulate, a punctation not visible. Vertex and temple with very fine dispersed punctures on a finely granulate or smooth background. Flagellum with 16–17 segments, slightly clavate, 1<sup>st</sup> segment 3.2 times, 2<sup>nd</sup> segment 1.8 times, median segment 1.7 times, penultimate segment 1.4 times as long as wide, last segment slightly enlarged (Fig. 115). Pronotum finely granulate and finely

punctate dorsolaterally, with short and fine striae in the anterior groove. Mesoscutum for the greater part with dispersed or rather dense punctures on a very finely granulate background, distinctly granulate in front of the prescutellar furrow. Notaulus as a narrow wrinkled furrow, extending to 0.2 the length of the mesoscutum. Prescutellar furrow with fine striae. Scutellum bordered by carinae on the anterior 0.2, with fine punctures on a smooth background. Mesopleurum with fine rather dense punctures on a finely granulate and finely wrinkled background. Foveate groove as a wrinkled furrow, about 0.3 times as long as the mesopleurum (Fig. 116). Mesosternum with fine punctures on a smooth background. Metapleurum with fine punctures and fine wrinkles. Hind femur 3.6 times as long as high. Pterostigma 2.2 times as long as wide (Fig. 117). Metacarpus reaching 0.6 the distance from radial cell to the tip of wing. Basal area of propodeum about as long as wide, without distinct lateral carinae, replaced by an area with longitudinal wrinkles, 0.4 times as long as the petiolar area. Dorsolateral area with fine dispersed punctures on a smooth background. Petiolar area 1.4 times as long as wide, flat, finely granulate and with a few fine wrinkles (Fig. 118). Propodeal spiracle separated from the pleural carina by half its diameter, the spiracular carina indistinct. Petiole slightly convex and with very fine sculpture dorsally, sometimes with a longitudinal furrow, with weak dorsolateral carinae, with fine striae laterally. Postpetiole smooth. 1<sup>st</sup> sternite almost reaching the spiracles (Figs 119, 120). Thyridial depression small, oblique. Gaster clavate posteriorly. Ovipositor 3.1–3.3 times, ovipositor sheath 2.3–2.4 times as long as the 1<sup>st</sup> tergite. Ovipositor slightly bent upwards proximally and medially, somewhat more bent upwards distally, with a shallow rather broad dorsal emargination subapically, with a very small tooth in front of this emargination, with very fine teeth ventrally (Fig. 121).

Measurements of the holotype: Body 2.7 mm long. Head 0.71 mm wide. Thorax 1.02 mm long, 0.50 mm wide (mesoscutum). Front wing 2.4 mm long. 1<sup>st</sup> gastral tergite 0.52 mm long. Postpetiole 0.25 mm long, 0.23 mm wide. 2<sup>nd</sup> tergite 0.31 mm long, about 0.5 mm wide. Ovipositor sheath 1.26 mm long. Ovipositor 1.7 mm long.

Colour: Head, thorax and propodeum reddish brown or dark brown, head tinged with black dorsally, pronotum yellowish red in the dorsal posterior corner, mesoscutum sometimes tinged with dark brown. Palpi, mandible (teeth medium brown), median and ventral parts of clypeus, scape, pedicellus, tegula and legs yellowish red. Flagellum dark brown. Pterostigma light brown. Gaster reddish brown, posterior tergites tinged with dark brown dorsally.



Figs 114-124. *Gelanes intermedius* spec. nov. 114-121. ♀. 114. Head, top view. 115. Antenna. 116. Mesopleurum. 117. Pterostigma and areolet. 118. Propodeum, top view. 119. 1<sup>st</sup> and 2<sup>nd</sup> gastral tergites, top view. 120. 1<sup>st</sup> gastral segment, side view. 121. Ovipositor, side view. 122-124. ♂. 122. Head, top view. 123. Head, front view. 124. 1<sup>st</sup> and 2<sup>nd</sup> gastral tergites, top view.

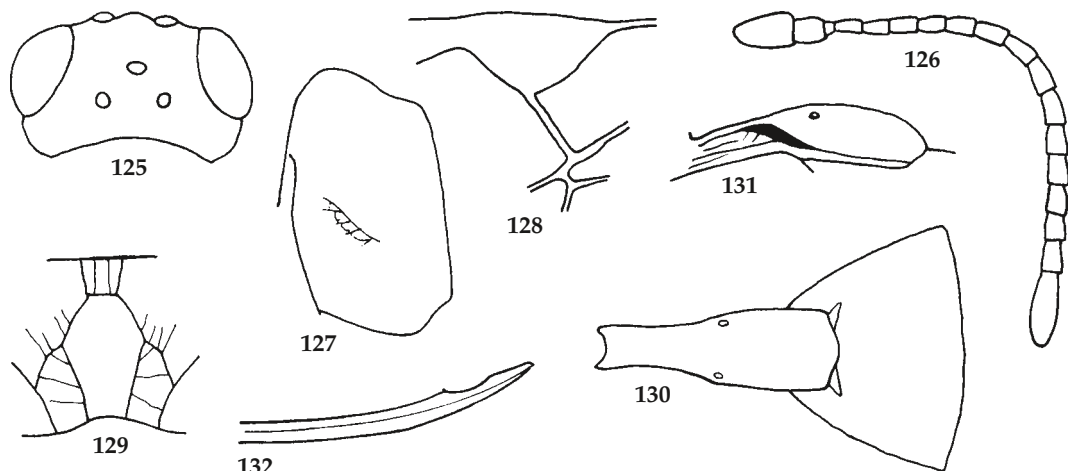
**M:** Eyes moderately large. Temples distinctly constricted behind the eyes, 0.6 times as long as the width of an eye, tangential lines on eyes and temples intersect on the scutellum. Face 1.2 times as wide as the frons. Frontal index 0.37-0.39 (Figs 122, 123). Ocellar index 0.5. Malar space index 0.2. Flagellum with 15-16 segments, filiform, 1<sup>st</sup> segment 3.0 times, 2<sup>nd</sup> segment 1.8 times, median segment 1.6 times, penultimate segment 1.5 times as long as wide, last segment not enlarged. Mesopleurum finely or distinctly granulate, a punctation hardly or not at all discernible. Basal area of propodeum replaced by several longitudinal wrinkles or by a median keel. 1<sup>st</sup> gastral tergite 3.1 times as long as wide. Petiole with longitudinal striae dorsally and laterally. 2<sup>nd</sup> tergite about as long as wide. Thyridium indicated, thyridial depression as a small oblique groove (Fig. 124). Head, thorax and propodeum black. Palpi, mandible (including teeth), median and ventral parts of clypeus light reddish brown. Scape and pedicellus marked with reddish brown ventrally. Tegula brownish. Legs reddish brown, coxae, trochanters and base of femora tinged with brown. Gaster dark reddish brown or blackish. In other characters similar to the ♀.

**Taxonomic remark:** *G. intermedius* is similar to *G. gubarevae* Khalaim from Europe. The latter differs by: Mesopleurum shining and almost smooth centrally. Tip of ovipositor slenderer (see fig. 16 in Khalaim 2002: 7).

#### *Gelanes montanus* spec. nov.

**Holotypus** (♀): "Anarchist Mt., Osoyoos, B.C., 20.V. 1959, R. E. Leech" (British Columbia, Canada) (OTT).  
**Paratypes** (3 ♀♀): Canada: British Columbia: same data as holotype (HOR). USA: Idaho: Paradise Ridge, Moscow (WAS); Wyoming: Dubois, Fremont Co. (TEX).  
 Flight period: v-vi.

**w:** Body length 3.0-3.2 mm. Temples distinctly constricted behind the eyes, 0.6 times as long as the width of an eye, tangential lines on eyes and temples intersect on the propodeum (Fig. 125). Face 1.1 times as wide as the frons. Frontal index 0.51. Ocellar index 1.6-1.8. Malar space index 0.9. Mandibular teeth about equal. Clypeus 0.85 times as long as the face, 3.9 times as wide as long, convex and with a few punctures dorsally, flat and smooth medially and subventrally. Face with fine dispersed punctures on a finely granulate background. Frons with fine



**Figs 125- 132.** *Gelanes montanus* spec. nov. (♀). 125. Head, top view. 126. Antenna. 127. Mesopleurum. 128. Pterostigma and areolet. 129. Propodeum, top view. 130. 1<sup>st</sup> and 2<sup>nd</sup> gastral tergites, top view. 131. 1<sup>st</sup> gastral segment, side view. 132. Ovipositor, side view.

dispersed punctures, the background finely granulate or smooth laterally, almost smooth medially. Vertex and temple with fine dispersed punctures on a smooth background, outer orbit without punctures. Flagellum with 15–16 segments, clavate, 1<sup>st</sup> segment 2.2 times, 2<sup>nd</sup> segment 1.5 times, median segment 1.4 times, penultimate segment 1.2 times as long as wide, last segment enlarged (Fig. 126). Thorax punctate on a smooth background. Pronotum with fine dense punctation dorsolaterally, with fine striae in the anterior groove. Mesoscutum for the greater part with fine dispersed punctures, the punctation stronger in front of the prescutellar furrow. Notaulus as a slightly depressed wrinkled groove, extending to 0.3 the length of the mesoscutum. Prescutellar furrow with fine striae. Scutellum bordered by carinae on the anterior 0.2, with fine dispersed punctures. Mesopleurum with fine dispersed punctures on a finely wrinkled background. Foveate groove as a wrinkled furrow, 0.3–0.5 times as long as the mesopleurum (Fig. 127). Mesosternum with fine dispersed punctures. Metapleurum with very fine dispersed punctures, with wrinkles ventrally. Hind femur 3.2 times as long as high. Pterostigma 2.0 times as long as wide (Fig. 128). Metacarpus reaching 0.3 the distance from radial cell to the tip of wing. Basal area of propodeum as long as wide or slightly wider than long, about rectangular, with fine lateral carinae, 0.25 times as long as the petiolar area, covered with fine longitudinal wrinkles. Dorsolateral area with fine dispersed punctures on a smooth background. Petiolar area 1.4 times as long as wide, flat, finely granulate and with some fine wrinkles (Fig. 129).

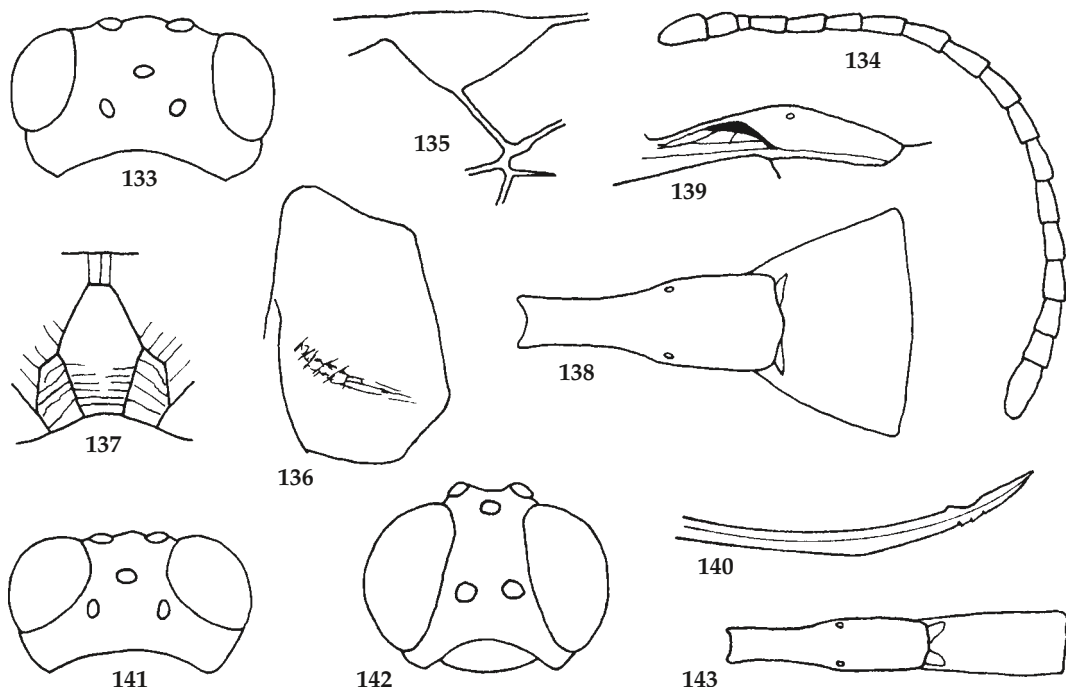
Propodeal spiracle separated from the pleural carina by 1.5 times its diameter, the spiracular carina narrow. Petiole slightly convex and with very fine sculpture dorsally, with a dorsal anterior depression, with indistinct dorsolateral carinae, with few striae laterally. Postpetiole smooth, sometimes with fine sculpture anteriorly. 1<sup>st</sup> sternite not reaching the spiracles (Figs 130, 131). Gaster clavate posteriorly. Ovipositor about 4.7 times, ovipositor sheath 3.6–3.8 times as long as the 1<sup>st</sup> tergite. Ovipositor slightly bent upwards proximally and medially, distinctly bent upwards distally, with a shallow rather broad dorsal emargination subapically, with a very small tooth in front of this emargination, without teeth ventrally (Fig. 132).

Measurements of the holotype: Body 3.0 mm long. Head 0.77 mm wide. Thorax 1.08 mm long, 0.55 mm wide (mesoscutum). Front wing 2.7 mm long. 1<sup>st</sup> gastral tergite 0.60 mm long. Postpetiole 0.30 mm long, 0.25 mm wide. 2<sup>nd</sup> tergite 0.30 mm long, about 0.6 mm wide. Ovipositor sheath 2.2 mm long. Ovipositor about 2.8 mm long.

Colour: Head, thorax and propodeum dark brown or blackish, head tinged with black dorsally. Palpi, mandible (teeth brownish), median and ventral parts of clypeus, tegula and legs yellowish red or reddish brown. Antenna dark brown or blackish, scape and pedicellus tinged with yellowish red ventrally. Mid and hind coxae and trochanters tinged with brown. Pterostigma light brown. 1<sup>st</sup> and 2<sup>nd</sup> gastral segments dark reddish brown, posterior tergites dark brown or blackish.

**M:** unknown.





**Figs 133- 143.** *Gelanes nigrinus* spec. nov. 133- 140. ♀. 133. Head, top view. 134. Antenna. 135. Mesopleurum. 136. Pterostigma and areolet. 137. Propodeum, top view. 138. 1<sup>st</sup> and 2<sup>nd</sup> gastral tergites, top view. 139. 1<sup>st</sup> gastral segment, side view. 140. Ovipositor, side view. 141- 143. ♂. 141. Head, top view. 142. Head, front view. 143. 1<sup>st</sup> and 2<sup>nd</sup> gastral tergites, top view.

**Taxonomic remark:** *G. montanus* is similar to *G. bidentatus* Khalaim from the eastern Palaearctic region. The latter differs by: Basal area of propodeum 1.5 times as long as wide. Ovipositor with two dorsal teeth subapically (see fig. 10 in Khalaim 2002: 7).

***Gelanes nigrinus* spec. nov.**

**Holotype** (♀): “USA, Wyoming: Albany Co., Medicine Bow Natl. Forest, Yellow Pines Camp Area, near Pole Creek, S. R. Shaw, 28 May to 4 June 2003, Malaise trap (near willows)” (LAR). – **Paratypes** (2 ♀♀, 5 ♂♂): same data as holotype (HOR, LAR).

**w:** Body length 3.3–3.5 mm. Temples slightly constricted behind the eyes, 0.6 times as long as the width of an eye, tangential lines on eyes and temples intersect on the petiole (Fig. 133). Face 1.1 times as wide as the frons. Frontal index 0.53. Ocellar index 1.5. Malar space index 1.0. Mandibular teeth about equal. Clypeus 0.8 times as long as the face, 3.9 times as wide as long, convex and distinctly punctate dorsally, flat and smooth medially and subventrally. Head punctate on a smooth background. Face, frons and vertex with fine dispersed punctures.

Temple with distinct dispersed punctures, outer orbit without punctures. Flagellum with 15 segments, clavate, 1<sup>st</sup> segment 3.0 times, 2<sup>nd</sup> segment 1.8 times, median segment 2.2 times, penultimate segment 1.2 times as long as wide, last segment enlarged (Fig. 134). Thorax punctate on a smooth background. Pronotum with rather dense punctures dorsolaterally, with long striae in the anterior groove. Mesoscutum for the greater part with fine dispersed punctures, punctation stronger in front of the prescutellar furrow. Notaulus as a slightly depressed wrinkled groove, extending to 0.2 the length of the mesoscutum. Prescutellar furrow with fine striae. Scutellum bordered by carinae on the anterior 0.4, with fine dispersed punctures. Mesopleurum with fine dispersed punctures, sometimes with additional fine wrinkles. Foveate groove scarcely depressed, almost as long as the mesopleurum, covered with longitudinal and irregular wrinkles (Fig. 135). Mesosternum with fine dispersed punctures. Metapleurum with fine rather dense punctures. Hind femur 3.4 times as long as high. Pterostigma 2.1 times as long as wide (Fig. 136). Metacarpus reaching 0.3 the distance from radial cell to the tip of wing. Basal area of propodeum about 1.5 times as long as wide,

the lateral carinae sometimes indistinct, 0.3 times as long as the petiolar area, covered with longitudinal wrinkles. Dorsolateral area with fine dispersed punctures on a smooth background dorsally, with wrinkles laterally. Petiolar area 1.3 times as long as wide, flat, with fine irregular wrinkles anteriorly, with transverse striae posteriorly (to a variable extent) (Fig. 137). Propodeal spiracle separated from the pleural carina by about its diameter, the spiracular carina narrow or broad. Petiole slightly depressed or flat dorsally, with very fine sculpture or smooth, with distinct dorsolateral carinae, with distinct striae laterally. Postpetiole smooth or with very fine sculpture. 1<sup>st</sup> sternite almost reaching the spiracles (Figs 138, 139). Gaster clavate posteriorly. Ovipositor 5.6–5.9 times, ovipositor sheath 4.5–4.7 times as long as the 1<sup>st</sup> tergite. Ovipositor slightly bent upwards proximally and medially, distinctly bent upwards distally, with a shallow rather broad dorsal emargination subapically, with a very small tooth in front of this emargination, with very fine teeth ventrally (Fig. 140).

Measurements of the holotype: Body 3.3 mm long. Head 0.79 mm wide. Thorax 1.13 mm long, 0.58 mm wide (mesoscutum). Front wing 3.0 mm long. 1<sup>st</sup> gastral tergite 0.59 mm long. Postpetiole 0.33 mm long, 0.27 mm wide. 2<sup>nd</sup> tergite 0.33 mm long, about 0.6 mm wide. Ovipositor sheath 2.75 mm long. Ovipositor 3.45 mm long.

Colour: Black. Palpi and mandible (teeth reddish brown) yellowish red. Clypeus with small yellowish red marks laterally. Scape and pedicellus tinged with reddish brown ventrally. Tegula dark brown. Pterostigma medium brown. Coxae, trochanters and trochantelli yellowish brown with dark brown marks. Femora, tibiae and tarsi yellowish red, the femora sometimes tinged with brown basally. 1<sup>st</sup> gastral tergite tinged with dark brown.

**M:** Eyes large. Temples slightly constricted behind the eyes, 0.5 times as long as the width of an eye, tangential lines on eyes and temples intersect on the postpetiole. Face 1.5 times as wide as the frons. Frontal index 0.26–0.36 (Figs 141, 142). Ocellar index 0.3. Malar space index 0.3. Flagellum with 15–17 segments, filiform, 1<sup>st</sup> segment 2.1 times, 2<sup>nd</sup> segment 1.7 times, median segment 1.7 times, penultimate segment 1.7 times as long as wide, last segment not enlarged. Mesoscutum strongly shining, with very fine punctures, partly without punctures. 1<sup>st</sup> gastral tergite 4.1 times as long as wide. 2<sup>nd</sup> tergite 1.6 times as long as wide. Thyridial depression as an oblique furrow, longer than wide (Fig. 143). Body almost completely black. Mandible brownish. Femora, tibiae and tarsi yellowish brown, femora marked with black proximally, tarsi brownish distally. Gaster behind

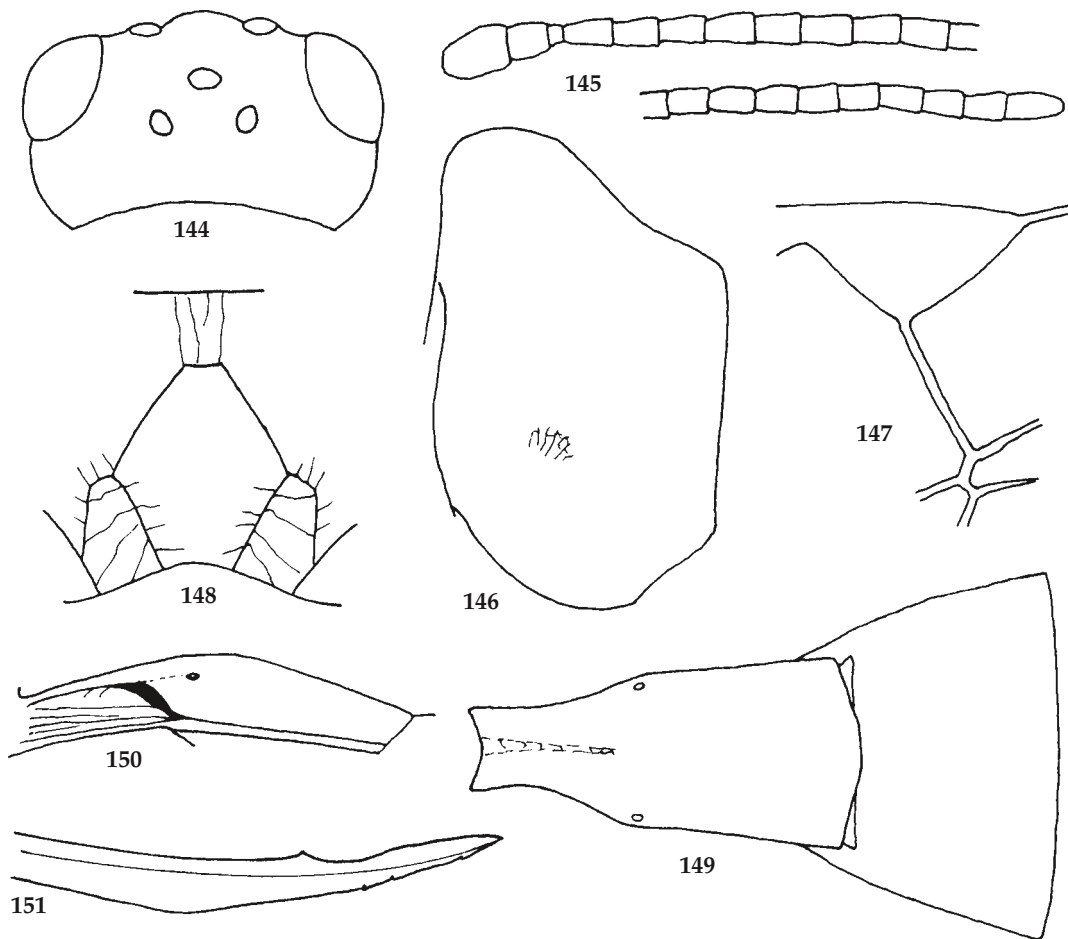
the 1<sup>st</sup> segment tinged with dark brown. In other characters similar to the ♀.

**Taxonomic remark:** *G. nigrinus* is similar to *G. bidentatus* Khalaim from the eastern Palaearctic region. The latter differs by: Propodeal spiracle separated from the pleural carina by about twice its diameter. Ovipositor sheath 3.5–4.0 times as long as the 1<sup>st</sup> gastral tergite. Ovipositor with two dorsal teeth and one ventral tooth subapically (see fig. 10 in Khalaim 2002: 7).

#### *Gelanes pleroneuræ* spec. nov.

**Holotype** (♀): “CAL: Modoc Co., 9 mi. NE Adin, 1-2 (USFS block XI, VI-24-74” (California, USA), “Insecticide/dropcloth study under *Abies concolor*” (BER). – **Paratypes** (28 ♀♀, 8 ♂♂): Canada: Quebec: Hull (OTT), Stoneham (AED). USA: Arizona: Alpine (AED); California: Adin, Modoc Co. (BER), Blodgett Forest, El Dorado Co. (BER, WAS), Camino (AED), Cedar Pass, Modoc Co. (BER, HOR), Donner Pass (AED), Echo Lake, El Dorado Co. (BER), Smoky Jack Camp, Yosemite Park (AED), Strawberry (AED), Tamarack Flat, Yosemite Park (AED); Maine: Greenville (AED), Waterford (AED); Michigan: Iron River (AED); Oregon: Corvallis (AED), Hyatt Reservoir (AEL, HOR); Wyoming: Dubois, Fremont Co. (TEX). Flight period: v–vii.

**w:** Body length 4.5–5.5 mm. Temples not constricted directly behind the eyes, 0.85 times as long as the width of an eye, tangential lines on eyes and temples intersect behind the apex of the gaster (Fig. 144). Face 1.05 times as wide as the frons. Frontal index 0.58. Ocellar index 1.8. Malar space index 0.5. Upper mandibular tooth the longer. Clypeus 0.7 times as long as the face, 4.0 times as wide as long, distinctly convex and distinctly punctate on a smooth background dorsally, slightly depressed and smooth medially and subventrally. Face and frons with fine rather dense or dispersed punctures on a finely granulate background, central swelling of the face smooth. Vertex with fine dispersed punctures on a smooth background. Temple with very fine dispersed punctures on a smooth background. Flagellum with 19–22 segments, very slightly attenuated, 1<sup>st</sup> segment 2.0 times, 2<sup>nd</sup> segment 1.7 times, median segment 1.6 times, penultimate segment 1.4 times as long as wide, last segment not enlarged (Fig. 145). Pronotum with fine dispersed or rather dense punctures on a finely granulate and rugose background dorsolaterally, with distinct striae in the anterior groove. Mesoscutum with fine dispersed or rather dense punctures on a smooth background, sometimes the background very finely granulate in front of the prescutellar furrow. Notaulus almost obliterated, as a short very shallow groove. Prescutellar furrow



**Figs 144- 151.** *Gelanes pleroneuræ* spec. nov. (♀). 144. Head, top view. 145. Antenna. 146. Mesopleurum. 147. Pterostigma and areolet. 148. Propodeum, top view. 149. 1<sup>st</sup> and 2<sup>nd</sup> gastral tergites, top view. 150. 1<sup>st</sup> gastral segment, side view. 151. Ovipositor, side view.

with distinct striae. Scutellum bordered by carinae on the anterior 0.25, with fine dispersed punctures on a smooth background. Mesopleurum with fine or distinct dispersed punctures on a smooth background. Foveate groove very slightly depressed, usually small, covered with fine wrinkles and fine dorsoventral striae, sometimes almost obliterated (Fig. 146). Mesosternum with fine dispersed punctures on a smooth background. Metapleurum with fine dispersed punctures on a smooth background, with wrinkles ventrally. Hind femur 3.5 times as long as high. Pterostigma 2.1 times as long as wide (Fig. 147). Metacarpus reaching to 0.6 of the distance from radial cell to the tip of wing. Basal area of propodeum about as long as wide or slightly longer, as an area covered with some longitudinal wrinkles, sometimes with distinct lateral carinae, 0.25–0.3 times

as long as the petiolar area. Dorsolateral area with fine dispersed punctures on a smooth background. Petiolar area 1.2 times as long as wide, flat, finely granulate and with fine wrinkles and punctures (Fig. 148). Propodeal spiracle separated from the pleural carina by 1.5 times its diameter, the spiracular carina slightly widened. Petiole concave, with a distinct longitudinal furrow and with very fine sculpture dorsally, with dorsolateral carinae, with distinct striae laterally. Postpetiole convex, with very fine sculpture anteriorly, sometimes with a small groove, smooth posteriorly. 1<sup>st</sup> sternite almost reaching the spiracles (Figs 149, 150). Gaster clavate-compressed posteriorly. Ovipositor 2.5 times, ovipositor sheath 1.5 times as long as the 1<sup>st</sup> tergite. Ovipositor rather evenly bent upwards over its total length, with a shallow rather broad dorsal emargination subapi-

cally, with a small tooth in front of this emargination, with few fine teeth ventrally (Fig. 151).

Measurements of the holotype: Body 5.3 mm long. Head 1.18 mm wide. Thorax 1.9 mm long, 1.0 mm wide (mesoscutum). Front wing 4.6 mm long. 1<sup>st</sup> gastral tergite 1.02 mm long. Postpetiole 0.53 mm long, 0.53 mm wide. 2<sup>nd</sup> tergite 0.58 mm long, about 1.0 mm wide. Ovipositor sheath 1.5 mm long. Ovipositor 2.5 mm long.

Colour: Head, thorax and propodeum blackish, sometimes tinged with dark brown. Palpi, mandible (teeth reddish brown), median and ventral parts of clypeus and tegula yellowish. Scape, pedicellus and legs yellowish or yellowish red. Flagellum dark brown, tinged with yellowish proximally. Fore and mid coxae brown basally, hind coxa reddish brown or brown. Hind femur tinged with red. Pterostigma medium brown or dark brown. Gaster dark brown or blackish, 2<sup>nd</sup> tergite reddish brown or brown.

**m:** Eyes not enlarged. Temples slightly constricted behind the eyes, 0.75 times as long as the width of an eye, tangential lines on eyes and temples intersect on the apex of gaster. Frontal index 0.54. Ocellar index 1.8. Malar space index 0.2. Flagellum with 21 segments, slightly attenuated, 1<sup>st</sup> segment 2.2 times, 2<sup>nd</sup> segment 1.8 times, median segment 1.7 times, penultimate segment 1.6 times as long as wide, last segment not enlarged. Foveate groove almost obliterated, only a few fine wrinkles present. Basal area of propodeum 0.3–0.4 times as long as petiolar area. 1<sup>st</sup> gastral tergite 2.6 times as long as wide. Postpetiole with slightly divergent lateral contours. 2<sup>nd</sup> tergite about 1.2 times as long as wide. Thyridial depression triangular, almost as long as wide. Gaster clavate posteriorly. In other characters (also in colour) similar to the ♀.

**Taxonomic remarks:** A ♀ of this species was figured by Townes (1971: 258) under the name *Allophroides* sp. [Alpine, Arizona (AEI)]. The species is similar to the Palearctic species *G. clypeatus* Horstmann. The latter differs by: Foveate groove not covered with wrinkles. Basal area of propodeum 0.55–0.6 times as long as petiolar area. Ovipositor sheath 1.7–1.9 times as long as the 1<sup>st</sup> gastral tergite.

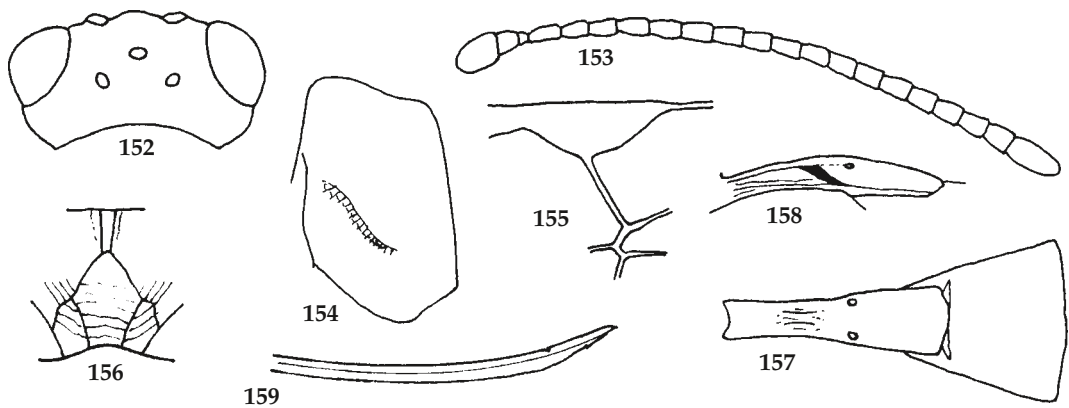
**Hosts:** *Pleroneura* spp. (Hymenoptera, Xyelidae) on *Abies concolor* (Gord. and Glend.) Lindl. The hosts are univoltine. The larvae of three host species (*Pleroneura aldrichi* Ross, *P. koebelei* Rohwer, *P. lutea* Rohwer) feed in spring in the buds and expanding shoots of *Abies concolor*, drop to the ground, build earthen cells in the soil, in which they hibernate, pupate in late winter, and the new adults emerge in spring (Ohmart & Dahlsten 1977). The parasitoids oviposit in the host larvae in the buds and shoots,

kill their hosts in the pupal cells, and the new adults emerge in spring too (Ohmart & Dahlsten 1979). No reared specimen was found in the material studied and Ohmart & Dahlsten do not expressly write that they reared adult parasitoids (but they observed eggs and larvae inside of the host larvae). Five ♀♀ have been caught in Blodgett Forest (California) while inserting their ovipositors in *Pleroneura* infested buds (BER, WAS), and seven specimens (6 ♀♀, 1 ♂) have been collected in Modoc Co. (California) in a special study on *A. concolor* (see label of holotype) (BER, HOR). In addition, two adults were collected on undetermined *Abies* species (AEI).

### *Gelanes punctipleuris* spec. nov.

**Holotype** (♀): “R218, Coll. Columbia Co., Fla., 2/10/1960, B. H. Ebel” (Florida, USA), “♂ strobili – *Pinus eliotii* – paras. *Xyela* sp. larvae (prob. *X. pini*)”, “Hopkins U.S. 45714 – (a)” (WAS). – **Paratypes** (314 ♀♀, 169 ♂♂): Canada: Alberta: Elkwater (OTT), Island Lake, Coleman, 4500' (OTT), Waterton (OTT); British Columbia: Crownsnest (OTT), Hixon (OTT), Oliver (OTT); Ontario: Constance Bay (OTT), Limerick Forest, Spencerville (NHM, OTT), Roebuck (OTT); Quebec: Kazabazua (NHM, OTT). USA: Alabama: Montgomery (AEI); District of Columbia: Dalecarlia (WAS); Florida: Columbia Co. (HOR, WAS), Union Co. (WAS); Maryland: Bowie (OTT, WAS), Colesville (OTT), Glen Echo (WAS), Hughesville (AEI, WAS), Laurel (OTT), Lexington Park (AEI), Meadowood, Colesville (WAS), Millington (OTT), Takoma Park (AEI), Upper Marlboro (OTT); North Carolina: Southern Pines (AEI), Wake Co. (AEI); Pennsylvania: Manchester (OTT), Spring Bridge (AEI); South Carolina: Greenville (AEI); Virginia: Alexandria (HOR, WAS), Barcroft (WAS), Clifton (WAS), Falls Church (WAS), Rosslyn (WAS), Vienna (WAS). Flight period: iii–vi, with a peak in iv.

**w:** Body length 2.5–3.1 mm. Temples distinctly constricted behind the eyes, 0.7 times as long as the width of an eye, tangential lines on eyes and temples intersect on the propodeum (Fig. 152). Face 1.05 times as wide as the frons. Frontal index 0.55. Ocellar index 1.7. Malar space index 0.9. Mandibular teeth about equal. Clypeus 0.9 times as long as the face, 3.3 times as wide as long, slightly convex and finely punctate dorsally, flat and smooth medially and subventrally. Head punctate on a smooth background. Face with fine rather dense punctures. Frons and vertex with fine dispersed punctures. Temple with very dispersed punctures, outer orbit without punctures. Flagellum with 16–18 segments, clavate, 1<sup>st</sup> segment 2.1 times, 2<sup>nd</sup> segment 1.5 times, median segment 1.5 times, penultimate segment 1.05 times as long as wide, last segment enlarged (Fig. 153). Thorax punctate on a smooth background. Pronotum for the



Figs 152- 159. *Gelanes punctipleuris* spec. nov. (♀). 152. Head, top view. 153. Antenna. 154. Mesopleurum. 155. Pterostigma and areolet. 156. Propodeum, top view. 157. 1<sup>st</sup> and 2<sup>nd</sup> gastral tergites, top view. 158. 1<sup>st</sup> gastral segment, side view. 159. Ovipositor, side view.

greater part with longitudinal wrinkles dorsolaterally, finely punctate in the dorsal posterior corner. Mesoscutum with fine rather dense punctures. Notaulus as a wrinkled groove, extending to 0.3 the length of the mesoscutum. Prescutellar furrow with fine striae. Scutellum bordered by carinae on the anterior 0.3, with fine punctures. Mesopleurum with distinct rather dense or fine dispersed punctures (punctures in some small specimens hardly discernible). Foveate groove as a transversely striate furrow, 0.4–0.6 times as long as mesopleurum (Fig. 154). Mesosternum with fine dispersed punctures. Metapleurum with fine rather dense punctures dorsally and medially, with wrinkles ventrally. Hind femur 3.5 times as long as high. Pterostigma 2.4 times as long as wide (Fig. 155). Metacarpus reaching half the distance from radial cell to the tip of wing. Basal area of propodeum 2–3 times as long as wide, with fine lateral carinae, sometimes replaced by a longitudinally striate area, 0.45 times as long as the petiolar area. Dorsolateral area with fine dispersed punctures on a smooth background dorsally, with striae laterally. Petiolar area 1.5 times as long as wide, flat, finely granulate and with fine wrinkles, often with a few transverse wrinkles posteriorly (Fig. 156). Propodeal spiracle situated close to the pleural carina, the spiracular carina broad. Petiole convex and with fine sculpture dorsally, with dorsolateral carinae, with fine striae laterally. Postpetiole convex, smooth. 1<sup>st</sup> sternite reaching the spiracles (Figs 157, 158). Gaster clavate-compressed posteriorly. Ovipositor 2.8–4.5 times, ovipositor sheath 1.6–3.3 times as long as the 1<sup>st</sup> tergite. Ovipositor slightly bent upwards proximally and medially, distinctly bent upwards distally, with a very small dorsal incision subapically, with a fine tooth ventrally (Fig. 159).

Measurements of the holotype: Body 3.1 mm long. Head 0.78 mm wide. Thorax 1.18 mm long, 0.60 mm wide (mesoscutum). Front wing 2.7 mm long. 1<sup>st</sup> gastral tergite 0.65 mm long. Postpetiole 0.33 mm long, 0.24 mm wide. 2<sup>nd</sup> tergite 0.35 mm long, about 0.5 mm wide. Ovipositor sheath 1.8 mm long. Ovipositor 2.6 mm long.

Colour: Head, thorax and propodeum dark brown or blackish, sometimes head dark brown, thorax and propodeum reddish brown. Palpi, mandible (teeth reddish brown), median and ventral parts of clypeus and tegula yellowish red. Antenna dark brown, tinged with reddish brown proximally. Legs yellowish red, hind coxa reddish brown. Pterostigma light brown. Gaster blackish, postpetiole and 2<sup>nd</sup> tergite tinged with reddish brown.

**M:** Eyes almost not enlarged. Temples distinctly constricted behind the eyes, 0.7 times as long as the width of an eye, tangential lines on eyes and temples intersect on the petiole. Face as wide as the frons. Frontal index 0.52. Ocellar index 1.4–1.5. Malar space index 0.6. Flagellum with 17–19 segments, filiform, 1<sup>st</sup> segment 2.1 times, 2<sup>nd</sup> segment 1.2 times, median segment 1.1 times, penultimate segment 1.1 times as long as wide, last segment not enlarged. Basal area of propodeum half as long as petiolar area. 1<sup>st</sup> gastral tergite 3.1 times as long as wide. Postpetiole with slightly divergent lateral contours. 2<sup>nd</sup> tergite about as long as wide. Thyridial depression triangular, about as long as wide (variable). Gaster clavate posteriorly. Colour about as in the ♀, thorax, propodeum and 1<sup>st</sup> gastral segment always blackish. Mid and hind coxae often blackish, hind femur sometimes tinged with brown proximally. In other characters similar to the ♀.

**Variation:** Some ♀♀ (not included in the type series) are very small: Body length 2 mm; Flagellum with 15 segments; ovipositor sheath 2.0–2.2 times as long as the 1<sup>st</sup> gastral tergite [localities: Lake Placid, Florida (AEI), Clifton, Virginia (WAS)].

**Taxonomic remark:** *G. punctipleuris* is very similar to *G. cuspidatus* Khalaim from the eastern Palaearctic region. The latter differs by: Flagellum almost not clavate, penultimate segment 1.3–1.4 times as long as wide, last segment not enlarged. Ovipositor sheath 3.0–3.5 times as long as the 1<sup>st</sup> gastral tergite (according to a female paratype in the Zoologische Staatssammlung, Munich).

**Hosts:** *Xyela* spp. on *Pinus* (see note under *G. brevicornis*). ♀♀ of *G. punctipleuris* were frequently collected on *Pinus banksiana* Lamb., *P. virginiana* Mill. and undetermined *Pinus* species, some of these caught on staminate buds while searching for hosts or inserting their ovipositors in the buds (HOR, NHM, OTT, WAS).

#### *Gelanes punctulatus* spec. nov.

**Holotype** (♀): “Julian, Calif., May 10, 1974, H. & M. Townes” (California, USA) (AEI). – **Paratypes** (3 ♀♀, 1 ♂): USA: California: Julian (AEI, HOR); Oregon: Selma (AEI). Flight period: v.

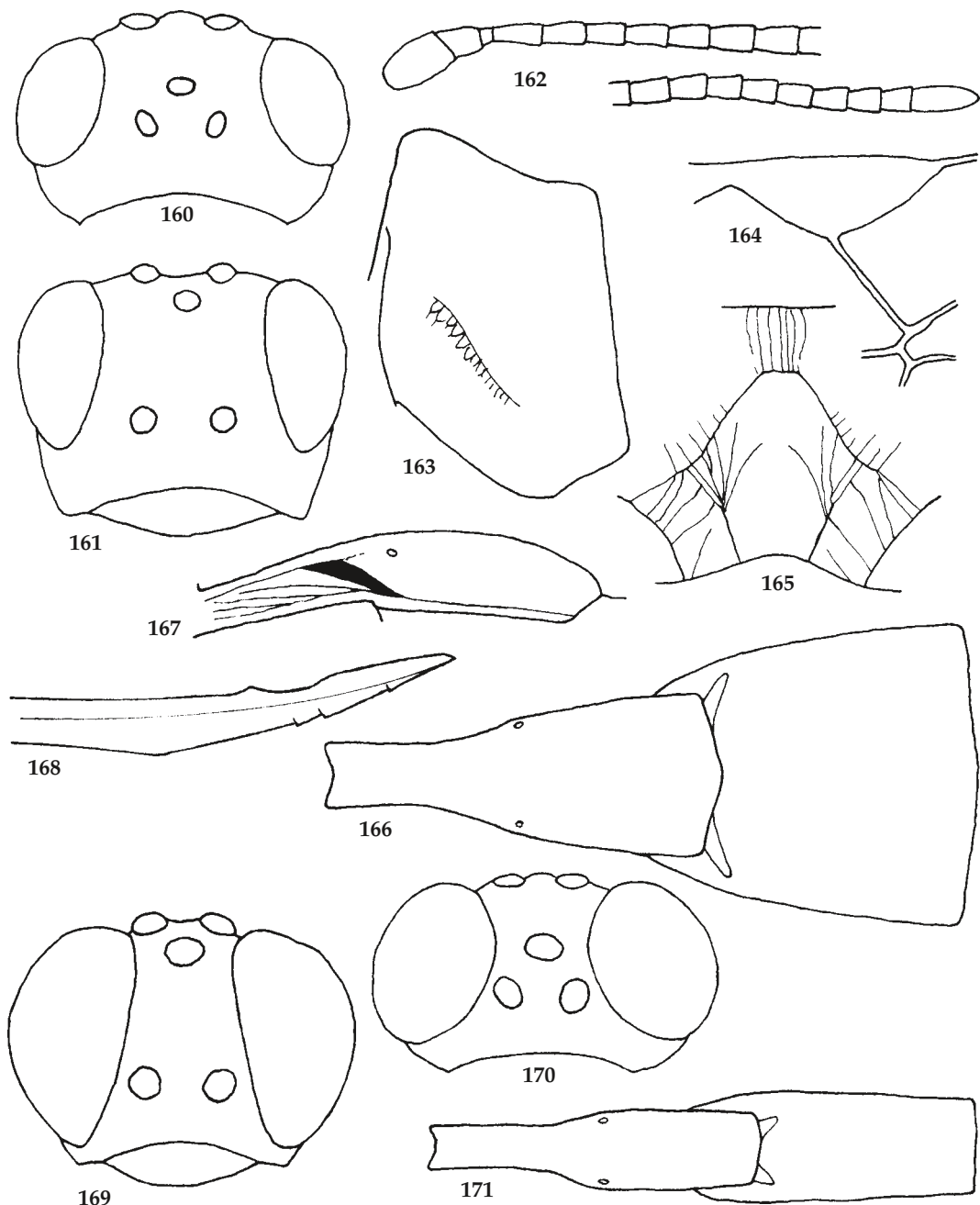
**w:** Body length 4.5–6.0 mm. Temples distinctly constricted behind the eyes, 0.65 times as long as the width of an eye, tangential lines on eyes and temples intersect on the propodeum. Face 1.3–1.4 times as wide as the frons. Frontal index 0.47 (Figs 160, 161). Ocellar index 1.5. Malar space index 0.9. Lower mandibular tooth distinctly the longer. Clypeus as long as the face, 4.0 times as wide as long, convex and with rather dense punctures dorsally, flat or slightly depressed and smooth medially and subventrally. Face, frons, vertex and temple with fine rather dense or dispersed punctures on a smooth background, frons with a finely granulate background laterally, outer orbit without punctures. Flagellum with 22–23 segments, filiform, 1<sup>st</sup> segment 2.3 times, 2<sup>nd</sup> segment 1.7 times, median segment 1.6 times, penultimate segment 1.15 times as long as wide, last segment not enlarged (Fig. 162). Pronotum with very fine punctures on a very finely granulate or wrinkled background dorsolaterally, with fine long striae in the anterior groove. Mesoscutum with fine rather dense or dispersed punctures on a smooth background. Notaulus as a distinctly depressed wrinkled furrow, extending to 0.2 the length of the mesoscutum. Prescutellar furrow with fine short striae. Scutellum bordered by carinae on the anterior 0.25,

with fine dispersed punctures. Mesopleurum with fine dispersed punctures on a smooth background. Foveate groove as a furrow with transverse wrinkles, 0.3–0.5 times as long as the mesopleurum (Fig. 163). Mesosternum with very fine dispersed punctures on a smooth background. Metapleurum with fine punctures on a smooth background dorsally and medially, with wrinkles ventrally. Hind femur 3.4 times as long as high. Pterostigma 2.7 times as long as wide (Fig. 164). Metacarpus reaching half the distance from radial cell to the tip of wing. Basal area of propodeum about as long as wide, covered with longitudinal wrinkles, the lateral carinae indistinct, 0.4 times as long as the petiolar area. Dorsolateral area with distinct dispersed punctures on a smooth background, with wrinkles at the edges. Petiolar area about 1.3 times as long as wide, slightly depressed, with fine wrinkles and punctures anteriorly, with distinct wrinkles laterally and posteriorly. Lateral boundary of the petiolar area and lateral parts of the transverse carina obliterated and replaced by several wrinkles (Fig. 165). Propodeal spiracle separated from the pleural carina by its diameter, the spiracular carina narrow. Petiole flat or slightly depressed and almost smooth dorsally, with distinct dorsolateral carinae, distinctly striate laterally. Postpetiole smooth. 1<sup>st</sup> sternite not reaching the spiracles (Figs 166, 167). Thyridial depression as an oblique furrow. Gaster clavate posteriorly. Ovipositor about 7.0 times, ovipositor sheath 5.7–5.8 times as long as the 1<sup>st</sup> tergite. Ovipositor slightly or distinctly bent upwards over its total length, with a shallow rather broad dorsal emargination subapically, with a fine tooth in front of this emargination, with few fine teeth ventrally (Fig. 168).

Measurements of the holotype: Body 6.1 mm long. Head 1.18 mm wide. Thorax 1.87 mm long, 0.94 mm wide (mesoscutum). Front wing 4.5 mm long. 1<sup>st</sup> gastral tergite 1.07 mm long. Postpetiole 0.57 mm long, 0.42 mm wide. 2<sup>nd</sup> tergite 0.69 mm long, about 0.8 mm wide. Ovipositor sheath 6.2 mm long. Ovipositor 7.5 mm long.

**Colour:** Head, thorax and propodeum blackish, rarely dark reddish brown. Palpi, mandible (teeth dark brown), ventral part of clypeus, tegula and legs yellowish red, mid and hind coxae dark brown. Scape and pedicellus tinged with reddish brown. Pterostigma medium brown. Gaster dark reddish brown or brownish black, postpetiole, 2<sup>nd</sup> tergite and lateral parts of the posterior tergites tinged with reddish brown (to a variable extent).

**M:** Eyes large. Temples strongly constricted behind the eyes, 0.4 times as long as the width of an eye, tangential lines on eyes and temples intersect on the centre of the mesoscutum. Face 1.75 times as wide as



Figs 160- 171. *Gelanes punctulatus* spec. nov. 160- 168. ♀. 160. Head, top view. 161. Head, front view. 162. Antenna. 163. Mesopleurum. 164. Pterostigma and areolet. 165. Propodeum, top view. 166. 1<sup>st</sup> and 2<sup>nd</sup> gastral tergites, top view. 167. 1<sup>st</sup> gastral segment, side view. 168. Ovipositor, side view. 169- 171. ♂. 169. Head, top view. 170. Head, front view. 171. 1<sup>st</sup> and 2<sup>nd</sup> gastral tergites, top view.

the frons. Frontal index 0.27 (Figs 169, 170). Ocellar index 0.25. Malar space index 0.2. Flagellum with 21 segments, filiform, 1<sup>st</sup> segment 3.0 times, 2<sup>nd</sup> segment 1.75 times, median segment 1.75 times, penultimate segment 1.5 times as long as wide. Basal area of propodeum about twice as long as wide, 0.6 times as long as the area petiolaris. 1<sup>st</sup> gastral tergite 3.9 times as long as wide. 2<sup>nd</sup> tergite about 1.5 times as long as wide. Thyridial depression as an oblique furrow, about as long as wide (Fig. 171). 1<sup>st</sup> gastral segment black, the other tergites blackish, tinged with brown posteriorly. In other characters similar to the ♀.

*Gelanes rarus spec. nov.*

**Holotype** (♀): "Elkwater, Alta., 11-VI-1956, O. Peck" (Alberta, Canada) (OTT).

**w:** Body length 2.6 mm. Temples distinctly constricted behind the eyes, 0.6 times as long as the width of an eye, tangential lines on eyes and temples intersect on the postscutellum (Fig. 172). Face 0.95 times as wide as the frons. Frontal index 0.55. Ocellar index 1.5. Malar space index 0.65. Mandibular teeth about equal. Clypeus 0.9 times as long as the face, 3.1 times as wide as long, convex and with few punctures dorsally, almost flat and smooth medially and subventrally. Face and frons with fine dispersed punctures on a finely granulate background. Vertex and temple with fine dispersed punctures on a very finely granulate or smooth background. Flagellum with 15 segments, clavate, 1<sup>st</sup> segment 2.4 times, 2<sup>nd</sup> segment 1.7 times, median segment 1.7 times, penultimate segment 1.6 times as long as wide, last segment enlarged (Fig. 173). Pronotum with very fine punctures and wrinkles on a finely granulate background dorsolaterally, with short striae in the anterior groove. Mesoscutum for the greater part with fine dispersed punctures on a smooth background, the background finely granulate in front of the prescutellar furrow. Notaulus as an indistinct furrow, extending to 0.2 the length of the mesoscutum. Prescutellar furrow with a few fine striae. Scutellum bordered by carinae on the anterior 0.3, with fine punctures on a smooth background. Mesopleurum with distinct fine dispersed punctures on a smooth background. Foveate groove as a slightly depressed furrow with transverse wrinkles, 0.3 times as long as the mesopleurum (Fig. 174). Mesosternum with very fine dispersed punctures on a smooth background. Metapleurum with a few fine punctures and wrinkles on a smooth background. Hind femur 3.8 times as long as high. Pterostigma 2.4 times as long as wide (Fig. 175). Metacarpus reaching to 0.6 of the distance from radial cell to the tip of wing.

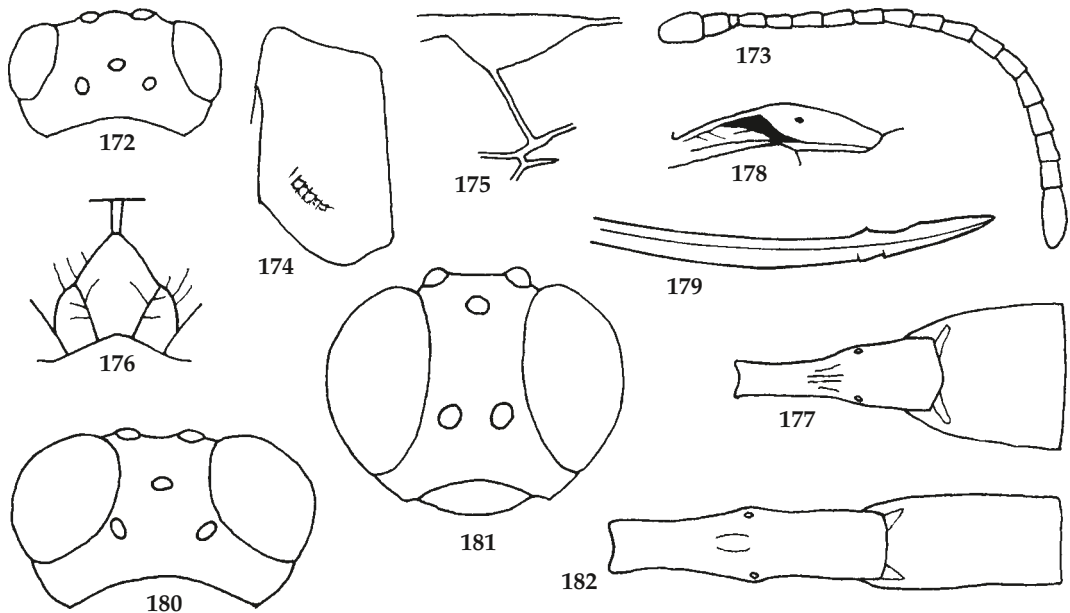
Basal area of propodeum four times as long as wide, with almost parallel lateral carinae, 0.3 times as long as the petiolar area. Dorsolateral area with very fine dispersed punctures on a smooth background. Petiolar area 1.2 times as long as wide, flat, with fine sculpture and a few fine wrinkles (Fig. 176). Propodeal spiracle separated from the pleural carina by its diameter, the spiracular carina narrow. Petiole flat and with fine striae dorsally, with distinct dorsolateral carinae, with a few fine striae laterally. Postpetiole for the greater part smooth, with fine short striae anteriorly. 1<sup>st</sup> sternite almost reaching the spiracles (Figs 177, 178). Thyridial depression as an oblique furrow. Gaster clavate posteriorly. Ovipositor about 4.0 times, ovipositor sheath 2.8 times as long as the 1<sup>st</sup> tergite. Ovipositor slightly bent upwards proximally and medially, more strongly bent upwards distally, with a shallow rather broad dorsal emargination subapically, with a fine tooth in front of this emargination, with very fine teeth ventrally (Fig. 179).

Measurements of the holotype: Body 2.6 mm long. Head 0.66 mm wide. Thorax 0.94 mm long, 0.47 mm wide (mesoscutum). Front wing 2.4 mm long. 1<sup>st</sup> gastral tergite 0.51 mm long. Postpetiole 0.25 mm long, 0.23 mm wide. 2<sup>nd</sup> tergite 0.30 mm long, about 0.4 mm wide. Ovipositor sheath 1.45 mm long. Ovipositor 2.1 mm long.

**Colour:** Head, thorax and propodeum reddish brown, head blackish dorsally. Palpi, mandible (teeth light brown), clypeus, ventral parts of scape and pedicellus, tegula and legs yellowish or yellowish red. Flagellum dark brown. Pterostigma light brown. Gaster dark brown or blackish, 1<sup>st</sup> and 2<sup>nd</sup> segments reddish brown.

**M** [?correctly associated]: Body length 3.6 mm. Eyes large. Temples distinctly constricted behind the eyes, 0.5 times as long as the width of an eye, tangential lines on eyes and temples intersect on the propodeum. Face 1.6 times as wide as the frons. Frontal index 0.27 (Figs 180, 181). Ocellar index 0.3. Malar space index 0.3. Flagellum with 17 segments, filiform, 1<sup>st</sup> segment 2.7 times, 2<sup>nd</sup> segment 2.0 times, median segment 1.7 times, penultimate segment 1.7 times as long as wide, last segment not enlarged. Mesoscutum, mesopleurum and metapleurum with very fine dispersed punctures on a smooth background. 1<sup>st</sup> gastral tergite 3.8 times as long as wide. 2<sup>nd</sup> tergite about twice as long as wide. Thyridial depression as an oblique furrow, about as long as wide (Fig. 182). Head (clypeus included), thorax, propodeum and gaster blackish. Palpi dark brown. Mandible reddish brown. Base of antenna blackish. Tegula dark brown, with a yellow mark. Coxae, trochanters, trochantelli and proximal parts of femora dark brown or black-





Figs 172- 179. *Gelanes rarus* spec. nov. (♀). 172. Head, top view. 173. Antenna. 174. Mesopleurum. 175. Pterostigma and areolet. 176. Propodeum, top view. 177. 1<sup>st</sup> and 2<sup>nd</sup> gastral tergites, top view. 178. 1<sup>st</sup> gastral segment, side view. 179. Ovipositor, side view.

Figs 180- 182. *Gelanes rarus* spec. nov. (♂). 180. Head, top view. 181. Head, front view. 182. 1<sup>st</sup> and 2<sup>nd</sup> gastral tergites, top view.

ish, distal parts of femora, tibiae and tarsi yellowish red. Gastral tergites from the 2<sup>nd</sup> tergite onwards tinged with dark brown. In other characters similar to the ♀. 1♂ has been collected at the same locality and date as the holotype, but it is distinctly larger and its identity is in slight doubt.

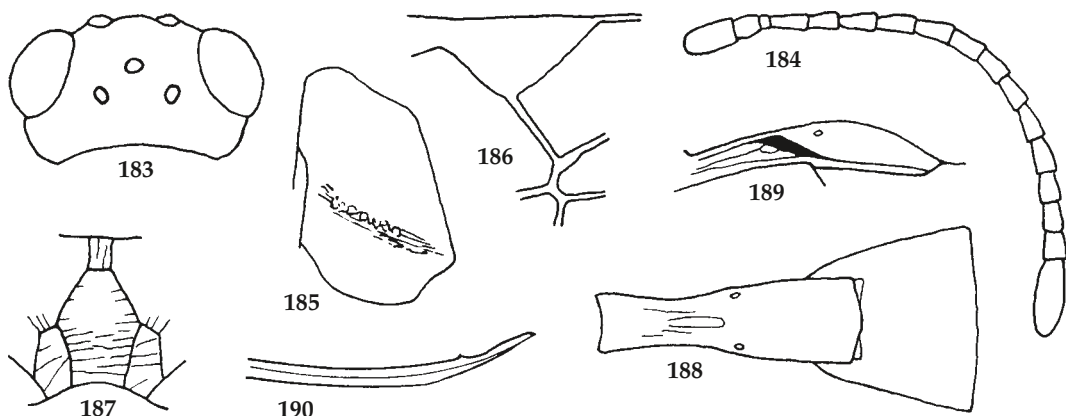
**Variation:** Malar space index 0.8. Flagellum with 14 segments. Punctures of the mesopleurum more distinct. Foveate groove shallowly depressed, for the greater part covered with fine longitudinal striae, about 0.7 times as long as the mesopleurum. Head, thorax and propodeum dark brown [1 ♀ from Knox Mt., California (WAS)]. The status of this specimen is unknown; it is not regarded as a paratype.

**Taxonomic remark:** *G. rarus* is similar to *G. gubarevae* Khalaim from Europe. The latter differs by: Flagellum with 17–18 segments. Mesopleurum finely granulate and shining centrally, a punctation hardly discernible. Tip of ovipositor slenderer (see fig. 16 in Khalaim 2002: 7).

#### *Gelanes striatus* spec. nov.

**Holotype** (♀): “Krasel Ida, V-17-57” (Idaho, USA), “*Pseudotsuga menziesii*”, “M. M. Furniss, Hopk. 39545” (WAS).

**w:** Body length 3 mm. Temples distinctly constricted behind the eyes, 0.6 times as long as the width of an eye, tangential lines on eyes and temples intersect on the propodeum (Fig. 183). Face 1.1 times as wide as the frons. Frontal index 0.53. Ocellar index 1.6. Malar space index 0.95. Mandibular teeth almost equal. Clypeus 0.8 times as long as the face, 3.3 times as wide as long, convex and with a smooth background, with a few punctures dorsally, without punctures subventrally. Face, frons and vertex with very fine dispersed punctures on a finely granulate background, vertex partly with a smooth background. Temple with very fine dispersed punctures on a smooth background, outer orbit without punctures. Flagellum with 14 segments, clavate, 1<sup>st</sup> segment 2.5 times, 2<sup>nd</sup> segment 1.5 times, median segment 1.6 times, penultimate segment 1.2 times as long as wide, last segment enlarged (Fig. 184). Pronotum with fine rather dense punctation on a very finely granulate background dorsolaterally, with distinct striae in the anterior groove. Mesoscutum for the



**Figs 183- 190.** *Gelanes striatus* spec. nov. (♀). 183. Head, top view. 184. Antenna. 185. Mesopleurum. 186. Pterostigma and areolet. 187. Propodeum, top view. 188. 1<sup>st</sup> and 2<sup>nd</sup> gastral tergites, top view. 189. 1<sup>st</sup> gastral segment, side view. 190. Ovipositor, side view.

greater part with fine dispersed punctures on a smooth background, the background finely granulate in front of the prescutellar furrow. Notaulus as a distinct wrinkled furrow, extending to 0.2 the length of the mesoscutum. Prescutellar furrow with fine striae. Scutellum bordered by carinae on the anterior 0.15, with fine dispersed punctures on an almost smooth background. Mesopleurum with rather distinct dispersed punctures on a very finely granulate or smooth background, with some additional wrinkles. Foveate groove shallow, about as long as the mesopleurum, covered with longitudinal striae (Fig. 185). Mesosternum with fine dispersed punctures on a smooth background. Metapleurum finely granulate and with fine punctures and wrinkles, slightly shining. Hind femur 3.5 times as long as high. Pterostigma 2.0 times as long as wide (Fig. 186). Metacarpus reaching to 0.4 of the distance from radial cell to the tip of wing. Basal area of propodeum 1.5 times as long as wide, rectangular, with distinct lateral carinae, 0.35 times as long as the petiolar area. Dorsolateral area with very fine dispersed punctures on a smooth background dorsally, with wrinkles laterally. Petiolar area 1.5 times as long as wide, flat, with fine irregular wrinkles anteriorly, with distinct transverse wrinkles posteriorly (Fig. 187). Propodeal spiracle separated from the pleural carina by 0.7 times its diameter, the spiracular carina narrow. Petiole flat and with very fine striae and a short longitudinal furrow dorsally, with distinct dorsolateral carinae, with distinct striae laterally. Postpetiole smooth. 1<sup>st</sup> sternite almost reaching the

spiracles (Figs 188, 189). Thyridial depression as a small oblique furrow. Gaster clavate-compressed posteriorly. Ovipositor 3.7 times, ovipositor sheath 2.8 times as long as the 1<sup>st</sup> tergite. Ovipositor slightly bent upwards proximally and medially, distinctly bent upwards distally, with a shallow rather broad dorsal emargination subapically, with a very fine tooth in front of this emargination, without teeth ventrally (Fig. 190).

Measurements of the holotype: Body 3.0 mm long. Head 0.77 mm wide. Thorax 1.07 mm long, 0.55 mm wide (mesoscutum). Front wing 2.7 mm long. 1<sup>st</sup> gastral tergite 0.60 mm long. Postpetiole 0.28 mm long, 0.23 mm wide. 2<sup>nd</sup> tergite 0.30 mm long, about 0.45 mm wide. Ovipositor sheath 1.65 mm long. Ovipositor 2.2 mm long.

Colour: Head, thorax and propodeum dark reddish brown, head blackish dorsally. Palpi and mandible (teeth reddish brown) yellowish. Clypeus reddish brown dorsally, yellowish ventrally. Antenna dark brown, tinged with reddish brown basally. Tegula and legs yellowish red. Pterostigma light brown. Gaster reddish brown, posterior tergites blackish dorsally.

**M:** unknown.

**Remark:** The holotype was collected on the bark of *Pseudotsuga menziesii* (Mirb.) Franco (Pinaceae) infested with *Dendroctonus pseudotsugae* Hopkins (Coleoptera, Scolytidae) (note in Hopkins' card file, WAS). However, there is no indication that the latter might be the host of *G. striatus*.

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