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## REVIEW OF THE EUROPEAN SPECIES OF THE GENUS *GELANES* HORSTMANN (HYMENOPTERA: ICHNEUMONIDAE: TERSILOCHINAE), PARASITOIDS OF XYELID SAWFLIES (HYMENOPTERA: XYELIDAE)

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### ABSTRACT

Twelve species of the genus *Gelanes* occur in Europe. Six of them are described in this paper: *G. altenhoferi* sp. nov., *G. alternus* sp. nov., *G. carinatus* sp. nov., *G. clavulatus* sp. nov., *G. flagellatus* sp. nov., and *G. graecus* sp. nov. *Gelanes cuspidatus* Khalaim is recorded from Europe for the first time. New data on distribution of other species in Europe are provided. A key to the twelve European species of *Gelanes* is given. New host records and plant associations are ascertained for ten species of *Gelanes*; all these species are parasitoids of *Xyela* larvae developing in staminate pine cones.

**Key words:** Europe, *Gelanes*, Ichneumonidae, key, taxonomy, Tersilochinae, *Xyela*, Xyelidae

## ОБЗОР ЕВРОПЕЙСКИХ ВИДОВ РОДА *GELANES* HORSTMANN (HYMENOPTERA: ICHNEUMONIDAE: TERSILOCHINAE), ПАРАЗИТОИДОВ ПИЛИЛЬЩИКОВ-КСИЕЛИД (HYMENOPTERA: XYELIDAE)

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### РЕЗЮМЕ

Двенадцать видов рода *Gelanes* обитают в Европе. Шесть из них описаны в этой работе: *G. altenhoferi* sp. nov., *G. alternus* sp. nov., *G. carinatus* sp. nov., *G. clavulatus* sp. nov., *G. flagellatus* sp. nov. и *G. graecus* sp. nov. *Gelanes cuspidatus* Khalaim отмечен в Европе впервые. Представлены данные о распространении в Европе других видов. Дан определительный ключ для двенадцати европейских видов *Gelanes*. Впервые установлены хозяева и кормовые растения для десяти видов *Gelanes*; все эти виды – паразитоиды личинок *Xyela*, развивающихся в тычиночных шишках сосен.

**Ключевые слова:** Европа, *Gelanes*, Ichneumonidae, определительный ключ, таксономия, Tersilochinae, *Xyela*, Xyelidae

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## INTRODUCTION

*Gelanes* Horstmann, 1981 is a medium-sized Holarctic genus of the Tersilochinae with 16 species, including six species described in this paper, inhabiting the Palaearctic region; the Nearctic fauna is not described. To date five species have been known from Europe (Horstmann 1971, 1981; Khalaim 2002).

This genus belongs to the genus group *Tersilochus* (Horstmann 1981) as it has a first tergite with glymmae joining by furrow to ventral part of postpetiole. Within this group it resembles the genus *Allophroides* Horstmann as only in these two genera glymmae are placed at or before middle of the first tergite (petiole short). *Gelanes* differs from *Allophroides* by the predominantly smooth head, mesosoma and first tergite (predominantly granulate in *Allophroides*), simple tarsal claws (usually pectinate in *Allophroides*), usually smaller pterostigma of fore wing, and normal eyes and antennae of male (eyes strongly enlarged and antennae unusually short in males of *Allophroides*).

Adults of *Gelanes* species fly predominantly in May and June. Unidentified species of *Gelanes* were registered as parasitoids of *Xyela curva* Benson (Schedl 1997) and *Xyela* spp. (Achterberg and Altenhofer 1997; Blank 2002) belonging to the ancient and primitive sawfly family Xyelidae. Another tersilochine genus, *Allophroides* Horstmann, is morphologically similar to *Gelanes*, and also was mentioned as parasitoid of xyelid sawflies of the genera *Xyela* Dalman (Carlson 1979) and *Pleuroneura* Ashmead (Ohmart and Dahlsten 1979) in North America. However these host records may belong to *Gelanes*, because this genus was described after publication of the host records for *Allophroides*. Almost all other tersilochines are parasitoids of various Coleoptera.

The aim of this paper is to describe and illustrate six new species of the genus, and provide a key to the twelve European species. New records of hosts and distribution are also provided.

## MATERIAL AND METHODS

This work is predominantly based on the large material (over 240 specimens) of *Gelanes* reared by Dr. E. Altenhofer and the junior author from *Xyela* larvae, or collected from pines in Austria, Croatia, Germany, Greece and Italy. Additional material was borrowed from the Natural History Museum (London, United

Kingdom; further BMNH), Senckenberg Deutsches Entomologisches Institut (Müncheberg, Germany; further DEI), Zoological Institute of the Russian Academy of Sciences (Saint Petersburg, Russia; further ZIN), Zoologische Staatssammlung (München, Germany; further ZSM), Dr. K. Horstmann Collection (Würzburg, Germany; further HORSTM) and Dr. J. Sawoniewicz Collection (Warsaw, Poland; further SAWON). Morphological terminology follows Townes (1969) with some changes according to Horstmann (2010). General distribution is given after Horstmann (1971, 1981) and Khalaim (2002, 2007). For reared specimens, the dates of collection of material (coll.) and of adult emergence (em.) are given. The key is given only for females as males of seven European species are unknown and in other five species males are often also hardly distinguishable.

## SYSTEMATICS

### Family Ichneumonidae Latreille, 1802

### Subfamily Tersilochinae Schmiedeknecht, 1910

### Genus *Gelanes* Horstmann, 1981

**Type species:** *Tersilochus fuscus* Holmgren, 1860, by original designation.

**Diagnosis.** Body predominantly smooth and shining, sometimes partly finely punctate; temple, mesopleuron and postpetiole of first tergite always smooth, face and frons usually granulate. Eyes and ocelli in both sexes not enlarged. Temple weakly to strongly rounded behind eyes in dorsal view. Mandible slender, upper tooth longer than lower tooth. Clypeus usually broad, lenticular or truncate apically, flat to weakly convex in lateral view. Malar space shorter, equal to or rarely somewhat longer than basal width of mandible. Flagellum of antenna filiform or in some species clavate, with 15–23 segments; second flagellomere sometimes conspicuously shorter and narrower than the first and subsequent flagellomeres. Notaulus usually present but short. Foveate groove of mesopleuron absent or weak, rarely sharp and crenulate. Propodeal spiracle separated from pleural carina by 2.0 or less diameters of spiracle. Propodeum with basal area (basal longitudinal carinae sometimes indistinct) or rarely with basal keel. Fore wing with pterostigma moderately large; first abscissa of radius longer than width of pterostigma. Vein *2m-cu* postfurcal, unpigmented anteriorly. Brachial cell closed distally. Legs slender.

Hind tibia with short, straight or very weakly curved apically spurs. Tarsal claws not pectinate. First tergite with petiole short, smooth or striate; postpetiole dorsally smooth. Glymma always present, usually rather large, joining by groove to ventral part of postpetiole, situated at or before middle of tergite. Thyridial depression strongly transverse (virtually absent) to slightly elongate. Ovipositor slender, weakly upcurved, sometimes very long, its apex variable (with dorsal notch, depression, teeth, etc).

In this paper six species, *G. altenhoferi* sp. nov., *G. alternus* sp. nov., *G. carinatus* sp. nov., *G. clavulatus* sp. nov., *G. flagellatus* sp. nov. and *G. graecus* sp. nov., are described from Europe and *G. cuspidatus* is recorded from Europe for the first time. Thus, to date the European fauna of *Gelanes* comprises twelve species. Ten European species were reared from *Xyela* larvae or collected from pines; general data on hosts and plant associations are presented in Table 1. All host records for species of *Gelanes* are new.

#### Key to European species of *Gelanes* (females only) (Figs 1–18)

1. Ovipositor thin, with apex strongly upcurved, without neither sharp dorsal notch, nor dorsal or ventral teeth (Fig. 11). Flagellum distinctly clavate; subapical flagellomere as long as wide to distinctly transverse. Basal area of propodeum elongate ..... 2
  - Ovipositor thin to rather robust, more or less evenly upcurved, apically often with sharp dorsal notch or teeth. Flagellum filiform to slightly clavate; subapical flagellomere more or less elongate, or sometimes as long as wide. Basal area of propodeum transverse or elongate ..... 3
2. Flagellum with 15–17 segments; subapical flagellomere distinctly transverse. Ovipositor sheath about 2.4 times as long as first tergite ..... 4. *G. clavulatus* sp. nov.
  - Flagellum with 18 segments; subapical flagellomere as long as wide. Ovipositor sheath 3.0–3.5 times as long as first tergite ..... 7. *G. flagellatus* sp. nov.
3. Ovipositor sheath longer than body. Basal area of propodeum distinctly transverse. Flagellum with 15–16 segments. First tergite dorsally smooth ..... 1. *G. altenhoferi* sp. nov.
  - Ovipositor sheath distinctly shorter than body. Basal area of propodeum elongate (except in *G. graecus* sp. nov., but first tergite with petiole dorsally striate in this species), or propodeum with basal keel ..... 4
4. Foveate groove of mesopleuron deep and crenulate. Thyridial depression elongate. Clypeus fuscous in upper part. Ovipositor apically lanceolate, with a sharp and narrow dorsal notch (Fig. 18) ..... 5
  - Foveate groove of mesopleuron shallow, often with weak oblique wrinkles, or sometimes foveate groove indistinct. Thyridial depression transverse. Clypeus usually entirely yellow. Ovipositor apically without dorsal notch, or with moderately broad notch (Fig. 17) ..... 6
5. Ovipositor sheath at least 3.0 times as long as first tergite. Flagellum with 18–19 segments ..... 6. *G. cuspidatus* Khalaim
  - Ovipositor sheath about twice as long as first tergite. Flagellum with 21 segments ..... 12. *G. stigmaticus* Horstmann
6. Mesopleuron distinctly punctate. Foveate groove absent. Flagellum of antenna with 22 segments. Temple long, in dorsal view about as long as eye width (Fig. 4). Ovipositor sheath twice as long as first tergite. First tergite dorsally smooth, sometimes with median longitudinal furrow ..... 5. *G. clypeatus* (Horstmann)
  - Mesopleuron very finely punctate or impunctate. Foveate groove present, oblique and more or less wrinkled. Flagellum with 15–19 segments. Temple, in dorsal view, distinctly shorter than eye width. Length of ovipositor sheath varied ..... 7
7. Ovipositor with fine (rarely indistinct) ventral subapical teeth; dorsal subapical depression situated far from ovipositor apex, distance from depression to apex of ovipositor 4.0 times as long as average height of ovipositor (Fig. 15) ..... 10. *G. gubarevae* Khalaim
  - Ovipositor usually without ventral subapical teeth; dorsal subapical depression or notch situated much closer to apex of ovipositor (Figs 12, 14, 16, 17) ..... 8
8. Temple, in dorsal view, about 0.6 times as long as eye width (Fig. 3). Flagellum with 15–16 segments. Propodeum with broad, transverse basal area ..... 9. *G. graecus* sp. nov.
  - Temple distinctly longer. Flagellum with 17–19 segments. Propodeum with elongate basal area, or with basal keel ..... 9
9. Ovipositor sheath at most 2.5 times as long as first tergite ..... 10
  - Ovipositor sheath more than 3.0 times as long as first tergite ..... 11
10. First metasomal segment with petiole dorsally striate. Ovipositor with a very small dorsal subapical notch (sometimes indistinct), with shallow broad depression between notch and apex of ovipositor (Fig. 16) ..... 8. *G. fuscus* (Holmgren)
  - First metasomal segment with petiole dorsally smooth. Ovipositor with a distinct and moderately broad dorsal subapical notch, without depression between dorsal notch and apex of ovipositor (Fig. 17) ..... 11. *G. simillimus* Horstmann
11. Propodeum with rather broad, slightly elongate basal area, sometimes indistinct. Distance between propodeal spiracle and pleural carina subequal to diameter of spiracle (Fig. 9). First metasomal segment with petiole more or less striate dorsally ..... 2. *G. alternus* sp. nov.

**Table 1.** Host records and plant associations of European species of *Gelanes*.

Parasitoid	Host, <i>Xyela</i>	Host plant, <i>Pinus</i>	Country
1. <i>G. altenhoferi</i>	<i>X. alpigena</i>	<i>P. cembra</i>	Austria
2. <i>G. alternus</i>	<i>X. graeca</i> , <i>Xyela</i> sp.	<i>P. nigra</i>	Austria
3. <i>G. carinatus</i>	<i>Xyela curva</i> , <i>Xyela</i> sp. (? <i>graeca</i> )	<i>P. nigra</i>	Austria
	–	collected from <i>P. nigra</i>	Germany
4. <i>G. clavulatus</i>	<i>X. curva</i> , <i>X. graeca</i>	<i>P. nigra</i>	Austria
	<i>Xyela</i> sp.	<i>P. nigra</i>	Greece
	–	<i>P. halepensis</i>	Croatia
5. <i>G. clypeatus</i>	–	–	–
6. <i>G. cuspidatus</i>	<i>X. alpigena</i>	<i>P. cembra</i>	Austria
7. <i>G. flagellatus</i>	<i>Xyela</i> sp. (? <i>curva</i> , ? <i>graeca</i> )	<i>P. nigra</i>	Austria
8. <i>G. fuscus</i>	<i>X. obscura</i>	<i>P. mugo</i>	Italy, Austria
	<i>X. julii</i>	<i>P. sylvestris</i>	Austria
	<i>X. ?alpigena</i>	<i>P. cembra</i>	Austria
9. <i>G. graecus</i>	–	collected from <i>P. nigra</i>	Greece
10. <i>G. gubarevae</i>	<i>X. graeca</i> , <i>X. ?curva</i>	<i>P. nigra</i>	Austria
	–	collected from <i>P. nigra</i>	Greece
11. <i>G. simillimus</i>	<i>X. julii</i>	<i>P. sylvestris</i>	Austria
	–	collected from <i>P. halepensis</i>	Croatia
12. <i>G. stigmaticus</i>	–	–	–

- Propodeum with a very narrow basal area (basal longitudinal carinae almost touching), or sometimes propodeum with a single median basal keel. Propodeal spiracle adjacent to pleural carina, or separated from this carina by half diameter of spiracle (Fig. 10). First metasomal segment dorsally smooth, sometimes with a median longitudinal furrow . . . . 3. *G. carinatus* sp. nov.

**1. *Gelanes altenhoferi* Khalaim et Blank sp. nov.**  
(Figs 5–7, 13)

**Holotype.** Female – AUSTRIA: Kärnten (Carinthia), Schönfeld, ex *Xyela alpigena* on *Pinus cembra*, coll. 14 July 1996, em. 26 April 1998, coll. E. Altenhofer (DEI).

**Paratypes.** AUSTRIA: 1 female (ZIN), same data as holotype. SWITZERLAND: 2 females (BMNH), Valais, Saas-Fee, 6000–7000 ft (1830–2130 m), 20 June 1962, coll. J.E. and R.B. Benson.

**Etymology.** Named in honour of the well-known Austrian expert in Xyelidae and collector of the type material Dr. Ewald Altenhofer.

**Differential diagnosis.** *Gelanes altenhoferi* sp. nov. is readily distinguished from other species in this genus by its ovipositor, which is longer than the body, and its propodeum with a very short basal area. The new species resembles *G. graecus* sp. nov. which also has rather short and broad basal area of propodeum, but differs from this species by the dorsally striate petiole of the first tergite and longer ovipositor.

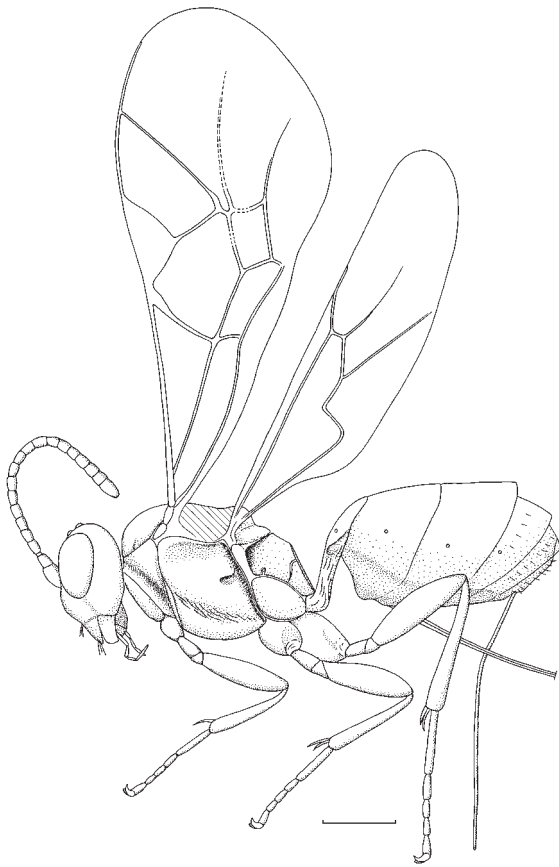


Fig. 1. *Gelanes clavulatus* sp. nov., female (holotype). Scale bar = 0.4 mm.

**Description of the holotype (female).** Body length 4.0 mm. Antenna length 2.0 mm. Head width 1.0 mm. Mesosoma length 1.5 mm, width 0.86 mm. Fore wing length 3.6 mm. First tergite length 0.86 mm, posterior width 0.4 mm. Second tergite length 0.47 mm. Ovipositor sheath over 4.0 mm.

**Head.** Strongly rounded behind eyes in dorsal view (Fig. 5), temple distinctly shorter than eye width. Flagellum slightly clavate, with 15 flagellomeres; all flagellomeres distinctly elongate (Fig. 6). Mandible punctate on its basal half, upper tooth slightly longer than lower tooth. Clypeus with median transverse ridge, dull and sparsely punctate in its upper half, smooth and impunctate in its lower half. Malar space about as long as basal width of mandible. Face, frons and vertex finely granulate and mostly finely punctate. Temple centrally smooth and shining, impunctate.

**Mesosoma.** Mesoscutum very finely and sparsely punctate, almost smooth anteriorly and laterally, and finely granulate posteriorly. Mesopleuron smooth, mostly finely and sparsely punctate. Foveate groove of mesopleuron short, horizontal, about half as long as mesopleuron. Propodeum smooth, partly weakly irregularly rugulose; basal area strongly transverse. Distance between propodeal spiracle and pleural carina subequal to diameter of spiracle.

**Fore wing** (Fig. 7). Vein *2m-cu* postfurcal. First abscissa of radial vein almost as long as width of pterostigma. Metacarp short, ending far before apex of fore wing.

**Metasoma.** First metasomal segment with petiole laterally strongly striate, dorsally smooth, with deep dorsal longitudinal furrow posteriorly. Thyridial depression very short, transverse. Ovipositor strongly and evenly upcurved, usually with one or two rounded dorsal teeth and wide depression apically (Fig. 13); its sheath somewhat longer than body.

**Coloration.** Body black. Palpi, mandible medially, lower half of clypeus, and legs yellow-brown. Tegula, all coxae and femora brown to dark brown. Pterostigma pale brown. Metasoma behind first tergite predominantly dark brown.

**Male.** Unknown.

**Distribution.** Austria, Switzerland; probably Alpine species.

**Biology.** Reared from *Xyela alpigena* (Strobl) on *Pinus cembra* L. (Pinaceae) in Austria.

## 2. *Gelanes alternus* Khalaim et Blank sp. nov. (Fig. 9)

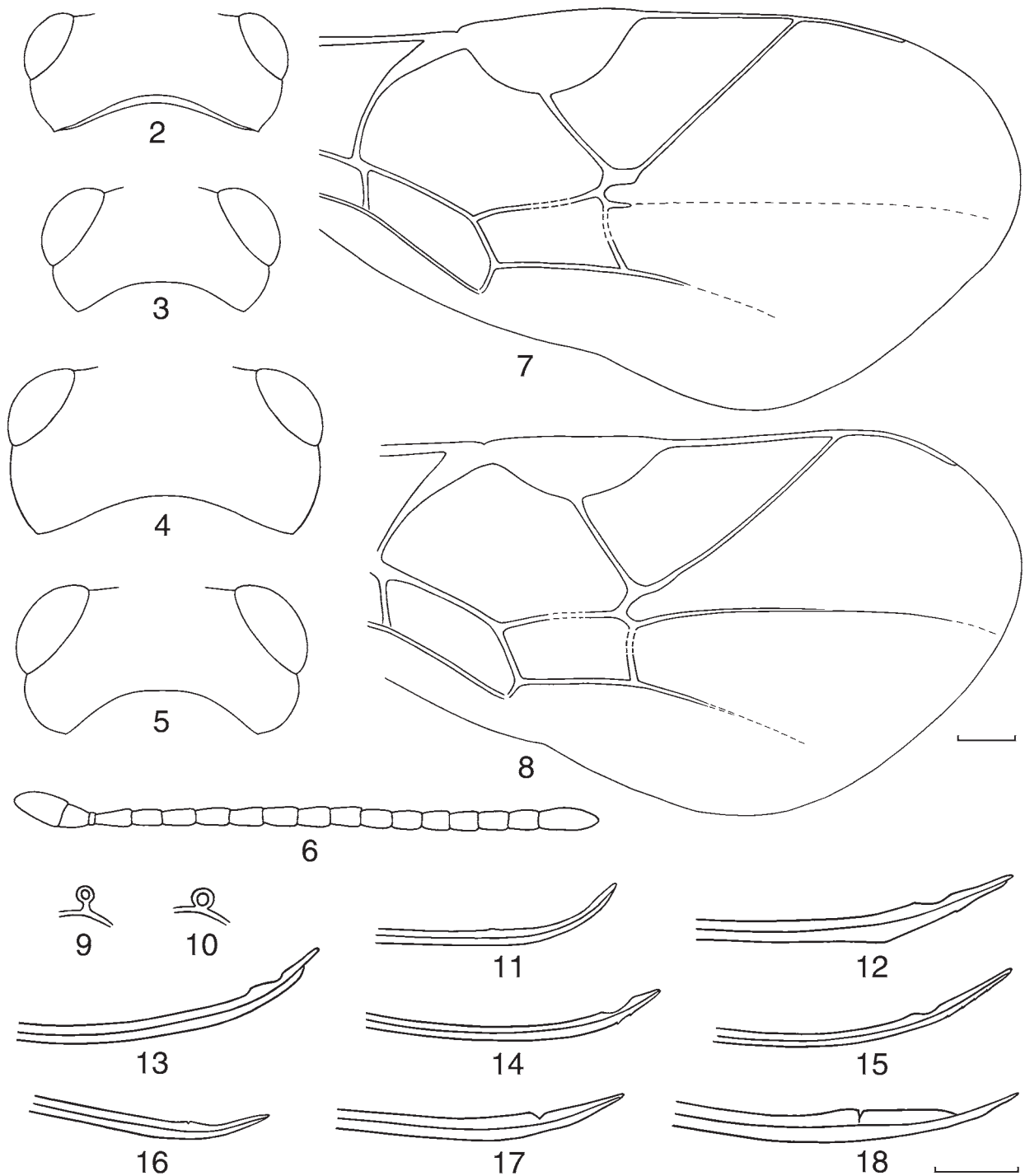
**Holotype.** Female – AUSTRIA: Langenlois, ex *Xyela graeca* on *Pinus nigra*, coll. 17 May 1998, em. 27 April 1999, coll. E. Altenhofer (DEI).

**Paratypes.** AUSTRIA: 1 female (ZIN), Langenlois, ex *Xyela* sp. on *Pinus nigra*, coll. 17 May 1998, em. 6 May 1999, coll. E. Altenhofer; 2 females (1 female, DEI; 1 female, ZIN), same data, but coll. 24 May 1996, em. 12 May 1997; 3 females (DEI), Neulengbach, ex *Xyela ?curva*, *?graeca* on *Pinus nigra*, coll. 1–14 May 1994, em. March 1995, coll. E. Altenhofer.

**Etymology.** From the Latin “*alternus*” (alternate).

**Differential diagnosis.** *Gelanes alternus* sp. nov. is structurally very similar to *G. carinatus* sp. nov., but differs in having a broader basal area of propodeum, longer distance between propodeal spiracle and pleu-





**Figs 2–18.** *Gelanes* spp., females. 2, 11 – *G. clavulatus* sp. nov.; 3, 14 – *G. graecus* sp. nov.; 4 – *G. clypeatus* Horstm.; 5–7, 13 – *G. altenhoferi* sp. nov.; 8, 18 – *G. stigmaticus* Horstm. (holotype); 9 – *G. alternus* sp. nov.; 10, 12 – *G. carinatus* sp. nov.; 15 – *G. gubarevae* Khalaim; 16 – *G. fuscus* Holmgren; 17 – *G. simillimus* Horstm. 2–5 – head, dorsal view; 6 – antenna, lateral view; 7, 8 – fore wing; 9, 10 – propodeal spiracle; 11–18 – apex of ovipositor, lateral view. Scale bars = 0.2 mm (2–8, 11–18).

ral carina (Fig. 9), and first metasomal segment with petiole dorsally striate.

**Description of the holotype (female).** Body length 3.2 mm. Fore wing length 2.8 mm. Antenna length 1.7 mm. Head width 0.77 mm. Mesosoma length 1.2 mm, width 0.64 mm. First tergite length 0.64 mm, posterior width 0.29 mm. Second tergite length 0.36 mm. Ovipositor sheath about 2.0 mm.

**Head.** Roundly narrowed behind eyes in dorsal view, temple distinctly shorter than eye width. Flagellum filiform, with 17–18 segments; all flagellomeres distinctly elongate, second flagellomere shorter than the first and subsequent ones. Mandible punctate on its basal part; upper tooth longer than lower tooth. Clypeus flat centrally, entirely smooth or sometimes finely punctate on its upper part. Malar space about as long as basal width of mandible. Face granulate and sometimes indistinctly punctate. Frons granulate, impunctate. Vertex smooth and dull, impunctate. Temple smooth and shining, impunctate.

**Mesosoma.** Mesoscutum very finely and sparsely punctate, almost smooth anteriorly and laterally, finely granulate posteriorly. Mesopleuron smooth, sometimes indistinctly punctate. Foveate groove of mesopleuron small, irregularly rugulose. Propodeum mostly irregularly rugulose, dorsolateral area dorsally smooth; basal area wide, slightly elongate (sometimes indistinct). Distance between propodeal spiracle and pleural carina subequal to one diameter of spiracle (Fig. 9).

**Fore wing.** Vein *2m-cu* postfurcal. First abscissa of radial vein longer than width of pterostigma. Metacarp short, not reaching apex of fore wing.

**Metasoma.** First metasomal segment with petiole strongly striate laterally, usually also striate dorsally. Thyridial depression transverse, very short. Ovipositor with a wide dorsal subapical depression; its sheath more than 3.0 times as long as first tergite.

**Coloration.** Body black with brownish hue. Palpi, mandible (except for teeth) and clypeus yellow. Scape and pedicel of antenna yellowish, flagellum evenly darkening towards apex. Tegula and legs brownish yellow (mid and hind coxae sometimes brown). Pterostigma pale brown.

**Male.** Unknown.

**Distribution.** Austria.

**Biology.** Reared from *Xyela graeca* Stein and *Xyela* sp. (probably *X. curva* Benson) on *Pinus nigra* Aiton (Pinaceae).

### 3. *Gelanes carinatus* Khalaim et Blank sp. nov. (Figs 10, 12)

**Holotype.** Female – AUSTRIA: Neulengbach, ex *Xyela curva* on *Pinus nigra*, coll. 14 May 1995, em. 30 April 1996, coll. E. Altenhofer (DEI).

**Paratypes.** AUSTRIA: 2 females (1 female, DEI; 1 female, ZIN), same data as holotype; 1 female, 3 males (1 male, DEI; 1 female, 1 male, ZIN; 1 male, HORSTM), Neulengbach, ex *Xyela ?curva, ?graeca* on *Pinus nigra*, coll. 14 May 1994, em. March 1995, coll. E. Altenhofer; 1 female (HORSTM), Dürnstein, ex *Xyela* sp. on *Pinus nigra*, coll. 7 May 1994, em. 3 March 1995, coll. E. Altenhofer; 1 male (DEI), Langenlois, ex *Xyela* sp. on *Pinus nigra*, coll. 17 May 1998, em. 6 May 1999, coll. E. Altenhofer. GERMANY: 2 females (DEI), Thüringen, N Rottleben, on *Pinus nigra*, coll. 2 May 1998, coll. S. Blank.

**Etymology.** The species name refers to the structure of propodeum, having a single basal carina (keel) or a pair of basal longitudinal carinae which are very closely located, almost in contact.

**Differential diagnosis.** *Gelanes carinatus* sp. nov. is structurally very similar to *G. alternus* sp. nov., but differs by its very narrow basal area of propodeum (sometimes propodeum with basal keel), shorter distance between propodeal spiracle and pleural carina (Fig. 10), and first metasomal segment with petiole dorsally smooth.

**Description of the holotype (female).** Body length 3.5 mm. Fore wing length 3.0 mm. Antenna length 1.9 mm. Head width 0.86 mm. Mesosoma length 1.3 mm, width 0.68 mm. First tergite length 0.7 mm, posterior width 0.3 mm. Second tergite length 0.35 mm. Ovipositor sheath about 2.5 mm.

**Head.** Roundly narrowed behind eyes in dorsal view, temple distinctly shorter than eye width. Flagellum filiform, with 18 segments; all flagellomeres distinctly elongate, second flagellomere shorter than the first and subsequent ones. Mandible distinctly punctate basally, upper tooth slightly longer than lower tooth. Clypeus centrally flat, sparsely punctate, almost entirely smooth. Malar space as long as basal width of mandible, or slightly shorter. Face and frons very finely granulate, sometimes indistinctly punctate. Vertex almost smooth, dull. Temple smooth and shining.

**Mesosoma.** Mesoscutum very finely punctate, smooth and shining. Mesopleuron mostly smooth. Foveate groove of mesopleuron shallow, rugulose.

Propodeum with a very narrow basal area (basal longitudinal carinae almost in contact), or sometimes with a basal keel; dorsolateral area more or less smooth; apical area irregularly rugulose. Propodeal spiracle adjacent to pleural carina, or separated from this carina by half diameter of spiracle (Fig. 10).

*Fore wing.* Vein *2m-cu* postfurcal. First abscissa of radial vein longer than width of pterostigma. Metacarp short, not reaching apex of fore wing.

*Metasoma.* First metasomal segment with petiole laterally striate, dorsally smooth. Thyridial depression short, transverse. Ovipositor weakly and evenly upcurved, with shallow and wide dorsal subapical depression (Fig. 12); its sheath about 3.5 times as long as first tergite.

*Coloration.* Body black with brownish hue. Palpi, mandible (except for teeth), clypeus, tegula and legs (coxae brown) yellow to brownish yellow. Scape and pedicel of antenna yellowish, flagellum evenly darkening towards tip. Pterostigma pale brown. Metasoma, including first segment, brown to dark brown.

**Male.** Flagellum with 19–20 segments. Malar space about 0.33 times as long as basal width of mandible. First tergite more slender than in female. Otherwise similar to female.

**Distribution.** Austria, Germany.

**Biology.** Reared from *Xyela curva* Benson and *Xyela* sp. (probably *X. graeca* Stein) on *Pinus nigra* Aiton (Pinaceae) in Austria. Collected from *P. nigra* in Germany.

#### 4. *Gelanes clavulatus* Khalaim et Blank sp. nov. (Figs 1, 2, 11)

**Holotype.** Female – GREECE: Nomos Grevena, E Pindos National Park, 15 km N Metsovo, Mt. Bliia, 1550 m, 39°54' N, 21°12' E, on staminate cones of *Pinus nigra* with *Xyela* larvae, 27–28 May 2000, coll. S. Blank and C. Kutzscher (DEI).

**Paratypes.** GREECE: 5 females (4 females, DEI; 1 female, ZIN), same data as holotype; 3 females, 2 males (DEI), Nomos Ioannina, 19 km NW Metsovon, 7 km SW Vovoussa, 39°53' N, 21°01' E, 1500 m, ex *Xyela* sp. on *Pinus nigra*, coll. 26 May 2000, em. 20–25 February 2001, coll. S. Blank and C. Kutzscher; 42 females, 15 males (36 females, 12 males, DEI; 6 females, 3 males, ZIN), Nomos Larissa, N Anatoli, Mt Ossa, 39°47' N, 22°42' E, 1200 m, ex *Xyela* sp. on *Pinus nigra*, coll. 24 May 2000, em. 17 February – 2 March 2001, coll. S. Blank and C. Kutzscher. CROATIA: 28

females (23 females, DEI; 5 females, ZIN), 3 km SW Plomin, Načinović, 45°07' N, 14°12' E, 300 m, on *Pinus halepensis*, 7 April 1999, coll. S. Blank and E. Altenhofer; 5 females (4 females, DEI; 1 female, ZIN), SW Vozilići, 45°09' N, 14°09' E, 50 m, on *Pinus halepensis*, 7 April 1999, coll. S. Blank and E. Altenhofer; 1 female, 13 male (1 female, 11 males, DEI; 2 males, ZIN), Na inovi, near Motel Vidikovac, 45°12' N, 14°20' E, 300 m, ex *Pinus halepensis*, coll. 7 April 1999, em. 14 April 2000, coll. S. Blank and E. Altenhofer. AUSTRIA: 1 female, 1 male (ZIN), Langenlois, ex *Xyela graeca* on *Pinus nigra*, coll. 17 May 1998, em. 27 April 1999, coll. E. Altenhofer; 2 females (DEI), Langenlois, ex *Xyela* sp. on *Pinus nigra*, coll. 17 May 1998, em. 30 April 1999, coll. E. Altenhofer; 1 female (DEI), Langenlois, ex *Xyela curva* on *Pinus nigra*, coll. 24 May 1996, em. 12 May 1997, coll. E. Altenhofer; 2 females (1 female, DEI; 1 female, ZIN), Neulengbach, ex *Xyela curva* on *Pinus nigra*, coll. 14 May 1995, em. 30 April 1996, coll. E. Altenhofer; 1 female (HORSTM), Neulengbach, ex *Xyela ?curva*, *?graeca* on *Pinus nigra*, coll. 14 May 1994, em. March 1995, coll. E. Altenhofer; 1 female (DEI), Hernstein, on *Pinus nigra*, coll. 11 May 1996, coll. S. Blank. BULGARIA: 1 female (ZSM), “Osogovo, h. Osogovo”, 28 May 1988, coll. J. Kolarov.

**Etymology.** The name *clavulatus* refers to the conspicuous, distinctly clavate flagellum of antenna.

**Differential diagnosis.** *Gelanes clavulatus* sp. nov. may easily be distinguished from other species of the genus by its short and strongly clavate flagellum of antenna (subapical flagellomere distinctly transverse), and thin and strongly upcurved apex of ovipositor (Fig. 11).

**Description of the holotype (female).** Body length 2.9 mm. Fore wing length 2.7 mm. Antenna length 1.6 mm. Head width 0.8 mm. Mesosoma length 1.14 mm, width 0.61 mm. First tergite length 0.64 mm, posterior width 0.31 mm. Second tergite length 0.31 mm. Ovipositor sheath about 1.5 mm.

**Head.** Roundly narrowed behind eyes in dorsal view (Fig. 2), temple shorter than eye width. Flagellum distinctly clavate, with 15–17 segments; second flagellomere shorter than the first and subsequent ones; basal and middle flagellomeres slightly elongate; subapical flagellomere transverse (Fig. 1). Mandible punctate basally, upper tooth longer than lower tooth. Clypeus centrally flat, smooth and shining, usually impunctate. Malar space 1.0–1.2 times as long as basal width of mandible. Face and frons finely granulate, impunctate. Vertex and temple smooth, impunctate.



*Mesosoma*. Mostly smooth (propodeum partly rugulose-granulate) and impunctate (except for very finely punctate mesoscutum). Foveate groove of mesopleuron rugulose, often as long as mesopleuron. Propodeum with basal area moderately wide, distinctly elongate. Propodeal spiracle small, distance between spiracle and pleural carina as long as 0.6–1.0 diameters of spiracle.

*Fore wing*. Vein *2m-cu* slightly postfurcal, sometimes almost interstitial. First abscissa of radial vein almost as long as width of pterostigma. Metacarp short, not reaching apex of fore wing.

*Metasoma*. First metasomal segment with petiole dorsally and laterally striate. Thyridial depression very short, transverse. Ovipositor with apex thin and strongly upcurved, dorsally with a more or less distinct small tooth (Fig. 11); its sheath about 2.4 times as long as first tergite.

*Coloration*. Body black, sometimes with brownish hue. Palpi, mandible (except for teeth) and clypeus yellow to yellowish brown. Tegula and legs yellow-brown (coxae and sometimes femora brown). Pterostigma pale brown. Metasoma behind first segment predominantly dark brown.

**Male**. Flagellum of antenna with 18–20 flagellomeres, not clavate, all flagellomeres elongate. Malar space about 0.33 times as long as basal width of mandible. Head and mesosoma largely smooth. Foveate groove of mesopleuron sometimes short and sharp. Otherwise similar to female.

**Distribution**. Austria, Croatia, Greece, Bulgaria.

**Biology**. Reared from *Xyela* sp. on *Pinus nigra* Aiton (Pinaceae) in Greece. Collected and reared from *P. halepensis* Mill. in Croatia. Reared from *X. curva* Benson and *X. graeca* Stein on *P. nigra* Aiton in Austria.

### 5. *Gelanes clypeatus* (Horstmann, 1971)

(Fig. 4)

**Material**. GERMANY: 1 female (HORSTM), "Thüringen, O. Schmiedeknecht S." RUSSIA: 1 female (ZIN), Khabarovsk Territory, Khekhtsir, 30 May 1983, coll. D.R. Kasparyan; 1 female (ZIN), Khabarovsk Territory, 20 km N Bikin, Boytsovo, 25 May 1993, coll. S.A. Belokobylskij.

**Distribution**. Austria, Germany, Czech Republic, Russia (south of Far East).

**Biology**. Host unknown.

### 6. *Gelanes cuspidatus* Khalaim, 2002

**Material**. AUSTRIA: 3 females, 2 males (DEI), Salzburg, Obertauern, ex *Xyela alpigena* on *Pinus cembra*, coll. 9 July 1997, em. 21 May 1999, coll. E. Altenhofer; 2 females (DEI), same locality, ex *Xyela alpigena* on *Pinus cembra*, coll. 10 July 1997, em. 21 March 2000, coll. E. Altenhofer; 1 female, 2 males (DEI), Kärnten, Nockalmstraße, ex *Xyela alpigena* on *Pinus cembra*, coll. 15 July 1996, em. 27–28 April 1998, coll. E. Altenhofer; 1 male (DEI), Kärnten, Nockalmstraße, ex *Xyela alpigena* on *Pinus cembra*, coll. 15 July 1996, em. 13 May 1999, coll. E. Altenhofer. SWITZERLAND: 1 female, 5 males (BMNH), Graubünden, Engadine, National Park, 1800–2500 m, 8–20 June 1960, coll. J.E. and R.B. Benson.

**Remarks**. Specimens from Europe are larger and darker than material from Asia, having antenna with 18–19 flagellomeres (16–18 flagellomeres in specimens from the Russian Far East).

**Description**. Male (described for the first time). Flagellum of antenna with 19–24 segments. Malar space 0.6 times as long as basal width of mandible. First tergite more slender than in female. Thyridial depression elongate.

**Distribution**. Switzerland, Austria, Russia (south of Far East).

**Biology**. Reared from *Xyela alpigena* (Strobl) on *Pinus cembra* L. (Pinaceae) in Austria.

### 7. *Gelanes flagellatus* Khalaim et Blank sp. nov.

**Holotype**. Female – AUSTRIA: Neulengbach, ex *Xyela ?curva*, *?graeca* on *Pinus nigra*, coll. 14 May 1994, em. March 1995, coll. E. Altenhofer (DEI).

**Paratypes**. AUSTRIA: 1 female (ZIN), same data as holotype; 1 female (HORSTM), Langenlois, ex *Xyela* sp. on *Pinus nigra*, coll. 17 May 1998, em. 30 April 1999, coll. E. Altenhofer.

**Etymology**. The species name is given in reference to the conspicuous, clavate flagellum of antenna.

**Differential diagnosis**. Differs from *G. clavulatus* sp. nov. and *G. fuscus* by its subapical flagellomere as long as wide, whereas this flagellomere transverse in *G. clavulatus* sp. nov. and elongate in *G. fuscus*, and its longer ovipositor sheath. Also differs from *G. clavulatus* sp. nov. by its 18-segmented flagellum (15–17-segmented in *G. clavulatus* sp. nov.), and from *G. fuscus* by its clavate flagellum (filiform in *G. fuscus*).

**Description of the holotype (female).** Body length 3.45 mm. Fore wing length 2.9 mm. Antenna length 1.7 mm. Head width 0.82 mm. Mesosoma length 1.23 mm, width 0.62 mm. First tergite length 0.64 mm, posterior width 0.3 mm. Second tergite length 0.3 mm. Ovipositor sheath about 2.2 mm.

**Head.** Roundly narrowed behind eyes in dorsal view, temple shorter than eye width. Flagellum clavate, with 18 segments; second flagellomere shorter than the first and subsequent ones; basal and middle flagellomeres distinctly elongate; subapical flagellomere subsquare. Mandible basally punctate, upper tooth slightly longer than lower tooth. Clypeus centrally flat, entirely smooth and shining, with sparse fine punctures on its upper part. Malar space 1.0–1.2 times as long as basal width of mandible. Face and frons finely granulate, impunctate. Vertex and temple smooth, impunctate.

**Mesosoma.** Mostly smooth (propodeum partly rugulose-granulate) and impunctate (except for very finely punctate mesonotum). Foveate groove of mesopleuron rugulose. Propodeum with basal area wide and distinctly elongate. Distance between propodeal spiracle and pleural carina equal to about half diameter of spiracle.

**Fore wing.** Vein *2m-cu* postfurcal. First abscissa of radial vein almost as long as width of pterostigma. Metacarp short, not reaching apex of fore wing.

**Metasoma.** First metasomal segment with petiole striate dorsally and laterally. Thyridial depression very short, transverse. Ovipositor thin, slightly stronger upcurved apically, with small dorsal subapical tooth; its sheath 3.0–3.5 times as long as first tergite.

**Coloration.** Body black. Palpi, mandible (except for teeth), clypeus, tegula and legs yellowish brown to yellow-brown (coxae and sometimes femora brown). Pterostigma pale brown. Metasoma behind first segment dark brown to black.

**Male.** Unknown.

**Distribution.** Austria.

**Biology.** Reared from *Xyela* sp. (probably *X. curva* Benson or *X. graeca* Stein) on *Pinus nigra* Aiton (Pinaceae).

## 8. *Gelanes fuscus* (Holmgren, 1860)

(Fig. 16)

**Material.** ENGLAND: 1 female (BMNH), “Burnham Beeches, Burks”, 26 May 1980, coll.

Bouček; 1 female (BMNH), “Hants, Stoney Cross”, 30 May 1977, coll. J.S. Noyes and S.L. Ward; 1 female (BMNH), Sampshire, Lyndhurst, on leaves of *Quercus borealis* Michx., 24 May 1962, coll. C.R. Vardy. FRANCE: 1 female (BMNH), Finistère, Huelgoat, 2 June 1954, coll. J.F. Perkins. ITALY: 5 females, 8 males (DEI), Trentino-Alto Adige, Sexten [=Sesto], Mt. Helm, ex *Xyela obscura* on *Pinus mugo*, coll. 17 July 1998, em. 31 March 2000, coll. E. Altenhofer. SWITZERLAND: 1 female (BMNH), Valais, Saas-Fee, 5000–6000 ft (1520–1830 m), 19 June 1962, coll. J.E. and R.B. Benson; 2 females (BMNH), Graubünden, Engadine, National Park, 2000–2100 m, 11–22 June 1960, coll. J.E. and R.B. Benson. GERMANY: 1 male (DEI), Bayern, 3 km N Mittenwald, 47°29' N, 11°16' E, 800 m, host?, coll. 25 May 1999, em. 24 March 2000, coll. S. Blank; 1 female (ZSM), “Obb. Linderhof Sefelwand”, 1700 m, 13 June 1973. AUSTRIA: 1 female (DEI), Salzburg, Krumltal, Rauris, ex *Xyela obscura* on *Pinus mugo*, coll. 5 July 1995, em. 4 May 1997, coll. E. Altenhofer; 1 female (DEI), Hörweix (Etzen), ex *Xyela julii* on *Pinus sylvestris*, coll. 31 May 1996, em. 18 April 1998, coll. E. Altenhofer; 2 females (DEI), Ottenstein, ex *Xyela julii* on *Pinus sylvestris*, coll. 25 May 1996, em. 25 April 1998, coll. E. Altenhofer; 6 females, 2 males (DEI), same locality, ex *Xyela julii* on *Pinus sylvestris*, coll. 25 May 1995, em. 19 April 1996, coll. E. Altenhofer; 1 female (DEI), Kärnten, Nockalmstraße, ?ex *Xyela alpigena* on *Pinus cembra*, coll. 15 July 1996, em. 28 April 1998, coll. E. Altenhofer; 1 female (DEI), Salzburg, Obertauern, ex *Xyela obscura* on *Pinus mugo*, coll. 9 July 1997, em. 15 March 1999, coll. E. Altenhofer; 1 female (DEI), same locality, ex *Xyela obscura* on *Pinus mugo*, coll. 10 July 1997, em. 22 March 2000, coll. E. Altenhofer; 1 female (ZSM), Tirol, “Plansee Zwerchenberg”, Fichtenwald (spruce forest), 1500–1660 m, 27 June 1986; 6 females (ZSM), Tirol, “Berwand Bichlbächler J.”, 1900 m, 21 July 1972, coll. Haeselbarth. POLAND: 1 female, 1 male (SAWON), “Jesionowe Góry at Czarna Białostocka”, 23 June 2002, coll. J. Sawoniewicz. BULGARIA: 11 females, 2 males (ZSM), Rhodopi, Jundola, 25 May 1988, coll. J. Kolarov.

**Distribution.** Almost entire Europe, Kazakhstan, southern Siberia and south of the Russian Far East.

**Biology.** Reared from *Xyela obscura* (Strobl) on *Pinus mugo* Turra (Pinaceae) in Italy and Austria, from *X. julii* (Brebisson) on *P. sylvestris* L. and probably from *X. alpigena* (Strobl) on *P. cembra* L.

in Austria. Collected from leaves of *Quercus borealis* F. Michx. (Fagaceae) in England.

**9. *Gelanes graecus* Khalaim et Blank sp. nov.**  
(Figs 3, 14)

**Holotype.** Female – GREECE: Nomos Grevena, Pindos National Park E, Metsovo N 15 km, Mt Bliá, 1550 m NN, 39°54' N, 21°12' E, on staminate cones of *Pinus nigra* with *Xyela* larvae, 27–28 May 2000, coll. S. Blank and C. Kutzscher (DEI).

**Paratype.** GREECE: 1 female (ZIN), Nomos Ioannina, 10 km N Metsovo, 5 km WNW Milea, NE Mt. Mavrovouni, 39°52' N, 21°10' E, 1750 m, 28 May 2000, coll. S. Blank and C. Kutzscher.

**Etymology.** The specific epithet *graecus* refers to the type locality, Greece.

**Differential diagnosis.** Differs from *G. clavulatus* sp. nov. by its shorter temple (Fig. 3), weakly clavate flagellum with subsquare subapical flagellomere, and transverse basal area of propodeum.

**Description of the holotype (female).** Body length 3.1 mm. Fore wing length 2.6 mm. Antenna length 1.5 mm. Head width 0.83 mm. Mesosoma length 1.2 mm, width 0.65 mm. First tergite length 0.64 mm, posterior width 0.25 mm. Second tergite length 0.3 mm. Ovipositor sheath about 2.0 mm.

**Head.** Moderately rounded behind eyes in dorsal view (Fig. 3), temple 0.6 times as long as eye width. Flagellum with 15–16 segments; all flagellomeres more or less elongate; subapical flagellomere subsquare. Mandible basally punctate, upper tooth slightly longer than lower tooth. Clypeus with transverse carina, smooth and shining, with some punctures on its upper part. Malar space as long as basal width of mandible. Face and frons finely granulate. Vertex almost smooth, dull. Temple smooth and shining.

**Mesosoma.** Mesoscutum mostly smooth and very finely punctate, very finely granulate posteriorly. Mesopleuron smooth, sparsely and finely punctate. Foveate groove of mesopleuron shallow, rugulose, about 2/3 times as long as mesopleuron. Propodeum mostly irregularly rugulose, partly smooth; basal area wide, distinctly transverse. Distance between propodeal spiracle and pleural carina equal to 1.2–1.4 diameters of spiracle.

**Fore wing.** Vein *2m-cu* postfurcal. First abscissa of radial vein longer than width of pterostigma. Metacarp short, not reaching apex of fore wing.

**Metasoma.** First metasomal segment with petiole strongly striate laterally and dorsally. Thyridial depression very short, transverse. Ovipositor evenly upcurved, with subapical depression dorsally and fine teeth ventrally (Fig. 14); sheath 3.0 times as long as first tergite.

**Coloration.** Body black. Palpi, mandible (except for teeth), tegula and legs yellowish brown (coxae brown). Lower part of clypeus yellowish brown (holotype with clypeus black on its lower half). Pterostigma pale brown. Metasoma dark brown to black.

**Male.** Unknown.

**Distribution.** Greece.

**Biology.** Collected from staminate cones of *Pinus nigra* Aiton (Pinaceae) with *Xyela* larvae.

**10. *Gelanes gubarevae* Khalaim, 2002**  
(Fig. 15)

**Material.** AUSTRIA: 4 females (DEI), Neulengbach, ex *Xyela ?curva*, *?graeca* on *Pinus nigra*, coll. 14 May 1994, em. March 1995, coll. E. Altenhofer; 5 females (DEI), Langenlois, ex *Xyela* sp. on *Pinus nigra*, coll. 17 May 1998, em. 6 May 1999, coll. E. Altenhofer; 1 female (DEI), Langenlois, ex *Xyela* sp. on *Pinus nigra*, coll. 24 May 1996, em. 12 May 1997, coll. E. Altenhofer; 2 females (DEI), Dürnstein, ex *Xyela graeca* on *Pinus nigra*, coll. 16 May 1997, em. 27 April 1999, coll. E. Altenhofer; 2 females (DEI), Dürnstein, ex *Xyela* sp. on *Pinus nigra*, coll. 16 May 1997, em. 16 April 1999, coll. E. Altenhofer. GREECE: 1 female (DEI), Nomos Grevena, E Pindos National Park, 15 km N Metsovo, Mt. Bliá, 39°54' N, 21°12' E, 1550 m, on staminate cones of *Pinus nigra* with *Xyela* larvae, 27–28 May 2000, coll. S. Blank and C. Kutzscher. BULGARIA: 1 female (ZSM), Rhodopi, 30 April 1977, coll. J. Kolarov.

**Remarks.** The holotype somewhat differs from other non-type material by the shape of its ovipositor (compare Fig. 15 and Khalaim 2002: Fig. 16), and shorter ovipositor sheath, which is 2.4 times as long as first tergite in holotype, and about 3.0 times in other specimens.

**Distribution.** Austria, Greece, Bulgaria, Ukraine (Carpathians).

**Biology.** Reared from *Xyela graeca* Stein and probably *X. curva* Benson on *Pinus nigra* Aiton (Pinaceae) in Austria. Collected from staminate cones of *P. nigra* with *Xyela* larvae in Greece.



### 11. *Gelanes simillimus* Horstmann, 1981 (Fig. 17)

**Material.** ENGLAND: 1 female (BMNH), "Hants, Rhinefield SU20", 8–21 June 1976, coll. G.E.J. Nixon. SWITZERLAND: 1 female, 2 males (BMNH), Graubünden, Engadine, National Park, 1800–2000 m, 6–23 June 1960, coll. J.E. and R.B. Benson. GERMANY: 1 female (DEI), Bayern, Mittenwald N 3 km, 47°29' N, 11°16' E, 800 m, host?, coll. 25 May 1999, em. 24 March 2000, coll. S. Blank. AUSTRIA: 1 female (DEI), Ottenstein, ex *Xyela julii* on *Pinus sylvestris*, coll. 25 May 1996, em. 25 April 1998, coll. E. Altenhofer. CROATIA: 1 female, 10 males (DEI), SW Vozili'i, 50 m, 45°09' N, 14°09' E, on *Pinus halepensis*, date?, coll. S. Blank and E. Altenhofer. SWEDEN: 1 female (BMNH), Vallentuna, 12 June 1955, coll. K.J. Heqvist. POLAND: 1 female (SAWON), Białystok, 11 May 2003, coll. J. Sawoniewicz. BULGARIA: 1 female (ZSM), "Rhodopi, Jundola", 25 May 1988, coll. J. Kolarov; 1 female (ZSM), "Rodopi h Sdravez", 26 May 1977, coll. A. Germanov.

**Forma "longicauda".** Ovipositor sheath 3.75 times as long as first tergite in specimen from Austria, and 3.2–3.6 times as long as first tergite in other material of "longicauda" from the Russian Far East (Khalaim 2002). Normal females have distinctly shorter ovipositor sheath which is about 2.5 times as long as first tergite.

**Material of forma "longicauda".** AUSTRIA: 1 female (DEI), Ottenstein, ex *Xyela julii* on *Pinus sylvestris*, coll. 25 May 1996, em. 25 April 1998, coll. E. Altenhofer.

**Distribution.** Almost entire Europe, southern Siberia and south of Far East of Russia.

**Biology.** Reared from *Xyela julii* (Brebisson) on *Pinus sylvestris* L. (Pinaceae) in Austria. Collected from *P. halepensis* Mill. in Croatia.

### 12. *Gelanes stigmaticus* Horstmann, 1981 (Fig. 8, 18)

**Material.** POLAND: 1 female – holotype examined (SAWON), "Smolniki bei Ilawa", 24 May–3 June 1972, coll. J. Sawoniewicz; 1 female (SAWON), "S578". UKRAINE: 1 female (ZIN), Kiev Province, 16 May 2003, coll. A.G. Kotenko.

**Remarks.** In the specimens examined pterostigma is about twice as long as wide (Fig. 8), whereas,

according to the original description (Horstmann 1981), pterostigma is 3.0 times as long as wide.

**Distribution.** Poland, Ukraine.

**Biology.** Host unknown.

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