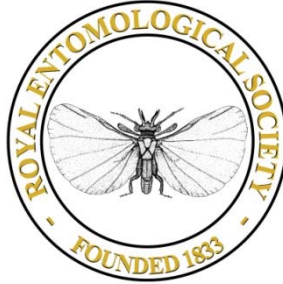


# Royal Entomological Society



## HANDBOOKS FOR THE IDENTIFICATION OF BRITISH INSECTS

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ROYAL ENTOMOLOGICAL  
SOCIETY OF LONDON

Vol. VI. Part 2(c).

# HANDBOOKS FOR THE IDENTIFICATION OF BRITISH INSECTS



## HYMENOPTERA

2. SYMPHYTA. SECTION (c)

By

R. B. BENSON.

LONDON

Published by the Society  
and Sold at its Rooms.

41, Queen's Gate, S.W. 7

3rd October, 1958

Price 26s. 6d.

## HANDBOOKS FOR THE IDENTIFICATION OF BRITISH INSECTS

The aim of this series of publications is to provide illustrated keys to the whole of the British Insects (in so far as this is possible), in ten volumes, as follows :

- |                                    |                        |
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| " 3. Protura.                      | " 11. Thysanoptera.    |
| " 4. Collembola.                   | " 12. Neuroptera.      |
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The Society is indebted to the Royal Society for a grant towards the cost of initiating this series of *Handbooks*.

**A list of parts now available appears on the back cover**



CORRIGENDA TO SECTIONS (a) AND (b).

- Page 14, line 23, for "4, 5 and 6" read "3, 4 and 5".
- Page 21, top line, for "medial cell" read "cell 3R1".
- Page 29, line 10 up and 3 up, for "basal stalk" read "apical stalk".
- Page 40, line 18 up, for "**femorata**" read "**femoratus**".
- „ line 8 up, for "**lutea**" read "**luteus**".
- Page 41, line 5, for "**connata**" read "**connatus**".
- „ line 15, for "**femorata**" read "**femoratus**".
- „ line 14 up, for "**lutea**" read "**luteus**".
- „ line 12 up, for "**connata**" read "**connatus**".
- Page 42, bottom line, for "**sylvaticum**" read "**latreillei**".
- Page 44, line 11 up, add ("†*Morice*, 1913, Ent. mon. Mag. 49: 143)".
- Page 45, top line, add "*and in Ireland*".
- Page 61, line 3 up, for "subfamily" read "tribe".
- Page 83, line 11 up, for "*Prince horpe*" read "*Princethorpe*".
- „ line 10 up, for "*Sawn*" read "*Sawnt*".
- Page 88, line 3 up, for "as broad as long" read "as long as broad".
- Page 95, line 10, delete "(var. *filiformis* Klug)".
- Page 97, line 10, for "*Perilista*" read "*Perichlista*".
- Page 98, lines 25-26, delete "and hind wing with or without an enclosed cell".
- „ lines 29-30, delete "hind wing without an enclosed cell".
- Page 100, line 16 up, add "Hind wing without enclosed cell".
- „ line 10 up, add "Hind wing with an enclosed cell".
- Page 108, line 24, for "*Fenusia*" read "*Profenusia*".
- „ line 33, for "etpraea" read "petraea".
- Page 127, line 10 up, for "231-51" read "231-5".

# HYMENOPTERA (SYMPHYTA)

By ROBERT B. BENSON.

## Subfamily NEMATINAE.

Of the three tribes in this subfamily only the Cladiini and Nematini occur in Britain; the Pristolini are, so far as is known, confined to North America. About 750 species are so far known, in over 30 genera, confined to the northern hemisphere except for a few on the mountains of tropical regions. The treatment in this Handbook is novel, and many of the characters for separating genera are here used for the first time.\*

### KEY TO THE TRIBES OF NEMATINAE.

- A. Veins 1m-cu and 2m-cu in fore wing (fig. 365) received on M in different cells (1RS and 2RS); vein 2r missing; anal cell divided into two by a wide medial constriction; fore wings always reach the apex of abdomen  
3 genera, CLADIINI, p. 139
- Either veins 1m-cu and 2m-cu both received on M in cell 2RS (fig. 368, etc.), or anal cell petiolate (also figs. 375-7), or vein 2r present (fig. 367-9), or fore wings do not reach apex of abdomen and may be abnormal in venation  
13 genera, NEMATINI, p. 143

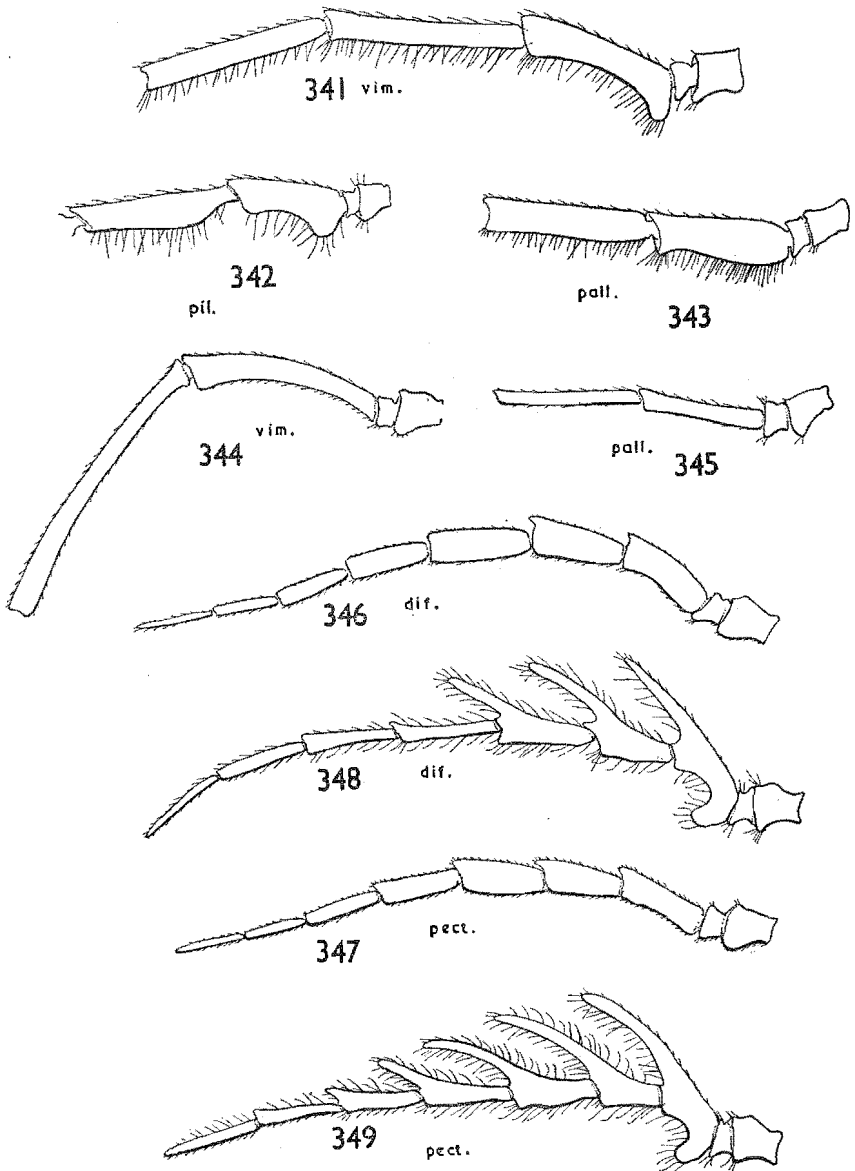
### Tribe Cladiini.

A small tribe of about 40 species (9 British) in 3 genera. The larvae are associated with catkin-bearing trees (Salicaceae, Betulaceae and Ulmaceae) or Rosaceae. Except in *Trichocampus*, the adults are mainly black insects with legs white or yellow.

### KEY TO GENERA OF CLADIINI.

- 1 Antenna of ♂ with flagellar segments beyond the first at most only swollen apically (figs. 341-3), and of ♀ long and slender so that the basal flagellar segments are at least four times longer than broad and are not produced apically above (figs. 344-5); cerci of ♀ often do not reach back as far as the apex of the sawsheath (figs. 351-3); head above either shining or dull with surface sculpture ..... 2
- Antenna of ♂ with long apical projections to some of the flagellar segments (figs. 348-9); antenna of ♀ short and compressed so that the 3 basal flagellar segments are each only about three times longer than broad and at least the 2 basal ones are slightly produced apically above (figs. 346-7). Cerci of ♀ reach back further than the apex of the sawsheath (fig. 350). Head shining above, without surface sculpture or hair-warts. Inner hind tibial spur much longer than the apical breadth of the tibia. Tarsal claws with a large subapical tooth. Saw divided into 8 segments strongly armed with teeth laterally as well as ventrally (fig. 361). 2 spp. . . *Cladius* Rossi, p. 141

\* Species of which no ♂ has been seen are marked in the keys with an asterisk.



FIGS. 341-5.—Basal segments of antenna in Cladiini : 341, *Trichiocampus viminalis* ♂ ; 342, *Priophorus pilicornis* ♂ ; 343, *P. pallipes* ♂ ; 344, *Trichiocampus viminalis* ♀ ; 345, *Priophorus pallipes* ♀.

FIGS. 346-9.—Antenna in *Cladius* spp. : 346, *difformis* ♀ ; 347, *pectinicornis* ♀ ; 348, *difformis* ♂ ; 349, *pectinicornis* ♂.

- 2 (1) Abdomen mainly black. Hind basitarsus about as long as the 3 following tarsal segments. Clypeus broadly emarginate in front and flat. Head above shining or dull. Claws with small or large inner tooth. Saw of *Cladius* or *Trichiocampus* type. 6 spp. . . . *Priophorus* Dahlbom, p. 141
- Abdomen yellow. Hind basitarsus only as long as the 2 following tarsal segments together. Clypeus strongly excised in front and labrum with the front margin reflexed. Head shining above without surface sculpture. Claws with large inner tooth. Saw of ♀ without lateral teeth but with a straight ventral margin bearing 12-14 small simple teeth (cf. fig. 362)
- 1 sp. . . . . *Trichiocampus* Hartig, p. 143

### Genus *Cladius* Rossi.

A genus of about eight or nine known species of which two occur in Britain; they are easily distinguished in the male, but with difficulty in the female (saw, fig. 361; male genitalia, fig. 354).

#### KEY TO SPECIES OF *Cladius*.

- A Antenna of ♂ (fig. 349) with almost equally long apical projections to the 3 basal flagellar segments, a shorter projection on the fourth and a minute one on the fifth; the projection on the first one and a half to twice as long as the main part of the following segment. Antenna of ♀ (fig. 347) with minute apical projections above on segments 1-3 or 4. 5-7 mm.  
*Larva destructive to wild and cultivated Rosa and Fragaria, but will also feed on Sanguisorba officinalis L. One of the commonest of sawflies throughout Britain and Ireland. V-IX (with 2 or more broods). All Europe to Caucasus, Asia Minor and Siberia to Japan. . . . . ♂ and ♀ pectinicornis (L.)*
- B Antenna of ♂ (fig. 348) with long apical projections to the 2 basal flagellar segments, a shorter one on the third and a minute one on the fourth; the projection on the first at most one and a quarter times as long as the main part of the following segment. Antenna of ♀ (fig. 346) with minute apical projections above only on the first and second flagellar segments. 5-7 mm.  
*Larva likewise destructive to wild and cultivated Rosa and Fragaria; also on Comarum palustre L. and Filipendula ulmaria (L. Maxim). Common throughout Britain and Ireland. V-IX (2 or more broods) († Perkins, 1929, Trans. Devon. Ass. Adv. Sci. 61: 299). All Europe to Caucasus, and in North America (? introduced) . . . . . ♂ and ♀ difformis (Panzer)*

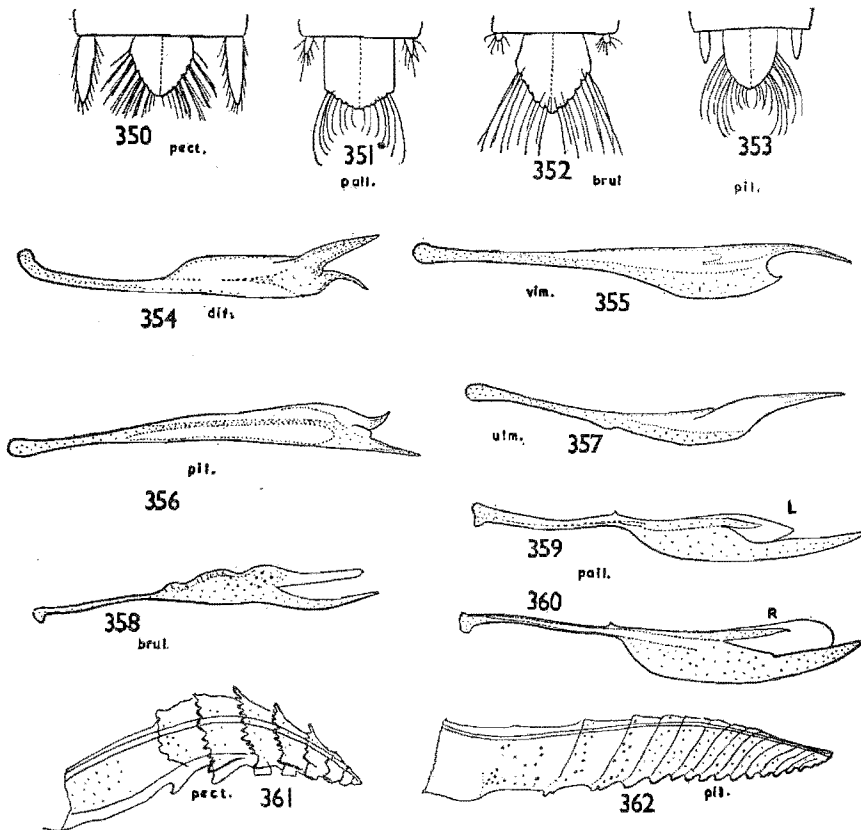
### Genus *Priophorus* Dahlbom.

A genus of about 20 known species. *P. laevifrons* Benson has been wrongly treated by Zhelochovtzev in his recent revision of the Russian Cladiini (1952, *Zool. Zh.* 31: 257-68) as a synonym of *Cladius* (*Trichiocampus*) *eradiatus* (Hartig, 1837), which is here treated for the first time as a synonym of *Cladius pilicornis* Curtis, 1833, from recent type study. *P. pallipes* Lep. is noteworthy in having the left and right halves of its penis valve asymmetrical (figs. 359-60).

#### KEY TO SPECIES OF *Priophorus*.

- 1 Antenna of ♂ with no dentate projection below at the base of the third segment (fig. 343), and in the ♀ this segment almost straight (fig. 345). Head above dull with fine surface sculpture or hair-warts. Claws sub-bifid.  
(Mesopleural hair-patch not broken through by a glabrous patch in sternopleural region (cf. figs. 363 and 364). Saw of *Cladius* type (fig. 361). Attached to Rosaceae or *Betula*) . . . . . 2
- Antenna of ♂ with third segment bearing below a dentate basal projection (fig. 342) and in the ♀ this segment contracted medially and arched (cf. fig. 344). Either the head above is entirely smooth without surface sculpture or hair-warts, or claws have only a small inner tooth (less than half as long as end tooth) . . . . . 3





Figs. 350-3.—Sawsheath from above in Cladiini : 350, *Cladius pectinicornis* ; 351, *Priophorus pallipes* ; 352, *P. brullei* ; 353, *P. pilicornis*.

Figs. 354-60.—Penis valves in Cladiini : 354, *Cladius difformis* ; 355, *Trichiocampus viminalis* ; 356, *Priophorus pilicornis* ; 357, *P. ulmi* ; 358, *P. brullei* ; 359, *P. pallipes* (left) ; 360, *P. pallipes* (right).

Figs. 361-2.—Saw in Cladiini : 361, *Cladius pectinicornis* ; 362, *Priophorus pilicornis*.

- 2 (1) Inner hind tibial spur little longer than apical breadth of tibia. Wings infuscate and abdomen black, though usually with a brown spot in the middle of the first tergite. Median fovea between the antennae separated from the frontal basin above by an unbroken ridge. Sawsheath of ♀ strongly expanding towards the apex in dorsal view and then contracting behind to a blunt point (fig. 352), so that its greatest breadth is more than the apical breadth of the hind tibia ; ♂ genitalia fig. 358. 4.5-7 mm.

*Larva* on *Rubus*, especially *R. idaeus* L., and also on *Sorbus aucuparia* L. Common locally throughout Britain and Ireland ; V-VIII (2 or more broods). ♂ rare. All Europe to Caucasus and East Siberia ; introduced into New Zealand. . . . . ♂ and ♀ (= *tener* Hartig) *brullei* Dahlbom Inner hind tibial spur about one and a half times as long as the apical breadth of the tibia and almost half as long as the basitarsus. Wings subhyaline. Abdomen black or piceous but without brown medial spot on the first

tergite. Ridge on the head between the median fovea and the frontal basin usually notched, or more or less broken through. Sawsheath of ♀ nearly parallel-sided in dorsal view, bluntly rounded behind, with its greatest breadth much less than apex of hind tibia (fig. 351); ♂ genitalia with right and left penis valves asymmetrical (figs. 359 and 360). 5-8 mm.

Larva on Rosaceae such as Crataegus, Fragaria, Laurus, Prunus, Pyrus and Sorbus; also recorded from Betula. Common throughout Britain and Ireland. V-IX (2 or more broods). ♂ normally common. All Europe to Caucasus and Transcaucasia, and to E. Siberia and Japan.

- ♂ and ♀ (= *padi* L. auctt. nec L.) **pallipes** (Lepeletier)
- 3 (1) Head on frons and temples above smooth and shining without surface sculpture or hair-warts. Mesopleural hair-patch broken through by a glabrous band in sterno-pleural region (fig. 363). ♂ genitalia fig. 357. Pale parts of legs yellowish. Attached to *Ulmus*.....4
- Head dull above on frons and temples, and covered with minute hair-warts. Mesopleural hair-patch not broken through by a glabrous band in sterno-pleural region (fig. 364); ♂ genitalia fig. 356. Pale parts of legs almost white.

Larva on Crataegus. Common throughout Britain N. to Perth, also in Ireland. V-VIII (2 or more broods). N. and C. Europe.

♂ and ♀ (*Cladius pilicornis* Curtis, 1833 = *Cladius (Trichiocampus) eradiatus* Hartig, 1857, **syn. nov.** = *drewseni* Thomson). **pilicornis** (Curtis)

- 4 (3) Wings more or less infusate and abdomen with brown spot in middle of first tergite. Claws sub-bifid with inner tooth strong in ♀, and in ♂ more than half as long as end tooth. ♀ saw of *Cladius*-type (cf. fig. 361). 5-7.5 mm.
- Larva on *Ulmus*. Local in England to Dumfries in Scotland; also Dublin and Wicklow in Ireland. V-VIII (2 broods). All Europe to Caucasus and Asia Minor.....♂ and ♀ (= *rufipes* Lepeletier) **ulmi** (L.)
- Wings subhyaline and abdomen not marked with brown on first tergite. Claws with small inner tooth not half as long as end tooth in ♀, and scarcely longer than its basal breadth in ♂. ♀ saw of *Trichiocampus* type (cf. fig. 362) 5-6.5 mm.

Larva on *Ulmus*. England: Isles of Scilly, Devon, Somerset, Glos., Berks., Hants., Herts., Beds., Cambs. and Suffolk; Ireland: Co. Dublin († Benson, 1936, Ent. mon. Mag. 72: 205-6). V-VIII (2 or more broods). Not yet recorded outside British Isles.....♂ and ♀ **laevifrons** Benson

### Genus *Trichiocampus* Hartig.

This genus contains only six known species, of which only one of the two European species is British. The larvae are highly coloured with dark spots on a bright background and feed gregariously, at least in their early stages, on Salicaceae and Fagaceae.

The only British species is 7-9 mm. long; body mainly yellow with only the head-capsule, upperside of antennae, pronotum (in middle), meso- and metanotum and mesosternum black; wings yellowish at their bases and subhyaline to subinfusate at their apices; stigma brown in the middle with darker margins, costa yellow, rest of venation brown to piceous. Saw cf. fig. 362; ♂ genitalia fig. 355.

Larvae gregarious on *Populus* and sometimes *Salix*. Throughout Britain N. to Inverness, locally abundant; also in Ireland. V-VIII (2 or more broods). All Europe to E. Siberia and N. America....♂ and ♀ **vimalis** (L.)

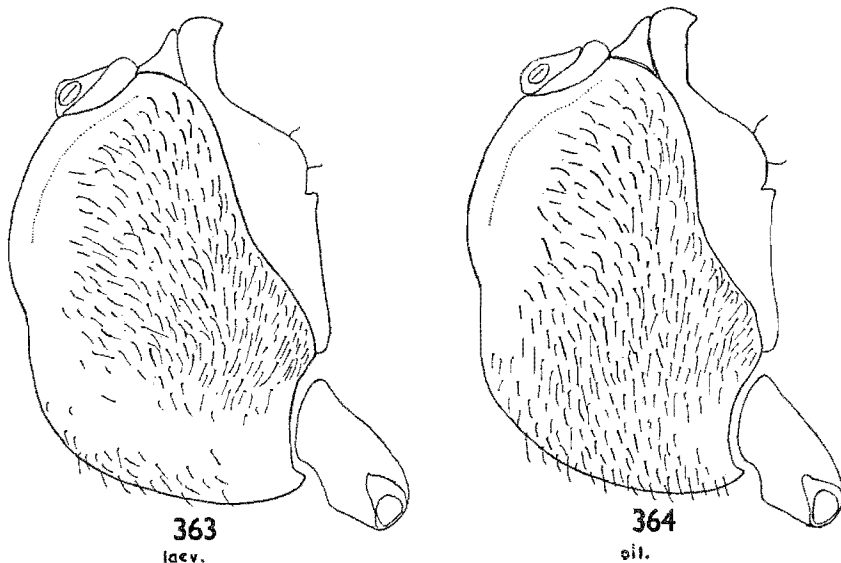
### Tribe Nematini.

The Nematini increase progressively northwards proportionately to all other sawflies, until in arctic regions they represent almost the entire sawfly fauna and are rich in species.

In the higher members of this group the complexes of closely related

forms are still very imperfectly investigated, and one of my worst problems has been the segregating of species-groups into definable genera.

Except for the odd species of *Pristiphora* in the highlands of Borneo and Brazil, the tribe is, so far as is known, confined to the northern hemisphere. The foodplant association is mainly with deciduous catkin-bearing trees, especially Salicaceae, but the total foodplant range is wide and includes Gramineae by one section of *Pachynematus*, and Coniferae by *Anoplonyx* and certain groups of both *Pachynematus* and *Pristiphora*: no other Tenthredinid tribe is known to attack Coniferae.



FIGS. 363-4.—Mesopleura of *Priophorus* to show pilosity of sterno-pleural line in : 363, *laevifrons*; 364, *pilicornis*.

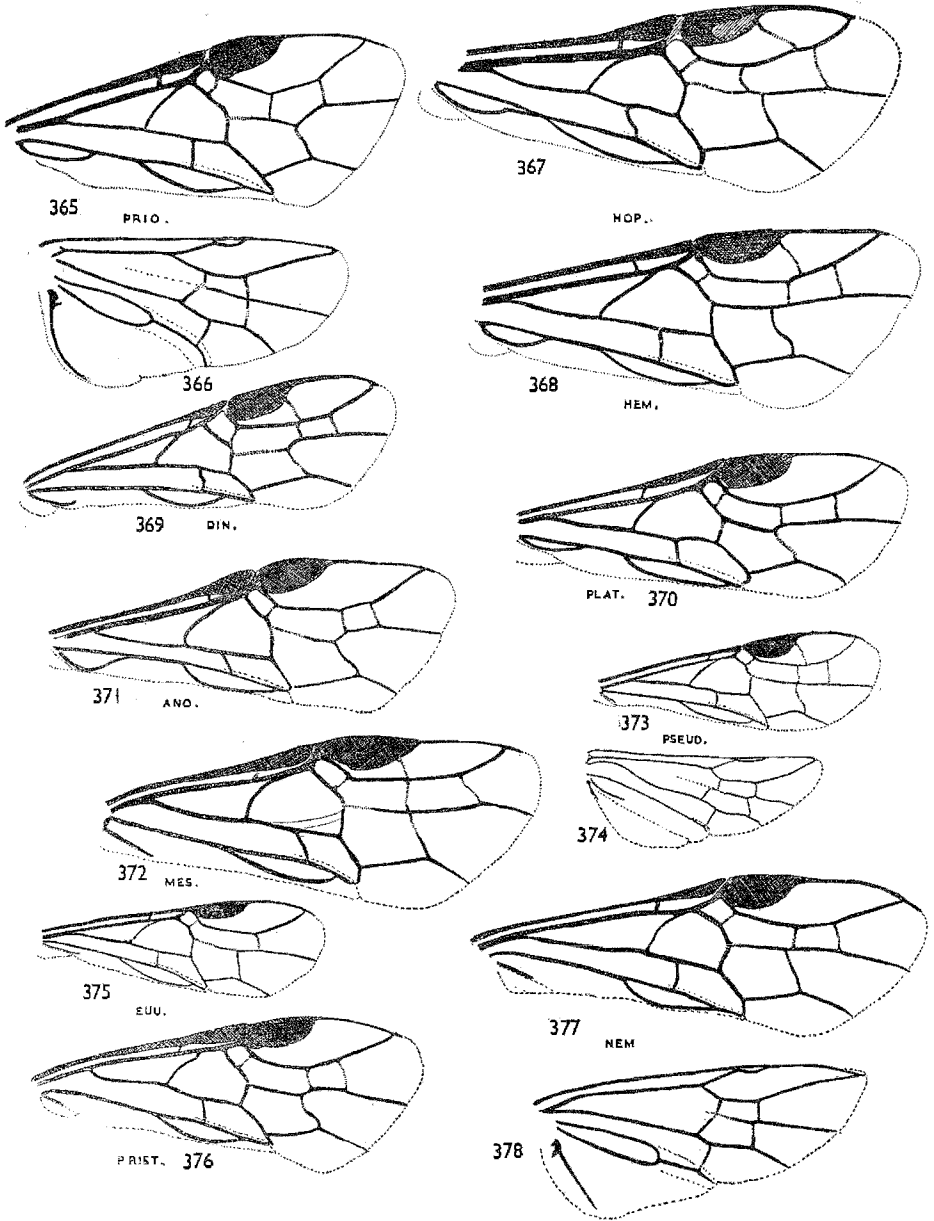
The Nematini contain about 700 valid described species in the world, divided into nearly 30 genera, but it can scarcely be said that more than a beginning has been made to explore the Nematine fauna of the whole of the northern hemisphere. One hundred and eighty British species have so far been recognized, divisible into 16 genera.

In the key that follows the extremely awkward second couplet is due to the tiresome variability of the venation of *Dineura*, which in the last resort has to be distinguished from *Nematus* by the form of its mandibles.

#### KEY TO GENERA OF BRITISH Nematini.

- |       |   |   |
|-------|---|---|
| 1     | Wings normal; fore wings reaching beyond apex of abdomen.....   | 2 |
| -     | Wings reduced so that fore wings do not reach apex of abdomen and have abnormal venation. (High-mountain <i>Amauronematus</i> and <i>Pristiphora</i> spp., ♀ cf. fig. 501).....   | 9 |
| 2 (1) | Cell 2R1 of fore wing without cross-vein 2r; vein Sc before point of origin of vein M from R; anal cell without an enclosed basal loop (figs. 375-8). Left mandible in lateral view with a swollen base to a thin blade-like apex (fig. 380)..... | 9 |

- Either cell 2R1 of fore wing with cross-vein 2r indicated (figs. 367–9, 372–3), or Sc at or beyond point of origin of vein M from R (fig. 369), or anal cell with an enclosed basal loop (figs. 370–1). Left mandible often almost evenly tapering from base to apex (fig. 370).....3
- 3 (2) Anal cell of fore wing with basal loop complete (figs. 367–8, 370–1).....4
- Anal cell of fore wing without a closed basal loop (figs. 369 and 372).....7
- 4 (3) 2R1 of fore wing with cross-vein 2r indicated (figs. 367–8).....5
- 2R1 of fore wing without cross-vein 2r indicated figs. 370–1).....6
- 5 4) Fore wing with cross-vein 1m-cu received in cell 1RS and 2m-cu in RDS fig. 367); constricted portion of anal cell much shorter than basal loop; C strongly dilated apically so that the intercostal cell at the point of origin of Rs + M is no wider than the width of the middle of cell c. Antenna short, less than twice as long as breadth of head; second segment much longer than broad. Malar space longer than apical breadth of second antennal segment. Larvae in fruit of Rosaceae. 9 spp.
- **Hoplocampa** Hartig, p. 149
- Fore wing with cross-vein 1m-cu and 2m-cu received in cell 1RS (fig. 368); constricted portion of anal cell much longer than basal loop; C not strongly dilated apically so that at the point of origin of vein RS + M from R, C is scarcely wider than cell c at that point. Antenna long, more than twice as long as breadth of head; second segment not longer than broad. Malar space shorter than apical breadth of second antennal segment. Larvae on Betulaceae and Corylaceae. 2 spp.....
- 6 (4) Tarsal claws simple. C so dilated at apex that at the point of origin of vein RS + M from R cell c is no wider than the width of vein C in the middle (fig. 371). Sawsheath in dorsal view broadening towards apex, where it is emarginate. Attached to *Larix*. 1 sp.....
- **Anoplonyx** Marlatt, p. 153
- Tarsal claws with large inner tooth. C not strongly dilated at apex so that at the point of origin of vein RS + M from R the intercostal cell c is about as wide as vein C at the same point (fig. 370). Sawsheath in dorsal view tapering to a point at apex. Attached to *Alnus*. 1 sp.
- 7 (3) Antenna less than twice as long as breadth of head; eyes converge in front so that distance between them is less than one and a half times height of an eye. Malar space less than apical breadth of second antennal segment. Fore wing with vein M joining R beyond intercostal vein SC (figs. 372–3); anal vein straight, not leaving jugal fold at its apex to approach M + Cu1; vein 2r present.....8
- Antenna more than twice as long as breadth of head; eyes further apart in front than one and a half times height of an eye. Malar space greater than apical breadth of second antennal segment. Intercostal vein Sc usually beyond junction with M and R (fig. 369); anal vein apically leaves jugal fold and converges slightly towards M + Cu1; vein 2r present or absent.
- C so strongly dilated that cell c at point of origin of vein RS + M with R is no wider than width of C in the middle. Attached to Rosaceae and Betulaceae. 3 spp.....
- 8 (7) Large species, 6–7 mm. Fore wing with apex of C so strongly dilated that at the point of origin of vein RS + M from R cell, c is no wider than the width of vein C in the middle (fig. 372); anal cell in hind wing closed. Black species marked with yellow and orange on head and thorax. Claws with large inner tooth. Attached to *Quercus*. 1 sp....
- **Mesoneura** Hartig, p. 154
- Small species, 3–4 mm. Fore wing with cell c about as wide as vein C at the point of origin of vein RS + M from R (fig. 373); anal cell absent from hind wing (fig. 374). Black species with only labrum and tegulae on head and thorax. Claws without inner tooth. Larvae leaf-mining in Ranunculaceae. 2 spp..... (= *Pelmatopus* Hartig) **Pseudodineura** Konow, p. 155
- 9 (1&2) Apex of vein C of fore wing so strongly swollen that at the point of origin of vein RS + M from R cell c is only about as wide as the medial width of vein C (fig. 376). Clypeus subtruncate in front with, at the most, a slight emargination in front to a depth of less than one-third total length of clypeus. Tarsal claws various, but usually with inner tooth small and widely separated from end tooth (fig. 381), though *Stauronematus* has a strong inner tooth and also a basal lobe (fig. 383).....10



FIGS. 365, 367-73, 375-7.—Right fore wing in Nematinae: 365, *Priophorus*; 367, *Hoplocampa*; 368, *Hemichroa*; 369, *Dineura*; 370, *Platycampus*; 371, *Anoplonyx*; 372, *Mesoneura*; 373, *Pseudodineura*; 375, *Euura*; 376, *Pristiphora*; 377, *Nematus*.

FIGS. 366, 374, 378.—Right hind wing in Nematinae: 366, *Priophorus*; 374, *Pseudodineura*; 378, *Nematus*.

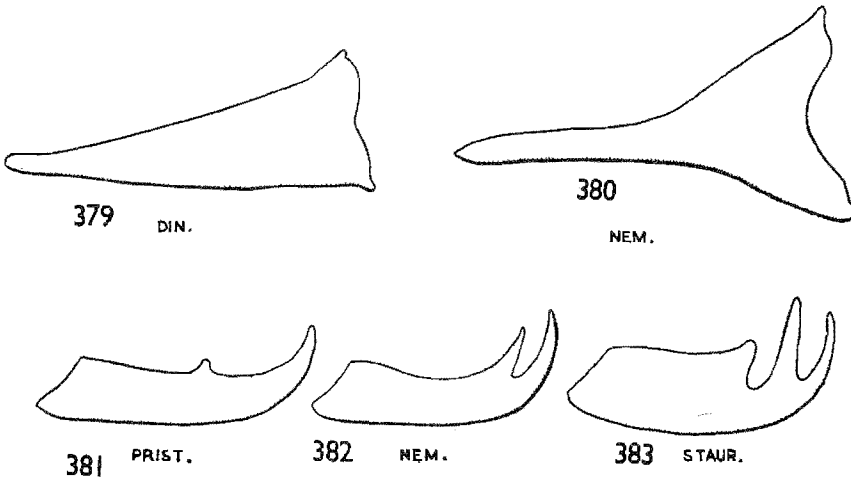
Apex of vein C less strongly swollen so that at the point of origin of RS + M from R cell c is at least one-half the width of vein C at that point (figs. 375 and 377). Clypeus usually deeply excised in front to a depth of at least one-third total length of clypeus. Tarsal claws various, but usually with at least a strong inner tooth in addition to end tooth. . . . . 11

- 10 (9) Claws with a swollen basal lobe in addition to an inner tooth, which is erect and well separated from end tooth and longer than it (fig. 383). Clypeus subtruncate. ♂ with antenna laterally compressed (third segment scarcely four times longer than broad) with each segment produced slightly at apex beneath.

(Larva free living but builds palisade of dried saliva round portion of leaf of *Populus* or *Salix* on which it is feeding)

(= *Stauronema* Bens. nec Solla) **Stauronematus** Benson, p. 155

- Claws usually with small inner tooth but may be sub-bifid or simple but without an enlarged basal lobe (figs. 381-2). Clypeus subtruncate or medially emarginate in front. Antenna usually setiform with simple segments. 3 spp. (+ *Lygaeonematus* and *Micronematus*) **Pristiphora** Latreille, p. 156



FIGS. 379-80.—Left mandible in : 379, *Dineura* ; 380, *Nematus*.  
 FIGS. 381-3.—Tarsal claw in : 381, *Pristiphora* ; 382, *Nematus* ; 383, *Stauronematus*.

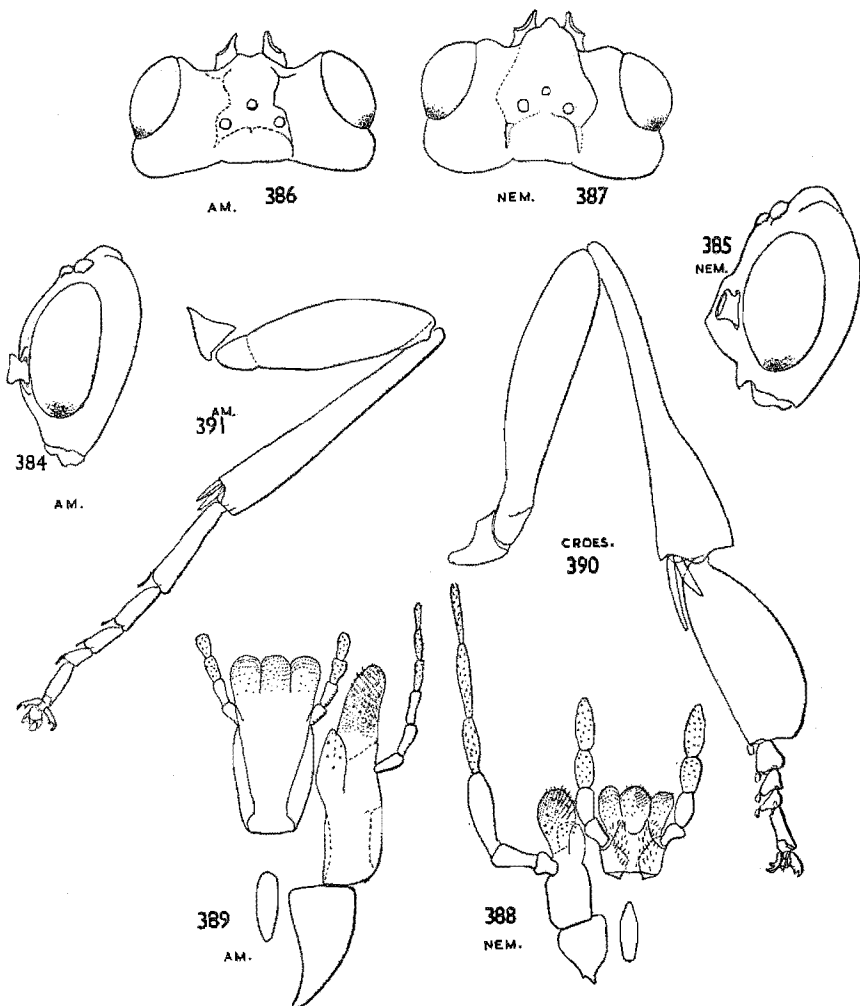
- 11 (9) Frontal crest in lateral view appears angularly produced between the antenna (fig. 385) ; inner orbits between the eyes and the antennae, in dorsal aspect, often convex (fig. 387). Mouthparts with elongate maxillary palps (as long as cardo + stipes of maxilla) with unequal segments, the third of which is the longest (fig. 388).

(In some very small mountain (arctic) species, under 6 mm. long, crest between antennae only slightly developed (fig. 660), scarcely more proportionately than in some large *Amauronematus* (fig. 384) but yet strikingly more so than in small *Amauronematus* of the same size). . . . . 12

- Frontal crest between the antennae very little developed in large species (fig. 384) and scarcely at all in small species (under 6 mm.), so that the head appears evenly convex between the antennae in lateral view and the whole face is very long and flat : inner orbits scarcely convex and very deeply depressed outside the antennal sockets (fig. 386). Mouthparts often elongated, with maxillary palp short (shorter than cardo + stipes of maxilla) and its segments almost of equal length (fig. 389).

(Antenna often black and shorter than C + stigma of fore wing. Whole mesonotum with scutellum and mesopleura often dull with coriaceous

- sculpture. Hind tibial spurs of almost equal length and scarcely longer than apical width of hind tibia. Larva, free-living or inhabiting catkins, on *Salix*, *Betula* or *Populus*). 21 spp. . . . . **Amauronematus** Konow. p. 176
- 12 (11) Apex of hind tibia and hind basitarsus greatly expanded, like leaves (figs. 390, 652); breadth of basitarsus greater than half the length of the rest of the tarsal segments together. Large species (7.5–10 mm.) with a red-banded, or occasionally an entirely black, abdomen. 4 spp. . . . . **Croesus** Leach p. 209
- Apex of hind tibia and hind basitarsus normal (fig. 391); breadth of basitarsus much less than the length of the rest of the tarsal segments together. . . . 13



FIGS. 384–5.—Lateral view of head in : 384, *Amauronematus* ; 385, *Nematus*.

FIGS. 386–7.—Dorsal view of head in : 386, *Amauronematus* ; 387, *Nematus*.

FIGS. 388–9.—Mouthparts in : 388, *Nematus* ; 389, *Amauronematus*.

FIGS. 390–1.—Hind leg in : 390, *Croesus* ; 391, *Amauronematus*.

- 13 (12) Species, if brown, then of slender build and the stigma not yellow with a dark basal smudge. Sawsheath never twice as broad at base as the apical width of the hind tibia; eighth ♂ tergite with a well marked apical projection, the proclentia (figs. 745-6, 782 etc.). Fore wing with cell 2RS often not longer than its apical breadth. . . . . 14
- Broad brown species marked with black; stigma yellow with a piceous basal smudge. Sawsheath (figs. 589-91) in dorsal view very broad at the base, where it is almost twice as wide as the width of the apex of the hind tibia, not reaching so far back as the very long cerci and subtruncate or tapering at the apex, with a very stout segmented and ornamented saw (figs. 582-3); eighth ♂ tergite (fig. 588) produced apically in the middle, but without a clearly defined proclentia. Fore wing with cell 2RS, if separated from 1RS, at least one and a half times as long as its apical breadth. 5 spp.  
**Nematinus** Rohwer, p. 192
- 14 (13) Not more than 5 mm. long and either antennal grooves (round outer edge of antennal sockets) deeper than front edge of eyes (fig. 386) or (in certain species where this is less obvious) hind tibial spurs subequal and shorter than apical width of tibia. Malar space shorter than distance between antennal sockets (cf. fig. 556). Body often mainly black and stigma often darker at apex than base (fig. 375). . . . . 15
- Over 5 mm. long, or antennal grooves shallow (not as deep as front edge of eyes); hind tibial spurs unequal in length or longer than apical width of tibia. Malar space often longer than distance between antennal sockets (cf. fig. 555). Stigma never darker at apex than base . . . . . 16
- 15 (14) Cells 1RS and 2RS in fore wing fused together by the absence of cross-vein 2rm (fig. 375).  
(Black bodied species with at most face, temples, pronotum and more or less apex of abdomen pale; stigma usually piceous except only for extreme base. Antenna very short (in ♀ shorter than C of fore wing; in ♂ not longer than C). Sawsheath much shorter than basal plate (cf. fig. 613); cerci very long, usually reaching back much further than apex of sawsheath (figs. 596-600). Claws bifid or with small inner tooth. Larva inhabits gall in stem, petiole, leaf-vein or bud of *Salix* and *Populus*)  
**Euura** E. Newman, p. 194
- Cells 1RS and 2RS in fore wing separated normally by a cross-vein 2rm (cf. fig. 377).  
(Occasionally small individuals occur in which all sign of this cross-vein is missing in both wings. These can then only be recognized by their having one or other of the following characters different: body more extensively yellow, stigma entirely pale, antenna longer, sawsheath not shorter than basal plate (figs. 617-21) or different in form (figs. 626-34), or cerci shorter (fig. 622). Claws bifid or sub-bifid. Larva in leaf-edge rolls or leaf-galls on *Salix*). . . . . **Pontania** O. Costa, p. 197
- 16 (14) Hind claws with long inner tooth subparallel with end tooth and close to it (fig. 382): in the ♀ the distance between the tips of the two teeth less than length of inner tooth; in the ♂ the inner tooth at least longer than its basal breadth. . . . . **Nematus** Panzer, p. 211
- Hind claws with a small erect inner tooth distant from end tooth (cf. fig. 381): in the ♀ the distance between the tips of the two teeth much more than length of inner tooth; in the ♂ the inner tooth not longer than its basal breadth. . . . . **Pachynematus** Konow, p. 231

### Genus *Hoplocampa* Hartig.

A small genus with 34 described species in the world, and of these 11 occur in Europe and 9 in Britain. The adults are to be found mostly at the blossoms of their host-plants (Rosaceae of the subfamilies Pomoidea (*Crataegus*, *Malus*, *Pyrus* and *Sorbus*) and Prunoidea (*Prunus*)) in the ovaries of which they oviposit. The larvae feed in the developing fruit, which generally fall off when the larva is mature, and they are often common enough in our



orchards to do serious damage to apples and plums. They are thus all single brooded. In the keys below the species are arranged in such a way that those most closely related come next to each other, but in the opening couplet gross colour characters have been resorted to as being the quickest way to arrive at the species-groups.

The British species on Pomoidea could be segregated together by the combination of two characters—the clypeus being excised up to at least one-third of its greatest length and the mesopleura being glabrous below. In the group on Prunoidea *H. flava* is exceptional in having a deeply excised clypeus, but all the species have densely pubescent mesopleura.

KEY TO SPECIES OF *Hoplocampa*.

- 1 Abdomen black above except for apical segment..... 2  
 - Abdomen mainly yellow above, though sometimes more or less black-marked at base..... 4
- 2 (1) Stigma of fore wing darker at base than apex, often over 5 mm. long. Eyes subparallel in front. Ovipositor of ♀ as long as hind tibia; penis valve without a curved apical process; on *Pyrus* and *Malus*..... 3  
 - Stigma unicolorous pale brown. Under 5 mm. Eyes slightly converging in front below. Ovipositor clearly shorter than hind tibia; penis valve with a curved apical dorsal process like a tusk; on *Prunus*..... 8
- 3 (2) Head with a large black patch covering vertex, ocelli and frontal area; mesonotum almost entirely piceous or black. Wings slightly infusate with venation black to piceous. Penis valve fig. 392. 6-7 mm.  
*This species is the notorious pest of apple (Malus pumila Mill.). Locally abundant in England and S. Scotland. IV-V. C. Europe to the Caucasus. Introduced into W. Canada..... ♂ and ♀ testudinea (Klug.)*  
 - Head almost entirely light brown above; mesonotum with conspicuous light brown areas on medial and lateral lobes and on scutellum. Wings subhyaline with yellow venation. 5-5.5 mm.  
*This species attacks pear (Pyrus communis L.) and is a serious pest locally in C. Europe. In Britain it was first found in a garden in Cambridge in 1935 by Dr. I. Thomas († Miles, 1936, Ent. mon. Mag. 72: 58) and in 1949 began to appear as a serious pest in the orchards in N. Kent. IV-V. C. Europe. ♂ not seen..... ♂ and ♀ brevis (Klug)*
- 4 (1) Stigma of fore wing darker at base than apex. Fore wings either under stigma with fuscous, or else mesonotum, including scutellum, black. Abdomen orange-yellow. Mesopleura densely pubescent all over. Penis valve of ♂ without any setae at apex but in one species bears a long twisted process (figs. 393, 399 and 400)..... 7  
 - Stigma of fore wing not darker at base than apex. Wings unicolorous without fuscous band and body mainly pale yellow with at least scutellum of mesonotum not entirely black. Mesopleura glabrous below. Penis valve of ♂ with an apical tuft of fine hooked setae (figs. 394-6)..... 5
- 5 (4) Sunken parts of metanotum mainly pale in ♀ and in ♂; if black, then lateral mesonotal lobes immaculate, and if basal tergites marked with black medially then a lateral row of black spots also present on each side of third to sixth basal tergites. Abdomen yellowish-white. Hind tarsus equal in length to hind tibia. Ovipositor of ♀ shorter than hind tibia. Attached to *Sorbus*.. 6  
 - Sunken parts of ♂ and ♀ metanotum black and usually with at least middle of two basal tergites black-marked; ♂ with mesonotal lobes and basal abdominal tergites more or less marked with black medially, but tergites without a lateral row of black spots on each side. Abdomen yellow. Hind tarsus longer than tibia. Ovipositor of ♀ about as long as hind tibia. 3.5-5.5 mm. Very variable in colour; in ♀ mesonotal lobes may be mainly black or entirely pale. Penis valve fig. 394.  
*Larva feeds in developing fruits of Crataegus. Locally abundant throughout Britain and Ireland. V-VI. All Europe*  
 ♂ and ♀ (= *plagiata* Klug. Cameron nec. Klug) **crataegi** (Klug)

6 (5) Wings creamy-white. Sunken parts of metanotum mainly pale in ♂ and ♀; abdomen blackened at most in basal sutures. Penis valve, fig. 395. 3.5-5.5 mm.

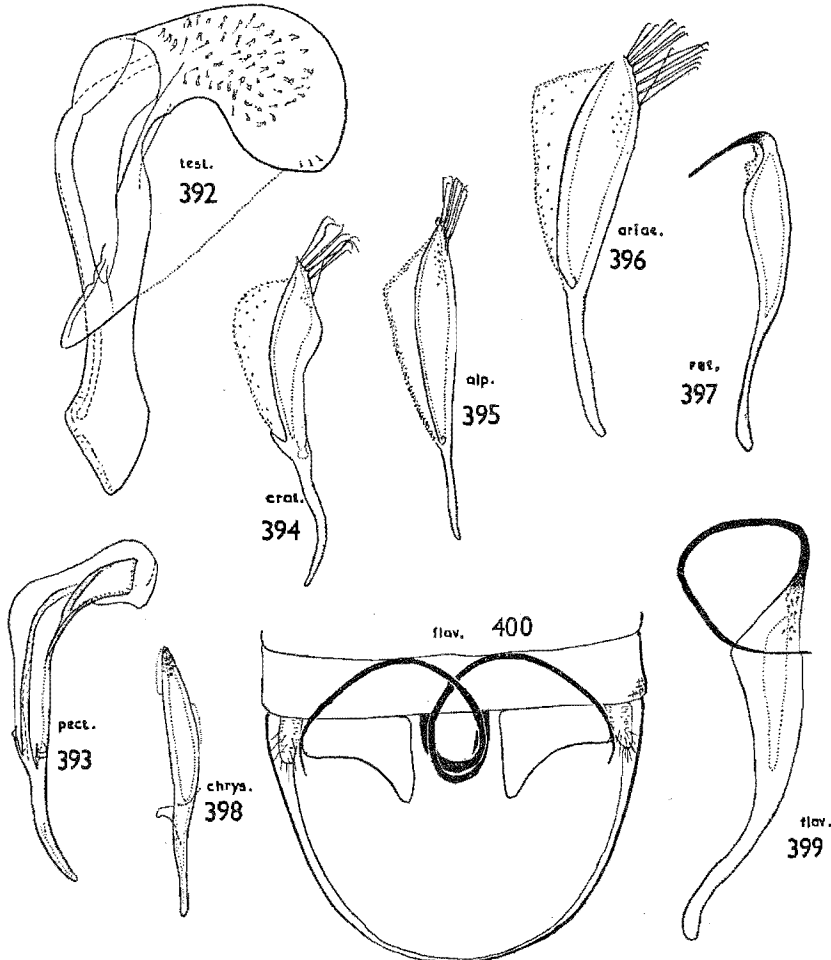
*Larva in developing fruits of Sorbus aucuparia L. Local throughout Britain and Ireland. V-VI. C. and N. Europe, Siberia to Japan*

♂ and ♀ *alpina* (Zetterstedt)

Wings yellowish. Sunken parts of metanotum mainly pale in ♀ but more or less black in ♂, which also has basal abdominal tergites marked with black, often extensively, in the middle, and laterally a row of black spots on third to sixth basal tergites. Penis valve fig. 396. 4.5-6.5 mm.

*Larva in developing fruits of Sorbus aria L. ? etc. Known from Gloucester, Berks., Oxford, Bucks., Herts., and Surrey, and also from Yorks and Cheshire († Benson, 1933, Stylops 2 : 255-6). V-VI. C. Europe*

♂ and ♀ *ariae* Benson



FIGS. 392-9.—Penis valve in *Hoplocampa* spp.: 392, *testudinea*; 393, *pectoralis*; 394, *crataegi*; 395, *alpina*; 396, *ariae*; 397, *rutilicornis*; 398, *chrysorrhoea*; 399, *flava*.

FIG. 400.—Apex of abdomen of *Hoplocampa flava* ♂ from above.

- 7 (4) Wings uniformly subhyaline, costa, subcosta and base of stigma greyish-brown; apex of stigma and rest of venation yellow. Mesonotum mainly black in ♀ and in ♂ with at least postoccipital area black. Antenna mainly black in ♀ and at least above on basal segments of ♂. Hind tarsus as long as hind tibia, as also is ♀ ovipositor. Penis valve of ♂ without apical seta (fig. 393). 3-5 mm.

*Larva in developing fruits of Crataegus. Throughout Britain and Ireland. V-VI. C. and S. Europe.* . . . . . ♂ and ♀ **pectoralis** C. G. Thomson

- Wings with fuscous band under stigma of fore wing; apical to this band wings are clear, basal to it yellow; costa, subcosta and base of stigma yellow. Mesonotum, head and antenna brown in ♀; in ♂ mainly so but some piceous markings on vertex and mesonotum may occur. Hind tarsus shorter than tibia, as also is ♀ ovipositor. Penis valve of ♂ with a long twisted apical process (figs. 399 and 400). 3.5-5.5 mm.

*Larvae in developing fruit of wild and cultivated plums and damsons (Prunus spinosa L. etc.). Common locally in England, where it is often a serious pest causing over 50 per cent. loss of fruit, and sometimes as much as 90 per cent. Has also occurred sparingly in S. Scotland and in Ireland. IV-V. All Europe and Asia Minor to Caucasus*

♂ and ♀ (= *ferruginea* F. and *minuta* auctt, angl, nec. Christ.) **flava** (L.)

- 8 (2) Abdomen with entire underside yellow. Antenna mainly infusate above. Legs yellow with apices of tibiae and tarsal segments infusate; tarsus of hind legs about as long as tibia. Penis valve without apical process (fig. 398). 4-4.5 mm.

*Attached to wild sloe (Prunus spinosa L. etc.) rather than cultivated plums. Local throughout England to Dumfries; also from Ireland: Kerry and Cavan IV-V. Throughout Europe.* . . . . . ♂ and ♀ **chrysoorrhoea** (Klug)

- Abdomen entirely black, except for apex beneath. Antenna and legs entirely yellow. Tarsus of hind leg clearly shorter than tibia. Penis valve with an apical process (fig. 397). 3.5-4 mm.

*Attached also to wild sloe (Prunus spinosa L. etc.) rather than cultivated plums. Much rarer than the preceding species though it has much the same distribution and occurs as far north as Kirkcudbrightshire and in the same counties in Ireland. IV-V. Throughout Europe*

♂ and ♀ **rutilicornis** (Klug)

### Genus **Hemichroa** Stephens.

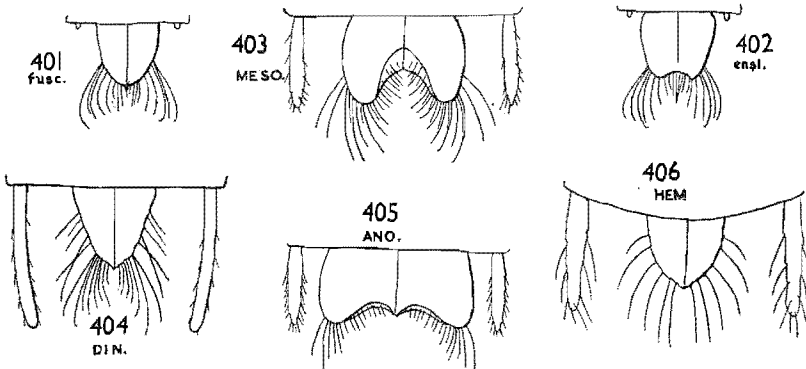
A small genus of about six known species, of which three are recorded from Europe and two from Britain. Superficially very like *Nematinus* (p. 192) and, as in the latter genus, the species use their strong saws to oviposit in leaf petioles. Attached to Betulaceae and Corylaceae. Mainly parthenogenetic species with rare males.

- A ♀. Whole body mainly reddish-yellow with entirely black antenna (entirely reddish-yellow except for the following, which are black: antenna, mouth-parts, sternal region of thorax and whole metathorax, basal tergite and sawsheath of abdomen, coxae, base of femora, apex of tibiae and tarsal segments). Wings subinfusate; C, stigma and apical venation brown; basal venation and Sc + R piceous. 5-8 mm.

- ♂. Antenna, head and thorax entirely black or piceous except for partially yellow tegula, and more or less reddish-brown legs. Abdomen mainly piceous, though some of the tergites and sternites are more or less yellow. Wings infusate at base, subhyaline beyond stigma; stigma brown in the middle; C and apical venation yellow; basal venation piceous. 5-6 mm.

*Larva feeds gregariously on Alnus and Betula, and in Ireland has also been found on Corylus avellana L. Probably throughout Britain and Ireland, and in some seasons exceptionally abundant locally. In the summer of 1932 a grove of alders near Berkhamsted, Herts., was completely defoliated by this species, which that year produced three broods. V-IX. Europe including Spain, Siberia to Kamtchatka and N. America.* . . . . . ♂ and ♀ **crocea** (Geoffroy)

- B ♀. Antenna at least beneath, whole head and mesonotum reddish-yellow, but underthorax, legs and abdomen entirely black. Wings subhyaline; C yellow; stigma, Sc + R and rest of venation piceous. 5-8 mm.
- ♂. Differs from *crocea* ♂ in that the antenna is at least red below and the stigma of the wing is piceous. 5-6 mm.
- Larva on *Alnus* and *Betula* and usually solitary. Throughout Britain but not recorded from Ireland. V-VI, and VII-VIII. N. and C. Europe. Siberia to Japan. ♂ and ♀ (= *alni* L. 1767 nec 1758) **australis** (Lepelletier)



FIGS. 401-6.—Sawsheath of Nematinae from above in: 401, *Pseudodineura fuscula*; 402, *P. ensleni*; 403, *Mesoneura opaca*; 404, *Dineura viridiorata*; 405, *Anoplonyx destructor*; 406, *Hemichroa crocea*.

### Genus *Anoplonyx* Marlatt.

(= *Platycampus* Schiödt. in part, *Camponiscus* Newman in part and *Leptocercus* Konow in part.)

A small genus of eight known species, all attached to *Larix*. Four of these occur in Europe but only one has so far been introduced into Britain. Superficially very similar to *Pristiphora* (cf. *P. laricis* Hartig) with its expanded apex to vein C of the fore wing, but it is at once separated by the presence of the basal loop of the anal cell (cf. figs. 371 and 376).

The only British species is 5-6.5 mm. and black, except for the more or less brown mouthparts and labrum, and the white hind margin of the pronotum, tegula, trochanters, apices of femora, tibiae and tarsi. Wings clear hyaline with almost white C, Sc + R and stigma, and with other venation pale brown. Sawsheath from above about as broad as apex of hind tibia and slightly trifid at apex (fig. 405). ♂ so far unknown.

Larva on *Larix decidua* Mill and *leptolepis* (Sieb. and Zucc.) Gord. and locally abundant throughout Britain, sometimes causing serious damage in plantations. The British species is so far known elsewhere only in Finland. (Benson, 1952, Bull. ent. Res. 43: 543-7)

\*♀ (= *duplex* Lepelletier auctt. angl. nec Lep.) **destructor** Benson

### Genus *Platycampus* Schiödt.

(= *Camponiscus* Newman in part, *Leptocercus* Konow in part).

A small genus with six or seven described species, of which two or three are known in Europe and one in Britain. The flattened and extremely modified larvae feed on the underside of leaves of *Betulaceae* (*Alnus* and *Betula*).

The only British species is black with reddish-yellow legs sometimes infuscate on the apices of the tibiae and tarsi; the following are also brown: in the ♂ the tegula, the underside of the antenna and hypopygium; in the ♀ the edge of the pronotum, more or less the underside of the abdomen and sometimes a fleck on the mesopleura. Wings subhyaline with stigma and venation piceous. Sawsheath rounded behind and not projecting as far back as the long cerci (much as in *Hemichroa*, fig. 406). Inner hind tibial spur more than half the length of the basitarsus. 5-6 mm.

*Larva on Alnus. Locally common throughout Britain and Ireland. V-VI. N. and C. Europe. . . . .* ♂ and ♀ *luridiventris* (Fallén)

### Genus *Dineura* Dahlbom.

A small genus with only two or three known species, all of which occur in Britain. The larvae are flattened against the leaves of their foodplant and, when feeding, leave intact the lower cuticle of the leaves. The adults are remarkable for the great variation of their wing venation, which is sometimes scarcely distinguishable from that of *Nematus*; when this is so the genera must be separated by the form of the mandibles (cf. figs. 379 and 380).

#### KEY TO SPECIES OF *Dineura*.

- 1 Head all black except, at most, for the mouthparts. Eyes larger so that the malar space is about equal to the distance between the antennal sockets. Antenna often dark, at least above. Thorax black except, at most, for the pronotum (more or less), margins of mesonotal lobes, tegula and mesepisternum. Abdomen black, or yellow with black spreading more or less from the basic tergite each side of the abdomen above towards the apex, leaving till last a pale medial line. Wings slightly brownish; stigma about twice as long as broad and slightly infuscate round the margin; C and rest of venation pale brown. 4.5-6 mm. . . . . 2
- Head with at least the inner orbits pale. Eyes smaller so that the malar space is longer than the distance between the antennal sockets. Antenna pale above, even in the darkest forms. Thorax of ♀ mainly orange, though black spots may develop on the mesonotal lobes and in extreme forms fuse with the black sunken parts of the mesonotum to form an almost entirely black upper surface to the thorax as in the ♂. Abdomen yellow, or may be more or less black, spreading from the basal tergite towards the apex, medially at first, leaving the sides pale. Wings yellowish hyaline; stigma about two and a half times longer than broad and pale yellow, as is the rest of the venation. 5-8 mm.  
*Larva on Betula. Common throughout Britain and Ireland, though the Irish and Scottish forms are often darker than the English and may be almost entirely black above. V-VI. C. and N. Europe, and Siberia to Kamtchatka*  
♂ and ♀ *virididorsata* (Retzius)
- 2 (1) Abdomen with more or less of the apical segments pale above, at least medially.  
*Larva on Crataegus. Throughout Britain and Ireland but commonest in the South. V-VI. C. and N. Europe and Italy. . . . .* ♂ and ♀ *stolata* (Klug)
- Abdomen entirely black above except at most for the apical segment.  
*Larva on Sorbus aucuparia L. Ireland and throughout Britain but commoner in the north and west. V-VI. N. and C. Europe, Siberia to Kamtchatka. . . . .* ♂ and ♀ *testaceipes* (Klug)

### Genus *Mesoneura* Hartig.

A small genus of three or four species, only one of which occurs in West Europe and Britain. This species is apparently entirely parthenogenetic and the male is unknown.

♀ Head black except for the yellow labrum, mandibles, and (more or less) clypeus. Thorax very variable in colour: in the darkest forms entirely black except for yellow

tegula and pronotum; in the commonest form middle lobe of the mesonotum, scutellum and most of mesopleura orange; in the palest form side lobes of mesonotum also orange. Legs dark yellow with at least apex of hind tibia and tarsi infusate, but coxae and bases of femora may be more or less infusate. Wings hyaline; C and stigma yellow, though stigma may be more or less brown, as is the rest of the venation. Abdomen mainly black, but may be more or less yellow beneath. Sawsheath broad and apically emarginate in dorsal view (fig. 403). 6-7 mm.

*The great range of colour pattern, even among ♀♀ collected from the same tree on the same day, is interesting in a parthenogenetic species. Larva on Quercus. Common throughout Britain and Ireland. IV-VI. N. and C. Europe*

\*♀ (= *verna*, *biloba* Stephens and *selandriiformis* Cameron) *opaca* (Klug)

### Genus *Pseudodineura* Konow.

(= *Pelmatopus* Hartig nec Fischer de Waldheim).

A small genus of nine known species, of which eight are European and two British. The larvae all live in blister mines in the leaves of Ranunculaceae. They have a single annual brood and fly in early spring. The adults are much more difficult to find than the mines.

- A Antennal segments 7, 8 and 9 equal to segments 3 and 4; segment 8 less than than three times longer than broad. Malar space very short (only about as long as one and a half facets of compound eye). Sawsheath of ♀ with an apical and ventral keel so that in dorsal view it is apically produced (fig. 401). 3-4 mm.

*Larva lives V-IX singly in a blister mine in the leaves of various terrestrial species of Ranunculus with divided leaves, such as R. repens L. R. acer L., and even R. auricomus L. Probably widespread in Britain. Has been found in England: Devon, Dorset, Herts., Cambs., N. Lincs. and Warwicks.; and in Scotland: Lanark, Dumfries, Moray, and Caithness. IV-VI. C. and N. Europe, and Siberia. . . ♂ and ♀ (= *despectus* Hartig) *fuscula* (Klug)*

- B Antennal segments 7, 8 and 9 greater than segments 3 and 4; segment 8 more than three times longer than broad. Malar space about as long as two compound eye facets. Sawsheath of ♀ with an apical and ventral groove so that, from above, it appears apically emarginate (fig. 402). 3-4 mm.

*Larva mines the leaves and petioles of Trollius europaeus L. So far only found in Scotland: near Grantown-on-Spey in Moray, and near Bettyhill in Sutherland (Benson, 1934, Ent. mon. Mag. 70: 202). V-VI. C. and N. Europe. . . . . ♂ and ♀ *enslini* (Hering)*

### Genus *Stauronematus* Benson.

(= *Stauronema* Benson nec Solas).

A monotypic genus closely related to *Pristiphora*, with which it was formerly included.

Black, with edge of pronotum, tegula and legs yellow (except for black apices of hind tibia and tarsus). Wings hyaline with piceous stigma and pale brown venation including C and Sc + R. Ovipositor as long as two basal tarsal segments; sawsheath reaches back about as far as tips of cerci, about as broad as apex of basitarsus, rounded in form but drawn into an acute apex and bearing long curved setae on its sides. Saw fig. 407; penis valve fig. 408. 5-6.5 mm.

*Larva usually on Populus but sometimes on Salix; surrounds itself with a palisade of dried salivae. England, mainly S. of Bristol-Humber line, but also Wales, Glamorgan. V-VI and VII-IX. Holarctic*

♂ and ♀ *compressicornis* (Fabricius)

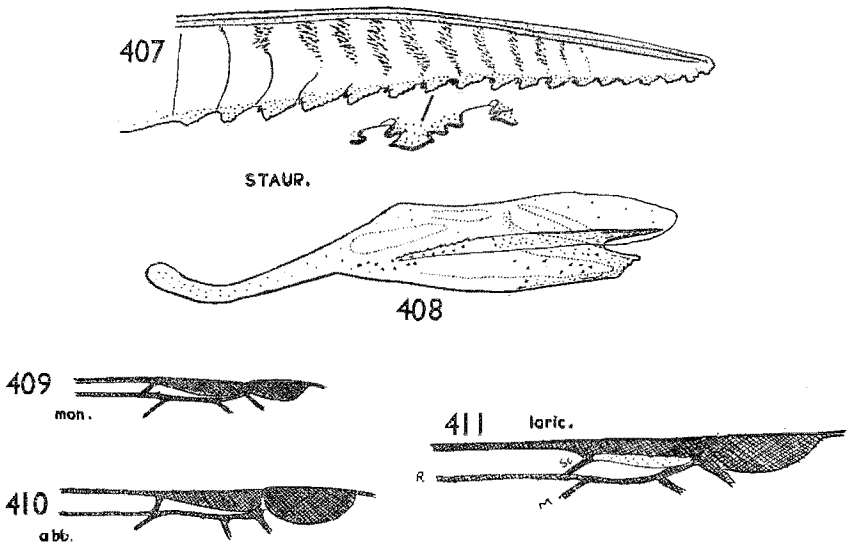


FIG. 407.—Saw of *Stauronematus compressicornis*.

FIG. 408.—Penis valve of *S. compressicornis*.

FIGS. 409–11.—Costal region of fore wing in *Pristiphora* spp.: 409, *monogyniae*; 410, *abbreviata*; 411, *laricis*.

### Genus *Pristiphora* Latreille.

(= *Lygaeonematus* Konow and *Micronematus* Konow).

By fusing *Lygaeonematus* and *Micronematus* with *Pristiphora* a genus of some 120 described world species (40 British) is segregated, very diverse in form and habit, and rich in undescribed species.

#### KEY TO GROUPS A–G OF SPECIES-GROUPS.

- 1 Mesopleura dull with rough or coriaceous surface sculpture. Abdomen black above except at most for yellowish apical segments, and if under 5 mm. long then with mainly black hind femur. (*molhis*, *alpestris*, *lativentris* and *staudingeri* groups)..... **C Groups**
- Mesopleura shining without rough surface, or, if this is slightly developed or the mesopleura is punctate then either (a) it is under 5 mm., with pale hind femur or (b) the abdomen has a reddish girdle covering the middle segments or (c) it has bifid tarsal claws..... **2**
- 2 (1) Species over 8 mm. long with a red-girdled abdomen. In ♀ with laterally compressed sawsheath which, in dorsal view, is narrower than the apex of the hind femur; cerci acuminate apically but broad and flattened at the base which is broader than the apex of the sawsheath in dorsal view. Attached to *Larix*. (*erichsonii* group)..... **D Group**
- Species with abdomen not red-girdled, or else less than 7 mm. long. Saw-sheaths of various forms, often broader than the apex of the hind femur and always broader than the base of the cerci..... **3**
- 3 (2) Sawsheath of ♀ subtruncate at apex in lateral view (figs. 480–3) and abdomen often laterally compressed towards apex; ♂ with pale mesosternum. Attached to Coniferae. (*abietina* group)..... **E Group**

- Sawsheath of ♀ rounded or acute in lateral view and abdomen not laterally compressed towards apex; ♂ with dark mesosternum..... 4
- 4 (3) *Either* Sc of fore wing almost interstitial with origin of M from R (fig. 410), or total length less than 4 mm.; antenna short (♀ less than C of fore wing; ♂ less than C + stigma). Mainly black-bodied species with stigma in part piceous. Attached to Rosaceae (*Malus* and *Prunus*). (*monogyniae* and *retusa* groups)..... **A Groups**
- *Either* Sc of fore wing at least half its own length away from origin of M from R (cf. figs. 409, 411), and total length over 4 mm., or antenna longer (♀ more than C; ♂ more than C + stigma)..... 5
- 5 (4) Not more than 4.5 mm. long and mainly black with hind femur at least infusate basally. Antenna not longer than C of fore wing. Ovipositor longer than hind femur plus its second trochanter, and sawsheath protruding (figs. 478 and 479). Attached to *Picea*. (*ambigua* group).. **F Group**
- *Either* over 4.5 mm. long, or antenna clearly longer than C of fore wing. Often coloured otherwise. Ovipositor shorter than hind femur plus its second trochanter and less protruding. Attached to various plants. (*testacea*, *pallipes* etc. groups)..... **B Groups**

KEY TO SPECIES OF A GROUPS (*monogyniae* AND *retusa*).

- 1 Abdomen entirely black; stigma and C of fore wing piceous; trochanters piceous ..... 2
- Abdomen marked with yellow laterally or beneath; stigma and/or C of fore wing more or less pale; trochanters pale. (Sc of fore wing almost interstitial with origin of M on R (cf. fig. 410))..... 3
- 2 (1) Smaller species 3-3.5 mm. Pronotum all black and rest of insect black except for labrum, more or less the clypeus, tegula, more or less fore and middle femora, and more or less tibiae and tarsi of all legs. Wings with stigma and venation piceous; Sc of fore wing received on R far from origin of M (fig. 409). Sawsheath fig. 412; penis valve fig. 445.  
*Larva on Prunus spinosa* L. Widespread in England and Ireland. IV-V. (†Morice, 1906, Ent. mon. Mag. 42: 31). N. and C. Europe, Caucasus and Transcaucasia. .... ♂ and ♀ (= *hibernicus* Cameron) *monogyniae* (Hartig)
- Larger species (4-5 mm.). Pronotum with its hind angles yellow, otherwise coloured as the former. Sc of fore wing almost interstitial with origin of M on R (fig. 410). (Parthenogenetic species with ♂ unknown).  
*Larva on Pyrus communis* L. Known only from Devon, Surrey, Herts. and Beds. V. (†Perkins, 1929, Trans Devon. Ass. Adv. Sci. 61: 306). C. and S. Europe and California  
 ♀ (= *californica* Marlatt, syn. nov.) *abbreviata* (Hartig)
- 3 (1) Smaller species (3-4 mm.). Stigma piceous at edges and white in the middle; in ♀ white also at base. Sawsheath of ♀ less than three times the breadth of a cercus in dorsal view and about half apical breadth of hind tibia (fig. 413). Colour mainly black; yellow are: mouthparts, edge of pronotum, tegula and apical abdominal segments 3-4 laterally. Legs pale except for black bases of coxae, underside of femur, and, on the hind legs, the brown apex of tibia and tarsus.  
*Superficially like one of the gall-making Pontania species. Larva on Prunus padi* L. Only known as British from a few ♀♀ and a larva taken near Aviemore, Inverness-shire, in VI, 1934 and 1952 (†Benson, 1941, Ent. mon. Mag. 77: 17). N. Europe..... \*♀ *retusa* (C. G. Thomson)
- Larger species (5.5-7 mm.). Stigma piceous brown in the middle. Sawsheath of ♀ several times broader than a cercus and slightly broader than apex of hind tibia. Colour as in preceding species but more extensively pale on pronotum and on the apex of abdomen laterally and beneath. Penis valve fig. 446.  
*Larva gregarious on apple* (*Malus pumila* Mill.). Local and sporadic in S. England: Kent, Surrey, Berks., Herts., Essex. (†Theobald 1913, Entomologist 46: 108-9). IV-V and ? VIII. C. and N. Europe to E. Siberia  
 ♂ and ♀ *moesta* (Zaddach)

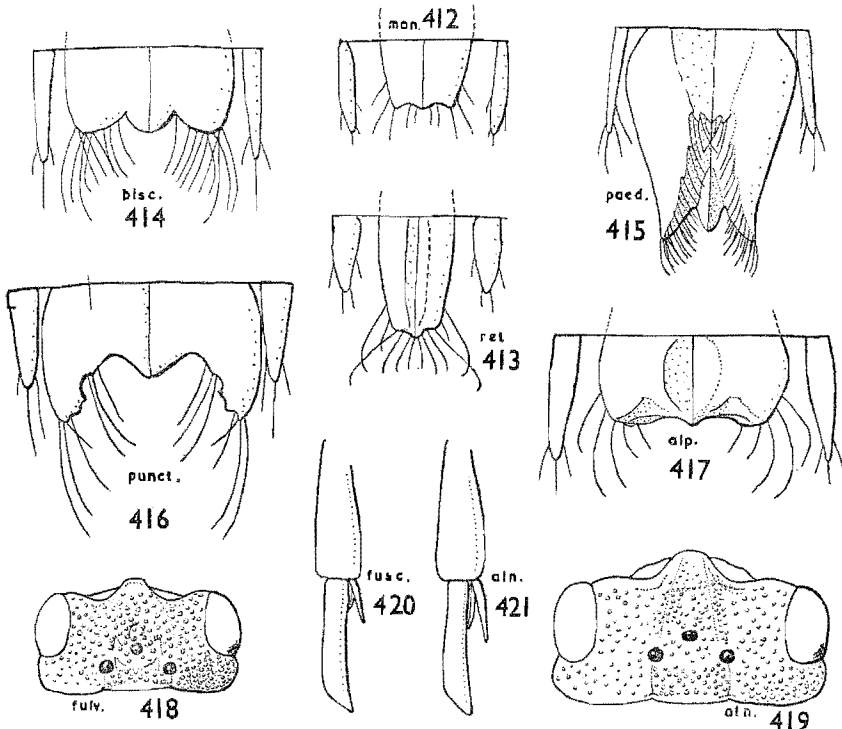


KEY TO SPECIES OF B GROUPS (*pallipes*, *ruficornis*, *testacea* ETC.).

*P. alpestris*, which belongs among the C Groups, is also included here for technical convenience. *P. geniculata* is likewise included, though it is probably more closely related to *P. moesta* in A Groups than to any species here.

## Females.

- 1 Abdomen with more than ninth tergite pale above, or hind femur not pale at the base with a black mark at the apex, or under 6 mm. long. . . . . 2  
 - Large species (over 6 mm. long) with abdomen black above (except sometimes for ninth tergite) and hind femur pale at the base but black at the apex. 6.5-7.5 mm.



FIGS. 412-7.—Sawsheath of *Pristiphora* spp. Groups A and B from above: 412, *monogyniae*; 413, *retusa*; 414, *biscalis*; 415, *paedida*; 416, *punctifrons*; 417, *alpestris*.

FIGS. 418-9.—Head of *Pristiphora* spp. from above to show position of ocelli in: 418, *fulvipes*; 419, *alnivora*.

FIGS 420-1.—Hind tibial spurs in *Pristiphora*: 420, *thalictri fuscata*; 421, *alnivora*.

Whole thorax and underside of abdomen mainly black; frontal area depressed in the middle with clearly defined raised margins.

Larvae in colonies on *Sorbus aucuparia* L. Not common in British Isles; first found in New Forest by Miss E. F. Chawner (†Morice, 1922, Ent. mon. Mag. 58: 199) and, more recently, at Tring, Herts., 1941 (R. B. B.) and at Heath and Reach, Beds., 1949 (V. H. Chambers); in Ireland: Co. Wicklow (A. W. Stelfox). V-VI and VII-VIII. N. and C. Europe to Italy, to E. Siberia and N. America, locally as a pest of forest and ornamental trees

♀ *geniculata* (Hartig)

- 2 (1) Abdomen black above and beneath with at most only the ninth tergite more or less pale. . . . . 3  
 - Abdomen with at least some of the sternites wholly or considerably pale. . . . . 12  
 3 (2) Hind legs reddish-yellow, more or less infusate at apex of tibia and tarsus but never on femur. Either mesopleura dull, or wings more or less infusate with C piceous. . . . . 4  
 - Hind legs yellowish-white and may be more or less infusate or black on femur, tarsus and apex of tibia. Mesopleura shining. Wings hyaline with brownish-white C. . . . . 6  
 4 (3) Hind ocellus at least about twice its own diameter from hind margin of head (fig. 419). Wings more or less infusate with piceous stigma and C in fore wing. Mesopleura smooth and shining. Sawsheath in dorsal aspect about as broad as apex of hind tibia. . . . . 5  
 - Hind ocellus only about its own diameter distant from hind margin of head (fig. 418). Wings subhyaline with brownish-white stigma and C. Sawsheath in dorsal aspect broader than apical width of tibia. 4-5 mm.  
 Head with temples and postocellar region dull with dense tubercles. Inner spur to hind tibia longer than apical breadth of tibia and about half length of basitarsus.

*Larva on Salix. Widespread throughout Britain from Cornwall to Caithness and in Ireland. Parthenogenetic species of which the ♂ has not yet been found in Britain. V-VI and VII-VIII. Throughout Europe to Spain, to Asia Minor, to Caucasus and Transcaucasia, and E. to Siberia*

♀ *fulvipes* (Fallén)

- 5 (4) Head above on the temples and postocellar region smooth and shining with tubercles obsolete. Inner hind tibial spur only as long as apical breadth of tibia (fig. 420). Hind tarsus unicolorous with tibia and reddish-yellow. 4.5-5.5 mm.

*Larva on Thalictrum flavum L. Discovered at Askham Bog, Yorks., by W. D. Hincks in 1942 (†Benson, 1943, Ent. mon. Mag. 79: 180) and since found in England: Bucks., Beds., Hunts. and Norfolk, and Ireland: Co. Cavan. V-VI and VII-VIII. Gotland, Finland, N. Germany and replaced by dark-legged forms of P. thalictri Kriechbaumer in other parts of Eurasia to Japan. . . . ♀ (Jumipennis Thomson nec Stephens) thalictri fuscata Benson*

- Head covered with tubercles on temples and postocellar area (fig. 419). Inner hind tibial spur much longer than apical breadth of tibia and about half as long as basitarsus (fig. 421). Hind tibia reddish-yellow but tarsus infusate at apices of segments. 4.5-5.5 mm.

*Larva on Aquilegia vulgaris L. etc., and a troublesome garden pest in C. Europe. In Britain discovered first in gardens in 1946 in Middlesex (C. H. Andrewes) and Devon (R. C. L. Perkins), and in 1949 at Wye, Kent (H. W. Miles). (†Benson and Andrewes, 1947, Ent. mon Mag. 83: 223). IV-IX (with many broods). C. Europe to E. Siberia. . . ♀ alnivora (Hartig)*

- 6 (3) Hind femur mainly black (i.e. entirely black except for extreme base and apex). Claws with an inner tooth present. Sawsheath as broad or broader apically than apex of hind tibia. Sc of fore wing at least half its own length from origin of M from R (cf. figs. 409 and 411). Antenna piceous, or more or less flavous<sup>1</sup>. . . . . 7

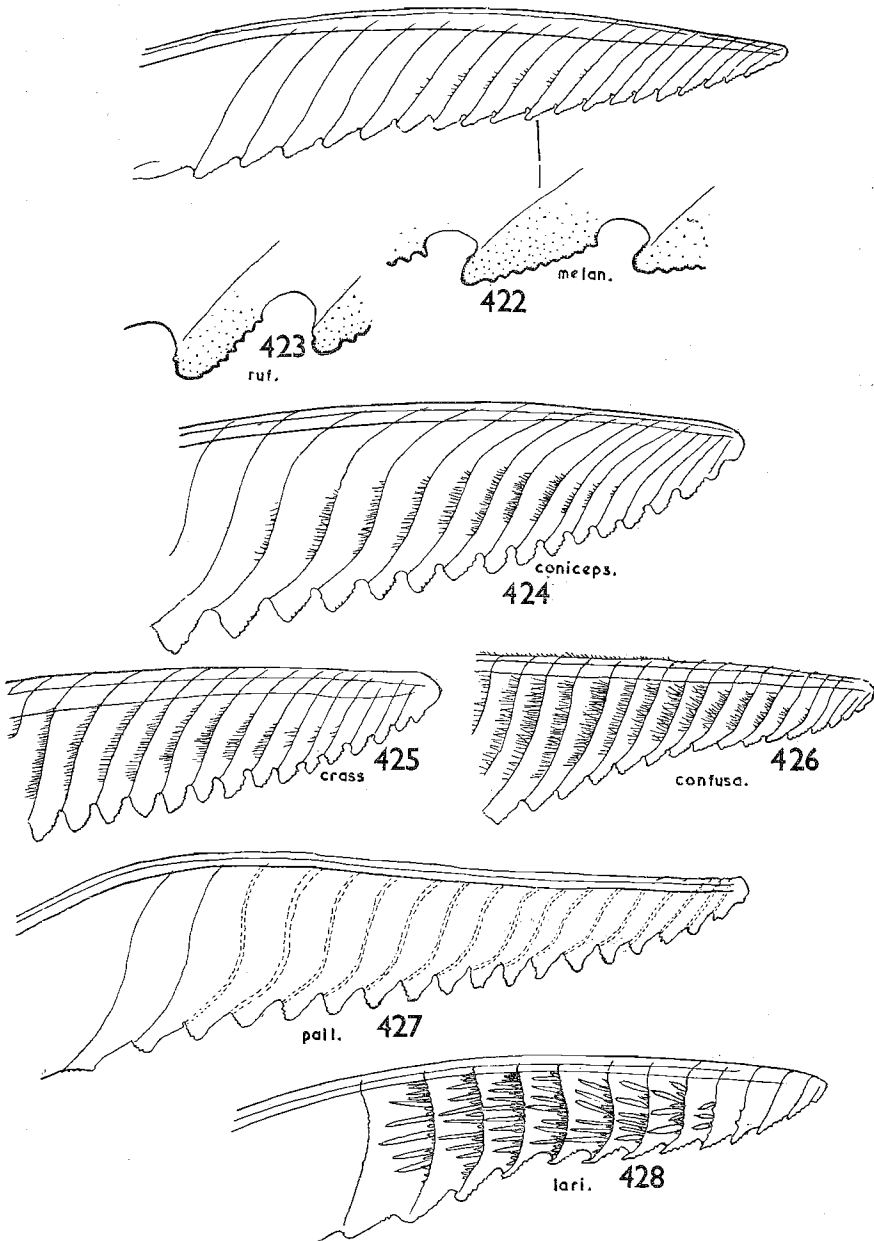
- Hind femur yellowish-white, though more or less piceous; if mainly piceous then either the claws are simple, without any inner tooth, or the sawsheath in dorsal aspect is narrower apically than the apex of the hind tibia and Sc of the fore wing is less than half its own length from origin of M from R (cf. fig. 410). Antenna piceous. . . . . 11

- 7 (6) Claws with small inner tooth. . . . . 7a  
 - Claws bifid (saw with lateral setae on fifth and following segments)

*Larva unknown. Scotland, Inverness, Kincairig, 1 ♀, 20.v.1949, P. Harwood. New British record. Lapland. . . . ♀ bifida Hellén*

<sup>1</sup> Lindqvist (1955, *Notul. ent.* 35: 35-50) has distinguished 8 species in this complex from Finland, and, of these, 5 have so far been identified in British material. These species are difficult to distinguish, especially in the ♀, and external characters have yet to be satisfactorily correlated with the minute differences in the genitalia on which the species are now based. The status of some of these species and their distributions and biology require further studies.

- 7a (7) Saw without bands of setae on the lateral margins of the 6 apical segments (figs. 422-3). Antenna piceous or more or less flavous. . . . . 8  
 - Saw with bands of setae on the lateral margins of at least the fifth and following segments (figs. 424-6). Antenna more or less flavous. . . . . 9
- 8 (7a) Antenna piceous. Saw narrow with sixth marginal tooth about three times as long as high (fig. 422). 4-5.5 mm.  
*Larva on Betula. England: Devon, Surrey, Bucks., Herts.; Scotland: Dumbarton, Aberdeen. IV-VI. Throughout Europe*  
 ♀ *melanocarpa* (Hartig)  
 - Antenna more or less flavous beneath. Saw wider, with sixth marginal tooth about twice as long as high (fig. 423). 4-5.5 mm.  
*Larva unknown. England: Devon, Surrey, Bucks., Herts.; Scotland: Perth., Inverness. V-VII. Throughout Europe*  
 ♀ (*frazini* Hartig) *ruficornis* (Olivier)
- 9 (7a) Head with clearly defined raised frontal area. Saw with long bands of setae from lateral margin of fourth or fifth and following segments (fig. 425-6). . 10  
 - Head very rounded above so that frontal area is scarcely defined. Saw with setae on lateral segmental margins in short bands from about fifth to fifteenth segment (fig. 424). 4-5.5 mm.  
*Larva on Salix spp. related to caprea L. New British Record. Hants.: Lyndhurst, 1 ♀ reared by Miss E. P. Chawner (B.M. 1929); Kent: Wye, 1 ♀, vii. 1946 (R. B. B.); Bucks.: Ivinghoe Common, 1 ♂, v. 1936 R. B. B.); Herts.: Bozmoor, 1 ♀, v. 1933; Perth.: Rannoch, 1 ♂, vi. 1931 (R. B. B.). Sweden, Finland, Russia, Germany. . . . . ♀ *coniceps* Lindqvist*
- 10 (9) Frontal area narrower (only about as broad as distance between hind ocelli). Saw with middle marginal teeth about twice as long as high (fig. 425).  
*Larva on Crataegus. England: Devon, Glamorgan, Worcester, Hants., Berks., Bucks., Herts., Middlesex, Essex, Suffolk, Cambridge; Scotland: Lanark. IV-VII. France, Germany, Sweden, Finland*  
 ♀ (*fletcheri* Cameron) *crassicornis* (Hartig)  
 - Frontal area broader than distance between hind ocelli. Saw with middle marginal teeth about three times as long as high (fig. 426).  
*Larva on Salix fragilis L., phlyicifolia L. etc. New British Record. Bucks.: Weston-Turville, 1 ♀ reared iv. 1924 (R. B. B.); Berks.: Windsor Forest, 1 ♀, v. 1935 (H. St. J. Donisthorpe). Sweden, Finland, Russia, Germany and Switzerland. . . . . ♀ *confusa* Lindqvist*
- 11 (6) Sc of fore wing at least its own length away from origin of M from R (cf. fig. 409). Claws without any inner tooth. Sawsheath in dorsal view broader apically than apex of hind tibia, and trifid, with middle tooth shorter than lateral tooth. Saw without backwardly projecting spines from lateral margins of segments (fig. 427). 4.5-5.5 mm.  
*Mainly parthenogenetic with very rare ♂. Notorious in the larval stage as a pest of red currants (Ribes rubrum L.) and gooseberries (Ribes uva-crispa L.). Common throughout Britain and Ireland. IV-X (several broods). Distributed throughout the temperate regions of the northern hemisphere*  
 ♀ (= *appendiculata* Hartig) *pallipes* Lepelletier  
 - Sc of fore wing less than its own length away from origin of M from R (fig. 411). Claws with minute inner tooth. Sawsheath in dorsal aspect narrower at apex than apex of hind tibia and trifid with middle tooth as long as lateral teeth, but the whole often so withdrawn within the apex of the abdomen as to be scarcely visible. Saw with backwardly projecting spines from lateral margins of segments (fig. 428). 4-6.5 mm.  
*Larva often destructive to Larix decidua Mill. and leptolepis (Sieb. and Zucc.) Gord. Throughout Britain and Ireland. (†Morice, 1906, Ent. mon. Mag. 72: 250). IV-VI and VII-VIII. N. and C. Europe*  
 ♀ (= *oblongus* Cameron) *laricis* (Hartig)
- 12 (2) Hind femur more or less pale but with a piceous spot at the apex. . . . . 17  
 - Hind femur entirely pale, yellowish-white to reddish-yellow, or more or less infusate from the base, but with apex unmarked. . . . . 13
- 13 (12) Sc of fore wing at least half its own length away from origin of M from R (cf. fig. 411). Hind femur pale. . . . . 14  
 - Sc of fore wing less than half its own length away from origin of M from R (cf. fig. 410). Hind femur more or less infusate from the base.

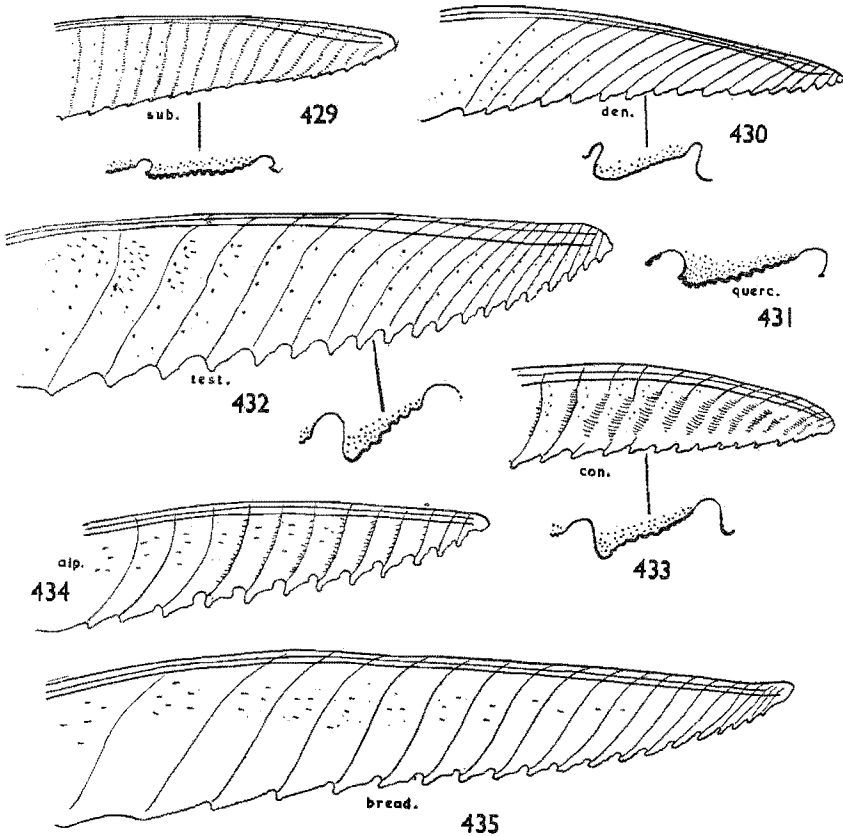


FIGS. 422-8.—Saw of *Pristiphora* spp. Group B: 422, *melanocarpa*; 423, *rusticornis*; 424, *coniceps*; 425, *crassicornis*; 426, *confusa*; 427, *pallipes*; 428, *laricis*.

- Stigma piceous. Sawsheath (fig. 414) narrower in dorsal aspect than apex of hind tibia and scarcely emarginate, almost truncate at apex 4.5–5.5 mm.
- Larva solitary on Prunus spinosa L. S. England: Devon, Dorset, Glos., Surrey, Bucks., Herts. and Beds.; also Wales: Glamorgan; and Ireland: Wicklow.* (†Perkins, 1929, Trans. Devon. Ass. Adv. Sci. 61: 305). IV–VI. C. Europe. . . . . ♀ **biscalis** (Förster)
- 14 (13) Abdomen entirely or mainly dark above. . . . . 15  
 – Abdomen entirely or mainly yellow above. . . . . 19
- 15 (14) Sawsheath as broad as apex of hind tibia in dorsal aspect and projecting but little beyond apex of abdomen: in form with either the apex strongly excised or subtruncate but not narrowed behind. . . . . 16  
 – Sawsheath (fig. 415) narrower than apex of hind tibia and exerted, broad and rounded at the base, tapering behind, where it is slightly emarginate through the apical projection of the lateral angles. 4.5–5.5 mm.  
 ? Parthenogenetic species with rare ♂. Larva unknown. Not common, England to Perth. in Scotland. (†Morice, 1906, Ent. mon. Mag. 42: 250). V–VI. C. Europe. . . . . ♀ **paedida** (Konow)
- 16 (15) Smaller (4–5 mm.) with sawsheath in dorsal aspect deeply emarginate behind (fig. 416).  
*Larva on Rosa. Widespread throughout Britain.* (†Morice, 1906, Ent. mon. Mag. 42: 249). IV–VI. C. and N. Europe with Iberian Peninsula and eastwards to E. Siberia  
 ♀ (= *viridana* Konow) **punctifrons** (C. G. Thomson)  
 – Larger (5–6 mm.) with sawsheath in dorsal aspect almost truncate at apex, with but a slight emargination each side of the middle (fig. 417) (cf. couplet 1 in key to C Groups). . . . . ♀ **alpestris** (Konow)
- 17 (12) Abdomen black at base and apex with a red girdle covering two to four of middle segments. Pronotum black with only hind margin pale. Inner hind tibial spur only about half as long as basitarsus.  
 Sawsheath about as broad behind as apex of hind tibia and emarginate each side of the middle (cf. fig. 416). Saw (fig. 431). 5.5–6.5 mm.  
*There appear to be 2 races (? species), a smaller one attached to Vaccinium myrtillus L. and a larger one attached to Betula. Throughout Britain and Ireland, but much commoner (Vaccinium race) in the W and N., reaching even the summits of the highest Scottish Mountains. IV–VI. C. and N. Europe to E. Siberia and N. America. ♀ (= idiota Norton, Syn. nov.) quereus* (Hartig)  
 – Abdomen differently coloured. Pronotum mainly pale. Hind tibial inner spur more than half as long as basitarsus. . . . . 18
- 18 (17) Abdomen yellow except for the one or two basal tergites, which are marked with black. 5–6 mm.  
 Structurally not distinguished from the following species. Saw, fig. 430.  
*Larva not described. Widespread in England and also occurs in Ireland. V–VI and VII–X.* (†Benson, 1940, Trans. Herts. nat. Hist. Soc. 21: 229). Europe, mostly restricted to countries with an Atlantic seaboard, reaching the Azores and Madeira. . . . . ♀ **denudata** Konow  
 – Abdomen very variable in colour with underside yellowish or greenish-white and above with every tergite at least marked with black. 4.5–5.5 mm.  
 Structurally not distinguished from the foregoing species with which it forms a Continental Atlantic pair. Superficially very similar to *Pachyne-matus obductus* Hartig from which it is distinguished by its broad sawsheath apically emarginate in dorsal aspect.  
*Larva on various Rosaceae (Geum, Potentilla, Rubus and Ulmaria). Throughout Britain and Ireland even to the summit of the highest Scottish mountains. IV–VI and VI–IX. N. and C. Europe to Caucasus*  
 \* ♀ (= *obductus* Hartig Cameron nec Hartig) **pallidiventris** (Fallén)
- 19 (14) Orbits mostly black. Sawsheath yellow to piceous, wider from above than apex of hind tibia; strongly emarginate at apex. . . . . 20  
 – Inner and outer orbits conspicuously pale. Sawsheath black and in dorsal aspect subtruncate at apex, which is not as wide as apex of hind tibia. 5–7 mm.

Mesopleura pale. Saw, fig. 429.

Larva on *Acer campestre* L. and *A. pseudoplatanus* L. England (scarce): Devon, Dorset, Wilts., Surrey, Middlesex, Bucks., Herts. and Worcester. V. N. and C. Europe. . . . . ♀ *subbifida* (C. G. Thomson)



Figs. 429-35.—Saw of *Pristiphora* spp. Groups B and C: 429, *subbifida*; 430, *denu- data*; 431, *quercus*; 432, *testacea*; 433, *conjugata*; 434, *alpestris*; 435, *bread- albanensis*.

20 (19) *Mesopleura* pale. Stigma with pale spot near apex. Sawsheath piceous at apex. 5-7 mm. Saw, fig. 433.

Larva socially on *Populus*. England: Cornwall, Devon, Hants., Herts., Beds. and Lancs. IV-VI and VII-VIII. N. and C. Europe to Italy.

♀ *conjugata* (Dahlbom)

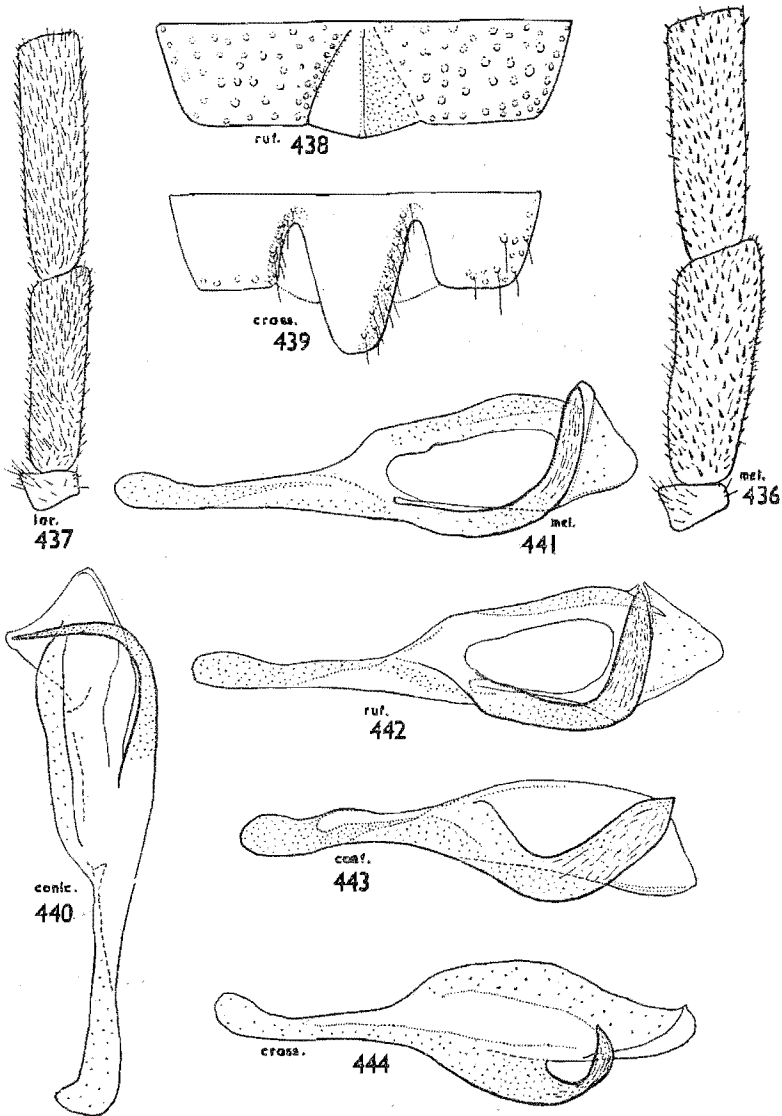
- Underthorax entirely black. Stigma entirely black. Sawsheath entirely yellow. 5-7 mm. Saw, fig. 432.

Larva socially on *Betula*. England: Devon, Hants., Surrey, Kent, Herts. Ireland: Cos. Cavan and Wicklow. V-VI and VII-VIII. N. and C. Europe. . . . . ♀ (= *betulae* Retzius) *testacea* (Jurine)

## KEY TO SPECIES OF B GROUPS.

## Males

- 1 Abdomen including last sternite all black. . . . . 2  
 - Abdomen with at least last sternite more or less pale. . . . . 11
- 2 (1) Hind femur black at least on apical portion, and antenna also black. Frontal area somewhat depressed in the middle and with the margins distinct. Inner orbits above antenna not densely and evenly punctured throughout. Usually over 5 mm. . . . . ♂ *geniculata* (Hartig)  
 - Either hind femur not black on apical portion; or antenna distinctly pale beneath; or frontal area not defined and inner orbits above antenna densely and somewhat coarsely punctured throughout. Usually under 5 mm. . . . . 3
- 3 (2) Hind femur and tibia mainly reddish-yellow. . . . . 4  
 - Hind femur mainly black and tibia mainly brownish-white. . . . . 6
- 4 (3) Wings infusate. Whole of tibia and tarsus yellow. Penis valve, fig. 449  
     ♂ *thalietri fuscata* Benson  
 - Wings subhyaline. Apex of hind tibia and tarsus marked with black. . . . . 5
- 5 (4) C and stigma of fore wing piceous. Penis valve, fig. 450. . . . . ♂ *alnivora* (Hartig)  
 - C and stigma of fore wing yellowish-white (no British ♂ of this species known)  
     ♂ *fulvipes* (Fallén)
- 6 (3) Claws with an inner tooth present, even if very small. . . . . 7  
 - Claws simple, without any inner tooth  
     Penis valve fig. 447. Very rare ♂ of normally parthenogenetic species.  
     4-5 mm. . . . . ♂ *pallipes* Lefebvre
- 7 (6) Claws with small inner tooth. . . . . 7a  
 - Claws bifid. (Penis valve, see Lindqvist 1955, l.c. fig. 24). . . . . ♂ *bifida* Hellén
- 7a (7) Sc received on R in fore wing more than half its own length from origin of M (fig. 409). Flagellar segments of antenna furnished, especially on their inner sides, with numerous conspicuous stout black setae among the finer paler ones (fig. 436). . . . . 7b  
 - Sc received on R less than half its own length from origin of M (fig. 411). Flagellar segments of antenna without any stout black setae set among the paler ones (fig. 437). Penis valve fig. 448. . . . . ♂ *laricis* (Hartig)
- 7b (7a) Eighth tergite not medially produced (fig. 438). . . . . 8  
 - Eighth tergite with a long medial projection (fig. 439). Penis valve fig. 444  
     ♂ *crassicornis* (Hartig)
- 8 (7b) Penis valve with curved spine sharply bent and tapering from base to apex (figs. 440-2). . . . . 9  
 - Penis valve with thick spine scarcely bent or tapering (fig. 443)  
     ♂ *confusa* Lindqvist
- 9 (8) Penis valve with spine very fine and sharp but with a swollen base (fig. 440)  
     ♂ *coniceps* Lindqvist  
 - Penis valve with curved spine tapering evenly from base to apex (figs. 441-2)  
     10
- 10 (9) Penis valve (fig. 441). . . . . ♂ *melanocarpa* (Hartig)  
 - Penis valve (fig. 442). . . . . ♂ *ruficornis* (Olivier)
- 11 (1) Hind femur pale at base but at least with a dark spot above at apex. Hind tibia black at apex. Stigma of fore wing usually piceous and contrasting strongly with the pale C. . . . . 12  
 - Hind femur entirely pale, more or less infusate from base to entirely dark, but never pale with a dark apex. Hind tibia may be pale at apex. Stigma yellow or brown, but not or scarcely darker than C. . . . . 13
- 12 (11) Abdomen mainly black above but usually with a red girdle round middle segments (in northern specimens girdle may be broken or even entirely absent). Inner hind tibial spur usually more than half length of basitarsus. Hypopygium emarginate apically. Penis valve fig. 451. . . . . ♂ *quercus* Hartig  
 - Abdomen almost entirely yellow except for basal tergite. Inner hind tibial spur less than half basitarsus Hypopygium entire. . . . . ♂ *denudata* Konow
- 13 (11) Underside of abdomen (sternites and down-turned portions of tergites) not wholly pale . . . . . 14  
 - Underside of abdomen wholly pale. . . . . 17



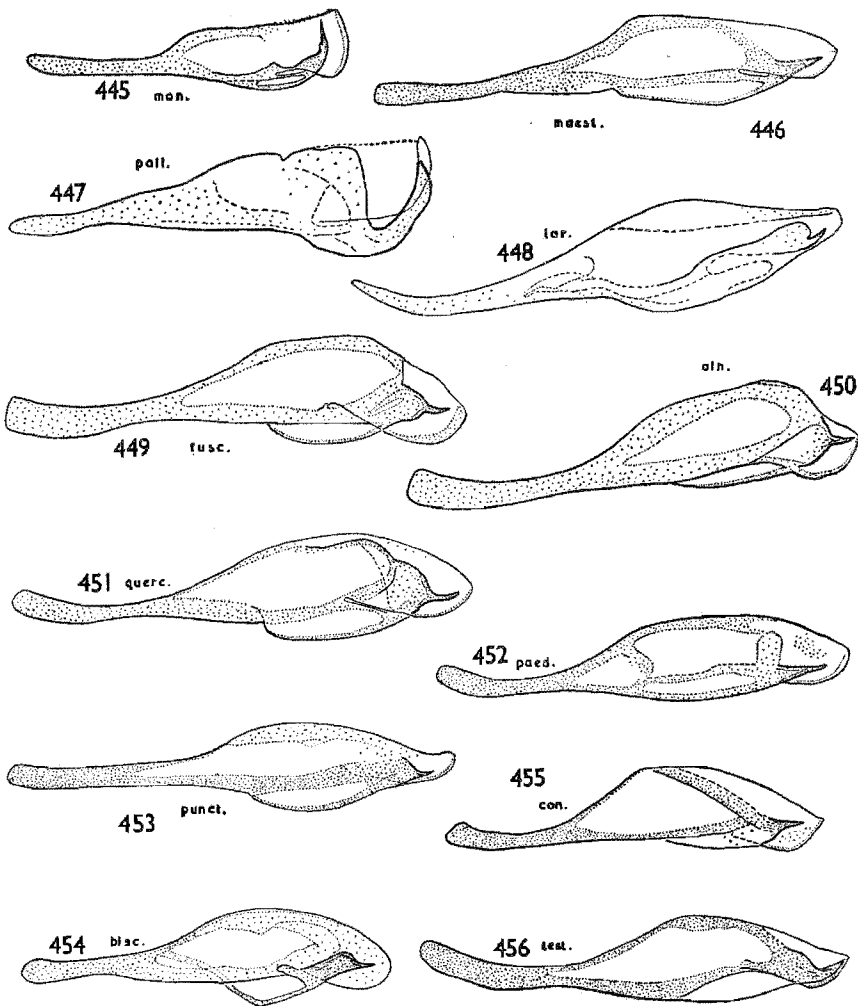
Figs. 436-7.—Basal segments of antenna in ♂ *Pristiphora* Group B :  
436, *melanocarpa* ; 437, *laricis*.

Figs. 438-9.—Eighth tergite of ♂ *Pristiphora* : 438, *ruficornis* ; 439, *crassicornis*.

Figs. 440-4.—Penis valve in *Pristiphora* spp. : 440, *coniceps* ; 441, *melanocarpa*.  
442, *ruficornis* ; 443, *confusa* ; 444, *crassicornis*.



- 14 (13) Antenna not as long as C + stigma of fore wing. Eighth tergite with raised medial triangle between grooves not clearly defined and apparently transecting the whole segment.....15
- Antenna longer than C + stigma of fore wing. Eighth tergite with sharply defined raised apical medial triangle between deep excavations not reaching base of segment.....16



FIGS. 445-56.—Penis valve in *Pristiphora* spp. Groups A and B: 445, *mongyniae*; 446, *moesta*; 447, *pallipes*; 448, *laricis*; 449, *thalictri fusca*; 450, *alnivora*; 451, *quercus*; 452, *paedida*; 453, *punctifrons*; 454, *biscalis*; 455, *conjugata*; 456, *testacea*.

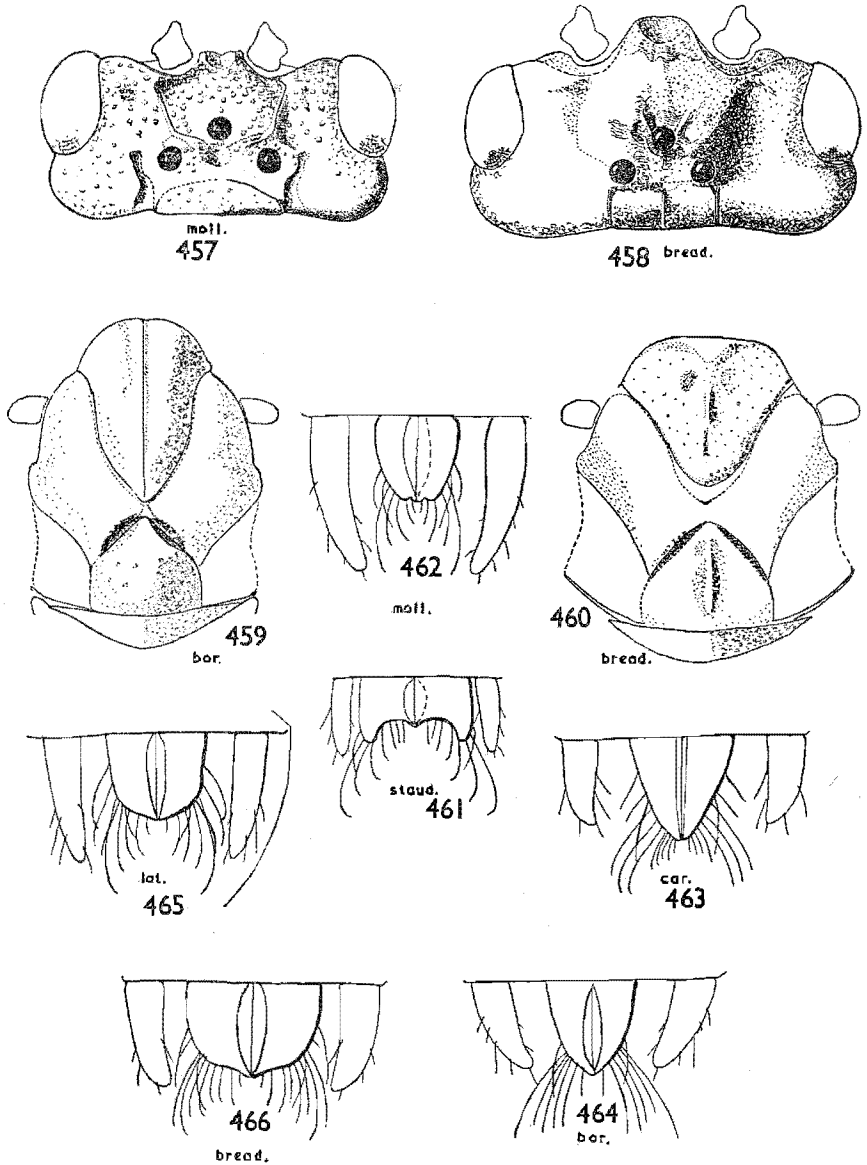
- 15 (14) Larger (5-6 mm.). Stigma and C of fore wing yellow; rest of venation piceous. Head above with a raised frontal area usually depressed in middle with a more or less carinate margin and covered with irregular coarse tubercles. Penis valve fig. 469 (*cf.* couplet 1 in key to C Groups). ♂ *alpestris* (Konow)
- Smaller (4-4.5 mm.). Stigma of fore wing piceous, C likewise but paler, as is rest of venation. Head above with a raised but undefined frontal area, with the surface shining between dense regular tubercles. Penis valve fig. 452.  
*Only known British ♂ taken at Beds.: Maudden Woods, iv.55 (V. H. Chambers).....♂ paedida (Konow)*
- 16 (14) Sc of fore wing at least half its own length away from origin of M from R (*cf.* fig. 409). Mesonotum dull all over with fine tubercles and coriaceous sculpture. Upper surface of head without clearly defined frontal area and whole head dull with dense tubercles. Penis valve fig. 453. 4-4.5 mm.  
♂ *punctifrons* (Thomson)
- Sc of fore wing less than half its own length away from origin of M from R (*cf.* fig. 410). Mesonotum shining between the fine surface sculpture, which is almost obsolete on side lobes and middle of front lobe. Head with a defined frontal area shining in places between the fine scattered tubercles. Penis valve fig. 454. 4.5-5 mm.....♂ *biscalis* (Förster)
- 17 (13) Mesopleura yellow. Stigma of fore wing considerably pale within its margins. Penis valve fig. 455. 5-6 mm.....♂ *conjugata* (Dahlbom)
- Mesopleura black. Stigma entirely piceous. Penis valve fig. 456. 5-6 mm.  
♂ *testacea* (Jurine)

KEY TO SPECIES OF C GROUPS (*mollis*, *alpestris*, *lativentris* AND *staudingeri*).

The representatives of these groups are all arctic-alpine or northern subalpine heath and moorland species. It is thus convenient to treat the different groups together, although they are not necessarily closely related. The adults are black in colour with more or less pale underface, pronotum, legs, tegulae and apex of abdomen. *P. alpestris*, with its smooth mesopleura, would run to the B Groups in the group key above, and is therefore also dealt with in the key to species of those groups, though its natural affinities in structure and habit lie in the present group. Some of the species here were duplicated by Enslin in different genera: *P. mollis*, for example, reappears as *Pachynematus penegalensis*. *P. alpestris* is treated by Enslin as a *Pachynematus*, but he also says that it may be no more than a form of *Pristiphora maesta*.

The European species of the *lativentris* and *alpestris* groups were recently revised by Lindqvist (1952, *Notul. ent., Helsingf.* 32: 80-119), and the *staudingeri* group by the same author (1953, *Opusc. ent.* 18: 220-4).

- 1 Mesopleura dull with dense surface sculpture.....2
- Mesopleura shining without surface sculpture.  
(Sawsheath of ♀ very short and in dorsal view broadly rounded at apex where it is about as broad as apex of hind tibia (fig. 417). Saw fig. 434; penis valve fig. 469). ♂ 4.5-5.5 mm.; ♀ 5-6 mm.  
*Larva on Betula. England: Devon, Dorset, Surrey, Herts., Beds. and Hereford. IV-V. N. and C. Europe. (†Benson, 1934, Ent. mon. Mag. 70: 203 and 1940, Trans. Herts. nat. Hist. Soc. 21 (2): 227).*  
.....♂ and ♀ (= *strandii* Konow Benson nec Konow) *alpestris* (Konow)
- 2 (1) Small, almost entirely black species (4.5-5.5 mm.) with only middle of tibiae, stigma and C of fore wing obscurely paler. Head with warts. Sawsheath of ♀ from above as broad as apex of hind tibia and deeply emarginate apically (fig. 461). Penis valve fig. 467.  
*Larva on Salix herbacea L., S. phylicifolia L. etc., but not yet described. Frequent in the arctic-alpine zones on the tops of the Grampian Mountains in Perth., Inverness, Aberdeen and Angus. England: banks of the Upper Tees in Durham and N. Yorks. Ireland: sea level at Wexford (1902, J. J. F. X. King) and the Mullet, in Co. Mayo, Annagh (1936, A. W. Stelfox). V-VI. Arctic Eurasia and high Alps of Central Europe. (†Benson, 1935, Trans. R. ent. Soc. Lond. 83: 36)*  
♂ and ♀ (= *asperlatus* Benson, *hyperborea* Malaise) *staudingeri* (Ruthe)
- Larger or paler species or head dull with surface sculpture. Sawsheath not deeply emarginate apically in dorsal view.....3



FIGS. 457-8.—Head from above of *Pristiphora* Group C :  
457, *mollis* ; 458, *breadalbanensis*.

FIGS. 459-60.—Mesonotum of *Pristiphora* : 459, *borea* ; 460, *breadalbanensis*.

FIGS. 461-6.—Sawsheath of *Pristiphora* from above : 461, *staudingeri* ; 462, *mollis* ;  
463, *curinata* ; 464, *borea* ; 465, *lativentris* ; 466, *breadalbanensis*.

- 3 (2) Labrum, pronotum, tegula, coxæ, femora and bases of tibiae as well as C reddish-yellow, but stigma often piceous. Sawsheath of ♀ triangular in dorsal view (*cf.* fig. 463).....9  
 - If these parts pale then they are not reddish, stigma always pale, and hind femur usually more or less infusate.....4
- 4 (3) Scutellum shining and almost impunctate. Sawsheath of ♀ in dorsal view either broadly rounded at apex without a medial projection, or strongly tapering behind and triangular in form (fig. 463). Heath and moorland species .....5  
 - Scutellum either dull with dense surface sculpture, or, if shining, then distinctly punctured at least anteriorly. Sawsheath of ♀ either tapering, rounded, or, if truncate, with a narrow medial projection (figs. 462, 465-6). Northern moorland or arctic-alpine species.....6
- 5 (4) Sawsheath of ♀ subtriangular in dorsal view (fig. 463). Antenna with third segment about as long as height of an eye in ♀ and clearly longer in ♂. Penis valve fig. 471. 6-8 mm.

*Larva on Vaccinium. In Scotland known only from Aberdeenshire: Braemar (B. Harwood, 1931) and Inverness-shire: near Aviemore (P. Harwood, 1944-5, R. B. B., 1934 and 1952); Wales: Radnor Forest, above 2000 ft. (R. B. B., 1953). (†Benson, 1935, Trans. R. ent. Soc. Lond. 83: 34). IV-VI. N. and Subalpine Europe*

.....♂ and ♀ (= *pallipes* Fallén nec Lapeletier) **carinata** (Hartig)  
 - Sawsheath as broad at apex in dorsal view as apex of hind tibia, rounded and not reaching as far as cerci. Antenna with third segment shorter than height of an eye in the ♀ and only as long as height of an eye in the ♂. Penis valve *cf.* fig. 469. 5-6 mm.

*Larva on Betula. So far only recorded from Devon: the Great Haldons, iii-iv. 1924-7 (J. F. and R. C. L. Perkins), Surrey: Oxshott, iv. 1938 (K. M. Guichard) and Herts.: Bricket Wood, iii. 1935 (R. B. B.). (†Benson, 1934, Ent. mon Mag. 70: 203 and, 1953, 89: 153). N. Europe*

♂ and ♀ (= *pachyvalvis* Konow, Benson nec Konow) **pseudocoactula** (Lindqvist)

- 6 (4) Head with a frontal field surrounded by a carina (fig. 457); and within this carina, adjoining the front ocellus, is a shiny area with only very sparse tubercles. Sawsheath in ♀ in dorsal view not reaching back as far as the cerci, and narrowing behind from a broad base and truncate at apex (fig. 462). Penis valve fig. 468. 6-7.5 mm.

*Larva on Vaccinium myrtillus L., etc. Scotland: common in Perth., Inverness, Angus and Aberdeen in moorland localities and extending to the summits of the highest mountains; Wales: Monmouthshire; England: found on the higher ground of Cumberland, Yorks., Lancs., Cheshire, Notts and Hereford; Ireland: Cos. Wicklow and Cavan. V-VII. N. and sub-alpine Eurasia*.....♂ and ♀ **mollis** (Hartig)

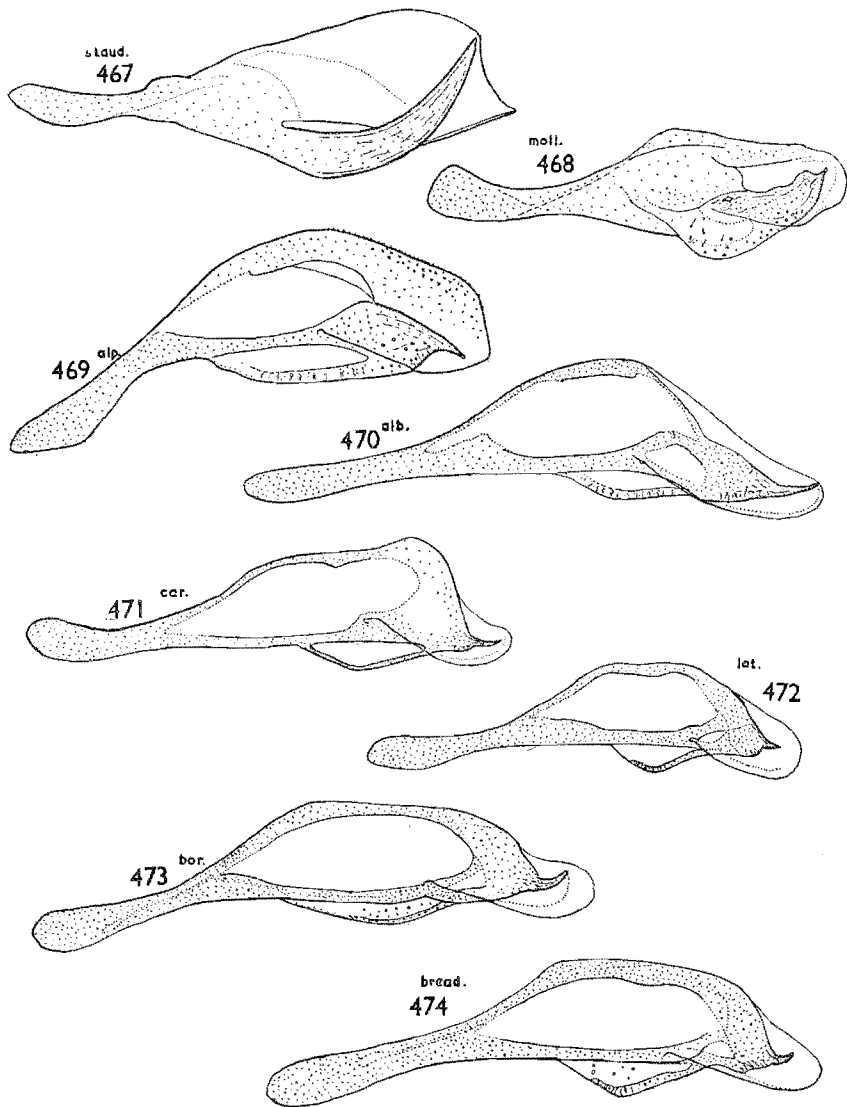
- Head without a definite carina surrounding the frontal area (fig. 458) and without a conspicuous shiny area with only sparse tubercles in front of the front ocellus (*coactula* complex).....7
- 7 (6) Larger species (5.5-7.5 mm.). Mesonotum and scutellum largely dull with dense sculpture.....8  
 - Smaller species (4-6 mm.). Mesonotum at least behind and scutellum with shining interspaces between the punctures.

Dark species with hind femur and in ♂ hypopygium infusate; ♀ sawsheath fig. 465. Penis valve fig. 472.

*Frequent in the arctic-alpine zones on the tops of the Grampian Mountains: Perth., Inverness, Angus and Aberdeen. VI-VII. Arctic and Alpine Europe*.....♂ and ♀ (= *scoticus* Cameron) **lativentris** (Thomson)

- 8 (7) Hind femur mainly black and clypeus truncate. ♀ with front lobes of mesonotum flat, as broad as long, and more or less fused with medial suture partly obsolete (fig. 460); sawsheath at least as broad as apex of hind femur (fig. 466). Saw fig. 435; penis valve fig. 474.

*Frequent in the high moors and arctic-alpine zones of the Grampian Mountains: Perth., Inverness, Angus, Aberdeen and, no doubt, elsewhere; England:*



FIGS. 467-74.—Penis valve in *Pristiphora* Group C: 467, *staudingeri*; 468, *mollis*; 469, *alpestris*; 470, *albilabris*; 471, *carinata*; 472, *lativentris*; 473, *borea*; 474, *breadalbanensis*.

on the summits of the Pennine Range to Cheshire, Derby, and Yorks. ; Ireland: top of Gearhan (2423 ft.) in the Slieve Mish Range, S. Kerry (A.W. Stejfor, 1946). V-VII. Arctic and Alpine Europe

♂ and ♀ (= *corpulentus* Konow, *tromsøensis* Kiaer)

- ..... **breadalbanensis** (Cameron)
- Hind femur mainly brown. Clypeus more or less emarginate medially. ♀ with front lobes of mesonotum together longer than broad, convex, and separated from each other by a normal suture (fig. 459); sawsheath narrower than apex of hind femur (fig. 464). Penis valve fig. 473.
- Only known from Perthshire: near the summits of Schiehallion, and Beinn à Chuallaich, vi. 1931. (†Benson, 1953, Ent. mon. Mag. 89:153). Arctic Europe..... ♂ and ♀ **borea** (Konow)
- 9 (3) Stigma of fore wing piceous and darker than C. ♀ sawsheath in dorsal view narrower basally than apex of hind tibia. Penis valve fig. 470. 6-7 mm.
- Larva on Betula. England: Staffs., Burnt Wood v. 1934 (H. W. Daltry); Scotland: Inverness, Aviemore, v. 1943-1952 (P. Harwood). (†Saunt, 1936, Ent. mon. Mag. 72:116)..... ♂ ♀ **albilabris** (C. G. Thomson)
- Stigma brown and not darker than c. ♀ sawsheath as broad basally as apex of hind tibia. Penis valve similar to fig. 473. 6-7 mm.
- Larva unknown. Scotland, Inverness, Aviemore, v. 1947-48 (P. Harwood)
- New British Record.** Finland and N. Sweden.... ♂ ♀ **grönblomi** (Hellén)

#### D GROUP (*erichsonii*).

One species, 8.5-9.5 mm. long. Mainly black apart from the red girdle covering the middle abdominal segments; also yellow are the labrum and legs (apart from bases of coxae, apices of front and middle tarsi, apex of hind femur, apical half of hind tibia and whole of hind tarsus, which are black). Wings subhyaline; stigma of fore wing black; C and rest of venation brown to piceous.

Normally entirely parthenogenetic, rarely producing males. Sporadically and locally abundant and destructive to *Larix decidua* Miller and *leptolepis* Harris in plantations in Britain and has occurred also in Wicklow in Ireland, IV-VII. Introduced from N. and C. Europe. Occurs throughout the northern temperate region to E. Siberia and N. America.... ♂ and ♀ **erichsonii** (Hartig)

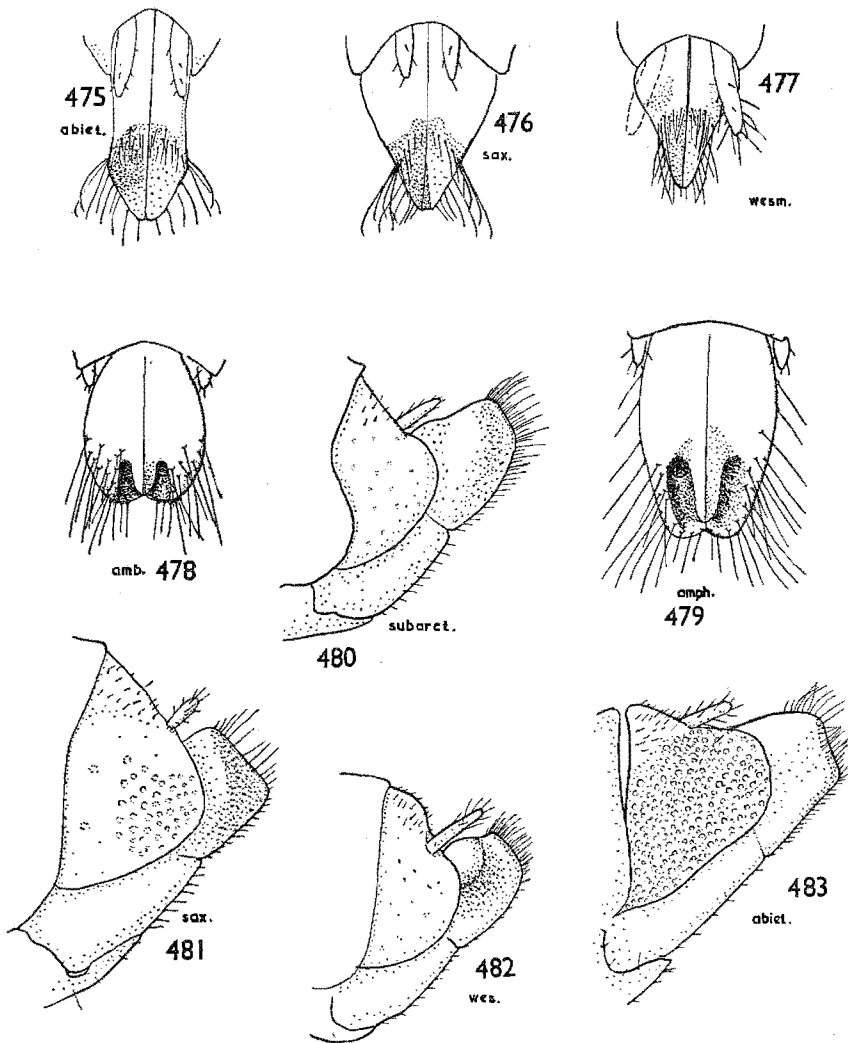
#### KEY TO SPECIES OF E GROUPS (*abietina* AND *wesmæli*).

##### Females.

- 1 Sawsheath in dorsal aspect tapering from base to apex (fig. 476) or bulbous at base with a tapering apex (fig. 477). Sides of ninth tergite flanking the sawsheath shining with only scattered or feeble punctures (figs. 481-2).... 2
- Sawsheath with basal portion parallel sided in dorsal aspect (fig. 475). Sides of ninth tergite flanking the sawsheath dull with surface sculpture between the punctures (fig. 483)..... 5
- 2 (1) Sawsheath bulbous at base and longer (fig. 477), so that, in lateral view, the apical truncation is clearly less than the length of the lower margin (fig. 482). Ovipositor at least as long as the 3 basal hind tarsal segments. Hind femur clear yellow or infusate below..... 3
- Sawsheath tapering from base to apex in dorsal aspect and short (fig. 476) so that, in lateral view, its apical truncation is about as long as its lower margin (fig. 481). Ovipositor scarcely longer than 2 basal hind tarsal segments. Hind femur darkened above at apex. 6-7.5 mm. Saw fig. 489.
- Larva on *Picea* and *Abies*. Throughout Britain. (†Morice, 1906, Ent. mon. Mag. 42:250). V-VII. N. and C. Europe..... ♀ **saxesenii** (Hartig)
- 3 (2) Larger (6-7.5 mm.). Sc of fore wing more than its own length from origin of M from R (cf. fig. 409); C so swollen apically that it entirely obliterates intercostal area at the point where Rs + M leaves R (fig. 484). Interantennal crest evenly rounded and scarcely produced in profile (as in *Amauronematus*) (fig. 384). Ovipositor half to three-fifths as long as hind tibia. Attached to *Larix*..... 4

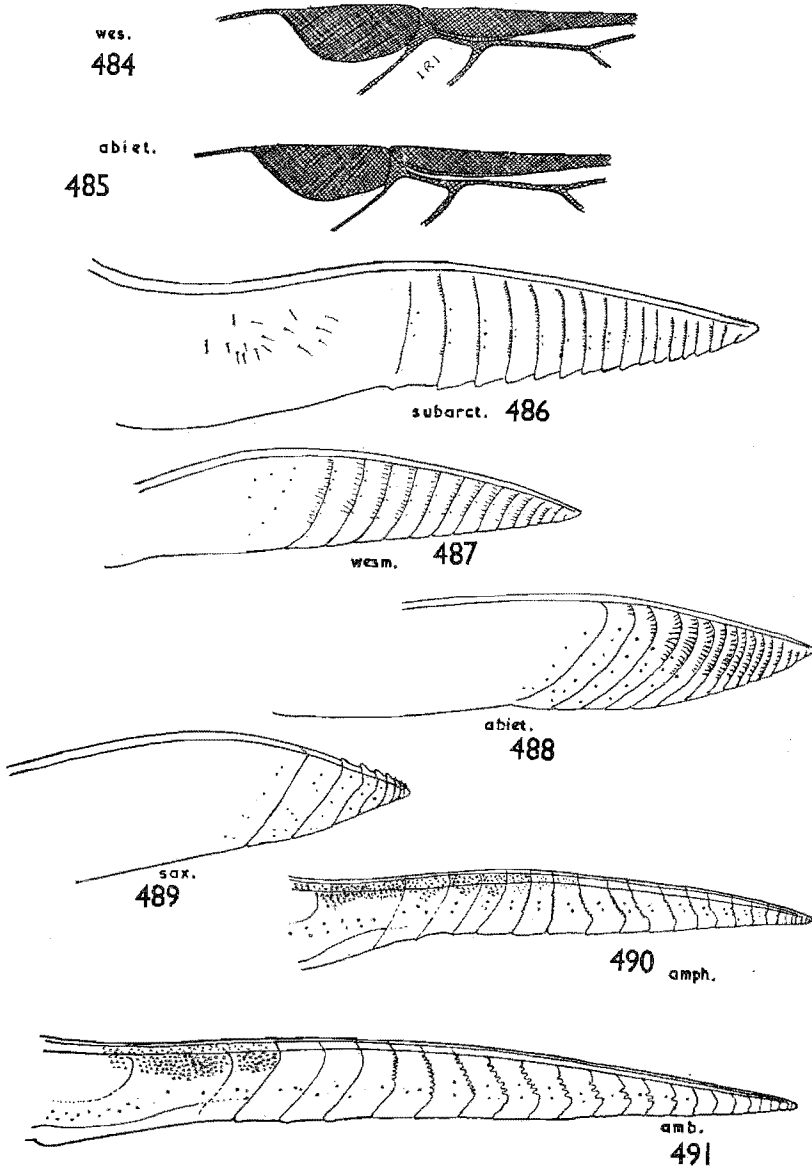
Smaller (5-6 mm.). Sc of fore wing less than its own length from origin of M from R (cf. figs. 410-1); C less swollen apically so that it does not entirely block out intercostal area at the point where Rs + M leaves R (fig. 485). Interantennal crest normal and slightly produced in profile (cf. fig. 385). Ovipositor two-thirds as long as hind tibia. Saw fig. 486.

Larva on *Picea* and *Abies*. Discovered in Forest of Dean, Glos., in 1949. (†Benson, 1950, Ent. mon. Mag. 86:223). V-VI. Scandinavia  
 .....♀ *subarctica* (Forsslund)



FIGS. 475-9.—Sawsheath from above in *Pristiphora* Groups E and F: 475, *abietina*; 476, *saxesenii*; 477, *wesmaelii*; 478, *ambigua*; 479, *amphibola*.

FIGS. 480-3.—Sawsheath laterally in *Pristiphora* Group E: 480, *subarctica*; 481, *saxesenii*; 482, *wesmaelii*; 483, *abietina*.



FIGS. 484-5.—Base of costa in fore wing in *Pristiphora* Group E :  
484, *wesmaeli* ; 485, *abietina*.

FIGS. 486-91.—Saw in *Pristiphora* Groups E and F : 486, *subarctica* ; 487, *wesmaeli* ;  
488, *abietina* ; 489, *saxesenii* ; 490, *amphibala* ; 491, *ambigua*.



- 4 (3) Ovipositor (sawsheath + basal plate) shorter than a front tibia (0.9 : 1.0); distance between cenchri more than one and a half times the breadth of one of them. Saw fig. 487.  
*Larva on Larix decidua Miller and leptolepis (Sieb. and Zucc.) Gord. Throughout British Isles. V-VII. (†Morice, 1919, Ent. mon. Mag. 55 : 204) ♀ wesmaeli (Tischbein)*
- Ovipositor longer than front tibia (1.1 : 1.0); distance between cenchri less than one and a half times the breadth of one of them.  
*Larva on Larix decidua Miller and leptolepis (Sieb. and Zucc.) Gord. England : Hants., Surrey, Norfolk, Salop, and Hereford; Wales : Radnor. III-V. (†Benson, 1954, Ent. mon. Mag. 89 : 113-4). Switzerland and Germany. . . . . ♀ glauca Benson*
- 5 (1) Smaller (5-6 mm.) with the ovipositor longer than the 4 basal tarsal segments together and longer than the middle tibia. Saw fig. 488.  
*Larva on Picea and Abies. Widespread throughout British Isles and locally destructive. (†Morice, 1906, Ent. mon. Mag. 42 : 250.) V-VII. N. and C. Europe. . . . . ♀ (= pini Retzius) abietina (Christ.)*
- Larger (6-7 mm.) with ovipositor scarcely as long as the 3 basal tarsal segments together and about as long as the middle tibia.  
*Larva on Picea and Abies. Probably widespread in plantations but heretofore confused with the preceding. (†Benson, 1940, Trans. Herts. nat. Hist. Soc. 21 : 227). V-VII. N. and C. Europe. . . . . ♀ compressa (Hartig)*

## KEY TO SPECIES OF E GROUPS.

## Males.

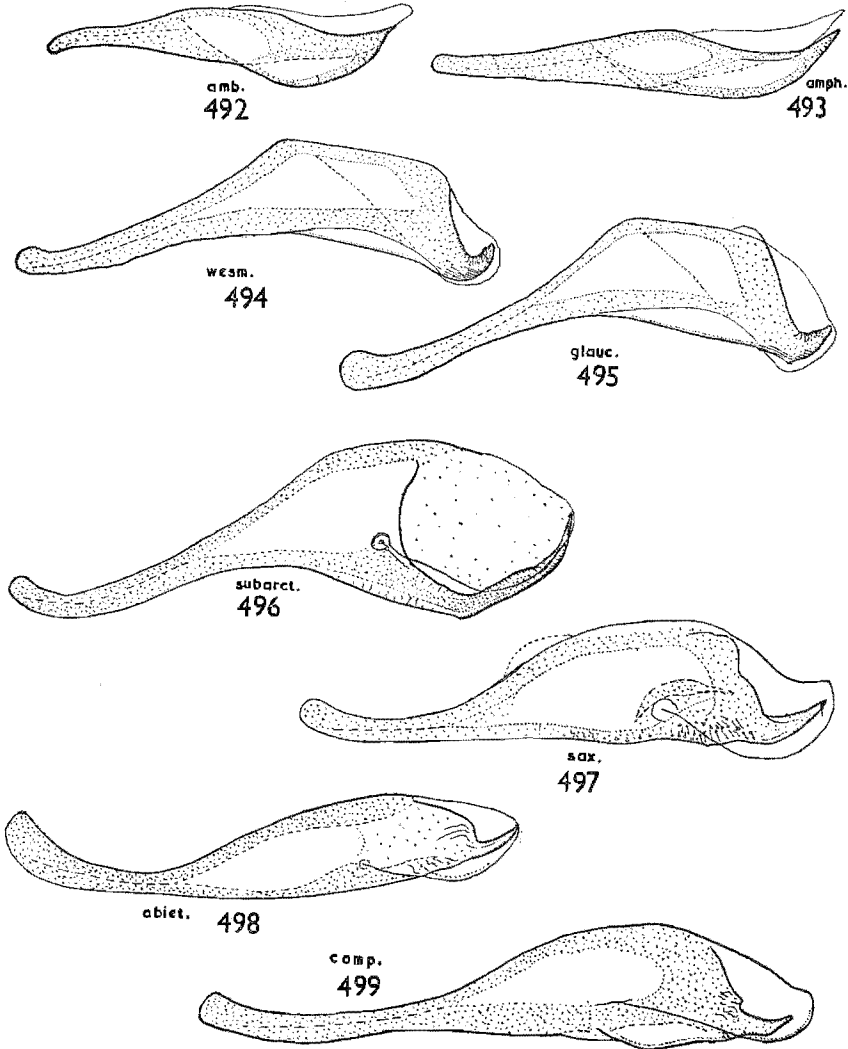
- 1 Swollen apex of C in fore wing does not entirely block out intercostal area at the point where Rs + M leaves R (fig. 485). Interantennal crest slightly angled in lateral view (cf. fig. 385). Dark spicules on basal flagellar segments (cf. fig. 436) much more plentiful on sides facing inwards and virtually absent from the lower part of the sides facing outwards. Attached to *Picea* and *Abies*. . . . . 2
- Swollen apex of C in fore wing entirely blocks out intercostal area at the point where Rs + M leaves R (fig. 484). Interantennal crest evenly rounded in lateral view, much as in *Amauronematus* (fig. 384). Dark spicules on basal flagellar segments more evenly spread on outer as well as inner surfaces. Attached to *Larix decidua* Miller and *leptolepis* Murr. . . . . 5
- 2 (1) Sc of fore wing at least its own length away from the origin of M from R (cf. fig. 409). Hind tarsus black throughout; hind tibia black-ringed apically. Penis valves figs. 497-9. . . . . 3
- Sc of fore wing less than its own length away from the origin of M from R (cf. figs. 410-1). Hind tarsus and apex of hind tibia brown below and piceous above. Penis valve fig. 496  
 Underthorax with at least mesepimeron infuscate. 4-5 mm.  
 ♂ *subarctica* (Forsslund)
- 3 (2) Hind ocellus less than twice its own diameter from back of head. Smaller (4.5-5.5 mm.) with pale mesopleura. Penis valve fig. 498  
 ♂ *abietina* (Christ.)
- Hind ocellus about twice its own diameter from back of head. Larger (5-6 mm.) . . . . . 4
- 4 (3) Mesopleura pale, without black fleck on sterno-pleural suture. Penis valve fig. 497. . . . . ♂ *saxesenii* (Hartig)
- Mesopleura with black fleck on sterno-pleural suture. Penis valve fig. 499  
 ♂ *compressa* (Hartig)
- 5 (1) Distance between cenchri less than one and a half times the breadth of one of them. Penis valve fig. 495. . . . . ♂ *glauca* Benson
- Distance between cenchri more than one and a half times the breadth of one of them. Penis valve fig. 494. . . . . ♂ *wesmaeli* (Tischbein)

KEY TO SPECIES OF F GROUP (*ambigua*).

- A Paler species with at least pronotum pale margined in ♀ and extensively pale in ♂ together with the tegulae; ♀ black with yellow on labrum, clypeus,

inner orbits, fore and middle femora, tibiae, tarsi and often also the mesopleura and hind femur; ♂ with orbits and face below antennae pale. Ovipositor in ♀ slightly shorter than a hind tibia and, in dorsal view, the projecting part slightly longer than broad and with a blunter apex (fig. 478). Saw with 20–21 segments, with lateral teeth on segments 9–19, and in form much shorter compared to its length than in *amphibola* (fig. 491). Penis valve of ♂ with lateral flap contracted and beaked at apex (fig. 492).

Larva on *Picea* and *Abies*. Widespread in Britain. IV–V. N. and C. Europe..... ♂ and ♀ (= *furvescens* Cameron) ***ambigua*** (Fallén)



FIGS. 492–9.—Penis valve in *Pristiphora* Groups E and F: 492, *ambigua*; 493, *amphibola*; 494, *wesmaeli*; 495, *glauca*; 496, *subarctica*; 497, *saxesenii*; 498, *abietina*; 499, *compressa*.

- B Darker species with pronotum entirely black in ♀ and only edged with pale colour in ♂; ♀ less richly marked with yellow, having the mesopleura and hind femur black; ♂ with inner orbits black. Ovipositor clearly longer than a hind tibia and, in dorsal view, strongly exerted, expanding at the base and then tapering to an emarginate apex (fig. 479). Saw with 22-24 segments and with lateral teeth on margins of segments 10-19 (fig. 490). Penis valve of the ♂ with lateral flap evenly tapering to apex and almost as long as medial flap (fig. 493).

Larva on *Picea* and *Abies* (L.) Karsten. Widespread in Britain. IV-V. C. Europe. (†Benson, 1948, Ent. mon. Mag. 84: 162-3)

♂ and ♀ *amphibola* (Förster)

### Genus *Amauronematus* Konow.

*Amauronematus* are early spring insects, among the first to appear, and have but a single annual flight. They are mainly attached to *Salix*, though a few species occur on *Betula*, *Populus* and *Vaccinium*. They are concentrated in the north and occur as far into the arctic regions or as near to the summits of mountains as does *Salix*. About 130 species are now distinguished in the world, though no doubt a great many more have yet to be found and described, some even in Britain, where already 21 are now recognized. Up to 1929 only seven of our species had been recorded, but in that year R. C. L. Perkins (*Ent. mon. Mag.* 65: 31-33) added six to the list and eight more have since been found.

In the following account *A. amentorum* has been transferred here from *Pristiphora* (it is sometimes treated as belonging to a distinct genus, *Pontoprístia* Malaise, together with a few other species whose larvae live likewise inside catkins of *Salix*). *A. fähræi* has been removed from *Amauronematus* to *Nematus*. In the keys that follow I have also included *Nematus reticulatus*, as it is sometimes mistaken for *Amauronematus*.

#### KEY TO SPECIES OF *Amauronematus*.

##### Females.

- 1 *Either* sawsheath in dorsal view narrow, at least behind where it is acute, rounded or at most narrowly truncate (not more than 3 times the medial breadth of a cercus (figs. 504-13)); *or* ovipositor longer than the hind femur (fig. 513)..... 2
  - *Sawsheath* in dorsal view not tapering behind, though it may be broadly rounded, truncate or emarginate at apex (figs. 514-23), where it is more than 3 times as broad as a cercus; the whole not longer than the hind femur (*cf.* fig. 512)..... 12
  - 2 (1) Ovipositor shorter than hind tibia (fig. 512)..... 3
  - Ovipositor longer than hind tibia (figs. 508 and 513).
- Reddish-brown species with black antenna and more or less marked with black on lateral lobe of mesonotum and basal tergites of abdomen. Saw with very prominent teeth (figs. 525 and 530). 7-8 mm. long.
- Larvae *undescribed but adults have been bred from larvae on Salix aurita* L. *Only known from Sussex (Tilgate Forest), Surrey (Hindhead), Bucks. (Whaddon Chase) and Herts. (Bricket Wood).* IV. (†Benson, 1948, Ent. mon. Mag. 84: 28). *Northern Eurasia to Kamtchatka*
- ♀ (*nec longiserra* Thomson Cameron) *longiserra* (C. G. Thomson)
- 3 (2) Abdomen with third to fifth tergites at least flecked with black medially and often almost entirely black (figs. 503a-b)..... 4
  - Abdomen with third to fifth tergites always entirely reddish brown (figs. 502a-b). 7-9 mm.

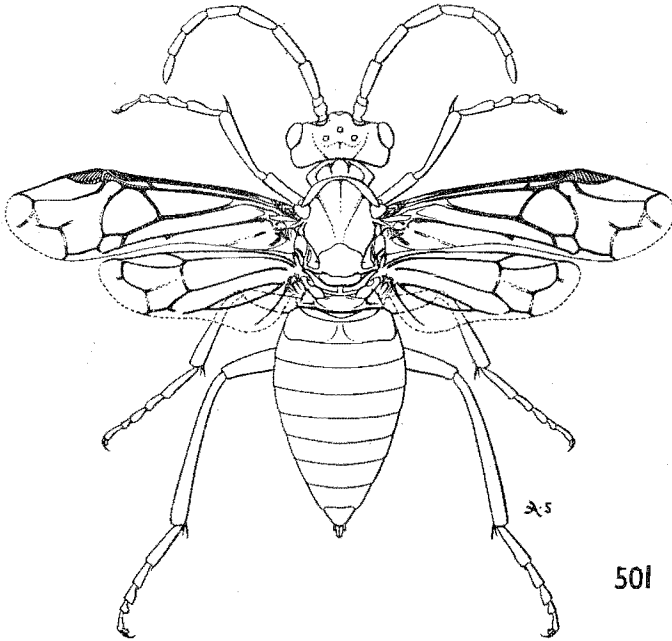
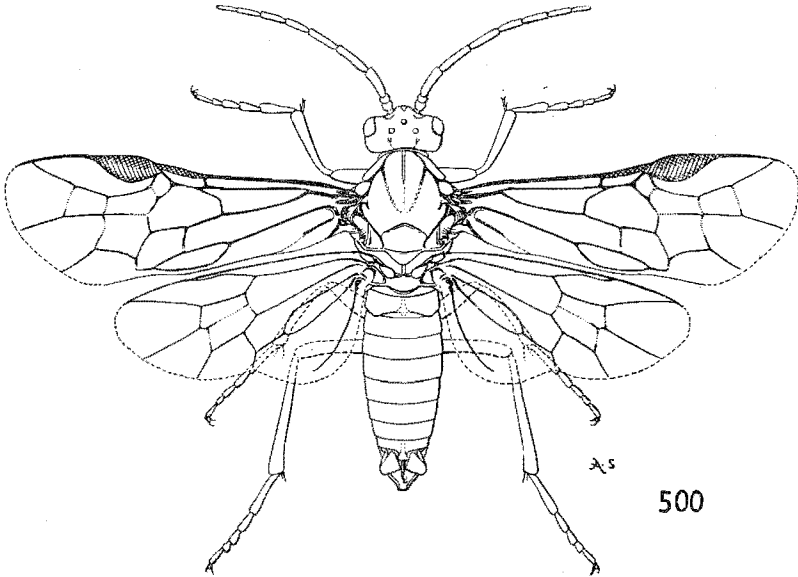
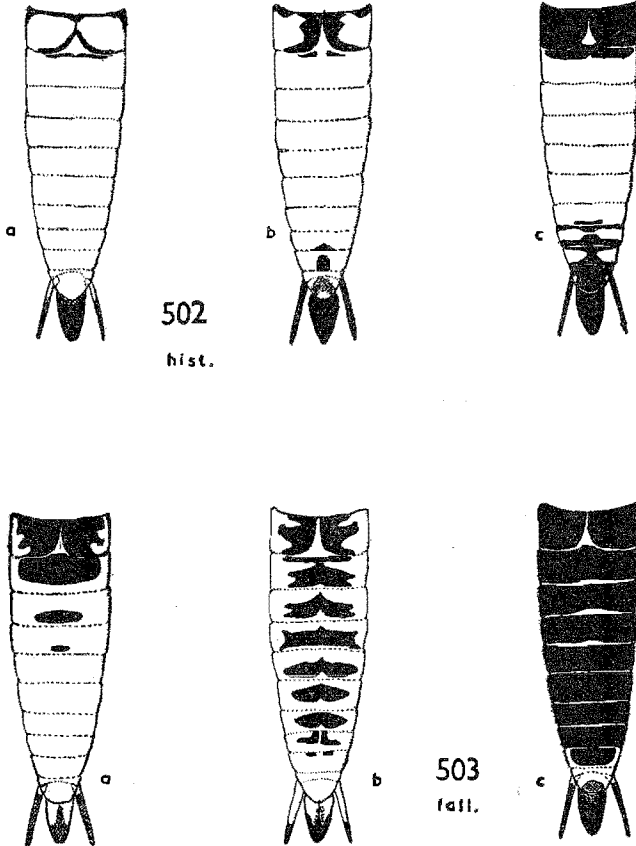


FIG. 500.—*Amauronematus abnormalis* ♂.

FIG. 501.—*A. abnormalis* ♀.

Variable in colour, basically reddish-brown with white on face and black antenna; more or less marked with black on ocellar region and thorax where this may be limited to a fleck on the lateral lobes of the mesonotum, the scutellum and the sternopleural line or may spread to cover the whole thorax. Abdomen nearly always black on first tergite and sawsheath; in darker specimens the black spreads to the second tergite and forwards from the apex to the seventh tergite, so that in the darkest specimens the first and second as well as the seventh and following tergites are marked with black (fig. 502c). This species is structurally scarcely distinguishable from *A. fallax*, but *fallax* is more northern in distribution and is usually much darker with the abdomen often entirely black above; and in the palest examples, where



Figs. 502-3.—Colour pattern of ♀ abdomen in *Amauronematus histrio* group : (a) palest ; (c) darkest. 502, *histrio* ; 503, *fallax*.

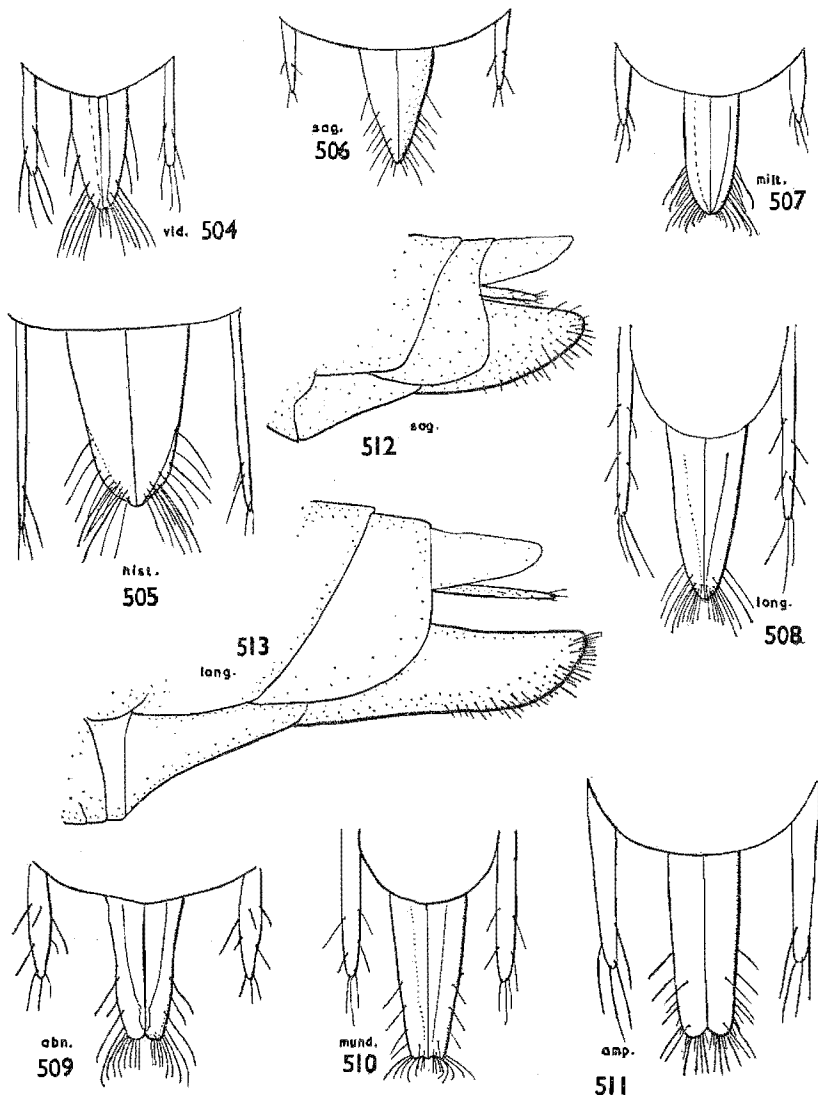
the abdomen is mainly reddish-brown, the third and fourth tergites are always flecked medially with black (cf. figs. 502 and 503). Sawsheath variable in form but often rather broad apically (fig. 505). Saw fig. 524.

Larva on *Salix alba* L., *atrocinerea* Brot., *aurita* L., *fragilis* L., etc. Common locally throughout Britain and Ireland. III-VI. C. and N. Europe to Caucasus, N. Asia and N. America

♀ (= *glennelgensis* Cameron) *histrio* (Lepelletier)

- 4 (3) Species not mainly black above or with pale stigma..... 5  
 - Species mainly black above and with dark stigma; more or less pale are the apical margins to the tergites, labrum, apex of clypeus, outer orbits (these brownish), hind edge of pronotum, edge of tegula and bases of tibiae. Saw-sheath fig. 511. Saw figs. 534 and 538. 7-9 mm.  
*Larva on Betula. Apparently local. England: Devon, Sussex, Kent, Bucks., Herts., Beds., Norfolk, Westmorland. Ireland: Cos. Wicklow and Cavan. IV-V. N. and C. Europe and Siberia..... ♀ amplus* Konow
- 5 (4) Wings normally developed and reaching beyond apex of abdomen..... 6  
 - Wings clearly shorter than abdomen and very abnormal and variable in venation (fig. 501).  
 Dull insects with heavy coriaceous sculpture all over. Black except for the more or less yellow head and mesonotum. Wings hyaline with yellow stigma and piceous venation. Ovipositor shorter than hind tibia and sheath acute behind in dorsal view (fig. 509). Saw figs. 527 and 532. 5-6 mm.  
*Larva undescribed but probably attached to Salix herbacea L., etc. Only known from near the summit (over 4000 ft.) of Mt. Braeriach, Inverness, in the Cairn Gorms, where it was discovered in VI-VII, 1934. (†Benson, 1935, Trans. R. ent. Soc. Lond. 83: 30). High arctic species: Lapland, Novaya Zemlya, New Siberian Islands, N. Bering Strait, Alaska, North West Territory of Canada and Baffin Land..... ♀ abnormis* (Holmgren)
- 6 (5) Cerci short (sawsheath viewed from above projects backwards about twice as far as length of cercus (figs. 506-7)). Front lobe of mesonotum and under-thorax entirely pale..... 7  
 - Cerci long (sawsheath viewed from above does not project beyond cerci by more than half length of a cercus). Front lobe of mesonotum and under-thorax often marked with black..... 8
- 7 (6) Antenna conspicuously pale beneath at apex. Scutellum entirely, and its post-tergite mainly pale. Sawsheath fig. 507; saw figs. 535 and 539. 6.5-7.5 mm.  
 Head and thorax mainly yellow, except for black depressed parts of mesonotum; abdomen mainly green fading to yellow, except for a medial black vitta more or less developed on tergites 1-3 or -7.  
*Larva on Salix viminalis L. Probably widespread in Britain but so far only known from osier holt in Devon, Berks., Bucks., Herts., Beds., and Lancs. V-VI. (†Perkins, 1929). C. and N. Europe and Siberia*  
 ♀ *miltonotus* (Zaddach)
- Antenna piceous. Scutellum posteriorly, its post-tergite and the first abdominal tergite entirely black. Sawsheath figs. 506 and 512; saw figs. 536 and 540. 5.5-6.5 mm.  
 Front and lateral lobe of mesonotum often entirely red. Abdomen mainly black above and orange beneath (in life the orange is green at first).  
*Larva on Salix spp. Only known from England: Dartmoor (Devon) and Upper Teesdale (Yorks. and Durham); and Ireland: Wicklow. IV-VI. (†Perkins, 1929). N. and C. Europe, Siberia and N. America*  
 ♀ *sagmarius* Konow
- 8 (6) Sawsheath in dorsal aspect much broader at base than apex, where it is acutely or obtusely rounded (figs. 504-5)..... 9  
 - Sawsheath in dorsal aspect very thin, almost parallel-sided, but with a truncate apex (fig. 510). 7-9 mm. Saw figs. 526 and 531.  
*Larva not described but attached to Salix repens L. Local in England: Devon, Dorset, Sussex, Middlesex, Herts., Hunts., and Cumberland; Scotland: Inverness, Moray and Sutherland. IV-VI. N. and C. Europe, Siberia and N. America..... ♀ mundus* Konow
- 9 (8) Malar space not longer than distance between antennal sockets (fig. 556). Saw with only the apical segments up to 13, and sometimes the 2 basal ones, bearing marginal teeth (figs. 528-9). Small species (5-7 mm.) with sculpture of head and thorax often obsolete..... 10  
 - Malar space longer than distance between antennal sockets (fig. 557). Saw with every segment bearing a marginal tooth..... 11

- 10 (9) *Mesopleura* shining, without surface sculpture. Front lobe of mesonotum with medial furrow obsolete behind. Ovipositor (fig. 504) usually about as long as hind tibia. Saw (fig. 529) very narrow (so that in the middle, together with its support, its width is less than that of the apex of the hind tibia) with 19–23 segments, of which the 8–13 apical ones and 2 basal ones

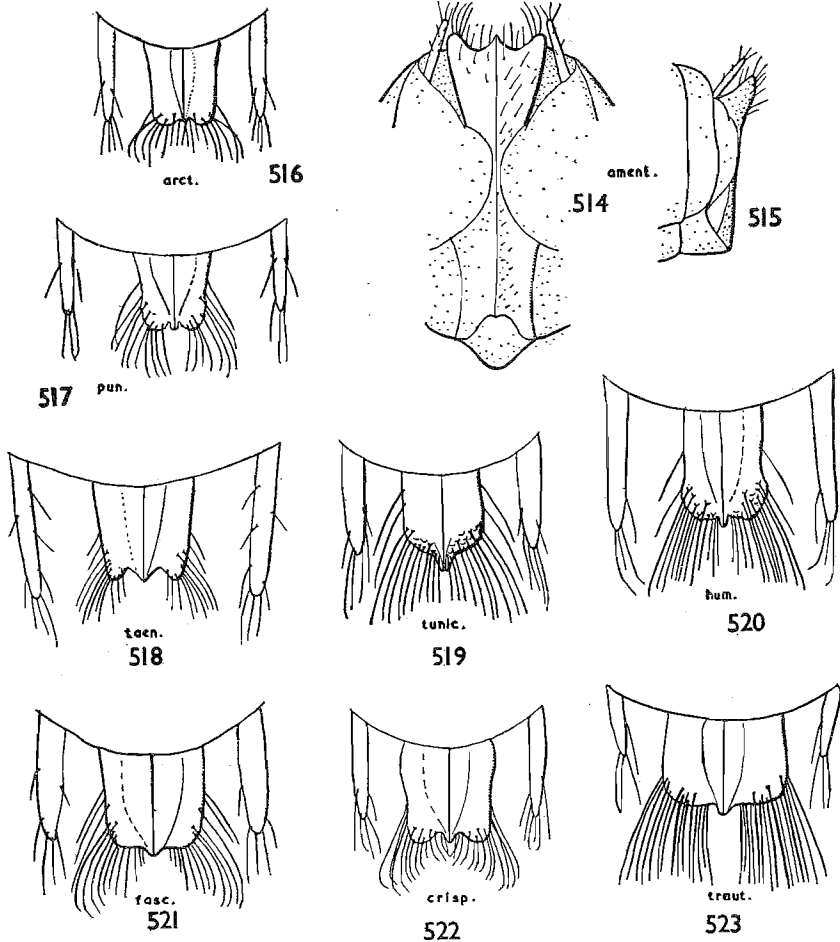


FIGS. 504–11.—Sawsheath from above in *Amauronematus* : 504, *viduatus* ; 505, *histrio* ; 506, *sagmarius* ; 507, *miltonotus* ; 508, *longiserra* ; 509, *abnormis* ; 510, *mundus* ; 511, *amplus*.

FIGS. 512–3.—Sawsheath in lateral view in *Amauronematus* : 512, *sagmarius* ; 513, *longiserra*.

have marginal teeth. Very variable in colour: in the typical pale form, which is the predominant one in Britain, the head (except for the ocellar basin), mesopleura, tegula, edge of pronotum, legs, spot on scutellum, underside and apex of abdomen are yellow; but in the darkest forms only the mouthparts, outer orbits, tegula, legs and apex of abdomen are pale. 5-6.5 mm.

Larva on *Salix repens* L., *atrocinerea* Brot., *aurita* L., *caprea* L., etc. Locally common throughout Britain and Ireland. III-V. C. and N. Europe ♀ (= *longiserra* Thoms., Cameron nec Thomson) **viduatus** (Zetterstedt) Mesopleura, at least in the middle, dull with fine coriaceous sculpture. Front lobe of mesonotum with medial furrow generally clearly defined. Ovipositor usually shorter than hind tibia. Saw (fig. 528) much broader (its width in



Figs. 514-5.—Sawsheath of *Amauronematus amentorum*:  
514, ventral view; 515, lateral view.

Figs. 516-23.—Sawsheath from above in *Amauronematus*: 516, *arctica*; 517, *purpureus*; 518, *taeniatus*; 519, *tunicatus*; 520, *humeralis*; 521, *fasciatus*; 522, *crispus*; 523, *trautmanni*.



the middle, together with that of its support, is about the same as that of the apex of the hind tibia) with 13-17 segments, of which the 6-11 apical ones bear marginal teeth but the two basal ones do not. Mainly black species with pale on mouthparts, clypeus, temples, more or less orbits, tegula, edge of pronotum, legs, apex and underside of abdomen. 5.5-6.5 mm.

*Larva on Salix atrocinerea* Brot., aurita L., repens L., etc. Common locally in S. England : Devon, Sussex, Kent, Surrey, Middlesex, Bucks., Herts. and Hunts. III-V. (†Benson, 1948, Ent. mon. Mag. 84 : 29. This species was incorrectly recorded as British by Morice, 1906, Ent. mon. Mag. 42 : 135 from Ben Nevis; the specimen on which this record was based is in the Morice collection and is *Pristiphora staudingeri* Ruthe q.v.). C. and N. Europe and N. Asia to Kamchatka

♀ (= *saarineni* Lindqvist Benson) **leucolaenus** (Zaddach)

- 11 (9) Smaller arctic-alpine species (4.5-5.5 mm.). Head and thorax more or less shining with coriaceous sculpture obsolescent. Very variable in colour but cerci always pale (see *Nematus reticulatus* Holmgren complex, p. 211-3).

- Larger lowland species (8-9 mm.). Head and thorax mainly dull with dense coriaceous sculpture. Cerci more or less dark.

In the saw (cf. fig. 524) and sawsheath (cf. fig. 505) and other structures this species is scarcely distinguishable from *histris*, though very variable. The greater extension of black on the tergites of *fallax* (as shown in figs. 502-3) will always distinguish the two species; tergites 3 and 4 each always have at least a black medial spot in *fallax*, but never in *histris*. Saarinen (1949, *Ann. ent. fem.* 15 : 55-82 and 1950, *op. cit.* 16 : 18-24 and 44-63) has described several of the forms of this very variable species as distinct species.

*Larva on Salix atrocinerea* Brot., aurita L. and repens L. England : only known from Devon, Dorset, Hants., Worcs., Norfolk, and Yorks. : much commoner in Scotland : Perth., Angus, Aberdeen, Inverness, Moray, Nairn and Sutherland; and in Ireland : Cos. Dublin and Cavan. IV-V. C. and N. Europe to Caucasus, to East Siberia and across N. America

♀ (*canaliculatus* Hartig Cameron nec Hartig, *humeralis* Lepelletier Cameron nec Lep.).....**fallax** (Lepelletier)

- 12 (2) Larger species (5-8 mm.), with the abdomen not laterally compressed and the sawsheath not set up erect (fig. 516-23).....13

- Small species (4-5 mm.), with the abdomen at the apex laterally compressed. Sawsheath tridentate at apex and carried almost erect (figs. 514-5).

Clypeus very feebly emarginate in front. Black with the following parts yellowish-white : face below the antennae, edge of pronotum, tegulae, legs and more or less underside of abdomen.

*Larva in catkins of Salix repens* L., caprea L., etc., feeding on the developing seeds. Few British records : Devon (Bovey Tracey, 1925, R. C. L. Perkins), Surrey (Bookham Common, 1946-49, P. W. E. Currie); Bucks. (Aylesbury, larvae 1944, L. W. Goodson, and Whaddon Chase, larvae 1945, R. B. B.), and Norfolk (Brundall, 1879, J. B. Bridgman). IV-V. (†Perkins, 1929, Trans. Devon. Ass. Adv. Sci. 61 : 306). N. and C. Europe, Siberia and N. America

♀ (= *Pristiphora amentorum*) **amentorum** (Förster)

- 13 (12) Stigma and costa pale yellow or white. Mesonotum and mesopleura often marked with pale colour.....14

- Stigma and apex of costa piceous. Mesonotum and mesopleura entirely black 20

- 14 (13) Scutellum about as broad as its length, with the post-tergite, convex in the middle and dull all over, with dense coriaceous sculpture (fig. 559).

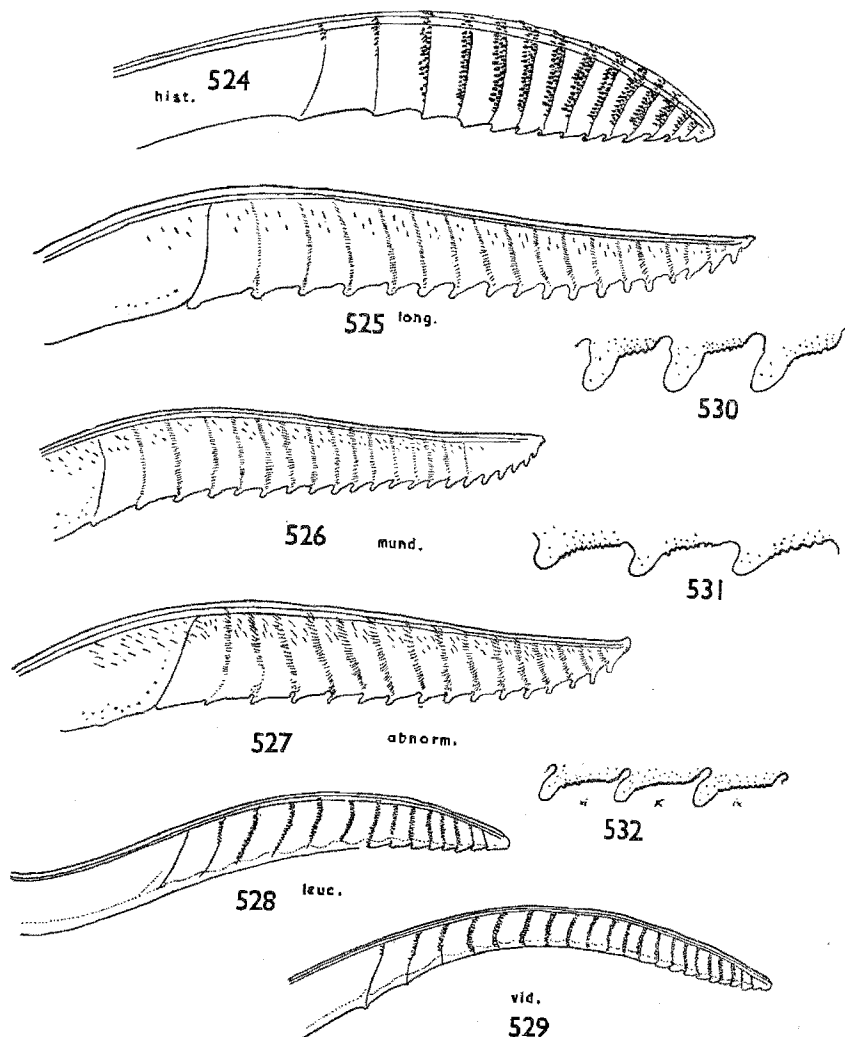
Plump species with dull surface sculpture, mostly orange-yellow with the following parts black : antenna, ocellar spot, propleura, mark on each of the 3 mesonotal lobes, mesosternum, sometimes a spot on scutellum, the metanotum and more or less one or more of the basal tergites up to 8, also base of sawsheath. Wings slightly yellowish hyaline with yellow stigma, costa and basal venation; rest of venation piceous. Sawsheath fig. 517.....15

- Scutellum either with its breadth at least one-fifth less than its length including the post-tergite (fig. 562) or else flattened in the middle and sometimes shining (figs. 558 and 560-1).....16

15 (14) Very variable in the extent of black on the abdomen; if however two or more of the basal tergites are mainly black, then there is no dark-centred pale spot each side of the first tergite. Frontal area of the head more clearly defined. In the saw the middle teeth along the margin longer at the base than their depth (fig. 545). 5.5-6.5 mm.

Larva on *Populus tremula* L. Locally common in Devon, Hants., Surrey, Bucks., Herts., Essex, Beds., Warwicks. and Notts. V-VI. (†Perkins, 1929). All Europe including Iberian Peninsular; also E. Siberia.

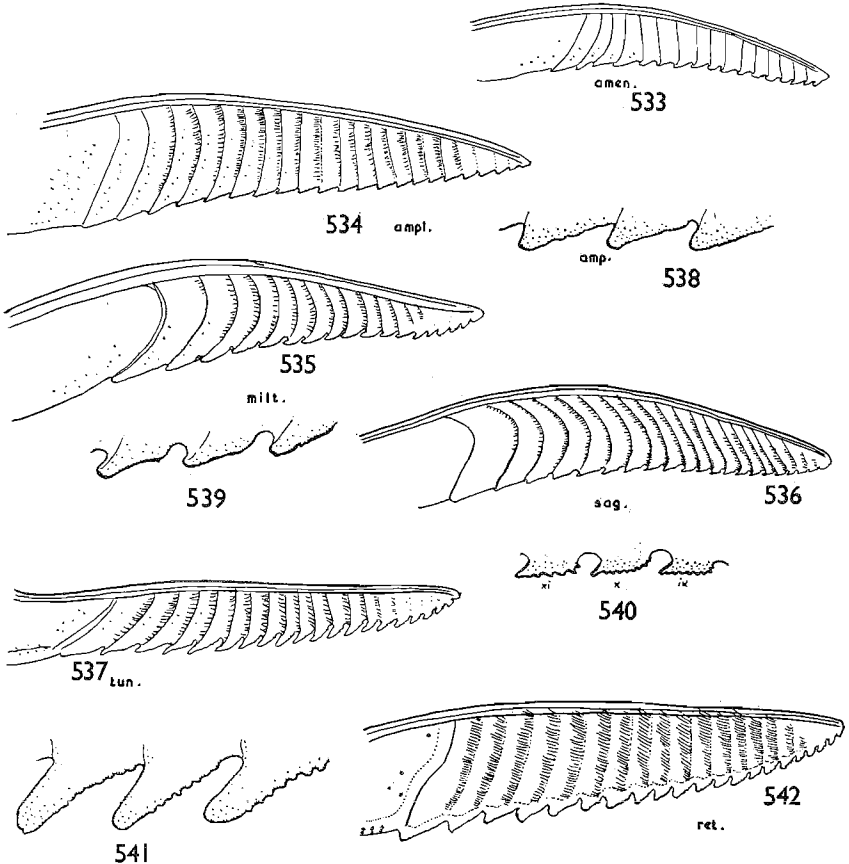
♀ *punicus* (Christ.)



FIGS. 524-32.—Saw of *Amauronematus*: 524, *hiatrio*; 525, *longiserra*; 526, *mundus*; 527, *abnormis*; 528, *leucolaenus*; 529, *viduatus*; 530, *longiserra* 9th to 11th tooth; 531, *mundus* likewise; 532, *abnormis* likewise.

- Abdomen almost entirely black above up to the seventh tergite but the first tergite has a pale dark-centred spot each side. Frontal area of head scarcely defined. In the saw the middle teeth along the margin deeper than their basal length (fig. 551). 5.5-6.5 mm.

*Larva on Salix aurita L. and atrocinerea Brot. England: Bucks. (Whad-*



FIGS. 533-7.—Saw of *Amauronematus*: 533, *amentorum*; 534, *amplus*; 535, *miltonotus*; 536, *sagmarius*; 537, *tunicatus*.

FIGS. 538-41.—9th to 11th teeth of saw of *Amauronematus*: 538, *amplus*; 539, *miltonotus*; 540, *sagmarius*; 541, *tunicatus*.

FIG. 542.—Saw of *Nematus reticulatus*.

*don Chase, 1946-7, R. B. B.), Beds. (Kings Wood, 1947, V. H. Chambers), and Devon (Great Haldons, 1926, R. C. L. Perkins); Ireland: Co. Cavan (Drumcarban and Lough Mentis, 1941-47, R. C. Faris and E. F. Bullock). IV. (†Benson, 1948, Ent. mon. Mag. 34: 32). Lapland, Siberia and Alaska*

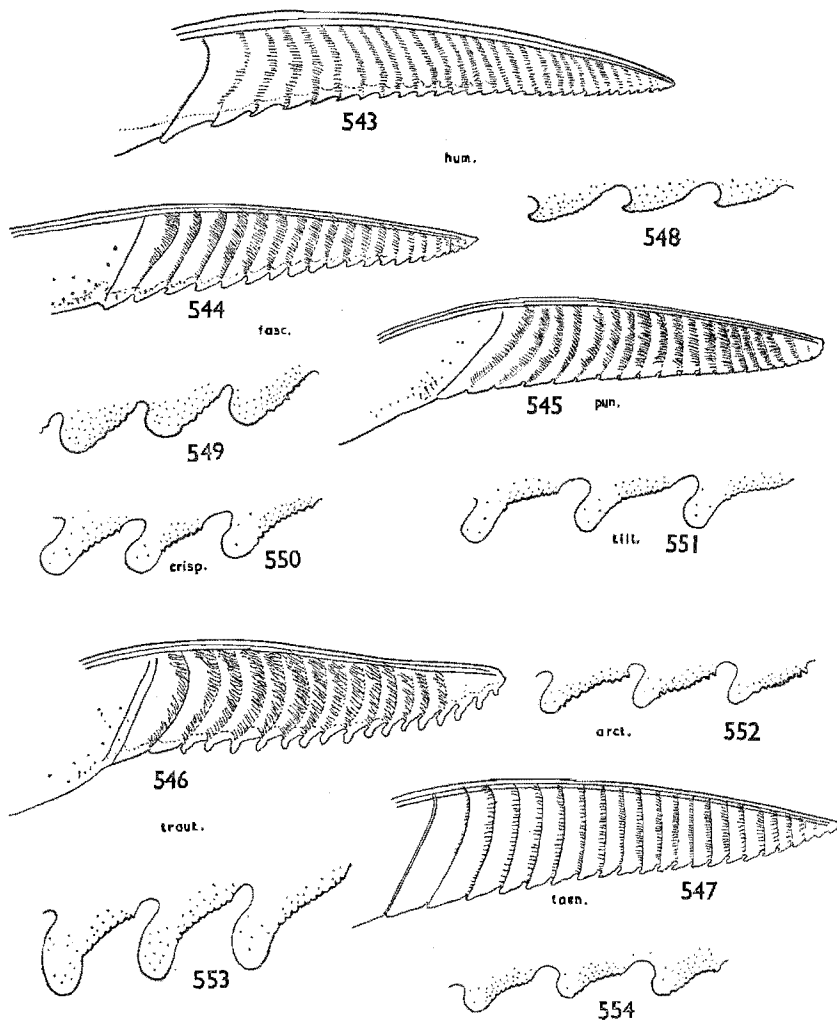
- \*♀ (= *rex* Benson) *tillbergi* Malaise  
 16 (14) Lowland species, mostly over 6 mm. with the scutellum or post-tergite at least partly unsculptured and shining and the sculpture of the thorax often not coriaceous, and with most of the sternites of the abdomen marked with pale colour. . . . . 17

- Arctic-alpine species, mostly under 6 mm. with the whole thorax, including the scutellum and post-tergite with dense coriaceous sculpture and the abdomen entirely black below except in the neighbourhood of the sawsheath.
- Almost entirely black except sometimes for the following which are more or less yellow: temporal spot, inner orbits, tegula, knees, tibiae and tarsi: wings hyaline with yellowish-white stigma. Sawsheath fig. 516. This species is extremely similar to the subarctic *A. zillbergi* (see above) but the latter species has the middle marginal teeth on the saw at least almost as deep as their basal lengths (fig. 551) while *articola* has them only half as deep (fig. 552).
- Larva unknown but apparently attached to Salix herbacea L. Found only in the arctic-alpine regions of the Grampian mountains (Perth and Inverness). VI-VII. (†Benson, 1935, Trans. R. ent. Soc. Lond. 83: 31). Lapland, Siberia and Alaska. ♀ (= mcluckiei Benson syn. nov.) articola* Enslin.
- 17 (16) Sawsheath in dorsal aspect truncate or broadly rounded at apex and slightly produced medially but not emarginate each side of the production (figs. 521 and 523). Post-tergite separated from scutellum by a continuous suture (fig. 562).....18
- Sawsheath in dorsal aspect perceptibly tridentate at apex, slightly emarginate each side of the middle (fig. 522). Suture separating post-tergite from scutellum more or less obsolete medially (figs. 560-1).
- Sawsheath with the setae curved and grouped into a lateral apical tuft each side. Saw with prominent marginal teeth almost as deep as their basal length (fig. 550). Very variable in colour: top of head, mesonotum and mesopleura reddish-brown, while the lower face, the pronotum and underside of abdomen are green in life, fading to yellow and all are more or less marked with black. 6-7 mm. Very similar to *A. vittatus* (Lep.), which has a normal suture separating scutellum from post-tergite and straight setae on apex of sawsheath.
- Larva on Salix repens L., England: Devon, Somerset, Herts., Cambs., Hunts., Norfolk, Warwick and Lancs. Wales: Glamorgan; Scotland: Caithness; Ireland: Wexford and Cavan. IV-VI. (†Benson, 1948, Ent. mon. Mag. 84: 30). Holland, Sweden and Finland*
- 18 (17) Sawsheath with apex more rounded in dorsal aspect and with setae almost straight and mainly set from this apex in a long even fringe (figs. 520 and 523) .....19
- Sawsheath truncate at apex in dorsal aspect and with setae well developed at the sides, while those at the apex are clearly curved (fig. 521). 7-8 mm.
- Scutellum narrower than its length including the post-tergite (fig. 562). Saw with middle teeth not as deep as their basal length (figs. 544 and 549).
- Larva on Salix caprea L. etc. England: Devon, Hants., Herts., Bucks., Beds. and Lancs.; Scotland: Lanark and Inverness; Ireland: Cos. Kildare and Cavan. V-VI. (†Benson, 1933, Stylops 2: 256-7). N. and C. Europe to E. Siberia and Alaska. . . ♀ (= perkinsi Benson) fasciatus* Konow
- 19 (18) Paler species with orbits, sides of mesonotal lobes, scutellum and mesopleura mostly reddish-yellow; venter of abdomen green to white. Mesonotum less heavily sculptured, and shining. Scutellum about as broad as its length including the post-tergite. Sawsheath subtruncate at apex in dorsal aspect (fig. 523). Saw with very prominent marginal teeth, the middle ones being much deeper than their basal length (figs. 546 and 553). 6-8 mm.
- Larva undescribed but presumably on Salix. England: Devon, Hants., Bucks., Herts., Salop; Scotland: Lanark and Inverness; Ireland: Cos. Dublin, Wicklow and Cavan: IV-VI. (†Perkins, 1929). N. and C. Europe. . . ♀ (= imperfectus Zaddach, Cameron, nec. Zaddach = piliserra Lindqvist = cameroni Perkins = excellens Forsius) trautmanni* Enslin
- Darker species, almost entirely black except for the more or less white inner orbits, temporal spot, pronotum, apices and sometimes whole of abdominal sternites. Mesonotum heavily coriaceous and dull; scutellum narrower than its length including the post-tergite. Sawsheath rounded apically in dorsal aspect (fig. 520). Saw with middle marginal teeth not as deep as basal length (figs. 543 and 548). 7-8 mm.

Larva on *Salix atrocinerea* Brot. England: Devon, Haris., Surrey, Berks., Bucks., Herts. and Beds. IV-V. N. and C. Europe and E. Siberia

♀ *humeralis* (Lepeletier)

- 20 (13) Mesoscutellum very flat, longer (without post-tergite) than broad, and shining between scattered punctures. Sawsheath in dorsal view broadly rounded at apex (fig. 519)..... 21  
 — Mesoscutellum convex, broader than long (without post-tergite), and dull with dense surface sculpture at least at sides (cf. fig. 559). Sawsheath in dorsal view emarginate at apex (fig. 518). 7-9 mm. Saw figs. 547 and 554.



FIGS. 543-7.—Saw of *Amauronematus*: 543, *humeralis*; 544, *fasciatus*; 545, *puniceus*; 546, *trautmanni*; 547, *taeniatus*.

FIGS. 548-54.—9th to 11th teeth of saw of *Amauronematus*: 548, *humeralis*; 549, *fasciatus*; 550, *crispus*; 551, *tillbergi*; 552, *arcticola*; 553, *trautmanni*; 554, *taeniatus*.

*Larva on Salix fragilis L. and other smooth-leaved Salix spp. Only known from single specimens in England: Herts. (Boxmoor, 1936, and Harpenden), Oxon. (Souldern, 1946), Warwicks. (Coventry, 1923, J. W. Saunt) and Scotland: Inverness (Aviemore, 1946, P. Harwood). IV-V. (†Perkins, 1929). N. and C. Europe. Siberia and N. America. . . ♀ taeniatus (Lepeletier)*

- 21 (20) Pale colour greenish-white except the temples, which are yellow; abdomen pale below but the tergites above are piceous except for their hind and lateral margins. Legs with hind femur more or less infuscate. Mesopleura above dull in the middle with dense surface sculpture. 6.5-7.5 mm. Saw very similar to that of *S. taeniatus*.

*Larva on Salix aurita L., caprea L., cinerea L., and repens L., etc. Only known from two or three specimens found on the Culbin Sands near Forres, Moray, and at Aviemore, Inverness, 1951-2. V. (†Benson, 1953, Ent. mon. Mag. 89: 152). Europe, Siberia and British Columbia*

- \*♀ *semilacteus* (Zaddach)  
 - Pale colour yellow except lower face and pronotum, which are white; abdomen pale with only the first and second tergites and sometimes the sternites more or less black. Legs with femur entirely pale. Mesopleura shining and scarcely sculptured. 6.5-7.5 mm. Saw figs. 537 and 541.

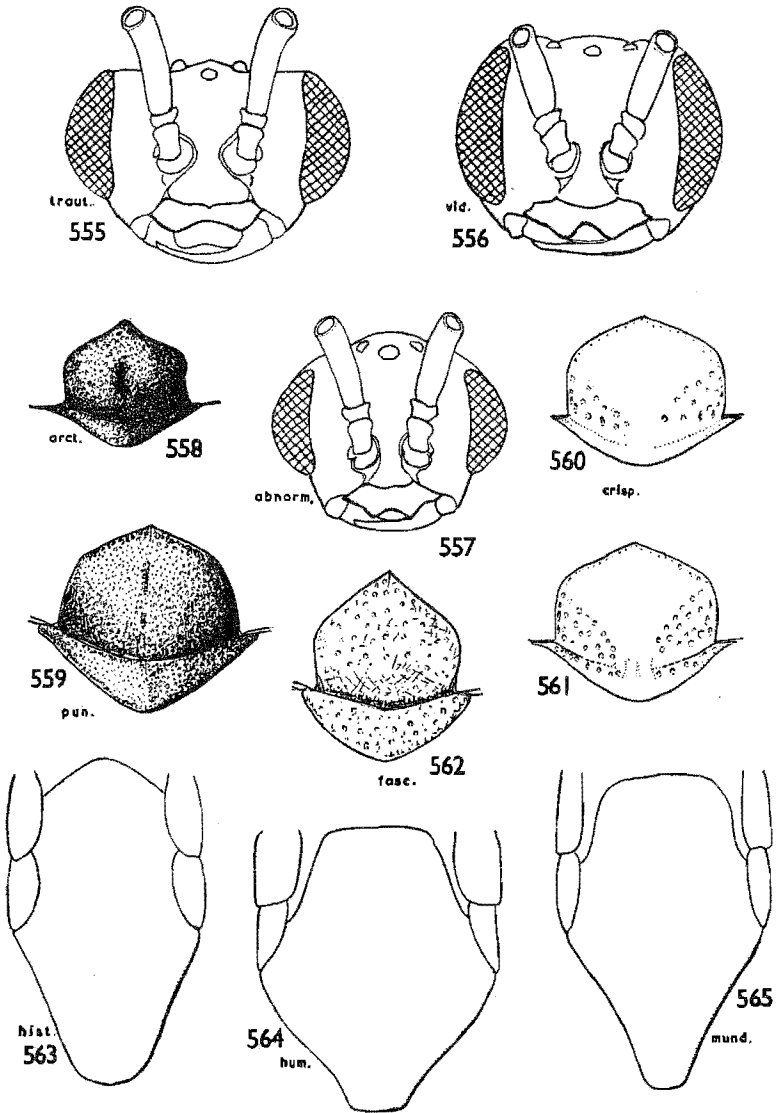
*Larva on Salix atrocinerea Brot., aurita L., etc. Local in England: Devon, Hants., Surrey and Herts., and Ireland: Co. Wicklow. III-IV. (†Perkins, 1929). N. and C. Europe. . . . . \*♀ tunicatus (Zaddach)*

Males.

I have been unable to see males of the following species, which are therefore not included in the key, and may not occur at all in nature. I have indicated in brackets the species nearest to which they would probably run in the key, if ever found:

- tillbergi* Malaise (cf. *punicus*).
- tunicatus* Konow (cf. *histrion* or *fasciatus*).
- semilacteus* (Zaddach) (cf. *fasciatus*).
- amentorum* (Förster) (from its small size, probably less than 4.5 mm., and pale underside would be unmistakable).

- 1 Eyes large, so that malar space is shorter than distance between antennal sockets (fig. 556). Sternites, apart from hypopygium, almost entirely infuscate. Not more than 5.5 mm.  
 Hypopygium broadly rounded at apex (cf. fig. 563). Scutellum convex and strongly shining between the surface sculpture, and slightly longer than broad) . . . . . 2
- Eyes smaller, so that malar space is at least as long as distance between antennal sockets (figs. 555, 557); or sternites almost entirely pale. Often more than 5.5 mm. . . . . 3
- 2 (1) Hind femur and tegula mostly pale. Mesopleura entirely smooth. Penis valve fig. 572. 4.5-5.5 mm. . . . . ♂ *viduatus* (Zetterstedt)
- Hind femur and tegula more or less infuscate. Mesopleura clearly sculptured in the middle. Penis valve fig. 573. 4.5-5.5 mm. . . . . ♂ *leucolaenus* (Zaddach)
- 3 (1) Eyes small (greatest measurement scarcely greater than breadth of clypeus); malar space long (at least one and a half times distance between antennal sockets) (fig. 557). Head and thorax with dense and regular coriaceous sculpture. Tegula and edge of pronotum dark. Arctic-alpine species.  
 Hypopygium with apical truncation narrower than apex of hind tibia (cf. fig. 565) . . . . . 4
- Eye larger (greatest measurement at least one-fifth more than breadth of clypeus) and malar space shorter (less than one and a half times distance between antennal sockets) (fig. 555). Head and thorax with coriaceous sculpture in part obsolete, or obscured by punctation or irregular surface sculpture. Tegula and edge of pronotum pale. Lowland species. . . . . 5
- 4 (3) Projection to last tergite expanding behind with the upper face triangular and margined laterally. Penis valve with a long curved projecting apical spine forming about one-quarter of the length of the valve (fig. 569). 5-6 mm. . . . . ♂ *abnormis* (Holmgren)



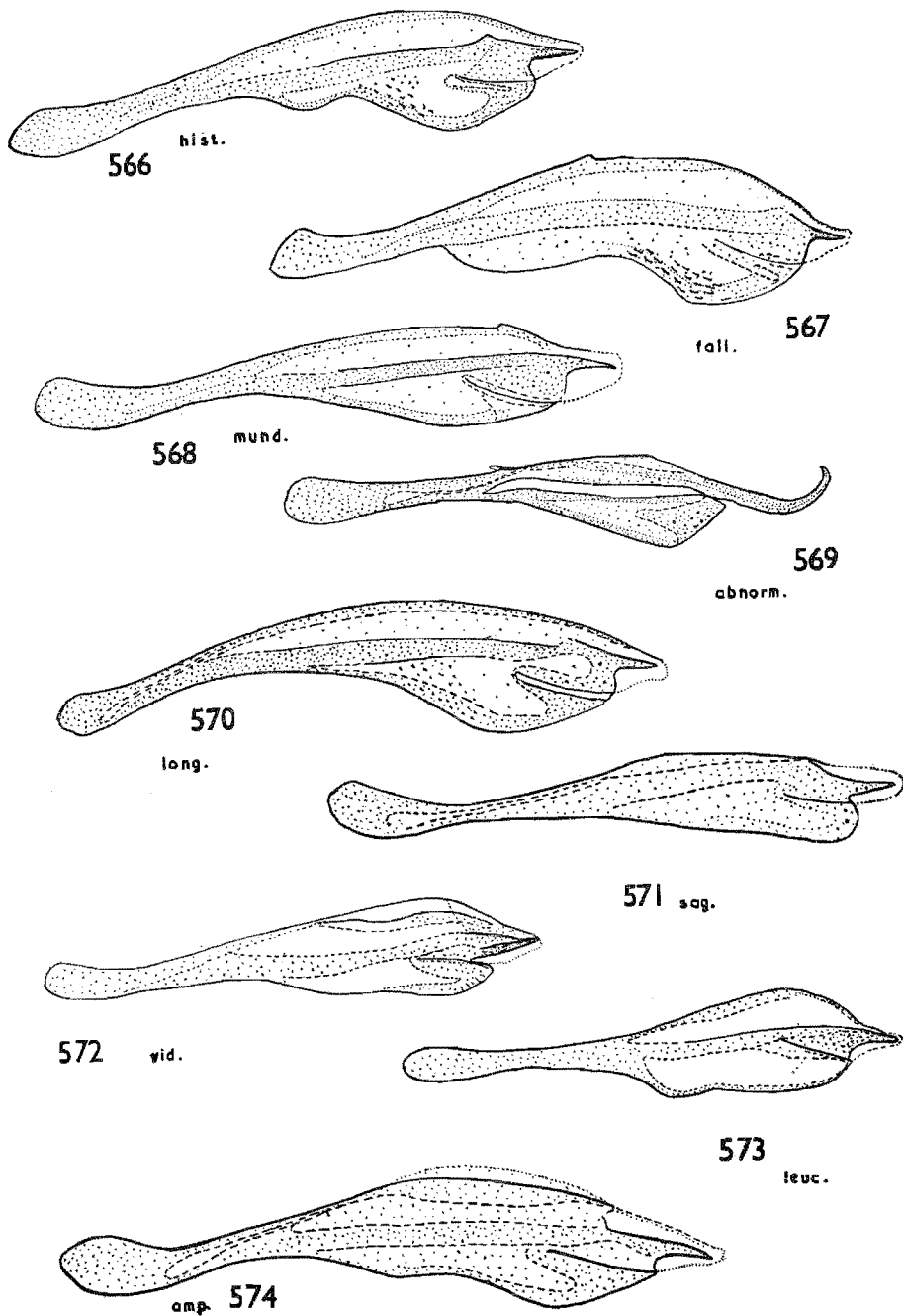
Figs. 555-7.—Face of *Amauronematus*: 555, *trautmanni*; 556, *viduatus*; 557, *abnormis*.

Figs. 558-62.—Scutellum of *Amauronematus*: 558, *arctica*; 559, *puniceus*; 560-1, *crispus*; 562, *fasciatus*.

Figs. 563-5.—Hypopygium of ♂ *Amauronematus*: 563, *hystrio*; 564, *humeralis*; 565, *mundus*.

- Projection to last tergite almost parallel-sided and without any clearly defined triangular upper face. Penis valve with the apical spine short and blunt, forming scarcely one-tenth the length of the whole valve (fig. 577). 4.5-5.5 mm.....♂ *arcticola* Enslin
- 5 (3) Scutellum (including post-tergite) one and a quarter times longer than broad (cf. fig. 562), scarcely convex, acute in front and shining between often sparse punctures. Abdomen more or less infuscate below.  
Hypopygium broadly rounded or truncate at apex (figs. 563-4) ..... 6
- Either scutellum scarcely longer than broad (figs. 559-61), or underside of abdomen entirely pale..... 7
- 6 (5) Abdomen with at least middle tergites 3, 4 and 5 entirely yellow. Hypopygium broadly rounded at apex (fig. 563). Penis valve fig. 566. 6-7 mm.  
♂ *histrion* (Lepeletier)
- Abdomen including tergites 3, 4 and 5, mainly black. Hypopygium broadly truncate at apex (fig. 564). Penis valve fig. 567. 6-7 mm.  
♂ *fallax* (Lepeletier)
- 7 (5) Stigma and costa black..... 8
- Stigma and costa pale brown or yellow..... 9
- 8 (7) Hypopygium black and narrower apically, so that the truncate apex is narrower than the width of the apex of the hind tibia (fig. 565). Penis valve fig. 574. 6-7 mm.....♂ *amplus* Konow
- Hypopygium brown and less narrowed apically so that the apical truncation is broader than the width of the apex of the hind tibia (fig. 564). (Penis valve not seen). 6-7 mm.....♂ *faeniatus* (Lepeletier)
- 9 (7) Mesonotum without yellow flecks. Stigma and costa pale brown. Scutellum often shining between sparse punctures or obsolescent sculpture..... 10
- Mesonotum laterally and often scutellum and mesopleura more or less flecked with yellow stigma and costa clear yellow. Scutellum convex and densely sculptured (fig. 559).  
Hypopygium with apical truncation narrower than apex of hind tibia (fig. 565). Penis valve fig. 576. 5-6.5 mm.....♂ *punicus* (Christ.)
- 10 (9) Mesopleura and scutellum shining at least between scattered punctures or obsolescent sculpture..... 11
- Mesopleura and often scutellum dull all over with dense punctures and/or surface sculpture..... 14
- 11 (10) Abdomen dark below (apart from hypopygium)..... 12
- Abdomen more or less pale yellow..... 17
- 12 (11) Hind tibial spurs shorter than apical width of hind tibia. Lowland species often over 5 mm..... 13
- Inner hind tibial spur longer than apical width of hind tibia. Arctic-alpine species under 5 mm. Penis valve fig. 575.....♂ *Nematus reticulatus* Holmgren
- 13 (12) Scutellum with patches of coriaceous sculpture in front. Penis valve fig. 571. Northern and western species. On *Salix atrocinerea* Brot., etc. 4.5-5.5 mm.  
♂ *sagmarius* Konow
- Scutellum almost impunctate, with only sparse obsolescent puncture. (Penis valve not seen). Mainly southern species on *Salix viminalis* L. 4.5-5.5 mm.  
♂ *miltonotus* Konow
- 14 (10) Inner orbits and entire underside of abdomen pale. Scutellum including post-tergite almost one and a quarter times as long as broad..... 15
- Inner orbits and more or less underside of abdomen (apart from hypopygium) infuscate. Scutellum scarcely longer than broad..... 16
- 15 (14) Pale colour on face, pronotum and tegula creamy-white. Underthorax black with a pale longitudinal band in the middle. Penis valve fig. 579. 6-7 mm.  
♂ *fasciatus* Konow
- Pale colour on face, pronotum and tegula yellow. Underthorax orange with a black band along the sterno-pleural line. Penis valve fig. 570. 6-7 mm.  
♂ *longiserra* (Thomson)
- 16 (14) Post-tergite of scutellum longer in the middle than a censer and clearly separated from the rest of the scutellum by a suture..... 17
- Post-tergite of scutellum very short (in the middle less than the length of a censer) and with the suture defining it obsolescent (figs. 560-1). Penis valve fig. 578.  
Hypopygium with apical truncation wider than apex of hind tibia (fig. 564). 5-6 mm.....♂ *crispus* Benson





FIGS. 566-74.—Penis valve in *Amauronematus*: 566, *histrio*; 567, *fallax*; 568, *mundus*; 569, *abnormis*; 570, *longiserra*; 571, *sagmarius*; 572, *viduatus*; 573, *leucolaenus*; 574, *amplus*.

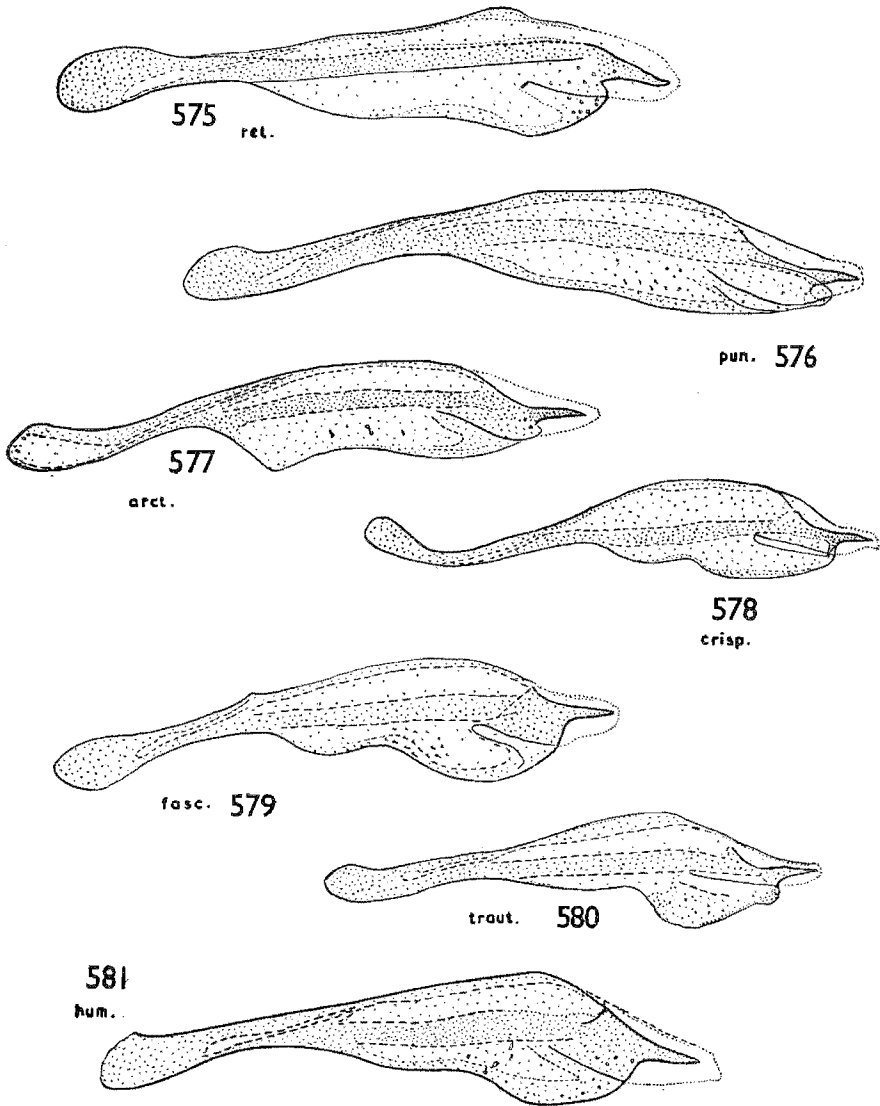


FIG. 575.—Penis valve of *Nematus reticulatus*.

FIGS. 576–81.—Penis valve of *Amauronematus*: 576, *puniceus*; 577, *arctica*; 578, *crispus*; 579, *fasciatus*; 580, *trautmanni*; 581, *humeralis*.

- 17 (11 & 16) Scutellum densely punctate all over..... 18  
 — Scutellum shining laterally and between punctures.  
 Underthorax entirely black. Hypopygium with apical truncation as wide or wider than apex of hind tibia (fig. 564). Penis valve fig. 580. 5-6 mm..... ♂ *trautmanni* Enslin
- 18 (17) Scutellum with a medial longitudinal furrow more or less developed. Hypopygium with apical truncation wider than apex of hind tibia (fig. 564). Mesosternum entirely black. Penis valve fig. 581. 6-7 mm.  
 — ♂ *humeralis* (Lepelletier)  
 Scutellum without a medial furrow. Hypopygium with apical truncation narrower than apex of hind tibia (fig. 565). Mesosternum often more or less brown medially. Penis valve fig. 568. 5.5-6.5 mm. ♂ *mundus* Konow

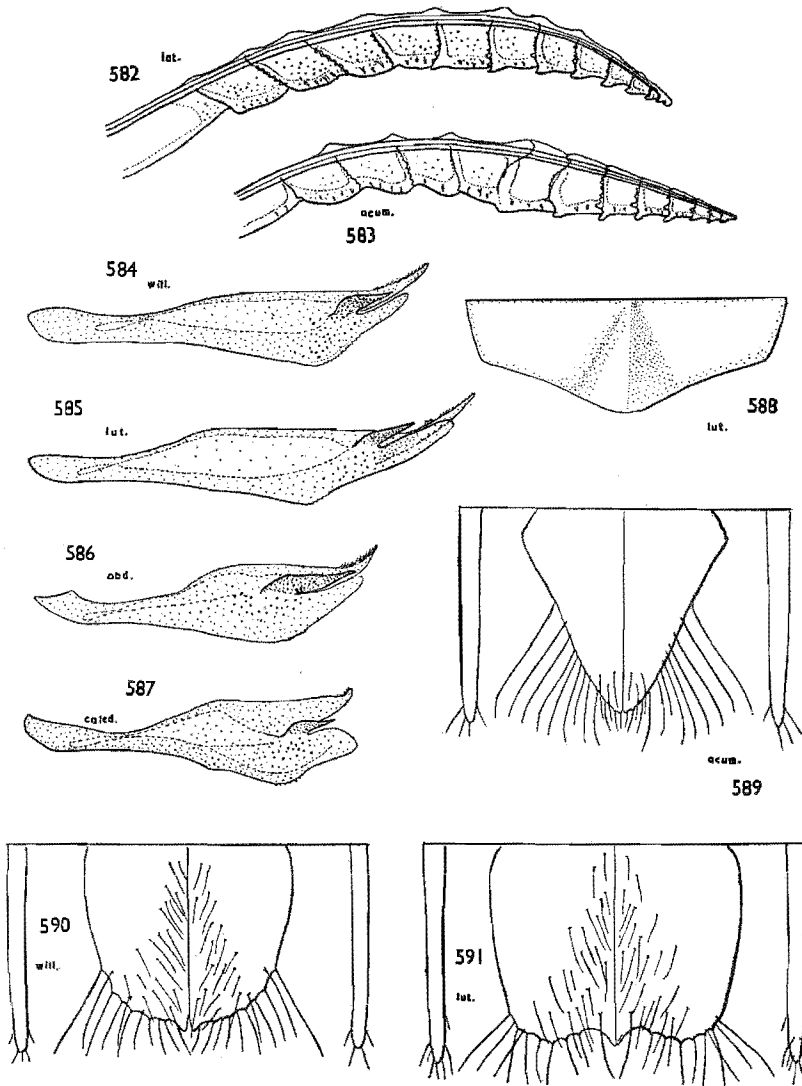
### Genus *Nematinus* Rohwer.

A small genus of about 12 world and six European species, of which five occur in Britain. They are attached mainly to Betulaceae, and the section on *Betula* is sharply distinguished morphologically from the section on *Alnus*; but *N. acuminatus* of the former group has also been found on *Corylus* (Corylaceae) in Co. Dublin. For what is known of the biology of the Central European species see Stein (1926, *Wien. ent. Ztg.* 43 : 105-26).

The eggs are laid in stems or in the mid-veins of leaves, and the saws are correspondingly tough and armoured (figs. 582-3). All the species are single-brooded.

#### KEY TO THE SPECIES OF *Nematinus*.

- 1 Sawsheath of ♀ acuminate behind in dorsal aspect (fig. 589); saw fig. 583. C less swollen apically in fore wing (at the origin of RS + M from R it is only about as wide as cell C at that point); anal cell of hind wing with a longer stalk (more than twice the length of cu-v). Eyes rounder in shape (1.3 to 1.2 times longer than broad) and antenna with flagellum usually entirely pale except for the 2 infuscate basal segments above. Abdomen usually with the bases of several tergites black in ♀, and in ♂ with the whole upper surface largely suffused with black. On *Betula* and *Corylus*..... 2
- Sawsheath of ♀ broadly rounded or truncate behind (figs. 590-1); saw fig. 582. C more swollen apically (at the origin of RS + M from R it is about twice as wide as cell C at that point); anal cell of hind wing with shorter stalk (at most only 1.5 times as long as cu-v). Eyes longer in shape (at least 1.5 times longer than broad) and antennal flagellum often largely black, at least above on its basal segments. Abdomen with at most only its 2 basal tergites black in ♀, and in ♂ with 2 or 3 apical tergites as well. On *Alnus*... 3
- 2 (1) Abdomen with basal tergites covered with regular transverse coriaceous sculpture. Mesonotum usually with a black fleck on middle lobe and each of the side lobes in the ♀ and the mesosternum all black. In ♂ most of head above, most of thorax and abdomen above mainly black. 6-7.5 mm. Penis valve fig. 587.  
*Larva on Betula. Has been found sparingly in England: Devon, Surrey, Bucks., Herts., Warwick and Staffs.; Scotland: Argyll, Inverness and Sutherland (see Benson, 1935, Ent. mon. Mag. 71 : 242). V-VI. N. and C. Europe to East Siberia*  
 ♂ and ♀ (= *nigrosternatus* Malaise) *caledonicus* (Cameron)
- Abdomen without regular coriaceous sculpture on basal tergites. Mesonotum not marked with black and mesosternum only edged with black in ♀; ♂ unknown. 6-7.5 mm.  
*Larva usually on Betula but in 1941 was found on Corylus avellana L. in Ireland: Co. Dublin, by A. W. Stelfox. Distributed sparingly throughout Britain and Ireland, but no ♂ has yet been seen. V-VI. N. and C. Europe to East Siberia*..... \*♀ *acuminatus* (C. G. Thomson)
- 3 (1) ♀♀..... 4  
 - ♂♂..... 6



FIGS. 582-3.—Saw of *Nematinus*: 582, *luteus*; 583, *acuminatus*.  
 FIGS. 584-7.—Penis valve in *Nematinus*: 584, *willigkiae*; 585, *luteus*;  
 586, *abdominalis*; 587, *caledonicus*.

FIG. 588.—Apical tergite of ♂ *Nematinus* *luteus*.

FIGS. 589-91.—Sawsheath of *Nematinus*: 589, *acuminatus*;  
 590, *willigkiae*; 591, *luteus*.

- 4 (3) Whole thorax yellow (except for mesosternum and sometimes a black fleck on each mesonotal lobe). Abdomen often entirely yellow and at most with first tergite marked with black.....5  
 - Almost entire head, whole of thorax and 2 basal tergites of abdomen black. 6-7.5 mm.  
*Larva on Alnus. Common throughout Britain and Ireland. V-VII. All Europe.....♀ (=fuscipennis Lepeletier) abdominalis (Panzer)*
- 5 (4) Sc and venation of base of fore wing yellow and paler than venation of rest of wing. Sawsheath slightly narrowed behind, where it is broadly rounded, not emarginate, in dorsal aspect (fig. 590). Mesosternum immaculate. Basal tergites of abdomen without punctures. Mesopleura in English, Welsh and Irish specimens with a longitudinal glabrous patch just above the sterno-pleural line. 6-8.5 mm.  
 In Scotland the typical form of the species is replaced by *Nematinus willigkiae pilosus* subsp. n. which differs from the typical race in lacking the longitudinal glabrous patch on the mesopleura immediately above the sterno-pleural line.<sup>2</sup>  
*Larva on Alnus. Typical form from England: Cornwall, Devon, Hants., Warwicks., Oxford, Herts., and Norfolk; Wales: Glamorgan; Ireland: Co. Wicklow. (†Benson, 1935, Ent. mon. Mag. 71: 242). VI-VII. All Europe.....♀ willigkiae (Stein)*
- Sc, base of M and base of A1 in fore wing piceous and as dark or darker than venation of rest of wing. Sawsheath in dorsal aspect subparallel-sided and slightly emarginate behind each side of middle (fig. 591). Mesonotum with or without dark flecks. Basal tergites of abdomen with scattered punctures medially. Mesopleura without glabrous patch above sterno-pleural line. Saw fig. 582. 6-8.5 mm.  
*Larva on Alnus. Throughout Britain and Ireland commonly. VI-VIII. N. and C. Europe..♀ (=ruficapillus Gmelin, Cameron, bilineatus Klug, Cameron nec. Klug. and antennatus Cameron). luteus (Panzer).*
- 6 (3) Vein C of fore wing, clypeus, tegula, edge of pronotum and often mesopleura in part, yellow.....7  
 - All venation, including C, piceous; clypeus, tegula and whole of pronotum entirely black.  
 Wings deeply infusate at base. Penis valve fig. 586. 5-6.5 mm.  
 ♂ *abdominalis (Panzer)*
- 7 (6) Wings subhyaline. Mesopleura all yellow and without glabrous patch above sterno-pleural line. Penis valve fig. 585. 5-6.5 mm....♂ *luteus (Panzer)*  
 - Wings infusate. Mesopleura mostly black with a yellow fleck, and in English, Welsh and Irish specimens with a conspicuous glabrous patch above sterno-pleural line. Represented in Scotland by *pilosus* subsp. n. (see above) which lacks this glabrous patch. Penis valve fig. 584. 5-6.5 mm.  
 ♂ *willigkiae (Stein)*

### Genus *Euura* E. Newman.

(= *Cryptocampus*).

A small genus with seven known European species, of which five occur in Britain. The larvae live, with or without galls, inside stems, leaf-petioles, leaf-veins or buds of *Salix* and *Populus*. The bud inhabiting species have a different type of saw (fig. 593) from the others, which are all very similar to fig. 592. *Euura mucronata* (Hartig), whose larvae live in *Salix* buds of many species, must surely be the commonest sawfly in N.W. Europe. Outside Europe the genus is very little understood, and it is not possible to estimate the number of valid species.

<sup>2</sup> 4 ♂, 15 ♀ in the British Museum from Perth., Inverness, Argyll, Ross and Sutherland. Holotype, ♀, Scotland: Inverness, Aviemore, i. vii. 1944 (*P. Harwood*).

KEY TO SPECIES OF *Euura*.

## Males and females.

- 1 Face with at least labrum, front margin of clypeus and base of mandibles, often also the inner orbits, yellow. Inner orbits smooth and shining. Frontal basin with a notch in the front wall so that it communicates with the median fovea. Ovipositor not longer than hind tibia (1 : 1 or more) and, in dorsal aspect, broad at the base, narrowing abruptly to the sharp apical flange (figs. 596-8 and 600). Eyes more oval (length to breadth as 1 : less than 1.4).....2
- Face with at most labrum and mandible-base brown. Inner orbits dull with rough surface. Frontal basin with the front wall entire. Ovipositor clearly longer than hind tibia (1 : c.0.8) and, in dorsal aspect, evenly acuminate (fig. 599). Eyes more elongate (1 : more than 1.5). 4.5-5 mm. Saw as in fig. 592.

*Larva solitary in stems of various species of Salix and also recorded from Populus tremula L. In smaller stems a distinct swelling results but not in stouter stems; the full-fed larva bores an exit hole before changing to a prepupa but overwinters in the gall. Possibly more than one species is confused here. Throughout Britain and Ireland. V-VI. Holarctic*

- 2 (1) Claws with inner tooth almost as long as end tooth. Cerci of ♀ reach back beyond apex of sawsheath. Sawsheath in dorsal aspect with rounded shoulders merging into broad medial triangular flange (figs. 596-8); lateral setae strongly curved or, if straight, directed more backwards.

- *Larva singly in mid-rib, petiole or bud galls of Salix*.....3
- Claws with inner tooth scarcely longer than its basal breadth. Cerci of ♀ not reaching back further than apex of sawsheath. Sawsheath in dorsal aspect subtruncate at apex, with short sharp medial flange, and lateral setae set more outwards and very straight except at their tips (fig. 600). 5-6 mm. Saw fig. 592; penis valve fig. 594.

*Larvae massed together in irregular walnut-like gall in twig of Salix pentandra L. etc. and Populus. Britain: N. from Cheshire and Yorks., locally common. V-VI. N. and C. Europe to E. Siberia*

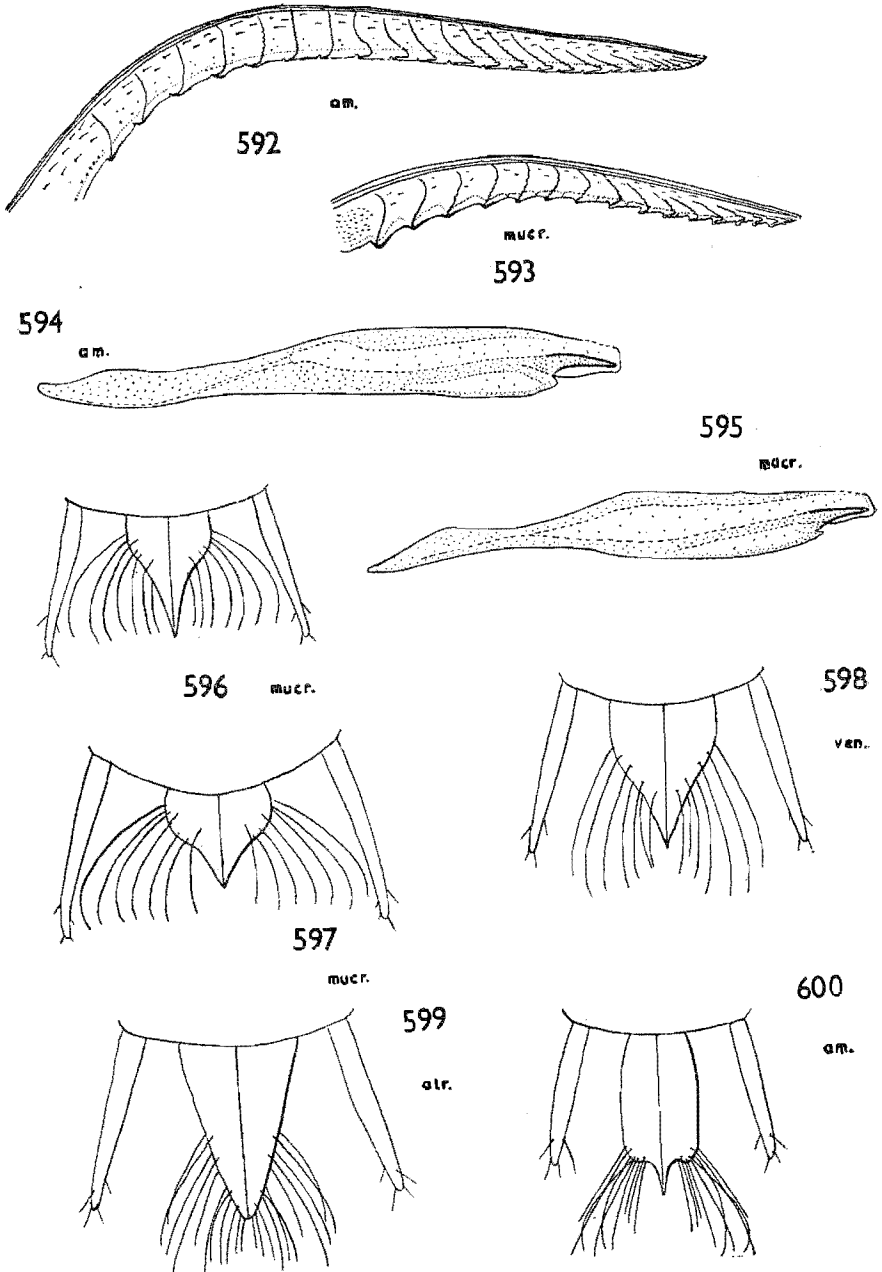
- 3 (2) Sawsheath of ♀ less swollen in dorsal aspect (not so broad as apical breadth of hind tibia) and more evenly tapering to the long medial flange, which is longer than the greatest breadth of the sheath; its lateral setae are almost straight and directed strongly backwards (fig. 598). ♂ not distinguished...4
- Sawsheath of ♀ more swollen in dorsal aspect (so that its greatest breadth is more than apical breadth of hind tibia) and narrowing abruptly to the medial flange which is, at most, not longer than the greatest breadth of the sheath; its lateral setae are strongly curved and set strongly outwards (figs. 596-7). ♂ not distinguished. 2.5-5 mm. Saw fig. 593; penis valve fig. 595.

Extremely variable in size. Mostly black with outer orbits, hind angles of pronotum, apex of femora, tibiae and tarsi more or less yellow.

*Larva in galls affecting buds and bud-peduncles, mostly of Salix atrocinerea Brot., S. caprea L., S. cinerea L. and S. aurita L. but also in S. fragilis L., S. purpurea L., S. viminalis L., S. phylicifolia L., S. nigricans Sm. and S. triandra L. in summer and autumn. Probably the commonest of British sawflies. Among the larger specimens may be mingled representatives of the closely related E. laeta (Zaddach) (only doubtfully specifically distinct or British). E. laeta lives in a gall in the swollen leaf base ensheathing a bud of S. viminalis L. and the adult ♀ is said to have a longer flange on the sawsheath than N. mucronata but the range of variation of the size of the flange in N. mucronata is as great as the supposed differences between these species. V-VII. Holarctic.*

- 4 (3) Hind femur (except at base), orbits and hind angles of pronotum yellow in ♀. Saw similar to fig. 592.

Almost identical morphologically with the following species.



Figs. 592-3.—Saw of *Euura*: 592, *amerinae*; 593, *mucronata*.  
 Figs. 594-5.—Penis valve of *Euura*: 594, *amerinae*; 595, *mucronata*.  
 Figs. 596-600.—Sawsheath from above in *Euura*: 596-7, *mucronata*;  
 598, *venusta*; 599, *atra*; 600, *amerinae*.

Galls in leaf mid-rib of *Salix fragilis* L., *alba* L. and *triandra* L. etc. in summer and autumn. Galls widespread in Scotland and N. England; also recorded from Staffs., Herts. and Surrey, but adults have rarely been obtained. (†Connald, 1909, Plant Galls of Great Britain: 234). V-VI. N. and C. Europe.....\*♀ *testaceipes* (Zaddach)

- Hind femur (except at base) orbits and hind angle of pronotum mostly black. Saw similar to fig. 592.

Almost identical morphologically with the preceding species.

Galls in base of leaf-petiole of *Salix aurita* L., *caprea* L. *cinerea* L., and *atrocinerea* Brot. Galls common throughout Britain, though adults rarely obtained. (†Traill, 1888, Trans. Perthsh. Soc. nat. Sci. 1: 87). V-VI. N. and C. Europe.....\*♀ *venusta* (Zaddach)

### Genus *Pontania* O. Costa.

A genus with about 70 described species (30 in Europe), of which at least 23 are now known to occur in Britain (only nine were recognized by Morice). These species fall into two distinct biological groups: those whose larvae live in rolled leaf-margins of *Salix* (and *Populus* also in N. America), and those whose larvae live inside galls (usually pea-, bean-, pear- or cigar-shaped) on the leaf blades of *Salix* (and *Populus* in N. America). The galls of the gall-making group in Britain have been summarized recently by Benson, 1954, *J. Soc. Brit. Ent.* 4: 206-11.

These two biological groups might be treated as different genera if some reliable morphological differences could be found to distinguish the males of each group, for the females segregate naturally into two groups correlated with these biological differences.

#### KEY TO SPECIES OF *Pontania*.

##### Females.

- 1 Sawsheath in lateral view either emarginate beneath the apex or acute at the apex (figs. 613-8); ovipositor at most scarcely longer than hind femur; saw figs. 636-41.....2
- Sawsheath in lateral view entire to the apex, where it is usually bluntly rounded, but if acute here, then the whole ovipositor is about one-fourth longer than the hind femur (figs. 619-21); saw figs. 542, 642-3.....11
- 2 (1) Scutellum only slightly convex and without coarse punctures, though it may be dull with a fine coriaceous surface.....4
- Scutellum strongly convex and dull with coriaceous surface between coarse punctures.....3
- 3 (2) Mainly yellow with the following parts black: upperside of base of antenna, patch covering frontal and post-ocellar areas of head, mesonotum except more or less for a fleck on the sides of the lateral lobes and sides of scutellum, metanotum, and basal 2 or 3 tergites medially, fleck covering mesosternopleural line and apex of sawsheath. Sawsheath figs. 614 and 623; saw fig. 637. 5-6 mm.

*Larva in rolled leaf-edges of Salix viminalis* L. Throughout Britain. V-VI and VII-VIII. N. Europe.

♀ (= *xanthogaster* Forster, Cameron nec. Först.) *piliserra* (Thomson).

- Mainly black with the following parts brown: more or less face, outer orbits, pronotum, legs and underside of abdomen. Sawsheath cf. fig. 624; saw cf. fig. 636.

Saw with basal bands strongly arched and oblique as in *coriacea*, which, with its dull inner orbits, etc., this species strongly resembles, but the hollows round the outside of the antennae are glabrous in *scotaspis* and pilose in *coriacea*.

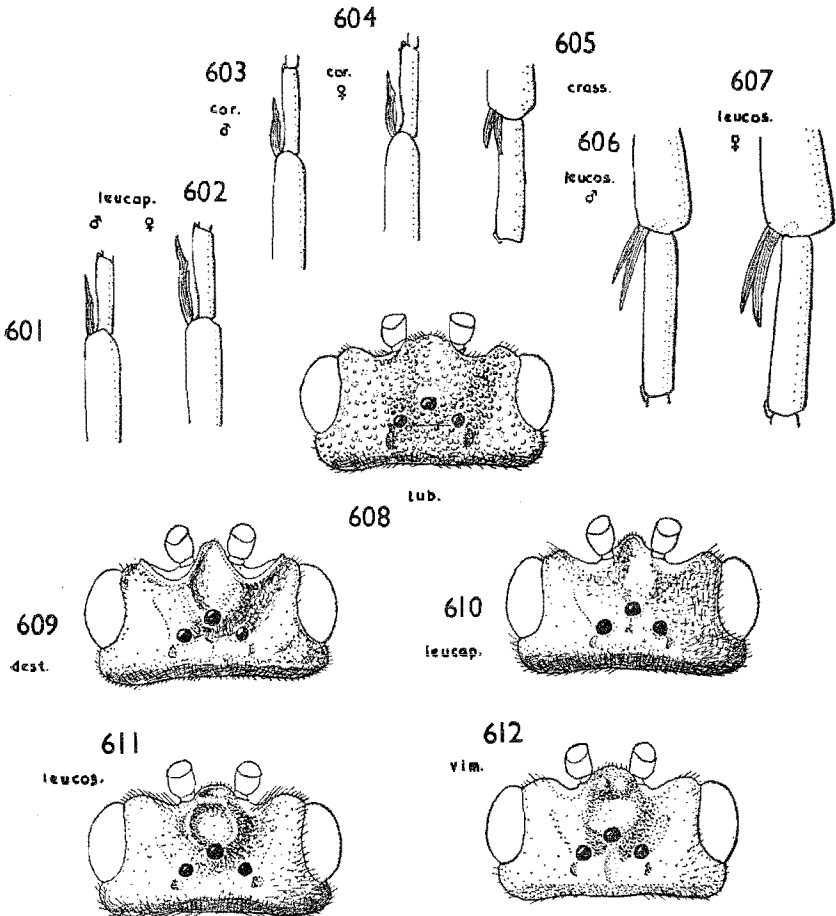
*Larva in rolled leaf-edge of Salix viminalis* L. N. England and Scotland. C. and N. Europe.....♀ *scotaspis* (Förster)



- 4 (2) Mostly black insects with pale colour confined to face, narrow hind orbits, edge of pronotum and sternites of abdomen.....5  
 - More profusely yellow-marked but very variable in colour; head (except for ocellar and post-ocellar regions) and pronotum entirely yellow; mesopleura and underside of abdomen also more or less yellow-marked. 4-5 mm.

Sawsheath strongly pointed at apex and emarginate beneath the point (fig. 618). Saw cf. fig. 638. Face dull with coriaceous surface sculpture but the hollows outside the antennae are glabrous. Stigma with venation, costa, underside and antennae and legs yellow.

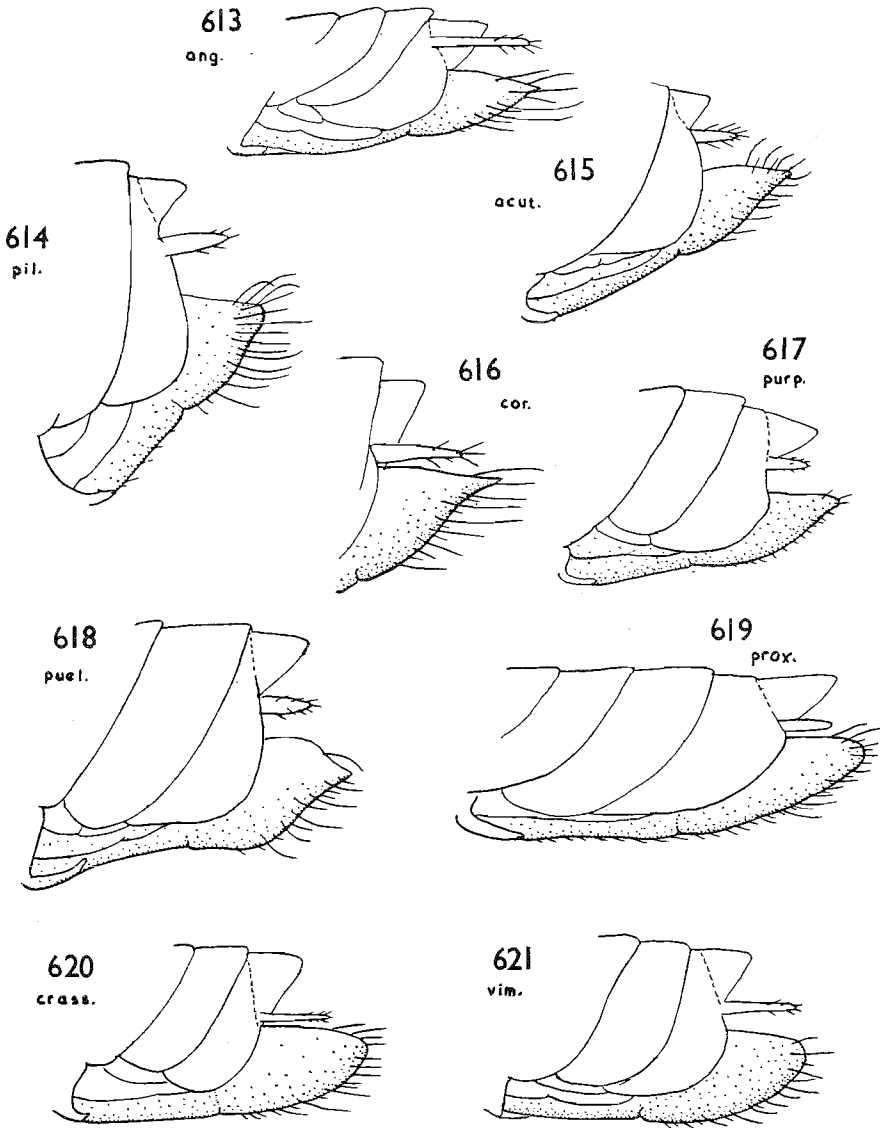
*Larva in rolled leaf-edge of Salix fragilis L., alba L. and triandra L. Only known from Lancs., Cambs. and Bucks. VI-VII. N. and C. Europe.*  
 ♀ (= *arcticus* Thomson, Cameron nec. Thomson, in part) *puella* (C. G. Thomson)



FIGS. 601-4.—Front tibial spurs in *Pontania*: 601, *leucapsis* ♂; 602, *leucapsis* ♀; 603, *coriacea* ♂; 604, *coriacea* ♀

FIGS. 605-7.—Hind tibial spurs in *Pontania*: 605, *crassipes* ♀; 606, *leucosticta* ♂; 607, *leucosticta* ♀.

FIGS. 608-12.—Head of *Pontania* from above: 608, *tuberculata*; 609, *dstricta*; 610, *leucapsis*; 611, *leucosticta*; 612, *viminalis*.

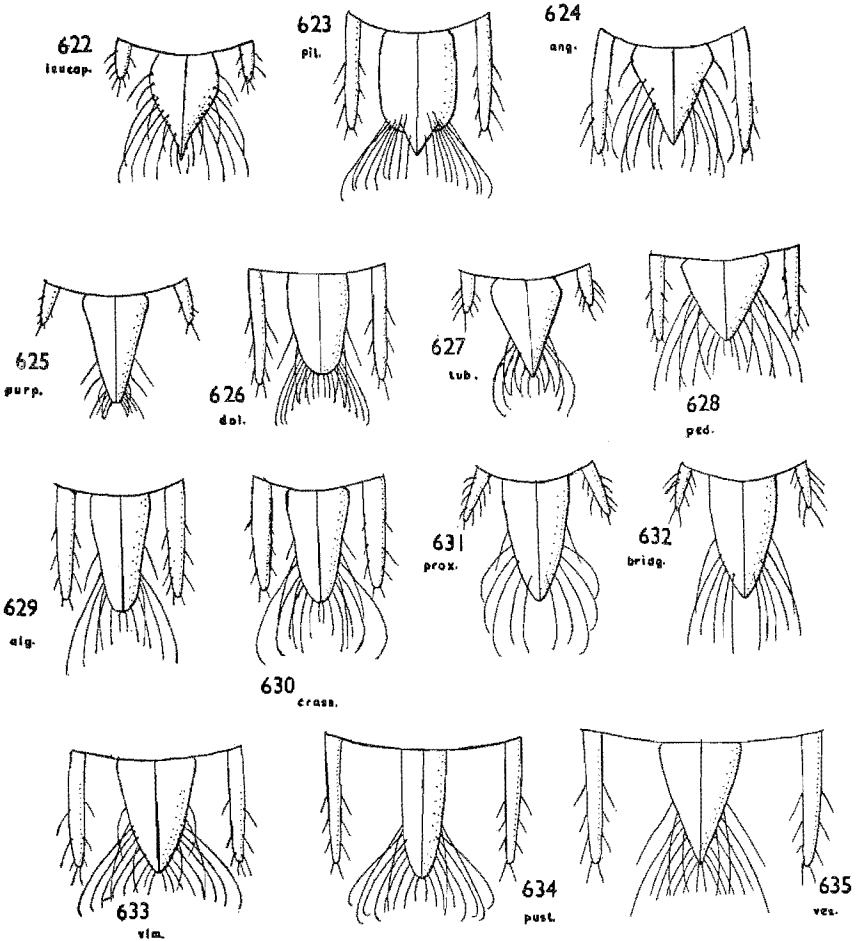


FIGS. 613-21.—Sawsheath in lateral view in *Pontania*: 613, *anglica*; 614, *piliserra*; 615, *acutiserra*; 616, *coriacea*; 617, *purpureae*; 618, *puella*; 619, *proxima*; 620, *crassipes*; 621, *viminalis*.

- 5 (4) Hind femur more or less infuscate at base above and below. Hind tibial spurs almost straight and less than half as long as basitarsus. Mesothorax beneath pilose but with a glabrous band in the sterno-pleural region. . . . . 6  
 - Hind femur entirely reddish-yellow. Hind tibial spurs clearly curved and about half as long as basitarsus (fig. 607). Mesothorax beneath pilose, without glabrous sterno-pleural band. 4.5-5.5 mm.

Ovipositor longer than the 4 basal hind tarsal segments. Hind basitarsus longer than 3 following tarsal segments. Face with hollow around antennae dull and pilose. Saw fig. 638.

Larva in rolled leaf-margins of *Salix aurita* L., *caprea* L., *atrocinerea* Brot. and *cinerea* L. Common throughout Britain and Ireland. V-VIII. 2 broods. N. and C. Europe. . . . . ♀ (= *sharpi* Cameron) *leucosticta* (Hartig)



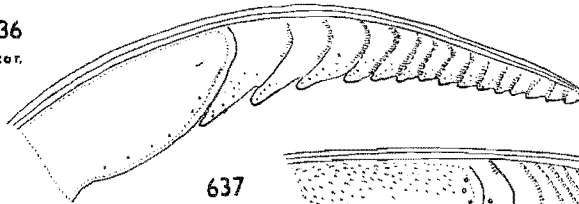
Figs. 622-35.—Sawsheath from above in *Pontania*: 622, *leucapsis*; 623, *piliserra*; 624, *anglica*; 625, *purpureae*; 626, *dotichura*; 627, *tuberculata*; 628, *pedunculi*; 629, *algida*; 630, *crassipes*; 631, *proxima*; 632, *bridgmani*; 633, *viminalis*; 634, *pustulator*; 635, *vesicator*.

- 6 (5) Face with the hollow around the outside of the antennae shining and glabrous (figs. 609 and 610).....7  
 - Face with the hollow outside the antennae dull with pilose patches (cf. fig. 611).....8
- 7 (6) Ridge surrounding the hollow outside the antennal sockets strongly defined and curving inwards behind the antennae to the sides of the frontal area and carinate all the way (fig. 609). Inner orbits outside this carina dull with coriaceous sculpture. Face, temples, pronotum, hind femur and tarsus mainly all black. Inner front tibial spur scarcely half as long as basitarsus. Saw like fig. 638 but narrowing apically. 4.5-5.5 mm.  
*Larva in rolled leaf-edge of Salix pentandra L. So far only recorded from England: W. Yorks; Scotland: Roxburgh and Stirling; Ireland: Leitrim. VI. Subarctic and subalpine Europe to E. Siberia and Alaska. (†Benson, 1940, Ent. mon. Mag. 76: 209-12)*  
 ♀ (= *carinifrons* Benson, *apicifrons* Malaise) **destricta** MacGillivray, *syn. nov.*
- Ridge surrounding the hollow outside the antennal sockets rounded, not strongly carinate and breaking down behind the antennae before reaching the frontal area (fig. 610). Inner orbits outside this ridge smooth and shining. Face, temples, pronotum, hind femur and tarsus often more or less marked with yellow or white. Inner front tibial spur at least about three-fourths as long as basitarsus (fig. 602). Sawsheath figs. 622 and cf. 615. Saw cf. fig. 638. 3.5-5 mm.  
*Larva in rolled leaf-edges of Salix aurita L., caprea L. and atrocineria Brot. Common throughout Britain and Ireland. V-VIII. 2 broods. C. and N. Europe to E. Siberia*  
 ♀ (= *leucostigmus* Cameron) **leucopsis** (Tischbein)
- 8 (6) Sawsheath in lateral view very thin and acute, scarcely emarginate below (fig. 617); lateral hairs sparse and not longer than cerci; in dorsal view sheath very narrow (narrower at base than apex of hind tibia) and acuminate (fig. 625). Hind tarsus equals hind tibia. Basitarsus little more than 2 following tarsal segments together. 3.5-4.5 mm. Saw fig. 640.  
 Cerci not reaching back further than half the length of the protruding portion of the sheath.  
*Larva lives on Salix purpurea L. in the folded edges of leaves which are later rolled and twisted throughout their length. Apparently common throughout England. V-VIII. ? 2 broods. (Benson, 1938, Ent. mon. Mag. 74: 256-7). C. Europe.....♀ purpureae (Cameron)*
- Sawsheath in lateral view strongly emarginate below apex, which is produced into a sharp point (figs. 613, 615-6); some lateral hairs longer than cerci; in dorsal view sheath broad at base (as apex of hind tibia) and produced behind into a sharp point (fig. 624). Hind tarsus much shorter than hind tibia. Basitarsus more than 3 tarsal segments together.....9
- 9 (8) Cerci in dorsal view reach back at least half as far as apex of sawsheath (figs. 613, 616 and 624). Saw with segmented bands oblique at apex (fig. 641) or arched at base (fig. 636).....10
- Cerci in dorsal view reach back less than half as far as apex of sawsheath (fig. 615). Saw with 16 almost straight transverse segmental bands (fig. 639). 3.5-4 mm.  
*Scotland, Inner Hebrides, Isle of Rhum, 1 ♀, emerged vii.1939 from gall of P. ? pedunculi Hartig, vii.1938 (J. W. Heslop-Harrison). New British record. Lapland and N. Russia.....♀ acutiserra Lindqvist*
- 10 (9) Frontal area of head concave and shining in the concavity. Saw with about 20 segmental bands, the lateral margins of which are straight at the base and oblique at the apex (fig. 641). 3.5-4.5 mm.  
*Larva in rolled margin of leaf of S. viminalis L. Probably common but only recorded from the following counties. England: Glos., Bucks. and Herts.; Ireland: Co. Cavan. V-VI. Outside Britain only known from E. Siberia*  
 ♀ (= *nigrolineatus* Cameron) **anglica** (Cameron)
- Frontal area of head dull. Saw with about 16 segmental bands which are strongly arched at the base and straight at the apex (fig. 636). 3.5-4.5 mm.  
*England: Bucks. and Yorks.; Scotland: Perth., Moray and Inverness. V-VII. (†Benson, 1953, Ent. mon. Mag. 89: 150-1). Scandinavia and Switzerland.....♀ coriacea (Benson)*

- 11 (1) Stigma yellow or yellowish-white, at most a deeper yellow at apex. Hind tibial spurs clearly much shorter than apical breadth of tibia and curved at their apices (fig. 605). (Entirely northern and arctic-alpine gall-makers) . . . 12
- Either stigma piceous at apex or hind tibial spurs straight and at least almost as long as apical breadth of hind tibia. (Including southern and lowland species as well as northern ; larvae free-feeding or in galls) . . . . . 15
- 12 (11) Abdomen mostly yellow ; larger species (over 5 mm. long). . . . . 15
- antennae pilose (cf. fig. 611). Mesothorax beneath pilose without a glabrous sterno-pleural line (cf. fig. 364).  
(Larva in bean-shaped galls transected by leaf-blade of *Salix*) . . . . . 13

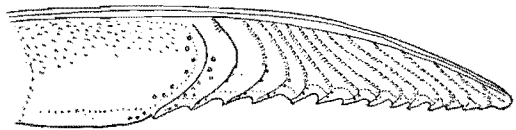
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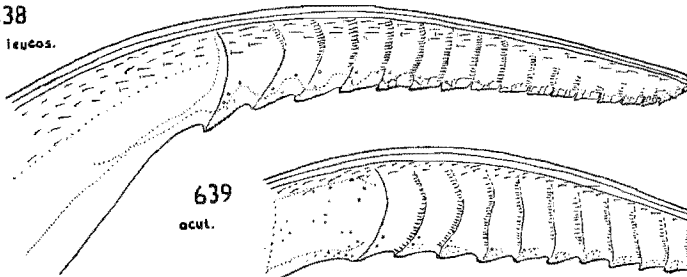
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pil.



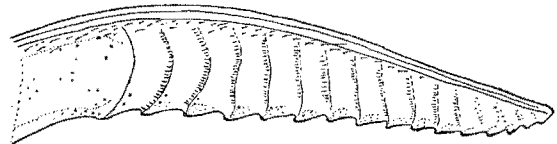
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leucos.



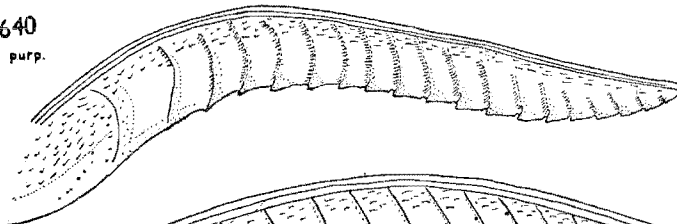
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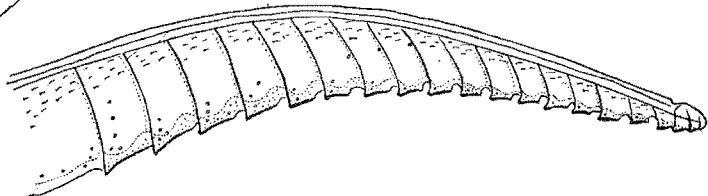
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purp.



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angl.



FIGS. 636-41.—Saw of *Pontania*: 636, *coriacea*; 637, *piliserra*; 638, *leucosticta*; 639, *acutiserra*; 640, *purpureae*; 641, *anglica*.

- Abdomen mostly black; smaller species (2.5–5 mm. long). Hollows outside antennae glabrous (cf. fig. 612). Mesothorax beneath with a glabrous sternopleural line (cf. fig. 363).  
(Larva in pea-shaped galls transected by leaf-blade of arctic *Salix*)... 14
- 13 (12) Sawsheath broad at base and tapering behind in dorsal aspect and with the lateral hairs almost straight to their apices (fig. 635). 5.5–7 mm.  
Colour of head and thorax variable, more or less brown but head, except for face and narrow inner orbits and mesonotum, can be entirely black.  
*Larva in large, often reddish bean-shaped galls transected by leaf-blades of Salix purpurea L. N. England: Durham and Northumberland; Scotland: Inverness-shire, nr. Granton, vi. 1946 (P. Harwood) (†Harrison, 1937, Entomologist 70: 74). V–VI and VII–VIII. C. Europe*  
♀ (= *nec. vesicator* Bremi. Cameron cf. *pustulator*) **vesicator** (Bremi-Wolf)
- Sawsheath more parallel-sided in dorsal aspect with the lateral hairs strongly curved at their apices (fig. 634). 5.5–7 mm.  
Very similar to the preceding species but head and thorax generally more brown.  
*Larva in very similar bean-shaped galls but on Salix phylicifolia L. and nigricans Smith. Widely distributed in England: N. Pennines, in N. Yorks., Durham, Northumberland and Cumberland; also in Scotland: Perth. and Inverness. V–VI. N. Europe*  
♀ (= *vesicator* Bremi Cameron *nec. Bremi*) **pustulator** Forsius
- 14 (12) Longest lateral hairs on sides of sawsheath straighter and directed more backwards (fig. 629) so that the produced bases of those on one side would form an acute angle with those on the other side. Front lobes of mesonotum divided anteriorly by a carina.  
Clypeus only slightly emarginate apically, to a depth of less than half length of clypeus. Mesopleura dull and coriaceous. 4.5 mm. Clypeus and hind femur entirely dark. Hind tarsus shorter than hind tibia.  
*Larva in pea-shaped galls transected by the leaf blade of Salix herbacea L. Only known from 4 ♀ collected from catkins of Salix herbacea L., on Meall na Samhne, in the Breadalbane Mts. of Perthshire, vi. 1932. (†Benson, 1935, Trans. ent. Soc. Lond. 33: 28 and 1941, Proc. R. ent. Soc. Lond. (B) 10: 135). Lapland. . . . (= polaris Malaise Benson, 1935 *nec.* 1941) ♀ **algida** (Benson)*
- Longest lateral hairs on sides of sawsheath in dorsal aspect strongly curved and directed more outwards (fig. 630), so that the produced bases of those on one side and those on the other side would meet at about a right angle. Medial suture dividing front lobes of mesonotum obsolescent. Clypeus deeply excised in front to a depth of half length of clypeus. Mesopleura shining and scarcely coriaceous. 3–4.5 mm.  
Extremely variable in head sculpture. Hind tarsus varies from being about four-fifths to being about equal in length to hind tibia. Sawsheath laterally fig. 620. Saw fig. 642.  
*Larva in pea-shaped gall on one side of the leaf-blade, which transects it, and adjoining or including the mid-vein of Salix herbacea L.; similar galls on Salix arbuscula L. probably belong to the same species. Locally common in the arctic-alpine zones of the mountains in the Lake District, in Snowdonia, in the Grampians, on Ben Laoghal in Sutherland and on the Island of Rum. VI–VII. (See Benson, 1941, Proc. R. ent. Soc. Lond. (B) 10: 132–3). Arctic and High Alps, Europe*  
♀ (= *herbaceae* Cameron, and ? *arbusculae* Benson)<sup>3</sup> **crassipes** (C. G. Thomson)
- 15 (11) Stigma browner, piceous at apex..... 16
- Stigma yellowish-white, either entirely or slightly deeper yellow at apex... 22

<sup>3</sup> *P. lapponica* Malaise may also be British as indicated by the presence of what appear to be its characteristic galls on *Salix lapponum* L. samples in the Herbarium of the British Museum (Natural History) from Glen Callater, S. Aberdeen in 1887 and Glen Fallach (Corrie Ardrain), Perthshire in 1891. The galls, which are pea-shaped, are attached to the mid-vein of the leaf and project almost equally above and beneath the leaf-blade. Adults from Swedish Lapland would run to *P. crassipes* in this key except that the medial suture of the front lobe of the mesonotum is clearly marked (cf. Benson, 1954).

- 16 (15) Cerci very short in dorsal aspect, reaching back less than half way to apex of sawsheath (figs. 631-2). Ovipositor about as long as hind tibia (fig. 619). Front wall of frontal area of head entire (cf. fig. 611).  
(Larva in small coffee-bean gall transected by leaf-blade. Parthenogenetic species only rarely producing males. *proximus* group).....17
- Cerci longer, so that in dorsal aspect they reach back almost as far as tip of sawsheath and at least more than half way there (figs. 626, 628 and 633). Ovipositor often as much as one-fourth shorter than hind tibia (fig. 621). Front wall of frontal area of head often notched in the middle or channelled right through (fig. 612).  
(Larva free-feeding, or in pea-shaped or irregular galls on the underside of the leaf, or in sausage-shaped galls on upperside of leaf. Species with normal intersexual reproduction).....19
- 17 (16) Hind basitarsus little longer than the 2 following tarsal segments together. Sawsheath longer than 2 hind basal tarsal segments. Lateral hairs on sawsheath in dorsal aspect directed more outwards (fig. 631). Hind femur mostly pale.....18
- Hind basitarsus nearly as long as 3 following tarsal segments together. Sawsheath about as long as 2 basal hind tarsal segments. Lateral hairs on sawsheath in dorsal view directed more backwards (fig. 632). Hind femur mostly black.  
Ovipositor about as long as hind tibia. 3-4.5 mm.  
Galls flat coffee-bean shaped transected by leaf-blade but developed more above the leaf than below. Dark green and with a smooth surface more or less pubescent. Those on *Salix caprea* L. are larger and more glabrous than those on *S. atrocinerea* or *S. cinerea* L. In the Inner and Outer Hebrides, Harrison (1942, Ent. mon. Mag. 78 : 90) records *S. aurita* L. also as a host-plant but suggests that this race is really specifically distinct ; so far as I know no material has been bred or studied. In my garden at Boxmoor a small strain started on a single plant of *S. phylicifolia* L. that had been brought some years before from Cumberland ; there was 1 gall in the autumn of 1942, 3 in 1943 and 3 in 1944. These galls scarcely projected at all below the leaf. Unfortunately no adults were secured for study. Very common throughout Britain and Ireland. (†Benson, 1940, Ent. mon. Mag. 76 : 90-1). V-VI and VII-VIII. C. and N. Europe.... (= *capreae* L. auctt. nec. L. in part) ♀ **bridgmanii** (Cameron)
- 18 (17) Ovipositor longer than hind tibia. 3-4.5 mm.  
Galls coffee-bean shaped but deeper than broad and projecting about equally above and below the leaf-blade ; covered with irregular ridges and protuberances. On *Salix fragilis* L. the gall is usually bright rose-pink above and pink or yellowish-green below ; on *S. alba* L. the colour is usually less bright. For the biology of this and the following species see the classic paper by Carleton (1939, J. Linn. Soc. Lond. (Zool.) 40 : 575-624, pls. 20-1.) Very common throughout Britain. V-VI and VII-VIII. N. and C. Europe  
♀ (= *capreae* L. auctt. nec. L., in part, *gallicola* Stephens, *Hoplocampa gallicola* Cameron and *Euura flavipes* Cameron) **proxima** (Lepelletier)
- Ovipositor scarcely as long as hind tibia. 3-4.5 mm.  
Larva as in *P. proxima*. Gall as in *P. proxima* but on *Salix triandra* L. and dark red above, pale yellowish-green below and with the surface glabrous and quite smooth. For biology of this species see Carleton, 1939, l.c. Very common throughout Britain and Ireland. (†Benson, 1941, Proc. R. ent. Soc. Lond. (B) 10 : 131-2)  
♀ (= *capreae* L. auctt. nec. L. in part) **triandrae** Benson
- 19 (16) Sawsheath in dorsal view with its greatest breadth much less than its length (figs. 626 and 633). Front wall of frontal area of head notched in the middle or channelled through (fig. 612) or scarcely developed at all.....20
- Sawsheath very broad basally in dorsal aspect so that it appears about as broad as it is long (fig. 628). Front wall of frontal area conspicuously raised and entire (cf. fig. 611).  
Hollows round outside of antennae glabrous. 3.5-4.5 mm.  
The densely pubescent pea-shaped galls, about 7 mm. in diameter, are attached to the undersides of leaves, chiefly of *Salix aurita* L. but sometimes of *S. caprea* L., *atrocinerea* Brot. or *S. cinerea* L. Common throughout Britain

to the Outer Hebrides; also in Ireland. IV-VI and VII-VIII. N. and C. Europe E. to Kamtchatka

♀ (= *baccarum* Cameron, *bellus* Zaddach) **pedunculi** (Hartig)

- 20 (19) Frontal area of head defined laterally by continuous sutures, with a concave basin in the middle bordered by a pronounced front wall which is, however, notched or channelled right through in the middle (fig. 612). Hollows round outside of antennae glabrous and shining. Hind femur yellow. Sawsheath fig. 633 . . . . . 21

— Frontal area of head scarcely raised above the level of the orbits and not defined by continuous sutures, with the frontal basin very shallow and not connected in front by channel or notch with the circular median fovea. Hollows round outside of antennae pilose and dull. Hind femur mainly black. Sawsheath fig. 626.

Small species 2.5-4.5 mm. Stigma white at the base with only the extreme apex or at most apical half piceous. Saw fig. 643.

The galls are quite distinct and unique; they are sausage-shaped (2 to 3 by 5 to 13 mm.) and often paired one each side of the mid-rib of the leaf; they are usually dark purple or red above and green below and project only from the upper surface of the leaf. They can be found in V-VI but are vacated before the middle or end of VII and are thus very early for a mountain species. In Britain mostly on *Salix nigricans* Sm. and *phylicifolia* L. but also locally on *S. arbuscula* L., *S. myrsinites* L., *S. lanata* L. and *S. lapponum* L. (In C. Europe also on *S. purpurea* L.) Locally common from the Pennines northwards, chiefly at altitudes over 1000 ft. IV-V. N. and Alpine Europe, E. to Kamtchatka, often at the sea coast, and N. America

♀ (= *ischnocerus* Thomson, Cameron, nec. Thomson, = *femoralis* Cameron, = *robbinsi* Benson) **dolichura** (C. G. Thomson)

- 21 (20) Stigma conspicuously white for about basal third and C also pale. Hind tarsus shorter than tibia (1 : 1.1) and scarcely infuscate. Profusely marked with brown especially on hind orbits, antennae, pronotum and abdomen behind and below. 4-5 mm.

Larva in pubescent mostly greenish-yellow irregular pea-shaped pyriform, bi- or tricuspid galls attached to the mid-veins on the undersides of leaves of *Salix purpurea* L. and *nigricans* Sm. in N. England: Yorks., Durham and Northumberland; and Scotland: Dumfries, Roxburghshire, Perth, and Inverness. VI, ? single-brooded. N. and subalpine Europe. These galls are very similar to those of *P. phylicifoliae* (q.v.) but are larger (with longest axis often over 10 mm.) and even more irregular in form. (†Benson, 1940, Ent. mon. Mag. 76 : 91-94). N. and C. Europe. . . . . ♀ **harrisoni** Benson

— Stigma but little paler at base than apex and costa mostly piceous. Hind tarsus about as long as tibia and in contrast to it infuscate. Less profusely marked with brown. 4-5.5 mm.

Larvae live in glabrous, red-flushed more regular oval or pea-shaped galls (of diameter about 5-8 mm.) covered with warts and attached to the mid-vein on the underside of the leaves chiefly of *Salix purpurea* L. but occasionally also of *S. fragilis* L. and *S. viminalis* L. Very common throughout Britain and Ireland. V-VI and VII-VIII. 2 broods. Throughout most of Europe

♀ (= *salicis-cinereae* Retzius, *vollenhoveni* Cameron, *interstitialis* Cameron) **viminalis** (L.)

- 22 (15) Head above covered with numerous tubercles and the surface coriaceous between (fig. 608). Frontal area not clearly defined. Mesonotum and mesopleura dull with coriaceous surface. Sawsheath in dorsal view narrowed behind to a sharp point (fig. 627). 4-4.5 mm.

Hind basitarsus as long as 3 following tarsal segments together.

Recorded from England: Malham Tarn, W. Yorks., 1955 (R. B. B.); Wales: Presteigne, Radnor, 1953 (R. B. B.); Ireland: Lough Mentis and Farrinseer, Co. Cavan, 1944 (R. C. Faris); Scotland: Culbin Sands, near Forres, Moray, 1952 (R. B. B.). (†Benson, 1953, Ent. mon Mag. 89 : 151-2). N. Sweden and Finland. . . . . ♀ **tuberculata** (Benson)

— Head never covered with tubercles though the surface may be dull; frontal basin more clearly defined. Mesopleura and usually mesonotum shining without coriaceous sculpture. . . . . 23



- 23 (22) Antennal grooves (round outer edge of antennal sockets) glabrous and shining. Antenna shorter than costa. Head in front view broader than high. Front wall of frontal basin well developed but clearly notched or channelled right through. Gall makers. . . . . 24
- Antennal grooves pilose and dull. Antenna longer than costa. Head in front view higher than broad. Front wall of frontal basin entire or the basin is scarcely developed at all. Saw fig. 542.
- 24 (23) Stigma with apex darker than base. Head mostly yellow (except for black spot covering frontal area and antennal furrows). Hind tarsus about as long as hind tibia. 4-5 mm.

*Larva in yellowish-green, irregular pea-shaped or purse-shaped pyriform galls attached to the mid-rib on the underside of the leaves of Salix phylicifolia L. and nigricans Sm. The surface of the galls is only slightly pubescent and the long axis, which is usually less than 10 mm., is bent sideways outwards from the mid-rib (cf. P. harrisoni above). Local from the Pennines northwards. (†Harrison, 1926, Vasculum 12 : 116-7). VI. N. Europe.*

- Stigma with disc entirely yellowish-white and head mostly black (except for parts of the face and the outer and hind orbits). Hind tarsus shorter than tibia (0.8 : 1.0). 4-5 mm.

*Larva in irregular oval or pea-shaped galls (under 10 mm. diameter) yellow and red-flushed or deep red attached to the underside of the leaf near the mid-vein of Salix repens L. Locally common from Lancs. (Freshfield), northwards throughout Scotland and the Western Isles and in Co. Mayo in Ireland. V-VI. Single brooded. C. and N. Europe. In some of the Western Isles the galls are called "cranberries" and the creeping willow the "cranberry" (Harrison, 1939, Ent. mon. Mag. 75 : 63); and Cameron even recorded the host of this species as Vaccinium vitis-ideae L.*

♀ (= *phylicifoliae* Forsius) *arcticornis* Konow

♀ (= *vacciniellus* Cameron)<sup>4</sup> *collactanea* (Förster)

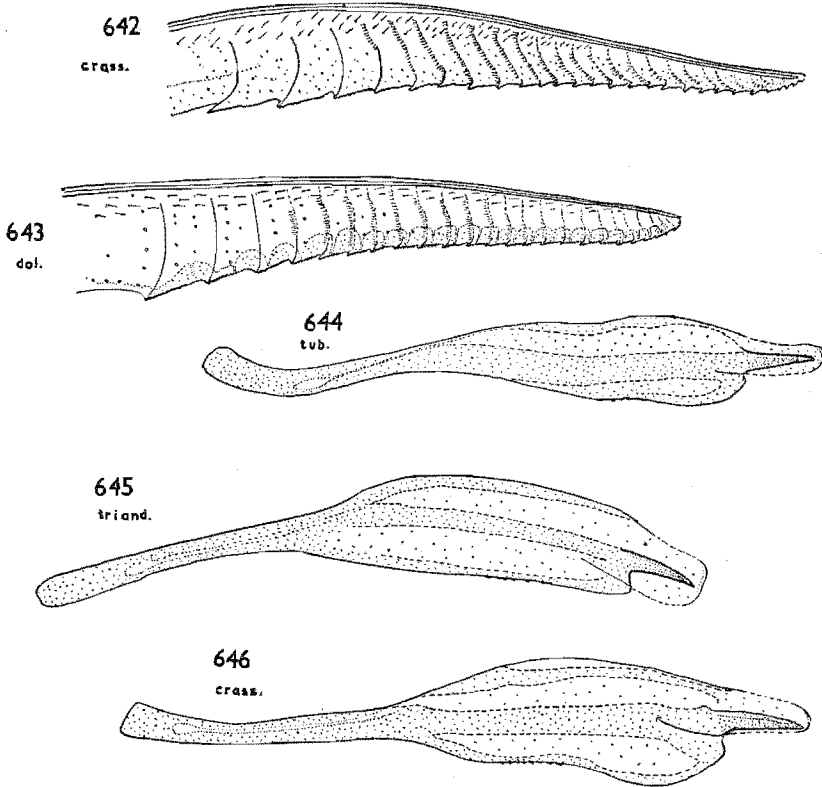
#### KEY TO SPECIES OF *Pontania*.

##### Males.

- 1 Antennal grooves (round outer edge of antennal sockets) glabrous and shining (figs. 609-10, and 612). . . . . 2
- Antennal grooves pilose and dull (figs. 608 and 611). . . . . 13
- 2 (1) Mesoscutellum strongly convex and dull with coriaceous sculpture between coarse punctures. Head with pale orbits and face. . . . . 3
- Scutellum at most only slightly convex and without coarse punctures. . . . . 4
- 3 (2) Underthorax yellow except for a black fleck on the sterno-pleural line. Abdomen yellow except for the 2 or 3 basal tergites medially. Penis valve fig. 648. 4.5-5.5 mm. . . . . ♂ *piliserra* (Thomson)
- Underthorax black except for a more or less pale spot in the front of the mesopleura. Abdomen black above on every segment medially and on the 2 or 3 basal ones entirely. Penis valve fig. 650. 4-5 mm. ♂ *scotaspis* (Förster)
- 4 (2) Head mainly black. If face and orbits marked with pale colour, then antenna shorter than C + stigma in length. . . . . 5
- Head mainly yellow above and below. Antenna very long—longer than C + stigma. Penis valve fig. 649. . . . . ♂ *puella* (C. G. Thomson)
- 5 (4) Hind femur more or less infusate. Labrum and more or less clypeus white. Ridge between eyes and antennal sockets carinate in dorsal view (figs. 609-10). . . . . 6
- Hind femur pale or labrum not white (yellow or infusate). Ridge between eyes and antennal sockets not carinate in dorsal view (fig. 612). . . . . 7

<sup>4</sup> *P. samolad* Malaise may also be British as indicated by the presence of what appear to be its characteristic galls on *Salix lapponum* L. samples in the Herbarium of the British Museum (Natural History) from Creagendale in Aberdeen in 1889, and at Glen Falloch (Corrie Ardrain), Meal Garbh, and Ben Lawers, in Perthshire, 1891-4. The galls, which are pea-shaped, are attached to the mid-vein near the base of the underside of the leaf. Adults from Swedish Lapland would run to *P. collactanea* in this key except that the hind tarsus is about the same length as the hind tibia and the inner orbits in front are duller (cf. Benson, 1954).

- 6 (5) Ridge between eyes and antennal sockets strongly defined and curving inwards behind the antennae to the sides of the frontal area and carinate all the way (fig. 609). Inner front tibial spur about half as long as basitarsus (cf fig. 603). Face, temples, pronotum, hind femur and tarsus mostly all black. 4.5-5.5 mm.....♂ *destricta* MacGillivray
- Ridge between eyes and antennal sockets rounded, less strongly carinate and breaks down behind antennae before reaching the frontal area (fig. 610). Inner front tibial spur nearly two-thirds as long as basitarsus (fig. 601). Face, temples, pronotum, hind femur and tarsus often more or less marked with yellow. 3.5-5 mm.....♂ *leucapsis* (Tischbein)



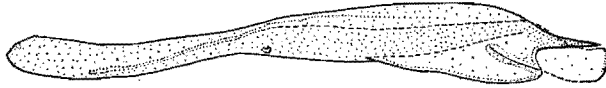
FIGS. 642-3.—Saw of *Pontania*: 642, *crassipes*; 643, *dolichura*.  
 FIGS. 644-6.—Penis valve of *Pontania*: 644, *tuberculata*; 645, *triandrae*; 646, *crassipes*.

- 7 (5) Hind trochanter and femur (except perhaps at extreme base) yellow and frontal area concave in the middle and with a lateral suture outside hind ocellus... 8  
 — Hind femur with at least basal half and often also hind trochanter infuscate, or frontal area not concave in the middle or lateral suture absent... 10
- 8 (7) Face with at least inner orbits below level of antennal sockets more or less black ..... 9  
 — Face below level of antennal sockets together with the broad outer and hind and the narrow inner orbits continuously yellow. 4-5 mm.  
 ♂ *arcticornis* Konow

- 9 (8) Hind basitarsus and base of hypopygium piceous. 4-5.5 mm. . . ♂ *viminalis* (L.)  
 - Hind basitarsus and hypopygium testaceous. 4-5.5 mm. . . ♂ *harrisoni* Benson
- 10 (7) Front wall of frontal area notched or channelled by a groove connecting median fovea with frontal basin (fig. 612) or hind tibial spurs not longer than apical breadth of hind tibia. . . . . 11  
 - Front wall of frontal area entire (fig. 611). Hind tibial spurs longer than apical breadth of hind tibia. . . . . 12

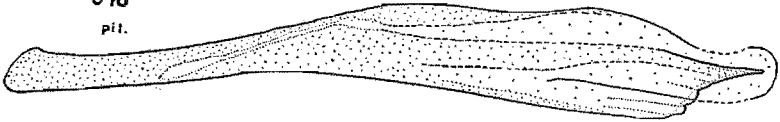
647

purp.



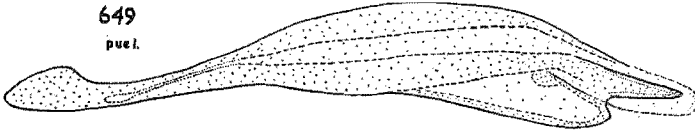
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pil.



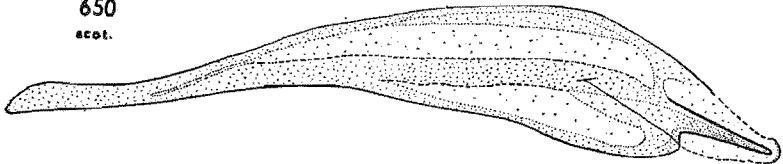
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puel.



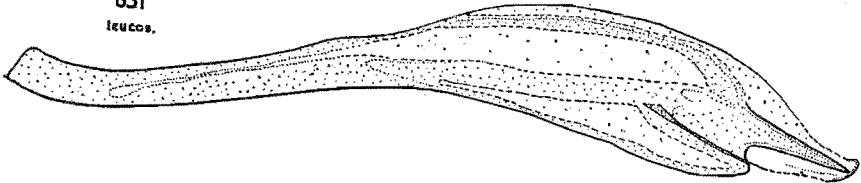
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scot.



651

leucos.



FIGS. 647-51.—Penis valve of *Pontania*: 647, *purpureae*; 648, *piliserra*; 649, *puella*; 650, *scotaspis*; 651, *leucosticta*.

- 11 (10) Stigma and hypopygium mostly piceous. Tibial spurs longer than apical breadth of hind tibia. 4-5 mm. . . . . ♂ *collactanea* (Förster)  
 - Stigma and usually hypopygium mostly yellow. Tibial spurs not as long as apical breadth of hind tibia (fig. 605). Penis valve fig. 646. 2.5-5 mm. . . . . ♂ *algida* Benson and *crassipes* (Thomson)
- 12 (10) Frontal area with well-defined surrounding wall and with lateral suture adjoining each hind ocellus. Males as common as females. 3.5-5.5 mm. . . . . ♂ *pedunculi* (Hartig)

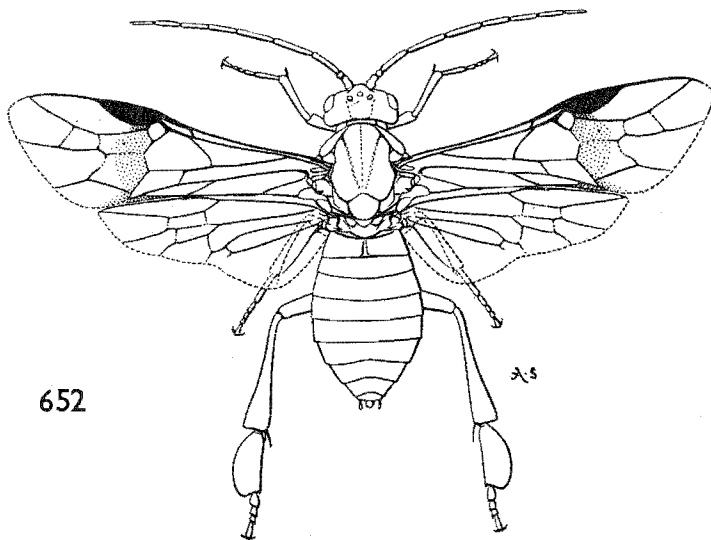
- Frontal area without clear surrounding walls and without a lateral suture. Very rare males of normally parthenogenetic species. *P. bridgmanii* Cameron has not been seen and only single bred specimens of *P. triandrae* Benson and of *P. proxima* Lepeletier have been available for study. (Penis valve of *triandrae* fig. 645).
- 13 (1) Hind tibial spurs almost straight or not longer than apical breadth of hind tibia. Hypopygium not longer than femur without second trochanter or hind legs often not entirely red . . . . . 14
- Hind tibial spurs strongly curved and much longer than apical breadth of hind tibia (figs. 606). Hypopygium enlarged and as long as hind femur plus second trochanter. Hind legs mostly red. Stigma white with only the apex infuscate. Penis valve fig. 651. 4.5–5.5 mm. . . . ♂ *leucosticta* (Hartig)
- 14 (13) Hind femur mostly infuscate and hypopygium piceous. Mostly under 5 mm. . . . . 15
- Hind femur and hypopygium mostly testaceous. Often over 5 mm. . . . . 18
- 15 (14) Head without definite carina surrounding frontal area. Stigma piceous at least at apex or round apical margin; C piceous too. . . . . 16
- Head with definite carina surrounding frontal area. Stigma brown, not darker at apex; C also brown. . . . . ♂ (see *Nematus reticulatus* Holmgren complex, p. 211–213).
- 16 (15) Hypopygium clearly longer than hind femur plus second trochanter, piceous 3.5–4.5 mm. . . . . 19
- Hypopygium scarcely as long as hind femur without second trochanter. . . . . 17
- 17 (16) Head above covered with minute warts. Lowland leaf-roller. Penis valve fig. 647. 3.5–4.5 mm. . . . . ♂ *purpureae* (Cameron)
- Head above with fine coriaceous sculpture. Subarctic gall maker. 2.5–4.5 mm. . . . . ♂ *dolichura* (Thomson)
- 18 (14) Species under 5 mm. Head with frontal area not clearly defined and head coriaceous between numerous large tubercles (fig. 608). Mesonotum and mesopleura dull with coriaceous sculpture. Penis valve fig. 644
- Species over 5 mm. long. Head with clearly defined frontal basin and dull with coriaceous sculpture but with no tubercles. Mesonotum shining between round punctures. Mesopleura shining without surface sculpture
- ♂ *tuberculata* (Benson)
- ♂ *pustulator* Forsius and *vesicator* (Bremi)
- 19 (16) Frontal area of head concave and shining in the concavity. . . ♂ *anglica* (Cameron)
- Frontal area of head dull and coriaceous
- ♂ *coriacea* (Benson) (and ? *acutiserra* Lindqvist)

### Genus *Croesus* Leach.

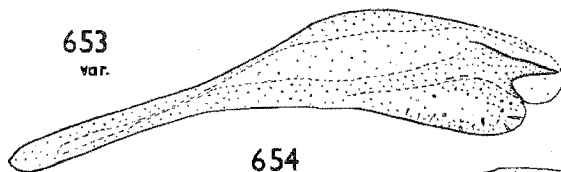
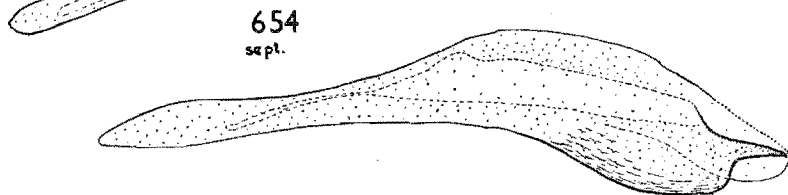
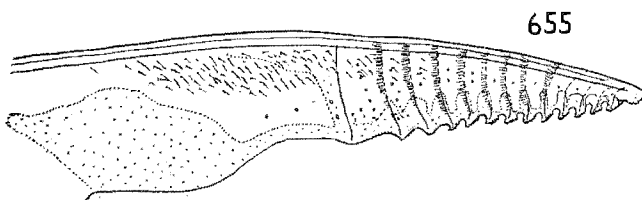
A small genus of only nine known species of which the four European ones all occur in Britain. The species are large, 7–11 mm. long (see fig. 652) with at least four middle segments of the abdomen red (except in a melanic form of *C. septentrionalis*). On the hind legs the femur is reddish-brown tipped with black in the males and more or less widely infuscate from the apex in the females; the hind tibia is black on the apical portion and white on the basal, and the hind tarsus is entirely black or piceous. The wings are hyaline, often with an infuscate band under the piceous stigma. Saw, fig. 655. Penis valves figs. 653–4.

#### KEY TO SPECIES OF *Croesus*.

- 1 Surface sculpture between punctures in middle of upper part of mesopleura so coarse and rugged that the separate punctures are scarcely discernible. . . 2
- Surface between punctures in middle of upper part of mesopleura shining or, at most, with fine surface sculpture which does not obscure the separate punctures. . . . . 3



652

653  
var.654  
sept.

655

FIG. 652.—*Croesus septentrionalis*.FIGS. 653-4.—Penis valve of *Croesus*: 653, *varus*; 654, *septentrionalis*.FIG. 655.—Saw of *Croesus septentrionalis*.

- 2 (1) Hind ocelli further from hind margin of head than from each other (1·2-1·3 : 1·0).  
8-10 mm. Saw fig. 655. Penis valve fig. 654.  
*Larvae gregarious on various trees and shrubs, mainly Alnus and Betula, but also on Acer, Carpinus, Corylus, Fraxinus, Populus, Salix and Sorbus. Common throughout British Isles. The Irish race contains a proportion of specimens with an entirely black abdomen (var. stephensii Newman); this form is recessive to the red-banded form (Perkins, 1929, Ent. mon. Mag. 68 : 18). V-VI and VII-IX. C. and N. Europe including Iberian Peninsula, Asia Minor and Caucasus. . . . . ♂ and ♀ septentrionalis (L.)*
- Hind ocelli about as far from hind margin of head as from each other (1·0-1·1 : 1·0).  
7·5-10 mm.  
*Larvae gregarious on Betula. Widely distributed in England but less common than the preceding; also Scotland: Lanark and Roasay and S. Uist of the Western Isles; and Ireland: Cavan. V-VI and VII-IX. N. and C. Europe to Caucasus. . . . . ♂ and ♀ latipes (Villaret)*
- 3 (1) Fore wings without an infusate band under the stigma. Labrum, edge of clypeus, and tegula yellowish-white. Femora mainly yellow, infusate only at base and extreme apex. Middle of mesopleura above with shining interspaces between the punctures. Sawsheath of ♀ about as broad as base of hind tibia in dorsal aspect. 7·5-8 mm. Penis valve fig. 653.  
*Larva on Alnus. Throughout Britain; also from Ireland: Leitrim. V-VI and VII-IX. C. and N. Europe, Iberian Peninsula, Siberia and N. America. ♂ very rare. . . . . ♂ and ♀ varus (Villaret)*
- Fore wings with an infusate band under the stigma. Labrum pale brown; clypeus and tegula piceous. Femora mainly black. Middle of mesopleura dull with fine surface sculpture between the punctures. Sawsheath much narrower than base of hind tibia in dorsal aspect. 7-8 mm.  
*Larva on Carpinus and Corylus. This species has so far been found only on a few occasions at Apsley Guise and Clophill, in Bedfordshire (†Chambers, 1950, Ent. mon. Mag. 86 : 85-86). V-VI. C. Europe. ♂ unknown*  
\*♀ brischkei (Zaddach)

Genus *Nematus* Panzer.

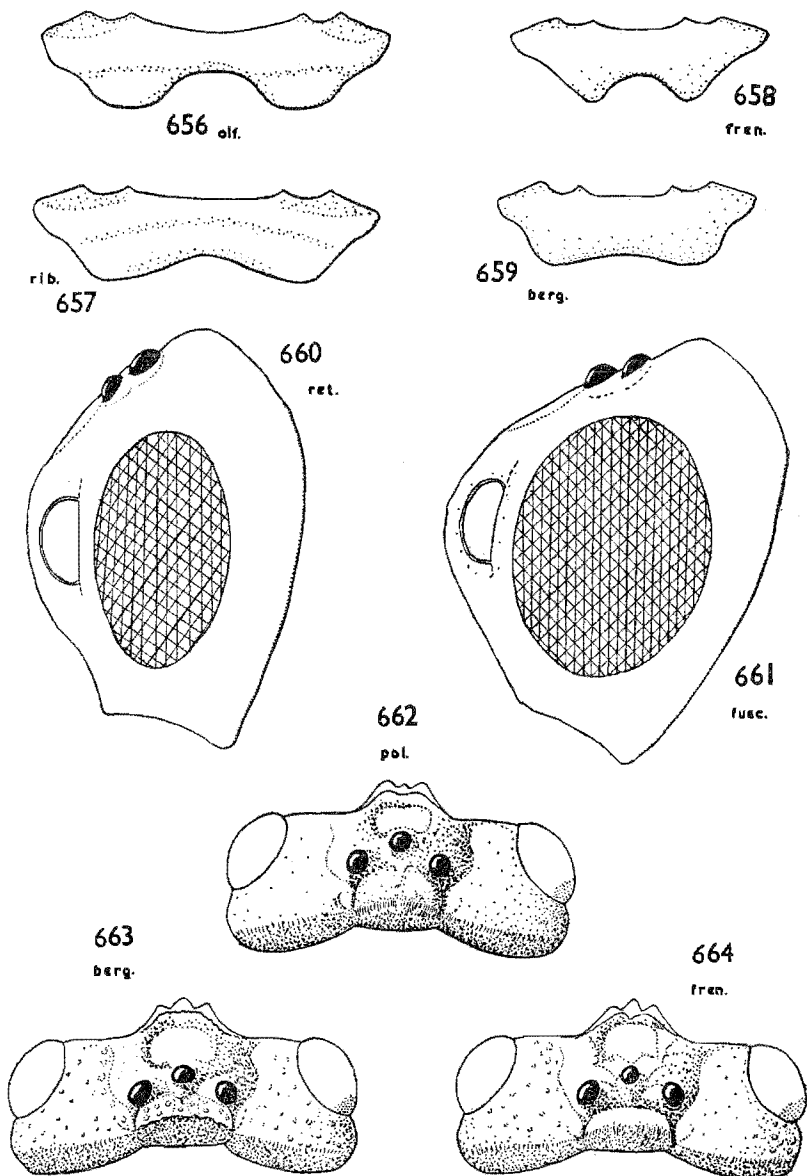
(= *Holococneme*, *Pteronidea*).

More than 120 species of *Nematus* are now known from the world, and 39 of these are here recognized as British, *N. frenalis* and *N. ponojense* for the first time. The *N. reticulatus* complex has already been included in the keys to *Amauronematus* and *Pontania* as it is easily mistaken as belonging to one or other of these genera. The species pattern in this complex is also still uncertain and there may prove ultimately to be more than two British species or only one.

KEY TO SPECIES OF *Nematus*.

Females.

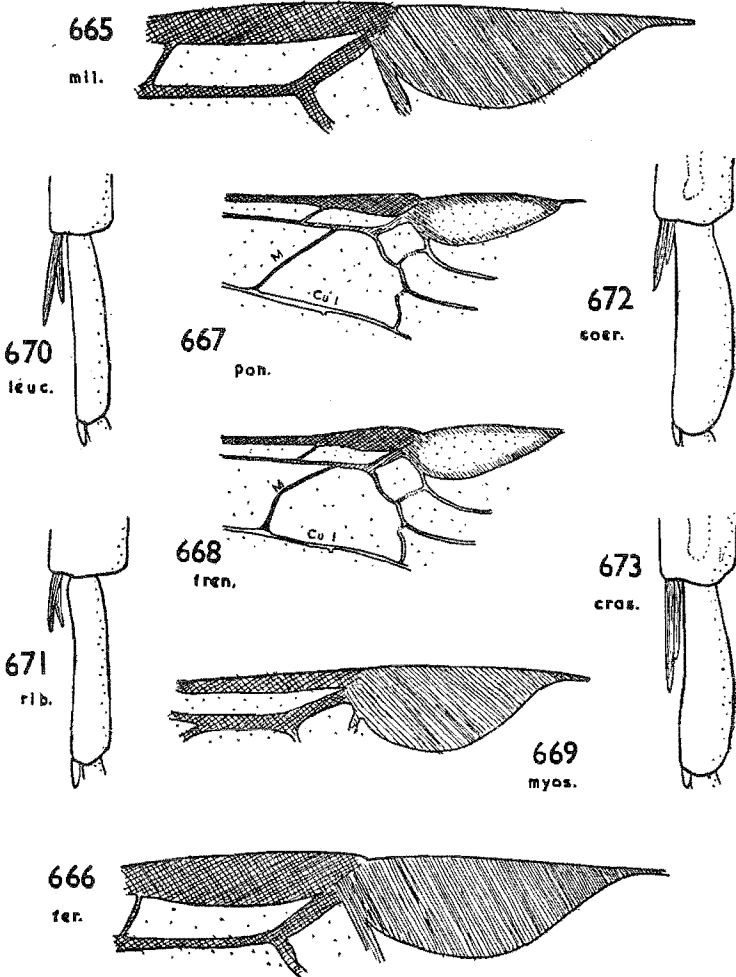
- 1 Arctic-alpine species at most 5·5 mm. long, with pale stigma and small eyes (fig. 660) (so that in lateral view the length of the middle of the eye is only about one and a half times the length of the head behind the eye): hind tibial spurs not longer than apex of tibia. . . . . 2
- Lowland species more than 6 mm. long, or with larger eyes (fig. 661) (so that in lateral view the length of the middle of the eye is at least twice as long as the length of the head behind the eye); stigma sometimes dark and spurs often longer. . . . . 3
- 2 (1) Antenna and head, except labrum, entirely black, as also is most of the body except the cerci, tibiae and tarsi. Sawsheath narrow and almost parallel-sided with straight lateral setae (fig. 679). 4-5 mm.  
*Only known from arctic-alpine zone of the Grampian mountains in Perth and Inverness. VI. (†Benson, 1935, Trans. R. ent. Soc. Lond. 83 : 30). Also Finland. . . . . ♀ nubium (Benson)*
- Antenna and head mostly reddish-yellow, also usually body on at least most of thorax and underside of abdomen. Sawsheath tapering behind and with curved setae (fig. 680). 4-5·5 mm. Saw fig. 542. Penis valve fig. 575.



FIGS. 656-9.—Clypeus of *Nematus*: 656, *olfaciens*; 657, *ribesii*; 658, *frenalis*; 659, *bergmanni*.  
 FIGS. 660-1.—Lateral view of head to show compound eye in *Nematus*: 660, *reticulatus*; 661, *fuscumaculatus*.  
 FIGS. 662-4.—Head from above to show postocellar region in *Nematus*: 662, *polyspilus*; 663, *bergmanni*; 664, *frenalis*.

Larva on *Vaccinium*. In arctic-alpine zone of the Grampian mountains (Perth., Inverness. and Angus) and probably elsewhere in Britain. In Ireland a large form with black antennae and mesonotum has been found by R. C. Faris at Farrinseer and Farnham in Co. Cavan in lowland country but this may prove to be another species. V-VI. (†Benson, 1935, Trans. R. ent. Soc. Lond. 33 : 29-30). Arctic alpine circumpolar

♀ (*forsiusi* Enslin, *alsius* Benson) *reticulatus* Holmgren



Figs. 665-6.—Apex of costa in fore wing of *Nematus* :  
665, *miliaris* ; 666, *ferrugineus*.

Figs. 667-8.—Portion of fore wing to show form of M in *Nematus* :  
667, *ponojense* ; 668, *frenalis*.

FIG. 669.—Stigma of *Nematus myosotidis*.

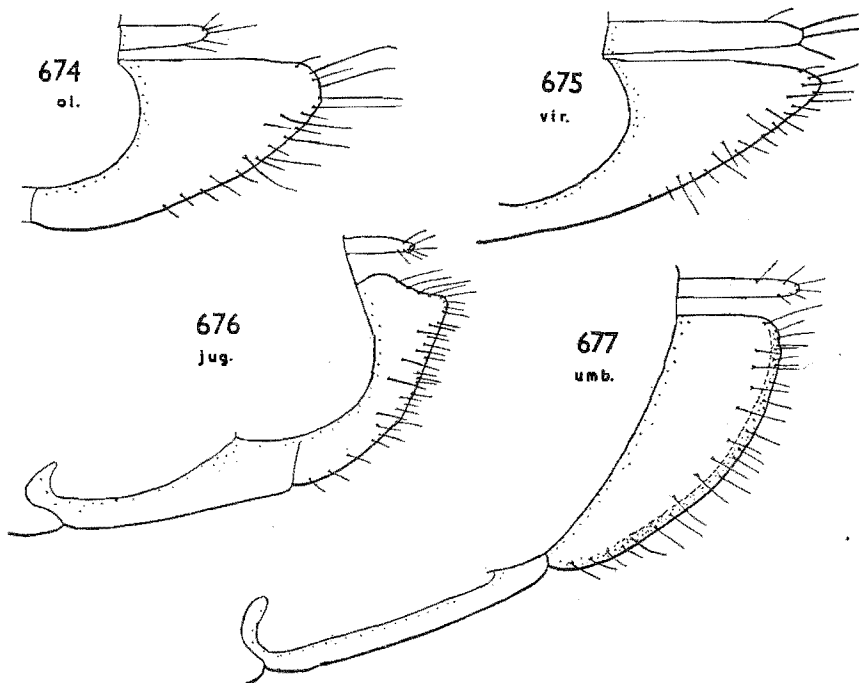
Figs. 670-3.—Hind tibial spurs in *Nematus* : 670, *leucotrochus* ; 671, *ribesii* ;  
672, *coeruleocarpus* ; 673, *crassus*.



- 3 (1) Abdomen never black above with a red girdle and often stockier or smaller, and often with shining thorax.....4  
 - Very elongate species with torpedo-shaped body, red-girdled, 8-11 mm. long. Mesonotum and mesopleura dull with heavy punctures and surface sculpture. Saw fig. 707.

Larva socially on *Crataegus* and *Prunus spinosus* L. Throughout Britain, commoner in South. IV-VI. Europe to Spain and Caucasus

♀ (*Holcoeneme lucida* (Panzer) ) **lucidus** (Panzer)



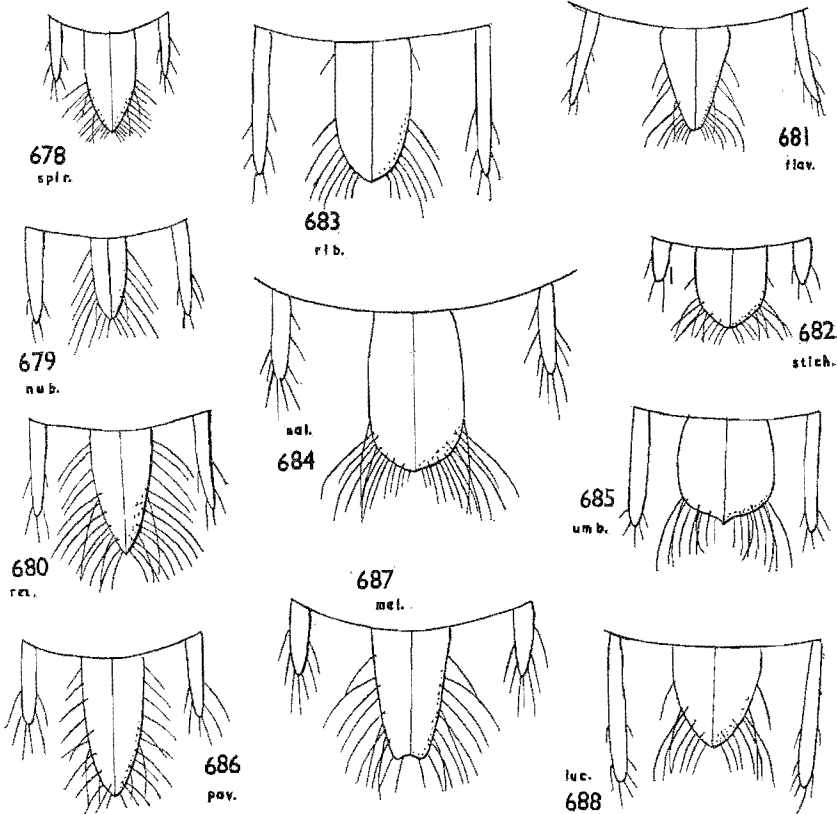
Figs. 674-7.—Sawsheath in lateral view in *Nematus*: 674, *oligospilus*; 675, *viridis*; 676, *jugicola*; 677, *umbratus*.

- 4 (3) Abdomen mainly orange-yellow (more or less infuscate basally above); head and mesonotum mainly black. Hind tibia yellow except sometimes at extreme apex. Antenna often entirely black.....5  
 - Abdomen variously coloured, sometimes green fading to straw yellow; if mainly orange-yellow, then either so also are head and mesonotum above mainly yellow, or hind tibia mainly black. Antennae (except in *incompletus*) at least pale beneath.....15  
 5 (4) Sawsheath in dorsal view broadly rounded behind and often subparallel-sided (figs. 683-5 and 687). Stigma of fore wing often mainly dark.....6  
 - Sawsheath in dorsal view acute behind, either subtriangular or very narrow in general shape (cf. figs. 679, 686). Stigma often pale at least in middle....11  
 6 (5) Sawsheath in lateral view slightly emarginate behind with dorsal apex acutely angled (cf. fig. 676). Larger species, 6.5-10 mm.....7  
 - Sawsheath in lateral view, rounded behind and not sharply angled at apex (fig. 677). Smaller species 5.5-7.5 mm.....8  
 7 (6) C (except extreme base) and Sc (except apex) in fore wing black. Scutellum black except at most for narrow margins. Sawsheath fig. 684; saw fig. 716. 8-10 mm.

*Larva on Salix alba L., S. fragilis L., etc. Locally common England to Berwickshire, and Ireland. V-VI and VII-IX. N. and C. Europe to Caucasus.* . . . . . ♀ *salicis* (L.)

C and most of Sc (except margins) yellow. Scutellum yellow each side of the black middle line. Sawsheath fig. 687; saw fig. 715. 6.5-8 mm.

*Larva on Salix and sometimes Betula, Corylus, Populus or Ulmus. Local throughout Britain and Ireland reaching N. Ebusdes. V-VI and VII-IX. C. and N. Europe* . . . . . ♀ *melanocephalus* Hartig



FIGS. 678-88.—Sawsheath from above in *Nematus*: 678, *spiracae*; 679, *nubium*; 680, *reticulatus*; 681, *flavescens*; 682, *stichi*; 683, *ribesii*; 684, *salicis*; 685, *umbratus*; 686, *pavidus*; 687, *melanocephalus*; 688, *lucidus*.

8 (6) C pale on at least basal two-thirds. Ovipositor much longer than 2 basal hind tarsal segments (figs. 677 and 685). Saw with prominent marginal teeth (fig. 708). Head with yellow temporal spots absent or very faint. Antennae entirely black. 5.5 to 7.5 mm.

Mesonotum often with the lobes yellow at the margins. Abdomen usually entirely yellow.

*Larva on Betula, also Ulmus, Corylus and Alnus. Local and scarce throughout Britain. V-VI and VII-IX. N. Europe*

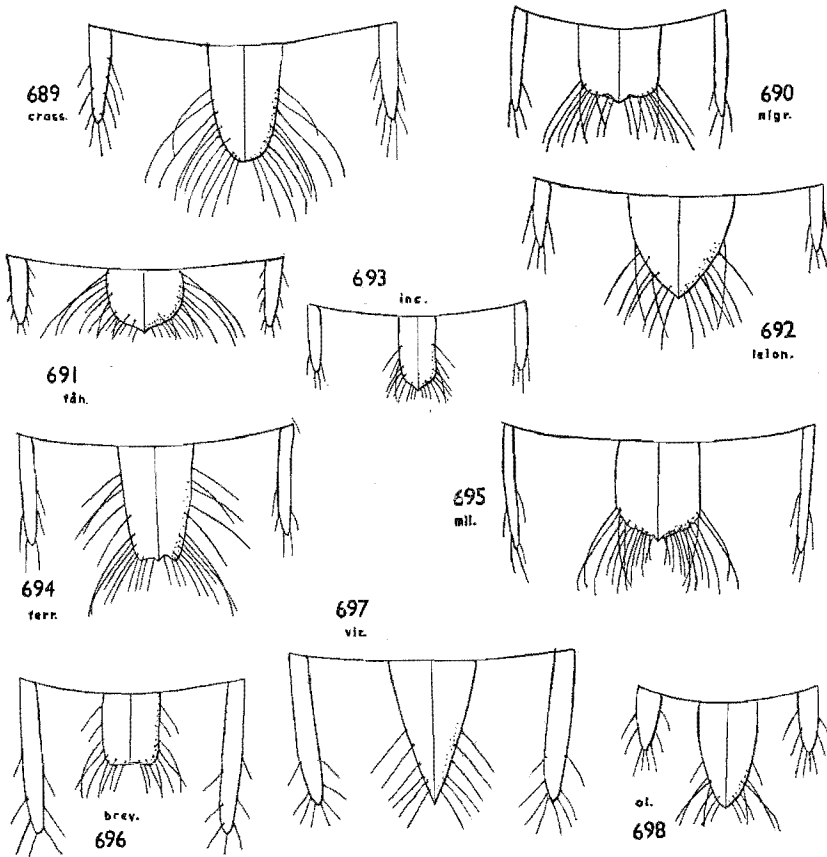
♀ (= *similis* Forsius, *collenus* Cameron) *umbratus* Thomson

C infusate except at extreme base. Ovipositor scarcely as long as 2 basal hind tarsal segments together (fig. 674). Saw of very simple pattern without

- distinct marginal teeth (figs. 699-701). Head black with usually a yellow mark in the upper orbits. Antenna usually pale beneath. (On *Ribes*)... 9
- 9 (8) Clypeus excised in front to a depth of less than half total depth of clypeus (fig. 657). Either antennae pale beneath or inner hind tibial spur about half as long as metatarsus (fig. 670). (Larva on *Ribes* spp. excluding *nigrum*)... 10
- Clypeus excised in front to a depth of at least half total depth of clypeus (fig. 656). Antenna piceous beneath. Inner hind tibial spur clearly less than half metatarsus (cf. fig. 671). Saw fig. 699.  
Abdomen except for first and more or less second tergites mainly yellow. 5.5-6.5 mm.  
*Larva on Ribes* spp. including *nigrum*. Found in 1952 in Angus by Dr. Ann Sanderson and in Glos. by R. C. Twynn. Now apparently widespread throughout Britain. (†Benson, 1953, Ent. mon. Mag. 89 : 60-63). Not known for certain outside Britain. . . . . ♀ **olfaciens** Benson
- 10 (9) Scutellum, mesonotum and abdomen almost entirely yellow. Antenna always pale beneath. Inner hind tibial spur clearly less than half length of metatarsus (fig. 671). Saw fig. 700. 6-7 mm.  
*Larva well-known pest of Ribes rubrum L., uva-crispa L. and alpinum L. Common throughout Britain to Outer Hebrides and Ireland. I V-IX (2-3 broods). All Europe to Caucasus. Introduced into N. America. . . . . ♀ ribesii* (Scopoli)
- Metanotum and abdomen with at least 2 basal tergites and often entire upper surface black. Antenna piceous below. Inner hind tibial spur about half as long as metatarsus (fig. 670). Saw fig. 701. 6-7 mm.  
*Larva on Ribes, chiefly uva-crispa L. Throughout Britain but seldom common. IV-V (1 brood). C. and N. Europe*  
♀ (*consobrinus* Vollenhoven) **leucotrochus** Hartig
- 11 (5) Ovipositor very short (fig. 676) (scarcely longer than hind basitarsus and much shorter than 2 basal tarsal segments) and in dorsal aspect narrow (not more than twice breadth of a cercus), subparallel-sided and reaching back further than the apices of the short cerci (fig. 686). Sawsheath abbreviated (shorter than basal plate) and saw with only very fine ventral teeth (figs. 702 and 705). Stigma of fore wing with margin sordid at least at apex. Inner hind tibial spur more than half length of basitarsus (cf. fig. 673). . . . . 12
- Ovipositor longer than 2 basal hind tarsal segments (cf. fig. 677) and in dorsal aspect more than twice breadth of a cercus, tapering behind where it is rounded and not reaching back much further than the apices of the long cerci. Sawsheath longer than basal plate and saw with conspicuous ventral teeth (figs. 713-4 and 717). Stigma may be with sordid margins. Inner hind tibial spur at most only about half basitarsus (cf. figs. 670-1). . . . . 13
- 12 (11) Front wall of frontal area notched. Abdomen all yellow except for a small black fleck each side of apical excision of first tergite and sometimes a fleck in middle of second and third. Stigma with margins sordid all round and much more than twice as long as wide. Antenna almost entirely black. Saw fig. 705. Sawsheath fig. 686. 6-7 mm.  
*Larva on Salix, Populus and also Alnus glutinosa (L.) Gaertn. Common throughout Britain to the Outer Hebrides; also in Ireland. IV-VI and VII-IX. All Europe. . . . . ♀ pavidus* Lapeletier
- Front wall of frontal area entire and abdomen with first and second tergites almost entirely black and a medial row of black flecks on most of the following tergites. Stigma with only apical margin sordid and only about twice as long as wide (cf. fig. 669). Antenna with flagellum entirely yellow. Saw fig. 702. 6-7 mm.  
*Larva on Salix aurita L. etc. England: Yorks., Teesdale, 1 ♀, v. 1939 (R. B. B.). Scotland: Inverness, Loch Morlich, 1 ♀, vi. 1934 (R. B. B.) and Moray, Cullbin Sands, near Forres, 11.vii.1904 (J. J. F. X. King). (†Benson, 1934, Ent. mon. Mag. 70 : 14). Two broods on the Continent, not common. N. and C. Europe. . . . . ♀ jugicola* C. G. Thomson
- 13 (11) Abdomen normal with a medial row of black flecks down its whole length, but the extent of black very variable, sometimes covering entire dorsal surface of abdomen and sometimes entirely absent. Stigma only twice as wide as long (fig. 669). Antenna entirely black. 6-7 mm.

(cf. *incompletus* (couplet 30) which is rather similar to this species but its pale body colour is green in life fading to straw and it has the upper half of the inner orbits with a pale line; in this species only the upper corner of the orbit is pale). Saw fig. 717.

Larva on *Onobrychis vicicifolia* Scop. and *Trifolium* spp. Common throughout Britain and Ireland. V-VIII (2 or more broods). Common throughout Europe to Caucasus and W. Siberia. . . . . ♀ *myosotidis* Fallén



FIGS. 689-98.—Sawsheath from above in *Nematus*: 689, *crassus*; 690, *nigricornis*; 691, *fähraei*; 692, *leionotus*; 693, *incompletus*; 694, *ferrugineus*; 695, *miliaris*; 696, *brevivalvis*; 697, *viridis*; 698, *oligospilus*.

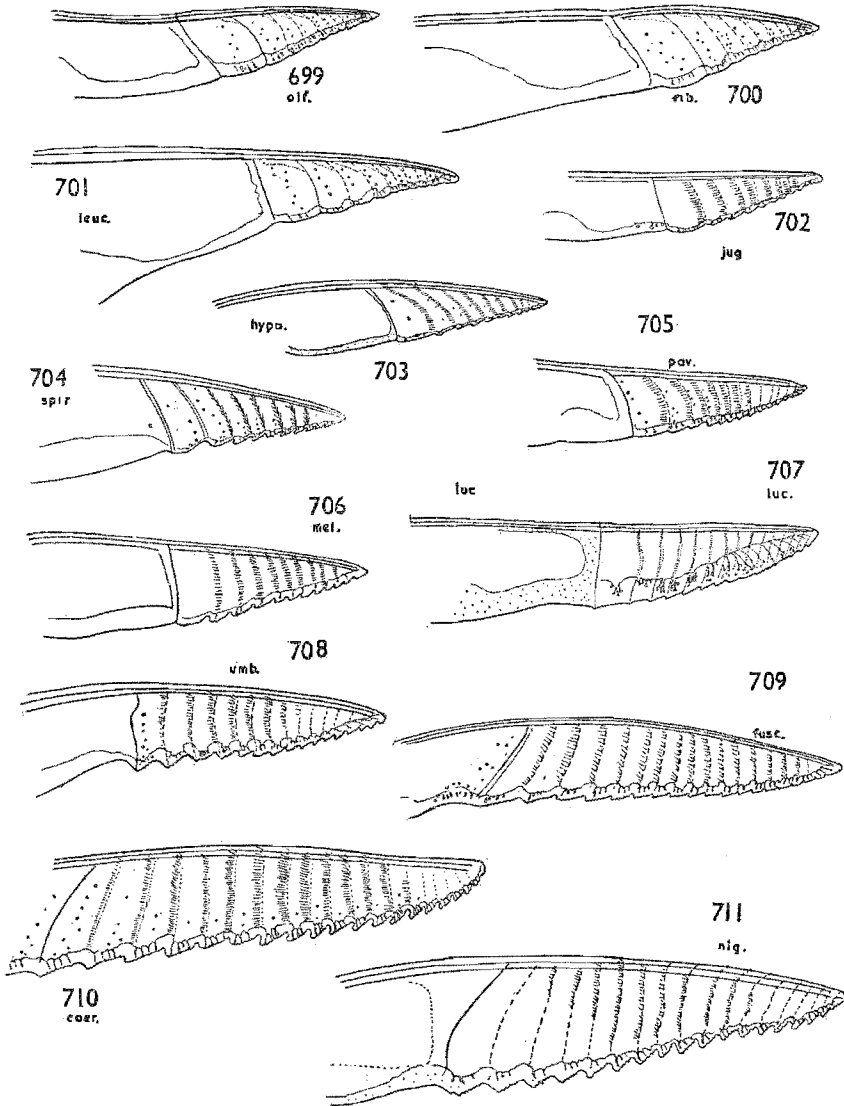
- Abdomen yellow with at most the first and second tergites mainly black and the third and fourth with a small medial spot. Stigma more than twice as long as wide (cf. fig. 666). Antenna conspicuously pale beneath. . . . 14
- 14 (13) Wings slightly infusate and C in fore wing much paler than M, which is piceous. Abdomen with first and second tergites mainly black and third and often the fourth with a medial black spot. Inner hind tibial spur about half length of basitarsus. Scutellum scarcely convex and without coarse punctures. Saw fig. 714. 6-7 mm.

Larva unknown. In Britain known only from the few specimens collected

by Cameron in *Clydesdale and a few found at Malham Tarn, Yorks., in 1955.*  
VI. Rare in C. and N. Europe to Caucasus.

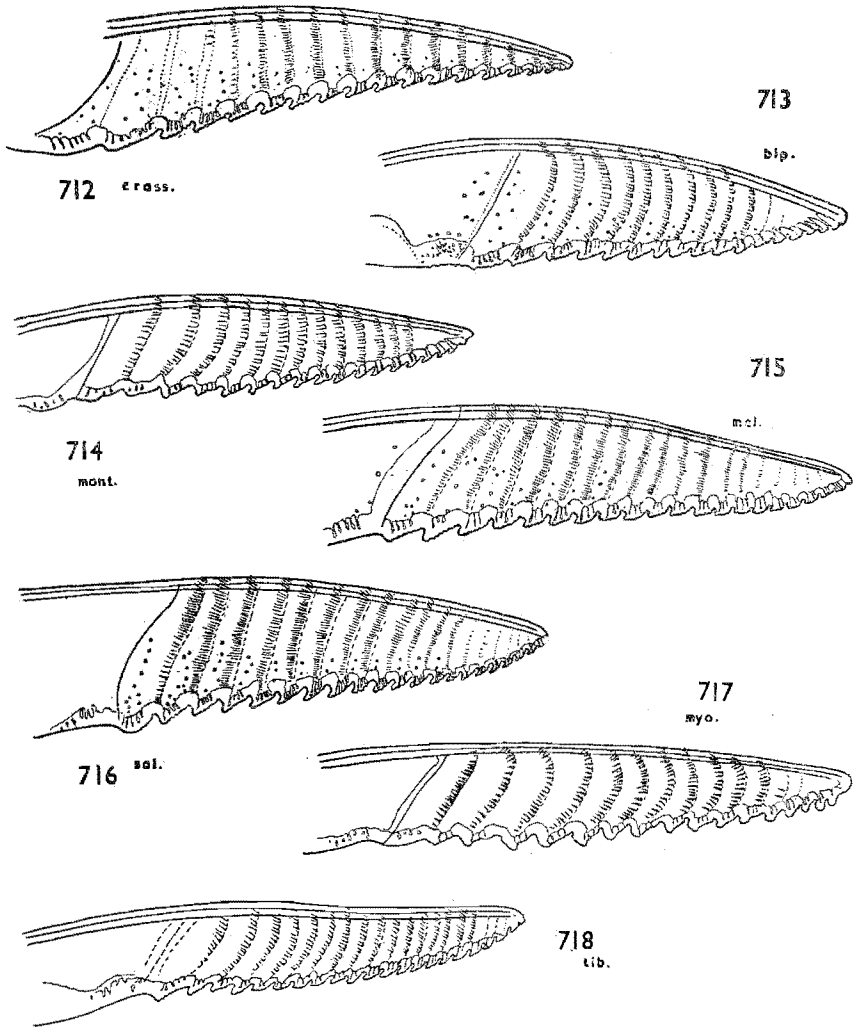
- ♀ (= *similator* Förster Morice nec Förster) ♀ **monticola** Thomson
- Wings subhyaline and C scarcely paler than M. Abdomen with at most a small black fleck each side of the excision of the first tergite. Inner hind tibial spur less than half basitarsus. Scutellum clearly convex, almost hemispherical, with coarse shallow punctures. Saw fig. 713. 5-6.5 mm.  
*Larva on underside of rolled leaves of Salix repens L., viminalis L. etc. V-VI and VII-VIII. Throughout Britain, locally common. C. and N. Europe.*.....♀ **bipartitus** Lepeletier
- 15 (4) Head, mesonotum and often abdomen mainly brown or orange-yellow (but usually with black flecks and abdomen more or less black above). Post-ocellar area of head often without black flecks.....16
- Head, mesonotum and abdomen either mainly black, or with ground colour green fading to straw, more or less marked with black. Postocellar region of head black or at least black-flecked.....24
- 16 (15) C of fore wing not much swollen apically (fig. 665) (so that it is not wider than intercostal area at point of origin of vein Rs + M). Antenna as long as or longer than C + stigma of fore wing.....17
- C of fore wing strongly swollen apically (fig. 666) (so that it is clearly wider than intercostal area at point of origin of vein Rs + M). Antenna not as long as C + stigma of fore wing.....21
- 17 (16) Smaller species (5.5-8 mm.) with sawsheath subtriangular in dorsal view (figs. 681-2).....18
- Larger species (7.5-9 mm.) with sawsheath in dorsal view expanding towards the apex where it is bluntly rounded and not extending as far back as the tips of the cerci (fig. 695).....20
- 18 (17) Head without a black spot between the ocelli. Antenna not noticeably infuscate above. Depressed parts of metanotum in front of cenchri pale or abdomen marked with black above. Cerci in dorsal aspect reach back more than half way to apex of sawsheath (fig. 681).....19
- Head with a black spot between the ocelli. Antenna black above. Depressed parts of metanotum in front of cenchri black. Abdomen entirely yellow. Cerci in dorsal aspect reaching back less than half as far as apex of sawsheath (fig. 682). Saw fig. 720. 5.5-6.5 mm.  
*Larva on Salix atrocinerea Brot. etc. Discovered in Ireland: Devil's Glen, Wicklow, in 1927 by A. W. Stelfox. Also in Scotland: Lanark. V-VI and VII-VIII. (†Benson, 1933, Stylops, 2: 258-9). Finland, Latvia and Spain.*.....♀ (= *fuscirima* Benson) **stichi** (Enslin)
- 19 (18) Larger species (7.5-8 mm.). Depressed parts of metanotum as well as metascutum and 2 or 3 basal abdominal tergites marked with black. Front wall of frontal area notched in the middle.  
*Larva on Betula. Only 2 ♀ known: the type from Scotland: Bishopton, Renfrew, and another from N. Wales: Bangor, Caernarvon (J. J. F. X. King). VI. Not known outside Britain.*.....\*♀ **dorsatus** Cameron
- Smaller species 5.5-7 mm. Metanotum entirely yellow and abdomen with or without a medial row of dorsal black spots. Front marginal wall of frontal area entire. Saw fig. 719.  
*Larva on Salix atrocinerea Brot., viminalis L. etc. In England: Devon, Dorset, Bucks., Herts., Worcester, Warwick, Chester, Lancs.; Scotland: Ross and Cromarty and Inverness. V-VI and VII-VIII. N. and C. Europe.*.....♀ (*stichi* Enslin auctt. nec. Enslin) **flavescens** Stephens
- 20 (17) Apex of hind tibia and all tarsus on inner side infuscate. Hind basitarsus slenderer, clearly more than four times as long as apical breadth.  
(The saw of this species is not yet distinguished from that of *N. miliaris* (Panz.) and is quite different, therefore, from Zirngiebl's figure (1941, *Mitt. Dtsch. ent. Ges.* 10: 41, fig. 4) which must be abnormal or belong to some other species).  
*Larva solitary edge-feeder on Fagus sylvatica L. Widespread S. England to Perthshire; commonest in S.E. Europe. V-VI and VII-VIII fagi* Zadd.
- Apex of hind tibia and tarsus not or scarcely infuscate. Hind basitarsus stouter, not more than four times longer than apical breadth. Saw fig. 724.

Larva gregarious on *Salix* spp. or sometimes *Populus*. Throughout Britain and Ireland. V-VI and VII-VIII. All Europe to Asia Minor and to E. Siberia  
(*croceus* Fallén, Cameron, nec. *miliaris* Panzer, Cameron) ♀ *miliaris* Panzer



FIGS. 699-711.—Saw of *Nematus*: 699, *olfaciens*; 700, *ribesii*; 701, *leucotrochus*; 702, *jugicola*; 703, *hypoxanthus*; 704, *spirææ*; 705, *pavidus*; 706, *melanaspis*; 707, *lucidus*; 708, *umbrius*; 709, *fuscomaculatus*; 710, *coeruleocarpus*; 711, *nigricornis*.

- 21 (16) Sawsheath narrow and tapering towards apex, where it is subtruncate in dorsal aspect (fig. 694). Basal tergites mainly brown. Scutellum entirely brown. Antenna mainly brown, at most infusate above at the base. . . . . 22
- Sawsheath broadly rounded at apex in dorsal view (figs. 691–2). Either apex of scutellum and basal tergites of abdomen mainly black, or antenna almost entirely black (except at apex below). . . . . 23

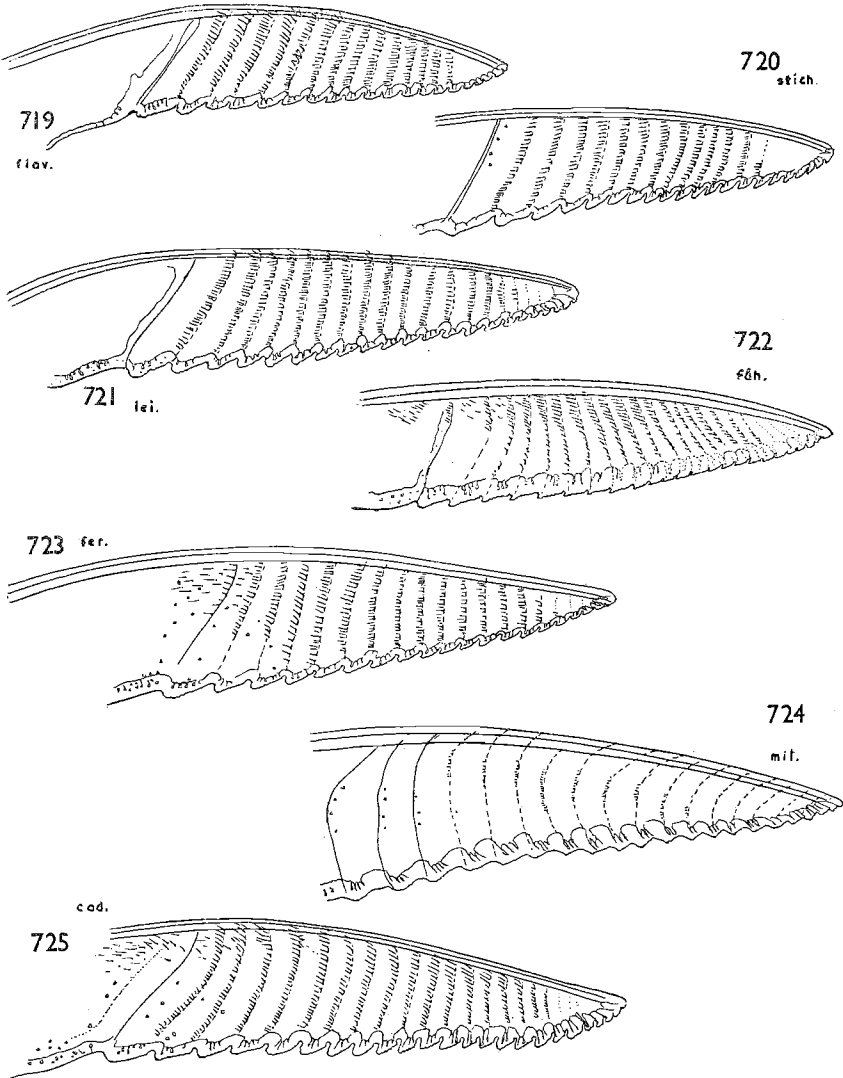


Figs. 712–18.—Saw of *Nematus*: 712, *crassus*; 713, *bipartitus*; 714, *monticola*; 715, *melanocephalus*; 716, *salicis*; 717, *mysotidis*; 718, *tibialis*.

22 (21) Saw with prominent teeth on lower margin (fig. 725) (the tenth tooth from the apex projecting about one-third as much as its basal length). 7-9 mm.

(This species in the adult is not for certain distinguishable from *N. ferruginea* except by the saw).

Larva on *Betula*. Widespread throughout Britain but not common: Devon, Bucks., Herts., Norfolk, Argyle, Lanark and Inverness. V-VI. *N. and C. Europe* . . . . . ♀ *cadderensis* Cameron



FIGS. 719-25.—Saw of *Nematus*: 719, *flavescens*; 720, *stichi*; 721, *leionotus*; 722, *f&h&e*; 723, *ferrugineus*; 724, *militaris*; 725 *cadderensis*.



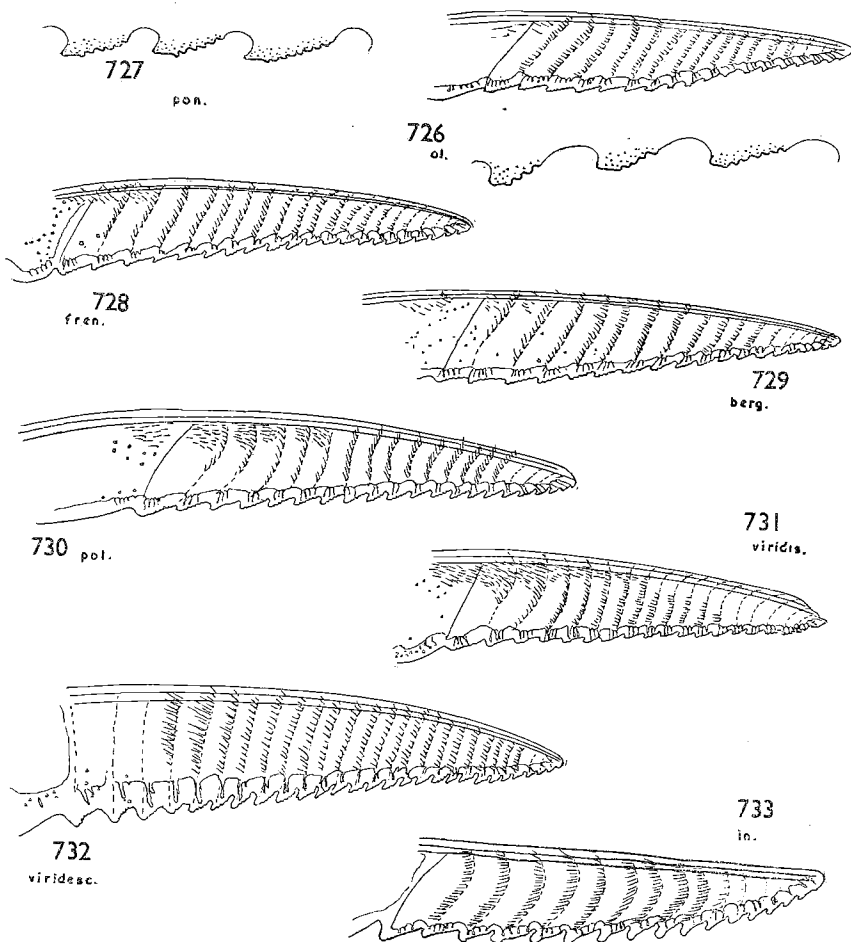
- Saw with less prominent teeth on lower margin (fig. 723) (the tenth tooth from the apex projecting less than half its basal length). 7-9 mm.  
(This species in the adult is not for certain distinguishable from *N. caed-derensis* except by the saw).  
*Larva* on *Salix atrocineræ* Brot. etc. Common throughout Britain and Ireland. V-VI and VII-IX. N. and C. Europe to E. Siberia
- 23 (21) Scutellum with transverse black band along hind margin and abdomen, with tergites 1-4 to 1-7 largely or wholly black. Mesonotum shining and impunctate. Antenna black above and brown below. Sawsheath bluntly subtriangular in dorsal view (fig. 692). Saw fig. 721. 7 mm.  
*Larva* on *Betula*. Only known from England: S. Devon (bred by R. C. L. Perkins), Surrey, Oxshott, 1 ♀, v. 1936 (J. F. Perkins) and Hindhead, 1 ♀, iv. 1946 (C. H. Andrewes); and from Ireland: Wicklow (Miss G. S. Scott). IV-V. (Benson, 1933, *Stylops* 2: 259-60). Also found in Finland
- Scutellum without a black band on its hind margin. Abdomen with at most 1-3 basal tergites marked with black in the middle. Mesonotum dull with fine surface sculpture. Antenna entirely black except at apex below. Sawsheath bluntly rounded in dorsal view (fig. 691). Saw fig. 722. 6-7 mm.  
*Larva* on *Populus tremula* L. Probably occurs in all our larger aspen thickets but is so far only recorded from England: S. Devon (R. C. L. Perkins); Herts., Bricket Wood; Bucks., Whaddon Chase; Beds., Kings Wood; and Scotland: Inverness, (Aviemore, 1934 and 1952). V-VI. (Perkins, 1929, *Ent. mon. Mag.* 65: 33). C. and N. Europe
- 24 (15) Postocellar area of head at least mainly black and/or antenna almost entirely black. Front and middle lobes of mesonotum usually mainly black and abdomen usually mostly black above with the pale parts yellow or green in life. Stigma often more or less sordid. . . . . 25
- Postocellar area mainly pale with at most but a black spot and antenna conspicuously pale below and at apex. Mesonotum with pale background marked more or less with black on the lobes. Basal tergites more or less marked with black; the pale colour green in life fading to straw in death. Stigma pale. . . . . 34
- 25 (24) Mesopleura and hind orbits mainly black. . . . . 26
- Mesopleura and usually hind orbits entirely pale. . . . . 31
- 26 (25) Either abdomen entirely black, or, if partly pale below and at sides, then cerci reaching back beyond apex of short blunt sawsheath (fig. 690). Mesopleura often dull. Larger species (8-9 mm). . . . . 27
- Abdomen always partly pale below and cerci not reaching back as far as apex of the narrow sawsheath (figs. 678 and 693). Mesopleura shining. Smaller species (5-7 mm). . . . . 29
- 27 (26) Abdomen entirely black. Cerci not reaching back as far as apex of sawsheath (fig. 689). Stigma piceous. . . . . 28
- Abdomen yellow at sides and below. Cerci reaching back beyond apex of sawsheath (fig. 690). Stigma pale in the middle. 6-8 mm. Saw fig. 711.  
*Larva* on *Populus* and *Salix*. Throughout Britain and Ireland but males very scarce. V-VI and VII-VIII. N. and C. Europe
- 28 (27) Inner hind tibial spur half as long as basitarsus and more than one and a half times as long as apical breadth of hind tibia (fig. 673). Sawsheath fig. 689. 8-9 mm.  
*Larva* on *Betula*, *Populus* and *Salix* as well as *Rumex obtusifolius* L. Throughout Britain and Ireland sparingly. V-VII. N. and C. Europe to E. Siberia. . . . . ♀ (*Holocneme crassa*) **crassus** (Fallén)
- Inner hind tibial spur shorter than apical breadth of hind tibia (fig. 672). Saw fig. 710. 8-9 mm.  
*Larva* usually on *Salix* and *Populus* but also recorded from *Ranunculaceæ* (*Aquilegia*, *Delphinium* and *Paeonia*). England: widespread but not generally common; Scotland: Angus, 1939. V and VI-VIII (and IX). N. and C. Europe to Italy and Caucasus
- ♀ (*Holocneme coeruleocarpa*) **coeruleocarpus** Hartig

- 29 (26) Stigma pale. Cerci reaching almost to apex of sawsheath (cf. fig. 693). . . . . 30  
 — Stigma piceous. Cerci in dorsal aspect not reaching back as far as half way to apex of projecting portion of sawsheath (fig. 678). Saw fig. 704. 5-6 mm.  
*Larvae gregarious on Aruncus silvester (Kosl.). Normally parthenogenetic with very rare males. (See Robbins, 1927, Lond. Nat. 1926: 11-15). Alien, very abundant in gardens almost wherever this food-plant is grown as far north as Angus (1946) but though this plant has been in cultivation in England since 1633, the sawfly was not detected here till 1924. (†Morice, 1925, Proc. ent. Soc. Lond. 1924: cxx-cxxii). IV-IX, many brooded. C. and N. Europe*  
 \*♀ *spiraeae* Zaddach
- 30 (29) Abdomen with tergites almost entirely black above. Sawsheath in dorsal aspect triangular with broad base and acute behind (cf. fig. 681). Frontal area of head without a clearly defined lateral carina and inner orbits with a large pale spot above reaching almost to lateral furrows of postocellar area and down to level of antennal sockets. Saw fig. 709. 5-6 mm.  
*Larva on Populus tremula L. Very few British records: Cameron records 2 ♀ from Scotland: Stirling (Kilsyth Glen and Cannisburn); solitary specimens have been found in England: Devon, Hants., Herts., Beds., Warwick., Durham and Cumberland. V-VI. C. and N. Europe. ♂ unknown*  
 \*♀ (= *strongylogaster* Cameron) *fuscocomaculatus* Förster
- Abdomen above with tergites black medially but broadly pale at the sides and more or less on their apical margins. Sawsheath in dorsal aspect narrow, only tapering slightly behind where it is blunt (fig. 693). Frontal area of head with a clearly defined lateral carina and inner orbits with only a small spot above and narrow upper half of margins pale. 5-7 mm. Saw fig. 733.  
*Throughout Britain and in Ireland. V-VI and VII-VIII. N. and C. Europe to Caucasus. (cf. myosotidis couplet 13)*  
 ♀ (= *pulchellus* Cameron, *segmentarius* Förster *auctt. nec.* Förster) *incompletus* Förster
- 31 (25) Cerci reaching back more than half way to apex of projecting portion of sawsheath. Hind tibia black-lined above or antenna black except for discolouring at joints between segments. . . . . 32  
 — Cerci very short and not reaching back as much as half way to apex of projecting portion of sawsheath. Hind tibia not black-lined above and antenna usually pale beneath. . . . . 33
- 32 (31) Pale colour in life yellow; hind tibia mainly black. Saw fig. 718. 6-7 mm.  
*Larva on Robinia pseud-acacia L. Parthenogenetic species with male unknown. Introduced into this country with its food-plant in early nineteenth century. Widely distributed in England wherever its food-plant is grown. V-VI. Native of N. America but by introduction now widespread in Europe*  
 \*♀ *tibialis* Newman
- Pale colour in life green; hind tibia black only at apex. Saw fig. 732. 6-8 mm.  
 (Very variable in colour and size).  
*Larva on Betula. Parthenogenetic species with male very rare. Common throughout Britain. IV-IX. C. and N. Europe. ♀ (= poecilonotus auctt. nec. Zaddach, palliatus Thomson, Cameron in part) viridescens Cameron*
- 33 (31) Larger species (6-8 mm.). Mesonotum duller with more defined surface punctures and medial division of fore-lobes obsolete. Hind tibia at apex and hind tarsi black. Mesosternum black or entirely pale. Saw fig. 706.  
*Larva on Populus, Salix and Betula, feeding gregariously. Throughout Britain and Ireland. V-VI and VII-VIII. N. and C. Europe and Siberia*  
 ♀ (*maculiger* Cameron) *melanaspis* Hartig
- Smaller species (5-6 mm.). Mesonotum shining with less defined surface punctures and with medial division between fore-lobes clearly marked. Hind tibiae and tarsi, as well as mesosternum, entirely pale. Saw fig. 703.  
*Larva on Salix and Populus. Britain and Ireland. V-VI and VII-VIII. C. and N. Europe to Spain and to Siberia*  
 ♀ (= *orbitalis* Cameron) *hypoxanthus* Förster

34 (24) Postocellar area much longer in the middle than the diameter of an ocellus (fig. 662) or not clearly margined behind (fig. 664). Clypeus clearly excised in middle of front margin (fig. 658). Inner hind tibial spur usually much longer than apical breadth of hind tibia. . . . . 35

— Postocellar area in the middle scarcely longer than the diameter of an ocellus and margined behind with a distinct carina (fig. 663). Clypeus only very slightly and broadly emarginate in front (fig. 659). Inner hind tibial spur scarcely longer than apical breadth of hind tibia. 6-8 mm.

(Very variable in the extent of the black colour above: the early spring forms are the darkest and can be almost entirely black above on the thorax and abdomen especially in northern regions; the mid-summer forms, however, are mostly green above with perhaps only the three dark flecks on the mesonotum, the invariable anchor on the scutellum and on the



FIGS. 726-33.—Saw of *Nematus*: 726, *oligospilus*; 727, *ponojense*; 728, *frenalis*; 729, *bergmanni*; 730, *polyspilus*; 731, *viridis*; 732, *viridescens*; 733, *incompletus*.

abdomen a small black fleck on the first or first and second tergites). Saw fig. 729.

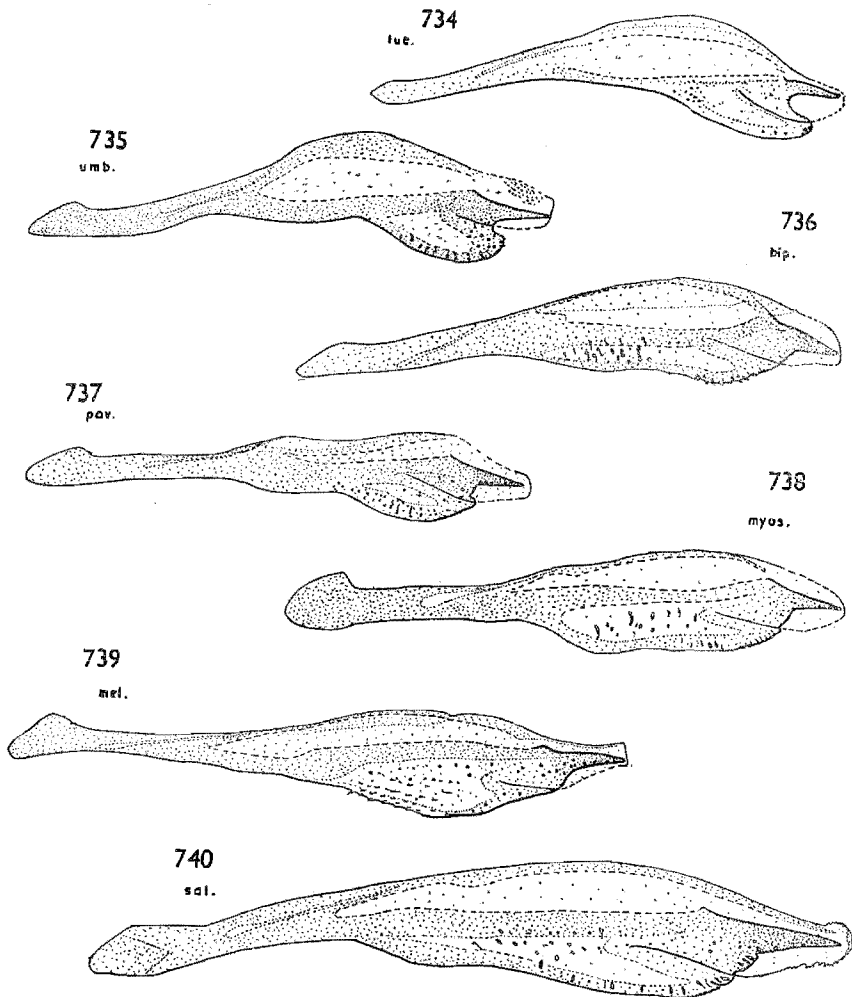
*Larva on Salix. Throughout Britain and Ireland, common. IV-IX, many brooded. C. and N. Europe to Siberia*

- ♀ (= *curtispirina* Thomson) **bergmanni** Dahlbom
- 35 (34) *Either* sawsheath in lateral and dorsal view tapering evenly to an acute apex (in dorsal view narrower apically than a cercus (fig. 697) and in lateral view with length of free upper edge as great or greater than the greatest height (fig. 675)); or (*i.e.* in *polyspila*, the sawsheath may not quite conform to this definition) metascutellum pale except only for a dark round central spot. . . . . 36
- Sawsheath bluntly rounded or subtruncate at apex in lateral and/or dorsal view (in dorsal view blunter and broader at apex than the cerci, fig. 698); in lateral view length of free upper edge clearly less than the greatest height (*cf.* fig. 677). Metascutellum entirely or more or less marked with black, but never pale with only the centre dark. . . . . 37
- 36 (35) Metascutellum usually yellow, sometimes entirely so, often with a dark suffusion on hind margin, or a lunate dark mark which may be attenuate in the middle to form two lateral marks and sometimes the whole of this part suffused with black. Supra-clypeal area normally produced (so that in dorsal view it projects beyond front edge of antennal sockets, *cf.* fig. 664). Saw fig. 731. 6-9 mm.
- Larva on Betula. Common throughout England; Scotland: Lanark, Ross and Perth. Ireland: Cavan and Wicklow. VI-V and VII-VIII. N. and C. Europe. ♀ (= bergmanni Dahlbom auctt. nec. Dahlbom; brevisulvis Thomson Konow nec. Thomson; dispar Zaddach auctt. brit. nec. Zaddach)*
- Metascutellum pale, almost white, with a very conspicuous black spot occupying the middle, usually round or transversely elliptical in shape. Supra-clypeal area less pronounced (so that in dorsal view it does not project beyond front edges of antennal sockets, fig. 662). Saw fig. 730. 7-8 mm.
- Larva on Alnus glutinosae (L.) Gaertn. Throughout Britain and Ireland. V-VI and VII-VIII. C. and N. Europe to Italy*
- \*♀ (= *glutinosae* Cameron) **polyspilus** Förster
- 37 (35) Sawsheath projects beyond cerci (figs. 674 and 698). . . . . 38
- Sawsheath blunt and subtruncate apically (fig. 696) with cerci projecting beyond apex. 8-9 mm.
- Larva on Betula. England: Surrey, Bucks., Herts., Beds.; Scotland: Inverness. (†Benson, 1934, Ent. mon. Mag. 79: 203). Elsewhere only Sweden and Finland*
- ♀ (*nec. brevisulvis* Thomson Konow) **brevivalvis** C. G. Thomson
- 38 (37) Hind ocelli (fig. 664) clearly further apart than their distance from hind margin of head. Postocellar region more or less defined behind. Saw figs. 727-8 . . . . . 39
- Hind ocelli about as far apart as their distance from hind margin of head (*cf.* fig. 662). Postocellar region rounded behind and not defined. Sawsheath tapering behind. Saw fig. 726. 5-6.5 mm.
- Larva on Salix. Throughout Britain and Ireland. V-VI and VII-VIII. N. and C. Europe to Caucasus. . . ♀ (= salicivorus Cameron, sylvestris Cameron, miliaris Panzer Cameron nec. Panzer, capreae L. auctt. brit. nec. L.)*
- oligospilus** Förster
- 39 (38) M in fore wing slightly sigmoid in shape, and joining Cu1 obliquely (fig. 667). Sawsheath subparallel-sided in dorsal view. Saw fig. 727. 5-6.5 mm.
- Larva undescribed but in Britain associated with Salix pentandra L. England: Yorks., Malham Tarn, vi.1955 (R. B. B.); Scotland: Roxburghshire, Newcastleton, vi.1940 (R. B. B.). New British Record. N. Europe and Siberia. . . . . ♀ ponojense (Hollén)*
- M in fore wing strongly bent in the middle and forming a right angle where it joins Cu 1 (fig. 668). Sawsheath strongly tapering apically in dorsal view. Saw fig. 728. 5-6.5 mm.
- Larva on Salix. Scotland: Inverness-shire, Nethybridge, 1 ♀, 7.vi.1934 (R. B. B.). New British Record. N. Europe and Siberia*
- ♀ (= *fastosus* Konow) **renalis** C. G. Thomson

KEY TO SPECIES OF *Nematus*.

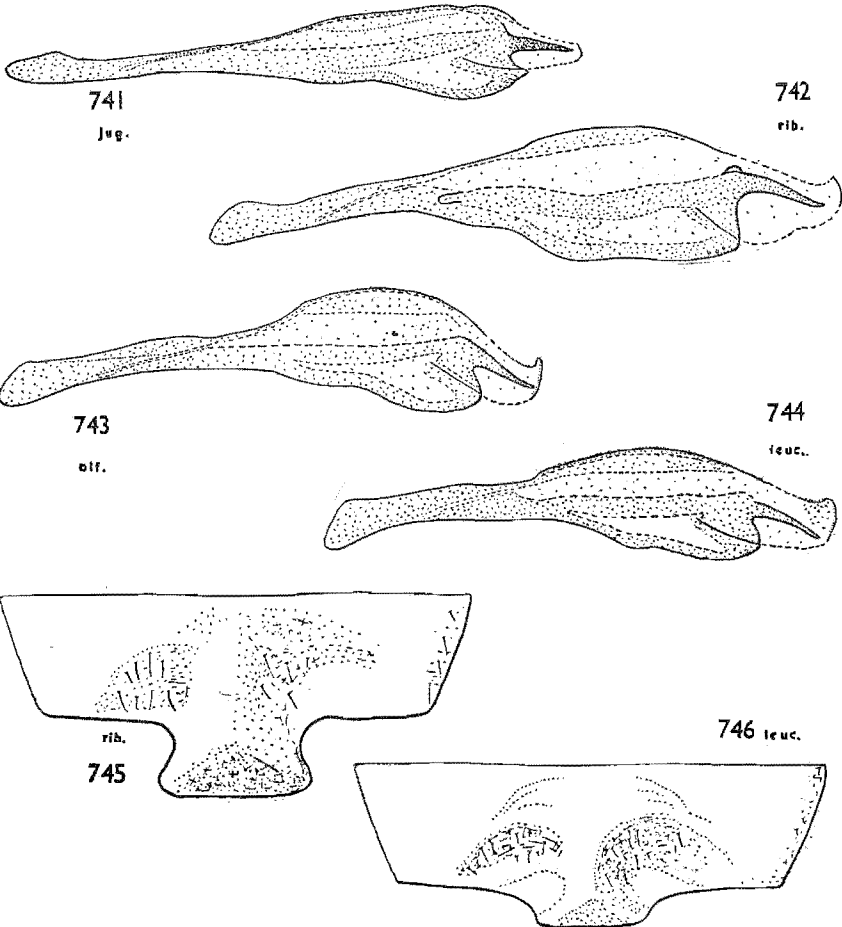
## Males.

- 1 Arctic alpine species at most 5 mm. long, with pale stigma, and small eyes (fig. 660) (so that in lateral view the length of the middle of the eye is less than twice the length of the head behind the eye) and hind tibial spurs not longer than apical breadth of tibia. Penis valve fig. 575  
*reticulatus* Holmgren and ? *nubium* (Benson)
- Lowland species more than 5.5 mm. long, or with larger eyes (fig. 661) (more than twice as long as the length of the head behind the eye in lateral view). Stigma sometimes dark and spurs often larger. . . . . 2



FIGS. 734-40.—Penis valve of *Nematus*: 734, *lucidus*; 735, *umbratus*; 736, *bipartitus*; 737, *pavidus*; 738, *myosotidis*; 739, *melanocephalus*; 740, *salicis*.

- 2 (1) Abdomen never black above with a red girdle, often stockier or smaller and often with shining thorax.....3  
 - Very elongate species with torpedo-shaped body, red girdled, 8-11 mm. long. Mesonotum and mesopleura dull with heavy punctures and surface sculpture. Penis valve fig. 734.....♂ *lucidus* (Panzer)  
 3 (2) *Either* inner orbits, *or* mesopleura mainly black.....♀.....4  
 - Inner orbits pale, continuously even if narrowly (or almost so), and mesopleura also mainly pale.....21  
 4 (3) Prolongation of eighth tergite not broader apically than apex of hind tibia and truncate (fig. 746).....5  
 - Prolongation of eighth tergite very large, about one and a third times as broad as apex of hind tibia (fig. 745). Abdomen yellow with a variable amount of black above. Penis valve fig. 742.....♂ *ribesii* (Scopoli)  
 5 (4) Abdomen yellow above except, at most, for a medial row of black flecks....6  
 - Abdomen almost entirely black above.....14

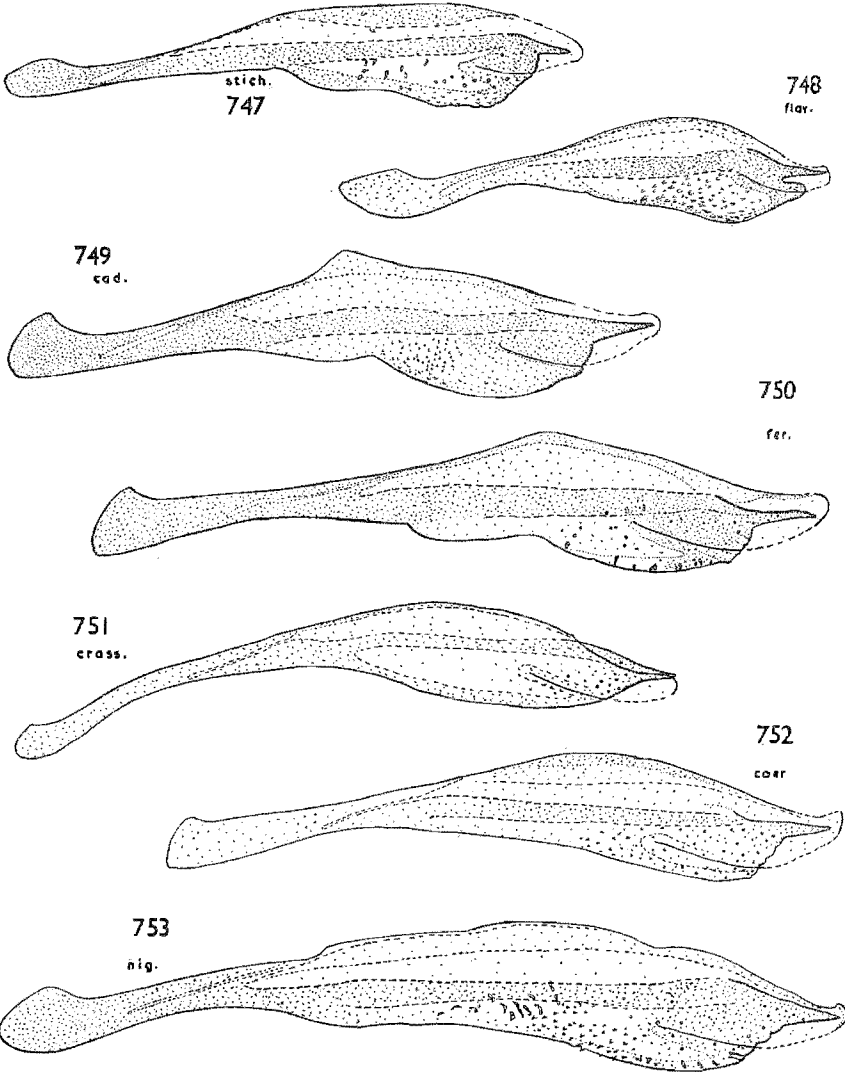


FIGS. 741-4.—Penis valve in *Nematus*: 741, *jugicola*; 742, *ribesii*; 743, *olfaciens*; 744, *leucotrochus*.

FIGS. 745-6.—Male apical tergite in *Nematus*: 745, *ribesii*; 746, *leucotrochus*.

- 6 (5) Abdomen yellow with at most first and second tergites black-flecked. Stigma black ..... 7  
 — *Either* abdomen more extensively flecked with black, or stigma not black . . . 9
- 7 (6) Smaller species (less than 6.5 mm.) with mesopleura at least mainly black, as also are outer orbits and antenna. . . . . 8  
 — Larger species (over 6.5 mm.) with yellow mesopleura, face below antennae, lower outer orbits and antenna beneath. Penis valve fig. 740. ♂ *salicis* (L.)
- 8 (7) Projection to eighth tergite about half as wide apically as apex of hind tibia (and about as wide as apex of metatarsus). Penis valve fig. 735  
 — ♂ *umbratus* Thomson  
 Projection to eighth tergite about as wide apically as apex of hind tibia (*cf.* fig. 746). Penis valve fig. 743. . . . . ♂ *olfaciens* Benson
- 9 (6) Stigma acute at apex and sometimes, together with C, brown. . . . . 10  
 — Stigma obtuse at apex and clear yellow, as is C. . . . . 12
- 10 (9) Inner orbits continuously pale. Front wall of frontal area often notched medially. Penis valve fig. 737. 6-7 mm. . . . . ♂ *pavidus* (Lepeletier)  
 — Inner orbits not continuously pale. Front wall of frontal area not notched medially. . . . . 11
- 11 (10) Scutellum scarcely convex (so that the middle is about as high as the post-tergite) and shining (with at most sparse sculpture). 5.5-6.5 mm.  
 — ♂ *monticola* C. G. Thomson  
 Scutellum clearly convex (so that the middle is higher than the post-tergite) and with coarse though shallow punctures. Penis valve fig. 736. 5-6 mm.  
 ♂ *bipartitus* (Lepeletier)
- 12 (9) Pale colour orange. . . . . 13  
 — Pale colour straw. . . . . ♂ *incompletus* Förster
- 13 (12) Antenna entirely black. Penis valve fig. 738. . . . . ♂ *myosotidis* (Fabricius)  
 — Antenna partly yellow. Penis valve fig. 741. . . . . ♂ *jugicola* C. G. Thomson
- 14 (5) Stigma, hind tarsus above and whole antenna piceous; mesopleura pale or dark . . . . . 15  
 — Stigma yellow or brown; hind tarsus not infusate above or antenna conspicuously pale beneath; mesopleura dark. . . . . 19
- 15 (14) Abdomen entirely black. . . . . 16  
 — Abdomen at least partly pale beneath. . . . . 17
- 16 (15) Inner hind tibial spur clearly more than one half as long as basitarsus. Penis valve fig. 751. 7.5-8 mm. . . . . ♂ *crassus* (Fallén)  
 — Inner hind tibial spur clearly less than one half as long as basitarsus. Penis valve fig. 752. 7.5-8.5 mm. . . . . ♂ *coeruleocarpus* Hartig
- 17 (15) Mesopleura pale. Penis valve fig. 739. 5-6 mm. . . . . ♂ *melanocephalus* Hartig  
 — Mesopleura black. . . . . 18
- 18 (17) Hind femur entirely or almost entirely pale; inner orbits mainly pale, eighth tergite with a truncate rectangular apical projection about as wide as apex of tibia (fig. 746). Penis valve fig. 744. 6 mm. . . . . ♂ *leucotrochus* Hartig  
 — Hind femur and inner orbits mainly black. Projection to eighth tergite rounded apically though not clearly defined laterally, but apparently broader than apex of hind tibia. Penis valve fig. 753. 6-7 mm.  
 ♂ *nigricornis* Lepeletier
- 19 (14) Smaller (under 6 mm.). Hind tarsus infusate but inner orbits and underside of antenna pale. Projection to eighth tergite narrower at apex than apical breadth of hind basitarsus. . . . . 20  
 — Larger (over 6 mm.). Hind tarsal segments pale except at apices, but inner orbits and antenna entirely black or piceous. Projection to eighth tergite broader at apex than apex of hind basitarsus. Penis valves figs. 749-50.  
 ♂ *ferrugineus* Förster and *cadderensis* Cameron
- 20 (19) Tergites entirely black. (Not seen). 5-5.5 mm. . . . . ♂ *fuscocomaculatus* Förster  
 — Tergites more or less pale at sides. Penis valve fig. 754. 5-5.5 mm.  
 ♂ *melanaspis* Hartig
- 21 (3) Projection to eighth tergite quite twice as long as breadth of the subtruncate apex. Inner orbits brown. Mesosternum dark. 6.5-7 mm.  
 — ♂ *miliaris* (Panzer) and *fagi* Zaddach  
 Projection to eighth tergite not nearly twice as long as its apical breadth. Inner orbits yellow or white. Mesosternum pale or dark. . . . . 22

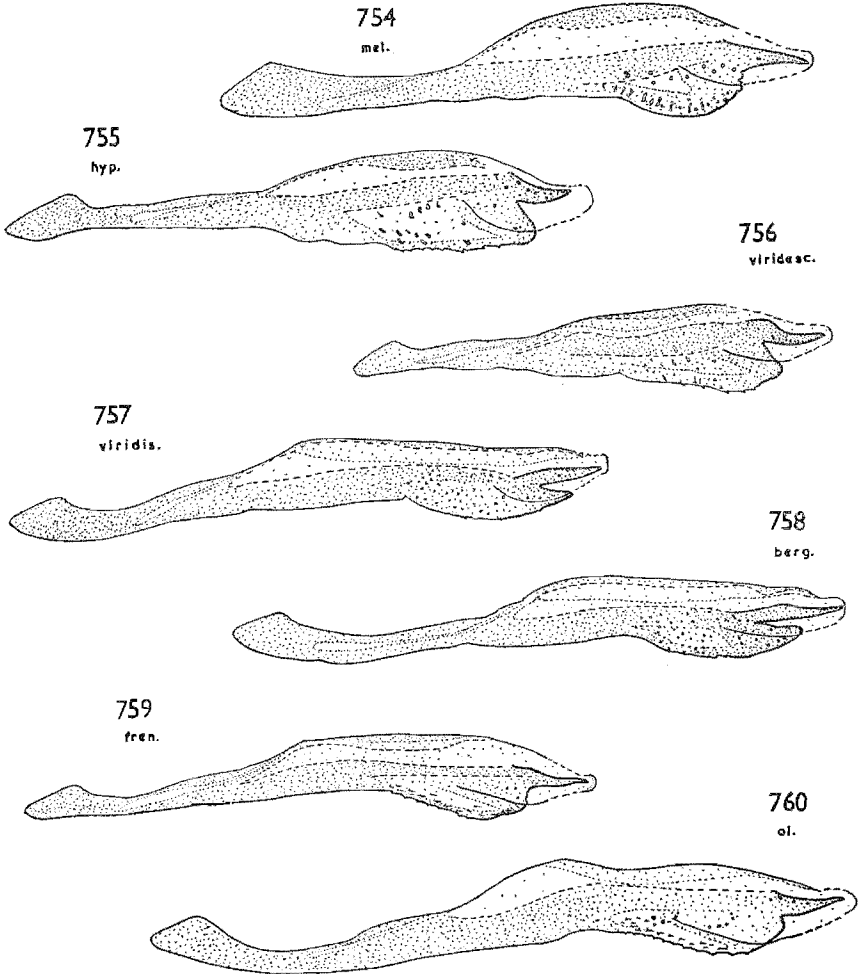
- 22 (21) Postocellar region much longer than diameter of an ocellus (fig. 662) or hind margin not clearly defined medially (fig. 664). Clypeus deeply emarginate in the middle in front (fig. 658). Inner hind tibial spur longer than apical breadth of tibia. . . . . 23
- Postocellar region very short (fig. 663) so that sharp edge between dorsal and hind face is not much further from a hind ocellus than the diameter of a hind ocellus. Front of clypeus only slightly emarginate in the middle (fig. 659). Inner hind tibial spur scarcely longer than apical breadth of tibia.



Figs. 747-53.—Ponis valve of *Nematus* : 745-6, *stichi* ; 748, *flavescens* ; 749, *cadderensis* ; 750, *ferrugineus* ; 751, *crassus* ; 752, *coeruleocarpus* ; 753, *nigricornis*.



- Projection to eighth tergite about as long as its apical breadth. Penis valve fig. 758. Hypopygium bluntly rounded at apex. Colour very variable but hind surface of head black. 5-6 mm..... *bergmanni* Dahlbom
- 23 (22) Hypopygium rounded or narrowly truncate at apex. Frontal area of head without a tubercle adjoining middle of front wall.....24
- Hypopygium with the blunt apex emarginate medially. Frontal area of head often with a tubercle adjoining middle of front wall. 5 mm.....27
- 24 (23) Projection to eighth tergite clearly broader at apex than long. Pale parts of face yellow.....25
- Projection to eighth tergite at least about as long as apex is broad. Pale parts of face yellowish-white.....26



Figs. 754-60.—Penis valve in *Nematus*: 754, *melanaspis*; 755, *hypoxanthus*; 756, *viridescens*; 757, *viridis*; 758, *bergmanni*; 759, *frenalis*; 760, *oligospilus*.

- 25 (24) Projection to eighth tergite broadly rounded at apex, not raised and without a medial carina extending forward. Last 2 tergites mainly black. 5-6 mm. . . . . 28
- Projection to eighth tergite in form of a raised triangle continued forwards as a medial carina to front of segment. Last 2 tergites mainly pale. Penis valve fig. 755. 5-5.5 mm. . . . . ♂ *hypoxanthus* Förster
- 26 (24) Mesosternum pale. . . . . ♂ *brevivalvis* Thomson
- Mesosternum black. Penis valve fig. 757. . . . . ♂ *viridis* Stephens
- 27 (23) Hind ocelli almost as far from back of head as their distance apart (*cf.* fig. 662). Penis valve fig. 760. . . . . ♂ *oligospilus* Förster
- Hind ocelli about twice as far apart as from back of head (fig. 664). Penis valve fig. 759. . . . . 29
- 28 (25) Penis valve fig. 748. . . . . ♂ *flavescens* Stephens
- Penis valve fig. 747. . . . . ♂ *stichi* (Enslin)
- 29 (27) M in fore wing slightly sigmoid in shape and joining Cul obliquely (fig. 667) . . . . . ♂ *ponojense* (Hollén)
- M in fore wing strongly bent in the middle and forming a right angle where it joins Cul (fig. 668). . . . . ♂ *frenalis* C. G. Thomson

### Genus *Pachynematus* Konow.

Characteristic of this genus is the development, not found elsewhere, of a ventral flap to the base of the spine on the penis valve and the peculiar armature to the eighth tergite in the males. The armature, however, is not developed in every species, nor, it seems, is the flap to the penis valve. The group attached to Coniferae, for example, lack the armature on the eighth tergite and have the flap on the penis valve reduced to a mere notch; they are thus intermediate between *Pachynematus* and the North American *Pikonema*. *P. rumicis* (and related species not occurring in Britain) shows neither the armature to the eighth tergite nor the notch to the penis valve, and its generic position is in doubt.

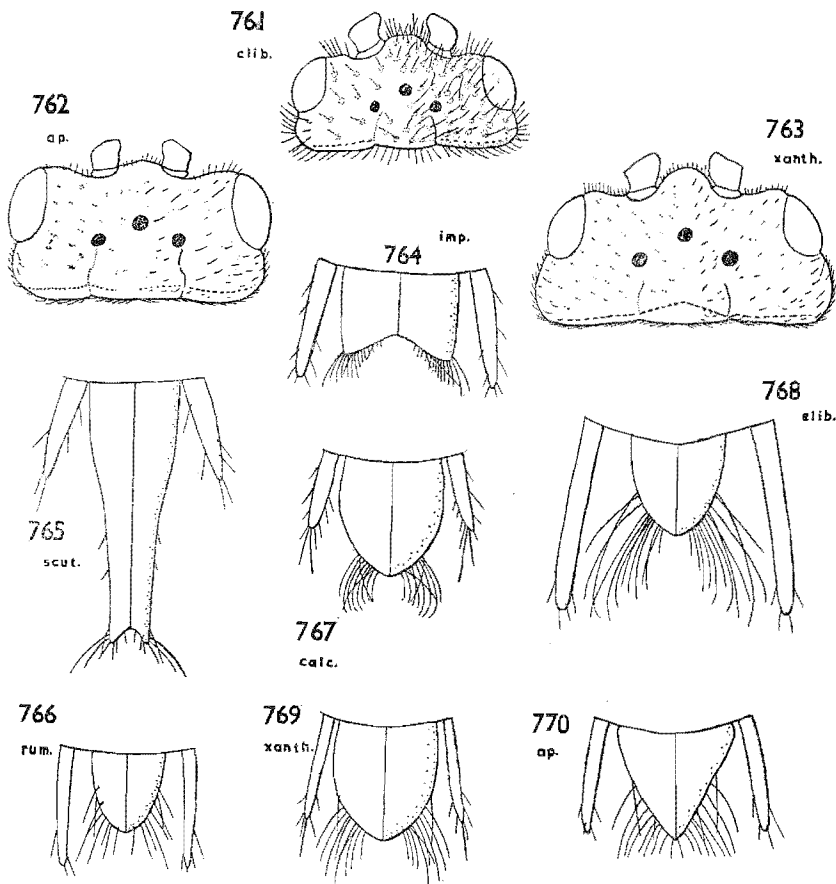
Over 70 species have been described. Of the 18 found in Britain most were dealt with by Benson (1948, *Ent. mon. Mag.* 84 : 58-65), but the females of several of them cannot yet be separated; that of *callicola* is distinguished here for the first time.

Most of the species are attached to Gramineae and Cyperaceae (on which families no other Nematinae feed); a few feed on Salicaceae, Polygonaceae, and two or three groups on Coniferae.

#### KEY TO SPECIES OF *Pachynematus* KONOW.

- 1 Hind tarsus about as long as hind tibia, or even longer. Stigma of fore wing usually darker at apex than base. Sawsheath truncate at apex in lateral view and emarginate in dorsal view (figs. 764-5), and often strongly compressed laterally. Male with medial projection at apex of eighth tergite often very small, carinate laterally, with declivous sides, and narrower apically than apex of hind tibia (figs. 782-4). Attached to Coniferae (*imperfectus* and *scutellatus* groups). . . . . 2
- Hind tarsus only two-thirds to three-quarters as long as hind tibia. Stigma never clearly darker at apex than base. Sawsheath not truncate at apex in lateral view, and in dorsal view never emarginate at apex nor strongly compressed laterally (figs. 766-770). Male with projection to eighth tergite (figs. 785-97) either long and much broader apically than apex of hind tibia, or, if short and narrow, then not carinate laterally. Attached to Gramineae, Cyperaceae, Polygonaceae and Salicaceae (*clitellatus*, *kirbyi*, *vagus*, *rumicis* and other groups). . . . . 4

- 2 (1) Sawsheath of ♀ strongly compressed laterally, so that it is narrow and several times longer than broad in dorsal aspect (fig. 765); cerci very short and not reaching back nearly as far as apex of sawsheath. Male with projection to eighth tergite very narrow and scarcely expanded behind (fig. 782). Underthorax entirely pale. Tibiæ with long spurs (those on hind legs as long as half basitarsus). Eyes not more than about one and one-third times longer than broad. Attached to *Picea* (*scutellatus* group).....3
- Sawsheath of ♀ as broad in dorsal aspect as apex of hind tibia (fig. 764); cerci reaching back as far as apex of sawsheath. Male with the medial carina to its eighth tergite expanding behind into a triangular field (fig. 784). Underthorax with at least mesosternum black. Tibial spurs short (those on hind legs scarcely longer than apical breadth of tibia). Saw fig. 772. Penis valve fig. 808. 5-7 mm.

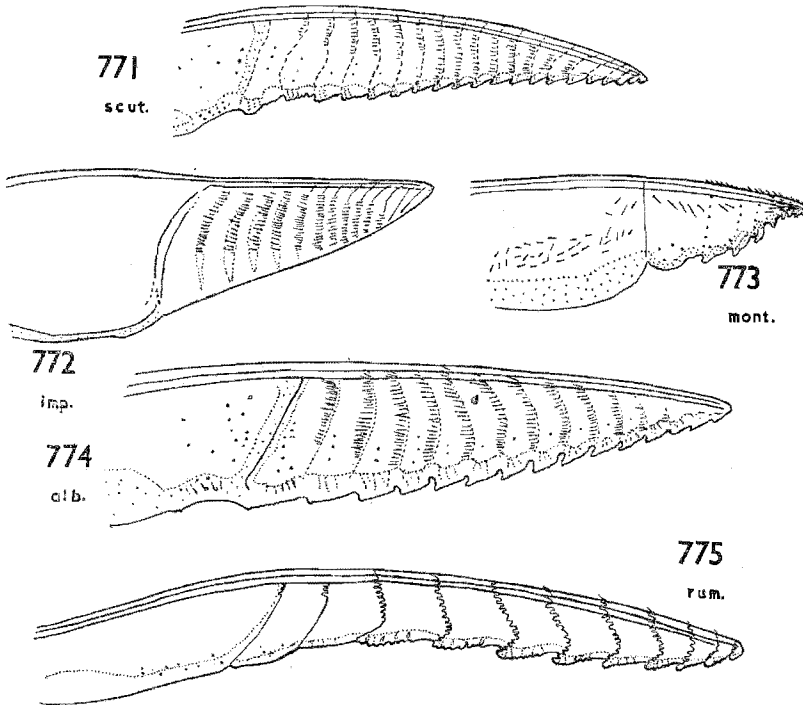


Figs. 761-3.—Head of *Pachynematus* from above in : 761, *clibrichellus* ; 762, *apicalis* ; 763, *xanthocarpus*.

Figs. 764-70.—Sawsheath from above in *Pachynematus* : 764, *imperfectus* ; 765, *scutellatus* ; 766, *rumicis* ; 767, *calcicola* ; 768, *clibrichellus* ; 769, *xanthocarpus* ; 770, *apicalis*.

Larva on *Larix decidua* Miller. England: Devon, Gloucester, Surrey and Herts. (†Perkins, 1929, Rep. Dev. Ass. Adv. Sci. 61: 305). IV-V. Introduced from C. Europe

- ♂ and ♀ (*nec. imperfectus* Zaddach Cameron) **imperfectus** (Zaddach)
- 3 (2) Smaller species (not exceeding 6.5 mm.). Stigma of fore wing only darkened on apical margin. Ovipositor (sawsheath + basal plate) shorter than basitarsus of hind leg, and in lateral view with apical truncation more than twice as long as upper edge. Saw fig. 773. In ♂ scutellum without a pale front border. Penis valve fig. 809. 5.5-6.5 mm.



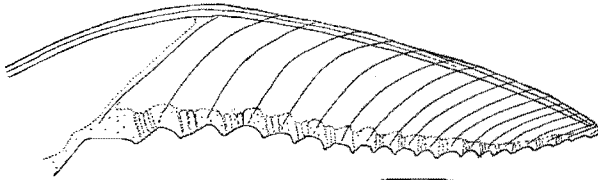
FIGS. 771-5.—Saw of *Pachynematus*: 771, *scutellatus*; 772, *imperfectus*; 773, *montanus*; 774, *albipennis*; 775, *rumicis*.

Larva on *Picea* and *Abies* and sometimes destructive thereto. England: Devon, Herts., Suffolk; Scotland: Inverness. (†Perkins, 1929, Rep. Dev. Ass. Adv. Sci. 61: 305). V. Introduced from C. Europe

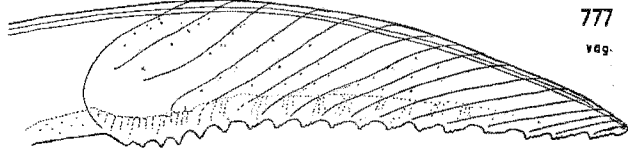
- ♂ and ♀ **montanus** (Zaddach)
- Larger species (7 mm. or longer). Stigma of fore wing with hind apical fourth darkened. Ovipositor as long as 3 basal hind tarsal segments together, and in lateral view the apical truncation shorter than the dorsal edge. Saw fig. 771. In ♂ the dark scutellum bordered in front with pale colour. Penis valve fig. 810.

Larva on *Picea* and *Abies* and often common. Widely distributed in England, also in Wales and Ireland. (†Morice, 1906, Ent. mon. Mag. 32: 209). Introduced from N. and C. Europe..... ♂ and ♀ **scutellatus** (Hartig)

- 4 (1) Inner hind tibial spur half as long as basitarsus. Stigma piceous, or hind femur reddish. Abdomen of ♀ black above and green to white below.  
(Hind tibia less than one and one-third times longer than hind femur without second trochanter).....5
- Inner hind tibial spur less than half as long as basitarsus. Stigma pale and at most but slightly infuscate. Hind femur pale yellow, more or less infuscate from base.....6
- 5 (4) Stigma and at least apex of hind femur black. Sawsheath rounded behind in dorsal view and the very rare ♂ with an enlarged spatulate projection to eighth tergite (fig. 793). Saw fig. 776. Penis valve fig. 800. 4-5.5 mm.  
*Larva on Poa, Festuca and other Gramineae. Throughout Britain and Ireland even to the tops of the highest mountains in Scotland. IV-IX (2 or more broods). N. and C. Europe to Faeroes, Iceland, and Greenland, N. Asia and N. America. . . . ♂ and ♀ (= conductus Ruthe, graminis Cameron, nec. obductus Hartig Cameron, palliventris Cresson) obductus (Hartig)*
- Stigma and hind femur entirely reddish-yellow. Sawsheath diamond-shaped, contracted at base and acute behind; the very rare ♂ has the eighth tergite only slightly produced apically (fig. 786). Saw fig. 777. Penis valve fig. 801. 6-7 mm.  
*It seems likely that more than one species is here confounded as females have been bred from larvae feeding on Carex as well as from larvae feeding on Salix; but males, which in this genus show the better specific differences, are very rare in this species group and have not been bred yet from either food-plant. Widely distributed throughout Britain and Ireland but only known ♂ was taken at Bozmoor, Herts., 15.v.1938. V-VIII. N. and C. Europe, Siberia, Mongolia and N. America*
- ♂ and ♀ (= *leucogaster* Hartig, *corticosus* MacGillivray Syn. nov.) *vagus* (Fabricius)
- 6 (4) Smaller species (under 6 mm.). Wings yellowish hyaline with yellow stigma. Either scutellum convexly rounded with coarse punctures, or antenna short (in ♀ not longer than C of fore wing and in ♂ not longer than C + stigma). Male with only a small medial projection to eighth tergite.....7
- Often over 6 mm. Wings usually not yellowish hyaline. Scutellum scarcely convex and almost impunctate. Antenna in ♀ usually longer than C and in ♂ than C + stigma. Male with eighth tergite often ornately produced (figs. 785, 787-92, 794-7).....8
- 7 (6) Abdomen yellow with at most first tergite black-marked; head mainly black with black inner orbits. Antenna longer (in ♀ longer than C + stigma and in ♂ almost as long as fore wing). Scutellum convexly rounded and coarsely punctured. Saw fig. 774. Penis valve fig. 799. 4.5-5.5 mm.  
(Very similar to *Nematus bipartitus* q.v., the ♂ of which has a very small inner tooth to the hind tarsal claw but lacks the ventral notch to the spine on the penis valve).
- Larva on Polygonum persicaria L., etc., on the underside of rolled leaves. England north to Kirkcubrightshire but not common. V-VI and VII-VIII. Europe and Siberia. . . . ♂ and ♀ albipennis (Hartig)*
- Abdomen mainly bronze above (and in ♀ below also) and head mainly yellow with yellow orbits. Antenna shorter (in ♀ not longer than C of fore wing, in ♂ not longer than C + stigma). Scutellum scarcely convex and sparsely sculptured. Saw fig. 775. Penis valve fig. 798. 4.5-5.5 mm.  
*Larva on Rumex spp. Common locally throughout Britain and Ireland (1-2 broods). V-VII. Europe, north to Faeroes and Iceland, Siberia and Alaska . . . ♂ and ♀ (= flavipennis Cameron, arcticus Thomson Cameron nec. Thoms., rumicis Fallén) rumicis (Linné)*
- 8 (6) Head scarcely expanded behind the eyes (figs. 761-2). Almost entirely black except for labrum, tegula, edge of pronotum and extreme apex of abdomen. Inner hind tibial spur clearly longer than apical breadth of hind tibia; hind tibia less than one and a third times as long as femur (without second trochanter). Mesopleura often more or less covered with tubercles.....9
- Head very strongly expanded behind the eyes (fig. 763). Various coloured, often extensively marked with pale yellow. Inner tibial spur not or scarcely longer than apical breadth of tibia; hind tibia about one and a half times as long as femur (without second trochanter). Mesopleura smooth and shining.....11

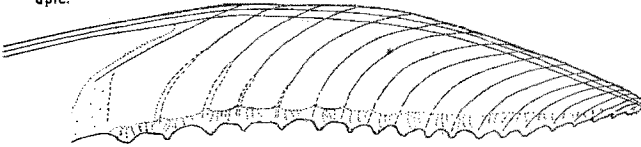


776  
abd.

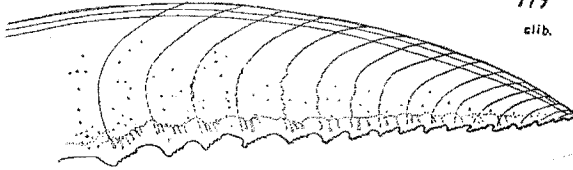


777  
vag.

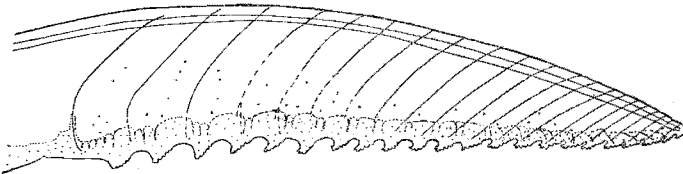
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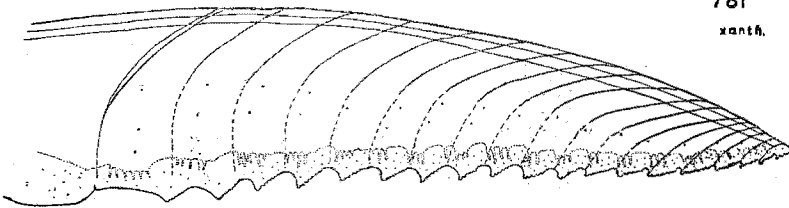
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780  
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781  
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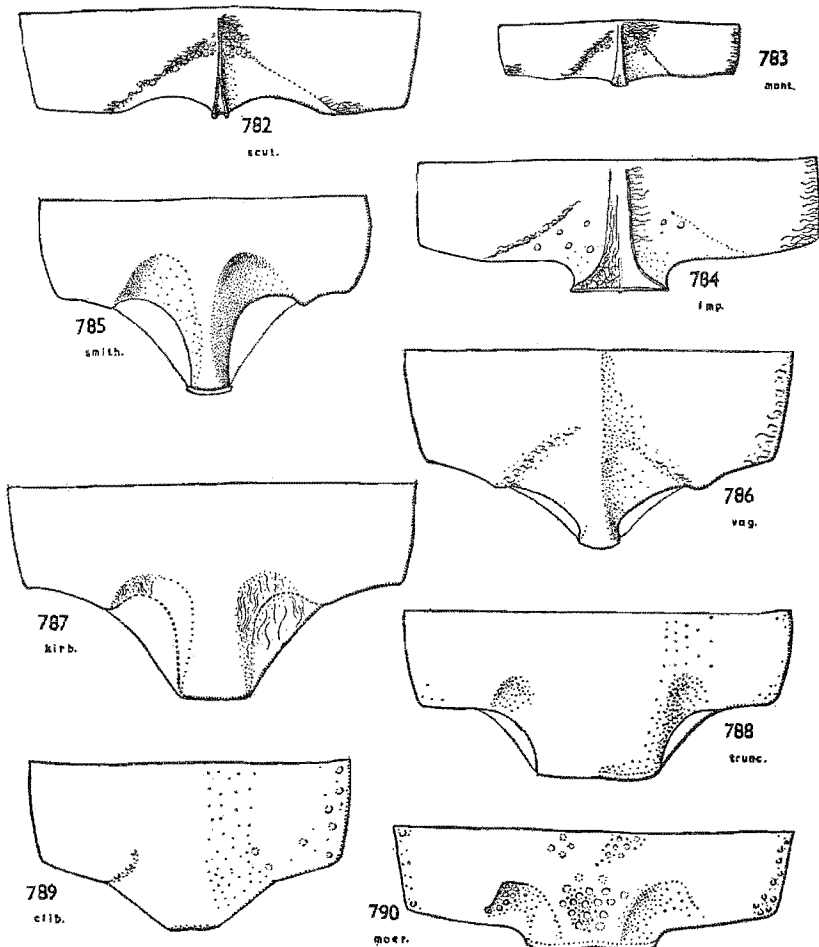


FIGS. 776-81.—Saw of *Pachynematus*: 776, *obductus*; 777, *vagus*; 778, *apicalis*; 779, *clibrichellus*; 780, *calcicola*; 781, *xanthocarpus*.

- 9 (8) Pubescence on head and thorax fine and silvery and scarcely longer than diameter of an ocellus (fig. 762). Lowland species. Sawsheath fig. 770..10  
 Pubescence on head and thorax coarse, piceous and up to as long as twice the diameter of an ocellus (fig. 761). Arctic-alpine species. Sawsheath fig. 768. 6-7 mm.

Apical projection to male eighth tergite as a simple triangle (fig. 789). Penis valve fig. 803. Saw fig. 779.

Larva on *Carex*. Scotland: Perth., Inverness, Angus, Sutherland and Caithness, mostly on mountain tundra, but at sea level at Wick in Caithness, vi. 1934. (Benson, 1935, Trans. R. ent. Soc. Lond. 83: 33-34) V-VI. Arctic Eurasia and N. America.....♂ and ♀ (= *thomsoni* Cameron, *clibrichensis* Cameron, *pubescens* Marlatt) *clibrichellus* (Cameron)



FIGS. 782-90.—Male apical tergite in *Pachynematus*: 782, *scutellatus*; 783, *montanus*; 784, *imperfectus*; 785, *smithiae*; 786, *vagus*; 787, *kirbyi*; 788, *truncatus*; 789, *clibrichellus*; 790, *moerens*.

- 10 (9) Male with eighth tergite bearing an apical projection much broader than long (fig. 790). Penis valve fig. 802. Female with antenna only about as long as C of fore wing, and with fourth segment shorter than longest axis of eye; hind basitarsus about three and a half times as long as broad. Hind tarsus ♂ and ♀ about as long as tibia. 5.5-6.5 mm.

*Larva unknown.* England: Devon, Somerset, Bucks., Herts., Staffs., and Cheshire; Ireland: Co. Cavan. (†Morice, 1906, Ent. mon. Mag. 42: 208). IV-V. N. and C. Europe

♂ and ♀ (= *pleuralis* Thomson, *falonus* Ross) **moerens** (Förster)

- Male with eighth tergite bearing an apical projection longer than its apex is broad (fig. 791) Penis valve fig. 804. Female with antenna as long as C + half stigma, and with fourth segment longer than eye. Hind basitarsus about four and a half times as long as broad. Hind tarsus ♂ and ♀ about three-quarters as long as tibia. Saw fig. 778. 5.5-6.5 mm.

*Larva on Gramineae.* England: Devon, Hants., Surrey, Bucks., Herts., Beds. and Cheshire; Wales: Glamorgan; Scotland: Lanark, Dumfarton and Inverness; Ireland: Co. Cavan. IV-V. . . . . ♂ and ♀ **apicalis** (Hartig)

- 11 (8) Males . . . . . 12  
 — Females . . . . . 19

- 12 (11) Projection from eighth tergite subtruncate at apex and without a medial carina or sulcus (figs. 785, 787-8). Spur on penis valve alongside dorsal flap (figs. 805-7). . . . . 13

- Projection from eighth tergite rounded at apex and with an apical medial sulcus more or less developed, giving place basally to a medial carina (figs. 792-7). Spur on penis valve alongside ventral flap (figs. 811-5). . . . . 15

- 13 (12) Projection of eighth tergite clearly longer than its apical breadth (figs. 786-787) . . . . . 14

- Projection of eighth tergite not longer than its apical breadth (fig. 788). Tegulae, most of hind femur and abdomen black except for apex of hypopygium and apex of projection from the eighth tergite. Penis valve fig. 806. 5.5-7 mm.

*Larvae on Gramineae including cultivated Triticum.* Widespread in Britain to Inverness; also Ireland: Co. Wicklow. (†Benson, 1948). V-VI. C. and N. Europe and N. America. . . . . ♂ **truncatus** Benson

- 14 (13) Projection to eighth tergite dark and very narrow with raised rim at apex (fig. 785).

Black with the following parts pale: clypeus, labrum, apex of femora, tibiae, tarsi, sides of eighth tergite and hypopygium. Penis valve fig. 807. 6.5 mm.

Only 1 ♂ known from Britain, without exact data, Stephens Coll., B.M. 1853-46 (†Benson, 1948). High Alps of Switzerland, Swedish Lapland, and Mt. Washington, in New Hampshire, U.S.A. ♀ unknown. . . . . ♂ **smithiae** Ross

- Projection to eighth tergite usually entirely pale and without a raised apical rim (fig. 787). Abdomen very variable in colour above from entirely yellow to entirely black. Wings often more or less infuscate. Penis valve fig. 805. 6-7.5 mm.

*Larva on Carex.* Throughout Britain and Ireland even to the tops of the highest Scottish mountains. V-IX. N. and C. Europe, Siberia and N. America. . . . . ♂ (= *diaphanus* Eversmann, *flaviventris* Hartig, *turgidus* Zaddach, *umbripennis* Eversmann, *zaddachi* Konow, *suadus* Cresson) **kirbyi** (Dahlbom)

- 15 (12) Thickened part of projection to eighth tergite with its greatest breadth at least as broad as its length (figs. 794-5) . . . . . 16

- Thickened part of projection to eighth tergite longer than its greatest breadth (figs. 792 and 796-7). . . . . 17

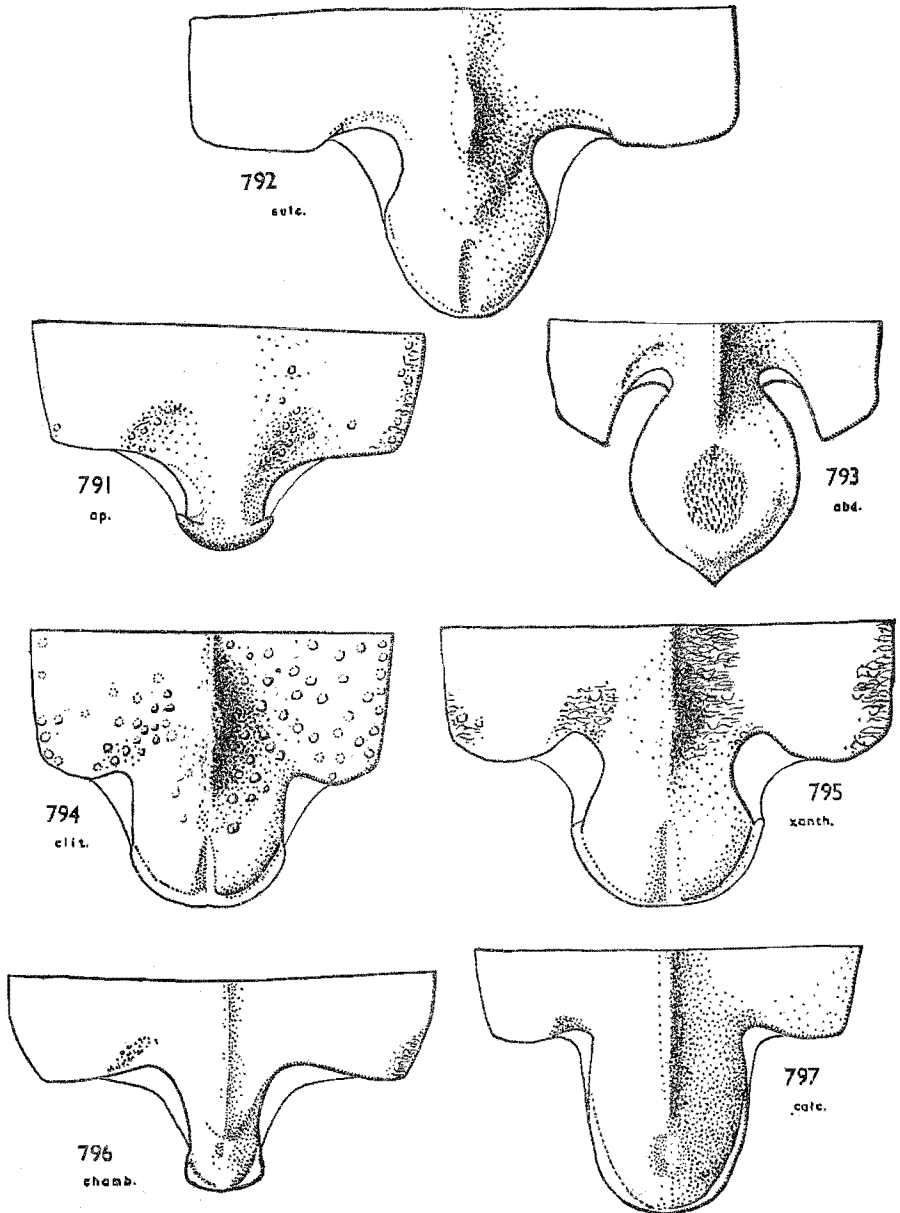
- 16 (15) Tegula and hind femur except at extreme base pale. Projection to eighth tergite with thickened part scarcely narrowed at base and apical lobe not broader than long (fig. 794). Penis valve fig. 813. Smaller species (6-7 mm.).

*Larva on Gramineae.* Widespread in Britain and Ireland. V-IX. N. and C. Europe

♂ (= *capreae* Panzer, *trisignatus* Förster) **clitellatus** (Lepelletier)

- Tegula and hind femur mostly black. Projection to eighth tergite with thickened part strongly narrowed at base and apical lobe broader than long

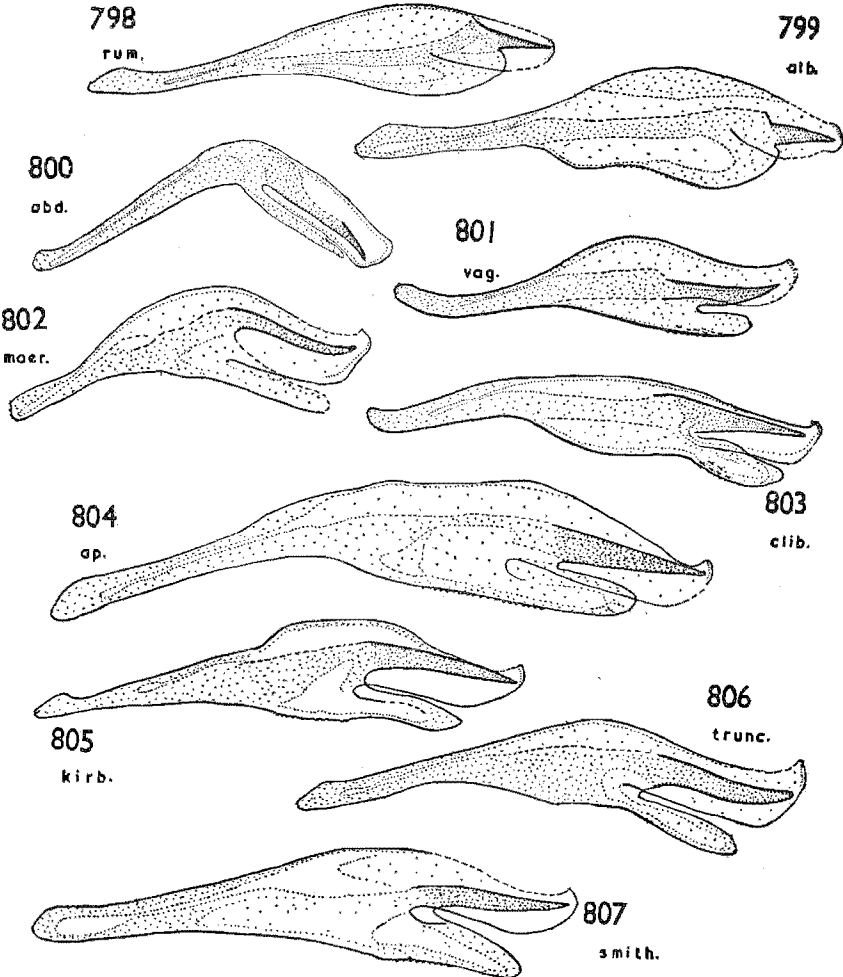




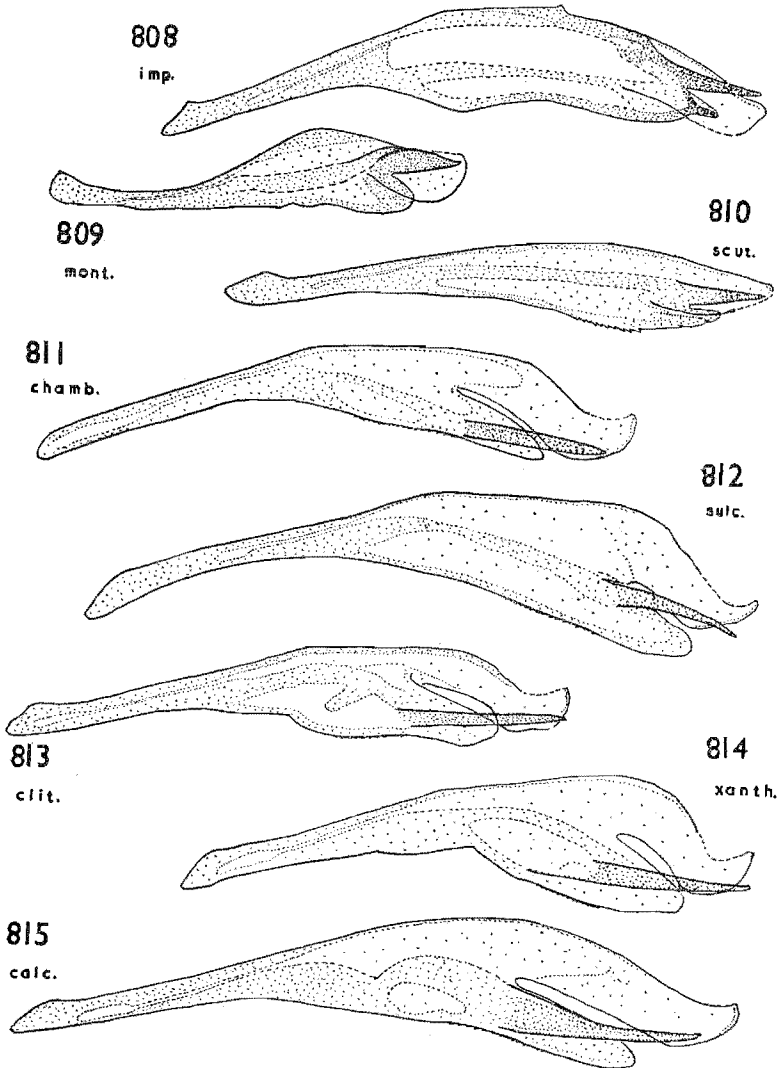
FIGS. 791-7.—Male apical tergite in *Pachynematus*: 791, *apicalis*; 792, *sulcatus*; 793, *obductus*; 794, *clitellatus*; 795, *xanthocarpus*; 796, *chambersi*; 797, *calcicola*.

(fig. 795). Penis valve fig. 814. Larger species (7-7.5 mm.).  
*Only known from England: Bucks., Herts., Cambs. and Hunts.* (†Morice, 1906, Ent. mon. Mag. 42: 208). *V. N. and C. Europe*

- ♂ *xanthocarpus* (Hartig)  
 17 (15) Projection to eighth tergite with thickened part scarcely narrowed at base and medial sulcus obsolete (figs. 796-7).....18  
 — Projection to eighth tergite with thickened part strongly narrowed at base and the medial sulcus at apex strong (fig. 792). Penis valve fig. 812.  
*Only known from unique type, Scotland: Killin, Perth., 31.v-14.vi.1932* (R. B. B.). (†Benson, 1948).....♂ *sulcatus* Benson



FIGS. 798-807.—Penis valve of *Pachynematus*: 798, *rumicis*; 799, *albipennis*; 800, *obductus*; 801, *vagus*; 802, *moerens*; 803, *clibrichellus*; 804, *apicalis*; 805, *kirbyi*; 806, *truncatus*; 807, *smithiae*.



Figs. 808-15.—Penis valve in *Pachynematus*: 808, *imperfectus*; 809, *montanus*; 810, *scutellatus*; 811, *chambersi*; 812, *sulcatus*; 813, *clitellatus*; 814, *xanthocarpus*; 815, *calicicola*.

- 18 (17) Flange of projection to eighth tergite foliaceous without lateral angles (fig. 797). C entirely pale. Penis valve fig. 815. 6-7 mm.  
*Mainly from limestone grassland in the Chilterns (Bucks., Herts. and Beds.), and the Pennines of the W. Riding of Yorkshire (Pen-Y-Ghent, and Moughton). (†Benson, 1948). IV-VI. France and Switzerland. . . . ♂ calcicola Benson*
- Flange of projection to eighth tergite angled laterally at apex (fig. 796). C black except for basal quarter. Penis valve fig. 811.  
 Black with the following parts yellowish-white: labrum, tibiae and tarsi of all legs, apical margin of hypopygium and apical half of projection to eighth tergite.  
*Only known from unique type on a sandy heath, Beds.: Amphill, 17.v.1947 (V. H. Chambers). (†Benson, 1948). . . . ♂ chambersi Benson*
- 19 (11) Sawsheath with subapical setae paler and straighter (fig. 769) . . . . . 20  
 — Sawsheath with apical setae piceous, stiff, and evenly curved (fig. 767). Saw fig. 780.  
 Antenna with fourth segment shorter than the longest axis of the eye. Scutellum less than one and a half times as broad as long. Apical hind tibial spurs shorter than apical width of tibia . . . . . ♀ calcicola Benson
- 20 (19) Scutellum (without post-tergite) more than one and a half times as broad as long. Inner hind tibial spur at least as long as apical width of tibia. Mesopleura pale marked. . . . . 21  
 — Scutellum less than one and a half times as broad as long. Inner hind apical tibial spur not always as long as apical width of tibia. Mesopleura pale marked or entirely black. . . . . 22
- 21 (20) Abdomen pale above, usually with a transverse black stripe on at least some basal tergites, and the black stripes may be partly fused together. Wings more or less infuscate. Antenna with fourth segment at least about one and one-sixth times as long as greatest axis of eye . . . . . ♀ kirbyi (Dahlbom)
- Abdomen entirely black above except for the 2 apical segments. Wings hyaline. Antenna with fourth segment scarcely longer than longest axis of eye and at most less than one and one-sixth times as long  
 ♀ truncatus Benson
- 22 (20) Larger species (over 7.5 mm.). Abdomen above, mesonotum and mesopleura of thorax almost entirely black. Saw fig. 781  
 ♀ (? and sulcatus Benson) xanthocarpus (Hartig)
- Smaller species (under 7.5 mm.). Mesonotum and mesopleura of thorax more or less marked with yellow  
 ♀ (? and chambersi Benson) clitellatus (Lepelletier)



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## SUPPLEMENT TO SECTION (a).

- Page 1, line 4, for "four" read "three".
- „ line 11, delete "(d) Larvae; foodplant and other indexes."
- Page 2, line 8 up, after "... independently." insert "For a recent study of European sawfly larvae together with keys to genera and species and with host plant lists see Herbert Lorenz and Manfred Kraus "Die Larvalsystematik der Blattwespen" *Abh. Larvalsystem. Insekt.* 1, viii + 340 pp., 435 figs."
- Page 10, lines 8-9, delete: "front tibia with a pre-apical spine . . . spura."
- „ line 10, delete: "2 spp."
- „ line 11, for "*Acantholyda* A. Costa" read "1a."
- „ after couplet 1 add:
- "1 Front tibia with a pre-apical spine on its inner side in addition to the apical spurs. On *Pinus*. 2 spp. . . . . *Acantholyda* A. Costa
- "- Front tibia without any pre-apical spine. On *Larix*. 1 sp. *Cephalcia* Jurine."
- Page 11, before "Subfamily PAMPHILINAE" add:
- "Genus *Cephalcia* Jurine.
- "Larvae live in webs on *Larix*, *Abies* and *Picea*.
- "Of the 35 world species five or six are found in Europe and in recent years one has become established in Britain.
- "Mainly black species with white flecks on head and mesonotum, and brownish underside to the abdomen. 10-11 mm.
- "*Larva solitary in silken tubes on Larix. First found in 1954, Berks.: Wytham Woods* (†J. B. Gurdon, 1954, Ent. mon. Mag. 90: 234 as *C. falleni* Dalman), more recently at Alice Holt, in the plantations of the Forestry Commission, at Wrecclesham, Farnham, Surrey, where it has been reared from larvae. V-VI. Europe . . . . . ♂ ♀ *alpina* (Klug)."
- Page 12, line 7, add "and Wales: Radnor, 1953, R. B. B."
- „ line 21 up, add "and Inverness (Aviemore, 1952, R. B. B)."
- „ line 14 up, after "Beds." add "Yorks."
- Page 17, line 17, add "Somerset".
- Page 18, under "KEY TO BRITISH GENERA OF SIRICIDAE" before couplet 1 add:
- "1a. Antennae filiform and long (longer than C + stigma of fore wing) and set close together (so that the distance between them is only about one and a half times as much as the distance of one from the nearest eye-margin). Eyes not more than one and a half times as broad as long. Labial palps 3-segmented. Cerci present. Anal cell of fore wing contracted from about the middle. Attached to Coniferous trees (Pinaceae) (SIRICINAE) . . . . . 1
- "- Antennae slightly swollen in middle and short (shorter than C + stigma of fore wing) and set far apart (3 times as great as the distance from one of them to the nearest eye-margin). Eyes at least twice as broad as long. Labial palps 2-segmented. Anal cell of fore wing contracted in basal third. Attached to Angiosperm trees. 1 sp. (TREMECINAE)
- Tremex* Jurine."



Page 19, lines 34-39, delete "Hind tibia. . . . . ♀ *augur augur* (Klug) "  
and add " . . . . . 6 "

Page 20, at end of key to "Females", add another couplet :

" 6 Hind tibia with basal two-thirds black. Abdomen with at least tergites 3-7 and 9 banded with black above. Claws with large subapical tooth (longer than its basal breadth). Ovipositor as long as fore wing.

*C. and S. E. Europe. Occasionally introduced into Britain in timber but not established here, cf. Stephens, 1835: 14, and Benson, 1938, Ent. mon. Mag. 74: 255, as 'Urocerus cedrorum Smith'*

(= *augur augur* Klug) *fantoma fantoma* Fabricius

" - Hind tibia all yellow with at most the extreme apex brown. Abdomen mostly yellow above with only tergites 6 and 7 banded apically with black, and sometimes 4 and 5 with lateral spots. Claws with a minute subapical tooth not longer than its basal breadth. Ovipositor only about two-thirds as long as fore wing.

*Warwicks.: Leamington Spa, Lillington, 1 ♀, vi. 1953, emerged from imported timber (W. T. Taylor). New British record. C. Europe and W. Siberia*

(= *fantoma* Fabricius *auctt. nec. Fab*) *tardigradus* Cederhjelm."

Page 22, before "Superfamily **ORUSSOIDEA**", add :

" Genus **Tremex** Jurine.

" Of the nearly 20 world species, two are known in Europe. One introduced from N. America has been found in Britain.

" 15-40 mm. long. ♀ thorax infusate brown; abdomen piceous with tergite 1 yellow and the following 6 each with a yellow band. Wings more or less infusate. ♂ mainly piceous.

" *Larva bores in Acer, Quercus, Ulmus, etc. Devon: Seaton, 1 ♀, emerged from wood of imported Ulmus thomasi Sarg., ix. 1957 (J. A. Richman). New British record. North American species. . . . . columba (L.).*"

Page 26, line 5, after "*Hunts.*" add "*Oxon., Middlesex and Beds.*"

,, line 6, add "*New British record*".

Page 27, line 8, add "*Herts., Flaunden, 1957 (R. B. B.); Suffolk, Brandon, 1945 (R. B. B.)*".

Page 35, line 5, after "*In Britain.*" add "up till 1953".

,, line 13, after ". . . secured." add

" *In 1953 discovered in Kew Gardens by Mr. A. H. G. Alston: and Goldstitch Moss, Staffordshire by Mr. James Edwards at an altitude of 1100-1200 ft., between Leek and Buxton, in a wild area where it must surely be a native species. In both these localities the larvae were boring in petioles of Athyrium filix-femina (L.) Roth. And from Goldstitch Moss the first British adults were obtained.*"

Page 41, line 4, add "*Hunts., Holme Fen (W. E. Russell, 1954)*".

,, line 5, for "*W. Cork and S. Kerry*" read "*W. Cork north to W. Galway*".

## SUPPLEMENT TO SECTION (b).

- Page 53, line 13 up, after " stigma " add " (except in *Eriocampa*) " .  
 ,, line 10 up, for " is crossed " read " is often crossed " .  
 Page 57, line 21, for " five " read " four " .  
 ,, line 31, add " Also Wales, Radnor and Ireland. " .  
 Page 57, line 16 up, delete " Only 6 specimens ever recorded. " .  
 ,, line 15 up, add " Berwicks., Earlstone, 1 ♀, v. 1890 (J. Clark) " .  
 ,, line 11 up, before " *exsectus* " add " *mixta* Klug, Cameron *nec.* Klug " .  
 Page 58, line 10 up, delete " 5 " and add the second half of couplet 5 (4)  
 from page 59 ending with " ♂ and ♀ *macula* (Klug) " .  
 Page 59, delete lines 1-9, being first half of couplet 5 (4).  
 Page 61, line 18, for " *C. and N. Europe* " read " *Holarctic* " .  
 ,, lines 27-28, for " *C. and N. Europe* " read " *Arctic* " .  
 Page 64, line 6, after " *Siberia* " add " and *N. America* " .  
 ,, line 20, after " *Siberia* " add " Also *N. America* " .  
 ,, lines 22-23, delete " *E. of Lake Baikal . . . common there* " .  
 ,, line 36, after " *Caucasus* " add " and *E. to N. America* " .  
 Page 65, line 4, for " *saxatilis* " read " *yukonensis* " .  
 ,, line 17, for " *undescribed* " read " on *Juncus gerardii* Loıs " .  
 ,, line 29, after " *Wicklow* " add " *Co. Cavan* " and after " *Yorks.,*"  
 add " *Cothill Bog, Berks.* " .  
 ,, line 10 up, for " *saxatilis* Hartig " read " *yukonensis* Norton " .  
 Page 68, fig. 199, for " *brevi* " read " *lio* " .  
 ,, bottom line, for " *brevitarsus* " read " *liogaster* " .  
 Page 70, line 2, after " *Scotland* " add " *Staffs.: Madeley and Hereford:*  
*Moccas Park (H. W. Daltry)* " .  
 ,, line 13, after " *Harwood* " add " Also found in *Arran (W. D.*  
*Hincks, 1953)* " .  
 ,, line 22, add " and *N. America* " .  
 ,, line 29, for " *Not yet recognized outside Britain* " read " *Finland* " .  
 ,, line 24 up, after " *Britain* " add " and *Ireland* " .  
 ,, line 15 up, after " *Britain* " add " and *Ireland* " .  
 ,, line 12 up, after " *south.* " add " also *Japan and Kurile Is.* " .  
 Page 71, line 9, after " *Britain* " add " and *Ireland* " .  
 ,, line 15, after " *Britain* " add " and *Ireland* " .  
 ,, line 4 up, for " *brevitarsus* Hartig " read " *liogaster* Thomson (*cf.*  
*couplet 14)* " .  
 ,, line 5 up, delete and insert " ♀ (= *varispinus* Hartig, Cameron,  
*rugulosus* Dalla Torre and *brevitarsus* Hartig, Benson *nec*  
*Hartig)* " .  
 Page 72, line 8 up, for " *saxatilis* Hartig " read " *yukonensis* Norton " .  
 Page 76, line 9 up, for " *brevitarsus* Hartig " read " *liogaster* Thomson (*cf.*  
*couplet 14)* " .  
 Page 79, line 6, for " 34 " read " 33, " and for " 93 " read " 92 " .  
 ,, line 9, for " 2 " read " 3 " .  
 ,, lines 20-32, omit whole couplet (*cf.* p. 109).

- Page 83, line 13 up, for "*Larva unknown*" read "*Larva on Sedum album L.*" and delete "*Only 4 ♀ British records known*".
- „ line 12 up, before "*Bucks.*" read "*Dorset: Wimborne, 1954 (P. Harwood); I. of Wight, East Cowes, 1953 (J. W. Saunt) and Oxford, reared from larvae, 1956 (G. R. Gradwell)*".
- Page 85, line 29, add "*and Glaux maritima L.*".
- „ line 31, after "*Kerry*" add "*and Cavan*".
- Page 91, line 21, add "*and Salix*".
- „ line 23, after "*Herts.*" add "*Beds.*".
- „ bottom line, delete "*♂ and*" and add "*Parthenogenetic species*".
- Page 94, line 6, after "*Essex*" add "*and has found it at Wimborne, Dorset. Dr. Chambers has found it at Culworth, Beds., 1952*".
- Page 95, Transfer lines 17-33 ("*Tribe Eriocampini*") to p. 112, before "*Tribe Perineurini*".
- Page 100, line 21, after "*England*" add "*from Radnor, Wales;*".
- „ line 13 up, add "*(= geniculata Stephens)*".
- „ line 6 up, before "*Somerset*" add "*Dorset, Parley, 1953 (P. Harwood)*".
- Page 101, line 10, after "*Caucasus*" add "*and Japan*".
- „ line 12 up, after "*Herts.*" add "*and at Byton, Hereford. In Wales near Presteigne, Radnor, 1953*". . .
- Page 102, line 18, after "*England*" add "*and Wales*".
- „ line 20, after "*Caucasus*" add "*and Japan*".
- Page 103, line 4 up, for "*Larva unknown*" read "*Larva on Rubus fruticosus L.*".
- Page 104, line 5 up, after "*Ireland*" add "*The very rare ♂ has been found in S. Devon, at Mardon Common and Bagtor, Dartmoor, 1951-52 (L. H. Woollatt)*".
- Page 108, line 5, for "*instead*" read "*also*".
- „ line 11 up, delete "*Only known from 2 specimens*" and add "*Staffs.: Maer Woods, 1936 (H. W. Daltry) and Herts.: Bricket Wood, 1950 (R. B. B.)*".
- „ line 10 up, after "*Germany*" add "*and N. America*".
- Page 109, lines 21-22, for "*One species occurs in Britain . . .*" read "*Two species occur in Britain, one of them . . .*"
- „ line 25, for "*the species is . . .*" read "*the species are . . .*"
- „ line 25, *et seq.* after "*. . . parthenogenetic.*" insert the following:
- " A. ♀ antenna 13-16-segmented, at least twice as long as breadth of head. Basal sector of M in fore wing almost angled at base, then straight in apical two-thirds. Antennal segments 3 : 4 as 1 : 2 : 1.  
*" Mines in leaves of ? Geranium sylvaticum L. etc. Scotland: Inverness., Kincaig, 2 ♀, v. 1952, and England: Yorks., near Austwick, 3 ♀, vi. 1955 (R. B. B.) († Benson, 1953, Proc. R. ent. Soc. Lond. (B) 22 : 136-8). Mines in leaves of Geranium sylvaticum found by L. Parmenter in Glen Lyon, Perth., vii. 1955, may belong to the same species. Norway, Sweden and Switzerland*  
 ♀ *monilecornis* Dahlbom
- " B. ♀ antenna 11-12-segmented, less than one and a half times breadth of head. Basal sector of M in fore wing arcuate throughout, though more strongly at base. Antennal segments 3 : 4 as 1 : 6 : 1."  
 (Biological data as before.)

Page 109, line 5 up, under "KEY TO GENERA OF TENTHREDININAE" insert another couplet thus :

- " 1a Anal cell of fore wing either medially constricted or with short erect cross-vein and M joins Sc + R about as far from junction of Rs + M as Rs + M is from base of stigma (figs. 137-8)..... 1  
 " - Anal cell of fore wing with oblique cross-vein and M joins Sc + R much closer to junction of Rs + M than distance between Rs + M and base of stigma (cf. figs. 142-3)."

Insert here lines 20-32 from page 79 but ending :

". . . 1 species. (Eriocampini) *Eriocampa* Hartig, p. 112."

Page 112, Before "Tribe Perineurini" insert "Tribe Eriocampini . . ."  
 (lines 17-33 from p. 95).

Page 115, line 10 up, for ". . . 4" read ". . . *nassata* L." and eliminate couplet 4 (3) continued on to page 116.

Page 116, line 17 up, for "♀ *friesei* Konow" read "form of ♀ *nassata* L."

Page 117, line 12 up, for "only 3" read "very few".

" line 11 up, before "Surrey" add "*Berks. : Silwood Park, vi.1953 (A. Woods),, vi.1954 (J. C. Felton) and Cothill Bog, vi.1956 (K. G. V. Smith)*".

" line 7 up, for "f. *flaveola*" read "flaveola" and delete "The two were".

" line 6 up, delete "considered to be distinct species but . . .".

" line 4 up, delete "flaveola".

" line 3 up, for "E. *flaveola flaveola*" read E. *flaveola*".

" line 2 up, after "occur." add "For differences between these two species see Benson, 1954 (Bull. Brit. Mus. (Nat. Hist.) (Ent.), 3 (7) : 285)."

" bottom line, delete "*flaveola* L." and "flaveola".

Page 122, line 21, for "*Larva unknown*" read "*Larva on Gramineae (Calamagrostis epigejos (L.) Roth. and Dactylis glomerata L.)*".

Page 122, line 34, for "*All Europe and eastwards to E. Siberia*" read

"*T. celtica* Benson (1953, Ent. mon. Mag. 89 : 275-7) forms with *T. temula* Scopoli an Atlantic-continental species pair and replaces it in the British Isles, Spain and Italy ; *T. temula* occurs throughout the rest of temperate Europe and Siberia to E. Asia. *T. celtica* is more extensively marked with yellow at the apex of the abdomen than *temula* and has a more prominently convex scutellum, forming almost a right angle in profile."

line 35 after ". . . nec L." add "*temula* Scopoli Brit. auctt. nec Scopoli" and for "*temula* Scopoli" read "*celtica* Benson".

Page 123, line 24, add "Antenna occasionally all black".

" line 5 up, after "Westmorland" add "Occurs also in Staffordshire and Northants."

Page 124, line 5, for "*Dumfries*" read "*Midlothian*".

Page 125, line 2, add "and N. Korea".

" line 19 up, add "*Ranunculus repens L. and Senecio fuchsii Gmelin.*".

Page 127, line 20 up, insert "♂ with brush beneath hind tarsus brown."

" line 16 up, insert "♂ with brush beneath hind tarsus black at least on inner side."

- Page 128, top line, for "*Larva unknown*" read "*Larva on Lotus corniculatus L.*".
- Page 128, line 10, before "*Larva . . .*" insert "Presumed now to be only a colour variant of the following species."
- line 13, before "**perkinsi** (Morice)" insert "**schaefferi** ab."
- Page 129, top line, after "*Scrophularia*" add "*Antirrhinum*".
- Page 130, line 28, for "8-10 mm." read "7-10 mm."
- line 34, for "10-11 mm." read "8-11 mm."

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