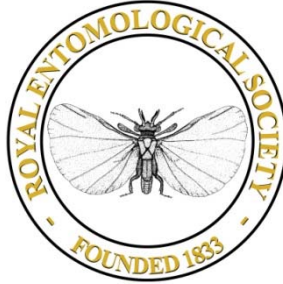


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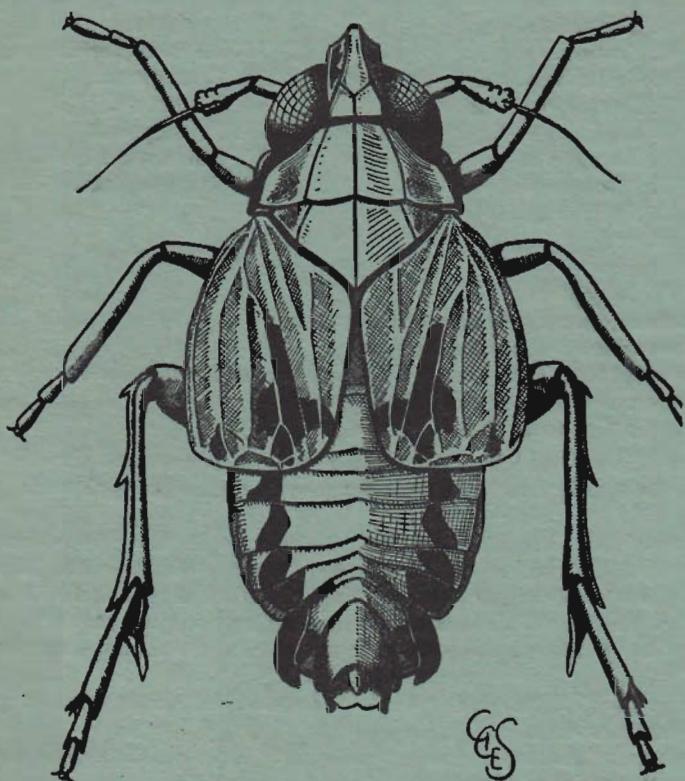
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HEMIPTERA
FULGOROMORPHA

By
WALTER J. LE QUESNE

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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 :

- | | |
|------------------------------------|------------------------|
| I. Part 1. General Introduction. | Part 9. Ephemeroptera. |
| „ 2. Thysanura. | „ 10. Odonata. |
| „ 3. Protura. | „ 11. Thysanoptera. |
| „ 4. Collembola. | „ 12. Neuroptera. |
| „ 5. Dermaptera and
Orthoptera. | „ 13. Mecoptera. |
| „ 6. Plecoptera. | „ 14. Trichoptera. |
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- II. Hemiptera.
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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

HEMIPTERA

(FULGOROMORPHA)

By WALTER J. LE QUESNE

THE Auchenorrhyncha are generally regarded as being divided into two series, the Fulgoromorpha and the Cicadomorpha: for convenience these will be dealt with in separate *Handbooks*. The present one deals with the Fulgoromorpha, comprising 4 families and 84 species in Britain; the Cicadomorpha total about 260 British species.

GENERAL ADULT CHARACTERISTICS

In the British species the fore wings are of a consistency varying between hyaline membranous and finely pitted coriaceous: the basic venation is simple, supernumeraries being present in some species (notably *Issus coleoptratus*). The nomenclature used for the veins and cells of the fore wings is shown in figure 4. A key to the parts shown in figures 1-6 is given below, where the number in brackets indicates the relevant figure.

The antennae consist of two short, stout basal segments, followed by a thin filament consisting of a number of segments. In the Cixiidae only one of the former can be seen distinctly and is referred to as the globular segment. The head and forebody are shown in figures 1-3.

- | | |
|---|--|
| <i>A1</i> , first anal vein (4) | <i>IM</i> , inner margin (of wing) (4) |
| <i>A2</i> , second anal vein (4) | <i>ISA</i> , internal subapical cell (4) |
| <i>AC</i> , anteclypeus (2, 3) | <i>IX</i> , ninth abdominal segment (6) |
| <i>AE</i> , aedeagus (penis) (5) | <i>L</i> , lorum (3) |
| <i>AES</i> , aedeagus support (5) | <i>M</i> , median vein (4) |
| <i>AM</i> , apical margin (of wing) (4) | <i>MA</i> , median apical cell (4) |
| <i>AN1</i> , first antennal segment (2, 3) | <i>Ma</i> , marginal raised edge (of wing) (4) |
| <i>AN2</i> , second antennal segment (2, 3) | <i>MC</i> , median cell (4) |
| <i>AO</i> , apical opening (of genital segment of male) (5) | <i>MG</i> , median keel of gena (3) |
| <i>AT</i> , anal tube (tenth abdominal segment of male) (5) | <i>OC</i> , ocellus (2, 3) |
| <i>AV</i> , anal vein (4) | <i>P</i> , pronotum (1) |
| <i>BL</i> , basallamina (of female genitalia) (6) | <i>PA</i> , paramere (clasper) (5) |
| <i>CCS</i> , corio-claval suture (4) | <i>PC</i> , postclypeus (2, 3) |
| <i>CE</i> , compound eye (1, 2, 3) | <i>R</i> , radial vein (4) |
| <i>Cu</i> , cubital vein (4) | <i>RC</i> , radial cell (4) |
| <i>CuC</i> , cubital cell (4) | <i>Sc</i> , subcosta (4) |
| <i>EA</i> , external apical cell (4) | <i>ScC</i> , subcostal cell (4) |
| <i>ES</i> , epieranal suture (3) | <i>SEA</i> , subexternal apical cell (4) |
| <i>ESA</i> , external subapical cell (4) | <i>SIA</i> , subinternal apical cell (4) |
| <i>F</i> , frons (2) | <i>ST</i> , scutellum (1) |
| <i>G</i> , gena (2, 3) | <i>T</i> , tegula (1) |
| <i>GC</i> , first gonocoxa (5) | <i>VE</i> , vertex (1) |
| <i>GP</i> , gonoplae (ovipositor sheath) (6) | <i>VI</i> , sixth abdominal segment (6) |
| <i>GS</i> , genital segment (male) (5) | <i>VII</i> , seventh abdominal segment (6) |
| <i>IA</i> , internal subapical cell (4) | <i>VIII</i> , eighth abdominal segment (6) |
| | <i>X</i> , tenth abdominal segment (6) |
| | <i>XI</i> , eleventh abdominal segment (5, 6) |

The genitalia are of such importance in classification that the parts must be clearly recognised. The male genital segment is the ninth abdominal and the anal tube the tenth; the genital block is illustrated for *Araeopus pulchellus* in figure 5. The female genitalia have been less studied, but the shapes of the first gonocoxa and gonoplacs are valuable taxonomic characters. The external parts of the female genitalia of *A. pulchellus* are shown in figure 6.

GENERAL LARVAL CHARACTERISTICS

The larvae of Auchenorrhyncha have not, on the whole, been well studied. The head and antennae in larva and adult are sometimes similar, but reliance on this generalization can lead to errors, as discussed, for example, under the headings Cixiidae and Delphacidae. Larvae of three out of the four British families of Fulgoromorpha are figured here (figs. 7-12); they all have a number of pore-like openings, the function of which is uncertain, on the head and forebody.

CLASSIFICATION AND NOMENCLATURE

The nomenclature used is based on China's check list (1950), with a number of changes in the Delphacidae, discussed by Le Quesne (1960). Sufficient synonymy is given to correlate with Kloet and Hincks' *Check list of British Insects* (1945) and with Edwards' *Hemiptera-Homoptera of the British Islands* (1894-6).

MOUNTING

The ventral surface of the abdomen should not be gummed to a card as the study of this feature is important. Specimens can be pinned with a stainless steel micro-pin through the scutellum or the underneath of the thorax can be glued to a cardboard point. Alternatively they can be mounted on celluloid with a thin transparent paste.

EXPLANATION OF KEYS

The keys are designed to fit the British species and the characters used to define genera and higher groups are not necessarily applicable to non-British species.

The distribution of many species in Britain is very imperfectly worked out, owing to the paucity of collectors, so that the distributional data cannot be regarded as in any way exclusive of other parts of Britain. The months during which a species has been recorded are represented by Roman numerals: again, these should not be regarded as exclusive of other parts of the year in our present state of knowledge of the group.

Lengths of whole insects are measured from the apex of the vertex to that of either the abdomen or the fore wings, whichever is the longer.

ACKNOWLEDGMENTS

I wish to thank the Trustees of the British Museum (Nat. Hist.), the Director of the Royal Scottish Museum, the Hope Professor of Entomology at Oxford and the Curator of the Castle Museum, Norwich, for allowing me

to study the respective collections in their charge. Dr. J. R. Chiswell has tested the keys to a large extent and has made very valuable suggestions; Dr. T. R. E. Southwood, Dr. G. G. E. Scudder and Mr. M. J. L. Bishop have also tried out parts of the keys and made useful contributions. Besides these, I must thank Dr. W. E. China, Mr. H. W. Daltry, Dr. C. D. Day, Colonel C. A. W. Duffield, Mr. R. G. Fennah, the late Mr. P. Harwood, Dr. A. R. Hill, Mr. W. R. B. Hynd, Mr. D. Leston, Dr. R. Linnavuori, Dr. F. Ossiannilsson, Professor H. Ribaut, Mr. M. A. Salmon, Mr. A. R. Waterston and Dr. W. Wagner, all of whom have given me assistance with this work or lent me specimens.

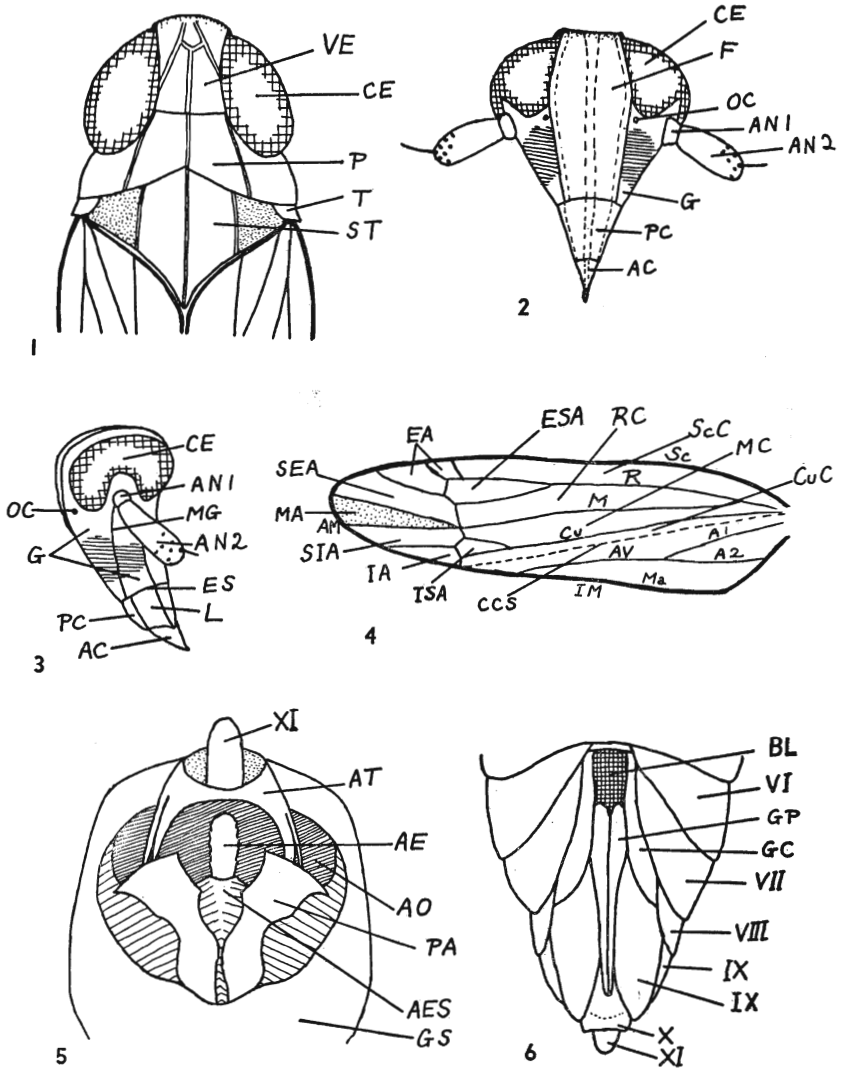
The drawing of *Megamelus notula* used on the cover and for figure 101 was kindly made by Dr. G. G. E. Scudder: the rest of the drawings are my own, except for a few of the parts of the male genitalia of *Cixius*, which I have borrowed from Dr. China's (1942) paper on the genus.

DEFINITION OF FULGOROMORPHA

Postelypeus distinct from frons and with upper margin below compound eyes so that frons is situated on face (fig. 2). Median coxae elongate, mobile, with bases widely separated (fig. 18) (except Tettigometridae (fig. 20)). Tegulae present over base of fore wings (sometimes hidden under pronotum) (figs. 1, 15, 21, etc.). Fore wings with two anal veins united in apical part (figs. 4, 35, etc.). Hind wings without marginal vein (fig. 37). Antennae with base directly beneath compound eyes (figs. 2, 14, 43, etc.) (except Tettigometridae, where base is below level of eyes and between them (fig. 16)).

KEY TO FAMILIES

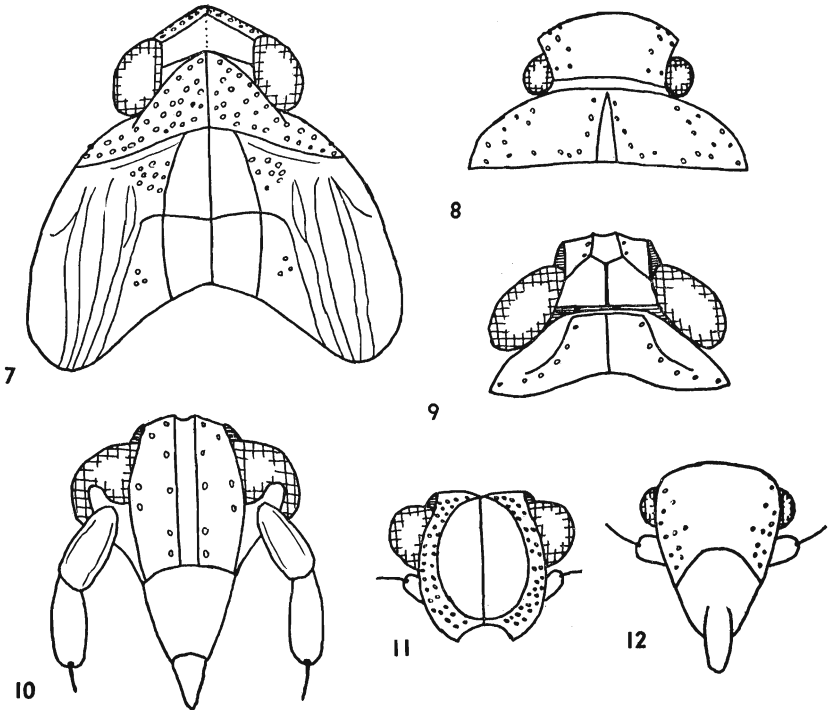
- 1 Frons flattish, without sharp or keeled side margins or central keel (fig. 16). Fore wings horny, distinctly and finely pitted, with veins weakly marked (fig. 17). Compound eyes almost on plane of frons. (Median coxae shorter, fixed, with bases fairly close together (fig. 20)).....TETTIGOMETRIDAE (p. 6)
- Frons with sharp or keeled side margins, often also keeled medially (figs. 2, 14, 43, etc.). Fore wings more or less membranaceous, with veins strongly marked, cells not pitted. Compound eyes below level of frons. (Median coxae long, mobile, with bases wide apart (fig. 18)).....2
- 2 Posterior tibiae with large movable spur at apex, as well as several much smaller fixed spines (figs. 97, 100). Lower margin of compound eye with more or less well developed recess to contain base of antennae (figs. 2, 3). Side margins of genae with distinct keel. (Pronotum variable in shape, but not very strongly narrowed medially and with posterior margin not forming sharply angled V-shape. Two ocelli present).....(= ARAEOPIDAE) DELPHACIDAE (p. 17)
- Posterior tibiae with only several fixed spines of comparable size at apex (fig. 50). Lower margin of eye without recess and somewhat separated from base of antennae (figs. 14, 43, etc.). Side margins of genae without distinct keel.....3
- 3 Fore wings with costa swollen at base, somewhat horny, with numerous reticulate cross-veins (fig. 13). Pronotum without distinct keels and with posterior margin nearly straight (fig. 15). (No ocellus present on frons).....ISSIDAE (p. 5)
- Fore wings with costa not distinctly swollen at base, membranaceous, with sharply defined veins, but no supernumeraries present (figs. 23, 35, etc.). Pronotum with well-defined outer keels, very narrow medially, with posterior margins forming sharply angled V-shape (figs. 22, 36, etc.). (Median ocellus present at lower margin of frons, only clearly visible under high-power magnification (fig. 43))
CIXIIDAE (p. 7)



FIGS. 1-4.—*Kelisia guttula* : (1) fore body ; (2) face ; (3) head from side ; (4) fore wing.
 FIGS. 5, 6.—*Araeopus pulchellus* : (5) male genitalia from behind ; (6) posterior end of female abdomen from beneath.
 (For labelling, see text p. 1.)

Family ISSIDAE

This rather distinctive family, with only one British genus and species, is considerably better represented in the south of Europe: in all, 12 genera are reported from this continent.



FIGS. 7-12.—Final instar larvae: (7) *Issus coleopratus*, head and thorax; (8) *Cixius pilosus*, head and pronotum; (9) *Araeopus pulchellus*, head and pronotum; (10) the same, face; (11) *I. coleopratus*, face; (12) *C. pilosus*, face.

Genus *Issus* Fabricius

This genus has 10 European species, most of which are southern. The larva of *I. coleopratus* is figured here (figs. 7, 11).

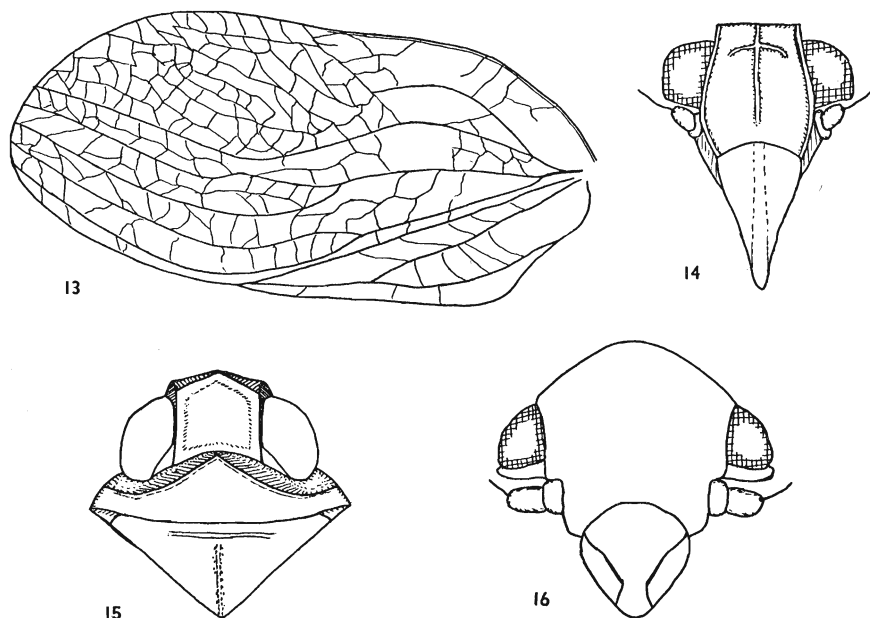
Postelypous marbled darker and lighter brown. Frons brownish, sometimes with greenish patches, marbled with black-brown at sides and towards junction with vertex; transverse keel present, as well as median and side keels (fig. 14). Vertex about as long as broad, brownish with sharply angled anterior margin, with edges sharply keeled, but without keels across it, except for median keel sometimes weakly present posteriorly (fig. 15). Pronotum short, sharply angled anteriorly, nearly straight posteriorly, brownish with some darker mottlings towards sides, without distinct keels. Scutellum brownish, triangular, with weak median keel; transverse keel present, but no distinct outer keels.

Fore wings translucent, brownish, with veins mainly darker, sometimes greenish in a few patches towards base. Hind wings smoky brownish, veins darker. Abdomen mottled brownish or green and black-brown above. Overall length: 5.5-7.0 mm. **coleoptratus** (Geoffroy)

On ivy, holly and various trees or in moss. Widespread in England as far N. as Westmorland. Wales. Ireland. vi-x. All Europe. N. Africa.

Family TETTIGOMETRIDAE

The classification and affinities of this very distinctive family have been discussed by Fennah (1952). As there is only one British representative,



FIGS. 13-15.—*Issus coleoptratus*: (13) fore wing; (14) face; (15) fore body.
FIG. 16.—*Tettigometra impressopunctata*, face.

the family and generic characters are included in the description of the species.

Genus *Tettigometra* Latreille

This genus has no less than 29 European species, but only one reaches Britain.

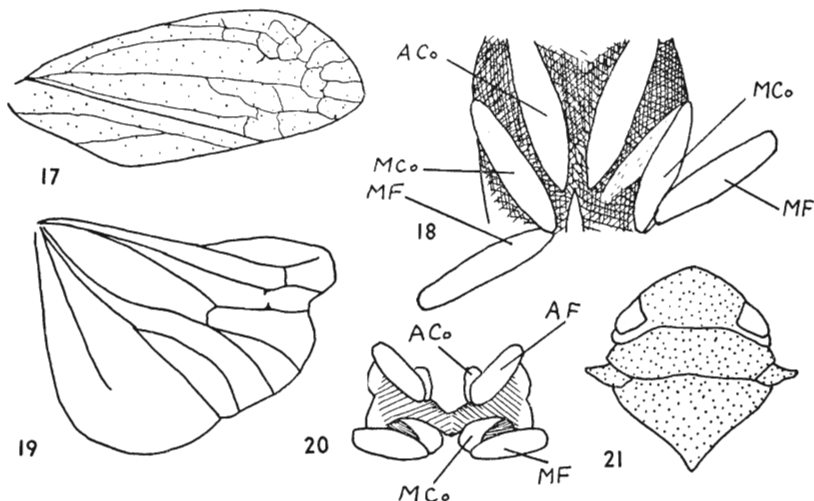
Head, pronotum, scutellum and fore wings brown or red-brown, deeply and closely pitted. Abdomen black, sometimes reddish at sides. Frons rather flat, without keels, finely pitted and brownish above level of lower margin of eyes, often black-brown in lower part of this area; lower part of frons pale and not pitted: postclypeus and lorae black-brown. No median ocellus. Frons and vortex forming strongly acute angle, somewhat rounded at junction. Posterior and lower part of eye-socket strongly developed, callous, extending laterally beyond

eye (figs. 16, 21). Fore wings horny, normally unmarked except for small dark streak along inner margin just beyond corio-claval suture. Hind wings broad, hyaline, outer margin excised near apex of radial vein (fig. 19). In male, genital segment cleft beneath (simulating genital plates of Cicadellidae, but in fact doubtfully homologous). Overall length: 4.0-4.5 mm. . . **impressopunctata** Dufour

On chalk hills and sand-hills, local. England: Oxon., Bucks., Kent, Surrey, Dorset, also Yarmouth (Hants. or Norfolk?). Wales: Pembs. ii-v, vii-x. C., S. and E. Europe. N. Africa.

Family CIXIIDAE

This family contains 8 European genera, two of which occur in Britain, where 12 species are recorded. Females of this family are often found with flat plates of a waxy secretion towards the apex of the abdomen. In the



FIGS. 17, 19-21.—*Tettigometra impressopunctata*: (17) fore wing; (19) hind wing; (20) part of ventral surface of thorax; (21) fore body.

FIG. 18.—*Cixius nervosus*, part of ventral surface of thorax.

(*ACo*, anterior coxa; *AF*, anterior femur; *MCo*, median coxa; *MF*, median femur.)

male, the aedeagus is complex: when erected, the apical part bends backwards and the apical spines of the aedeagus sheath also move.

Larvae of *Cixius pilosus* are without keels on the frons and the median ocellus of the adult is not apparent (figs. 8, 12): they are thus not readily recognizable from a knowledge of the adult characters.

KEY TO GENERA

- 1 Scutellum with three keels (fig. 36). Veins of fore wings with conspicuous setigerous dark tubercles (figs. 35, etc.). (In male, anal tube seen from above narrow; paramere simple, flattened (fig. 66)) **Cixius** Latreille (p. 8)
- Scutellum with five keels (fig. 22). Veins of fore wings without setigerous tubercles (fig. 23). (In male, anal tube seen from above broad, flattened (figs. 29, 33); parameres with projections, not flattened (figs. 26, 27)) **Oliarus** Stål (p. 8)

Genus *Oliarus* Stål

Two of about 25 European species are found in Britain.

I have recently learned that the species so long regarded as *Oliarus panzeri* in Britain does not agree with Dlabola's concept of it. A revision of the genus is thus clearly needed, which may result in the name of this species being changed.

KEY TO SPECIES

- 1 Vertex distinctly longer than broad (fig. 22). Eyes usually reddish throughout. Usually longer—overall length: ♂, 5.3–5.9 mm.; ♀, 6.3–7.4 mm. (Frons and postclypeus black, keels light brown. Globular antennal segment pale brownish. Vertex, pronotum and scutellum blackish; pronotum with keels and posterior margin light ochreous brown. Veins of fore wings light brown basally, black-brown apically, with short pale hairs. In male, anal tube rounded posteriorly (fig. 29); projection of paramere short (fig. 26); sclerotized projection at lower margin of genital segment rounded apically (fig. 30); aedeagus as in figs. 24, 28) **leporinus** (Linnaeus)
Usually, but not always, in salt-marshes. England: Suffolk, Surrey, Hants., Dorset, Devon, Glos. Scotland: Rannoch (teste Marshall, 1866). Ireland: Co. Kerry. vi-viii. All Europe. Asia. N. Africa.
- Vertex much broader than long (fig. 25). Eyes usually greyish, sometimes margined reddish. Usually smaller—overall length: ♂, 4.6–5.2 mm.; ♀, 5.7–6.8 mm. (Frons and postclypeus dark brown or black, keels narrowly light brown. Globular antennal segment pale brownish. Vertex, pronotum and scutellum blackish or black-brown; pronotum with keels and posterior margin light ochreous brown. Veins of fore wing light brown basally, black-brown apically, with short pale hairs. In male, anal tube produced laterally into sharp angles posteriorly (figs. 33, 34); projections of paramere long (fig. 27); sclerotized projection at lower margin of genital segment pointed apically (fig. 34); aedeagus as in figs. 31, 32)..... **panzeri** Löw
In dry, usually cracked, fields. England: Oxon., Berks., Surrey, Essex, Sussex, Hants., Kent. vi-viii. C. and S. Europe. N. Africa.

Genus *Cixius* Latreille

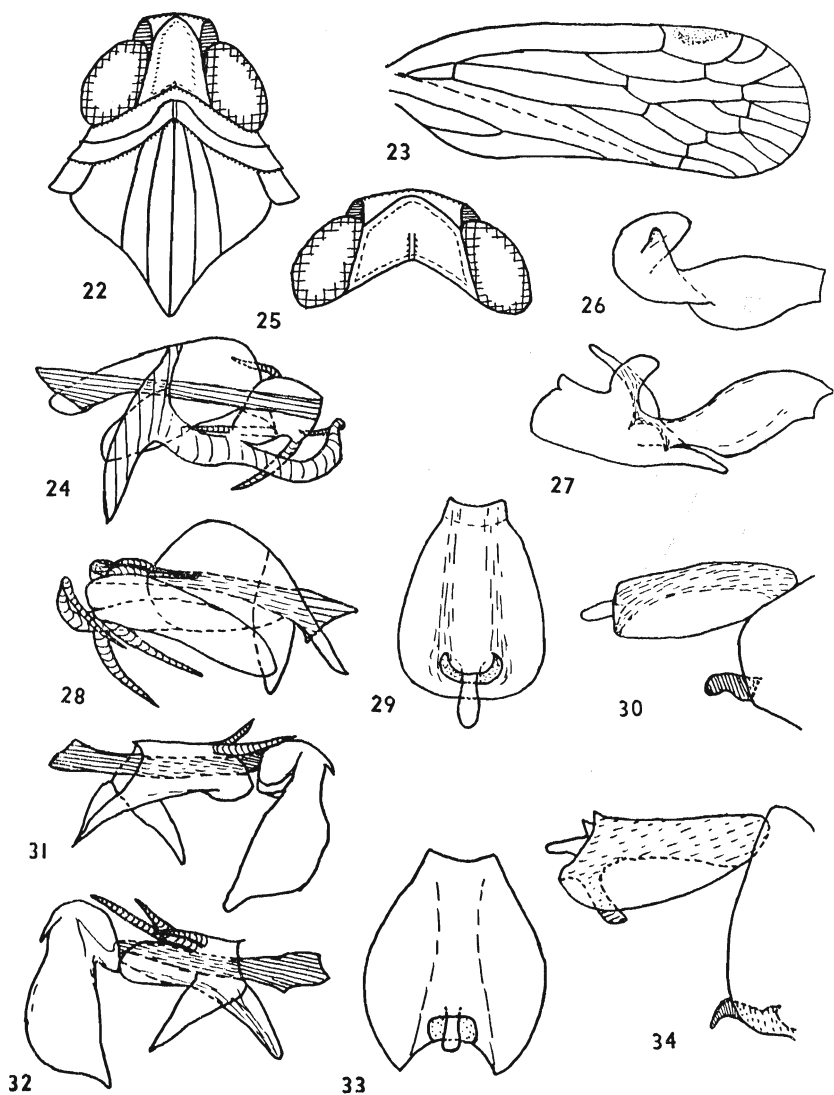
This genus is well represented in the European fauna.

Ten species are included in the British list, one of which, *C. borussicus* Wagner, rests on rather doubtful evidence. The British species have been monographed by China (1942). One non-British species, *venustus* Germar, occurs in the Channel Islands.

The genus was divided into a number of subgenera by Wagner (1939), who subsequently (1947) elevated *Tachycixius* to generic status, with *pilosus* as the type species. As the genitalia of the latter group are very similar to the rest of the *Cixius* genus, I prefer in the present work to retain them all in one genus. For purposes of this key, I have also found it more convenient to ignore the subgeneric classification.

KEY TO SPECIES

- 1 Fore wings with tubercles on apical margin between veins; dark spots along costal margin small, of about same size as tubercles of veins (fig. 42). (Frons and postclypeus dark brown, pale edged. Vertex rounded anteriorly, anterior keel sharp. Markings of fore wings very variable, from completely hyaline to almost completely blackish brown; costal margin with three more or less distinct short brownish stripes (except in completely unmarked specimens). In male,

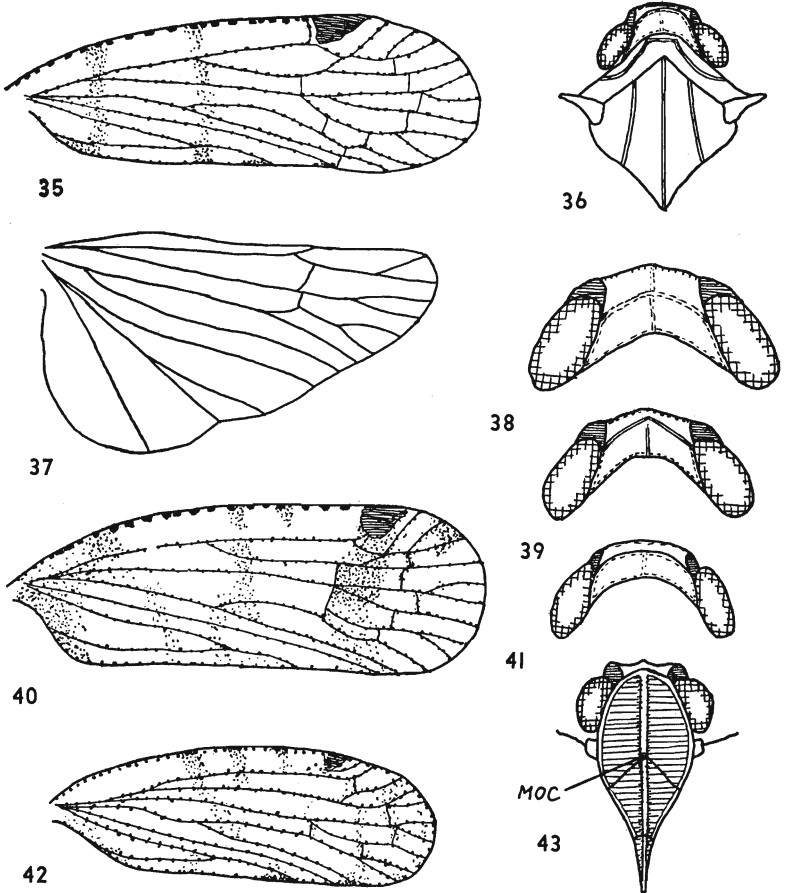


FIGS. 22 24, 26, 28-30.—*Oliarus leporinus*: (22) fore body; (23) fore wing; (24) aedeagus from left; (26) paramere; (28) aedeagus from right; (29) male, anal tube from above; (30) male, genital segment and anal tube, side view.

FIGS. 25, 27, 31-34.—*O. panzeri*: (25) head from above; (27) paramere; (31) aedeagus from right; (32) the same, from left; (33) male, anal tube from above; (34) male, genital segment and anal tube, side view.

anal tube without teeth at apex (figs. 58, 60); aedeagus sheath with two apical movable spines, its lower margin with fixed spine-like tooth (figs. 57, 59). Overall length: ♂, 4.4–5.1 mm.; ♀, 5.1–5.7 mm.)..... **pilosus** (Olivier)

Larva in open, near base of grass, in dry places. Generally common and widespread. England. Scotland. Wales. Ireland. v–vii. Almost all Europe. Asia. N. Africa.



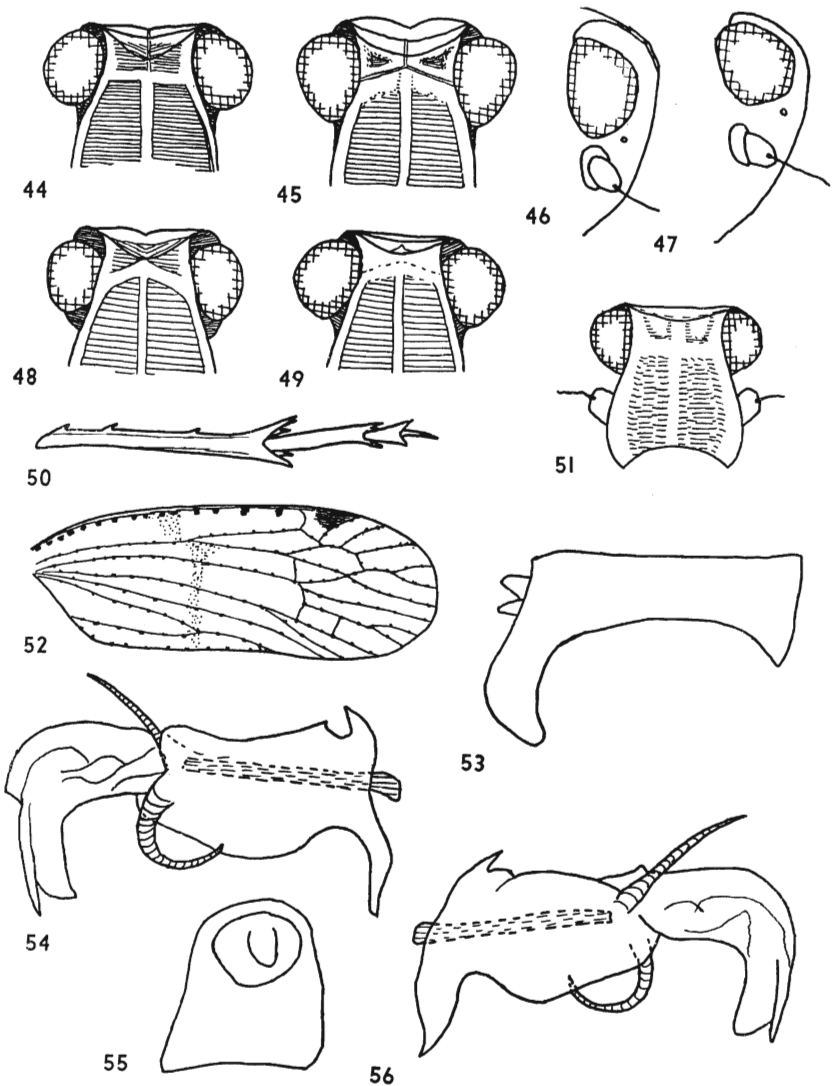
FIGS. 35–43.—*Cixius* spp.: (35) *nervosus*, female, fore wing; (36) the same, fore body; (37) the same, hind wing; (38) *distinguendus*, head from above; (39) *simplex*, head from above; (40) *cunicularius*, fore wing; (41) *borussicus*, head from above; (42) *pilosus*, fore wing; (43) *nervosus*, face. (MOC, median ocellus).

- Fore wings without tubercles on apical margin between veins; dark spots along costal margin distinctly larger than tubercles of veins..... 2
- 2 Apex of fore wing beyond stigma comparatively short, distance from base of stigma to apical margin of fore wing less than breadth of fore wing from costal margin of stigma to apex of clavus (fig. 40); a broad dark brown band extending from apex of clavus to below stigma, variable in intensity, sometimes dark coloration extending to base of fore wing. Upper edge of apex of hind wing infuscate in

well-defined patch. (Frons dark brown with keels paler; postclypeus light brownish. Globular antennal segment light brownish. Anterior margin of vertex broadly rounded. Pronotum light brownish; scutellum black-brown. Fore wings with narrow brownish streaks and markings in basal two-thirds, confluent in darkly marked specimens. In male, anal tube without distinct teeth apically (figs. 72, 73); aedeagus sheath with two apical movable spines, without sharp projections on upper or lower surfaces (figs. 70, 71). Overall length: ♂, 5.8–6.9 mm.; ♀, 6.2–7.4 mm.).....**cunicularius** (Linnaeus)

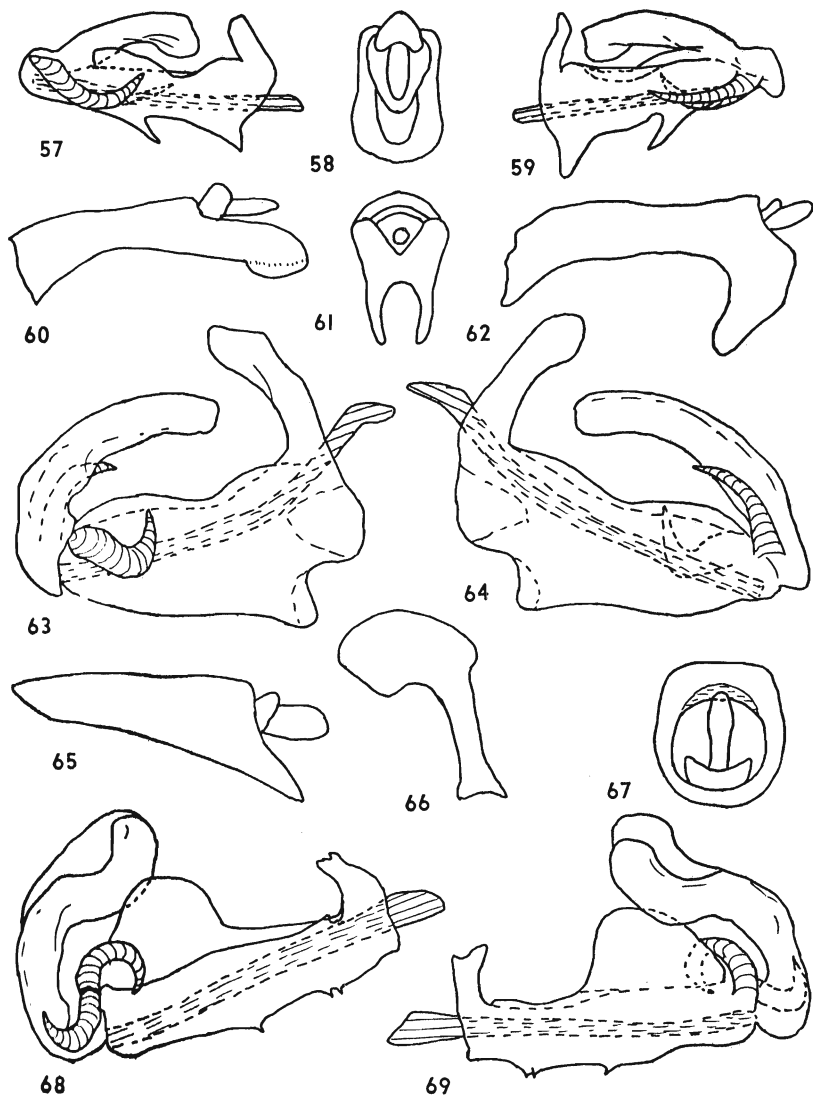
Usually near streams; not common and rather local, but widely distributed. England. Scotland. Wales. Ireland. v–ix. Europe. Asia. N. Africa.

- Apex of fore wing beyond stigma as long as or longer than breadth of fore wing from costal margin of stigma to apex of clavus (fig. 35); no broad dark oblique band across this area. Apex of hind wing usually entirely hyaline or vaguely and indefinitely infuscate.....3
- 3 Transverse keel between frons and vertex flattened, almost obsolete (fig. 49); in side view, frons and vertex broadly rounded into each other (fig. 47). Anterior keel of vertex broadly rounded, somewhat flattened (fig. 38). Globular antennal segment black. (Frons and postclypeus uniformly brownish, with keels somewhat paler. Fore wings hyaline, usually with thin brownish transverse band medially and a brownish patch at base. In male, anal tube broad at apex, without teeth (figs. 65, 67); aedeagus sheath with two apical movable spines, left-hand spine strongly twisted round; lower margin of aedeagus sheath with three minute teeth (figs. 68, 69). Overall length: ♂, 6.1–6.4 mm.; ♀, 7.1–7.7 mm.)... (= *brachycranus* Scott, = *intermedius* Scott) **distinguendus** Kirschbaum
Mainly in woods; widely distributed, but rather local. England, Scotland, probably Ireland. viii–x. France. Sweden. Germany. Alps. Hungary. Trieste.
- Transverse keel between frons and vertex more or less distinct (figs. 44, 45, 48): in side view, frons and vertex forming more or less distinct angle at junction (fig. 46). Anterior keel of vertex sharp, in some cases angular medially in form of ogive arch (fig. 39). Globular antennal segment almost always not black but more or less dark brownish.....4
- 4 Larger species—overall length: ♂, 6.5–7.4 mm.; ♀, 7.1–8.0 mm. Postclypeus brownish-yellow throughout, much lighter than frons. In male, anal tube terminating in two large teeth, directed downwards and backwards (figs. 61, 62). In female, and sometimes also in male, base of fore wings with broad brownish band, or rarely whole fore wing brownish (fig. 35). (Fore wing usually with transverse band, its distance from base somewhat less than half length of wing; faint dark markings also sometimes present in apical cells and near stigma. Anterior keel of vertex sharp, usually forming more or less distinctly shape of ogive arch. Pronotum yellow-brown; scutellum black or brown-black. In male, aedeagus sheath with two apical movable spines and with blunt projection along lower margin near base (figs. 63, 64)).....**nervosus** (Linnaeus)
Common and widely distributed, especially in wooded country. England. Wales. Scotland. Ireland. v–x. Europe. Asia. N. Africa.
- Smaller species—overall length: ♂, up to 6.4 mm.; ♀ up to 6.8 mm. Postclypeus dark brown or black, concolorous with frons, either throughout or bordering on lateral keels. In male, termination of anal tube not developed into distinct teeth, though sometimes into weaker laminar projections (figs. 84, 86, etc.). Fore wings without definite fuscous band at base.....5
- 5 Cells of fore wings more or less pale brown with some obscure darker mottlings. In male, two (or rarely only one) out of three apical movable spines of aedeagus sheath developed into two or more points apically (figs. 92, 93). (Frons and postclypeus black, shining, keels orange-brown: transverse keel between frons and vertex sharp, straight. Anterior keel of vertex sharp, forming more or less shape of ogive arch. Pronotum yellow-brown; scutellum black. In male, anal tube forming two short points along lower margin apically (figs. 89, 91). Overall length: ♂, 4.8–5.1 mm.; ♀, 5.1–6.2 mm.)
(= *stigmaticus* auct. nec (Germar) **similis** Kirschbaum
Rather local; not uncommon on somewhat boggy heaths. England. Scotland, probably Ireland. v vii, ix. France. Sweden. Germany. Hungary.
- Cells of fore wing clear or milky hyaline, not generally tinged with brown; markings, if present, forming more or less distinct bands. In male, apical movable spines of aedeagus sheath simple at apex.....6



FIGS. 44-50.—*Cixius* spp. : (44) *remotus*, upper part of face ; (45) *nervosus*, upper part of face ; (46) the same, head, side view ; (47) *distinguendus*, head, side view ; (48) *simplex*, upper part of face ; (49) *distinguendus*, upper part of face ; (50) *nervosus*, posterior tibia and tarsus.

FIGS. 51-56.—*Cixius caledonicus* : (51) face ; (52) fore wing ; (53) male, anal tube from right ; (54) aedeagus from left ; (55) male, anal tube, terminal view ; (56) aedeagus from right.

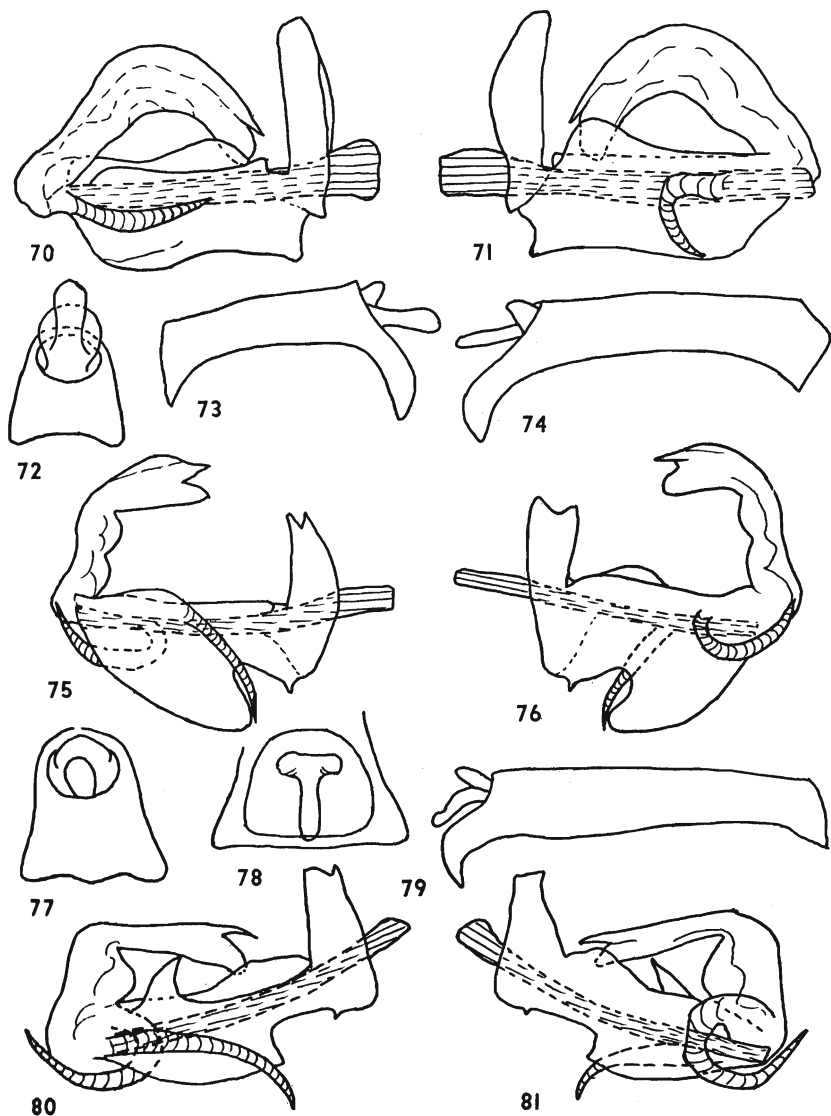


FIGS. 57-60. — *Cixius pilosus*, male genitalia: (57) aedeagus from right; (58) anal tube, terminal view; (59) aedeagus from left; (60) anal tube from left.

FIGS. 61-64, 66. — *C. nervosus*, male genitalia: (61) anal tube, terminal view; (62) the same, from left; (63) aedeagus from right; (64) the same from left; (66) paramere.

FIGS. 65, 67-69. — *C. distinguendus*, male genitalia: (65) anal tube from left; (67) the same, terminal view; (68) aedeagus from right; (69) the same, from left.

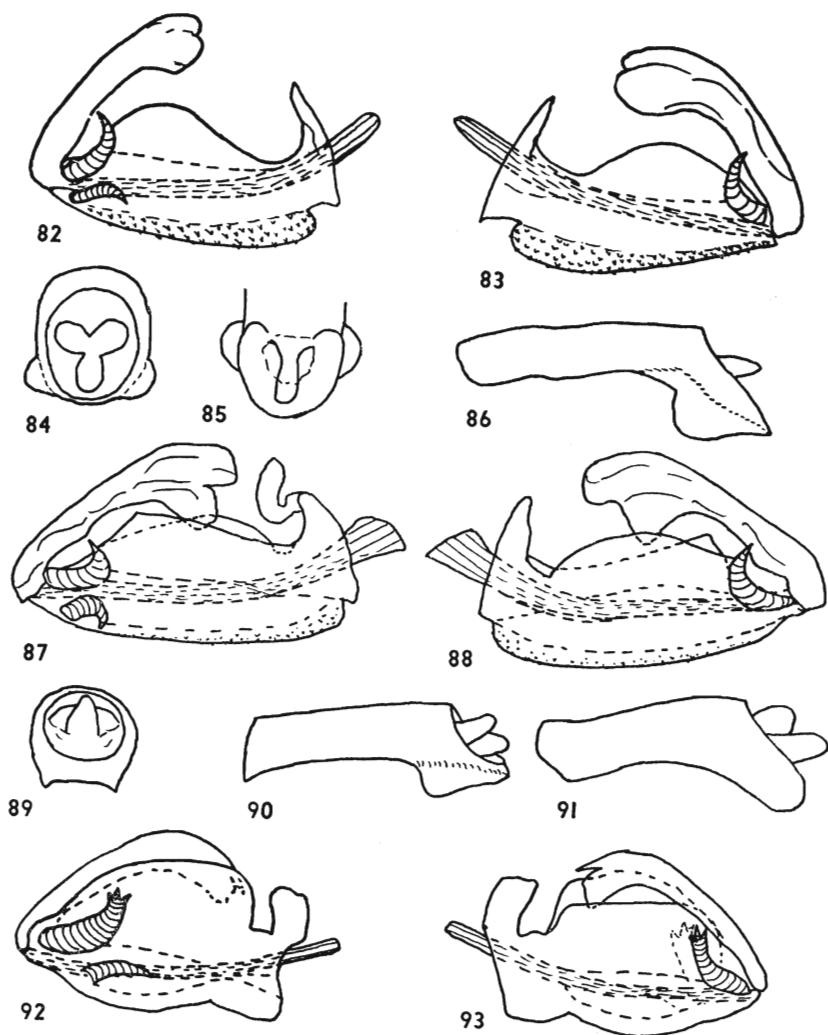
- 6 Tubercles on veins of fore wing finer, more widely spaced: 8-11 present along median vein from base to junction with first *m-cu* crossvein.....7
- Tubercles on veins of fore wing coarser, more closely spaced: 12-16 present along median vein from base to junction with first *m-cu* crossvein (fig. 52).....8
- 7 Vertex longer, its length at least half of width between two lateral keels anterior to it, usually forming more or less distinctly shape of ogive arch anteriorly (as in fig. 39). Dark tubercles of veins and granules along costa mainly elongate. (Transverse keel between frons and vertex sharp, almost straight (fig. 44): frons and postclypeus black, keels orange-brown. Pronotum black anteriorly, brown posteriorly: scutellum black. Cells of fore wings usually without definite markings in both sexes. In male, anal tube with apex somewhat broadened below, but not forming distinct teeth or keels (figs. 74, 78): aedeagus sheath with two apical movable spines, with upper margin broadly rounded and with broad keel below, terminating basally in broadly rounded angle (figs. 75, 76). Overall length: ♂, 5.2-6.3 mm.; ♀, 5.7-6.8 mm.).....**remotus** Edwards
Near sea-coast, salterns. England: Suffolk, Kent, Hants., Dorset, Cornwall. vi-x. France.
- Vertex shorter, its length distinctly less than half width between two lateral keels anterior to it, its anterior margin smoothly rounded (fig. 41). Dark tubercles of veins and granules along costa almost round. (Transverse keel between frons and vertex rather broad and flattened. Globular antennal segment black-brown. Pronotum yellow-brown; scutellum black. Fore wings without distinct markings (in British specimen) or with weak transverse band. In male, anal tube at apex developed into weak laminar projections (figs. 85, 90); aedeagus sheath with three apical movable spines, with lower margin weakly granulate, and margin of right-hand upper lobe distinctly angular (figs. 87, 88). Overall length: ♂, 5.2 mm.).....**borussicus** Wagner
One specimen in Capron collection without data, possibly from Surrey. Germany.
- 8 Fore wing relatively shorter, about two and a half times as long as broad (fig. 52). Lateral margins of frons somewhat foliaceous, broadly pale (fig. 51). (Globular antennal segment light brown. Vertex short, crescent-shaped: anterior keel and transverse keel between frons and vertex somewhat flattened. Pronotum light brown; scutellum black-brown. Fore wings with narrow, rather irregular transverse band in both sexes. In male, lower apical margin of anal tube almost straight (figs. 53, 55): aedeagus sheath with two movable apical spines and sinuate lower margin (figs. 54, 56). Overall length: ♂♀, 4.4 mm.)
caledonicus China
Scotland: under a stone set in grass by Heriot Water and Edinburgh, Midlothian; mid-Perth. vii, viii. Not recognized elsewhere.
- Fore wing relatively longer, about three times as long as broad. Lateral margins of frons not distinctly foliaceous, narrowly pale.....9
- 9 Transverse keel between frons and vertex flattened, particularly towards sides, distinctly arched so that its ends tend to curve into side keels of frons (fig. 48). In male, aedeagus sheath with a fixed spine-like appendage on upper margin, two long movable apical spines and a smooth keel terminating in a sharp angle of approximately 90° on lower margin (figs. 80, 81). (Pronotum sometimes dark anteriorly, sometimes uniformly brownish; scutellum black or brown-black. Frons black or black-brown: postclypeus concolorous either throughout or against side keels and lighter brown medially. Length of vertex slightly less than half width between two lateral keels anterior to it, usually forming more or less distinctly shape of ogive arch anteriorly (fig. 39). Fore wings with narrow transverse band at level of claval fork, usually distinct in female, weak or absent in male: dark tubercles of veins and granules of costa mainly elongate. In male, anal tube apically somewhat broadened at apical lower margin, but not forming distinct teeth or keels (fig. 77, 79). Overall length: ♂, 5.6-5.7 mm.; ♀, 5.7-6.1 mm.).....(=*scotti* Edwards) **simplex** (Herrich-Schaeffer)
Local and rather scarce: salt-marshes, woods, scrubland. S. and C. England. Wales: Denbigh. viii-x. W. and C. Europe.
- Transverse keel between frons and vertex more or less sharp, almost straight, making distinct angle with side keels of frons (fig. 44). In male, aedeagus sheath without fixed spine-like appendage on upper margin and either with three movable apical spines and finely granulate lower margin (figs. 82, 83) or with two



FIGS. 70-73. *Cixius cunicularius*, male genitalia: (70) aedeagus from right; (71) the same, from left; (72) anal tube, terminal view; (73) the same, from left.

FIGS. 74-76, 78. *C. remotus*, male genitalia: (74) anal tube from right; (75) aedeagus from right; (76) the same, from left; (78) anal tube, terminal view.

FIGS. 77, 79-81. *C. simplex*, male genitalia: (77) anal tube, terminal view; (79) anal tube from right; (80) aedeagus from right; (81) the same, from left.



FIGS. 82-84, 86.—*Cixius cambricus*, male genitalia: (82) aedeagus from right; (83) the same, from left; (84) anal tube, terminal view; (86) the same, from left.

FIGS. 85, 87, 88, 90.—*C. borussicus*, male genitalia: (85) anal tube, terminal view; (87) aedeagus from right; (88) the same, from left; (90) anal tube from left.

FIGS. 89, 91-93.—*C. similis*, male genitalia: (89) anal tube, terminal view; (91) the same, from left; (92) aedeagus from right; (93) the same, from left.

- long movable spines and broad smooth keel below, terminating basally in broadly rounded angle (figs. 75, 76).....10
- 10 Fore wings with narrow transverse band across middle in female and sometimes faintly in male. Setae of tubercles of fore wings usually shorter. In male, aedeagus sheath with three apical movable spines and lower margin slightly convex and finely granulate (figs. 82, 83). (Globular antennal segment dark brown or blackish. Pronotum light brownish, scutellum black. Anal tube apically developed into rounded keels directed downwards and outwards (figs. 84, 86). Upper margin of aedeagus sheath smoothly rounded. Overall length: ♂, 4.8-5.3 mm.; ♀, 4.9-5.8 mm.).....**cambricus** China
Sweeping low herbage on mountain side. Wales: Snowdon, Caernarvon. Scotland: Aviemore, Inverness; Kinlochewe, Wester Ross. vi, vii. Czechoslovakia.
- Cells of fore wings usually without definite markings in both sexes. Setae of tubercles of fore wings usually longer. In male, aedeagus sheath with two long apical movable spines and lower margin forming broad, smooth keel below, terminating basally in broadly rounded angle (figs. 75, 76).....**remotus** Edwards
 (See couplet 7.)

Family DELPHACIDAE

(= ARAEOPIDAE)

The Delphacidae are a large family of world-wide distribution and by far the best represented Fulgoromorph family in Europe. In Britain we have 70 species so far recognized.

The larval stages have been described in comparatively few cases, but those of several species have been described by Hassan (1939), who has also discussed their Strepsipterous and other parasites. Lindberg (1939) has studied the life-history and Strepsipterous parasites of *Chloriona*. In general, the larvae possess two frontal keels throughout, whatever the condition in the adult insect; they also possess pore-like cavities on the frons, vertex and pronotum. This condition is retained in the adult state in the non-British genus *Achorotile*.

Most species exist in both macropterous and brachypterous forms, and the sexes are often very different in appearance. It is largely because of these factors that difficulties have arisen in this family.

KEY TO GENERA

- 1 Basal segment of antennae distinctly longer than second, with broad flattened keels on either side (figs. 94, 98).....2
- Basal segment of antennae distinctly shorter than second, without distinct keel (figs. 2, 106, etc.). (Spur at apex of posterior tibiae flat, with row of fine teeth along posterior margin).....3
- 2 Frons broadest just above lower margin, regularly tapering to this point, with two median keels throughout (fig. 94). Anterior and median femora and tibiae flattened, dilated (fig. 96). Spur at apex of posterior tibiae round in cross-section, without teeth (fig. 97).....**Asiraca** Latreille (p. 19)
- Frons broadest near middle, with one median keel forking towards upper margin (fig. 98). Anterior and median femora and tibiae not flattened or dilated. Spur at apex of posterior tibiae flat, with row of fine teeth along posterior margin (fig. 100).....**Araeopus** Spinola (p. 20)
- 3 Outer keels of pronotum more or less divergent but reaching or almost reaching posterior margin without curving outwards posteriorly (figs. 101, 115, etc.)¹.....4
- Outer keels of pronotum not reaching posterior margin, more or less strongly curving outwards posteriorly (figs. 186, 304, etc.).....7

¹ Care is needed in the direction of the lighting to see this character clearly.

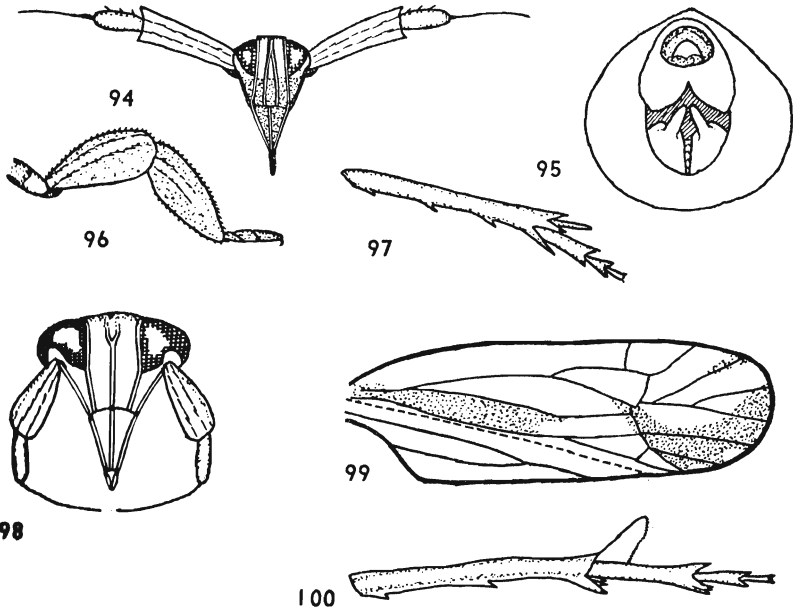
- 4 Basal segment of antennae at least half length of second segment (fig. 106). Frons broadest in lower half, its breadth not more than half its length (figs. 106, 107). (Width of head, including eyes, about three-quarters that of pronotum) 5
- Basal segment of antennae distinctly less than half length of second segment (fig. 2). Frons almost parallel-sided in lower half (fig. 116) or broadest in upper half (fig. 2) or its breadth more than half its length (fig. 133) 6
- 5 Outer keels of pronotum less divergent, distance between their posterior ends subequal to length of median keel (fig. 101). Vertex more elongate, about one and a half times as long as broad. In male, genitalia complex, with ovate accessory lobes and paired outgrowths of wall of genital segment (figs. 108, 111)
Megamelus Fieber (p. 20)
- Outer keels of pronotum more divergent, distance between their posterior ends much greater than length of median keel (figs. 102–4). Vertex less elongate, less than one and a quarter times as long as broad. In male, genitalia simple, without accessory lobes or outgrowths of wall of genital segment (figs. 110, 114, etc.) **Megamelodes** Le Quesne (p. 20)
- 6 Vertex tapering, narrowing anteriorly, extending for at least one-third of its length in front of eyes, with keel at apex sharply defined (fig. 115). Frons at least two and a half times as long as broad, parallel-sided in lower half (fig. 116)
Stenoeranus Fieber (p. 24)
- Vertex rounded anteriorly, only extending short distance in front of eyes (fig. 1). Frons about twice as long as broad, or shorter, sides convex or almost straight and narrowing downwards in lower part of frons (figs. 2, 133, 134)
Kelisia Fieber (p. 26)
- 7 Vertex forming almost regular pentagon, extending forwards in an obtuse angle (fig. 129). Frons with only median keel throughout, distinct but not very sharp (fig. 130) **Delphacinus** Fieber (p. 31)
- Vertex not forming sharp obtuse angle anteriorly, often more or less rectangular (figs. 200, 207, etc.). Frons with median keel forked above (figs. 205, 303, etc.) or with two keels throughout (figs. 366, 375, etc.) or keels not distinct throughout (figs. 320, 323, etc.) 8
- 8 Vertex distinctly narrowing in front, distinctly longer than broad (fig. 186). Males (and rarely females) macropterous, with pronotum and scutellum grey-green; females usually brachypterous, bright green **Chloriona** Fieber (p. 31)
- Vertex not markedly narrowing in front, rarely distinctly longer than broad (figs. 200, 207, etc.). Not green or grey-green 9
- 9 First segment of antennae about three times as long as diameter, conical; second segment about four times as long as diameter, cylindrical (fig. 205). (Fore wings pale ochreous, in macropters (δ and rarely φ) with dark markings as in fig. 208. Frons brownish with a few small pale spots. Overall length of brachypterous females, 4.5–5.0 mm.) **Euidella** Puton (p. 35)
- First and second segments of antennae shorter (*e.g.* fig. 212) 10
- 10 Frons with two keels throughout, in some species indistinct, especially in upper part (figs. 366, 375, etc.) **Criomorpus** Curtis (p. 62)
- Frons with single keel in lower part which forks towards vertex, sometimes more or less indistinct (figs. 307–28, 356, 357, etc.) 11
- 11 Keels of vertex and median keels of pronotum and scutellum rather weakly developed (fig. 200). Vertex shorter than broad; posterior areas formed by its keels distinctly shorter than broad. Keels of frons obsolescent in upper part (fig. 204)
Eurysa Fieber (p. 35)
- Keels of vertex (at least posteriorly) and median keels of pronotum and scutellum strongly developed (fig. 304). Vertex usually about as long as broad; posterior areas formed by its keels longer than broad or only slightly shorter than broad. Keels of frons often distinct throughout (figs. 307–28, etc.) 12
- 12 Median keel of frons forked in at least upper third (figs. 356, 357). Vertex anteriorly with four parallel keels at roughly equal intervals (fig. 355)
Dieranotropis Fieber (p. 60)
- Median keel of frons forked at or nearer junction with vertex (figs. 303, 307–28, etc.). Vertex anteriorly with median keels more or less convergent (figs. 302, 305) 13
- 13 Veins of fore wings not tuberculate or bearing tubercles narrower than veins (fig. 306). Median keel of frons forking at junction with vertex in most species (figs. 307–28), but below in a few cases (fig. 303) **Delphacodes** Fieber (p. 38)

- Veins of fore wings bearing dark tubercles distinctly wider than veins (figs. 210, 213, etc.). Median keel of frons forked somewhat below junction with vertex (fig. 209).....14
- 14 Second antennal segment with a weak keel at base (fig. 212). Brachypters with more or less well-defined dark band at apex of fore wings, reaching apical raised edge throughout, which latter may, however, be partly pale (fig. 213) : macropters with dark markings of fore wing roughly forming semicircle round apex of costa, without oblique transverse band towards base of fore wing (fig. 210)
Conomelus Fieber (p. 36)
- Second antennal segment without keel at base. Brachypters with broad blackish band on apical half of fore wing, leaving three semicircular pale patches at apex (fig. 214) : macropters with distinct oblique transverse band near base of fore wing, dark markings towards apex of costa not forming semicircular band (fig. 211).....**Euconomelus** Haupt (p. 38)

Genus **Asiraca** Latreille
 (= *Delphax* Fabricius)

This genus contains only one European species.

Vertex and upper part of frons yellow-brown ; frons black-brown below. Genae with large black spot. Basal segment of antennae about twice as long as second. Pronotum dark brown, narrowly pale anteriorly, with three keels, all reaching posterior margin. Scutellum black with four keels. Pronotum and scutellum with pale scale-like hairs. Fore wings whitish, marbled with light brown and with blackish marks along costa and near apex ; veins with darker tubercles,



FIGS. 94-97. *Asiraca clavicornis* : (94) face and antennae ; (95) male genitalia from behind ; (96) anterior leg ; (97) posterior tibia and tarsus.
 FIGS. 98-100. *Arucopus pulchellus* : (98) face and antennae ; (99) fore wing of male ; (100) posterior tibia and tarsus.

each carrying a stiff black hair. Legs mainly dark, marbled lighter. Male genitalia as in fig. 95. Overall length: 3.8–4.0 mm. . . . **clavicornis** (Fabricius)
In grass. England, S. of line from Wash to Bristol Channel. iv-x. C. and S. Europe. C. Asia. N. Africa.

Genus **Araeopus** Spinola

(= *Delphax* auctt. nec Fabricius)

Five or six European species of this genus are recognized and have been collated by Ribaut (1934), only one of which occurs in Britain. China (1957) has shown that *Araeopus* is the correct name, *Delphax* Fabricius being a junior synonym of *Asiraca*.

Vertex rounded in front, only projecting short distance in front of eyes, with keels faint anteriorly. Frons brown, with a few pale, dark-bordered spots, sometimes uniting to form a band, and with a whitish band across apex. Basal antennal segment a little longer than second. Pronotum and scutellum light yellowish, darker at sides. Pronotum with three keels, outer ones bent outwards posteriorly, not reaching posterior margin. Scutellum with three keels. Fore wings of males and macropterous females slightly yellowish, with a dark streak in basal two-thirds of median cell and another broad dark patch with concave, smoothly rounded outer margin from apex of median cell to apex of wing (fig. 99). Females normally brachypterous, with fore wings extending to about half length of abdomen, pale with trace of darker streak at base but no other distinct markings. In the male, parameres broadened at apex into flat, roughly quadrilateral plates, anal tube with backward directed spines beneath (fig. 5). In female, basal lamina with three angles at apex (fig. 6). Overall length: ♂, 5–6 mm.; brachypterous ♀, 5.5–6.5 mm.; macropterous ♀, 7–8 mm. **pulchellus** (Curtis)

Locally common on Phragmites (reeds). S. and C. England, as far N. as S. Yorks. Wales: Caernarvon. S. Ireland, as far N. as Co. Galway. vii-ix. Europe. Turkestan. Japan.

Genus **Megamelus** Fieber

This genus in the sense formerly used by European authors was heterogeneous and has recently been split (Linnavuori, 1957; Le Quesne, 1960), as a result of which four of the British species previously ascribed to the genus have been transferred to *Megamelodes* and only one remains in *Megamelus*. The genus as now defined occurs in the Palaearctic and Nearctic regions.

Vertex straw-yellow, darker at sides towards apex: frons light and dark mottled. Pronotum, scutellum (in brachypters) and abdomen above straw-yellow, dark brown to black at sides. Fore wings of brachypters short, rather squarely truncate apically, reaching to about one-third of length of abdomen in males and about one-fifth in females (fig. 101); sometimes yellowish with two longitudinal black-brown streaks, sometimes wholly black-brown except for broad yellowish patch at inner angle and mainly or wholly pale marginal edge. Macropters with scutellum dark brown, fore wings with dark patch along inner margin before apex of anal vein. Overall length: brachypterous male, 2.7–3.0 mm.; brachypterous female, 3.6–3.9 mm.; macropters 3.9–4.8 mm. . . . **notula** (Germar)

Locally common on vegetation near ground level in marshy places. Widespread in England. Wales. Scotland. Ireland. vii-ix (reported to hibernate as adult on Continent). Europe. N. Asia. N. America.

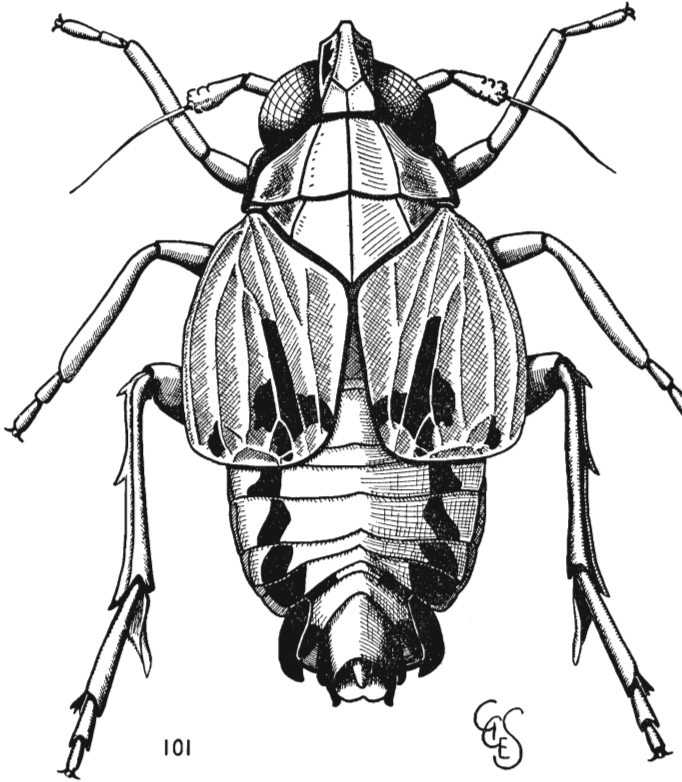
Genus **Megamelodes** Le Quesne

(= *Megamelus* auctt. in part = *Delphacodes* auctt. nec Fieb.)

The species of this genus have been ascribed to *Megamelus* or more recently to *Delphacodes* (Linnavuori, 1957; Dlabola, 1957), but have now

been separated (Le Quesne, 1960) on the basis of the striking difference in the male genitalia.

The genus *Megamelodes* consists of rather small species, usually brachypterous with fore wings distinctly shorter than the abdomen, but macropters are occasionally found. The basal segment of the antennae is half the length of the second segment or a little longer. The length of the vertex is between



101

FIG. 101.—*Megamelus notula* Germ.

one and one and a quarter times the breadth, and the posterior margin of the vertex is slightly broader than the anterior. The frons is about twice as long as broad. The width of the head, including eyes, is about three-quarters that of the pronotum. The side keels of the pronotum reach the posterior margin without curving outwards very markedly, but may do so to a slight extent. Spurs of posterior tibiae with 12–15 small teeth.

KEY TO SPECIES

- 1 Vertex rather longer: two posterior areas formed by keels distinctly longer than broad, with more distinct circular impressions (fig. 102). Side keels of pronotum usually convex throughout in brachypters. In male, parameres with thin erect

spine arising at base, curving outwards apically, about half length of paramere (fig. 113). (Yellow-brown, with pronotum, scutellum and abdomen dark brown at sides. Fore wings of brachypters extending to about one-third length of abdomen, rather squarely truncate posteriorly, yellow-brown with small brown-black patch at anal angle and another in middle of posterior margin: veins prominent, with small, rather indistinct tubercles. Macropters rare: fore wings light brownish. Overall length: brachypters, 3.0-3.9 mm.; macropters, 4.7-4.9 mm.)..... **quadrimaculatus** (Signoret)

In marshy places, local. England. Scotland. Ireland. iii, viii-x. France. Belgium. Germany.

- Vertex rather less elongate: posterior areas formed by keels not distinctly longer than broad, with circular impressions usually absent or indistinct (figs. 103, 104). Side keels of pronotum straight or slightly concave in middle or posteriorly. In male, paramere without spine arising from base (figs. 105, 112, 114)..... 2

- 2 First antennal segment about as long as thick at apex. Lower margin of frons not paler. In brachypters, fore wings unicolorous yellowish or reddish-brown, without markings. In male, appendages of anal tube not longer than broad (fig. 112). (Pronotum and scutellum yellowish or reddish-brown between outer keels, blackish at sides. Vertex yellowish or reddish-brown. Fore wings of brachypters extending to about two-thirds length of abdomen, with rounded posterior margin: veins prominent, not distinctly tuberculate or setigerous. Fore wings of macropters semi-transparent with black-brown veins. Abdomen completely blackish posteriorly. Legs clear yellow-brown. Overall length: brachypters, 1.5-2.0 mm.; macropters, 3.3-4.0 mm.)

(= *thoulessi* (Edwards), = *melanopachys* (Scott)) **venosus** (Germar)

In marshy places, often near base of rushes or in Sphagnum. S. and C. England, as far N. as Staffs. and Salop. Scotland: Dumfries. iii-v, vii-xi. N. and C. Europe, Transcaucasia.

- First antennal segment much longer than thick at apex. Lower margin of frons narrowly pale. In brachypters, fore wings with markings, sometimes not very distinct. In male, appendages of anal tube longer than broad (figs. 105, 114)..... 3

- 3 Frons uniformly brown except for pale lower margin. Veins of fore wings with regular series of tubercles bearing semi-erect hairs. Fore wings of brachypters yellowish-hyaline with a dark spot at apex of clavus, weakly developed in female, and sometimes a brown stripe along radial vein. In male, parameres short and stout, only slightly incurved at apex (fig. 105). (Brachypters yellow-brown, broadly dark at sides of pronotum, scutellum and abdomen. Fore wings of brachypters extending to about two-thirds of length of abdomen, with rounded posterior margin. Macropters more or less unicolorous brown with fore wings semi-transparent, uniformly light brown with rather darker veins; inner margin usually narrowly dark medially. Overall length: brachypters, 2.0-2.5 mm.; macropters, 2.8-3.4 mm.) (= *pilosus* (Haupt), = *paludicola* (Lindberg))

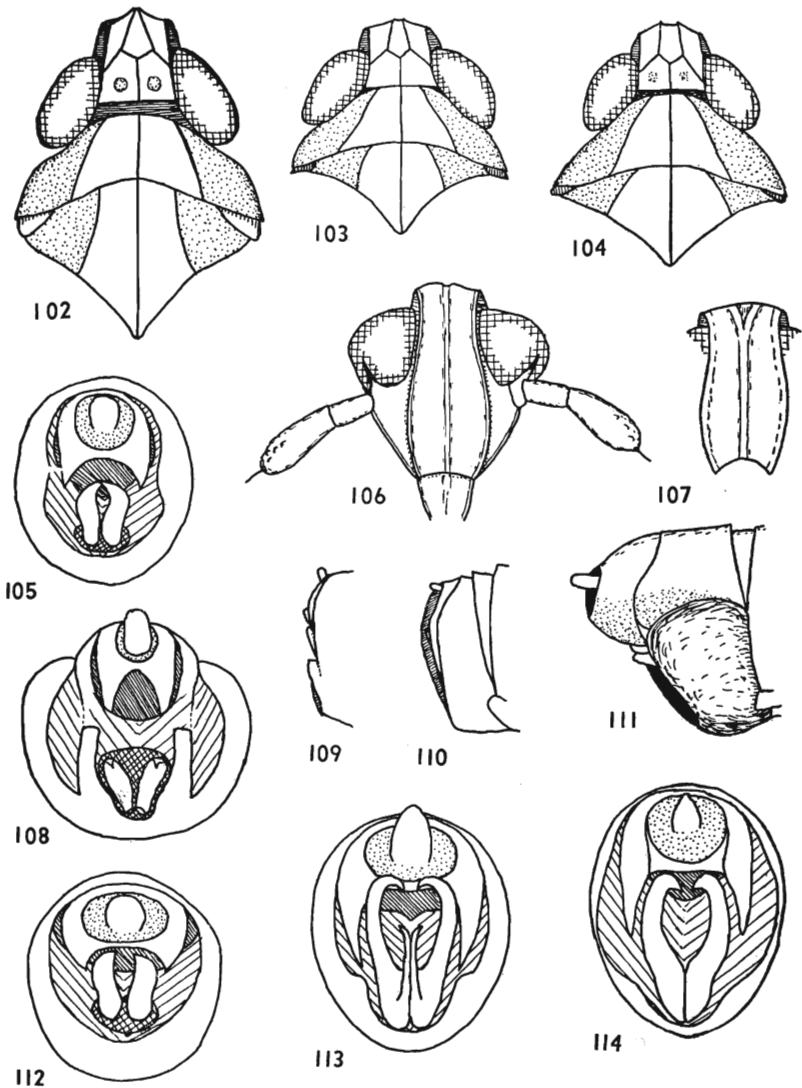
(see China, 1938; Le Quesne, 1960) **capnodes** (Scott)

In Sphagnum-bog patches: New Forest, Hants.; Cothill, Berks.; Weston-on-the-Green, Oxon. i-vi, ix-xi. Scandinavia. Germany. Hungary. Poland.

- Frons dark brown, with lighter transverse markings. Veins of fore wings usually with a few scattered setigerous tubercles. Fore wings of brachypters more or less dark brown, with a large obscure, pallid spot in middle of claval area and two distinct whitish spots along posterior margin. In male, parameres long and relatively thin, strongly incurved at apex (fig. 114). (Body colour variable, between light brown and almost black, often darker at sides. Abdomen with three more or less developed paler longitudinal streaks, formed by pale markings along posterior margins of terga. Fore wings of brachypters similar in colour to body or rather darker, rather squarely truncate at apical margin, extending to rather less than one-half of length of abdomen in males, and to about one-quarter of length in females. Macropterous females with scutellum black; fore wings pale with dark patch along inner margin, just anterior to apex of anal vein. Overall length: brachypters, 2.2-3.0 mm.; macropters, 3.9-4.1 mm.)

fleberi (Scott)

In vegetation in marshy places, often near base of rushes. S. England, to Norfolk? Yorks. S. Wales. Ireland. i xi. Germany. Austria. Hungary.



FIGS. 102, 109, 113.—*Megamelodes quadrimaculatus*: (102) head and fore body (109) male genital segment, side view; (113) the same, from behind.

FIGS. 103, 112.—*M. venosus*: (103) head and fore body; (112) male genitalia from behind.

FIGS. 104, 107, 110, 114.—*M. fieberi*: (104) head and fore body; (107) frons; (110) male genitalia in side view; (114) the same, from behind.

FIG. 105. *M. capnodes*: male genitalia from behind.

FIGS. 106, 108, 111. *Megamelus notula*: (106) face; (108) male genitalia from behind; (111) the same, side view.

Genus *Stenocranus* Fieber

The genus has four European species, all of which occur in Britain.

In this genus, the development of the hind wings is rather variable, but they are always longer than the abdomen and the fore wings are longer than the hind wings. The vertex and frons are elongate. The ground colour is yellow-brown, the fore wings usually more or less marked with black-brown. The basal segment of the antennae is about one-third the length of the second. The frons has a single median keel which is entire or only forked at the transition with the vertex. The aedeagus has a loose sheath, which usually separates from it during dissection.

KEY TO SPECIES

- 1 Anterior tibiae distinctly broadened towards apex, with apical two-thirds black in male, pale or with a weak dark streak apically in female (fig. 120). Apical segment of anterior tarsus black at apex for at least half its length. (Vertex pale brown with black streaks between keels anteriorly. Frons with black lines between keels, usually strong throughout in male and weaker in lower part in female. Vertex posteriorly, pronotum and scutellum pale brown with white streak along median keel. In male, fore wings black-brown, with clavus and more or less narrow streak along costa paler. In female, fore wings pale brown except for more or less developed dark streak at apex. In male, outer margin of parameres concave towards apex (fig. 126), aedeagus simply curved throughout (fig. 128). Side of head between eye and margin of frons only slightly wider above eye as at a point just above ocellus. Overall length : 6.0-6.5 mm.)

longipennis (Curtis)

Locally common, marshy places. C. and S. England, as far N. as Staffs. and Yorks. Wales : Merioneth. Ireland : Co. Cork ; Co. Wicklow. iii, vii-x. France. Russia. Algeria.

- Anterior tibiae hardly wider at apex than at base, subcylindrical, pale, sometimes with darker stripe (fig. 121). Apical segment of anterior tarsus more or less black at apex, usually for less than half its length 2
- 2 In lateral view, side of head between eye and margin of frons about twice as wide above eye as at narrowest part just above ocellus (fig. 117). Usually two more or less distinct brownish, never black, lines present on vertex anteriorly and on frons between keels (figs. 115, 116). Membrane between veins of fore wings distinctly and finely transversely wrinkled. (Vertex, pronotum and scutellum yellow-brown with white streak along median keel. Fore wings light brownish, often with dark brown longitudinal streak of varying extent and intensity, remote from costa throughout even in very dark specimens, which have most of inner half of fore wings dark, except narrow band along inner margin. In male, parameres with apices convergent, almost straight (fig. 122). Aedeagus doubly sinuate (fig. 127). Overall length : 4.9-5.8 mm.)

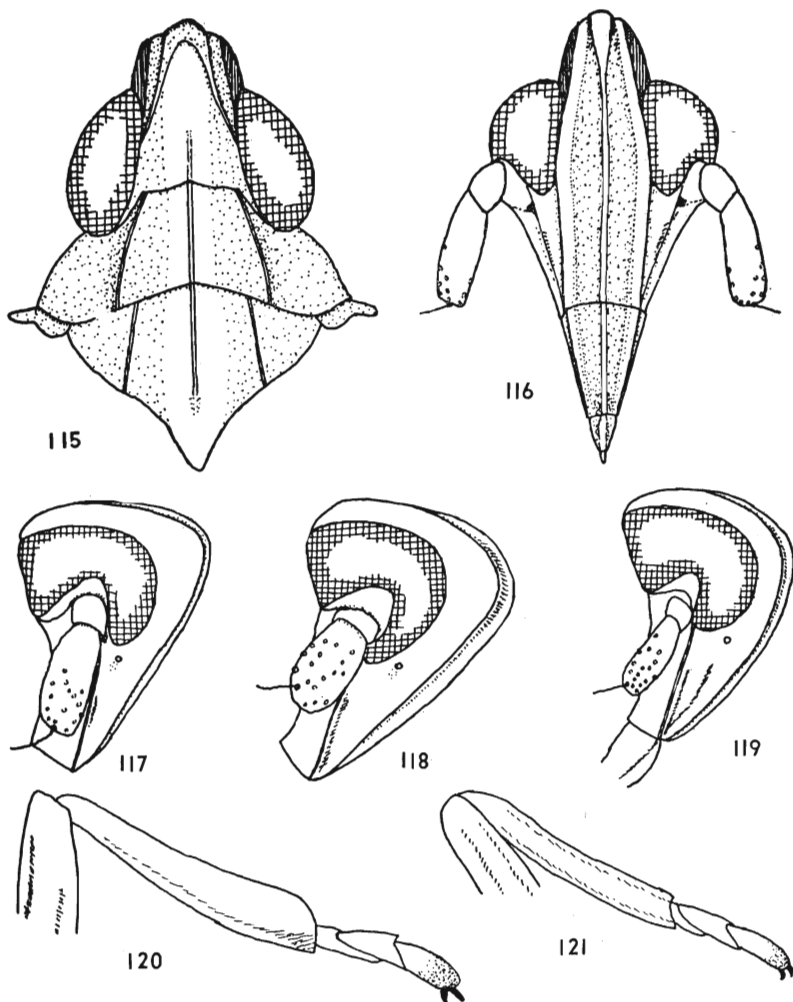
(= *lineola* (Germar) *minutus* (Fabricius)

Common among grasses in woods, meadows, etc. England as far N. as Yorks., Northants. and Glos. S. Ireland, as far N. as Co. Dublin. i-vi, viii-xii. Europe. Siberia. Japan. N. Africa.

- Side of head between eye and margin of frons distinctly less than twice as wide above eye as at narrowest place just above ocellus (figs. 118, 119). Two black lines present on vertex anteriorly and on frons between keels. Membrane between veins of fore wings less distinctly transversely wrinkled. 3
- 3 Side of head between eye and margin of frons one and a half times as wide above eye as at narrowest part just above ocelli ; lower part of gena without distinct black streaks or with a fine one against median keel (fig. 118). In male, outer margins of parameres almost straight towards apex (fig. 124). (Vertex posteriorly, pronotum and scutellum yellow-brown with white streak along median keel. Fore wings light brownish, often with more or less strong, narrow, dark, longitudinal streak. Aedeagus doubly sinuate (as in *minutus*). Overall length : 5.4-6.7 mm.) **major** (Kirschbaum) (*see* Chinn, 1939)

Locally common, marshy places, on *Phalaris arundinacea*. England: Cambs., Northants., Bucks., Herts., Surrey, Berks. Only two specimens taken before 1938, when first recognized in Britain: thus seems to have increased considerably in numbers in more recent years. *ii*, *v*, *vi*, *viii-x*. Germany.

- Side of head between eye and margin of frons about equally wide above eye as at a point just above ocellus; lower part of gena with two strong black streaks forming V, one along median keel and one running towards ocellus (fig. 119).



FIGS. 115-117, 121.—*Stenocranus minutus*: (115) fore body; (116) face; (117) head in side view; (121) anterior tibia and tarsus.

FIG. 118.—*S. major*, head in side view.

FIG. 119.—*S. fuscovittatus*, head in side view.

FIG. 120.—*S. longipennis*, female, anterior tibia and tarsus.

In male, outer margin of parameres distinctly concave towards apex (fig. 125). (Vertex posteriorly, pronotum and scutellum yellow-brown with white streak along median keel. Fore wings light brownish, often with more or less strong, narrow longitudinal streak. Overall length: 4.9-5.8 mm.) . . . *fuscovittatus* (Stål)

Local in grass or Carex; reported from both "breckland" and damp places. England: Norfolk, Cambs., Suffolk, Sussex, (? Dorset). vi, viii, ix. Europe. Siberia.

Genus *Kelisia* Fieber

This genus contains a number of closely allied forms, some of which have been comparatively recently recognized by Ribaut (1934), Haupt (1935) and Wagner (1939, 1952). About twenty species are now described from Europe and the genus also occurs in the other four continents.

K. guttula and *guttulifera* are recent additions to the British list (Le Quesne, 1960). I regard *K. sabulicola* Wagner as an ecological form of *ribauti* until further evidence shows the contrary. We thus have eight clearly defined species in Britain.

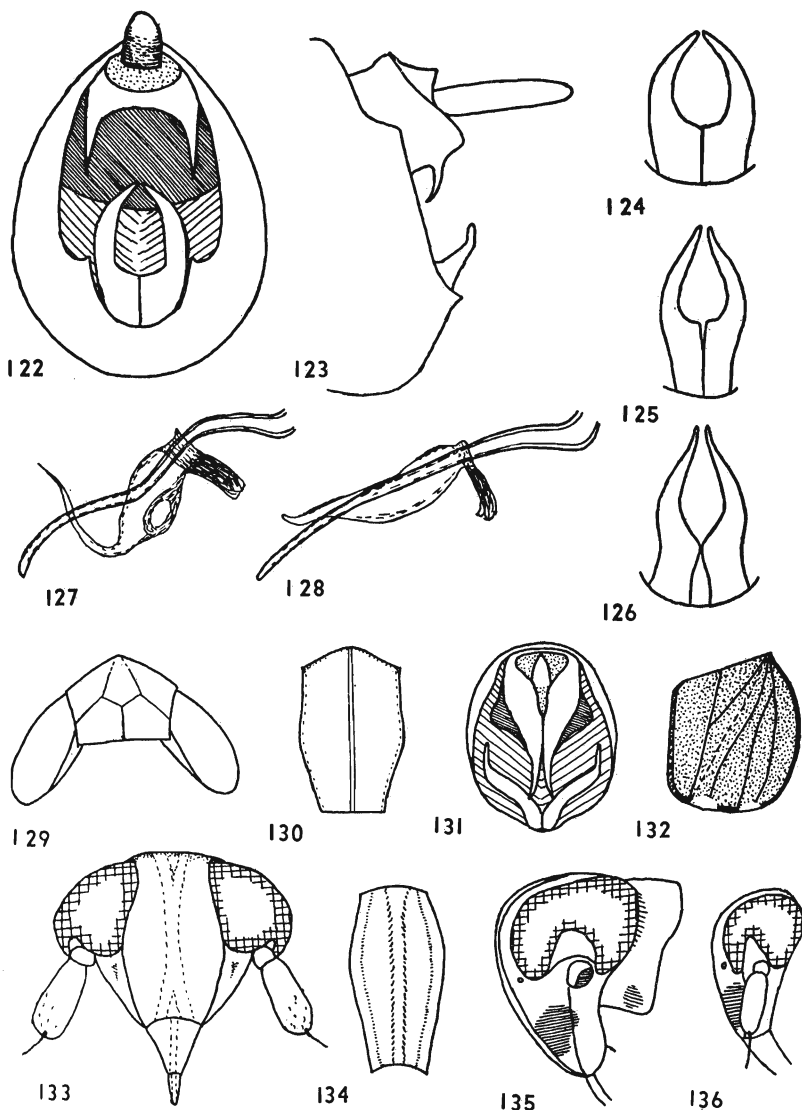
The genus *Kelisia* consists of yellow or yellow-brown species, some of which have the sides of pronotum, scutellum and abdomen blackish. The fore wings are hyaline or nearly so, often with dark markings, not or scarcely shorter than the abdomen in brachypters. The basal segment of the antennae is about one-quarter the length of the second. The vertex is short and rounded anteriorly and the frons not very elongate. The keels of the pronotum reach its posterior margin without curving outwards posteriorly. The male has a rather long anal tube and the aedeagus is thin and elongate, sometimes with laminate appendages or a sheath.

KEY TO SPECIES

- 1 Genae without black spot or with a small one remote from frontal margin (fig. 133). Lobes of pronotum without black spot or with a small rather linear dark mark. (Vertex, pronotum and scutellum pale yellow-brown, not or little darker at sides) 2
- Genae with black spot occupying entire width between frontal margin and median keel of gena, sometimes also extending beyond this keel (figs. 2, 3, 135). Lobes of pronotum with a well-developed black spot (fig. 135) 4
- 2 Frons broader, convex-sided, with median keel less clear-cut and usually partly doubled (fig. 133). Three apical cells of fore wing bordering on apex of radial cell, more or less completely separated by cross-veins; cubital vein not forked; median cell often open at apex (fig. 146). In male, anal tube squarely truncate at apex, short and relatively broad (fig. 142). (Usually small black spot on genae and small, rather linear dark mark on lobes of pronotum. Usually brachypterous, with fore wings slightly longer than abdomen, hind wings not reaching posterior margin of metanotum. Macropters with fore wings about one-third longer than abdomen, usually pale with a small black spot half-way along inner margin. In brachypterous male, fore wings pale, often with small dark brown spot at apex across median vein and another half-way along inner margin. In brachypterous females, fore wings usually partly pale with variable dark brown markings; lightly marked forms with only dark spot at apex of fore wing, sometimes also small dark spot at apex of subcostal cell; darkly marked specimens with a large dark patch at base and another at apex of clavus besides markings mentioned above; rarely whole fore wing suffused dark. Overall length: brachypters, 3.2-4.2 mm.; macropters, 4.8-5.2 mm.)

(= *scotti* (Fieber in Scott)) *fasciata* (Kirschbaum)
Local, at base of sedges. S. and C. England, as far N. as Staffs. and Leics. vii-x. France. Germany. Denmark. Austria. Hungary. Rumania.

- Frons narrower, with sides almost straight above and below widest point, with median keel sharp, simple (fig. 134). Two apical cells or one apical and one subapical cell bordering on apex of radial cell (figs. 143-5). Cubital vein forked;



FIGS. 122-128. Male genitalia of *Stenocranus* spp.: (122) *minutus*, male genitalia from behind; (123) the same, from side; (124) *major*, parameres; (125) *fuscovittatus*, parameres; (126) *longipennis*, parameres; (127) *minutus*, aedeagus; (128) *longipennis*, aedeagus.

FIGS. 129-131. *Delphacinus mesomelas*: (129) head from above; (130) frons; (131) male genitalia from behind.

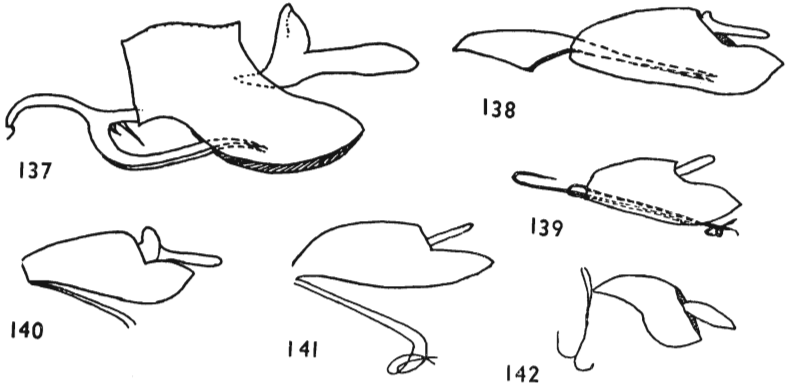
FIG. 132. *Megamelodes fieberii*, fore wing of bruchypter.

FIGS. 133-136. *Kelisia* spp.: (133) *fasciata*, frons; (134) *pallidula*, frons; (135) *vittipennis*, head from side; (136) *perspicillata*, head from side.

median cell almost always closed by cross-vein at apex. Anal tube with apex angularly pointed, more elongate (figs. 140, 141)..... 3

- 3 Overall length: brachypters, 2.5–3.3 mm.; macropters, 3.4–3.7 mm. Black spot on gena almost always absent (except blackish ocelli). Median vein of fore wings often forked before apex of wing, not darkened in brachypters (fig. 144). Apex of anal tube more acuminate; appendages straight at base and looped round at apex (fig. 141). (Fore wings of brachypters entirely pale, as long as or slightly longer than abdomen; hind wings reaching second abdominal segment. Macropters rare: scutellum darker beyond outer keels; fore wings pale with median and sometimes cubital vein dark brownish.) *pallidula* (Boheman)

At base of sedges, marshy places, local. England: Norfolk, Cambs., Herefords., Surrey, Kent, Hants. viii–ix. N. and C. Europe to Turkestan.



Figs. 137–142.—Anal tubes of male *Kelisia* spp.: (137) *ribauti*; (138) *vittipennis*; (139) *guttulifera*; (140) *punctulum*; (141) *pallidula*; (142) *fasciata*.

- Overall length: brachypters, 3.6–4.3 mm.; macropters, 4.6–5.1 mm. Black spot on gena often present, occupying about half width between frontal margin and median keel of gena. Median vein of fore wing usually darkened, particularly towards apex, usually reaching apex of fore wing without forking (figs. 143, 145). Apex of anal tube broader and with margins more strongly curved; appendages of anal tube smoothly and gently curved throughout (fig. 140). (Scutellum somewhat darker beyond outer keels. Brachypters with fore wings distinctly longer than abdomen, rather acuminate at apex and with hind wings reaching third abdominal segment. Macropters with fore wings broader towards apex and hind wings nearly as long as fore wings. Fore wings pale throughout except for darker median vein and occasionally cubital and anal veins)

punctulum (Kirschbaum)

Widely distributed on sedges in damp places. England, S. of line from Wash to Bristol Channel; Yorks. Ireland. vii–x. France. Germany. Czechoslovakia. Russia.

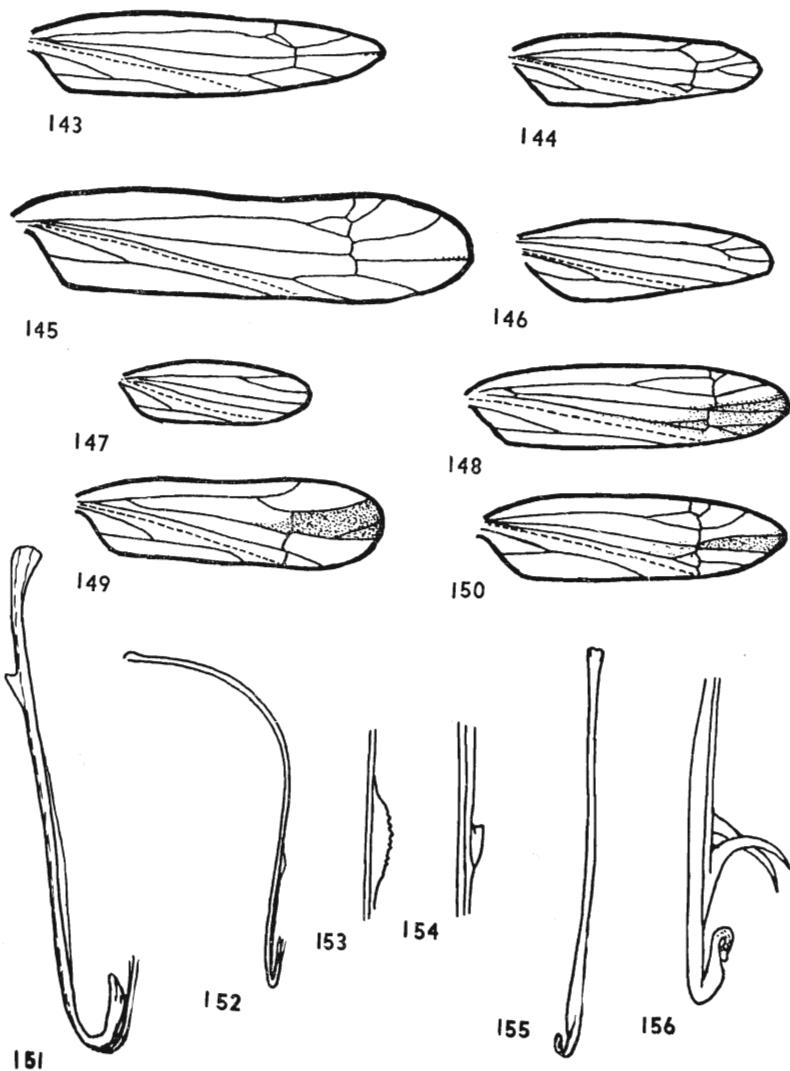
- 4 Anterior and median tibiae each with two longitudinal black streaks, one along exterior margin and one along interior margin. (Black spot of gena not extending beyond median keel. Vertex yellowish, at sides dark apically. Pronotum and scutellum yellow, black-brown at sides. Fore wings with more or less developed dark brown longitudinal streak, strongest at apex (fig. 148). Anterior and median femora with two longitudinal black lines. Anal tube as in figure 137. Aedeagus almost straight except for recurved apex (fig. 151)

British specimens divisible into two forms (cf. Le Quesne, 1960): -

(1) Always macropterous. Male: overall length, 3.1–4.0 mm.; length of nedeagus, 0.57–0.68 mm.; ratio, 4.8–6.2. Female: overall length, 3.5–4.3 mm.

ribauti Wagner form *sabulicola* Wagner

On coastal sandhills, also Suffolk "breckland". England. Scotland. Wales. Ireland. vii–x. Germany. Sweden.



FIGS. 143-150.—Fore wings of *Kelisia* spp.: (143) *punctulum*, brachypter; (144) *pallidula*, brachypter; (145) *punctulum*, macropter; (146) *fasciata*, brachypter; (147) *perspicillata*, brachypter; (148) *ribauti*, macropter; (149) *perspicillata*, macropter; (150) *vittipennis*, brachypter.

FIGS. 151-156.—Aedeagi of *Kelisia* spp.: (151) *ribauti*; (152) *vittipennis*; (153) the same, median portion enlarged; (154) *guttula*, median portion enlarged; (155) *guttulifera*; (156) *perspicillata*.

(2) Often brachypterous, with fore wings narrowed apically. Macropterous male: overall length, 3.6–3.8 mm.; length of aedeagus, 0.68–0.70 mm.; ratio, 5.3–5.4. Brachypterous male: overall length 2.6–3.1 mm.; length of aedeagus, 0.58–0.71 mm.; ratio, 3.7–4.9. Macropterous female: overall length 3.6–3.9 mm. Brachypterous female: overall length 2.9–3.6 mm. *ribauti* Wagner

In coastal marshes and saltings, peaty marshes. England: Dorset, Hants. Scotland: East Lothian; Kincardine; Clyde Islands; Inverness. vii–x. France. Germany. Alps. Sweden.

- Anterior and median tibiae without distinct longitudinal black streaks. 5
- 5 Black spot of genae reaching posterior keel (fig. 3). In male, aedeagus elongate, curved widely at base (as in fig. 152), with laminate projection about halfway along stem forming approximately a right angle anteriorly, but without teeth or large appendages (fig. 154). (Transition between vertex and frons not smoothly rounded, somewhat angular. Pronotum yellowish, sometimes dark beneath eyes, but pale posteriorly. Scutellum yellow, black on either side of outer keels. Fore wings with median apical cell blackish, with dark colour sometimes spreading somewhat into adjacent cells, otherwise hyaline or almost so (fig. 4). Metathoracic epimera and mesosternum blackish. Overall length: 2.8–3.8 mm.) (= *pascuorum* Ribaut) **guttula** (Germar)
Widely distributed; on sedges on dry chalk hillsides or in marshy places. England. Wales. Scotland. Ireland. ? iii, vii–x. W. Europe, probably also E. Europe. N. Africa.
- Black spot of genae not extending more than half the distance between median and posterior keels, usually not beyond median keel (figs. 135, 136). In male, aedeagus either not curved widely at base (figs. 155, 156) or with carina expanded and armed with several minute teeth about halfway along stem (figs. 152, 153)². 6
- 6 Transition between frons and vertex more smoothly rounded (fig. 136). Median keel of frons obsolescent above. Brachypters with cross-veins apically closing cells of fore wings indistinct (fig. 147) and with hind wings not reaching beyond metanotum. Macropters with four apical cells, that formed by fork of radial vein fused with apical external cell (fig. 149). In male, aedeagus with broad, hook-like appendages about halfway along stem (fig. 156). (Vertex, pronotum and scutellum yellowish above without dark markings. Usually brachypterous, with fore wings without dark markings, about as long as abdomen. Fore wings of macropters with brownish veins and black streak at apex. Overall length: brachypters, 1.3–2.2 mm.; macropters, 3.1–3.3 mm.) **perspicillata** (Boheman)
Local; on dry hillsides and heathy places, possibly also damp places. England. Scotland. vii–ix. Europe. Siberia.
- Transition between frons and vertex somewhat angular (fig. 135). Median keel of frons sharp throughout. Venation of fore wings of brachypters distinct throughout; hind wings extending beyond metanotum by at least half their length. Fore wings of macropters and brachypters with at least five apical cells, that formed by fork of radial vein separated from external apical cell by transverse vein (fig. 150) 7
- 7 Mesothoracic epimera and mesosternum widely dark brown. A black band present at sides of scutellum and often behind eye on sides of pronotum. Overall length: brachypters, 2.9–3.9 mm.; macropters, 3.6–4.2 mm. In male, aedeagus elongate, curved widely at base, with carina about halfway along on stem expanded and armed with several minute teeth (figs. 152, 153). (See footnote (2).) Appendages of anal tube stout and straight (fig. 138). (Pronotum and scutellum yellowish medially. Fore wings with third apical cell blackish, dark colour sometimes spreading somewhat to adjacent cells, otherwise hyaline or faintly cloudy; surface of cells hardly rugose. Brachypters with hind wings reaching or almost reaching apex of abdomen) **vittipennis** (Sahlberg)
Widely distributed; on sedges on dry hillsides or in peat-bogs. England. Scotland. Doubtfully recorded from Wales. Ireland. viii–x. France. Germany. Czechoslovakia. Scandinavia. Probably most of Europe. N. Africa.
- Sides and underneath of thorax entirely pale or mesosternum narrowly dark in centre. Black band not present on pronotum behind eye; scutellum very little darker at sides in brachypters, moderately dark brown in macropters. Overall length: brachypters 2.8–3.3 mm.; macropters, 3.1–3.5 mm. In male, aedeagus

² This carina is sometimes bent back over stem or over itself in making a preparation.

almost straight, not armed with teeth or sudden dilatation of carina on stem (fig. 155): appendages of anal tube thin and looped apically (fig. 139). (Third apical cell of fore wings dark at apex, fore wings otherwise rather cloudy hyaline, with surface of cells rather rugose. In brachypters, hind wings extending to about two-thirds of length of abdomen)

(= *fallax* Ribaut) *guttulifera* (Kirschbaum)

At base of sedges on lightly wooded dry hillside. England: Norfolk, Bucks., Herts., Surrey, Dorset. Wales: Merioneth. iii, viii, ix. France. Germany.

Genus *Delphacinus* Fieber

This genus contains one species from Britain and Europe; a second species is described from Turkestan.

In brachypters, head, pronotum, scutellum and fore wings yellowish-white. In macropters, fore body somewhat darker yellowish, scutellum sometimes with brownish longitudinal stripes; fore wings hyaline, rather rugose, with brownish veins. In male, abdomen largely black, with pale tergum immediately before genital segment; genitalia from behind as in fig. 131. In female, abdomen yellow-brown. Overall length: brachypterous ♂, 2.1–2.3 mm.; macropterous ♂, 3.2–3.8 mm.; brachypterous ♀, 2.7–2.9 mm.; macropterous ♀, 3.7–4.0 mm.

mesomelas (Boheman)

On grasses, dry heaths and edges of woodland; local. England. Scotland. Ireland. vi–viii. All Europe.

Genus *Chloriona* Fieber

We have in Britain five out of the eight or nine European species now described. Ossiannilsson (1946a) has identified *C. smaragdula* with *prasinula* (*sensu* Jensen-Haarup, 1920); *C. prasinula sensu* Edwards, 1898, was renamed *edwardsi* Le Quesne, 1960, but has now been identified with *unicolor* Herrich-Schaeffer, 1835 (Le Quesne, *in press.*)

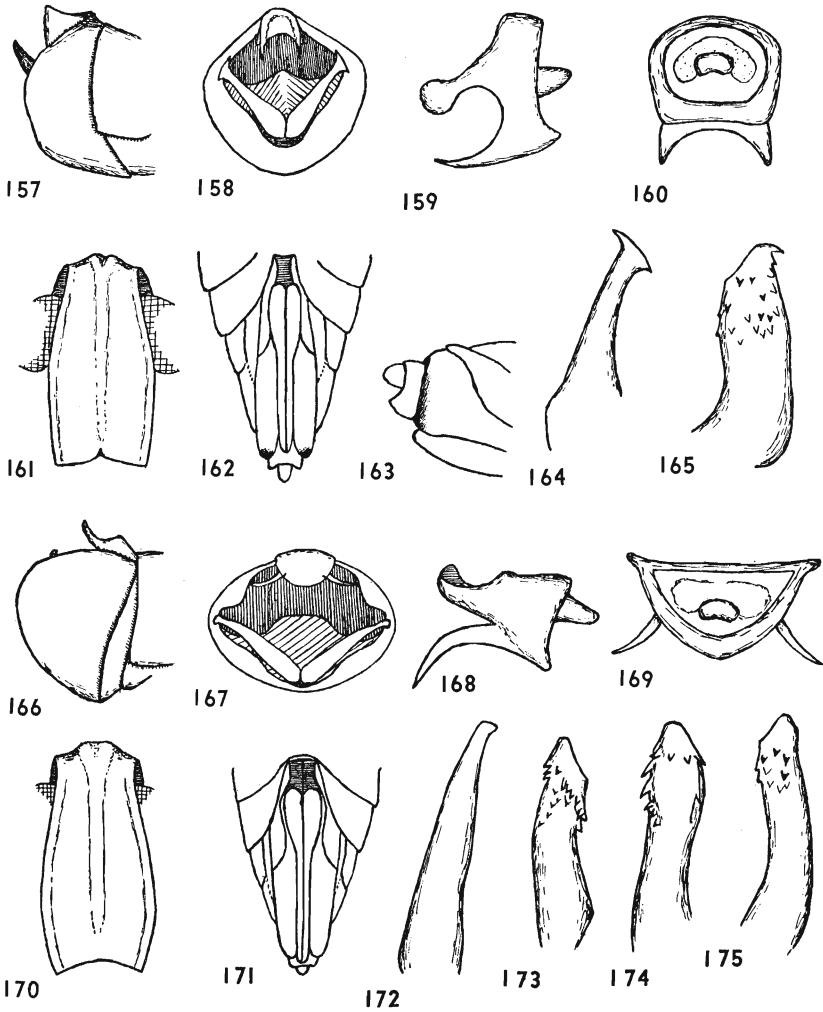
The males and brachypterous females are very different in general appearance and, as the main characters used in the identification of this group are in the external genitalia, the sexes are keyed separately below. The species of this genus occur on *Phragmites*, often in large colonies, and the colony often consists of a single species.

The genus is characterized by uniformly coloured fore wings, with a row of short black bristles along the veins and the absence of dark markings on the body (except a subtriangular patch on each side of the scutellum in male *dorsata* and a narrow dark ring at the apex of the ninth abdominal segment in some females). In brachypterous females the fore wings extend to less than one-quarter of the length of the abdomen. The frons has a well-defined median keel which forks at the transition with the vertex. The first and second antennal segments have short black bristles, the first segment being slightly more than half the length of the second.

KEY TO SPECIES

(Males)

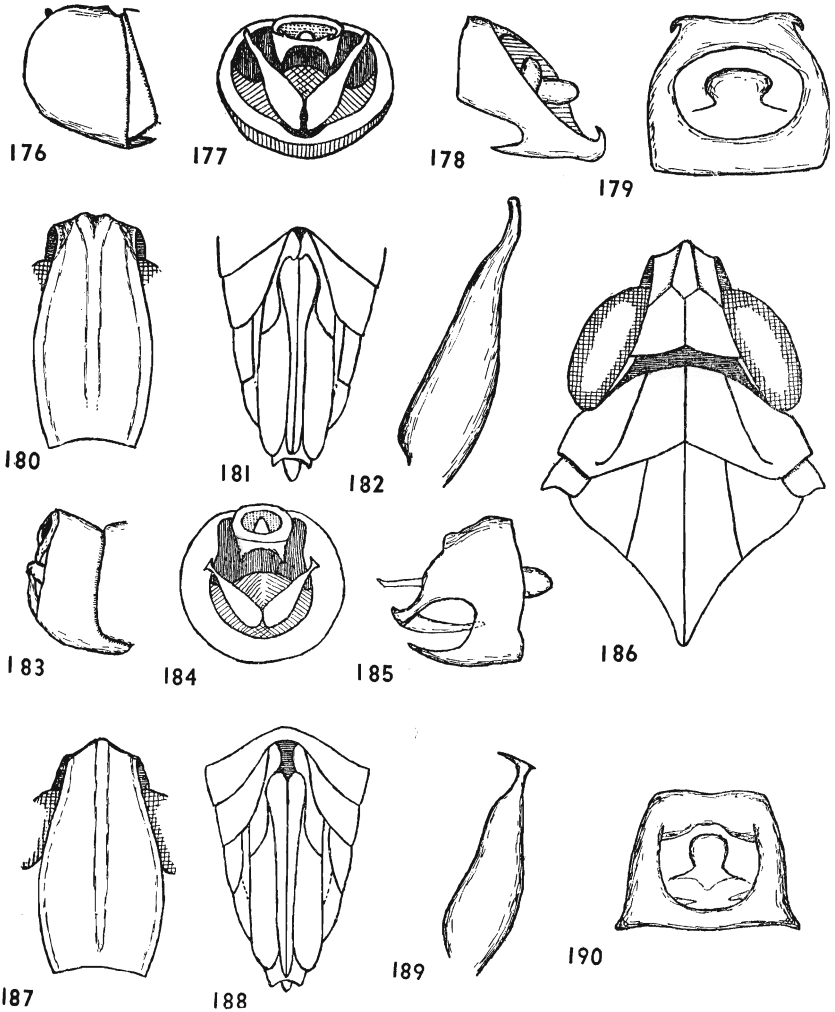
- 1 Paramere considerably broadened and truncate at apex, forming acute angle at either side (figs. 164, 189). Genital segment seen from behind about as high as broad (figs. 158, 184).....2
- Paramere not or slightly broadened at apex, only forming acute angle outwardly (fig. 196) or not forming acute angle at either side (figs. 172, 182). Genital segment seen from behind distinctly broader than high (figs. 167, 177, 192)....3



FIGS. 157-165.—*Chloriona dorsata* : (157) male genitalia from side; (158) the same, from behind; (159) male, anal tube from side; (160) the same, from behind; (161) frons; (162) end of female abdomen from beneath; (163) the same, from side; (164) paramere; (165) aedeagus.

FIGS. 166-173.—*Chloriona unicolor* : (166) male genitalia from side; (167) the same, from behind; (168) male, anal tube from side; (169) the same, from behind; (170) frons; (171) female, end of abdomen from beneath; (172) paramere; (173) aedeagus.

FIGS. 174, 175.—Aedeagi of *Chloriona* spp. : (174) *glaucescens* ; (175) *smaragdula*.



FIGS. 176-182.—*Chloriona glaucescens* : (176) male genitalia from side ; (177) the same, from behind ; (178) male, anal tube from side ; (179) the same, from behind ; (180) frons ; (181) female, end of abdomen from beneath ; (182) paramere.

FIGS. 183-190.—*C. smaragdula* : (183) male genitalia from side ; (184) the same, from behind ; (185) male, anal tube from side ; (186) fore body ; (187) frons ; (188) female, end of abdomen from beneath ; (189) paramere ; (190) male, anal tube from behind.

- 2 Paramere gradually narrowed towards apex, at apex about two and a half times as broad as at narrowest part (fig. 164). Genital segment largely pale, seen from side with rounded apical margin making obtuse angle with upper margin (fig. 157). Scutellum beyond outer keels with more or less developed blackish patch on each side. (Anal tube as in figs. 159, 160. Aedeagus as in fig. 165). Overall length : 3.9-4.3 mm.) **dorsata** Edwards
On Phragmites (reeds). England : Epping Forest, Essex ; Lyvington, Hants. v-vii. France. Denmark. S. E. Alps.
- Paramere more swollen in middle, sharply narrowing to thin "neck" about one-fifth of breadth of apex (fig. 189). Genital segment dark throughout, seen from side with straight apical margin making slightly acute or right angle with upper margin (fig. 183). Scutellum pale throughout. (Anal tube as in figs. 185, 190. Aedeagus as in fig. 175. Overall length : 4.7-5.1 mm.)
 (= *prasinula* Fieber) **smaragdula** (Stål)
Locally abundant on Phragmites (reeds). England : Norfolk, Glos., Berks. vi, vii. Almost all Europe. N. Africa.
- 3 Apex of paramere angled outwardly and downwards (fig. 195). Anal tube apically bearing narrow projection acutely angled at either extremity (figs. 193, 194). (Genital segment pale throughout, structure as in figs. 191, 192 ; aedeagus as in fig. 196. Overall length : 4.3 mm.) . . . (see Le Quesne, 1960) **vasconica** Ribaut
One specimen, Thornham, Norfolk, 7.vi.1956. France. Sweden.
- Apex of paramere not acutely angled³ (figs. 172, 182). Anal tube broad at apex, without teeth on apical margin or with small recurved tooth (figs. 169, 179) . . . 4
- 4 Anal tube seen from above with two short spines on apical margin directed forwards (fig. 179) : spines of lower margin fairly short, straight (fig. 178). Parameres stouter at base, more erect, almost reaching upper margin of segment (fig. 177). Genital segment largely pale. (Aedeagus as in fig. 174. Overall length : 3.5-4.9 mm.) (= *unicolor* auctt. nec Herrich-Schaeffer) **glaucescens** Fieber
Locally common on Phragmites (reeds). England, S. of line from Wash to Bristol Channel. Scotland : Edinburgh, Midlothian ; Aviemore, Inverness. v-ix. N. and C. Europe.
- Anal tube without spines on apical margin, but with long recurved spines beneath clearly visible from behind (figs. 168, 169). Parameres more slender at base, less upright, only reaching to about half height of segment (fig. 167). Genital segment dark throughout. (Aedeagus as in fig. 173. Overall length : 3.6-5.0 mm.) (= *edwardsi* Le Quesne, = *prasinula* Edwards nec Fieber)
unicolor Herrich-Schaeffer⁴
Locally common on Phragmites (reeds). England, S. of line from Wash to Bristol Channel. Ireland : Co. Galway (teste Halbert). v-viii. S. Germany. N. Italy. Spain.

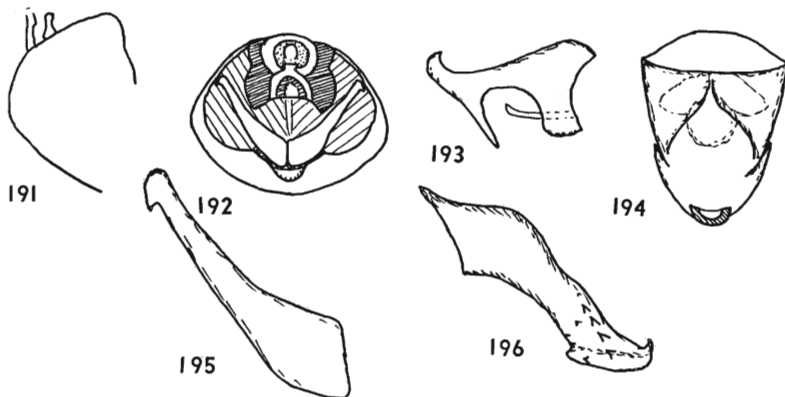
(Females)

- 1 Basal part of first gonocoxa with a blunt angular projection directed backwards (fig. 181). (Ninth abdominal segment not usually darkened apically. Frons smoothly convex-sided, widest just below middle ; lower margin almost straight or somewhat concave (fig. 180). Overall length : brachypters, 3.7-5.0 mm. ; macropters, 5.1-5.6 mm.) **glaucescens** Fieber
- Basal part of first gonocoxa with rounded margins, without projection directed backwards (figs. 162, 171, 188) 2
- 2 Frons widest considerably below eyes, rather sharply narrowing between eyes (fig. 187). Overall length : brachypters, 4.2-5.1 mm. ; macropters, 5.0-5.5 mm. (Ninth abdominal segment often darkened apically. Base of first gonocoxa distinctly broadened into rounded lobe) **smaragdula** (Stål)
- Frons widest near lower margin of eyes or below eyes, not so sharply narrowing between eyes ; sides often more smoothly rounded (figs. 161, 170). Overall length of brachypters usually less than 4.2 mm. 3
- 3 Ninth abdominal segment darkened apically. Frons often with indentation in middle of lower margin (fig. 161). (Base of first gonocoxa hardly broadened at

³ Seen from behind ; *unicolor* has apex of paramere angled outwardly, and downwards when seen from beneath.

⁴ The reasons for this last minute nomenclatorial change will be published elsewhere.

- base, not forming distinct rounded lobe. Overall length : brachypters, 3.3-4.0 mm. ; macropters, 4.9-5.3 mm.).....**dorsata** Edwards
- Ninth abdominal segment not darkened apically. Frons without indentation in middle of lower margin (fig. 170).....4
- 4 First gonocoxa distinctly broadened at base into rounded lobe. (Overall length of brachypters about 4-5 mm.).....**vasconica** Ribaut
- First gonocoxa little broadened at base, not forming distinct rounded lobe (fig. 171). (Overall length : brachypters, 3.1-4.1 mm. ; macropters, 4.9-5.5 mm.)
unicolor Herrich-Schaeffer.



FIGS. 191-196.—*Chloriona vasconica* : (191) male genitalia from side ; (192) the same, from behind ; (193) male, anal tube from side ; (194) the same, from beneath ; (195) paramere ; (196) aedeagus.

Genus **Euidella** Puton

This genus has only one British species, but three more are described from Europe.

Frons brownish with a few small pale spots, about twice as long as broad, with single well-defined central keel, forking just below vertex (fig. 205). Vertex as long as broad or very slightly longer, very slightly broader posteriorly than at apex, with well-defined keels (fig. 207). Pronotum and scutellum brown, with broad central white streak, often not very well defined in female. Fore wings with small tubercles on veins ; in brachypterous females, extending to about half length of abdomen, obtusely rounded at apex, without dark markings ; in macropterous males, markings blackish ; in macropterous females, markings similar but lighter or more diffuse (fig. 208). In male, parameres very broad and truncate at apex ; anal tube with long thin spiniform projections, directed downwards and somewhat outwards towards apex (fig. 206). Basal segment of posterior tarsus considerably longer than other two joints together, distinctly more than half of length of tibiae. Overall length : ♂ and brachypterous ♀, 4.5-5.0 mm. ; macropterous ♀, 6.5-6.8 mm.....**speciosa** (Boheman)

At base of Phragmites (reeds). England, S. of line from Wash to Bristol Channel. v-viii. N. and C. Europe to Turkestan.

Genus **Eurysa** Fieber

Three out of the eight recognized European species occur in Britain : the British species have been discussed by China (1939). They may be confused with some species of *Criomorpus* as the keels of the frons are often largely

obsolescent ; also on general facies males of *E. lurida* somewhat resemble *C. pteridis* and *E. lineata* may be confused with *C. nigrolineatus*. However, in *Eurysa* there is a single keel in the lower part of the frons, more or less clearly discernible, forking towards the vertex.

The genus *Eurysa* has also the basal segment of the antennae much shorter than the second. The veins of the fore wing are without large dark granules.

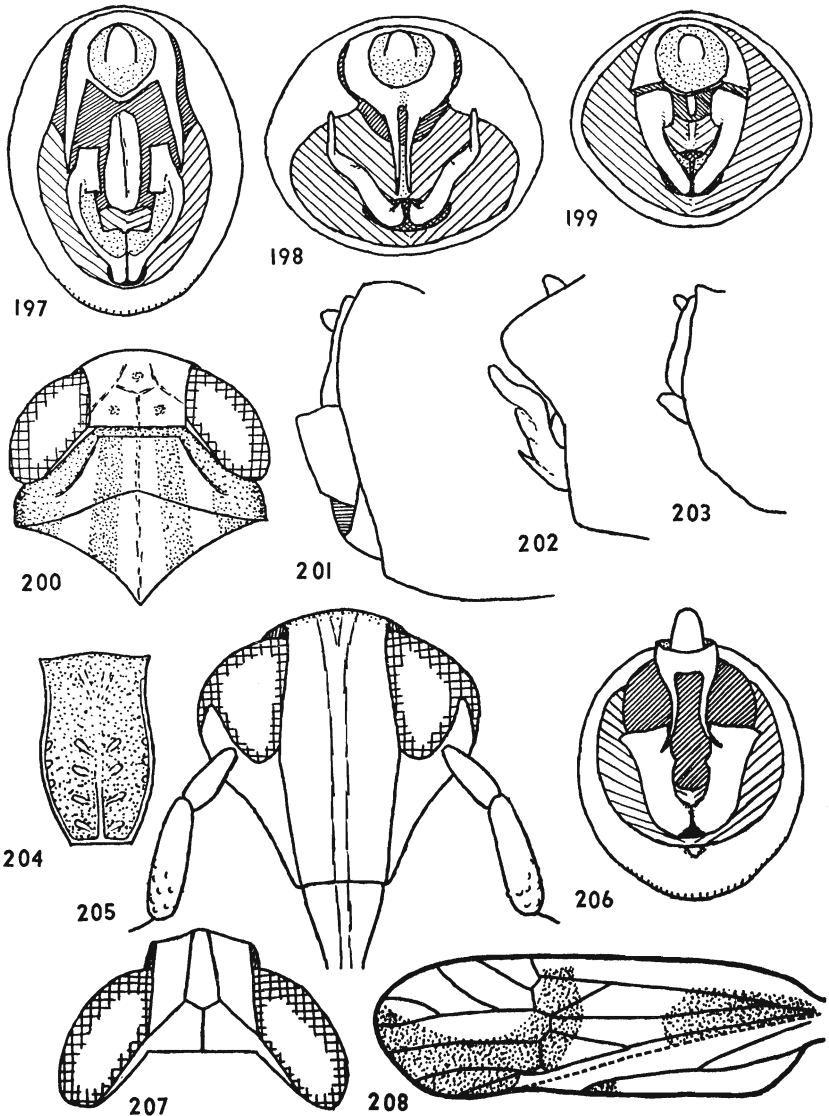
KEY TO SPECIES

- 1 Frons uniformly light brown, with central keel obsolescent, forking on to vertex. Scutellum, fore wings and abdomen entirely black in brachypterous male. (Pronotum entirely black or brown medially in male, entirely brown in female. Scutellum, fore wings and abdomen uniformly brown in brachypterous female. Usually brachypterous, with fore wings about one and one-third times as long as broad. In male, anal tube with long parallel appendages beneath, almost touching ; genital segment as in figs. 198, 202. Overall length : brachypterous ♂, 2.2-2.5 mm. ; brachypterous ♀, 3.0 mm.) *lurida* Fieber
In fens, on Calamagrostis epigeios Roth. England : Wicken Fen, Cambs. ; Holme Fen, Hunts. ; Charing, Kent (?) . vi, viii. Most of Europe, N. Africa.
- Frons, at least in lower half, brown or black with paler spots, with central keel distinct in lower part, obsolete at transition with vertex (fig. 204). Scutellum, fore wings and abdomen not entirely black. 2
- 2 In brachypterous male, scutellum and pronotum yellow-brown or brown between outer keels, dark brown beyond them ; in brachypterous female, scutellum and pronotum more uniformly brownish. In macropters, pronotum blackish-brown, scutellum black with keels paler. Fore wings of brachypters uniformly dark brown in male, uniformly pale yellow-brown in female : posterior margin truncate, with rounded angles ; fore wings about 1.4 times as long as broad. In male, apex of parameres expanded into rather squarish plate with rounded angles along inner margin ; anal tube without distinct spines beneath (figs. 199, 203). (Macropters with fore wings slightly fuscous, with dark cloud on inner angle in female, with dark cloud on third and fourth apical areas and reaching almost to base of wing in male. Overall length : brachypterous ♂, 1.9-2.1 mm. ; brachypterous ♀, 2.4-2.8 mm. ; macropters, 3.5 mm.) *douglasi* (Scott)
At roots of rushes or on dry hillsides. England : Wye and Folkestone Warren, Kent. viii, ix. Only otherwise recorded from Siberia !
- In brachypters, scutellum pale with outer angles and streak on each side of median keel darker brown or blackish ; pronotum similarly coloured, median streaks sometimes missing (fig. 200). Rarely macropterous, when pronotum pale, more or less marked with dark brown between keels, and scutellum black, generally with light brown streak along median keel. In brachypters, fore wings yellowish hyaline, without distinct markings ; posterior margin widely rounded ; fore wings usually more than one and a half times as long as broad. In male, apex of paramere forming oblong plate, with sharp angles along inner margin (fig. 197). Anal tube with rather long spines beneath, well separated, divergent. (Fore wings of macropters hyaline, more or less widely brownish at apex of inner margin ; veins brownish. Overall length : brachypterous ♂, 2.4-2.6 mm. ; brachypterous ♀, 2.7-3.4 mm. ; macropterous ♂, 3.6-4.0 mm. ; macropterous ♀, 3.9-4.4 mm.)
lineata (Perris)
In grasses in dry places. England, S. of line from Wash to Bristol Channel ; Yorks. Ireland : Co. Dublin. v-viii. Almost all Europe, except extreme N.

Genus *Conomelus* Fieber

There is one British species : a second European species has fairly recently been described from Italy.

A fairly good magnification is needed to see the generic character of the so-called " keel " at the base of the second antennal segment : the inner margin is distinctly convex and a weak depression is discernible (fig. 212).



FIGS. 197, 200, 201, 204.—*Eurysa lineata*: (197) male genitalia from behind; (200) fore body of brachypter; (201) male genitalia from side; (204) frons.
 FIGS. 198, 202.—*E. lurida*: (198) male genitalia from behind; (202) the same, from side.
 FIGS. 199, 203.—*E. douglasi*: (199) male genitalia from behind; (203) the same, from side.
 FIGS. 205-208.—*Euidella speciosa*: (205) face; (206) male genitalia from behind; (207) head from above; (208) male, fore wing.

Frons and genae light brownish, becoming dark brown below ; clypeus dark brown. Frons widest just above middle, where almost twice as wide as at lower margin (fig. 209). Vertex and pronotum light yellowish-brown ; scutellum rather darker, especially in macropters. Abdomen black-brown at sides, somewhat lighter medially, with more or less distinct paler markings, with long pale hairs along side margins. In male, genital segment as in figs. 215, 216 ; aedeagus as in fig. 219. Overall length : brachypterous ♂ and ♀, 2.7-3.1 mm. ; macropterous ♀, 3.7-4.5 mm. (= *limbatus* (Fabricius) nec (Olivier)) **anceps** (Germar)

Widespread and common on Juncus (rushes). England. Scotland. Wales. Ireland. vi-x. Europe. N. Africa.

Genus **Euconomelus** Haupt

Only one species has been referred to this genus.

Frons dark brown with light brown spots. Pronotum and scutellum light brown medially, dark beyond outer keels. Abdomen dark brown with pale central lines and series of spots laterally. In male, genital segment in lateral view with lower margin produced, pale-edged (fig. 218) ; seen from behind as in fig. 217. Aedeagus as in fig. 220. Anterior and median tibiae sharply ringed dark and whitish. Overall length : brachypters, 1.8-2.8 mm. ; macropters, 3.3-3.6 mm.

lepidus (Boheman)

On low species of Juncus (rushes), local. S. and C. England, as far N. as Staffs. and Norfolk. Scotland : Lawers, Perthshire. Ireland. vi-x. Europe to Turkestan.

Genus **Delphacodes** Fieber

(= *Calligypona* Sahlberg, = *Liburnia* auctt. nec Stål,
= *Delphax* auctt. nec Fabricius)

Dr. China referred to this genus as *Calligypona* J. Sahlberg in his check list (1950), but has subsequently shown (1954) that the earlier name of *Delphacodes* Fieber is applicable to this genus. It is a genus of world wide distribution with numerous species, especially in the Palaearctic and Nearctic regions. There are about 80 species in Europe, of which 30 are reliably reported from Britain ; further study will, however, probably increase this number. One non-British species, *D. fumipennis* Fieber, occurs in the Channel Islands.

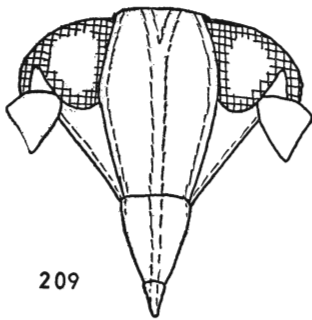
The majority of species exhibit brachypterous and macropterous forms—some species, e.g. *D. adela*, are found in three forms differing in the lengths of the fore and hind wings. In some cases macropters are the common form, while in others they are exceptional. The head (including eyes) is almost or quite as wide as the pronotum and the first antennal segment is about half the length of the second.

Separate keys are given for males and females of this genus ; the latter cannot always be recognized with certainty.

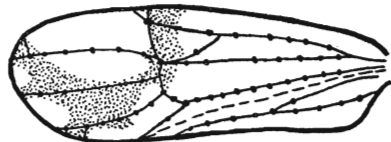
KEY TO SPECIES

(Males)

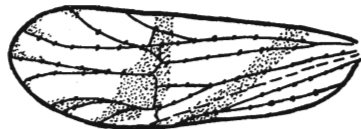
- 1 Frons wholly black, black-brown or chocolate-brown between keels, extending to upper margin (keels pale, at least in lower part) 2
- Frons not entirely black, black-brown or chocolate-brown, partly or wholly pale between keels (in *clypealis*, often more or less completely dark brown except for pale upper margin) 13
- 2 Broad whitish longitudinal streak present along central keel of pronotum and scutellum. (Fore wings of brachypters 1.4-1.5 times as long as broad, brownish, with costa and apical margin whitish. Frons rather narrow, convex-sided (fig. 321).



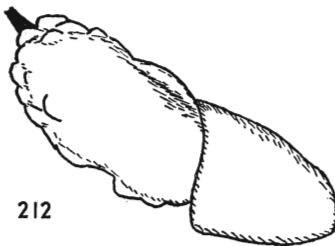
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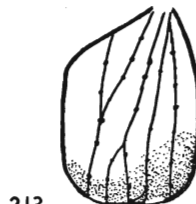
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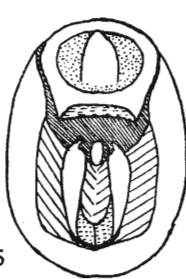
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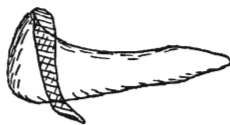
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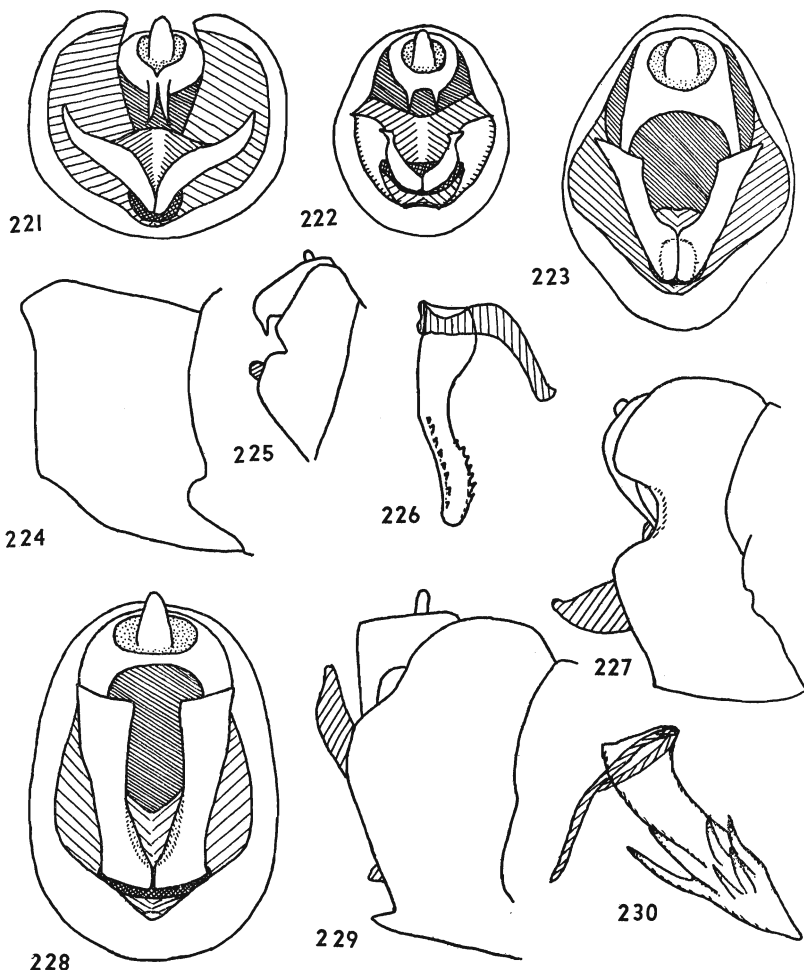
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FIGS. 209, 210, 212, 213, 215, 216, 219.—*Conomelus anceps*: (209) face; (210) fore wing of macropter; (212) first and second antennal segments; (213) fore wing of brachypter; (215) male genitalia from behind; (216) the same, from side; (219) aedeagus.

FIGS. 211, 214, 217, 218, 220.—*Euconomelus lepidus*: (211) fore wing of macropter; (214) the same, of brachypter; (217) male genitalia from behind; (218) the same, from side; (220) aedeagus.

Keels of frons and vertex creamy-white, very prominent. Vertex black between keels anteriorly, yellow-brown posteriorly. Pronotum and scutellum yellow-brown with more or less developed darker markings: outer keels narrowly whitish. Macropters undescribed. Abdomen mainly black with pregenital tergum and median streak pale. Genital segment as in figs. 255, 258. Aedeagus as in fig. 259. Overall length: brachypters, 2.0-2.5 mm.)

(= *albocarinata* auctt. Brit. nec (Stål)—cf. Kontkanen, 1952; Le Quesne, 1960)
distincta (Flor)



FIGS. 221, 224, 226.—*Delphacodes forcipata*: (221) male genitalia from behind; (224) the same, from side; (226) aedeagus.

FIGS. 222, 225.—*D. striatella*: (222) male genitalia from behind; (225) the same, from side.

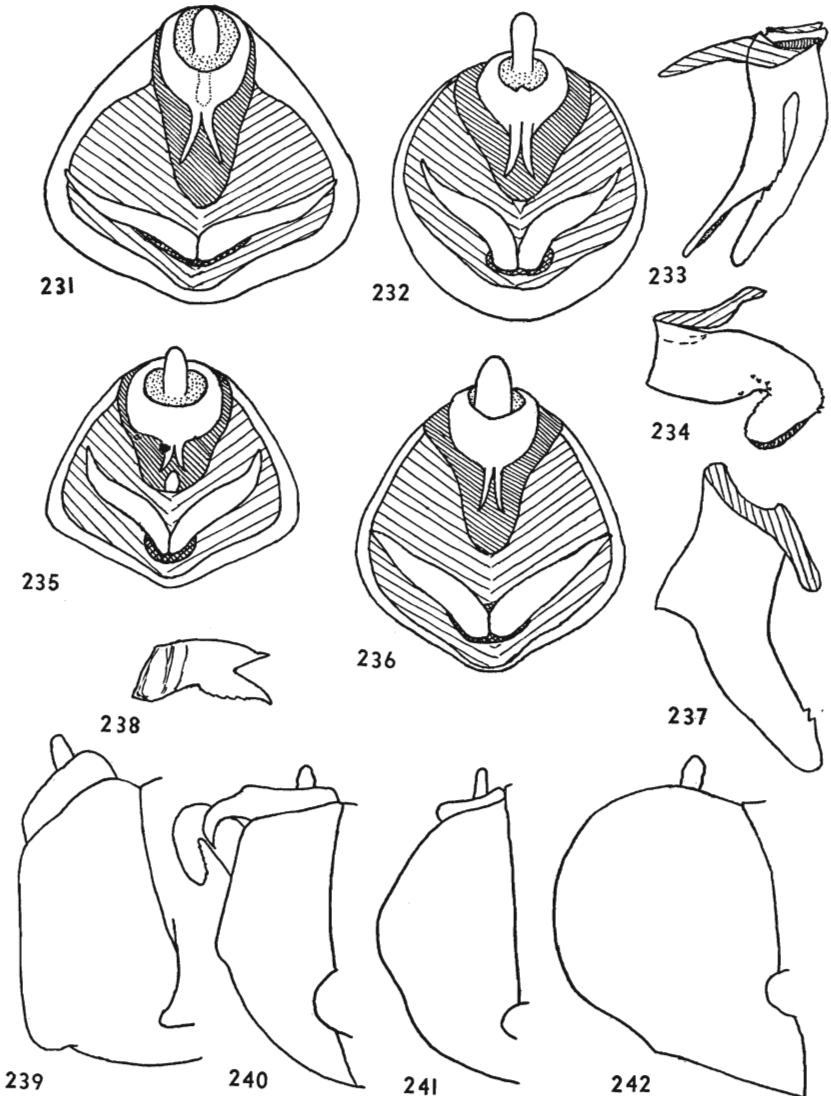
FIGS. 223, 227, 230.—*D. elegantula*: (223) male genitalia from behind; (227) the same, from side; (230) aedeagus.

FIGS. 228, 229.—*D. reyi*: (228) male genitalia from behind; (229) the same, from side.

In Sphagnum-bogs, probably on Eriophorum. England: Cumberland, Cheshire, Monmouth., Surrey, (? Hants.). Scotland: Perth; Inverness; Inner Hebrides; Midlothian. Ireland. v-vii, ix. N. and C. Europe.

- Pronotum and scutellum without pale longitudinal streak along median keel (though keel itself occasionally pale).....3
- 3 Genital segment in side view with broad semicircular deep incision in apical margin (fig. 227). (Frons rather narrow, keels prominent (fig. 322). Vertex black between keels anteriorly, light brownish posteriorly. Pronotum pale yellowish, black anteriorly at sides. Scutellum black, pale at extreme apex. Fore wings of brachypters 1.4-1.5 times as long as broad, pale with a dark spot at apex of inner margin. Macropters rare; fore wings grey-white, veins brownish. Abdomen brownish, broadly black at sides. Genitalia from behind as in fig. 223; aedeagus as in fig. 230. Overall length: brachypters, 2.1-2.2 mm.; macropters, 3.2-3.6 mm.).....**elegantula** (Boheman)
- Common among grasses, usually in rather dry places. England. Scotland. Ireland. iv-ix. All Europe. N. Africa.*
- Genital segment in side view without incision or with small V-shaped incision (fig. 225).....4
- 4 Dark longitudinal mark present at apex of clavus in fore wings (fig. 306). Genital segment in side view with small V-shaped incision (fig. 225). (Frons narrow, almost parallel-sided, 2.2-2.3 times as long as broad (fig. 311). Keels of frons and vertex prominent. Vertex posteriorly light brown. Pronotum pale, dark beyond outer keels except on posterior margin. Scutellum blackish, pale at apex, in macropters. Usually macropterous, with fore wings hyaline, veins brownish. Brachypters with fore wings about twice as long as broad. Abdomen black. Genitalia from behind as in fig. 222. Overall length: macropters, 3.1-3.9 mm.).....(= *marginata* auctt. *nec.* (Fabricius) **striatella** (Fallén)⁵
- Local on grasses, usually in damp places. England, S. of line from Wash to Bristol Channel. v-ix. Whole Palaearctic region. Philippines. Sumatra.*
- No dark mark present at apex of clavus in fore wings (though marginal edge sometimes very narrowly dark) or fore wings largely dark. Genital segment in side view without sharp incision.....5
- 5 Teeth of lower margin of anal tube appreciably remote from each other (figs. 228, 265, 266, 284).....6
- Teeth of lower margin of anal tube set close to each other, almost touching at base, clearly hook-shaped in side view (figs. 232, 240, etc.).....9
- 6 Parameres approximately parallel, broadening towards squarely truncate apex (fig. 228). Genital segment about one and a half times as long as broad (figs. 228, 229). (Teeth of anal tube long. Vertex anteriorly and its junction with frons entirely black, including keels. Frons almost parallel-sided in lower half (fig. 312). Vertex posteriorly light brownish. Pronotum pale yellowish, blackish at sides. Scutellum black-brown. Fore wings of brachypters light brownish-yellow, about one and a half times as long as broad. Macropters undescribed. Abdomen largely pale, with broad black-brown patches at either side. Overall length: brachypters, 2.9-3.2 mm.).....**reyi** (Fieber)
- Local, on Juncus in coastal marshes. England: Weybourne, Norfolk; Seaford, Sussex; Arne, Dorset. viii. Europe to Turkestan.*
- Parameres somewhat divergent, not as markedly broadened towards convex or acuminate apex (figs. 265, 266, 284). Genital segment less than one and a quarter times as long as broad.....7
- 7 Teeth of anal tube acuminate, almost parallel, with distance between them less than half width of anal tube (fig. 265). Usually brachypterous, with fore wings blackish, rather narrowly white along apical margin (See couplet 23)
- albofimbriata** (Signoret *in Fieber*)
- Teeth of anal tube tapering, almost at extremities of lower margin of anal tube (figs. 266, 284). Brachypters with fore wings uniform pale yellow-brown or smoky grey-brown, without paler apical margin.....8
- 8 Parameres with acute angle at apex of outer margin (fig. 266). Frons more convex, black between prominent yellow-brown keels (fig. 325). Fore wings of brachypters yellow-brown, translucent, a little more than one and a half times as long as broad. (Vertex anteriorly and transition with frons more or less dark or black,

⁵ The reasons for this last minute nomenclatorial change will be published elsewhere.



FIGS. 231, 233, 239.—*Delphacodes dubia* : (231) male genitalia from behind ; (233) aedeagus ; (239) male genitalia from side.

FIGS. 232, 234, 240.—*D. pellucida* : (232) male genitalia from behind ; (234) aedeagus ; (240) male genitalia from side.

FIGS. 235, 238, 241.—*D. obscurella* : (235) male genitalia from behind ; (238) aedeagus ; (241) male genitalia from side.

FIGS. 236, 237, 242.—*D. discolor* : (236) male genitalia from behind ; (237) aedeagus ; (242) male genitalia from side.

keels often concolorous in this region. Vertex posteriorly light brown. Pronotum light brown above; scutellum light brown above in brachypters, blackish in macropters. Fore wings of macropters hyaline, almost colourless. Abdomen largely dark. Genitalia as in figs. 266, 269; aedeagus as in fig. 270. Overall length: brachypters, 2.1–2.3 mm.; macropters, 3.5–4.1 mm.). *litoralis* (Reuter) (see Linnavuori, 1951a; Le Quesne, 1960)

On sedges round a small loch in a deep hollow on the moors. Scotland: Aviemore, Inverness. vi, vii. Finland.

- Parameres with blunt, obtuse angle at apex of outer margin (fig. 284). Frons straighter-sided, dirty grey-brown between more or less distinctly paler keels (fig. 309). Fore wings of brachypters smoky grey-brown, rather more than twice as long as broad. **adela** (Flor)
(See couplet 31)
- 9 Genital segment seen from above with a suboval opening around anal tube, narrowing behind to form acute angle with nearly straight hind margin (fig. 286). (Frons, pronotum and scutellum black-brown; frons as in fig. 315. Fore wings of brachypters little longer than broad, rather dark brown, usually lighter basally. Abdomen blackish. Genital segment as in figs. 221, 224; aedeagus as in fig. 226. Overall length: brachypters, 1.9–2.5 mm.; macropters, 2.7–3.5 mm.)
forcipata (Boheman)
Local, on grass, often in or near woods. England. Wales. Scotland. Ireland. v-viii. N. and C. Europe.
- Genital segment seen from above with opening not or only slightly narrowed behind, not making acute angle with posterior margin (fig. 287). 10
- 10 Genital segment in side view with apical margin strongly convex (fig. 242). Fore wings of brachypters about one and a half times as long as broad, more or less smoky brownish, often whitish along apical marginal edge. Frons with side margin usually more strongly convex, usually 1.6–1.8 times as long as broad (fig. 314). (Vertex, pronotum and scutellum black, keels sometimes paler. Abdomen black. Macropters not rare; fore wings somewhat brownish. Genital segment from behind as in fig. 236; aedeagus as in fig. 237. Overall length: brachypters, 2.3–2.7 mm.; macropters, 4.2 mm.) **discolor** (Boheman)
Widely distributed on long grass, usually in or near woods; also on Kilnshaw Chimney, Westmorland, at about 2000 feet and on open headland in Ireland. England. Wales. Scotland. Ireland. v-ix. All Europe to Turkestan. N. Africa
- Genital segment in side view with apical margin straight or weakly convex (figs. 239–41). Fore wings of brachypters about twice as long as broad, variable in colour, but not whitish along apical marginal edge. Frons with side margins generally less convex, usually about twice as long as broad (fig. 313). 11
- 11 Genital segment in side view with almost straight apical margin for nearly whole height of segment (fig. 239): apical opening of segment in posterior view considerably deeper than broad (fig. 231). Often brachypterous, with fore wings reaching approximately to base of genital segment. Aedeagus with deep cleft in apex about three times as long as width of aedeagus (fig. 233). (Vertex black, with keels pale. Pronotum blackish, often more or less pale medially and on keels. Scutellum and abdomen black. Fore wings brownish. Overall length: brachypters, 2.1–2.4 mm.; macropters, 3.5–3.8 mm.)
(= *difficilis* (Edwards)) **dubia** (Kirschbaum)
Common and widely distributed on grasses, especially in woods. England. Scotland. Ireland. v-ix. N. and C. Europe.
- Genital segment in side view with apical margin almost straight for not more than half height of segment (figs. 240, 241): apical opening of segment in posterior view very little deeper than broad (figs. 232, 235). If brachypterous, fore wings reaching or almost reaching apex of abdomen or reaching beyond it. Aedeagus either recurved and not cleft at apex (fig. 234) or with cleft at apex about as deep as width of aedeagus (fig. 238). 12
- 12 Larger, more often macropterous. Overall length: macropters, 4.0–4.6 mm.; brachypters, 2.4–3.1 mm. Fore wings pale yellow-brownish; brachypters with fore wings distinctly longer than abdomen. Aedeagus recurved and not cleft at apex (fig. 234). (Vertex black, with keels pale. Pronotum black, at least anteriorly between outer keels, often more or less broadly white between them. Scutellum black, sometimes light brown along outer keels and on apical margin. Abdomen black). **pellucida** (Fabricius)

Common and widely distributed on grasses. England. Wales. Scotland. Ireland. v-ix. All Palaearctic and Nearctic Regions.

- Smaller, usually brachypterous. Overall length : macropters, 3.7 mm. ; brachypters, 2.0-2.4 mm. Brachypters with fore wings about as long as abdomen, generally black-brown ; macropters with fore wings brownish. Aedeagus with cleft at apex about as deep as width of aedeagus (fig. 238). (Vertex black, with keels pale. Pronotum black, keels and posterior margin sometimes paler. Scutellum and abdomen black) . . . (= *discreta* (Edwards)) *obscorella* (Boheman)

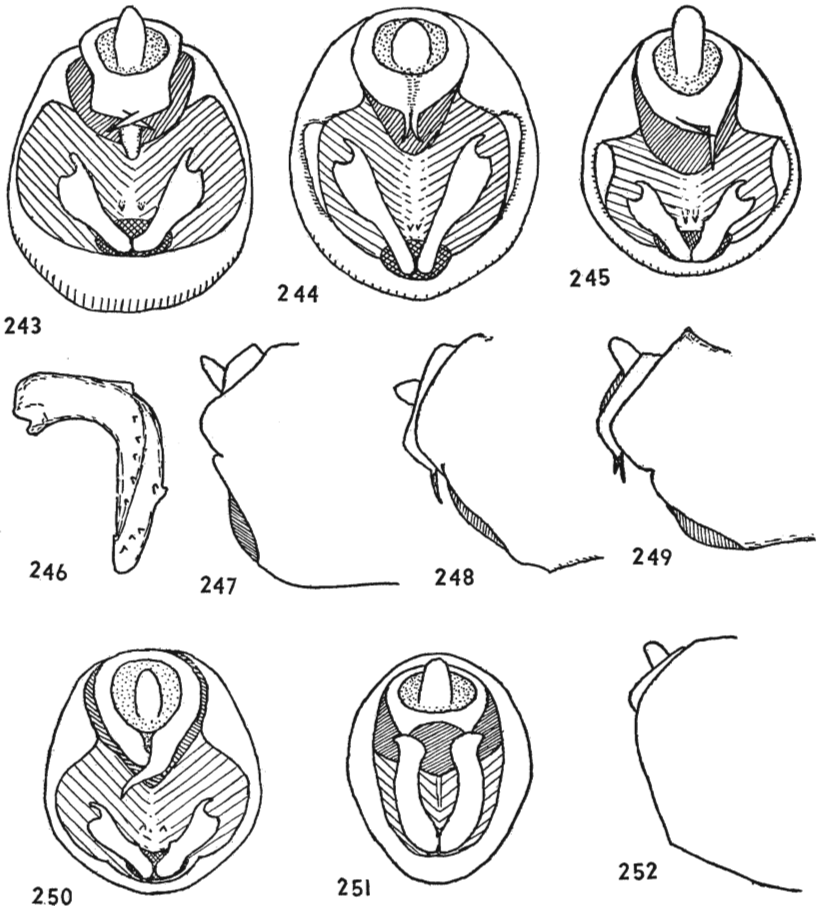


FIG. 243.—*Delphacodes pallens* : male genitalia from behind.
 FIGS. 244, 247.—*D. imitans* : (244) male genitalia from behind ; (247) the same, from side.
 FIGS. 245, 248.—*D. pungens* : (245) male genitalia from behind ; (248) the same, from side.
 FIGS. 246, 249, 250.—*D. angulosa* : (246) aedeagus ; (249) male genitalia from side ; (250) the same, from behind.
 FIGS. 251, 252.—*D. clypealis* : (251) male genitalia from behind ; (252) the same, from side.

On grasses in damp places, usually at edges of ponds. S. and C. England, as far N. as Staffs. and Norfolk. Scotland: Midlothian. Wales. Ireland. Palae-arctic and Nearctic Regions.

- 13 Vertex black anteriorly between pale keels (fig. 305).....14
 — Vertex not black anteriorly between keels.....18
 14 Inner margin of paramere produced at apex into short straight tooth, projecting inwards (fig. 273). Anal tube with very short teeth beneath, not always visible from behind. Scutellum with median keel concolorous or paler, without distinct longitudinal streak across it. (Frons light brownish, keels dark-edged (fig. 308). Pronotum and scutellum light yellow-brown. Fore wings of brachypters light yellow-brown, about one and a half times as long as broad. Abdomen black above with thin orange median line. Genital segment from side as in fig. 274. Overall length: brachypters, 2.8–3.0 mm.; macropters, 4.4–4.6 mm.)

boldi (Scott)

On marram-grass (Ammophila or Psamma) on coastal sandhills. England: southern counties, East Anglia, Northumberland. Scotland: Forres, Morayshire. vi–ix. N. and C. Europe.

- Inner margin of paramere produced at apex into thin projection curving outwards above apex of outer margin (figs. 243, 244, 245, 250). Anal tube with well developed acuminate teeth beneath. Distinct longitudinal white streak present across median keel of scutellum and usually also pronotum. (Frons light brownish, keels dark-edged. Vertex posteriorly, pronotum and scutellum light brownish, keels whitish. Fore wings of brachypters light yellowish brown).....15
 15 Appendages of anal tube not crossing each other, thin, at base almost parallel and nearly contiguous (fig. 244). (Fore wing of brachypters about one and three-quarters times as long as broad. Abdomen blackish, with light brownish median streak and two more or less broken light streaks on either side. Parameres two and three-quarters to three times as long as broad, with inner margin almost straight. Lower margin of genital segment seen from behind with concave incision below base of parameres, making obtuse-angled discontinuities at extremities: genital segment from side as in fig. 247. Overall length: brachypters, 2.3–2.6 mm.)

(= *collina* auct. nec (Boheman))

(see Ribaut, 1953; Le Quesne, 1960) **imitans** (Ribaut)

England: Corfe and Portland, Dorset. viii. France. Germany. Austria.

- Appendages of anal tube crossing each other, not nearly parallel (figs. 243, 245, 250).....16
 16 Appendages of anal tube symmetrically crossed (fig. 243). Inner margin of paramere not forming distinct tooth. (Abdomen widely chestnut-brown medially above, with narrow yellowish median line, blackish at sides, broken by brown spots. Lower margin of genital segment with very weak concave incision. Overall length: brachypters, 2.5 mm.)

(= *collina* auct. nec (Boheman))

(see Ribaut, 1953; Le Quesne, 1960) **pallens** (Stål)

Dry grassy places. England: Wytham Wood, Berks. vi, viii. N. Europe. Siberia.

- Appendages of anal tube not symmetrically crossed (figs. 245, 250). Paramere with inner margin produced into more or less distinct tooth.....17
 17 Appendages of anal tube more elongate and straighter, one of them, more often the right one, extending almost vertically downwards and the other one inwards towards it (fig. 245). Lower margin of genital segment with concave incision below base of parameres making indistinctly angled discontinuities at extremities. (Fore wings of brachypters about one and three-quarters times as long as broad. Abdomen more or less widely brown medially above. Genital segment from side as in fig. 248. Overall length: brachypters, 2.3–2.6 mm.)

(= *collina* auct. nec (Boheman))

(see Ribaut, 1953; Le Quesne, 1960) **pungens** (Ribaut)

England: Folkestone Warren, Sandwich and Wye, Kent; Withington and Colesborne, Glos.; Worth, Dorset. iv–vii, ix. France. Germany. Czechoslovakia.

- Appendages of anal tube shorter, more bent, right hand appendage directed towards left and downwards, left hand one underneath, directed horizontally towards right (fig. 250) (rarely mirror-image of this). Lower margin of genital segment with concave incision below base of parameres making more distinct angles at

discontinuities at extremities. (Fore wings of brachypters one and half to one and three-quarters times as long as broad. Abdomen with narrow pale median streak and pale spots forming broken streaks at sides, otherwise blackish. Genital segment from side as in fig. 249 : aedeagus as in fig. 246. Overall length : brachypters, 2.1-2.4 mm.) . . . (= *collina* auctt. nec (Boheman)) (see Ribaut, 1953 ;

Le Quesne, 1960) **angulosa** (Ribaut)

Dry grassy places. England : Herts., Surrey, Hants., Dorset. v, vii. France. Sweden. Finland. Germany. Austria. Switzerland.

- 18 Genital segment in side view with a broad concavity excised from apical margin (figs. 256, 257, 261) 19
 — Genital segment in side view with apical margin normally convex or straight ; if concave, only slightly so (e.g. fig. 281) 21
 19 Parameres broadly truncate at apex, wholly black or black-brown (figs. 253, 254). Genital segment largely pale above. Pronotum and scutellum light yellowish medially, more or less darker beyond outer keels. (Median keel of frons forked somewhat below junction with vertex, keels sharp throughout : frons rather elongate (fig. 303). Fore wings of brachypters between one and two-third times and twice as long as broad, brownish with paler marginal edges, especially along inner margin. Fore wings of macropters very pale with veins and marginal edges darker in apical half. Dorsum of abdomen rather sharply angled medially, with thin pale line, light brownish-yellow, more or less dark at sides) 20
 — Parameres small, acuminate and brown at apex (fig. 260). Genital segment mainly blackish above. Pronotum and scutellum light yellow throughout, or scutellum sometimes rather greyish medially. (Frons yellowish, rather broad and convex-sided with keel indistinct at transition with vertex (fig. 320). Fore wings pale yellowish in brachypters, as long as broad or a little longer. Abdomen blackish. Genital segment with sharp upturned median tooth below base of parameres and with sharp inwardly directed point on either side at approximately level of apex of paramere ; below latter, genital segment inwardly broadly whitish (figs. 260, 261). Overall length : brachypters, 2.1-2.5 mm. ; macropters, 3.0-3.3 mm.) (= *insignis* (Scott) : see Le Quesne, 1960) **denticauda** (Boheman)

Scarce and local ; woods, glades, damp places. England. Scotland. v, vi. N. and C. Europe.

- 20 Genital segment in side view with deeper concavity, terminating above with sharply pointed projection, directed somewhat downwards ; this projection, seen from behind, directed inwards (figs. 253, 256). (Frons brownish between keels, not distinctly mottled. Macropters rather common. Aedeagus as in fig. 263. Overall length : brachypters, 2.5-3.0 mm. ; macropters, 4.0-4.1 mm.)

brevipennis (Boheman)

Local in damp places, ditches. England. Wales. Scotland. vii-x. All Europe.

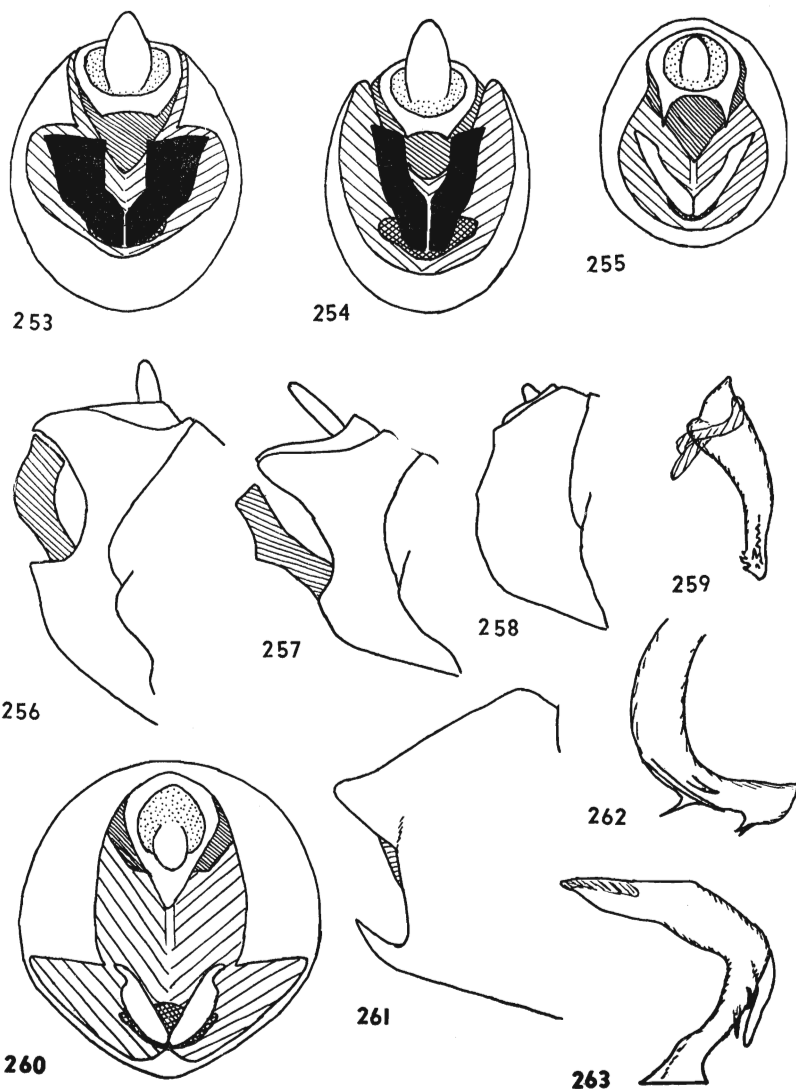
- Genital segment in side view with shallower concavity, terminating above with blunt projection, not directed downwards ; seen from behind, this projection not directed inwards (figs. 254, 257). (Frons mottled brown and yellowish in darker specimens. Macropters infrequent. Aedeagus as in fig. 262. Scottish specimens are darker than the average English example ; further study may show the presence of geographical races. Overall length : brachypters, 2.1-2.5 mm. ; macropters, 3.3-4.2 mm.) **fairmairei** (Ferris)

Widely distributed in damp places. England. Scotland. Wales. Ireland. vii-x. Most of Europe. China.

- 21 Genital segment seen from behind about twice as high as broad (fig. 278). Teeth of anal tube very stout, long, parallel (figs. 278, 281). (Frons and vertex dirty light brown ; frons convex-sided, its median keel forked a little below transition with vertex, keels not very distinct in this part (fig. 310). Pronotum and scutellum dirty yellowish, darker at sides. Fore wings of brachypters a little longer than broad, shining brown-black, apical margin narrowly yellowish. Abdomen dirty yellowish above, brownish at sides, genital segment brown-black. Parameres short, apical margins concave. Overall length : brachypters, 1.6-1.9 mm.) **pullula** (Boheman)

Marshy places. England : Cumwhitten Moss, Cumberland. Scotland : Aviemore, Inverness-shire ; Rannoch, Perthshire. v, vi. N. Europe, France.

- Genital segment less than one and a half times as high as broad. Teeth of anal tube slender or divergent or short 22



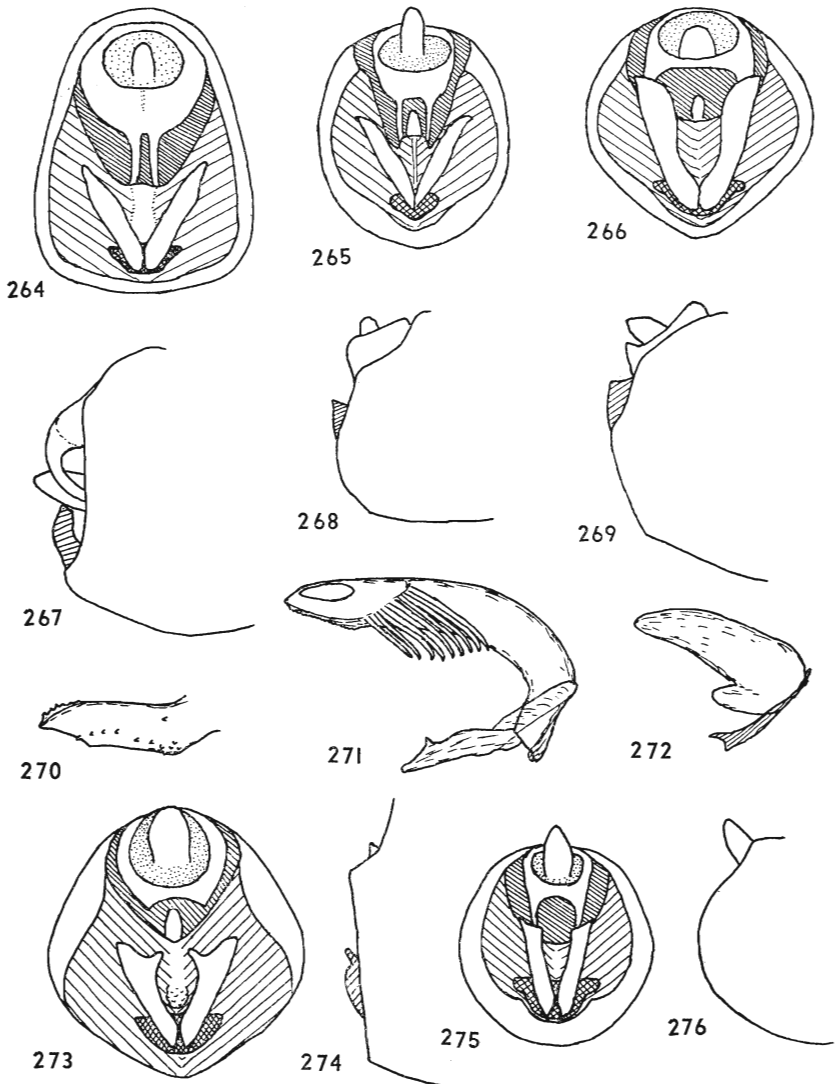
FIGS. 253, 256, 263.—*Delphacodes brevipennis*: (253) male genitalia from behind; (256) the same, from side; (263) aedeagus.

FIGS. 254, 257, 262.—*D. fairmairei*: (254) male genitalia from behind; (257) the same, from side; (262) aedeagus.

FIGS. 255, 258, 259.—*D. distincta*: (255) male genitalia from behind; (258) the same, from side; (259) aedeagus.

FIGS. 260, 261. *D. denticaula*: (260) male genitalia from behind; (261) the same, from side.

- 22 Teeth of anal tube acuminate, almost parallel for most of their length, their mutual distance much less than half width of anal tube (figs. 264, 265). Usually brachypterous, with fore wings blackish except for rather narrowly white apical margins, sometimes also rather paler basally. (Fore wings about one and a third times as long as broad)..... 23
- Teeth of anal tube, if present, either with mutual distance more than half width of anal tube (*e.g.* fig. 275) or sharply divergent (*e.g.* fig. 277) or gradually tapering from broad base (*e.g.* fig. 279). If brachypterous, fore wings either not blackish or almost entirely paler bordered..... 24
- 23 Keels of frons obsolescent on transition with vertex (fig. 323). Genital segment in apical view about one and a quarter times as long as broad, with sides of segment not projecting inwards behind anal tube (fig. 264). Teeth of anal tube nearer together. (Frons and vertex orange-yellow, sometimes mottled brownish. Pronotum and scutellum in brachypters usually entirely white, latter sometimes with ill-defined greyish patch in middle. Macropters mainly black-brown, with posterior margin of scutellum broadly white. Abdomen black. Genital segment from side as in fig. 267; aedeagus as in fig. 271. Overall length: brachypters, 2.2-2.4 mm.; macropters, 3.3 mm.)... (= *niveimarginata* (Scott): see Linnavuori, 1951b; Le Quesne, 1960) **leptosoma** (Flor)
- Long herbage in swampy places. England: Booton Common and Swardston Common, Norfolk; Dungeness, Kent; Wimbledon Common, Surrey. vi, vii. N. of Europe.*
- Keels of frons and vertex distinct throughout (fig. 324). Genital segment about as long as broad, with sides of segment projecting somewhat inwards behind anal tube (fig. 265). Teeth of anal tube wider apart. (Frons and vertex brown or black between keels. Pronotum often dark anteriorly, scutellum usually largely blackish. Fore wings of macropters hyaline, veins dark brown. Genital segment from side as in fig. 268; aedeagus as in fig. 272. Overall length: brachypters, 2.0-2.4 mm.; macropters, 3.5 mm.)
- (= *leptosoma* auctt. Brit. nec (Flor): see Linnavuori, 1951b; Le Quesne, 1960) **albofimbriata** (Signoret in Fieber)
- Common on grasses in damp places. England. Wales. Scotland. Ireland. v-xi. C. and S. Europe.*
- 24 Scutellum jet-black, with apex narrowly yellow. (Frons and vertex orange-yellow to brownish, frons rather broad, convex-sided, with keels indistinct on junction with vertex (fig. 328). Pronotum whitish, sometimes rather darker beyond outer keels. Usually brachypterous, with fore wings light yellowish, slightly less than one and a half times as long as broad. Abdomen black, more or less widely pale at base and medially at apex. Anal tube with long thin slightly convergent teeth, their mutual distance nearly equal to width of anal tube (fig. 275). Parameres rather stout, truncate, almost straight. Genital segment from side as in fig. 276. Overall length: brachypters, 1.7-1.8 mm.)
- dalei** (Scott)
- On grass, open places. England: Bucks., Surrey, Hants., Dorset. iii, v, vii, viii. France.*
- Scutellum black-brown or paler between outer keels or with small black spots near base only..... 25
- 25 Anal tube with long stout divergent teeth (fig. 277). Genital segment in apical view much wider than high. Usually brachypterous with fore wings black, with pale margins throughout (except sometimes for spot at apex of clavus) and inner angle broadly pale. (Frons rather narrow, brownish, without distinct dark markings (fig. 326); vertex same colour throughout. Pronotum and scutellum yellowish medially, more brownish beyond outer keels. Abdomen largely black, paler on tergum before genital segment. Genital segment black; in side view as in fig. 280. Anterior and median coxae black. Overall length: brachypters, 2.5-3.1 mm.)..... **lugubrina** (Boheman)
- In marshy places, at base of Glyceria, local. S. England, as far N. as Bucks. and Glos. Ireland: Co. Kilkenny, Co. Westmeath. v-viii. Most of Europe.*
- Anal tube without teeth or with teeth not divergent (*e.g.* fig. 279). Genital segment in apical view not distinctly wider than high. If brachypterous, fore wings not black with pale margins..... 26
- 26 Parameres seen from behind tapering to acuminate apex, extending above level of aedeagus support (figs. 290, 298). Anal tube with poorly developed teeth, not



FIGS. 264, 267, 271.—*Delphacodes leptosoma*: (264) male genitalia from behind; (267) the same, from side; (271) aedeagus.

FIGS. 265, 268, 272.—*D. albofimbriata*: (265) male genitalia from behind; (268) the same, from side; (272) aedeagus.

FIGS. 266, 269, 270.—*D. litoralis*: (266) male genitalia from behind; (269) the same, from side; (270) aedeagus.

FIGS. 273, 274.—*D. boldi*: (273) male genitalia from behind; (274) the same, from side.

FIGS. 275, 276.—*D. dalei*: (275) male genitalia from behind; (276) the same, from side.

- always visible from behind. Abdomen black with narrow orange or yellowish longitudinal median line, other pale markings sometimes present as more or less broken longitudinal lines at sides. 27
- Parameres seen from behind either broader towards apex, which is rounded or more or less truncate (figs. 251, 279, 284, 289) or rather short, directed backwards, not extending above level of aedeagus support (fig. 288). Anal tube with well-developed teeth, more or less visible from behind (unless hidden by paramere). Abdomen either black without pale median line or broadly pale medially, with or without irregular dark suffusions at sides. 28
- 27 Paramere in side view with strong spine directed backwards near base (fig. 300). Frons relatively shorter and broader, more convex-sided (fig. 317). Abdomen without pale markings at sides. Brachypters with fore wings little longer than broad, usually rather squarely truncate apically. (Frons and vertex light yellow-brown, frons often darker marked below, keels rather indistinct on transition between frons and vertex. Pronotum and scutellum of brachypters dirty yellowish, rather darker at sides. In macropters, scutellum often black beyond outer keels and with two black spots at base between them. Genital segment as in figs. 298, 299; aedeagus as in fig. 301. Overall length: brachypters, 1.8–2.2 mm.; macropters, 2.9–3.3 mm.) (= *scutellata* (Scott) : see Le Quesne, 1960) **exigua** (Boheman)

On short grass in dry, open places. England, S. of line from Wash to Bristol Channel; S. Wales. iii–viii. Most of Europe. N. Africa.

- Paramere in side view without spine near base (fig. 294). Frons relatively longer and narrower, more nearly straight-sided (fig. 318). Abdomen with two, three or four more or less broken, yellowish, longitudinal streaks on each side, at least in brachypters. Brachypters with fore wings usually a little more than one and a half times as long as broad, rather rounded apically. (Frons and vertex uniformly light yellow-brown, sometimes with keels weakly darker-edged below, keels rather indistinct on transition between frons and vertex. Pronotum and scutellum of brachypters dirty yellowish, rather darker and more brownish beyond outer keels. Fore wings of macropters hyaline, apical third fumose; veins pale brown apically. Genital segment as in figs. 290, 293; aedeagus as in fig. 297. Overall length: brachypters, 2.1–2.8 mm.; macropters 3.5 mm.)

aubei (Perris)

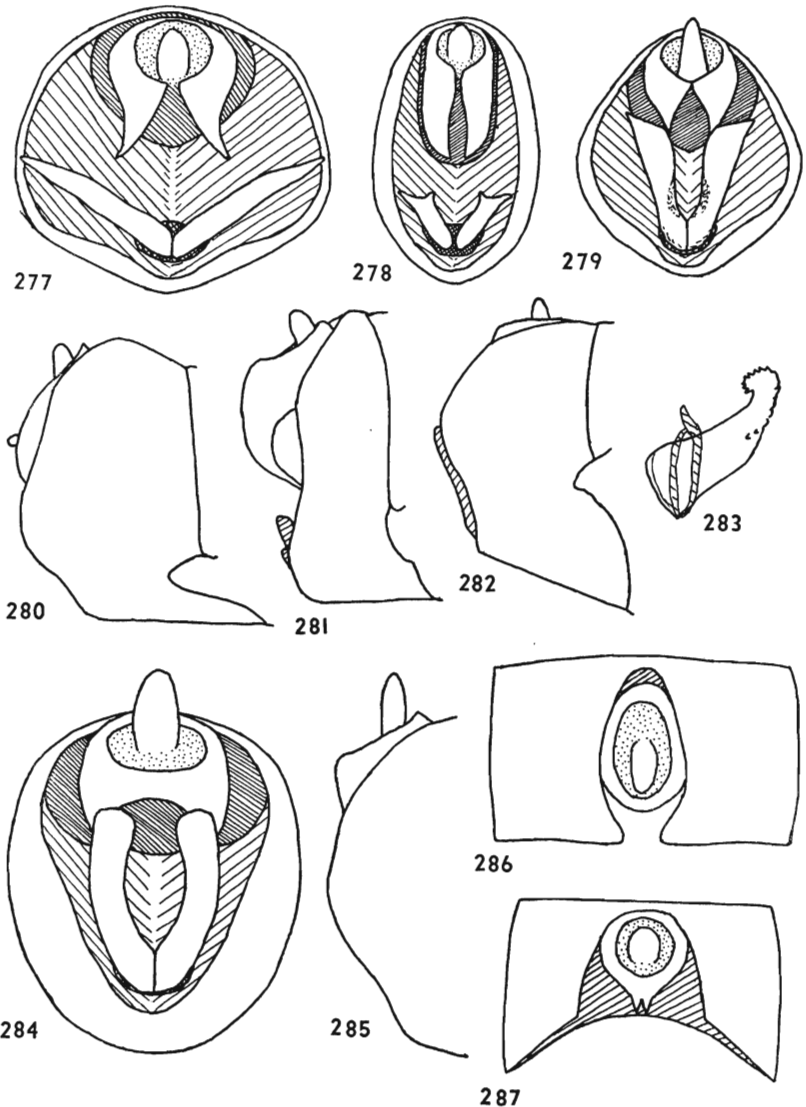
On grass in dry places, usually on coastal sandhills, occasionally inland (Stoke Common, Bucks.; Chingford, Essex). England. Wales. Scotland. Ireland. iv–viii, x. Europe. Transcaucasia. N. Africa.

- 28 Frons relatively short and broad, distinctly less than twice as long as broad, convex-sided and considerably narrowed below (fig. 319). Abdomen in brachypters usually wholly pale yellowish, except for dark brown apices of teeth of anal tube and margins of parameres. (Abdomen in macropters usually with dark patches) 29
- Frons more nearly parallel-sided, at least twice as long as broad (figs. 307, 309, 316). Abdomen in brachypters either uniformly blackish above or broadly pale medially and more or less blackish at sides. 30
- 29 Parameres squarely truncate apically, longer, extending above level of aedeagus support (fig. 289). Appendages of anal tube more closely approximated, with pointed apices directed inwards so that often not distinctly visible from behind. (Brachypters entirely light yellowish except for eyes, ocelli, claws, margins of parameres and teeth of anal tube. Genital segment from side as in fig. 292; aedeagus as in fig. 295. Overall length: brachypters, 1.9–2.1 mm.)

flaveola (Flor)

On very fine hair-grass, England: Wareham Heath, Dorset; (? Barnes Common, Surrey). vi, vii. Most of Europe.

- Parameres with pointed apices, much shorter, not extending above level of aedeagus support (fig. 288). Appendages of anal tube longer, pointed at apices which are nearly as far apart as maximum width of anal tube and clearly visible from behind. (Head, except eyes, uniformly light yellowish, sometimes tinged brownish; vertex anteriorly often rather darker in macropters. Pronotum and scutellum uniformly light yellowish, latter rather darker beyond outer keels in macropters. Fore wings of brachypters about one and a half times as long as broad, uniformly light yellowish; fore wings of macropters nearly twice as long as abdomen, veins often darker towards apex. Legs light yellowish, except



FIGS. 277, 280.—*Delphacodes lugubrina* : (277) male genitalia from behind ; (280) the same, from side.

FIGS. 278, 281.—*D. pullula* : (278) male genitalia from behind ; (281) the same, from side.

FIGS. 279, 282, 283.—*D. paludosa* : (279) male genitalia from behind ; (282) the same, from side ; (283) aedeagus.

FIGS. 284, 285.—*D. adela* : (284) male genitalia from behind ; (285) the same, from side.

FIGS. 286, 287.—Male genitalia from above of *Delphacodes* spp. : (286) *forcipata* ; (287) *discolor*.

claws. Genital segment seen from side as in fig. 291; aedeagus as in fig. 296. Overall length: brachypters, 2.1-2.6 mm.; macropters 3.2-3.6 mm.)

straminea (Stål)

- Local, dry grassy places. England, Scotland. v-vii. Most of Europe.*
- 30 Parameres broadening considerably towards apex, apical margin almost straight (fig. 279). Abdomen above broadly pale medially, more or less blackish at sides. (Frons and vertex yellow-brown, keels sharp throughout; frons as in fig. 307. First and second antennal segments rather long, apex of first and base of second with dark ring. Pronotum and scutellum pale yellow-brown; latter slightly darker beyond outer keels in macropters. Fore wings of brachypters pale yellow-brown, about two and a half times as long as broad, approximately reaching apex of abdomen. Fore wings of macropters hyaline, veins light brownish. Genital segment black-brown below and at sides; aedeagus as in fig. 283. Overall length: brachypters, 2.4-2.7 mm.; macropters, 3.7-4.1 mm.)

paludosa (Flor)

Very local in Sphagnum-bogs. England: New Forest, Hants.; Cothill, Berks.; (? Wimbledon, Surrey). v, vi, viii. Most of Europe.

- Parameres with apical margin convex, of almost same width throughout (fig. 284) or widened somewhat at extreme apex (fig. 251). Abdomen blackish above. 31
- 31 Frons more or less dirty brownish or grey-brownish; keels concolorous or narrowly and not very distinctly paler in part. Fore wings more or less tinged dirty greyish, about twice as long as broad or rather longer in brachypters, approximately extending to apex of abdomen. Parameres not distinctly widened at apex, not forming acute angle at apex of outer margin (fig. 284). (Vertex more or less dirty yellow-brown, keels rather variable in prominence. Pronotum rather dirty yellow-brown. Scutellum more or less dark grey-brown in brachypters, dark chocolate-brown in macropters. Genital segment from side as in fig. 285. Overall length: brachypters, 2.7-3.0 mm.; macropters, 4.8 mm; intermediate form, 3.7 mm.).....(= *signoreti* (Scott)) **adela** (Flor)

In marshes, usually at base of Glyceria. S. and C. England, as far N. as Cheshire and Staffs. Ireland: Co. Dublin, Co. Meath. vi-viii. N. and C. Europe. Siberia.

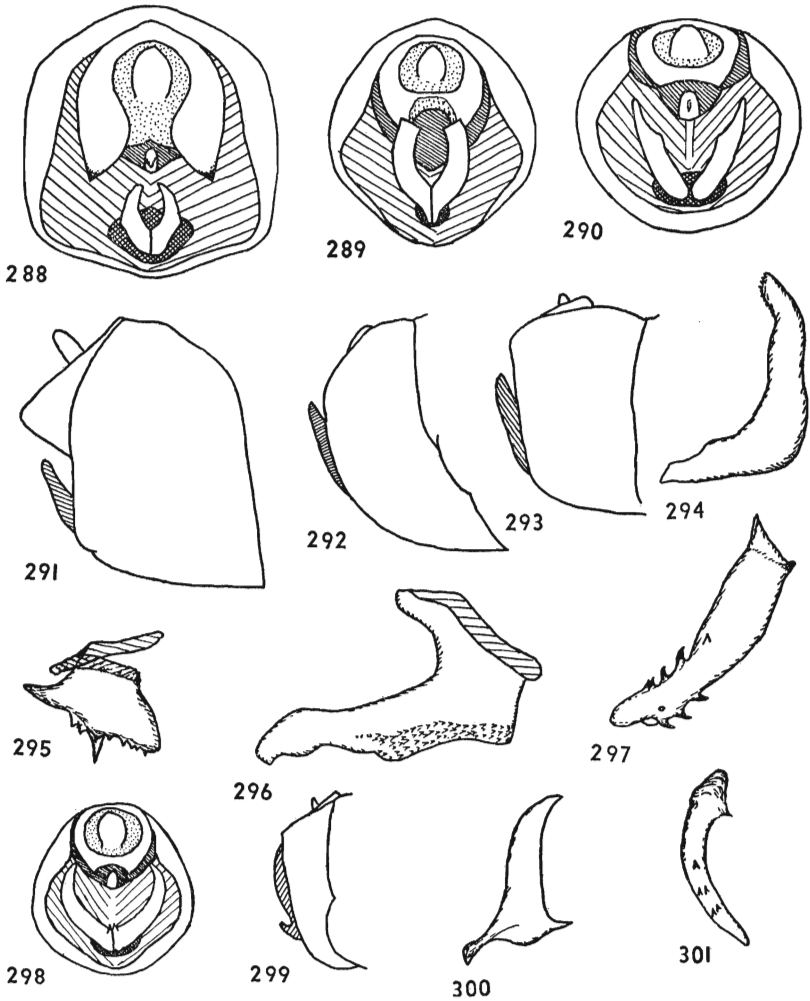
- Frons more or less marked with black-brown, not reaching upper margin; keels broadly and conspicuously pale. Fore body of brachypters light orange-brown; fore wings clear light orange-brown, usually rather darker apically, about one and a half times as long as broad, reaching to about half length of abdomen. Scutellum of macropters largely dark brown. Parameres distinctly widened at apex, forming acute angle at apex of outer margin (fig. 251). (Genital segment from side as in fig. 252. Overall length: brachypters, 2.3-2.4 mm.; macropters, 3.8 mm.).....(see Le Quesne, 1960) **clypealis** (Sahlberg)

Under Calamagrostis canescens Gmel. in fens. England: Wicken Fen, Cambs. vii. Scandinavia.

(Females)

(Note.—The number in brackets after the name of the species refers to the couplet in the key to males under which notes on distribution and habits are given.)

- 1 Frons more or less dark marked or black between keels.....2
 — Frons uniformly pale yellowish or brownish throughout.....16
 2 Vertex entirely black or black-brown anteriorly between keels, continued on to transition with frons; frons partly pale, keels dark-edged (figs. 305, 308).....3
 — Either vertex paler anteriorly between keels (at least in part or at transition with frons) or frons wholly black between keels.....5
 3 Distinct narrow longitudinal whitish streak present along median keel of pronotum and scutellum (specially prominent in macropters). (Frons rather convex-sided (fig. 327). Fore wings of brachypters at least one and a half times as long as broad, without markings, veins concolorous; macropters with veins darker. Ground colour light brownish, abdomen more or less dark marked at sides. Overall length: brachypters, 2.6-2.8 mm.; macropters, 3.7-4.1 mm.)
imitans (Ribaut) (15), **pal lens** (Stål) (16), **pungens** (Ribaut) (17)
 or **angulosa** (Ribaut) (17)
 — Whitish streak along median keel of pronotum and scutellum weak or indistinct, keel itself often being whitish.....4



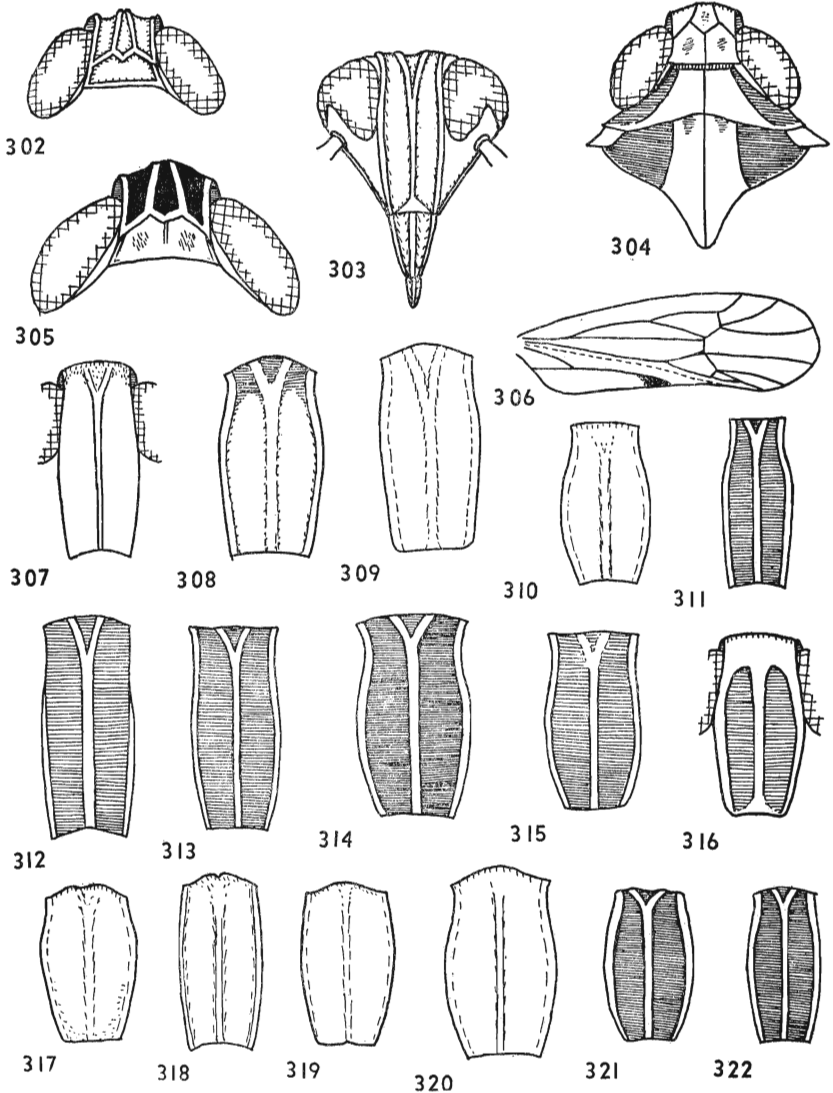
FIGS. 288, 291, 296.—*Delphacodes straminea*: (288) male genitalia from behind; (291) the same, from side; (296) aedeagus.

FIGS. 289, 292, 295.—*D. flaveola*: (289) male genitalia from behind; (292) the same, from side; (295) aedeagus.

FIGS. 290, 293, 294, 297.—*D. aubei*: (290) male genitalia from behind; (293) the same, from side; (294) paramere, side view; (297) aedeagus.

FIGS. 298-301.—*D. exigua*: (298) male genitalia from behind; (299) the same, from side; (300) paramero, side view; (301) aedeagus.

- 4 Frons broader, 1.7-1.8 times as long as broad, more distinctly widened near lower margin of eyes (fig. 308). Overall length: brachypters, 3.1-3.4 mm.; macropters, 4.7-4.9 mm. Usually brachypterous, with fore wings rather more than one and a half times as long as broad, without dark markings. (Vertex posteriorly, pronotum and scutellum light brownish, keels paler. Brachypters with fore wings almost hyaline, veins pale. Macropters with veins light brownish. Abdomen brownish with pale median line and blackish markings at sides. First gonocoxa as in fig. 335)..... **boldi** (Scott) (14)
- Frons narrower, 1.9-2.1 times as long as broad, more nearly uniform in width throughout (cf. fig. 322). Overall length: brachypters, 2.4-2.6 mm.; macropters, 3.3 mm. Usually brachypterous, with fore wings one and a half times as long as broad or rather shorter, often with indistinct dark marking at apex of inner margin. (Pronotum and scutellum light brownish between outer keels, rather darker beyond outer keels; keels rather paler. Fore wings almost hyaline, veins light brownish, in macropters rather darker in apical half. Abdomen brownish with pale mottlings, pale median line and blackish markings at sides. First gonocoxa as in fig. 344)..... **elegantula** (Boheman) (3)
- 5 Larger: overall length of brachypters, 3.6-4.0 mm.; (macropters undescribed). Keels of anterior part of vertex and of its transition with frons brown-black: intervening parts more or less dark. (Antennae black-banded at base and apex of first and second segments. Frons parallel-sided in lower half (fig. 312). Vertex slightly longer than broad. Pronotum and scutellum light yellowish-brown, slightly darker at sides. Fore wings of brachypters about one and two-thirds times as long as broad, tinged brownish. Abdomen mainly light brownish above, suffused darker at sides. First gonocoxa as in fig. 334) .. **reyi** (Fieber) (6)
- Smaller: overall length of brachypters not more than 3.5 mm. Keels of anterior part of vertex and of its transition with frons pale (except in macropterous *pullula* and sometimes in *litoralis*)..... 6
- 6 Pronotum and scutellum with white longitudinal line along median keel. (Frons entirely black between conspicuous pale keels, rather convex-sided (fig. 321). Vertex posteriorly, pronotum and scutellum orange-brown, keels whitish. Fore wings of brachypters brownish, veins pale, marginal vein whitish throughout: fore wing about one and two third times as long as broad. Abdomen brownish above with pale median line and dark markings at sides, often also transverse dark streaks across segments (broken by pale median line). Overall length: brachypters, 2.5-2.8 mm.)..... **distincta** (Flor) (2)
- Pronotum and scutellum without white longitudinal line along median keel, though keel itself sometimes paler..... 7
- 7 Pronotum and scutellum pale yellowish between outer keels (scutellum sometimes brownish in macropters), darker brownish beyond outer keels. Marginal edge of fore wings whitish along inner margin, more conspicuously so in brachypters, but also in basal half in macropters. Median keel of frons forked somewhat below junction with vertex, nearly level with base of antennae; keels of vertex and frons sharp throughout (figs. 302, 303). (Frons light brown, more or less darker marbled; postclypeus usually darker brown, with pale median keel. Fore wings of brachypters between one and two-thirds times and twice as long as broad, varying between hyaline with light brown veins to smoky with black-brown veins, marginal edges pale, especially along inner margin. Macropters with hyaline fore wings, sometimes light brownish towards base of inner margin with dark brown veins; marginal edges pale in basal half, dark in apical half. Dorsum of abdomen rather sharply angled medially, with thin pale line, usually brownish with sides black-brown, sometimes uniformly light brown. First gonocoxa as in figs. 330, 331. Overall length: brachypters, 2.4-3.4 mm.; macropters, 3.9-4.7 mm.)
- **brevipennis** (Boheman) (20) or **fairmairei** (Perris) (20)
- Pronotum and scutellum either not uniformly pale yellowish between outer keels or not sharply darker beyond outer keels. Marginal edges of fore wings rarely distinctly whitish along inner margin. Median vein of frons usually forked at or very near junction with vertex, sometimes more or less evanescent at junction with vertex..... 8
- 8 Inner margin of first gonocoxa with deep, approximately right-angled indentation near base (figs. 333, 340-2, 345)..... 9

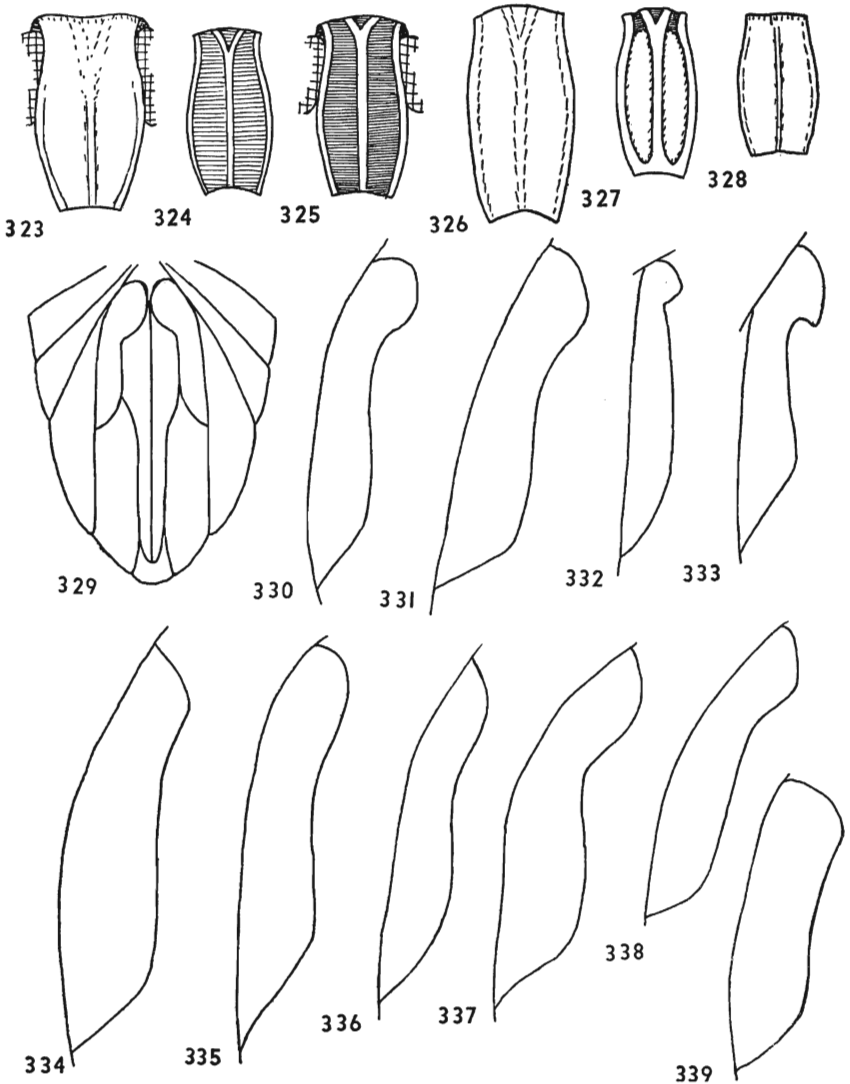


FIGS. 302-306.—*Delphacodes* spp. : (302) *fairmairei*, head from above ; (303) the same, face ; (304) *exigua*, macropter, fore body ; (305) *boldi*, head from above ; (306) *striatella*, fore wing of macropter.

FIGS. 307-322.—Frons of *Delphacodes* spp. : (307) *paludosa* ; (308) *boldi* ; (309) *adela* (310) *pullula* ; (311) *striatella* ; (312) *reyi* ; (313) *dubia* ; (314) *discolor* ; (315) *forcipata* ; (316) *chypcalis* ; (317) *exigua* ; (318) *aubei* ; (319) *straminea* ; (320) *denticauda* ; (321) *distincta* ; (322) *elegantula*, male.

- Inner margin of first gonocoxa without indentation or with less deep indentation forming rounded obtuse angle. (Fore wings of brachypters about one and two-third times as broad or shorter).....11
- 9 Frons rather broader, convex-sided (fig. 324). Basal lobe of first gonocoxa forming sharp acute angle (fig. 345). Usually brachypterous, with fore wings about one and a half times as long as broad, varying between light brown and black-brown, with apical margin rather narrowly whitish. (Frons brownish, more or less variegated black-brown, between keels. Vertex, pronotum and scutellum in brachypters yellow-brown, sometimes tending towards grey-brown. Abdomen above varying between light brown and black-brown, darker at sides and with thin pale median line. Macropters with scutellum black-brown beyond outer keels, fore wings hyaline with dark brown veins. Overall length : brachypters, 2.5-2.7 mm. ; macropters, 4.1 mm.)...**albofimbriata** (Signoret *in* Fieber) (23)
- Frons narrower, sides more nearly parallel (figs. 311, 313). Basal lobe of first gonocoxa smoothly rounded or forming blunt obtuse or right angle (figs. 333, 340-2). If brachypterous, fore wings at least twice as long as broad, apical margin not paler.....10
- 10 Fore wing almost hyaline, with short dark streak along inner margin just before apex of clavus (fig. 306) (not always very prominent, especially in brachypter). Frons very narrow, almost straight-sided, usually entirely black or black-brown between keels (fig. 311). Basal lobe of first gonocoxa forming rather sharp right angle (fig. 333). (Pronotum and scutellum yellow-brown, rather darker at sides in brachypters, blackish at sides in macropters. Fore wings of brachypters reaching or nearly reaching apex of abdomen, veins light brownish. Dorsum of abdomen usually yellow-brown, more or less suffused darker at sides, sometimes almost completely blackish. Overall length : brachypters, 2.4-3.0 mm. ; macropters, 3.6-4.3 mm.).....**striatella** (Fallén) (4)
- Fore wing hyaline or more or less dark brownish, but without darker streak along inner margin. Frons rather less narrow, either variegated paler or entirely blackish between keels (fig. 313). Basal lobe of first gonocoxa usually more definitely rounded (figs. 340-2). (Vertex, pronotum, scutellum and abdomen varying between light yellow-brown and black. Overall length : brachypters, 2.4-3.1 mm. ; macropters 4.0-5.0 mm.)
 - pellucida** (Fabricius) (12), **dobia** (Kirschbaum) (11) or **obscura** (Boheman) (12)
 - (These cannot be separated with certainty. *D. pellucida* is often rather larger and paler than the others and macropters over 4.5 mm. long or brachypters with fore wings distinctly longer than abdomen are probably this.)
- 11 Apical margin of first gonocoxa truncate, angularly excised (fig. 347). (Frons uniformly dark brown, keels not paler. Macropters with scutellum blackish) [See couplet 23 of this key]**pullula** (Boheman) (21)
- Apical margin of first gonocoxa more or less smoothly rounded, not excised or truncate12
- 12 Inner margin of first gonocoxa only slightly curved, nearly parallel with outer margin, so that gonocoxa is almost of equal width throughout (fig. 339). Frons narrower, sides nearly straight (fig. 316). (Median keel of frons forked somewhat below junction with vertex, not very sharp at transition between frons and vertex. Vertex, pronotum, and in brachypters scutellum, light yellow-brown, the two latter slightly darker at sides ; scutellum of macropters dark brown beyond outer keels and usually with brown streaks between them. Fore wings of brachypters rather smoky brown, somewhat darker towards apex, about one and two-third times as long as broad. Abdomen above brownish, darker ringed. Overall length : brachypters, 2.7-3.4 mm. ; macropters, 3.9-4.1 mm.)
 - elypealis** (Sahlberg) (31)
- Inner margin of first gonocoxa more or less sharply changing direction towards base, so that gonocoxa is distinctly narrower at this point. Frons broader, sides distinctly convex.....13
- 13 Keels indistinct on transition between frons and vertex (fig. 323) ; frons and vertex mainly orange-yellow. Normally brachypterous, with fore wings about one and a third times as long as broad, brown, rather narrowly white along apical margin [See couplet 19 of this key]**leptosoma** (Flor) (23)
- Keels of frons and vertex distinct throughout. Brachypters with fore wings about one and a half or one and two-third times as long as broad, not white along apical margin.....14

- 14 Usually brachypterous, with vertex, pronotum and scutellum light yellow-brown, fore wings translucent, straw-coloured, edge not paler along apical margin. Inner margin of first gonocoxa rather weakly bent towards base (fig. 338). (Frons as in fig. 325). In brachypters, fore wings about one and two-thirds times as long as broad; abdomen light brown above, darker marked. In macropters, vertex, pronotum and scutellum largely black-brown; fore wings light brownish, veins darker. Overall length: brachypters, 2.6-3.2 mm.; macropters, 3.8-4.3 mm.)..... **litoralis** (Reuter) (8)
- Usually brachypterous, with vertex, pronotum and scutellum largely or wholly blackish, fore wings either partly dark brown or with edge paler along apical margin. Inner margin of first gonocoxa rather more strongly bent towards base (figs. 337, 343).....15
- 15 Keels of vertex less sharp, vertex anteriorly usually brownish and frons darker brown between keels (fig. 315). Brachypters with dark brown fore wings, except in generally pale individuals, usually paler towards base. (Vertex, pronotum, scutellum and abdomen above uniformly black or brownish. In brachypters, fore wings about one and a half times as long as broad. Overall length of brachypters, 2.2-2.8 mm.; macropters, about 4.0 mm.).. **forcipata** (Boheman) (9)
- Keels of vertex sharper, frons and vertex usually black between keels (fig. 314). Brachypters with light brown fore wings, edge paler along apical margin. (Vertex, pronotum, scutellum black, usually keels and apex of scutellum paler. Abdomen above mainly black. In brachypters, fore wings about one and a half times as long as broad. Overall length: brachypters, 2.7-3.1 mm.; macropters, 4.0-4.5 mm.)..... **discolor** (Boheman) (10)
- 16 Larger species: brachypters 3.5-4.5 mm. long; macropters 5.0-5.6 mm. long..17
- Smaller species: brachypters less than 3.5 mm. long; macropters less than 5.0 mm. long.....18
- 17 Usually brachypterous with fore wings about twice as long as broad, reaching more than half length of abdomen. First gonocoxa almost equally broad throughout, inner margin gently curved (fig. 353). (Vertex, pronotum and scutellum light yellow-brown. Frons as in fig. 309. Abdomen light yellow-brown, often darker at sides. Fore wings of brachypters brownish, sometimes rather smoky tinged. Overall length: brachypters, 3.5-4.0 mm.)..... **adela** (Flor) (31)
- Usually brachypterous with fore wings about one and a half to one and two-third times as long as broad, reaching less than half length of abdomen. First gonocoxa narrow medially, inner margin bent sharply forming lobe at base (fig. 346). (Vertex, pronotum and scutellum light yellow-brown, two latter sometimes slightly darker at sides. Frons as in fig. 326. Abdomen light yellow-brown, often marked with blackish dots or streaks at sides, sometimes forming broad longitudinal bands. Fore wings of brachypters brownish. Overall length: brachypters, 3.9-4.5 mm.; macropters, 5.1-5.6 mm.).. **lugubrina** (Boheman) (25)
- 18 Abdomen with sharply defined black markings at sides (sometimes including a few discrete dark dots).....19
- Abdomen entirely light yellowish, sometimes suffused darker at sides, but not forming definite markings (except sometimes for a few dark dots).....21
- 19 Pronotum brownish anteriorly, with posterior margin and scutellum whitish. Usually brachypterous with fore wings about one and a third times as long as broad, brown, with apical margin broadly whitish. (Frons and vertex orange-yellow; keels indistinct on transition between frons and vertex (fig. 323). Abdomen brownish with series of darker markings at sides. Inner margin of first gonocoxa with obtusely angled indentation (fig. 329). Overall length: brachypters, 3.1-3.5 mm.)..... **leptosoma** (Flor) (23)
- Pronotum and scutellum yellowish, sometimes brownish or black beyond outer keels. Brachypters without whitish apical margin of fore wings.....20
- 20 Frons convex-sided, relatively broader (fig. 317). Overall length: brachypters, 2.1-2.4 mm.; macropters, 3.4 mm. First gonocoxa tapering regularly towards base, inner margin convex throughout (fig. 354). (In brachypters: pronotum and scutellum pale yellowish throughout; fore wings about one and a third times as long as broad, yellow-brown, veins smooth, glabrous. In macropters: scutellum black or dark brown beyond outer keels, often two dark marks present at base of scutellum between outer keels (fig. 304). Abdomen brownish with thin pale median line and sharp black markings coalescing into longitudinal streaks at sides)..... **exigua** (Boheman) (27)

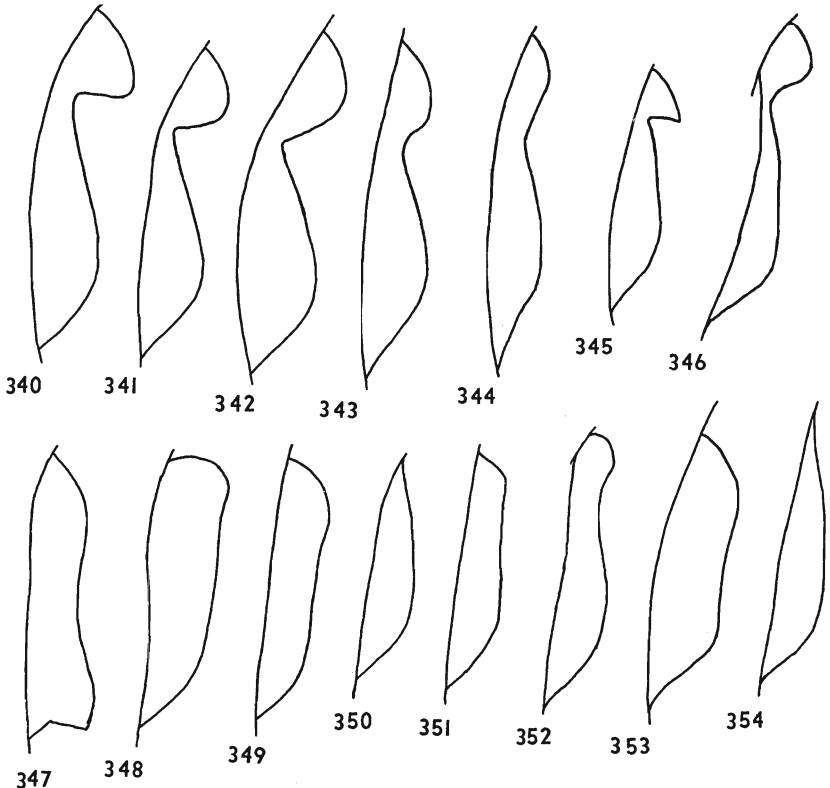


FIGS. 323-328.—Frons of *Delphacodes* spp.: (323) *leptosoma*; (324) *albofimbriata*; (325) *litoralis*; (326) *lugubrina*; (327) *angulosa*; (328) *dalei*.

FIG. 329.—*D. leptosoma*: female, end of abdomen from beneath.

FIGS. 330-339.—First gonocoxa of female *Delphacodes* spp.: (330) *brevipennis*; (331) *fairmairei*; (332) *pallens*; (333) *striatella*; (334) *reyi*; (335) *boldi*; (336) *aubei*; (337) *forcipata*; (338) *litoralis*; (339) *clypealis*.

— Frons narrow, almost straight-sided (fig. 318). Overall length: brachypters, 2.8–3.3 mm.; macropters, 3.2–4.1 mm. First gonocoxa not regularly tapering towards base, inner margin weakly concave (fig. 336). (Pronotum and scutellum light yellowish between outer keels, brownish outside them. Usually brachypterous with fore wings light yellow-brown, about one and a half to one and two-third times as long as broad: veins smooth, glabrous. Abdomen above light yellow-brown with series of distinct spots on either side forming broken longitudinal stripe and sometimes another weaker one. Overall length: brachypters, 2.8–3.3 mm.; macropters, 3.7–4.1 mm.)..... **aubei** (Perris) (27)



FIGS. 340–354.—First gonocoxa of female *Delphacodes* spp.: (340) *pellucida*; (341) *dubia*; (342) *obscurella*; (343) *discolor*; (344) *elegantula*; (345) *albofimbriata*; (346) *lugubrina*; (347) *pullula*; (348) *denticauda*; (349) *straminea*; (350) *flaveola*; (351) *dalei*; (352) *paludosa*; (353) *adela*; (354) *exigua*.

21 First antennal segment nearly twice as long as broad, rather widely darkened at apex; second about three times as long as broad, rather widely darkened at base. Usually brachypterous with fore wings about two and a half times as long as broad. (Frons very narrow, almost straight-sided (fig. 307). Pronotum and scutellum yellowish, often rather darker beyond outer keels. Fore wings brownish in brachypters, hyaline with light brown veins in macropters; veins with bristles emanating from granules, easily rubbed off. Abdomen above light yellow-brown, suffused darker at sides. Inner margin of first gonocoxa weakly concave (fig. 352). Overall length: brachypters, 2.8–3.3 mm.; macropters, 3.8–4.3 mm.)..... **paludosa** (Flor) (30)

- First antennal segment hardly longer than broad, second about twice as long as broad, not or only narrowly darker ringed. Brachypters with fore wings less than twice as long as broad. 22
- 22 Keels of frons and vertex sharp throughout, frontal keel forking well below transition with vertex, nearly level with base of antennae; frons narrow, almost straight-sided (fig. 303) [See couplet 7 of this key]
- brevipennis** (Boheman) (20) or **fairmairei** (Perris) (20)
- Keels of vertex not sharp, at least anteriorly towards junction with frons and vertex; frons rather broader. 23
- 23 First gonocoxa with inner margin distinctly concave and apical margin angularly excised, truncate (fig. 347). Vertex chestnut brown, distinctly darker than scutellum in brachypters. (Pronotum and scutellum of brachypters light yellow-brown, abdomen yellow-brown, usually darker at sides. Frons as in fig. 310. Fore wings of brachypters yellow-brown, about one and a third times as long as broad. In macropters, scutellum blackish, pronotum more or less dark, fore wings hyaline with light brownish veins. Overall length: brachypters, 2.1–2.4 mm.; macropters, 3.1–3.4 mm.) **pullula** (Boheman) (21)
- First gonocoxa with inner margin almost straight for much of its length, apical margin not excised, forming rounded obtuse angle with inner margin. Vertex not or hardly darker than scutellum. 24
- 24 Margin of first gonocoxa rather sharply angled at base (fig. 351). (Frons as in fig. 328. Vertex, pronotum and scutellum light yellow-brown. Abdomen light yellowish or brownish, rarely rather darker at sides. Fore wings of brachypters light brownish, about one and a half times as long as broad. Overall length: brachypters, 1.9–2.3 mm.) **dalei** (Scott) (24)
- Margin of first gonocoxa not angled at base. 25
- 25 First gonocoxa broadest towards apex, gradually narrowing towards base (fig. 350). Overall length: brachypters, 2.1–2.5 mm.; macropters (in Sweden; not reported from Britain), 3.0–3.5 mm. (Frons 1.7–1.8 times as long as broad, not very convex-sided. Keels of vertex rather indistinct. Brachypters pale yellowish. Fore wings of brachypters about one and a half times as long as broad)
- flaveola** (Flor) (29)
- First gonocoxa broadest near base, nearly parallel-sided for most of length (figs. 348, 349). Overall length of brachypters at least 2.5 mm.; macropters at least 3.4 mm. 26
- 26 Frons more convex-sided, broader, about 1.6 times as long as broad (fig. 320). Fore wings of brachypters somewhat shorter, rather less than one and a half times as long as broad. (Keels of vertex rather indistinct. Vertex, pronotum, scutellum and fore wings of brachypters pale yellow-brown. Overall length: brachypters, 2.6–2.8 mm.) **denticauda** (Boheman) (19)
- Frons straighter-sided, narrower, 1.8–2.0 times as long as broad (fig. 319). Fore wings of brachypters somewhat longer, at least one and a half times as long as broad. (Keels of vertex rather indistinct. Vertex, pronotum, scutellum and fore wings of brachypters pale yellowish. Overall length: brachypters, 2.5–2.6 mm.; macropters, 3.4–3.8 mm.) **straminea** (Stål) (29)

Genus *Dicranotropis* Fieber

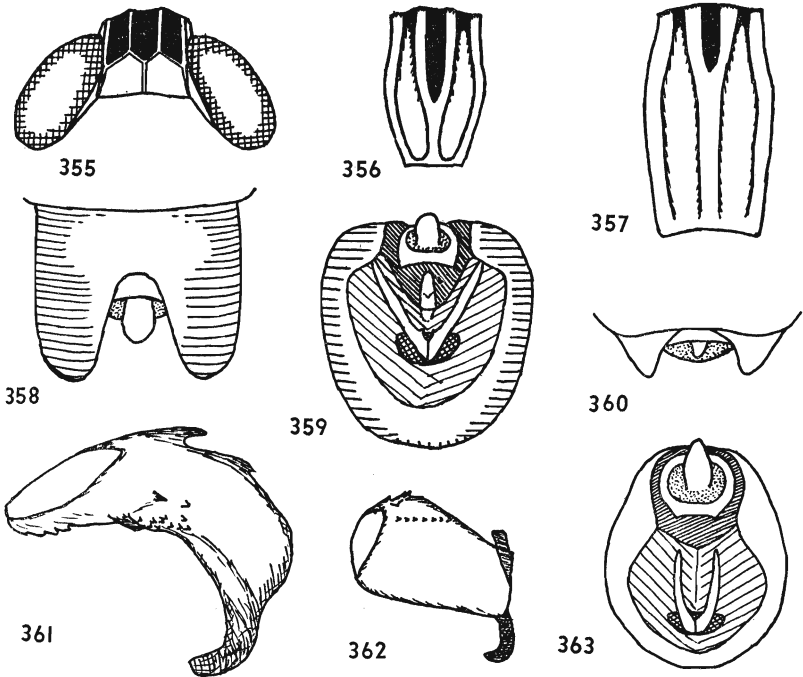
Two out of the five European species occur in Britain, one of which was added to our list in 1939. Both British species are usually brachypterous, with fore wings reaching not more than half length of abdomen, though macropterous forms also are found.

KEY TO SPECIES

- 1 Fork on frons higher, making its branches shorter than its stem (fig. 357). Fore wings pale, rather hyaline, with black streak along inner margin towards apex of anal vein in macropters and brachypterous male, weak or absent in brachypterous female: fore wings of brachypters rounded at apex. In male, abdomen black with fine pale dorsal line and sometimes rows of pale spots on each side; genital segment, seen from above, partly pale, long, with apical margin deeply emarginate (fig. 358). (Keels of frons whitish, bordered with black; vertex anteriorly entirely black between keels. Pronotum and scutellum variable in colour,

rather pale yellowish or brownish, sometimes with paler streak along median keels. Fore wings with fine black stiff hairs along veins, in brachypters reaching to about half length of abdomen or sometimes rather less in female. In female, abdomen with very variable dark brown markings, sometimes running into longitudinal bands and cross-markings at sides and sometimes reduced to a few dots. In male, parameres long, extending upwards to level of anal tube (fig. 359). Aedeagus as in fig. 361. Overall length: brachypters, 2.7-3.6 mm.; macropters, 4.5-5.0 mm. **hamata** (Boheman)

Generally common on grasses. England. Wales. Scotland. Ireland. v-ix. All Europe. Siberia. N. Africa.



Figs. 355, 357-359, 361.—*Dicranotropis hamata*: (355) head from above; (357) frons; (358) male genitalia from above; (359) the same, from behind; (361) aedeagus. Figs. 356, 360, 362, 363.—*D. divergens*: (356) frons; (360) male genitalia from above; (362) aedeagus; (363) male genitalia from behind.

- Fork on frons lower, making its branches longer than stem, the actual relative proportions rather variable (fig. 356). Fore wings without dark markings, in brachypters truncate at apex. In male, genital segment short, without deep median emargination (fig. 360). (On frons, keels white, margined with black; vertex black between keels anteriorly. Pronotum and scutellum light brownish in male, darker at sides. Fore wings of brachypters without distinct hairs along veins, greyish-white, with veins and apical margin white in male, brownish in female. In male, abdomen more or less entirely black, except for extreme base. In male, genital segment seen from behind higher than broad, parameres short, thin and acuminate, feebly divergent (fig. 363). Aedeagus as in fig. 362. Overall length: brachypterous ♂, 2.1-2.5 mm.; brachypterous ♀, 2.8-3.3 mm.; macropters, 3.7-4.2 mm.) **divergens** (Kirschbaum) (see China, 1939)

Wet places in upland pasture. Scotland: Perthshire, Inverness., Midlothian. vi viii. Mountain species, N. and C. Europe.

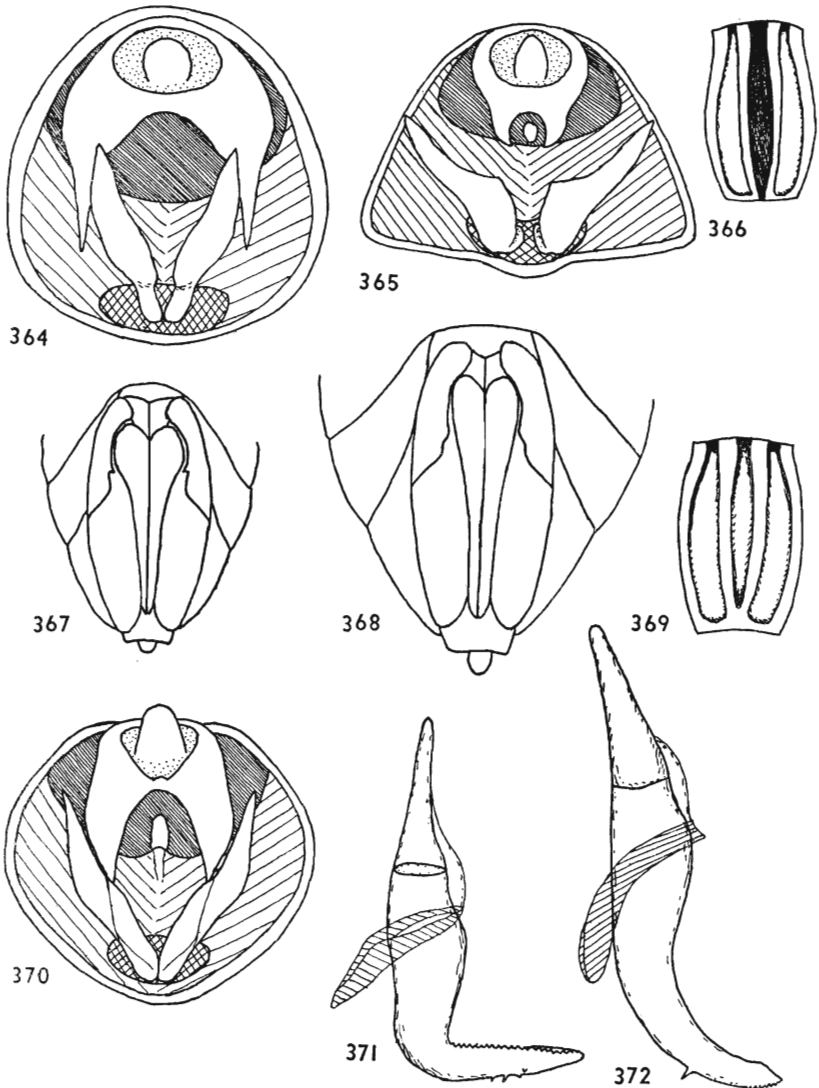
Genus *Criomorphus* Curtis(= *Stiroma* Fieber, = *Eurybregma* Scott)

In this genus I provisionally include *Stiroma* and *Eurybregma*, which have been separated by some authors: my reasons have been discussed elsewhere (Le Quesne, 1960). Seven out of the nine European species have been reported from Britain and these are discussed by China (1939).

All the British species are more usually brachypterous, but macropterous forms are not rare in some cases and have been reported in all of them. Some species bear a superficial resemblance to certain *Euryrsa* species, as already mentioned under the latter genus.

KEY TO SPECIES

- 1 Keels of frons whitish, thick and prominent (figs. 366, 369). Usually brachypterous, with fore wings black or brown in male, light brown in female, white along apical margin in both sexes. 2
- Keels of frons concolorous, thin and indistinct (figs. 375, 376, 382). Fore wings of brachypters either completely black or largely hyaline. 4
- 2 Inner keels of frons evanescent towards junction with vertex. In male, genital segment seen from behind almost oval, slightly broader than high, teeth of anal tube much longer than broad at base, gradually tapering to their apices (fig. 370). (Pronotum and scutellum whitish in brachypters, scutellum black in macropters; scutellum with keels very indistinct. In male, abdomen black with posterior margin of eighth tergum narrowly yellow, posterior margin of genital segment broadly whitish, lateral margins narrowly whitish. Fore wings of brachypters reaching base of abdomen, broadly rounded at apex; fore wings of macropters three-fourths longer than abdomen. Overall length: brachypterous ♂, 2.4 mm.; macropterous ♂, 4.2 mm.) *moestus* (Boheman)
Very local. N. England: Melkinthorpe and Cliburn Moss, Westmorland; Robin Hood's Bay, Yorks. On Continent, in damp places, under Calamagrostis canescens Gmel. vi. N. and C. Europe.
- Inner keels of frons equally distinct throughout. In male, genital segment seen from behind either nearly triangular (fig. 365) or higher than broad (fig. 364), teeth of anal tube either shorter than broad at base or swollen at base and suddenly narrowed. 3
- 3 In male, genital segment almost triangular from behind, teeth of anal tube shorter than broad at base, not divergent (fig. 365). Smaller—overall length: brachypterous ♂, 2.2–2.5 mm.; brachypterous ♀, 2.7–3.0 mm.; macropterous ♀, 3.9–4.2 mm. In female, gonoplasts broadly expanded and flattened basally into heart-shape, against which projects sharp tooth at side of first gonocoxa (fig. 367). (Keels of frons usually separate throughout, margined with black or dark brown (fig. 366). Pronotum broadly whitish posteriorly, anteriorly light brownish in brachypters, dark brown in macropters. Scutellum in brachypters usually brownish, more or less whitish bordered; almost black in macropters. In brachypters, fore wings reaching to about one-third length of abdomen, more or less truncate at apex; almost black in males except for whitish apical margin; veins smooth, without hairs. In macropters, fore wings brownish, veins with very fine pale hairs. In male, abdomen black, usually with thin brown broken median line, posterior margin of genital segment from above narrowly whitish. In female, abdomen brownish, transversely darker between some terga)
- albomarginatus* Curtis
- Common and widespread on grass in woods and on hillsides. England. Wales. Scotland. Ireland. iv-viii. Europe to Turkestan. N. Africa.*
- In male, genital segment from behind almost pearshaped, slightly higher than broad; teeth of anal tube longer than broad at base, then suddenly narrowed (fig. 364). Larger—overall length: brachypterous ♂, 2.6–2.9 mm.; brachypterous ♀, 3.5–3.9 mm.; macropterous ♂, 4.1–4.3 mm.; macropterous ♀, 4.5–



FIGS. 364, 368, 369.—*Criomorphus williamsi*: (364) male genitalia from behind; (368) female, end of abdomen from beneath; (369) frons.

FIGS. 365–367.—*C. albomarginatus*: (365) male genitalia from behind; (366) frons; (367) female, end of abdomen from beneath.

FIGS. 370–372.—*C. spp.*: (370) *moestus*, male genitalia from behind; (371) *affinis*, aedeagus; (372) *bicarinatus*, aedeagus.

4.9 mm. In female, gonoplares anteriorly slightly and gradually expanded, against which project rounded lobes at side of first gonocoxa (fig. 368). (Keels of frons usually tending to converge near lower margin, margined with black or dark brown (fig. 369). Pronotum brownish anteriorly, broadly whitish posteriorly. Scutellum in brachypters usually brownish, more or less whitish bordered; almost black in macropters. In brachypters, fore wings reaching to about one-third length of abdomen, more or less truncate at apex, brown in male except for whitish apical margin, without hairs. In macropters, fore wings greyish hyaline, veins yellowish, darker on apical part of costal margin. In male, abdomen mainly black, posterior margin of genital segment broadly whitish. In female, abdomen brownish, transversely darker between some terga)

(see China, 1939) *williamsi* China

On grasses, usually in rather damp places. *C. England : Northants., Oxon., Bucks., Herts., Middlesex, Surrey, Berks. v-vii. Not recognized elsewhere.*

- 4 Frons narrow, uniformly yellow (fig. 376). Scutellum, fore wings of brachypters, abdomen posteriorly and usually pronotum posteriorly shining black, sometimes brownish in female. (Vertex uniformly yellow. Legs light yellow, tarsi and coxae darker, rather long proportionately, especially in males. Fore wings reaching to about half length of abdomen in brachypterous males, one-quarter or less in brachypterous females, veins smooth, not very prominent. Macropters rare, with fore wings translucent, dirty whitish at apex, brownish at base, veins brownish. In male, anal tube whitish, genital segment as in fig. 377. Overall length: brachypterous ♂, 2.2-2.5 mm.; brachypterous ♀, 3.1-4.0 mm.; macropterous ♀, 4.4-4.7 mm.).....*pteridis* (Spinola)

Common and widespread on Pteris (bracken), mainly in woods. England, as far N. as Westmorland. Ireland. v-viii, x. Almost all Europe to Transcaucasia.

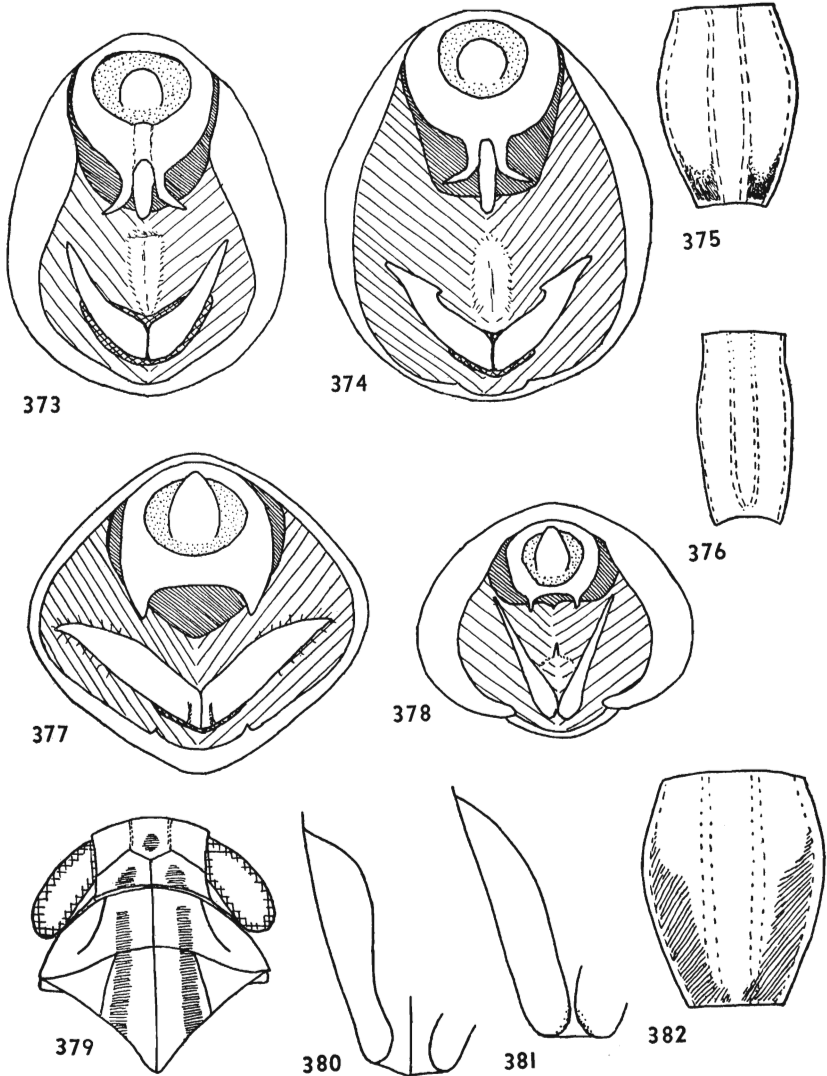
- Frons broad, usually with dark markings near lower margin, sometimes uniformly brownish (figs. 375, 382). Pronotum and scutellum largely pale, with black or brown longitudinal stripes or with black triangles on scutellum outside outer keels. Fore wings largely hyaline.....5
- 5 Pronotum, scutellum and abdomen yellowish with longitudinal black stripes in male, brown stripes in female (fig. 379). Vertex light brown with three black spots in triangle. Fore wings with three longitudinal brown stripes. (Lower part of frons more or less broadly dark at sides, frons rarely uniformly brownish (fig. 382). In brachypterous males, fore wings reaching to about one-half length of abdomen; in females about one-third. In macropters, fore wings much longer than abdomen with two outer dark streaks broadened towards apex. In male, anal tube whitish, parameres long, acuminate (fig. 378). Overall length: brachypterous ♂, 3.1 mm.; brachypterous ♀, 3.7-4.5 mm.; macropters, 4.9-5.4 mm.).....*nigrolineatus* (Scott)

On grasses, often in salt-marshes, but sometimes on grass-berges well inland and away from marsh. England, S. of line from Wash to Bristol Channel; S. Yorks. v-vii. N. and C. Europe to Turkestan.

- Vertex and pronotum wholly yellowish, without dark markings, or rarely, pronotum suffused darker but not forming longitudinal stripes. Scutellum yellowish, with black triangles beyond outer keels, or rarely completely dark. Abdomen yellowish or brownish, gradually darkened at sides, rarely completely blackish. Fore wings entirely hyaline between light brown veins.....6
- 6 In male, parameres obliquely truncate at apex, each angle produced into a small pointed tooth (fig. 374); aedeagus as in fig. 371. In female, first gonocoxæ widest near apex, with inner margin concave, remote from each other at base (fig. 380). (Frons brownish-yellow, sides with pair of black spots at lower margins (fig. 375). Vertex, pronotum and scutellum medially pale. In brachypterous males, fore wings reaching to about one-third length of abdomen; in brachypterous females, to about one-fifth. Overall length: brachypterous ♂, 2.9-3.4 mm.; brachypterous ♀, 3.3-3.7 mm.).....*affinis* (Fieber)

Locally common, usually in woods, perhaps associated with Fragaria or Geum. S. and C. England, as far N. as Staffs. and Yorks. vi-viii. N. and C. Europe.

- In male, parameres acuminate at apex (fig. 373); aedeagus as in fig. 372. In female, first gonocoxæ of equal width for most of their length, with inner margin straight, closely approximated to each other at base (fig. 381). (Brachypters normally coloured as *affinis*, but one male specimen has pronotum broadly dark posteriorly, scutellum and abdomen entirely blackish. Macropt-



FIGS. 373, 381.—*Criomorphus bicarinatus*: (373) male genitalia from behind; (381) female, first gonocoxa.

FIGS. 374, 375, 380.—*C. affinis*: (374) male genitalia from behind; (375) frons; (380) female, first gonocoxa.

FIGS. 376–377.—*C. pteridis*: (376) frons; (377) male genitalia from behind.

FIGS. 378, 379, 382.—*C. nigrolineatus*: (378) male genitalia from behind; (379) fore body; (382) frons.

terous male with scutellum dark brown medially, blackish beyond outer keels. Overall length: brachypterous ♂, 3.2–3.4 mm.; brachypterous ♀, 4.0 mm.; macropterous ♂, 4.6 mm.)..... *bicarinatus* (Herrich-Schaeffer)
Local in woods. England. Scotland. vi, vii. Europe. N. Africa.

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