## Royal Entomological Society



HANDBOOKS FOR

## THE IDENTIFICATION

## OF BRITISH INSECTS

To purchase current handbooks and to download out-of-print parts visit:
http://www.royensoc.co.uk/publications/index.htm


This work is licensed under a Creative Commons Attribution-NonCommercial-ShareAlike 2.0 UK: England \& Wales License.

Copyright © Royal Entomological Society 2012

## HANDBOOKS FOR THE IDENTIFICATION OF BRITISH INSECTS



HEMIPTERA
CICADOMORPHA
DELTOCEPHALINAE
By
WALTER J. LE QUESNE

LONDON
Published by the Society
and Sold at its Rooms
4I, Queen's Gate, S.W. 7

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.
" 2. Thysanura.
" 3. Protura.
, 4. Collembola.
; 5. Dermaptera and Orthopter.
6. Plecoptera.
7. Psocoptera.
" 8. Anoplura.

Part 9. Ephemeroptera.
" 10. Odonata.
" 11. Thysanoptera.
12. Neuroptera.
13. Mecoptera.
14. Trichoptera.
15. Strepsiptera.
16. Siphonaptera.
II. Hemiptera.
III. Lepidoptera.
IV. and V. Coleoptera.
VI. Hymenoptera: Sumohrta and Ambulate
VII. Hymenop
VIII. Hymenop
IX. Diptera:

Accession No
X. Diptera:

Volumes II t Subject not possible to 8]

Author


HOMOPTERA oidea.

Con part is
d ahoanness are main objectives in this series, and each of the new ar

ACCESSION NUMBER .........8.?3

A and $W$

TH of init

British Entomological \& Natural History Society
c/o Linton Pastures Country Park, Davis Street, Hurst, Reading, Berkshire RG10 TH
Presented by ...E E.
 Date

## Librarian

## REGULATIONS

1.- No member shall be allowed to borrow more than five volumes at a time, or to keep any of them longer than three months.
2.- A member shall at any time on demand by the Librarian forthwith return any volumes in his possession.
3.- Members damaging, losing, or destroying any book belonging to the Society shall either provide a new copy or pay such sum as the Council shall think fit.

# HEMIPTERA (CICADOMORPHA—DELTOCEPHALINAE) 

By Walter J. Le Quesne

Tmis part deals with the subfamily Deltocephalinae, which includes 101 British species.

General Adult Characteristics
Most of the terms used are defined in the previous part of this Handbook (1965). The following additional ones are indicated in the illustrations numbered as shown in brackets below:-
$A E C$, aedeagus connective (372)
CSC, central subapical cell (353)
$G O$, gonopore (667)
Explanation of Keys
These are as in previous parts of the Handbooks (1960, 1965). Measurements of total length apply to dried specimens and are often apparently larger for brachypterous specimens preserved in alcohol.

## Acknowledgments

I wish again to thank the Trustees of the British Museum (Nat. Hist.), the Director of the Royal Scottish Museum and the Hope Professor of Entomology, University of Oxford, for allowing me to study the respective collections in their charge. I am very grateful to Dr. W. J. Knight, Dr. M. G. Morris, Dr. J. B. Whittaker and Mr. G. E. Woodroffe who have tried out parts of these keys and made valuable suggestions. Besides the above and those mentioned in the previous part (1965), I must also thank Dr. A. F. Emel'janov, Mr. E. W. Groves, Mr. T. Huxley, Mr. R. N. B. Prior, Prof. O. W. Richards, Mrs. G. A. Smith, Mr. L. Trolle and Dr. N. Waloff, all of whom have given me assistance or lent me specimens.

I am also especially grateful to Mr. R. N. B. Prior and to the publishers of the Entomologist's Monthly Magazine for allowing me to use his drawings of the sternal apodemes and aedeagi of the Macrostelini (figs. 759-830). Some of these have been published previously (Prior, 1967).

## Subfamily Deltocephalinae <br> (= Edscelinae)

This large subfamily has a world-wide distribution, but the largest number of species occur in the Palaearctic and Nearctic regions. The majority of species feed on grasses, although some feed on clovers and other low plants
and transmit virus diseases to them and a few are found on trees and bushes.
A number of authors, including Haupt (1935), Evans (1947), Oman (1949), Wagner (1951), Ribaut (1952), Linnavuori (1959) and Emel'yanov (1962), have proposed tribal classifications. Most of these systems rely largely on the structure of the internal male genitalia and are thus not easily used for the naming of specimens. The key to tribes given below is an attempt to give a more practical assignment of British material, and thus more fundamental characters are often relegated to a secondary place.

## Key to Tribes

1 Ocellus very close to eyt, its distance less than half that of adjacent frontal suture from eye (fig. 338). Fore wings, when closed, with a broad red-brown band, narrowed in two places and edged with golden yellow (fig. 357). (Aedeagus connective of male long, Y-shaped apically (fig. 344)) ...... PLATYMETOPHNI (p. 70)

- Ocellus not so close to eye, usually either on frontal suture or on remote side of frontal suture from eye. Fore wings without such a red-brown longitudinal band
.2
2 Vertex distinctly concave and relatively sharply and acutely angled anteriorly in side view (fig. 365), distinctly longer than pronotum, normally with large black spot at apex and smaller ones at either side (fig. 337). Usually brachypterous, with fore wings less than one and a helf times as long as broad. (Aedeagus sturdy, articulated towards base (figs. 324, 329)) . . . . . . . . . . . . . . . . . . . . Doraturini (p. 67)
- Vertex in side view rarely distinctly concave; if so, more rounded anteriorly (fig. 361) and not distinctly longer than pronotum. If brachypterous, fore wings more than one and a half times as long as broad
.3
3 Width of genae at narrowest part (near anteclypeus; W in fig. 364) more than helf distance between ocellus and eye (figs. 366, 392, etc.) (except Metalimnus, where ratio about one-half). Vertex nearly flat in side view, longer than or approximately as long as pronotum (fig. 390) (except in Paramesus and sometimes in Psammotettix). Subapical $m$-cu cross-vein present in fore wings (fig. 653) (except in some Deltocephalus, Recilia, Palus, Psammotettix and Mocuellus). (In male, aedeagus connective long and narrow, forked, with branches parallel, often converging again at apex. Fore wings with at least two subapical cells (except sometimes in Mocuellus)) . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . Deltocephainni (p. 70)
- Width of genae at narrowest part at most half distance between ocellus and eye. Vertex often distinctly convex, but in some cases flat or concave; vertex at most approximately as long as pronotum, often distinctly shorter. Subapical $m$-cu cross-vein absent in fore wings (except in Allygus and Allygidius, where many supernumerary cross-veins are present (fig. 517), and rarely in Sardius and Mocydiopsis)
4 Fore wings completely developed, with only one subapical cell (neither central nor internal ones present-fig. 735)
- Fore wings with at least two subapical cells (either central or internal one presentfigs. 351-353, etc.) in macropters. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . 6
5 Vertex of approximately equal length throughout (fig. 742). Subcostal and radial veins of hind wings united to form a single vein at apex (fig. 739)

Balcluthini (p. 143)

- Vertex much longer in middle than near eyes (figs. 734, 741, etc.). Subcostal and radial veins of hind wings distinct at apex, although united for part of their length (fig. 737) . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . Macrostedini (p. 132)
6 Anteclypeus narrow, with lower part bent inwards towards thorax (figs. 636, 638). Ocelli approximately equidistant between eye and median line of head

Grypotini (p. 131)

- Anteclypeus broader, flat, situated entirely on face. Ocelli distinctly nearer eye than to median line of head.
7 Vertex not or very slightly longer in middle than close to eyes, green, unmarked (fig. 639). Transition between vertex and face smoothly and regularly rounded. (Fore wings bright green in basal half to two-thirds. Aedeagus with two gonopores (figs. 725, 728))
. OpSLINI (p. 128)
- Vertex distinctly longer in middle than close to eyes (except in Limotettix atricapillus, which has blackish markings (fig. 549)). Head seen from side with distinct, more or less rounded, angle between vertex and face (fig. 633). (Aedeagus with single gonopore. Aedeagus connective Y-shaped (Athysanini) or in form of triangle with concave edges (Fieberiellini)) Athysanint (p.93) or Fieberieidini (p. 131)


## Tribe Doraturini

This distinctive tribe was first clearly defined by Emel'janov (1962) and is represented in the Palaearctic and Nearctic regions. Five genera are found in Europe, but only Doratura occurs in Britain.


Figs. 324, 325, 326, 332.—Doratura impudica: (324) aedeagus, side view; (325) aedeagus, from behind; (326) paramere; (332) male genital segment, from above.
Figs. 329-331.-D. stylata: (329) aedeagus, side view; (330) aedeagus, from behind; (331) paramere.

Figs. 327, 328.-Arocephalus punctum: (327) aedeagus, from behind; (328) aedeagus, side view.
Figs. 333-335.-Metalimnus formosus: (333) aedeagus, side view; (334) aedeagus, from behind; (335) male, appendage of side of genital segment.
Fig. 336.-Arthaldeus striifrons, female, seventh abdominal sternum.

## Genus Doratura Sahlberg

Two species occur in Britain. British specimens of D. stylata are variable in size, markings and in the form of the male genitalia, some of them approximating to exilis, so that Le Quesne (1964a) synonymised the two species. However, recent work by Dworakowska (1968) on Continental material has shown that stylata and exilis are both valid species.

## Key to Species

1 Larger species-overall length: of at least 4.0 mm .; of at least 5.3 mm . In male, dorsal black spots on genital segment smaller, so that width of median spot is less than its distance from lateral spots (fig. 332); distance between apex of paramere and tooth at its inner margin at least 1.5 times that between this tooth and base of paramere (fig. 326). In female, gonoplac visible in ventral view $2 \cdot 0-2 \cdot 1 \mathrm{~mm}$. long. (Face straw-coloured, with or without two transverse bands; three blackish spots present or absent on margin of vertex and face. Vertex, pronotum, scutelcum and fore wings straw-coloured. Abdomen light brownish, often with four broken dark longitudinal lines at sides and a few dark dots on the terga. In male, posterior margin of eedeagus without teeth (figs. 324, 325) ...impudica Horvath On sandhills. England: Holkham and Hunstanton, Norfolk. viii. N. and C. Europe. Asia Minor.


Fig. 337.-Doratura stylata, male.

- Smaller species-overall length: of $3 \cdot 0-3.7 \mathrm{~mm}$.; ㅇ $4 \cdot 1-4 \cdot 5 \mathrm{~mm}$. In male, dorsal black spots on genital segment larger, so that width of median spot is greater than its distance from lateral spots (fig. 337); distance between apex of paramere and tooth at its inner margin less than 1.5 times that between this tooth and base of paramere (fig. 331). In female, gonoplac visible in ventral view $1 \cdot 0-1 \cdot 3 \mathrm{~mm}$. long. (Face light brownish or straw-coloured, with two transverse black bands and three black spots at margin of vertex and face (fig. 362). Vertex otherwise light brownish or straw-coloured, sometimes with some brown markings. Pronotum, scutellum and fore wings light brownish or straw-coloured. Macropters rare, with fore wings almost as long as abdomen. Abdomen brownish, with four or six more or less well-defined, often broken, longitudinal dark lines, and sometimes some dark dots on terga. In male, aedeagus with or without fine teeth (figs. 329, 330). In female, abdomen tapering apically into elongate gonoplacs (fig. 363).................. (= exilic: Le Quesne, nee Horváth) stylata (Boheman)

Widespread in open situations, often on sandy or calcareous soils, but sometimes on heavy, acid soils. Specimens from sandy localities often rather larger and paler. England. Scotland: Perthshire; Fife. vi-x. Europe. N. Africa. Siberia. N. America (probably introduced).


341


345


347


348

Figs. 338-341, 344, 345, 348.-Platymetopius undatus: (338) face; (339) aedeagus, from behind; (340) parameres and genital plates; (341) aedeagus, side view; (344) aedeagus connective; (345) appendage of male genital segment; (348) female, seventh abdominal sternum.
Figs. 342, 343, 346.-Paramesus nervosus: (342) aedeagus, from behind; (343) aedeagus, side view; (346) appendage of male genital segment.
Figs. 347, 349.-Seventh abdominal sterna: (347) Recilia coronifera; (349) Palus costalis.

## Tribe Platymetopitini

This tribe was first recognized by Haupt (1935), while Evans (1947) used the name in a wider sense. Oman (1949) showed that the Platymetopiini in Evans' sense was heterogeneous, and he and subsequent authors have included Platymetopius in the Deltocephalini. However, this genus seems intermediate between the Deltocephalini and Athysanini in several ways and I feel that it best fits into a separate tribe.

## Genus Platymetopius Burmeister

This genus is represented in Western Europe by seven species, though only one is found in Britain.

Face yellow, sometimes with two or three brown V-shaped bands on upper part of frontoclypeus, with frontoclypeus narrow and genae very broad; side margins of face with only slight incision below eye (fig. 338). Vertex rather acutely angled anteriorly (fig. 387), almost as long as pronotum, mainly red-brown with some yellow mottling, and with yellow area anteriorly against eyes. Pronotum and scutellum red-brown with yellow mottling; pronotum narrowly yellow anteriorly. Fore wings orange-yellow towards costa, red-brown towards inner margin with some whitish dots (fig. 357). In male, sides of genital segment with appendages as in fig. 345: genital plates and parameres as in fig. 340; qedeagus as in figs. 339, 341; aedeagus connective as in fig. 344. In female, seventh abdominal sternum as in fig. 348. Overall length: ${ }^{8} 4 \cdot 9-5 \cdot 3 \mathrm{~mm}$. ; ㅇ $5 \cdot 6-6 \cdot 2 \mathrm{~mm} . . .$. . undatus (DeGeer)

Local: in Britain has been reported from Pteris (bracken), from sallow and from oak, on Continent also from birch and Helianthemum. England: Norfolk, Herts., Kent, Surrey, Sussex, Berks., Wilts., Dorset, Devon. vi-ix. Europe. Probably also from Siberia and N. Africa.

## Tribe Deltocephalini

This tribe of small grass-feeding species has recently been split by Emel'yanov (1962), who has transferred most of its genera into the tribe Jassargini. Since this separation can be only be performed with certainty on the basis of the internal male genitalia, it has been found more convenient to use the name Deltocephalini in its wider sense here.

## Key to Genera

1 Vertex with strong black line parallel to anterior margin (figs. 391, 435) ......... 2

- Vertex without black line parallel to anterior margin .............................. 3

2 Anterior margin of vertex rounded, finely striolate (fig. 435). Frontoclypeus between ocelli approximately as broad as its length (fig. 438). Larger, overall length: at $5.0-5.4 \mathrm{~mm} . ;$; $5.8-6.8 \mathrm{~mm} . \ldots \ldots \ldots . . . . . . .$. . Paramesus Fieber (p. 75)

- Anterior margin of vertex more sharply angled, not striolate. Breadth of frontoclypeus between ocelli about three-quarters of its length (fig. 392). Smaller, overall length: ${ }^{\delta} 4.3-4.6 \mathrm{~mm}$.; ; $4.5-5.3 \mathrm{~mm}$. .. Paralimnus Matsumara (p. 92)
3 Vertex with two black or orange (black in British specimens so far found) spots covering more than half its area (fig. 393). Frontoclypeus in upper part with two blackish bands parallel to upper margin, distinct medially and fused at sides (fig. 396). (Fore wing boldly marked, as in fig. 356)

Metalimnus Ribaut (p. 77)

- Vertex with or without small black or brown spots, without large black or orange spots. Frontoclypeus in upper part either without blackish bands or with them not in above pattern
Several cross-veins present in cells of clavus of fore wing (fig. 354). Fore body and fore wings brown, apical cells of latter at least darker edged. In male, genital plates terminating in narrow points which cross each other apically (fig. 563). In female, posterior margin of seventh abdominal sternum with narrow two-pointed projection medially (fig. 407)
.Errastunus Ribaut (p. 80)
- No cross-veins (sometimes one or two in Jassargus) present in cells of clavus of fore wings. In male, genital plates not crossing each other at apex. In females of brown species, posterior margin of seventh abdominal sternum without narrow two-pointed projection medially

$$
.5
$$

5 External apical cell of fore wings with hyaline triangles on boundary veins meeting costa on either side, sometimes not very obvious when ground-colour rather pale (figs. 386, 388, 389)

$$
.6
$$

- External apical cell of fore wings without hyaline triangle on boundary vein meeting costa on at least one side

$$
.9
$$

6 anteriorly; two black or dark brown spots often also present along posterior margin (fig. 439). Face light brownish, usually unicolorous, but sometimes with broad red-brown V-shaped mark on frontoclypeus. (In male, genital segment without appendages, genital plates squarish apically, their spines disordered (fig. 446). In female, posterior margin of seventh abdominal sternum rather wavily concave (fig. 403)
. Adarrus Ribaut (p. 80)

- Vertex without well-defined black or dark brown spots medially or along posterior margin; two blackish triangular spots or linear streaks often present anteriorly. Face normally with dark brown or blackish markings
.. 7
7 Distinct black spot usually present at apex of internal subapical cell of fore wings (fig. 389); no other dark mark on fore wings except rarely some dark edging of apical cells. In male, genital plates only extending short distance beyond apex of valve (fig. 447). In female, posterior margin of seventh abdominal sternum broadly and smoothly concave for most of width (fig. 410)

Arocephalus Ribaut (p. 79)


Fias. 350-357.-Fore wings: (350) Palus costalis: (351) Mocydia crocea; (352) Sardius argus; (353) Mocydiopsis attenuata; (354) Errastunus ocellaris; (355) Rhytistylus proceps; (356) Metalimnus formosus; (357) Platymetopius undatus. (CSC $=$ central subapical cell).

- Black markings of fore wings almost always more extensive or absent. In male, genital plates longer than valve (figs. 569, 573). In female, seventh abdominal sternum of different form (figs. $400,402,404$ )
8 Curvature of apex of fore wings more or less symmetrical (fig. 386). Dark markings of vertex usually consisting of thin lines parallel to anterior margin (fig. 395) or absent. In male, genital plates longer, not or less distinctly truncate (fig. 573). In female, posterior margin of seventh abdominal sternum with three shallow depressions (of which, median one may be sinuate) separated by pointed projections (figs. 400, 402)

Jassargus Zakhvatkin (p. 83)

- Curvature of apex of fore wings not symmetrical in brachyters (fig. 388); macropters very rare. Two wedge-shaped markings present towards apex of vertex (fig. 397). In male, genital plates fairly short, truncate (fig. 569). In female, posterior margin of seventh abdominal sternum with median angular incision (fig. 404)

Turrutus Ribaut (p. 80)


Figs. 358, 364.-Recilia coronifera: (358) vertex; (364) face. (W = width of gena at narrowest part.)
Fig. 359.-Rhytistylus proceps, face.
Fig. 360.-Deltocephalus maculiceps, vertex.
Fig. 361.-Graphocraerus ventralis, head in side view.
Figs. 362, 363, 365.-Doratura stylata: (362) face; (363) female, body; (365) head in side view.
Figs. 366, 367 -Deltocephalus pulicaris : (366) face; (367) vertex.
9 Transition between vertex and face with broad black band, bent downwards along eyes at sides, enclosing seven distinct white roundish spots, five visible from above and other two at lower level (figs. 358, 364)
........... Recilia Edwards (p. 77)

- If black band present between vertex and face, this either does not contain series of whitish spots or contains only three white spots, the side ones being elongate or 8 -shaped and the black band not bent downwards along eyes at sides (figs. 380, 381)

Vertex anteriorly with two comma-shaped black marks, forming part of a rather variable black band on transition between vertex and face, interrupted medially by a white, roughly circular spot (figs. 380, 381) ; a pale 8- or boot-shaped spot enclosing ocellus is more or less completely bounded by this black band

Palus DeLong and Sleesman (caudatus Flor) (p. 79)

- If black markings present on transition between vertex and face, not as above . II

11 Fore wing reddish brown apically, paler basally, with two well defined black spots, one in internal apical cell and other in subexternal apical cell (fig. 350)

Palus DeLong and Sleesman (costalis Fallén) (p. 79)

- Fore wings without well defined black spots in internal apical and subexternal apical cells
12 Males . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . 13
Females . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . 21
13 Genital plates short, in ventral view with internal edges much shorter than length of valve (fig. 444)

Psammotettix Haupt (p. 89)
Genital plates longer, with internal edges as long as or longer than valve....... 14
14 Genital plates with strong incision in outer margin (fig. 445). (Fore wings greenish or brownish, rather opaque. Overall length $3 \cdot 3-4 \cdot 4 \mathrm{~mm}$.)

Diplocolenus Ribaut (p. 85)
Genital plates without mcision in outer margin . . . . . . . . . . . . . . . . . . . . . . . . . . . 5
15 Genital plates truncate, with inner margins about as long as valve (fig. 450). Aedeagus asymmetrical (figs. 451, 452). (Vertex with two pairs of black-brown spots; fig. 448 )3

Genital plates with inner margins longer than valve. Aedeagus symmetrical... 16
Frontoclypeus broad, less than one and a half times as long as broad at level of base of antennae (figs. 366, 641)
.17

- Frontoclypeus narrow, more than one and a half times as long as broad at level of base of antennae (figs. 398, 644)
.18
17 Vertex usually with black or dark brown spots (figs. 360, 367). Fore wings brownish
Veltocephalus Burmeister (p. 78)
Vertex without dark spots or with rather indistinct thin dark streaks near anterior margin. Fore wings, yellowish or greenish . . . . . . . Sorhoanus Ribaut (p. 88) Genital segment distinctly shorter than genital plates; latter with minute tooth (only distinct under high magnification) at apex of inner margin (fig. 567). Postclypeus with distinct alternate lighter and darker bands (fig. 454)

Arthaldeus Ríbaut (p. 88)

- Genital segment longer than genital plates; latter without minute tooth at apex of inner margin. Postclypeus unmarked or with faint paler patches at extreme sides only
.19
19 Genital plates convex, less than two-thirds as long as genital segment (fig. 443)
Mocuellus Ribaut (metrius (Flor)) (p. 86)
Genital plates concave along outer margin, more than two-thirds as long as genital segment .20
20 Fore wings greenish, cells not darker margined, almost invariably considerably shorter than abdomen. Genital plates more pointed apically (fig. 461)

Mocuellus Ribaut (collinus (Boheman)) (p. 86)

- Fore wings brownish, cells often darker margined, at least as long as abdomen. Genital plates more smoothly rounded apically (fig. 572)

Palus DeLong and Sleesman (panzeri Flor) (p. 79)
21 Posterior margin of seventh abdominal sternum with rather narrow two-pointed projection medially (fig. 399). (Fore wings greenish or brownish, rather opaque. Overall length $3 \cdot 8-4 \cdot 9 \mathrm{~mm}$.) $\ldots . . . . . . . . .$. . . . Diplocolenus Ribaut (p. 85)

- Posterior margin of seventh abdominal sternum without narrow two-pointed projection medially

22
22 Posterior margin of seventh abdominal sternum divided by incisions into three lobes (figs. 406, 408, 409, 453)

- Posterior margin of seventh abdominal sternum straight or smoothly curved, sometimes with narrow median incision, but not divided into three lobes. . . . . . . . 26
Posterior margin of seventh abdominal sternum with three projections separated by incisions approximately as deep as broad, lateral projections sharply pointed (fig. 453)
.Ebarrius Ribaut (p. 86)
Posterior margin of seventh abdominal sternum divided into three rounded lobes by shallow incisions, much broader than deep (figs. 406, 408, 409)

24 Vertex usually with distinct black or dark brown spots (figs. 360, 367). Fore wings brownish, with or without cells darker edged. (Frontoclypeus broad, less than one and a half times as long as broad at level of base of antennae (fig. 366))

Deltocephalus Burmeister (p. 78)

- Vertex without distinct black or dark brown brown spots. Fore wings usually greenish or yellowish, cells not darker edged
Frontoclypeus with alternate pale and dark transverse markings, less than 1.5 times as long as broad at level of base of antennae (fig. 641). Median lobe of posterior margin of seventh abdominal sternum usually with median incision (fig. 406)

Sorhoanus Ribaut (p. 88)


Figs. 368, 369.-Deltocephalus pulicaris: (368) aedeagus, side view; (369) aedeagus, from behind.
Fig. 370.-D. maculiceps, aedeagus, side view.
Figs. 371, 376.-Recilia coronifera: (371) aedeagus, side view; (376) genital plates, valve and parameres.
Figs. 374, 375, 377, 378.-Palus costalis: (374) aedeagus, from behind; (375) aedeagus, side view; (377) appendage of side of male genital segment; (378) genital plates and valve.
Figs. 372, 373, 379.-P Panzeri : (372) aedeagus, from behind; (373) aedeagus, side view; (379) male genital segment, side view. (AEC $=$ aedeagus connective.)

- Frontoclypeus unicolorous, more than 1.5 times as long as broad at level of base of antennae (fig. 644). Median lobe of posterior margin of seventh abdominal sternum without trace of median incision (fig. 408) .. Mocuellus Ribaut (p. 86)
26 Posterior margin of seventh abdominal sternum straight or smoothly and gently concave, without incision (fig. 405) .............Psammotettix Haupt (p. 89)
- Posterior margin of seventh abdominal sternum with deep, narrow median incision (figs. 401, 411).
.27
27 Posterior margin of seventh abdominal sternum almost straight (except for median incision) (fig. 411). Fore wings brown, with cells often margined darker brown

Palus DeLong and Sleesman (panzeri Flor) (p. 79)

- Posterior margin of seventh abdominal sternum strongly concave (figs. 336, 401). Fore wings greenish or yellowish, cells not distinctly darker margined

Arthaldeus Ribaut (p. 88)


Figs. 380-385.-Palus caudatus: (380) face; (381) vertex; (382) parameres and genital plates; (383) aedeagus, from behind; (384) aedeagus, from side; (385) female, seventh abdominal sternum.

Genus Paramesus Fieber
Of the three species reported from Western Europe, only one occurs in Britain.

Face broad, light yellow-brown with black-brown transverse band just below ocelli; frontoclypeus with other brown transverse bands; anteclypeus usually marked with brown basally and medially; lorae brown edged in males; brown patches present round base of antennae (fig. 438). Length of vertex about three-quarters that of pronotum. Vertex smoothly curved anteriorly, yellow-brown with strong black line just behind ocelli and ill-defined grey-brown line posteriorly. Pronotum yellowish-brown, more or less irregularly marked with grey-brown. Scutellum yellow-brown with more or less clear darker markings basally and


Figs. 386, 395.-Jassargus pseudocellaris: (386) fore wing; (395) vertex and pronotum. Fic. 387.-Platymetopius undatus, vertex.
Fias. 388, 397.-T'urrutus socialis: (388) fore wing; (397) vertex and pronotum.
Fig. 389.-A rocephalus punctum, fore wing.
Fras. 390, 394.-Errastunus ocellaris: (390) head in side view; (394) face.
Figs. 391, 392.-Paralimnus phragmitis: (391) vertex and pronotum; (392) face.
Figs. 393, 396.-Metalimnus formosus: (393) vertex, pronotum and scutellum; (396) face.
Fig. 398.-Palus panzeri, face.
medially, as in fig. 435. Fore wings with prominent yellowish veins, cells edged darker brown, especially in male. In male, appendage of side of genital segment as in fig. 346; aedeagus as in figs. 342, 343. Overall length: ${ }^{\boldsymbol{t}} 5 \cdot 0-5 \cdot 4 \mathrm{~mm}$.;


Marshy places near coast, associated with Scirpus maritimus L. and perhaps also Phragmites. England, as far $N$. as Lancs., Cheshire and Lincs. vii-ix. Europe. S.W. Asia. N. America (probably introduced).

## Genus Metalimnus Ribaut

$(=S c a p h o i d e u s:$ auctt., nec Uhler, $=$ Deltocephalus: auctt. partim,
nec Burmeister)

This genus has two European species, one of which is found in Britain. The description below is based on British and Swedish material, since the British specimens which I have seen are all females and represent only one of the colour-forms found on the Continent.

Face light brown; anteclypeus, lorae and lower part of genae black in dark specimens; frontoclypeus with two transverse black-brown or brown bands near upper margin and two large black-brown patches below; black-brown patches present around base of antennae (fig. 396). Vertex and pronotum light grey-brown with black or orange markings as in fig. 393. Scutellum light brownish with darker brown or orange besal triangles and dark transverse mark. Fore wings light brown and white with bold black-brown markings as in fig. 356. Femora black except at apices in dark specimens. In male, sides of genital segment with appendage as in fig. 335; aedeagus as in figs. 333, 334. Overall length: $\delta^{*} 3 \cdot 3-3.6 \mathrm{~mm}$.; 우 4.2-


In damp places, perhaps associated with Glyceria, Pseudacorus or Carex. England: Brandon, Suffolk. viit, ix. N. and C. Europe. Caucasus.

## Genus Recilia Edwards

## ( = Deltocephalus: auctt. partim, nec Burmeister)

This genus was regarded as a subgenus of Deltocephalus by Ribaut (1952) and in the second edition of the Kloet \& Hincks check-list (Le Quesne, 1964b). However, I now prefer to give it generic status, following Emel'janov (1962, 1964). Recilia and Deltocephalus are both characterised by the aedeagus being fused to the connective and by variable presence of an $m$-cu cross-vein in the fore wing.

One of the two European species occurs in Britain.
Transition between vertex and face with broad black band, bent downwards along eyes at sides, enclosing seven distinct white roundish spots, five visible from above and other two at lower level (figs. 358, 364). Face light brownish with darker brown transverse streaks on frontoclypeus and upper edge of lorae darkened. Vertex (except for above-mentioned black band) light brownish, sometimes with rather indistinctly darker brown pattern. Pronotum and scutellum light brown, sometimes with rather indefinite markings. Fore wings light brown, usually with one or two darker spots and apical cells darker margined; some other cells sometimes darker margined. Legs pale brown with blackish spots. In male, genital plates and parameres as in fig. 376; aedeagus as in fig. 371. In female, seventh abdominal sternum with three lobes separated by shallow incisions (fig. 347). Overall length: đ̛ o $+3 \cdot 3-3.8 \mathrm{~mm}$.)
( $=$ coroniceps (Kirschbaum),$=$ i-album (Scott)) coronifera Marshall Local, on short grass in heathy or calcareous situations. C. and S. England, as far N. as Staffs. and Norfolk. vi-x. C. and S. Europe. Caucasus.

## Genus Deltocephalus Burmeister

This genus as now defined contains two European species, both of which occur in Britain.

## Key to Species

1 Vertex with two large roundish black spots (fig. 360) separated by approximately their own diameter, and sometimes two smaller black spots towards apex. Cells of fore wings uniformly light brown. (Face light brown, often uniformly so in females; in males and some females, frontoclypeus with large blackish patch medially and blackish lines at sides in lower half, anteclypeus with longitudinal blackish median band, and blackish streaks present below insertion of antennae. Pronotum and scutellum uniformly light brown. Lege uniform pale brown or femora and tibiae partly black-brown. In male, aedeagus as in fig. 370. Overall
 Locally common on grasses, mainly on acid heaths. C. and S. England, as far N. as Staffis. and Norfolk. Ireland: Woodford, Co. Galway. vi-x. France. Germany. Austria. Scandinavia.

- Vertex light brown, usually with smaller dark brown spots, variable in number and pattern; if two large spots present medially, these are irregular in shape and are


399


401


403


406


404


407


410
402


400



408


411
409
Figs. 399-411.-Females, seventh abdominal sterna: (399) Diplocolenus abdominalis juvencus ; (400) Jassargus pseudocellaris ; (401) Arthaldeus pascuellus ; (402) Jassargus flori; (403) Adarrus multinotatus; (404) Turrutus socialis; (405) Psammotettix putoni; (406) Sorhoanus xanthoneurus; (407) Errastunus ocellaris; (408) Mocuellus metrius; (409) Deltocephalus pulicaris; (410) Arocephalus punctum; (411) Palus panzeri.
separated by less than their width (fig. 367). Cells of fore wing more or less widely marked with dark brown. (Face largely black, frontoclypeus with pale crosslines, at least in upper part (fig. 366). Pronotum and scutellum light brown, more or less darker marked. Femora blackish except apically; hind tibiae blackish. In male, aedeagus as in figs. 368, 369. In female, seventh abdominal sternum as in fig. 409. Overall length: ${ }^{\text {o }} 2 \cdot 5-2 \cdot 8 \mathrm{~mm}$.; 우 $2 \cdot 5-3 \cdot 4 \mathrm{~mm}$.) . .pulicaris (Fallén)

Common on short grasses, usually in drier localities, such as hill-sides. England. Wales. Scotland. Ireland. vi-x. Europe. Siberia. N. Africa. N. America.

## Genus Palus DeLong and Sleesman

( = Cosmotettix Ribaut, = Deltocephalus: auctt. partim, nec Burmeister)
Three species are recorded from Western Europe, all of which occur in Britain. A fourth species is found in Scandinavia. The presence of an $m$-cu cross-vein in the fore wings is variable and the aedeagus has a " collar " in the species of this genus.

## Key to Species

1 Vertex anteriorly with two comma-shaped black marks, forming part of a rather variable black band on transition between vertex and face, interrupted medially by a whitish, roughly circular spot (figs. 380, 381); a pale 8- or boot-shaped spot enclosing ocellus is more or less completely bounded by this black band. (Face yellow-brown; in females, lorae usually marked with dark streaks along edges. Vertex (except for black marks anteriorly), pronotum and scutellum orangebrown, often with rather darker brown longitudinal bands. Fore wings orangebrown, sometimes with rather darker streaks in cells; subapical $m$-cu cross-vein usually absent. In male, genital plates and parameres as in fig. 382, aedeagus as in figs. 383, 384. In female, seventh abdominal sternum as in fig. 385. Overall


On grass in damp places near ponds. England: Amersham, Bucks. vii. France. Germany. Scandinavia. N. Russia.

- Black markings absent on head....................................................... . . 2

2 Fore wings with two well-defined blackish spots, one in internal apical cell and other in subexternal apical cell (fig. 350). In male, large oblong black spot present on genital plate (fig. 378). In female, seventh abdominal sternum with a broad, shallow incision, divided into three lobes (fig. 349). (Face, vertex, pronotum and scutellum yellow-brown, unmarked. Fore wings yellow-brown, with some hyaline patches in apical half. In male, aedeagus as in figs. 374, 375; genital segment with appendages beneath as in fig. 377. Overall length: ${ }^{1} 3.2 \mathrm{~mm}$.; ; $3 \cdot 4-3.5 \mathrm{~mm}$.)
costalis (Fallén)
Among low plants in marshes. England: Ranworth, Norfolk. vii. Germany. Hungary. Scandinavia. Russia. Turkestan.

- Fore wings without blackish spots, more or less brownish with veins often margined darker brown. In male, genital plates without distinct black spot. In female, seventh abdominal sternum with a simple deep and narrow incision in posterior margin (fig. 411). (Face (fig. 398), vertex, pronotum and scutellum more or less uniform brownish. In male, aedeagus as in figs. 372, 373; genital segment without appendages, considerably longer than anal tube or genital plates (fig. 379); genital plates and parameres as in fig. 572 . Overall length: of ㅇ $3 \cdot 1-3 \cdot 4 \mathrm{~mm}$.)
panzeri (Flor)
In marshy areas, perhaps associated with Eriophorum (cotton-grass). England. Newchurch Common, Cheshire; Chobham, Surrey. Scotland: Isle of Canna. vii, viii. N. and C. Europe.


## Genus Arocephalus Ribaut

( $=$ Deltocephalus: auctt. partim, nec Burmeister)
Only one out of the four Western European species occurs in Britain. A. longiceps (Kirschbaum) was included in China's (1950) check-list, presumably due to its being incorrectly synonymised with Deltocephalus $i$-album

Scott (cf. Le Quesne, 1964a), but there is no other evidence that it has been found in Britain.

Face greyish-brown, with thin oblique blackish or brown lines on upper part of frontoclypeus. Vertex rather sharply pointed apically, pale yellow-brown with two thin dark lines converging towards apex and sometimes other darker patches posteriorly. Pronotum and scutellum yellow-brown, sometimes with indistinet brownish longitudinal bands. Fore wings straw-yellow, almost always with blackish spot at apex of median subapical cell, almost always rather shorter than abdomen (fig. 389). In male, genital plates not reaching apex of genital seginent (fig. 447); aedeagus as in figs. 327, 328. In female, seventh abdominal sternum as in fig. 410. Overall length: ${ }^{7}$. $2 \cdot 6-3 \cdot 1 \mathrm{~mm}$.; ㅇ $2 \cdot 8-3.9 \mathrm{~mm}$. .... punctum (Flor) Common on fine grasses in dry situations. Eingland. Wales. Scotland: Invernessshire; Morays. vii-x. Europe. Turkestan.

## Genus Turrutus Ribaut <br> (= Deltocephalus: auctt. partim, nec Burmeister)

There is only one species in Western Europe.
Frontoclypeus black-brown or chestnut brown with thin pale oblique lines, broken medially. Anteclypeus light brown, often with darker longitudinal band. Lorae light brown, often darker edged. Vertex, pronotum and scutellum light brownish, often with tendency to form darker longitudinal streaks; vertex anteriorly with two blackish, wedge-shaped markings and often a pair of blackish dots between these and compound eyes (fig. 397). Fore wings brown, cells sometimes darker edged; normally brachypterous, with fore wings almost as long as abdomen in male, about three-quarters of length of abdomen in female (fig. 388); macropters rare, with fore wings longer than abdomen. In male, genital plates and parameres as in fig. 569; side of genital segment with appendage as in fig. 423; aedeagus as in figs. 417, 418. In female, seventh abdominal sternum as in fig. 404. Overall
 On grasses, usually on calcareous soils. England. Scotland: Perthshire; Rhum. Ireland: Co. Clare; Co. Dublin. vi-x. Europe. Algeria.

## Genus Errastunus Ribaut

( = Deltocephalus: auctt. partim, nec Burmeister)

There is only one species in Western Europe.
Face yellow-brown, frontoclypeus with more or less extensive black-brown markings (sometimes nearly completely black-brown), anteclypeus, edges of lorae and areas around base of antennae usually more or less widely black-brown (fig. 394). Vertex yellow-brown with broad red-brown patches and sometimes dark brown spots or streaks near anterior margin. Pronotum and scutellum yellow-brown, with more or less well-defined red-brown longitudinal streaks and often blackbrown besal triangles on scutellum. Fore wings slightly longer than abdomen in mole, about as long as abdomen (rather variable) in females; cells light brown, apical cells, and often all cells, more or less widely edged dark brown (fig. 354). In male, aedoagus as in figs. 424, 425; aedeagus connective as in fig. 426; genital

ocellaris (Fallén)
Widely distributed and common on grasses, especially in rather rank herbage. England. Wales. Scotland. Ireland. v-x. N. and C. Europe. Siberia. N. America.

Genus Adarrus Ribaut
( = Deltocephalus: auctt. partim, nec Burmeister)
One species occurs in Britain out of seven from Western and Central Europe.


Figs. 412, 413, 422.-Jassargus sursumflexus: (412) medeagus, from behind; (413) aedeagus, side view; (422) female, seventh abdominal sternum.
Figs. 414-416.-J. pseudocellaris: (414) aedeagus, from behind; (415) aedeagus, side view; (416) male, ventral tooth of genital segment.
Figs. 419-421.-J. flori: (419) aedeagus, from behind; (420) aedeagus, side view; (421) appendages of side of male genital segment.
Ftgs. 417, 418, 423.-Turrutus socialis: (417) aedeagus, from behind; (418) aedeagus, side view; (423) appendage of mole genital segment.
Figs. 424-426.-Errastunus ocellaris: (424) aedeagus, from behind; (425) qedeagus, side view; (426) aedeagus connective.

Head light brownish (except for markings described in key to genera) (fig. 439). Pronotum light brownish, often with two to five well-defined black or dark brown spots. Scutellum light brownish, often with two dark dots. Cells of fore wings mainly light brownish, apical cells and some others often partly edged dark brown, often with a prominent dark spot or streak at apex of internal subapical cell; some veins often whitish or with adjacent white patches. Fore wings slightly longer than abdomen in males, somewhat shorter in females. In males, genital plates as in fig. 446, often each with black longitudinal streak apically; aedeagus as in figs. 429, 430. In female, seventh abdominal sternum as in fig. 403. Overall length: ${ }^{\text {o }}$ 2.9-3.2 mm.; 우 $3 \cdot 3-3.6 \mathrm{~mm} . . . . . . . . .$. . . multinotatus (Boheman)

Local, near base of taller grasses, usually in calcareous areas. England: Yorks., Staffs, Derbys., Notts., Leics., Northants., Glos., Essex, Surrey, Berks. vi-x. Europe. N. Africa.


Figs. 427, 428.-Diplocolenus abdominalis juvencus: (427) aedeagus, from behind; (428) aedeagus, side view.
Fias. 431, 432,-D. bensoni : (431) aedeagus, from behind; (432) aedeagus, side view.
Figs. 429, 430.-Adarrus multinotatus: (429) aedeagus, from behind; (430) qedeagus, side view.
Figs. 433, 434.-Sorhoanus xanthoneurus: (433) aedeagus, from behind; (434) aedeagus, side view.

## Genus Jassargus Zakhvatkin

## ( $=$ Lausulus Ribaut, $=$ Deltocephalus: auctt. partim, nec Burmeister)

There are at least ten species in Western Europe, but only three occur with certainty in Britain. The two common British species are variable in degree of pigmentation, which has caused some confusion among the older authors. I have discussed the synonymy elsewhere (Le Quesne, 1964a). Males and females are keyed separately below for convenience.

Key to Spectes
(Males)
1 Anal tube, in side view, not reaching as far as apex of side of genital segment (fig. 496). Side of genital segment without small tooth inwardly, but with larger tooth ventrally (not normally visible without dissection) (fig. 416). Aedeagus seen from behind shaped like pen-nib, pointed apically (figs. 414, 415). (Face yellow-brown with extensive black-brown markings on frontoclypeus and usually dark streak on anteclypeus; lorae dark-edged. Vertex yellow-brown, often indistinctly marked with red-brown, anteriorly with two narrow dark streaks converging towards apex and two blackish dots about half-way between apex and eyes; two dark median spots very rarely present (fig. 395). Pronotum and scutellum yellow-brown. Fore wings yellow-brown, slightly longer than abdomen; apical cells often and other cells sometimes darker edged (fig. 386). In male, genital plates and parameres as in fig. 573. Overall length: $2 \cdot 7-3 \cdot 3 \mathrm{~mm}$.)
( $=$ distinguendus (Flor), $=$ repletus: (Edwards) nec (Fieber), $=$ paleaceus (Sahlberg)) pseudocellaris (Flor) Common and widespread on grasses. England. Wales. Scotland. Ireland. vi-x. Europe. Iceland. Siberia.

- Anal tube, in side view, reaching beyond apex of side of genital segment (fig. 497). Side of genital segment with small tooth inwardly as well as larger tooth ventrally (neither normally visible without dissection) (fig. 421). Aedeagus seen from behind either narrow, with two spines near apex (fig. 419) or terminating apically in two narrow projections (fig. 412)
2 Aedeagus short and stout, seen from behind terminating apically in two narrow projections (figs. 419, 420). (Face yellow-brown with extensive black-brown markings on frontoclypeus and usually dark streak on anteclypeus; lorae dark edged. Vertex yellow-brown, usually with rather distinct red-brown patches, anteriorly with two more or less distinct narrow dark streaks converging towards apex and two blackish dots or very short narrow streaks about half-way between apex and eyes. Pronotum and scutellum yellow-brown, often more or less marbled with red-brown. Fore wings light brown, slightly longer than abdomen; apical cells usually and some other cells often darker edged. Overall length : $2 \cdot 7-3 \cdot 2 \mathrm{~mm}$.)
( $=$ oculatus (Sahlberg), $=$ picturatus: $(E d w a r d s)$ nec (Fieber)) flori (Fieber)
Locally common on grasses, sometimes associated with patches of heather or calcareous grassland. England. Wales. Scotland. vii-ix. N. and C. Europe.
- Aedeagus long and thin, apically with two lateral projections making an acute angle with stem (figs. 412, 413). (Colouration as in flori. Overall length: $2.5-3.2 \mathrm{~mm}$.)
sursumflexus (Then)
Local, in heathy areas, sometimes at edges of pools. England: Cheshire, Staffs., N.E. Yorks. viii, ix. N. and C. Europe.


## (Females)

1 Seventh abdominal sternum with two pointed projections prominent and depression between them smoothly curved, distinctly shallower than lateral depressions (figs. 402, 422). (Colouring as in male flori, but anterior dark streaks of vertex sometimes obsolescent. Fore wings normally somewhat shorter than abdomen. Overall length $2 \cdot 9-3 \cdot 7 \mathrm{~mm}$.)
. flori (Fieber) or sursumflexus (Then) ${ }^{1}$

[^0]

Figs. 435, 438.-Paramesus nervosus: (435) vertex, pronotum and scutellum; (438) face. Fig. 436.-Graphocraerus ventralis, vertex and pronotum.
Figs. 437, 443.-Mocuellus metrius: (437) vertex and pronotum; (443) male, genital segment in side view.
Figs. 439, 446.-Adarrus multinotatus: (439) vertex and pronotum; (446) male, genital plates and parameres.
Figs. 440, 442.-Sorhoanus xanthoneurus: (440) vertex and pronotum; (442) apex of male genital segment, side view.
Fig. 441.-Arthaldeus pascuellus, male genital segment, ventral view (genital plates removed).
Fig. 444.-Psammotettix putoni, male, valve and genital plates.
Fig. 445.-Diplocolenus abdominalis juvencus, genital plates and parameres.
Fig. 447.-Arocephalus punctum, male genital segment, ventral view.

- Seventh abdominal sternum with two pointed projections much less prominent and depression between them often sinuate, not appreciably shallower than lateral depressions (fig. 400). (Colour pattern as in male pseudocellaris. Fore wings about as long as abdomen or slightly shorter. Overall length : 2.8-3.2 mm.)
pseudocellaris (Flor)


## Genus Diplocolenus Ribaut

( $=$ Deltocephalus: auctt. partim, nec Burmeister, = Euscelis: auctt. partim, nec Brullé)
At least ten species are found in Western and Central Europe, of which two reach Britain. Both these species, and more especially D. bensoni, are quite variable in colour pattern and it is not always possible to name individual females with certainty.


Figs. 448-453.-Ebarrius cognatus: (448) vertex, pronotum and scutellum; (449) face; (450) genital plates, valve and parameres; $(451,452)$ aedeagus (from different angles); (453) female, seventh abdominal sternum.

1 In male, genital segment long, in ventral view extending beyond genital plates, but not extending appreciably on either side of them (fig. 492); aedeagus longer and narrower, with four projections at apex, seen from behind somewhat resembling a letter H (figs. 427, 428). Fore wings clear green or yellow-green, sometimes narrowly darkened along apical margin. Usually larger-overall length: $\sigma^{7} \mathbf{3 . 6 - 4 . 3 \mathrm { mm } . ; ~} \ddagger 3.9-4.5 \mathrm{~mm}$. (Erontoclypeus often largely or wholly pale brownish, but sometimes black-brown, in lower part; with alternate pale and black-brown transverse lines in upper part; anteclypeus pale brownish, often with a darker mark; lorae sometimes dark-edged. Vertex, pronotum and scutellum uniform yellow-green, vertex sometimes with two convergent narrow dark streaks near apex. In male, fore wings longer than abdomen; in female, usually slightly shorter. In females, seventh abdominal sternum as in fig. 399. Legs wholly or largely pale, sometimes with darker patches)
( = temperei Ribaut) abdominalls (Fabricius) juvencus (Hardy) On grasses, often among ranker vegetation, widely distributed and often common. England. Wales. Scotland. v-ix. This form is otherwise known from C. France, other forms from Europe, Siberia and Tunisia.

- In males, sides of genital segment short, in ventral view not extending beyond genital plates but extending laterally on either side of them (fig. 493); aedeagus shorter and stouter, with two projections at apex, seen from behind like a bull's horns (figs. 431, 432). Fore wings greenish or brownish, veins often edged with darker dots and costa sometimes dark edged. Usually smaller-overall length : đ 3.3-
3.8 mm ; $\uparrow \mathbf{~} 3.8-4.3 \mathrm{~mm}$. (Frontoclypeus black, with light transverse lines, at least in upper part, sometimes with broad light patch in lower part. Anteclypeus brown, often with a black patch. Lorae often black margined, sometimes entirely black. Vertex, pronotum and scutellum usually greenish yellow or dirty greenish, vertex sometimes with two or four small dark streaks near anterior margin, often more or less mottled with brown. Fore wings longer than abdomen in male, shorter than abdomen in female. In female, apical segments of abdomen largely greenish. Legs often largely darkened)
( = obenbergeri (Dlabola)) bensoni (China)
On grasses on mountains, usually above 1200 feet. England: Cumbs., Westmorland, Yorks. Scotland: Perthshire. vi-x. France. Czechoslovakia.


## Genus Mocuellus Ribaut

(= Deltocephalus: auctt. partim, nec Burmeister, = Cicadula: auctt. partim, nec Zetterstedt)
Two species are found in Western Europe, both of which occur in Britain. At least six more species are found in Central and Eastern Europe.

## Key to Species

1 Normally brachypterous: fore wings extending to about three-quarters of length of abdomen in males, and to about half length of abdomen in females. Vertex rather sharply pointed apically, its length about three-quarters of distance between eyes (fig. 494). Length of antennae approximately equal to that of vertex and pronotum together. Frontoclypeus light brown with paler longitudinal median line and transverse lines. In male, genital plates broadly concave towards apex (fig. 461). (Face pale yellow-brown. Vertex, pronotum and scutellum uniform pale greenish or yellowish. Fore wings uniformly greenish-yellow or yellowish. Abdomen pale yellowish or brownish, sometimes with paired dark spots on each segment. In male, aedeagus as in figs. 459, 460. In female, seventh abdominal sternum similar to metrius (fig. 408). Overall length: ${ }^{7} 3 \cdot 5-3 \cdot 7 \mathrm{~mm}$.; q $4 \cdot 1-$
 On grasses on dry, sandy soils near coast. England: St. Helens, Isle of Wight. vii. Europe. Siberia. N. America.

- Always macropterous: fore wings longer than abdomen. Vertex smoothly rounded apically, its length approximately equal to distance between eyes (fig. 437). Length of antennae distinctly longer than pronotum and scutellum together. Frontoclypeus and rest of face light greenish or yellow-brown, without distinct markings (fig. 644). In male, genitel plates convex throughout (fig. 465). (Vertex, pronotum and scutellum uniform light greenish or yellow-brown. Fore wings uniformly yellowish, sometimes narrowly darker along inner margin; $m$-cu cross-vein often absent, subapical external cell sometimes absent. In female, seventh abdominal sternum as in fig. 408. In male, genital segment in side view as in fig. 443; aedeagus as in figs. $463,464,466 .{ }^{2}$ Overall length: ${ }^{7} 3 \cdot 7-4 \cdot 2 \mathrm{~mm}$.; ㅇ $4 \cdot 1-4.5 \mathrm{~mm}$.)
.metrius (Flor)
In coarse vegetation in marshes, locally common. England, as far N. as Yorks. Ireland: Co. Antrim. vii-ix. N. and C. Europe. Siberia.


## Genus Ebarrius Ribaut

This genus contains two European species. One of these, first included in the British list by China (1950; cf. Le Quesne, 1964a), occurs in Britain.

Face light brown, frontoclypeus with pale, dark-edged median streak and a series of curved dark bands on either side of this (fig. 449); anteclypeus and lorae darkedged; anteclypeus sometimes also dark medially. Vertex light brown, with four
${ }^{2}$ The apical appendages readily change the angle made with the stem and have been observed to twist round while making a preparation. (A.R. Waterston private communication.)
blackish comma-shaped marks anteriorly (fig. 448) and some other brownish markings. Pronotum brownish, with more or less distinct light and dark longitudinal lines of which pale median line usually the most clearly marked. Scutellum light brown, with smail dark basal triangles and sometimes two other longitudinal bands. Fore wings fully developed, light brown with cells mainly edged darker. In male, genital plates rather squarely truncate, parameres as in fig. 450; aedeagus twisted, as in figs. 451, 452. In female, seventh abdominal sternum


Figs. 454, 457, 458, 462.-Arthaldeus striifrons: (454) face; (457) aedeagus, side view; (458) aedeagus, from behind; (462) male genital segment, ventral view (genital plates removed).
Figs. 455, 456.-A. pascuellus: (455) aedeagus, side view; (456) aedeagus, from behind.
Figs. 459-461.-Mocuellus collinus: (459) aedeagus, from behind; (460) aedeagus, side view; (461) parameres and genital plates.
Fias. 463-466.-M. metrius: (463) medeagus, from behind; (464) aedeagus, side view; (465) parameres and genital plates; (466) aedeagus from behind (another specimen).
with three projections along posterior margin, of which outer pair are sharply pointed and median one rounded, as in fig. 453. Overall length: of $3 \cdot 0-3 \cdot 6 \mathrm{~mm}$.;

Rare, on grasses. England: Moorhouse, Westmorland. Scotland: Aviemore and Nethy Bridge, Inverness-shire; Broomhill, Glasgow. vi, vii, ix. Europe.

## Genus Sorhoanus Ribaut <br> ( = Deltocephalus: auctt. partim, nec Burmeister)

There are at least five European species, only one of which occurs in Britain. The species $S$. assimilis (Fallén) was included in China's (1950) checklist, but, as discussed elsewhere (Le Quesne, 1964a), I can find no reason to retain it on the British list.

Frontoclypeus dirty brown with pale transverse lines, usually interrupted medially (fig. 641). Rest of face, vertex, pronotum and scutellum yellow or greenish yellow, vertex often with four rather indistinct narrow dark streaks near anterior margin (fig. 440). Fore wings with yellowish veins; cells hyaline or yellowish, sometimes brownish edged. In male, side of genital segment with appendage as in fig. 442; aedeagus as in figs. 433, 434. In female, seventh abdominal sternum as in fig. 406. Overall length: of $3 \cdot 1-3 \cdot 4 \mathrm{~mm}$.; 早 $3 \cdot 3-3 \cdot 4 \mathrm{~mm}$.
zanthoneurus (Fieber)
Local, on grasses, in very wet open bog. England: Malham Tarn and Goathland, Yorks.; Trelleck Bog, Mon. Scotland: Aviemore, Inverness-shire. vii, viii. Scandinavia. Germany. Czechoslovakia. Possibly France. : N. America.

## Genus Arthaldeus Ribaut

(= Deltocephalus: auctt. partim, nec Burmeister)
Two species are found in Britain out of four or five described from Europe.

## Key to Species

1 Frontoclypeus with well-defined broad median longitudinal ivory-white streak, often broadening towards lower margin; black-brown at sides with transverse pale lines (fig. 454). In male, genital segment ventrally with two long, amoothly curved and tapering appendages (not normally visible in undissected specimens; fig. 462); aedeagus in side view with stem smoothly curved, except near apex (figs. 457, 458). In female, posterior margin of seventh abdominal sternum strongly produced towards lateral margins (fig. 336). (Genae usually largely darkened and lorae usually blackish-edged. Vertex yellow-green with two dark streaks nearly converging at apex enclosing a whitish spot and two more small dark streaks often present near anterior margin about half-way between apex and eye. Pronotum, scutellum and fore wings uniform yellow-green. Overall length : $8 \mathbf{3 . 3 - 3 . 6} \mathrm{~mm}$.; ㅇ $3.5-3.9 \mathrm{~mm}$.) . striffrons (Kirschbsum)
Local, on grasses, often in damper places, but also found on calcareous hillside. England, as far N. as Leics. and Cambs. vii, viii, x. C. and S. Europe. Tunisia.

- Frontoclypeus more or less dark brownish with paler transverse streaks, but without distinct whitish longitudinal band. In male, genital segment ventrally with two long appendages each with a long recurrent spine towards apex (fig. 441); aedeagus in side view with stem sinuate, changing direction of curvature about half-way along (figs. 455, 456). In female, seventh abdominal sternum not much longer near lateral margins than near median incision (fig. 401). (Genae usually partly darkened and lorae blackish-edged. Vertex yellow-green, usually with two more or less distinct dark streaks nearly converging at apex, often enclosing a pale spot and sometimes two more small dark streaks present near anterior margin about half-way between apex and eyes (fig. 642). Pronotum and scutellum uniform yellow-green or greenish. Fore wings uniform greenish or rarely with cells darker
margined. In male, genital plates and parameres as in fig. 567. Overall length:
 Widely distributed and common on grasses, especially in drier situations. England. Wales. Scotland. Ireland. vi-xi. N. and C. Europe. Siberia. N. America.


## Genus Psammotettix Haupt

$=$ Ribautiellus Zakhvatkin, $=$ Deltocephalus: auctt. partim, nec Burmeister)
Over thirty European species of this very difficult genus have been described. Of these, eight occur in Britain (cf. China, 1939; Le Quesne, $1960 b$


## 477

Fuss. 467-469, 473.-Psammotettix albomarginatus: (467) fore wing of strongly marked brachypter; (468) vertex; (469) head in side view; (473) aedeagus, side view.
Fiss. 470, 475, 476.-P. sabulicola: (470) fore wing; (475) aedeagus, side view; (476) sedeagus, from behind.
Fiss. 471, 472, 474.-P. putoni : (471) vertex; (472) head in side view; (474) aedeagus, side view.
Fres. 477, 478.-P. confinis: (477) aedeagus, from behind; (478) aedeagus, side view.
Fics 479, 480.—P. striatus: (479) aedeagus, side view; (480) aedeagus, from behind.
and 1964a). However, it is possible that frigidus may be a brachypterous form of cephalotes occurring under montane or sub-arctic conditions, especially since what appears to be a brachypterous form of nodosus occurs in Scotland and a similar phenomenon has been reported in the European species helvolus (Kirschbaum) (Wagner, 1958). Females of this genus cannot always be named with certainty.

## Key to Species

1 Brachypterous, with fore wings not or hardly longer than abdomen and with very narrow appendix (fig. 467)

- Macropterous, with fore wings considerably longer than abdomen and with well developed appendix (fig. 470)
2 Vertex seen from above bluntly rounded apically (fig. 471), in side view somewhat swollen apically (fig. 472). Usually larger and broader-overall length : ${ }^{2} 2 \cdot 8$ 3.15 mm .; ; $9.0-3.7 \mathrm{~mm}$.; width of pronotum: $\delta^{6} 0.85-0.90 \mathrm{~mm}$.; $q 0.90-0.95 \mathrm{~mm}$.; length of posterior tibiae: of $1.55-1.70 \mathrm{~mm}$; ; $\boldsymbol{1} 1.6-1.85 \mathrm{~mm}$. Posterior tarsi usually mainly darkened.
.3
- Vertex seen from above sharply angled anteriorly (fig. 468), in side view not swollen anteriorly (fig. 469). Usually smaller and narrower-overall length: of 2.353.0 mm .; $\frac{q}{} 2.65-3.2 \mathrm{~mm}$.; width of pronotum : ${ }^{\text {of }} 0.75-0.85 \mathrm{~mm}$.; $\% 0.80-0.85 \mathrm{~mm}$.; length of posterior tibia: d $^{2} 1 \cdot 3-1 \cdot 55 \mathrm{~mm}$.; 우 $1 \cdot 35-1 \cdot 6 \mathrm{~mm}$. Posterior tarsi usually wholly pale. (Frontoclypeus black-brown or grey-brown with more or less whole pale median line and pale transverse lines on either side. Rest of face light brownish, sometimes with dark patch on anteclypeus and lorae rarely dark-edged. Vertex black-brown or grey-brown with some paler mottlings, with more or less distinct pale median band, often paler along anterior margin (fig. 468). Pronotum and scutellum light brown, more or less darker marbled. Fore wings light brownish, often with well developed dark streaks in cells (fig. 467). In male, aedeagus with expansion of inner margin towards apex (fig. 473)
albomarginatus Wagner
Locally common on sandy soils. England: Mousehold Heath and Attlebridge Heath, Norfolk; Foxhole Heath and Cavenham Heath, Suffolk; Braunton, Devon. Ireland: Ballynalacken, Co. Clare. viii-xi. Germany. Sweden.
3 In male, aedeagus with expansion of inner margin towards apex (figs. 474, 489). Fore wings without dark markings or with a few slight ones, often confined to clavus.
- In male, aedeagus with inner margin smoothly curved towards apex (figs. 481, 482). Fore wings usually with a number of cells dark-edged or with dark streaks. (Frontoclypeus black-brown with pale transverse streaks at sides, without or with indistinct pale median line. Rest of face light brown, anteclypeus usually with dark patch, lorae usually dark-edged. Vertex black-brown with broad pale median streak and sometimes other paler marblings. Pronotum and scutellum light brown, often somewhat darker marbled. Overall length: a ${ }^{12 \cdot 8-3.0 ~ m m . ; ~}$ of $\mathbf{3 . 0 - 3 . 1} \mathrm{mm}$.) . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . frigidus (Bohemen)

On mountain-sides. Scotland: Ben Lawers, Perthshire ; An Gleannan, Invernessshire. viii. Scandinavia. N. Russia.
4 In male, aedoagus in side view with outer margin straighter towards apex, truncate at apex and inner margin more sharply bent towards base (figs. 485, 486)
nodosus (Ribaut)

## [See couplet 8 below]

- In male, 凤edeagus in side view with outer margin more convex towards apex, more or less pointed at apex and inner margin widely curved towards base (figs. 474, 489); aedeagus seen from behind either truncate or narrowly rounded apically (figs. 487, 488). (Frontoclypeus black-brown or grey-brown with pale transverse streaks at sides, with more or less distinct pale median line. Rest of face light brown, anteclypeus rarely with dark patch. Vertex light brown with darker marblings, usually leaving distinct pale median band (fig. 471). Pronotum and scutellum light brown, sometimes indistinctly darker marbled. Overall length: ${ }^{2} 2 \cdot 8-3 \cdot 2 \mathrm{~mm}$;


In coastal salt-marshes, often locally common. England. Wales: Menai Bridge, Anglesey. Scotland: Forres, Morays. Ireland: Parkmore, Co. Galway. vi-x. France. Germany.

5 Fore wings light brownish with several discrete squarish spots, not tending to form streaks or dark margins to cells (fig. 470); veins often with whitish patches. (Frontoclypeus brown with pale transverse streaks and more or less distinct pale median band. Rest of face pale yellow-brown, usually with a blackish dot along outer margin of each lora. Vertex pale yellow-brown, with more or less distinct darker spots; ratio of length of vertex to that of pronotum 0.8-1.0. Pronotum pale yellow-brown, often with darker mottling. Scutellum pale yellow-brown, sometimes with two dark basal triangles. In male, aedeagus as in figs. 475, 476. Posterior tarsi pale. Overall length $\sigma^{t} \mathbf{3 . 3 - 3 . 9} \mathrm{~mm}$.; ; $\mathbf{3 \cdot 6} \mathbf{4} \cdot \mathbf{1} \mathrm{mm}$.)
sabulicola (Ourtis)
On coastal sand-hills, often resting on bare sand, perhaps associated with marramgrass. England. Wales. Scotland. Ireland. vi-x. Germany. Scandinavia.

- Fore wings without dark markings or with dark markings tending to form streaks or dark margins to cells.

481

487


483


488


485
489


486


490


491

Figs. 481-491.—Psammotettix spp., aedeagi: (481) P. frigidus, from behind; (482) the same, side view; (483) $P$. cephalotes, from behind; (484) the same, side view; (485) $P$. nodosus, from behind; (486) the same, side view; $(487,488) P$. putoni, from behind (two specimens); (489) the same, side view; (490) P. nodosus, from behind (another specimen); (491) the same, side view.

6 Ratio of length of vertex to that of pronotum $0.6-0.8$. Usually larger-overall length : of $\$ 4.0-4.5 \mathrm{~mm}$. Posterior tarsi usually pale. In male, aedeagus in side view with inner margin almost straight, without marked expansion towards apex (fig. 479); seen from behind with width of stem at most one-sixth of length of aedeagus (fig. 480). (Face straw-coloured with interrupted grey-brown transverse streaks on frontoclypeus, sometimes coalescing into irregular patches. Vertex straw-coloured, often with two large brownish patches and thin dark lines near anterior margin. Pronotum straw-coloured with six brownish longitudinal bands. Scutellum brownish with two or three straw-coloured longitudinal bands. Veins of fore wings straw-coloured; cells hyaline, some narrowly darker edged)
striatus (Linnaeus)
Local, apparently confined to "Breck-land" in Britain. England: Freckenham, Suffolk. viii, ix. Europe.

- Ratio of length of vertex to that of pronotum $0.8-1.0$. Overall length usually less than 4.0 mm . Posterior tarsi usually darkened. In male, aedeagus in side view with inner margin regularly concave almost to apex (fig. 484) or with well-
developed expansion of inner margin towards apex (figs. 486, 491) or, seen from behind, with width of stem one-third to one-quarter of length of aedeagus (fig. 477)

7 Fore wings usually greenish or yellowish, without dark markings, sometimes brownish with darker markings. Aedeagus seen from behind with stem narrow, its width at most one-sixth of length of aedeagus (fig. 483); in side view with inner margin regularly concave almost to apex (fig. 484). (Frontoclypeus brown with pale transverse streaks and usually distinct pale median band. Rest of face usually pale yellow-brown, sometimes darker; edges of lorae sometimes darkened or with a derk dot on each. Vertex usually yellow-brown, often with rather indistinct darker spots; pronotum and scutellum yellow-brown, often indistinctly darker marbled: in specimens with brown fore wings, dark spots on vertex and dark markings on pronotum and scutellum usually distinct and two dark basal triangles present on scutellum. Overall length : of o $\mathbf{P} \mathbf{3 . 1 - 3 . 7 \mathrm { mm } \text { .) }}$
(= citrinellus (Kirschbaum), = normani (Scott)) cephalotes (Herrich-Schaeffer)
Locally common, often on short grass in calcareous areas. England. Scotland. Ireland. $v-i x$. Europe. Siberia. N. America.

- Fore wings brownish with darker markings. Aedeagus either seen from behind with stem wide, its width one-third to one-quarter of length of aedeagus (fig. 477) or in side view with interior margin convex for part of its length (figs. 486, 491) ... . 8
8 Aedeagus seen from behind with stem broad, its width one-third to one-quarter of length of aedeagus (fig. 477), broadly truncate at apex; in side view as in fig. 478. (Frontoolypeus grey-brown with more or less distinct median pale band and thin pale transverse streaks on either side. Rest of face yellow-brown; each lora with a black dot on outer margin or sometimes with outer margin entirely dark. Vertex yellow-brown with two or four darker streaks near anterior margin and usually other more or less distinct darker patches. Pronotum yellow-brown, often with brownish longitudinal bands or indistinct brownish marblings. Scutellum yellow-brown, sometimes with two dark basal triangles. Fore wings straw-

( $=$ thenii (Edwards)) confinis (Dahlbom)
Common and widespread on grasses. England. Wales. Scotland: Broomhill, Glasgow. Ireland. $v-x$. Europe. Alaska.
- In male, aedeagus seen from behind with width of stem at most one-sixth of length of aedeagus (figs. 485, 490), truncate or rounded at apex. (Frontoclypeus grey- or black-brown with more or less distinct median paler band and thin paler transverse streaks on either side. Rest of face yellow-brown; anteclypeus sometimes with dark spot; lores sometimes entirely darkened or dark-edged, more often with dark dot along outer margin of each. Vertex yellow-brown with darker brown patches, sometimes almost wholly black-brown. Pronotum yellow-brown, sometimes with brown or black-brown longitudinal bands or indistinct brownish marblings. Scutellum yellow-brown, sometimes with dark basal triangles and other dark markings. Fore wings straw-yellow, usually with some cells darker edged, sometimes with extensive confluent dark patches in cells. Overall length: of $q 2 \cdot 9-$ 3.95 mm .)
( = striatus: (Edwards) nec (Linnaeus), = putoni: Ribaut nec (Then)) nodosus (Ribaut)
On grasses, often in woods or on moorland; specimens from latter type of locality often darker. A brachypterous form has been reported at a height of about 2000 feet in Perthshire (cf. Le Quesne, 1964a). England. Scotland. Ireland. vi-ix. Europe.


## Genus Paralimnus Matsumara

## (= Paramesus: auctt. partim, nec Fieber)

One species occurs in Britain out of the three from Western Europe.
Upper margin of frontoclypeus yellowish with narrow black transverse band; rest of frontoclypeus brown with fine pale transverse streaks near side margins; rest of face yellow-brown with darker brown patches on genae (fig. 392). Vertex pale yellowish with black band near anterior margin and orange-brown transverse band medially (fig. 391). Pronotum yellowish with orange-brown band anteriorly and four orange-brown spots in a transverse row medially. Scutellum yellowish, with
two orange-brown triangles basally and one at apex. Veins of fore wings whitish, cells edged dark brown. In male, genital segment with appendage on lower margin at each side as in fig. 498; aedeagus as in figs. 499,500. In female, seventh abdominal sternum as in fig. 495. Overall length: $\delta^{*} 4 \cdot 3-4 \cdot 6 \mathrm{~mm}$.; 우 $4 \cdot 5-5 \cdot 3 \mathrm{~mm}$.
phragmitis (Boheman)
Local, in marshes, probably associated with Phragmites. England: Horning, Ranworth, Roydon Fen, Houston and Cley, Norfolk; Wicken Fen, Cambs.; Haslemere, Surrey; Chippenham, Wilts. v, vii-ix. N. and C. Europe. Turkestan.


Fims. 492, 493.-Genital plates and valve: (492) Diplocolenus abdominalis juvencus; (493) D. bensoni.

Fig. 494.-Mocuellus collinus, vertex.
Fris. 495, 498-500.-Paralimnus phragmitis: (495) female, seventh abdominal sternum; (498) appendage of side of male genital segment; (499) aedeagus, from behind; (500) aedeagus, side view.
Fras. 496, 497.-Male genital segments, side view: (496) Jassargus pseudocellaris; (497) J. flori.

Fis. 501 .-Rhytistylus proceps, genital plates and valve.

## Tribe Athysanini <br> (= Euscelini)

In the past forty years or so, this tribe has generally been known as the Enscelini. However, the oldest group name is Athysanini, first used by Van Drezee in 1892.

In view of the difficulty of separating the tribe Fieberiellini except on the
basis of the internal male genitalia, the key given below includes our one genus belonging to this tribe.

## Key to Genera

1 Two anal veins of fore wing united in middle (fig. 352); cross-veins absent in clavus
Sardius Ribaut (p. 100)

- Two anal veins of fore wing distinct throughout, although sometimes united by cross-veins.
2 Fore wing more or less acuminate at apex, outer margin bending sharply in median apical cell (figs. 351, 353) . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . 3


Figs. 502, 503, 509, 513.-Sardius argus : (502) vertex and pronotum; (503) genital plates, valve and parameres; (509) aedeagus, from behind; (513) aedeagus, side view.
Figs. 504, 505, 512, 515.-Graphocraerus ventralis: (504) genital plates, valve and parameres; (505) aedeagus, side view; (512) appendage of side of male genital segment; (515) female, seventh abdominal sternum.
Figs. $506,508,510$.-Hardya melanopsis: (506) aədeagus, side view; (508) paramere; (510) appendage of side of male genital segment.

Figs. 507, 511, 514--Rhytistylus proceps: (507) medeagus, from behind; (511) aedeagus, side view; (514) female, seventh abdominal sternum.

- Fore wing broadly and more or less evenly rounded at apex. .................... 4

3 Apex of fore wing sharply acuminate. Central subapical cell not contiguous at any point with subcostal cell (i.e. external subapical cell closed basally by transverse vein). No distinct black spot present along inner margin of fore wing (fig. 351) Mocydia Edwards (p. 117)

- Apex of fore wing more rounded (fig. 353). Central subapical cell contiguous basally with subapical cell (i.e. external subapical cell closed basally by coalescence with radius). Black spot often present about halfway along inner margin of fore wing Mocydiopsis Ribaut (p. 119)
* Vertex in side view distinctly concave (fig. 361), greenish, marked with four small black dots (fig. 436) . . . . . . . . . . . . . . . . . . . . . . Graphocraerus Thomson (p. 100)
- Vertex in side view more or less flat or convex, its markings not as above.......5

F Fore wing with numerous milky white secondary cross-veins (fig. 517), at least 4.5 mm . long

- Fore wing without milky white secondary cross-veins, often less than 4.5 mm . long
* In male, opening of genital chamber wide, so that aedeagus and parameres are readily seen (fig. 516); lobes of genital segment with long appendages (fig. 532). In female, seventh abdominal sternum shorter than sixth, base of gonoplacs exposed (fig. 526)

Allygidius Ribaut (p. 102)

- In male, mouth of genital chamber not wide, base of aedeagus and parameres hidden (fig. 518); sides of genital segment without appendages. In female, seventh abdominal sternum longer than sixth (figs. 522, 525) ...Allygus Fieber (p. 102)
- Black marking present posteriorly on vertex in form of outline of clover-leaf with median lobe bisected (fig. 608). In male, genital plates with inner margins widely divergent (fig. 565). (Frontoclypeus about 1.5 times as long as broad at level of base of antennae) . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . Hardya Edwards (p. 101)
- Vertex without marking in this form posteriorly. In male, genital plates with inner margins contiguous for most of their length
- Frontoclypeus narrow, 1.5 times to twice as long as broad at level of base of antennae (e.g. fig. 609)
. 9
- Frontoclypeus broader, distinctly less than 1.5 times as long as broad at level of base of antennae . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . 15
4 Fore body and fore wings, and in females also face (fig. 609), more or less sprinkled with small red dots (sometimes confined to a few on pronotum and veins of fore wings)
.Idiodonus Ball (p. 121)
- Face, fore body and fore wings not sprinkled with red dots.
[44 Vertex with four distinct spots disposed in a cross, two laterally between ocelli and eyes, one at apex and one in middle of posterior margin (fig. 652)

Paluda DeLong (adumbrata Sahlberg) (p. 115)

- Vertex marked otherwise or unmarked

II Head (including eyes) narrower than pronotum (figs. 632, 634). Blackish postocellar spots present on vertex, usually rather linear, sometimes forming streak from one eye to the other .12

- Head (including eyes) broader than pronotum (fig. 553). Postocellar spots either more or less round or absent

13
Wore wings without distinct white streak along costa. Scutellum with black markings which include basal triangles approximately half as long as scutellum (fig. 634). In both sexes, vertex medially with two distinct black spots, but without black streak. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . Lamprotettix Ribaut (p. 123)

- Fore wings with distinct broad white streak along costa. In females, scutellum without dark markings or with only indistinctly darker ones; in males, basal triangles present, at most one-third as long as scutellum. In males, vertex medially with black streak from eye to eye (fig. 680) ........... Colladonus Ball (p. 122)
13 Dark spots usually present on vertex or junction of vertex and face (e.g. fig. 553). In male, genital segment extending considerably beyond genital plates (fig. 560). In females without dark spots on vertex, seventh abdominal sternum in middle as long as or longer than at sides, without median incision (fig. 711). (Antennae at least one-third as long as body. Spines of genital plates in single row)

Cicadula Zetterstedt (p. 123)

- Dark markings absent on vertex and junction of vertex and face. In male, genital segment not extending appreciably beyond genital plates. In female, seventh abdominal sternum longer at sides than in middle (figs. 521, 523, 524) .14

14 Antennal cavities broadly marked with black, spot usually reaching eye (fig. 643) and thorax broadly spotted with black at sides. In male, anal tube parallel-sided, not reaching beyond sides of genital segment (fig. 566); spines of genital plates in single row (fig. 570). In females, seventh abdominal sternum little shorter in middle than at sides (figs. 521, 524) ...........................Elymana DeLong (p. 128)


Figs. 516, 526.-Alygidius commutatus: (516) male genitalia, side view; (526) female, sixth and seventh abdominal sterna and base of gonoplacs.
Figs. 517-519, 522.-Allygus mixtus: (517) fore wing; (518) male genitalia, side view; (519) vertex; (522) female, sixth and seventh abdominal sterna.

Figs. 520, 525.-A, modestus: (520) vertex; (525) female, seventh abdominal sternum.
Figs. 521, 524.-Elymana sulphurella, females, seventh abdominal sterna (two examples).
Fig. 523.-Paluda flaveola, female, seventh abdominal sternum.

- Antennal cavities usually with small black spot (fig. 645). Thorax without black marks at sides. In males, anal tube viewed from above convex-sided, extending considerably beyond sides of genital segment (fig. 558); spines of genital plates numerous and disordered (fig. 568). In females, seventh abdominal sternum much shorter in middle than at sides (fig. 523)

Paluda DeLong (in part) (p. 115)
15 Vertex with strong black line from eye to eye, immediately behind ocelli, sometimes more or less coalescent with markings in front, but leaving clear band posteriorly (figs. 635, 614).

- Vertex without strong black line from eye to eye behind ocelli, or with irregular band not leaving clear band in posterior part

16 Overall length $6.5-8.0 \mathrm{~mm}$. Fore wings straw-coloured, with dark markings forming rather thin longitudinal streaks. Scutellum pale with dark median line (fig. 614)
.Athysanus Burmeister (p. 113)

- Overall length $3 \cdot 6-5.4 \mathrm{~mm}$. Fore wings usually somewhat greenish tinged, with cells lighter or darker brown. Scutellum unmarked or markings include dark triangles at base
.Limotettix Sahlberg (p. 105)


Figs. 527, 532, 533.-Allygidius commutatus: (527) aedeagus, from behind; (532) appendage of male genital segment; (533) aedeagus, side view.
Figs. 528, 530, 535.-Allygus modestus: (528) genital plates and part of valve; (530) aedeagus, from behind; (535) aedeagus, side view.
Figs. 529, 531, 534.-A. mixtus: (529) genital plate and part of valve; (531) aedeagus, side view; (534) aedeagus, from behind.

17 Frontoclypeus with V-shaped black mark across, consisting of two or three closely adjoining lines, otherwise unmarked (fig. 359). Angle of genae rather sharp. Vertex in side view more or less flat .................Rhytistylus Fieber (p. 100)
Black lines of frontoclypeus, if present, straight or partially fused. Angle of genae rounded or blunt. Vertex in side view convex

18 Face with uniform black band from eye to eye just below ocelli, frons without other transverse bands (fig. 555) . . . . . . . . . . . . . . . . . . . . . . Placotettix Ribaut (p. 131)

- Face without black band from eye to eye just below ocelli or frons with other transverse bands. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . 19
$\overline{20}$ Ocelli smaller, distance from eye considerably greater than their diameter. ..... 21 Vertex pale with dark brown markings (fig. 610). Fore wings patterned with dark dots. Overall length $3.7-5 \cdot 4 \mathrm{~mm} . \ldots$. ............ Euscelidius Ribaut (p. 109)
- Vertex red-brown, not or indistinctly darker marked. Fore wings sometimes with a few larger spots, but not patterned with dots. Overall length $5 \cdot 9.6 .7 \mathrm{~mm}$.

Thamnotettix Zetterstedt (dilutior Kirschbaum) (p. 120)
21 Males . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . 22

- Females ..................................................................................... 28

22 Anal tube well developed; genital segment covered above (fig. 562). . . . . . . . . . . 23

- Anal tube poorly developed; genital segment open above, revealing aedeagus
(figs. 564, 683)
.27
23 Spines on genital plates in single row. Cells of fore wings patterned with dots or streaks or unmarked; sometimes largely dark and pale margined (fig. 588) ...24
- Spines of genital plates disordered. Cells of fore wings darker margined (fig. 557); sometimes largely dark but not pale margined. Scleroracus Van Duzee (p.104)
24 Genital plates with outer margin nearly straight for muoh of their length, sharply pointed apically (fig. 576)

Euscelis Brullé (part) (p. 105)

- Genital plates with outer margin convex throughout (figs. 571, 581, 675)........ 25

25 Genital plates about three times as long as broad (fig. 675). Fore wings always fully developed, veins normally more or less tinged greenish (darker in some Scottish specimens) . . . . . . . . . . Thamnotettix Zetterstedt (confinis Zetterstedt) (p. 120)

- Genital plates much less than three times as long as broad (figs. 571, 581). Fore wings often shortened, wings not tinged greenish............................. . 26
26 Overall length $4.7-5 \cdot 6 \mathrm{~mm}$. Four more or less strongly marked spots usually present on vertex in form of inverted $V$, not tending to form transverse streaks (fig. 612), except in very dark specimens, when vertex largely dark. Spines on anterior (and median) tibiae regularly paired (fig. 559)

Euscelis Brulle (obsoletus Kirschbaum) (p. 105)

- Either insect sunaller or markings of vertex tending to form streaks which reach ocelli. Basal spine of anterior (and median) tibiae not paired (fig. 554)

Streptanus Ribaut (p. 110)
27 Ratio of length of vertex to that of pronotum $0.5-0.6$ (fig. 615). Fore wings more elongate, more than three times as long as broad. Genital segment apically without hooklike appendages (fig. 683) . . .............. Speudotettix Ribaut (p. 121)

- Ratio of length of vertex to that of pronotum at least 0.75 . Fore wings broader, less than three times as long as broad. Genital segment with two hook-like appendages apically, crossing each other (fig. 564). ................ Macustus Ribaut (p. 113)
28 Posterior margin of seventh abdominal sternum without projections (fig. 586). Fore wings at least reaching tergum anterior to genital segment . . . . . . . . . . . . . . . . 31
- Posterior margin of seventh abdominal sternum medially with one or two smail teeth (fig. 561, 587, 618) (sometimes not distinct in Streptanus marginatus in which fore wings not reaching tergum anterior to genital segment)
29 Posterior margin of seventh abdominal sternum with bifid projection (fig. 618)
Macustus Ribaut (p. 113)
- Posterior margin of seventh abdominal sternum with a single tooth (figs. 561, 587) .30
30 Fore wings reaching apical abdominal tergum. Four spots almost always present on vertex in form of inverted V, rarely tending to streak, two apical ones rarely absent (fig. 612), except in very dark specimens when vertex largely dark. Spines of anterior (and median) tibiae regularly paired (fig. 559). (Overall length 5.26.2 mm.$)$. . . . . . . . . . . . . . . . . . . Euscelis Brullé (obsoletus Kirschbaum) (p. 105)
- Fore wings usually not reaching apical abdominal tergum, although occasionally longer than abdomen. Markings of vertex indistinct or tending to form transverse streaks. Basal spine of anterior (and median) tibiae not paired (fig. 654)

Streptanus Ribaut (p. 110)
31 Fore wings more or less sprinkled with dark dots (fig. 585); cells sometimes largely darkened, but then pale margined (fig. 588) .....Euscelis Brullé (part) (p. 105) Fore wings unicolorous or cells margined darker, but not marked with dark dots 32
32 Cells of fore wing darker margined (fig. 557), sometimes largely dark. Smaller: overall length $2 \cdot 7-4 \cdot 4 \mathrm{~mm} . . . . . . . . . .$. ..... Scleroracus Van Duzee (p. 104) Cells of fore wing uniformly light brownish, greenish or hyaline. Larger: overall length $4.9-6.4 \mathrm{~mm}$.
33 Cells and veins of fore wing more or less uniformly light brown. (Head, including eyes, about equally broad as pronotum (fig. 615)) Speudotettix Ribaut (p. 121)
Veins of fore wings more or less tinged greenish, cells usually hyaline or greenish; veins and cells sometimes darker in Scottish specimens

Thamnotettix Zetterstedt (confinis Zetterstedt) (p. 120)


Figs. 536, 539, 541, 545, 550.—Scleroracus corniculus : (536) aedeagus, from behind; (539) vertex; (541) aedeagus, side view; (545) paramere; (550) male genital segment, side view (genital plates removed).
Figs. 537, $542,546,551 .-S$. decumanus: (537) aedeagus, from behind; (542) aedeagus, side view; (546) paramere; (551) male genital segment, side view (genital plates removed).
Figs. 538, 540, 543, 544, 547, 552.-S. plutonius: (538) aedeagus, from behind; (540) vertex; (543) aedeagus, side view; (544) vertex (another example); (547) paramere; (552) male genital segment, side view (genital plates removed).

Fig. 548.-Euscelidius schenckii, vertex.
Fig. 549.-Limotettix atricapillus, vertex.

## Genus Rhytistylus Fieber <br> (= Glyptocephalus Edwards, = Edwardsiastes Kirby)

This genus has one European species, which occurs in Britain.
Head light brownish, except for dark V-shaped mark on frontoclypeus, usually extending into black marks on genae under eyes (fig. 359). Pronotum and scutellum light brownish, the latter rarely with two basal triangles. Fore wings light brownish, sometimes with weak darker streaks in cells and along corio-claval suture, usually rather shorter than abdomen (fig. 355); in fresh specimens often with a rather waxy " bloom ". Abdomen light brownish with three well-developed dark longitudinal streaks. In male, genital plates much narrower than genital segment in ventral view, with apex extended into tubular projection (fig. 501); aedeagus as in figs. 507, 511. In female, seventh abdominal sternum with posterior margin weakly concave with very slight median incision (fig. 514). Overall length: ơ $3 \cdot 7-4.4 \mathrm{~mm}$; ; f $4.8-5 \cdot 2 \mathrm{~mm} . . . . . . . .$. . proceps (Kirschbaum) Locally common near base of taller grasses, particularly on calcareous soils. England, S. of line from Wash to Bristol Channel. vi-xi. W. and C. Europe.

## Genus Graphocraerus Thomson

This genus has one European species, which is found in Britain.
Face yellow-green with two black spots near apex of frontoclypeus and usually a smaller black mark above the base of each antenna. Vertex greenish with four small black spots in a line (fig. 436). Pronotum greenish, usually with two or four dark dots. Scutellum uniformly greenish. Fore wings greenish, sometimes tinged yellow-brown, about as long as abdomen in males, slightly shorter in females. In males, genital plates short and somewhat curved (fig. 504); sides of genital segment with appendages as in fig. 512; aedeagus as in fig. 505 . In female, seventh abdominal sternum with posterior margin strongly excised medially, as in


Local, on grasses. England, as far N. as Durham and Yorks. vi-viii. Europe. N. Africa. Siberia.

> Genus Sardius Ribaut
> $(=$ Deltocephalus: auctt. partim, nee Burmeister)

This genus has been placed by some authors in the Deltocephalini, but Ribaut (1952) points out that it is close to Hardya and Emel'janov (1962) places it correctly in the Euscelini on the basis of the form of the connective.

There is only one European species, which extends to Britain.
Frontoclypeus light brownish, with blackish transverse bands, coalescing medially with one or two blackish longitudinal bands; anteclypeus strongly marked blackish; lorae marked blackish, at least along outer margin. Vertex light brownish, usually with six blackish dots near anterior margin and brownish spots posteriorly, latter sometimes with small blackish marks at edges (fig. 502). Pronotum light brownish, with more or less distinct darker brown markings. Scutellum light yellowish or brownish with brown markings. Fore wings longer than abdomen, light brownish with some hyaline patches tending to form two transverse bands and to be extended near some veins; dark patches present, particularly along costa towards apex, at apex of wing and in several cells (fig. 352). In male, genital plates short, rather truncate (fig. 503); ;edeagus as in figs. 509,513. In female, posterior margin of seventh abdominal sternum more or less smoothly curved. Overall
 On fine grasses, sometimes those growing under bracken or in heathy situations. England, as far N. as Norfolk, Worcs. and Herefords. Wales: Montgomerys., Pembs. iii, iv, vii-xi. France. Belgium. Germany. Switzerland. Morocco.


553


$$
1
$$




560


561

Fig. 553.-Cicadula quadrinotata, vertex and pronotum.
Fig. 554.-Streptanus sordidus, anterior tibia and tarsus.
Fig. 555.-Placotettix taeniatifrons, face.
Figs. 556, 557.-Scleroracus decumanus: (556) vertex, pronotum and scutellum; (557) fore wing.
Fig. 558.-Paluda flaveola, male genital segment and anal tube, from above.
Fig. 559.-Euscelis obsoletus, anterior tibis and tarsus.
Fig. 560.-Cicadula frontalis, male genitalia, side view.
FIG. 561.-Euscelidius variegatus, female, seventh abdominal sternum.

## Genus Hardya Edwards

One out of the three European species has been reported from Britain.
Face black with interrupted transverse light brown bands on frontoclypeus; a few small brown spots or streaks often present, especially at sides of anteclypeus. Vertex light brownish, with irregular black streak along anterior margin and black marking posteriorly in form of outline of clover-leaf with median lobe bisected (fig. 608). Pronotum light brownish with some darker spots anteriorly and often four or six dark longitudinal bands posteriorly. Scutellum light brown, usually with two dark dots anteriorly. Fore wings usually somewhat longer than abdomen in male, not longer than abdomen in female; veins light brownish, cells dark edged. In male, genital plates divargent as in fig. 565; sides of genital segment with comb-like appendages, as in fig. 510; paramere as in fig. 508; aedeagus as in
fig. 506. In female, posterior margin of seventh abdominal sternum weakly


Local, on fine grasses on alkaline heaths. Eingland: Yorks., Staffs., Derbys., Norfolk, Surrey, Wilts., Somerset. iii-v, vii-x. France. Germany. Czechoslovakia. Siberia.

Genus Allygidius Ribaut
( = Allygus: auctt. partim, nec Fieber)
Out of the six European species, only one reaches Britain.
Face brownish; frontoclypeus broad, largely darkened in lower half and often with indistinct darker transverse bands in upper half; anteclypeus with broad dark patch widening towards upper margin; broad dark patch present around base of each antenna. Vertex light brownish, usually with two oblique dark streaks (as in Allygus modestus, cf. fig. 520) and with more or less dark irregular patches anteriorly to these; two brownish sub-circular spots present near posterior margin. Pronotum light brownish, with irregular dark patches anteriorly and peppered with dark dots posteriorly, with fine transverse striations. Scutellum light brownish, with some more or less darker markings. Fore wings brownish, with veins mainly whitish; cells with dark markings made up of irregularly shaped dots. Hind wings smoky grey. In male, genital segment and parameres as in fig. 516; aedeagus as in figs. 527,533 ; side of genital segment interiorly with curved spine as in fig. 532. In female, seventh abdominal sternum short, as in fig. 526. Over-


Local, often on trees and shrubs, sometimes in grassland. England, as far N. as S. Yorks., Northants. and Monmouths. vi-ix. Europe. N. Africa.

## Genus Allygus Fieber

(=Jassus: auctt., nec Fallén)

## We have in Britain two out of the four European species.

## Key to Species

1 Vertex light brownish, with two narrow dark streaks running obliquely from each ocellus towards posterior margin (fig. 520) and two or four dark dots. In male, insertion of spines on genital plates remote from outer margin, marked by strong black spots (fig. 528). In females, posterior margin of seventh abdominal sternum with a broad, rather square excision (fig. 525). (Face light brownish; frontoclypeus with transverse dark streaks, interrupted medially and with two black comma-shaped marks near upper margin; anteclypeus dark-edged and with dark median streak; large dark patches round bases of antennae. Pronotum light brownish with more or less distinct darker mottlings, with fine transverse striations. Scutellum light brownish, with two dark dots and sometimes other brown markings. Fore wings light brownish, with veins paler and some patterning with irregular dark dots in cells. Hind wings tinged grey-brown. In male, sides of genital segment without appendages; aedeagus as in figs. 530, 535. Overall

Fairly common; adult generally on trees, but larva on grasses. Eingland, as far $N$. as Yorks. and Glos. C. and S. Europe. N. Africa.

- Vertex light brownish or yellowish, sometimes greenish tinged, usually with several dark spots but without elongate streaks running obliquely from ocelli towards posterior margin (fig. 519). In males, insertion of spines of genital plate along outer margins, not marked by dark spots (fig. 529). In females, posterior margin of seventh abdominal sternum regularly and smoothly concave (fig. 522). (Face light brownish; frontoclypeus with transverse blackish bands, fused medially in upper part and interrupted by pale longitudinal band in lower part; anteclypeus usually with broad dark patch; lorae usually partly dark-edged; large dark patch round base of each antenna. Pronotum light brownish or yellowish, often with some more or less distinct darker markings and with fine transverse striations. Scutellum light brownish or yellowish, with two black (or rarely brown) spots
medially and usually some other black spots and brownish patches. Fore wings brownish with veins and some irregular patches whitish and with patterning with irregular dark dots in cells to a very variable extent (fig. 517). Hind wings tinged


565


567


568



572

566


573

## 571

Fra. 562.-Streptanus sordidus, male genitalia from above.
Fig. 563.-Errastunus ocellaris, genital plates and valve.
Fig. 564.--Macustus grisescens, male genitalia from above.
Fig. 565.-Hardya melanopsis, male genitalia from beneath.
Fia. 566.-Elymana sulphurella, male, genital segment and anal tube, side view (genital plates removed).
Figs. 567-573.-Genital plates, valves and parameres: (567) Arthaldeus pascuellus; (568) Paluda flaveola; (569) Turrutus socialis; (570) Elymana sulphurella; (571) Streptanus sordidus; (572) Palus panzeri; (573) Jassargus pseudocellaris.
grey-brown. In male, sides of genital segment without appendages; aedeagus as

mixtus (Fabricius)
Common; adult generally on trees, especially oak; larva green, feeding on grasses. England, as far N. as Durham and Lancs. Wales. Ireland. vi-x. Europe. N. Africa. N. America (probably introduced).

## Genus Scleroracus Van Duzee

(= Ophiola Edwards, = Thamnotettix: auctt. partim, nec Zetterstedt)
Although Ribaut (1952) regarded this as a subgenus of Limotettix, Medler (1958) and Le Quesne (1962) have treated it as a separate genus. In this sense, there are at least six European species, out of which three occur in Britain. Females cannot always be identified with certainty.
1 Vertex broadly rounded apically, its length medially not more than 1.5 times that close to eyes (fig. 556). In male, sides of genitail segment with sharply pointed spine (fig. 551); apex of paramere broad (fig. 546); aedeagus without lateral spines (figs. 537, 542). (Face light brownish; frontoclypeus with black transverse lines, interrupted medially; anteclypeus with black or brown mark; lorae more or less widely black-edged; broad black patch usually present round base of each antenna. Vertex light brownish, with rather variable black or brown streaks (fig. 556). Pronotum light brownish, with irregular, more or less well developed, black or brown markings. Scutellum light brown, with two black or brown basal triangles and often other dark markings, in some cases more or less fused. Fore wings longer than abdomen, cells brownish, darker edged (fig. 557). In females, posterior margin of seventh abdominal sternum straight medially. Overall length: © $3 \cdot 4-3.9 \mathrm{~mm}$.; $; 4 \cdot 2-4 \cdot 8 \mathrm{~mm}$.)
( $=$ striatulus (Fallén), $=$ corniculus: (Ribaut), nec (Marshall)) decumanus (Kontkanen)
Local. England: Tuddenham and Freckenham, Suffoll; Colesborne, Glos.; Handley, Dorset. Wales: Kidwelly, Carms. vi, viii, ix. France. Scandinavia. Russia.

- Vertex more or less pointed apically (figs. 539, 540, 544 ), its length medially usually more than 1.5 times that close to eyes. In male, sides of genital segment with short, blunt spine (figs. 550, 552); apex of paramere narrower (figs. 545, 547); aedeagus with or without lateral spines (figs. 536, 538)
2 In male, aedeagus without lateral spines (figs. 538,540 ); sides of genital segment with lower lobe very finely tuberculate (fig. 552); paramere as in fig. 547. (Face brownish with variable blackish markings, often as in decumanus (see above) or as in corniculus (see below). Vertex more or less sharply pointed apically, light brownish, with more or less extensive blackish markings (figs. 540, 544). Pronotum light brownish, with irregular blackish markings. Scutellum light brown, with black or brown basal triangles and usually other dark markings, often more or less fused. Fore wings longer than abdomen, cells brownish, darker-edged. In females, posterior margin of seventh abdominal sternum slightly convex medially. Overall length : of $2 \cdot 8-3.6 \mathrm{~mm}$.; ; $3 \cdot 2-3.7 \mathrm{~mm}$.)
(=striatulellus (Edwards), = russeolus: auctt. nec (Fallén)) plutonius (Uhler)
Local, often on peaty heaths, possibly associated with Erica tetralix L. England: Staffs., Norfolk, Bucks., Surrey, Hants., Dorset. Scotland; Inverness-shire. vii, viii. N. and C. Europe. Siberia. N. America.
- In male, aedeagus with lateral spines (figs. 536,541); sides of genital segment with lower lobe smooth (fig. 550); paramere as in fig. 545. (Face black, anteclypeus with thin brown transverse lines broken medially and often with very narrow brown longitudinal streak; anteclypeus with two small brown patches near upper margin; genae brown edged, sometimes with small brown spots. Vertex rather sharply pointed, largely black with some brown streaks (fig. 539). Pronotum light brownish with heavy, irregular blackish markings, sometimes mainly black. Scutellum black with some brown markings. Fore wings longer than abdomen; cells brownish, conspicuously darker-edged, sometimes almost completely blackish.

In females, posterior margin of seventh abdominal sternum straight or slightly concave medially. Overall length: of $3.2-3.5 \mathrm{~mm}$; ; $9.5-4.0 \mathrm{~mm}$.)
( $=$ striatulus: (Edwards), nec (Fallén), $=$ intractabilis (Kontkanen))
corniculus (Marshall)
Locally common on peaty heaths, perhaps associated with Calluna or Vaccinium. England. Scotland. vii-ix. France. Germany. Russia. N. America.

# Genus Limotettix Sahlberg 

( = Drylix Edwards)
Two out of the four European species occur in Britain.

## Khy to Spectes

1 Vertex distinctly broader medially than close to eyes, greenish yellow with a wider or narrower pale streak extending from one ocellus to the other, enclosed by strong black streaks posteriorly and normally also anteriorly (fig. 635); two dark spots often present posteriorly next to eyes. In male, genital plates more narrowly rounded apically, with outer margins almost straight for much of their length (fig. 600); paramere with apex equally widened on either side, somewhat resembling rose of a watering-can (fig. 601); aedeagus as in figs. 606, 607. (Face yellow-ish-green; frontoclypeus with transverse, usually black but sometimes brown, bands, interrupted medially by two longitudinal dark bands; anteclypeus usually with black median streak; loree usually strongly black edged. Pronotum greenish anteriorly, often with four small dark streaks, grey-brown or greenish posteriorly; if latter colour, sometimes with brownish patches. Scutellum greenish yellow, in males often with darker basal and median markings. Fore wings with veins greenish, cells marked longitudinally with grey-brown or concolorous. In female, posterior margin of seventh abdominal sternum concave, more or less sharply

striola (Fallén)
Locally common in marshy places, possibly associated with Scirpus. England. Scotland. Ireland. vii-ix. Europe. N. Africa. N. America.

- Vertex not appreciably broader medially than close to eyes, greenish yellow with very narrow pale streak between ocelli, but not extending right up to them, enclosed by strong black streaks (fig. 549). In male, genital plates more broadly rounded apically, with outer margins smoothly convex (fig. 599); paramere with apex strongly produced inwards (fig. 602); aedeagus as in figs. 604, 605. (Face yellow-green, with lorae strongly black edged, anteclypeus with black median streak, frontoclypeus with two series of black transverse bands fused medially with two longitudinal bands. Pronotum and scutellum yellow-green. Fore wings with yellowish veins, cells paler greenish, sometimes edged grey-brown or with grey-brown streaks. In female, posterior margin of seventh abdominal sternum concave, more or less sharply angled medially (fig. 603). Overall length: $\delta^{\text {o }} 3 \cdot 7-3 \cdot 8 \mathrm{~mm}$.; ㅇ $4 \cdot 0-4 \cdot 3 \mathrm{~mm}$.) . . . . . . . . . . . . . . . . . . . . . atricapillus (Boheman)

Very local. England: Newchurch Common and Delamere Forest, Cheshire. viiix. Scandinavia. Russia. N. America.

## Genus Euscelis Brullé

( $=$ Phrynomorphus Curtis,$=$ Athysanus: auctt. partim, nec Burmeister, $=$ Thamnotettix: auctt. partim, nec Zetterstedt)
The taxonomy of this genus is complicated by seasonal polymorphism, which affects not only the external appearance but also the male genitalia (cf. Müller, 1954, 1957). Ribaut (1952) lists eleven French species, but two of these have been shown by Müller to be within the variation range of lineolatus. There are five British species, of which four were discussed by Le Quesne (1960) and the other has recently been discovered by Woodroffe (1968).

## Key to Species

1 In male, genital plates broad, with outer margin markedly convex throughout (fig. 581); aedeagus extended into two long, narrow projections (figs. 593, 596). In female, posterior margin of seventh abdominal sternum with callose tooth medially (fig. 587). (Face normally light brownish; frontoclypeus with thin blackish transverse lines, interrupted medially; more or less extensive dark patches round base of each antenna and sometimes along margins of lorae and on anteclypeus;


577

582

586


575

578


579



576


585


587

Figs. 574-576, 582, 583, 586.-Euscelis incious: (574) female, apex of abdomen, dorsal view; (575) the same (another specimen); (576) genital plates and valve; (582) apex of aedeagus, from behind (spring generation); (583) the same (summer generation); (586) female, seventh abdominal sternum.

Figs. 577-580.-E. lineolatus: (577) female, apex of abdomen, dorsal view; (578-580) male, apex of aedeagus, from behind (three specimens).
Figs. 581, 587.-E. obsoletus: (581) genital plates and valve; (587) female, seventh abdominal sternum.
Figs. 584, 585.-E. ohausi: (584) male, apex of abdomen (from behind); (585) fore wing.
face rarely largely black-brown, with broadly interrupted pale streaks on frontoclypeus and a pale spot next to eye on each side. Vertex light brownish, usually with four more or less well defined dark spots in form of inverted $V$ (fig. 612), occasionally absent or accompanied by smaller black dots; rarely black-brown with two thin curved pale lines anteriorly and some more or less distinct peler patches posteriorly. Pronotum brownish, sometimes with more or less distinct dark spots anteriorly, rarely black-brown except for a few lighter patches anteriorly. Scutellum brownish, sometimes with somewhat darker basal triangles, rarely largely dark. Fore wings slightly longer than abdomen in males, somewhat shorter than abdomen in females, light brownish, more or less widely marked with irregular dark dots, often tending to form streaks parallel to veins, rarely coalescing to form broad dark bands. Abdomen widely marked with black-brown. Overall length :才' 4.7-5.6 mm. ; 우 $5 \cdot 2-6.2 \mathrm{~mm}$.)

> ( = sejungendus (Kirschbaum)) obsoletus (Kirschbaum)

Generally common on grasses in damp places: the form sejungendus has a rather longer vertex and is associated with salt-marshes in the South of England (cf. Edwards, 1908). England. Wales. Scotland. Ireland. vii-x. Europe. N. Africa. N. America.

- In male, genital plates narrower, outer margin almost straight in middle (fig. 576); aedeagus with appendages, if present, recurrent (figs. 578-580, 582-584, 591). In female, posterior margin of seventh abdominal sternum without projection (fig. 586) . 2
2 Cells of fore wings with broad bands, uniformly black in males and in some females, made up of more or less closely packed dark dots in other females, but leaving clear light yellow-brown margin round veins, except in apical cells of some males (fig. 588). In male, incision in apex of aedeagus about twice as deep as wide (fig. 591). Basal spine of anterior (and median) tibiae not paired. (Frontoclypeus, anteclypeus and lorae usually largely blackish, with some narrow light brownish streaks, which are sometimes broader and more confluent; genae usually largely light brownish. Vertex light brownish, with irregular dark band behind ocelli, two dark spots towards apex and two dark spots posteriorly (fig. 592); markings sometimes more or less fused. Pronotum brownish, with some irregular dark markings anteriorly, often widely dark medially. Scutellum brownish with blackish markings, sometimes more or less fused. Fore wings usually about as long as abdomen or somewhat shorter. Legs usually largely blackish. Overall length : ${ }^{*} 3 \cdot 3-3 \cdot 7 \mathrm{~mm}$.; 우 $4 \cdot 5-4 \cdot 8 \mathrm{~mm}$.) . . . . . . . . . . . . . . . venosus (Kirschbaum)

Very local among rank calcicole vegetation. England: Chiltern Hills, Oxon. viii, ix. C. and S. Europe.

- Cells of fore wing more or less heavily marked with irregular dark dots, but not forming regular bands occupying most of cells. In male, incision in apex of aedeagus, if present, not or only slightly longer than wide and more V-shaped (figs. 578-580, 582-584). Spines on anterior (and median) tibiae regularly paired . 3
3 Dots on fore wing forming two distinct longitudinal streaks (fig. 585). In male, aedeagus broad, with stout recurrent appendages from apex to below level of gonopore (fig. 584). (Face light brownish with dark transverse streaks on frontoclypeus, which are usually fused into longitudinal median patch, dark patch on anteclypeus, lorae dark-edged and dark streaks round base of antennae. Vertex light brownish with two curved blackish streaks near anterior margin and several blackish spots, including two large ones posteriorly. Pronotum light brownish with some dark spots, which sometimes tend to form longitudinal streaks. Scutellum light brownish often with blackish markings. Fore wings in male rather longer than abdomen, in female usually slightly shorter than abdomen. Abdomen largely blackish, in female with light brownish markings posteriorly as in lineolatus (cf. fig. 577). Overall length: J $3 \cdot 4-4 \cdot 3 \mathrm{~mm}$; ; ㅇ $4 \cdot 1-5 \cdot 0 \mathrm{~mm}$.)

> (= distinguendus: (Edwards) nec (Kirschbaum)) ohausi Wagner Local, perhaps associated with Cytisus (broom). England: Norfolk, Worcs., Kent, Surrey. Wales: Cardigans. Scotland: Inverness-shire viii-x. France. Germany. Denmark.

- Fore wings more or less heavily dotted, but dots not forming two distinct longitudinal streaks. In male, aedeagus less broad and recurrent appendages, if present, not reaching below level of gonopore (fig. 583)

4 In male, apex of aedeagus smoothly rounded, forming one or two humps (figs. 578580). In female, fore wings shortened, not as long as abdomen; apical terga of abdomen with pattern consisting of three longitudinal dark stripes on a pale background (fig. 577). (Face light brownish; frontoclypeus usually with transverse dark lines, which are sometimes more or less widely fused medially; a broad dark patch often present on anteclypeus; lorae often partly or wholly dark edged; dark patches present at base of each antenna. Vertex light brownish, usually with several blackish spots, often discrete but sometimes fused. Pronotum light brownish, usually with darker markings, often forming four or six longitudinal streaks. Scutellum light brownish, often with darker basal triangles and median markings. Overall length: on $^{\boldsymbol{*}} 3 \cdot 7-4.6 \mathrm{~mm}$.; 여 $3 \cdot 9-4.6 \mathrm{~mm}$.)
( = bilobatus Wagner in Ribaut) lineolatus Brullé
Locally common on grasses. England, as far N. as Yorks. and Clos. Wales: Caerns., Glam. (? Ireland.) v-x. Holland. France. Germany. S. Russia. N. Africa.


Figs. 588, 591, 592.-Euscelis venosus: (588) male, fore wing; (591) apex of aedeagus, from behind; (592) male, vertex, pronotum and scutellum.
Fig. 589.-Euscelidius schenckii, face.
Fig. 590.-E. variegatus, aedeagus, side view.

- In male, apex of aedeagus with sharp points at apex or with pointed appendages towards apex (figs. 582, 583). In female, fore wings as long as abdomen; apical terga of abdomen more or less darkly marked, but not with three longitudinal dark stripes on a pale background (figs. 574, 575). (Face brownish with variable darker markings; frontoclypeus with more or less prominent transverse streaks; anteclypeus often with a darker patch; lorae dark, dark-edged or pale; genae often more or less darker marked. Vertex brownish, with darker brown or black spots, which are often wedge-shaped and sometimes confluent. Pronotum and scutellum brownish with variable darker, often black, markings. In spring generation, male aedeagus without appendages (fig. 582), dark markings more extensive, size smaller-overall length: đ $3.0-3.6 \mathrm{~mm}$; ; $93.8-4.1 \mathrm{~mm}$. In summer generation, male aedeagus broader, with more or less well developed recurrent appendages (fig. 583), dark markings less extensive, size larger-overall length: © $\mathbf{3 . 7 - 4 . 4} \mathrm{mm}$.; ¢ $\mathbf{3 . 9 - 4 . 9 \mathrm { mm } \text { .) }}$
( $=$ plebejus (Fallén) nec (Scopoli), = albingensis Wagner, = galiberti Salmon and Salmon) incisus (Kirschbaum)
Common on grasses. England. Wales. Ireland. (? Scotland: St. Kilda.) iii-x. Europe. Siberia. N. Africa.


## Genus Euscelidius Ribaut

(= Euscelis: auctt. partim, nec Brullé, = Thamnotettix: auctt. partim, nec Zetterstedt)
Both European species of this genus have been reported from Britain.


Figs. 593, 596.-ETuscelis obsoletus: (593) aedeagus, from behind; (596) aedeagus, side view.
Figs. 594, 597, 598.-Euscelidius schenckit: (594) aedeagus, from behind; (597) aedeagus side view; (598) genital plates, valve and parameres.
Fig. 595.-E. variegatus, aedeagus, from behind.
Figs. 599, 602-605.-Limotettix atricapillus: (599) genital plates and valve; (602) apex of paramers; (603) female, seventh abdominal sternum; (604) aedeagus, side view; (605) aedeagus, from above.

Figs. 600, 601, 606, 607.-L. striola: (600) genital plates and valve; (601) paramere; (606) aedeagus, side view; (607) sedeagus, from above.

## Key to Spectes

1 Frontoclypeus with two large dark patches near upper margin, more or less widely marked with dark transverse streaks below (fig. 611), which may be partly fused in lower part in darkly marked individuals. In male, aedeagus with apical appendages hook-shaped in side view (fig. 590) and narrow when seen from behind (fig. 595). (Face brownish, anteclypeus with a few dark dots or a dark streak; lorae with black spot at lower margin or more or less widely darkened; genae with a dark spot at the base of each antenna and sometimes with other dark patches. Vertex light brownish with two blackish wedge-shaped marks just behind ocelli (fig. 610) and other more or less extensive dark markings, sometimes fused with these. Pronotum and scutellum light brownish with variable brown or black markings. Fore wings longer than abdomen, light brownish with more or less well-developed pattern of more or less fused irregular darker dots. In female, posterior margin of seventh abdominal sternum concave with small rounded projection medially (fig. 561 ). Overall length : ठ $3.7-4 \cdot 7 \mathrm{~mm}$.; if $4 \cdot 4-5 \cdot 3 \mathrm{~mm}$.)
variegatus (Kirschbaum)
Local, on grasses. England: Norfolk,Suffolk, Kent. viii-xi. Europe. Siberia. N. Africa. Azores.

- Frontoclypeus with two longitudinal and series of transverse dark brown streaks, usually joined in upper part, but not fused into large spots (fig. 589). In male, aedeagus with apical appendages in line with stem in side view (fig. 597) and broader when seen from behind (fig. 594). (Face light brownish; lorae edged dark brown. Vertex, pronotum and scutellum light yellowish brown; vertex with several irregular dark brown spots (fig. 548); pronotum with a few rather indistinct brownish spots anteriorly and sometimes also some posteriorly; scutellum with two brown dots medially and sometimes darker basal triangles. Fore wings longer than abdomen, marked with fine irregular dark brown dots which can locally be more or less fused into small patches. In male, genital plates as in fig. 598. In female, posterior margin of seventh abdominal sternum concave with small rounded projection medially. Overall length : of $4 \cdot 3-4.9 \mathrm{~mm}$.; ㅇ $5.0-5.4 \mathrm{~mm}$.)
( $=$ plebejus: (Edwards) nee (Feallén)) schenckiil (Kirschbaum)
In profusion among long grass in a badly kept garden (1884 and 1885); not reported since. England: Norwich, Norfolk. vii, viii. Europe. Turkestan. N. Africa. N. America.

Genus Streptanus Ribaut
(=Athysanus: auctt. partim, nec Burmeister)
Out of six European species, three reach Britain. The male aedeagus is asymmetrical, the apical part being twisted through an angle of about fifteen to twenty degrees.

## Key to Spectes

1 Brachypters with fore wings short, not reaching tergum anterior to genital segment; length of fore wings-- $1 \cdot 8-2 \cdot 0 \mathrm{~mm}$.; ; $1 \cdot 8-2 \cdot 2 \mathrm{~mm}$.; macropters not reported from Britain. Hind wings little more than half length of fore wings. Vertex rather sharply pointed apically, as long as or almost as long as pronotum (fig. 621), yellow-brown with more or less distinct brown transverse line medially or unmarked; only very indistinct markings, if any, present anteriorly. In male, genital plates rather sharply pointed apically (fig. 623); aedeagus in side view without trace of tooth near base of stem (fig. 627), with apical expansion seen from behind two to three times as broad as long (fig. 628). (Face yellow-brown; in males, frontoclypeus with brown transverse lines, interrupted medially, anteclypeus with dark patch; lorae partly dark edged; dark patch round base of each antenna: in females, frontoclypeus usually with faintly darker transverse lines, interrupted medially. Pronotum and scutellum yellow brown, without distinct markings; pronotum sometimes broadly greyish posteriorly. Fore wings yellow brown, translucent, without distinct markings. Abdomen yellow brown, dark basally in males and sometimes in females. In males, anal tube usually blackish. In females, posterior margin of seventh abdominal sternum usually with weak
median tooth, sometimes absent (fig. 622). Overall length: of $\mathbf{3 . 5 - 3 . 9} \mathrm{mm}$; 우 3.8-4.1 mm.)
( = brevipennis (Kirschbaum), = depressus (Scott)) marginatus (Kirschbaum) On grasses, often on acid heaths. England. Wales. Scotland. v-x. Europe. N. Africa. N. America.

- Brachypters with fore wings usually reaching tergum anterior to genital segment in males and sometimes doing so in females: length of fore wings normally greater than 2.0 mm . in males and greater than 2.2 mm . in females. Hind wings nearly as long as fore wings in males, about three-fifths of length of fore wings in females. Vertex more or less rounded apically, distinctly shorter than length of pronotum (figs. 616, 617), light brownish, usually with more or less distinct dark marks near anterior margin, sometimes also with dark marks medially and posteriorly. In males, genital plates truncate (fig. 571) or broadly rounded apically (fig. 620); aedeagus in side view with more or less well defined tooth near base of stem (figs. 629,630 ), with apical expansion seen from behind approximately as long as broad (figs. 624, 626). In females, posterior margin of seventh abdominal sternum with prominent tooth medially (fig. 619)
. 2


Fic. 608.-Hardya melanopsis, vertex.
Fig. 609.-Idiodonus cruentatus, female, face.
Figs. 610, 611 .-Euscelidius variegatus: (610) vertex; (611) face.
Fig. 612.-Euscelis obsoletus, vertex.
Fig. 613.-Macustus grisescens, vertex.
Fig. 614.-Athysanus argentarius, vertex, pronotum and scutellum.
Fig. 615.-Speudotettix subfusculus, vertex and pronotum.
2 Larger-overall length of brachypters: ${ }^{\star} 4 \cdot 5-5 \cdot 0 \mathrm{~mm}$. ; 오 $5 \cdot 2-5.6 \mathrm{~mm}$. Macropters rare-overall length : $\delta^{*} 5 \cdot 0-5 \cdot 1 \mathrm{~mm}$.; $; 5 \cdot 5-5 \cdot 6 \mathrm{~mm}$. In male, tooth near base of stem of aedeagus weaker (fig. 629); distance of apical expansion from gonopore three to four times length of former (fig. 626). Vertex broadly rounded apically, light brownish, with more or less distinct dark streaks near anterior margin and another unbroken (or narrowly interrupted in middle) transverse one medially; two dark spots often present posteriorly (fig. 616). (Face light brownish; frontoclypeus in males and some females with darker transverse lines, interrupted medially (at least in lower part); lorae sometimes partly dark edged, dark brown patch often present round base of each antenna. Pronotum light brownish, with
some dark spots in anterior half and sometimes weak longitudinal streaks in posterior half. Scutellum light brownish, in males and in some females with two dark spots near middle of anterior margin. Fore wings light brownish, in males usually with darker streaks in cells. In males, abdomen with three broad longitudinal streaks, of which median one may be bisected by narrow pale line; in




623


629
624


617


625


626


622


631

Fias. 616, 620, 626, 629.-Streptanus aemulans: (616) vertex, pronotum and scutellum; (620) genital plates and valve; (626) apex of aedeagus, from behind; (629) aedeagus, side view.
Figs. 617, 619, 624, 630.-S. sordidus: (617) vertex and pronotum; (619) female, seventh abdominal sternum; (624) apex of aedeagus, from behind; (630) zedeagus, side view.
Figs. 621-623, 627, 628.-S. marginatus: (621) vertex and pronotum; (622) female, seventh abdominal sternum; (623) genital plates and valve; (627) aedeagus, side view; (628) apex of aedeagus, from behind.
Fias. 618, 625, 631.-Macustus grisescens: (618) female, seventh abdominal sternum; (625) apex of aedeagus, from behind; (631) aedeagus, side view.
females, abdomen usually brownish, often with indistinctly darker longitudinal streaks. In males, genital plates broadly rounded apically (fig. 620))
( $=$ sahlbergi (Reuter)) aemulans (Kirschbaum)
On grasses, often in damp habitats. England. Wales. Scotland. Ireland. vii-ix. N. and C. Europe. Siberia. N. America.

- Smaller-overall length of brachypters: of $3 \cdot 5-4 \cdot 2 \mathrm{~mm}$; ; ㅇ $4 \cdot 0-4 \cdot 7 \mathrm{~mm}$. Macropters occasionally found-overall length: of $4.4-4.7 \mathrm{~mm}$.; ㅇ $4.8-5.0 \mathrm{~mm}$. In male, tooth near base of stem of aedeagus larger and sharper (fig. 630); distance of apical expansion from gonopore about twice length of former (fig. 624). Vertex rather narrowly rounded apically, light yellowish or greyish brown, in most males and some females with dark streaks near anterior margin; dark markings sometimes also present medially, but not forming unbroken transverse band; two dark dots sometimes present posteriorly (fig. 617). (Face light yellowish or greyish brown; frontoclypeus usually with more or less well developed dark transverse lines, usually interrupted medially; anteclypeus often with dark patch; lorae often with dark patches around edges; dark spot often present around base of each antenna. Pronotum light brownish, in males often and in females sometimes with some dark spots in anterior half. Scutellum light brownish, sometimes with dark spots anteriorly and occasionally (usually in macropters) with dark basal triangles. Fore wings light brownish, often in males and sometimes in females with darker streaks in cells. In males, abdomen variable in colour, wholly or largely black in darkly marked specimens; in females, abdomen often brownish, sometimes darker marked. In males, genital plates truncate apically (fig. 571). In female, seventh abdominal sternum as in fig. 619). . . . . . . . . . . . . . . . . . . . sordidus (Zetterstedt) Common, on grasses. England. Wales. Scotland. Ireland. iv-xi. Europe. N. America.


## Genus Macustus Ribaut

(=Athysanus: auctt. partim, nec Burmeister)

There is only one European species, which is found in Britain.
Face light brownish; frontoclypeus with stronger or weaker transverse dark lines, often broken medially; anteclypeus sometimes with dark patch; lorae sometimes partly dark edged or with one or two dark dots along edge; dark spot often present round base of each antenna. Vertex light brownish with two more or less distinct darker transverse bands, of which anterior obtusely angled medially (fig. 613). Pronotum light brownish, often with rather indistinct darker spots anteriorly and sometimes with indistinct longitudinal brownish bands posteriorly. Scutellum light brownish, often with two dark dots anteriorly and sometimes with dark basal triangles. Fore wings light brownish, apical margin usually and sometimes also inner margin darkened; dark streaks occasionally present in some cells. In males, fore wings usually slightly longer than abdomen, hind wings nearly as long as fore wings. In females fore wings normally reaching to about two-thirds of length of abdomen, hind wings about two-thirds of length of fore wings. In male, genital segment open above, with two hook-like appendages apically, crossing each other (fig. 564); aedeagus with stem twisted, as in figs. 625, 631. In female, posterior margin of seventh abdominal sternum with bifid projection (fig. 618). Overall


Common on grasses. England. Wales. Scotland. Ireland. iv-ix. N. and C. Europe. Siberia. N. America.

## Genus Athysanus Burmeister

One of the two European species occurs in Britain.
Face pale yellow-brown; frontoclypeus with grey-brown transverse lines uniting with wedge-shaped longitudinal grey-brown band; genae with short blackish streak above base of each antenna. Vertex pale yellow-brown with strong transverse black line just behind ocelli (fig. 614). Pronotum pale yellow-brown, translucent, with four more or less well defined dark longitudinal streaks; dark median line of scutellum visible through. Scutellum with strong median dark line and a short


Fra 632 .
Fig. 633.-Euscelis incious, head in side view.
Fic. 634.-Lamprotettix octopunctatus, vertex, pronotum and scutellum.
Fig. 635.-Limotettix striola, vertex.
Figs. 636-638.-Grypotes puncticollis: (636) head in side view; (637) vertex; (638) face.
Figs. 639, 640.-Opsius stactogalus: (639) vertex; (640) face.
Fig. 641.-Sorhoanus xanthoneurus, face.
Fig. 642.-Arthaldeus pascuellus, vertex.
Fig. 643.-Elymana sulphurella, face.
Fig. 644.-Mocuellus metrius, face.
Fig. 645.-Paluda flaveola, face.
thin line near each basal corner. Fore wings light yellow-brown; corio-claval suture and inner margin narrowly dark brown; cells of corium with dark streaks; a narrow dark streak between first and second anal veins. In male, genital plates with outer margins convex, rather sharply pointed apically, spines disordered (fig. 662); valve with broad black streak; aedeagus as in figs. 655, 657. In females, seventh abdominal sternum with black longitudinal streak medially, posterior margin somewhat concave (fig. 663). Overall length: of 우 6.7-7.8 mm.
( $=$ argentatus (Fabricius) nec (Olivier)) argentarius Metoalf
Local, near coast, often in salt-marshes. First reported from Britain in 1866 (Marshall, 1866), not found again till 1951, since when there have been a number of records (Duffeld, 1957; Salmon, 1959; Le Quesne, 1966). England: Suffolk, Kent, Sussex, Hants. vi-ix. N. and C. Europe. Siberia. N. America (introduced).

## Genus Paluda DeLong

(=Rhopalopyx Ribaut, = Stictocoris: auctt. partim, nec Thomson)
This genus has been called Rhopalopyx by European authors for nearly thirty years, but Emel'janov (1964) refers correctly to it by the earlier name

of Paluda, which is based on a North American type-species. Eight European species have been described, but some are very close and may be subspecies or phenotypic variants (cf. Le Quesne, 1964a). Three species occur in Britain.

## Key to Spectes

l Vertex yellowish, with four black spots, three on anterior margin and one on the posterior margin (fig. 652). Fore wings fully developed, yellow-brown with two


Fias. 656, 658, 659.-Paluda flaveola: (656) male genital segment, side view; (658) aedeagus, side view; (659) zedeagus, from behind.
Fias. 654, 660, 661, 664, 665.-P. adumbrata: (654) face; (660) male, anal tube and sides of genital segment, seen from above; (661) appendage of side of male genital segment; (664) aedeagus, side view; (665) aedeagus, from behind.

Figs. 655, 657, 662, 663.-Athysanus argentarius: (655) aedeagus, from behind; (657) aedeagus, side view; (662) genital plates and valve; (663) female, seventh abdominal sternum.
thin longitudinal dark brown streaks anteriorly, one along inner margin and the other along median vein. In male, anal tube seen from above parallel-sided (fig. 660). (Face yellowish with two large black spots on each side between eye and frontoclypeus; on frontoclypeus, a large black spot medially near upper margin and, in males, a dark median longitudinal streak, some weak transverse lines rarely present; two or three black dots present along outer margin of each lora (fig. 654). Pronotum yellowish, with broad median longitudinal band and often two more or less distinct dark spots laterally towards hind margin (fig. 652). Scutellum yellowish with broad median longitudinal streak. In male, appendage of side of genital segment broad for most of its length, accuminate at apex (fig. 661); aedeagus in side view with outer margin convex throughout (fig. 664), seen from behind as in fig. 665. In female, posterior margin of seventh abdominal sternum concave, with narrow V-shaped median incision. Overall length : of $3 \cdot 6-4.0 \mathrm{~mm} . ;$; $3 \cdot 7-4 \cdot 1 \mathrm{~mm}$.)
( $=$ preyssleri: auctt. nec (Herrich-Schaeffer)) adumbrata Sahlberg
Local, on grasses, usually on calcareous or other dry hillsides. England, as far N. as Yorks. and Glos. vii-ix. Europe. Siberia.

- Vertex and fore wings without black or dark brown markings. In male, anal tube considerably broader towards apex than basally, seen from above (fig. 558) ...2
2 Ground colour yellow or orange. Vertex broadly rounded anteriorly (fig. 651). In male, appendages of sides of genital segment broadly truncate apically, with a narrow straight spine (fig. 656). (Face yellowish or orange, unmarked except for small black spot usually present near base of each antenna and lower part of frontoclypeus very narrowly black-edged (fig. 645). Vertex, pronotum, scutellum and fore wing yellowish or orange, unmarked. Wings fully developed. Abdomen yellowish with blackish markings, often tending to form three longitudinal dark streaks. In male, spines of genital plates numerous and disordered (fig. 568); aedeagus as in figs. 658, 659. In female, seventh abdominal sternum much shorter in middle than at sides, its posterior margin smoothly rounded (fig. 523). Overall length: ${ }^{\pi}{ }^{4} 4 \cdot 2-4 \cdot 6 \mathrm{~mm}$.; ㅇ $4 \cdot 4-5 \cdot 0 \mathrm{~mm}$.)
.flaveola (Boheman)
Local, on grasses in marshy or damp areas, perhaps associated with Calamogrostis epigeios Roth. England, as far N. as Durham and Staffs. vi-ix. N. and C. Europe.
- Ground colour greenish. Vertex longer, sharply pointed apically (fig. 646). In male, appendages of sides of genital segment rounded apically, continued in a long spine (fig. 647). (Frontoclypeus grey-brown with pale median longitudinal streak and series of pale transverse lines on either side. Vertex orange-brown, with some more or less distinct yellow-green marks posteriorly. Pronotum and scutellum more or less uniform greenish yellow. Veins of fore wing orange brown or greenish. Abdomen largely black above. In male, aedeagus as in fig. 650. In female, seventh abdominal sternum considerably narrower in middle than at sides, leaving base of gonoplacs uncovered, its posterior margin being usually curved smoothly (fig. 648), but rarely with median V-shaped incision (fig. 649). Overall

( =monticola: Le Quesne, nec Ribaut) vitripennis (Flor) hibernica Le Quesne
Very local, on limestone pavement. Ireland: 643 feet, Mullagh, near Corofin, Co. Clare. ix. This form probably confined to Ireland: species spreads through Europe, Siberia and N. Africa.


## Genus Mocydia Edwards

## ( = Thamnotettix: auctt. partim, nec Zetterstedt)

As now defined, this genus has only one European species, which occurs in Britain.

Face light yellow-brown, sometimes suffused widely with grey; frontoclypeus usually with two or three more or less distinct medially interrupted brownish transverse streaks near upper margin, sometimes with such streaks throughout or without markings. Vertex rather narrowly rounded apically, nearly as long as pronotum, brownish with more or less distinct pale yellow median longitudinal band, almost always with two narrow black streaks near anterior margin, whieh occasionally meet apically (fig. 666). Pronotum pale yellowish with six more or less distinct brownish longitudinal bands. Scutellum pale yellowish with two basal triangles
and median longitudinal band brownish. Wings always developed; fore wings light brownish with veins pale; median apical cell dark and often central subapical cell and inner margin of radial cell black-edged (fig. 351). In male, aedeagus as in figs. 667,668 . In female, posterior margin of seventh abdominal sternum almost


Figs. 666-668.-Mocydia crocea: (666) vertex, pronotum and scutellum; (667) apex of aedeagus, from behind; (668) aedeagus, side view. ( $\mathrm{GO}=$ gonopore.)
Figs. 669, 670, 673.-Mocydiopsis parvicauda: (669) aedeagus, side view; (670) aedeagus, from behind; (673) anal tube ( $L=$ length, $W=$ width ).
Figs. 671, 672.-M. attenuata: (671) aedeagus, from behind; (672) aedeagus, side view.
Figs. 674, 675.-Thamnotettix confinis: (674) aedeagus, from behind; (675) genital plates and valve.
straight with shallow median incision. Overall length: ${ }^{\text {o }} 4.3-4.8 \mathrm{~mm} . ;$ if $4.7-$ $5 \cdot 2 \mathrm{~mm} . .$. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .crocea (Herrich-Scheeffer)

Common on grasses, possibly associated with Bromus erectus Huds., Brachypodium or Dactylis. England, as far N. as Yorks., Derbys. and Staffs. Wales: Pembs. Ireland. i-xii. C. and S. Europe. N. Africa.

## Genus Mocydiopsis Ribaut

( = Mocydia: auctt. partim, nec Edwards, = Thamnotettix: auctt. partim, nec Zetterstedt)
This genus has five European species, two of which occur in Britain.


Fig. 676.-Thamnotettix confinis, aedeagus, side view.
Frgs. 677, 679.-T. dilutior: (677) aedeagus, from behind; (679) aedeagus, side view.
Figs. 678, 680.-Colladonus torneellus: (678) face; (680) vertex.
Frgs. 681-683, 685.-Speudotettix subfusculus: (681) aedeagus, side view; (682) zedeagus, from behind; (683) male genital segment, from above; (685) female, seventh abdominal sternum.
Fig. 684.-Idiodonus cruentatus, medeagus, side view.

They can only be separated on the basis of the male genitalia and thus females cannot be named.

## Key to Species

1 In male, anal tube more elongate, in dried specimens almost as long as the rest of the abdomen: its length (measured as shown in fig. 673) $0 \cdot 43-0.52 \mathrm{~mm}$., more than 1.5 times its width; aedeagus in side view narrower, its outer margin more strongly convex (fig. 672); gonopore remote from point of attachment of appendages of aedeagus (fig. 671). (Face pale brownish; frontoclypeus with transverse greybrown bands, interrupted medially by pale, dark-edged longitudinal band; anteclypeus usually with a dark patch; lorae sometimes dark edged, often with dark spot on outer margin; genae with dark patches near eyes. Vertex rather narrowly rounded apically, somewhat shorter than pronotum, brownish, often with broad pale yellowish median longitudinal band, sometimes with two narrow and rather indistinct dark lines near anterior margin. Pronotum pale yellowish with six rather indistinct brownish longitudinal bands. Scutellum pale yellowish with brownish basal triangles and sometimes also small basal median spot and two small spots towards apex. Wings always developed; fore wings light brownish with veins pale; median apical cell dark; some other cells often dark-edged; distinct black spot present between first and second anal veins along inner margin in males and some females (fig. 353). In females, posterior margin of seventh abdominal sternum strongly concave, medially almost straight. Overall length: ${ }^{\boldsymbol{A}} 3.8$ $4 \cdot 2 \mathrm{~mm}$.; 우 $4 \cdot 3 \cdot 4 \cdot 6 \mathrm{~mm}$.) . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . attenuata (Germar)
Locally common on grasses, often on calcareous soils. England, as far N. as Lancs, and Suffolk. i, iii, iv, viii-xi. France. Holland. Germany. Czechoslovakia. S. Russia. ? Scandinavia.

- In male, anal tube shorter, in dried specimens about half length of rest of abdomen; its length (measured as shown in fig. 673) $0.32-0.40 \mathrm{~mm}$., less than 1.5 times its width; aedeagus in side view broader, its outer margin less convex (fig. 669); gonopore near point of attachment of appendages of aedeagus (fig. 670). (Colouring as in attenuata, but frontoclypeus sometimes without distinct transverse bands, genae sometimes without dark marks near eyes. Fore wings with median apical cell dark, some other cells sometimes dark-edged; distinct black spot present between first and second anal veins along inner margin in some males and some females. In female, posterior margin of seventh abdominal sternum usually as in

Locally common on grasses, perhaps on more acid soils than previous species. S. Rngland, as far N. as Suffolk, Bucks. and Somerset. vii-x. France. Belgium. Holland. Germany. Austria. Czechoslovakia.


## Genus Thamnotettix Zetterstedt

$$
(=\text { Loepotettix Ribaut) }
$$

This genus, as now defined, contains four European species, two of which are found in Britain. At first, Ribaut (1942) regarded Loepotettix as a separate genus, with type-species dilutior, but later (1952) relegated this to subgeneric status.

## Key to Species

1 Ocelli larger, their distance from eye approximately equal to their diameter. Veins of fore wing whitish, cells pale brownish, sometimes with some darker streaks along inner margin. (Face light brownish, frontoclypeus in males and some females with darker brown transverse lines, sometimes fusing medially into longitudinal band; anteclypeus sometimes with two dark streaks; genae in males and some females with blackish lines bordering eyes, near base of antenna; in some females, face without dark markings. Vertex light brownish, with rather indistinctly darker brown spots or unmarked. Pronotum anteriorly yellow-brown with more or less distinct red-brown mottlings, posteriorly grey-brown. Scutellum light brownish, usually with more or less distinct red-brown basel triangles and often with two dark dots medially. Fore wings always developed. In male, genital
plates nearly three times as long as broad, with single row of spines; aedeagus as in figs. 677, 679. In female, seventh abdominal sternum nearly twice as long as

dilutior (Kirschbaum)
Usually on trees, especially oaks, but sometimes on lower vegetation. England, as far N. as Yorks. Ireland: Co. Dublin. vi-x. C. and S. Europe. Siberia.

- Ocelli smaller, distance from eye considerably greater their diameter. Veins of fore wing more or less tinged greenish; cells hyaline or greenish. (Face greenish yellow; frontoclypeus usually with more or less widespread greyish transverse lines, sometimes with broad greyish median patch. Vertex yellow-green or olivegreen, often with two or four brownish or greyish spots. Pronotum and scutellum uniform yellow-green or olive-green; pronotum sometimes with darker marblings and sometimes with dark marks at base of scutellum visible through it; scutellum sometimes with darker basal triangles and median dots. Fore wings always developed. In male, genital plates about three times as long as broad, with single row of spines, the bases of which are remote from edge of genital plate (fig. 675); aedeagus as in figs. 674, 676 . In female, seventh abdominal sternum about twice as long as sixth, with posterior margin straight. Overall length: $\delta$ 早 $4 \cdot 9-6 \cdot 4 \mathrm{~mm}$.) ( $=$ simplex (Herrich-Schaeffer), $=$ prasinus: auctt. nec (Fabricius))
confinis Zetterstedt
Widespread on trees or lower vegetation. Shows geographical variation in size and colouring; the smallest and darkest specimens which I have seen are from Rhum. England. Wales. Scotland. Ireland. v-ix. N. and C. Europe. Siberia. N. America.


## Genus Speudotettix Ribaut

## ( = Thamnotettix: auctt. partim, nec Zetterstedt)

This genus has only one European species, which is found in Britain.
Face brownish; frontoclypeus with blackish transverse lines, often coalescing into large blackish patch in lower part; anteclypeus often with broad blackish patch; lorae wholly or partly black-edged or sometimes entirely black; black streak present on genae next to eye around base of antenna. Vertex light brownish, with two dark streaks near anterior margin which are often united medially (fig. 615); transverse orange-brown (or occasionally black-brown) band often also present medially. Pronotum light brownish anteriorly, more or less distinctly darker marbled, grey-brown posteriorly. Scutellum brownish with more or less distinctly darker basal triangles and median dots; in males, often also with broad dark streak towards apex. Wings always developed; veins of fore wings whitish; cells light brownish with darker suffusion towards apical and inner margins in males and some females; cells occasionally in males widely marbled with blackbrown. In male, genital segment open above, anal tube poorly developed (fig. 683); eedeagus as in figs. 681, 682. In female, seventh abdominal sternum narrower medially than at sides, in form of shallow inverted V, sometimes with distinct median incision (fig. 685). Overall length: $\delta \sqrt{5} \cdot 2-5 \cdot 7 \mathrm{~mm}$.; $; \frac{5}{5} \cdot 5-5 \cdot 9 \mathrm{~mm}$.
subfusculus (Fallén)
Common on trees, especially oak, and sometimes on lower vegetation. England. Wales. Scotland. Ireland. v-viii. Europe. Siberia. N. Africa.

## Genus Idiodonus Ball

( = Orolix Ribaut, = Thamnotettix: auctt. partim, nec Zetterstedt)
The one European species of this genus occurs in Britain.
Face light yellowish, in females sprinkled with red dots; two small oval dark spots present at junction of frontoclypeus and vertex in males and some females; in males, frontoclypeus with brown transverse lines, interrupted medially; on genae, edges of frontoclypeus between anteclypeus and base of antennae normally narrowly blackened (fig. 609); in males, genae rarely broadly black. Vertex, pronotum and scutellum yellowish, normally sprinkled with red dots, rarely with a few on the pronotum only; vertex rarely with two dark spots medially in males;
somewhat indistinctly darker basal triangles often present on scutellum. Fore wings always developed; yellowish, sprinkled with red dots, especially along veins; apical cells usually without red dots. In male, outer margins of genital plates strongly concave (fig. 693); aedeagus as in figs. 684, 686. In female, posterior margin of seventh abdominal sternum usually weakly convex, sometimes with small rounded median incision. Overall length : $\delta^{7} 4 \cdot 8-5 \cdot 1 \mathrm{~mm}$; ; $75 \cdot 4-4.8 \mathrm{~mm}$.
cruentatus (Panzer)
Local, usually on heaths. England. Wales. Scotland. Ireland. vii-x. N. and C. Europe. Siberia.

## Genus Colladonus Ball

( = Hypospadianus Ribaut, = Thamnotettix: auctt. partim, nec Zetterstedt) There is only one European species in this genus, which extends into Britain.


Figs. 686, 693.-Idiodonus cruentatus: (686) medeagus, from behind; (693) genital plates and valve.
Frgs. 687, 689-691.-Colladonus torneellus: (687) male genital segment, side view; (689) female, seventh abdominal sternum; (690) medeagus, from behind; (691) aedeagus, latero-ventral view.
Figs. 688, 692.--Lamprotettix octopunctatus: (688) aedeagus, side view; (692) aedeagus, from behind.

Face yellow-brown; frontoclypeus narrowly edged blackish below level of antennae, with thin transverse black or brown lines broadly interrupted medially and two suboval blackish spots towards transition with vertex; anteclypeus with blackish lateral streaks in males, reduced to two basal spots in females; in males, genae blackish below level of bases of antennee except for pale band along outer margin (fig. 678), in females blackish spot present below base of each antenna and sometimes some dark suffusion below this. Vertex dirty yellowish; in males, with strong transverse black band medially from eye to eye (fig. 680); in females, usually with blackish spot posterior to each ocellus, joined by complete or interrupted orange-brown or grey-brown transverse band (fig. 632). Pronotum in males dirty brownish yellow, with darker mottling near anterior margin and sometimes also posteriorly; in females, dirty yellowish anteriorly, dirty whitish posteriorly. Scutellum dirty yellowish; in males with short blackish basal triangles, at most one-third as long as scutellum, and with blackish T-shaped marking apically; in females, with basal triangles indicated slightly darker than background colour. Wings always developed; fore wings pale brownish with broad whitish streak along costa and usually another whitish patch adjacent to appendix; in males, dark longitudinal streak present from near base to median apical cell and often some other dark streaks in cells, including along inner margin. In males, sides of genital segment with narrow apical spine (fig. 687); aedeagus as in figs. 690, 691. In females, posterior margin of seventh abdominal sternum with narrow median incision (fig. 689). Overall length : ${ }^{1} 4.6-4.9 \mathrm{~mm}$; ; $4.9-5 \cdot 2 \mathrm{~mm}$.
torneellus (Zetterstedt)
Local, usually in woods. England. Scotland. iv-vii, ix. Europe. Siberia. N. Africa. N. America.

## Genus Lamprotettix Ribaut

## (= Thamnotettix: auctt. partim, nec Zetterstedt)

The only European species reaches Britain.
Face light yellow-brown; frontoclypeus with two black spots at junction with vertex and thin blackish transverse lines, interrupted medially; anteclypeus with large blackish patch; blaokish patch on genae around base of each antenna. Vertex yellowish with four distinct black spots, two at junction with frontoclypeus and two medially (fig. 634); narrow black streak sometimes also present adjacent to each eye. Pronotum yellowish with some dark spots anteriorly and four more or less distinct longitudinal brownish streaks posteriorly. Scutellum yellowish, with two black basal triangles approximately half length of scutellum and two black median dots anteriorly, unmarked posteriorly. Wings always developed; fore wings light brownish with hyaline and grey patches in apical cells; some dark brown spots present in other cells, especially towards apex of costa, along inner margin and at apices of subapical cells. In males, zedeagus as in figs. 688, 692. In females, posterior margin of seventh abdominal sternum often almost straight, sometimes divided into three lobes by shallow incisions, sometimes with weak median incision. Overall length : of $4 \cdot 9-5 \cdot 2 \mathrm{~mm}$.; ㅇ $5 \cdot 2-6 \cdot 1 \mathrm{~mm}$.
( $=$ splendidulus (Fabricius)) octopunctatus (Schrank) Local, usually on trees. England, as far N. as Yorks. and Derbys. Wales. Ireland. vii-x. N. and C. Europe.

## Genus Cicadula Zetterstedt

This genus contains twelve Western European species, of which seven occur in Britain. Some of these are difficult to separate and certain of these have been discussed by Le Quesne (1964a). Females of some species cannot be recognised with certainty.

## Key to Spectes

1 Black streak present on face between frontal suture and eye in line with two crescentshaped spots on junction of frontoclypeus and vertex (fig. 707). In male, aedeagus without appendages, relatively broad in region of gonopore (figs. 708, 712). In
female, seventh abdominal sternum with coarse longitudinal ridges towards apical margin (fig. 710). (Face, fore body, fore wings and legs orange-yellow. Face with frontoclypeus, anteclypeus and lorae black edged; in female, variable blackish markings present on frontoclypeus; in male, latter markings reduced or absent. Small punctiform black spots often present on vertex behind ocelli. In male, genital segment without spine-like appendages; genital plates and parameres as in fig. 709. Overall length: $\sigma^{7} 4 \cdot 7-5 \cdot 1 \mathrm{~mm}$.; $+5 \cdot 2-5 \cdot 5 \mathrm{~mm}$.)

> ( = lunulifrons (Sahlberg)) intermedia (Boheman)

Local, in Carex marshes. Eingland: Westmorland, Yorkshire, Staffs. Scotland: Inverness-shire; Morays. Ireland: Lough Neagh; Co. Wicklow. vii-ix. France. N. Eurape. Siberia. N. America.

- Black streak rarely present on face between frontal suture and eye; spots at junction of frontoclypeus and vertex more or less roundish, linear or absent. In male, either



703


Figs. 694-696.-Cicadula quinquenotata: (694) vertex; (695) apex of aedeagus, from behind; (696) medeagus, side view.
Figs. 697-699, 705, 706.-C. aurantipes: (697) vertex; (698, 705, 706) apex of aedeagus, from behind (three specimens); (699) aedeagus, side view.
Figs. 700, 703, 704.-C. frontalis: (700) aedeagus, side view (typical form); (703, 704) aedeagas, side view (form pellucens; two specimens).
Figs. 701, 702.-C. persimilis : (701) apex of aedeagus, from behind; (702) aedeagus, side view.
aedeagus with appendages or (in saturata, fig. 716) much narrower in region of gonopore. In female, seventh abdominal sternum without coarse sculpturing on outside surface
.2
2 Black spots present on vertex behind ocelli. Overall colour greenish, yellowish or orange. In male, sides of genital segment each with two spine-like appendages (fig. 719) $\qquad$

- Black spots absent on vertex behind ocelli. Overall colour usually light brownish, rarely orange-yellow; darker streaks sometimes present in cells of fore wings. In male, sides of genital segment without spine-like appendages. (Face with black mark under base of antennae, frontoclypeus sometimes black edged. Two small round or linear blackish spots sometimes present at junction between frontoclypeus and vertex and rarely small blackish streaks present between frontal suture and eye. In male, aedeagus with appendages, as in figs. 700, 703, 704, 714 (somewhat variable in width, perhaps due to ecophenotypic variation-see Le Quesne, 1964a). In female, seventh abdominal sternum longer medially than at sides, with fine convex longitudinal ridges (fig. 711). Overall length: of $5 \cdot 0-$ 5.4 mm .; 우 $5.4-6.1 \mathrm{~mm}$.)
( = antennata (Boheman), = pellucens Salmon) frontalis (Herrich-Schaeffer)
Locally common, on tall Carex (e.g. acutiformis Ehrh.) or Scirpus (e.g. sylvaticus L.) in marshy places. England, as far N. as Yorks. and Leics. Ireland. vii-x. Europe.
3 Normally larger: overall length : © $4 \cdot 7-5 \cdot 5 \mathrm{~mm}$.; if $5 \cdot 2-5 \cdot 7 \mathrm{~mm}$. In male, aedeagus as in figs. 698, 699, 705, 706, in side view less smoothly curved than in quinquenotata (fig. 696), but more so than persimilis (fig. 702); always markedly asymmetric apically, seen from behind. (Face, fore body, fore wings and legs more or less tinged orange. Two well developed black spots present on transition between vertex and face and two well developed black spots on vertex behind ocelli; two fine dark streaks also sometimes present on vertex (fig. 697). Postclypeus and anteclypeus narrowly bordered blackish. Pronotum sometimes with indistinct darker markings. In males, two black basal triangles usually present on scutellum, rarely in females. Cells of fore wings sometimes with dark brown streaks)
aurantipes (Edwards)
Local, in marshy areas at the margin of ponds, on Carex (including C. riparia Curt.). England. Wales. Scotland. vii-x. Denmark.
- Normally smaller : overall length of of usually at most 4.7 mm ., of $q$ at most 5.3 mm . In male, aedeagus not as above.
4 Vertex with two black spots behind ocelli considerably smaller than those of transition between vertex and face; two dark streaks, often fused into a single marking, often present medially on vertex (fig. 694). In male, aedeagus as in figs. 695, 696, smoothly curved in side view and more or less symmetrical apically. (Face, fore body, fore wings and legs yellowish or light orange. Overall length: $\boldsymbol{o n}^{4} 4-4$


Local, probably associated with Sphagnum-moss areas. England: Newchurch Common and Delamere Forest, Cheshire. Scotland: Grantown-on-Spey, Morays; Bowden, Roxburghs. viii, ix. France. Scandinavia. N. Russia. Germany. Belgium. N. America.

- Vertex usually with two black spots behind ocelli of approximately same size as those between vertex and face; median marking very rarely present on vertex (fig. 553). In male, aedeagus either not smoothly curved in side view or without apical appendages
.5
5 Anteclypeus not edged blackish at sides. In male, anterior tibize without distinct dark streak: aedeagus without apical appendages, as in figs. 716, 717. (Face orange yellow, frontoclypeus narrowly dark edged; in female indistinct darker markings often present on frontoclypeus and genae. Vertex rarely with two rather indistinct brownish streaks; black spots behind ocelli rather variable in size. Pronotum and scutellum yellowish, without distinct darker markings. Fore wings and legs often bright orange in male, yellowish in female and in some males. In female, anterior tibiae with darker streak: seventh abdominal sternum as in quadrinotata (see fig. 713). Overall length : o $4 \cdot 2-4.7 \mathrm{~mm}$.; ㅇ $5 \cdot 0-5 \cdot 3 \mathrm{~mm}$.)
saturata (Edwards)
Local, in marshy areas. England, Yorks., Staffs., Norfolk, Surrey, Hants. Scotland: Morays., Inverness-shire, Midlothian. viii, ix. France. Scandinavia. Germany. N. Russia.


Figs. 707-710, 712.-Cicadula intermedia: (707) face; (708) aedeagus, from behind; (709) genital plates, valve and parameres; (710) female, seventh abdominal sternum; (712) aedeagus, side view.

Figs. 711, 714.-C. frontalis: (711) female, seventh abdominal sternum; (714) aedeagus, from behind.
Figs. 713, 715, 718, 719.-C. quadrinotata: (713) female, seventh abdominal sternum; (715) aedeagus, side view; (718) apex of aedeagus, from behind; (719) appendages of side of male genital segment.
Figs. 716, 717.-C. saturata : (716) aedeagus, side view; (717) aedeagus, from behind.


Figs. 720, 721, 723, 730.-Grypotes puncticollis: (720) aedeagus, from behind; (721) sedeagus, side view; (723) female, seventh abdominal sternum; (730) side of male genital segment.
Figs. 722, 724, 725, 727, 728.-Opsius stactogalus: (722) aedeagus connective; (724) female, seventh abdominal sternum; (725) aedeagus, side view; (727) genital plates and valve; (728) aedeagus, from above.
Fig. 726.-Elymana sulphurella, \&edeagus, side view.
Figs. 729, 731-733.-Placotettix taeniatifrons: (729) aedeagus, side view; (731) \&edeagus, from behind; (732) aedeagus connective; (733) genital plates, valve and parameres.

- Anteclypeus more or less widely blackish edged at sides. Anterior tibiae with distinct blackish streak on outside for almost entire length in both sexes. In male, aedeagus with apical appendages, either as in figs. 715, 718 or as in figs. 701, 702. (Face yellowish or greenish, frontoclypeus more or less narrowly blackish edged, sometimes with dark patches in either sex. Vertex always with two large black spots behind ocelli; median streaks not present. In female, seventh abdominal sternum as in fig. 713)
6 In male, aedeagus with distinct hump near bese, as in figs. 715, 718. Veins of fore wing light yellowish green; cells paler, but similarly tinged. (Overall length: of $3 \cdot 9-4 \cdot 5 \mathrm{~mm}$.; ㅇ $4 \cdot 2-5 \cdot 0 \mathrm{~mm}$.) . . . . . . . . . . . . . . . . . . . . . quadrinotata (Fabricius) Widespread, often in damp places, on Carex. England. Wales. Scotland. Ireland. $v-x$. Europe. Iceland. Siberia. Japan. N. Africa.
- In male, aedeagus without hump at base, as in figs. 701, 702. Veins of fore wing greenish or brownish; cells sometimes with dark brown streaks. (Overall length: of $4 \cdot 2-4.7 \mathrm{~mm}$.; $; 4 \cdot 4-5.0 \mathrm{~mm}$.) . persimilis (Edwards) Locally common, on Juncus (including J. conglomeratus L.) or Carex, often in marshy places, but sometimes in drier grasslands if plant cover is sufficient. England. Wales. Scotland. vi-x. France. Scandinavia. Germany. Czechoslovakic. Switzerland.


## Genus Elymana DeLong

(=Solenopyx Ribaut, = Limotettix: auctt. partim, nec Sahlberg)
This genus has two European species, one of which is found in Britain.
Face greenish with broad black spot at base of antenna, usually extending from margin of frontoclypeus to eye (fig. 643). Vertex greenish or yellowish, sometimes with narrow dark sinuate line between ocelli and sometimes with dark patch medially. Pronotum and scutellum greenish, unmarked. Thorax broadly spotted with black at sides. Wings fully developed: veins of fore wings yellowish or greenish; cells hyaline or pale greenish. In male, genital plates with spines in single row (fig. 570); sides of genital segment with acuminate projections as in fig. 566; anal tube parallel-sided, not reaching beyond sides of genital segment; aedeagus as in fig. 726. In females, seventh abdominal sternum with posterior margin smoothly curved, little shorter in middle than at sides (figs. 521, 524). Overall length : of $4 \cdot 3-4 \cdot 8 \mathrm{~mm}$.; ; $4 \cdot 5-5 \cdot 3 \mathrm{~mm}$.
( $=$ virescens (Fabricius), nec (Gmelin)) sulphurella (Zetterstedt) Common on grasses, often in drier areas. England. Wales. Scotland. Ireland. vii-x. Europe. Asia Minor. Siberia. Japan. N. Africa. N. America.

## Tribe Opsitini

This tribe, first recognised by Emel'janov (1962), is characterised by the aedeagus with two gonopores. There is one British genus and species, but a second genus, Circulifer, is represented in the Channel Isles by the species fenestratus (Herrich-Schaeffer).

## Genus Opsius Fieber <br> (= Limotettix: auctt. partim, nec Sahlberg)

Only one of the eight European species occurs in Britain.
Face green, frontoclypeus broad, sometimes with thin more or less distinctly darker transverse lines, widely interrupted medially (fig. 640). Vertex green or yellowgreen, not or very slightly longer in middle than close to eyes (fig. 639); transition between vertex and face smoothly and regularly rounded. Pronotum bright green. Scutellum green or yellow-green, sometimes with more or less distinctly darker basal triangles. Wings fully developed; basal half to two-thirds of fore wings opaque green, sometimes with small whitish spots, apical part translucent grey-brown. Abdomen black above. In male, genital plates with outer margins concave, acuminate apically, with single row of spines and longer hairs (fig. 727); aedeagus with four branches projecting from base, two of which have gonopores


Figs. 734, 744.-Sagatus punctifrons: (734) vertex; (744) genital plates and valve. Figs. 735, 737, 740, 741.-Macrosteles sexnotatus : (735) fore wing; (737) hind wing; (740) face; (741) vertex and pronotum.
Figs. 736, 738, 745.-Sonronius dahlbomi: (736) male, vertex; (738) female, vertex; (745) genital plates and valve.

Figs. 739, 742.- Balclutha punctata: (739) hind wing; (742) vertex and pronotum. Figs. 743, 746.-Erotettix cyanc: (743) vertex and pronotum; (746) face.


Fia. 747.--Macrosteles variatus, vertex, pronotum and scutellum.
Fig. 748.-M. septemnotatus, vertex, pronotum and scutellum.
Figs. 749, 751.-M. quadripunctulatus: (749) vertex, pronotum and scutellum; (751) fore wing.
Fig. 750.-M. frontalis, female, fore wing.
Fig. 752.-M. horvathi, face.
Figs. 753, 756.-M. laevis, female; (753) vertex and pronotum; (756) head in side view.
Figs. 754, 755.-M. sordidipennis, female: (754) vertex and pronotum; (755) head in side view.
Figs. 757, 758.-Balclutha punctata: (757) genital plates, valve and parameres; (758) aedeagus, side view.
apically (figs. 725, 728); connective as in fig. 722. In female, posterior margin of seventh abdominal sternum broadly convex (fig. 724). Overall length: ${ }^{7} 4 \cdot 0-$


On Tamarix, usually along coast, but occasionally on cultivated varieties inland. England: Oxon., London, Essex, Kent, Surrey, Sussex, Hants, Dorset. viii-xi. Europe. Turkestan. N. Africa. N. America.

## Tribe Grypotini

This tribe, first recognised by Wagner (1951), is characterised chiefly by the position of the ocelli remote from the eyes and the form of the anteclypeus. There is only one British genus and species.

## Genus Grypotes Fieber

## One of the two European species occurs in Britain.

Face much broader than long, light brownish with dark transverse streaks on frontoclypeus, of which two towards upper margin reach from eye to eye (fig. 638); lorae and genae sometimes largely darkened; anteclypeus apically bent backwards (fig. 636). Vertex light brownish with sinuate dark streak anteriorly and two dark spots next to eyes posteriorly (fig. 637). Pronotum greyish brown with a few dark spots anteriorly. Scutellum brownish, without distinct markings or with a dark transverse scar medially. Wings fully developed; fore wings uniformly light brownish. In male, sides of genital segment with two strong black teeth apically and a small black tooth adjacent to well-developed anal tube (fig. 730) ${ }^{3}$; aedeagus as in figs. 720, 721. In female, posterior margin of seventh abdominal sternum convex, with small concave incision medially (fig. 723). Overall length: ठ 4.2 5.0 mm .; 우 $4.6-5.0 \mathrm{~mm}$.
( $=$ pinetellus (Zetterstedt)) puncticollis (Herrich-Schaeffer)
Locally common on pines. England: Yorks., Suffolk, Glos., Oxon., Bucks., Kent, Surrey, Sussex, Hants., Dorset. vii-x. N. and C. Europe. N. Africa.

## Tribe Fieberiellini <br> ( $=$ Synophropsini)

The tribe Fieberiellini was first raised by Wagner (1951) and the Synophropsini by Ribaut (1952). Emel'yanov (1962) showed that these constituted a single tribe, characterised by the aedeagus connective, which is either subtriangular, with concave sides and truncated apices, or bar-like. There is only one British genus and species.

## Genus Placotettix Ribaut

This genus has only one European species, which has probably been introduced into Britain in the last two or three decades.

Face light orange-brown, with dark transverse line from eye to eye near upper margin; frontoclypeus medially with some irregular dark suffusion; lorae broadly darker edged; broad dark patch around base of each antenna (fig. 555). Vertex yellowish with broad orange brown patches and two small oval blackish spots just behind ocelli. Pronotum and scutellum brownish, without distinct markings. Wings developed; fore wings largely pale orange-brown, with veins dark brown towards apex, apical cells partially or wholly grey-brown, cells along apical part of costa and in region of base of apical cells sometimes more or less widely hyaline. In male, aedeagus connective subtriangular (fig. 732); outer margins of genital plates thickened (fig. 733); aedeagus as in figs. 729, 731. In female, seventh abdominal sternum about four times as long as sixth, somewhat longer medially than at sides,

[^1]its posterior margin forming obtuse angle. Overall length: ${ }^{7} 4.8-5.6 \mathrm{~mm}$;
 Locally introduced species on Rhododendron. England: Buckingham Palace Gardens; Kew Gardens, Surrey; Blackheath, Kent. ix, x. France. Italy. Roumania.

## Tribe Macrostelini

This tribe is represented by six European genera, four of which extend to Britain.

The sternal apodemes of the first and second abdominal segments are well developed in males of this tribe and often provide good specific characters ( $c f$. Ossiannilsson, 1949, 1951). These form part of the equipment for making the "drumming" calls which are used, among other functions, by the male in attracting the female: such calls are probably the most usual pre-mating


Figs. 759-762.-Sonronius dahlbomi : (759) aedeagus, from behind; (760) sedeagus, side view; (761) first sternal apodeme; (762) second sternal apodeme.
Fias. 763-766.-Sagatus punctifrons: (763) aedeagus, from behind; (764) sedeagus, side view; (765) first sternal apodeme; (766) second sternal apodeme.
isolating mechanisms in Auchenorhyncha. It should be noted that these apodemes may be severely stunted in some parasitised individuals (cf. Prior, 1967).

## Key to Genera

1 Head (including eyes) considerably narrower than pronotum (fig. 743). Frontal sutures above antennae sinuate (fig. 746). Vertex, pronotum, scutellum and fore wings largely dark. .................................. Erotettix Haupt (p. 143)

- Head as wide as pronotum or wider (fig. 741). Frontal sutures above antennae straight or smoothly curved (fig. 740). Often largely pale above
2 Vertex with large round or slightly oval black spot immediately behind each ocellus, sometimes partly fused into other dark markings (figs. 734, 736, 738)......... 3
- Vertex either without black spot immediately behind each ocellus (figs. 747-749) or with elongate black streak in this position (fig. 741). (Markings sometimes more or less fused)........................................ Macrosteles Fieber (p. 135)
3 Vertex without black markings other than two spots behind ocelli (fig. 734). Spines of male genital plates disordered (fig. 744). Veins of fore wing pale

Sagatus Ribaut (p. 135)

- Vertex with markings other than two spots behind ocelli (figs. 736, 738). Spines of male genital plates in single series (fig. 745). Males with veins of fore wing blackish, females with veins pale..................... Sonronius Dorst (p. 134)


Figs. 767-770.-Erotettix cyane: (767) aedeagus, from behind; (768) aedeagus, side view; (769) first sternal apodeme; (770) second sternal apodeme.

Figs. 771-774.-Macrosteles quadripunctulatus: (771) zedeagus, from behind; (772) aedeagus, side view; (773) first sternal apodeme; (774) second sternal apodeme.

## Genus Sonronius Dorst

$(=$ Cicadula $:$ auctt. partim, nec Zetterstedt, $=$ Macrosteles $:$ auctt.
partim, nec Fieber $)$

## One out of the two European species occurs in Britain.

Face brownish or dirty greenish, with blaok transverse spots, interrupted medially near upper margin; lower two-thirds black with or without pale median transverse band in males and some females and with black transverse lines, interrupted medially in other females; anteclypeus with broad median black band or wholly black in males, dark-edged with or without dark median patch in females; lorae black-edged or, in some males, wholly black. Vertex yellowish or greenish with black spots, which are distinct in female (fig. 738) and coalescing into dark streaks or widely fused in males (fig. 736). In males, pronotum largely black, sometimes with yellowish patches anteriorly; in females, pronotum clear yellowish anteriorly, greenish grey posteriorly. Scutellum largely blackish in males, yellowish with black basal triangles in females. Fore wings of males dirty whitish, costa yellowish, veins black-brown; in females, veins yellow-green, cells dirty whitish.


Figs. 775-778.-Macrosteles sordidipennis: (775) aedeagus, from behind; (776) aedeagus, side view; (777) first sternal apodeme; (778) second sternal apoderne.
Figs. 779-782.-M. septemnotatus: (779) aedeagus, from behind; (780) aedeagus, side view; (781) first sternal apodeme; (782) second sternal apodeme.

Abdomen black above. In males, sternal apodemes as in figs. 761, 762; aedeagus as in figs. 759, 760; genital plates as in fig. 745. Overall length : $\mathbf{\delta}^{\mathbf{~} ~} 4.5-4.8 \mathrm{~mm}$.; ㅇ $5 \cdot 0-5 \cdot 4 \mathrm{~mm}$.
( = quadripunctatus (Fallén), nec (de Villers)) dahlbomi (Zetterstedt)
Very local, occurring in colonies, often in woodland, possibly associated with Epilobium angustifolium L. or Rubus idaeus L. England: Yorks., Glos., Surrey, Berks. Ireland: Co. Kerry. vi-viii. N. and C. Europe. N. America.

## Genus Sagatus Ribaut

(= Davisonia: auctt., nec Dorst, = Cicadula: auctt. partim, nec Zetterstedt)
There is only one European species so far recognised in this genus. It should be noted that the appendages of the aedeagus approximate closely but do not cross in the two British and one Channel Island specimen which I have dissected. Those figured by Ribaut (1952) and Ossiannilsson (1947) have these appendages crossed. It is thus possible that the British specimens may represent a different species or form from the true punctifrons.


#### Abstract

Face greenish or yellowish, often with brown transverse lines which are sometimes fused into patches on frontoclypeus; lower part of frontoclypeus narrowly blackedged. Vertex greenish or yellowish with two black spots immediately behind ocelli (fig. 734); in females, brown anteriorly. Pronotum and scutellum greenish or yellowish; scutellum with black basal triangles in some males. Fore wings yellowish, costa sometimes orange ; clavus and inner apical cells often marked with grey-brown, which sometimes extends across middle of wing. Abdomen largely black above. In male, sternal apodemes as in figs. 765, 766; aedeagus as in figs. 763, 764; genital plates as in fig. 744. Overall length: ${ }^{\text {d }} 4.5-5.0 \mathrm{~mm}$.;  On dwarf sallows and Salix purpurea L., very local. England: Woking, Surrey; Stoke St. Gregory, Somerset. vii. Europe. Siberia.


## Genus Macrosteles Fieber

(= Cicadula: auctt. partim, nec Zetterstedt)

This is a genus of about thirty European species, of which fifteen are now recorded from Britain. Several of the species can only be separated on the basis of the aedeagus and sternal apodemes of the males, and in these cases no characters for separating the females have been found up to now.

## Key to Spectes

1 Blackish markings absent at junction of vertex and frontoclypeus; vertex with or without two blackish dots towards posterior margin. (Face yellowish, generally with a few dark lines at sides of frontoclypeus. Vertex, pronotum and scutellum yellowish. Fore wings greyish green, unmarked. Abdomen black above, narrowly pale at sides. In made, aedeagus as in figs. 803, 804 ; sternal apodemes as in figs. 805,806 . Overall length: ${ }^{*} 3 \cdot 2-3 \cdot 4 \mathrm{~mm}$.; $; \mathbf{3 \cdot 4 - 3 \cdot 6} \mathrm{mm}$.)
( = opacipennis: auctt., nec (Lethierry)) oshanini Razvyaskina Very local, in very wet places in Norfolk Broads. England: Ranworth, Norfolk. vi. Germany. Russia. Siberia.

- Blackish markings present at junction of vertex and frontoclypeus and also often on vertex (markings sometimes more or less fused)
2 Vertex with two more or less large blackish spots medially (sometimes absent in septemnotatus) and two at junction with frontoclypeus, but without clavate spots immediately behind each ocellus (figs. 747-749).
- Blackish markings of vertex either including two clavate spots immediately behind ocelli or fused (figs. 741, 753, 754)
3 Anterior blackish spots of vertex extending posteriorly between ocelli and relatively
close to posterior spots: in female small mark often present between ocellus and corresponding eye; in male, streak present along margin of eye confluent with posterior spot (fig. 749). Size smailler-overall length: of $2 \cdot 9-3 \cdot 1 \mathrm{~mm}$; ; $\quad 3.2-$ 3.5 mm . In male, aedeagus with apical appendages branched, not recurrent (figs. 771, 772). (Frontoclypeus yellowish with pair of large roundish dark spots at transition with vertex and a few thin transverse black streaks on either side in lower part. Pronotum uniform greenish-yellow, scutellum yellowish with pair of black triangles at base. Fore wings pale brownish or greenish, often with darker spots, in middle of median cell, one in middle of clavus and one near apex of clavus (fig. 751). Abdomen dark above, yellow at sides: in male, sternal apodemes as in figs. 773, 774)) ....... (cf. Le Quesne, 1960b) quadripunctulatus (Kirschbaum)

On sandhills, possibly associated with Setaria or Panicum. England: Braunton, Devon. ix. Germany. Czechoslovakia. Poland. Scandinavia.

- Anterior blackish spots of vertex confined to transition with frontoclypeus, not extending posteriorly between ocelli and remote from posterior spots: no blackish mark present between ocellus and corresponding eye. Size larger-overall length: $\sigma^{\text {a }}$ at least 3.3 mm .; of at least 3.6 mm . In male, aedeagus with two unbranched recurrent apical appendages (figs. 779, 780, 787, 788)


785


783
784
786


Figs. 783-786.-Macrosteles horvathi: (783) aedeagus, from behind; (784) aedeagus, side view; (785) first sternal apodeme; (786) second sternal apodeme.
Figs. 787-790.-M. variatus: (787) aedeagus, from behind; (788) aedeagus, side view; (789) first sternal apodeme; (790) sec̣ond sternal apodeme.

4 Posterior spots of vertex small or absent, their width (if present) at most approximately equal to their distance from eye (fig. 748). Ground colour of vertex, pronotum and scutellum orange-yellow. Fore wings usually broadly streaked with orange-yellow, sometimes more uniformly clear yellow. Size smalleroverall length : ${ }^{\text {or }} 3 \cdot 3-3 \cdot 6 \mathrm{~mm}$.; ; $3 \cdot 6-4 \cdot 2 \mathrm{~mm}$. In male, aedeagus with stem broad, appendages short (figs. 779, 780). (Face light yellow-brown, often with large blackish spot at lower margin of postclypeus (sometimes reduced to dot or absent), dark spot under base of each antenna and two dark spots at transition with vertex. Scutellum with two large black spots, the anterior part of which can be seen through translucent pronotum. Abdomen yellowish, usually more or less widely blackish dorsally : in male, sternal apodemes as in figs. 781, 782)
septemnotatus (Fallén)
Locally common on Spiraea ulmaria L. (meadow-sweet). England, as far N. as Yorks. Wales. Ireland. vii-ix. N. and C. Europe.

- Posterior spots of vertex larger, their width inuch greater than their distance from eye (fig. 747). Ground colour of vertex, pronotum and scutellum yellow or greenish yellow. Fore wings yellowish with irregular grey-brown areas, usually rather indistinct in males and more distinct in females. Size larger-overall length:


791


792


793


794

Figs. 791-794.-Macrosteles frontalis: (791) aedeagus, from behind; (792) aedeagus, side view; (793) first sternal apodeme; (794) second sternal apodeme.
ot $4.0-4.3 \mathrm{~mm}$.; ㅇ $4.1-4.5 \mathrm{~mm}$. In male, aedeagus with stem relatively narrower, appendages long (figs. 787, 788). (Face clear yellowish, with two large black spots at junction with vertex and small black area under base of each antenna: lower part of frontoclypeus sometimes narrowly blackish-edged and lorae rarely partly black edged. Scutellum with two large blackish spots baselly. Abdomen above blackish, yellowish at sides: in male, sternal apodemes as in figs. 789, 790)
variatus (Fallén) Never numerous but widely distributed, often in woodland, possibly associated with nettles. England: as far N. as Yorks. and Derbys. Wales: Carms. vi-ix. Eiurope. N. America.
5 Frontoclypeus at level of ocelli with two parallel black transverse streaks, interrupted medially, rarely fused to give single large spots on either side, and in lower part with thin black lines, sometimes fused medially or rarely fused into a completely black area (fig. 752). In male, appendages of male recurrent, crossing each other at their base, stem of aedeagus with a pair of pointed teeth about half-way up (figs. 783, 784). (Face light yellow-brown; frontoclypeus, anteclypeus and lorae dark-edged; anteclypeus with dark streak medially. Vertex light brownish, with blackish markings, often more or less widely fused, sometimes largely dark. Pronotum grey-greenish, sometimes marked with black-brown. Scutellum brownish, with dark basal triangles, median dots and streak. Fore wings brownish, often more or less widely black-brown. Abdomen black above; in
 ㅇ 3.8-4.2 mm.)
(= fasciifrons: (Edwards), nec (Stål), = warioni: (Edwards), nec (Lethierry)) horvathi Wagner Locally common in marshy areas, perhaps associated with Juncus articulatus L. England. Wales. Scotland. Ireland. v-x. Palaearctic region. Canary Isles.

- Frontoclypeus with two large blackish spots, each not divided into two parallel streaks, at level of ocelli (fig. 740) or with markings fused. In male, either appendages of aedeagus not recurrent or stem of aedeagus without pair of pointed teeth
6 Fore wings dirty whitish with well defined dark patches (fig. 750) or largely blackish brown with well defined pale patches. In male, appendages of aedeagus recurrent, forming loop in side view, with stem tuberculate (figs. 791, 792). (Face yellowish; frontoclypeus with thin black streaks, interrupted medially in lightly marked specimens, fused into black mass in darkly marked specimens; lower part of


Figs. 795-798.-Macrosteles lividus: (795) aedeagus, from behind; (796) aedeagus, side view; (797) first sternal apodeme; (798) second sternal apodeme.
Figs. 799-802.-M. fieberi: (799) aedeagus, from behind; (800) medeagus, side view; (801) first sternal apodeme; (802) second sternal apodeme.
frontoclypeus, anteclypeus and lorae narrowly dark-edged; lorae black in dark specimens; frontoclypeus and anteclypeus often with brown median line. Vertex light brownish, with dark spots as in sexnotatus (cf. fig. 741), which are usually more or less fused. Pronotum dirty yellowish with two large brownish or blackbrown patches medially, sometimes fused together. Scutellum yellowish with black basal triangles, sometimes joined by transverse line. Abdomen mainly blackish; in male, apodemes as in fige. 793, 794. Overall length : of $3 \cdot 4-4 \cdot 0 \mathrm{~mm}$.; ㅇ $4.0-4.7 \mathrm{~mm}$.)

Local in swampy areas England: Cumbs., Yorks., Staffs. Scotland: Inverness-shire. Ireland: Co. Galway. viii, ix. N. and C. Europe.

- Fore wings largely pale greenish, without well defined dark patches, or dark without pale patches (except for a single one near base in some lividus) or with dark streaks between pale veins (some lividus). In male, appendages of aedeagus not forming loop in side view.
7 Frontoclypeus in side view strongly and smoothly convex (fig. 755). In female, vertex rather sharply angled apically, its length at least three-quarters of that of pronotum (fig. 754). In male, aedeagus with appendages crossing and stem smooth (figs. 775, 776). (In male, lower three-quarters of frontoclypeus and lorae completely black or almost so; anteclypeus brownish with dark median streak.


803


804


806

Figs. 803-806.-Macrosteles oshanini: (803) aedeagus, from behind; (804) aedeagus, side view; (805) first sternal apodeme; (806) second sternal apodeme.

In female, face light yellowish brown; frontoclypeus with dark transverse lines, interrupted medially, with or without brown longitudinal median streak; lorae with outer margin dark edged; anteclypeus with brown longitudinal streak. Vertex dirty yellowish, black anterior spot and postocellar streak sometimes fused. Pronotum dirty greenish, rather indistinctly marked. Scutellum yellowish with dark basal triangles. Abdomen largely black above; in male, apodemes as in figs. 777, 778. Overall length: $\boldsymbol{\sigma}^{7} 2 \cdot 9-3 \cdot 4 \mathrm{~mm}$.; $; 3 \cdot 4-4 \cdot 1 \mathrm{~mm}$.)
( = salinus (Reuter)) sordidipennis (Stål)
Local, in coastal marshes. England: Wirral, Cheshire; Pevensey Bay, Sussex. vi,vii. Holland. Germany. Czechoslovakia. Scandinavia. N. America.

- Frontoclypeus in side view less strongly convex (fig. 756). In female, vertex more rounded apically, its length less than three-quarters of that of pronotum. In male, if appendages of aedeagus crossing, stem tuberculate (figs. 795, 796, 799, 800)

8 Size usually larger-overall length: $\sigma^{\boldsymbol{*}} 3 \cdot 9-4 \cdot 2 \mathrm{~mm}$.; $; 4 \cdot 0-4 \cdot 6 \mathrm{~mm}$. In male, aedeagus with appendages approximating or crossing towards apex, stem tuberculate, but without lateral crests (figs. 799, 800 ); second sternal apodeme with elongate projections (fig. 802). (Face brownish, frontoclypeus with dark transverse streaks, interrupted medially or fused more or less widely into dark longitudinal band; lorae broadly darkened along outer margins; anteclypeus usually with dark longitudinal streak. Vertex yellowish brown, blackish markings often more or less fused. Pronotum grey-green, often with a few irregular dark dots anteriorly.

Scutellum yellowish; in males, with black basal triangles and two thin dark transverse streaks; these markings brownish and not always distinct in females. Fore wings usually rather uniform pale brownish with veins paler. Abdomen mainly blackish above; in male, first sternal apodeme as in fig. 801)
fieberi (Edwards)
Local, in marshy areas, sometimes near the sea. England: Yorks., Norfolk. Scotland: Inverness-shire, Perthshire. Ireland (teste Halbert). vi-ix. Most of Europe. $\quad N$. America.

- Size usually smaller-overall length: of usually less than 3.9 mm ; ; ㅇ usually less than 4.0 mm . In male, if aedeagus with appendages approximating or crossed towards apex, stem with lateral crests with serrated edges (figs. 795, 796) and second sternal apodemes with appendages shorter (fig. 798). (Frontoclypeus with transverse dark lines; anteclypeus, lorae and lower part of frontoclypeus dark edged. Black spots of vertex usually separate in females and more or less fused in males. Pronotum yellowish or greenish, sometimes greyish or with dark patches posteriorly. Scutellum yellow, with or without black basal triangles)
9 Fore wings usually largely or completely black or grey-brown, often with a distinct whitish patch near base; in many females, dark pigment largely filling cells, leaving veins pale. In males, aedeagus with appendages approximating or crossed towards apex, stem with well-defined lateral crests with serrate edges (figs. 795, 796). In females, spines of ventral region of genital segment elmost entirely black. (Pronotum with two grey-brown, sometimes fused patches posteriorly, scutellum with black basal triangles. In male, sternal apodemes as in figs. 797, 798. Overall length: os $3 \cdot 7-4 \cdot 0 \mathrm{~mm}$.)
.lividus (Edwards)


Figs. 807, 809, 811, 812.-Macrosteles cristatus : (807) first sternal apodeme; (809) second sternal apodeme; (811) aedeagus, from behind; (812) aedeagus, side view.
Figs. 808, 810, 813, 814.-M. alpinus: (808) first sternal apodeme; (810) second sternel apodeme; (813) aedeagus, from behind; (814) aedeagus, side view.


815


819


816


820


821


822
Fias. 815-818.-Macrosteles ossiannilssoni: (815) aedeagus, from behind; (816) aedeagus, side view; (817) first sternal apodeme; (818) second sternal apodeme.
Figs. 819-822.-M. sexnotatus: (819) aedeagus, from behind; (820) aedeagus, side view; (821) first sternal apodeme; (822) second sternal apodeme.

Local, sometimes in swampy coastal marshes. England: Weybourne, Norfolk; New Forest, Hants. vi, viii, x. Germany. Scandinavia.

- Fore wings usually light greenish or brownish; if darker, without distinct whitish patch near base. In males, appendages of aedeagus not normally approximated or crossing towards apex ${ }^{4}$. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . 10
10 In male, appendages normally parallel in apical part (rarely convergent or crossed) in form of pitch-fork; stem with distinct lateral crests in lower half (figs. 827, 828); sternal apodemes as in figs. 829, 830. (Pronotum yellowish or greenish throughout, sometimes greyish posteriorly. Scutellum sometimes with basal triangles in males, not in females. In females, vertex somewhat pointed apically (but not as sharply as in sordidipennis). Overall length: of $2 \cdot 9-3.3 \mathrm{~mm} . ;$; $\mathbf{3 . 5 - 3 . 8} \mathrm{mm}$.)
viridigriseus (Edwards)
Common and widespread in marshy areas, often at margins of ponds. England. Wales. Scotland. vi-x. N. and C. Europe.
- In male, appendages of aedeagus more or less widely divergent apically; if stem with distinct lateral crests, these are not confined to lower half (figs. 811, 812) .... 11
${ }^{4}$ Rarely doing so in abnormal specimens of viridigriseus, where lateral crests are lower down stem-cf. figs. 827, 828.

11 In male, aedeagus in side view with outer margin of base of appendages with more or less distinct concave impression (figs. 816, 820)

- In male, aedeagus in side view with outer margin of appendages forming more or less smoothly convex curve throughout (figs. 812, 814, 824)


Figs. 823-826.-Macrosteles laevis: (823) aedeagus, from behind; (824) aedeagus, side view; (825) first sternal apodeme; (826) second sternal apodeme.
Figs. 827-830.-M. viridigriseus: (827) aedeagus, from behind; (828) aedeagus, side view; ( 829 ) first sternal apodeme; ( 830 ) second sternal apodeme.

In male, second sternal apodemes elongate, with the maximum distance between the projections less than twice the depth of the incision between them, and often subequal to it (fig. 818) : inner margins of projections of apodeme with a distinct convexity about half-way along. (Pronotum usually greyish posteriorly and scutellum with black basal triangles. In male, first sternal apodemos as in fig. 817; aedeagus as in figs. 815,816 . Overall length: ${ }^{*} 2 \cdot 9-3 \cdot 6 \mathrm{~mm} . ; ~$; $3 \cdot 2-3 \cdot 7 \mathrm{~mm}$.)

> (cf. Le Quesne, 1968a, 1968b) (= ossiannilssoni Le Quesne)
ossiannilssoni Lindberg
Local, sometimes in montane areas associated with Juncus squarrosus L. or Sphagnum patches. England: Westmorland, Yorlcs., Surrey, Hants. Scotland: Perthshire, Argylls., Kircudbright, Wester Ross, Inverness-shire. St. Kilda. vi-x. W. and C. Europe. Canary Isles.

- In male, second sternal apodemes shorter, with the maximum distance between projections at least twice of depth of incision between them: inner margins of projeotions of apodeme usually concave throughout (fig. 822). (Pronotum sometimes greyish postariorly; scutellum usually with black basal triangles. In male, fore wing often more or less suffused with grey-brown. In male, first sternal apodeme as in fig. 821; aedeagus as in figs. 819, 820. Overall length : ${ }^{\mathbf{x}} \mathbf{3 . 2 - 3 . 7} \mathrm{mm}$.; ¢ $3 \cdot 3-3 \cdot 8 \mathrm{~mm}$.) .............................................. sexnotatus (Fallén)

Common and widespread, on grasses and in clover fields. England. Wales. Scotland. Ireland. v-x. Europe.
13 In male, second sternal apodeme very short (figs. 809, 810): stem of aedeagus almost straight for much of its length, crested or finely rugose (figs. 811, 812, 813, 814)

- In male, second sternal apodeme longer (fig. 826). Stem of aedeagus curved, smooth (figs. 823, 824). (Pronotum not usually grey posteriorly; black basal triangles sometimes present in both sexes. Fore wings pale greenish, not usually suffused with grey-brown. In females, vertex smoothly rounded anteriorly (fig. 753). In male, first sternal apodeme as in fig. 825. Overall length: ${ }^{\circ} 3 \cdot 2-3.5 \mathrm{~mm}$.; ¢ $3 \cdot 3-3 \cdot 8 \mathrm{~mm}$.). . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . laevis (Ribaut)

On grasses, usually in drier areas such as calcareous hill-sides, but has been found in a salt-marsh. Often occupies disturbed areas quickly (Andrzejewska, 1962). England. Wales: Caerns. Scotland. v-x. Europe. Iceland. N. America.
14 In male, aedeagus with more or less marked lateral crests extending backwards (figs. 811, 812). (In male, basal triangles present on scutellum; first sternal apodeme as in fig. 807). Overall length : of $\mathbf{3} \cdot 5-3 \cdot 8 \mathrm{~mm}$.) (cf. Prior, 1967)
cristatus Ribaut
Very scarce, in clover fields, mixed with other Macrosteles species; on Continent perhaps associated with Polygonum or Linum. England: Ware, Herts; Cranbrook, Kent. vi, viii. N. and C. Europe.

- In male, aedeagus without lateral crests (figs. 813, 814). (Fore wings more or less dark brownish. Scutellum often with besal triangles absent. In male, first sternal apodeme as in fig. 808 . Overall length : $\delta^{3} \mathbf{3 . 0 - 3 . 4} \mathrm{~mm}$.)
alpinus (Zetterstedt)
Local, in montane areas at 1800-2000 feet, perhaps associated with Juncus squarrosus L. England: Moorhouse, Westmorland. Scotland: Dunfermline, Perthshire. vii, viii. Switzerland. Italy. Germany. Scandinavia.


## Genus Erotettix Haupt

( $=$ Macrosteles: auctt., partim, nec Fieber, $=$ Cicadula: auctt. partim, nec Zetterstedt)
This is regarded as a subgenus of Macrosteles by Ribaut (1952). However, Ossiannilsson (1947) considered it as a separate genus and I now feel this view to be justified. There is only one European species and this is found in Britain.

Face mainly blackish above with yellowish rings round ocelli, light brownish below with dark streaks at sides of frontoclypeus, often with dark patch medially on anteclypeus and lorae and lower part of frontoclypeus dark edged (fig. 746). Vertex, pronotum and scutellum largely or wholly blackish, often with bluish "bloom", with distinct lighter patches in females (fig. 743). Fore wings blackbrown or, in some females, brown with darker veins, often paler apically; bluish " bloom" often present basally. In males, sternal apodemes as in figs. 769, 770; aedeagus as in figs. 767, 768. Overall length: $\delta^{7} 4.0-4.2 \mathrm{~mm}$. ; $; 4.8-5.4 \mathrm{~mm}$. cyane (Boheman)
On Potamogeton natans L. and perhaps also water-lilies, in ponds. England: Essex, Surrey, Sussex. vii-x. N. and C. Europe.

## Tribe Balcluthini

This tribe is represented in Europe by the single genus Balclutha.

Genus Balclutha Kirkaldy<br>(= Gnathodus Fieber, nec Pander)

Of the five European species reported in this genus, only one is known to occur in Britain.


#### Abstract

Face clear or dirty greenish, sometimes more or less widely darker in lower part; thin transverse lines, usually interrupted medially, present on frontoclypeus. Vertex, pronotum and scutellum greenish or dirty yellowish, usually unmarked in bright greenish specimens; when ground colour dirty greenish, two large black-brown or grey-brown spots usually present on pronotum, sometimes also on vertex and dark basal triangles often also on scutellum; in other specimens, ground colour yellowish with spots on vertex, freckles anteriorly on pronotum and basal triangles and median spot on scutellum rust red. Fore wings greenish or red-brown, often with several black-brown spots which are rarely more extensive and fused. In male, genital plates and parameres as in fig. 757; aedeagus as in fig. 758. In female, posterior margin of seventh abdominal sternum almost straight. Overall length: of $3 \cdot 6-3 \cdot 9 \mathrm{~mm}$.; 우 $3 \cdot 7-4 \cdot 1 \mathrm{~mm}$. .punctata (Thunberg) Widespread, but not usually very common; on grasses, often overwinters in fir-trees. England. Scotland. Ireland. ii, iii, v-xi. Palaearctic, Nearctic, Oriental and Australian regions.


## References

Only references not listed in the previous part (Le Quesne, 1965) are included.
Andrzejewska, L., 1962, Macrosteles laevis Rib. as an unsettlement index of natural meadow associations of Homoptera. Bull. Acad. pol. Sci. Cl. II. Sér. Sci. biol. 10 : 221-6.
China, W. E., 1939, Additions to the British Homoptera. Entomologist's mon. Mag. 75 : 41-56.
Dworakowska, I., 1968, Contributions to the Knowledge of Polish Species of the genus Doratura J. Shlb. (Homoptera, Cicadellidae). Annls zool., Warsz. 25 : 381-401.
Edwards, J., 1908, On some British Homoptera hitherto undescribed or unrecorded. Entomologist's mon. Mag. 44 : 55-9.
Emel'yanov, A. F., 1962, New tribes of leaf-hoppers of the subfamily Euscelinae (Auchenorrhyncha, Cicadellidae). Ent. Obozr. 51 : 388-97.
_ 1964, Suborder Cicadina (Auchenorrhyncha) in G. Ya. Bei-Bienko, The Determination of insects of the European Part of the USSR, $1: 337-437$.
Le Quesne, W. J., 1960b, Some additions to the British Deltocephalinae (Hem., Cicadellidae) with notes on synonymy. Entomologist's mon. Mag. 95 : 281-7.
__ 1965, Hemiptera Cicadomorpha (excluding Deltocephalinae and Typhlocybinae) in Handbooks for the Identification of British Insects, Vol. II, Part 2 (a). London, R. ent. Soc.
__ 1966, Athysanus argentarius Metcalf (Hem., Cicadellidae) in the Isle of Wight. Entomologist's mon. Mag. 101 : 288.
_-_ 1968a, Macrosteles ossiannilssoni (Hem., Cicadellidae), a new species previously confused with M. sexnotatus (Fallén). Entomologist's mon. Mag. 103 : 190-2.
1968b, Macrosteles ossiannilssoni Le Quesne (Hem., Cicadellidae)-a correction. Entomologist's mon. Mag. 104 : 3.
Marshall, T. A., 1866, An essay towards a knowledge of British Homoptera (continued). Entomologist's mon. Mag. 3 : 9-12.
MüLuer, H. J., 1954, Die Saisondimorphismus bei Zikaden der Gattung Euscelis Brullé. Beitr. Ent. 4 : 1-56.
1957, Die Wirkung exogener Faktoren auf die myklische Formenbildung der Insekten, inbesondere der Gattung Euscelis (Hom. Auchenorhyncha). Zool. Jb. (Syst.) 85 : 317-430.
Oman, P. W., 1949, The Nearctic Leafhoppers (Homoptera: Cicadellidae). A generic classification and check list. Mem. ent. Soc. Wash. 3: 1-253.
Ossiannilsson, F., 1949, Insect Drummers. Opusc. ent. Supplem. 10 : 1-146.
-1951, On the shape of the apodemes of the second abdominal sternum as a specific Character in the genus Macrosteles Fieb. (Hom. Auchenorrhyncha). Opusc. ent. 16 : 109-11.

Prior, R. N. B., 1967, Occurrence of Macrosteles cristatus (Ribaut) (Homoptera, Auchenorrhyncha) in Britain with notes on related species. Entomologist's mon. Mag. 102: 286-8.
Ribaut, H., 1942, Démembrement des genres Athysanus Burm. et Thamnotettix Zett. (Homoptera-Jassidse). Bull. Soc. Hist. nat. Toulouse 77:259-70.
-_ 1946, Démembrement du genre Deltocephalus Burm. (Homoptera-Jassidae). Bull. Soc. Hist. nat. Toulouse 81 : 81-6.
Salmon, M. A., 1959, On the rediscovery of Athysanus argentatus (Fab.) (Hem., Cicadellidae) in Britain. Entomologist's Gaz. 10 : 51-3.
Wagner, W., 1951, Beitrag zur Phylogenie und Systematik der Cicadellidae (Jassidae) Nord- und Mitteleuropas. Commentat. biol. 12 (2) : l-44.
1958, Über die Variabilitat der Penisform bei der Deltocephalide Psammotettix helvolus Kirschb. (Homopt.). Mitt. dt. ent. Ges. 15 : 90-2.
Woodroffe, G. E., 1968, Euscelis venosus (Kirschbaum) (Hem., Cicadellidae) new to Britain. Entomologist's mon. Mag. 104: 131.

## INDEX

Numbers refer to text pages.
Synonyms are in italics.
abdominalis (Diplocolenus), 85
Adarrus, 71, 80
adumbrata (Paluda), 117
aemulans (Streptanus), 113
albingensis (Euscelis), 108
albomarginatus (Psammotettix), 90
Allygidius, 95, 102
Allygus, 95, 102
Allygus, 102
alpinus (Macrosteles), 143
antennata (Cicadula), 125
argentarius (Athysanus), 115
argentatus (Athysanus), 115
argus (Sardius), 100
Arocephalus, 71, 79
Arthaldeus, 73, 75, 88
assimilis (Sorhoanus), 88
Athysanini, 67, 93
Athysanus, 97, 113
Athysanus, 105, 110, 113
atricapillus (Limotettix), 105
attenuata (Mocydiopsis), 120
aurantipes (Cicadula), 125
Balclutha, 144
Balcluthini, 66, 143
bensoni (Diplocolenus), 86
bilobatus (Euscelis), 108
brevipennis (Streptanus), 111
caudatus (Palus), 79
cephalotes (Psammotettix), 92
Cicadula, 95, 123
Cicadula, 86, 134, 135, 143
Circulifer, 128
citrinellus (Psammotettix), 92
cognatus (Ebarrius), 88
Colladonus, 95, 122
collinus (Mocuellus), 86
commutatus (Allygidius), 102
confinis (Psammotettix), 92
confinis (Thamnotettix), 121
corniculus (Scleroracus), 105
corniculus (Scleroracus), 104
coroniceps (Recilia), 77
coronifera (Recilia), 77
Cosmotettix, 79
costalis (Palus), 79
cristatus (Macrosteles), 143
crocea (Mocydia), 119
cruentatus (Idiodonus), 122
cyane (Erotettix), 143
dahlbomi (Sonronius), 135
Davisonia, 135
decumanus (Scleroracus), 104
Deltocephalinat, 65
Deltocephalint, 66, 70
Deltocephalus, 73, 74, 78
Deltocephalus, 77, 79, 80, 83, 85, 86, 88, 89, 100
depressus (Streptanus), 111
dilutior (Thamnotettix), 121
Diplocolenus, 73, 85
distinguendus (Euscelis), 107
distinguendus (Jassargus), 83
Doratura, 67
Doraturini, 66, 67
Drylix, 105
Ebarrius, 73, 86
Edwardsiastes, 100
Elymana, 96, 128
Erotettix, 133, 143
Errastunus, 70, 80
Euscelidius, 97, 109
Euscelinae, 65
Euscelini, 93
Euscelis, 98, 105
Euscelis, 85, 109
exilis (Doratura), 68
fasciifrons (Macrosteles), 138
fenestratus (Circulifer), 128
fieberi (Macrosteles), 140
Fieberiellini, 67, 131
flaveola (Paluda), 117
flori (Jassargus), 83
formosus (Metalimnus), 77
frigidus (Psammotettix), 90
frontalis (Cicadula), 125
frontalis (Macrosteles), 139
galiberti (Euscelis), 108
Glyptocephalus, 100
Gnathodus, 144
Graphocraerus, 95, 100
grisescens (Macustus), 113
Grypotes, 131
Grypotint, 66, 131
halophilus (Psammotettix), 90
Hardya, 95, 101
hibernica (Paluda), 117
horvathi (Macrosteles), 138
Нуровраdiarия, 122
i-album (Recilia), 77
Idiodonus, 95, 121
impudica (Doratura), 68
incisus (Euscelis), 108
intermedia (Cicadula), 124
intractabilis (Scleroracus), 105

Jassargini, 70
Jassargus, 72, 83
Jassus, 10 ?
juvencus (Diplocolenus), 85
laevis (Macrosteles), 143
Lamprotettix, 95, 123
Lausulus, 83
Limotettix, 97, 105
Limotettix, 128
lineolatus (Euscelis), 108
lividus (Macrosteles), 140
Loepotettix, 120
longiceps (Arocephalus), 79
lunulifrons (Cicadula), 124
Macrosteles, 133, 135
Macrosteles, 134, 143
Macrostelini, 66, 132
maculiceps (Deltocephalus), 78
Macustus, 98, 113
marginatus (Streptanus), 111
melanopsis (Hardya), 102
Metalimnus, 70, 77
metrius (Mocuellus), 86
mixtus (Allygus), 104
Mocuellus, 73, 75, 86
Mocydia, 95, 117
Mocydia, 119
Mocydiopsis, 95, 119
modestus (Allygus), 102
monticola (Paluda), 117
multinotatus (Adarrus), 82
nervosus (Paramesus), 77
nodosus (Psammotettix), 90, 92
normani (Psammotettix), 92
obenbergeri (Diplocolenus), 86
obsoletus (Euscelis), 107
ocellaris (Errastunus), 80
octopunctatus (Lamprotettix), 123
oculatus (Jassargus), 83
ohausi (Euscelis), 107
opacipennis (Macrosteles), 135
Ophiola, 104
OPSIINI, 66, 128
Opsius, 128
Orolix, 121
oshanini (Macrosteles), 135
ossiannilssoni (Macrosteles), 142
paleaceus (Jassargus), 83
Paluda, 95, 96, 115
Palus, 73, 79
panzeri (Palus), 79
Paralimnus, 70, 92
Paramesus, 70, 75
Paramesus, 92
parvicauda (Mocydiopsis), 120
pascuellus (Arthaldeus), 89
pellucens (Cicadula), 125
persimilis (Cicadula), 128
phragmitis (Paralimnus), 93
Phrynomorphus, 105
picturatus (Jassargus), 83
pinetellus (Grypotes), 131
Placotettix, 97, 131
Platymetopitni, 66, 70
Platymetopius, 70
plebejus (Euscelis), 108
plebejus (Euscelidius), 110
plutonius (Scleroracus), 104
prasinus (Thamnotettix) 121
preyssleri (Paluda), 117
proceps (Rhytistylus), 100
Psammotettix, 73, 75, 89
pseudocellaris (Jassargus), 83, 85
pulicaris (Deltocephalus), 79
punctata (Balclutha), 144
puncticollis (Grypotes), 131
punctifrons (Sagatus), 135
punctum (Arocephalus), 80
putoni (Psammotettix), 90
putoni (Psammotettix), 92
quadrinotata (Cicadula), 128
quadripunctatus (Sonronius), 135
quadripunctulatus (Macrosteles), 136
quinquenotata (Cicadula), 125
Recilia, 72, 77
repletus (Jassargus), 83
Rhopalopyx, 115
Rhytistylus, 97, 100
Ribautiellus, 89
russeolus (Scleroracus), 104
sabulicola (Psammotettix), 91
Sagatus, 133, 135
sahlbergi (Streptanus), 113
salinus (Macrosteles), 139
Sardius, 94, 100
saturata (Cicadula), 125
Scaphoideus, 77
schenckii (Euscelidius), 110
Scleroracus, 98, 104
sejungendus (Euscelis), 107
septemnotatus (Macrosteles), 137
sexnotatus (Macrosteles), 143
simplex (Thamnotettix), 121
socialis (Turrutus), 80
Solenopyx, 128
Sonronius, 133, 134
sordidipennis (Macrosteles), 139
sordidus (Streptanus), 113
Sorhoanus, 73, 74, 88
Speudotettix, 98, 121
splendidulus (Lamprotettix), 123
stactogalus (Opsius), 131
Stictocoris, 115
Streptanus, 98, 110
striatulellus (Scleroracus), 104
striatulus (Scleroracus), 104, 105
striatus ( $\mathbf{P}$ sammotettix), 91
striatus (Psammotettix), 92
striifrons (Arthaldeus), 88
striola (Limotettix), 105
stylata (Doratura), 68
subfusculus (Speudotettix), 121
sulphurella (Elymana), 128
sursumflexus (Jassargus), 83
Synophropsini, 131
taeniatifrons (Placotettix), 132
temperei (Diplocolenus), 85

Thamnotettix, 97, 98, 120
Thamnotettix, 104, 105, 109, 117, 119 121, 122, 123
thenii (Psammotettix), 92
torneellus (Colladonus), 123
Turrutus, 72, 80
undatus (Platymetopius), 70
variatus (Macrosteles), 137
variegatus (Euscelidius), 110
venosus (Euscelis), 107
ventralis (Graphocraerus), 100
virescens (Elymana), 128
viridigriseus (Macrosteles), 141
vitripennis (Paluda), 117
warioni (Macrosteles), 138
xanthoneurus (Sorhoanus), 88

The Royal Entomological Society of London is a scientific Society founded in 1833 and incorporated by Royal Charter in 1885 for the improvement and diffusion of Entomological Science exclusively.

The principal Publications of the Society are the following:
TRANSACTIONS. Papers published in the Transactions are issued separately and separately priced. One volume is issued every year at a subscription price of $£ 1010 \mathrm{~s}, 0 \mathrm{~d}$.
PROCEEDINGS: Series A. Contains short papers on general entomology. Four parts are issued annually at a subscription price of $£ 40 \mathrm{~s}$. 0 d .
PROCEEDINGS: Series B. Consists exclusively of short papers on systematic entomology. Six parts are issued each year at a subscription price of $£ 40 \mathrm{~s} .0 \mathrm{~d}$.
PROCEEDINGS: Series C. Contains the minutes of meetings, Presidential Addresses, etc. A part is issued before each meeting as an agenda paper. The annual subscription price is £1 4s. Od.

The above are supplied free to Fellows. Further copies can be obtained by Fellows on special terms.

Other publications issued by the Society, in addition to the Handbooks (for particulars of which see pp. ii and iv of cover), are the following:

The Generic Names of British Insects. Nine parts so far published, covering the Rhopalocera, Odonata, Neuroptera, Hymenoptera Aculeata, Carabidae, Hydradephaga, Hemiptera-Heteroptera, and Staphylinidae.

Stylops: A Journal of Taxonomic Entomology. 1932-1935, Vols. 1-4 (all issued). £2 3s. 0d. per Vol.

Hübner : A biographical and systematic account of the entomological works of Jacob Hübner and the supplements thereto. By Francis Hemming, 2 Vols., £2 10s. 0 d .

The Centenary History of the Society. 10s. 6d.
Symposia of the Royal Entomological Society
No. 1. Insect Polymorphism, 1961
fl $0 \quad 0$
No. 2. Insect Reproduction, 1964
$\begin{array}{lll}\mathbf{1 2} & 0 & 0\end{array}$
No. 3. Insect Behaviour, 1966
£2 50
No. 4. Insect Abundance, 1968
£2 126
Communications offered to the Society for publication should be addressed to the Registrar at the Society's Rooms. Those intended for the Transactions must be communicated by a Fellow of the Society.

Meetings are held at the Society's Rooms on the first Wednesday in each month, except January and February (third Wednesday) and August (no meeting).

Particulars concerning the Fellowship can be obtained on application to the Registrar, 41, Queen's Gate, London, S.W.7.



[^0]:    ${ }^{1}$ Females of these two species cannot be separated with certainty. On the average, marsumflexus is rather paler and has the projections of the seventh abdominal sternum racher more prominent.

[^1]:    ${ }^{3}$ Specimens which are parasitised often lack these teeth and the anal tube is poorly developed: however, the aedeagus is generally normal.

