

Joy's keys to Elateridae, Eucnemidae and Throscidae.

Pp. 438 - 450 in Joy, N.H. (1932). *A practical handbook of British beetles*. Two volumes. H.F. & G. Witherby. Reprinted in slightly reduced format in 1976 by E.W. Classey Ltd, Faringdon. Out of print but available on CD-ROM from Pisces Conservation.

The original text was scanned and processed through Optical Character Recognition. The resultant text was then manually checked against the original to spot and correct any errors introduced by the OCR process (but some could still remain). This version has then been edited to update nomenclature, add additional species and a few corrections, comments and hyperlinks. Nomenclature follows Duff (2008) which should be consulted if authority names are required.

Please treat this as a test key and let me have any and all comments, corrections and updates. This is now a live document with scope for improvement! Thanks to James McGill, Clive Washington, Lloyd Garvey, Jim Jobe and Chris Sullivan for comments and corrections. 7th December 2013: addition of a reference for *Isorhipis melasoides* and two references for additional identification help with genus *Ampedus*, and minor corrections.

ELATERIDAE, EUCNEMIDAE AND THROSCIDAE

These families have a characteristic general shape, and have the habit, when lying on their backs, of jumping into the air, and are well known as "Skipjacks" or "Click-Beetles". Tarsi 5, 5, 5 jointed. The ♂ differs from the ♀ considerably, in general shape, and in structure of the ant., in several species. The larvae are of characteristic general appearance, and some of them are well known by farmers as "wire-worms." They live at the roots of plants, and in rotten wood.

Joy (1932) treated all three of these modern families as belonging to a single family under the name Elateridae.

KEY TO GENERA

Six genera in the British list of Duff (2012) were omitted from Joy's key.

Eucnemidae: *Hylis cariniceps*, *H. olexai*, *Epiphanis cornutus* and *Isorhipis melasoides*.

All the British eucnemids except *Isorhipis melasoides* can be identified using the key by A.A. Allen (1969). *I. melasoides* was discovered to be established at Windsor in 2006; the paper by Mendel *et al.* (2011) covers its identification and includes excellent photos.

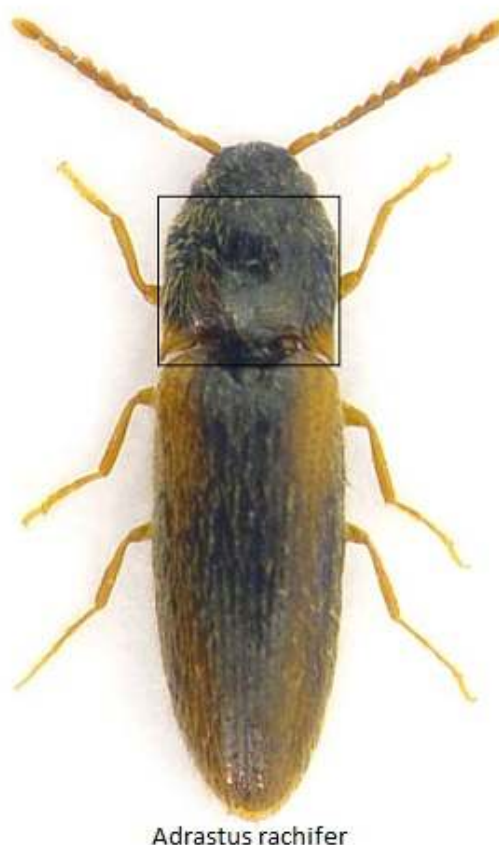
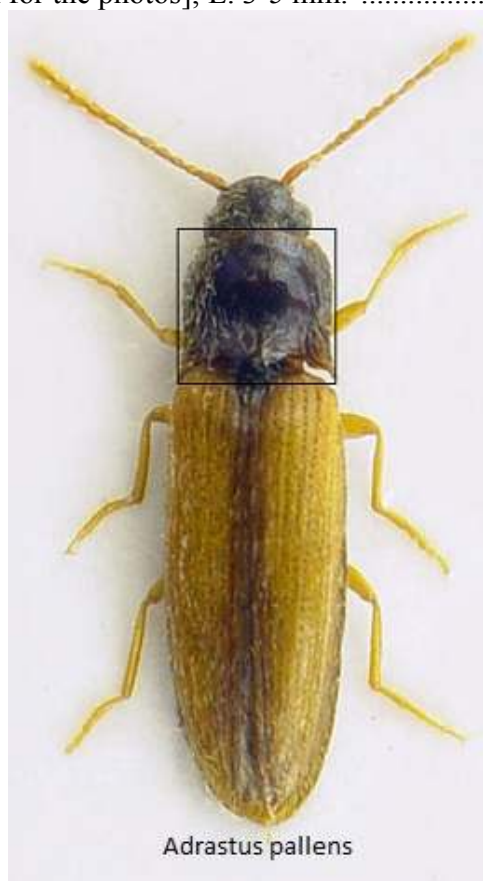
Elateridae: *Lacon querceus*, *Limoniscus violaceus* and *Panspaeus guttatus*.

All are saproxylic species, ranging from extremely rare (*L. violaceus*) to scarce and localised.

- 1 (2). Ant. with a 3-jointed club (Pl. 127, 1)..... THROSCIDAE
- 2 (1). Ant. not clubbed.
- 3 (4). Eyes very convex (Pl. 127, 2).DENTICOLLIS
- 4 (3). Eyes much less convex.
- 5 (6). Th. broadest at front angles (Pl. 127, 3). EUCNEMIDAE: MELASIS
- 6 (5). Th. not broadest at front angles.

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- 7 (8). Joint 1 of ant. much longer than space between insertion of ant. (Pl. 127, 4).
EUCNEMIDAE: MICRORHAGUS
 8 (7). Joint 1 of ant. as long as, or shorter than, space between insertion of ant.
 9 (10). El. confusedly punctured; tibiae thickened as *Trixagus* (Pl. 127, 1).....
EUCNEMIDAE: EUCNEMIS
 10 (9). El. with striae; tibiae narrower.
 11 (14). Upper surface patterned by pubescence.
 12 (13). El. almost covered with yellow and white scale-like pubescence; hind angles of
 th. very blunt, much blunter than in any of its allies of the same size (Pl. 127, 5).
AGRYPNUS
 13 (12). El. with ordinary yellow pubescence, in parts at right angle to striae, in parts
 parallel; hind angles of th. moderately sharp. PROSTERNON
 14 (11). Upper surface not patterned by pubescence, except in some by being present in
 one part, and absent in another.
 15 (22). Joint 2 of ant. quite, or very nearly, as long as 4; L. 2-10 mm.*
 16 (19). El. more elongate (Pl. 127, 6-9), yellow to pitchy, ant. yellow or piceous in part.
 [Th. generally darker than el.]
 17 (18). Claws pectinate; th. quadrate (photos below & Pl. 127, 6) [Note: Joy's key uses
 "th. strongly transverse" but as Jim Jobe has pointed out this is very misleading. Thanks to
 Jim for the photos]; L. 3-5 mm.ADRASTUS



* Clive Washington notes that in a specimen of *Sericus brunneus*, joint 2 is 70% of the length of 4 and yet Joy keys this as "Joint 2 of ant. much shorter than 4". Joy could perhaps have said "Joint 2 of ant. obviously shorter than 4, even if it may be 70% or more of its length".

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- 18 (17). Claws simple; th. slightly elongate, or if quadrate or transverse L. 7-10 mm. (Pl. 127, 7-9); L. 4-10 mm. AGRIOTES
- 19 (16). El. less elongate (Pl. 127, 10-14), black, ant. black, except perhaps joints 1-3. [Hd. and th. black.]
- 20 (21). El. unicolorous; th. distinctly transverse (Pl. 127, 10), black, with a slight greenish or coppery reflection; th. very finely, and very diffusely, punctured; L. 5-7 mm. HYPNOIDUS
- 21 (20). El. with yellow marks (Pl. 127, 11-14), or if unicolorous th. not transverse; th. finely and closely punctured, or rugose; L. 2-6 mm. FLEUTIAUXELLUS, NEGASTRIUS, OEDOSTETHUS and ZOROCHROS
- 22 (15). Joint 2 of ant. much shorter than 4; L. 6-20 mm.*
- 23 (26). Joint 2 of ant. transverse, 3 quadrate, 2 and 3 together shorter than 4 (Pl. 127, 15). [Th. with hind angles keeled; el. broadest at base.][†]
- 24 (25). General shape about as *Sericus* (Pl. 128, 14), closely punctured on disc, densely at sides, shining; L. 15-18 mm. ELATER: 1 species *ferrugineus*
- 25 (24). General shape as *Cidnopus aeruginosus* (Pl. 128, 1), shagreened, and very finely punctured, quite dull; L. 8-10 mm. MEGAPENTHES: 1 species *lugens*
- 26 (23). Joint 2 of ant. transverse to elongate, 3 elongate, 2 and 3 together at least as long as 4.
- 27 (28). Black, th. bright red; th. more strongly narrowed to front margin ISCHNODES
- 28 (27). Not coloured thus; th. not so strongly narrowed to front margin.
- 29 (32). Hind angles of th. shorter, scarcely extending further back than hind margin, which is produced backwards in middle (Pl. 127, 16, 128, 1). [Entirely black, except legs in *C. vestigialis*.]
- 30 (31). Th. with a short longitudinal impression at hind margin, close to hind angle, and somewhat sinuate at sides (Pl. 127, 16); th. and el. extremely finely, and almost densely, punctured. CARDIOPHORUS and DICRONYCHUS
- 31 (30). Hind margin and sides of th. simple (Pl. 128, 1); th. and interstices of el. somewhat diffusely punctured. CIDNOPUS and KIBUNEA
- 32 (29). Hind angles of th. longer, extending some distance further back than hind margin, which is not, or less, produced in middle; if hind angles rather short el. reddish-yellow.
- 33 (34). Joint 4 of tarsi very small, but strongly lobed beneath (Pl. 128, 2); black, generally nearly covered with grey pubescence. SYNAPTUS
- 34 (33). Joint 4 of tarsi simple, or slightly bilobed; pubescence not so conspicuous.
- 35 (36). Middle and hind tarsi with joint 4 very small, about one-third as long as 3 (Pl. 128, 3). [Th. quadrate or elongate.] ATHOUS (part: 4 of 5 species), HEMICREPIDIUS and STENAGOSTUS
- 36 (35). Middle and hind tarsi with joint 4 distinct, at least half as long as 3.
- 37 (40). Th. quadrate or slightly elongate, with front margin slightly narrower than space between tips of hind angles (Pl. 128, 7); yellowish, hd. and sometimes disc of th. pitchy, ant. yellow, or fuscous with base yellow. [Ant. with joints 8-10 more than twice as long as broad.]

[†] Lloyd Garvey notes that *Melanotus villosus/castanipes* keys out here. Given how common *M. villosus/castanipes* is and how rare are both *E. ferrugineus* and *M. lugens*, it is fair to say that most specimens keying out here will be *M. villosus/castanipes*. I think the pectinate claws of *M. villosus/castanipes* distinguish it from the other two.

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- 38 (39). Joint 1 of ant. at least as long as next two, and el. with interstice 1 or 1-3 fuscous (Pl. 128, 7); L. 5-7 mm.DALOPIUS
- 39 (38). Joint 1 of ant. much shorter than next two; el. unicolorous; L. 9-11 mm.ATHOUS (part: 1 of 5 species) (*Orthathous* in Joy)
- 40 (37). Th. quadrate or transverse, with front margin much narrower than space between tips of hind angles (Pl. 128, 8-19); if el. yellow, ant. black.
- 41 (44). Claws serrate (Pl. 128, 8); pubescence short, but outstanding. [Entirely black, th. sometimes lighter; ant. with joints 2-3 as *Sericus* (Pl. 128, 14); L. 10-20 mm.]
- 42 (43). Narrower, el. longer in proportion to th., and ant. with joints 4-10 not, or scarcely, serrate (Pl. 128, 8).MELANOTUS (part: 2 of 3 species) (*Melanotus* in Joy)
- 43 (42). Broader, el. shorter in proportion to th., and joints 4-10 of ant. strongly serrate, as *Sericus* (Pl. 128, 14).MELANOTUS (part: 1 of 3 species) (*Ectinus* in Joy)
- 44 (41). Claws simple.
- 45 (46). Th. and el. with definite outstanding pubescence; el. more or less bright red, or black with definite yellow marks, or entirely black without metallic lustre; joint 2 of ant. slightly shorter than 3 (Pl. 128, 11-13). AMPEDUS and BRACHYGONUS
- 46 (45). Th. and el. with pubescence recumbent, sometimes very scanty; el. not bright red; or, if yellow, black markings arranged differently; or, if black, joint 2 of ant. equal to 3 (*Procræus*, 49 (48)), or th. somewhat elongate, and very finely and almost densely punctured (*Selatosomus* etc., 58 (57)).
- 47 (50). Th. very finely and diffusely punctured, more closely at sides. [Hd. and th. black, legs yellow; L. 6-8 mm.]
- 48 (49). General shape as *Selatosomus aeneus* (Pl. 128, 19); el. black with a small reddish mark at shoulder, or entirely reddish-yellow (v. *semiflavus* Fleis.); hind angles of th. without a keel. CALAMBUS
- 49 (48). General shape almost as *Cidnopus aeruginosus* (Pl. 128, 1); but th. more contracted in front; el. entirely black; hind angles of th. with a keel on upper side. PROCRAERUS
- 50 (47). Th. closely punctured, densely at sides.
- 51 (54). Th. with sides strongly sinuate before hind angles, the tooth being more angled with sides than usual, and without a keel. [Th. densely punctured throughout; hd., th., ant. and legs black.]
- 52 (53). General shape as *Selatosomus aeneus* (Pl. 128, 19), but th. narrower; th. thickly covered with bright yellow pubescence; el. yellow, with apex black. ANOSTIRUS
- 53 (52). General shape as *Ctenicera* (Pl. 128, 17), but th. not so narrowed in front; th. with scattered pubescence; el. pitchy-red, with three lighter transverse bands, due to light yellowish pubescence.DIACANTHOS
- 54 (51). Th. with sides less, or not, sinuate before hind angles, the tooth not, or less, angled with sides (Pl. 128, 14, 17, 19), with a longitudinal keel on its upper side.
- 55 (56). Joint 3 of ant. quadrate, as long as 2, much shorter than 4, and general shape of ♀ (Pl.128,14), ♂ narrower. [Th. densely punctured through-out; joints 4-10 of ant. strongly serrate in both sexes.] SERICUS
- 56 (55). Joint 3 of ant. elongate, longer than 2, as long as 4, or strongly serrate (Pl. 128,15-19).

- 57 (58). Ant. pectinate, or strongly serrate, the serrate angle distinctly acute (Pl. 128, 15-18).ACTENICERUS and CTENICERA
58 (57). Ant. not pectinate, joint 3 not serrate, very slightly in *Aplotarsus incanus*, 5-10 less serrate, the serrate angle about a right angle (Pl. 128, 19).SELATOSOMUS, APLOTARSUS and PARAPHOTISTUS

KEYS TO SPECIES

THROSCIDAE: TRIXAGUS and AULONOTHROSCUS

With light yellow pubescence, except where rubbed; in flood-rubbish, moss, etc.; probably often overlooked, as they lie with their legs tucked in, looking like a seed.

Joy's keys omit the rare saproxylic *Aulonothroscus brevicollis* which differs from *Trixagus* species by having undivided eyes (illustrated at FHL15: 225 (Leseigneur (1998))). A new British *Trixagus* has been found at Chelsea Harbour (and elsewhere?). It is well worth dissecting males of this group.

- 1 (4). Pitchy-red; L. 2.5-3.3 mm. [Hd. with raised lines between eyes.]
2 (3). Eyes divided beyond middle, and el. more contracted to apex (Pl. 127, 1), more shining, interstices punctured almost as strongly as striae (to be viewed with light coming from behind). [Eng. S. to Yorks; l.].**carinifrons**
3 (2). Eyes divided to about middle; el. less contracted to apex, less shining, interstices much less strongly punctured than striae. [♂ with club of ant. longer than rest of ant.; Eng., Scot. 1, 2, Irel.; l.].**dermestoides**
4 (1). Reddish; L. 1.5-2.3 mm. [Eyes as carinifrons; shape of el. as dermestoides, punctuation of interstices as carinifrons.]
5 (6). Hd. with two parallel raised lines between eyes; L. 2-2.3 mm. [Eng. S., E.; vl.; generally in early spring in salt marshes.]**elateroides**
6 (5). Hd. simple; L. 1.5-2 mm. [Eng. S. to Yorks; vl.].**obtusius**

DENTICOLLIS

Somewhat variable in colour; ♂ narrower, entirely yellow, hd. and th. reddish, to hd., ant. and legs as in ♀; ♀ broader, hd. black, forehead red, th. red, el. black, sides narrowly yellow, ant. black, base sometimes yellow, femora black; L. 9-12 mm.; l.; by general sweeping. **linearis**

EUCNEMIDAE

Joy's keys included three species in three separate genera. Three more species have been added to the British list since: *Hylis cariniceps*, *H. olexai* and *Epiphanis cornutus*. A fourth, *Isorhipis melasoides*, has apparently also been discovered more recently.

MELASIS

Black, ant. and legs reddish ant. with joints 6-10 pectinate, very strongly serrate in ♀ (Pl. 127, 3) L. 6-8 mm.; Eng. S. to Yorks, Irel. M. vl.; in dead beech and other trees. **buprestoides**

MICRORHAGUS

Black, legs yellowish; ♂ with ant. strongly pectinate (Pl. 127, 4); ♀ strongly serrate; L. 3.5-4.5 mm.; Eng. S.; rare; generally by sweeping fern under oaks. **pygmaeus**

EUCNEMIS

General shape as *Cardiophorus* (Pl. 127, 16); black, legs pitchy-red, tarsi yellowish-red; ant. with joints 5-10 transverse; L. 4-5.5 mm.; Hants; vr.; in old beech. **capucina**

AGRYPNUS

Undersurface colour black, ant. red, joint 1 black, tibiae black, tarsi red; L. 10-15 mm.; c.; by general sweeping. **murinus**

PROSTERNON

Undersurface colour black, ant. black, legs red; th. very finely and densely punctured; L. 9-11 mm. Eng., Scot. 1, 2; l.; by general sweeping. **tessellatum**

ADRASTUS

Hd. and th. shining black, diffusely punctured; el. with distinct outstanding pubescence; legs yellow; by general sweeping.

1 (2). El. with only suture dark; ant. entirely yellow, joints 8-10 slightly elongate, as *Agriotes pallidulus* (Pl. 127, 7); L. 4-5 mm. [c.] **pallens**

2 (1). El. with apical half dark; ant. fuscous, joints 1 and 2, or 1-4, yellow, joints 8-10 more distinctly serrate, quadrate (Pl. 127, 6); L. 3-4 mm. [Kent; vl.] **rachifer**

AGRIOTES

Under stones, by general sweeping, etc.

1 (4). Hd. broader in proportion to th., th. quadrate, broadest at tip of hind angles, and el. more elongate (Pl. 127, 7); th. somewhat diffusely punctured; el. with pubescence somewhat outstanding. [Pitchy, with interstice 1 generally darker; th. shining, ant. with joints 8-10 less than twice as long as broad.]

2 (3). El. with striae less strongly punctured, interstices with two rows of punctures; ant. entirely yellow; L. 5.5-7 mm. [Eng.; l.] **acuminatus**

3 (2). El. with striae more strongly punctured, interstices with one row of punctures; ant. fuscous towards apex; L. 4-5 mm. [Eng., Scot. 1, 2; c.] **pallidulus**

4 (1). Hd. narrower in proportion to th., th. not so distinctly broadest at tip of hind angles, and el. less elongate (Pl. 127, 8, 9); th. somewhat closely to densely punctured; el. with pubescence quite recumbent.

5 (6). Th. more transverse and rounded at sides (Pl. 127, 8). [Th. strongly and densely punctured, quite dull; striae of el. as *sordidus*; el. pitchy, ant. entirely yellow; L. 7-9 mm.; vc.] **obscurus**

6 (5). Th. less transverse and rounded at sides (Pl. 127, 9).

7 (8). El. with alternate interstices lighter and darker; th. more strongly, densely, to almost densely, punctured; striae of el. as *sputator*; ant. entirely yellow; L. 7.5-10 mm.; vc.

..... **lineatus**
8 (7). El. unicolorous; th. more finely punctured.

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- 9 (10). Th. more shining, interspaces on disc, in parts, slightly broader than punctures; el. reddish-yellow, striae broader, about one-third as broad as broadest interstice; ant. entirely yellow; L. 5.5-8 mm. [Eng., Scot. 1, 2; c.] **sputator**
10 (9). Th. duller, almost densely punctured; el. pitchy, with striae narrower, about a quarter as broad as broadest interstice; Joint 1 of ant. fuscous, legs pitchy-yellow; L. 8-9 mm. [Eng. S. to Lancs; vl.; generally banks of rivers.] **sordidus**

HYPNOIDUS

With scattered yellow recumbent pubescence; hind angle of th. with a keel on its upper side (Pl. 127, 10); legs yellow; l; generally on the coast. **riparius**

FLEUTIAUXELLUS, NEGASTRIUS, OEDOSTETHUS and ZOROCHROS

On the banks of rivers, under stones, etc.

Since Joy's keys, *Negastrius arenicola* has been added to the British list by Mendel (2002). *Zorochros meridionalis* has also been added but is known from only a single 19th century specimen thought to have been collected in Kent.

- 1 (2). Entirely black; hind angles of th. strongly angled with sides, without a keel; joints 8-10 of ant. nearly twice as long as broad. [Th. very finely and closely punctured; striae impunctate; Eng. W., N., Scot. 1, 4; vl.] **Fleutiauxellus maritimus**
2 (1). Legs yellow, or nearly so; hind angle of th. not, or slightly, angled with side; joints 8-10 of ant. not so elongate. [Ant. generally with more or less of base yellow.]
3 (6). Th. longitudinally shagreened, dull, quadrate, and el. narrower, generally with three yellow marks on each (Pl. 127, 11, 12), sometimes absent.
4 (5). Th. not broadest before hind angles (Pl. 127, 11). [L. 2.5-4 mm.; Scot. 4; vr.] **Negastrius pulchellus**
5 (4). Th. broadest before hind angles (Pl. 127, 12). [L. 3.5-5 mm.; Hereford, Cumberland, Scot. 1; r.] **Negastrius sabulicola**
6 (3). Th. finely punctured, shining, transverse, and el. broader, generally with two yellow marks on each (Pl. 127, 13, 14), sometimes absent. [L. 2.5-3.5 mm.]
7 (8). Th. entirely black, less rounded at sides, and el. with smaller yellow marks (Pl. 127, 13); striae of el. impunctate. [l.] **Zorochros minimus** or **Z. meridionalis**
8 (7). Th. with hind angle tooth yellow, more rounded at sides, and el. with larger yellow marks (Pl. 127, 14); striae punctured. [Eng.; 1.; in damp grassy places by sweeping.] **Oedostethus quadripustulatus**

ELATER

Pitchy-red to black, ant. and legs black; Eng. S., E.; vr.; in rotten wood. **ferrugineus**

MEGAPENTHES

Entirely black, legs sometimes lighter; el. -with very short thick outstanding pubescence, somewhat shining; ♂ with ant. more strongly serrate than ♀; Eng. S.E.; vr.; in decaying timber. **lugens**

ISCHNODES

El. shaped as *Ampedus cinnabarinus* (Pl. 128, 10), but th. more contracted in front; with rather long outstanding pubescence; joints 3-10 of ant. pectinate; L. 8-10 mm.; Eng. S., E.; vr. **sanguinicollis**

CARDIOPHORUS and DICRONYCHUS

Th. with a central longitudinal impression at base; el. with short recumbent pubescence; ant. with joints 8-10 nearly twice as long as broad, slightly serrate, 3 twice as long as 2; at roots of grass, etc.

Cardiophorus gramineus and *C. ruficollis* were omitted by Joy as they were even then very rare and doubtfully British. Both are presumed extinct in Britain.

1 (2). Femora and tibiae reddish-yellow, tarsi black. [L. 7-9 mm.; Eng. S.W.; r.; in dry places.] **vestigialis**

2 (1). Legs black, tarsi reddish. [In damp places.]

3 (4). Th. slightly more transverse, broader in proportion to el. (Pl. 127, 16); L. 8-9.5 mm. [Eng. S.; l.] **asellus**

4 (3). Th. slightly less transverse, narrower in proportion to el.; L. 6-8.5 mm. [Eng. S.W., Wales; r.] **Dicronychus equisetioides**

CIDNOPUS and KIBUNEA

In grassy places by sweeping.

1 (2). Somewhat metallic, with longer yellowish conspicuous pubescence, giving a greyish colour in some lights; th. more strongly, and less diffusely, punctured, hind angles sharp (Pl. 128, 1); L. 7.5-10.5 mm. [Brit., Irel. L.; l; sandy places.] **Cidnopus aeruginosus**

2 (1). Not metallic; pubescence shorter, inconspicuous; th. more finely and more diffusely punctured, hind angles blunt; L. 5-7 mm. [Eng., Scot. 2; l.] **Kibunea minuta**

SYNAPTUS

Th. strongly sinuate at sides (Pl. 128, 2); ant. and legs reddish; L. 9-11 mm.; Eng. S., Wales; l.; by sweeping grass at sides of water. **filiformis**

ATHOUS (part: 4 of 5 species), HEMICREPIDIUS and STENAGOSTUS

By general sweeping, etc.

1 (2). Ant. strongly serrate (Pl. 128, 3). [Entirely black; general shape of ♀ as *Agriotes sputator* (Pl. 127, 9), ♂ with th. slightly less transverse; hind angle of th. with a somewhat indistinct keel; el. with long, rather closely set, yellow outstanding pubescence; L. 9-14 mm.; c.] **Hemicrepidius hirtus**

2 (1). Ant. slightly, or not, serrate.

3 (4). Hind angles of th. with a keel close to side margin; el. with transverse bands of white pubescence; ant. with joints 8-10 slightly serrate, with a raised ridge in the middle of each (Pl. 128, 4); L. 16-18 mm. [Darker or lighter reddish; th. quadrate or slightly elongate, parallel-sided for hinder two-thirds; Eng. S. to Cheshire; vl.; in decaying trees.]

..... **Stenagostus rhombeus**

4 (3). Hind angles of th. without a keel; el. with evenly distributed pubescence; ant. with joints 8-10 not at all serrate; L. 8-14 mm.

5 (6). Th. densely punctured, dull; joint 3 of ant. more than twice as long as 2. [Hd. pitchy, th. pitchy, front margin and sides red, el. yellow, interstice 1 often fuscous, ant. fuscous to black; el. in ♂ contracted from base to apex, in ♀ parallel-sided for front two-thirds; ant. in ♂ longer; L. 8-10 mm. Eng., Scot. 2; l.] **Athous bicolor**

6 (5). Th. closely, but not densely, punctured, shining; joint 3 of ant. slightly longer than 2. [Th. black, el. reddish to pitchy; joints 8-10 of ant. about twice as long as broad.]

- 7 (8). Ant. entirely black, legs in part fuscous; th. more strongly punctured. [Shape as *vittatus*; el. very rarely black; L. 10-13 mm.; vc.]. **Athous haemorrhoidalis**
- 8 (7). Ant. with at least joint 1, and legs, entirely yellow; th. less strongly punctured. [Sides of th. often reddish.]
- 9 (10). Th. with front margin distinctly narrower than hind, and el. broadest in front of middle (Pl. 128, 5); el. almost densely punctured; ant. black with joints 1 or 1-3 yellow. [L. 9-12 mm.; Brit.; c.]. **Athous vittatus**
- 10 (9). Th. with front margin about as broad as hind, and el. broadest behind middle (Pl. 128, 6); el. diffusely punctured, broader in ♀ than ♂; ant. entirely yellow; L. 7-10 mm. [Orkney and Shetland; vr.]. Now also to be found in Surrey. **Athous subfuscus**

DALOPIUS

Th. sometimes rather strongly sinuate before hind angles, almost densely punctured; c.; sweeping, etc. **marginatus**

ATHOUS (part: 1 of 5 species) (*Orthathous* in Joy)

Th. almost densely punctured; ♂ in general shape as *Athous subfuscus* (Pl. 128, 6), but th. more parallel-sided; ♀ broader; ant. of ♂ and ♀ as *Athous bicolor* (p. 446); Eng. S.E., Yorks, Irel. L.; r.; by sweeping. **campyloides**

MELANOTUS (part: 2 of 3 species) (*Melanotus* in Joy)

General shape typical; th. with a keel on upper side close to side margin; L. 11-20 mm.; c.; in rotten wood. **castanipes** or **villosus**

Joy was aware of the possibility that two species occurred in Britain but lumped them with the following comment: “*castanipes* Pk. is regarded as synonymous with this on the Continent (see Fowler, vol. vi., p. 142). ... A careful study of habitat and dissection of genital organs, and other points, are wanted.” Mendel (2004) put the case for treating *castanipes* and *villosus* as distinct species and described how to identify them.

MELANOTUS (part: 1 of 3 species) (*Ectinus* in Joy)

Th. strongly and densely punctured, with a keel on upper surface of hind angle; L. 11-15 mm.; Eng. S.E.; r.; at roots of grass in sandy places. **punctolineatus**

AMPEDUS and BRACHYGONUS

Chiefly in rotten wood, and under bark of dead trees.

This must be the most difficult elaterid genus and the latter part of Joy's key, separating the species with uniformly red elytra is not to be entirely trusted. Joy omitted *Brachygonus ruficeps* (formerly known as *Ampedus ruficeps*) which is known from Windsor Forest. It may seem like cheating but the distribution maps in Mendel & Clarke (1996) are useful in identifying *Ampedus* with red elytra. I've found Leseigneur's (1972) key (in French, with many illustrations) to be very useful for this genus, and Arved Lompe's webpage (<http://www.coleo-net.de/coleo/texte/ampedus.htm>, in German) also looks to be very useful.

- 1 (4). Entirely black, or black with legs yellow.
- 2 (3). Th. strongly and closely punctured; ant. strongly serrate as *cinnabarinus* (Pl. 128, 13); legs black, except tarsi reddish; L. 8-10 mm. [Berks; vr.]. **nigerrimus**

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- 3 (2). Th. finely and diffusely punctured; ant. not serrate, joints 8-10 nearly twice as long as broad; legs reddish; L. 5-7 mm. [Brit.; r.; pine and fir.] **nigrinus**
- 4 (1). El. in some part red or yellow. [Hd., th., legs black, tarsi generally reddish.]
- 5 (6). El. black, base and sides abruptly yellow ant. fuscous, base lighter, very slightly serrate. [L. 7-8 mm.; Scot. 4; vr. spruce fir.] **tristis**
- 6 (5). El. not coloured thus; ant. black, joints 2 and 3 sometimes reddish.
- 7 (8). El. red, with about apical third somewhat abruptly black; ant. less serrate, 9 and 10 only slightly so. [L. 7-9 mm.; Brit., Irel. U., M.; l.; in fir stumps.] **balteatus**
- 8 (7). El. entirely, or in part, red, or yellowish; ant. strongly serrate.
- 9 (10). El. with a distinct black mark at apex; L. 6-8 mm. [El. yellowish- red; Eng. S., Scot. 1; vl.; in oak and fir stumps.] **elongantulus**
- 10 (9). El. entirely red, or with a black mark at middle, or sutural angle black; L. 9-15 mm.
- 11 (12). El. somewhat dull red, broader, almost parallel-sided for basal two-thirds (Pl. 128, 9). [Ant. as *sanguinolentus*; pubescence black or yellow; L. 8-11 mm.; Eng., Scot. 4, Irel.; vl.; chiefly in fruit trees.] **pomorum**
- 12 (11). El. brighter red, or yellowish, broadest at base, and narrowed gradually to apex (Pl. 128, 10).
- 13 (14). Ant. with joints 3-10 more pectinate (Pl. 128, 11). [El. entirely bright red, shaped as *cinnabarinus*; pubescence black; L. 10-12 mm.; Eng. S.; vr.; chiefly in beech.] **rufipennis**
- 14 (13). Ant. not so pectinate (Pl. 128, 12, 13).
- 15 (16). El. less distinctly contracted from base to apex, with a slight yellowish tinge, to yellowish, normally with a variable black sutural mark; ant. with joints 4-10 narrow (Pl. 128, 12). [Pubescence black or yellow; disc of th. as *pomona*; L. 9-11 mm.; Eng. S. to Worcester; vl.; chiefly at the roots of heather.] **sanguinolentus**
- 16 (15). El. more distinctly bright red, more distinctly contracted from base to apex (Pl. 128, 10).[‡]
- 17 (18). Pubescence yellowish. [Th. with an impression at middle of base only, disc somewhat diffusely punctured; el. entirely red; ant. with joints 4-10 broad (Pl. 128, 13); L. 8-15 mm.; Eng. S., E., Wales; l.] **cinnabarinus**
- 18 (17). Pubescence black.
- 19 (20). El. entirely red; th. with an impression at middle of base, extending shallowly to front margin; ant. with joints 4-9 as *sanguinolentus* (Pl. 128, 12); L. 10-15 mm. [Eng.; vr.] **sanguineus**
- 20 (19). Sutural angle of el. black; th. with an impression at middle of base only; ant. as *cinnabarinus* (Pl. 128, 13); L. 8-11 mm.
- 21 (22). Base of th. very diffusely punctured; el. brighter red, more shining, more diffusely punctured. [Eng. S., Irel. U., M.; vl.] **quercicola**
- 22 (21). Base of th. closely punctured; el. darker red, less shining, not so diffusely punctured. [Sussex, Hants, Irel. M.; vr.] **cardinalis** or **pomona**
- In recent decades, *pomona* has only been found in Ireland (Co. Kerry and reported recently from Co. Clare also).

[‡] Joy wrote: "I am not quite satisfied with this part of the key; there is still much difference of opinion about these species."

CALAMBUS

Ant. slightly serrate, joint 3 distinctly longer than 2, black with base reddish; L. 6-8 mm.; Eng. S. to Notts, Irel. M.; r.; in old willows.....**bipustulatus**

PROCRAERUS

Ant. with joints 8-10 distinctly elongate, scarcely serrate, entirely black. L. 6-8 mm.; Eng. S. to Notts; vr.; in decaying oaks.**tibialis**

ANOSTIRUS

Ant. with joint 2 quadrate, one-third as long as 3, pectinate in ♂, strongly serrate in ♀; ♀ broader than ♂, th. more rounded at sides; L. 8-10 mm. Eng.; vr.; sweeping.....**castaneus**

DIACANTHOS

Ant. with Joint 3 about twice as long as 2, 8-10 elongate, not serrate; L. 13-16 mm.; Scot. 4; vr.**undulatus**

SERICUS

Th. somewhat dull, each puncture with a black mark in middle; ant. black, legs reddish; ♂ with th. black, generally with greenish reflection, el. reddish, area around suture sometimes darker, or entirely black; ♀ with th. red, generally with centre and sides darker (Pl. 128, 14), el. reddish, or entirely reddish; L. 7-9 mm.; l.; sandy places..... **brunneus**
It may be worth noting that there is a fairly common brown chafer with a very similar name: *Serica brunnea*.

ACTENICERUS and CTENICERA

Ant. and legs black, knees sometimes reddish; by sweeping long grass, etc.

1 (2). El. with distinct white pubescence in more or less of a pattern, sutural angle a right angle, and serrate joints of ant. with angle not so acute (Pl. 128, 15). [Black, with a slight bronze or coppery reflection; th. without or with a slight longitudinal furrow in middle; last joint of antennae narrower in ♂ than ♀; L. 12-14 mm.; l.; in marshy places.]**Actenicerus sjælandicus**

2 (1). El. glabrous, or almost so, sutural angle distinctly acute (Pl. 128, 16); joints of ant. with serrate angle much more acute in ♀, pectinate in ♂. [Th. with a slight, or well-marked, longitudinal furrow in middle; ♂ narrower than ♀, with th. more contracted in front, and less rounded at sides (Pl. 128, 17).]

3 (4). ♂ with ant. much more strongly pectinate, and ♀ slightly more strongly serrate (Pl. 128, 17). [Metallic-green; L. 13-17 mm.; Brit.; 1.]. **Ctenicera pectinicornis**

4 (3). ♂ with ant. much less strongly pectinate; ♀ slightly less strongly serrate (Pl. 128, 18). [Entirely metallic-green or purple, or th. green or purple, and el. yellow with apical third black; L. 12-15 mm.; vl.]..... **Ctenicera cuprea**

SELATOSOMUS, APLITARSUS and PARAPHOTISTUS

♂ with th. slightly narrower than ♀.

Joy's key omitted *Selatosomus melancholicus*, *Selatosomus cruciatus* and *Aplitarsus angustulus*. *Selatosomus cruciatus* was recorded from 'near Windsor' in the early 19th century but with no more recent records it is presumed extinct (Mendel & Clarke, 1996).

1 (2). Strongly metallic; broader (Pl. 128, 19); glabrous. [Green, blue, bronze-black, etc., legs black or red; L. 10-14 mm.; Brit., Irel. M.; l. under stones, etc.]

..... **Selatosomus aeneus** or **S. melancholicus**

Note that *melancholicus* is currently known from Ireland but not Britain.

2 (1). Not, or slightly, metallic; narrower; slightly pubescent.

3 (4). General shape as *Cidnopus aeruginosus* (Pl. 128, 1), but th. more narrowed in front; th. very finely, and almost densely, punctured; L. 7-8 mm. [Black, legs yellow; el. rarely yellow (v. *ochropterus* Steph.); l.; by sweeping, etc.]

..... **Aplotarsus incanus** or **A. angustulus**

Hodge & Jones (1995) report that *A. angustulus* has been recorded from "River Vyrnwy, Melferley, Shropshire; R. Ithon, Radnorshire and near Priddy, Somerset".

4 (3). General shape as *Sericus brunneus* (Pl. 128, 14); th. strongly and somewhat diffusely punctured on disc; L. 9-14 mm.

5 (6). Th. with central longitudinal furrow only at base; el. with yellowish pubescence; L. 9-11 mm. [Black, sometimes with a slight greenish reflection, ant. fuscous, legs reddish-yellow; Eng. S. to Yorks; r.; by sweeping.]

..... **Paraphotistus nigricornis**

6 (5). Th. with central furrow extending whole length; el. with grey pubescence; L. 11-14 mm. [Black, sometimes with a slight bronze reflection, ant. black, legs black or red (v. *rufipes* Schil.); sutural angle of el. as *Ctenicera pectinicornis* (Pl. 128, 16); Eng. N., Scot. 3, 4; l.; on Scotch pine and birch.]

..... **Paraphotistus impressus**

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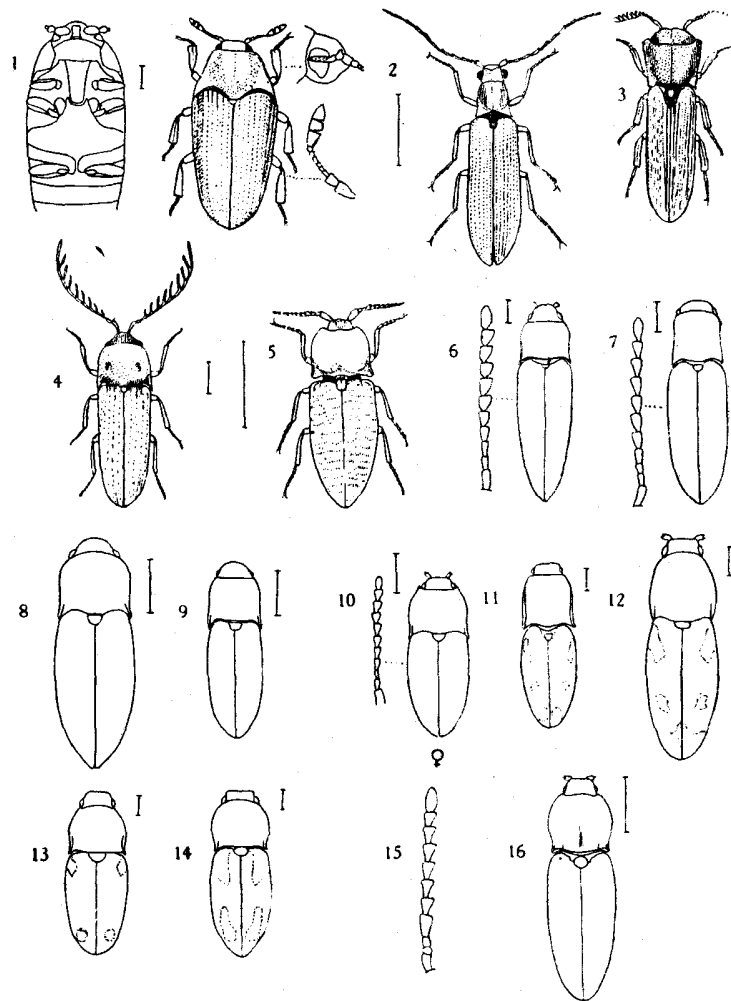
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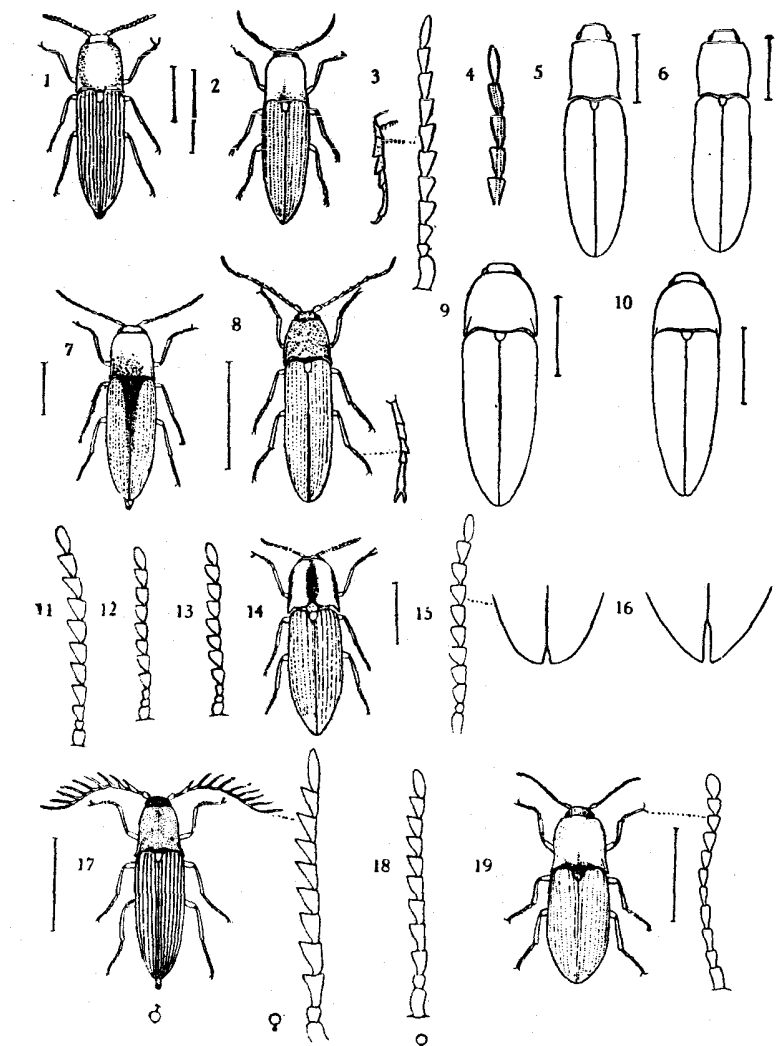
Plate 127



- 1, *Trixagus carinifrons*
- 2, *Denticollis linearis*
- 3, *Melasis buprestoides* ♀
- 4, *Microrhagus pygmaeus* ♂
- 5, *Agrypnus murinus*
- 6, *Adrastus rachifer*
- 7, *Agriotes pallidulus*
- 8, *Agriotes obscurus*

- 9, *Agriotes sputator*
- 10, *Hypnoidus riparius*
- 11, *Negastris pulchellus*
- 12, *Negastris sabulicola*
- 13, *Zoroachros minimus*
- 14, *Fleutiauxellus quadripustulatus*
- 15, *Megapenthes lugens*, antenna
- 16, *Cardiophorus asellus*

Plate 128



- | | |
|--|--|
| 1, <i>Cidnopus aeruginosus</i> | 10, <i>Ampedus cinnabarinus</i> |
| 2, <i>Synaptus filiformis</i> | 11, <i>Ampedus rufipennis</i> , antenna |
| 3, <i>Hemicrepidius hirtus</i> , hind tarsus and antenna | 12, <i>Ampedus sanguinolentus</i> , antenna |
| 4, <i>Stenagostus rhombeus</i> , antenna | 13, <i>Ampedus cinnabarinus</i> , antenna |
| 5, <i>Athous vittatus</i> | 14, <i>Sericus brunneus</i> ♀ |
| 6, <i>Athous subfuscus</i> | 15, <i>Actenicerus sjaelandicus</i> , antenna and elytral apices |
| 7, <i>Dalopius marginatus</i> | 16 & 17, <i>Ctenicera pectinicornis</i> |
| 8, <i>Melanotus castanipes</i> or <i>villosus</i> | 18, <i>Ctenicera cuprea</i> , antenna |
| 9, <i>Ampedus pomorum</i> | 19, <i>Selatosomus aeneus</i> |