

Studies of some fungus gnats (Diptera: Mycetophilidae) including nine additions to the British list

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ABSTRACT. A key is provided to the eight species of *Anatella* recorded in Britain, including three species newly recorded (*A. dampfi* Landrock; *A. gibba* Winnertz; *A. lenis* Dziedzicki). A further six species are newly recorded from Britain (*Exechia sororcula* Lackschewitz; *Exechiopsis dumitrescae* (Burgehele-Balacesco); *Allodia (Brachycampta) angulata* Lundström; *Mycetophila autumnalis* Lundström; *M. lubomirskii* Dziedzicki; *M. lunata* Meigen); these and several other species are redescribed. The following nomenclatural changes are proposed. *Exechia bicincta* (Staeger) (= *spinosa* Bukowski, syn.n.); *Mycetophila confusa* Dziedzicki (= *affluctata* Edwards, syn.n.); *Mycetophila dziedzickii* nom.n. (= *obscura* Dziedzicki nec Walker). Female characters of seventeen of the twenty-two British species of *Exechia* and eight species of *Mycetophila* are discussed and illustrations provided.

Introduction

Since the revision of Edwards (1925b) and his supplementary notes (1941), knowledge of British Mycetophilidae has advanced slowly. Nineteen species have, however, been added to the British list but five have been deleted, bringing the total to 416. During examination of recent collections of British fungus gnats, several species were discovered new to the British list although known from other parts of Europe; nine of them are dealt with here, all belonging to the sub-family Mycetophilinae. Material of the genera concerned in the British Museum (Nat. Hist.) and Hope Department of Entomology, Oxford University Museum (referred to below by the abbreviations BMNH and HD respectively) has also been studied.

A revised key to *Anatella* was desirable but this can still only be applied to males as so few females have been associated. In *Exechia*, more work had been done previously

on females but the characters employed required revision and this is attempted as far as practicable. Also in the Exechiini, where the generic revision of Tuomikoski (1966) is now generally followed, the generic position of *Allodiopsis ingeniosa* Kidd was found to require discussion.

The interpretation of some species groups in *Mycetophila* is in need of clarification but as such groups have not been clearly defined in the Palaearctic fauna, only those including species new to the British list or involving nomenclatural changes are discussed here. Again, it has been possible to elucidate female characters where these were unknown in several species.

Anatella Winnertz

Anatella Winnertz, 1863, 854. Type-species *Anatella gibba* Winnertz, designated by Johannsen, 1909: 90.

Anatella species are small (1.5-3 mm in length), dark coloured and possess few useful characters other than in the male genitalia.

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Anatella is the only Palaearctic genus of Exechiini to have the costa distinctly produced beyond the tip of vein R5 and it was considered monophyletic by Tuomikoski (1966), who studied fifteen species. The single dark basal bristle on the hind coxa characteristic of all other Exechiini may be absent but there are intermediate species with a weakly developed bristle. The base of the cubital fork is usually a little beyond that of the median fork (a little before in *A.gibba*) but its position is variable within species and cannot be used for reliable identification. The variation in the development of the mid tibial spurs mentioned by Tuomikoski and the distinctive mid femoral chaetotaxy of some species appear to be secondary sexual characters of the male.

Eight species have been recorded from Britain but three others can now be added. Only seven have been figured in British literature (*setigera* Edwards and *unguigera* Edwards in Edwards, 1921, claspers only; the others in more detail in Edwards, 1925b) while *A.turi* Dziedzicki was added by Edwards (1941) without a figure. Eight or nine other European species are recognized but several are of uncertain status. Some were figured by Dziedzicki (1923) and Landrock (1924, 1925) but the three described by Strobl have not been figured. Strobl's *rufithorax* was founded on thoracic coloration, i.e. distinct stripes on a paler ground and the type was a female although he recognized the male later. I have found that this pattern may occur in several species and the record by Matile (1967) of female *rufithorax* from the Pyrenees is therefore uncertain.

No external characters have been found in females to associate them with their respective males but there are probably good characters in the ovipositor. This was figured by Dziedzicki (1923) for *A.longisetosa* Dziedzicki and by Plassmann (1970b) for *A.lenis* Dziedzicki, of which he had reared both sexes from the bark encrusting fungus *Exidia glandulosa* Fries (Tremellinaceae). The rearing of *A.flavomaculata* Edwards from a small lignicolous Ascomycete, *Helotium aciculare* Persoon has enabled the female of this species to be recognized. Nothing else is known of the development of *Anatella*.

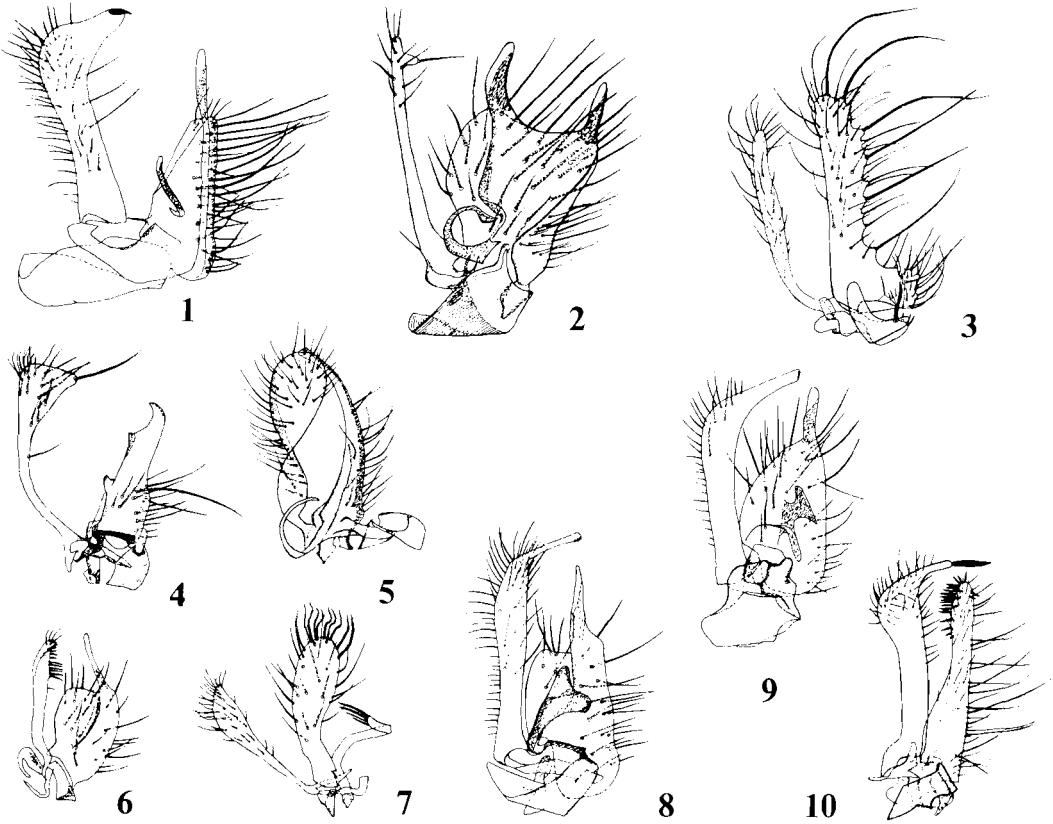
The present study of male *Anatella* has

suggested further specific characters, employed in the following key, which it is hoped will be a useful aid to sorting species but examination of the genitalia is still essential for confirmation. Structural characters are given precedence where possible but in some instances it is necessary to place greater reliance on colour, the three types of thoracic coloration being perhaps most reliable. The first flagellar segment is elongate in all species, the next few being progressively shorter and relative measurements cited apply best to the fourth and immediately following segments.

Although only one or two specimens have been seen of the three additional species, they are easily distinguished by the highly specific genital characters. These are figured in detail for these species but an internal view of the clasper complex is figured for all British species except *lenis*. The nomenclature adopted has, however, required careful consideration of the literature in the cases of *gibba* and *dampfi*.

Key to British species (males only)

- 1 Mid femora with posteroventral fringe well developed, distinctly longer and stronger than anteroventral fringe, with some hairs at least nearly half median femoral depth. 2
 - Mid femora with weak fringes, posteroventral never better developed than anteroventral, although some hairs of latter may be half median femoral depth 4
- 2 Mid femoral fringe strong, longest towards base where it reaches median femoral depth. Outer (anterior) spur of mid tibia very short, not more than one quarter length of inner spur. Antennal flagellar segments more than twice as long as broad. No bristle at base of hind coxa. (Thorax grey pruinose; tergites 1–2 sometimes slightly paler. First flagellar segment yellow basally. Wing length 2.3–2.5 mm.)
 - ciliata* Winnertz
 - Mid femoral fringe weaker, scarcely exceeding half depth of femur. Outer spur of mid tibia at least half length of inner spur. 3
- 3 Flagellar segments less than twice as long as broad. Mid femoral fringe longer on basal half. A well developed bristle at base of hind coxa. (Body blackish grey. Flagellum entirely grey. Wing length 2.0–2.3 mm.)
 - longisetosa* Dziedzicki
 - Flagellar segments at least twice as long as broad. Mid femoral fringe longest apically but not quite half femoral depth. Hind coxal bristle small and weak.



FIGS. 1-10. *Anatella* males, internal view of left claspers: (1) *unguigera* Edwards; (2) *gibba* Winnertz; (3) *longisetosa* Dziedzicki; (4) *setigera* Edwards; (5) *turi* Dziedzicki; (6) *minuta* Staeger; (7) *flavomaculata* Edwards; (8) *dampfii* Landrock; (9) *simpatica* Dziedzicki; (10) *ciliata* Winnertz.

- (Body grey pruinose. First flagellar segment yellow basally) *setigera* Edwards
- 4 Outer spur of mid tibia absent although inner spur of normal strength. Flagellar segments longer than broad but not twice breadth. No bristle at base of hind coxa. Mid femoral fringes very short.
(Thorax grey pruinose; tergites 1-3 yellow laterally. First one or two flagellar segments yellow. Wing length 1.9-2.2 mm.)
turi Dziedzicki
- Outer spur of mid tibia always present; although almost invariably shorter than inner spur, never less than half as long 5
- 5 Bristle at base of hind coxa absent. Outer mid tibial spur more than five-sixths length of inner spur. Wing veins yellow. Flagellar segments from the fourth onwards nearly quadrate (segment 3, 1.2 X breadth). Mid femoral fringes short, longest apically.
(Body dark grey, thorax blackish dorsally. Basal antennal segments and palpi darker than in *A. setigera*. Wing length 2.4-2.5 mm.)
unguigera Edwards
- Bristle at base of hind coxa usually well developed, always present. Outer mid tibial spur usually shorter (except in *dampfii*). Wing veins grey, fork veins as usual paler than the radial sector. 6
- 6 Flagellar segments 3-4 about 1.5 X long as broad. Outer mid tibial spur about 0.8 length of inner spur. Hind coxal bristle well developed. Anteroventral mid femoral fringe well developed but less than half femoral depth.
(Thorax grey pruinose. Base of first flagellar segment pale. Wing length 3.1 mm.)
gibba Winnertz
- Flagellar segments 3-4 quadrate or a little longer than broad 7
- 7 Thorax uniformly sooty black on dorsum. Sides of first three tergites usually broadly yellowish but this coloration sometimes obscured or reduced in extent. Antennae and palpi grey, base of first flagellar segment brownish 8
- Thorax obscurely grey brown, often more reddish brown laterally, never uniformly black but sometimes with pale ground bearing a dark central stripe and shorter more or less fused

- lateral stripes, leaving pale shoulders. Mid femoral fringes short and weak, longer apically 9
- 8 Mid femora with anteroventral fringe well developed but short, longest apically. Outer mid tibial spur five-sixths length of inner spur. Bristle at base of hind coxa small and weak. Wing length 2.3 mm. *dampfii* Landrock
- Mid femora with anteroventral fringe weak and not close-set but on basal half may exceed half median femoral depth. Outer mid tibial spur about three-quarters length of inner spur. Bristle at base of hind coxa well developed. Wing length 1.9–2.0 mm. *flavomaculata* Edwards
- 9 Basal antennal segments (scape and pedicel) and palpi obscurely yellowish brown. Abdominal tergites 1–4 with yellow patches towards their lower posterior corners, sometimes faint. Outer mid tibial spur of variable length, from little more than half to three-quarters length of inner spur. Wing length 1.6–2.4 mm.
- simpatica* Dziedzicki
- Basal antennal segments and palpi yellow but antennal flagellum usually entirely grey. Outer mid tibial spur about two-thirds as long as inner.
- 10
- 10 Flagellar segments slightly longer than broad. Fork veins pale grey but more distinct than in *minuta*. Thorax dull orange brown with three darker stripes. Wing length 2.4 mm.
- lenis* Dziedzicki
- Flagellar segments quadrate or slightly broader than long. Fork veins very pale. Coloration variable, thorax often all dark grey brown but usually paler laterally and may have colour described for *lenis*. Sides of tergites 2–3 sometimes pale. Wing length 1.8–2.0 mm.
- minuta* Staeger

Anatella lenis Dziedzicki

Anatella lenis Dziedzicki, 1923; 5, Figs. 23–24.

The British example agrees well with Dziedzicki's (1923) figures and there is little doubt that it is correctly identified. *A. lenis* was recorded by Lackschewitz (1937) from the Baltic States and Plassmann (1970a, b, 1971, 1973), who reared it in Germany, described the larva and figured the ovipositor but in a contracted position.

Male. Head grey. Palpi and basal antennal segments yellow; flagellum dark grey. Flagellar segments slightly longer than broad. Thorax dull orange brown with three darker stripes, the median broadened anteriorly to the fore margin, the laterals ending where the median begins to broaden and rounded

anteriorly. Pleura largely pale brownish yellow (the thoracic coloration may display the same range of variation found in *minuta* and *simpatica*). Halteres pale yellow. Abdomen grey with tergites 2–3 narrowly pale laterally. Hypopygium brownish yellow (Figs. 13 and 14).

Legs yellow. Fore metatarsus four-fifths length of its tibia. Mid femora with fringes very short, stronger and longer towards tip. Outer mid tibial spur two-thirds length of inner spur. Bristle at base of hind coxa strong.

Wings with fork veins pale grey but distinct. Costa extending about halfway from R5 to M1. Cubital fork beginning slightly beyond base of median fork. Wing length 2.4 mm.

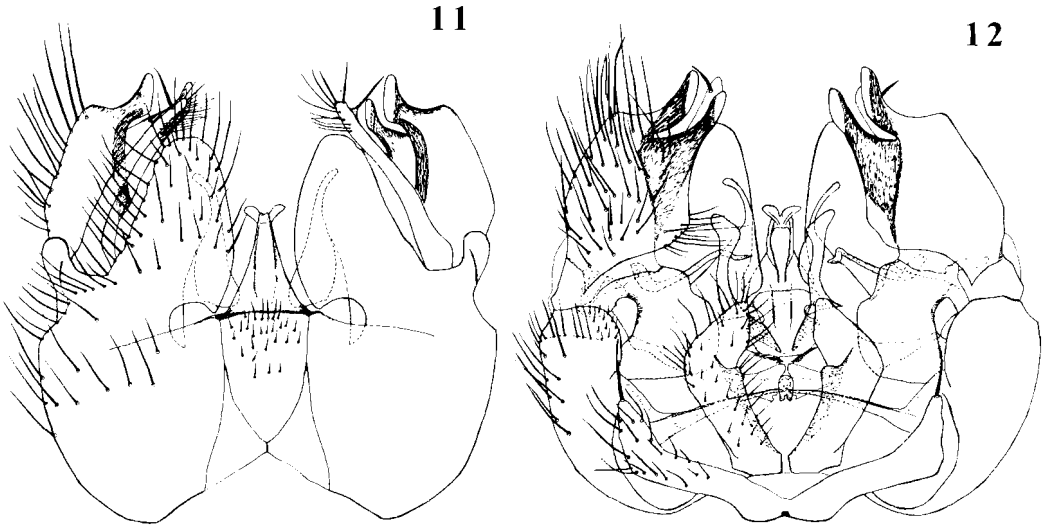
Material examined. HUNTS: Monk's Wood, 15.ix.1972, 1 ♂ ex suction trap (Cole).

Anatella gibba Winnertz

Anatella gibba Winnertz, 1863, 855; Dziedzicki, 1923: 3, Figs. 11 and 12 (based on Winnertz' type).

Landrock's (1927) character of the base of the cubital fork being a little before that of the median applies to the British specimen and may be constant. I did not use it in the key because I found that some other species may have it either immediately below or distinctly beyond the base of the median fork. Landrock did not reproduce a figure of the genitalia because he was then unaware of the work of Dziedzicki (1923) (published posthumously, the author having died in 1921), who figured dorsal and ventral views. The British example agrees with these figures in the slender lower claspers, hairy only at the tip and the nearly equally bilobed broad posterior margin of the upper claspers. It apparently differs in the relative dimensions of the median and lateral sternal processes but this may be due to the angle at which they were drawn (in Dziedzicki's figure the lateral processes are much shorter).

Male. Head dark grey. Antennae with basal segments dark yellowish brown, flagellum grey with base of first segment paler. Palpi grey brown. Flagellar segments 3–4 1.5 times as long as broad. Thoracic dorsum grey pruinose, slightly paler laterally. Pleura grey



FIGS. 11–12. *Anatella gibba* Winnertz, male genitalia: (11) ventral view; (12) dorsal view.

but propleura brownish yellow. Halteres brownish with paler stalk. Abdomen grey. Hypopygium brownish yellow (Figs. 11 and 12; claspers, Fig. 2).

Legs yellow. Fore metatarsus equal to tibia in length. Mid femoral fringes short, anterior fringe increasing in length apically where it approaches half median femoral width. Mid tibia with outer spur three-quarters length of inner. A well-developed bristle at base of hind coxa.

Wing veins yellowish grey, fork veins paler. Costa extending half distance from R5 to M1. Cubital fork begins slightly before base of median fork. Wing length 3.7¹ mm (the largest specimen of *Anatella* examined but it may be abnormally large for the species).

Material examined. INVERNESS: Kinrara, 23.vi.1967, 1 ♂ (*D. M. Ackland*, BMNH).

Anatella dampfi Landrock

Anatella dampfi Landrock, 1924: 80, Figs. 8–10.

Landrock (1924) described *A. dampfi* from Estonia and figured the genitalia. If his dorsal and ventral views represent the species described here they must be inaccurate, agreeing in the lateral sternal processes being separate

flanges articulating with the genital capsule but not very exactly in their shape. His lateral view of the claspers, however, is considered confirmatory as their shape is nearly identical; the thin membranous internal process is omitted but its shape and position are indicated in his dorsal view.

Landrock (1937) suggested that *A. novata* Dziedzicki (1923) might be the same as *dampfi* but *novata* is not used here because in his figures of *novata* the upper claspers resemble the lower claspers of *dampfi* from the views figured and I think this synonymy unlikely. According to Landrock's (1927) key, *A. dampfi* (like *A. unguigera* Edwards) has the outer mid tibial spur nearly as long as the inner as in the British specimen. The dark thoracic coloration is also found in *unguigera*, *flavomaculata* and *longisetosa* but the genitalic structure is nearer to *simpatica*.

Male. Head grey dusted. Antennae and palpi grey, but basal antennal segments and first flagellar segment brownish. Flagellar segments nearly quadrate, slightly longer than broad. Thoracic dorsum slightly shining sooty black; pleura and metanotum brownish grey. Halteres yellow. Abdomen dark grey with tergites 2–4 yellowish laterally. Hypopygium small, brownish yellow (Figs. 15 and 16; claspers, Fig. 8).

Legs yellow. Fore metatarsus equal to tibia. Mid femoral fringes short and weak.

Mid tibia with outer spur five-sixths length of inner spur. Hind tibia (as usual) with outer spur three-quarters length of inner. A small weak bristle near base of hind coxa.

Wings with grey veins, fork veins paler. Costa extending two-fifths of distance from R5 to M1. Base of cubital fork distinctly beyond base of median fork. Wing length 2–3 mm.

Material examined. MERIONETH: Cwm Bychan, 12.x.1975, 1 ♂ in hillside oakwood (*Ismay*); SELKIRK: Happertutie Burn, iv.1976, 1 ♂ (*B. Milligan*).

***Anatella unguigera* Edwards**

Anatella unguigera Edwards, 1921: 122, Fig. 2 (examined).

Claspers, Fig. 1; 12 ♂ seen from Britain (Sussex to Sutherland) and Ireland (Down).

***Anatella longisetosa* Dziedzicki**

Anatella longisetosa Dziedzicki, 1923: 6, Figs. 27–31.

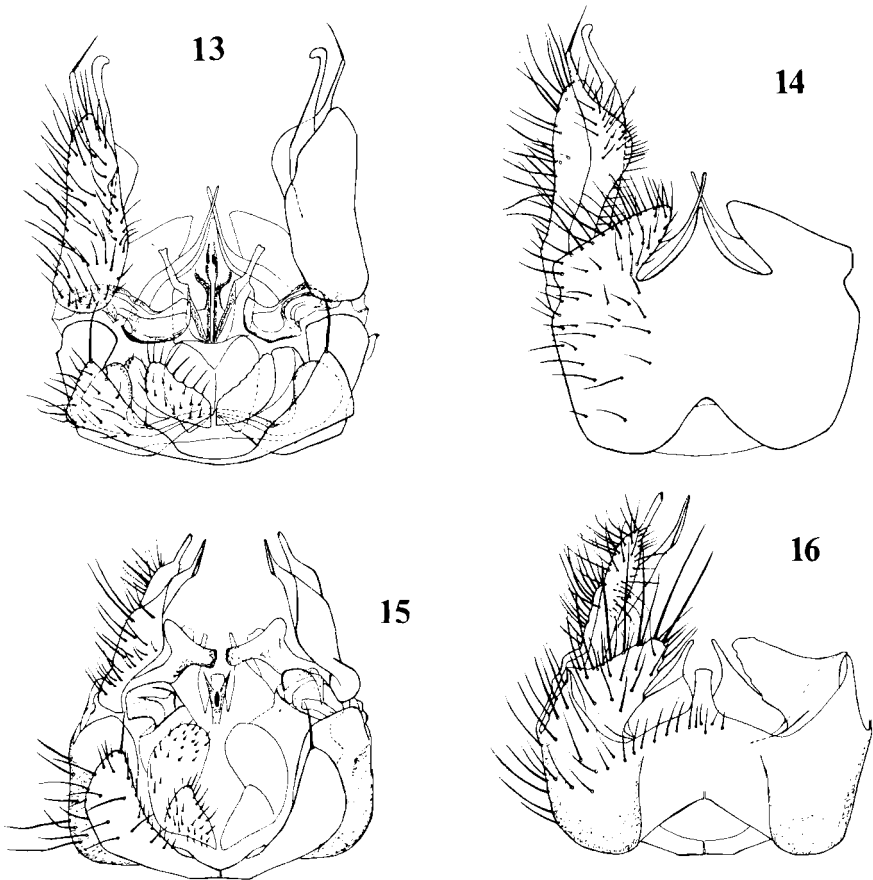
Anatella piligera Edwards, 1925b: 590, Figs. 48–50 (examined).

Claspers, Fig. 3; 16 ♂ seen from Britain (Bucks. to Inverness).

***Anatella setigera* Edwards**

Anatella setigera Edwards, 1921: 122, Fig. 1.

Claspers, Fig. 4; 14 ♂ seen from Britain (Devon and Hunts. to Argyllshire) and Ireland (Sligo).



FIGS. 13–16. *Anatella* male genitalia: (13–14) *lenis* Dziedzicki, dorsal and ventral views; (15–16) *dampfi* Landrock, dorsal and ventral views.

***Anatella turi* Dziedzicki**

Anatella turi Dziedzicki, 1923: 4, Figs. 17 and 18.

Claspers, Fig. 5; 10♂ seen of this previously little known but evidently widespread species. New records are: HUNTS: Monk's Wood, 28.vi.1971, 4♂, 25.viii.1972, 1♂ (*Cole*); CAMBS: Chippenham Fen, 24.ix.1941, ♂ (*Collin*, HD); CAERNARVON: Glan-y-Gors, 16.vii.1976, ♂; ROSS: Kinrive pinewood, 15.vi.1976, 2♂ (*Chandler*).

***Anatella minuta* (Staeger)**

Mycetophila minuta Staeger, 1840: 253 (examined by Edwards, 1925a).

Anatella minuta (Staeger): Edwards, 1925a, 167.

Claspers, Fig. 6; 11♂ seen, mostly from southern England and Wales but one from Scotland (INVERNESS: Inverdrurie).

***Anatella flavomaculata* Edwards**

Anatella flavomaculata Edwards, 1925b: 590, Figs. 51–53 (examined).

Claspers, Fig. 7; ovipositor, Figs. 17 and 18; 24♂ and 1♀ seen from many parts of Britain. Two males and one female were reared by R. E. Evans from *Helotium aciculare* collected at Oversley Wood, WARWICKS. in ix.1972.

***Anatella simpatica* Dziedzicki**

Anatella simpatica Dziedzicki, 1923: 6, Figs. 25 and 26.

Anatella incisurata Edwards, 1925b: 589, Figs. 43–45 (examined).

Claspers, Fig. 9; 24♂ seen from Britain (Sussex to Sutherland).

***Anatella ciliata* Winnertz**

Anatella ciliata Winnertz, 1863: 856; Dziedzicki, 1923: Figs. 13 and 14 (based on Winnertz' type).

Claspers, Fig. 10; 31♂ from all parts of the British Isles.

***Exechia* Winnertz**

Exechia Winnertz, 1863: 879. Type-species *Mycetophila fungorum* Degeer, designated by Johannsen, 1909: 106 (misident.) = *fusca* (Meigen).

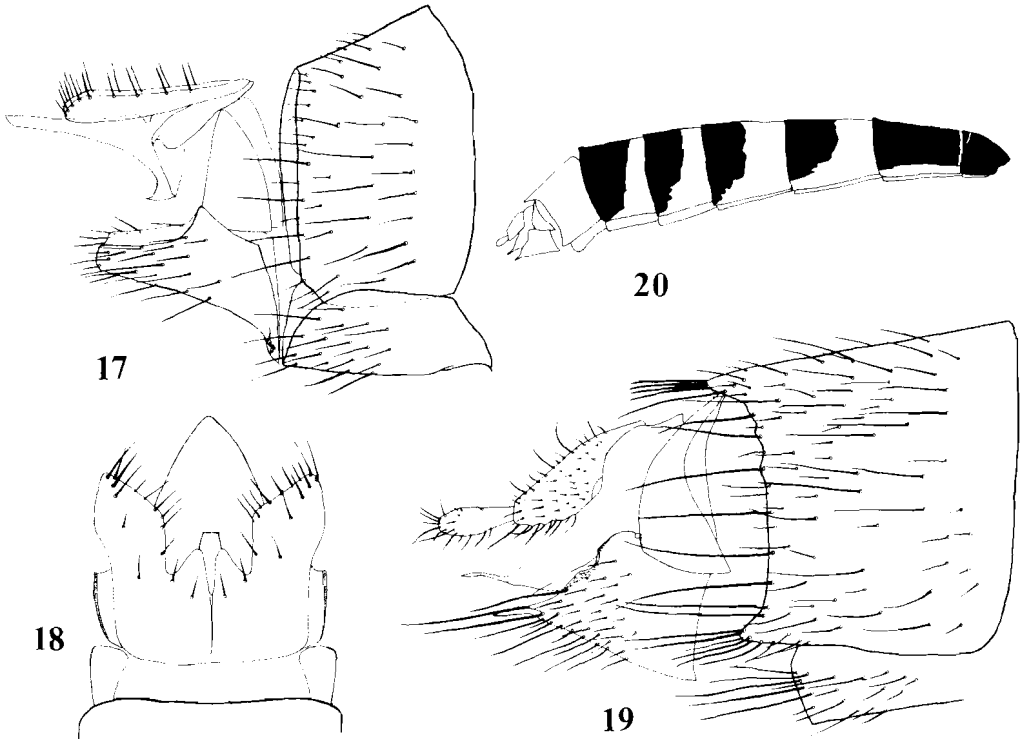
This name is restricted, following Tuomikoski (1966) to Group I of Edwards' (1925b) key, with twenty-one British species. Many are only reliably determined by reference to the male genitalia and females have been inadequately studied. The discovery of both sexes of an *Exechia* new to Britain led to a re-assessment of the characters used to distinguish species of the *bicincta* Staeger-*lundstroemi* Landrock Group, to which it belongs. Females of other species were studied and good characters in the ovipositor were found although differences are less pronounced between related species than in the male genitalia.

Many published figures of Mycetophilid ovipositors show the contracted position, often concealing important features, while inaccuracy and misidentification are sometimes involved. In *Exechia*, the shape of the pregenital tergite (VII), sometimes omitted from figures, is highly specific and often permits identification of dried material. As few ovipositors have been figured in sufficient detail for accurate recognition, those which have been identified in the material examined are discussed and figured.

***Exechia sororcula* Lackschewitz**

Exechia sororcula Lackschewitz, 1937: 22, Figs. 6a–g.

This little known species was frequent in the Dolgellau area of north Wales in October 1975. Apart from Lackschewitz' unique Estonian type, no records have appeared although it was included in the keys of Landrock (1940) and Ostroverkhova & Stackelberg (1969). It runs in the key of Edwards (1925b) to *E.lundstroemi* Landrock, of which only one British male is certainly known (Edwards, *op. cit.*) although it is said to be not uncommon in some parts of Europe. The locality for *lundstroemi* was not recorded, only that it was in Mr Collin's collection; I have not, however, located the speci-



FIGS. 17–20. Female genitalia of *Anatella* and *Exechia*: *Anatella flavomaculata* Edwards, (17) lateral view; (18) dorsal view; *Exechia* sp. near *dizona* Edwards (?*cincta* Winnertz), (19) lateral view; (20) abdominal pattern.

men. Comparison of *sororcula* with *bicincta* Staeger is also necessary because this often runs to *lundstroemi* in keys.

The hypopygium of *sororcula* is distinctive; the external claspers are rounded and bear long dense apical bristling. There are yellow markings on the bases of the male tergites 2–5 compared with 2–4 in *bicincta* and only 3–4 in *lundstroemi*. The female *sororcula*, not previously recognized, has yellow markings on tergites 3–6 while *bicincta* has them on 2–5; the female characters of *lundstroemi* require clarification. The ovipositor is obviously different from *bicincta* as interpreted below. That of *lundstroemi* has only been figured by Ostroverkhova & Stackelberg (*op. cit.*) but the figure may represent *bicincta* which it resembles.

Male. Head dark, with yellow palpi and basal antennal segments; flagellum dark except basal half of first segment. Thorax largely dark with small yellow humeral

patches and yellowish propleura. Two propleural bristles. Abdomen with tergites 1 and 6 entirely dark, 2–5 with yellow lateral spots in contact with fore margins, that on 2 elongate, those on 3–5 more rounded, all occupying at least half tergal length, narrowly but distinctly separated dorsally. Hypopygium brownish yellow (Figs. 21–23). Legs yellow with distinct dark patches beneath bases of mid and hind femora. Hind tibia with 3–5 d, 6–10 a, 4–6 short p near tip.

Female. Very similar to male except in abdominal pattern. Tergites 1–2 entirely dark; 3–6 have large yellow lateral spots at bases, those on 3–4 not in contact with fore margin on upper half, 5–6 only touching fore margins at lower corners, that on 6 distinctly smaller than those on 3–5. Tergite 7 and ovipositor (Fig. 24) brownish yellow.

Wing length 3.25 mm.

Material examined. MERIONETH: Brithdir-Isaf, 25.ix.1971, ♂, ♀ (*Hutson*,

