

NOTES ON THE AUSTRALIAN SPECIES OF *MOLOPHILUS* [TIPULIDAE,
DIPTERA]. I.

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(Communicated by I. M. Mackerras, M.B., Ch.M.)

(Plate v.)

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In the present article, I wish to discuss the species of the genus *Molophilus* that were described by Skuse in 1889 (PROC. LINN. SOC. N.S.W., (2) 4, 804-814).

This genus, which will undoubtedly be found to be the largest and one of the most involved groups of crane-flies in the Australian fauna, includes a host of usually small, hairy flies that are often very similar to one another in their general appearance. To handle this vast complex of species, it is necessary to separate them into groups, the only feasible basis for such a separation apparently being the structure of the male hypopygium. The wing-venation is remarkably uniform throughout the group, while the antennae, although showing a great range in length and structure in the males of various species, if used as a basis for group separation would tend to divide closely allied form (as *translucens* Skuse, with short antennae, and *filistylus* Alexander, with elongate antennae). The characters upon which the groups herein recognized are based are admittedly artificial, but appear to me to be the most important and constant that are available. The Australian groups so far discovered may be separated by means of the following key:

1. Male hypopygium with only the ventral lobe of the basistyle well-developed 2
Male hypopygium with either the dorsal lobe (*verticalis* group) or dorsal, ventral and mesal lobes of the basistyle well-developed 4
2. Three dististyles present, the outer (*od*) with a narrow chitinized strip extending basad along the mesal face of the basistyle to opposite the level of the two basal dististyles (*obd*, *ibd*) *pervagatus* group
Two dististyles present 3
3. Apex of ventral lobe of basistyle produced into a chitinized beak . . *plagiatus* group
Apex of ventral lobe of basistyle unarmed *gracilis* group, *ruficollis* subgroup
4. Dorsal, ventral and usually the mesal lobe of the basistyle produced into lobes, the ventral lobe clavate and provided with erect to retrorse setae and abundant setulae *gracilis* group, *gracilis* subgroup
Only the dorsal lobe of the basistyle produced into a broad lobe that tapers gradually into a spine *verticalis* group

The *pervagatus* group is now known to be represented in Australia and Tasmania by an extensive series of species, but the group has not been found elsewhere. The chief specific characters are to be found in the pattern of the head, wings and legs, and in the details of structure of the male hypopygium.

The outer dististyle (*od*) is often simple, but may be bilobed or even trilobed. The shape and relative proportions of the basal dististyles are of great importance in the separation of allied species.

The *plagiatus* group is very widely distributed, being represented by an abundance of species in New Zealand, Australia, North and South America, and possibly elsewhere in the Old World.

The *gracilis* group is unusually protean and appears to form a number of lesser divisions in various parts of its range. Members of the *ruficollis* subgroup are abundant throughout Australia and Tasmania and are further represented by a few very large species that seem to be most nearly allied to *froggatti* Skuse in the Chilean subregion. Other subdivisions of the *gracilis* group occur in North and South America and in Eurasia.

The *verticalis* group is still known from a single Tasmanian species.

It should be observed that the presence of an enlarged and usually dark-coloured ring, possibly homologous with a similar structure in the Tettigoniidae and Gryllidae (Orthoptera), is found in the males in several of the above groups. This structure was first noted by Skuse and is best indicated in members in the Australian fauna, but is also found in many extra-limital species.

In the genus *Molophilus*, Skuse described fifteen Australian species, all known only from various stations in New South Wales and now known to represent but a very small proportion of the total number in the Commonwealth. Through the great kindness of the late Dr. Eustace W. Ferguson and Dr. Ian Mackerras, I have been able to examine the male hypopygium of all of the species so described by Skuse that were contained in the Macleay collections. The species so represented are *M. annulipes*, *M. canus*, *M. flavonotatus*, *M. froggatti*, *M. gracilis*, *M. longicornis*, *M. lucidipennis*, *M. pervagatus*, *M. pulchripes*, *M. ruficollis* and *M. translucens*. One additional species, *M. femoratus*, represented in the type series only by females, has since been recognized in the male sex in the Tonnoir collections. The only other species in the Macleay series, *M. notatipennis*, is still known only from the unique female type and, since it belongs to a group that includes several very similar forms, it seems doubtful whether the species can be finally determined without a critical comparison with the type. The two additional species of *Molophilus* described by Skuse are preserved in the Australian Museum and are not discussed in this report: *M. montivagus* is still known only from the unique female type taken at Jindabyne, Kosciusko, at 3,000 feet, and its identity may remain in question, even upon comparison with the type. The last species, *M. helmsi*, is not known to the present writer.

The twelve species to be discussed are herewith arranged in their respective groups, as defined above, and will be described in that order.

MOLOPHILUS ANNULIPES Skuse.

Skuse, PROC. LINN. SOC. N.S.W., (2) 4, 1889, 809-810.

The types were from Sydney, the Blue Mts., and Hogan's Brush, near Gosford, August to January. Of the specimens in the Macleay collection, five are males, paratype 1 being identical with the holotype, as described herewith. Paratype 2 is a very distinct but similar species that has been described as *M. mackerrasi* Alexander (*Ann. Mag. Nat. Hist.*, (9) 20, 1927, 369-370), the type being from Hogan's Brush, in August. Paratype 3 is different from the type but the hypopygium is in poor condition, the basal dististyle lacking; this may equal the species later described as *M. persimilis* Alexander. An additional male

and female were earlier removed from the type-series by Dr. Ferguson and described as *M. persimilis* Alexander (*Ann. Mag. Nat. Hist.*, (9) 19, 1927, 22-23), these types being from Knapsack Gully, Blue Mts. Thus, of the large original series, only the type and a single paratype male can be safely retained under the name *annulipes*.

The hypopygium of the lectotype may be described and illustrated (Plate v, fig. 1), as follows:

Basistyle with the dorso-lateral lobe terminating in a black acute spine; ventral lobe elongate, the apex relatively narrow, its mesal face produced into an extensive blackened margin, the cephalic portion of which is further produced into a powerful black spine, directed cephalad; ventrad of the blackened portion with a dense group of long erect yellow setae. Outer dististyle long and slender, the blackened tip expanded and bifid, the two arms very unequal, the outer more than twice the length of the inner, sinuous to the acute apex; inner arm short and nearly straight. Basal dististyle a powerful, nearly straight rod that runs out into a long straight spine, just beyond midlength on the mesal edge with a large nearly appressed lateral spine; on the opposite margin of the style and slightly more basad a tiny blackened spine; surface of style at this level with two setigerous punctures. Aedeagus long and straight, in slide mounts extending caudad to opposite two-thirds the length of the basal dististyle.

The species belongs to the *plagiatus* group and has been made the type of a subgroup.

MOLOPHILUS FLAVONOTATUS Skuse.

Skuse, These PROC., (2) 4, 1889, 810-811.—*Molophilus canus* Skuse, *ibid.*, (2) 4, 1889, 811-812.

The present species is common and widely-distributed in south-eastern Australia and Tasmania. The above synonymy has been established by a comparison of the lectotypes of the two species. In the type series of *flavonotatus* were the lectotype and a paratype male, from Sydney, in September. In the type series of *canus*, the second paratype is identical with the lectotype, but Paratype 1 represents a distinct but allied form that has been described as *M. indivisus* Alexander (*Ann. Mag. Nat. Hist.* (9) 20, 1927, 368-369), the type (according to Skuse) being from Sydney. *M. flavonotatus* is allied to *M. evanidus* Alexander (New Zealand), differing in the dense patch of setae beyond the outer fork of the basal dististyle, in *evanidus* these setae being greatly reduced in number.

The lectotype is described as follows (Plate v, fig. 2):

Male hypopygium with the basistyle relatively long and narrow, the apical beak small, blackened, surrounded by numerous yellow setae. Outer dististyle relatively long and slender, gently curved, the arms short, the inner arm straight, narrowed to the subacute apex. Basal dististyle a long pale blade, widely expanded near midlength, at the level of the dilated portion bearing a conspicuous curved black spine; apical two-fifths of the style more slender, gently curved to the acute tip; before the apex, at the base of the darkened portion, a smaller black lateral spine; mesal face beyond this spine with a dense patch of long yellow setae. Aedeagus long and straight.

The species belongs to the *plagiatus* group, *annulipes* subgroup.

The present records show the following distribution:

New South Wales: Wentworth Falls, Blue Mts., November 18, 1921 (Tonnoir); Sydney, August and September (Skuse); Woy Woy, November, 1921 (Tonnoir).

Tasmania: Burnie, October 25, 1922 (Tonnoir); Geeveston, December 8, 1922 (Tonnoir); Tullah, November 8, 1922 (Tonnoir); Zeehan, January, 1924 (Hardy); Mt. Wellington, November 28, 1922 (Tonnoir); Eaglehawk Neck, Tasman Peninsula, November 17, 1922 (Tonnoir).

MOLOPHILUS FEMORATUS Skuse.

Skuse, These Proc., (2) 4, 1889, 805.

The unique type of this species, a female, was taken at Lawson, in the Blue Mts., in January. No additional specimens have been taken excepting a male from Mt. Wilson, Blue Mts., November 19, 1921 (Tonnoir) and a second male at Wentworth Falls, Blue Mts., November 18, 1921 (Tonnoir). This second male is described as allotype, being preserved in the collection of Dr. Tonnoir.

Allotype.—Male. Length about 3 mm.; wing 4.4 mm.

Agrees closely with the female except that the thoracic dorsum is more ochreous-brown than greyish-brown, the median region of the prescutum darker, with very long conspicuous black setae; humeral region brighter. Antennae (male) of moderate length, if bent backward extending about to the base of the halteres; scapal segments ochreous, the flagellar segments darker, fusiform, with a very conspicuous white pubescence and a few scattered dark verticils. Knobs of halteres conspicuously dark brown. Posterior tibiae and tarsi pale yellow. Wings broad, tinged with brown, the veins and macrotrichiae darker, the latter very conspicuous; costal fringe dense.

Male hypopygium (Plate v, fig. 3) with the basistyles elongate, the terminal beak very conspicuous, at apex produced into a strong point that is directed cephalad. Dististyles widely separated, the outer style arising at a point that is nearly opposite midlength of the basal dististyle, relatively small, bifid, one arm directed in a straight line with the axis of the stem and appearing as a spine, the other arm a flattened triangular blade that is directed almost at a right angle. Basal dististyle a very long slender blade, the basal half more dilated, thence narrowed into a long curved apical portion that terminates in a spine; entire outer margin of style with conspicuous spinulae that become larger and more appressed outwardly. Aedeagus relatively long and slender.

The species belongs to the *plagiatus* group.

MOLOPHILUS TRANSLUCENS Skuse.

Skuse, These Proc., (2) 4, 1889, 811.

Skuse described this species from a small series taken at Lawson, Blue Mts., and at Gosford and Hogan's Brush, Narara Creek. The lectotype and one paratype male have been examined.

Male hypopygium (Plate v, fig. 4) with the ventral lobe of the basistyle relatively elongate, the apical beak very deep, feebly chitinized, surrounded by numerous setae. Outer dististyle relatively short, bifid, the arms blackened, the inner arm a blunt straight rod, the lateral arm much longer, expanded into a blade, the mesal angle weakly produced. Basal dististyle appearing as a powerful, gently curved blackened rod, the outer or caudal margin with a double row of seven pairs of spines, the basal ones more erect, the outer three becoming progressively reduced in size and more appressed; apex of style relatively short, slender, the extreme tip twisted to one side; base of style more expanded, pale,

on the mesal portion, near the point of darkening with several small elevated punctures, each set with a tiny conical spine. Aedeagus short, less than the basal dististyle.

The species belongs to the *plagiatus* group.

M. translucens is most nearly allied to *M. bipectinatus* Alexander (Victoria, Tasmania), which differs in the slender apex of the basistyle and the more slender basal dististyle, which, beyond the serrations, is prolonged to a curved, acutely pointed spine.

MOLOPHILUS LONGICORNIS Skuse.

Skuse, These Proc., (2) 4, 1889, 814-815.

The types, a male and female, were taken in August at Berowra and at Knapsack Gully, Blue Mts. Mackerras has designated the male as lectotype.

Male hypopygium (Plate v, fig. 5) with the basistyle relatively long and slender; apical beak relatively slender, chitinized, the tip obtuse, the base surrounded by numerous long setae. Outer dististyle relatively short-stemmed, the arms short and powerful, the outer arm more flattened, the inner arm more slender and nearly straight, the space between the arms narrow. Basal dististyle a long slender horn, gently sinuous, gradually narrowed to the acute darkened tip, longer than the outer dististyle; on outer face just beyond base a small blunt tooth; surface of style on distal third with a linear row of three microscopic spinulae.

The species belongs to the *plagiatus* group.

MOLOPHILUS RUFICOLLIS Skuse.

Skuse, These Proc., (2) 4, 1889, 804-805.

The type series of six specimens was collected at Lawson, Blue Mts., in January. Through the kind interest of Dr. Mackerras I have been able to examine four type males, including the lectotype.

Male hypopygium (Plate v, fig. 6) with the ninth tergite densely setiferous, the caudal margin pale and smooth. Basistyle produced into a long ventrolateral lobe, the mesal face with abundant erect setae and setulae. Dististyles arising rather close together in the notch of the basistyle; outer style a long slender blade, widened distally, bifid at apex, the inner arm a conspicuous flattened blade, its caudal margin obliquely truncate, the outer arm slender, thumb-like, appressed to the inner arm. Basal dististyle a heavily blackened structure of peculiar shape, broadest just beyond midlength, thence suddenly narrowed into an anchor-like apex, the shank stouter than the two slightly unequal arms, the latter acute at tips, the crown of the anchor being further produced into a small knob. Phallosomic structure heavily blackened, rectangular, the apex produced into two curved hooks, the space between with a U-shaped notch. Aedeagus relatively long and slender, in slide mounts extending caudad to shortly before the apex of the ventral lobe of basistyle, its proximal two-thirds subtended by a narrow flattened wing.

The species belongs to the *gracilis* group and has been made the type of a subgroup.

MOLOPHILUS LUCIDIPENNIS Skuse.

Skuse, These Proc., (2) 4, 1889, 813-814.

The types were from the Blue Mts., taken in January. Of the four specimens in the Macleay series, two are males and were mounted and sent to me by Dr. Mackerras. The paratype male proved to be a very distinct species from the lectotype and has been described as *M. forceps* Alexander (*Ann. Mag. Nat. Hist.*, (9) 20, 1927, 37-38). The lectotype is the only specimen in the type series that can safely be referred to *lucidipennis*.

Male hypopygium (Plate v, fig. 7) with the ventral lobe of the basistyle unusually elongate, being approximately as long as the basal portion of the style, the mesal face with abundant erect setae and setulae. Dististyles placed close together in the notch of the basistyle; outer style with a short sinuous stem that soon dilates into a flattened blade, the apex further produced caudad into a long slender gently-curved black spine; outer margin of the flattened blade blackened; blade produced into a small pale lobe opposite its widest point. Inner dististyle a very long, slender, gently sinuous needle-like rod. Aedeagus long and slender, straight, in slide mounts extending caudad to opposite mid-length of the ventral lobe of the basistyle.

Belongs to the *gracilis* group, *ruficollis* subgroup.

MOLOPHILUS FROGGATTI Skuse.

Skuse, These Proc., (2) 4, 1889, 807-808.

Skuse knew only the unique type female, taken at Waverley, near Sydney, in October. The species is now well known and has a wide range in south-eastern Australia, as follows:

New South Wales: Brooklana, Eastern Dorrigo, October, November (Heron); Barrington Tops, 5,000 feet, January, 1925 (Mackerras); Blue Mts., January 26, 1922 (Ferguson); Mt. Wilson, Blue Mts., November 19, 1921 (Tonnoir); Wentworth Falls, Blue Mts., November 18, 1921 (Tonnoir); Sydney, November 19, 1922 (Ferguson).

Victoria: Beaconsfield, November 6, 1923 (Hill); Lower Tarwin, November 22, 1925 (Hill).

Tasmania: Burnie, February 1, 1923 (Tonnoir); Cradle Valley, January 12, 26 and 27, 1923 (Tonnoir); Zeehan, February, 1924 (Hardy); Eaglehawk Neck, November 22-23, 1922 (Tonnoir); Geeveston, December 8, 1922 (Tonnoir); Adventure Bay, December 31, 1922 (Tonnoir).

The male sex not having been described is discussed briefly at this time.

Allotype.—Male. Length 7.9 mm.; wing 7.8 mm.

Characters as in the female, differing chiefly in sexual characters. Male hypopygium (Plate v, fig. 8) with the ninth tergite comparatively large, the caudal margin with a broad V-shaped notch, the lateral lobes thus formed projecting caudad as conspicuous ears, the mesal margins of which are obliquely truncated, the tips narrowly obtuse; a conspicuous slender median lobe. Basistyle with the proximal half stout, the ventral lobe narrower but longer than the longest dististyle. Outer dististyle relatively slender, appearing as a gently curved chitinized rod arising from a more enlarged base, the apex bifid, the inner arm narrowly tipped with black. Inner dististyle a very small acutely-pointed horn. Gonapophyses lyriform, each a long slender rod arising from an enlarged base, these rods directed laterad, thence caudad, decussate across the median line, the tips rather suddenly narrowed, blackened, sinuous.

Belongs to the *gracilis* group, *ruficollis* subgroup.

MOLOPHILUS GRACILIS Skuse.

Skuse, These Proc., (2) 4, 1889, 808-809.

The type series in the Macleay collection included six specimens, among which more than a single species may be confused. Dr. Mackerras sent me the hypopygia of the lectotype male and an additional paratype that is identical with the type, as described and figured, except that the lateral spine or thorn of the inner dististyle is bifid at apex. The species is common and wide-spread and seems to show unusual modifications in the details of structure of the male hypopygium.

Male hypopygium (Plate v, fig. 9) with the basistyle profoundly divided, as in the subgroup; dorso-lateral lobe a slender, gently curved spine; mesal lobe slender and nearly straight, with a few scattered setae along its mesal edge, as figured. Outer dististyle slender, gently curved and narrowed to the acute tip, before the terminal spine with a small erect tuberculate spine. Inner dististyle a powerful rod, the apical half narrowed and gently curved, the tip acute or nearly so; on the lateral face a powerful nearly straight thorn-like spine. Aedeagus relatively short, in slide mounts, if bent backward, extending to a short distance beyond the base of the mesal lobe of the basistyle.

Belongs to the *gracilis* group and subgroup.

MOLOPHILUS PERVAGATUS Skuse.

Skuse, These Proc., (2) 4, 1889, 813.

The type series in the Macleay collection included six individuals of both sexes. Of these, the lectotype and first paratype males are undoubtedly conspecific. Paratype 2 is in poor condition and its identity is doubtful.

Male hypopygium (Plate v, fig. 10) with the tergite relatively long and narrow, provided with numerous long setae. Basistyle elongate, the apex of the ventral lobe flattened, with conspicuous yellow setae. Outer dististyle irregularly trifid, the apex being irregularly bilobed, as shown in the sub-figures; before apex on outer margin with a flattened appressed lobe; as usual in the group, this style is adnate to the basistyle. Outer basal dististyle a long slender rod, nearly straight, narrowed gradually to the acute blackened apex. Inner basal dististyle shorter, appearing as a slender flattened blade, the apical third a trifle dilated, provided with a series of about six small acute teeth arranged in a linear series along the outer margin. Aedeagus relatively long and slender, sinuous.

Skuse stated that the species was generally distributed in New South Wales. I have seen material from Wentworth Falls, Blue Mts., November 18, 1921 (Tonnoir) and Waterfall, November, 1921 (Tonnoir).

The species is the type of the *pervagatus* group.

MOLOPHILUS PULCHRIPES Skuse.

Skuse, These Proc., (2) 4, 1889, 812.

Skuse's types, two males, were taken at Sydney in September. Dr. Mackerras sent me the hypopygia of these two specimens and it was found that the paratype was an entirely distinct species from the type, since described as *M. gracillimus* Alexander (*Ann. Mag. Nat. Hist.*, (9) 20, 1927, 356-357). *M. pulchripes* is now known to be well distributed in New South Wales and Victoria, as shown by the following records:

New South Wales: Brooklana, Eastern Dorrigo, May 26, 1928 (Heron); Barrington Tops, 5,000 feet, January, 1925 (Mackerras).

Victoria: Clarkefield, September 27, 1928 (Wilson); Eltham, August 25, 1928 (Wilson); Ringwood, May 5, 1928 (Wilson); Melton, May 27, 1928 (Wilson).

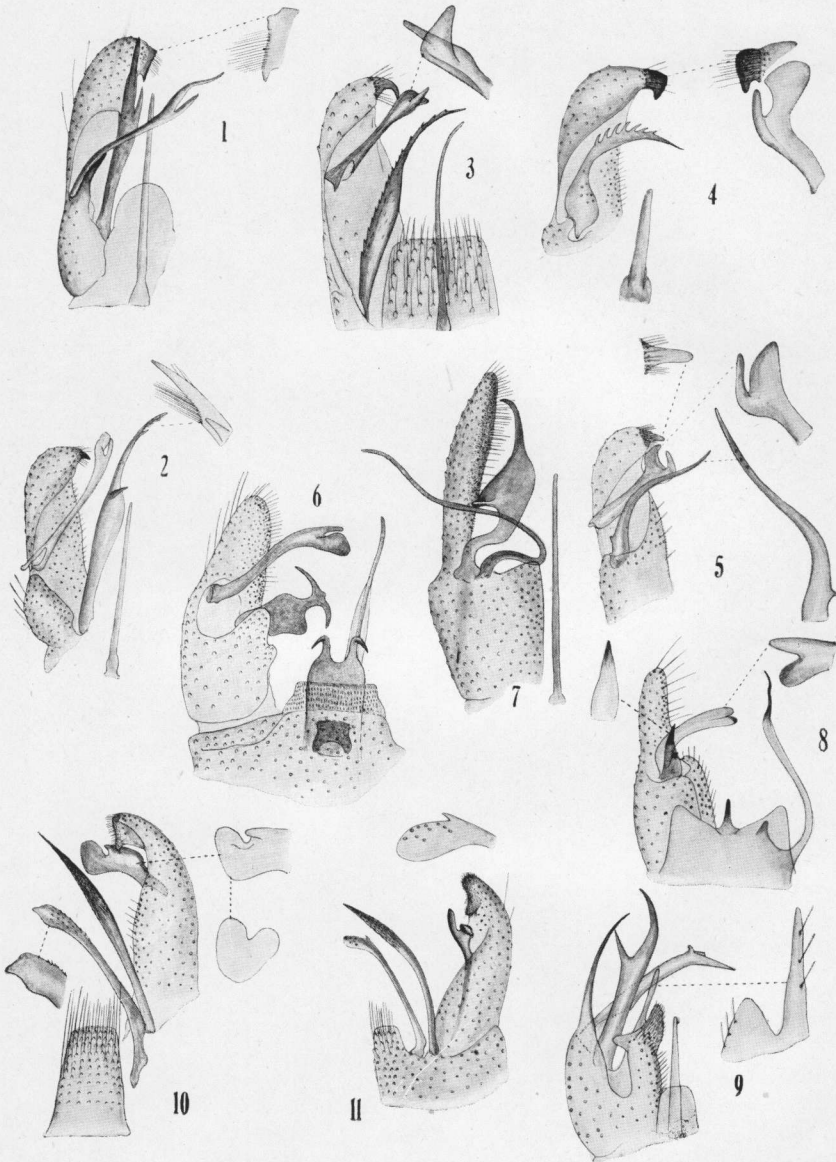
Male hypopygium (Plate v, fig. 11) with the outer dististyle, when viewed laterally, terminating in a stout black lobe. Outer basal dististyle a little longer than the inner, the basal half pale, the apical half blackened, a little dilated, thence narrowed to a long acute point, the dark portion roughened. Inner basal dististyle slender, the apex dilated into a flattened oval head, at the base of this dilated portion on outer margin with a single appressed spine; head with about ten punctures.

Belongs to the *pervagatus* group.

EXPLANATION OF PLATE V.

Male hypopygia of species of *Molophilus*.

- Fig. 1.—*Molophilus annulipes* Skuse. (Apex of basistyle further enlarged.)
 Fig. 2.—*Molophilus flavonotatus* Skuse. (Apex of basal dististyle further enlarged.)
 Fig. 3.—*Molophilus femoratus* Skuse. (Apex of outer dististyle further enlarged.)
 Fig. 4.—*Molophilus translucens* Skuse. (Apex of basistyle, and outer dististyle further enlarged.)
 Fig. 5.—*Molophilus longicornis* Skuse. (Apex of basistyle, apex of outer dististyle, and basal dististyle further enlarged.)
 Fig. 6.—*Molophilus ruficollis* Skuse.
 Fig. 7.—*Molophilus lucidipennis* Skuse.
 Fig. 8.—*Molophilus froggatti* Skuse. (Apex of outer dististyle, and basal dististyle further enlarged.)
 Fig. 9.—*Molophilus gracilis* Skuse. (Mesal lobe of basistyle further enlarged.)
 Fig. 10.—*Molophilus pervagatus* Skuse. (Apices of outer dististyle, and apex of inner basal dististyle further enlarged.)
 Fig. 11.—*Molophilus pulchripes* Skuse. (Apex of inner basal dististyle further enlarged.)



Male hypopygia of species of *Molophilus*.