

TRYPETIDAE (DIPTERA) ASSOCIATED WITH THE PLANT MONECHMA (ACANTHACEAE) IN THE KALAHARI GEMSBOK NATIONAL PARK

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The study of animals and plants that live in desert and semi-desert areas always has a fascination for the biologist mainly because of the more adverse conditions that have to be met for survival. Apart from the possible effects of ecological factors such as climate, the distribution and presence in particular areas of species of Trypetidae are dependent on the occurrence of suitable host-plants. This is shown by the absence of certain genera of Trypetidae such as *Isoconia*, *Pliomelaena* and others from the south-western area of the Cape because species of Acanthaceae are also absent, and this is a family of plants that these particular flies need in their larval stages.

In the Kalahari Gemsbok National Park some peculiar species of the genera *Platomma*, *Leucothrix* and *Hyaloctoides* were found associated with plants of the genus *Monechma* (Acanthaceae). To discover more about them and their distribution was thus an interesting problem and thanks are due to the National Parks Board that it has been possible to study these flies in the Gemsbok Park. That the distribution may be much wider is indicated by the record of *Platomma luniferum* from the Niger Republic and the recovery of a specimen of the new *Platomma* from a bait trap at the Roodeplaat Experiment Station near Pretoria. It is also possible that species of *Monechma* are not the only host-plants; the new *Platomma* has not been reared but in the Gemsbok Park may well breed in *Monechma*, but *Monechma* is not known to occur near Pretoria. However, even to find out whether any of the species live only on *Monechma*, wherever it may occur, would require extensive field collecting; *Hyaloctoides semiatra* is known to breed in other Acanthaceae.

It is interesting that four species, *Platomma luniferum*, *Leucothrix oryx*, *L. incana* and *Hyaloctoides semiatra* occur together in the Gemsbok Park, three of them (*L. oryx* has not been reared) breeding at the same time in the flower buds of the same plant. Species of *Leucothrix* have so far only been taken in the western desert-like areas; the two species of *Platomma* are also mainly from the same areas, but are found much further afield as well;

Hyaloctoides semiatra is wide-spread from South to East Africa and Eritrea; the form *superhyalina* has only been taken in South West Africa, but other forms indicate a much wider distribution of the species in Africa. *L. barbata* and *L. incana* have not been taken together.

From the taxonomic aspect, this paper deals with a small group of highly specialised and well-differentiated species. A study has been made as far as possible of the terminalia of both sexes as a contribution towards a better understanding of the relationships and classification of the family as a whole. As may be seen from the figures, the species may be separated on almost any series of characters. On the whole the taxonomic position is not clear; *Leucothrix* seems to be isolated on account of the long antennae while *Platomma* may be more nearly allied to *Ghentia* and other related genera. *Hyaloctoides* is nearer *Pliomelaena* and its allies, the species of which also live in the flowers of Acanthaceae.

On the wing, the costa, just beyond the tip of vein 3 and around the apical, hyaline, lunate area, becomes thin and transparent — in a Canada balsam mount it almost disappears. In other species, for instance of *Spathulina*, that also have an apical, hyaline area, the costa remains dark. The male and female terminalia also reveal differentiating characters. One that may be of use later in understanding the taxonomic position of the genera is that, in the male, the fultella, as usual asymmetric, has the left ray meet the genital ring with hardly any lower projection, while on the right there is a relatively long downward projection to the tip of which the ray is attached, there being no supplementary bar posteriorly.

Terminalia.* If it is still too soon to more than comment on the possible taxonomic value of these structures. They and the sternites, which are included here for convenience, present characters that may be termed "hidden" in so far as they are not usually readily observed and mostly only on dissection.

Male. Sternites (figs. 11-15) : sternite 5 is as usual somewhat asymmetric; the greatest difference is between *barbata* and *incana*. Tergum 9 is in posterior view more or less rounded horse-shoe shaped and there is some resemblance between *Leucothrix* and *Platomma*. The lower ends bend inwards almost at right angles appearing as a pair of rounded knobs above which are the prenisetae. The latter are well-developed and close together; both are flattened, the upper nearly circular, the lower moderately narrow. In *Leucothrix* the lower ends appear obliquely truncate presenting a smooth area behind. In lateral view (figs. 16-19) the appearance is characteristic for each species showing a pronounced anterior point and a flange that projects posteriorly on the lower inner margin and is not apparent in posterior view as it is then seen on edge. In *Platomma* the lower ends are broadly rounded and in lateral view (fig. 16) the flange is not seen. Tergum 9 in *Hyaloctoides* the lower ends are turned in to form scoops in which lie the prenisetae which are well separated and the twist in the rods is easily seen.

* Munro, 1947, Mem. ent. Soc., S. Afr. 1 : 73-82.

The aedeagus (figs. 24-27) is extremely intricate and complex and only superficial comparisons are possible. In the four species studied it is curious that there seems to be more resemblance between *Platomma luniferum*, *Leucothrix barbata* and *L. incana* than, in particular, the two latter and *L. oryx*. However, no hairy tail has been seen in slides of *Platomma luniferum*. The aedeagus is quite distinct in *Hyaloctoides*. The fultella (figs. 20-23) is the supporting structure of the phallosome and aedeagus and there is little difference in its general shape between the species. In *Leucothrix* there is a thimble-like gland, most developed in *incana*, in the membrane between the rays of the fultella, in *Hyaloctoides* a wide sac, while in *P. luniferum* only an elongate thickening of the membrane was observed.

GUIDE TO GENERA AND SPECIES

- A. Antennae very elongate, much longer than face *Leucothrix*.
 - 1. wing pattern forming a dark hook, not reticulate ... *oryx*.
 - wing pattern reticulate with apical hyaline area ... 2
 - 2. wing pattern entirely reticulate *incana*.
 - wing pattern a wide, dark, reticulate band along costa and round apex (inside apical hyaline area), along the hind margin only some wide, broken reticulation and the discal cell mainly hyaline *barbata*.
- B. Antennae normal, shorter than face, joint 2 short as usual 1, 2.
 - 1. Head flattened; wing widened, black with narrow apical hyaline area *Platomma*.
 - a. face yellow *luniferum*.
 - b. face shining black on lower half and across epistome *nigrantior*.
 - 2. Head of normal shape, not at all flattened, wing mainly black with hyaline spots *Hyaloctoides*.
 - a. wing mainly black, the hyaline spots small but very variable, isolated or more or less confluent *semiatra*.
 - i. the spot below end of vein 2 may be almost as wide as the submarginal cell, very seldom touching vein 2, or smaller, or almost absent; below vein 6 a wide hyaline area united to hyaline above the vein, rarely an isolated hyaline spot form *semiatra*.

- ii. an additional hyaline spot at end of posterior cell 2 and two small hyaline spots below vein 6 form *bioculata*.
- iii. the hyaline spot at end of submarginal cell large and broadly touching vein 2; three small isolated spots below vein 6 form *gorgonea*.
- b. the wing mainly hyaline, the hyaline spots very large and confluent form *superhyalina*.

PLATOMMA Bezzi.

Bezzi, 1924, *Ann. S. Afr. Mus.*, 19 : 526; *Bull. ent. Res.*, 15 : 79, 127.

Munro, 1947, *Mem. ent. Soc. S. Afr.*, 1 : 239.

Type species : *Trypeta lunifera* Loew. When Bezzi erected the genus he suggested that it might be related to *Afreutreta*, and later (Munro 1947) it was placed in the *Afreutreta-Oedaspis* series. However, when it was discovered that the larvae of *Platomma luniferum* live in the flower buds of an acanthaceous plant, *Monechma*, it became evident that it is more probable that *Platomma* belongs nearer *Ghentia* Mro. and *Elaphromyia* Walk., the larvae of which live in plants of the same family. There is certainly at least a superficial resemblance to *Cosmetothrix* Mro., but species of this genus as well as of *Afreutreta* and *Parafreutreta* Mro., form galls on the stems of plants of the family Compositae.

Bezzi based his generic description on "a single, rather badly preserved female specimen" and a few corrections are necessary.

Head (figs. 1-2) much flattened, the eye very oblique; occiput very concave, the vertical edge sharp, postocular bristles white and a row of short, black postorbital setulae. Frons about half width of head, 1.2 times long as wide (not "twice"), some white pubescence on middle and on sides; bristles brownish, 3 lower, 2 upper orbitals, the hind upper short, white; ocellars moderate. Lunule moderate, Bezzi's use of the word "free" is not clear. Antennae normal, about as long as face; arista micropubescent, almost bare. Face short, concave, parafacials narrow, epistome very prominent. Proboscis with massive labella; palpi short, rounded oval.

Thorax : dorsum black; bristles normal, brownish, no scapulars, dorso-centrals at suture; pubescence coarse, white, sparse; dust thin. Squamae large, rounded. Legs moderate. Wing (figs. 4-5) widened; vein 3 strongly setose above (not "bare"); pattern more or less uniformly brownish to blackish with some irregular, blacker spots where the microtrichiae are more dense and at apex of wing a typical hyaline, lunate area where the costa is pale. Scutellum large, flat or slightly convex, sides rather straight, the apex straight or somewhat rounded; four long bristles.

Abdomen usually shining yellow to ochraceous, occasionally some dark median marks or almost quite black. There are the normal six tergites in the female, the oviscapae shining black, conical. In the type species that has been examined, the free ends of the stylets of the aculeus are armed with minute, retrorse teeth (fig. 34). Aedeagus fig. 24; tergum 9, fig. 16.

Platomma luniferum (Loew).

Trypeta lunifera Loew, 1861, *Berl. Ent. Zeit.*, 5:268, Pl. ii, Fig. 7; ♀; 1862, *Ofv. Kongl. Vet.-Akad. Förh.*, 19:4, ♀. Becker, 1903, *Mitt. Zool. Mus. Berl.*, 2:131 (in list). Bezzi, 1908, *Bull. Soc. ent. Ital.*, 39:140 (in cat.); 1918 *Bull. ent. Res.*, 9:25.

Platomma luniferum (Loew) Bezzi, 1924, *Ann. S. Afr. Mus.*, 19:526, pl. xiv, fig. 71, ♀; 1924, *Bull. ent. Res.*, 15:127. Munro, 1929, *Ann. S. Afr. Mus.*, 29:15; 1947, *Mem. ent. Soc. S. Afr.*, 1:239.

Type in Naturhistoriska Riksmuseet, Stockholm, Sweden. *Trypeta lunifera* was twice described as "new". In reply to an enquiry, Dr. Eric Kjellander of the Naturhistoriska Riksmuseet wrote to say that Loew had published in "Ofversigt af Kongl. Vet.-Akad. Förhandlingar" a series of papers on the Diptera collected by Wahlberg during his travels in South Africa from 1838 to 1845. The last of these papers appeared in 1862 and included the Trypetidae but only short Latin diagnoses were given. It is curious, however, that Loew had already published full German descriptions with the same Latin diagnoses of the same Trypetids in "Berliner Entomologische Zeitschrift" in 1861. A few specimens taken by other collectors are included in both papers.

Length, male 3.75 to 4.0 mm., wing 3.1 mm.; female, 4.8 mm., wing 3.2 mm. oviscapae 1.3 mm. In this species the clothing generally, except the darker bristles, has a decided yellowish tinge.

Head (fig. 1) yellowish (brownish in poor specimens), black behind above neck but narrowly yellow behind vertical ridge; of peculiar shape, much flattened and the epistome very prominent; the impression of flatness depends on the position of the head in relation to the thorax because the back of the head is very concave and when drawn well back over the thorax it appears much flatter. The eye is very oblique, but certainly not "nearly parallel with the frons". Length about equal to height at vertex, height at antennae about 0.3 less, and width about 1.5 height. *Frons* about 1.25 long as wide, 0.4 width of head, glistening yellowish, somewhat translucent, a small dark spot at sides of antennae, some white pubescence on sides and a little on anterior half of median line; vertical triangle blackish and touching a fine, sharp vertical ridge; bristles brownish, 3 lower, 2 upper orbitals, the hind upper smaller and paler, ocellars 0.75 length of anterior upper orbital; *lunule* moderate, length about half width; *antennae* yellow, normal, a little shorter than face, joint 2 with dark setulae; *arista*, base yellow, flagellum black, micropubescent; *face* yellow, short, concave, a median ridge, parafacials narrow; epistome very

prominent, more so in male than in female, yellow or brownish, occasionally very slightly blackened on sides where there is some fine, dark pubescence grading to longer, curved bristle-hairs (weaker in female) these extending backwards along mouth border to longer, pale yellowish hairs on postgenae among which the genal bristle is longer and darker; palpi pale yellowish, broadly rounded at ends; proboscis when fully extended nearly as long as width of head; labella massive.

Thorax: dorsum black with more or less ferruginous tinge as far as notopleural suture on either side, but the rather thin, iridescent dust and sparse, rather coarse white pubescence only extend to a line just inside anterior notopleural bristle, leaving a polished area above the suture. The dust is composed of minute, iridescent scales separated from one another and varying from orange to grey with the light. Bristles brown, normal, dorso-centrals near suture, no scapulars. Pleura yellow, the yellow extending on to upper parts of sternites which are black below; some thin whitish dust varying to yellowish behind and slight, inconspicuous pale pubescence, but the upper, hind corner of mesopleura adjacent to the black polished area above the notopleural suture, polished and with some black pubescence; bristles: a short row of white propleurals, 1 mesopleural with bristle-hairs below, the upper more or less becoming a bristle, pteropleural strong, pale, sternopleural strong, more brownish. *Scutellum* flat, sides only slightly convex, apex straight or more rounded, length 0.7 width, dust as on mesonotum, white pubescence slight, 4 long bristles of equal length or apicals a little shorter. Squamae both wide, semi-circular, pale brownish or whitish, the upper with a pale brown radial streak. Legs normal, yellow, two males from near Rietfontein have hind legs slightly blackened. *Wing* (fig. 4) moderately wide, width 0.6 length; uniformly blackish with apical, hyaline, lunate stripe from end of vein 3 to just over vein 4 the end of the costa here and the extreme tip of vein 4 pale and transparent. By transmitted light the anal area appears paler and over the anal, basal cell 2 and inner part of discal more yellowish. On the anterior half of the wing are some irregular, blacker patches caused by close-set, black microtrichiae. In oblique light from above the wing surface, except the apical hyaline area, appears uniformly brown, the microtrichial spots shining brown. Veins blackish, brownish at base of wing; vein 3 setose above.

Abdomen shining yellow to ochraceous; in some specimens median black markings occur on the tergites, in others the whole dorsum is almost entirely black. There are not enough specimens to judge whether the blackness is developed more in one area than another. The appearance of the abdomen in the present specimens is:

Gemsbok Park. 4 ♂♂, 8 ♀♀; 1 ♀ small median spots on tergites 2 to 5.

Richtersveld. 1 ♂ yellow.

Matjesfontein. 1 ♀ tergites 2 to 5 quite black, only very narrow, yellow hind margins; sides of epistome slightly blackish.

near Rietfontein. 1 ♂ yellow; 1 ♂ median spots on tergites 2 to 4; sides of epistome slightly darkened and legs darker than usual.

Namib Desert, S.W.A. 2 ♂ ♂ tergites 2 to 5 mainly black, sides and hind margins narrowly yellow.

Kamanyab, S.W.A. 1 ♀ tergites 2 to 5 broadly black on middle, sides moderately yellow.

Terminalia.

Male : sternites (fig. 11) normal, 2 and 5 widened; tergum 9 in posterior view the lower ends turned in like a pair of knobs, the outer aspect of which appears smooth. In lateral view (fig. 16) the lower end is rounded. Fultella (fig. 20). Aedeagus: fig. 24 gives an impression of the structure in lateral view; apart from the complicated inner portion there is an apical tube associated with which is a very finely setose plate and a pair of somewhat curved rods that seem to have longer setulae.

Female : sternites (fig. 28) wide, 6 with a strong, anterior, median phragma. Oviscape shining black with a slight ferruginous tinge, 1.3 mm., 0.4 wing length and about 0.7 preabdomen, conical, more circular in section at base, somewhat flattened at apex, lateral ridges prominent; pubescence very fine, short, black. Aculeus somewhat inverted boat-shaped, curved downwards, the apex pointed, the free tips of stylets armed with minute, retrorse teeth (fig. 34) the portion shown being about 0.25 mm. in length. At the inner end of the aculeus is a pair of large, internal flanges. Spermatheca (fig. 37). The two are elongate, about 0.15 mm. in length and covered with numerous, papillae. Morula gland (fig. 41) transversely flattened, shallowly spatulate.

Biology and Distribution.

Specimens : South West Africa, 2 ♀ ♀, Kamanyab, Jan. 1925, S. Afr. Mus. Exp.; 2 ♂ ♂, Husab Mountains, 30 miles east of Swakopmund, 19.v.59, H. D. Brown. Cape Province, 1 ♀, Matjesfontein, 7-13.xi.1928, R. E. Turner (received from British Museum); 1 ♂, Richtersveld, Doornpoort, 21.ix.53, H. K. Munro; 2 ♂ ♂, near Rietfontein, south of Gemsbok Park, Feb. 1961, sweeping over *Monechma hereroense*; 1 ♂, 24.v.56; 2 ♀ ♀, 12-20.ii.58, reared from flower-buds of *Monechma incanum*, and 1 ♂, 1 ♀ netted; 4 ♂ ♂, 8 ♀ ♀, Feb. 1961, sweeping over *Monechma hereroense* and 1 ♂, 1 ♀ sweeping over *Pituranthos*, Kalahari Gemsbok National Park, H. K. Munro. Two specimens received from the Commonwealth Institute of Entomology for identification were taken at Kolo, near Niamey, Niger Republic, 19.ix.1958 "from" *Sorghum* — the flies were probably feeding on honey dew from aphids.

The type of *Trypeta lunifera* was obtained in "Caffraria" as most of South Africa was then called, probably in 1830 by Carl Friedrich Drege one of three brothers who travelled in South Africa from Little Namaqualand, around the Cape and into Natal. The one brother, Johann Frantz, collected plants. Miss Gunn, Librarian of the Division of Botany, has seen the diary of Carl Friedrich and it appears that he was an apothecary, selling his wares and collecting

insects. He also bought or obtained insects from missionaries and others, so that, as there are no collector's labels on the specimens, it is not possible to say whether or not any particular specimen was actually taken by C. F. Drege himself. It seems somewhat uncertain whether the surname is German, Drege, or whether the French form, Drège, is more correct, the latter actually being used in a German work on C. F. Drege's papers.

From the fore-going records, therefore, Little Namaqualand may well be regarded as the type locality of *Trypeta lunifera*.

Puparium, length 3.5 mm., diameter 1.7 mm., sometimes a little flattened. Posterior end and ventral surface black, the former slightly ferruginous in middle, the latter about three-fourths width of puparium, somewhat narrower in front and ending a little before anterior end extreme tip of which is black; puparium otherwise orange. Segmentation is well-marked on lower surface. The integument is shining but not smooth; it appears, especially on the orange paler and more translucent areas, to be cellular. The cells are transparent, oval or lenticular and those that seem to be actually on the outer surface shine like silver and even at low magnification give the surface a shining, speckled appearance.

Platomma nigranti n.sp.

Although there is a considerable resemblance between this species and *Platomma luniferum*, there are several distinctive specific differences, such as the greater amount of white pubescence on the frons, the black across epistome and lower face, and even in the bristles on the sides of the mouth opening. The thorax is almost quite black and the wing wider.

Holotype ♂, allotype ♀, 1 ♀ paratype, Kalahari Gemsbok National Park, 16-24.v.1956, H. K. Munro, taken sweeping over *Pituranthos* where the flies were feeding on honey dew from a coccid. 1 ♂ paratype, Roodeplaat, Pretoria, 1961, J. Bot, taken in a bait trap — an unexpected discovery.

Length, holotype male 3.2 mm., paratype male 3.8 mm., wing 2.9 mm.; allotype female 4.1 mm., paratype female 3.3 mm., wing 3.0 mm., oviscapae 1.0.

Head (fig. 2): *frons* yellowish brown, almost orange, sides pale yellow, a black spot at sides of antennae, sparse, short, white pubescence on sides and over middle (more than in *luniferum*); hind upper orbital short, white, ocellars about half length of anterior upper orbital, four or five longer, white bristles among the row of black postorbital setae; lunule normal; *antennae* pale yellow, as long as face, joint 2 less strongly setose, arista micropubescent, almost bare; *face* concave, slight median ridge parafacials narrow, epistome very prominent; upper half of face yellow, lower half and sides of epistome shining black or blackish brown, on latter a little brown pubescence; narrow genae and moderate postgenae yellow with white, rather short, clothing, on margins of mouth opening a few (three) moderately long, pale, straight bristle-

hairs, the genal bristle behind these similar but longer darker; palpi oval, broadly rounded at end, inner half pale yellow and slight pale, fine pubescence, outwardly deep yellow with numerous black setulae; proboscis yellowish, massive.

Thorax: the black or brownish black of the dorsum extends laterally to upper fourth of mesopleura, but the thin, iridescent dust and sparse white pubescence only to line of notopleural bristles, below this line and including the upper fourth of mesopleura polished, with some black pubescence on the mesopleural portion; the lower part of mesopleura (its lower edge more or less bare) and posteriorly there is dense, brownish, iridescent dust and slight black pubescence; sternites black, brown on upper margin, dust grey; bristles normal, two brown mesopleurals, the lower small, pteropleural pale, sternopleural darker. *Scutellum* black, flat, dust and pubescence as on mesonotum; a little shorter than basal width, rounded at apex, four long, brown bristles; postscutellar area black, slight dust. *Legs* normal, ochraceous, clothing black; squamae large, brownish, upper with median brown streak; halteres yellow. *Wing* (fig. 5), wide, width about 0.7 length; by transmitted light almost uniformly blackish brown, only lightly paler on inner angle, and with irregular, dark, microtrichial patches on anterior half, the apical hyaline; lunate area from end of vein 3 to just below vein 4, the costa here transparent but margined with fine black hairs; in oblique light the wing appears burnished brown; vein 3 strongly setose above.

Abdomen, male, shining ochraceous, with a little irregular blackening towards base; pubescence black, white on hind margins and laterally on tergites 2, 3 and 4; membranes yellowish brown; sternites ochraceous, the terminalia somewhat blackened. *Female*, ochraceous, slight blackening at base and blackish spots on mid anterior margins of tergites 3, 4 and 5. Oviscape 1.0 mm., 0.3 wing-length, a little shorter than preabdomen; shining blackish ferruginous, pubescence fine, brown; more or less legging-shaped, the lower margin laterally slightly concave, lateral ridges strong.

LEUCOTHRIX Munro.

Munro, 1929, *Ann. S. Afr. Mus.*, 29:15; 1947, *Mem. ent. Soc. S. Afr.*, 1:237; 1956, *J. ent. Soc. S. Afr.*, 19:354.

Type species *Leucothrix barbata* Munro. It is not possible to say much more about this genus since the earlier comments (Munro 1956) and no satisfactory conclusion about its systematic position has been reached. It is definitely not allied to *Afreutreta* Bez.; from *Platomma* it differs markedly, especially in the shape of the head and the elongate antennae. However, as females have now been dissected it is seen that the spermatheca is much alike in *Leucothrix incana*, a new species, and in *Platomma luniferum*, and that in these species the free tips of the stylets of the aculeus are armed with minute teeth or spines. These two characters alone need not necessarily indicate re-

lationship, and the structure of the aculeus may be regarded as merely functional. Both *Platomma* and *Leucothrix* appear to be highly specialised and, with the discovery of another new species in each genus, to be well established. Larvae of the two genera live in the flower buds of the acanthaceous plant *Monechma*, but similar larval habits may also not necessarily indicate relationship since the larvae of *Hyaloctoides semiatra* live in the same flower buds, but this species is certainly not allied.

Leucothrix may be recognised by the peculiar short head (fig. 3), the long antennae, joint 2 being much lengthened, the large rounded tubercle on the upper part of the face, the short epistome and the rather prominent mouth border. There are three strong lower orbitals and two upper, the hind one short and pale; ocellars absent, or represented by very short, white, coarse hairs not much different from the coarse, white pubescence on the frons; similar pubescence covers head and thorax, very dense in *barbata*, moderate in *incana*, almost absent in *oryx*. On the first two the pubescence on the abdomen is also white, but thinner, in *oryx* mainly black. There is a row of short, black, postorbital setae. *Barbata* and *incana* are somewhat alike in appearance and have a more or less reticulate wing pattern; *oryx* is blacker with a well-defined, hooked wing pattern (figs. 6-8); on the wing vein 3 is setose and the outer end of posterior cell 1 very wide.

Leucothrix barbata Munro.

Munro, 1929, *Ann. S. Afr. Mus.*, 29:16, Pl. 1, fig. 6; 1947, *Mem. ent. Soc. S. Afr.*, 1:238, textfig. 5c, figs. 24, 81, 228; 1956, *J. ent. Soc. S. Afr.*, 19:355.

The species was described on three males and a female from Kamanyab, South West Africa, in the South African Museum, one paratype in the South African National Collection of Insects, Pretoria. Mr. H. D. Brown took three males sweeping over *Monechma* in the Husab Mountains, 30 miles east of Swakopmund, S.W.A. A female has not been available for dissection.

In the male sternites 1 to 4 are small and squarish, 5 wide and moderately to deeply bifid (fig. 12). The lower ends of tergum 9 are turned inwards knob-like and appear obliquely truncate, the posteroventral surfaces smooth; in lateral view (fig. 17) there is a moderate flange. The prenisetae are close together, both flattened, the upper nearly circular; the twist in the rods is not very apparent.

Leucothrix incana n.sp.

Holotype ♂, allotype ♀, 18♂ and 20♀ paratypes, Kalahari Gemsbok National Park, Tweerivieren, 12-20.ii.1958, reared from puparia in flower buds of *Monechma incanum* (Nees) C.B.Cl. (Acanthaceae); 1♀ paratype sweeping over *Geigeria* and 1♂, 1♀ paratypes sweeping over *Pituranthos* infested with Coccids, February 1961, H. K. Munro. (South African National Collection of Insects, Pretoria). Also 1♀ paratype, Victoria West District, (South African) Museum Staff, March 1931, in South African Museum, Cape Town.

Length, male 3.4 mm., female 3.3 mm., wing male and female 2.5 mm.

Head (fig. 3) length: height: width, 6:7.5:10; black, covered with coarse, translucent, white pubescence; posteriorly above bare with slight grey dust behind vertex; postocular bristles thick, white, but outer verticals pale blackish, a row of short, black setae with the four or five white bristles of the postorbital row; no postocellars. *Frons* as wide as long, width about 0.5 width of head; black, on sides widely with some dense brownish dust and short, thick, white pubescence carried forwards below antennae, less dense on middle of frons and not around ocellar dot; bristles dark brown, three lower, two upper orbitals, the hind one short, white; ocellar absent or represented by tiny white setae. *Lunule* very short and inconspicuous. *Antennae* elongate, joint 1 short, 2 and 3 pendent, of equal length and together 1.7 length of face; joint 1 brown with a little white pubescence at end, 2 brown with some short black setae and a longer one about middle above, 3 black, velvety; arista rather short, about 1.5 length of joint 3 of antennae, base brown, flagellum black, very slightly pubescent. *Face* shining black, on upper half strongly convex, dense white pubescence on sides not crossing hollow above moderate epistome; parafacials narrow, densely grey dusted. Genae and postgenae densely grey dusted the bristle white and longer but hardly differentiated from the long, white pubescence extending on to the postgenae. *Palpi* flat, oval, yellow below with long, white pubescence, above basally yellow, bare or a few black setae, apically velvety black with close-set, very fine, black pubescence; proboscis brown, massive.

Thorax black, evenly, covered with thin brown dust and rather sparse, coarse, whitish pubescence except on hind parts; bristles brown, normal, dorso-centrals near suture, one mesopleural with some long bristle-hairs, as also pteropleural, the sternopleural white. *Scutellum* large, slightly convex, broadly rounded behind, clothed as mesonotum, four bristles, long, brown, apicals crossed, basals a little the longer. *Legs* blackish or slightly brownish, dust grey, clothing on femora partly long white and some short black pubescence, tibiae with some white on inner end, on outer end and on tarsi fine black pubescence. *Wing* (fig. 7) more uniformly reticulate, the apex hyaline, by transmitted light the pattern is paler on inner angle of wing; the spots are not quite hyaline, they appear, mainly on the middle of the wing, pale brownish, with a very narrow, clearer margin between the brown and the black of the reticulation. In oblique light the reticulation appears evenly blackish-brown all over or slightly more blackish around the costal and apical areas where the spots are smaller and fewer; in this light the spots seem white. At, or just beyond the tip of vein 3 the costa weakens, becoming pale and thin; outer end of posterior cell 1 very wide; vein 3 setose above.

Abdomen: *male*: dorsum strongly convex, shining black, slight grey dust, tergite 5 polished except on anterior margin; pubescence thinner, white, rather sparse; sternites (fig. 13): pubescence short, white, 3 and 4 about

twice as long. Tergum 9 in posterior view much like *barbata*, the lower ends obliquely truncate from behind, but the inturned points narrower; in lateral view (fig. 18) there is a broad anterior point, concave on the inner side, the flange small. Fultella (fig. 22): the upper apodeme variable, wider or narrower; there is a well-developed, thimble-like gland between the bases of the rays. Aedeagus (fig. 26): the little hairy tail is not always seen, it may be deciduous and in one preparation there seems to be a spot where it has broken off.

Abdomen: female: tergites 1 to 3 with very light dust, 4, 5 and 6 polished; pubescence as in male. Sternites (fig. 29) wide, 1 to 5 about four times wide as long, 6 about twice wide as long and with a strong phragma. Oviscape black, stout legging-shaped, short, about 0.3 wing-length, short white pubescence on anterior two-thirds, fine black (brown shining) apically. Aculeus (fig. 32) basal half stout, strongly acuminate to a needle point apically; extreme tip rounded, lateral stylets with rather few, retrorse teeth (fig. 33). Spermatheca (fig. 38) elongate, length 0.15 mm., apical two-thirds covered with numerous, large, basally directed papillae, these sometimes bifid at ends; morula gland (fig. 42) very small, transversely flattened, very thin, the spherical "papillae" few.

Biology. Larvae live singly in the flower buds of *Monechma incanum* (Nees) C.B.C1. (Acanthaceae) feeding on the developing ovary. The species was not reared from *Monechma hereroense* (Engl.) C.B.C1. but specimens were taken sweeping over *Pituranthos* infested with coccids and over *Geigeria*. Hymenopterous parasites of the families Eurytomidae and Eulopidae emerged from some puparia.

The puparium is found between the sepals, quite exposed or the remains of the unopened flower remain as a cap. It is black, oval, about twice long as wide, length about 2.5 mm., the surface is not smooth but seems to be covered with extremely fine "dust" more or less arranged in spots that in a strong light give a speckled effect. The general appearance of the surface is not easy to describe.

Eggs were found in one female. The egg is guttate, the wide end marked with an hexagonal pattern and ending in a point that seems to be papillate.

Leucothrix oryx Munro.

Munro, 1956, *J. ent. Soc. S. Afr.*, 19:355, figs. 1, 2.

The species was described on four males taken in the Gemsbok Park in May 1956. Further specimens were taken in the Park, 3 ♀♀, 16-20.ii.1958, and 3 ♂♂ and 2 ♀♀, February 1961, also a male near Riefontein somewhat to the south of the Park, H. K. Munro, and another male in the Husab Mountains, 30 miles east of Swakopmund, S.W.A. 19.v.59, H. D. Brown.

A figure of the wing (fig. 8) is given for comparison.

Male. Sternites (fig. 14) 3 and 4 narrow, 5 broadly rounded anteriorly.

Tergum 9 much like that of *barbata* in posterior view, the lower ends obliquely truncate from behind and in lateral view (fig. 19) have a short anterior point and a pronounced flange. Fultella (fig. 23): there is a small gland in the membrane between the rays.

Female : quite like the male. Sternites (fig. 30) wide, 5 with a long, strong, median, internal phragma. Oviscape polished black, fine black pubescence, usually flattened in specimens, after treatment in dilute potash, conical, more or less transversely ridged above. Aculeus brown, acuminate, down-curved, tips of stylets with retrorse teeth (fig. 35). Spermatheca (fig. 39) of peculiar shape, the apex bent over, the papillae few. Morula gland (fig. 43) : in the two preparations the gland has a ragged appearance that may be accidental; it is much like that of *Hyalotooides semiatra* appearing somewhat like a series of more or less flask-shaped papillae attached by a narrow neck to a stout column.

Biology. *Leucothrix oryx* has not been reared. In the Gemsbok Park and near Rietfontein specimens were taken, together with *Platomma luniferum*, sweeping over *Monechma hereroense*. In the Park the first specimens and others later were taken sweeping over *Pituranthos* infested with coccids.

HYALOTOIDES Munro.

Munro, 1937, *Dept. Agric. S. Afr., Ent. Mem., No.2:18*; 1947, *Mem. ent. Soc. S. Afr., 1:187*.

No further comment on this genus is needed here.

Hyalotooides semiatra (Loew).

Trypeta semiatra Loew, 1861, *Berl. Ent. Zeit., 5:276*, Pl. ii, Fig. 12.

Hyalotooides semiatra (Loew) Munro, 1947, *Mem. ent. Soc. S. Afr., 1:188*, figs. — see for further references.

Synonym : *Spathulina semiatra* (Loew) var. *semirufa* Bezzi, 1924, *Ann. S. Afr. Mus., 19:535*, Pl. xiv, fig. 61.

Forms : *Spathulina semiatra* (Loew) var. *superhyalina* Munro, 1929, *Ann. S. Afr. Mus., 29:18*, Pl. i, fig. 8. South West Africa.; *Spathulina bioculata* Bezzi, 1920, *Bull. ent. Res., 10:258*. Nigeria; *Hyalotooides semiatra* (Loew) subsp. *gorgonea* Hering *apud* Frey, 1958, *Soc. Sci. Fennica, Comment. Biol., 18:21*, fig. 7. Cape Verde Islands.

It is certain, as Bezzi suspected, that what he described as *semirufa* is the male of the species. A series of 93 specimens from Southern and East Africa and Eritrea has been studied. In the male the abdomen is never quite black; at least the base may be somewhat orange ("reddish") this colour becoming more and more extensive leaving irregular blackish areas and in some specimens the abdomen is quite orange. In the female the abdomen is usually orange towards the base, or may be black with a strong ferruginous tinge.

Head : there is no row of short, black postorbital setulae; the orbital

bristles are pale brownish to light brown, the hind upper orbital as dark as the others, often a little paler and occasionally white. In the type of *semirufa* this bristle is as dark as the others; Bezzi states "all the bristles of the head and thorax are pale yellowish" and this may be correct in certain lights but it is better to say they are light brown as generally in the present specimens. In *gorgonea* the hind upper orbitals are stated to be "whitish" ("weisslich") which is within the normal range of the species but to imply at the same time that in *semirufa* they are "yellow" gives an incorrect impression.

Wing (fig. 9): the hyaline spots are very variable, more usually somewhat larger and confluent, or smaller and separated, for instance those in posterior cell 2; the spot at the outer end of posterior cell 3 is occasionally absent while the two small spots in posterior cell 1 tend to disappear. On the figure the lightly shaded areas show the more or less greatest normal variation, the unshaded the least. It is only possible to regard *superhyalina*, *bioculata* and *gorgonea* as wing-pattern forms of *semiatra*. The male terminalia of the first are quite like those of the typical form but dissections of males of the other two would be needed to make a final decision and the specimens should be from the same localities and have the same wing-patterns. In the figure of *gorgonea* the hyaline spot below the end of vein 2 is large and touching the vein; in the present specimens the spot is variable in size and somewhat in position, it may nearly fill the width of the cell — in one specimen just touching vein 2 — or become small and almost vanish. Also, in Hering's figure of *gorgonea*, there are three small, isolated spots below vein 6, while in the present specimens there is in most a large hyaline area united to the hyaline above the vein; in one Eritrea specimen there are two spots below vein 6, but even here the outer is united to the hyaline above the vein and in one South African specimen there is a single, large, isolated, hyaline spot below the vein. Further, in the *gorgonea* figure the ends of veins 3 and 4 are not shown as divergent as is the case in the species.

A drawing (fig. 9a) of the wing of the type of *bioculata* was kindly made by Mr. H. Oldroyd of the British Museum. The hyaline spots are rather small and that at the end of posterior cell 2 may be noted, but this cell cannot be said to be "distinctly more elongate" at least as compared to *semiatra*. In *superhyalina* (fig. 10) the hyaline spots are much enlarged and confluent and there are no specimens showing a gradation between this pattern and that of typical specimens that have the largest hyaline spots.

The terminalia of the male have been considered in detail, Munro 1947. For comparison with the other species discussed here, it may be noted that tergum 9 is rounded, the lower, inturned ends scoop-like with thin edges; in lateral view it is rounded with a small flange projecting. Some characteristics of the female terminalia follow.

Female. sternites (fig. 15) are wide and short like those of *Platomma* and *Leucothrix*, the larger fifth having the usual phragma. Oviscape shining black

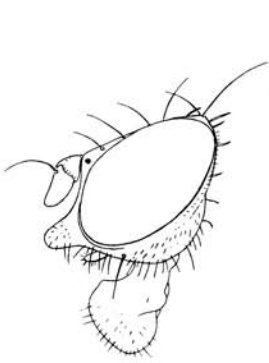


FIG. 1. *Platomma luniferum*

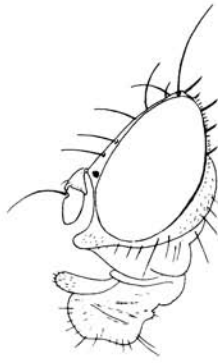


FIG. 2. *Platomma nigrantior*

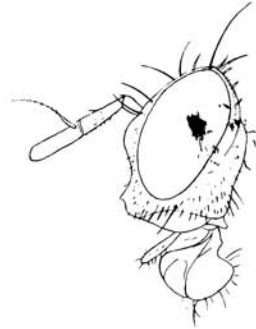


FIG. 3. *Leucothrix incana*

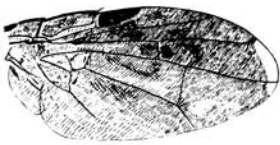


FIG. 4. *Platomma luniferum*

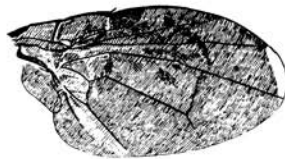


FIG. 5. *Platomma nigrantior*

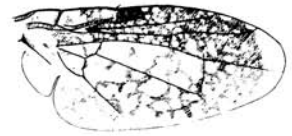


FIG. 6. *Leucothrix barbata*

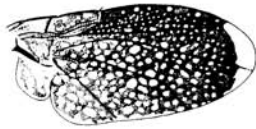


FIG. 7. *Leucothrix incana*

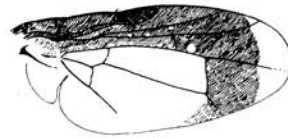


FIG. 8. *Leucothrix oryx*

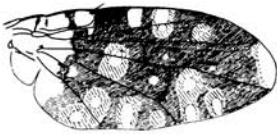


FIG. 9. *Hyaloptoides semiatra*,
form *semiatra*



Fig. 9a. *Hyaloptoides semiatra*,
form *bioculata*

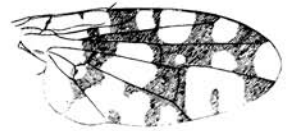


FIG. 10. *Hyaloptoides semiatra*,
form *superhyalina*

FIGS. 1 - 3, Heads 4-10, Wings.



FIG. 11. *P. luniferum*



FIG. 12. *L. barbata*



FIG. 13. *L. incana*



FIG. 14. *L. oryx*

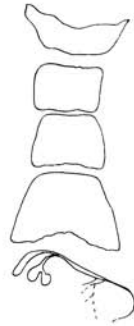


FIG. 15. *H. semiatra*



FIG. 16. *P. luniferum*

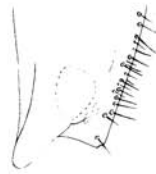


FIG. 17. *L. barbata*



FIG. 18. *L. incana*



FIG. 19. *L. oryx*



FIG. 20. *P. luniferum*

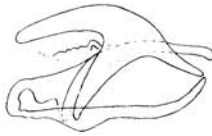


FIG. 21. *L. barbata*



FIG. 22. *L. incana*

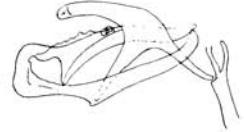


FIG. 23. *L. oryx*



FIG. 24. *P. luniferum*



FIG. 25. *L. barbata*



FIG. 26. *L. incana*



FIG. 27. *L. oryx*

MALES. FIGS. 11 - 15, Sternites; 16 - 19, Terga 9, lower ends.

FIGS. 20 - 23, Fultellae and Rings; 24 - 27, Aedeagi.

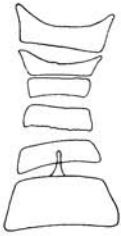


FIG. 28. *P. luniferum*

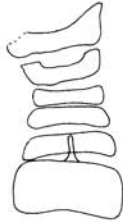


FIG. 29. *L. incana*

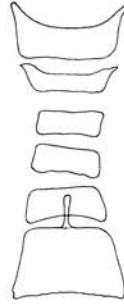


FIG. 30. *L. oryx*

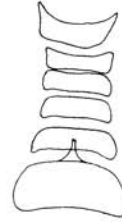


FIG. 31. *H. semiatra*



FIG. 32. *L. incana* : aculeus.



FIG. 33. *L. incana* : tip of aculeus

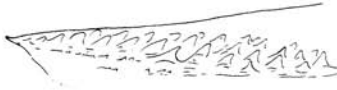


FIG. 34. *P. luniferum*, aculeus, tip of stylet

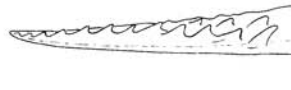


FIG. 35. *L. oryx*, aculeus, tip of stylet



FIG. 36. *H. semiatra*, tip of aculeus



FIG. 37. *P. luniferum*



FIG. 38. *L. incana*



FIG. 39. *L. oryx*



FIG. 40. *H. semiatra*



FIG. 41. *P. luniferum*



FIG. 42. *L. incana*



FIG. 43. *L. oryx*



FIG. 44. *H. semiatra*

FEMALES. FIGS. 28 - 31, Sternites; 32 - 36, Aculei.

FIGS. 37 - 40, Spermathecae; 41 - 44 Morula glands.

with fine black pubescence, short, somewhat flattened conical, lateral ridges well marked, about 0.6 preabdomen, 0.25 wing-length. Aculeus about the same shape and down-curved as in the other two genera, but the ends of the stylets (fig. 36) are without teeth. Spermatheca (fig. 40) irregularly papillose. Morula gland (fig. 44) appears like a series of inverted flask-like papillae arranged on a short stem.

Biology and Distribution.

Hyaloctoides semiatra is wide-spread in South Africa and has been recorded from Kenya and Nyasaland. Three specimens were received from Mr. G. de Lotto while he was in Eritrea (Asmara, 6.xii.49 and 5.iii.50, and Debaroa, 17.viii.48). In South Africa odd specimens have been taken in bait traps during 1959 and 1960 at the Roodeplaat Experiment Station near Pretoria, Dr. J. Bot.

The forms *bioculata* from Nigeria and *gorgonea* from Cape Verde Islands indicate a wider range for the species. *Superhyalina* which has the most distinctive wing-pattern was only known from the type locality, Kamanyab in South West Africa; Mr. H. D. Brown took a male sweeping over *Monechma* in the Husab Mountains, 30 miles east of Swakopmund, S.W.A., 19.v.59.

The species was reared by Mr. W. E. Marriott from larvae in the flower buds of *Justicia pulegioides* in Natal. In the Gemsbok Park during February 1958 it was found breeding with *Platomma luniferum* and *Leucothrix incana* in the flower buds of *Monechma incanum*, a single larva to each bud. Specimens were also taken sweeping over *Pituranthos* infested with coccids.

The puparium is exposed between the sepals of the flower. It is oval, pale yellow, darker yellow on the anterior end and quite distinct from the puparia of the other two species.