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## New species of *Gymnochiromyia* Hendel, 1933 (Diptera: Schizophora: Chyromyidae) from Southern Africa

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### ABSTRACT

The genus *Gymnochiromyia* Hendel, 1933 is redescribed. Several new characters are used in the diagnosis, and the characters in the female postabdomen are presented and discussed for the first time. The little that is known on the biology, ecology and distribution of the genus is summarised. Fourteen new species are described from Southern Africa: *balteata*, *capensis*, *gilva*, *maculiventris*, *malagasica*, *maraisi*, *megacephala*, *milleri*, *nubilipennis*, *pretoriella*, *setulosa*, *spinifera*, *stuckenbergi* and *turneri*. A key is provided.

**KEY WORDS:** Chyromyidae, *Gymnochiromyia*, Afrotropical, faunistics, taxonomy, new species, identification key.

### INTRODUCTION

The Chyromyidae are small to very small cyclorrhaphous, acalyptrate flies currently classified within the Heleomyzoidea by most authors. The majority have a pale yellow integument and bright iridescent green, red or purple eyes.

Their biology is poorly known and no life history of any species has been elucidated. There appears to be some association with bird and mammalian nests (Collin 1933; Ferrar 1987; Smith 1989), though the nature of this association is not clear. Some species have been reared from guano and dung, from debris in tree hollows, and bird and mammalian nests. Only one species was reared from the material discussed in this paper (from a bird's nest, possibly the Dusky Flycatcher, according to the data label). The nest was collected by R. Miller in Gilletts near Pinetown, KwaZulu-Natal on 17.x.1976 and two females of an unidentifiable species of *Gymnochiromyia* emerged, one on 10.xii.1976 and the other on 17.xii.1976. The specimens are in the collections of Natal Museum.

The family is represented in all continents except Antarctica. *Gymnochiromyia* s.str. is known from the Nearctic (2 species), the Palaearctic (8 species) and now, the Afrotropical Region (15 species). The scant material from the Neotropical and Oriental Regions that I examined establishes that it does not belong to this genus as defined in this article.

As with most Chyromyidae, coastal habitats have a more diverse fauna, and usually support larger populations than do habitats inland. Vegetated dunes with marshes in the vicinity are often particularly rich. Countries with a Mediterranean type of climate are also richer in species than cold temperate regions, tropical rainforests or extreme deserts. *Gymnochiromyia* along with *Chyromyia* Robineau-Desvoidy, 1830 are sometimes found in woodland and savannah (very rarely in dense forest), but *Aphaniosoma* Becker, 1903 is absent. *Somatiosoma* Frey, 1958 is usually found in eremic areas.

There are about 150 named species in this family worldwide, including the new species described in this article. There has been no comprehensive taxonomic study to elucidate the generic limits of species in the family. Currently, only four genera are recognised, but ongoing studies of the African species indicate that there are more. These will be described in a forthcoming paper.

Only eight species of Chyromyidae in four genera are listed in the Afrotropical Catalogue (Cogan 1980). One of these, *Gymnochiromyia flavella* (Zetterstedt, 1848), is a Mediterranean species extending to northern Europe (Soós 1984). It is listed in the Catalogue as having been recorded from the Atlantic island of St Helena. However, I found no specimen(s) of *flavella* from St Helena in the Natural History Museum, London and no further comment can therefore be made. In my assessment it is unlikely that this species is indeed *flavella* but more possibly to be one of the many Southern African species described in this article. This opinion is based on what is currently known about the distribution of species in the Chyromyidae. No species have yet been found to have a distribution across continents, other than the *Chyromya flava* (Linnaeus, 1758) species complex, which appears to be Holarctic. Furthermore, of the very many species of *Aphaniosoma* Becker, 1903 that I have examined, only one *A. fissum* Collin, 1949 so far has been found both north and south of the equator. It is widespread in Egypt and the Middle East, and was recently found in Kenya (unpubl. observ.). Although *flavella* has a wide European distribution, it is less frequent and its populations are usually outnumbered by those of several other species in the Mediterranean, suggesting that it is reaching the edge of its range here. Nevertheless, given the strong similarities of some South African insect groups to those in the Mediterranean, it remains possible that *flavella* occurs in South Africa.

Cogan (1980) has treated *Gymnochiromyia* and *Somatiosoma* Frey, 1958 as subgenera of *Chyromya*. He places *dubia* (Lamb, 1914) and *sexspinosa* (Lamb, 1914) in the subgenus *Gymnochiromyia* and leaves *hirtiscutellata* Lamb, 1914 in *Chyromya* s.str. However, none of these species shares the suite of character states of these genera, and in my assessment they do not belong in *Gymnochiromyia*. Both *dubia* and *sexspinosa* belong to a new genus that will be described along with more new species in a forthcoming paper, and *hirtiscutellata* is referred to *Somatiosoma*, which I now recognise as a valid genus. The only true Afrotropical *Gymnochiromyia* known to date is *punctata* Ebejer, 1996, described from Ethiopia and Yemen.

Eight species of *Gymnochiromyia* have been cited in a recent overview of the African Chyromyidae (Ebejer 2000) although only one had been described. Of Afrotropical species of Chyromyidae currently available, some can easily be assigned to the genus *Gymnochiromyia*. This appears to be the most uniform genus in the family, and separation of species is difficult, particularly so in the female sex, which until now has not been studied.

The genus *Gymnochiromyia* has been erected on the basis of the absence of additional discal setulae and marginal setae on the scutellum, apart from the usual basal and subapical pair of setae. Although this characteristic holds true worldwide, there are many species that clearly do not belong here, but could easily and mistakenly be placed in this genus, if only this characteristic were to be relied upon. These species present characteristics that are not present in *Gymnochiromyia* as defined by Hendel. His description was brief and omitted many features that can now be recognised as useful and reliable to separate species from true *Gymnochiromyia*. Previously, Ebejer (1998) noted some additional characteristics that could help separate *Aphaniosoma* from *Chyromya* and from *Gymnochiromyia*. More detailed study has revealed even more characteristics, now making it imperative to redescribe *Gymnochiromyia* in greater detail, and to include both sexes.

There are no published studies on the female postabdomen in Chyromyidae that investigate the diversity of form and whether this may be useful in taxonomy. Although some authors provided illustrations of a few species, these were within taxonomic studies based mainly on males. None of these studies indicates which structures in the female postabdomen might be of significance in classification. The most comprehensively illustrated species is *Chyromya flava* (Linnaeus). The whole abdomen has been illustrated (Hennig 1958; McAlpine 1987). These authors' figures have been used again in subsequent literature (Soós 1981; Wheeler 1998). Carles-Tolrá has given outline drawings of two species of *Gymnochiromyia* and five species of *Aphaniosoma*, but there is so little detail that similar species cannot be reliably separated from them (Carles-Tolrá 2001). Hardy has illustrated the spermathecae and spermathecal ducts of two species of *Aphaniosoma* and one species of *Gymnochiromyia* from Hawaii (Hardy & Delfinado 1980). Wheeler and Sinclair have given the most useful recent drawings of female postabdomens of three species of *Aphaniosoma* from the Galapagos. They included the terminal sclerites, spermathecae and spermathecal ducts (Wheeler & Sinclair 1994). However, these three species are not typical of the genus *Aphaniosoma*, given that they have significant differences in chaetotaxy, somatic and genitalic characters in both sexes. They belong to a separate species group, if not to a separate genus (work in progress).

The female abdomen in Chyromyidae consists of seven easily recognisable segments, followed by the postabdomen which consists of segments 8 to 10 and the cerci. In *Gymnochiromyia*, a small ventral sclerite lies caudal to segment 8 (or 10 according to some authors), but beyond the genital opening. Thus, this probably represents the subanal plate or hypoproct. I have not found a sclerite that could represent the supraanal plate in any of the species that I have examined. The cerci are relatively small in comparison to those of other genera. They are narrowly separated and lie just lateral and a little more caudal to the subanal plate. The cerci in this genus are fairly uniform in size and appearance between species, and they have no special modifications.

Unlike in *Chyromya*, segment 8 in *Gymnochiromyia* has no sclerite dorsally, but it has a pair of ventral or ventro-lateral sclerites (a divided sternite 8) each bearing a small number of setae. These sclerites may be fused together at their rostral end in the midline (one Palaearctic species, known so far). They may be useful in species diagnosis because of their shape and the number and placement of their setae. Caudally to these sclerites is the genital opening with margins that are simple, unlike in *Somatiosoma*, where the margins are comprised of membranous lobes (unpubl. observ.).

The paired spermathecae are very small (0.04–0.07 mm), round or nearly so, heavily sclerotised and pigmented. The spermathecal ducts are not visible in any of the species examined. Each spermatheca has a wide opening on one side and a small circular translucent area approximately on the opposite side. The darker internal structures appear to vary in shape, depending on the degree of distortion produced by desiccation and/or subsequent preparation of the postabdomen. These internal structures do not appear to be reliable features for separation of species.

Fourteen new species are described in this article, and a tentative key for their identification is provided. Many species are exceedingly similar in general appearance, and others are quite variable. The key must therefore be interpreted with caution, especially as the variability of some of the species cannot be assessed from the few

specimens available. All the new species originate from South Africa, Namibia and Madagascar, although many Chyromyidae from 18 African states and islands have also been examined. It is too early to draw any conclusions as to what zoogeographical relevance this might have, as many more African countries require investigation, and no doubt more species will be discovered, even in Southern Africa.

#### MATERIAL AND METHODS

The material was loaned from several institutions, where the types have been deposited. The type number (where available) is indicated at the end of each entry. The following acronyms of depositories are used:

- MJE – M.J. Ebejer, Cowbridge, UK (personal collection);
- NHML – Natural History Museum, London, UK;
- NMC – National Museum Wales Amgueddfa Cymru, Cardiff, UK;
- NMNW – National Museum Windhoek, Namibia;
- NMSA – Natal Museum, Pietermaritzburg, South Africa;
- TAU – Tel Aviv University, Israel;
- ZSM – Zoologische Staatssammlung Munich, Germany.

The specimen data are given as found on the labels, except that in the case of the South African Provinces, where they are given under current provincial names. Species data are grouped in chronological order within each province. The mode of collection is stated, where known. Many specimens have been dry mounted and either micro-pinned or mounted on card points. Other specimens are preserved in alcohol. The postabdomen is preserved with the remainder of the specimen in glycerine inside a small sealed plastic tube mounted on a pin, where a preparation of the postabdomen has been made from a specimen preserved in alcohol. In the case of dry material, the postabdomen is similarly preserved, and the plastic tube is pinned beneath the source specimen.

Measurements have been made from the head (antenna excluded) to the apex of the abdomen; the wing (Fig. 1) has been measured from its insertion into the thorax to the apex, the point where vein  $R_{4+5}$  meets the costal vein. Measurements should only be taken as a guide. Some specimens shrivel more than others when dry and some expand more than others in alcohol. Furthermore, personal experience has shown that individuals within a species vary by as much as 25% in length. The measurements are based on the holotype and a female paratype of average appearance and size. Descriptions are based on the holotypes. In most cases, the illustrations of the male postabdomen are also based on the holotype.

The abdomen of selected specimens was macerated in 10% potassium hydroxide, rinsed in water and alcohol and preserved in glycerine. Freehand drawings were made with the specimen suspended in glycerine on a slide. Material was orientated to allow view from the left lateral side, but was frequently rotated and adjusted to allow better view of 3-dimensional detail of the structures and their articulation. The view of the male postabdomen from below or behind was too complex in many cases, with many structures that were superimposed to the extent that it proved impossible to draw individual structures clearly and reliably *in situ*. However, the latter depiction was included in cases where the appearance of the pregonite in lateral view differed

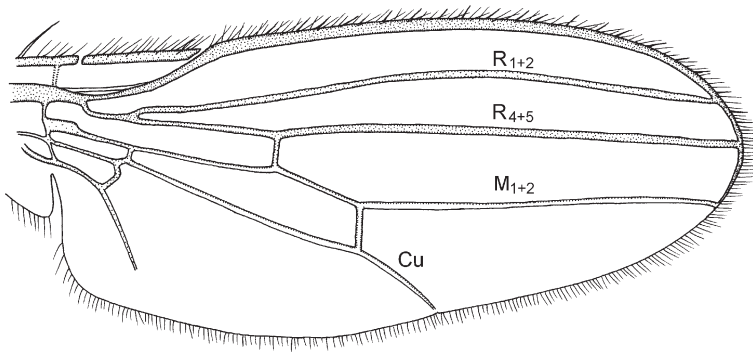


Fig. 1. *Gymnochiromyia maculiventris* sp. n., wing. Scale bar = 1 mm.

significantly from the ventral view. The same applies to the surstylus in two cases. Terminology of the male postabdomen follows Sinclair (2000) and for that of the female, Kotrba (2000).

The following abbreviations are used in the text and figure captions:

|  |  |
|--|--|
| <i>acrs</i> – acrostichal              | <i>orb(s)</i> – orbital(s)                 |
| <i>bac scl</i> – bacilliform sclerite  | <i>ph</i> – phallus                        |
| <i>dc</i> – dorsocentral               | <i>ph apd</i> – phallapodeme               |
| <i>ej apd</i> – ejaculatory apodeme    | <i>psth</i> – posthumeral                  |
| <i>ep</i> – epandrium                  | <i>prg</i> – pregonite                     |
| <i>fr</i> – frons, frontal             | <i>psg</i> – postgonite                    |
| <i>hu</i> – humeral                    | <i>pra</i> – pre-alar                      |
| <i>hyp</i> – hypandrium                | <i>pvt</i> – postvertical                  |
| <i>hypl</i> – hypopleuron, hypopleural | <i>sa</i> – supra-alar                     |
| <i>ia</i> – intra-alar                 | <i>scut</i> – scutellum, scutellar         |
| <i>mspl</i> – mesopleuron, mesopleural | <i>st</i> – sternite                       |
| <i>msn</i> – mesonotum, mesonotal      | <i>stpl</i> – sternopleuron, sternopleural |
| <i>mtn</i> – metanotum                 | <i>surs</i> – surstylus                    |
| <i>ntpl</i> – notopleuron, notopleural | <i>tg</i> – tergite                        |
| <i>oc</i> – ocellus, ocellar(s)        | <i>vte</i> – external vertical             |
| <i>ocp</i> – occiput, occipital        | <i>vti</i> – internal vertical             |

#### TAXONOMY

##### Genus *Gymnochiromyia* Hendel, 1933

*Gymnochiromyia* Hendel, 1933: 43. Type species: *Peletohila minima* Becker, 1904 (= *Antophilina flavella* Zetterstedt, 1848), by designation of Hendel.

**Diagnosis:** The following combination of characters not previously noted by earlier workers separates *Gymnochiromyia* with greater confidence from other genera in the family. The *ocp* is flat or concave when viewed from above. This character is shared with other genera including *Aphaniosoma*, but not *Chyromyia*. The disc of the *ocp* is entirely or largely bare, quite unlike *Chyromyia* which is strongly setose. Only *Aphaniosoma* has an intrahumeral seta or setula and this is usually incurved. *Gymnochiromyia*



usually has no *pra* and no posterior *ia*; these are present separately or together in some other genera. *Gymnochiromyia* has oval eyes with the longest axis positioned horizontally or only slightly obliquely (*Chyromyia* has round eyes; *Aphaniosoma* and undescribed genera have very obliquely placed oval eyes). The frons in most species of *Gymnochiromyia* protrudes above the antennae so that it is clearly visible in profile, often markedly so and thus, in most species, the head is longer above than it is below. In *Aphaniosoma*, an apicoventral seta on the mid tibia is always clearly longer than the diameter of the tibia at apex. This seta may be present in *Somatiosoma* and a closely related undescribed genus, but it does not exceed the diameter of the tibia and is generally less conspicuous. It is absent in *Chyromyia* and *Gymnochiromyia*. There are only two exceptions to this combination of character states. In the species treated below, *G. pretoriella* and *G. maculipennis* have a weak *pra* (in the latter species it is only present in the holotype). None of the Palearctic species of *Gymnochiromyia* has a *pra*. In all other respects these two species fit in *Gymnochiromyia*.

#### Description:

**Head** (Fig. 6): Predominantly yellow, *fr* protruding beyond anterior eye margin, sides converging towards antennae; gena wide with rounded lower margin, vibrissal angle poorly differentiated; face depressed, poorly sclerotised, except for a narrow median line, carina never properly developed although this sclerotised median line may give the impression in some specimens that a shallow carina exists; *ocp* flat to concave when viewed from above, in profile usually barely visible behind eye margin, on lower part, behind gena with a distinct pale seta directed downwards; chaetotaxy: 3 well-developed *orb*, anterior inclinate; 1 strong *vti* and 1 strong *vte*, *oc* divergent, *pvt* distinct and convergent or crossed; *fr*, across middle, often with very fine pale setulae, short setulae also on post *oc* margin, but none on disc of *ocp*; gena finely, but distinctly setulose; 2 to 3 short vibrissal setulae. Antenna with round third segment, first and second segments short, latter with seta dorsally; arista 3-segmented, usually bare, sometimes very short pubescent.

**Thorax**: Ground colour predominantly yellow; *msn* with or without stripes; *mtn* often dark; pleura sometimes with brown on *stpl* and *hypl*; chaetotaxy: 1–2 *hu*, 1 *psthu*, 0+1 to 1+4 *dc*, *acrs* in 4–8 rows with a strong prescut pair, 1 *sa* and 1 *pa*, 2 *ntpl*, *ia* and *pra* usually absent, if a posterior *ia* present this is always shorter than prescutellar *acrs*; 1 *mspl* at middle of hind margin and 1 *stpl* at upper posterior corner, pteropleurals absent.

**Wing** (Fig. 1): Hyaline (pigmented patch in one species), uniformly microtrichose except for basal half of subcostal cell; costa broken at weakly sclerotised humeral crossvein and at  $R_1$ ; subcosta merges with  $R_1$  just before this reaches costa; veins  $R_{4+5}$  and  $M_{1+2}$  parallel to wing margin or very slightly convergent; costa ends almost exactly at end of vein  $R_{4+5}$ ; costal setulae very short and of uniform length, sometimes a few setulae are longer than others at base of wing along anterior edge just before  $R_1$  merges with costa; mixed in randomly amongst the pale costal setulae are darker and thicker setulae appearing as minute spines, reminiscent of the costa of Heleomyzidae; 6–12 dark setulae set at intervals along dorsal aspect of costa between  $R_1$  and apex of  $R_{2+3}$ .

**Legs**: Yellow and short setulose except front femur where longer posterodorsal and posteroventral setae may be present; mid tibia never with long apicoventral seta; claws black in apical half or more, pulvilli normal.

**Abdomen:** Predominantly yellow in most species; sparse short setulose on all segments; tergites well sclerotised; *st* from poorly sclerotised to wholly membranous and very thinly and microscopically setulose.

**Male postabdomen:** *tg* 6 distinct from *ep*, but narrower than *tg* 5 and ventral margin may be narrowed almost to a point; pregenital *st* not modified; *prg* always distinct and most often distinctly setulose, fused to hypandrium or joined to it by a short membrane, never with an intermediate sclerite; *psg* and *bac scl* not always discernible, but in those species where these structures have been identified, they are small and simple when compared to other genera; *ej apd* often sclerotised and tubule to basiphallus sometimes visible; distiphallus usually large and of complicated structure, mostly membranous, but with several sclerotised plates; cercus always small, narrowly separated and finely setulose; surstylus usually separated from *ep*.

**Female postabdomen:** Segment 8 with only *st* sclerotised and in most species this is divided into two lateral plates; subanal plate (*sap*) present, small, poorly sclerotised and often with very fine setulae on minute papillae; supra-anal plate not developed; 2 small (0.04–0.07 mm) spermathecae dark coloured (grey, brown or black) lying deep to lateral aspect of *tg* 6 or 7; spermathecal ducts not sclerotised or pigmented.

**Length:** ♂ and ♀ 1.2–2.2 mm; wing 1.2–2.0 mm.

#### Key to species of African *Gymnochiromyia*

- 1 Metanotum black or brown contrasting with pale adjacent sclerites; *hypl* darkened ..... 2
- Metanotum yellow, if darker, not clearly contrasting with adjacent sclerites; *hypl* pale, only at base of haltere sometimes darker ..... 5
- 2 Mesonotum with brown or black stripes ..... 3
- Mesonotum not striped ..... 4
- 3 Most of lateral margin of *scut* dark; *ep* dark; ♂ with brown mark in anterior half of apical third of wing; ♀ with brown spot laterally at the middle of the third antennal segment; setae on head and thorax very long; anterior *orb* as long as width of *fr* at same level, posterior *orb* longer than height of eye, prescutellars as long as *scut*; ♂ postabdomen, Fig. 19 ..... **nubilipennis** sp. n.
- Only basal part of lateral margin of *scut* dark; *ep* often yellow (variable); wing entirely hyaline; ♀ with third antennal segment entirely yellow; setae on head and thorax of normal length; anterior *orb* about half as long as width of frons at same level, posterior *orb* distinctly shorter than height of eye, prescutellars about 1/3 as long as *scut*; ♂ postabdomen, Fig. 5, ♀, Fig. 7 ..... **capensis** sp. n.
- 4 1+3 *dc*, tergites shiny, *ep* brown, *acrs* in six rows; ♂ postabdomen, Fig. 26 ..... **turneri** sp. n.
- 0+2 *dc*, tergites matt, *ep* yellow with brown midline spot just above cerci and narrow brown transverse band along anterodorsal edge near *tg* 6 (Fig. 2d), *acrs* in eight rows; ♂ postabdomen, Fig. 3, ♀, Fig. 4 ..... **balteata** sp. n.
- 5 The following character states present simultaneously: *msn* with two stripes, *acrs* in four rows, *ep* yellow without spots, apical segments of ♀ abdomen without spots; ♂ postabdomen, Fig. 17, ♀, Fig. 18 ..... **milleri** sp. n.



- *msn* without stripes, *acrs* in 6–8 rows (except in some specimens of *gilva* and *megacephala* where rows may be reduced to 4–6) ..... 6
- 6 Males ..... 7
- Females (note: females of *gilva*, *malagasica* & *stuckenbergi* are unknown) ..... 16
- 7 *oc* triangle yellow, tergites yellow dorsally, brown on lateral margins, 0+3 *dc*; *ep* with small oval spot in middle (as in *maraisi*, see Fig. 12); ♂ postabdomen, Fig. 25 ..... **stuckenbergi** sp. n.
- *oc* triangle black or at least ocelli ringed with black, tergites darker dorsally than laterally or entirely yellow, 0+2 *dc* ..... 8
- 8 Epandrium, viewed from behind, with a distinct midline brown spot ..... 9
- Epandrium uniformly yellow ..... 13
- 9 Epandrial spot large, more or less rhomboidal and almost reaches anterior border of *ep* (Fig. 2a), *oc* triangle yellow, ocelli ringed with black; ♂ postabdomen, Fig. 8 ..... **gilva** sp. n.
- Epandrial spot smaller, occupying less than 1/3 width or height of *ep* when viewed from behind ..... 10
- 10 Prescutellar *acrs* distinct but short, epandrial spot broader, more pentagonal in shape with large central part clearly shining and well separated from edge of *ep* above cerci (Fig. 2e); ♂ postabdomen, Fig. 9 ..... **maculiventris** sp. n.
- Prescutellar *acrs* setae well-developed; epandrial spot narrow oval or rectangular, not or very little shining and lower edge touching the margin of *ep* above the cerci (Figs 2a, c, d, e) ..... 11
- 11 *acrs* in 8–10 irregular rows at level of transverse suture, epandrial spot small, more or less triangular and touching posterior margin of *ep* above cerci; ♂ postabdomen, Fig. 23 ..... **setulosa** sp. n.
- *acrs* in 6–8 irregular rows at level of transverse suture, epandrial spot either rectangular or well separated from edge of *ep* above cerci (Figs 2b, f) ..... 12
- 12 Epandrial spot small, oval and situated at middle third (Fig. 2b), apex of distiphallus large and broadly globular; ♂ postabdomen, Fig. 12 ..... **maraisi** sp. n.
- Epandrial spot narrow, rectangular and situated at posterior third just above cerci (Fig. 2f), apex of distiphallus narrow and more or less pointed; ♂ postabdomen, Fig. 21 ..... **punctata** Ebejer
- 13 *oc* triangle dark, 0+1 *dc*, *acrs* in 6–8 rows, tergites long setulose; ♂ postabdomen, Fig. 20 ..... **pretoriella** sp. n.
- Not with all these character states combined ..... 14
- 14 Head large and broader than thorax (Fig. 15) with very deeply recessed gena, usually 0+3 *dc*, *acrs* posteriorly often markedly reduced in number to one or two pairs; ♂ postabdomen, Fig. 14 ..... **megacephala** sp. n.
- Head normal, 0+2 *dc*, *acrs* posteriorly usually more numerous, at least 3–4 pairs ..... 15
- 15 Frons broad, at level of antennae about 1.2 width of one eye; ♂ postabdomen, Fig. 11 ..... **malagasica** sp. n.
- Frons narrower, at level of antenna about 0.8 width of one eye; ♂ postabdomen, Fig. 24 ..... **spinifera** sp. n.

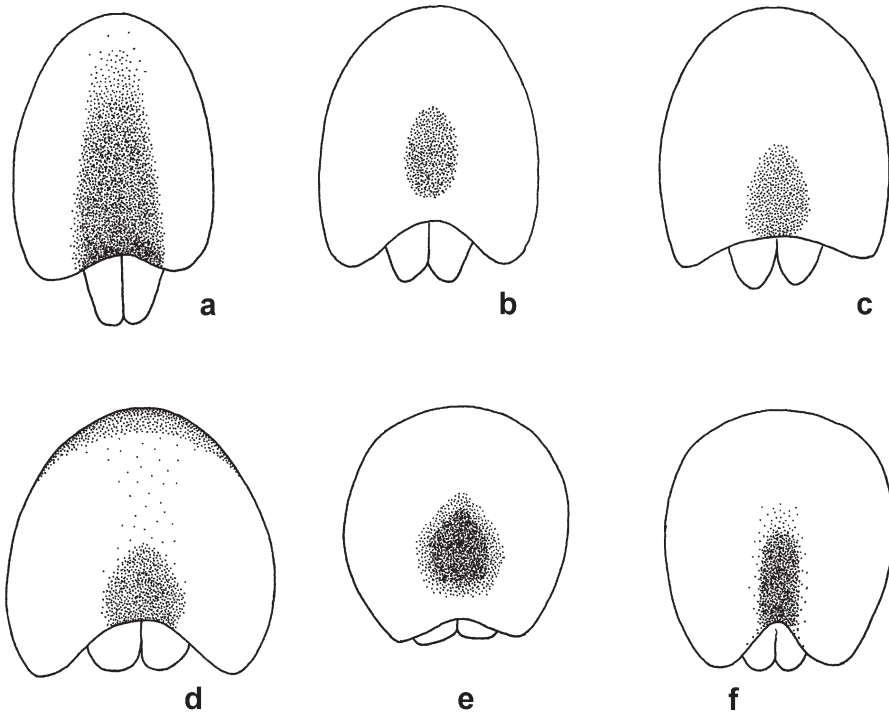


Fig. 2. *Gymnochiromyia*, posterior aspect of *ep*, semidiagrammatic, with setae omitted and cerci in outline: (a) *gilva* sp. n., (b) *maraisi* sp. n., (c) *setulosa* sp. n., (d) *balteata* sp. n., (e) *maculiventris* sp. n., (f) *punctata* Ebejer.

- 16 Apical tergites with well-defined dark spots ..... 17
- Apical tergites without discrete dark spots ..... 19
- 17 Tergites subshining, each becoming darker at middle third where more discrete brown spots appear, which in turn become darker towards apex of abdomen, sometimes a short brown stripe is present along *dc* line posteriorly, sometimes metanotum more brownish than yellow, abdominal setulae long pale brown to black: on dorsal aspect of tergites at least 2/3 length of *tg*; ♀ postabdomen, Fig. 10 ..... *maculiventris* sp. n.
- Tergites matt, usually only *tg* 7 with small, brown, more or less quadrate spot at middle third; setulae on dorsal part of tergites short; most only 1/3 length of *tg* ..... 18
- 18 Only *tg* 7 with small, brown, more or less quadrate spot at middle third; caudal end of plates of *st* 8 rounded and without any extension; ♀ postabdomen, Fig. 13 ..... *maraisi* sp. n.
- Either *tg* 7 with small, pale brown, more or less quadrate spot at middle third, or all tergites darkened at middle; caudal end of plates of *st* 8 with broad triangular extension; ♀ postabdomen, Fig. 22 ..... *punctata* Ebejer
- 19 *oc* triangle dark, 0+1 *dc*, tergites with brown setulae ..... *pretoriella* sp. n.
- *oc* triangle yellow, 0+2 *dc*, tergites with brown or yellow setulae ..... 20

- 20 Head large and broader than thorax, with deep and recessed gena; *acrs* sparse in 4–6 rows, tergites yellow with pale setulae; ♀ postabdomen, Fig. 16 ..... **megacephala** sp. n.
- Head at most as broad as thorax and gena not recessed or exceptionally deep, *acrs* numerous in 6–8 rows ..... 21
- 21 Tergites yellow with pale yellow setulae, which laterally are about 3/4 length of *tg* ..... **setulosa** sp. n.
- Tergites pale brownish yellow with dark brown setulae, which laterally are about only half length of *tg* ..... **spinifera** sp. n.

### **Gymnochiromyia balteata** sp. n.

Figs 2d, 3, 4

**Etymology:** From Latin *balteus* (belt). The name refers to the dark metanotum contrasting with the pale thorax and abdomen, giving the appearance of a belt around the waist of the insect.

**Diagnosis:** *msn* completely yellow without any markings, *acrs* in 8 rows, *mtn* and *hypl* at base of haltere dark; ♂ with brown spot on *ep*, ♀ abdomen all yellow, without dark spots.

**Description:**

*Male.*

**Head:** *fr* yellow with margins slightly convergent, at level of antennae about equal to width of one eye; *oc* triangle yellow and *oc* ringed with black; *ocp* yellow; antenna all yellow, only third segment of arista black; gena yellow and pale yellow setulose, in profile about 1.1 height of eye; eye elongate-oval, longest axis almost horizontal; face very pale yellow, poorly sclerotised with thin and shallow median carina; mouthparts entirely yellow. Chaetotaxy: stronger setae pale brown to yellow, 3 usual *orb*, 1 *vti* and 1 *vte*, crossed *pvt*, postoculars in single row and longer postgenal setula.

**Thorax:** Entirely yellow and *msn* unstriped, only *mtn* and base of haltere dark brown. Chaetotaxy: setae pale brown, 2 *hu* (one very short), 1 *psthu*, 2 *ntpl*, 1 *sa*, 1 *pa*, 0+2 *dc*, *acrs* in 8 rows with prescutellar pair as long as anterior *dc*; 1 *mspl* and 1 *stpl* each with a few adjacent short white setulae.

**Wing:** Hyaline, veins yellow, distance on costal margin between  $R_{2+3}$  to  $R_{4+5}$  is 0.7 that between  $R_{4+5}$  and  $M_{1+2}$ ; distance between crossveins equal to 0.6 length of apical section of Cu. Haltere yellow.

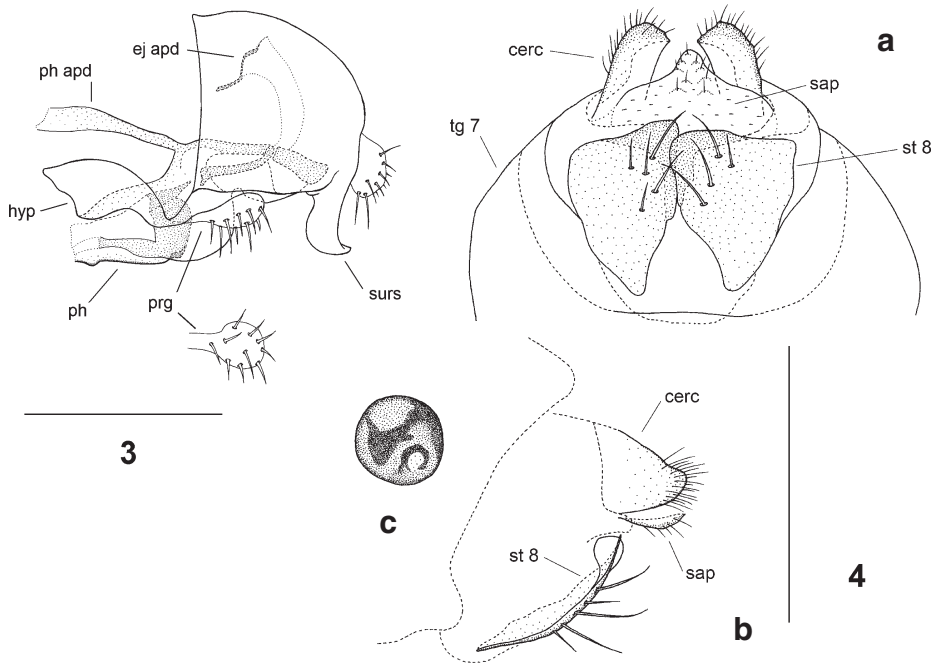
**Legs:** Entirely yellow and pale yellow setulose; claws black except at base.

**Abdomen:** Yellow and slightly shining; setulae about 1/3 length of *tg*.

**Postabdomen:** *ep* with dark brown margin at base dorsally and more or less triangular dark spot at apex just above cercus; *surs* fused to *ep*, long broad and curved inwards; *prg* with about 10 comparatively strong setae, *ph* relatively simple appearing mostly as broad tubular structure.

*Female.*

Similar to male, but setae a little darker; *tg* pale brown over most of dorsal surface on basal segments, becoming less so on apical segments which are completely unspotted.



Figs 3, 4. *G. balteata* sp. n.: (3) male hypopygium, lateral view, scale bar = 0.2 mm; (4) female postabdomen, ventral (a) and lateral (b) views, and (c) spermatheca, enlarged, scale bar = 0.15 mm.

Postabdomen (Fig. 4) with *st* 8 formed of two well sclerotised plates.

*Length*: ♂ 1.7 mm, wing 1.5 mm; ♀ 1.8 mm, wing 1.6 mm.

*Variation*: None noted.

*Holotype*: ♂ NAMIBIA: *Lüderitz District*: 8 km W Rosh Pinah, 27°59'28"S:16°39'14"E, Malaise trap, 10–26.viii.1998, A.H. Kirk-Spriggs and E. Marais, in glycerine tube (NMNW).

*Paratypes*: NAMIBIA: *Lüderitz District*: 3 ♀ Spitzkop 111, 27°31'S:16°42'E, pitfall traps, 8–19.viii.1990, E. Marais & C. Roberts, in alcohol (NMNW); 1 ♀ Skorpion area, 27°49'S:16°36'E, 9.viii.1997, beating/sweeping, A. Kirk-Spriggs & E. Marais (NMNW); 1 ♀ Rooiberg, 27°38'S:16°28'E, 22–24.ix.1997, Malaise trap, A. Kirk-Spriggs & E. Marais (NMNW).

### ***Gymnochiromyia capensis* sp. n.**

Figs 5–7

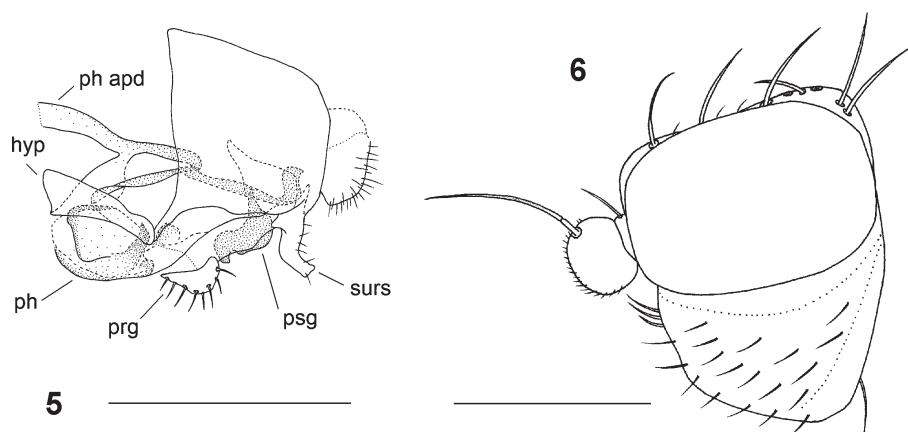
*Etymology*: Named after the former Cape Province of South Africa.

*Diagnosis*: This is one of the smaller species in the genus and exhibits significant chromatic variation; *msn* with 3–4 stripes (middle pair may be coalescent), dark brown *mtn*, *hypl* and *ep*; the larger setae on head and thorax vary from brown to dark brown; abdomen with shiny brown tergites.

*Description*:

*Male*.

*Head*: Yellow except for black *oc* triangle; *fr* protruding above antennae, about half width of head, narrowed anteriorly, at level of antennae 0.7 width at level of anterior *oc* and 0.7 width of one eye viewed from front. Gena in profile a little narrower anteriorly,



Figs 5, 6. *G. capensis* sp. n.: (5) male hypopygium, lateral view; (6) head, lateral view. Scale bars = 0.2 mm.

depth below middle of eye about 0.8 eye height, yellow and pale haired. *ocp* in profile not visible behind eye; with short postocular setulae in an irregular row; isolated lower post-genal seta present, but small and indistinct. Mouthparts small and yellow; buccal margin with long setulae. Face poorly sclerotised, depressed with a shallow linear median carina. Antenna yellow, second segment paler with distinct short dark seta dorsally; third segment round, finely pubescent: hairs not as long as diameter of arista at base; arista almost entirely dark and completely bare. Chaetotaxy: 3 strong *orbs*, the anterior inclinate; distance between middle and posterior *orb* almost twice that between anterior and middle; *pvt* well-developed and crossed, about half length of hind *orb*; 1 *vti* and 1 *vte*; *oc* procline and divergent; about 8 short setulae across middle of *fr*. All setae and setulae yellow.

**Thorax** (description supplemented with reference to paratypes because type is pinned through posterior *msn* and part of *scut*): *msn* with a brownish pattern consisting of a rounded spot behind *hu*, confluent with a stripe reaching as far back as wing base and with a pair of broad stripes in the middle between the *dc* lines; stripes tend to be darker posteriorly and behind *hu* lateral stripes, those between *dc* and *ia* lines may extend to lateral margin of *scut*; *scut* yellow; posterior third of *stpl* especially at upper [posterior] corner and *hypl* brown; *mtn* dark brown. Chaetotaxy: 1 *hu* with adjacent setula, 1 *psthu*, 2 *ntpl*, 1 *sa*, 1 *pa*, 1 *dc* with a shorter one in front of it, *acrs* in 6 irregular rows, 1 pair of prescutellars; 1 *mspl* and 1 *stpl*.

**Wing:** Hyaline, veins yellow, distance on costal margin between  $R_{2+3}$  to  $R_{4+5}$  is 0.7 that between  $R_{4+5}$  and  $M_{1+2}$ ; distance between crossveins equal to 0.6 length of apical section of Cu. Haltere yellow.

**Legs:** Not modified except for slightly thicker femora; fine setulae scattered on all pairs of legs in addition to longer setae on fore femur; claws and pulvilli normal.

**Abdomen:** *tg* brown, a little shiny; longer setae on *tg* 4 and 5 laterally, setae pale and about as long as *tg*.

**Postabdomen:** *tg* 6 unusually large for the genus, about 0.8 length of *ep*; cerci, in profile, appear rounded apically; *ep* distinctly angled at lower posterior corner with *surs*

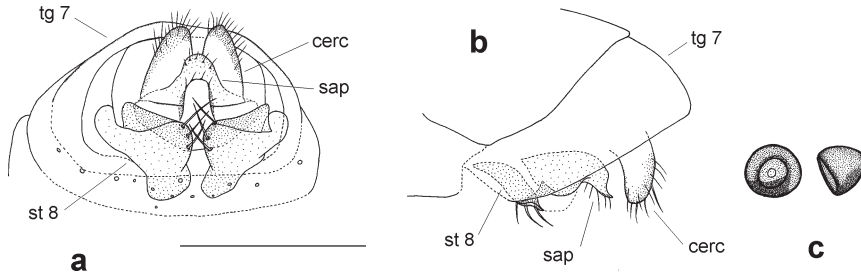


Fig. 7. *G. capensis* sp. n., female postabdomen, ventral (a) and lateral (b) views, and (c) spermatheca. Scale bar = 0.15 mm.

embedded in fold, angled and blunt at tip, curved medially; *hyp* small; *ph apd* and *ej apd* not clearly identified; *prg* trapezoidal, slightly curved with setae on inferior surface; *psg* projecting from behind and medial to *surs*; distiphallus a little broader apically.

#### Female.

Similar to male, but larger and somewhat darker; distance between cross veins almost equal to length of apical section of Cu; *tg* may be darkened only along midline, with apical 2 *tg* often darkest. Postabdomen (Fig. 7) with paired plates of *st* 8 of characteristic shape with lobulated margins and invaginated fold caudally.

*Length*: ♂ 1.2 mm, wing 1.3 mm; ♀ 1.6 mm, wing 1.9 mm.

*Variation*: The extent of darkening of *msn* stripes and *tg* varies from almost completely yellow to dark brown; in the male paratype from Namibia, the middle *msn* stripes are fused into one; setae and setulae can also be dark brown in the darker forms; some males have *ep* almost completely dark brown except for lower margin.

*Holotype*: ♂ SOUTH AFRICA: *Western Cape*: Knersvlakte north of Vanrhynsdorp, 6–9.x.1964, B. & P. Stuckenberg (NMSA, 1178).

*Paratypes*: SOUTH AFRICA: *Western Cape*: 1 ♀ same data and depository as holotype; 1 ♂ Mossel Bay, 5–31.vii.1921, R.E. Turner (Brit. Mus. 1921-315) (NHML); 1 ♀ Mossel Bay, vi–vii.1930, R.E. Turner (Brit. Mus. 1930-402) (NHML); 1 ♂ 1 ♀ Atlantic coast, Ysterfontein, 20.x.1964, B. & P. Stuckenberg (NMSA); 1 ♂ Strandfontein coast west of Vanrhynsdorp, 15–17.x.1964, B. & P. Stuckenberg (NMSA); 1 ♀ Bredasdorp District, Arniston coastal dunes, 22–23.x.1964, B. & P. Stuckenberg (NMSA); 1 ♂ 1 ♀ Saldanha, 8–9.x.1977, Malaise trap, R.M. Miller (NMSA); 1 ♂ 1 ♀ same data (NMC); 1 ♂ 1 ♀ Laaiplek, 9.x.1977, Malaise trap, R.M. Miller (NMSA); 1 ♂ 1 ♀ same data (TAU); 1 ♂ Strandfontein, Groot-Sandleegte, 12.x.1977, Malaise trap, R.M. Miller (NMSA). *Eastern Cape*: 2 ♀ Van Stadens Pass, 29.x.1964, B. & P. Stuckenberg (NMSA). NAMIBIA: *Lüderitz District*: 1 ♂ Skorpion area, 27°49'S:16°36'E, 9.viii.1997, beating/sweeping, A. Kirk-Spriggs & E. Marais (NMNW); 1 ♀ Rooiberg, 27°38'S:16°28'E, 22–24.ix.1997, Malaise trap, A. Kirk-Spriggs & E. Marais (NMNW); 2 ♀ Tsaus, 27°10'29"S:16°07'06"E, 24–26.ix.1997, in alcohol, E. Marais & A.H. Kirk-Spriggs (NMNW).

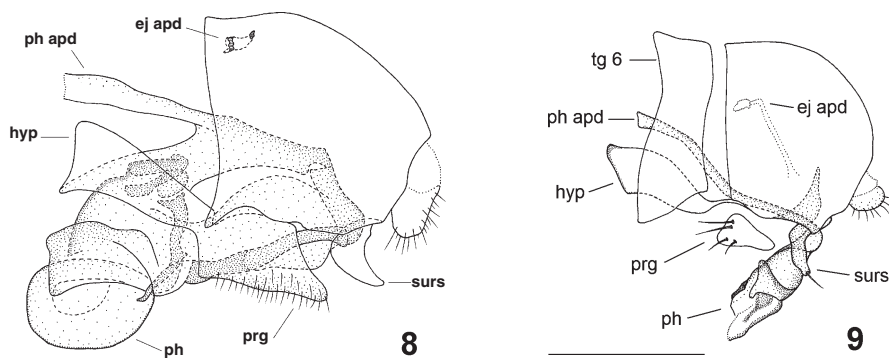
### *Gymnochiromyia gilva* sp. n.

Figs 2a, 8

*Etymology*: From Latin *gilvus* (yellow); refers to the predominant colour of this species.

*Diagnosis*: A completely yellow species except for the black *oc* triangle and a large dark brown spot on the *ep*; *acrs* in 4 rows at level of transverse suture, more numerous posteriorly between *dc*; pale setae and setulae.





Figs 8, 9. Male hypopygia, lateral aspect: (8) *G. gilva* sp. n., (9) *G. maculiventris* sp. n. Scale bars = 0.2 mm.

## Description:

### Male.

**Head:** All yellow; *oc* triangle yellow with *oc* ringed black; *fr* broad, at level of antennae 0.7 width at level of anterior *oc* and here 1.2 width of eye; *fr* protruding slightly above antennae. *ocp* in profile clearly visible behind eye, with short postocular setulae in one irregular row; isolated lower post-genal seta distinct, pale almost white. Gena in profile narrower anteriorly, depth below middle of eye about 0.8 height of eye, yellow with very pale setulae. Mouthparts small, all yellow; setulae of buccal margin relatively short except for two long setae just below vibrissal angle. Face depressed and poorly sclerotised. Antenna yellow, second segment paler than third, with distinct pale seta dorsally; third segment round, finely white pubescent, pubescence a little shorter than diameter of arista at base; arista with black third segment and yellow first and second segments. Chaetotaxy: 3 strong *orb*, anterior inclinate, middle and posterior *orb* reclinate, all more or less equidistant from each other and with a few fine setulae on *orb* plate between them; in addition, several fine pale setulae scattered on *fr*; *pvt* short, but distinct; 1 *vti* and 1 *vte* both strong; *oc* 0.75 length of hind *orb*, procline and laterocline, 0.75 length of *vti*; setae of *fr* and vertex brown.

**Thorax:** Entirely yellow; *msn* darker yellow but without stripes. Chaetotaxy: 2 *hu*, one long and one short, 1 *psthu*, 2 *ntpl*, 1 *sa*, 1 *pa*, 2 *dc*, *acrs* in 4 rows at transverse suture, increasing in number posteriorly; 1 *mspl*, 1 *stpl*, both with white setulae in front.

**Wing:** Hyaline, veins all pale brown, distance on costal margin between  $R_{2+3}$  to  $R_{4+5}$  is 0.8 that between  $R_{4+5}$  and  $M_{1+2}$ ; distance between crossveins equal to 0.7 length of apical section of Cu. Haltere yellow.

**Legs:** Not modified except for slightly thicker femora; brown setae and setulae scattered on all pairs of legs; in addition longer setae present on fore femur; claws and pulvilli normal.

**Abdomen:** All *tg* and *st* yellow and with brown setae and setulae, the longest about half length of *tg*.

**Postabdomen:** *ep* entirely pale yellow and with pointed anteroventral corner, *prg* in profile appearing broad trapezoidal, *surs* short and strongly curved, *ph apd* and *hyp* with no distinctive features, *ej apd* visible, distiphallus very large and more or less globular at apex.

*Female.* Unknown.

*Length:* ♂ 1.7 mm, wing 1.8 mm.

*Variation:* The two paratypes have paler setae and setulae and the *acrs* in 6 rows. One of these males has the long prescutellar *acrs* absent.

*Holotype:* ♂ SOUTH AFRICA: *Limpopo*: Soutpansberg, 1500 m, 15 km NW Louis Trichardt, 25.xii.1994, A. Freidberg (TAU).

*Paratypes:* 1♂ same data and depository; 1♂ same data (NMSA).

### ***Gymnochiromyia maculiventris* sp. n.**

Figs 1, 2e, 9, 10

*Etymology:* From Latin *macula* (spot) and *venter* (abdomen); the combination refers to the abdominal spots.

*Diagnosis:* Males have a brown spot on the *ep* and females have a brown spot on the midline of *tg* 2–7 (sometimes restricted to *tg* 5–7); *acrs* in 6–8 irregular rows at the level of the transverse suture, *mtn* yellow to brown; the apical section of Cu is equal to the distance between the crossveins.

*Description:*

*Male.*

*Head:* All yellow except for black *oc* triangle; *fr* (distorted in type; description supplemented from paratype with same data) broader than half width of head, narrowed anteriorly, at level of antennae 0.7 width at level of anterior *oc*, and 0.5 width of one eye, viewed from in front; *fr* protruding above antennae. Gena recessed so that in profile it is distinctly narrower anteriorly; depth below middle of eye about 0.8 height of eye; gena yellow with pale setulae. *ocp* in profile clearly visible behind eye, with short postocular setulae in one irregular row; isolated lower post-genal seta long and golden yellow. Mouthparts small, all yellow; setulae of buccal margin relatively long especially the upper 4. Face depressed, with distinct but low linear carina. Antenna with both second and third segments equally pale, second with distinct short dark seta dorsally; third segment round, finely pubescent, hairs a little shorter than diameter of arista at base; arista black to base and completely bare. Chaetotaxy: 3 strong *orbs*, anterior slightly inclinate, middle and posterior *orb* reclinate but also somewhat divergent, middle *orb* closer to first than the hind *orb*; about 10 fine pale setulae on *orb* plate between *orb*; in addition, about 16 fine pale brown setulae scattered on *fr*; *pvt* cruciate, about half length of hind *orb*; 1 *vti* and 1 *vte*; *oc* as long as hind *orb*, proclinate and divergent.

*Thorax:* *msn*, *scut* and pleura all yellow; *mtn* pale brown. Chaetotaxy: 1 *hu*, 1 *psthu*, 2 *ntpl*, 1 *sa*, 1 *pa*, 2 *dc* decreasing in size from back to front, *acrs* in 6–8 irregular rows at transverse suture; 2 longer distinct prescutellar *acrs*; 1 *mspl*, 1 *stpl*, both with a few setulae in front.

*Wing:* Hyaline, veins all pale yellow, distance on costal margin between  $R_{2+3}$  to  $R_{4+5}$  is 0.7 that between  $R_{4+5}$  and  $M_{1+2}$ ; distance between crossveins equal to length of apical section of Cu. Haltere yellow.

*Legs:* Not modified except for slightly thicker fore and hind femora; generally fine

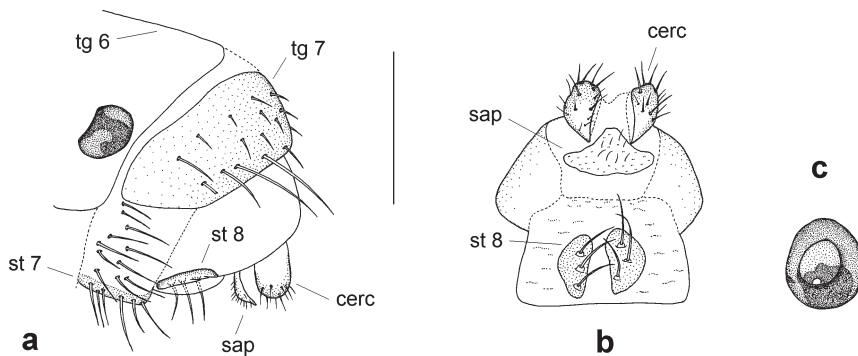


Fig. 10. *G. maculiventris* sp. n., female postabdomen, lateral (a) and ventral (b) views, and (c) spermatheca, enlarged. Scale bar = 0.2 mm.

yellow setulae scattered on all pairs of legs and in addition longer setae present on fore femur.

**Abdomen:** All *tg* and *st* yellow and with pale setae.

**Postabdomen:** *ep* with a black almost triangular spot on posterior surface; this spot, even when large, does not extend as far as anterior margin or posteroinferior margin of *ep*, cerci small and finely setulose; *surs* long, curved, with slightly undulating outline and distinct seta directed laterally at apex; *hyp* broad and short; *ph apd* narrow and well sclerotised and more curved than usual; *ej apd* and tubule distinct, but small; *prg* triangular and setose on outer surface below, *psg* not identified; distiphallus asymmetrical and relatively small and simple.

**Female.**

Differs as follows: *msn* with a short dark mark just lateral to *dc* line posteriorly; abdomen with brown spot on middle of *tg* 2–7; setae and setulae stronger; postabdomen (Fig. 10) with paired sclerites of *st* 8 comparatively small, but each with strong setae placed on minute tubercles.

**Length:** ♂ 1.6 mm, wing 1.6 mm; ♀ 1.7 mm, wing 1.8 mm.

**Variation:** Markings on *msn* generally absent in males, but variably present in females and vary in intensity of pattern and colour; posterior crossvein often oblique and distance between crossveins sometimes equal to apical section of Cu; *dc* may be better developed in females but there is never one in front of suture; in darker specimens, setae and setulae are often dark brown almost black; *mtn* varies from yellow (the more usual) to brown.

**Holotype:** ♂ SOUTH AFRICA: *Western Cape*: Mossel Bay, vii.1938, R.E. Turner (NHML, B.M. 1939-98).

**Paratypes:** SOUTH AFRICA: *Western Cape*: 1♂ 1♀ same data (NHML, B.M. 1939-98); 1♂ 1♀ same data (NMC); 1♂ same data (NMSA); 1♂ 3♀ same data, but vi–vii.1930 (NHML, B.M. 1930-402); 1♀ Mossel Bay, ii.1922, R.E. Turner (NHML, B.M. 1922-97); 1♀ Mossel Bay, v.1936, R.E. Turner (NHML, B.M. 1930-266); 1♀ Cape Hermanus, Hoy's Hill, 7.x.1993, 34°25'S:19°14'E, 60 m, Flowers & Dassie hole, J.G.H. Londt (NMSA). *Eastern Cape*: 1♀ Aliwal North, xii.1922, R.E. Turner (NHML, B.M. 1923-45); 1♀ Katberg, 1–10.ii.1933, R.E. Turner (NHML, B.M. 1939-139); 1♀ Barkly East District, Lundean Nek, 1925–2000 m, 18.i.1963, B. & P. Stuckenberg (NMSA). *KwaZulu-Natal*: 1♀ Eshowe, 6–31.v.1926, R.E. Turner (NHML, B.M. 1926-232); 5♀ Pietermaritzburg, 6.i.1954, 16.xi.1954, 24.xi.1954, 25.xi.1954, 1.xii.1954, B. Stuckenberg (NMSA); 3♀ Pietermaritzburg, 17.x.1983, 18.x.1983, on window, R.M. Miller (NMSA); 1♀ Pietermaritzburg, 20.i.1993, 29°34'S:30°20'E, 900 m, Montrose house, J.G.H. Londt (NMSA).

***Gymnochiromyia malagasica* sp. n.**

Fig. 11

**Etymology:** Named for Madagascar, where the holotype was collected.

**Diagnosis:** A completely yellow species except for a narrow darker line laterally on the *msn*; distance between  $R_{2+3}$  and  $R_{4+5}$  on costa equal to distance between  $R_{4+5}$  and  $M_{1+2}$ ; distance between crossveins 1.4 length of posterior crossvein; these proportions are unique among the species so far described in this genus.

**Description:**

*Male.*

**Head:** All yellow, including *oc* triangle and *oc*; *fr* broad with margins only slightly convergent, at level of antennae 0.9 width at level of anterior *oc* and 1.2 width of eye; *fr* protruding only slightly above antennae; *ocp* in profile barely visible behind eye, with short postocular setulae in one irregular row; isolated lower post-genal seta distinct, pale, almost white. Eye oval, long axis lying almost horizontal. Gena narrower anteriorly; depth below middle of eye about half height of eye, yellow with very pale setulae. Mouthparts small, all yellow; setulae of buccal margin short except for two long setae just below vibrissal angle. Face depressed and poorly sclerotised. Antenna yellow, second segment paler than third, with distinct pale seta dorsally; third segment round and rather smaller than congeners: pubescence a little shorter than diameter of arista at base; arista entirely yellow. Chaetotaxy: 3 *orbs* on right side, but 4 on left (middle *orb* duplicated); *pvt* short, but distinct and crossed; 1 *vti* and 1 *vte* both strong; *oc* 0.75 length of hind *orb*, proclinate and laterocline, 0.75 length of *vti*; setae of *fr* and vertex yellow.

**Thorax:** Entirely yellow; *msn* on each side with a narrow darker yellow stripe of apparently coarser texture, running from transverse suture to hind margin between *sa* and *ia* lines; *hu* callus of similar texture. Chaetotaxy: 1 *hu* and 3 short setulae, 1 *psthu*, 2 *ntpl*, 1 short *sa*, 1 *pa*, 0+1 *dc* with a much shorter seta in front, *acrs* in 6 rows at transverse suture increasing in number posteriorly, prescutellar pair short and wider apart than usual, thus each is distinctly closer to hind *dc* than to each other; 1 *mspl*, 1 *stpl*, both with a shorter adjacent seta and white setulae in front.

**Wing:** Hyaline, veins all pale yellow, distance between  $R_{2+3}$  and  $R_{4+5}$  on costa equal to distance between  $R_{4+5}$  and  $M_{1+2}$ ; distance between crossveins 1.4 length of posterior crossvein. Haltere pale yellow.

**Legs:** Not modified except for slightly thicker front femur; pale setae and setulae scattered on all pairs of legs, in addition longer setae present on fore femur.

**Abdomen:** All *tg* and *st* pale yellow and with short setulae.

**Postabdomen:** *ep* appears more globular than congeners, *ph apd* short and broad, *hyp* more or less parallel-sided in side view and small; *prg* small, narrow and very finely setulose, *surs* sinuate and truncate at apex, *psg* and *bac scl* not identified, distiphallus complex and mostly membranous.

*Female.* Unknown.

**Length:** ♂ 1.5 mm, wing 1.4 mm.

**Holotype:** ♂ MADAGASCAR: coastal dry scrub north of Toliara, 15.ii.1984, M. von Tschirnhaus, in alcohol (tube label: 1179) (ZSM).

***Gymnochiromyia maraisi* sp. n.**

Figs 2b, 12, 13

**Etymology:** Named in honour of Eugene Marais, who collected the species in Namibia.

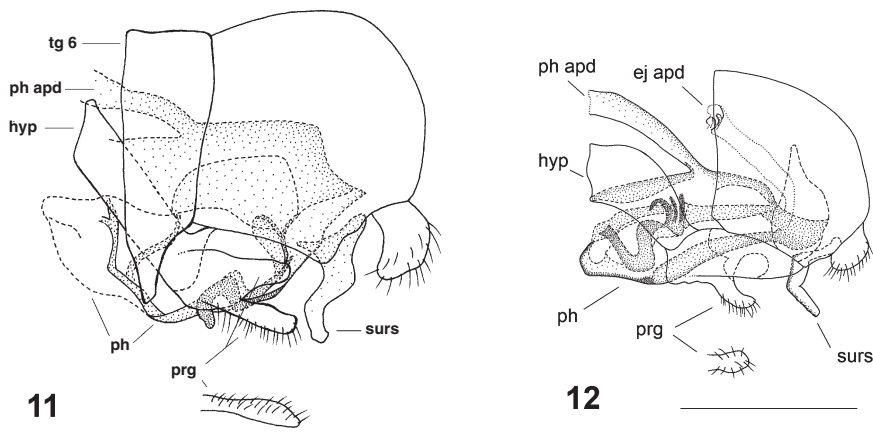
**Diagnosis:** A pale yellow species with an outward appearance very similar to *maculiventris*, but the hypopygium is similar to *stuckenbergi*; the male has a brown spot on the *ep* and females have a brown spot in the midline only on *tg* 7; *acrs* in 6–8 irregular rows at the level of the transverse suture, *mtn* yellow.

**Description:**

*Male.*

**Head:** All yellow except for some darkening in the middle of *oc* triangle; *oc* red ringed with black; *fr* narrow, at level of anterior *oc* equal to width of eye viewed from above and at level of antenna half width of that at level of anterior ocellus; in profile, *fr* protruding slightly just above antennae and visible at level of *oc* triangle; scattered upon it are about 10 very short and fine pale yellow setulae. Gena recessed so that it is distinctly narrower in front than behind; below middle of eye it is about 0.9 height of eye; gena yellow with very pale setulae; isolated lower post-genal seta short and pale, but distinct. Mouthparts all yellow; palp short somewhat spatulate; setulae of oral margin relatively long especially 2 just below vibrissal angle. Face depressed, with low linear carina. Antenna with both second and third segments equally pale yellow, second with distinct short pale seta dorsally; third segment round, finely pubescent: hairs a little shorter than diameter of arista at base; arista except for first segment black, clearly though finely pubescent. Chaetotaxy: 3 equally long *orb*, *oc* divergent and proclinate and about 0.75 length of posterior *orb*, *pvt* relatively long and crossed and about 0.5 length of *vte* and, *vti* which are the longest setae on head; postocular setulae relatively long, but sparse and in 1 regular row.

**Thorax:** Entirely pale yellow, only *msn* a little deeper yellow in colour and unstriped; *mtn* clear yellow. Chaetotaxy: 1 *hu* with 2 setulae adjacent, 1 *psthu*, 2 *ntpl*, 1 *sa*, 1 *pa*, 2 *dc* decreasing in size from back to front, *acrs* in 6–8 irregular rows at transverse suture; 2



Figs 11, 12. Male hypopygia, lateral aspect: (11) *G. malagasica* sp. n., (12) *G. maraisi* sp. n. Scale bars = 0.2 mm.

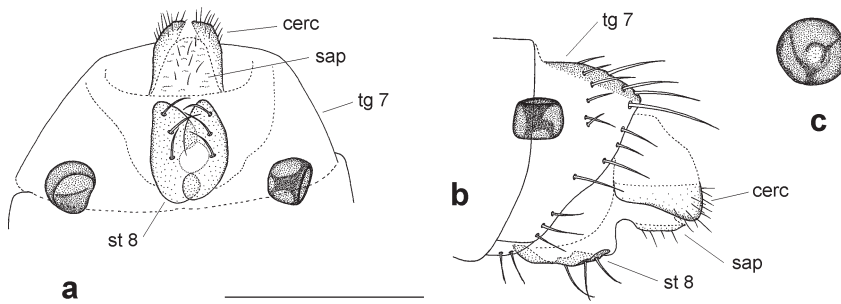


Fig. 13. *G. maraisi* sp. n., female postabdomen, ventral (a) and lateral (b) views, and (c) spermatheca, enlarged. Scale bar = 0.15 mm.

short but distinct prescutellar *acrs*; 1 *mspl*, 1 *stpl*, both with long white setulae in front.

Wing: Hyaline, veins all pale yellow, distance on costal margin between  $R_{2+3}$  to  $R_{4+5}$  is 0.8 that between  $R_{4+5}$  and  $M_{1+2}$ ; distance between crossveins about 0.8 length of apical section of Cu. Haltere yellow.

Legs: Not modified except for slightly thicker fore and hind femora; generally fine yellow setulae scattered on all pairs of legs and in addition longer setae present on fore femur.

*Abdomen*: All *tg* and *st* yellow and with pale brown setae, which on dorsum only about 1/3 length of *tg*.

*Postabdomen*: *ep* with small oval brown spot on middle third of posterior surface; cerci small pale and finely setulose; *surs* long, strongly angled, with rough anteroventral margin; *hyp* broad and short; *ph apd* normal; *ej apd* distinct with its broad tubular connection to basiphallus clearly visible though translucent; *prg* broad at base, narrowing distally to truncate end and setulose on outer surface below, *psg* not identified, distiphallus large and complex, more or less globular relatively symmetrical and at apex, within the circular outline, when viewed from in front a distinct tubular structure is evident.

#### *Female.*

As in male except for secondary sexual characters, but with the following additional differences: *fr* setulae brown, abdomen with dull brown spot in middle of *tg* 7; setae and setulae on abdomen darker than in male. Postabdomen (Fig. 13) with paired sclerites of *st* 8 close to each other and each with the medial margin distinctly curved.

*Length*: ♂ 1.5 mm, wing 1.6 mm; ♀ 1.7 mm, wing 2.0 mm.

*Variation*: Females are remarkably uniform.

*Holotype*: ♂ NAMIBIA: *Brandberg District*: Brandberg, Mason Shelter, 21°04'39"S:14°05'43"E, 05–14.iii.2002, 1750 m, Malaise trap, riverbed, A.H. Kirk-Spriggs & E. Marais (NMNW).

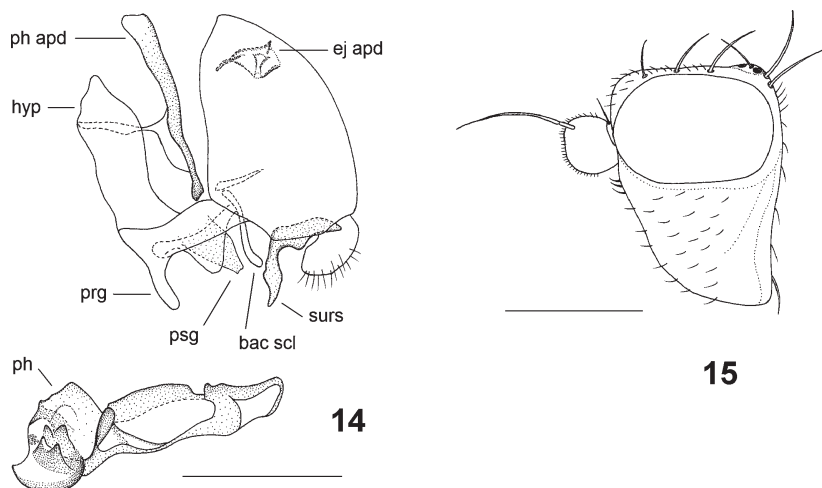
*Paratypes*: NAMIBIA: 3 ♀ same data and depository; 1 ♀ same data (NMC); 1 ♀ same data (NMSA); 1 ♂ 1 ♀ Brandberg, below Wasserfallfläche, 21°10'43"S:14°32'51"E, 18–22.iii.2001, McPhail trap baited with NU lure & mono-ethylene glycol, A.H. Kirk-Spriggs & E. Marais (NMNW).

### *Gymnochiromyia megacephala* sp. n.

Figs 14–16

*Etymology*: From Greek *mega* (large) and *cephalos* (head); after the characteristically large head.





Figs 14, 15. *G. megacephala* sp. n.: (14) male hypopygium, lateral view; (15) head, lateral view. Scale bars = 0.2 mm.

**Diagnosis:** A pale yellow species with a remarkably large head, in some specimens almost as large as thorax excluding *scut*; markedly protruding *fr* and deeply recessed gena; *acrs* in 4–6 irregular rows at the level of the transverse suture, rapidly decreasing behind, so that at the level of the hind *dc* or even before there are often only two rows; no developed prescutellars; 1–2 *dc*, *mtn* yellow to brown.

#### Description:

##### Male.

**Head:** All yellow except for black *oc* triangle; *fr* broader than half width of head, narrowing anteriorly where at level of antennae it is 0.5 width that at level of anterior *oc*, and 0.6 width of one eye, viewed from in front; *fr* protruding above antennae. Gena markedly recessed so that it is much narrower in front than behind; below middle of eye it is about 1.2 height of eye; gena yellow with pale setulae. *ocp* in profile clearly visible behind eye, with short postocular setulae in one irregular row; isolated lower post-genal seta distinct. Mouthparts small, all yellow; setulae of oral margin relatively short. Face depressed poorly sclerotised except for a narrow median line. Antenna yellow, second segment paler than third, with distinct short dark seta dorsally; third segment round, finely pubescent: hairs a little shorter than diameter of arista at base; arista pale yellow and completely bare. Chaetotaxy: 3 strong *orbs*, anterior slightly reclinate, middle and posterior *orb* reclinate, all more or less equidistant from each other and with a few fine setulae on *orb* plate between them; in addition, about 30 fine white setulae scattered on *fr*; *pvt* very short, indistinct; 1 *vti* and 1 *vte*; *oc* as long as hind *orb* proclinate and laterocline.

**Thorax:** All yellow with pale yellowish brown markings on *msn*: two broad stripes from anterior margin between *dc* and *ia* lines reaching just beyond wing base, and two central stripes between the *dc* lines reaching half way to scutellum; scutellum, *mtn* and pleura yellow. Chaetotaxy: 1 *hu*, 1 *psthu*, 2 *ntpl*, 1 *sa*, 1 *pa*, 1 *dc* with a shorter one in front, *acrs* in 4–6 irregular rows at transverse suture decreasing markedly in number posteriorly; 1 *mspl*, 1 *stpl*.

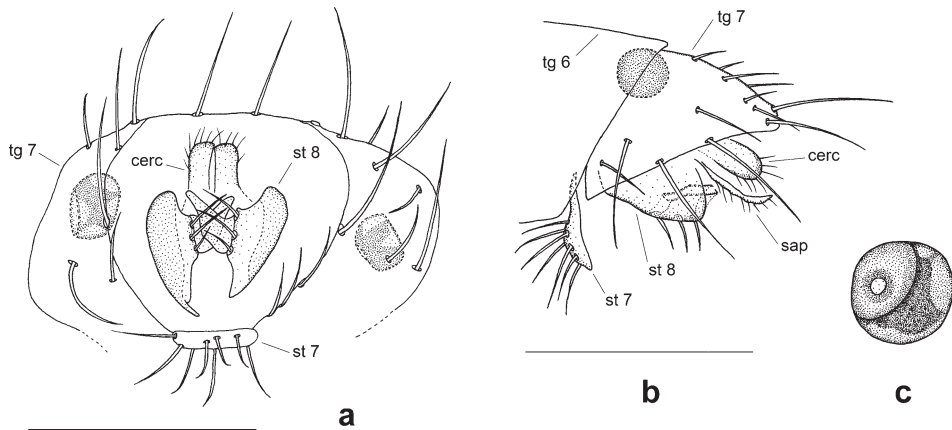


Fig. 16. *G. megacephala* sp. n., female postabdomen, ventral, with *sap* omitted (a) and lateral (b) views, and (c) spermatheca, enlarged. Scale bars = 0.2 mm.

Wing: Hyaline, veins all pale yellow, distance on costal margin between  $R_{2+3}$  to  $R_{4+5}$  is 0.8 that between  $R_{4+5}$  and  $M_{1+2}$ ; distance between crossveins about 0.8 length of apical section of Cu. Haltere yellow.

Legs: Not modified except for slightly thicker femora; generally fine setulae scattered on all pairs of legs and longer setae present on fore femur; claws and pulvilli normal.

*Abdomen*: All *tg* and *st* yellow and with pale setae, the longest about half length of *tg*. Postabdomen: *ep* a little narrower than usual for genus, cerci relatively large and finely setulose; *surs* long, pointed, curved and with undulating outline; *hyp* broad and short; *ph apd* well sclerotised; *ej apd* distinct and trapezoidal in shape; *prg* lobate and bare, *psg* similar, but appears narrow in profile; distiphallus asymmetrical and enlarged.

#### Female.

As in male, except for secondary sexual characters. Postabdomen (Fig. 16) with characteristically shaped sclerites of *st* 8 each having a medially directed flange; *st* 7 small but strongly setose.

*Length*: ♂ 1.6 mm, wing 1.6 mm; ♀ 1.8 mm, wing 2.0 mm.

*Variation*: Markings on *msn* vary in intensity of pattern and colour; depth of gena variable but never less than eye depth and always strongly receding; distance between crossveins sometimes equal to apical section of Cu; a third short *dc* may be present, but this always behind suture; in darker specimens the apical 2/3 of arista may be brown, as may the larger setae on thorax; there may be anything from 0+1 to 1+4 *dc*, in the case of the latter the first 2 to 3 are always much shorter than the hindmost *dc*; the usual number of *dc* is 0+2.

*Holotype*: ♂ SOUTH AFRICA: *Eastern Cape*: Jeffrey's Bay, dune vegetation, 2.xi.1978, R.M. Miller & J. Londt (NMSA, 1179).

*Paratypes*: SOUTH AFRICA: *Eastern Cape*: 9♂ 5♀ same data; 2♂ 2♀ same data (MJE); 2♂ 2♀ same data (NMC); 2♂ 2♀ same data (NMNW); 2♂ 2♀ same data (TAU); 2♂ same data (ZSM); 1♀ Kleinmond, 7.x.1953, B. Stuckenberg (NMSA); 4♂ 7♀ Port Elizabeth, Zwartkops R. coastal dunes, 29.x.1964, B. & P. Stuckenberg (NMSA); 1♂ 11♀ 11 km SW Alexandria Boknes, 3326DA, coastal dune vegetation, 3.xi.1978, J. Londt & R.M. Miller (NMSA); 2♀ same data (ZSM); 1♀ Transkei, The Haven, coastal dunes, 24-28.vi.1979, 3228Bb, R. Miller & B. Stabbins (NMSA). *Western Cape*: 2♂ 2♀ Milnerton, i.1926, R.E. Turner

(Brit. Mus. 1926-71) (NHML); 1 ♀ Mossel Bay, 13.xii.1938, R.E. Turner (Brit. Mus. 1939-56) (NHML); 1 ♀ 2.5 mi. S Elandsbaai, coastal sand dunes, 30 ft, 16.xi.1972, M.E. & B.J. Irwin (NMSA); 1 ♀ Arniston, 10 m, low coastal dunes, 22.viii.1973, M.E. Irwin (NMSA). *KwaZulu-Natal*: 1 ♀ 15 km NE Howick, Karkloof falls, 1500 m, 14.ii.1979, R.M. Miller (NMSA).

### ***Gymnochiromyia milleri* sp. n.**

Figs 17, 18

**Etymology:** Named after R.M. Miller, who collected this species.

**Diagnosis:** A yellow species with brown stripes running the length of *msn* near midline; entirely yellow pleura and *ep*; *scut* distinctly broader than long.

**Description:**

*Male.*

**Head:** Shrivelled, yellow with only *oc* triangle black; *fr* with about 30 fine white setulae; antenna and first two segments of arista yellow, remainder of arista black; mouthparts yellow, palp cylindrical; gena yellow and although somewhat shrivelled, appears to be less than height of eye; usual 3 *orb*, 1 *vti*, 1 *vte* and shorter *pvt*; *oc* as long as posterior *orb* and about 1.8 length of *pvt*.

**Thorax:** *msn* dull yellow with 2 brown stripes along midline reaching to anterior *dc*, *scut* yellow, broad at base about 1.4 its length; *mtn* and all pleura yellow. Chaetotaxy: 1 long and 1 short *hu* with setula between them, 1 *psthu*, 2 *ntpl*, 1 *sa*, 1 *pa*, 1 *stpl* and 1 *mspl* with a few setulae in front of each, 0+2 *dc*, *acrs* relatively long in 4 irregular rows, prescutellar weak, less than 1/3 length of posterior *dc*; 1 *mspl*, 1 *stpl*.

**Wing:** Hyaline, veins all pale yellow, distance on costal margin between  $R_{2+3}$  to  $R_{4+5}$  is 0.6 that between  $R_{4+5}$  and  $M_{1+2}$ ; distance between crossveins about 0.5 length of apical section of Cu. Haltere yellow.

**Legs:** Yellow and brownish yellow setulose with no special modifications except slight dilatation of femora.

**Abdomen:** All yellow with moderately long brown setulae.

**Postabdomen:** *ep* all yellow and covered with rather denser than usual brown setulae, with strong anteroventral angle at point of fusion with *hyp*, cerci small and finely setulose, *ph apd* narrow, *ej apd* small but distinct with narrow tubule visible to basiph, *prg* trapezoidal and finely setulose, *psg* small, *surs* with apex curved anteriorly, *bac scl* distinct, distiphallus broad apically and with pointed lobe.

*Female.*

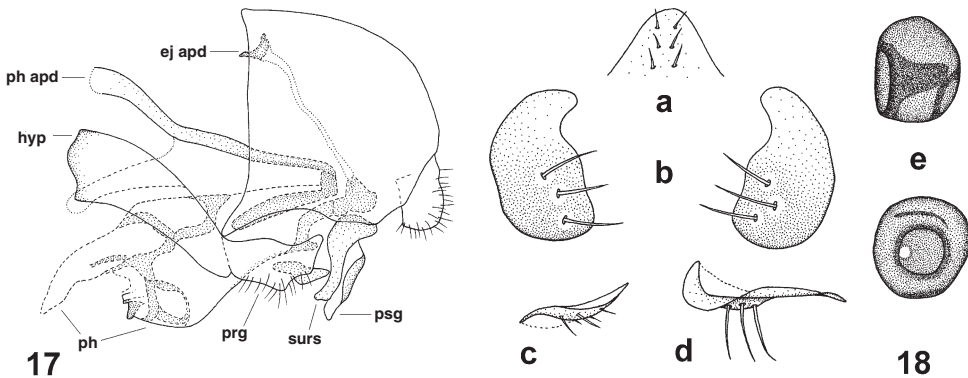
As in male except for secondary sexual characters. Postabdomen (Fig. 18) similar to *maculiventris*, but sclerites of *st* 8 with setae placed more medially and not on minute tubercles and rostral edge of each sclerite distinctly curved towards dorsum of abdomen.

**Length:** ♂ 1.5 mm, wing 1.6 mm; ♀ 1.7 mm, wing 2.0 mm.

**Variation:** Markings on *msn* barely discernable in two specimens whereas eight specimens have additional short stripes laterally to middle pair and three specimens have setulae of first costal section longer than thickness of costa.

**Holotype:** ♂ SOUTH AFRICA: *Western Cape*: 10 km SE Vanrhynsdorp, along river, Malaise trap, 14.x.1977, R.M. Miller (NMSA, 1186).

**Paratypes:** 9 ♀ same data and depository; 2 ♀ same data (NMC).



Figs 17, 18. *G. milleri* sp. n.: (17) male hypopygium, lateral view, scale bar = 0.25 mm; (18) female: ventral views of subanal plate (a) and st 8 (b), lateral views of subanal plate (c) and st 8 (d), and spermathecae (e), scale bar = 0.1 mm.

### *Gymnochiromyia nubilipennis* sp. n.

Fig. 19

**Etymology:** From Latin *nubilus* (cloud) and *penna* (wing); the combination refers to the coloured patch on the wing of the males.

**Diagnosis:** This species is characterized by unusually long setae especially vertical and *scut*; by 2 black *msn* stripes lateral to *dc* lines that may continue on to lateral boarder of the *scut*; male with a brown patch in anterior half of apical third of wing. Among the Chyromyidae known so far, this is the only species that has a coloured patch on the wing in the male.

**Description:**

*Male.*

**Head:** Somewhat shrivelled, yellow with black *oc* triangle; *fr* narrowing towards antennae, yellow (discoloured posteriorly due to post mortem changes) with about 8 fine white setulae; gena pale yellow about 0.65 height of eye; face poorly sclerotised and depressed; antenna yellow, third segment with dense fine pubescence around anterior margin; second segment with long yellow seta dorsally; arista black almost to base of third segment, but first two segments all yellow; peristomal setae white, as long as those on gena; isolated post-genal seta long; postocular setulae long and 2 irregular rows; *vti* and *vte* very long, *vti* about twice as long as hindmost of 3 *orb*; *oc* and *pvt* of equal length and about as long as anterior *orb*.

**Thorax:** *msn* pale brown; anteriorly just above neck a pair of very short broad black confluent stripes narrowly separated in midline only posteriorly, these do not extend beyond hind margin of *hu*; lateral to these and medial to *hu*, but set back a little is a round black spot; in line with this but commencing behind transverse *msn* suture is another narrower black stripe that continues along lateral boarder of *scut* and on to *mtn*, itself all black; viewed from above, *hu* and *ntpl* appear contrastingly pale yellow; pleura entirely pale yellow apart from dark brown spot on *hypl* and around base of haltere. Chaetotaxy: 0+2 *dc* set far back, *acrs* in 6 irregular rows, prescutellar pair almost as long as hind *dc*, 2 *hu*, (one long, one short), 1 *psthu*, 2 *ntpl*, 1 short *pra* (in holotype

only), 1 *sa*, 1 *pa*, 2 usual pairs of *scut* but apical pair almost twice as long as basal pair, 1 *mspl*, 1 *stpl*, in addition several long white setulae on both sclerites.

Wing: Veins brown except M vein along discal cell and posterior cross vein, both of which are very pale yellow; wing membrane with oval brown patch in apical half extending from costa to midway between  $R_{4+5}$  and  $M_{1+2}$  and sparing the wing apex; setulae on first costal section unusually long, about 1.5 to 2 thickness of costa; distance on costal margin between  $R_{2+3}$  to  $R_{4+5}$  is 0.5 that between  $R_{4+5}$  and  $M_{1+2}$ ; distance between crossveins about 0.7 length of apical section of Cu. Haltere yellow.

Legs: All yellow and yellow setulose without special modifications apart from slightly dilated femora.

*Abdomen*: *tg* dark brown, moderately shining; only extreme lateral margin yellow; dark brown setulae about as long as *tg*.

Postabdomen: *ep* dark brown, cerci pale and finely setulose; *surs* short, broad at base, curved and markedly tapering to a blunt end at apex; *hyp* broad and short; *ph apd* narrow and poorly sclerotised; *ej apd* small, indistinct and bilobed; *prg* large, trapezoidal and finely but densely setulose, *psg* small; *ph* asymmetrical and enlarged giving the impression of being spherical at apex.

#### *Female.*

Similar to male, but third segment of antenna with large brown spot on both sides, *msn* stripes shorter, *msn* dull yellow rather than pale brown, abdomen with lighter brown *tg* and wing without coloured patch.

*Length*: ♂ 1.6 mm, wing 1.5 mm; ♀ 1.7 mm, wing 1.9 mm.

*Variation*: Male paratype is more like the females in colouring and *msn* stripes much less developed; *tg* including *ep* brown only centrally; however, the wing marking extends beyond M vein towards hind margin.

*Holotype*: ♂ NAMIBIA: *Brandberg District*: Brandberg, Mason Shelter, 21°04'42"S:14°35'33"E, 05–14.iii.2002, 1750 m, light-trap, A.H. Kirk-Spriggs (NMNW).

*Paratypes*: 2 ♀ same data and depository; 1 ♂ 1 ♀ same data (NMSA).

### ***Gymnochiromyia pretoriella* sp. n.**

Fig. 20

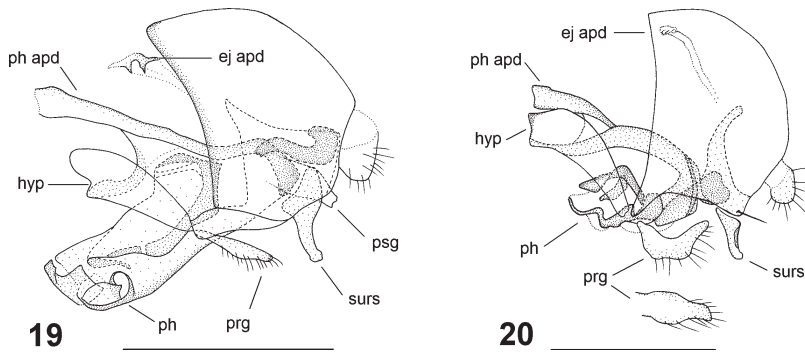
*Etymology*: Named after Pretoria, the South African city where it was found.

*Diagnosis*: This is a small entirely yellow species with the hypopygium distinctly larger than is usual in the genus: it forms approximately 1/3 the volume of the whole abdomen, whereas in other species 1/5 to 1/4 is more typical. Otherwise, there are no external distinguishing features.

#### *Description*:

##### *Male.*

*Head*: All yellow except for brownish *oc* triangle; *fr* narrower than half width of head, markedly narrowed anteriorly: at level of antennae 0.4 width that at level of anterior *oc* and 0.6 width of one eye viewed from front. Gena, more or less symmetrically rounded lower margin; in profile, below middle of eye, about equal to height of eye; yellow and pale haired. *ocp* in profile barely visible behind eye, with short postocular setulae in



Figs 19, 20. Male hypopygia, lateral aspect: (19) *G. nubilipennis* sp. n., scale bar = 0.25 mm; (20) *G. pretoriella* sp. n., scale bar = 0.2 mm.

one irregular row; isolated lower post-genal seta long and golden yellow. Mouthparts small, all yellow; setulae on oral margin short. Face poorly sclerotised and depressed, barely visible. Antenna yellow, second segment paler than third with distinct short pale brown seta dorsally; third segment round, finely pubescent: hairs shorter than diameter of arista at base; arista brown almost throughout and completely bare. Chaetotaxy: 3 strong *orbs*, anterior inclinate and closer to middle *orb* than latter is to hind *orb*; *pvt* short, but distinct and crossed; 1 *vti* and 1 *vte*; *oc* about half length of hind *orb*, proclinate and laterocline; about 4 minute pale setulae across middle of *fr*, none on *orb* plate.

**Thorax:** Entirely yellow including *mtn*. Chaetotaxy: 1 *hu*, 1 *psth*, 2 *ntpl*, 1 short *pra*, 1 *sa*, 1 *pa*, 1 *dc*, *acrs* very short in 6–8 irregular rows, one prescutellar pair distinctly longer; 1 *mspl*, 1 *stpl*.

**Wing:** Hyaline, veins all pale yellow, distance on costal margin between  $R_{2+3}$  to  $R_{4+5}$  is  $0.8\times$  that between  $R_{4+5}$  and  $M_{1+2}$ ; distance between crossveins about 0.5 length of apical section of Cu. Haltere yellow.

**Legs:** Not modified except for very slightly thicker femora; fine setulae scattered on all pairs of legs, in addition to somewhat longer setae on fore femur.

**Abdomen:** Entirely yellow, *tg* relatively short with numerous setae and setulae, longest about half as long as *tg*.

**Postabdomen:** Hypopygium about as large as the preceding two visible abdominal segments together; *ep* large without markings, but with distinct seta at the ventrocaudal angle; *surs* short but distinct and slightly curved medially at apex; cerci very small and finely setulose; *hyp* distinctly broader basally in profile; *ph apd* short, narrow, broad only at base; *ej apd* very small and tubule visible; *prg* trapezoidal and setulose on margin; *psg* not identified, *ph* complex, subquadrate and asymmetrical.

#### *Female.*

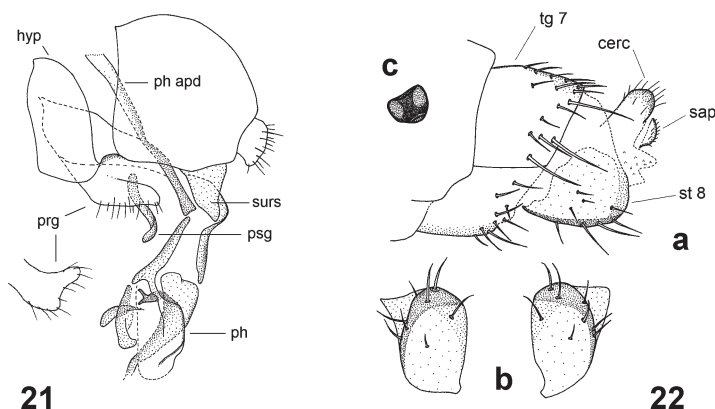
Similar to male except for absence of secondary sexual characters; and setae more brownish.

**Length:** ♂ 1.2 mm, wing 1.2 mm; ♀ 1.4 mm, wing 1.4 mm.

**Variation:** None noted.

**Holotype:** ♂ SOUTH AFRICA: Gauteng: Pretoria, Roodeplaat Dam N.R., 25 km NE Pretoria, 2.i.1995, A. Freidberg (TAU).





Figs 21, 22. *G. punctata* Ebejer: (21) male hypopygium, lateral view, scale bar = 0.25 mm; (22) female postabdomen, lateral view (a), st 8, ventral view (b), spermatheca (c), scale bar = 0.15 mm.

Paratypes: SOUTH AFRICA: *Gauteng*: 1 ♀ same data and depository as holotype; 2 ♂ Hartbeespoort, 25 km W Pretoria, 30.xii.1994, A. Freidberg (TAU).

### *Gymnochiromyia punctata* Ebejer, 1996

Figs 2f, 21, 22

*Gymnochiromyia punctata*: Ebejer 1996: 297.

Although this is not a Southern African species, it is included here as the only other species known from the Afrotropical Region until now. The type series has been re-examined and additional material listed below have been studied. The holotype had not been dissected, but a drawing was given of the postabdomen *in situ*. As more detailed postabdominal dissections are now required, the macerated postabdomens of a male and a female from the type locality (though not from the type series) are here illustrated.

Material examined: ♂ holotype and 15 ♂ 11 ♀ paratypes (NMC); YEMEN: 1 ♀ Ta'izz, 5.i–2.ii.1998, light trap, A. van Harten & A. Awad (NMNW); 1 ♂ 1 ♀ Ta'izz, x.1999, light trap, A. van Harten & A. Awad (TAU); 1 ♂ same data (NMNW); 1 ♂ same data (NHML); 1 ♂ 1 ♀ Sana'a, vii.1999, light trap, A. van Harten (NMSA); 1 ♀ 3.iv.1999, light trap, A. van Harten (NHML).

### *Gymnochiromyia setulosa* sp. n.

Figs 2c, 23

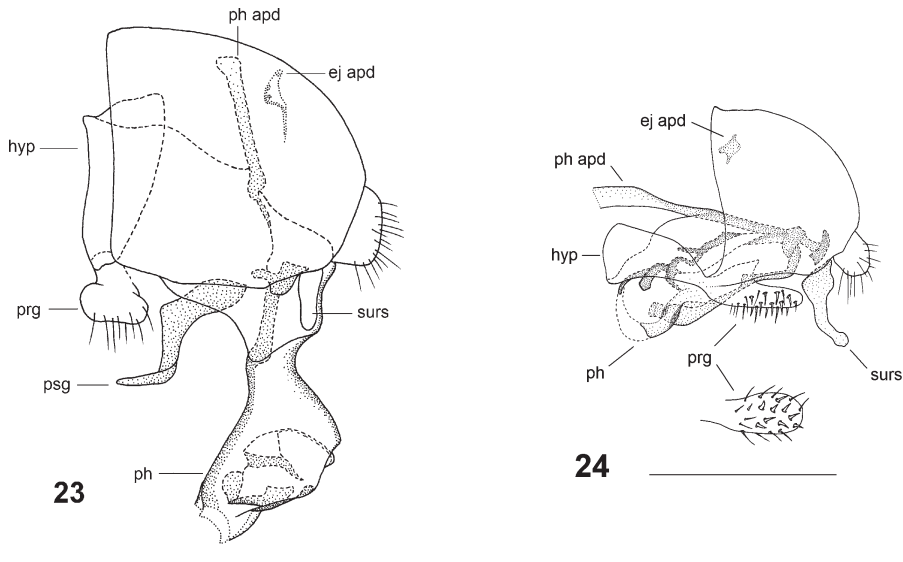
**Etymology:** From Latin *setulae*, diminutive of *setae* (bristles); after the more than usual numerous setulae.

**Diagnosis:** A completely yellow species very similar to *gilva*, and also with a dark brown spot on the *ep*; *acrs* shorter and in 8 irregular rows; generally paler setae and setulae; frons narrowing more markedly at level of antennae.

**Description:**

*Male.*

**Head:** All yellow; *oc* triangle yellow with *oc* ringed black; *fr* narrow, at level of antennae 0.45 width of that at level of anterior *oc*. *ocp* in profile just visible behind eye, with short postocular setulae in one irregular row; isolated lower post-genal seta distinct, pale almost white. Gena narrower in front than behind; below middle of eye it is about



Figs 23, 24. Male hypopygia, lateral view: (23) *G. setulosa* sp. n., scale bar = 0.2 mm; (24) *G. spinifera* sp. n., scale bar = 0.3 mm.

0.9 height of eye, yellow with pale golden yellow setulae. Mouthparts small, all yellow; setulae of oral margin relatively short except for one long seta just below vibrissal angle. Face depressed and poorly sclerotised. Antenna yellow, second segment paler than third, with distinct pale seta dorsally; third segment round, finely white pubescent: pubescence very short; arista with black second segment and yellow first two segments. Chaetotaxy: 3 strong *orbs*, anterior inclinate, middle and posterior *orb* reclinate, all more or less equidistant from each other and with a few fine setulae on *orb* plate between them; in addition, about 30 fine pale setulae scattered on *fr*; *pvt* distinct and crossed; 1 *vti* and 1 *vte*; *oc* as long as hind *orb*, proclinate and lateroclinate. Setae of *fr* and vertex yellow.

**Thorax:** Entirely yellow; *msn* darker yellow but without stripes, rather densely short setulose. Chaetotaxy: 2 *hu*, one long and one short, 1 *psthu*, 2 *ntpl*, 1 *sa*, 1 *pa*, 2 *dc*, *acrs* in 8–10 irregular rows at transverse suture increasing in number posteriorly, prescutellar distinct; 1 *mspl*, 1 *stpl*, both with pale setulae in front.

**Wing:** Hyaline, veins yellow, distance on costal margin between  $R_{2+3}$  to  $R_{4+5}$  is 0.6 that between  $R_{4+5}$  and  $M_{1+2}$ ; distance between crossveins about equal to length of apical section of Cu. Haltere yellow.

**Legs:** Not modified except for slightly thicker femora; pale yellow setae and setulae scattered on all pairs of legs.

**Abdomen:** All *tg* and *st* yellow and with yellow setae and setulae, the longest on lateral aspect of *tg* about 3/4 length of *tg*.

**Postabdomen:** *ep* slightly elongated, cerci pale and finely setulose; *surs* short and pale with rounded apex, *hyp* small, *ph apd* narrow and short, *ej apd* distinct, *prg* small and round, finely setulose, *psg* small and sinuous, *ph* large and asymmetrical, *bac scl* not identified.

*Female.* Similar to male but without secondary sexual characters.

*Length:* ♂ 1.7 mm, wing 1.6 mm, ♀ 2.0 mm, wing 1.9 mm.

*Variation:* None noted.

*Holotype:* ♂ SOUTH AFRICA: *Gauteng:* Pretoria, Hartbeespoort, 25 km W Pretoria, 30.xii.1994, A. Freidberg (NMSA, 1177).

*Paratypes:* SOUTH AFRICA: *Gauteng:* 1♂ same data as holotype (NMC); 1♂ same data (TAU). *Eastern Cape:* 1♀ 7 km N Steytleville, Groot R., 3324AB, 30.x.1978, lucerne field, R.M. Miller (NMSA); 1♀ same data (TAU).

### ***Gymnochiromyia spinifera* sp. n.**

Fig. 24

*Etymology:* From Latin *spinifer* (prickly); the name refers to the minute spine-like setulae on the *prg*.

*Diagnosis:* An entirely yellow species with only the *oc* ringed with black, otherwise there are no good external distinguishing features.

*Description:*

*Male.*

*Head:* Yellow; *fr* with margin moderately converging; at level of antenna 0.6 that at level of anterior *oc*; *oc* triangle yellow but *oc* distinctly ringed with black; about 16 minute pale golden yellow setulae on *fr*; eye oval lying oblique; gena in profile, below middle of eye, 0.9 height of eye; yellow and with pale setulae; *ocp* in profile barely visible behind eye, with short postocular setulae in one row; isolated lower post-genal seta long and pale; mouth parts small all yellow; 2 long setulae on oral margin at vibrissal angle; face poorly sclerotised and depressed; antenna all yellow, third segment a little larger than usual for genus and densely pubescent, second segment with brown dorsal seta, third arisal segment black, first two segments yellow; *orb* setae normal for genus, 1 *vti* and 1 *vte*, *pvt* distinct and crossed, *oc* long and divergent.

*Thorax:* *msn* yellow and unstriped; pleura and *mtn* yellow, no darker spot at base of haltere. Chaetotaxy: 1 *hu* with shorter seta and fine setula adjacent, 1 *psthu*, 2 *ntpl*, 1 *sa*, 1 *pa*, 0+2 *dc*, *acrs* in 6 rows at level of transverse suture, prescutellar short; 1 *mspl* and 1 *stpl*, each with a few setulae in front.

*Wing:* Hyaline, veins all pale yellow; distance between  $R_{2+3}$  and  $R_{4+5}$  about 0.7 that between  $R_{4+5}$  and  $M_{1+2}$  at costa; distance between crossveins about 0.8 length of apical section of Cu. Haltere pale yellow.

*Legs:* All yellow and not modified except for very slightly thicker fore femur; fine yellow setulae scattered on all pairs of legs, in addition to somewhat longer setae on fore femur.

*Abdomen:* *tg* entirely yellow; short setulose reaching about half length of *tg* on sides; *st* pale yellow.

*Postabdomen:* *ep* small; broad basally, *ph apd* long, *ej apd* indistinct, *surs* long, broad at base and slightly dilated and rounded at apex, a little curved inwards, cerci small and finely setulose, *prg* oval and short spinose on ventral aspect; *psg* and *bac scl* not identified, *ph* asymmetrical more or less globular at apex.

*Female.* Similar to male but without secondary sexual characters.

*Length:* ♂ 1.5 mm, wing 1.5 mm; ♀ 1.8 mm, wing 1.7 mm.

*Variation:* The distance between the crossveins may be a little less than that given for the holotype.

*Holotype:* ♂ SOUTH AFRICA: *Eastern Cape:* 7 km N Steytleville, Groot R., lucerne field, 30.x.1978, R.M. Miller (NMSA).

*Paratypes:* SOUTH AFRICA: *Eastern Cape:* 1♂ 1♀ same data and depository as holotype; 1♂ same data (NMC). NAMIBIA: *Lüderitz District:* 1♂ 1♀ Rooiberg, 27°38'S:16°28'E, 22–24.ix.1997, Malaise trap, A. Kirk-Spriggs & E. Marais (NMNW).

### ***Gymnochiromyia stuckenbergi* sp. n.**

Fig. 25

*Etymology:* Named in honour of Brian Stuckenberg who collected the species and many other specimens of Chyromyidae in South Africa.

*Diagnosis:* A predominantly yellow species with 3 posterior *dc* (most species have only one or two); the abdomen, unusually, has the tergites paler dorsally than ventrolaterally, otherwise there are no good external distinguishing features. The distiphallus is exceptionally large.

*Description:*

*Male.*

*Head:* Yellow; *fr* at level of anterior *oc* 1.3 width of one eye; *oc* triangle yellow but with small black area between *oc*; 8 minute pale setulae on *fr* hardly visible. Gena in profile, below middle of eye, about equal to height of eye; yellow and with pale setulae. *ocp* in profile barely visible behind eye, with short postocular setulae in one row above and two rows below; isolated lower post-genal seta long and pale yellow. Mouth parts small, palp narrow, all yellow; 3 long setulae on oral margin. Face poorly sclerotised and depressed. Antenna all yellow, second segment with brown dorsal seta, third arisal segment black, first two segments yellow; *orb* setae normal for genus, 1 *vti* and 1 *vte*, *pvt* almost as long as anterior *orb*.

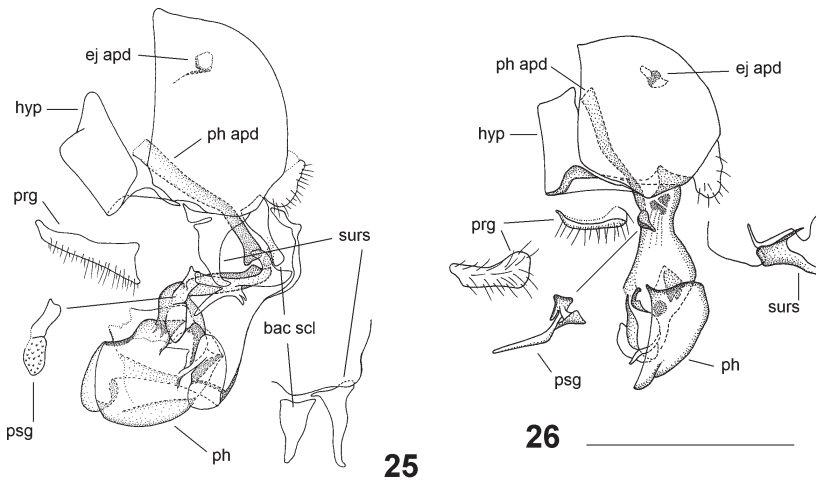
*Thorax:* *msn* yellow, pale brown only at middle anteriorly near transverse suture; *pleura* and *mtn* yellow. Chaetotaxy: 1 *hu* with shorter seta and fine setula adjacent, 1 *psthu*, 2 *ntpl*, 1 *sa*, 1 *pa*, 0+3 *dc*, *acrs* short in 6–8 rows at level of transverse suture; 1 *mspl* and 1 *spl*, each with a few setulae in front.

*Wing:* Hyaline, veins all pale yellow, distance on costal margin between  $R_{2+3}$  to  $R_{4+5}$  is 0.7 that between  $R_{4+5}$  and  $M_{1+2}$ ; distance between crossveins about 0.9 length of apical section of Cu. Haltere yellow.

*Legs:* All yellow and not modified except for very slightly thicker fore and hind femora; fine yellow setulae scattered on all pairs of legs, in addition to somewhat longer setae on fore femur.

*Abdomen:* *tg* yellow becoming pale brown on sides, short setulose; *st* yellow.

*Postabdomen:* Hypopygium small, *ep* with brown oval spot at middle, without distinct seta at the ventrocaudal angle, *hyp* short trapezoidal in profile, *surs* short with broad base and curved apex; cerci small and finely setulose; *ph* narrow, almost parallel sided; *ej apd* small; *prg* elongate trapezoidal and setulose on ventral aspect; *psg* elongate lying transversely with broader finely denticulate apex, *bac scl* triangular in posterior view, *ph* very large, complex, asymmetrical and appearing more or less globular.



Figs 25, 26. Male hypopygia, lateral aspect: (25) *G. stuckenbergi* sp. n., (26) *G. turneri* sp. n. Scale bars = 0.3 mm.

*Female.* Unknown.

*Length:* ♂ 1.8 mm, wing 2.0 mm.

*Variation:* None noted.

*Holotype:* ♂ SOUTH AFRICA: KwaZulu-Natal: Royal Natal National Park, i.1962, B. & P. Stuckenberg (NMSA, 1187).

### ***Gymnochiromyia turneri* sp. n.**

Fig. 26

*Etymology:* Named after R.E. Turner who collected this species and many other specimens of Chyromyidae in South Africa.

*Diagnosis:* A small species with pale brown *msn* stripes anteriorly and a presutural *dc*. The tergites and sternites are predominantly dark brown; the tergal setulae are long.

*Description:*

*Male.*

*Head:* Yellow. Gena in profile, below middle of eye, about equal to height of eye; yellow and with pale setulae. *ocp* in profile barely visible behind eye, with short postocular setulae in one irregular row; isolated lower post-genal seta short and pale yellow. Mouthparts small, palp narrow, all yellow; setulae on oral margin short. Face poorly sclerotised and depressed. Antenna yellow, second segment with strong dark dorsal seta, third segment brown, arista black except for yellow first two segments.

*Thorax:* *msn* yellow with pale brown stripes anteriorly; pleura and *mtn* yellow, only *stpl* with triangular pale brown mark. Chaetotaxy: 1 *hu*, 1 *psthu*, 2 *ntpl*, 1 *sa*, 1 *pa*, 1+3 *dc*, *acrs* short in 6 irregular rows, one prescutellar pair longer; 1 *mspl* and 1 *stpl*.

*Wing:* Hyaline, veins all pale yellow, distance on costal margin between  $R_{2+3}$  to  $R_{4+5}$  is 0.6 that between  $R_{4+5}$  and  $M_{1+2}$ ; distance between crossveins about equal to length of apical section of Cu. Haltere yellow.

Legs: All yellow and not modified except for very slightly thicker femora; fine yellow setulae scattered on all pairs of legs, in addition to somewhat longer setae on fore femur; claws and pulvilli normal.

*Abdomen*: *tg* and *ep* dark brown, moderately shining and with relatively long setulae, the longest on the sides about as long as *tg*; *tg* 5 with yellow apical band occupying about 1/4 length of *tg* and *ep* with yellow inferior margin. *st* 5 black and proximal *st* brown (some of this darkening may be due to postmortem changes).

Postabdomen: Hypopygium small; *ep* without distinct seta at the ventrocaudal angle; *surs* short with broad base, not visible in lateral view because it is infolded within *ep*, cerci small and finely setulose; *hyp*, in profile, broad basally; *ph apd* narrow, *ej apd* small indistinct; *prg* trapezoidal and setulose on ventral aspect; *psg* elongate lying transversely, *ph* moderately pigmented, asymmetrical.

*Female*. Similar to male except for secondary sexual characters.

*Length*: ♂ 1.3 mm, wing 1.4 mm; ♀ 1.7 mm, wing 1.9 mm.

*Variation*: None noted.

Holotype: ♂ SOUTH AFRICA: *Western Cape*: Mossel Bay, vi–vii.1930, R.E. Turner (Brit. Mus. 1930-402) (NHML). Slightly damaged: *oc* triangle, adjacent part of *fr*, hindmost *orb*, verticals and *pvt* missing.

Paratypes: SOUTH AFRICA: *Western Cape*: 1 ♀ same data and depository as holotype; 1 ♀ Mossel Bay, vi.1938, R.E. Turner (Brit. Mus. 1939-98) (NHML); 1 ♀ Atlantic Coast, Ysterfontein, 20.x.1964, B. & P. Stuckenberg (NMSA).

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#### REFERENCES

- BECKER, T. 1903. Aegyptische Dipteren (Fortsetzung und Schluss). *Mitteilungen aus dem Zoologischen Museum in Berlin* **2**: 67–195.
- CARLES-TOLRÁ, M. 2001. Eight new chyromid species from Spain (Diptera, Chyromyidae). *Boletín de la Asociación española de Entomología* **25** (3–4): 45–62.
- COGAN, B.H. 1980. Family Chyromyidae. In: Crosskey, R.W., ed., *Catalogue of the Diptera of the Afrotropical Region*. London: British Museum (Natural History), pp. 628–629.
- COLLIN, J.E. 1933. Five new species of Diptera. *Entomologist's monthly Magazine* **69**: 272–275.
- 1949. On Palaearctic species of the genus *Aphaniosoma*. *Annals and Magazine of Natural History* (12) **2**: 127–147.
- EBEJER, M.J. 1996. Chyromyidae (Diptera: Schizophora) from the Arabian Peninsula with descriptions of twelve new species. *Fauna of Saudi Arabia* **15**: 280–299.
- 1998. A new species of *Gymnochiromyia* Hendel (Diptera: Chyromyidae) from the Mediterranean, with notes, lectotype designations and a key to the species from the West Palaearctic. *Studia dipterologica* **5** (1): 19–29.
- 2000. Chyromyidae (Diptera: Heleomyzoidea). In: Kirk-Spriggs, A.H. & Marais, E., eds, *Dâures – Biodiversity of the Brandberg Massif, Namibia. Cimbebasia Memoir* **9**: 261–264.
- FERRAR, P. 1987. A guide to the breeding habits and immature stages of Diptera Cyclorrhapha. *Entomonograph* **8** (1–2): 1–907.



- HARDY, D.E. & DELFINADO, M.D. 1980. Chyromyidae. In: Zimmerman, E.C., ed., *Insects of Hawaii*. Vol. 13. Diptera: Cyclorrhapha III, Series Schizophora, Section Acalypterae, exclusive of Family Drosophilidae. Honolulu: Univ. of Hawaii Press, pp. 172–178.
- HENDEL, F. 1933. Neue acalyptrate Musciden aus der palaarktischen Region (Dipt.). *Deutsche Entomologische Zeitschrift* **1933**: 39–56.
- HENNIG, W. 1958. Die Familien der Diptera Schizophora und ihre phylogenetischen Verwandtschaftsbeziehungen. *Beiträge zur Entomologie* **8**: 505–688.
- KOTRBA, M. 2000. Morphology and terminology of the female postabdomen 1.3. In: Papp, L. & Darvas, B., eds, *Contributions to a Manual of Palaearctic Diptera*, Vol. 1. Budapest: Science Herald, pp. 75–84.
- LAMB, C.G. 1914. The Percy Sladen Trust expedition to the Indian Ocean in 1905, under the leadership of Mr. J. Stanley Gardiner, M.A. Vol. 5 No. XV. – Diptera Heteroneuridae, Ortalidae, Trypetidae, Sepsidae, Micropezidae, Drosophilidae, Geomyzidae, Milichiidae. *Transactions of the Linnaean Society of London* (2nd series, Zoology) **16**: 307–372.
- MCALPINE, J.F. 1987. Family Chyromyidae 91. In: McAlpine, J.F., ed., *Manual of Nearctic Diptera*. Vol. 2. Monograph 28. Ottawa: Research Branch, Agriculture Canada, pp. 985–988.
- SINCLAIR, B.J. 2000. Morphology and terminology of Diptera male terminalia 1.2. In: Papp, L. & Darvas, B., eds, *Contributions to a Manual of Palaearctic Diptera*, Vol. 1. Budapest: Science Herald, pp. 53–74.
- SMITH, K.G.V. 1989. An introduction to the immature stages of British flies. *Handbooks for the Identification of British Insects*. Vol. 10, part 14. London: Royal Entomological Society of London, pp. 1–280.
- SOÓS, A. 1981. 56. Chyromyidae. In: Papp, A. & Soós, A., eds, *Fauna Hungariae, Diptera: Heleomyzidae-Tethinidae*, Vol. XV, part 5. Budapest: Akadémiai Kiadó, pp. 84–93.
- 1984. Family Chyromyidae. In: Soós, A. & Papp, L., eds, *Catalogue of Palaearctic Diptera*. Vol. 10: Clusiidae–Chloropidae. Budapest: Akadémiai Kiadó, pp. 56–60.
- WHEELER, T.A. 1998. Family 3.42, Chyromyidae. In: Papp, L. & Darvas, B., eds, *Contributions to a Manual of Palaearctic Diptera*, Vol. 3. Budapest: Science Herald, pp. 457–461.
- WHEELER, T.A. & SINCLAIR, B.J. 1994. Chyromyidae (Diptera) from the Galapagos Islands, Ecuador: three new species of *Aphaniosoma* Becker. *Proceedings of the Entomological Society of Washington* **96** (3): 440–453.