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**NEW SPECIES OF SCAPTOMYZA
FROM MADAGASCAR AND MAURITIUS
WITH A NOTE ON TERMINOLOGY
(DIPTERA : DROSOPHILIDAE)**

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Résumé. — Trois nouvelles espèces de *Scaptomyza* originaires de Madagascar et de l'île Maurice avec un commentaire sur une nouvelle nomenclature (*Diptera : Drosophilidae*). — Trois espèces nouvelles de *Scaptomyza* provenant de Madagascar et de l'île Maurice sont décrites dans ce travail. Deux d'entre elles sont reconnues comme des *Scaptomyza* s. str. ; la dernière espèce, morphologiquement très proche de *S. pallida* Zetterstedt, est rattachée au sous-genre *Parascaptomyza*. Dans ce même matériel (Madagascar et îles voisines) deux espèces nouvelles supplémentaires, non décrites ici, sont identifiées. La terminologie utilisée dans l'étude morphologique des Diptères a été considérablement révisée par McAlpine (1981). La nouvelle nomenclature cohérente pour l'ordre entier, est adoptée dans ce travail et discutée. Les méthodes morphométriques sont données en détail.

Summary. — New species are described from Madagascar and Mauritius; two are classified in *Scaptomyza* s. str. and one in the subgenus *Parascaptomyza*; the latter species closely resembles *S. (P.) pallida* Zetterstedt. Two other *Scaptomyza* species from Madagascar and neighbouring islands have been classified as new but are not formally described. Terminology for dipteran morphology has been extensively revised by McAlpine (1981), new terms, which are now consistent throughout the order, are adopted here and discussed. Morphometric methods are described in detail.

Scaptomyza Hardy, 1849 is a large genus in *Drosophilidae*. Most species are endemic to the Hawaiian islands where a remarkable radiation, both in *Scaptomyza* and in *Drosophila*, has been the subject of a number of evolutionary investigations. The diversity of form in *Scaptomyza* is such that no single diagnostic character is available to separate it from *Drosophila* (Hackman, 1982). *Scaptomyza* has been divided into 17 subgenera (Frey, 1954; Hackman, 1959, 1962, 1982; Hardy, 1965; Okada, 1973; Tsacas & Cogan, 1977; Wheeler, 1981, 1986), eight of which (*Scaptomyza* s. str., *Euscaptomyza* Séguéy, *Hemiscaptomyza* Hackman, *Lauxanomyza* Tsacas & Cogan, *Macrosaptomyza* Frey, *Metascaptomyza* Hackman, *Parascaptomyza* Duda, *Trogloscaptomyza* Frey) are represented by

Afrotropical species (Tsacas, 1980). Of these eight, three were erected for species endemic to the southern Atlantic Ocean islands : Tristan da Cunha, St Helena and Gough (Frey, 1954 ; Tsacas & Cogan, 1977). In contrast, reports of *Scaptomyza* from islands in the Indian Ocean are scant. Tsacas *et al.* (1981) listed two undescribed *Scaptomyza* species : "sp. 1" from Madagascar and "sp. 2" from Comoro Island. *Scaptomyza punctiscutata* (Lamb, 1914) Tsacas, 1980 (transferred from *Drosophila*) is known from a single female collected on the Seychelles. David & Tsacas (1975) and David *et al.* (1989) report *S. pallida* from Mauritius, but this determination is now in doubt following research by Tsacas (in press) and the comparative study of terminalia of Mauritian and South African specimens discussed in this paper.

An extensive survey of the Malagasy drosophilid fauna in 1987 yielded two *Scaptomyza* species, one has not, hitherto this, been recorded and is described as new below, the other corresponds to "sp. 2" from Comoro Island but only females are available and it is not formally described. No additional specimens of "sp. 1" were found but sufficient material exists for a description of it to be given. The third species to be described in the present work was collected in Mauritius in 1986.

A NEW TERMINOLOGY IN THE TAXONOMY OF DROSOPHILIDAE

The form of species descriptions has, since Sturtevant's (1942) classification, been relatively standard among drosophilid taxonomists. But the terms used have differed to some extent from those developed for other dipteran families. McAlpine's (1981) revision of morphology and terminology of the Diptera makes it possible to apply many terms consistently throughout the order. Certain terms previously used by the author (McEvey, 1981 ; McEvey & Bock, 1982 ; McEvey *et al.*, 1987, 1988) are superseded and will be changed forthwith. Certain other terms recommended by McAlpine for the male terminalia are equivocal (Griffiths, 1981) and have not been widely accepted, for example see the works of Bock (1982) ; Carson, Val & Wheeler (1983) ; Hackman (1982) ; Grimaldi (1987, in part) ; Kumar & Gupta (1988) ; Okada (1984) ; Takada (1983) and Vilela (1984).

New terms with their old synonyms between parentheses are listed below. *Head* : facial carina (carina) ; first flagellomere (3rd antennal segment) ; fronto-orbital plate (orbit) ; gena (cheek) ; palpus (palp) ; pedicel (2nd antennal segment) ; postocellar seta (postvertical bristle). *Thorax* : acrostichal setulae (acrostichal hairs) ; anepimeron (pteropleuron) ; proepisternal seta (propleural bristle) ; anepisternum (mesopleuron) ; axillary area (wing base) ; halter or halteres (halter[s]) ; halter stem (halter stalk) ; katepisternum (sternopleuron), sterno-index is retained ; mesonotum (mesonotum and scutellum) ; postpronotum (humeral callus) ; prescutellar acrostichal seta (prescutellar bristle) ; prescutum and scutum (mesonotum) ; seta (bristle or spine) ; setula (hair). *Abdomen* : aedeagus (phallus) ; cercus (anal plate) ; epiandrium (genital arch) ; surstylus (primary clasper or clasper) ; terminalia (genitalia). Male terminalia is discussed further below. *Wing* : anterior branch of radius, R₁ (first longitudinal vein, L1) ; discal medial-cubital crossvein, dm-cu (posterior crossvein) ; fusion of cubitus and first anal vein, CuA₁ (fifth longitudinal vein, L5) ; fusion of radial branches 2 and 3, R₂₊₃ (second longitudinal vein, L2) ; fusion of radial branches 4 and 5, R₄₊₅ (third longitudinal vein, L3) ; humeral break (first costal incision) ; posterior medial vein (since no other medial veins are present M, rather than M₁, is used as abbreviation, following Okada) (fourth longitudinal vein, L4) ; radial-medial crossvein, r-m (anterior crossvein) ; subcostal break (second costal incision).

There is considerable confusion about the correct application of terms for processes arising in the proximity of the aedeagus. A detailed comparative study of the morphogenesis of these processes, in a broad range of muscomorph flies, is lacking. Until such time, the old terms "anterior paramere" and "posterior paramere" (*sensu* Okada, 1988 ; Bock & Wheeler, 1972 ; Hackman, 1982 ; Tsacas, in press), despite the criticisms raised by Grif-

fiths (1981), will continue to be applied. Novasternum will be retained to refer to the posteroventral part of the hypandrium, and decasternum (*sensu* Bock & Wheeler, 1972) will be used for the "bridge" (*pont* of Tsacas) connecting the sides of the epandrium internally.

Indices of taxonomic importance involve measures of structures abbreviated as follows: *Head*: *ch* - maximum width of gena (*cf.* *j* of Tsacas, width of gena along line of eye's greatest diameter); *fl* (*hf* of Tsacas) - frontal length from ptilinal fissure to the vertex medially; *fw* (*lf* of Tsacas) - frontal width, distance between eyes measured through anterior reclinate orbital setae; *H* - head length, measured from distal edge of pedicel to the vertex; *hw* (head width, *lf* of Tsacas) - distance between eye apices; *o* - maximum diameter of eye; *or* - orbital seta, *or1* proclinate, *or2* anterior reclinate, *or3* posterior reclinate. *Thorax*: *akpst* or *pkpst* - length of anterior or posterior katepisternal seta; *T* - thoracic length measured from the anterior edge of the scutum to the scutellar apex. *Abdomen*: *A* - abdomen; *Tl-6*, tergites. *Wing*: *a* - second costal section between the subcostal break and R_{2+3} ; *b* - third costal section between R_{2+3} and R_{4+5} ; *c* - M_1 between dm-cu and wing margin; *d* - M_1 between r-m and dm-cu; *e* - CuA_1 between dm-cu and wing margin; *f* - dm-cu between M_1 and CuA_1 ; *g* - length of heavy setation in third costal section; *h* - length of light setation in third costal section; *i* - distance between distal ends of R_{4+5} and M_1 ; *L* - wing length from axillary area to apex (*cf.* Grimaldi, 1987: from humeral crossvein to apex); *w* - maximum wing width. Abbreviations for certain setae are self-evident in context and are not given here. The length of curved features like the third costal section or the scutellar setae are measured in a straight line between the extremities. The *body length* is the sum of the head, thoracic and abdominal lengths ($H+T+A$); the abdomen in dry specimens is almost invariably shrivelled, therefore the body lengths of live material will be slightly greater than the measurements given in the descriptions below.

Indices are derived using formulae given by Sturtevant (1942) and Bock (1976): *C-index* = a/b , *4v-index* = c/d , *4c-index* = b/d , *5x-index* = e/f , *M-index* = e/d , *C3 fringe* = $g/(g+h)$ not g/b , *sterno-index* = $akpst/pkpst$. The relative positions of orbital and inner vertical setae are indicated by the *orbito-index* = (distance between bases of proclinate and posterior reclinate orbital setae)/(distance between bases of inner vertical and posterior reclinate orbital setae). The *ac-index* = b/i . The ratios $o:j$, b/c and d/c have been used for many years in the descriptions of a number of African Drosophilidae; for comparative purposes the former two are also given here; d/c is the reciprocal of the *4v-index* (see McEvey *et al.*, 1987: 378).

Specimens collected by the author, and some which are in temporary custody, have been numbered so as to facilitate their future recognition. The author consistently applies numbers to each specimen collected and to some others examined; an unpublished Specimen Register contains additional information about each. In addition to the number, a label reading "Registered Specimen S F McEvey" is pinned with each specimen, this is abbreviated to "Reg." in the following descriptions. Most material from Madagascar was collected during the 1987 CNRS-Ecotrop expedition; on labels the three collectors' names: Shane F. McEvey, Jean R. David and Sylvie Aulard, were abbreviated to: SFMcE.JRD.SA. Names of museums are abbreviated: AM, Australian Museum, Sydney; MP, Muséum National d'Histoire Naturelle, Paris. Only holotypes are described, when paratypes or females are known to vary such information is appended.

▼ *Scaptomyza (Scaptomyza) mateolata*, sp. n.

"*Drosophila (Lordiphosa)* sp. nov. B" (David *et al.*, 1989).

Holotype male in MP: "Curepipe [600 m], Mauritius, cultivated Cucurbitaceae flower, vii.1986, J.R. David", Reg. number 3354.

Distinguishing Features: Cerci fused ventromedially. Epandrium with long setae

on ventral extension only. Four pairs of dorsocentral setae. Acrostichal setulae enlarged and in four rows. Katepisternal setae arising close together, with length ratio 6:5:8. Thoracic pleura banded. Postocellars long and parallel, ocellars short and parallel. Subvibrissal setae long.

Description.

Body length : 1.8 mm.

Head. Arista with 3 or 4 straight rays above, 1 below, plus terminal fork. Frontal width 1.12 times length (hw:fw = 2.48). Fronto-orbital plates, frontal midline and occipital margin faintly pollinose. Frons with 5 short black setulae anteromedially. Ocellar triangle large and dark grey, with minute laterally pointing setulae. Pedicel and first flagellomere pale tan, the latter short and rounded. Facial carina prominent and narrow, developed only in upper half of face. Face subshining pale tan. Gena narrow, 0.11 greatest diameter of eye (o:j = 14.0, o:ch = 9.33), straight. Vibrissa single; 1st and 3rd subvibrissal setae short; 2nd, 4th and posterior subvibrissal setae nearly as long as vibrissal seta. Eye with very dense, short pile. Orbital setae in the ratio 7:5:8; anterior reclinate arises lateral to the base of the proclinate, orbito-index = 0.71. Ocellar setae short and parallel, arising lateral to the anterior ocellus; oc:orl = 0.95. Postocellars well developed, parallel, longer than ocellars (poc:oc = 1.24) and subequal to posterior reclinates. Inner vertical longer than posterior reclinate (or 3:iv = 0.74) and shorter than the 1st dorsocentral seta; longer than the outer vertical (iv:ov = 1.1).

Thorax. Mesonotum pale greyish tan. Acrostichals sparse; in four rows; middle two rows consisting of long setae some as long as ocellar setae; setae in outside row not greatly enlarged. Dorsocentrals in four well-developed pairs, the most anterior (1st pair, adc) are presutural; the 1st to 3rd pairs are approximately subequal, adc:pd = 0.7. Prescutellar acrostichal setae developed (psc:adc ca. 0.5) but shorter than the acrostichal setae between the 1st and 2nd pairs of dorsocentrals. Proepisternal seta absent. Basal scutellar setae divergent (bsc:asc = 1.10, pdc:asc = 1.01). Scutellum laterally, on one side, with a supernumerary setula. Thoracic pleura with 3 dark longitudinal stripes; anepisternum dark grey-tan above and in central band, otherwise pale tan; anepimeron dark centrally, pale tan above and below; katepisternum dark above and uniformly tan below; a fold of integument in the axillary area distinctly infuscated. Notopleuron and postpronotum darkened, the latter raised; apical and basal postpronotal setae (humeral of Hackman, 1959) approximately subequal. Halter stem grey-tan, darker than knob. Katepisternal setae large and arising close together, sterno-index = 0.82, mkpst:akpst = 0.86. Legs pale tan; a well-developed apical, tibial spur on mid leg only; no sex comb present on fore-leg.

Wing. Hyaline. Wing indices : L:w = 2.38, C-index = 2.37, 4v-index = 1.59, 4c-index = 0.91, 5x-index = 1.40, M-index = 0.51, ac-index = 3.29, b/c = 0.57, C3 fringe 0.56. Wing length = 1.74 mm.

Abdomen. Tergites tan, darkened posteriorly.

Male terminalia (fig. 1-5). Epandrium extensively hirsute with a number of strong spines of various lengths arising on ventral extension only. Cerci hirsute with long setae in upper halves only; the two plates are fused ventromedially, with four fine setae near ventral apex. Surstyli each with nine large blunt teeth in a straight row along interior margin plus about seven accompanying setae. Hypandrium in squared U-shape, anterior paramere rounded with three median sensilla. Paramedial hypandrial process papulous and with a single seta. Aedeagus expanded and with lateral angular processes, apically pointed in lateral view.

Female. Unknown.

Distribution. — Known from holotype only, Mauritius.

Remarks. — The combination of characters in this species poses a taxonomic problem. On the one hand, the possession of four pairs of dorsocentral setae and subequal postpronotals is characteristic of certain species in the *Drosophila* subgenus *Lordiphosa*. However, the single ventral aristal ray, the relative lengths of the katepisternal setae and the general form of the male terminalia in this fly are atypical for *Lordiphosa* (Lastovka and Máca, 1978; Toda, 1983; Okada, 1984). Furthermore the 29 known species of *Lordiphosa* are restricted to the Holarctic Region while the present species is from a remote island of the southern Indian Ocean. On the other hand, *S. mateolata*, sp. n. matches many

species in *Scaptomyza* because it possesses four rows of enlarged acrostichal setulae, an unbroken medial row of dentiform surstyler setae, elongate cerci with setae mostly restricted to the upper parts, an epandrium with no long setae dorsally or laterally and an arista with only a single ray ventrally.

Diagnostic details of the Afrotropical subgenera of *Scaptomyza* have been given by Hackman (1959) and Tsacas (1972) but *S. mateolata*, sp. n. cannot be placed easily in any of them. In Hackman's (1959) key to subgenera it is blocked at the first couplet because

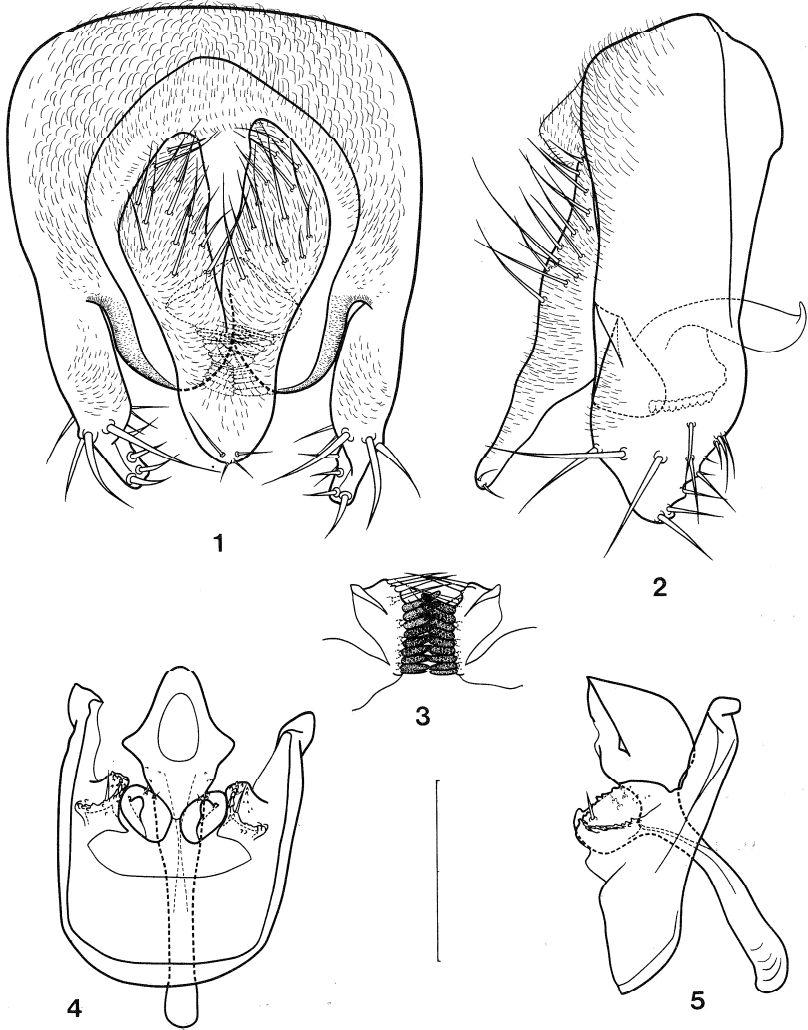


Fig. 1 to 5, *Scaptomyza mateolata*, sp. n. — Holotype : epandrium, 1, caudal and 2, lateral views; 3, surstyli, ventral view; hypandrium, 4, ventral and 5, lateral views. Scale 100 μ .

although it has four dorsocentrals it is not a large (3.5-4.0 mm) species, nor does it have one prominent and one minute postpronotal seta (cf. *Macrosaptomyza*). In other respects the fly is close to the typical subgenus *Scaptomyza* in that the postpronotal setae are subequal, the arista has a single ventral ray, acrostichals are in four rows, secondary claspers are absent, surstyli have an uninterrupted row of marginal teeth and the wings are hyaline. However, it is unlike other species of *Scaptomyza* s. str. in having four pairs of dorsocentrals and fused cerci.

The ventral fusion of the cerci is unusual and although it is known in the Calyptratae (McAlpine, 1981) it is rare in Drosophilidae. This character together with the presence of one presutural and three postsutural pairs of dorsocentrals may warrant the creation of a new subgenus for this species. In the interim, and until further specimens and females are available, *S. mateolata*, sp. n. is placed in the nominate subgenus. Hackman's (1959) subgeneric description requires no modification to accommodate it. However, it should be noted that in the first couplet of his 1959 subgeneric key, *Macrosaptomyza* is no longer unique in having four pairs of dorsocentrals.

Etymology. — In caudal view the ventral projection of the epandrium resembles a mace (*matea* Latin, diminutive : *mateola*).

***Scaptomyza (Scaptomyza) merina*, sp. n.**

“*Scaptomyza* sp. 1” of Tsacas *et al.* (1981 : 218).

Holotype male in MP : “Madagascar Centre, Kimoro 1 680 m, Andringitra Ambalavao, 19.I.58 *B. Stuckenberg*”, Reg. number 6172. **Paratypes** (3 males, 9 females) in MP, with same data as holotype and Reg. numbers 6163-6171 and 6173-6175.

Distinguishing Features : Large species; ocellar setae lateral to anterior ocellus; with two or three pairs of dorsocentral setae; scutellar setae approximately subequal; basal postpronotal setae 0.8 apical; C-index = 3.61; wing hyaline, long and narrow.

Description.

Body length. 2.91 mm (paratype range : males 2.51-3.12; females 2.72-3.04 mm).

Head. Arista with short straight rays, usually two (three in some paratypes) above and one below and a terminal fork. Frons dark brown posteriorly, pale brown anteriorly, reduced to narrow bands between the large ocellar triangle and broad fronto-orbital plates. Ocellar triangle and orbital plates concolorous; the orbits terminate well before the anterior frontal margin, broaden posteriorly and are slightly raised; the ocelli are small and colourless and lie on slightly raised integument inside a large silvery-grey, subshining, slightly pollinose triangle; $hw:fw = 2.16$, $fw:fl = 1.12$. Vertex rounded. Pedicel tan with two setae as long as dorsal arisal rays; first flagellomere darker and small. Facial carina prominent, nose-like; face dusky grey-tan medially, paler laterally. Palpus pale tan, with an apical and a shorter subapical seta and small setulae. Gena very broad and short (much of the occiput visible in lateral view), tan, greatest width about a 1/3 greatest diameter of eye ($o:j = 3.61$, $o:ch = 3.47$). Vibrissa single, first subvibrissal seta ca 0.6 its length; vibrissal and genal setae subequal. Eye dull, with very dense and long pilosity. Recline orbital setae equidistant from eye margin, proclinate orbital medial to anterior reclinate; orbitals in ratio 9:5:10 ($or1:or3 = 0.91$, $or1:or2 = 1.82$), orbito-index = 0.62, $or3$ about halfway between inner vertical seta and anterior frontal margin. Ocellar setae parallel, their bases wide apart and arising lateral to anterior ocellus and in line with posterior ocelli, $oc:or1 = 1.32$; postocellars convergent, $poc:oc = 0.82$. Inner and outer verticals approximately subequal ($or3:iv = 0.72$); paravertical and anterior reclinate orbital setae subequal.

Thorax. Mesonotum blackish-grey with faint golden pollinosity, scutellum and scutum concolorous. Acrostichal setulae in four well-defined rows between anterior dorsocentral setae diminishing to two rows posteriorly; prescutellar acrostichal setulae slightly enlarged. Three pairs of dorsocentral setae, adc barely larger than surrounding acrostichal setulae in holotype but larger in some paratypes e.g., in paratype 6163 adc more than twice as long as acrostichals and in approximate ratio 4:5:9 ($adc:mdc:pcdc$); $mdc:pcdc$ of holotype = 0.62. Basal postpronotal seta more than half the length of the apical seta, $bpn:apn = 0.8$. Basal scutellar setae long and divergent, apicals convergent, $bsc:asc = 1.24$ ($pcdc:asc = 1.06$). Thoracic pleurae and mesonotum concolorous. Halter conspicuous, pale tan. Sterno-index ($akpst:pkpst$) = 0.54, $mkpst:akpst = 0.66$ (variable among paratypes). Legs pale tan, paler than body; fore femur with 6-7 long posteroventral setae and 4-5 posterodorsal setae; each tibia with a subapical seta dorsally, mid-tibia with an apical spur ventrally.

Wing. Hyaline, long and narrow, veins pale tan. Wing indices, with paratype range between parentheses : $L:w = 2.74$ (2.58-2.91), C-index = 3.61 (3.28-4.04), $4v$ -index = 1.68 (1.51-1.71),

4c-index = 0.68 (0.56-0.70), 5x-index = 1.52 (1.33-2.00), M-index = 0.49 (0.41-0.50), ac-index = 2.16 (1.92-2.35), b/c = 0.40 (0.35-0.43), C3 = 0.58 (0.48-0.61). Wing length 2.89 mm (2.64-2.91 mm males, 2.64-2.98 mm females).

Abdomen. Dull dark brown, T1 paler laterally.

Male terminalia (fig. 6-10 of holotype). Aedeagus more than twice as long as aedeagal apodeme; with fine, blunt, serrated lateral edges.

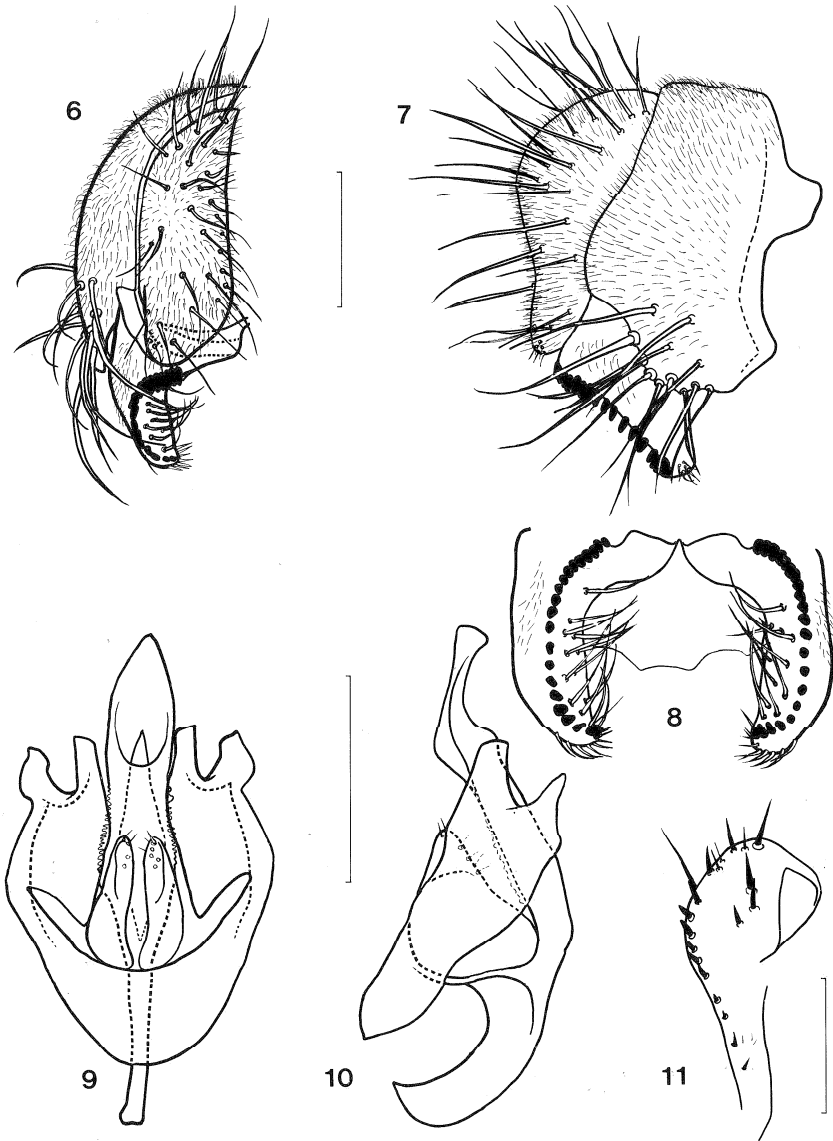


Fig. 6 to 11, *Scaptomyza merina*, sp. n. Holotype : epandrium, 6, caudal and 7, lateral views; 8, surstyli, ventral view; hypandrium, 9, ventral and 10, lateral views; 11, egg guide. Scales 100 μ .

Female terminalia. See figure 11 of paratype 6169.

Distribution. — Known only from the type locality : Kimoro (Andringitra Ambalavao district), central Madagascar.

Specimens examined. — Holotype* and paratype numbers 6163*, 6166*, 6167

(males); 6164-65, 6168, 6169*-71, 6173*-75 (females); the asterisk marks those specimens the terminalia of which have been examined, preparations are preserved in microvials pin-mounted with imagines; the terminalia of 6163 is in poor condition; 6170 is headless. Male terminalia compared to *S. graminum* (specimen with label-data : "Cor-doba, Spain; x.1988; coll. J. David" Reg. number 6154, in MP).

Remarks. — *Scaptomyza merina*, sp. n. is typical of other species in the *Scaptomyza* subgenus because it possesses two large postpronotal setae, acrostichals in four rows, no secondary clasper, a surstylus with an uninterrupted row of marginal teeth and a hyaline wing (Hackman, 1959). Indeed it closely resembles the type species *S. graminum*.

Tsacas (1980) listed three species of *Scaptomyza* s. str. from the Afrotropical Region : the cosmopolitan species *S. (S.) graminum* has been collected in Kenya and South Africa and *S. (S.) santahelenica* Tsacas & Cogan, [1977] and *S. (S.) mimitantalia* Tsacas & Cogan, [1977] are known only from the Atlantic Ocean island St Helena. *Scaptomyza merina*, sp. n. may be readily distinguished from these species by reference to the form of the terminalia. In *S. graminum* the peg prensisetae (Grimaldi, 1987) are evenly spaced and long and the medial, setiform prensisetae are clustered distally (*cf. S. merina*, sp. n.). In *S. santahelenica* the cercus has a ventral lobe with dentiform setae apically (*cf. S. merina*, sp. n.) and in *S. mimitantalia* there are very distinctive and large processes arising from the last sternite, unlike *S. merina*, sp. n.

Scaptomyza punctiscutata Lamb from the Seychelles, has not been examined in this study and the reasons for transferring it from *Drosophila* were not given by Tsacas (1980). Based on Lamb's (1914) description of the only available specimen (a female), it has in common with *S. merina*, sp. n. the distinctive character : ocellar setae outside the ocellar triangle. However, *S. punctiscutata* is also described (Lamb, 1914) as having no facial carina, 6/2-3 arista rays, a black gena and palpus, an anterior dorsocentral seta far forward and a patterned scutellum, these characters are not found in *S. merina*, sp. n.

Etymology. — The Merina ethnic group lived in central Madagascar.

✓ *Scaptomyza* species 2

"*Scaptomyza* sp. 2" of Tsacas *et al.* (1981 : 218).

Distinguishing Features : Postpronotal seta long and single; acrostichal setulae in four rows in front of, and two between, the dorsocentrals; arista with 3-4 rays above and one below the main axis; a rounded and orange-tan vertex, distinctively blackened occiput and postgena, hyaline wings, and the apical and basal scutellar setae are approximately subequal (asc:bsc = 0.94 Malagasy female, 0.75 Comoro female).

Distribution. — Mandraka in central Madagascar and Comoro Islands.

Specimens examined. — Two females, one with label-data : "Mandraka, ca 19°S 48'E, 11-13.x.1987, SFMcE.JRD.SA", Reg. number 3943; the other with label-data : "Grande Comore, La Grille (Guiri), 850-900 m. 13.xi.1973, *L. Matile* Rec.; *Scaptomyza* sp female L. Tsacas det. 1977", Reg. number 6353; both specimens in MP.

Remarks. — In general facies these two specimens (3943 and 6353) resemble certain flies collected in South Africa, two of which have label-data : "Entabeni (forest), 23°01'S 30°15'E, swept in forest, 20.viii.1983, *Shane F. McEvey*", Reg. number 2216 (male); and number 2260 (female) with data as above but "swept near creek, 21.viii.1983". These two South African specimens are part of a series to be described as a new species in a separate publication (Tsacas, in press). Some important differences have been detected, however, between the South African taxon and sp. 2. The length ratio postocellar : ocellar setae is 0.5 in specimen 2216 and 1.0 in sp. 2, and the ratio of apical to basal scutellars is 0.43 in 2216 and about 0.85 in sp. 2 (the apicals are upright in the former). Hackman

(1959) notes that short upright apical scutellars are a characteristic of the *Scaptomyza* subgenus *Metascaptomyza* but also of single species of other subgenera and that the scutellar index is variable in *S. (S.) graminum*. A proper classification of these specimens is therefore not possible until males of sp. 2 become available.

✧ *Scaptomyza (Parascaptomyza) exilis*, sp. n.

Holotype male in MP : “Andasibe, ca 19°S 48'E, 13-15.x.1987, SFMcE.JRD.SA”, Madagascar, Reg. number 4495. **Paratypes** (5 males, 5 females) all deposited in MP; comprising 3 males and 2 females with same data as holotype but numbered : 4494, 4496, 4497 (males); 4484 and 4577 (females); 1 female with same data as holotype but collected

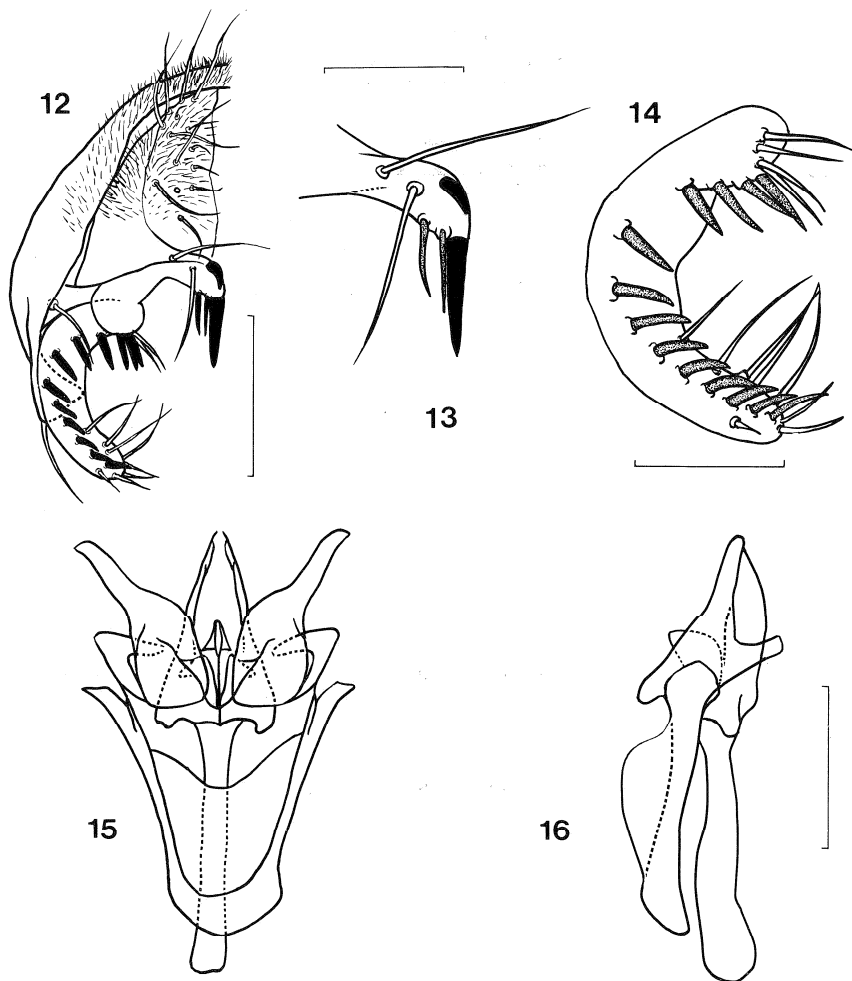


Fig. 12 to 16, *Scaptomyza exilis*, sp. n.; 12, epandrium (holotype); 13, secondary clasper (holotype); 14, surstylus (paratype 5799); holotype hypandrium, 15 ventral and 16, lateral views. Scales 100 μ (vertical), 50 μ (horizontal).

at a *Crinum* flower and numbered 4647; 2 males and 2 females with label-data : “Tsimbazaza Parc, Tananarive, Madagascar, 09-10.x.1987, SFMcE.JRD.SA”, Reg. numbers 3940, 5799 (males); 5801 and 5815 (females).

Distinguishing Features : Secondary clasper with no cluster of fine setae basally, only two setae on ventral edge and a large straight spine; surstylus with no dorsomedial projection; aegaeus not serrated; fore tibia and tarsi blackened.

Description.

Body length. 2.1 mm (paratype range : 1.9-2.0 mm males, 2.0-2.3 mm females).

Head. Arista with 4 straight, dorsal rays (the basal two arise close together), a single ventral ray and a terminal fork. Frons orange-tan anteriorly, dark grey posteriorly. Ocelli surrounded by a large dark grey triangle with diffuse borders. Fronto-orbital plate also dark grey ending abruptly in front of proclinate orbital seta. Vertex rounded, back of head black. Frontal integument finely pitted posteriorly and with silvery pollinosity in darkened areas. Frons wider than long and about half width of head ($fw:fl = 1.22$, $hw:fw = 2.20$). Pedicel and first flagellomere concolorous, dusky tan. Carina with a rounded profile tapering abruptly to epistoma; in frontal view : prominent, wide below, narrow above. Face tan. Palpus tan, with a long apical and several shorter subapical setae. Gena tan, 0.13 greatest diameter of eye ($o:j = 9.33$, $o:ch = 8.00$). Vibrissa single. Anterior reclinate orbital seta very fine and small, arising lateral to proclinate orbital; length ratios of orbital setae : $or1:or3 = 0.80$, $or1:or2 = 3.05$; $orb1:orb2 = 0.54$. Inner vertical longer than both outer vertical ($iv:ov = 1.13$) and posterior reclinate orbital setae ($or3:iv = 0.73$). Ocellar setae divergent, arising approximately between the anterior and posterior ocelli; $oc:or1 = 1.51$; postocellars cruciform, $poc:oc = 0.63$.

Thorax. Integument of mesonotum grey, finely pitted and with a silvery pollinosity, more pronounced anteriorly when viewed from certain angles. Acrostichal setulae large, in two well defined rows. Ratio of apical : basal postpronotal setae 2.1, the basal one is feeble; the apical and outer vertical setae are subequal. Anterior dorsocentral seta large and closer to transverse suture than to posterior dorsocentral ($adc:pdc = 0.82$ in paratype 4577). Prescutellar acrostichals smaller than other acrostichals. Scutellum and scutum concolorous; apical scutellar setae convergent, slightly upright and arising close together ($bsc:asc = 1.17$, $pdc:asc = 1.06$). Thorax grey laterally, fading to tan ventrally. Sterno-index = 0.51 ($mkpst:akpst = 0.63$). Halter with tan knob and dark stem. Legs pale tan except fore tibiae and tarsi which are distinctly blackened; apical tibial spur on midleg only.

Wing. Hyaline. Wing indices (paratype range between parentheses) : $L:w = 2.56$ (2.56-2.87), C-index = 2.80 (2.54-3.04), 4v-index = 1.76 (1.60-1.85), 4c-index = 0.86 (0.77-0.91), 5x-index = 1.88 (1.40-1.88), M-index = 0.52 (0.43-0.55), ac-index = 3.13 (2.75-3.13), heavy setation in third costal section ill-defined, C3 ca 0.38 (0.33-0.52), $b/c = 0.49$ (0.46-0.53). Wing length 2.23 mm (paratype range 2.17-2.59 mm).

Abdomen. Shiny black; T1 pale laterally.

Male terminalia. Epandrium (fig. 12) hirsute dorsally; with a single long seta on the ventral projection. Secondary clasper (fig. 13) slender, spare and completely devoid of basoventral cluster of fine setae and with only two strong subapical setae ventrally; apical spine long and straight (see fig. 23-26). Surstylus (fig. 12) with 12-13 median prenisetetae and clusters of slender setae at the extremities. Hypandrium (fig. 15 and 16) with distinctive parameres and aedeagus, the latter is without fine serration. Parts of a Tananarive paratype (specimen 5799) have also been illustrated to show the geographical consistency of form (fig. 14, 18, 26).

Female terminalia. A distinct dark patch with irregular edges marks the apex of the ovipositor medially, the mark attenuates towards the base reaching halfway.

Distribution. — Andasibe and Tananarive, Central Madagascar.

Specimens examined. — Holotype and paratypes. The terminalia were compared with those of sp. 3 from Mauritius (specimen numbers 3367, 3371 and 3372 in MP, see below), *S. substrigata* De Meijere, 1914 from the Cape Verde Islands (male with label-data "Ins. Cabo Verde, S. Antão Pombas, 23-26.12.1953, Lindberg" in Mus. Zool. Helsinki) and *S. pallida* from Belgium ("Turnhout, Belgium, 10.viii.1988, S.F. McEvey", male Reg. number 6119; in AM).

Remarks. — *Scaptomyza exilis*, sp. n. is one of seven taxa closely resembling the widespread species *S. (Parascaptomyza) pallida*: the number of ventral arista rays, the patterning of the abdomen and the form of the male terminalia are important in their classification. The anterior parameres and surstylus of *S. exilis*, sp. n. and *S. (P.) substrigata* De Meijere, 1914 are similar but *S. substrigata* has two ventral arista rays in addition to the terminal fork (De Meijere, 1914; Hackman, 1955) and is a yellowish-tan species

with a blackened sixth tergite. The secondary clasper of *S. substrigata* from Cape Verde is unlike that of *S. exilis*, sp. n. because it possesses a cluster of about eight long setae ventrally and an apical spine only as long as the secondary clasper is wide.

Val, in Carson *et al.* (1983), described *S. (P.) santacruzei* from the Galápagos Islands, they emphasized the striking abdominal pattern of this species. The same pattern is found in *S. substrigata*; never-the-less, the presence in *S. santacruzei* and absence in *S. substrigata* of a dorsal surstyler projection bearing setae remains diagnostic for these two taxa.

Scaptomyza elmoi Takada, 1970 and *S. (P.) himalayana* Takada, 1970 (from Nepal) are characterized by the form of their dorsomedial surstyler projection and aedeagal apex. Both have secondary claspers like *S. pallida* and may thus be distinguished from *S. exilis*, sp. n.

Two undescribed taxa are close to *S. pallida* and to each other, they are “*Parascaptomyza* aff. *disticha*” (Burla, 1957) (= aff. *pallida*) and “*Scaptomyza* species 3”. Burla’s (1957) taxon is represented by a single male, taken indoors near Kilimandjaro in Kenya; it has secondary claspers with dorsal spines unlike *S. pallida* while its anterior paramere resembles “*Scaptomyza* species 3” (fig. 20-22); the latter taxon is discussed further below.

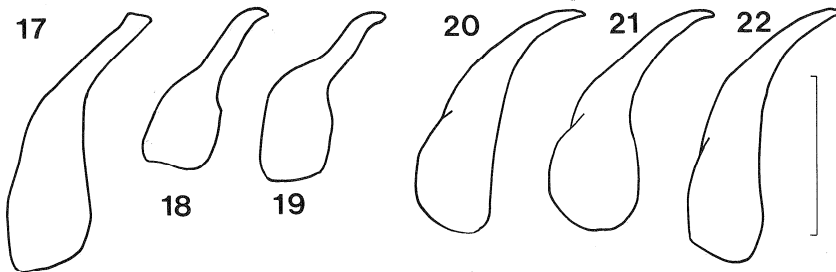


Fig. 17 to 22, posterior parameres : 17, *S. pallida* (Belgium specimen 6119); 18-19, *S. exilis*, sp. n., 18, Tananarive paratype 5799, 19, holotype; 20-22, sp. 3 (Mauritian specimens 3367, 3371 and 3372 respectively). Scales 100 μ .

The variability in the setation and overall shape of the *S. pallida* ovipositor, for example in Moroccan and Japanese specimens (Ibn Jilali, 1988), renders this structure of limited diagnostic value. Living *S. exilis*, sp. n. females failed to breed on medium which would, for *S. pallida* (and *Drosophila melanogaster* etc.), be entirely suitable (David, *pers. comm.*). One *S. exilis*, sp. n. female was collected from *Crinum* flowers while all others were swept over compost near buildings (Andasibe) and in disturbed garden habitats (Tananarive botanic gardens).

Scaptomyza pallida, *S. elmoi* and *S. substrigata* are widespread species while *S. exilis*, sp. n., *S. himalayana* and *S. santacruzei* have restricted distributions. Records of *S. pallida* in Australia (Bock, 1977) are attributed to misidentifications of *S. elmoi* (Bock, 1982) which is now known also from New Zealand (Takada, *pers. comm.* to Bock, 1982). Thus *S. pallida* should no longer be ranked as a cosmopolitan species; furthermore, earlier records of it from Africa and Indian Ocean islands should now be treated with circumspect. Java is the type locality for *S. substrigata* which is also recorded from Taiwan and the Cape Verde Islands (Hackman, 1955; Wheeler, 1981). *Scaptomyza elmoi* has a range including Taiwan, Japan, Hawaii and Australasia. *Scaptomyza pallida* occurs together with *S. elmoi* in Japan (Takada, 1970) and with *S. substrigata* in the Cape Verde Islands (Hackman, 1955) but has not been found in Madagascar.

Etymology. — *Exilis* (Latin) : very thin and spare, a reference to the secondary clasper.

✓ *Scaptomyza (Parascaptomyza)* species 3

Distinguishing Features : This species closely resembles *S. (Parascaptomyza) pallida* but may be distinguished from it by reference to the parameres which are pointed (fig. 17 vs 20-22).

Distribution. — The present series was collected in Mauritius but similar specimens are widespread in Africa (Tsacas, in press).

Specimens examined. — 10 specimens in MP with label-data : “Mauritius, vii.1986, coll. J.R. David”, Reg. numbers 3367-3376; 3 males dissected.

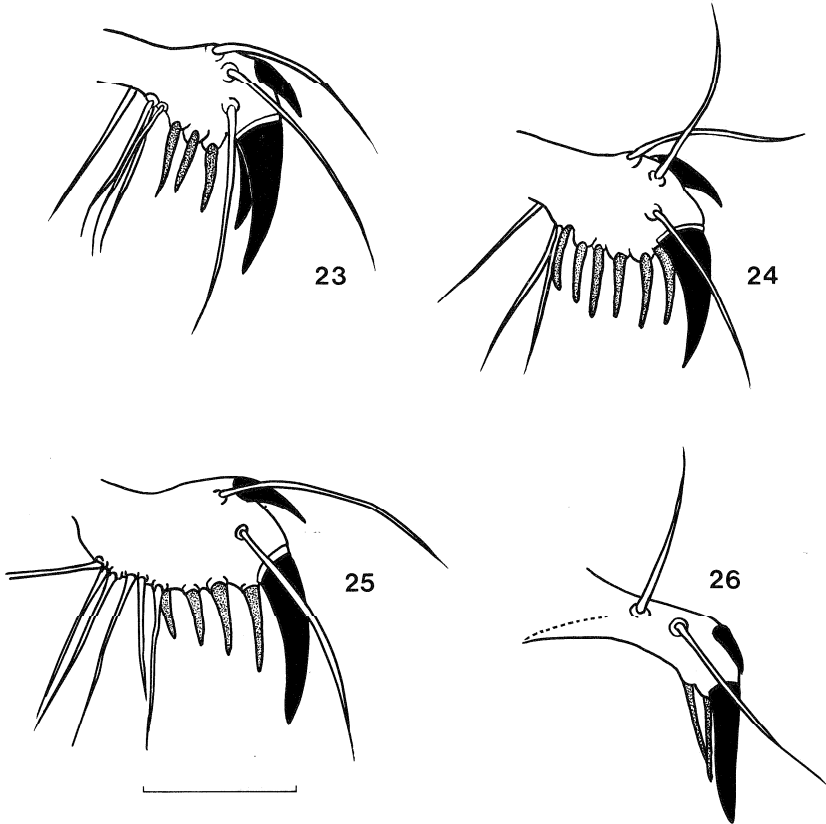


Fig. 23 to 26, Detail of secondary claspers (specimen numbers between parentheses) : 23 (3367) and 24 (3371), sp. 3; 25 (6119), *Scaptomyza pallida*; 26 (5799), *S. exilis*, sp. n. Scale 50 μ .

Remarks. — These specimens conform with a series presently under study by Tsacas, a formal description is to be published elsewhere (Tsacas, in press). The two sides of the aedeagal apex of sp. 3 almost occlude apically whereas in *S. pallida* they gape. The secondary clasper of sp. 3 (fig. 23, 24) has a form within the range known to exist among *S. pallida* specimens from northern Africa, Japan and Europe; Ibn Jilali (1988) has illustrated the variation in secondary claspers of Kenyan, Moroccan and Japanese *S. pallida* specimens. A Belgian specimen of *S. pallida*, which agrees especially closely with the latter two, is illustrated in figure 25. It should be noted that the secondary clasper form of sp. 3 and of *S. pallida* is quite unlike *S. exilis*, sp. n. (fig. 26). The secondary clasper in the Kenyan specimen illustrated by Ibn Jilali (1988) and determined by her to be *S. pallida* lacks dorsal spines (as is usual for *S. pallida*) whereas Burla's (1957) drawing of

“*Parascaptomyza* aff. *disticha*” (also Kenya) shows the clasper to be coarsely spinulate dorsally as well as apically and ventrally. This suggests that there are two species in Kenya differing only in secondary clasper form, their parameres are indistinguishable (compare Burla’s figure and fig. 20-22). It never-the-less remains possible that the names “sp. 3” and “*Parascaptomyza* aff. *disticha*” apply to the same species.

David & Tsacas (1975) and David *et al.* (1989) list *S. pallida* from Mauritius but this determination must now be treated as a misidentification of sp. 3. In Mauritius sp. 3 emerged in large numbers from Cucurbitaceae flowers from which adults were earlier aspirated (David *et al.*, 1989). It was also found that sp. 3 (in contrast to *S. exilis*, sp. n.) could be easily cultured on standard cornmeal-agar *Drosophila*-medium, one such strain was maintained for more than a year (David *pers. comm.*).

DISCUSSION

Three new species are described in the present paper, *Scaptomyza mateolata*, sp. n. from Mauritius and *S. merina*, sp. n. (=“*Scaptomyza* sp. 1”) and *S. exilis*, sp. n. from Madagascar. Two other species have been identified in the study region, they are described briefly, “*Scaptomyza* sp. 2” is represented by only two females from the Comores and Madagascar and “*Scaptomyza* sp. 3”, from Mauritius, agrees with a series to be described elsewhere by Tsacas (in press). *Scaptomyza mateolata*, sp. n. resembles no other known species and is classified in *Scaptomyza* with certain reservations. Whereas the other new species have clear affinities : *S. (S.) merina*, sp. n. with the type species *S. (S.) graminum* and *S. (Parascaptomyza) exilis*, sp. n. with *S. (P.) pallida*.

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