

On the genera *Scaptomyza* Hardy and *Parascaptomyza* Duda (Dipt., Drosophilidae).

by

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I. *Generic taxonomy.*

In a revision of material of holarctic Drosophilidae in the collections of the Zoological Museum of the University Helsingfors I have especially studied the *Parascaptomyza-Scaptomyza* group. Even in the generic nomenclature of this group confusion has been caused by different interpretations of the genus type *Drosophila graminum* Fallén 1823 (see DUDA 1935 p. 55—58, COLLIN 1953 p. 148—149, FREY 1954 p. 19). I have here followed COLLIN's nomenclature (see further p. 76):

Genus *Parascaptomyza* Duda (*Scaptomyza* sensu Hendel)

genus type: *P. disticha* Duda

Genus *Scaptomyza* Hardy (*Scaptomyzella* Hendel)

genus type: *Drosophila graminum* Fallén

DUDA (op.c.) has considered the above genera only as subgenera of *Drosophila* Fall. WHEELER (1952), on the other hand, in a paper on the nearctic species of the group, uses the generic name *Scaptomyza* in a wider sense (including *Parascaptomyza*) and divides the genus into species groups. FREY (op.c.) has made a further subdivision of *Parascaptomyza* into subgenera, but of these only *Parascaptomyza* (s.str.) is represented in the holarctic region.

DUDA (1935 p. 49) separates *Parascaptomyza* and *Scaptomyza* in his key to the subgenera of *Drosophila* as follows:

» 5. Nur eine starke obere h vorhanden, bzw. untere h minutiös, und nur zwei Reihen a.Mi. vorhanden. Mesonotum meist ganz matt oder wenigstens zwischen den a.Mi matt und bereift; Afterlamellen des ♂ und Legeröhrelamellen des ♀ verkümmert *Parascaptomyza* Duda

— Zwei h, von denen die untere wenigstens halb so lang wie die obere ist, und meist mehr als 2 Reihen a.Mi vorhanden 6

6. Mesonotum matt, meist mit einem medialen dunkelbraunen Längsstreifen. Nur 2 bis 4 Reihen a.Mi vorhanden. Afterlamellen des ♂ und Legeröhrelamellen des ♀ stark entwickelt *Scaptomyza* Hardy»

We find in this key that the size relation of the humeral bristles (h) and the number of rows of acrostichal hairs (a.Mi) are used as the main separating characters for the two genera. If we were to pursue this line, the North American species *adusta* Loew (and other species of WHEELER's *adusta* group) would be very difficult to place. In *adusta* Loew the humeral bristles are as in *Parascaptomyza* but the rows of acrostichals are four (on the presutural part of the mesonotum). FREY (1945) has described a *Scaptomyza adusta impunctata* from the Azores, but I have found that this is a species proper distinctly different from *adusta* in the male genitalia and in the shape of the ovipositor. In chaetotaxical characters the species are very similar. On the other hand in *impunctata* Frey the genitalia (fig. 3) are clearly of *Parascaptomyza* type and extremely similar to those of *Parascaptomyza clavigera* Frey (1945, also from the Azores). *P. clavigera* has only two rows of acrostichals, but *impunctata* has four. In *adusta* Loew the male genitalia (figs. 4, 5) are of a transitional type between *Parascaptomyza* and WHEELER's *Scaptomyza terminalis* group. One further transitional species (with 4 rows of acrostichals and one strong humeral bristle) has been described by FREY (1954) from Tristan da Cunha. FREY solved the problem by creating for this species, *frustulifera* Frey, a new genus *Tristanomyia*. *T. frustulifera*, together with some *Parascaptomyza* species from Tristan da Cunha, probably represents an isolated trend in the evolution of this group.

If we want to maintain *Parascaptomyza* and *Scaptomyza* as separate genera and as natural units, I think one solution is to include the *adusta* group in *Parascaptomyza* and give the characters of the male genitalia more importance than the number of acrostichal rows. The key characters for the two genera are then as follows:

Acrostichals in 2 or 4 rows. One prominent humeral bristle, the upper one. The lower humeral bristle represented by a fine hair or, if a true bristle, not longer than half the upper one. Male genitalia as a rule (except in subg. *Troglosaptomyza*) with conspicuous paired lobes between the anal plates (cerci) and the forcipes (see figs. 1—5). These lobes, called paralobes by FREY (1954), are provided with one or more strong teeth or setae and are probably derived from the anal plates. The latter are usually small and not protruding below. Ovipositor usually weakly chitinized and provided with short teeth at the margin. Larvae usually feeding on vegetable debris, at least not obligate leaf-miners
..... *Parascaptomyza* Duda.

Acrostichals in 4 rows, rarely in two (*S. subsplendens* Duda). Two humeral bristles, usually of nearly the same size, or the lower one at least half as long as the upper one. Male genitalia without paralobes (sensu FREY). Forceps with a dense marginal (rarely interrupted) row of stout and usually blunt teeth. Ovi-

positor usually with coarse marginal 'dentation' (see fig. 21). Includes obligate leaf-mining species *Scaptomyza* Hardy.

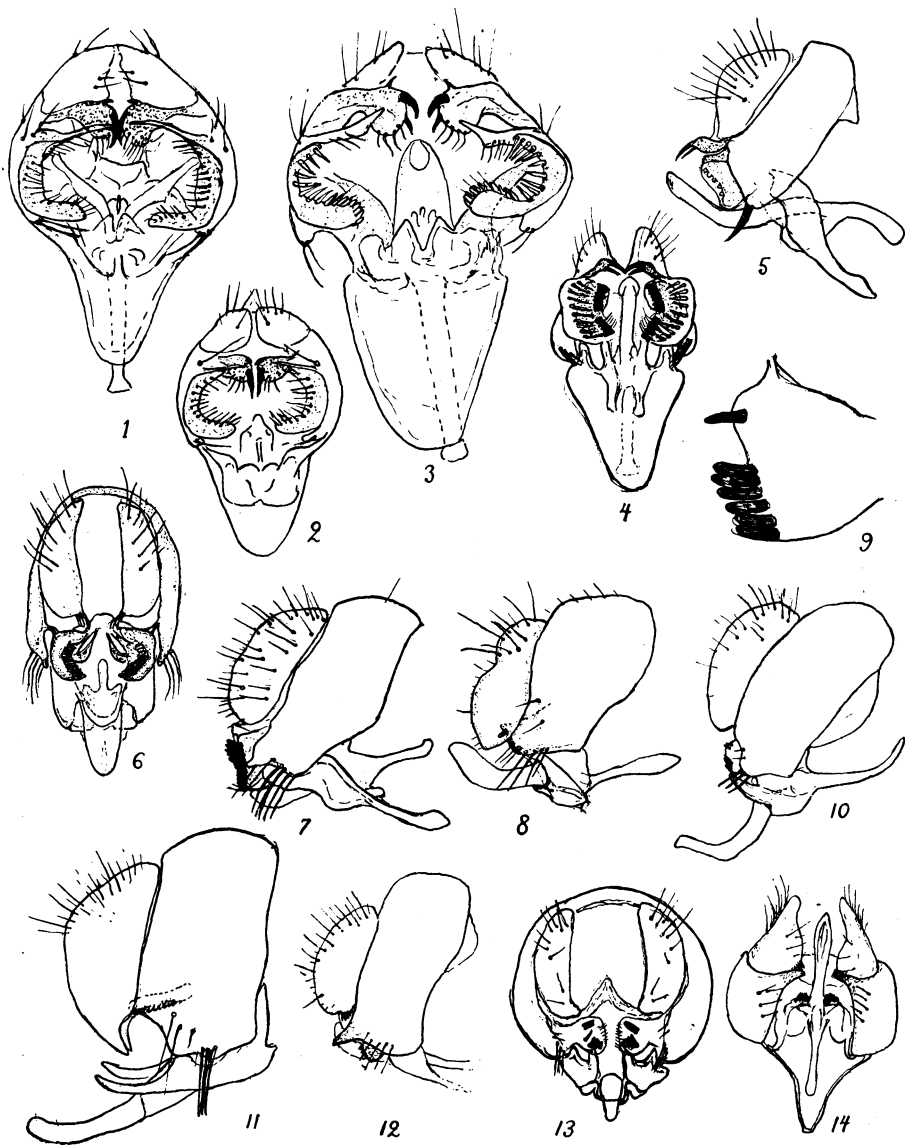
The *vittata* species group (WHEELER 1952 p. 195) should obviously be included in *Parascaptomyza* but I have not seen any figures of the genitalia nor any specimens of these mainly neotropical species. In *Scaptomyza* there remain two of WHEELER's species groups, the *terminalis* group and the *montana* group. These groups are rather distinct but it seems to me unnecessary to separate them as subgenera. The genus type species *graminum* Fall. belongs to the *montana* group. Following the above key *Tristanomyia* can be included as a subgenus of *Parascaptomyza*.

The genera *Parascaptomyza* and *Scaptomyza* are, as was already pointed out by DUDA (1935 p. 61), closely allied to the *fenestrarum* group in the genus *Drosophila*. It is interesting to note that the male genitalia in *Parascaptomyza* (*Trogloscaptomyza*) *brevilamellata* Frey (from Tristan da Cunha), especially the forceps, show a striking resemblance with those of *Drosophila forcipata* Collin (figs. 25, 26) belonging to the *fenestrarum* group. FREY (1954 p. 21) also points out that *Trogloscaptomyza* differs from other subgenera of *Parascaptomyza* in its primitive type of hypopygium. One other transitional species is obviously »*Scaptomyza*» *melancholica* Duda from Chile and Bolivia (judging from the figure given by MALLOCH 1934, fig. 78). DUDA (1935 p. 92) mentions that *Drosophila cameraria* Haliday (*D. pallida* sensu Duda, nec Zett.) is one of the forms leading over from *Scaptomyza* to *Drosophila*. However, the species has 6 rows of acrostichals and the male genitalia are markedly different from those of *Parascaptomyza*, *Scaptomyza* and the *Drosophila fenestrarum* group.

The systematics of the *Parascaptomyza* — *Scaptomyza* group has not yet attained nearly the same level as that of the genus *Drosophila* (see PATTERSON & STONE 1952) where taxonomists have been to no small degree aided by the cytological data and studies of aspects outside the usual dipterological routine work. Therefore it seems to me too early to try to build up a phylogenetic tree of the *Parascaptomyza*—*Scaptomyza* group, especially as these flies offer nearly the same possibility as the *Drosophila* species in general for more penetrating studies in the line of the new systematics.

II. The genera *Parascaptomyza* and *Scaptomyza* in Finland.

In my revision of the Finnish Drosophilidae, which I began in 1954 (see further HACKMAN 1955), the genus *Scaptomyza* posed several taxonomic and nomenclatorial problems. Concerning the interpretation of *Drosophila graminum* Fallén, the genus type of *Scaptomyza*, I have followed COLLIN (1933). It is obvious that FALLÉN's original type material contained both this species (with 4 rows of acrostichals) and *Parascaptomyza disticha* Duda. The material under the name *graminum* Fall. in ZETTERSTEDT's collection in is also a mixture



Figs. 1—5. — Male genitalia of *Parascaptomyza* species. Fig. 1 — *Parascaptomyza disticha* Duda (Finland), ventral view. Fig. 2 — *P. substrigata* De Meij. (Cape Verde Islands). Fig. 3 — *P. impunctata* Frey (Azores). Fig. 4 — *P. adusta* Loew (U.S.A.: D.C.), ventral view, Fig. 5 — The same species (U.S.A.: Md), profile. Figs. 6—14. — Male genitalia of *Scaptomyza* species. Fig. 6 — *Scaptomyza unipunctum* (Finland) Zett., ventro-caudal view. Fig. 7 — The same, profile. Fig. 8 — *S. trochanterata* Collin (Finland). Fig. 9 — Forceps of the same. Fig. 10 — *S. hsui* n.sp. (California), profile. Fig. 11 — *S. terminalis* Loew. Fig. 12 — *S. apicata* Thoms. (California). Fig. 13 — *S. hsui* n.sp. ventro-caudal view. Fig. 14 — *S. apicata* Thoms., ventral view.

of the two species (see FREY 1954 p. 19). Mr. E. B. BASDEN (Edinburgh, Scotland) has informed me in a letter that COLLIN has selected a lectotype for *graminum* in preference to his own and earlier DUDA's interpretation of *graminum*.

There is also another name used for *Scaptomysza graminum* sensu COLLIN, namely *incana* Meigen 1830. The type specimen of *incana* being probably lost, the name cannot be applied with certainty to any particular species in WHEELER's *montana* group, because there are at least two other species apart from *graminum* to which it might be applied. In any case, *incana* Meig. is a later name (1830) than *graminum* Fallén 1823. A further name proposed for *graminum* is *tetrasticha* Becker 1908 (see also p. 89).

Another nomenclatorial question concerns the species which COLLIN (1953) records from England under the name *Scaptomysza flaveola* Meig. 1830. This species is described by HARDY 1849 under the name *Scaptomysza apicalis*. MEIGEN's type specimen of *flaveola* is probably lost and the identity cannot be verified. There is, on the other hand, no special reason to doubt the synonymy of these two names, and I have used here the name *flaveola* Meig. for the species. FALLÉN's name *flava* (1823), as already pointed out by COLLIN (op.c.), is not available.

The species I am recording from Finland under the name *Scaptomysza montana* Wheeler 1949 (described from North America) is not the same as COLLIN's *S. montana* from England (1953). Finnish material of the species have been compared with American specimens by BASDEN, who informed me in a letter that he was not able to find any important differences between the Finnish and American specimens but that the British specimens recorded by COLLIN as *montana* Wheeler belong to a different species. Mr L. TIENSUU detected *S. montana* in his own Finnish material as long ago as 1951 and intended to describe it as a new species (recorded under a nomen nudum in Ann. Ent. Fennici 17 p. 175). The Finnish Museum collection included some specimens of *montana* under the name *Scaptomysza incana* Meig. In the same material I found in addition to *montana* and *graminum* two other species, *griseola* Zett. and one which I describe here as new under the name *Scaptomysza teinoptera* n.sp.

In the summer 1955 I found in Tvärminne (SW Finland) an additional new species of the above group and I am naming the species *Scaptomysza consimilis* n.sp.

The revision of Finnish collections further revealed that the *Scaptomysza terminalis* group (WHEELER 1952) is represented in this country by two species, *S. unipunctum* Zett. and *S. trochanterata* Collin. These two species are easy to recognize in the male sex but it appears impossible to separate the females. At least the description of the *trochanterata* female given by COLLIN (1953) agrees in every detail with females of *unipunctum*.

As a result of the revision following species of the group considered here can be recorded from Finland:

- Parascaptomyza disticha* Duda
Scaptomyza unipunctum Zett.
 » *trochanterata* Collin
 » *flaveola* Meig.
 » *montana* Wheeler
 » *consimilis* n.sp.
 » *teinoptera* n.sp.
 » *graminum* (Fall.) Collin
 » *griseola* Zett.

Parascaptomyza disticha Duda is easily distinguished from the Finnish *Scaptomyza* species in having only 2 rows of acrostichals. For identification of the Finnish *Scaptomyza* species the key is as follows:

1. Upper humeral bristle much stronger and sometimes nearly double as long as the lower one. Hind trochanters beneath with a short black spine-like bristle. Ground colour of mesonotum decidedly rufous 2
- Upper humeral bristle not much stronger than the lower one, or both equal in size. Trochanters beneath with hair-like bristles not contrasting in colour. Mesonotum yellow-brown or grey in ground colour 3
2. Male with a dark spot at the apex of the wing *unipunctum* Zett.
- Wings (♂, ♀) not spotted *trochanterata* Collin.
3. A minute bristle, sometimes present, sometimes absent, on the frontal orbits between the upper reclinate orbital and the vertical bristles. If absent, body entirely yellow with dark anal cerci 4
- No bristle between the upper reclinate orbital and vertical bristles. Greyish species 5
4. Body yellow. Male cerci dark and rounded, not drawn out to a point. *flaveola* Meig.
- Body always grey. Male cerci drawn out to a point .. *montana* Wheeler.
5. Palpus with one strong dark apical bristle, the other bristles more hair-like *consimilis* n.sp.
- Palpus with two or more dark apical bristles 6
6. In the male genitalia the teeth of the forceps margin are remarkably elongated in the ventral direction; the caudal margin of hypandrium with a deep median notch. Penis apodeme stout (see figs. 27—28). Wing length in both sexes as a rule more than 2.7 mm *teinoptera* n.sp.
- Marginal teeth of forceps almost equal in size, short and blunt; caudal margin of hypandrium with a narrow median split or a less deep notch (figs. 29—32). Penis apodeme slender. Wing length in both sexes as a rule less than 2.7 mm 7
7. Male cerci large with a broadly rounded free ventro-caudal margin (fig. 30) and only partially covered with microscopically small short hairs. In both sexes the brown stripes on the mesonotum distinctly contrasting with the light grey ground colour *graminum* Fall.
- Male cerci small, completely covered with microscopic hairs (figs. 31—32). In both sexes and especially the female the brown stripes on the mesonotum are only faint, if present at all *griseola* Zett.

Parascaptomyza disticha Duda (fig. 1).

A common species in Finland. It is an outdoor species feeding on vegetable debris. Laboratory cultures can be kept with the help of the usual *Drosophila* medium at 18° C (BASDEN 1954 p. 650). Imagines are collected by sweeping (May—September). I have seen material from the following biological provinces of Eastern Fennoscandia: Al, Ab, N, Ka, St, Ta, Sa, Tb, Sb, Kb, Om, Ob, Ks, Li and Ik. The northernmost find is from Utsjoki (leg. R. Frey). Probably the species occurs all over Finland. The species has a very wide distribution in the Holarctic region. Recorded also from islands in the Pacific.

Scaptomyza unipunctum Zett. (figs. 6—7).

The males of this species are easily recognized by the dark spot on the wing, but the females I have not been able to separate with certainty from *trochanterata* Collin. In the Finnish material of *unipunctum* and *trochanterata* there are only 11 females altogether. Two of them were taken together with males of *unipunctum* and very probably belong here. The following Finnish finds of *unipunctum* are known to me:

N: Helsinki 1 ♂ (R. Tuomikoski), Ta: Kangasala (R. Frey), Tammerfors 1 ♂ (J. Sahlberg), »Tavastia» 1 ♂ (leg.?), Sb: Nilsia 2 ♂♂ (C. Lundström), Tuovilanlahti 2 ♂♂ 1 ♀ (J. A. Palmén), Om: Nykarleby 1 ♂ (R. Storå), Ks: Kuusamo 4 ♂♂ 1 ♀ (R. Frey).

Female specimens which might equally well belong to *trochanterata* are known from following localities:

N: Sibbo (R. Frey), St: Karkku (W. Hellén), Ta: Sääksmäki (leg?), Sb: Leppävirta (J. A. Palmén).

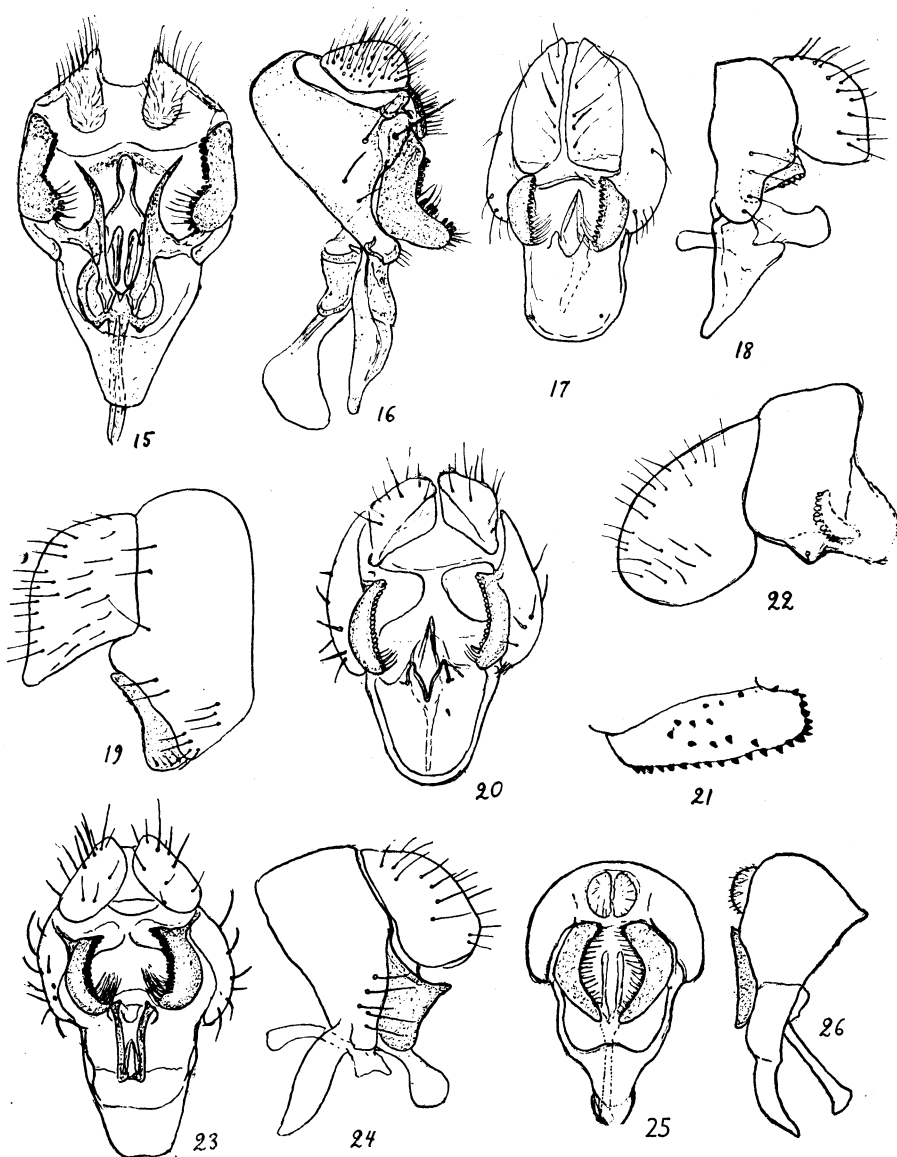
S. unipunctum is further known from Sweden, European Russia and Siberia (Kamchatka) (Duda 1928). The determination of some specimens from Kamchatka (leg. Y. Wuorentaus) have been checked by me from genital preparations.

Scaptomyza trochanterata Collin (figs. 8, 9).

One male specimen, taken in N:Esbo 22. 5. 1941 (R. Frey), agrees well with the description given by COLLIN (1953). The genitalia are distinctly different from those of *unipunctum*. The species was previously known only from Great Britain (COLLIN 1953, BASDEN 1954).

Scaptomyza flaveola Meig. (figs. 17—18).

A leaf-mining species represented in the Museum's collection by only a few Finnish specimens. HERING (1935—37) lists the following food plants: Cruciferae: *Aethionema*, *Alliaria*, *Arabis*, *Barbarea*, *Brassica*, *Cakile*, *Capsella*, *Cardamine*, *Cheiranthus*, *Cochlearia*, *Crambe*, *Dentaria*, *Diploxys*, *Erucastrum*, *Erysimum*, *Hesperis*, *Iberis*, *Isatis*, *Lepidium*, *Lunaria*, *Matthiola*, *Myagrum*, *Nasturtium*, *Raphanus*, *Sinapis*, *Sisymbrium*, *Stenophragma*, *Thlaspi*. — Resedaceae: *Reseda*. — Tropaeolaceae: *Tropaeolum*. — Leguminosae: *Anthyllis*, *Pisum*, *Trigonella*.



Figs. 15—20, 23—24 — Male genitalia of *Scaptomyza* species. Fig. 15 — *Scaptomyza consimilis* n.sp. (Finland), ventral view. Fig. 16 — The same, profile. Fig. 17 — *Scaptomyza flaveola* Meig. (Finland), ventral view. Fig. 18 — The same species (Canary Islands), profile. Fig. 19 — *S. montana* Wheeler (Finland), profile, (aedeagus and hypandrium omitted). Fig. 20 — The same species (Finland), ventral view. Fig. 21 — Ovipositor of the same species (Finland). Fig. 22 — *S. norica* n.sp. Genital arch and cerci of the male. Fig. 23 — *S. atlantica* n.sp. (Canary Islands), ventral view. Fig. 24 — The same, profile. Figs. 25—26 — Male genitalia of *Drosophila forcipata* Collin (Cyprus) ventral and side view.

Eastern Fennoscandian records: N: *Hoplax* 1 ♂ (R. Frey), Helsingfors 1 ♂ (R. Frey), Dickursby (R. Frey), St: Yläne 1 ♂ (J. Sahlberg). — Ik: Kirjola 1 ♂ (J. Sahlberg), Kol: Petrosawodsk 1 ♂ (Günther).

The species is widely distributed in the Palearctic Region.

***Scaptomyza montana* Wheeler (figs. 19, 20).**

This species, has been reared from leaf-mines on both *Pisum* and *Brassica*.

Records from Eastern Fennoscandia: Al: Saltvik (L. Tiensuu), Ab: Pargas (Ingelius), Turku—Åbo (Ingelius, Tiensuu), Koski (J. A. Palmén), Lojo (Frey), N: Tikkurila (leg.?), Ka: Virolahti (a series reared from *Brassica*, in the collection of the Agriculture Experimental station in Tikkurila), Ta: Hattula (Tiensuu), Ob: Torneå (Frey), Koski (according to Tiensuu), Ks: Paanajärvi (Frey), Li: Inari ((Hellén). — Ik: Valkjärvi (Frey), Lv: Kusomen (Hellén).

Described from North America. The specimens recorded as *S. montana* from Great Britain belong according to Basden to another species.

***Scaptomyza consimilis* n.sp. (figs. 15, 16).**

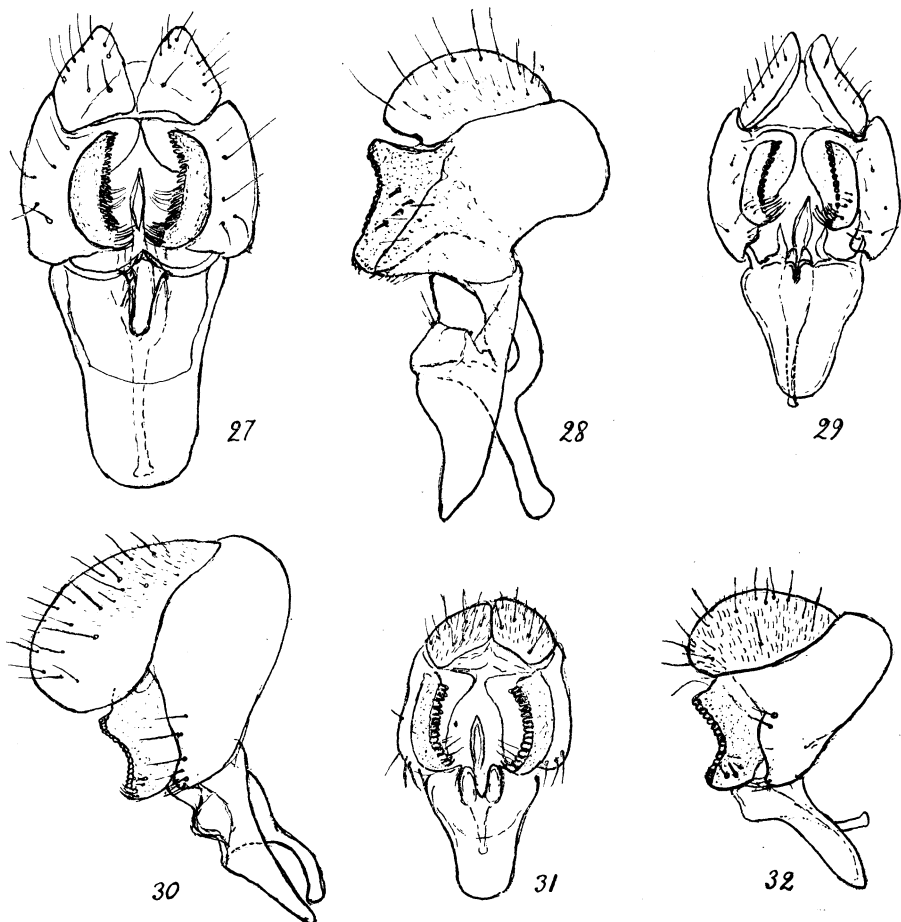
One single male specimen from Finland taken by me in N: Tvärminne on 5. 6. 1955, by sweeping roadside vegetation of grass and *Stellaria holostea*. In the Museum's collection I found two males and a female specimen from Kamchatka: Bolscherjetsk (2 ♂ 23.7, 1 ♀ 25.8 1917 leg. Y. Wuorentaus) obviously belonging to this species. I have based the description of this new species on the Finnish specimen.

♂ — Body length about 2.5 mm. Length of wing 2.9 mm. Colour pattern of head, thorax and abdomen as in *graminum* (Fall.) Collin and other species of the *montana* group. Face whitish with a low carina. Antennae yellow; arista of the usual type with only one ventral branch in addition to the terminal fork. Palpi yellow with only one dark terminal bristle, which is stronger than the other more hair-like bristles in the terminal part of the palpi (this important character is also found in the female from Kamchatka). Jowls narrow as in *graminum*. Chaetotaxy of head and thorax in other respects as in *graminum*. 4 rows of acrostichals. The brown stripes on the mesonotum are distinct and the median one is continued faintly on the scutellum. The basal scutellar bristles nearly reach the ends of the apical ones. Wings clear, pale yellowish. Costal space between 1st and 2nd vein 1.8 mm, between 2nd and 3rd vein 0.5 mm. Legs yellow. The male genitalia (figs. 15, 16) are distinctly different from those of the other species of the *montana* group. The cerci have a hairy ventral lobe, lacking in the other species considered here.

Holotype: Finland: N: Tvärminne 1 ♂ leg. W. Hackman. The type is preserved in the Zool. Museum of the University of Helsingfors.

***Scaptomyza teinoptera* n.sp. (figs. 27, 28).**

About a third of the Finnish material previously classified in the Museum's collection under the name »*Scaptomyza incana*» proved to belong to a species



Figs. 27—32. Male genitalia of *Scaptomyza* species. — Figs. 27—28. *Scaptomyza ternoptera* n.sp. (Finland), ventral and side view. — Figs. 29—30. *S. graminum* (Fall.) Collin (Finland), ventral and side view. — Figs. 31—32. *S. griseola* Zett. (Finland), ventral and side view.

constantly different, at least in the male genitalia, from *graminum* Fall. and *griseola* Zett. The description:

♂ — Body length about 2.5 mm. Length of wing 2.7—3.0 mm. The variation of the costal index is demonstrated for this species and the two following in the diagrams 1 and 2. Colour pattern of head, thorax and abdomen as in *graminum*. In most specimens the brown stripes of the mesonotum are distinct, especially the the median one, which is continued on the scutellum. Facial carina weak as in *graminum*; median area of face and clypeus pale yellowish. The jowls are usually narrow, as in *graminum*. Second and third joint of antennae yellow. Arista as in *graminum*. In the chaetotaxy I have found no reliable separating character. The hypopygium (figs. 27, 28) is rather large

in comparison with *graminum* and *griseola*. The cerci are more like those in *griseola*, but only partially covered with microscopic hairs. Dentation of forceps characteristic (see fig. 27 and also the key of species on p. 79). The differences in hypadrium and aedeagus between this species and the two others are shown in figs. 27—32.

♀ — Body length about 2.7 mm. Length of wing 2.8—3.2 mm. Resembling the male in most colour characters and in the chaetotaxy, but the second joint of the antennae is often dark fuscous in the basal half and the third joint is sometimes darkened on the outer side. Median area of face sometimes greyish. Legs yellow as in the male, the femora not darker than other parts of the legs. The ovipositor plates dark red-brown, dentation as in *griseola*.

Holotype ♂ Finland: Ta: Messuby, (leg. R. Frey. Allotype a female taken in the same locality together with the holotype. Both type specimens are preserved in the collection of the Zoological Museum of the University Helsingfors. Paratypes from Ks: Kuusamo in the Museum's collection and in Coll. R. FREY.

As shown in the key of species and in the description, the females of *teinoptera* are separated from those of *graminum* only by a rather small difference in the absolute length of the wing. The difference is, of course, statistically significant as far as the Finnish material is concerned. Even in the Finnish material there are some dubious borderline cases. The differences in the male genitalia, on the other hand, indicate that we are dealing with a distinct species.

The biology of *S. teinoptera* is not known. One can assume that the species is a leaf-miner like the other two extremely closely related species *graminum* and *griseola*, *S. teinoptera* has been collected by sweeping vegetation in moist habitats from June to September, and is known from the following localities in Eastern Fennoscandia:

Ab: Eriksberg (E. J. Bonsdorff), Karislojo (Frey), Ta: Messuby (R. Frey), Birkkala (Frey), Sa: Nyslott (Carlenius), Oa: Vasa (Frey), Tb: Jyväskylä (Woldstedt), Sb: Maaninka, Tuovilanlahti (Lundström), Kiuruvesi (Lundström), Om: Nykarleby (R. Storå), Ok: Suomussalmi (Hellén), Ob: Övertorneå (Frey), Kittilä (Frey), Pisavaara (Håkan Lindberg), Ks: Kuusamo (R. Frey), Paana-järvi (Frey, Hellén), Lkem: Muonio (J. A. Palmén, Frey), Pallastunturi (Frey), Li: Utsjoki (R. Frey). — Ik: Metsäpirtti (R. Frey).

One male specimen (in bad condition) taken i Sitka (F. Sahlberg, Coll. Frey) obviously belongs to *teinoptera* and shows that the species has a very wide holarctic distribution and probably could also be found elsewhere in the Nearctic region.

***Scaptomyza graminum* Fall. (figs. 29, 30).**

The males of this species can be recognized by the large rounded cerci (visible in dried specimens even without dissecting the abdomen). The females can be separated from *griseola* by the distinct thorax pattern and in most

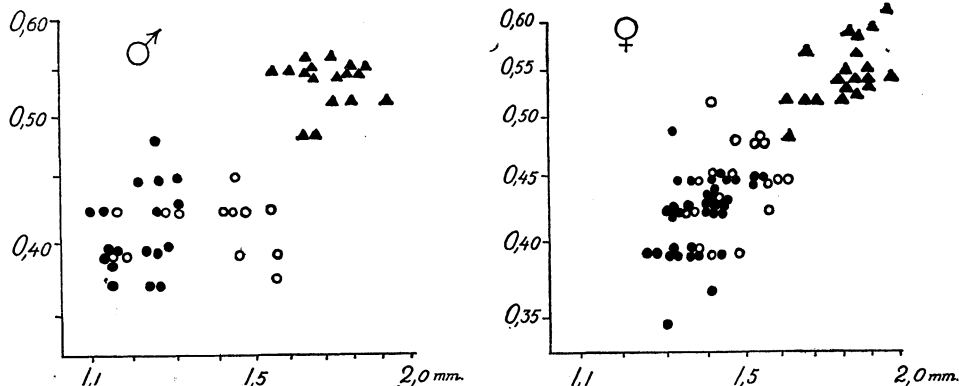


Diagram 1. The distance between the end points of first and second vein at the costa (on the abscisse) plotted against the distance between the end points of the second and third vein in wings of 3 *Scaptomyza* species: *S. graminum* (Fall.) Collin — O, *S. griseola* Zett. — ●, *S. teinoptera* n.sp. — ▲ Left males, right females.

cases from *teinoptera* by the difference in wing length. According to BASDEN (1954), imagines of this species can be trapped on apple baits. The larva is leaf-mining and feeds on Caryophyllaceous plants. Some of the food plants mentioned in the literature may refer to other grey species of *Scaptomyza*, but there is reliable record at least for *Stellaria media* (BASDEN op.c.). The Finnish material of imagines was mainly collected by sweeping vegetation in various habitats throughout the summer. Localities in Eastern Fennoscandia:

Al: Saltvik (Frey), Ab: Åbo (Ingelius), Lojo (Frey, A. Luther), Vichtis (Frey), N: Kyrkslätt (Frey), Helsingfors (Frey), Helsing (Frey), Hoplax (Frey), Ta: Messuby (Frey), «Tavastia» (leg.?), Kangasala (Frey), Sa: Nyslott (Carlenius), Oa: Vasa (Frey), Tb: Ähtäri (Frey), Om: Larsmo (R. Storå), Jakobstad (R. Storå), Nykarleby (R. Storå), Li: Utsjoki (Frey).

Obviously the species is rare (or perhaps lacking) in large areas in Northern Finland. From Muonio (Ikem) and Kuusamo (Ks) there are series of specimens of this group but all belong to *teinoptera* and *griseola*.

***Scaptomyza griseola* Zett. (figs. 31, 32).**

This species is recognized by the faintness or absence of mesonotum pattern, and some characters in the male genitalia (figs. 31, 32). The jowls are wider than in most specimens of *graminum*. The colour characters of face, antennae and palpi are less reliable for a separation from the two previous species as far as the Finnish material is concerned.

S. griseola has been reared from *Stellaria media* by J. A. PALMÉN. Imagines probably throughout the summer. Find records from Eastern Fennoscandia:

Ab: Pargas (Ingelius), Runsala (Frey), Vichtis (Frey), N: Kyrkslätt (Frey), Bobäck (Frey), Esbo (Frey), Helsingfors—Helsinki (Frey, A. Nordman, Tuomi-

koski), Helsing (Frey), Sibbo (Frey), Jollas (6 specimens reared from *Stellaria media*, J. A. Palmén), Ta: Messuby (Frey), Sa: Joutseno (E. Thuneberg), Oa: Kevlaks (Håkan Lindberg), Sb: Tuovilanlahti (Frey), Om: Nykarleby (Frey), Larsmo (R. Storå), Jakobstad (R. Storå), Ok: Hyrynsalmi (Hellén), Kajana (Hellén), Ob: Torneå (Frey), Ks: Kuusamo (Frey), Lkem: Kittilä (Frey), Muonio (J. A. Palmén, J. Sahlberg), Pallastunturi (Frey). — Ka: Viborg (Pipping) Kol: Petrosawodsk (Günther).

III. *A new Scaptomyza species from Austria.*

Among some old Central and South European material of Diptera collected by Prof. J. A. PALMÉN on his journeys in 1875—76 I found 2 specimens of a *Scaptomyza* species which I have not been able to identify with any species known to me. I am describing the species as new under the name *Scaptomyza norica* n.sp. The two specimens, a male and a female, were taken in Nassfeld in the Hohe Tauern area in the Austrian Alps. The species belongs to the *Scaptomyza montana* group and the description is as follows:

***Scaptomyza norica* n.sp. (fig. 22).**

♂ — Length of body about 2.7 mm. Length of wing 2.7 mm. Frons yellow, ocellar triangle and posterior parts of orbit grey. Orbital bristles in the same position as in *S. graminum* Fall. Between the posterior reclinate orbital and the vertical bristles an extra bristle, which is much stronger than in *montana* Wheeler and *flaveola* Meig., nearly as strong as the anterior reclinate orbital. Antennae yellow. Arista with one ventral and 3 dorsal branches apart from the terminal fork. Face pale yellow, carina very low. Jowls narrow as in *graminum*. Palpi and other mouthparts yellow. Vibrissae well developed, other orals thin, less than half the length of the first. Mesonotum dark grey with the usual brown *Scaptomyza* stripe pattern. Acrostichals in four rows. Upper humeral bristle slightly stronger than the lower one. Apical and basal scutellar bristles reaching about the same distance posteriorly. Pleurae greyish brown. Wings clear, veins yellowish. Costal space between the endpoints of first and second vein 1.75 mm and between second and third vein 0.5 mm. Halteres yellow. Legs yellow. Abdomen greyish brown. The male genitalia (fig. 22) are characterized by the very large, rounded and ventrally protruding anal plates (cerci). Forceps smaller than usual in the group.

♀ — Length of body 2.8 mm. Length of wing 3.6 mm. Rather similar to the male but differs in the following two chaetotaxal and colour characters: Third joint of antennae dark fuscous on the outer side. The supernumerary orbital bristle mentioned above for the male specimen is only half as strong as the anterior reclinate orbital. Ovipositor of the shape usual in the group and with coarse marginal dentation.

Scaptomyza norica is easily separated from *montana* Wheeler and other allied species by the unusually strong extra orbital bristle.

Holotype: Male, Austria: Hohe Tauern: Nassfeld (on the label: »Alp. noric.», Nassfeld), leg. J. A. Palmén.

IV. *Notes on Scaptomyza terminalis* Loew and allied species.

In an old collection of Diptera (in Coll. Frey) from Sitka in Alaska collected by F. SAHLBERG in the middle of the 19th century, I found some specimens belonging to a species of the *Scaptomyza terminalis* group of WHEELER (1952). The specimens are covered with mould but the characteristic spots at the apex of the wing in a male specimen is still clearly visible. Several nearctic species have been confused under the name *Scaptomyza terminalis* in the past. WHEELER (1952) has brought some order in this complex of very closely allied species and describes the male genitalia of three distinct species. In colour and gross morphology these three nearctic members of the group are practically identical and it seems impossible to identify the females with certainty. The male genitalia, on the other hand, offer good separating characters. WHEELER identified a species from California as *terminalis* Loew described from Sitka. However, he adds that if this should prove to be an error the name *apicata* Thoms. is available (types from San Francisco). When I made genital preparations of the single male specimen in the above-mentioned collection from Sitka I found that the specimen did not belong to the species considered by WHEELER as *terminalis*. On the other hand, it is highly probable that this is the true *terminalis* Loew, because LOEW described his species from the same Sitka material. I do not know the fate of LOEW's type specimen but, in any case, this interpretation of *terminalis* seems to me to be based on rather strong arguments. Through the kind help of Dr. C. SABROSKY I obtained some nearctic specimens of the *terminalis* group for study. All these specimens were included under the name *terminalis* Loew in the collection of the U.S. National Museum in Washington. The specimens, all from Western U.S.A., belong to two distinct species, *apicata* Thomson and the »species C» of WHEELER (1952). The male genitalia of the latter species have been figured by HSU (1949) under the name *terminalis* Loew. HSU's specimens came from Caliente in Sierra Nevada. The specimens from the U.S. National Museum were taken in W. Jacinto near Riverside in California. I am going to name the species *Scaptomyza hsui* n.sp. The *terminalis* group also includes a hypothetical species, »*Scaptomyza* species E» of WHEELER (op. cit.) from Eastern North America. In a collection of Diptera from Newfoundland brought together by a Finnish-Swedish expedition in 1949 there are some specimens belonging to the *S. terminalis* group, but all the specimens are unfortunately females (6♀♀ from Cow Head) and do not show any reliable characters for separation of a new species.

***Scaptomyza terminalis* Loew (fig. 11).**

Body length about 3 mm. Wing length in the male 3.2 mm. in the female 3.4—3.5 mm. The male genitalia (figs. 11) are briefly characterized as follows: Anal cerci drawn out to a point, forceps with a long dense row of blunt marginal teeth, Hypandrium with two long narrow caudal projections, one on each side of the aedeagus. Genital arch without any pointed projections.

1 ♂ and 3 ♀♀ from Sitka, Alaska, leg. F. Sahlberg (coll. R. Frey).

***Scaptomyza apicata* Thomson (*terminalis* Wheeler 1952, nec Loew).**

Body length about 2.3 mm. in the specimens investigated. Wing length in the male 2.6—2.7 mm. In the male genitalia this species is easily recognized by the pointed lower corner of the genital arch and the cluster of thick black bristles along the lower edge of the anal cerci (see fig. 12, 14).

Material investigated: California: Strawberry Canyon, U. C. Campus, Berkley 2 ♂♂ 27. 9. 1947 (leg. W. W. Wirth). — Victorville, San Berna, 1 ♂ 2. 5. 1953 (leg. G. A. Schuster).

Type locality: San Francisco.

***Scaptomyza hsui* n.sp. (*S. terminalis* Hsu 1949, nec Loew).**

♂ ♀ — Body length about 2.5 mm. Wing length in the male 2.8 mm., in the female 2.7—2.8 mm. Frons orange-brown, upper two-third of orbitae, ocellar triangle and hind part of head dark grey. Face yellowish, with a distinct nose-like carina. Antennae yellow; in the female the second joint is somewhat darker than the third. Arista with 2 ventral branches in addition to the terminal fork. Palpi and other mouthparts yellow. Chaetotaxy of the head as in *apicata* Thoms. and other species of the group. Jowls narrow. Mesonotum grey with the usual brown *Scaptomyza* pattern. 4 rows of acrostichals. Pleurae dark brown. Scutellum grey with faint continuation of the brown median stripe. Apical scutellar bristles reach nearly as far behind as the basal ones. Wing with a distinct dark spot at the apex (in both sexes). Abdomen dark brown. The male genitalia (figs. 10, 13) show the characteristic features already described by WHEELER (1952 p. 203) for his species »C».

Both *S. hsui* and *apicata* Thoms. are much darker in colour than *terminalis* and the two palearctic species of the group (*trochanterata* Collin and *unipunctum* Zett.) and in general appearance more like the grey species of the *montana* group.

Holotype of *S. hsui* n.sp.: ♂, California: Mt. San Jacinto, Riverside, 1. 6. 1952 (leg. R. E. Ryckman & C. T. Ames). A female allotype and a female paratype from the same locality. The types are preserved in the U.S. National Museum, Washington, U.S.A.

V. Three species of the Scaptomyza-Parascaptomyza complex from the Atlantic Islands.

***Scaptomyza atlantica* n.sp.** (*S. tetrasticha* Becker, pro partim).

In his paper on the Diptera of the Canary Islands, BECKER (1908) also dealt with the *Scaptomyza graminum* problem. Regarding the species with two acrostichal rows (*Parascaptomyza disticha* Duda) as *graminum* Fall., BECKER proposed a new name for the species with 4 acrostichals (*graminum* sensu Collin) which he had in his material, namely *Scaptomyza tetrasticha*. In addition to this German specimens (from Silesia) he had at the same time before him specimens from Teneriffe which differed greatly in colour from the former specimens. BECKER, however, considered them to be a form of *tetrasticha* without giving this form a name. *S. tetrasticha* Becker is thus a synonym of *S. graminum* (Fallen) Collin. In our Museum collection there are a series of the Canary form collected by FREY and STORÅ (see Frey 1936 p. 106) and also by HÅKAN LINDBERG in 1947 and 1949—50. FREY (op. cit.) records his specimens as »*Scaptomyzella incana* Meig. var. *tetrasticha* Becker.» When I made preparations of the male genitalia of this material I found some minor, but probably constant, differences from *graminum* (Fall.) Collin. In addition to this is the constant difference in the colour pattern of the mesonotum. I have therefore regarded this specimens as belonging to a distinct species. Hence there arises the question of whether the name *tetrasticha* Beck. can be used for this species or not. I have not seen any type material of *tetrasticha* but it seems to me quite clear that if BECKER has selected a type it must have been from his series from Silesia and not from the aberrant series from Teneriffe. BECKER (op. cit.) also mentions that he first intended to describe his Canary specimens as belonging to a distinct species but later included them in the species he named *tetrasticha*. Here, therefore I have given the species from the Canary Islands the name *Scaptomyza atlantica* n.sp. The description:

♂ — Body length about 2.5 mm. Length of wing 2.25—2.70 mm. Frons yellow, more yellow-brown around the dark greyish ocellar triangle. Orbitae yellow, pale greyish in the upper half. Face whitish, carina low. Jowls whitish and narrow. Antennae yellow. Arista as in *graminum* (Fall.) Collin. Palpi yellow with two dark terminal bristles. Chaetotaxy of head not different from *graminum*. Mesonotum yellow, tinged slightly greyish. The brown stripe pattern is distinct and of the usual *Scaptomyza* type. The median stripe is continued broadly on the scutellum. Chaetotaxy of thorax as in *graminum*. Pleurae and abdomen dusky yellow-brown. Wings clear. Legs yellow. The male genitalia (figs. 23, 24) differ from those of *graminum* in the following characters: Upper corner of forceps margin pointed. Aedeagus in side view clavate. Hypandrium somewhat different in shape (see figs. 23, 24).

♀ — Body length about 2.7 mm., length of wing 2.7—2.9 mm. Median line of frons and face and dorsal parts of second joint of antennae darkened (brownish). In other colour characters resembling the male. Chaetotaxy as in the male. Ovipositor as in *graminum*.

Male holotype: C a n a r y I s l a n d s : Teneriffe: Agua Garcia, leg. R. Frey. Allotype: female from the same locality.

Further localities: C a n a r y I s l a n d s : Teneriffe: Agua Mansa (Frey), Orotava (Frey), Valle de S. Andrés (Lindberg), Puerto de S. Juan (Lindberg), Puerto de la Cruz (Lindberg), Santa Ursula (Lindberg), Fuente Fria (Lindberg), Adeje, Barr. del Infierno (Lindberg), Supra Icod (Lindberg); Gran Canaria: Moya (Storå); Gomera: Valle de la Rosa (Lindberg). A z o r e s : S. Miguel, Sete Cidades (1 ♂ leg. Frey).

Some yellow-coloured specimens from the Azores and Madeira listed by Frey (1949) as *S. incana* var. *tetrasticha* Beck. have a minute extra bristle (like *S. flaveola* and *S. montana*) between the upper reclinate orbital bristle and the vertical bristles. These specimens might probably belong to *flaveola* Meig.

***Parascaptomyza impunctata* Frey (fig. 3).**

This species was described by FREY (1945) from the Azores under the name *Scaptomyzella adusta* Loew (?) var. *impunctata* (see also p. 75). In its gross morphology, colour characters and chaetotaxy it closely resembles *adusta*, but the wings are not spotted and the genitalia of the male are quite different from those of *adusta* (see figs. 3—5). Thus *impunctata* Frey is to be considered as a species proper. It may be mentioned that the female ovipositor is very weakly chitinized and clearly of *Parascaptomyza* type. The male genitalia closely resemble rather those of *Parascaptomyza disticha* DUDA and can hardly be distinguished from those of *P. clavigera* Frey (1954) also from the Azores. *P. impunctata* has 4 rows of acrostichals, *clavigera* only two. The localities for *P. impunctata* are already listed in FREY's paper of 1945.

***Parascaptomyza substrigata* de Meijere (fig. 2).**

In the material of Diptera collected on the Cape Verde Islands in 1953—54 by Prof. HÅKAN LINDBERG and Mr. S. PANELIUS there are numerous specimens of a *Parascaptomyza* identified by me as *P. substrigata* de Meijere (originally described from Java 1914). *P. substrigata* has been included by Duda (1928) as a synonym of *P. disticha* Duda and regarded as identical with the yellow form of the latter species («ab. *flava*»). DE MEIJERE (1914 p. 268), however, mentions in his description of *substrigata* that the arista has two ventral branches in addition to the terminal fork. This is, as far as I know, never the case in *disticha* Duda. The specimens from Cape Verde agree in every point of the description with *substrigata*. The male genitalia show some minor but constant differences from those of *disticha* (see figs. 1—2) and the hypopygium as a whole is much smaller. On the Cape Verde Islands *P. disticha* is also taken and in its usual dark form. I have regarded *substrigata* de Meijere

as a species proper. The species has probably a very wide distribution, like some other Drosophilidae described from Java by DE MEIJERE but later found on various parts of the African coast and on the Cape Verde Islands. *Leucophenga albicincta* De Meij. and *Lissocephala bicolor* De Meij. (both taken on the Cape Verde Islands by HÅKAN LINDBERG's expedition 1954—55) might serve as examples.

The material of *Parascaptomyza substrigata* investigated: Cape Verde Islands: San Antao: Pombas 23—26. 12. 1953, (29 specimens) leg. Lindberg & Panelius. Nicolau: Ribeira Brava 6—19. 12. 1953 leg. Lindberg, Chada Preguista 13—17. 12. 1953 (Lindberg).

S u m m a r y.

In the present paper the separating characters of the genera *Scaptomyza* Hardy and *Parascaptomyza* Duda are discussed. The *adusta* group of Wheeler has been included in *Parascaptomyza*. A key for the Finnish *Scaptomyza* species is given. The following species are described as new: *Scaptomyza consimilis* n.sp. (from Finland), *S. teinoptera* n.sp. (from Finland), *S. norica* n.sp. (from Austria), *S. hsui* (California), *S. atlantica* n.sp. (Canary Islands). *Parascaptomyza impunctata* Frey and *P. substrigata* de Meijere are considered as species proper. The male genitalia of 13 *Scaptomyza* species and 4 *Parascaptomyza* species are figured.

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