

European species of the *Drosophila* subgenus *Lordiphosa* (Diptera, Drosophilidae)

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Taxonomy, morphology of genitalia, lectotypes, distribution

Abstract. The subgenus *Lordiphosa* of the genus *Drosophila* is redefined and now comprises six European species, including the newly assigned *D. nigricolor* Str. and *D. miki* Duda. The Japanese *D. mommai* Takada & Okada is also transferred to this subgenus. Diagnostic characters are described and figured, those of the male of *D. hexasticha* Papp and the female of *D. acuminata* Coll. for the first time. Lectotypes are designated for *D. miki* Duda and *Scaptomyza flava* Fall. A key to the European species, and their known distributions and life histories are given. *D. andalusiaca* Str. and *D. acuminata* Coll. are recorded for the first time from Czechoslovakia and *D. andalusiaca* from Syria.

The subgenus *Lordiphosa* was erected by BASDEN (1961) for the *fenestrarum* species-group of the genus *Drosophila*; the group was established earlier by the same author (BASDEN, 1954). One Nearctic (*Drosophila basdeni* WHEELER), two Oriental species (*D. variopicta* BECKER; *D. hirsuta* DUDA) and three European species were originally included into this subgenus: *D. fenestrarum* FALLÉN, *D. andalusiaca* STROBL and *D. acuminata* COLLIN. More recently two other species were added: *D. collinella* OKADA, 1968, described from Japan and *D. hexasticha* PAPP, 1971, from Hungary.

Their obscure life histories, the failure of attempts at laboratory breeding and scanty study material are the main reasons for our poor knowledge of the subgenus *Lordiphosa*, particularly the subgeneric concept and the diagnoses of the included species. Therefore the main aim of the present paper is the taxonomic study of the subgenus, with the above mentioned points in mind, and the redefinition of the subgenus and redescriptions of the species concerned. Emphasis is placed on the detailed morphology of the terminalia of both sexes, which have previously been inadequately described and figured.

The following abbreviations are used to designate the source of the material: DMS — District Museum, Soběslav; FIP — Research Institute of Food Industry, Praha; HMB — Hungarian Natural History Museum, Department of Zoology, Budapest; IBP — Institute for International Biological Program, Brno; IPE — Institut für Pflanzenschutzforschung, Abteilung Taxonomie der Insekten, Eberswalde, GDR; MMB — Moravian Museum, Brno; MNS — Museum of Natural History, Stockholm; NMP — National Museum, Department of Entomology, Praha; NMW — Naturhistorisches Museum, Abteilung Insekten, Wien; UHS — University of Hokkaido, Department of Zoology, Sapporo; ZIL — Zoological Institute, Department of Systematics, Lund; ZMH — Zoological Museum of the University, Helsinki.

Subgenus *Lordiphosa* BASDEN, 1961

Drosophila, subgenus *Lordiphosa* BASDEN, 1961, *Beitr. Ent.*, 11 : 186.

Type-species: *Drosophila fenestrarum* FALLÉN, 1823 (by original designation).

Body small, 2—2.5 mm long, brownish yellow with diffuse dark brown spots on upper parts of pleurae, or brownish black. Carina mostly flat,

developed distinctly only in dorsal half. Arista ventrally with 2—3 rays. Three sternopleural bristles, posterior one the longest, middle as long or longer than anterior.*) Mesonotum mostly shining. Acrostichal bristles comparatively long, sparse and erect, arranged into 4—6 more or less regular rows. Four pairs of elongated dorsocentral bristles, 2nd pair (1st postsutural) only little longer than neighbouring acrostichal bristles. Wings long and narrow, c-index = 2.5—3. Fore metatarsus of male mostly with long, fine hairs ventrally, or (in *D. miki*) with sex combs on 1st and 2nd segments.

Terminalia**) of male. Clasper stout, with row of primary teeth. Aedeagus large, more or less serrate ventrally, usually with large ventral process. Aedeagal apodeme longer than aedeagus. Anterior paramere with apical bifurcation often reaching its basis, external lobe often hairy at distal part. Posterior parameres attached or fused. Hypandrium mostly with narrowed anterior part and prominent posterolateral angles. Paramedial spines absent.

Terminalia of female. 8th tergite mostly with row of short, fine setulae along posterior margin. Anal plates with long bristles. Egg guide heavily sclerotized, widened subterminally, with one long subterminal bristle and 3 short terminal hairs. Basal isthmus narrow.

The anatomy of *D. collinella* was studied by OKADA (1956; as *Scaptomyza apicalis*) and that of *D. andalusiaca* by BASDEN (1961). Characteristic features in both species are the central insertion of stem of ejaculatory apodeme, the elongate elliptic spermathecae with extensive introvert part and the regularly narrow ventral receptaculum with a number of irregular folds. Analogous characters were found by the present authors in *D. fenestrarum* and *acuminata*.

The information on the life history of members of the subgenus is negligible as yet. Some species are regularly swept from low forest undergrowth, in grass clearings or from vegetation along forest streams. PAPP (1976) captured three species (*D. fenestrarum*, *D. andalusiaca* and *D. hexasticha*) in soil traps. *D. fenestrarum* was bred by HERTING (1955) and *D. collinella* and *D. mommai* by KIMURA (1976) from decaying vegetable matter. These data support hypotheses on saprophagous or micromycophagous feeding habits of the larvae of this subgenus. In Czechoslovakia, most species occur in lowland zones, with the exception of *D. fenestrarum* which was found also at higher altitudes. The adults of common species are found throughout the vegetated period.

The subgenus in the present sense contains six European species. Two of them are, on the basis of both genitalic and somatic characters, newly included in *Lordiphosa*. These are *D. nigricolor* STROBL, whose relationship to the *fenestrarum* group was already indicated by BASDEN (1961), and *D. miki* DUDA, classified previously as *Sophophora*. Outside Europe, the subgenus *Lordiphosa* is distributed in Japan (*D. collinella* OKADA, 1968) and in the Nearctic (*D. basdeni* WHEELER, 1957) and Oriental (*D. variopicta* BECKER, 1908 and *hirsuta* DUDA, 1926) regions. Two other eastern Palaearctic species previously included in the subgenus *Sophophora*, *D. mommai*

*) The anterior bristle is absent in Japanese *D. mommai* TAKADA & OKADA.

**) Terminology is virtually based on that of WHEELER & MAGALHAES (1962) and OKADA (1956).

TAKADA & OKADA, 1960 and *D. pappi* OKADA, 1974, are closely related to *D. nigricolor* and belong also in *Lordiphosa*.

Key to European species

- 1 Mesonotum blackish brown to black. Carina somewhat prominent, nearly 2/3 as long as face. Legs long, fore metatarsus as long as following tarsal segments together. ♂: primary teeth of clasper in posterior half at least 5 times longer than basally wide (Fig. 41). Anal plate strongly vaulted, with dense cluster of short bristles apically (Fig. 42). ♀: egg guide with tooth-like widening subterminally (Fig. 49) *D. (L.) nigricolor* STROBL
- Mesonotum yellowish brown to light brown. Carina flat along the whole length, about half as long as face. Legs shorter, fore metatarsus, at most, as long as 3 following segments. ♂: primary teeth of clasper in dorsal part at most 3 times as long as basally wide. Anal plate usually flat, bristles at ventral end at most only slightly more dense than at dorsal end. ♀: egg guide (in known females) not strikingly widened subterminally 2
- 2 (1) First two fore tarsal segments of male with longitudinal combs of black spines (Fig. 56). Anal plate vaulted, with large thorn at ventral end (Fig. 52). Hypandrium with nearly parallel side margins (Fig. 55). Female unknown *D. (L.) miki* DUDA
- Fore tarsi of both sexes simple. ♂: anal plate flat, its surface only with standard bristles. Hypandrium strongly narrowed anteriorly. 3
- 3 (2) Lower humeral bristle usually longer and stronger than upper. ♂: clasper with row of primary teeth along 3/4 of its length. Ventral bristles of anal plate shorter than others. Posterior parameres fused distally. ♀: 8th tergite with several strong bristles ventrally. Ventral surface of vaginal complex with numerous grooves and setulae. 4
- Both humeral bristles about equally long. ♂: clasper with row of primary teeth along less than half its length. Ventral bristles of anal plate as long as others at least. Posterior parameres separated distally. ♀: 8th tergite without long bristles. Ventral surface of vaginal complex bare 5
- 4 (3) Palpi pale basally. Mesonotum with 6 rows of acrostichal hairs at least in its anterior half. Middle sternopleural bristle as long as anterior at most. Abdomen dark brown, with basal margins of 1st—4th tergites yellow at most. ♂: clasper with row of nearly equally long teeth along whole length, apex with numerous bristles much longer than primary teeth (Fig. 31). Phallic organs: Figs. 33—35. ♀: egg guide very slightly widened and rounded apically (Fig. 39) *D. (L.) hexasticha* PAPP
- Entire palpi dark brown. Mesonotum usually with 4 rows of acrostichal bristles, rarely with 6 irregular rows in anterior quarter. Middle sternopleural bristle distinctly longer than anterior one. Abdomen mostly yellow to yellowish brown, hind margins of tergites blackish brown. ♂: Clasper in distal 3/4 with row of primary teeth, gradually diminishing in length distad; apical bristles shorter than proximal primary teeth (Fig. 21). Phallic organs: Figs. 23—25. ♀: egg guide distally widened, with obtuse dorsal angle (Fig. 29) *D. (L.) acuminata* COLLIN
- 5 (3) ♂: end of abdomen broadly truncated. Clasper wider distally than basally, with blunt, short denticles at distal margin (Fig. 1). Phallic organs: Figs. 3—5. ♀: 2—3 posterior segments of abdomen brownish black. Subanal plate nearly twice as long as basally wide (Fig. 8). Egg guide with slightly pointed apex, widest at about distal third (Fig. 9) *D. (L.) fenestrarum* FALLÉN
- ♂: abdomen rounded posteriorly. Clasper tapering distally, with slightly pointed teeth in proximal part (Fig. 11). Phallic organs: Figs. 13—15. ♀: abdomen mostly yellowish brown, with narrow dark stripes at posterior tergal margins. Subanal plate nearly twice as wide as long (Fig. 18). Egg guide widest in about distal quarter, with widely rounded apex (Fig. 19) *D. (L.) andalusica* STROBL

Revision of the European species

Drosophila (Lordiphosa) fenestrarum FALLÉN, 1823

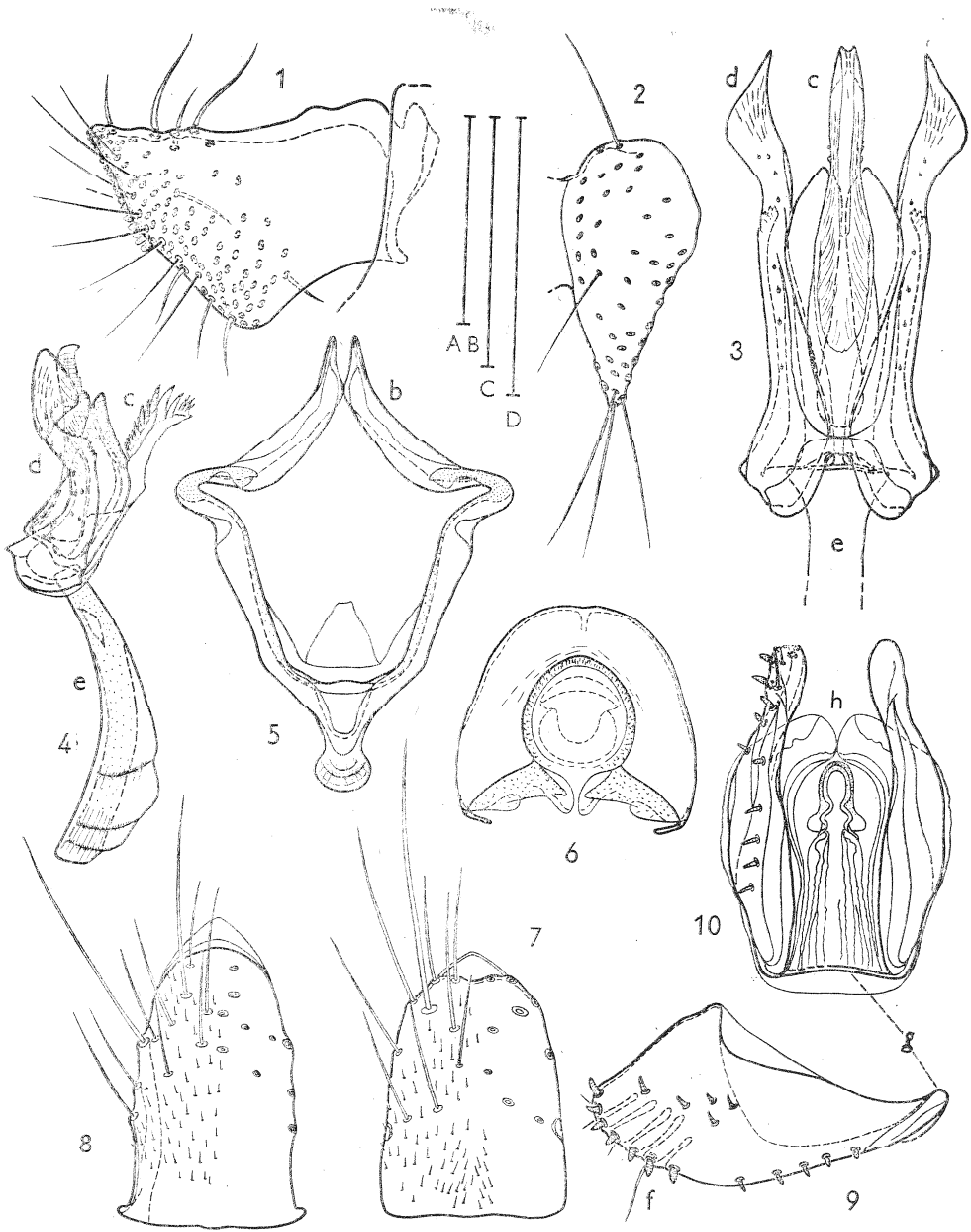
(Figs. 1—10)

Drosophila fenestrarum FALLÉN, 1823, Dipt. Succ., Geomyz.: 4.

Drosophila virginea MEIGEN, 1830, Syst. Besch., 6 : 84.

? *Drosophila nitidiventris* MACQUART, 1835, Hist. nat. Ins. Dipt., 2 : 551.

Previous descriptions by DUDA (1935), BURLA (1951) and COLLIN (1952) were concerned mainly with external diagnostic characters.



Figs. 1-10. *Drosophila fenestrarum* FALL.; 1-5 male, Klánovice, Czechoslovakia, 6-10 female, same data. 1 - Clasper, lateral view. 2 - Anal plate, posterior view. 3 - Anterior parameres and aedeagus, ventral view. 4 - Anterior parameres and aedeagus, lateral view. 5 - Hypandrium and posterior parameres, ventral view. 6 - 8th tergite, posterior view. 7 - Supraanal plate. 8 - Subanal plate. 9 - Ovipositor, lateral view. 10 - Ovipositor, ventral view. a - primary teeth; b - posterior parameres; c - aedeagus; d - anterior parameres; e - apodeme of aedeagus; f - subterminal bristle; g - basal isthmus; h - vaginal complex. Scales: A (Figs. 4-6) and D (Figs. 9, 10) = 0.5 mm; B (Figs. 2, 3, 7, 8) = 0.25 mm; C (Fig. 1) = 0.4 mm.

Male terminalia. Clasper wider distally than proximally, with short, blunt primary teeth at distal margin. Anal plate lanceolate, strongly narrowed ventrally, regularly bristled; bristles on its ventral section somewhat longer than on the dorsal. Aedeagus with long ventral process; aedeagal apodeme strongly curved. Outer lobe of anterior paramere widened distally, much longer than inner one, with sparse, short setulae. Posterior parameres separated distally, without inner tooth-like processes. Hypandrium strongly concaved anteriorly; narrowest part as wide as 1/10 distance of posterolateral angles.

Female terminalia. 8th tergite bare laterally. Subanal plate nearly twice, supraanal one nearly 2.5 times, as long as wide at the base. Egg guide widest at about distal third, with rather tapering apex, slightly convex in ventral aspect, with denticles also in proximal half, and dark tubules before apex. Ventral margin of vaginal complex bare.

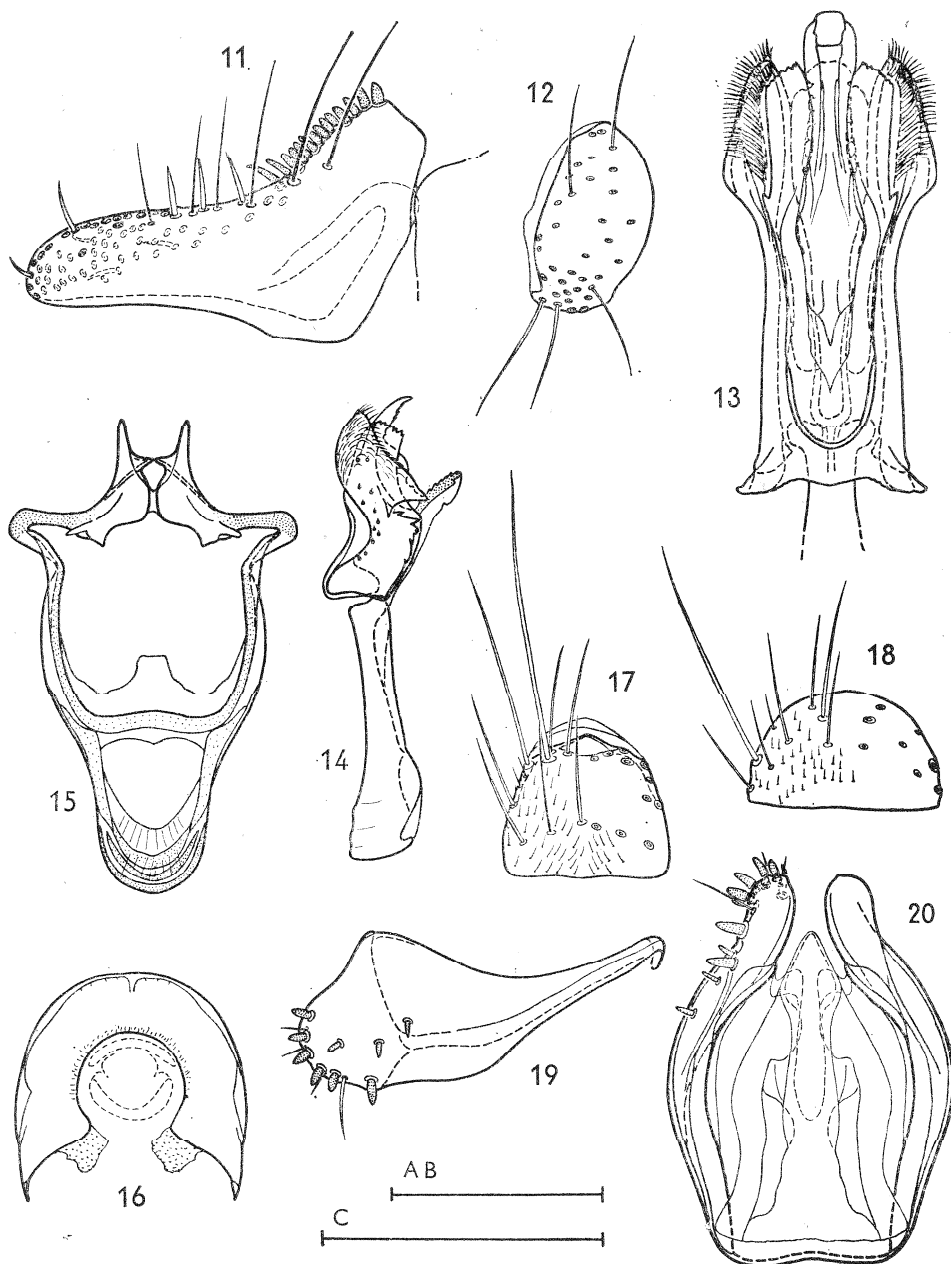
Life history. Adults were swept mostly in grass clearings, in the undergrowth of wet forests, on streamsides etc., often in large numbers. The species often occurs in association with *Scaptomyza* species but avoids dry places. *D. fenestrarum* was the only species of the subgenus trapped sporadically in baits. It represented 0.2% of the drosophilid fauna in samples from traps with fermenting beer (Veselí n. Lužnici; unpublished). Several specimens were also found on fermenting oak sap (Klánovice). Isolated cases are cited of it on other baits (BURLA, 1951; BASDEN, 1954; LAKOVAARA, 1975, pers. comm.). HERTING (1955) mentioned several adults bred from decaying cabbage. The few old records of a synanthropic nature for this species (e.g. ZETTERSTEDT, 1847; VIMMER, 1925) are undoubtedly based either on an overestimation of its incidental occurrence in anthropocenoses or on misidentifications.

The seasonal occurrence of *D. fenestrarum* is from March to October; mature ovarian eggs were discovered in April, September and October. *D. fenestrarum* is the only species of this subgenus found also at higher altitudes, namely in Plešné jezero (Bohemian Forest, 1090 m) and Černá Studnice in the Jizera Mountains (890 m).

Distribution. A European species but absent in northern Scandinavia and not yet found in the Apennines Peninsula, Balkans or in the European part of the USSR (except for the Leningrad area). It is common throughout Czechoslovakia and is recorded by a number of authors: DALLA TORRE (1878), THALHAMMER (1899), CZIŽEK (1906), VIMMER (1913), ARADI (1959), DOSKOČIL (1962) and MARTINEK (1973). However, some old data on this species must be treated with caution. Thus the record of CZIŽEK (1906) is based on the misidentification of *D. melanogaster* although specimens of *D. fenestrarum* (unidentified) are also present in Czižek's collection.

Studied material: 91 ♂♂, 86 ♀♀ deposited in DMS, FIP, IBP, IPE, MMB and NMP. Examples of localities: Czechoslovakia, Bohemia: Albeř, Borkovice, Dražice nr. Tábor, Plešné jezero (Bohemian Forest), Soběslav, Veselí n. Lužnici, Prague and vicinity, Týnec n. Labem, Černá Studnice, Svádov nr. Ústí n. Labem, Chábory nr. Dobruška. Moravia: Břeclav, Lednice, Strážnice, Brno, Stará Havný. Slovakia: Kyčera nr. Čadca, Píla nr. Modra, Zvolen. Germany: Berlin.

Remarks. The type series of the nominal taxon *Drosophila flava* FALLÉN, 1823, includes presently 3 specimens. One of these syntypes (deposited in Fallén's collection at MNS) is *Drosophila fenestrarum* FALL. (according to



Figs. 11–20. *Drosophila andalusiaca* STR.; 11–15 male, Klánovice, Czechoslovakia, 16–20 female, same data. Sequence of figures as in Figs. 1–10. Scales: A (Figs. 14–16) and C (Figs. 19, 20) = 0.5 mm; B (Figs. 11–13, 17, 18) = 0.25 mm.

the information of Dr. P. I. Persson), while the two other syntypes, examined by the present authors, are *Scaptomyza apicalis* HARDY, sensu MÁČA (1972)

(deposited in ZIL). The fact that the type series includes a specimen of *D. fenestrarum* was probably the main reason for excluding the name *flava* FALL. from the synonymy of *S. apicalis* and using the later name (COLLIN, 1953; HACKMAN, 1959; BASDEN, 1961; MÁCA, 1972). Nevertheless, FALLÉN (1823) probably intended to describe *Scaptomyza apicalis* as the original description, as far as we can conclude, corresponds to specimens of *Scaptomyza* from the type series. Therefore, it seems the most suitable solution to consider the name *Drosophila flava* as a valid senior synonym of the species in question. This synonymy was already proposed by FONSECA (1965) but probably without studying the types. Hence the synonymy of *Scaptomyza flava* FALLÉN is the following:

Drosophila flava FALLÉN, 1823, Dipt. Suec., Geomyz., 7 : 10.

? *Notiphila flaveola* MEIGEN, 1830, Syst. Beschreib.: 66.

Scaptomyza apicalis HARDY, 1849, Proc. Berwickshire Nat. Club, 2 : 362.

A lectotype of *Drosophila flava* FALLÉN is here designated: ♀, Sweden: Skåne, Tranås, Esperöd; *D. flava*; 33 (ZIL).

Drosophila (Lordiphosa) andalusiaca STROBL, 1906

(Figs. 11–20)

Drosophila andalusiaca STROBL, 1906, Mem. K. Soc. esp. Hist. nat., 3 : 372.

Drosophila forcipata COLLIN, 1952, Entomologist's mon. Mag., 88 : 198.

Adequate descriptions giving the main external diagnostic characters are those of COLLIN (1952) and BASDEN (1961).

Male terminalia. Clasper much narrower distally than proximally, with rather long, somewhat pointed teeth in proximal part. Anal plate widely ovate, with rounded ventral end, regularly long bristled. Aedeagus with long, acute ventral process; aedeagal apodeme nearly straight. Outer lobe of anterior paramere widened distally, slightly longer than inner, with long and dense hairs. Posterior parameres separated apically, inner borders tooth-like. Hypandrium anteriorly slightly narrowed and concave subterminally, the narrowest part as wide as third of distance between posterolateral angles.

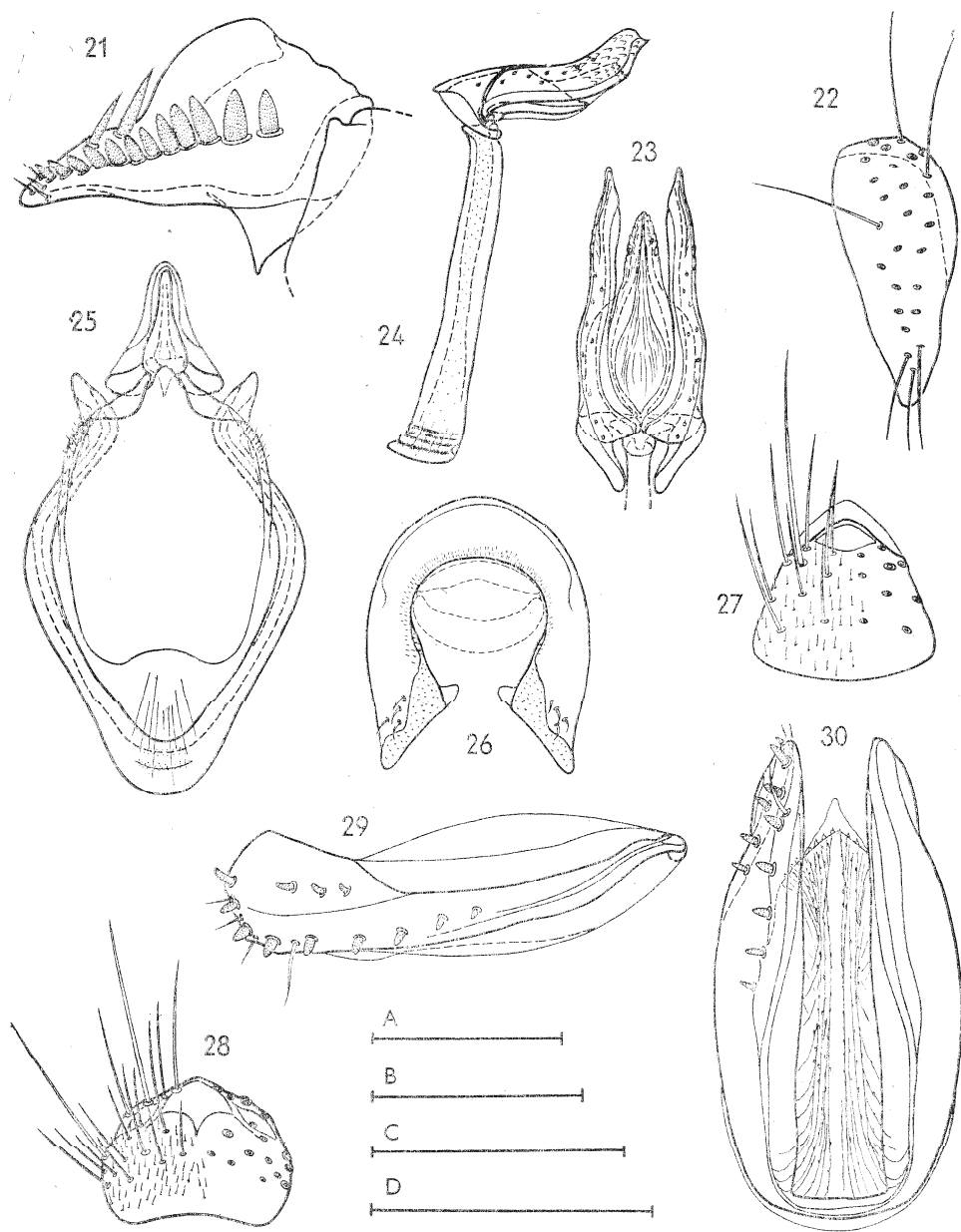
Female terminalia. 8th tergite bare laterally. Subanal plate nearly twice as wide as long, supraanal plate about as wide as long. Egg guide widest about the distal quarter, with widely rounded apex, strongly convex in ventral aspect; ventral margin with teeth limited to the distal quarter, without dark tubules. Ventral surface of vaginal complex bare.

Life history. Adults of *D. andalusiaca* occur in wet forest biotopes together with *D. fenestrarum* but are less abundant. PAPP (1976) collected this species in soil traps. In Czechoslovakia, the seasonal occurrence is from March to October. Ovarian eggs were found in spring and autumn months.

Distribution. Southern, middle and western Europe; the northernmost occurrence is in Denmark and Great Britain, the southernmost in Cyprus, Morocco, Madeira, Canary Islands and the Azores.

New records: Czechoslovakia, Syria.

Studied material: 45 ♂♂, 40 ♀♀. Spain: lectotype, female, Andalusien, Algeciras, G. Strobl; No 145, designated by Basden (see BASDEN, 1961). Czechoslovakia, Bohemia: Karlovy Vary, 24. viii. 1971, J. Máca; swept on *Atriplex* sp. (DMS); Klánovice nr. Praha, 22. ix. 1974, P. Laštovka; swept on *Rubus* (FIP); Vrané n. Vlt. (without date and collector, NMP); Praha-Satalice, iv. 1974, P. Laštovka (FIP). Hungary: Szaporca, viii. 1973, L. Papp; soil trap, lake-shore (HMB). Syria: Aleppo, v. 1974, P. H. Verner (FIP).



Figs. 21–30. *Drosophila acuminata* COLL.; 21–25 male, Lednice, Czechoslovakia, 26–30 female, same data. Sequence of figures as in Figs. 1–10. Scales: A (Fig. 21) = 0.1 mm; B (Figs. 23, 25, 27–30) = 0.25 mm; C (Fig. 22) = 0.2 mm; D (Figs. 24, 26) = 0.5 mm.

Remarks. Females of *D. andalusiaca* show a striking dichroism, mainly in the colour of abdominal tergites and of terminalia, as was noted by **BASDEN** (1961), **BEARDMORE** (1967) and others. In examined Czechoslovak

material, light forms were about three times more abundant than the dark ones.

Drosophila (Lordiphosa) acuminata COLLIN, 1952

(Figs. 21—30)

Drosophila acuminata COLLIN, 1952, *Entomologist's mon. Mag.*, **88** : 199

The original description involves only some diagnostic characters of male.

Male terminalia. Clasper pointed apically, with row of pointed primary teeth along its distal three quarters. Anal plate regularly bristled, ventral bristles shorter than dorsal ones. Aedeagus without long ventral process, strongly narrowed in distal third, with blunt apex. Aedeagal apodeme about twice as long as anterior paramere. Outer lobe of anterior paramere only slightly widened distally, without distinct bristles, with blunt denticles distally and with long basal process. Posterior parameres fused into blunt conus. Hypandrium irregularly ovate, widest over about half of length.

Female (femina nova). Abdominal tergites more extensively yellowish than in male, with very narrow, dark brown stripes at posterior margins. Other external diagnostic characters mostly agree with those in male.

Terminalia. 8th tergite with several equally long stout bristles in distal lateral part. Subanal plate much wider than long, with about 16 pairs of bristles. Supraanal plate slightly wider than long. Egg guide light brown, narrow, angularly widened distally, widest just before apex; inner borders nearly straight in ventral aspect. About 3 discal spines in widened part. Ventral surface of vaginal complex with dense grooves and numerous setulae.

Distribution: England (COLLIN, 1952), Czechoslovakia (new record).

Studied material: 1 ♂, 2 ♀♀. Czechoslovakia, Moravia: Lednice, 7. viii. 1971, J. Vaňhara; swept on *Glechoma* sp. (IBP).

Remarks. HACKMAN'S (1954, 1957) data on "*Drosophila acuminata* COLLIN (?)" from Finland and USSR refer to the following species. STACKELBERG (1970) probably copied HACKMAN'S (1957) record.

Drosophila (Lordiphosa) hexasticha PAPP, 1971

(Figs. 31—40)

Drosophila (Lordiphosa) hexasticha PAPP, 1971, *Folia ent. hung.*, N. S., **24** : 333.

Drosophila acuminata COLLIN (?); HACKMAN, 1954, *Notul. ent.*, **34** : 138.

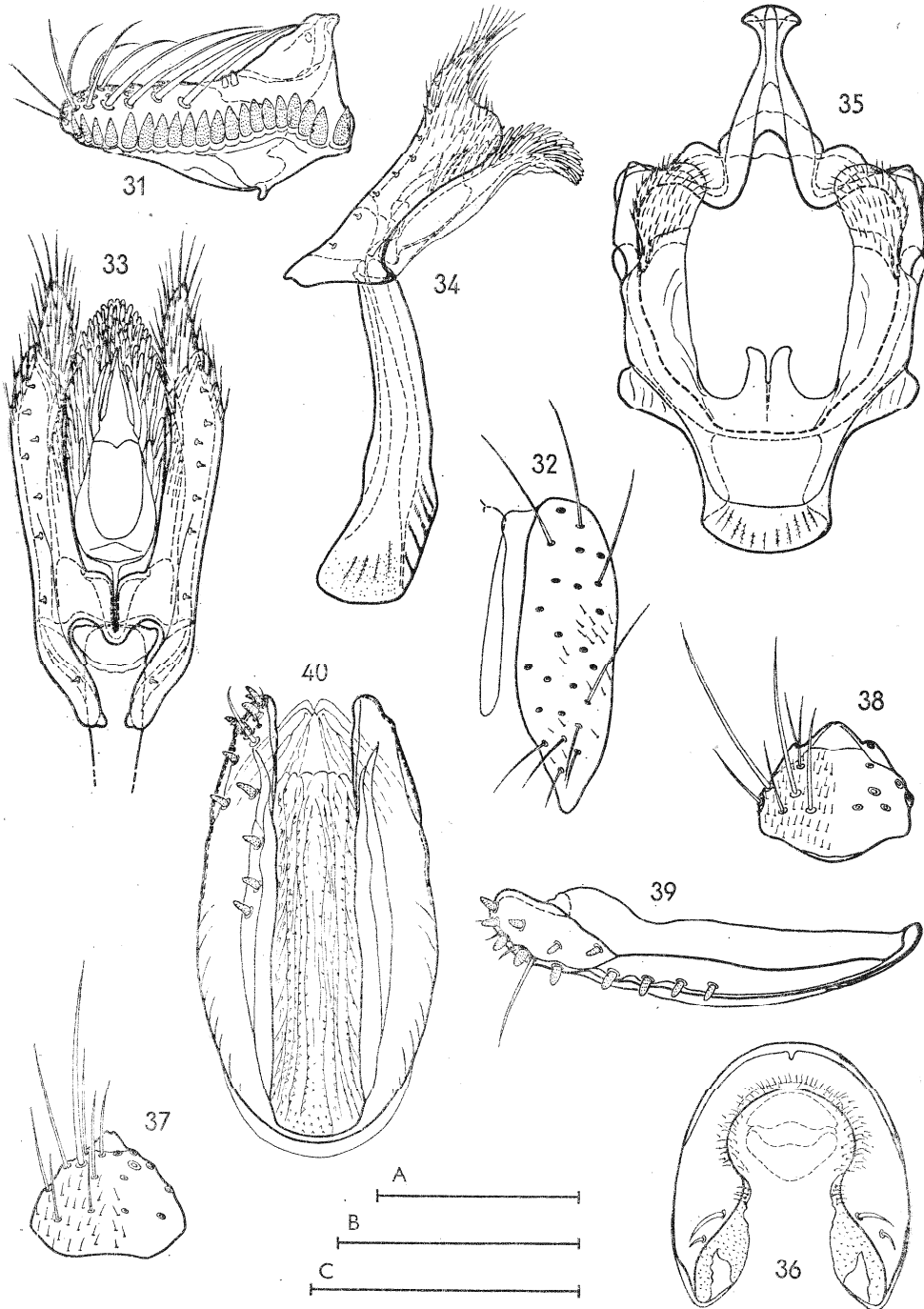
Drosophila acuminata COLLIN (?); HACKMAN, 1957, *Notul. ent.*, **37** : 21.

? *Drosophila acuminata*; STACKELBERG, 1970, *Opred. nasekomykh*, 5 (2) : 394.

Detailed description of external characters of female was published by PAPP (1971).

Male (mas novus; only characters differing from these of female are given). Third antennal segment yellowish white, lighter than first two. Arista ventrally with 2—4 branches. 6 partly irregular rows of acrostichal hairs in front of 3rd pair of dorsocentrals. Ratio of length of upper to lower humeral bristles 0.6—1.0 (1.0 in specimen from Hungary; see also PAPP, 1976). Middle sternopleural bristle as long as anterior or little shorter. Wings: length 2.20—2.24 mm, width 0.70—0.79 mm. Abdomen dark brown to blackish brown, with narrow, yellowish brown stripes at anterior margins of tergites.

Terminalia. Hypopygium dark brown. Clasper round apically, with row of about equally long primary teeth along whole length, apically with



Figs. 31-40. *Drosophila hexasticha* PAPP; 31-35 male, Vaaseni, Finland, 36-40 female, Szaporca, Hungary. Sequence of figures as in Figs 1-10. Scales: A (Figs. 34, 35, 37-40) = 0.25 mm; B (Figs. 31-33) = 0.2 mm; C (Figs. 36) = 0.5 mm.

numerous bristles much longer than primary teeth. Ventral bristles of anal plate much shorter than dorsal ones. Aedeagus wide, with short ventral process. Aedeagal apodeme only slightly longer than anterior paramere, widened distally. Outer branch of anterior paramere subterminally widened into broad lobe bearing long bristles. Posterior parameres fused distally, with fungiform dilation apically. Hypandrium wide in posterior two thirds, strongly narrowed in anterior third.

Female terminalia. 8th tergite with several inequally long bristles in distal lateral part. Both anal plates slightly wider than long, each with about 8 pairs of long bristles. Egg guide very narrow, slightly widened in distal quarter, with rounded apex; inner margins nearly straight in ventral aspect. Distal part with about 3 discal spines. Subterminal bristle strong, several times as long as terminal hairs. Ventral surface of vaginal complex with grooves and numerous spinulae.

Life history. PAPP (1976) found this species repeatedly in soil traps. The fact that some specimens from his material were hemipterous is support for the consideration of the terricolous habits of the species.

Distribution: Hungary and Romania (PAPP, 1971), Finland (HACKMAN, 1954) and the USSR (HACKMAN, 1957).

Studied material: 2 ♂♂, 1 ♀. Hungary: Aranyosgadány, iv.-v. 1973, L. Papp; soil trap (HMB); Szaporca, viii. 1973, L. Papp; lake shore, soil trap (HMB). Finland: Vaaseni, 28. v. 1942, L. Tiensu (ZMH; see HACKMAN, 1954).

Drosophila (Lordiphosa) nigricolor STROBL, 1898 subgen. comb. n.

(Figs. 41-50)

Drosophila nigricolor STROBL, 1898, *Mitt. naturw. Ver. Steierm.*, 34 : 266.

Drosophila (Drosophila) nigricolor; DUDA, 1935, *Die Fliegen*, 58g : 89.

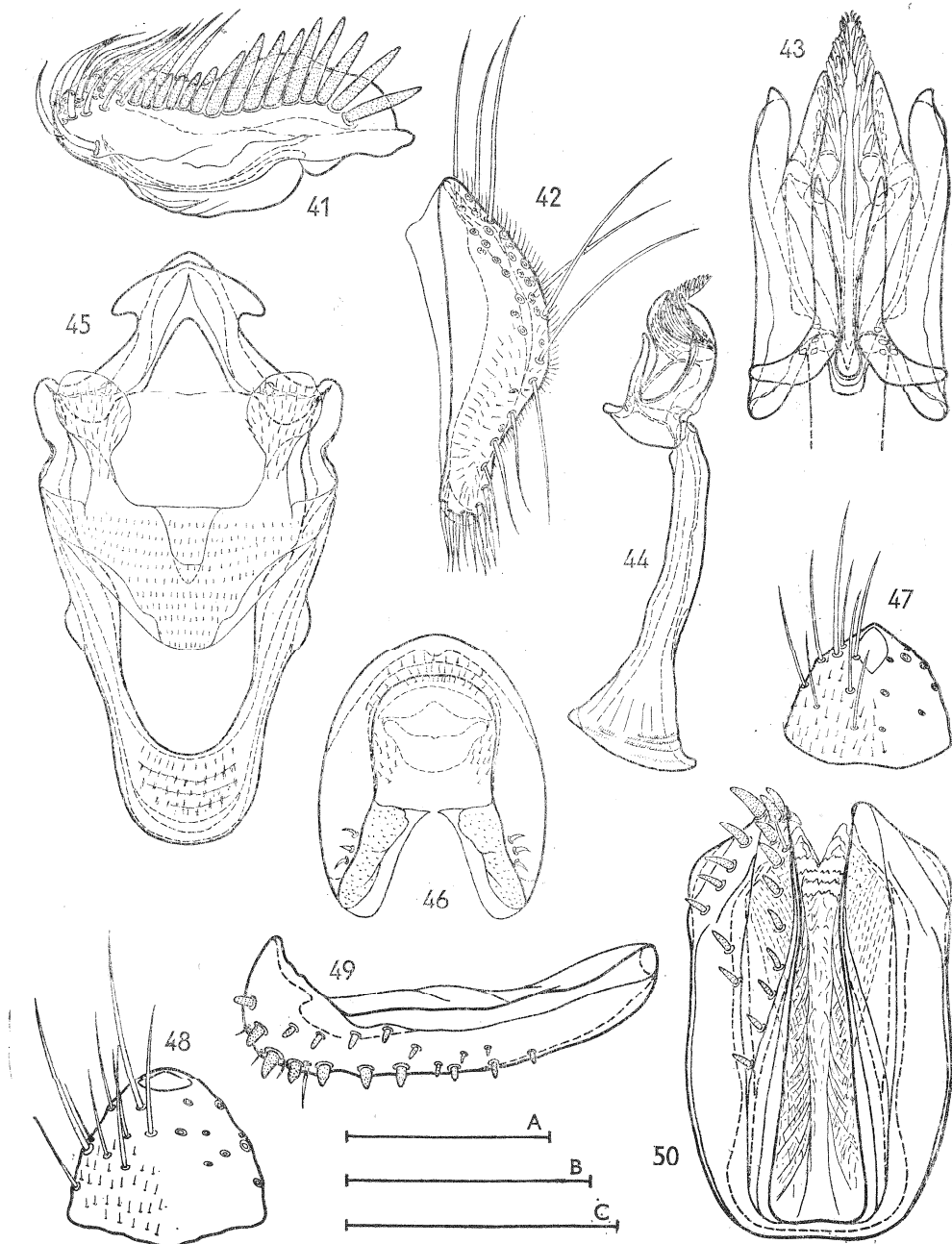
Detailed descriptions of external characters were given by DUDA (1935) and BASDEN (1961).

Male terminalia. Clasper rounded apically, with row of primary teeth along whole length, these being much longer in dorsal half than ventrally; apex with cluster of long, dorsally bent bristles. Anal plate strongly vaulted, narrowed ventrally, densely covered with microtrichiae, with long bristles in dorsal three quarters and with tuft of short bristles at ventral end. Aedeagus narrow, strongly curved dorsally, apodeme strongly widened distally, slightly bent dorsad, about twice as long as aedeagus. Anterior paramere trifurcated, outer lobe bare, shorter than half of aedeagal apodeme. Posterior parameres fused distally, with fungiform dilation apically. Hypandrium widest posteriorly, slightly narrowed anteriorly, at middle with rows of fine setulae.

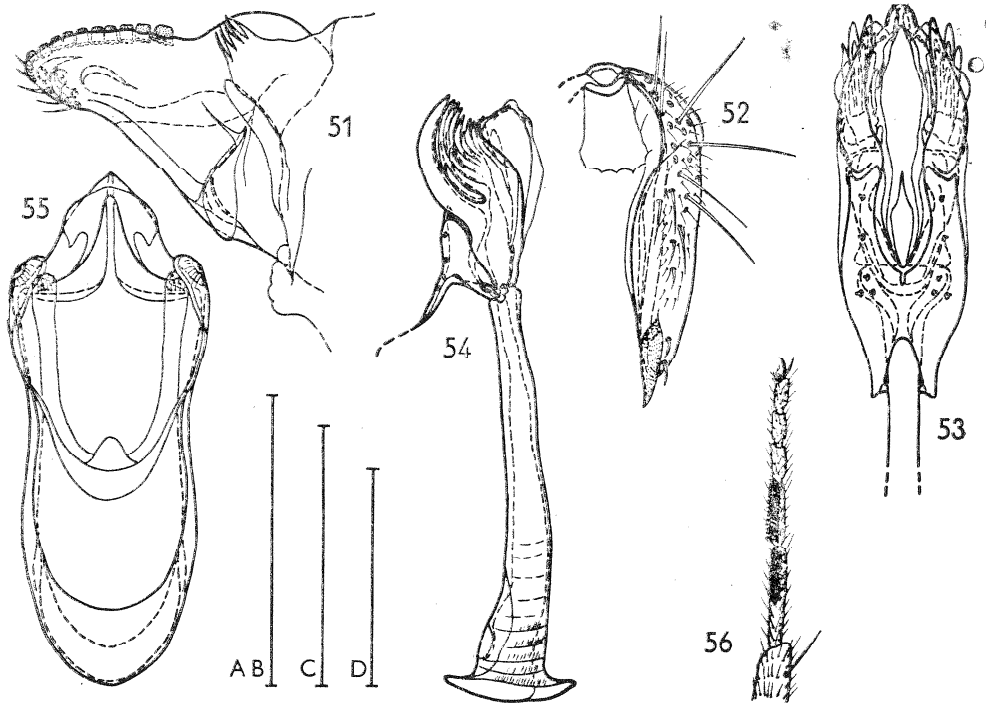
Female terminalia. 8th tergite with several short bristles in distal part. Anal plates about as long as wide, each with about 8 pairs of bristles. Egg guide narrow, with angular widening dorsally and subapically, apex blunt; distal part with numerous discal spines. Subterminal bristle about twice as long as terminal ones. Inner margins slightly convex in ventral aspect. Vaginal complex with numerous grooves ventrally.

Distribution: Finland, Germany, Austria and USSR (Leningrad district).

Studied material: 3 ♂♂, 2 ♀♀. Finland: Helsinki, R. Frey (ZMH); Joutseno, 26. v. 1954, E. Thuneberg (ZMH). Federal Republic Germany: Tegernsee, 17. vi. 1929, L. Oldenberg (DEB).



Figs. 41–50. *Drosophila nigricolor* STR.; 41–45 male, Joutseno, Finland, 46–50 female, Tegernsee, Germany. Sequence of figures as in Figs. 1–10. Scales: A (Figs. 45, 47–50) = 0.25 mm; B (Figs. 41–43) = 0.2 mm; C (Figs. 44, 46) = 0.5 mm.



Figs. 51–56. *Drosophila miki* DUDA; lectotype male, Vienna, Austria. Sequence of figures 51–55 as in Figs. 1–5; Fig. 56 — Fore tarsus. Scales: A (Figs. 54, 55) = 0.5 mm; B (Fig. 56) = 1 mm; C (Fig. 51) = 0.2 mm; D (Figs. 52, 53) = 0.25 mm.

Remark. **BASDEN** (1961) suggested the similarity of some characters of this species with those of *Lordiphosa*, namely the length of carina and of the sternopleural bristles, and the nature of the hairs on the fore metatarsus. The morphology of the terminalia of *D. nigricolor* agrees with the characteristics of the subgenus and thus justifies its placement in *Lordiphosa* in the present sense. However, by the dark body colour, shape of the carina, elongate fore metatarsus and some characters on the terminalia, this species differs from the rest of the subgenus. Closely related species, according to the characters of the terminalia, are the eastern Palaearctic species *Drosophila mommai* **TAKADA & OKADA** and (not studied by the authors) *D. pappi* **OKADA**, hitherto considered as belonging in *Sophophora*.

Drosophila (Lordiphosa) miki DUDA, 1924 subgen. comb. n.

(Figs. 51–56)

Drosophila miki DUDA, 1924, *Ent. Medd.*, 14 : 274.

Drosophila (Sophophora) miki; **BOCK & WHEELER**, 1972, *Univ. Tex. publ.*, 7213 : 88.

The original description of this species is relatively detailed. Some other taxonomically important characters are added in following redescription.

Male. Arista with 4–5 dorsal and 2 ventral rays. Carina prominent only in dorsal half, mostly flat, slightly keel-shaped only in upper part. Palps yellowish brown, with one strong apical bristle $3/4$ as long as vibrissa.

Mesonotum, scutellum and pleurae shining, brownish yellow with diffuse brown areas. Mesonotum with 4 pairs of strong dorsocentral bristles, 2nd pair weakest and shortest. 6 rows of regularly arranged acrostichal hairs, relatively sparse and long, with several interspersed hairs near middle of mesonotum. Length ratio of upper to lower humeral bristle = 0.8. Sternopleural bristles diminishing anterad, ratios of their length: 0.41 : 0.83 : 1.0. Tibiae slightly club-shaped, with longer preapical bristles; fore tibia without combs of flat bristles apically. First two segments of fore tarsi slightly thickened, each with longitudinal comb of black spines. Length ratios of segments of fore tarsi: 22 : 14 : 7.5 : 6.5 : 8. Wings narrow, ratio of length : width = 2.8. Length of vein section: $c_2 = 1.24$ mm, $c_3 = 0.54$ mm, ta-tp = 0.56 mm. Strong setae reach slightly before half of c_3 . Abdomen mostly yellow, first 3 tergites with narrow, brown, continuous strips at hind margins, other tergites dark brown in posterior half.

Terminalia. Clasper from base to apex strongly narrowed, apex rounded; distal half of dorsal border with row of flat primary teeth, apex with several short bristles. Anal plate strongly vaulted, inner border deeply notched at dorsal end; dorsal part with long bristles, ventral end with strong, dark thorn-like spine.

Female unknown.

Distribution: Austria.

Studied material: 2 male syntypes from NMW. Lectotype, here designated, ♂: Austria inf., Wien, 28. vi. 1872, J. Mik (white label); *Drosophila miki* DUDA, Syntype ♂, det. E. Basden 1956 (blue label). Paralectotype, 1 ♂, same data (white label).

Remark. This species has hitherto been included in the subgenus *Sophophora* with respect to the presence of sex combs on first two fore tarsal segments. WHEELER (1949) initially classified it as a member of the *melanogaster* group, and BOCK & WHEELER (1972), on the basis of unpublished figures of Basden, placed it in the *obscura* group. However, disregarding the features of the fore tarsi, this species shows all the typical characters of a *Lordiphosa* species, e.g. flat and short carina, narrow wings, anteriorly diminishing sternopleurals, shining mesonotum, long, rather erect and sparse acrostichals, 4 pairs of long dorsocentrals. Characters of the terminalia, namely the hypandrium, posterior and anterior parameres, confirm its relationship with other species of *Lordiphosa*. *D. miki*, like the preceding species, has a relatively isolated position within *Lordiphosa*; according to the form of terminalia, it shows somewhat closer relationship with *D. nigricolor* and its allies than to the *fenestrarum* group.

Non-European species examined

Drosophila (Lordiphosa) collinella OKADA, 1968

Scaptomyza apicalis; OKADA, 1956, Syst. Study: 69.

Drosophila (Lordiphosa) collinella OKADA, 1968, *Kontyu*, 34 : 339.

Studied material: 3 ♂♂, 2 ♀♀. Japan: Sapporo, 1973, M. T. Kimura (UHS).

This species is most closely related to *D. acuminata* COLLIN.

Drosophila (Lordiphosa) mommai TAKADA & OKADA, 1960 subgen. comb. n.

Drosophila (Sophophora) mommai TAKADA & OKADA, 1960, *Annot. zool. Jap.*, 33 : 143.

Studied material: 3 ♂♂, 2 ♀♀. Japan: Sapporo, 1973, M. T. Kimura (UHS).

Only two sternopleural bristles are present in this species. Nevertheless, characters of the terminalia show its close relationship with *D. nigricolor* STROBL.

Drosophila (Lordiphosa) sp., cf. basdeni WHEELER

Studied material: 1 ♀. Canada, Horseshoe Bay, vii. 1968, C. B. D. Garret (FIP).

Characters of the specimen do not differ from those given in the description of the only known Nearctic species, *D. basdeni* WHEELER, 1957. However, its identity cannot be confirmed definitely since the female of *D. basdeni* is unknown.

DISCUSSION

The incomplete nature of the information on the subgenus *Lordiphosa* is the reason for the hesitations in considering its position in the system of the family. The subgenus shares a number of characters with some other taxa. The low number of actrostichal hairs is reminiscent of the genus *Scaptomyza* HARDY, as is the shape of the wings and certain ecological characters, e.g. habitats or avoidance of fermenting organic substances. Some anatomical characters, such as the form of the ventral receptacle and ejaculatory apodeme, resemble those of the genus *Chymomyza* CZERNY. However, these characters are so simple or alternative that convergency cannot be excluded. Many structurally relatively rich characters are shaded between *Lordiphosa* and species of the subgenus *Sophophora* STURTEVANT, particularly characters on the terminalia (anterior parameres, aedeagus, hypandrium), antennae, carina and pigmentation of the abdomen. *D. nigricolor* and *D. miki* are probably nearest to *Sophophora*. Most characters which support the hypothesis of its isolated position are limited to the subgenus itself. Thus it appears that the subgenus *Lordiphosa* represents an isolated phylogenetic branch most closely related to the subgenus *Sophophora*, as was also deduced by OKADA (1963).

The classification within the subgenus involves three relatively well differentiated species-groups. One of these complexes is represented by species of the *fenestrarum* group (sensu RASDEN, 1954), namely *D. fenestrarum*, *andalusiaca*, *acuminata*, *hexasticha* and extra-European species *D. collinella* OKADA, *basdeni* WHEELER, *variopicta* BECKER and *hirsuta* DUDA. The second group contains *D. nigricolor* and eastern Palaearctic *D. mommai* TAKADA & OKADA and *pappi* OKADA. *D. miki* which bears characters not only of both the *fenestrarum* group (mostly somatic characters) and *nigricolor* complex (terminalia) but also of the subgenus *Sophophora* (fore tarsi) may be considered as an intermediate link between the two preceding groups.

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Европейские виды подрода *Lordiphosa* (Diptera, Drosophilidae, *Drosophila*)

Таксономия, определительная таблица, лектотипы, морфология гениталий, распространение

Резюме. Подрод *Lordiphosa* рода *Drosophila* в новом понимании включает 6 европейских видов. Заново в подрод перенесены европейские виды *Drosophila nigricolor* Str., *D. miki* Duda и японский вид *D. tommai* Takada & Okada. У всех европейских видов дано подробное описание и изображение диагностических признаков, в особенности гениталий обоих полов. Впервые дается описание самца вида *D. hexasticha* Papp. и самки *D. acuminata* Coll. Обозначены лектотипы видов *D. miki* Duda и *Scaptomyza flava* Fall. Приведена подробная определительная таблица для изучаемых в работе видов и обзор данных об их биологии и распространении. В Чехословакии были установлены три вида подрода, из них *D. andalusiaca* Str. и *D. acuminata* Coll. являются новыми для территории страны. Вид *D. undulsiaca* указан как новый для территории Сирии.

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