

## The West-Palaeartic species of *Spilomyia* MEIGEN (Diptera, Syrphidae)

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The West-Palaeartic species of *Spilomyia* are revised. One new species, *S. triangulata* sp.nov., is described. The male of *Spilomyia graciosa* VILOVITSH is described for the first time. Lectotypes are designated for *S. manicata* and *S. digitata*, and a neotype is designated for *S. saltuum*. It is established that *S. boschmai* LUCAS is a junior synonym of *S. manicata* (RONDANI), syn.nov. *S. longicornis* LOEW is reported for the first time for the Palaeartic region. Descriptions of all mentioned species are provided as well as a key for their identification. The biology and status of each species is briefly discussed. Distribution maps are presented for four species.

Keywords: Syrphidae, *Spilomyia*, new species, West-Palaeartic, key, distribution, endangerment.

### INTRODUCTION

MEIGEN (1803) founded the genus *Spilomyia*, with *Musca diophthalma* LINNAEUS, 1758, as its type species. The concept and limitation of *Spilomyia* have been clear since last century and no species have been wrongly included or excluded.

*Spilomyia* is Holarctic, except for a single species occurring in the Neotropics. In both the Palaeartic and the Nearctic regions the genus is well represented, with a combined total of 15 species, but until now not one of these has been reported as Holarctic (CURRAN, 1951; VOCKEROTH, 1958; VILOVITSH, 1985; PECK, 1988). The genus has three centres of occurrence, lying within the subtropical deciduous forest and subboreal coniferous forest zones: the south-western part of the United States and Mexico, the Mediterranean area and the Far East. The northern limit of occurrence of the genus lies approximately at the 65th parallel.

The imagoes of *Spilomyia* species are large hoverflies (9–22 mm) bearing a superficial resemblance to social wasps in abdominal colour pattern and behaviour (CURRAN, 1951; BARENDREGT *et al.*, in press). The genus is placed in Milesiini (HIPPA, 1978a), which share the following combination of characteristics: concave face, wings with subapical cell acute and slightly petiolate, scutellar margin strongly flattened, tergites slightly margined, and the general structure of aedeagus. The genus *Spilomyia* can be differentiated from the other Milesiine genera by the following characteristics: an obvious brown colour pattern on the eyes (*Spilomyia*), a strongly oblique vein R-M (*Spilomyia*, *Milesia*), nonpollinose pale abdominal pattern (*Spilomyia*, *Milesia*), hind femur with apicoventral anterolateral spur (*Spilomyia*, part of *Milesia*), aedeagus without massive ejaculatory process (*Spilomyia*), symmetric hypandrium (*Tenmostoma*, *Spilomyia*). The eyes in the male are holoptic, and the face is in some species less concave, and the femora more strongly swollen.

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The flight period of *Spilomyia* species is from the summer to the beginning of autumn. The larvae inhabit damp, rotten timber in hollow trees and the decaying heartwood of deciduous trees (MAIER, 1982; COPELAND, 1989). The adults can be caught on summer-flowering Umbelliferae. Males often patrol around these flowers, or around tree trunks and foliage, searching for females with which to mate (WALDBAUER & GHENT, 1984; BARENDREGT *et al.*, in press).

In many European countries, species of *Spilomyia* have been misidentified (BARENDREGT *et al.*, in press), despite the availability of good identification keys (SACK, 1910; STACKELBERG, 1958; VAN DER GOOT, 1981; BRADESCU, 1991). Neither SACK nor STACKELBERG studied the relevant type material, so the real status and names of the species have remained uncertain.

The objectives of the present paper are to resolve existing taxonomic problems and establish a stable nomenclature for the Western Palaearctic species of *Spilomyia*. Distribution maps and species accounts are also presented. *Spilomyia maxima* SACK, 1910, has been excluded from consideration because it is very rare, only one specimen being known (from the vicinity of Leningrad). This species can easily be distinguished from the other species dealt with in this paper by using the key in STACKELBERG (1958).

#### MATERIAL AND METHODS

The material studied is deposited in the following institutes or private collections:

Belgium: Koninklijk Belgisch instituut voor Natuurwetenschappen, Brussel (KBIN).

Denmark: Universitetets Zoologiske Museum, Copenhagen (UZMC).

Estonia: Zoological Museum, Tartu (ZMT).

Finland: Finnish Museum of Natural History, Helsinki (FMNH).

Germany: Staatliches Museum für Tierkunde, Dresden (SMTD); Martin Luther Universität Halle-Wittenberg, Halle (MLUH); Zoologisches Institut Universität, Kiel (ZIUUK); private collection D. DOCKAL, Malsch (DDM); Staatliches Museum für Naturkunde, Stuttgart (SMNS).

Italy: Museo Zoologico "La Specola", Firenze (MZF); Museo Civico di Storia Naturale "Giacomo Doria", Genoa (MCG).

The Netherlands: Zoologisch Museum, Amsterdam (ZMA); Naturalis, Leiden (former RMNH); private collection J.A.W. LUCAS, Rotterdam (JLR); private collection W. VAN STEENIS, Utrecht (WSU); Wageningen Agricultural University Department of Entomology, Wageningen (WAUW).

Norway: private collection M. FALCK, Oslo (MFO); Zoologisk Museum, Oslo (ZMO); private collection T.R. NIELSEN, Sandness (TNS).

Romania: Muzeul "Grigore Antipa", Bucharest (MGAB).

Russia: Zoological Institute of the Soviet Academy of Science, St Petersburg (ZIAS).

Sweden: Zoologiska Museet, Lund (ZML); private collection N. JANSSON, Motala (NJM); Naturhistoriska Riksmuseet, Stockholm (NRS); private collection R. PETTERSON, Umeå (RPU); private collection J. VAN STEENIS, Uppsala (JSU); Zoologiska Museet, Uppsala (ZMU).

Switzerland: private collection B. MERZ, Geneva (BMG); Musée Zoologique, Lausanne (MZL); Eidgenössische Technische Hochschule, Zürich (ETHZ).

Turkey: Atatürk University, Erzurum (AUE).

United Kingdom: British Museum, London (BMNH)

USA: The Museum of Comparative Zoology, Cambridge (MCZ).

Yugoslavia: private collection A. VUJIC, Novi Sad (AVN)

All of the illustrations accompanying this paper were made with the aid of a camera lucida attached to a stereomicroscope. The male genitalia were drawn in liquid after treatment with KOH, the other parts were drawn from untreated dry specimens. In most illustrations surface hairs were omitted. The terminology (MCALPINE, 1981) used for the pleural sclerites is explained in Figs 1A and 1B. Not all male genitalia are figured, because they are very similar for all species, see Figs 10, 11, 12 (VOCKEROTH, 1958), Fig. 23 (HIPPA, 1978b), Fig. 1 B, C, D (HIPPA, 1990),

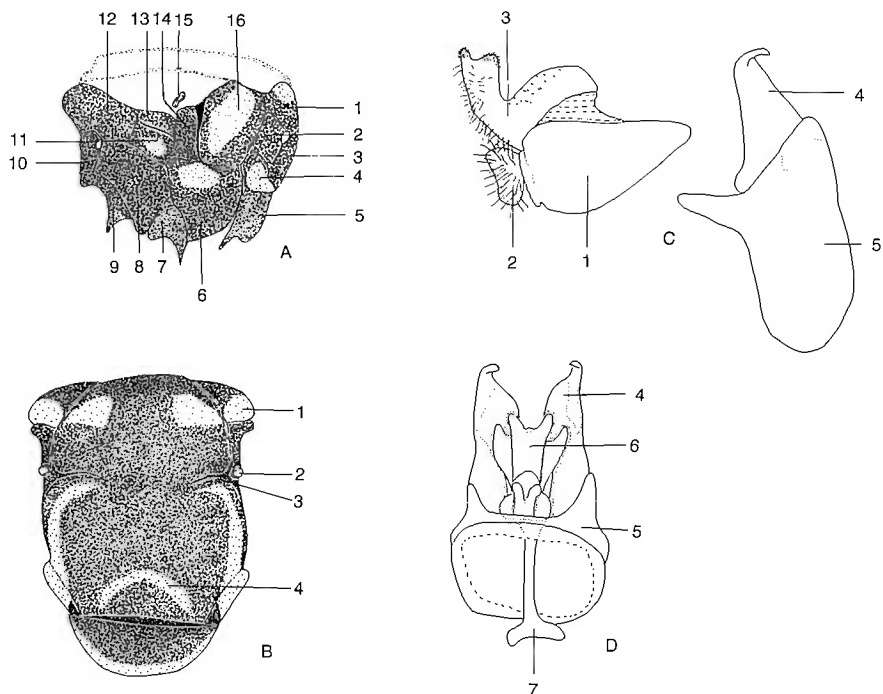


Fig. 1. – A. Pleura of *Spilomyia manicata* ♂ (Norway): 1 postpronotal lobe, 2 anterior anepisternum, 3 proepisternum, 4 proepimeron, 5 coxa I, 6 katepisternum, 7 coxa II, 8 meron, 9 coxa III, 10 metepimeron, 11 katepimeron, 12 katatergite, 13 posterior anepimeron, 14 anterior anepimeron, 15 Heavily-sclerotized projection on antero-dorsal section of subalare, 16 anepisternum. – B. Mesonotum and scutellum of *S. manicata* ♀ Lectotype (Italy): 1 postpronotal lobe, 2 notopleuron, 3 transverse suture, 4 inverted v. – C. Genitalia of *S. graciosa* ♂ (Turkey). – D. Genitalia with aedeagus in ventral view of *S. graciosa* ♂ (Turkey); C. & D. Genitalia: 1 epandrium, 2 cercus, 3 surstylus, 4 superior lobe, 5 hypandrium, 6 aedeagus, 7 ejaculatory apodeme.

and Figs 7, 8, 9 (IKEZAKI, 1996). Distribution maps for four species are provided. These maps are based on the material studied here and reliable, but unchecked, records in the literature or in collections.

KEY TO THE SPECIES

- 1 Katatergite black (Figs 1A & 5E) ..... 2
- Katatergite yellow (Figs 2E, 8E, 9E, 10E & 14E) ..... 3
- 2 Posterior margin of scutellum yellow (Figs 1B & 10D). Pleura with four yellow spots (Fig. 1A). Legs mostly yellow, but front tibia black on apical  $\frac{1}{2}$ – $\frac{3}{4}$ ; front tarsus entirely black. Setulae on front tarsus black. Heavily-sclerotized projection on antero-dorsal section of subalare yellow to brownish ..... *Spilomyia manicata* (RONDANI) (pro parte)
- Posterior margin of scutellum red-brown (Fig. 5D). Pleura with three yellow spots (Fig. 5E). Legs red-brown (Fig. 5F). Setulae on front tarsus red-brown. Heavily-sclerotized projection on antero-dorsal section of subalare brownish black ..... *Spilomyia diophthalma* (LINNAEUS)

- 3 Mesonotum and scutellum with long hairs. Pleura with five yellow spots (Fig. 10E). Spots on pleura and mesonotum vary in size and shape (Figs 1A & B, 10D & E). Posterior  $\frac{1}{4}$ – $\frac{1}{3}$  of scutellum yellow. Front tarsus entirely black, but seldom with apical tarsomere light brown. The anteromedial yellow bands on the tergites entire or slightly separated in the middle, the posterior yellow band on tergite IV curved in the male (Figs 10F & G) ..... *Spilomyia manicata* (RONDANI) (pro parte)
- Mesonotum and scutellum with short hairs. Pleura with four, five or six yellow spots (Figs 2E, 8E, 9E & 14E). Posterior margin of scutellum more extensively yellow. Front tarsus black, but often with apical tarsomeres yellow. The anteromedial yellow bands on tergites II–IV separated in the middle (Figs 2F & G, 8F & G, 13D & E, 14G & 17E & F) or the anteromedial yellow bands on tergite III–IV entire to slightly separated in the middle, the posterior yellow band on tergite IV straight in the male (Figs, 9F & G) ..... 4
- 4 Pleura with six yellow spots, the posterior three or five spots confluent (Figs 8E & 9E). Front tarsus entirely black. Female frons with median black line not reaching anterior ocellus (Figs 8B & 9B) ..... 5
- Pleura with four or five yellow spots, clearly separated from each other (Figs 2E & 14E). Front tarsus with at least apical half of fifth tarsomere yellow. Female frons with median black line reaching anterior ocellus (Figs 2B, 14B & 17B), except in one species (Fig. 13B) ..... 6
- 5 Antennae elongated (Fig. 9C). Inverted v on mesonotum triangular (Fig. 9D). Pleura with the posterior five spots confluent (Fig. 9E). Abdominal bands yellow; the anteromedial yellow bands on tergites III and IV entire or slightly separated in the middle (Figs 9F & G). Female frons with median black line tapering posteriorly, only a small brown line reaching anterior ocellus (Fig. 9B) ..... *Spilomyia longicornis* LOEW
- Antennae short (Fig. 8C). Inverted v on mesonotum bell shaped (Fig. 8D). Pleura with the posterior three spots confluent (Fig. 8E). Abdominal bands lemon yellow, the anteromedial yellow bands on tergites II–IV widely separated in the middle (Figs 8F & G). Female frons with median black line tapering posteriorly, not reaching anterior ocellus (Fig. 8B) ..... *Spilomyia graciosa* VIOLOVITSH
- 6 Front tibiae yellow, at most with a black spot on apical  $\frac{1}{8}$ . At least fourth and fifth tarsomere of front tarsus yellow. Setulae on at least ventral side of fourth and fifth tarsomere of front tarsus yellow ..... 7
- At least apical  $\frac{1}{4}$  of front tibia black, at most fifth tarsomere of front tarsus yellow. Setulae on front tarsus all black ..... 8
- 7 Pleura with five yellow spots (Fig. 14E). Front tarsus with fourth and fifth tarsomere yellow, first three segments black, or at most light brown. Setulae on front tarsus all yellow. Abdomen with narrow yellow bands, the anteromedial yellow band on tergites II–IV slightly separated in the middle (Fig. 14G). Female frons with median black line reaching anterior ocellus (Fig. 14B) .... *Spilomyia saltuum* (FABRICIUS)
- Pleura with four yellow spots (as in Fig. 2E). Front tarsus yellow, first three segments at most light brown. Setulae on ventral surface of front tarsus at least partially yellow and on dorsal surface at least partially black. Abdomen with broad yellow bands, the anteromedial yellow band on tergite II–IV widely

- separated in the middle (Figs 13D & E). Female frons with median black line tapering posteriorly, not reaching anterior ocellus (Fig. 13B) .....  
 ..... *Spilomyia maroccana* KUZNETZOV
- 8 Inverted v on the mesonotum, and the area enclosed between this v and the scutellum, with rounded corners (Fig. 2D). Notopleuron black, very seldom with a small yellow spot. Abdominal bands orange-yellow, with the posterior bands on tergites III and IV strongly curved (Figs 2F & G) .....  
 ..... *Spilomyia digitata* (RONDANI)
- Inverted v on the mesonotum, and the area enclosed between this v and the scutellum, with sharp corners, triangular in shape (Fig 17D). Notopleuron yellow (Fig. 17D). Abdominal bands bright yellow, with the posterior bands on tergites III and IV straight, of nearly uniform width throughout (Fig. 17E & F) .....  
 ..... *Spilomyia triangulata* sp.n.

## SPECIES ACCOUNT

*Spilomyia digitata* (RONDANI, 1865): 132

Type material – The description of *S. digitata* is based on males and females, originating from Italy, “In Apennino” [=Apennines]. Four of the original specimens

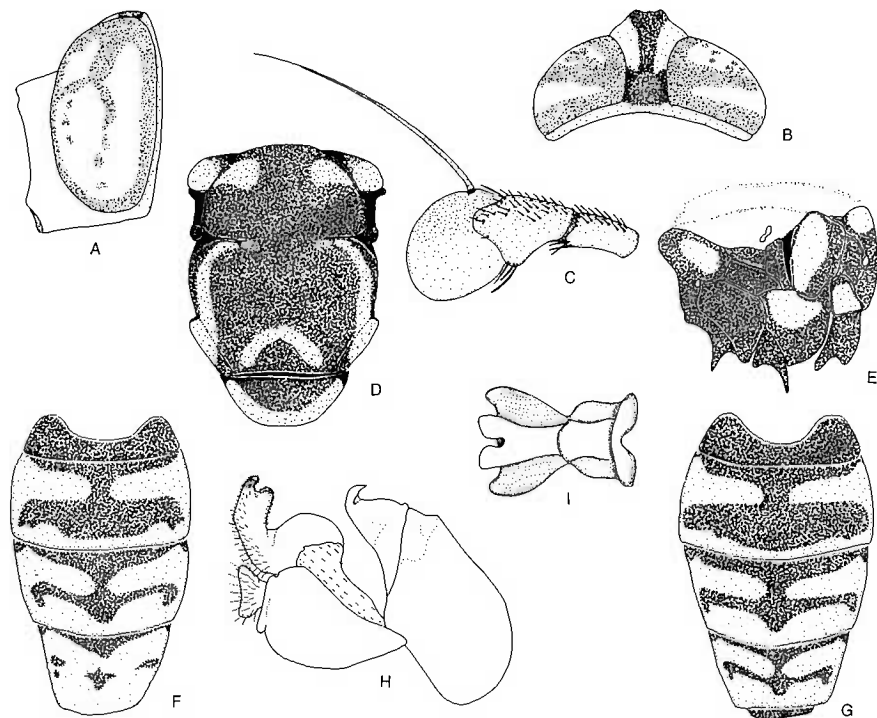


Fig. 2. *Spilomyia digitata*. – A. Face lateral view, ♂ lectotype (Italy). – B. Head dorsal view, ♀ (France). – C. Antennae mesal view, ♂ (France). – D. Mesonotum and scutellum, ♂ (France). – E. Pleura, ♂ lectotype (Italy). – F. Abdomen, ♂ (France); G. Abdomen, ♀ (France). – H. Genitalia, ♂ (France). – I. Aedeagus, ♂ (France).

are preserved in MZF and all bear a white round label with the number 94 and a red lectotype respectively paralectotype label (for example: Lectotype ♂ *Spilomyia digitata* (RONDANI, 1865) desig. J. VAN STEENIS, 1998). One male is here designated as lectotype, the other specimens as paralectotypes.

Description.

♂ – Length: 11.9–16.2 mm ( $\bar{x}$  13.7), wing 9.0–10.9 ( $\bar{x}$  10.1).

Head: Brown colour pattern on eyes as in Fig. 2A. Face yellow with black median line on ventral  $\frac{2}{3}$ . Frons yellow with a black triangular spot above the antennae. Ocellar triangle black, the triangle between anterior ocellus and the eyes yellow. Postocular orbit with greyish pollinosity. Hairs on face yellow, hairs on ocellar triangle black and longer than on face. Antennae brownish-yellow (Fig. 2C).

Thorax: Mesonotum and scutellum black with yellow spots (Fig. 2D), seldom a small rounded spot on notopleuron. Hairs short, appressed; yellow and black, corresponding to the ground colour. Hairs on posterior margin of scutellum about  $\frac{1}{4}$  of the length of the scutellum. Pleura black with yellow spots (Fig. 2E), very seldom a very small spot on katepimeron. Hairs on pleura short and black; on meron  $\frac{1}{2}$  as long as basal diameter of hind femur, as long as hairs on ventral side of katepisternum.

Wings: Heavily-sclerotized projection on antero-dorsal section of subalare yellow. Wing slightly darkened along anterior  $\frac{1}{3}$ . Membrane with the following areas bare of microtrichia: a band along posterior  $\frac{2}{5}$ – $\frac{1}{2}$  of first basal cell,  $\frac{3}{5}$ – $\frac{4}{5}$  of second basal cell, a small band along anterior  $\frac{1}{2}$ – $\frac{3}{5}$  and a small band along posterior  $\frac{1}{5}$ – $\frac{2}{5}$  of anal cell, and anterior  $\frac{2}{5}$ – $\frac{1}{2}$  of alula. Costal setulae all black. Halteres yellow.

Legs: All coxae and trochanters black. Front tarsus black, last tarsomere of front tarsus at least apical half yellow. Front tibia black on apical  $\frac{1}{2}$ – $\frac{3}{4}$ . Hind femur with a dark stripe ventrally and a dark spot apical posteroventral, near spur. All other parts yellow. Front and middle coxae with a few black hairs on apex, which are nearly  $\frac{1}{2}$  as long as basal diameter of middle femur. Hind coxae with white hairs  $\frac{3}{4}$  as long as hairs on meron; some black bristly hairs on coxal process. Trochanter with short black hairs. Front femur with yellow setulae, some black setulae present on apicoventral  $\frac{1}{3}$ . Middle femur with yellow and black setulae; black setulae only on ventral side, not numerous. On postero-dorsal surface of middle femur a row of yellow hairs about twice as long as other hairs. Hind femur with yellow setulae only on dorsal side, other setulae black. Tibiae and tarsi covered with black and yellow setulae, corresponding to the ground colour. Hind tibia often with black setulae on medial ridge and anteromedial surface. Spur on hind femur simple.

Abdomen: Predominantly orange-yellow coloured, lateral side of tergites II–IV black in anterior corner (Fig. 2F). Tergite IV with anteromedial and posterior bands touching on either side of median line, forming three separate black spots, sometimes the yellow bands narrowly separated (see Fig. 2G). Sternites I–IV with black rectangular spots, spots on sternite I broader than long.

Genitalia: Figs 2H & I.

♀ – Length 10.1–14.9mm ( $\bar{x}$  12.8), wing 8.4–12.3 mm ( $\bar{x}$  10.3)

Differing from male, besides the usual sexual dimorphism, in following characteristics.

Head: Fig. 2A.

Wings: Costal setulae on epaulet sometimes mixed yellow and black, otherwise entirely black.

Abdomen: Tergite IV with yellow bands not touching on either side of medial line (Fig. 2G), sometimes as in Fig 2F.

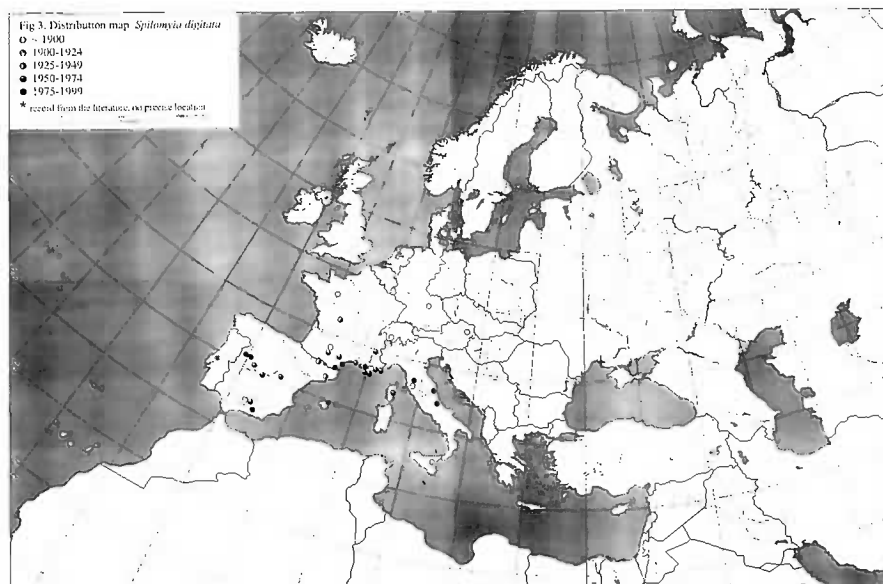


Fig. 3. Distribution map of *Spilomyia digitata*.

Other material – Austria 1 ♂, 2 ♀♀ (RMNH); France 13 ♂♂, 13 ♀♀ (KBIN, MLUH, ZIUK, ZMA, RMNH, JLR, WAUW, NRS, MZL, BMNH); Germany 1 ♂ (JLR); Italy 6 ♂♂, 4 ♀♀ (SMNS, MZF, MCG, ZMA, JLR); Spain 14 ♂♂, 7 ♀♀ (KBIN, SMNS, RMNH, JLR, JSU, MZL, BARENDREGT *et al.*, in press); Switzerland 1 ♂, 1 ♀ (ETHZ).

The occurrence of *S. digitata* in Portugal (GOMEZ, 1980) has been mentioned in literature and it is most likely that it concerns this species. The occurrence in

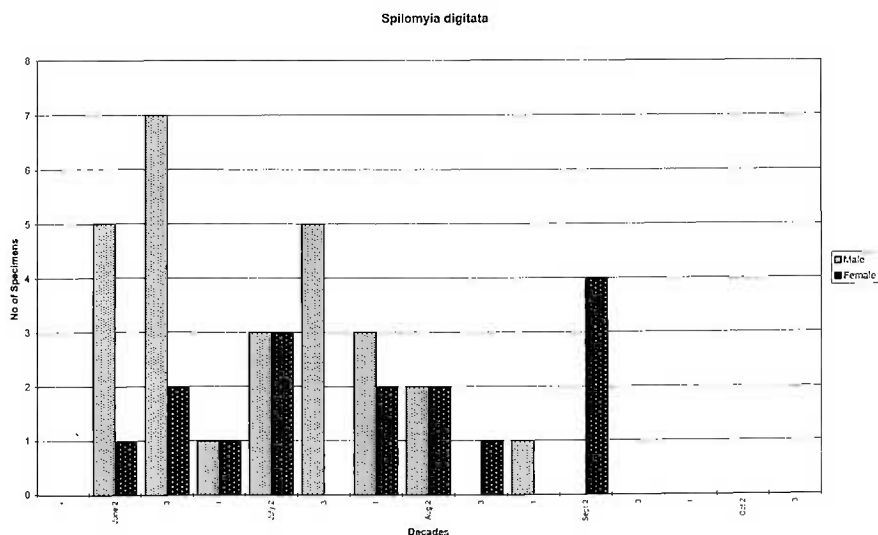


Fig. 4. Flight period of *Spilomyia digitata*.

Poland is, however, doubtful; Fig. 181 (BANKOWSKA, 1963) shows a female of *S. digitata*, not *S. manicata*. Distribution map Fig. 3.

Habitat and behaviour – According to SPEIGHT (1997) and new observations the species lives in thermophilous *Quercus* and evergreen *Q. ilex* forest, containing overmature and senescent trees.

Flowers visited: Umbelliferae and *Thapsia* sp.

Flight period: although Fig. 4 indicates that the species is bivoltine it is more likely that it is univoltine like all other studied species. The peaks are probably artefacts due to the low number of specimens studied.

Comments – *S. digitata* is a very rare species and confined to the western part of the Mediterranean area. There are only old records about its distribution north of the 45th parallel. South of this parallel there are many new records which does not suggest a decline.

### *Spilomyia diophthalma* (LINNAEUS, 1758): 593

Type material – The male lectotype, deposited in the Linnaean collection in the British Museum, was not studied. THOMPSON *et al.* (1982) designated a male lectotype and restricted the type locality to Sweden.

#### Description.

♂ – Length: 11.8–16.2 mm ( $\bar{x}$  14.6), wing 8.8–12.2 mm ( $\bar{x}$  10.6).

Head: Fig. 5A. Face yellow with black medial line on ventral 2/3–3/4, sometimes entirely yellow. Frons as in *S. digitata*. Ocellar triangle black, posterior part of ocellar triangle brown-yellow, sometimes very dark. Antennae elongate, brownish yellow (Fig. 5C).

Thorax: Mesonotum black with yellow spots, which can be very dark and vague. Size and shape of the spots variable. Hairs long and dense, mixed black and white. Posterior margin of scutellum red-brown, hairs on posterior margin about  $\frac{3}{4}$  of the length of the scutellum. Pleura black with yellow spots (Fig. 5E). Hairs long, predominantly white, on meron  $\frac{3}{4}$  as long as basal diameter of hind femur, and as long as hairs on ventral part of katepisternum.

Wings: Heavily-sclerotized projection on antero-dorsal section of subalare black. Wing darkened along anterior  $\frac{1}{2}$ . Membrane with the following areas bare of microtrichia: at most  $\frac{1}{5}$  of second basal cell, anterior  $\frac{3}{5}$ – $\frac{4}{5}$  of anal cell, and anterior half of alula. Costal setulae black or yellow. Halteres yellow.

Legs: All coxae brown to black. Trochanters red-brown to brown. Femora red-brown, sometimes with black stripes on ventral side. Tibiae red-brown on apical  $\frac{1}{2}$ – $\frac{2}{3}$ , basal part light yellow. Tarsi red-brown. Front and middle coxae with black bristly hairs on apex, as long as basal diameter of middle femur; also some white hairs present. Hind coxae with black bristly hairs and white hairs, white hairs as long as metasternal hairs, black bristly hairs confined to ridge on coxal process. Trochanter with short black bristly hairs. Front femur with yellow setulae on dorsal side, other setulae black. Hind femur covered with black setulae, on apical  $\frac{1}{4}$  predominantly with yellow setulae. Front and middle tibiae with yellow-brown setulae, ventromedially with some black setulae. Hind tibia with yellow-brown setulae, on anteromedial surface many black setulae. Setulae on tarsi yellow. Spur on hind femur simple. Hind leg Fig. 5F.

Abdomen: Lateral side of tergites II–IV black on anterior  $\frac{1}{5}$ – $\frac{2}{5}$ . Sternites I–IV with black rectangular spots.

Genitalia: Figs 5H & I.



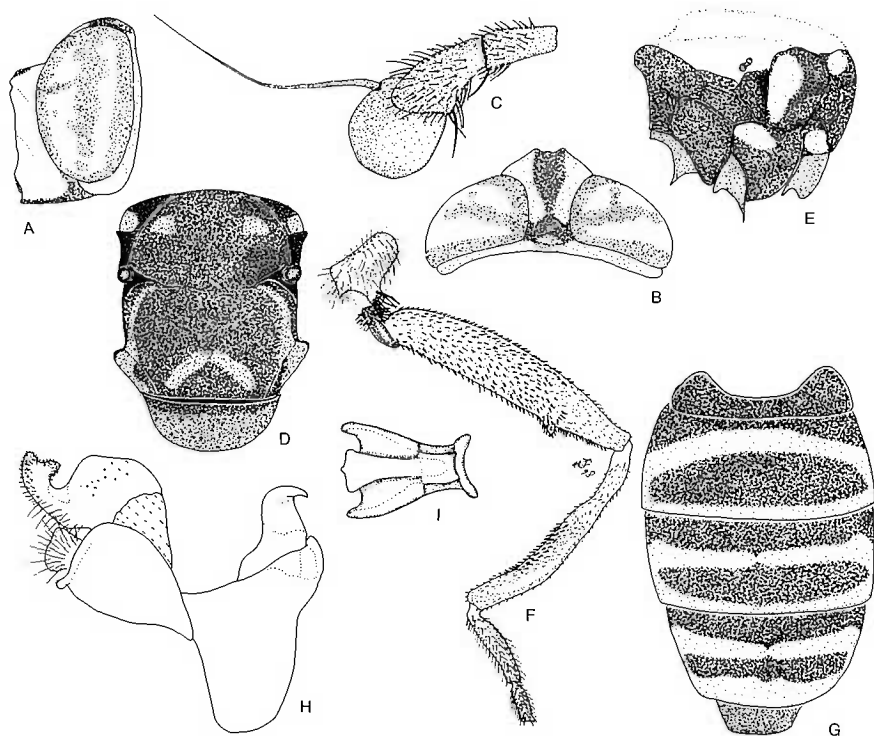


Fig. 5. *Spilomyia diophthalma*. – A. Face lateral view, ♂ (Sweden). – B. Head dorsal view, ♀ (Sweden). – C. Antennae mesal view, ♂ (Sweden). – D. Mesonotum and scutellum, ♀ (Austria). – E. Pleura, ♀ (Austria). – F. Hind leg lateral view, ♂ (Sweden). – G. Abdomen, ♀ (Austria). – H. Genitalia, ♂ (Sweden). – I. Aedeagus, ♂ (Sweden).

♀ – Length: 13.0–17.9 mm ( $\bar{x}$  16.1), wing 10.5–14.1 mm ( $\bar{x}$  12.7).

Differing from male, besides the usual sexual dimorphism, in following characteristics:

Head: Face in profile concave. Frons Fig. 5B.

Thorax: Yellow spots less reduced than in male (Fig 5D).

Wings: Bare areas more extended on second basal and anal cell. Costal setulae either entirely black or mixed black and yellow.

Abdomen: Lateral sides of tergites II–IV black on anterior 1/4–1/2 (Fig. 5G). Anteromedial band on tergites III and IV nearly always separated medially.

Other material – Austria 5 ♂♂, 6 ♀♀ (MLUH, SMNS, RMNH, JLR, ZIAS, BMNH); Czech Republic 3 ♂♂, 8 ♀♀ (KBIN, MLUH, ZIAS, NRS); Estonia 6 ♂♂, 6 ♀♀ (ZMT, RPU, JSU); Finland 63 ♂♂, 108 ♀♀ (FMNH, ZML NRS, ZMU); Germany 5 ♂♂, 5 ♀♀ (UZMC, SMNS, RMNH, JLR, ZIAS); Italy 2 ♂♂, 3 ♀♀ (MZF, MCG, JLR); Norway 15 ♂♂, 12 ♀♀ (JLR, MFO, ZMO, TNS); Poland 3 ♂♂, 4 ♀♀ (KBIN, SMTD, Bankowska, 1959; BARENDREGT *et al.*, in press); former Soviet federation 28 ♂♂, 33 ♀♀ (KBIN, ZMT, FMNH, ZIUK, JLR, ZIAS); Sweden 32 ♂♂, 48 ♀♀ (UZMC, ZMA, JLR, WSU, ZML, NRS, JSU, ZMU, BARTSCH & HUGGERT, pers. comm.); Switzerland 5 ♂♂, 5 ♀♀ (ZMA, JLR, BMG, MZL, ETHZ); Turkey 1 ♂, 2 ♀♀ (JLR, AUE); former Yugoslavia 1 ♀ (AVN).

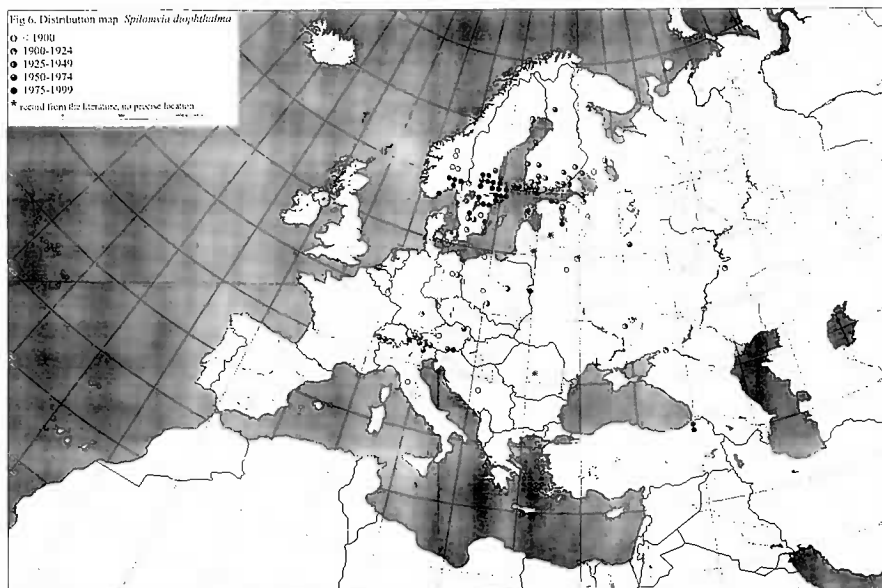


Fig. 6. Distribution map of *Spilomyia diophthalma*.

There are also records of *S. diophthalma* occurring in Bulgaria (PECK, 1988), Latvia, Lithuania (KUZNETZOV, 1993), and Rumania (BRADESCU, 1986). Distribution map Fig. 6.

**Habitat and behaviour** – Adults have been taken in *Abies-Picea* forest with over-mature trees, up to the upper limit of *Picea*. There are also records from mixed forests. Taken in forests and wooded moors on umbellifer rich meadows. Prefers sunny but not too dry places. Most often seen while visiting flowers, but also seen flying around trees and settling sometimes on foliage and tree trunks. The males often behave in a jerky manner when visiting flowers and searching for females with which to mate. They even chase workers of social wasps visiting the same flowers. To add to the deception of being a wasp they wave their front legs in front of their head as if to imitate the long antennae of wasps. They also vibrate their wings and move their abdomen up and down, thus simulating the expansion of the abdomen of the wasps. The females have been caught in traps on dead *Populus* trees (AHNLUND, 1996) and larvae could live deep down in rot-holes in these trees.

Flowers visited: Umbelliferae like *Angelica sylvestris* L., *Pastinaca sativa* L., *Cicuta virosa* L., *Heracleum sphondylium* L., *Peucedanum palustre* (L.) and also *Cirsium arvense* (L.), *Cirsium heterophyllum* (L.), *Crataegus spec.*, *Euonymus spec.* and *Knautia arvensis* (L.).

**Flight period:** Fig. 7. No differences can be found between the flight periods of Scandinavian and alpine populations.

**Comments** – Now recent records are available from lowlands of central Europe, and it may be that *S. diophthalma* is strongly endangered, if not extinct in this area. In alpine areas in Italy, Switzerland and Austria the species is probably rare. It is however not possible to say whether *S. diophthalma* is endangered there. Due to the extensive commercial forestry activity in Fennoscandia and the Baltic

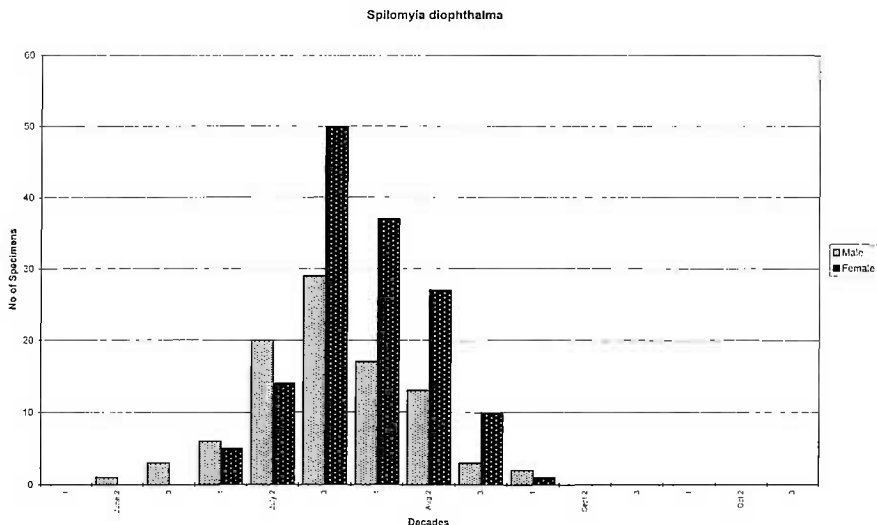


Fig. 7. Flight period of *Spilomyia diophthalma*.

states *S. diophthalma* is there uncommon but wide spread. The species is certainly not endangered in Sweden. The occurrence of *S. diophthalma* in France is mentioned by SEGUY (1961), but neither SPEIGHT (1994) nor I have found specimens from France.

#### *Spilomyia graciosa* VIOLOVITSH, 1985: 94

Type material – The description of *S. graciosa* is based on one female from Swaratuka (Iraq), coll. ZIAS. The type specimen was studied and bears the following labels: 1) round golden label, 2) white label, with the left middle leg glued on it “Swaratuka Aug 1961 J. Abul Hab.”, 3) white label (in Russian) “Lian”, 4) red label “Holotypus *Spilomyia graciosa* VIOLOVITSH”, 5) white label “Digital Photo: ex No 117”.

##### Description.

♂ – Length 10.9–11.6 mm ( $\bar{x}$  11.3), wing 8.4–9.0 mm ( $\bar{x}$  8.8).

Head: Fig. 8A. Face yellow with a narrow medial black line on ventral  $\frac{2}{3}$ . Antennae brownish yellow (Fig. 8C).

Thorax: Mesonotum and scutellum black with bright lemon-yellow spots (Fig. 8D). Hairs very short, yellow and black, following the ground colour. Hairs on posterior margin of scutellum  $\frac{1}{7}$  of length of scutellum. Pleura black with bright yellow spots (Fig. 8E). Hairs short and all yellow, hairs on meron  $\frac{1}{2}$  as long as basal diameter of hind femur and twice as long as hairs on ventral surface of katepisternum.

Wings: Heavily-sclerotized projection on antero-dorsal section of subalare yellow. Wing along anterior  $\frac{1}{4}$  pale brown. Membrane with the following areas bare of microtrichia: anterior  $\frac{1}{2}$  of first basal cell,  $\frac{4}{5}$ – $\frac{9}{10}$  of second basal cell, basal  $\frac{1}{2}$  of anal cell, and anterior half of alula. Costal setulae black. Halteres yellow.

Legs: All coxae black. Front and middle trochanters yellow, hind trochanter dark brown. All femora yellow, hind femur with darkened spot on ventral side near

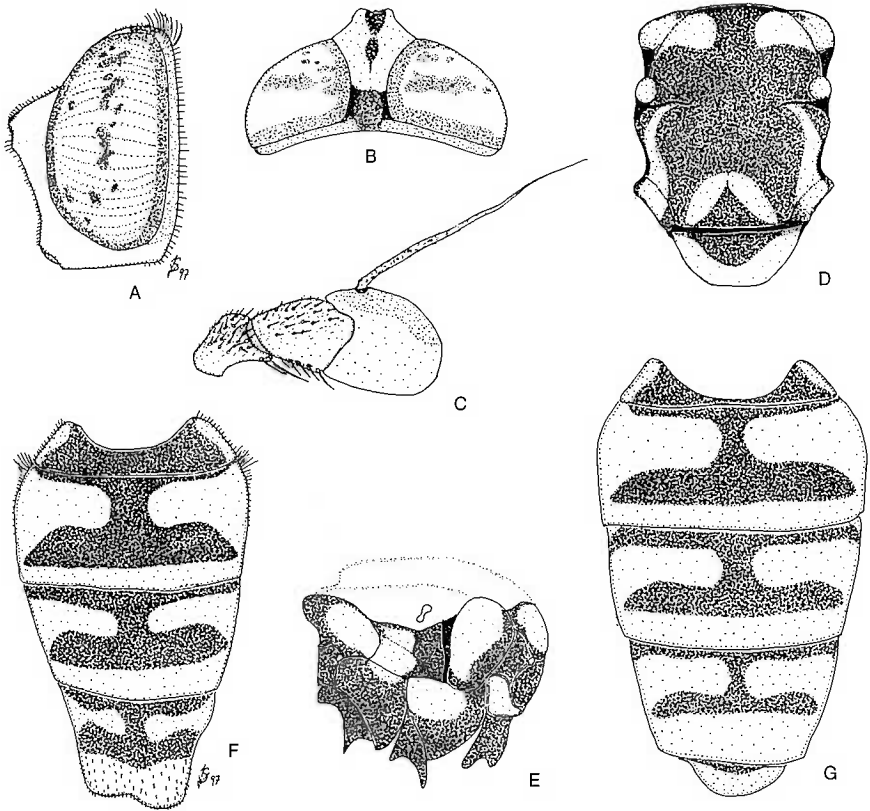


Fig. 8. *Spilomyia graciosa*. – A. Face lateral view, ♂ (Turkey). – B. Head dorsal view, ♀ (Turkey). – C. Antennae mesal view, ♂ (Turkey). – D. Mesonotum and scutellum, ♂ (Turkey). – E. Pleura, ♀; – F. Abdomen, ♂ (Turkey). – G. Abdomen, ♀ (Turkey).

the spur. Front tibia black on apical  $\frac{9}{10}$ , middle and hind tibiae yellow. Front tarsus black, middle and hind tarsi yellow. Front and middle coxae with yellow bristly hairs  $\frac{1}{3}$  as long as basal diameter of middle femur. Front and middle trochanters with a few short black setulae, hind trochanter apicoventrally with a patch of short black setulae. Femora predominantly with yellow setulae, middle femur with 2 to 3 rows short black setulae on apicoventral  $\frac{1}{6}$ – $\frac{1}{3}$ . Ventral side of hind femur covered with short black setulae. On dorsal part of hind femur also some black setulae, more numerous from basal  $\frac{2}{5}$ – $\frac{3}{5}$  towards apex. Hairs on front tibia yellow and black, corresponding to the ground colour, on middle tibia yellow. Hind tibia posteroventrally on apical  $\frac{1}{4}$ – $\frac{1}{2}$  with short black setulae. Front tarsus with black setulae, middle and hind tarsi with yellow setulae. Spur on hind femur simple.

Abdomen: (Fig. 8F). Lateral margins entirely yellow. Sternites 1 to 4 with black rectangular spots, the spots on sternite 1 broader than long, the anterior margin of the spot on sternite 2 with two yellow spots. Hairs on tergites III and IV very short and semiappressed.

Genitalia: Figs 1C & D.

♀ – Length 9.2–12.1 mm ( $\bar{x}$  11.1), wing 8.1–10.2 mm ( $\bar{x}$  9.5).

Differing from male, besides the usual sexual dimorphism, in following characteristics.

Head: Frons Fig. 8B.

Thorax: Inverted v in front of the scutellum more bell-shaped.

Abdomen: Fig 8G.

Other material – Turkey: Turkye Hakkari Sat Mountains Vargös 1700 m 5–VIII–1983, 1 ♀; ibid, 6–VIII–1983, 1 ♀; ibid, 7–VIII–1983, 1 ♂; Turkye Hakkari Servarihalil pas nr. the Habero Deresi W-side 1250 m 10–VIII–1983, 1 ♂, 2 ♀♀; ibid, 13–VIII–1984, 1 ♀, all leg. & coll. JLR; TK 1250 m Hakkari süd. Beytüssenbap 10–VIII–1983, leg. WARNCKE, 1 ♀, coll. JLR; Greece: Skaloula-Doris 16–VIII–1983 leg. R.H. COBBEN & P. DE VRIJER, 1 ♂, coll. WAUW; Greece Evros Lefkimi 100 m N 41003'03" E 26004'25" 8–IX–1998 2 ♀♀, leg. & coll. J. DILS.

Habitat and behaviour – Not known, probably a mountain species and probably rare in Greece.

*Spilomyia longicornis* LOEW, 1872: 82

Type material – The male lectotype and one female paralectotype (THOMPSON, 1997) in coll. MCZ were studied. Each specimen bears four white labels: Penns. auxer; Type 428; LOEW Coll.; *longicornis* Lw. The male bears an additional yellow label, Lectotype *Spilomyia longicornis* LOEW Desig. THOMPSON, 1979; the female, Paralectotype *Spilomyia longicornis* LOEW Desig. THOMPSON, 1979.

Description.

♂ – Length: 9.5 mm, wing 7.2 mm.

Head: Face yellow with black medial line on ventral  $\frac{2}{3}$ . Antennae elongate, brownish yellow.

Thorax: Mesonotum and scutellum black with yellow spots. Hairs short yellow and black, corresponding to the ground colour. Hairs on posterior margin of scutellum  $\frac{1}{4}$  of length of the scutellum. Pleura black with yellow spots. Hairs moderately long and yellow, on meron  $\frac{1}{2}$  as long as basal diameter of hind femur, as long as hairs on ventral part of katepisternum.

Wings: Heavily-sclerotized projection on antero-dorsal section of subalare yellow. Wing slightly darkened along anterior  $\frac{1}{3}$ . Membrane with the following areas bare of microtrichia: first basal cell along dorsal margin and on apicoventral  $\frac{1}{2}$ , complete second basal cell, anal cell except for apicomedia  $\frac{1}{5}$ , alula, and discal cell on basal  $\frac{1}{8}$ . Costal setulae on epaulet yellow, apical all black. Halteres yellow.

Legs: Yellow, except for front tarsus and apical  $\frac{3}{4}$  of front tibia, which are black. Hind femur with a brown ventromedial stripe. Coxae with black and yellow hairs on apex,  $\frac{1}{2}$  as long as basal diameter of middle femur. Hind coxae with hairs  $\frac{1}{2}$  as long as metasternal hairs. Trochanters with yellow hairs, hind trochanter with some black hairs on apicoventral  $\frac{3}{4}$ . Femora with yellow hairs, middle femur with a row of long hairs on posterodorsal surface 2.5 times longer than other hairs, hind femur ventrally with black hairs. Front tibia with black setulae. Middle tibia with yellow setulae. Hind tibia with yellow setulae, some black setulae on ventromedial part. Setulae on front tarsi black, on middle and hind tarsi yellow. Spur on hind femur simple.

Abdomen: Lateral side of tergites yellow (Fig. 9F). Sternites I–IV with rectangular black spots.

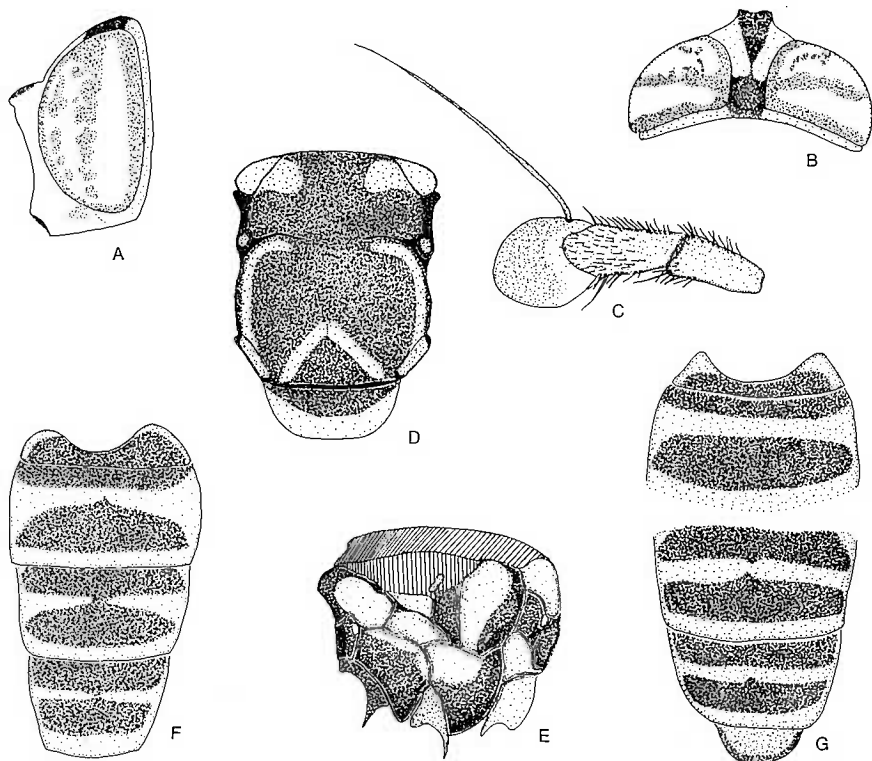


Fig. 9. *Spilomyia longicornis*. – A. Face lateral view, ♀ (Hungary). – B. Head dorsal view, ♀ (Hungary). – C. Antennae mesal view, ♀ (Hungary). – D. Mesonotum and scutellum, ♀ (Hungary). – E. Pleura, ♀ (Hungary). – F. Abdomen, ♂ lectotype (USA). – G. Abdomen, ♀ (Hungary).

♀ – Length: 12.0–16.2 mm ( $\bar{x}$  14.2), wing 9.3–12.6 mm ( $\bar{x}$  11.0).

Differing from male, besides the usual sexual dimorphism, in following characteristics.

Head: Figs 9A & B, antennae Fig. 9C.

Thorax: Mesonotum and scutellum Fig. 9D, pleura Fig. 9E.

Abdomen: Fig. 9G.

Other material – Budapest, Madarassy (Hungary) 2 ♀♀ leg KLÖCKER coll. UZMC; Canada 1 ♂, 1 ♀ (ZIUJ); USA 2 ♂♂, 6 ♀♀ (ZMA, ZML).

Habitat and behaviour – This is the first record of this species in the Palaearctic region. Nothing is known about habitat preferences and behaviour in Europe. CURRAN (1951) states that *S. longicornis* resembles *Vespa squamosa* DRYY in colour pattern and behaviour whilst visiting flowers like “Wild Aster” and “Goldenrod”.

*Spilomyia manicata* (RONDANI, 1856): 132*Spilomyia integra* KUNTZE, 1913: 549*Spilomyia boschmai* LUCAS, 1964: 206. Syn.nov.

Type material – RONDANI (1865) described *S. manicata* from Italy “In Apennino” [=Apennines]. RONDANI’s description was based on females of which two were found in his collection. One female is, however, *S. diophthalma*, the other female, corresponding with the original description, is hereby designated lectotype. The specimen preserved in MZF bears one round white label with the number 92 and one red label; Lectotype ♀ *Spilomyia manicata* (RONDANI, 1865) desig. J. VAN STEENIS, 1998.

The description of *S. integra* has been based on 5 ♂♂ and 5 ♀♀ originating from Corsica (France). The type specimens are lost (U. KALLWEIT, pers comm.). STACKELBERG (1958) assumed that *S. integra* was a junior synonym of *S. manicata*, although he had not studied the type material. Judging from the description of *S. integra* (KUNTZE, 1913) and the intraspecific variation within *S. manicata*, these two taxa are conspecific.

The two female type specimens of *S. boschmai* originate from Sicily (Italy) The holotype (coll. JLR) bears the following labels: one orange label, Holotype; and one white label, Cesaro Monte Soro 1500–1750–1850 m 3–VIII–1961. The paratype (coll. RMNH) bears the following three white labels: M. Nebrodicti Biyiero di Cesaro 1250–1350 m 30–VII–7–VIII–1961; Italia Sicilia V.S. v.D. GOOT J.A.W. LUCAS; *Spilomyia boschmai* LUCAS det. J.A.W. LUCAS; and one orange label, Paratype. These two specimens and one additional female (det. JLR) of *S. boschmai* were studied and found conspecific with *S. manicata*.

## Description.

♂ – Length 11.0–16.0 mm ( $\bar{x}$  14.2), wing 8.1–11.6 mm ( $\bar{x}$  10.3).

Head: Face in profile straight to slightly concave, with the median line varying from entirely yellow via a small brown stripe on medial part to black on ventral  $\frac{3}{4}$ . Antennae brownish yellow (Fig. 10C).

Thorax: Mesonotum and scutellum (Fig. 10D, or as in Fig. 1B) black with yellow spots which are very variable in size and shape. Hairs long white-yellow and black, following the ground colour. Hairs on posterior margin of scutellum  $\frac{3}{4}$ – $\frac{4}{5}$  of the length of scutellum. Pleura black with yellow spots which vary in size, the two extremes are shown in Figs 1A and 10E. Hairs long and all yellow, hypopleural hairs  $\frac{5}{8}$  of basal diameter of hind femur, as long as on ventral surface of katipisternum.

Wings: Heavily-sclerotized projection on antero-dorsal section of subalare ranging from dark brown to yellow. Wing darkened along anterior  $\frac{1}{4}$ – $\frac{1}{3}$ . Membrane with the following areas bare of microtrichia: a band along posterior  $\frac{1}{3}$ – $\frac{1}{2}$  of first basal cell, a band along posterior  $\frac{2}{5}$ – $\frac{4}{5}$  of second basal cell, a band along anterior  $\frac{2}{5}$ – $\frac{3}{5}$  of anal cell, and anterior  $\frac{2}{5}$ – $\frac{1}{2}$  of alula. Halteres yellow. Costal setulae black, sometimes some yellow intermingled.

Legs: Legs yellow except for all coxae which are yellow-brown to black. Ventral side of femora with black stripes, on front femur most extended. Front tibiae black on apical  $\frac{1}{2}$ – $\frac{3}{4}$ , front tarsus entirely black. Extreme apices of front and middle coxae with yellow hairs  $\frac{3}{4}$  as long as basal diameter of middle femur. Front and middle trochanters with black and yellow bristly hairs  $\frac{3}{4}$  as long as coxal hairs. Femora with black and some yellow setulae, hairs on posterodorsal surface of middle femur about twice as long as other hairs. Tibiae and tarsi with yellow and

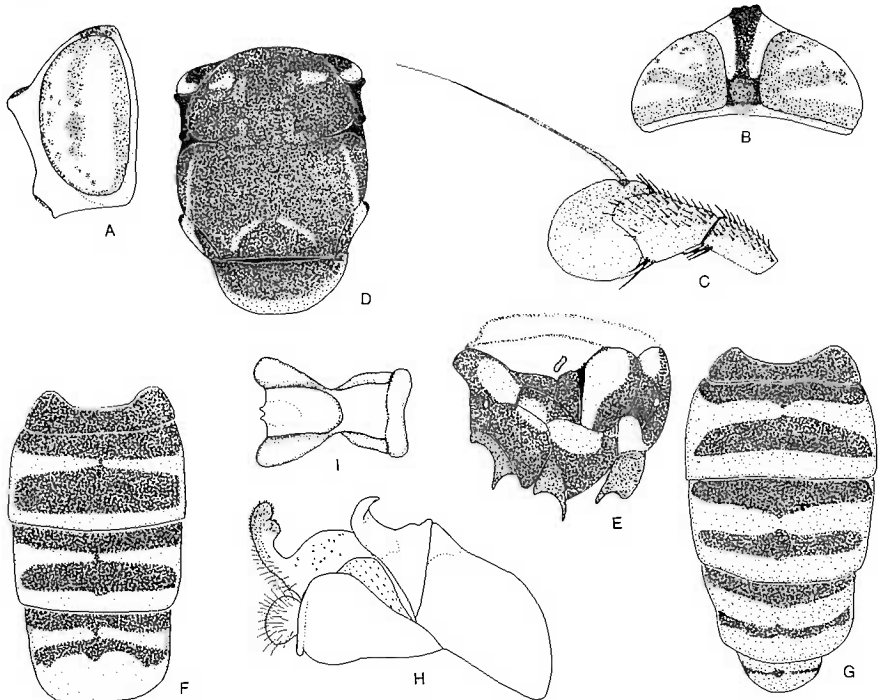


Fig. 10. *Spilomyia manicata*. – A. Face lateral view, ♀ lectotype (Italy). – B. Head dorsal view, ♀ lectotype (Italy). – C. Antennae mesal view, ♂ (Yugoslavia). – D. Mesonotum and scutellum, ♂ (Norway). – E. Pleura, ♀ lectotype (Italy). – F. Abdomen, ♂ (Norway). – G. Abdomen, ♀ lectotype *S. boschmai* (Italy). – H. Genitalia, ♂ (Denmark). – I. Aedeagus, ♂ (France).

black setulae, according to the ground colour. Black setulae on front tarsus sometimes with a golden sheen, as if they were yellow. Spur on hind femur simple, slightly concave apically.

Abdomen: The anteromedial yellow bands entire or slightly separated in the middle, the posterior yellow band on tergite IV curved (Fig. 10F). Sternites I to IV with black rectangular spots, the spots on sternite I broader than long. Hairs on tergites III and IV short, predominantly black, and appressed.

Genitalia: Figs 10H & I.

♀ – Length: 12.6–16.8 mm ( $\bar{x}$  14.9), wing 10.5–13.6 mm ( $\bar{x}$  11.8).

Differing from male, besides the usual sexual dimorphism, in following characteristics.

Head: Face more concave (Fig. 10A), frons Fig. 10B.

Yellow markings on mesonotum (Fig. 10B), pleura (Fig. 10E) and abdomen (Fig. 10G) more extended.

Other material – Austria 1 ♂, 3 ♀♀ (RMNH); Belgium 1 ♂ (VERLINDEN, 1991); Czech Republic 1 ♂, 1 ♀ (MLUH); Denmark 7 ♂♂, 5 ♀♀ (UZMC); France 9 ♂♂, 8 ♀♀ (ZMA, RMNH, JLR, WSU, TNS, BMNH); Germany 6 ♂♂, 3 ♀♀ (MLUH, DDM, ZMA, JLR, DOCZKAL, 1995); Greece 3 ♂♂, 1 ♀ (SMNS, RMNH, JLR); Italy 5 ♀♀ (UZMC, MZF, RMNH JLR); Netherlands 4 ♀♀ (ZMA, GEURTS, 1960); Norway 2 ♂♂, 5 ♀♀ (MFO, ZMO, TNS); Poland 1 ♂ (BARENDREGT *et al.*, in press);



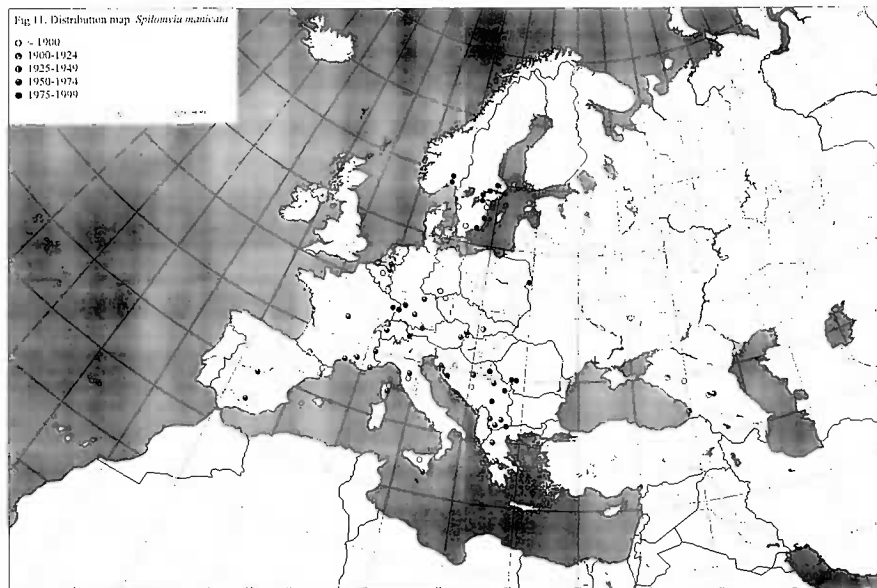


Fig. 11. Distribution map of *Spilomyia manicata*.

Rumania 3 ♂♂, 3 ♀♀ (TNS, MGAB); former Soviet Union 3 ♂♂, 6 ♀♀ (ZIAS); Slovakia 1 ♀ (ZIAS); Spain 4 ♂♂, 3 ♀♀ (RMNH); Sweden 16 ♂♂, 13 ♀♀ (ZML, NJM, NRS, ZMU, JSU, BARTSCH & HUGGERT, pers. comm.); Switzerland 3 ♀♀ (MZL, BMG); former Yugoslavia 16 ♂♂, 8 ♀♀ (RMNH, JLR, ZIAS, AVN). Distribution map Fig. 11.

**Habitat and behaviour** – This species has been caught in *Fagus-Quercus* forest with over-mature trees and also in *Pinus-Abies* forest rich in deciduous trees such as *Acer*, *Betula*, *Fraxinus*. In Sweden and Norway caught in the same places as *S. diophthalma*, but in much lower densities and with the northern limit of occurrence at the 60th parallel. Seen drinking from stream margins etc. at about midday, and also seen settling on foliage or flying along the border of the forest. Visiting flowers on warm exposed meadows with small brooks. The puparium has been found in a rot-hole in an *Acer platanoides* in Sweden (HUGGERT, pers. comm.).

Flowers visited: Umbelliferae, like *Daucus* sp., *Apium* sp., *Peucedanum palustre* (L.) and other flowers like *Filipendula ulmaria* (L.) and *Allium* sp., seems to visit flowers infrequently.

**Flight period:** Fig. 12. In Scandinavia the flight period is somewhat shorter than in southern Europe, the records from June, September and October are all from southern Europe.

**Comments** – A wide-spread, but rare, species all over Europe. In Scandinavia the number of populations has not changed over the years, only the number of specimens caught seems to have decreased. The data do not, however, suggest that the species is endangered in Scandinavia. The records from the Netherlands are regarded as migrants (BARENDREGT *et al.*, in press), maybe this is the same for the Belgium record. SPEIGHT (pers. comm.), however, does not share this opinion, and states that *Spilomyia* will fly at most a few kilometres. South of the 50th parallel there are more recent records. No signs of a decline could be found.

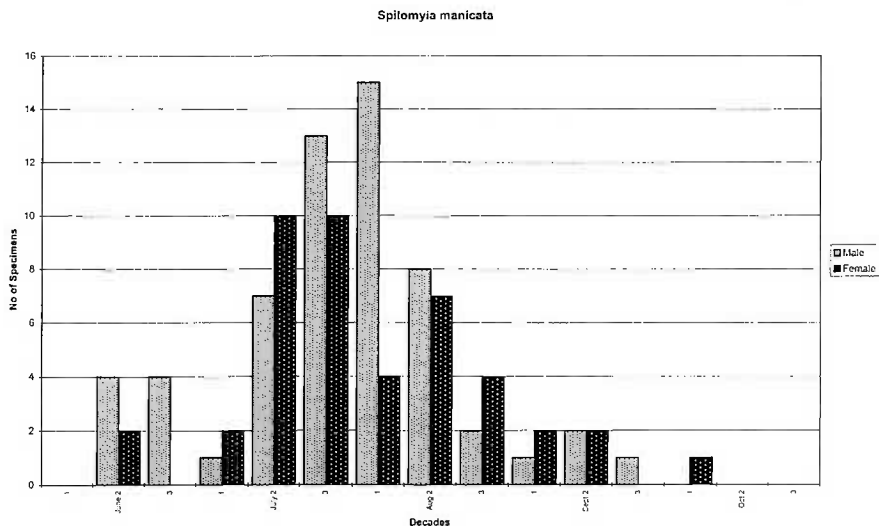


Fig. 12. Flight period of *Spilomyia manicata*.

*Spilomyia maroccana* KUZNETZOV, 1997: 203

Type material – This Moroccan species is recently described. The holotype and paratype were studied. The holotype ♂ and paratype ♀ bear the following labels: 1) white label “Tanger 1897” and 2) red label, holotype respectively paratype, both specimens are deposited in ZIAS.

Description.

♂ – Length: 12.7–12.9 mm, wing 9.8–9.9 mm.

Similar to *S. digitata*.

Head: Brown colour on eyes less extended (Fig. 13A) than in *S. digitata*. Antennae yellow, shaped as in Fig. 2C.

Thorax: Mesonotum and scutellum with yellow spots. Hairs very short. Hairs on posterior margin of scutellum about  $\frac{1}{5}$  of the length of the scutellum. Pleura as in Fig. 2E, hairs slightly shorter than in *S. digitata*.

Wings: Bare areas less extended than in *S. digitata*: a band along posterior  $\frac{1}{3}$ – $\frac{2}{5}$  of first basal cell, a band along anterior  $\frac{2}{5}$ – $\frac{1}{2}$  of second basal cell, a band along anterior  $\frac{3}{10}$ – $\frac{1}{2}$  of anal cell and anterior  $\frac{1}{4}$ – $\frac{2}{5}$  of alula. Costal setulae black.

Legs: Trochanters and coxae black. Legs yellow, first three segments of front tarsus darkened, front tibia at most with a black spot on apical  $\frac{1}{8}$ . Setulae on front tarsus black, at least on fourth and fifth tarsomere yellow. Other hairs and setulae as in *S. digitata*. Spur on hind femur more robust than in *S. digitata*.

Abdomen: Colour of abdominal bands light-yellow (Fig. 13D). Hairs on tergites III and IV very short and appressed.

Genitalia: Similar to Figs 2H & I.

♀ – Length: 10.5–14.0 mm ( $\bar{x}$  12.5), wing 8.9–11.5 mm ( $\bar{x}$  10.5).

Differing from male, besides the usual sexual dimorphism, in following characteristics.

Head: Fig. 13B.

Thorax: Mesonotum and scutellum Fig. 13C.

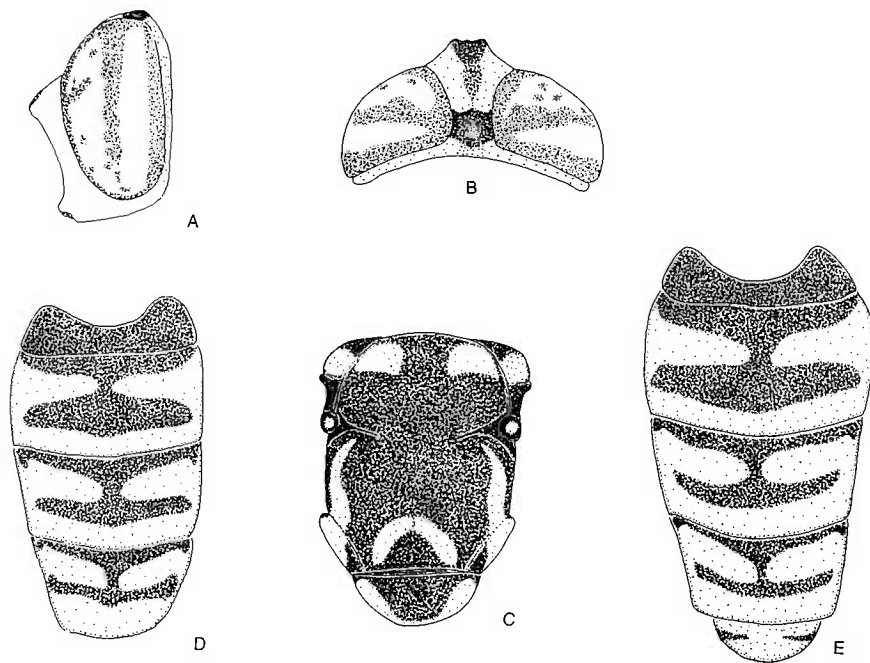


Fig. 13. *Spilomyia maroccana*. – A. Face lateral view, ♂ (Tunisia). – B. Head dorsal view, ♀ (Morocco). – C. Mesonotum and scutellum, ♀ (Morocco). – D. Abdomen, ♂ (Tunisia). – E. Abdomen, ♀ (Morocco).

Wings: Costal setulae entirely black.

Legs: First three segments of front tarsus often only slightly darkened. Setulae on ventral side of front tarsus sometimes entirely yellow.

Abdomen: Fig. 13E.

Other material – Tunisia: N-Tunesien 23.VI.1994, 25 Km S Tabarka, Waldwiese O. BABAUCH, leg HAUSER/Tu-AiB, 1 ♂, coll. SMNS; ibid, 1 ♀, coll. JSU; Morocco: Marokko, Ifrane/1750 m, 10.VIII.89 leg HAUSER, 1 ♀, coll. SMNS; Atlas med. Azrou, 24.VI–2.VII.26 leg LINDBERG, 1 ♂, coll. FMNH; Marokko Marrakech, 10 km S' Ouirgane Tagadirt, 31°05' N 8°08' W, 14.VIII.1996 leg C.F. KASSEBEER, 1 ♀, coll. ZIUK; Mikdane stream a, N. of road, 29.VII.1963, O.U. Exped. to Morocco Haut Atlas, Jb Ayachi, A.C. PONT leg B.M. 1964-30, 1 ♀ and Mikdane stream I, S. of road 6–VIII–1963, 1 ♀, both coll. BMNH.

Habitat and behaviour – This species is caught in mountain areas in North Africa only. *S. maroccana* was found in very dry valleys with small streams with running water, at an altitude of 1000 m. The dominating tree species in these valleys were evergreen oaks and cedar trees. Visiting flowers or sitting on the base of trees (Tamaricaceae).

Flowers visited: *Foeniculum vulgare*.

*Spilomyia saltuum* (FABRICIUS, 1794): 287

*Spilomyia hybrida* SUSTER & ZILBERMAN, 1958: 330

*Spilomyia hybrida* var. *intermedia* SUSTER & ZILBERMAN, 1958: 330

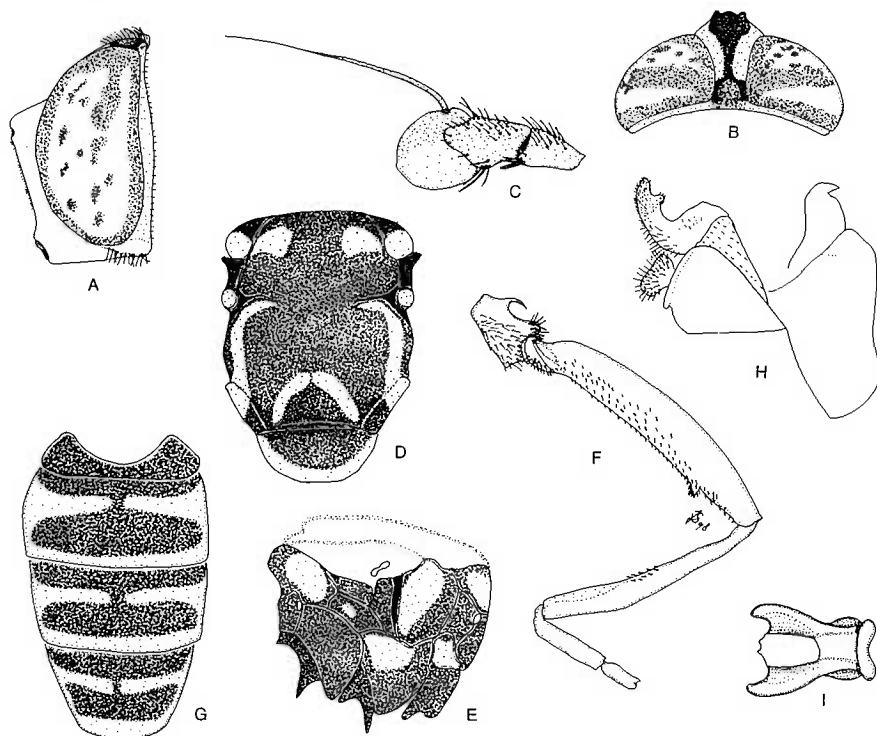


Fig. 14. *Spilomyia saltuum*. – A. Face lateral view, ♂ neotype (Italy). – B. Head dorsal view, ♀ (Italy). – C. Antennae mesal view, ♂ neotype (Italy). – D. Mesonotum and scutellum, ♂ neotype (Italy). – E. Pleura, ♂ neotype (Italy). – F. Hind leg lateral view, ♂ neotype (Italy). – G. Abdomen, ♂ (Turkey). – H. Genitalia, ♂ (Yugoslavia). – I. Aedeagus, ♂ (Yugoslavia).

**Type material.** The description of *S. saltuum* was based on one or more specimens originating from Italy, Dr. ALLIONI. Only the name label has been preserved (ZIMSEN, 1964) in UZMC. One male (coll. UZMC) from Sicily (Italy) designated neotype, bearing two white labels, Sicilia SCHIÖDTE; *Saltuum* FABR; and one red label, Neotype ♂ *Spilomyia saltuum* (FABRICIUS, 1794) desig. J. VAN STEENIS, 1998. The male genitalia were dissected, put in a microvial and pinned on a separate pin, bearing a similar neotype label as the original pin.

PECK (1988) mentions *S. hybrida* and *S. hybrida* var. *intermedia* as synonyms of *S. saltuum*. Neither the types nor the description of these taxa were studied.

#### Description.

♂ – Length 10.6–13.7 mm ( $\bar{x}$  12.1), wing 7.6–9.9 mm ( $\bar{x}$  9.2).

Head: Fig. 14A. Face yellow with a narrow median black line on ventral 2/3. Antennae brownish-yellow to orange (Fig. 14C).

Thorax: Mesonotum and scutellum black with yellow spots (Fig. 14D). Hairs short yellow and black, corresponding to the ground colour. Hairs on posterior margin of scutellum  $\frac{1}{5}$  of the breadth of the scutellum. Pleura black with yellow spots (Fig. 14E). Hairs short and all yellow, hypopleural hairs half as long as basal diameter of hind femur, as long as hairs on ventral surface of katepisternum.

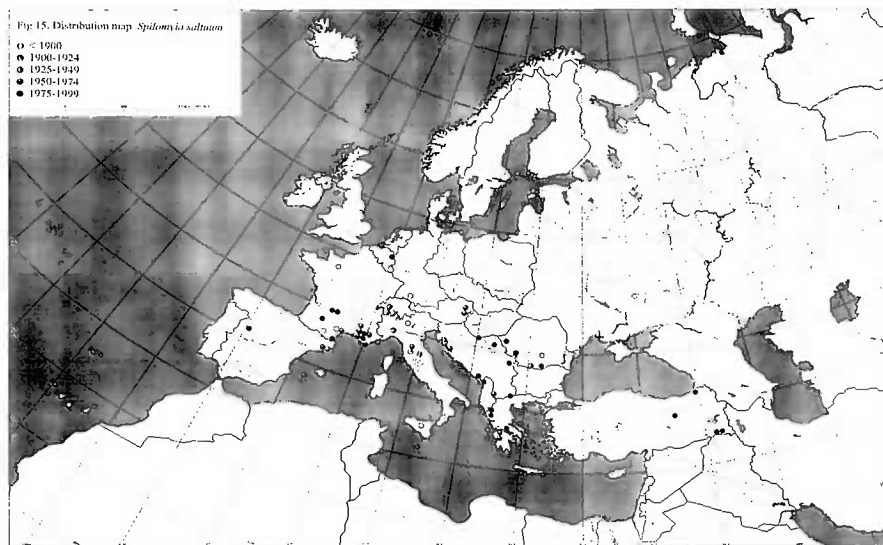


Fig. 15. Distribution map of *Spilomyia saltuum*.

Wings: Heavily-sclerotized projection on antero-dorsal section of subalare yellow. Wing darkened along anterior  $\frac{1}{3}$ . Membrane with the following areas bare of microtrichia: a band along posterior  $\frac{1}{4}$ – $\frac{1}{3}$  of first basal cell, basomedial  $\frac{1}{6}$ – $\frac{1}{4}$  of second basal cell, a band along anterior  $\frac{1}{3}$ – $\frac{4}{5}$  of anal cell, and anterior  $\frac{1}{3}$ – $\frac{2}{5}$  of alula. Costal setulae all black, sometimes all yellow. Halteres yellow.

Legs: Coxae and trochanters black. Femora, tibiae and tarsi yellow, first three tarsomeres of front tarsus dark brown to black, sometimes even these yellow. Front tibia at most darkened on apical  $\frac{1}{5}$ . Setulae on front tarsus yellow. Hind leg Fig. 14F. Hairs like in *S. digitata*.

Abdomen: Fig. 14G. Hairs on tergites III and IV very short and appressed.

Genitalia: Figs 14H & I.

♀ – Length 10.4–14.6 mm ( $\bar{x}$  13.5), wing 8.3–11.3 mm ( $\bar{x}$  10.4).

Differing from male, besides the usual sexual dimorphism, in following characteristics.

Head: Frons Fig. 14B.

Other material – Austria 6 ♂♂ (RMNH); France 6 ♂♂, 10 ♀♀ (KBIN, SMNS, RMNH, JLR, WSU, MZL, BMNH); Germany 1 ♂ (SMNS); Greece 2 ♂♂, 13 ♀♀ (RMNH, JLR, JSU); Hungary 1 ♀ (SMNS); Italy 5 ♂♂, 14 ♀♀ (UZMC, MZF, MCG, JLR); Netherlands 1 ♂, 1 ♀ (ZMA, JLR); Rumania 4 ♂♂, 6 ♀♀ (SMNS, ZMA, TNS, MGAB, BMNH); former Soviet Union 3 ♂♂ (ZIAS); Spain 3 ♀♀ (SMNS, RMNH); Switzerland 2 ♂♂, 1 ♀ (UZMC, MZL); Turkey 7 ♂♂, 5 ♀♀ (JLR, AUE); former Yugoslavia 11 ♂♂, 8 ♀♀ (JLR, AVN).

In addition, there are literature records of this species from Bulgaria (PECK, 1988) and Poland (BANKOWSKA, 1963). The occurrence of *S. saltuum* in Poland is doubtful, since Figs 183 and 184 in BANKOWSKA (1963) represents *S. manicata*, not *S. saltuum*. Distribution map Fig. 15.

Habitat and behaviour – *S. saltuum* has been caught in *Fagus* and *Quercus* forest with over-mature trees. Largely associated with evergreen *Quercus* forest, fur-

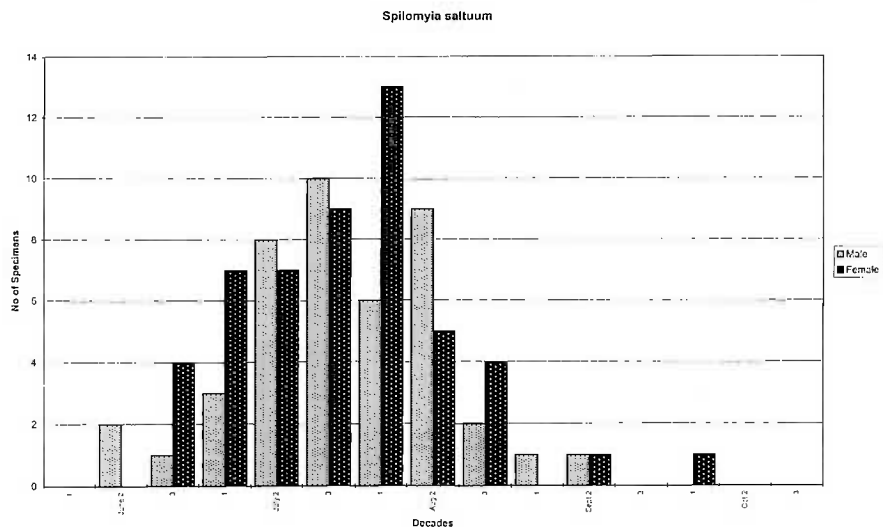


Fig. 16. Flight period of *Spilomyia saltuum*.

ther north also occurring in thermophilous *Quercus pubescens* forest. It was also found in a *Populus* plantation flying from tree to tree, sometimes settling on tree trunks or *Populus* foliage. According to SPEIGHT (1997) it may be seen drinking at the margins of forest brooks in direct sunlight and males can be seen hovering at 1–3 m at the edge of large open areas within the forest. Visiting flowers mainly in the morning. They also fly through the vegetation i.e., fern, along sunny tracks in forests.

Flowers visited: Umbelliferae and *Eryngium* sp., *Scabiosa* sp., and *Solidago* sp.  
Flight period: Fig. 16.

Comments – The species is mostly Mediterranean, but also with some records north of the Alps. The two specimens from the Netherlands are regarded as migratory specimens (BARENDREGT *et al.*, in press), see also the comments under *S. manicata*. The records north of the Alps are nearly all old and probably the species can be regarded as extinct there. Below the 45th parallel the species occurs frequently. In Spain, however, *S. saltuum* is very rare, and the many old records in Italy suggest a decrease in populations.

Specimens from eastern Turkey tend to have greater bare areas on the wings than European specimens.

*S. saltuum* has been reported from northern Europe in the past (NIELSEN, 1990; HEDSTRÖM, 1990; VERLINDEN, 1991; BARENDREGT, 1991; TORP, 1994; HÖGMO & ÖSTRAND, 1995). All these specimens were studied and only one specimen, from the Netherlands (BARENDREGT *et al.*, in press), turned out to be *S. saltuum*, all the other specimens belong to *S. manicata*.

#### *Spilomyia triangulata* sp.n.

Type material – Holotype (in perfect condition): Turkey: Turkye, Hakkäri, Suvarihalil pas nr., the Habero Deresi, W. side 1250 m, 10–VIII–1983, 1 ♂, leg J.A.W. LUCAS coll. ZMA.

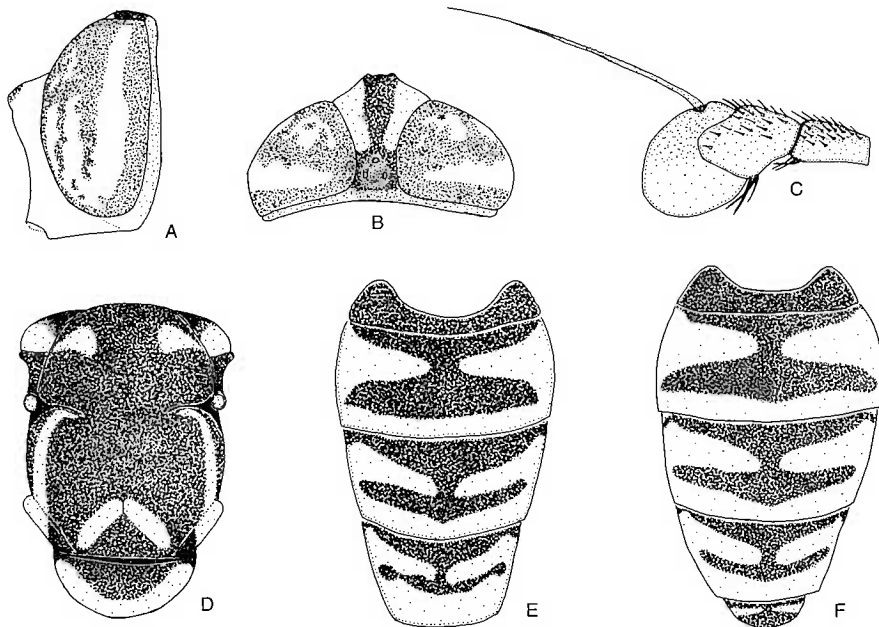


Fig. 17. *Spilomyia triangulata* sp.n. – A. Face lateral view, ♂ paratype (former Soviet Union). – B. Head dorsal view, ♀ paratype (Yugoslavia). – C. antennae mesal view, ♂ holotype (Turkey). – D. Mesonotum and scutellum, ♂ paratype (Greece). – E. Abdomen, ♂ holotype (Turkey). – F. Abdomen, ♀ paratype (former Soviet Union).

Paratypes: Turkey Erzurum, Ovit Geçidi S. side, 1400 m, 18.VII. 1989, 1 ♂, leg & coll. JLR; Senkaya, Erzurum, 9.VII.1992, leg R. Hayat, 1 ♂, coll. AUE; Greece: Greece, Gardiki Om., 1000–1200 m, 38°50' N 21°58' O, 1–4–VIII.1963, exc. Leiden, 1 ♂, coll. JLR; ibid, 2 ♂, coll. RMNH; Greece Karpenission 2000 ft. 20.VII.76 leg K. GUICHARD, 1 ♀, coll. BMNH; former Soviet Union: [Gelendzjik] [Tsjernom.] [G]. 25–VII.08, leg. [N. VOROBEV], 1 ♂, 1 ♀, coll. ZIAS; [Gelendzjik] 10.VIII.908, leg. [VOROBEV], 1 ♂, coll. ZIAS; [Gelendzjik] [Gern.] 10.VIII.908 leg. [VOROBEV], 1 ♀, coll. ZIAS; former Yugoslavia: Muć. D, Nevak, 5.VI.47, 1 ♀, coll. RMNH; 995 A. Makedonija, Konjsko-Kozew, 13.VI.1975, 1 ♀, leg. & coll. AVN; Horokialia Makadonia 28–VIII–1958 leg GLUMAC, Digital Photo: ex No 49 1 ♂, coll ZIAS; France: France, 8.VIII.1993, La Gorge Desous, Termignon Savoie, at 328\3344 leg. W. RENEMA, 1 ♂, coll. JSU.

#### Description.

Similar to *S. digitata*.

♂ – Length: 12.3–15.5 mm ( $\bar{x}$  13.9), wing 8.8–11.2 mm ( $\bar{x}$  10.6).

Head: Face Fig. 17A. Eyes with brown spots less developed than in *S. digitata*. Antennae Fig. 17C.

Thorax: Mesonotum and scutellum black with yellow spots (Fig. 17D). Hairs on posterior margin of scutellum about  $\frac{1}{7}$  as long as scutellum in medial line. Other hairs as in *S. digitata*.

Wings: Costal setulae black, on epaulet sometimes mixed yellow and black. Bare areas less extended; a band along posterior  $\frac{1}{3}$ – $\frac{2}{5}$  of first basal cell,  $\frac{2}{5}$ – $\frac{2}{3}$  of second basal cell, a small band along anterior  $\frac{2}{5}$ – $\frac{3}{5}$  and posterior  $\frac{1}{5}$  of anal cell and anterior  $\frac{2}{5}$ – $\frac{1}{2}$  of alula.

Tab. 1. Characters distinguishing *S. digitata*, *S. maroccana* and *S. triangulata*.

	<i>S. digitata</i>	<i>S. maroccana</i>	<i>S. triangulata</i>
Brown eye pattern	Most extended, anterior brown band along eye margin connected with medial band	Less extended, anterior and medial bands not connected	Less extended, however, anterior and medial bands often connected
♀: black line on frons	Broad, tapering gradually towards ocellus	Smaller, tapering towards ocellus, not reaching anterior ocellus	Broad, tapering gradually towards ocellus
Notopleuron	Black, seldom with a small yellow spot	Yellow	Yellow
Yellow stripe from postalar callus to transverse suture	Ending with a curve along the transverse suture	Not reaching the transverse suture	Ending with a sharp curve along the transverse suture
Inverted v	With rounded corners	With rounded corners	With sharp corners, triangulate
Wing microtrichia	Bare areas on first and second basal cell, on anal cell and alula	Bare areas less extended than in <i>S. digitata</i> and <i>S. triangulata</i>	Bare areas less extended than in <i>S. digitata</i>
Colour of front tarsus	Black, last tarsomere at least apical half yellow	Yellow, first three segments darkened, sometimes black	As in <i>S. digitata</i> , last tarsomere sometimes entirely black
Colour of front tibia	Black on apical $1/2-1/4$	Yellow, at most with a black spot on apical $1/8$	As in <i>S. digitata</i>
Spur on hind femur	Simple	More robust than in <i>S. digitata</i>	More robust than in <i>S. digitata</i>
Colour of abdominal bands	Orange-yellow	Bright yellow	Bright yellow
Bands on tergite IV	Posterior band strongly curved. Anterior and posterior band touching along either side of medial line, forming three separate black spots	Posterior band straight	Posterior band straight

Legs: Hind femur without dark stripe on ventral side. Spur on hind femur more robust than in *S. digitata*.

Abdomen: Fig. 17E. Abdominal bands yellow coloured. Hairs on tergites III and IV very short and appressed.

♀ – Length: 11.9–14.3 mm ( $\bar{x}$  13.2), wing 9.8–12.0 mm ( $\bar{x}$  10.9).

Differing from male, besides the usual sexual dimorphism, in following characteristics.

Head: Frons Fig. 17B.

Thorax: Pleura sometimes with a small rounded yellow spot on katepimeron, otherwise black.

Wings: Costal setulae black, on epaulet more than half yellow.

Abdomen: Fig. 17F.

Other material – *S. digitata* has been reported from Rumania (BRĂDESCU, 1972) and Yugoslavia (PECK, 1988) but it is more likely that these records concern *S. triangulata*, because *S. digitata* and *S. triangulata* have an allopatric distribution. One specimen of *S. triangulata* is reported from France, which lies within the known range of *S. digitata*.

Habitat and behaviour – In France, *S. triangulata* was observed on sunny, flower-rich alpine meadows with small springs, in coniferous forest, and settled on leaves near ground level. In Turkey this species was caught on flower-rich meadows and pastures at an altitude of 1700–1800 m.

Comments – The three species *S. digitata*, *S. maroccana* and *S. triangulata* are closely related and can be separated from each other by the characteristics given in Tab. 1. They have an allopatric distribution. *S. digitata* occurs in the west European part of the Mediterranean area, *S. triangulata* in the east European part and *S. maroccana* in the African part. There is however one specimen of *S. triangulata* known from France. This latter record may have a similar explanation to that of the record of *S. saltuum* from the Netherlands.



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