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JINDRA DUŠEK and PAVEL LÁSKA

**Descriptions of five new European species of the genus *Metasyrphus*
(Diptera, Syrphidae), with notes on variation within the species**

ABSTRACT

The genus *Metasyrphus* Matsumura, 1917 is characterized in detail. The results of studying the variability are presented; correlations between some colour characters have been found. The description of the species *M. luniger* (Meigen, 1822) is presented as a standard for comparison. Five new species of the subgenus *Metasyrphus* s. str.: *M. vandergooti* and *M. lambecki* from Corsica, *M. borealis* and *M. abiskoensis* from northern Fennoscandia and *M. tirolensis* from the Alps are described. The male terminalia are described and illustrated in all species.

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**Descriptions of five new European species of the genus *Metasyrphus*
(Diptera, Syrphidae), with notes on variation within the species**

JINDRA DUŠEK and PAVEL LÁSKA

Institute of Applied Entomology, University of Agriculture, Brno
and Plant Protection Laboratory, Vegetable Research Institute, Olomouc

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Descriptions of five new European species of the genus *Metasyrphus* MATSUMURA ascertained during our study of the genus are given. Since the species of the genus *Metasyrphus* resemble each other closely, before the species are described a detailed description of the genus and nominate subgenus is presented, including a number of characters which may be repeated in individual descriptions. Similarly, a detailed description of the species *Metasyrphus luniger* (MEIGEN) precedes descriptions of new species. It is one of the most common and largely distributed European species and the newly described species resemble it closely. Therefore, *M. luniger* is used as a standard and in the descriptions of the new species particular attention is paid to the characters by which the new species differ from *M. luniger*. We have also included a section concerning variability, which is important for understanding the values of the individual characters described.

Although the genus *Metasyrphus* was described as early as 1917, its present state is relatively new, dating back to 1950, when FLUKE classified the central group of the subfamily *Syrphinae* according to the genitalia. The species presently belonging to the genus *Metasyrphus* had been well classified and characterized as a group of species without formal designation by LUNDBECK (1916). A world review of the species of the genus *Metasyrphus* is given by VOCKEROTH (1969).

Genus *Metasyrphus* MATSUMURA, 1917

Metasyrphus MATSUMURA in MATSUMURA et ADACHI, 1917 : 147.

Type-species: *Syrphus corollae* FABRICIUS, 1794 (original designation).

Posthosyrphus ENDERLEIN, 1938 : 204.

Type-species: *Syrphus americanus* WIEDEMANN, 1830 (original designation).

— Mostly medium sized flies. Male holoptic, eye practically bare, at most with minute scattered hairs, more apparent in male, but long maximally 50 μ . Eye with facets rather larger, particularly above, rarely with an area of distinctly and uniformly enlarged facets. Face not prolonged with well developed, mostly rounded tubercle, yellow, to brownish often with dark spots above the antennae and with dark tubercle, sometimes with dark oral margin. Vertical triangle black with long black hairs. Frons above the antennae with long black hairs except a small area immediately above the antennal base. Somewhat shorter hairs continue along the antennae to the mouth. Hairs in lower half of face black, pale or mixed. Postocular orbits bearing long pale hairs, some black hairs mostly intermingled in the upper

part near vertical triangle. Antenna with segments 1 and 2 together about as long or shorter than segment 3. Black hairs on the apical margin of segment 1 reaching on the external side of the antenna the apical half of segment 2.

Mesonotum black, shining or subshining, in lighter specimens obscurely brownish laterally. Pleural part black, margins of pleuron and postalar calli sometimes also obscurely brownish. Mesonotum covered above by pale to brownish hairs. Anterior flat portion of mesopleuron without long hairs. Upper and lower sternopleural hair patches moderately separated or narrowly joined posteriorly (see VOCKEROTH, 1969), anterior part of sternopleuron without hairs. Metasternum hairy or bare. Scutellum yellow, in darker specimens rather metallic brown, dull, with black, pale or mixed hairs. Subscutellar fringe complete. Lower lobe of squama without long hairs on upper surface. Wing membrane covered with dense microtrichia, basal part of wing usually bare, rarely whole of basal half of wing bare. Wing membrane outside marginal veins broad and undulated (in Palaearctic and Nearctic species). Legs yellow to brownish, usually with at least the base of femora darker, brown to black. Hind tibia sometimes dark in the middle, upper side of tarsus partially segment 4 being darkest, followed by 3, 2 and 5, segment 1 being almost as light as tibia. Segment 5 of hind tarsus as dark as segment 3 or 4. Legs covered by short adjacent hairs and by long hairs situated on the posteroventral side of front and mid femora and more or less scattered on the anteroventral side of hind femur. Short hairs on front and mid legs pale or with black hairs intermingled, on hind leg mainly black except at base of femur.

Abdomen oval, rather flat, distinctly margined on sides. Dorsum black with a pair of yellow spots on tergite 2 (in Palaearctic and Nearctic species) and with pair of yellow spots or with yellow band on each of tergites 3 and 4. Hind margin of tergite 4 yellow, tergite 5 yellow with median black spot sometimes reaching lateral sides. In dark specimens the yellow colour may be reduced, in extreme cases all tergites may be completely black. Dark spots on sternites varying in shape and extense, in extreme cases absent or occupying whole sternites. Hairs around abdominal margin, except tergite 1 and half of tergite 2, black and mostly posterolaterally directed. Venter covered partly with short hairs, partly with fine long hairs situated in the middle of sternites 1 and 2. Similar hairs present on sternite 3, somewhat shorter.

Male terminalia. Hypandrium in frontal view as broad in upper part as in lower part, more or less rectangular, rarely broader above. Hypandrium on sides characteristically wrinkled. Lingula indistinct or absent.

Female. Dichoptic, facets somewhat smaller than in male. Vertex with hairs shorter and less dense, frons with hairs shorter and face with hairs somewhat shorter, than in male. Postocular orbits much broader than in male. Wing membrane generally with microtrichia more reduced. Spots or bands on dorsum usually narrower with greater tendency to reach side margin than in male of the same species. Colour of hind femur more variable than in male.

Notes on variation within the species

The variability of the characters generally used for identification of the species of the genus *Metasyrphus* was examined and evaluated in 145 speci-

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mens of *M. luniger* (75 ♂♂, 70 ♀♀), the majority of which (73 ♂♂, 64 ♀♀) originated from various localities in Czechoslovakia. Most of them (53 ♂♂, 52 ♀♀) were collected as adults, others (20 ♂♂, 12 ♀♀) were bred from immature material collected in the field. The rest of the material originated from other European countries (England, Poland, U.S.S.R.). The angle of eyes was measured also in additional specimens collected in the field. Smaller series of the common species [*M. corollae* (FABRICIUS) and *M. latifasciatus* (MACQUART)] were also evaluated.

The analysis has shown that numerous characters, especially colour, are dependent on the season of the year when specimens are collected. Generally, the adults collected in summer have lighter coloration than those collected in spring. This seasonal fluctuation depends primarily on the temperatures at which the puparium is developing; this is also confirmed by preliminary results of the experiments we have been initiating in this respect. Darker specimens develop at lower temperatures, while at higher temperatures lighter ones develop. One of the characters sensitive to the developmental conditions is either separation or fusion of yellow spots on tergite 2 with a margin of the abdomen. We have classified all the specimens according to this character, specimens with separated spots marked A, those with the spots on tergite 2 reaching a margin B, and studied correlations between this character and other characters. The colour of the spots above the antennae, a tubercle, upper oral margin, extent of dark colour of legs, size (eventually mutual connection or confluence of yellow spots on the tergites and size of dark spots on the sternites) are in evident correlation with the character mentioned above.

In *M. luniger*, e.g., as many as 89% males and 94% females of specimens A had black or at least brown spots above the antennae, while only 45% males and 83% females of specimens B were thus marked. A darker oral margin occurred only in extreme specimens A. Black or dark colour on the front femur occupied 1/3 or more of the femur length in 41% females of *M. luniger* of type A, but only in 4% females of type B. Connection or confluence of yellow spots on tergites 3 and 4 was relatively rare in *M. luniger* and mainly occurred in the lightest specimens B.

The colour of hairs on the face, highly variable in *M. luniger*, was not in such distinct correlation. Only 23% males of type A had all the hairs on the face exclusively pale and 27% mostly dark (the rest of the cases represented transitive forms); in the males of type B the proportion of specimens with pale face hairs increased only up to 32%, and the proportion of those with dark face hairs decreased only to 21%.

The above mentioned correlations show that during practical identification the coloration of a specimen should be considered as a whole. For distinguishing the species *M. luniger* and *M. latifasciatus* (if, however, other more reliable characters are not used) it is possible to use the character "mutual separation or connection of yellow spots on tergites 3 and 4", if taking into account the fact that in generally light specimens B the spots may be somewhat connected even in *M. luniger* and, on the contrary, in very dark specimens A the spots may be separated also in *M. latifasciatus*.

Similarly, in our descriptions of the new species which are mostly described according to dark or extremely dark specimens of type A, it is necessary to take into account the fact that generally lighter colouring, especially

the face, scutellum, legs and antennae, can be expected in the specimens of type B of the same species.

Bred specimens, mostly representing extreme forms B, are a sample probably due to the fact that laboratory temperatures are on average higher than those in the open field (in moderate and cold zones). Some specimens with a lower frequency of tubercle, imperfectly strained and smaller anterior angle of approximation of eyes in males often occur in the rearings. Similar defects in specimens may also occur under field conditions, but they are not found in collections of adults in the field because of their inability to fly and because of their short life.

Some characters are dependent on rearing conditions, e.g. the general size. The so-called "starvation forms" seem to have tendency to a relatively narrower abdomen, relatively shorter wings and shorter last segment of antenna, but this impression has not been supported by sufficient material.

Variability of the anterior angle of approximation of the eyes is shown on Fig. 1. The angle was measured at vertical view on the sutural eyes in the anterior part. The causes of the variability of this angle have not been known. They may be related to the general suitability of conditions during the whole development in the following respect: the more optimal the conditions are (optimal temperature, humidity, sufficient number of specimens), the larger the angle is. On average the bred specimens had a smaller angle which may be connected with poor breeding conditions, but also with presence of less viable specimens in the broods, as mentioned above.

Subgenera of the genus *Metasyrphus*

In the subdivision of the genus *Metasyrphus* we accept the classification of BROTH (1969) and distinguish the nominate subgenus *Metasyrphus* and the subgenus *Lapposyrphus* DUŠEK et LÁSKA, 1967. All described species in this subgenus belong to the subgenus *Metasyrphus* s. str.

Subgenus *Metasyrphus* s. str.

Antennum hairy. Vein r_{4+5} dipped only moderately. Postocular orbits broad or narrow, but not so narrow as in *Lapposyrphus*. Terminalia. Hypopygium not very large — measure of hypandrium 560–700 μ [except in *M. corollae* (FABR.) with terminalia en-

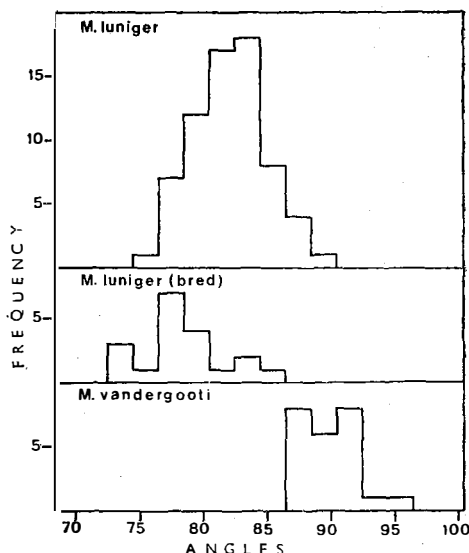


Fig. 1: Frequency diagram for anterior angle of approximation of eyes in males of *M. luniger* and *M. vanderghooti* (angle interval 2°). Explanations: Above — collected specimens of *M. luniger*; Middle — specimens of *M. luniger* bred in laboratory; Below — collected specimens of *M. vanderghooti*.

larged]. Epandrium considerably narrower than the distinct little teeth on the upper tooth slightly s-

Metasyrphus

(Plates I–V, * Fig. 1)

Syrphus luniger MEIGEN, 1822

Metasyrphus luniger: FLUKER, 1895

Male. Eye bare. Vertex with angle of approximation of eyes completely pale or with small tubercle usually black. Antenna pale, darkened only basally. Part of face mostly pale. Hairs. Postocular orbits reaching in the middle of the face with segment 3 elongated, brown, lower part yellow, inserted at 1/3 length.

Mesonotum shining, black hairs present in part. Bare about: basal 2/3 to whole of areas on basal part of of 1A, some bands on as 1/4 of the width of concentrated in apical Band of microtrichia, trichia and reaching to broader than 1/3 of the by microtrichia, or on 1/4–1/2 of the front. The dark colour of him almost pale. Long hair pale, on the basal part dark specimens only.

Tergites rather dull, shining. Yellow spots on the side margin. Yellow reaching the side margin broadly reaching side connected (Fig. 37), except of the spots on tergites almost straight cut, but usually also distinctly broadened towards the

* The Plates I–V will be

that of the face, scutellum, legs and abdomen, can be expected in the specimens of type B of the same species.

The bred specimens, mostly representing extreme forms B, are a special example probably due to the fact that laboratory temperatures are on average higher than those in the open (at least in moderate and cold zones). Defective specimens with a lower facial tubercle, imperfectly strained wings and smaller anterior angle of approximation of eyes in males often appear in the rearings. Similar defective specimens may also occur under natural conditions, but they are not usually found in collections of adults in the field because of their inability to fly and because of their short life.

Certain characters are dependent on nutrition, e.g. the general size. The so called "starvation forms" seem to have a tendency to a relatively narrower abdomen, relatively shorter wings and somewhat shorter last segment of the antenna, but this impression has not been supported by sufficient significant material.

The variability of the anterior angle of approximation of the eyes is shown on a chart (Fig. 1). The angle was measured at vertical view on the sutura of the eyes in the anterior part. The causes of the variability of this angle have not been known. They may be related to the general suitability of conditions during the whole development in the following respect: the more suitable the conditions are (optimal temperature, humidity, sufficient nutrition), the larger the angle is. On average the bred specimens had a smaller angle which may be connected with poor breeding conditions, but also with the presence of less viable specimens in the broods, as mentioned above.

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Subgenus *Metasyrphus* s. str.

Metasternum hairy. Vein r_{4+5} dipped only moderately. Postocular orbits in males broad or narrow, but not so narrow as in *Lapposyrphus*.

Male terminalia. Hypopygium not very large — measure of hypandrium on average 560–700 μ [except in *M. corollae* (FABR.) with terminalia en-

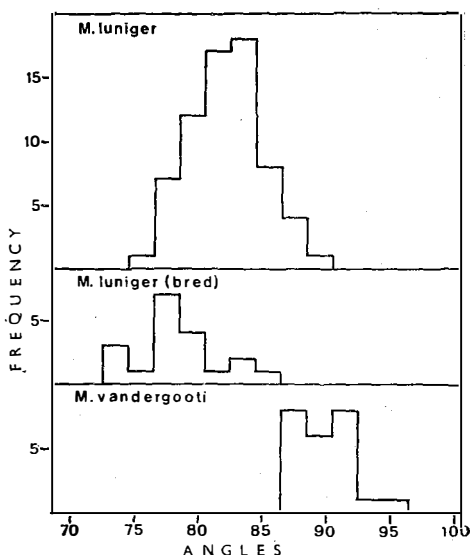


Fig. 1: Frequency diagram for anterior angle of approximation of eyes in males of *M. luniger* and *M. vanderghooti* (angle interval 2°). Explanations: Above — collected specimens of *M. luniger*; Middle — specimens of *M. luniger* bred in laboratory; Below — collected specimens of *M. vanderghooti*.

larged]. Epandrium rather well rounded. Paralobi oval in dorsal view, considerably narrowing and moderately beak-like curved. Aedeagus with distinct little teeth on mouth of the tubus. Teeth of pyxis rather distant, upper tooth slightly shorter and thicker.

Metasyrphus (Metasyrphus) luniger (MEIGEN)

(Plates I—V,* Figs. 2, 9, 15, 24, 29, 30, 36, 37, 45, 54, 61, 65, 66, 67, 68, 69)

Syrphus luniger MEIGEN, 1822 : 300.

Metasyrphus luniger: FLÜKE, 1949 : 41.

Male. Eye bare. Vertical triangle about as long as sutura of eyes. Anterior angle of approximation of eyes usually 77° — 86° , rarely 73° — 90° . Frons completely pale or with brown to black spots above the antennae. Facial tubercle usually black to brown, exceptionally in extreme light specimens pale, darkened only below. Oral margin pale, black or brown beneath tubercle, in extremely dark specimens rarely completely black. Hairs on the lower part of face mostly pale or pale and black, rarely with prevailing black hairs. Postocular orbits of medium width, grey dusted, dust sometimes reaching in the middle to the posterior ocelli on vertical triangle. Antenna with segment 3 elongate-ovate, upper $1/2$ — $3/4$ of the segment black to brown, lower part yellow to brown. Arista, somewhat shorter than antenna, inserted at $1/3$ length of the segment.

Mesonotum shining, scutellum with black hairs on disc, or at least some black hairs present in the centre. Wing membrane partially bare in the basal part. Bare about: basal $1/5$ of cell R_1 , upper margin of R_3 in basal $1/5$, basal $2/3$ to whole of first basal cell, $2/3$ — $9/10$ of second basal cell, small areas on basal part of discal and cubital cells, basal $1/5$ — $1/4$ and margins of $1A$, some bands on basal $1/4$ — $1/3$ of $2A$ and an area on alula as broad as $1/4$ of the width of the alula. On the second basal cell the microtrichia concentrated in apical part forming a dense patch in about apical $1/10$. Band of microtrichia, in the lower part of the cell, rising from apical microtrichia and reaching the basal $1/3$ — $1/5$ of the cell. The band usually not broader than $1/3$ of the width of the cell. Apical end completely covered by microtrichia, or one or two small areas near apical margin bare. Basal $1/4$ — $1/2$ of the front and mid femora and basal $2/3$ — $3/4$ of hind femur dark. The dark colour of hind femur often less intensive, exceptionally hind femur almost pale. Long hairs on the apical part of front femur black or black and pale, on the basal part pale at least on extreme base, blackish in extremely dark specimens only.

Tergites rather dull, only tergites 1 and 5 and margins of tergites 2—4 shining. Yellow spots on tergite 2 almost triangular, reaching or not reaching the side margin. Yellow spots on tergites 3 and 4 mostly separated, not reaching the side margin. Only in light specimens with spots on tergite 2 broadly reaching side margin; spots on tergites 3 and 4 sometimes narrowly connected (Fig. 37), exceptionally also reaching side margins. Upper margin of the spots on tergites 3 and 4 concave, lower margin convex, spots laterally almost straight cut, forming a distinct anterolateral corner and a less sharp but usually also distinct posterolateral corner. Medially the spots somewhat broadened towards the base and rounded. Tergite 5 yellow with a median

* The Plates I—V will be found at the end of this issue.

TABLE 1
Relative lengths of upper and lower teeth of the pyxis and difference between these lengths
in *Metasyrphus luniger* and *M. vandergooti*.

	Upper tooth	Lower tooth	Difference
	25	10	15
	24	10	14
	20	7	13
	20	7	13
	20	7	13
	19	6	13
	19	7	12
	19	7	12
	18	6	12
	20	9	11
	19	8	11
	19	8	11
	18	7	11
	19	9	10
	20	11	9
	21	13	8
\bar{x}	19.9	8.2	11.6
<i>M. vandergooti</i>	13	5	8
	12	5	7
	9	4.5	4.5
	10	6	4
\bar{x}	11	5.1	5.9

black spot, lateral margin yellow even if the black spot enlarged and covering almost whole of tergite. Dark spots on sternites mostly rounded or oval, exceptionally rather rectangular. Spot on sternite 1 small, rounded or oval, on sternite 2 larger mostly apparently rounded, on sternite 3 largest, mostly rather oval, on sternite 4 again smaller and rather narrower.

Male terminalia. Parameres in lower part with distinct but not very thick tooth. Head of pyxis rather regularly convex, about as high as broad. Teeth of pyxis relatively slender, usually of the same width, only exceptionally upper tooth thicker. Lower tooth longer, the rate of the length of the lower and upper teeth rather variable. These rates and differences between lengths of the teeth are apparent from Tab. 1.

Female. Dusted areas of frons broad, occupying mostly 2/3 of the width of frons or more, only in specimens from extreme localities sometimes less than 2/3. Frons above the antennae more frequently with black to brownish spots, less frequently pale. Microtrichia on average reduced more than in male. About 1/3 of the lower margin of R_3 and apical 1/3 of the first basal cell bare. Basal ends of R_5 , discal and cubital cells sometimes with microtrichia apparently less dense. A bare area usually present between apical area of microtrichia and the apical end of the second basal cell, microtrichia sometimes forming only an apical patch and narrow band along lower margin. Bare margin of cell 1A mostly broader and longer than in male. Bare

area on alula sometimes as broad as $1/2$ of the width of the alula. Front and mid femora partially dark, usually in basal $1/4$ — $1/3$, exceptionally at extreme base only. Hind femur either completely pale or almost pale, or with base or basal $1/5$ — $1/2$, exceptionally $3/4$, dark. Yellow spots on tergites somewhat narrower than in male. Black spots on sternites relatively broad, usually rather rounded, exceptionally narrow.

Length: body 8—12 mm, wing 7—10 mm.

Figured specimens: ♂, Slovakia or., Parkáš, iv. 1936 (Hoffer); 2 ♂♂, Slovakia, Vysoké Tatry, 2000 m, 2. viii. 1961 (Láska); 2 ♂♂, Slovakia or., Somotor, 14. v. 1965 (Moucha); ♂, Bohemia — without further data — (Bindner); ♂, Czechoslovakia, Eipel, 22. vi. 1934 (Špaček).

Metasyrphus (Metasyrphus) vandergooti sp. n.

(Plates I—V. Figs. 5, 16, 17, 21, 25, 38, 39, 40, 46, 52, 55, 63, 71, 72, 73, 74)

Male. Eye bare, anterior angle of approximation of eyes 87° — 95° (see Fig. 1), 90° on average. Facial tubercle slightly more asymmetrical in profile and face slightly more produced than in *M. luniger*. A distinct groove present between facial tubercle and oral margin (Fig. 5). Dark spots above the antennae absent. Facial tubercle brown to black. Oral margin dark beneath tubercle, but not continuously dark towards the eyes. Face in about 50% specimens pale haired, in the others with 1 to 5 (rarely more) black hairs on each side. Postocular orbits of rather varying width (Figs. 16 and 17) with hairs usually more dense and paler than in *M. luniger*.

Wings as in *M. luniger*. Legs similar as in *M. luniger*, $1/5$ — $1/3$ of front femur, $1/5$ — $1/2$ of mid femur and $1/2$ — $4/5$ of hind femur dark. If hind femur paler, the dark colour confined to lower margin. Hind tibia in about $1/3$ of specimens dark in the middle.

Tergites usually more slender than in *M. luniger*. Hairs on the margin in the apical half of the abdomen longer, more slender and more erect than in *M. luniger*. Length of the marginal hairs on tergite 4 usually 250—300 μ , sometimes reaching 340 μ , only in smaller specimens about 210 μ . Yellow spots on tergites 2—4 broad, sometimes broader than long (Figs. 38—40), separated in each pair and not reaching side margin, except in some specimens on tergite 2. Tergite 5 yellow with dark spot in the centre, lateral margin of the tergite continuously yellow. Dark spot on sternite 1 small, often less conspicuous, spots on sternites 2—4 usually rectangular, usually more extended and more angular than in typical *M. luniger* (Fig. 46). Spot on sternite 3 largest and most angular, spot on sternite 2 similar but usually somewhat smaller, spot on sternite 5 distinctly smaller and often rounded.

Male terminalia. Parameres with relatively small tooth below. Head of pyxis of rather irregular shape, with two distinct teeth. Upper tooth of pyxis considerably shorter than the lower tooth. Rates of lengths of upper and lower teeth and difference between these lengths are given in Tab. 1.

Length: body 8.4—11.6 mm, wing 7.4—9.6 mm.

Female. Frons in upper part slightly broader (on average) than in *M. luniger*. Dust spots on frons somewhat smaller than in *M. luniger*, occupying only about $2/3$ of the width of frons and narrowing more abruptly than in *M. luniger*. Dark spots above antennae absent, oral margin never continuously dark. Legs generally paler than in *M. luniger*, femora practically pale in $1/2$ of specimens. Front and mid femora dark in about basal $1/5$

or less, except in one specimen (1/4). Exceptionally 3/4 of hind femur dark, but not intensively. Abdomen broader than in male. Yellow spots on tergites broader than in *M. luniger*. Dark spots on sternites with tendency to be more angular than in *M. luniger*, in most specimens distinctly angular on sternite 3. Hairs on the abdominal margin in apical half distinctly more erect and somewhat longer than in *M. luniger*.

Length: body 8.8—14.4 mm, wing 7.4—9.8 mm.

Holotypè ♂: France, Corsica, Asco, Fôret de Stranciacone, 1400 m, 6. vii. 1967 (leg. V. S. van der Goot), length: body 11.6 mm, wing 9.4 mm, width: head 3.4 mm, abdomen 3.6 mm, angle of approximation of eyes 89°. Deposited in the Zoological Museum, Amsterdam.

Paratypes: all France, Corsica. Names in brackets indicate the collectors and the collections if not given otherwise. Paratypes are numbered from 1 to 36. Asco, 600—900 m, 5. vii. 1961 1 ♂ (leg. Lambeck, coll. Lucas — No. 1), 3. vii. 1961 1 ♂ (Lambeck — No. 2); Asco, Plateau de stagno, 1 400—1 700 m, 10. vii. 1967 2 ♂♂ (v. d. Goot — No. 3 and 4) and 1 ♀ (Lucas — No. 5); Asco, Fôret de Stranciacone, 1 400 m, 6. vii. 1967 1 ♂ (Lucas — No. 6) and 2 ♀♀ (Lucas — No. 7, v. d. Goot — No. 8); Asco, Stranciacone, 800—1 200 m, 4. vii. 1967 1 ♂ (v. d. Goot — No. 9) and 1 ♀ (Lucas — No. 10); Asco, Fôret de Carozzica, 800 m, 1 ♂ (v. d. Goot — No. 11); Mte Cinto, 1 500—2 000 m, 7. vii. 1964 2 ♂♂ (Lambeck, coll. v. d. Goot — No. 12 and 13), 7. vii. 1961 11 ♂♂ (Lambeck — No. 14—24), 1 200—1 800 m, 7. vii. 1961 2 ♂♂ (Lambeck — No. 25 and 26) and 1 ♀ (Lambeck — No. 27); Col de Vizzavone, 900—1 000 m, 9. vii. 1961 2 ♀♀ (Lambeck — No. 28 and 29), 1 000—1 150 m, 13. vii. 1967 1 ♂ (v. d. Goot — No. 30), 1 150 m, 17. vii. 1967 1 ♂ (Lucas — No. 31) and 1 ♀ (v. d. Goot — No. 32), 13. vii. 1967 1 ♀ (Lucas — No. 33), 14. vii. 1967 1 ♀ (v. d. Goot — No. 34), 19. vii. 1967 1 ♀ (v. d. Goot — No. 35); St. Florent, 10. v. 1963 1 ♀ (Lambeck — No. 36).

VAN DER GOOT (1961) noticed this new species without description and thus with other entomologists provided us with the material for our descriptions. The species has been found only in Corsica up to now, where it occurs together with *M. luniger*. This fact became evident from material obtained from Dutch entomologists. On the other hand, it is a rather variable species, so that the atypic individuals are difficult to distinguish from *M. luniger* and in some cases they are suspected of being hybrids. The species was caught at high altitudes with the exception of one specimen.

Differential diagnosis. Similar to *M. luniger* and *M. braueri* (EGGER) but distinguished by the longer and more erect marginal hairs in the apical half of the abdomen, by the distinct groove between the facial tubercle and the mouth and by further characters given in the description.

Metasyrphus (Metasyrphus) lambecki sp. n.

(Plates I—V, Figs. 3, 10, 18, 22, 26, 32, 41, 47, 59, 70)

Male. Vertical triangle slightly longer than suture of eyes. Anterior angle of approximation of eyes 92°. Facial tubercle symmetrical in profile, no distinct groove above the oral margin. Face yellow, spots above the antennae brown, tubercle black, oral margin broadly and continuously dark brown to black. Hairs on the lower half of face pale with black intermingled. Segment 3 of antenna rather rounded, dark brown in 4/5, small area close to base paler. Postocular orbits broader than in *M. luniger* (Fig. 18).

Mesonotum black, shining. Scutellum almost black basally, yellow apically, hairs on the disc black. Microtrichia covering the wing membrane in greater extent than in *M. luniger*. Apical half of wing completely haired including basal corners of R₅ and discal cells. Bare bands remaining along basal part of cell 2A, in basal part of cell 1A along veins confining this cell. About

basal $1/4$ of cell R_1 and basal $1/2-2/3$ of cell R_3 bare. About $2/3$ of the second basal cell haired, no bare area at the apical end of cell. Alula in middle with a semicircular bare area, as broad as $1/2$ of the width of alula. Basal $2/3$ of front and mid femora black, hind femur almost completely (about $6/7$) black. Front and mid tibiae with black spot at middle, about mid $1/3$ of hind tibia black. Tarsi brownish, particularly segments 2-4 dark brown on upper side. Long hairs on the lower side of front femur pale, except a row of black hairs in apical $2/3$.

Abdomen similar as in *M. luniger*, black, with yellow spots on tergites 2-4 separated from each other and from side margin. Yellow spots swollen at the inner end. More than $1/2$ of tergite 5 with yellow margin. In the centre of sternite 1 a small black rectangular spot, sternites 2-4 with broad black rectangular spots. Spot on sternite 5 in holotype less conspicuous due to translucent black ground colour (Fig. 43).

Male terminalia. Parameres with conspicuous tooth in lower part. Head of pyxis irregularly formed with distinct tubercle. Upper tooth very short, thick and blunt; lower tooth slender, long.

Holotype ♂: France, Corsica, Bonifacio, 23. iv. 1963 (leg. H. J. P. Lambeck). Length: body 7.8 mm, wing 6.8 mm, width: head 2.5 mm, abdomen 2.5 mm. Deposited in collection of Drs. H. J. P. Lambeck, Genetisch Instituut, Opaalweg 20, Utrecht. The holotype is an extreme dark form: summer specimens will be probably much lighter. The hairing of the holotype is greatly reduced. Since it is possible that the apparent sparsity of hairs may be due to abrasion, this character has been excluded in the description.

Differential diagnosis. Similar to *M. luniger* but distinguished from it by the broader postocular orbits, the less reduced microtrichia on the wing membrane and by the characteristic head of the pyxis bearing a robust upper tooth and distinct tubercle.

Metasyrphus (Metasyrphus) borealis sp. n.

(Plates I-V, Figs. 4, 42, 48, 57, 58, 64, 76, 77)

Male. Anterior angle of approximation of eyes $80^\circ-90^\circ$. Face in profile broadly concave between antennae and facial tubercle. Tubercle in profile distinctly asymmetrical, abruptly declining towards oral margin. Face pale, spots above antennae absent or light brown, facial tubercle dark, oral margin continuously black. Black hairs occur also in lower half of face among pale hairs. Postocular orbits somewhat broader than in *M. luniger*, with hairs more fine and less dense than in *M. luniger*. Segment 3 of antenna rather rounded, pale or brown to dark brown with pale base.

Mesonotum with whitish hairs. Wing often yellowish tinged in upper part, vein r_{4+5} relatively straighter. Microtrichia covering almost all wing membrane except a band in the middle of basal part of cell 2A, basal part of the first basal cell above vena spuria and an area on base of second basal cell. This area is about as long or shorter than the width of the cell. Front and mid femora in basal $1/2$ and hind femur in basal $2/3$ dark. Long hairs of front femur black also in basal $1/3$, but some paler hairs sometimes intermingled at base.

Yellow abdominal spots narrow, in specimens examined narrower than black cross-band separating them. Spots on tergites 3 and 4 separated each from other, with anterolateral corners approaching but not reaching lateral

margin. Generally the spots rather horizontally situated and less lunulate. Margin of tergite 5 continuously yellow. Spots on sternites somewhat more angular than in *M. abiskoensis*, but more oval than in *M. punctifer* (FREY).

Male terminalia. Parameres with half-moon-like tooth variable in size in lower part. Above tooth a further prominence apparent. Upper side of head of pyxis flat or concave. Upper tooth short, relatively blunt, abruptly sloping. Mouth of tubus with relatively thick spinules.

Holotype ♂: U.S.S.R., Kola peninsula, Ponoj (leg. Hellén). Length: body 8 mm, wing 6.6 mm, width: head 2.4 mm, abdomen 2.5 mm. Deposited in the Zoological Museum, Helsinki.

Paratype: ♂, U.S.S.R., Kola peninsula, Kusomen (leg. R. Frey). Deposited in the Zoological Museum, Helsinki.

Differential diagnosis. Similar to *M. luniger*, *M. punctifer* (FREY) and *M. lambecki*, from which it differs in the more extensive hairing of the wing membrane and in the form of the head of the pyxis, which is angular and has very thick upper and lower teeth.

Metasyrphus (Metasyrphus) abiskoensis sp. n.

(Plates I—V, Figs. 6, 11, 12, 19, 20, 27, 28, 33, 43, 44, 49, 50, 51, 56, 62, 78, 79)

Male. Vertical triangle relatively broad, broader than in *M. luniger* and *M. borealis* (Fig. 62). Anterior angle of approximation of eyes 87° — 95° . Face broad, broadly concave between antennae and facial tubercle in profile, facial tubercle asymmetrical in profile. Face pale, spots above antennae brown or absent, facial tubercle dark, oral margin broadly and continuously dark. Hairs in the lower half of face predominantly pale with more or less black hairs intermingled. Segment 3 of antenna rather rounded, dark brown except pale basal part (Fig. 20). Postocular orbits broad, broader than in *M. luniger* and also than in *M. borealis*.

Mesonotum black, shining, covered by hairs paler than in *M. luniger*. Basal part of scutellum slightly darkened, covered by black hairs in the centre and with some pale hairs on the margin. Microtrichia covering almost whole of wing except sometimes basal part of the first and second basal cells and a band along mid fold on cell 2A. Front, mid and hind femora dark in $1/3$ — $2/5$, $2/5$ — $1/2$ and $3/5$ — $2/3$ respectively. Long black hairs on front femur apparent also in basal $1/3$, but some pale hairs often intermingled.

Abdomen black, dull shining as in *M. luniger*. Yellow spots on tergite 3 with greater tendency to reach side margin with upper corners than with rounded lower corners. Yellow spots on tergites 3 and 4 distinctly separated from each other but approaching the sides of tergites. Lateral margin of tergite 5 continuously yellow. Spots on sternites rather rounded, circular or semicircular or oval in shape.

Male terminalia. Parameres in lower part with a long, very thick, regularly conical tooth. Head of pyxis elongate, about twice as broad as high, without apparent tubercles. Upper tooth very thick, as long as $1/2$ length of lower tooth or shorter.

Female. Vertex somewhat narrower than in *M. luniger*. Otherwise face as in *M. luniger*. Oral margin with tendency to be black. Microtrichia on membrane of wing about as in male. Front and mid femora in about $1/3$, hind in $1/4$ — $1/2$ dark. Yellow spots on tergites 3 and 4 narrower than in

male, semilunular, spots on sternites dark, more rounded than in *M. luniger*.
Length: body 7—9.4 mm, wing 6.6—7.5 mm.

Holotype ♂: Sweden, T. lpm., Abisko, 23. vi. 1951 (leg. J. R. Vockeroth). Length: body 8.8 mm, wing 6.8 mm, width: head 2.8 mm, abdomen 2.9 mm.

Paratypes: ♂, same locality data but collected 25. vi. 1951 (No. 1), ♀, same locality data but collected 27. vi. 1951 (No. 2).

Holotype and paratypes deposited in the Canadian National Collection, Ottawa.

Differential diagnosis. Very similar to *M. borealis*, from which it differs by the somewhat broader postocular orbits and the more elongate head of the pyxis.

Metasyrphus (Metasyrphus) tirolensis sp. n.

(Plates I—V, Figs. 7, 8, 13, 14, 23, 31, 34, 35, 53, 60, 75)

Male. Vertical triangle somewhat longer than sutura of eyes. Anterior angle of approximation of eyes 85° . Face broader than in *M. luniger*, facial tubercle in profile abruptly sloping towards oral margin. Between tubercle and oral margin a distinct groove is apparent. Face pale, spots above antennae only pale brownish, tubercle and oral margin broadly and continuously dark. Hairs in lower part of face pale with single black hairs intermingled. Segment 3 of antenna short, about as long as segments 1 and 2 together, pale brown, paler beneath. Postocular orbits broader than in *M. luniger*, but somewhat narrower than in *M. latifasciatus* (MACQUART), hairs on orbits pale only.

Scutellum brownish with black hairs (in lighter specimens the scutellum will normally be pale). Wing with membrane outside marginal veins broader than in *M. luniger*. Microtrichia on membrane similarly distributed as in *M. luniger*. Basal 1/2 of front and mid femora and basal 4/5 of hind femur dark, hind tibia with dark spot in the middle occupying 1/3—1/4 of the tibiae on the external side. Long hairs on base of front femur pale with black hairs intermingled.

Yellow spots on tergites 3 and 4 of characteristic shape (Fig. 34), rather oblique, separated each from other and from lateral margin. Tergite 5 with margins continuously yellow. Dark spots on sternites rather rectangular and relatively narrow.

Male terminalia. Parameres with large, thick tooth. Head of pyxis regularly rounded, somewhat broader than high. Upper tooth broad and short, 1/4 length of the lower tooth or less. Lower tooth relatively thick, rather blunt.

Female. Frons without dust spots similarly as in *M. latifasciatus*. Hairs on face somewhat shorter than in *M. luniger*, about as long as in *M. latifasciatus*. Oral margin brownish to broadly continuously black. Segment 3 of antenna about as in *M. luniger*, more elongate than in *M. latifasciatus*. Abdomen broadly oval, broader than in *M. luniger* and *M. latifasciatus*. Yellow spots similarly characteristic as in male (Fig. 35). Tergite 5 with lateral margins partially darkened. Dark spots on sternites 2—4 narrow, elongate, spot on sternite 5 not so much reduced as in *M. latifasciatus*.

Length: body 8.6—10.6 mm, wing 7.8—8.4 mm.

Holotype ♂: Austria, Tirol, Obergurgl, 1950 m, 18. vii. 1953 (leg. J. R. Vockeroth). Length: body 9.2 mm, wing 7.8 mm, width: head 3 mm, abdomen 3.3 mm. Deposited in Canadian National Collection, Ottawa.

Paratypes: 2 ♀♀, same locality data but dated 22. vii. 1953 (No. 1 and 2). Deposited in the Canadian National Collection, Ottawa.

Differential diagnosis. Distinguished from *M. luniger* and *M. vander-gooti* by its broader face and broader postocular orbits, the female by absence of dust spots on frons, and from *M. lambecki*, *M. borealis*, *M. abiskoensis* and *M. latifasciatus* by, among other characters, less intensive covering of the wing membrane with microtrichia. Male terminalia with evenly convex head of the pyxis, and very short, broad upper tooth and bluntly ended lower tooth.

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Authors' addresses: Ing. J. Dušek, CSc., Vysoká škola zemědělská v Brně, Zemědělská 1, 662 65 Brno; Ing. P. Láska, CSc., Výzkumný ústav zelinářský, 772 36 Olomouc, Czechoslovakia.

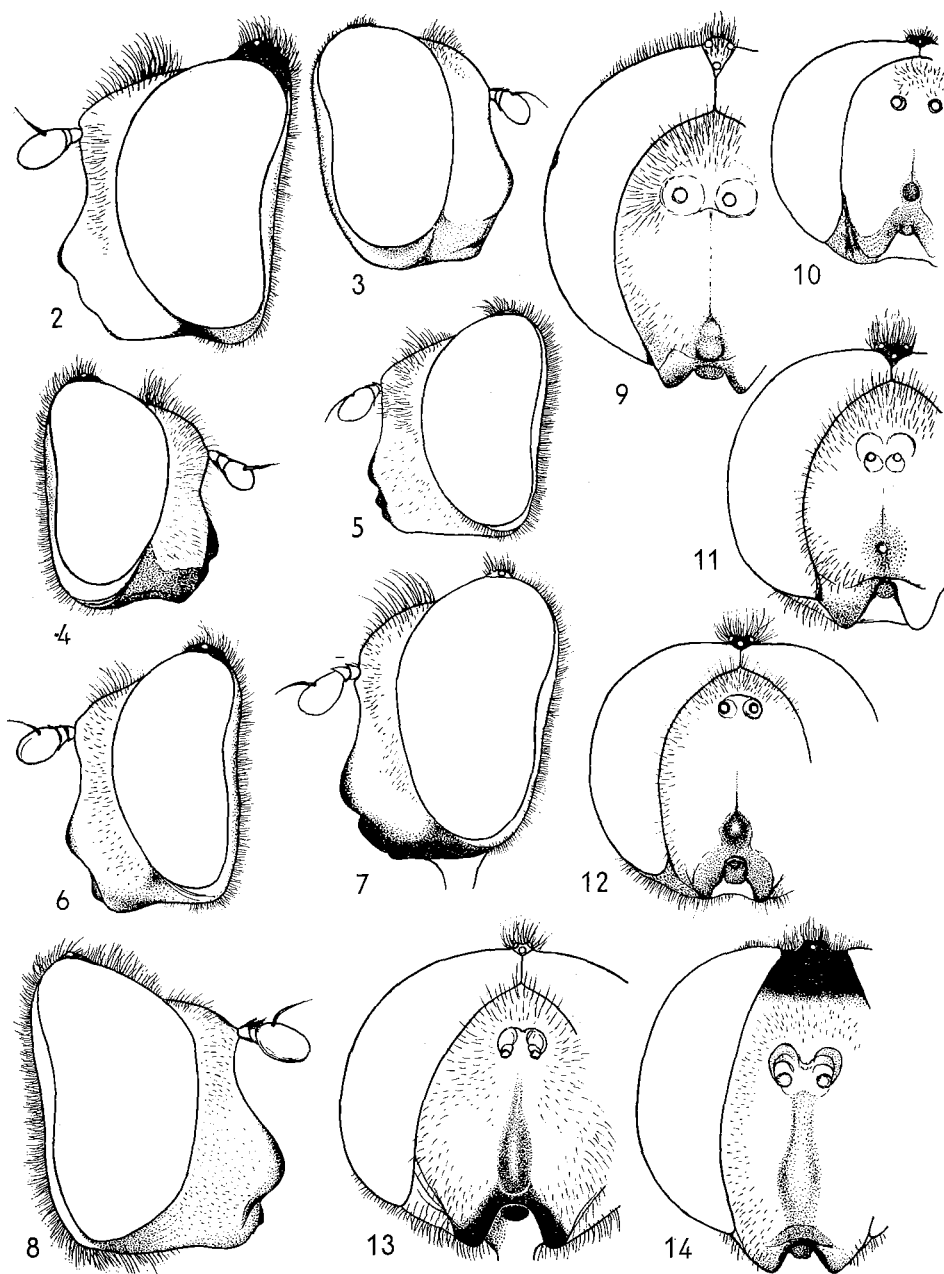


Plate I, Figs. 2-14: 2-8. Heads in profile: 2 - *Metasyrphus luniger* ♂ (Vysoké Tatry). 3 - *M. lambecki* ♂, holotype (Bonifacio). 4 - *M. borealis* ♂, holotype (Ponoi). 5 - *M. vanderghotti* ♂, holotype (Asco). 6 - *M. abiskoensis* ♂, holotype (Abisko). 7 - *M. tirolensis* ♂, holotype (Oberurgl). 8 - *M. tirolensis* ♀, paratype No 1 (Oberurgl). Figs. 9-14. Heads in frontal view: 9 - *M. luniger* ♂ (Vysoké Tatry). 10 - *M. lambecki* ♂, holotype (Bonifacio). 11 - *M. abiskoensis* ♂, paratype No 1 (Abisko). 12 - *M. abiskoensis* ♂, holotype (Abisko). 13 - *M. tirolensis* ♂, holotype (Oberurgl). 14 - *M. tirolensis* ♀, paratype No 1 (Oberurgl).

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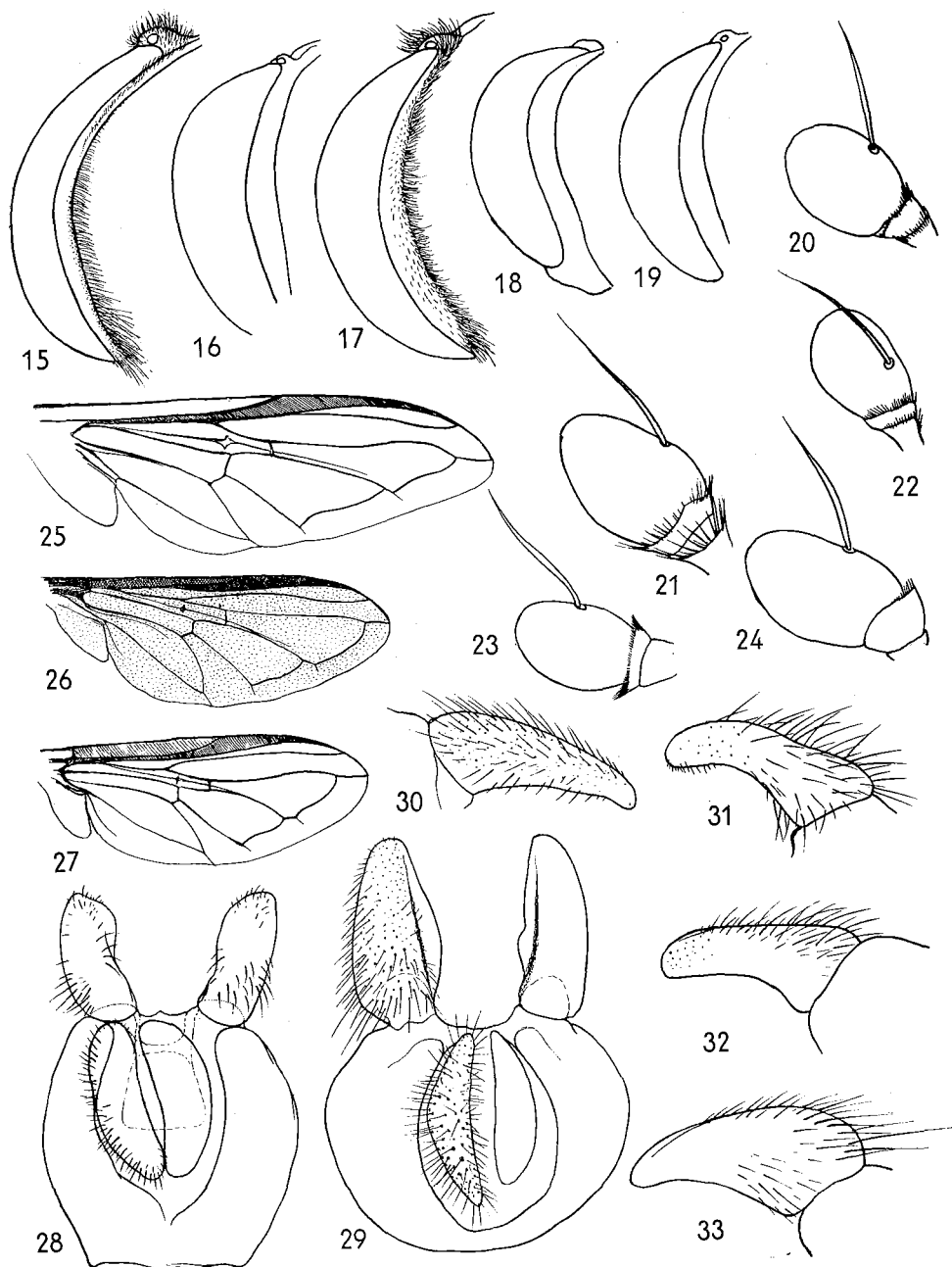


Plate II, Figs. 15-33: 15-19. Postocular orbits: 15 - *Metasyrphus luniger* ♂ (Vysoké Tatry). 16 - *M. vanderghotti* ♂, paratype No 15 (Mte Cinto). 17 - *M. vanderghotti* ♂, holotype (Asco). 18 - *M. lambecki* ♂, holotype (Bonifacio). 19 - *M. abiskoensis* ♂, holotype (Abisko). Figs. 20-24. Antennae: 20 - *M. abiskoensis* ♂, holotype (Abisko). 21 - *M. vanderghotti* ♂, holotype (Asco). 22 - *M. lambecki* ♂, holotype (Bonifacio). 23 - *M. tirolensis* ♂, holotype (Oberurgl). 24 - *M. luniger* ♂ (Vysoké Tatry). Figs. 25-27. Wings: 25 - *M. vanderghotti* ♂, holotype (Asco). 26 - *M. lambecki* ♂, holotype (Bonifacio). 27 - *M. abiskoensis* ♂, holotype (Abisko). Figs. 28-29. Epaneria, dorsal: 28 - *M. abiskoensis*, holotype (Abisko). 29 - *M. luniger* (Vysoké Tatry). Figs. 30-33. Paralobi, lateral: 30 - *M. luniger* (Vysoké Tatry). 31 - *M. tirolensis*, holotype (Oberurgl). 32 - *M. lambecki*, holotype (Bonifacio). 33 - *M. abiskoensis*, holotype (Abisko).

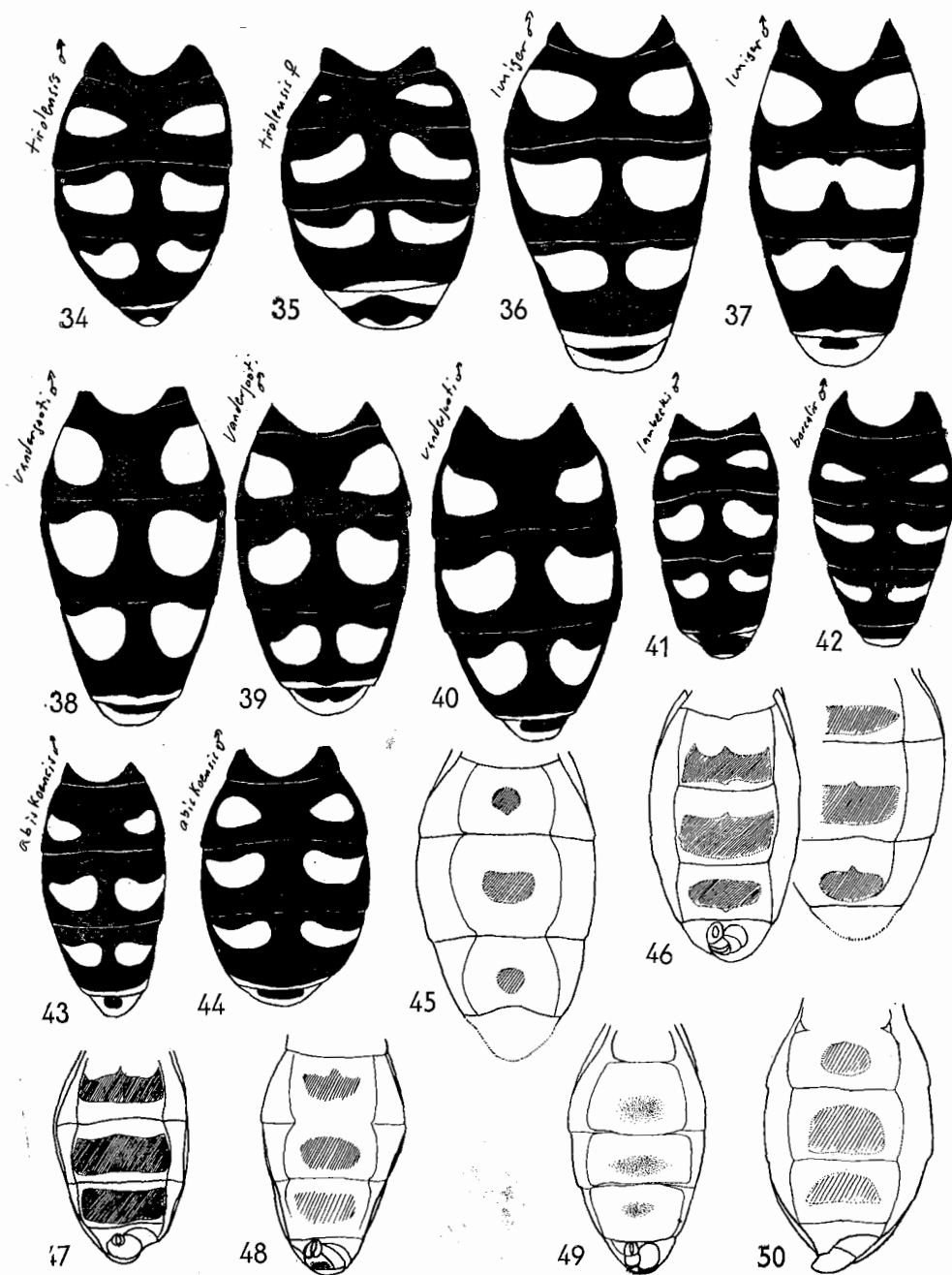


Plate III, Figs. 34–50: 34–44. Abdomens, dorsal: 34 – *Metasyrphus tirolensis* ♂, holotype (Oberurgl); 35 – *M. tirolensis* ♀, paratype No 1 (Oberurgl); 36 – *M. luniger* ♂ (Parkáň); 37 – *M. luniger* ♂ (Eipel); 38 – *M. vanderghotti* ♂, holotype (Asco); 39 – *M. vanderghotti* ♂, paratype No 1 (Asco); 40 – *M. vanderghotti* ♂, paratype No 2 (Asco); 41 – *M. lambecki* ♂, holotype (Bonifacio); 42 – *M. borealis* ♂, holotype (Ponoj); 43 – *M. abiskoensis* ♂, holotype (Abisko); 44 – *M. abiskoensis* ♂, paratype No 1 (Abisko). Figs. 45–50. Abdomines, ventral: 45 – *M. luniger* ♂ (Vysoké Tatry); 46 – *M. vanderghotti* ♂♂ (on the left paratype No 1, Asco; on the right holotype, Asco); 47 – *M. lambecki* ♂, holotype (Bonifacio); 48 – *M. borealis* ♂, holotype (Ponoj); 49 – *M. abiskoensis* ♂, holotype (Abisko); 50 – *M. abiskoensis* ♂, paratype No 1 (Abisko).

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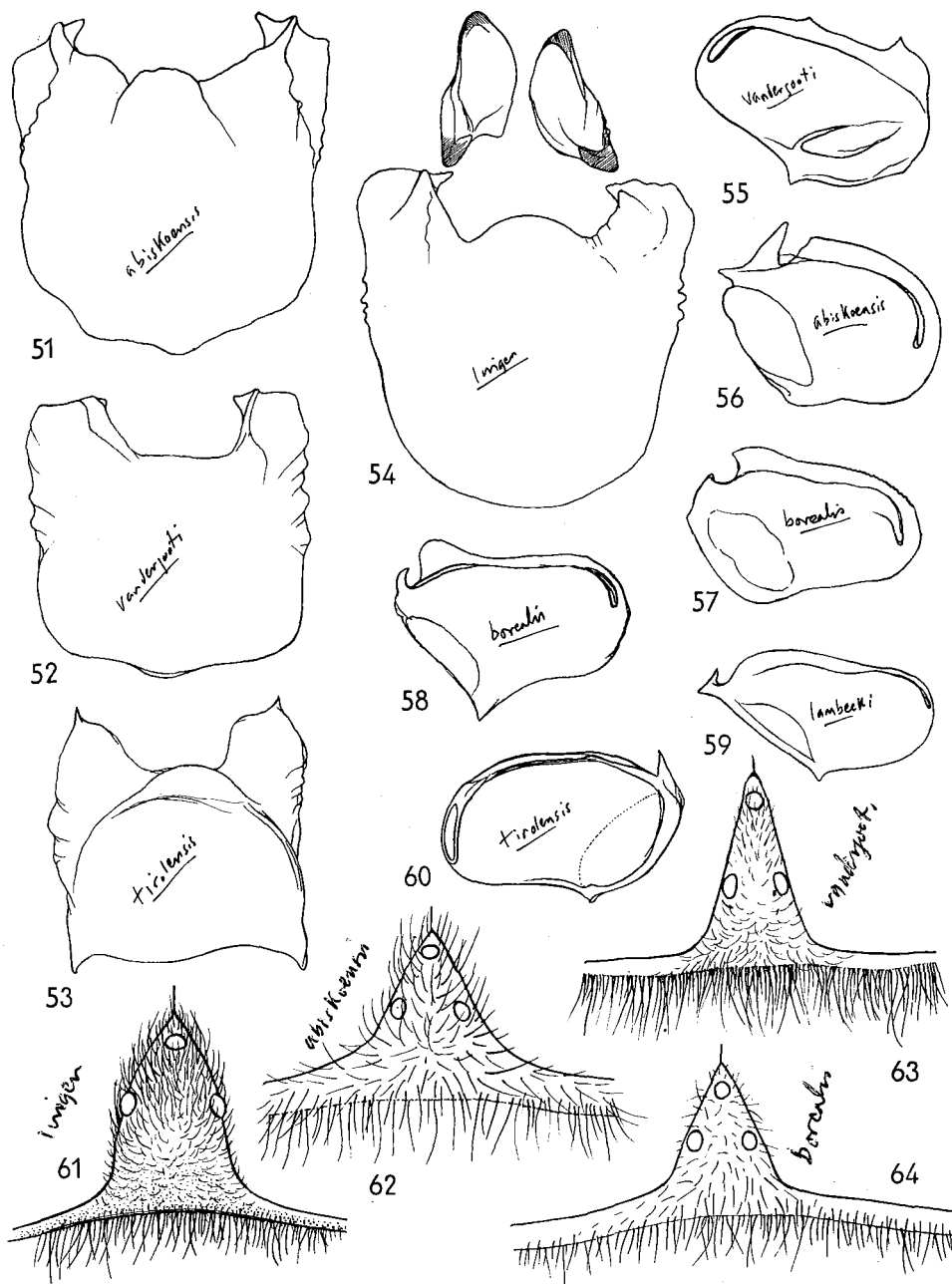


Plate IV, Figs. 51-64: 51-54. Hypandria, dorsal: 51 - *Matasyrphus abiskoensis*, holotype (Abisko). 52 - *M. vandergooti*, holotype (Asco). 53 - *M. tirolensis*, holotype (Oberurgl). 54 - *M. luniger* (Somator b). Figs. 55-60. Parameres of hypandria: 55 - *M. vandergooti*, holotype (Asco). 56 - *M. abiskoensis*, holotype (Abisko). 57 - *M. borealis*, holotype (Ponoj). 58 - *M. borealis*, paratype (Kusomen). 59 - *M. lambecki*, holotype (Bonifacio). 60 - *M. tirolensis*, holotype (Oberurgl). Figs. 61-64. Ocellar triangles: 61 - *M. luniger* (Vysoké Tatry). 62 - *M. abiskoensis*, holotype (Abisko). 63 - *M. vandergooti*, holotype (Asco). 64 - *M. borealis*, holotype (Ponoj).

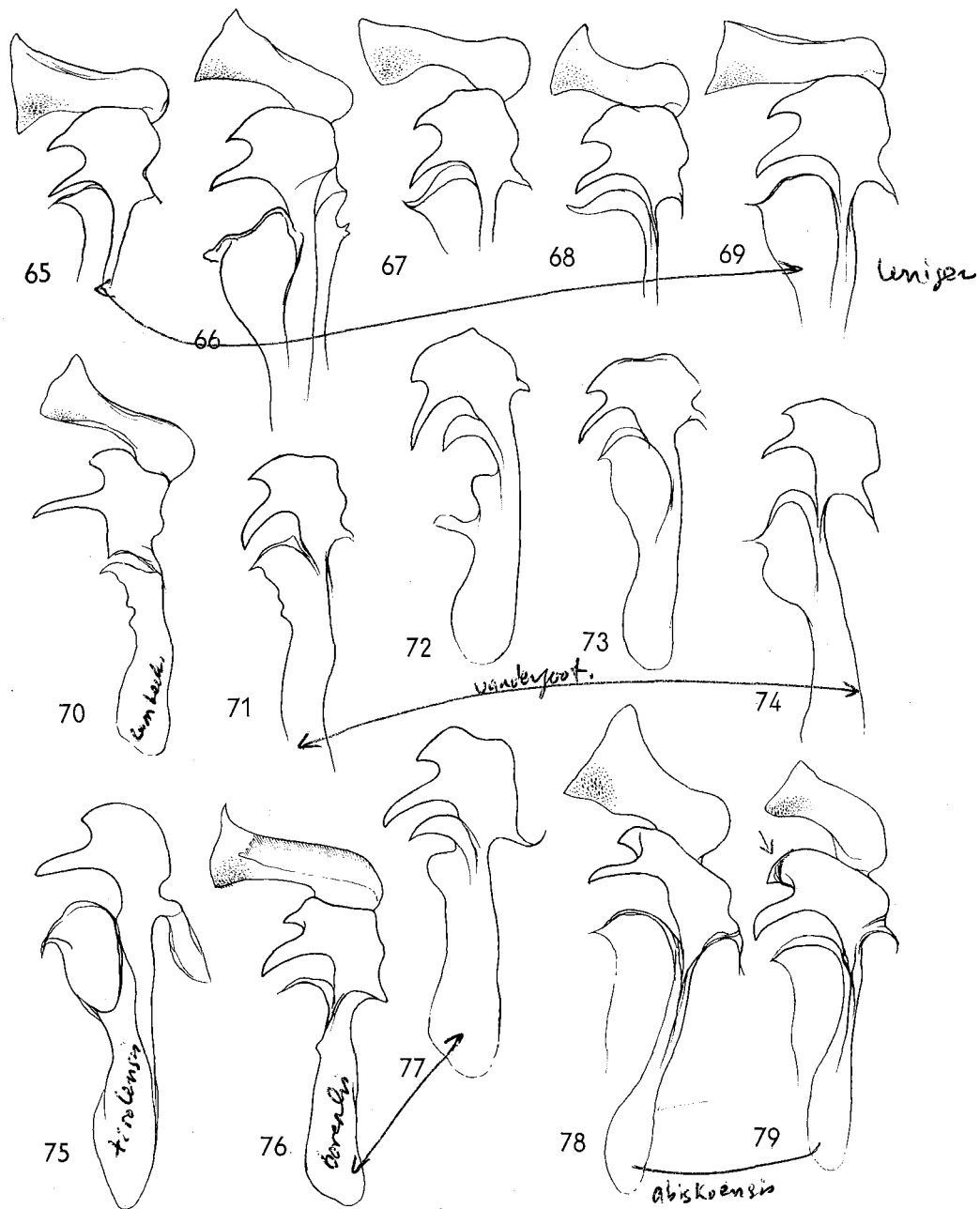


Plate V, Figs. 65–79: Aedeagi, lateral: Figs. 65–69. *Metasyrphus luniger*: 65 – Vysoké Tatry a. 66 – Par. kán. 67 – Vysoké Tatry b. 68 – Bohemia (Binder). 69 – Somotor b. 70 – *M. lambecki*, holotype (Bonifacio.) Figs. 71–74. *M. vandergooti*: 71 – Paratype No 15 (Mte Cinto). 72 – Paratype No 1 (Asco). 73 – Paratype No 15 (Mte Cinto). 74 – Paratype No 2 (Asco). 75 – Holotype (Asco). 75 – *M. tirolensis*, holotype (Oberurgl). 76 – *M. borealis*, holotype (Ponoj). 77 – *M. borealis*, paratype (Kusomen). 78 – *M. abiskoensis*, holotype (Abisko). 79 – *M. abiskoensis*, paratype No 1 (Abisko).