

Larvae and pupae of three European *Hybomitra* species (Diptera, Tabanidae)

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Horse flies, as with a great many other insects, are injurious as adults. Unlike most other insects of economic importance, comparatively little is known about their immature stages. Although 37 species of the genus *Hybomitra* Enderlein, 1922 are definitely known in Europe, descriptions of larvae of only 9 European species and pupae of only 7 species have been described up to the present time, sometimes inadequately at that.

Table of descriptions of the larvae and pupae of the genus
Hybomitra Enderlein, 1922 in Europe:

Hybomitra arpadii (Szilády, 1923):

Larva — Teskey (1969)

Pupa — Teskey (1969)

Hybomitra bimaculata (Macquart, 1826):

Larva — Chvála & Ježek (1969)

Pupa — Chvála & Ježek (1969)

Hybomitra bisignata (Jaenicke, 1886):= ? *bimaculata* (Macquart, 1826)

Larva — Surcouf (1924)

Pupa — Surcouf (1924)

Hybomitra ciureai (Séguy, 1937)

Larva — Chvála & Ježek (1969)

Pupa — Chvála & Ježek (1969)

Hybomitra distinguenda (Verrall, 1909):

Larva — Ivanišćuk (1970)

Hybomitra fulvicornis (Meigen, 1820):= ? *lundbecki* Lyneborg, 1959

Larva — Ivanišćuk (1970)

Hybomitra lapponica (Wahlberg, 1848):= ? *borealis* (Fabricius, 1781)

Larva — Soboleva (1971)

Hybomitra lundbecki Lyneborg, 1959:

Larva — Chvála & Ježek (1969), Lutta (1970)

Pupa — Chvála & Ježek (1969)

Hybomitra montana (Meigen, 1820):

Larva — Ivanišćuk (1970)

Hybomitra muehlfeldi (Brauer, 1880):

Larva — Chvála & Ježek (1969)

Pupa — Chvála & Ježek (1969)

Hybomitra solstitialis (Schiner, 1862):= ? *ciureai* (Séguy, 1937):

Larva — Ivanišček (1970)

Hybomitra tarandina (Linné, 1761):

Pupa — Portschinsky (1925)

Hybomitra tropica Panzer et auct.: = ? *bimaculata* (Macquart, 1826)

Larva — Stammer (1924), Skufin (1967), Ivanišček (1970)

Hybomitra tropica (Linné, 1758):

Larva — Chvála & Ježek (1969)

Pupa — Chvála & Ježek (1969)

Surcouf (1924) described the larva and pupa of *Hybomitra bisignata* (Jaenicke, 1886)= ? *bimaculata* (Macquart, 1826) and Portschinsky (1925) published the description of pupa of *Hybomitra tarandina* (Linné, 1761); unfortunately these records cannot be used for a key. Descriptions of the larvae and pupae of *Hybomitra tropica* Panzer et auct. (Stammer, 1924; Skufin, 1967) was discussed by Chvála & Ježek (1969).

Chvála & Ježek (1969) described and figured the larvae and pupae of 5 European species of the genus *Hybomitra* End. with the keys to mature larvae and pupae of known European Tabanid genera and *Hybomitra* species. Of great value are the descriptions of the larva and pupa of *H. arpadí* (Szil.) given by Teskey (1969) and the description of the larva of *H. distinguenda* (Verr.) given by Ivanišček (1970) but these descriptions are not up to my material entirely. Very important is description and figures of the larva of *Hybomitra lapponica* (Wahlberg, 1848)= ? *H. borealis* (Fabricius, 1781) published by Soboleva (1971). Mentioned species are included in the key to larvae of known European species of the genus *Hybomitra* compiled by Skufin (1973).

Generic key to larvae and pupae with the genus *Hybomitra* End. is given e.g. by Chvála & Ježek (1969).

Genus *Hybomitra* Enderlein, 1922

Last instar larvae of *Hybomitra* may be diagnosed as follows:

Mature larvae often much more than 20 mm. The coloration of living larvae orange, reddish, greenish or brownish. Mandibles with 7 to 9 teeth on apical part only. First segment of maxillary palps about twice longer than the second. Third antennal segment distinctly shorter than the second, canal in second segment continuous. Abdominal segments with four pairs of pseudopods. Anal segment elongated, without dorsolateral spots, siphon distinctly longer than one-third length of anal segment.

Pupae of *Hybomitra* may be diagnosed as follows:

Head shield and thorax with pigmentation, abdominal coloration different than thorax. Carinate tubercles undivided laterally. Antennal sheaths short, the tip not reaching the eclosian line or only just. Frons about as wide as high. Frontal tubercle with one seta. Sheath of proboscis short, sheath of labrum usually nearly reaching the lower margin of the sheath of maxillary palps. At least dorsolateral combs present on anal segment. Dorsal prongs of anal aster as a rule distinctly longer than the ventral ones.

Key to the last instar larvae of 8 European *Hybomitra* species

- 1 Anterior pubescent rings on meso- and metathorax conspicuous and uninterrupted; dorsal pseudopods with dark patches laterally 2
- Anterior pubescent rings on meso- and metathorax inconspicuous and interrupted, dorsal pseudopods without dark patches laterally 7
- 2 (1) Prothoracic ring with 5 indistinct longitudinal grooves rather without distinct spines. Glossae, lateral sclerite and configuration of pubescent patches on segments 6 and 7 as figured (Figs. 3, 7, 14) *H. arpadii* (Szil.)
- Not as above 3
- 3 (2) Prothoracic ring with 5 distinct longitudinal pubescent stripes, dark patches on abdominal segments narrow 4
- Prothoracic ring with only 3 distinct longitudinal pubescent stripes, dorsal stripes missing, dark patches on abdominal segments broad 6
- 4 (3) Pointed tooth of the lateral sclerite very long, occupying anterior third of it, index of the largest width of anterior spiracle to length as 1 : 1.5, the largest spines of preanal ridge shorter than the length of transverse cuticular rods of posterior spiracle *H. muehlfeldi* (Br.)
- Disagreeing with above 5
- 5 (4) Configuration of pubescent patches on segment 6 and 7 as figured (Fig. 56). The largest spines of preanal ridge (Fig. 51) about 1.5 times longer than the length of transverse cuticular rods of posterior spiracle (Fig. 52). Posterior ring on abdominal segment 7 averaging narrower (0.1–0.3 mm), postanal ring very narrowed ventrally *H. distinguenda* (Verr.)
- Configuration of pubescent patches on segment 6 and 7 as figured (Fig. 35). The largest spines of preanal ridge (Fig. 30) about 2.5 times longer than the length of transverse cuticular rods of posterior spiracle (Fig. 31). Posterior ring on abdominal segment 7 averaging broader (0.4 mm), postanal ring with the same width dorsally and ventrally ... *H. nitidifrons confiformis* Chv. & M.
- 6 (3) Rounded anterior tooth of lateral sclerite shorter than one-fifth of it, index of the largest width of anterior spiracle to length as 1 : 1.8. The largest spines of preanal ridge about five to six times longer than their breadth at base ... *H. bimaculata* (Macq.)
- Pointed anterior tooth of lateral sclerite about one-fifth of it, index of the largest width of anterior spiracle to length as 1 : 1. The largest spines of preanal ridge about three times longer than their breadth at base ... *H. ciureai* (Ség.)
- 7 (1) The largest spines of preanal ridge about as broad as or slightly broader at base than the width of cuticular rods. Postanal ring rather broad (the width to the length as 1 : 6) *H. lundbecki* Lyneb.
- The largest spines of preanal ridge about twice broader at base than transverse cuticular rods of posterior spiracle. Postanal ring rather narrow (the width to the length as 1 : 7) *H. tropica* (L.)

Key to pupae of 8 European Hybomitra species

- 1 Abdominal tergites with distinct two spinose fringes 7
 — Not as above 2
- 2 (1) One row of short and at base broad spines, with a pair of long and thin spines mesally on each abdominal tergite 3
 — Two close and irregular rows of spines (broad anteriorly, thin posteriorly) or only one fringe of thin spines on each abdominal tergite. All spines of equal length, without a pair of long and thin spines mesally *H. bimaculata* (Macq.)
- 3 (2) Dorsal part of head shield with distinct dark pigmentation which reaches to and between frontal tubercles, ventral part with distinct pigmentation on anterior margin to sheaths of maxillary palps. Sides of segment 7 with 15—20 spines *H. ciureai* (Ség.)
 — Dorsal and ventral part of head shield rather without distinct dark pigmentation restricted only to the area between sheaths of antennae ventrally. Sides of segment 7 with 24—30 spines 4
- 4 (3) Frontal carinae divided, head shield, mesonotal spiracle and anal aster as figured (Figs. 17, 18, 20, 21) *H. arpadi* (Szil.)
 — Frontal carinae mostly touching apically 5
- 5 (4) Head shield and mesonotal spiracle as figured (Figs. 38, 39). Lateral prongs of anal aster very prominent and on apical half upturned (Figs. 41, 42) *H. nitidifrons confiformis* Chv. & M.
 — Disagreeing with above 6
- 6 (5) Head shield usually without any irregular striae, frontal tubercles rounded and smooth, mesonotal spiracle smooth and without any fold *H. muehlfeldi* (Br.)
 — Head shield with some irregular striae (Fig. 59), frontal tubercles of another shape, with many small rugosities basally, mesonotal spiracle plain and smooth dorsally but with many strong folds and large pit ventrally (Fig. 60). Anal aster as figured (Figs. 62, 63) *H. distinguenda* (Verr.)
- 7 (1) Frontal carinae separated by a deep median cleft, frontal tubercles rather large and semiglobular, between and above them some areas with radiating rugosities, lateral prongs of anal aster almost straight *H. lundbecki* Lyneb.
 — Frontal carinae contiguous, frontal tubercles rather small and conical, between and above them a number of small tubercles. Lateral prongs of anal aster apparently turned upward, almost at right angles *H. tropica* (L.)

Hybomitra arpadi (Szilády, 1923)

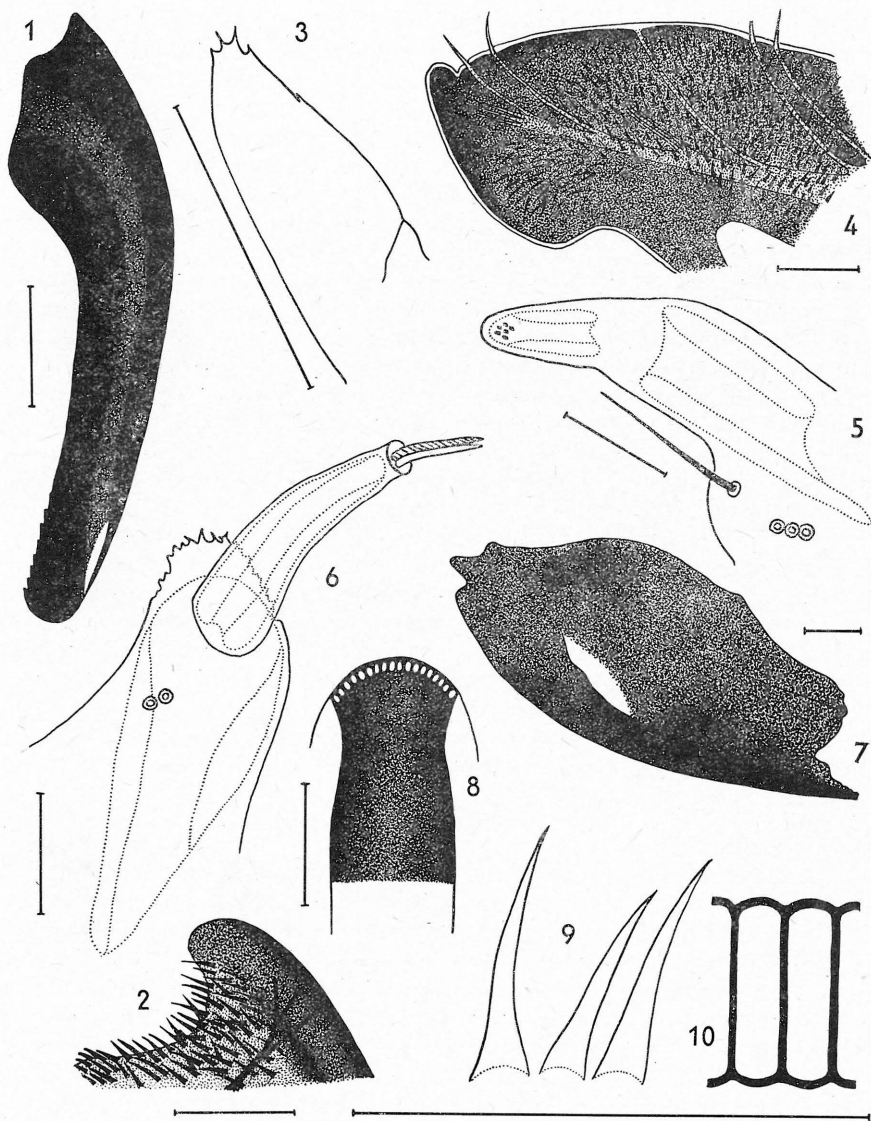
Last instar larvae (Figs. 11—16)

32—34 mm long when extended, the coloration of living larvae reddish-orange with distinct pubescent rings on each segment. Mandibles (Fig. 1) with about 9 teeth

on whole part beneath. Glossae with about 5 teeth (Fig. 3). Basal segment of maxillary palps (Fig. 5) being twice as long as apical segment. Cephalic brush with very closely set spines polyfurcated apically. First antennal segment (Fig. 6) with many teeth on the inner side near apex. Maxilla, Clypeus and Labrum as figured (Figs. 2, 4). Lateral sclerite (Fig. 7) elliptical-shaped, with some blunt teeth anteriorly, superior part of the lateral sclerite very chitinized, aperture distinct. The striations present on usual aspects of all segments except dorsal and ventral area of pro-, meso- and metathorax. Stria on the abdominal segments ventrally in small part missing, the striations a little narrower laterally than on the dorsal parts of the abdominal segments. Prothoracic pubescent annulus pale (Fig. 11, 13, 15), with five longitudinal grooves (2 dorsal, 2 lateral, 1 ventral). Likewise, rings on meso- and metathorax light, posteriorly with 8 short projections; the lateral ones are especially rather indistinct. These dorsal projections are accentuated as inconspicuous narrow brown spots. The dorsal pubescent spots are present on all abdominal segments except the last. Anterior and posterior pubescent rings are connected ventro-laterally on first abdominal segment, by a small light brown dorsal spot also latero-dorsally. Anterior ring is whole on segments 2 to 7, while posterior one is interrupted only at sides of lateral pseudopods, with characteristic configuration of pubescent patches on segments 6 and 7 (Figs. 12, 14, 16). The seventh abdominal segment with narrow ring at the hind margin, its maximum width is up to 0.2 mm, however, it can be reduced to only two light brown dorsal spots. Anal segment without any maculations. The largest spines (Fig. 9) of preanal ridge about 1.5 times longer than the length of transverse cuticular rods (Fig. 10) of posterior spiracle. The base of these spines as wide as the width of transverse cuticular rods. Siphon, when extended, shorter than anal segment. Postanal ring as wide as half the length of atrium of posterior spiracle. Atrium of anterior spiracle (Fig. 8) is mushroom-shaped, and index of the largest width to length is 1 : 1.8, in posterior spiracle as well.

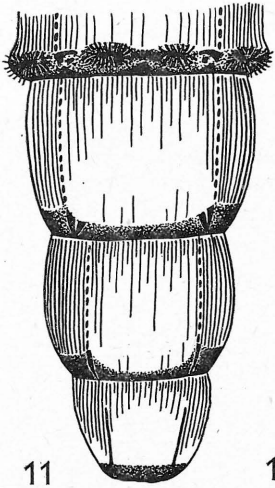
Pupa.

Pupal case 20—21 mm in length, yellowish-brown; dark pigmentation reduced to the area between sheaths of antennae ventrally, very pale between maxillary palps, restricted to narrow stripe along dorso-median hatching suture. The venter of thorax and other parts on head with only very pale pigmentation. The median cleft between frontal carinae rather narrow (Fig. 17). Frontal tubercles rounded and smooth. Striation of the head shield as figured. The margin of the head shield with visible tooth near tip of antennal sheaths. The back of head only slightly striated. Mesonotal spiracle as figured (Fig. 18), rima curved. Spiracle on first abdominal segment slightly conical with rugose surface, a little larger than spiracles on following segments, rima elongate and eccentric. Spiracles on segments 2 to 7 of the same shape but much smaller and rimas nearly circular. Spinose fringes on tergites complete (Fig. 19), spines in one row only. Each tergite predominantly with short and broad spines, and on medial third a pair of long and very thin spines and some additional thin spines laterally. Sides with one row of spines, sternites with one row of thin spines of various length, but they are never as long as the medial pair on tergites; no broad spines on sternites. Sides of segment 7 with about 25 spines. Dorsocentral comb with 3—8 spines, lateral one with 4—6 spines. Preanal fringe in female with 7—9 spines on each side, the spines being longer towards medial gap.

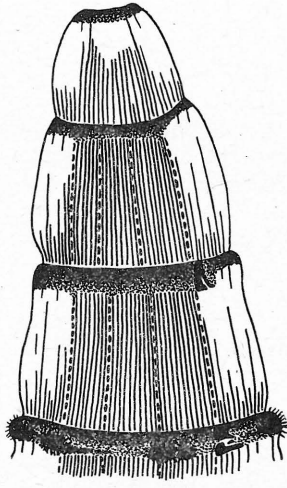


Figs. 1—10: *Hybomitra arpadí* (Szilády, 1923) — Last instar larvae. 1 — Mandible; 2 — Maxilla; 3 — Glossa; 4 — Clypeus and Labrum; 5 — Maxillary palp; 6 — Antenna; 7 — Lateral sclerite; 8 — Anterior spiracle; 9 — The largest spines of preanal ridge; 10 — Cuticular rods of posterior spiracle, lateral view. The scale line 0.1 mm.

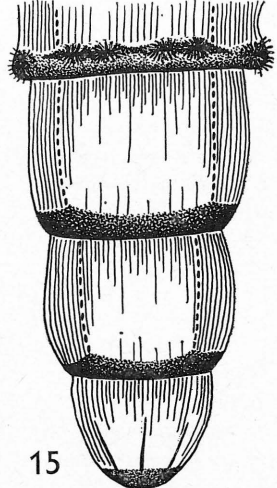
Figs. 11—16: *Hybomitra arpadí* (Szilády, 1923) — Last instar larvae (schematically). 11, 12 — Dorsal view; 13, 14 — Lateral view; 15, 16 — Ventral view. The scale line 0.5 cm.



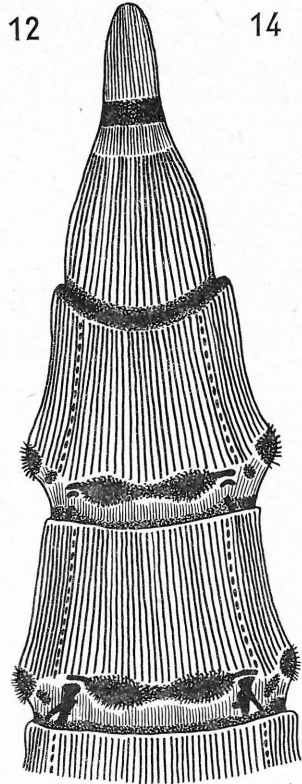
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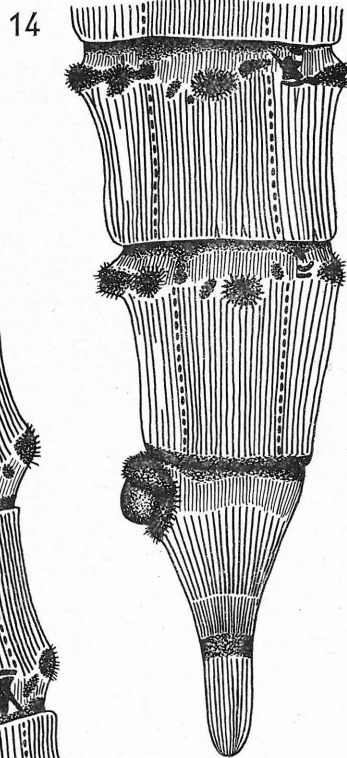
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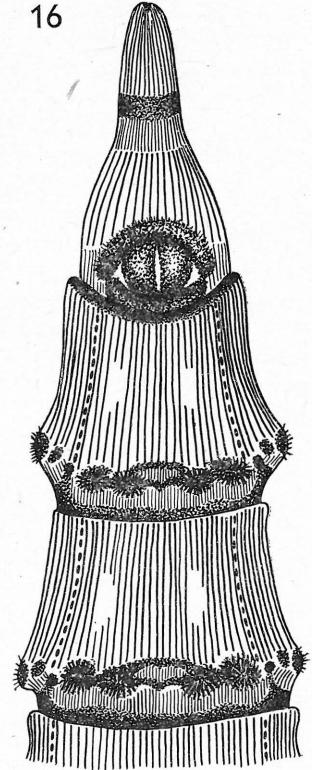
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12



14



16



Anal aster as figured (Figs. 20, 21). Dorsal prongs of anal aster longer than the ventral prongs but of the same stoutness, lateral prongs more prominent, longer and thicker at base.

Material: 2 exuviae of last instar larvae, 2 pupal cases (♀).

Two larvae were found on the one hand 5. 10. 1967 at Jabkenice near Nymburk, Central Bohemia, on marshy periphery of forest pond with *Quercus*, *Pinus* and *Betula* around, associated with *Hybomitra nitidifrons confiformis* Chv. et M., on the other hand 20. 3. 1972 at Životice near Blatná, Occidental Bohemia, in the mud of forest swamp (*Alnus*, *Picea*). The first imago was recorded 6. 6. 1968, the second one 1. 5. 1972.

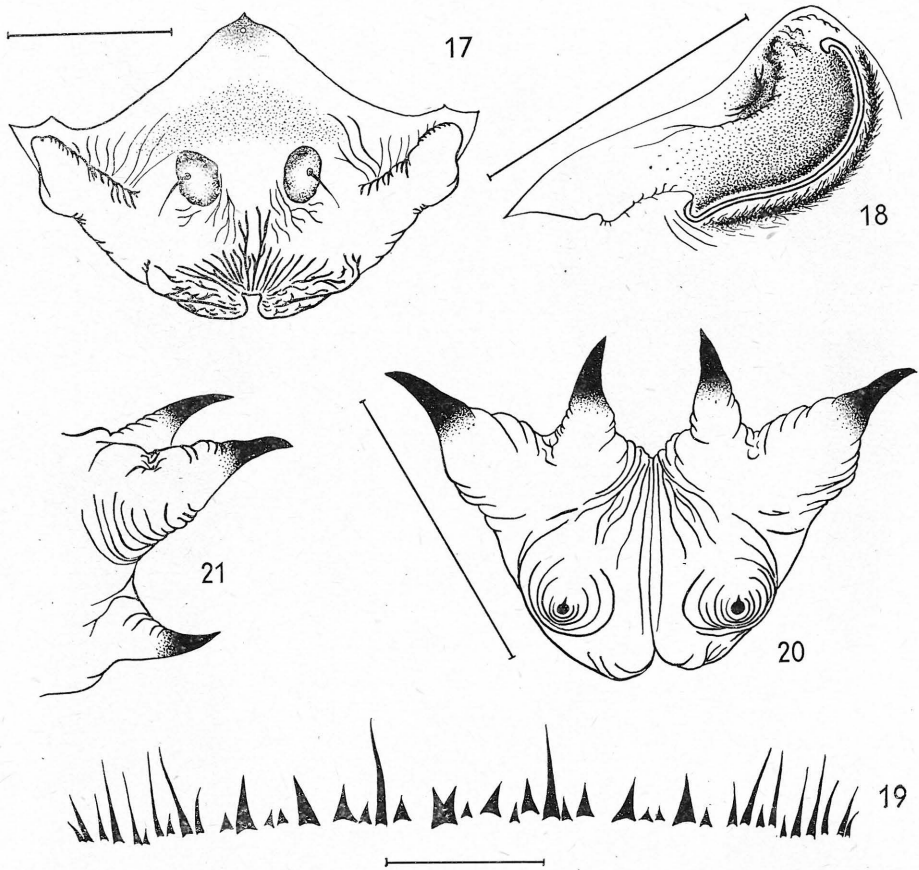
***Hybomitra nitidifrons confiformis* Chvála & Moucha, 1971**

Last instar larvae (Fig. 32—37)

26 mm long when extended, the coloration of living larvae reddish-orange with distinct pubescent rings on each segment. Mandibles (Fig. 22) mostly with 8 teeth on whole part beneath. Glossae and maxillary palp as figured (Figs. 24, 26). Cephalic brush with very closely set spines, polyfurcated apically. First antennal segment (Fig. 27) with 12 teeth on the inner side near apex. Maxilla, Clypeus and Labrum as figured (Figs. 23, 25). Lateral sclerite (Fig. 28) elliptical-shaped, with several chitinized projections anteriorly, superior part of the lateral sclerite very chitinized, aperture distinct. The striations present on usual aspects of all segments except dorsal and ventral area of pro-, meso- and metathorax. Stria on the abdominal segments ventrally in small part missing, the striations a little narrower laterally than on the dorsal parts of the abdominal segments. Prothoracic pubescent annulus (Figs. 32, 34, 36) with five longitudinal stripes (2 dorsal, 2 lateral, 1 ventral). Rings on meso- and metathorax posteriorly with 8 short prongs; the lateral ones are especially rather indistinct. Dorsal projections are accentuated as distinct dark spots. The brown dorsal pubescent spots are present on all abdominal segments except the last. Anterior and posterior pubescent rings are connected ventro-laterally on first abdominal segment by a dark dorsal spot also laterodorsally. Anterior ring is whole on segments 2 to 7, while posterior one is interrupted only at sides of lateral pseudopods, with characteristic configuration of pubescent patches on segments 6 and 7 (Figs. 33, 35, 37). The seventh abdominal segment with rather wide ring at the hind margin, its maximum width is hardly 0.4 mm, rather less. Anal segment without any maculations. The largest spines (Fig. 30) of preanal ridge about 2.5 times longer than the length of transverse cuticular rods of posterior spiracle (Fig. 31). The base of these spines is more than twice as wide as the width of transverse cuticular rods. Siphon, when extended, shorter than anal segment. Postanal ring rather narrow, as wide as a half of the length of atrium of posterior spiracle. Atrium of anterior spiracle (Fig. 29) is mushroomshaped and index of the largest width to length is 1 : 2.3, in posterior spiracle 1 : 1.9.

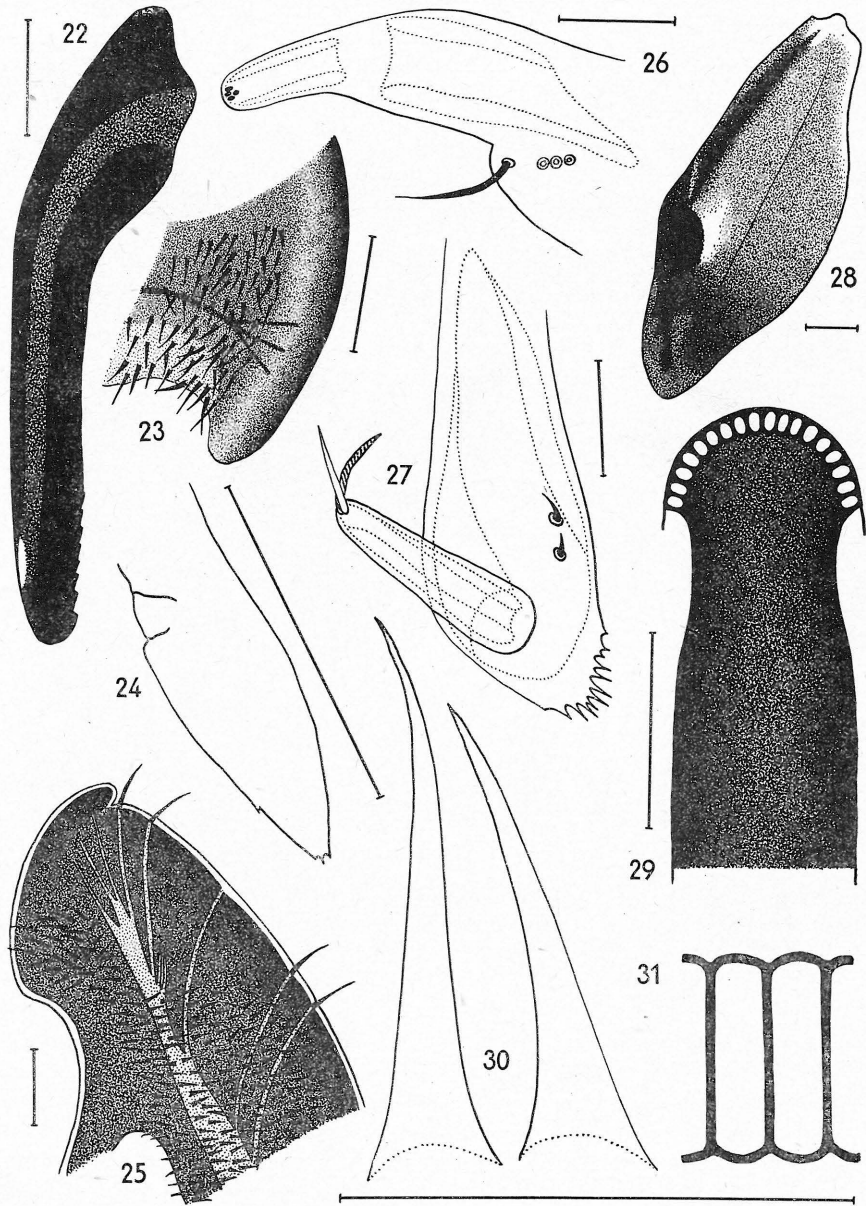
Pupa.

Pupal case 23 mm in length, yellowish-brown; dark pigmentation restricted to the area between sheaths of antennae ventrally, inconspicuous between maxillar palps, reduced to dorsum of thorax and to a narrow stripe along dorso-medial



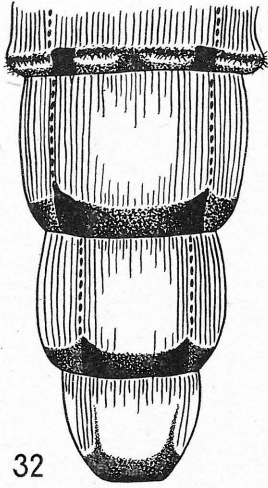
Figs. 17–21: *Hybomitra arpadi* (Szilády, 1923) — Pupa of female. 17 — Head shield in frontal view; 18 — Mesonotal spiracle; 19 — Spinose fringe on the 4th abdominal tergite; 20 — Anal aster, caudal view; 21 — The same, lateral view. The scale line 1 mm.

hatching suture. The venter of thorax and other parts on head with only indistinct pigmentation. The median cleft (Fig. 38) between frontal carinae very narrowed, both carinate tubercles touching above, flanked by radially furrowed areas dorsally. Frontal tubercles rounded and rather smooth. Head shield with some irregular striae, its margin with only hardly visible tooth near tip of antennal sheaths which are very large and almost touching the eclosian line. The back of head only slightly striated. Mesonotal spiracle (Fig. 39) with strong folds and pigmentation ventrally, rather plain and smooth dorsally, rima curved. The top of the spiracular mound on thorax overlaps anteriorly the end of rima. Spiracle on first abdominal segment slightly conical with rugose surface, a little larger than spiracles on following segments. Rima elongate and eccentric. Spiracles on segments 2 to 7 of the same structure but smaller. Spinose fringes (Fig. 40) on tergites complete, spines in one

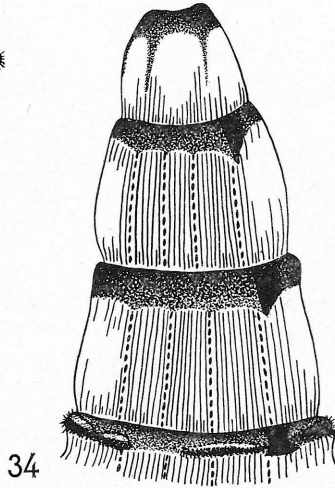


Figs. 22–31: *Hybomitra nitidifrons confiformis* Chvála & Moucha, 1971 — Last instar larvae. 22 — Mandible; 23 — Maxilla; 24 — Glossa; 25 — Clypeus and Labrum; 26 — Maxillary palp; 27 — Antenna; 28 — Lateral sclerite; 29 — Anterior spiracle; 30 — The largest spines of preanal ridge; 31 — Cuticular rods of posterior spiracle, lateral view. The scale line 0.1 mm.

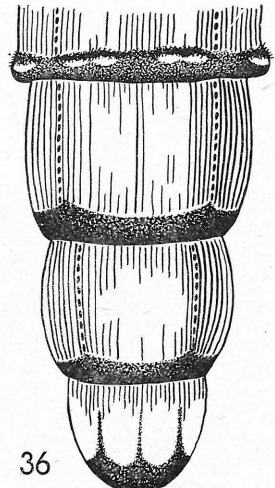
Figs. 32–37: *Hybomitra nitidifrons confiformis* Chvála & Moucha, 1971 — Last instar larvae. 32, 33 — Dorsal view; 34, 35 — Lateral view; 36, 37 — Ventral view. The scale line 0.5 cm.



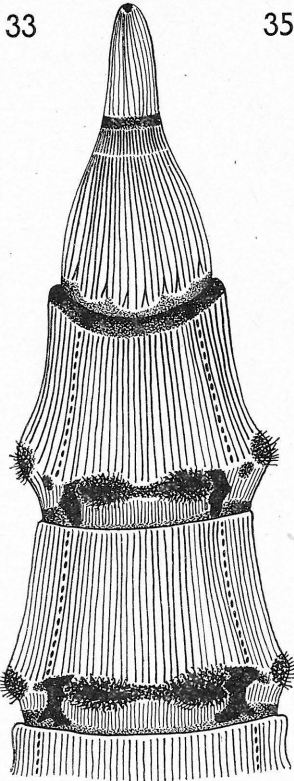
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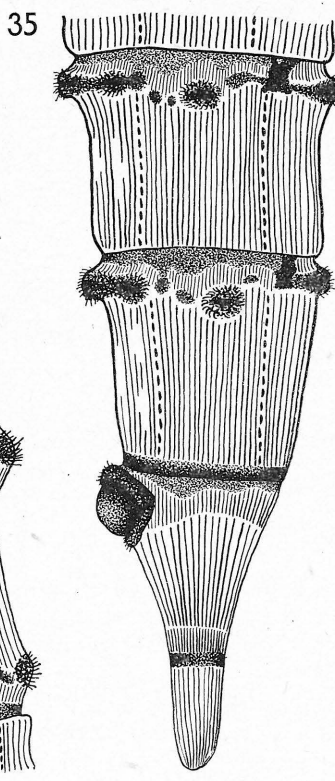
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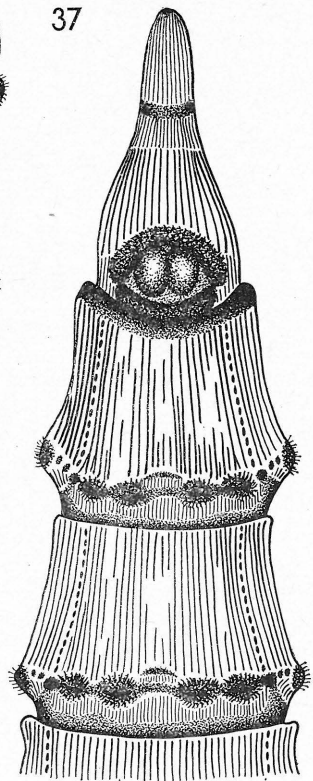
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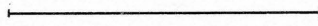
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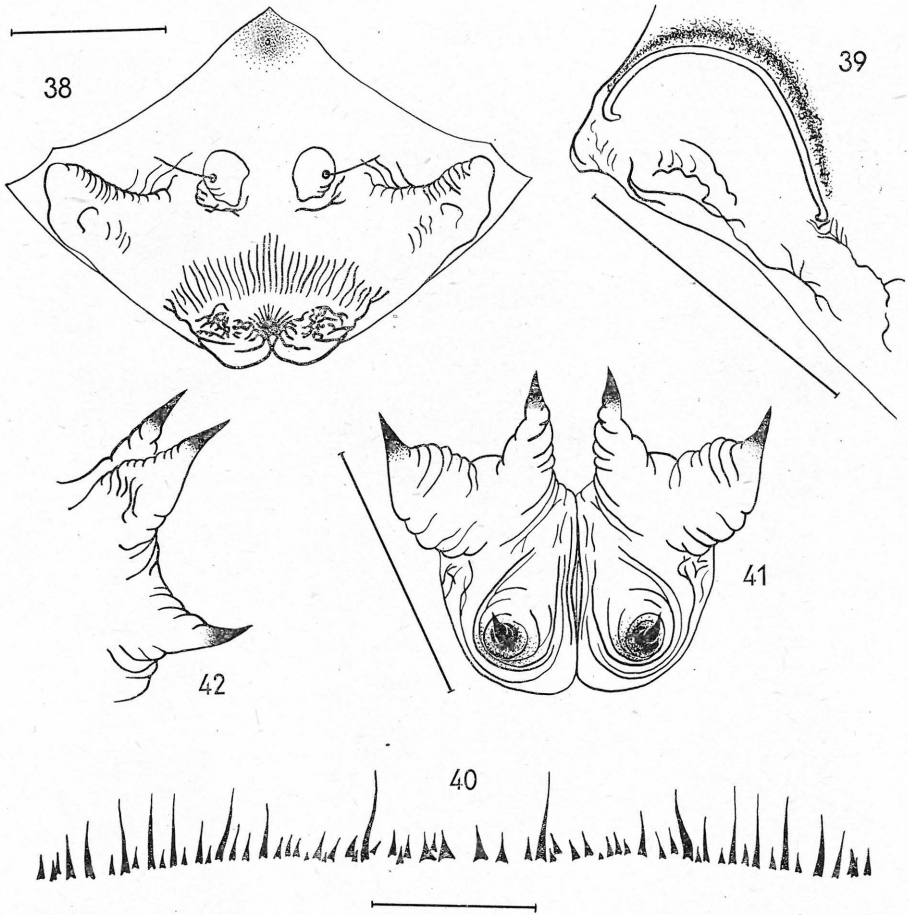


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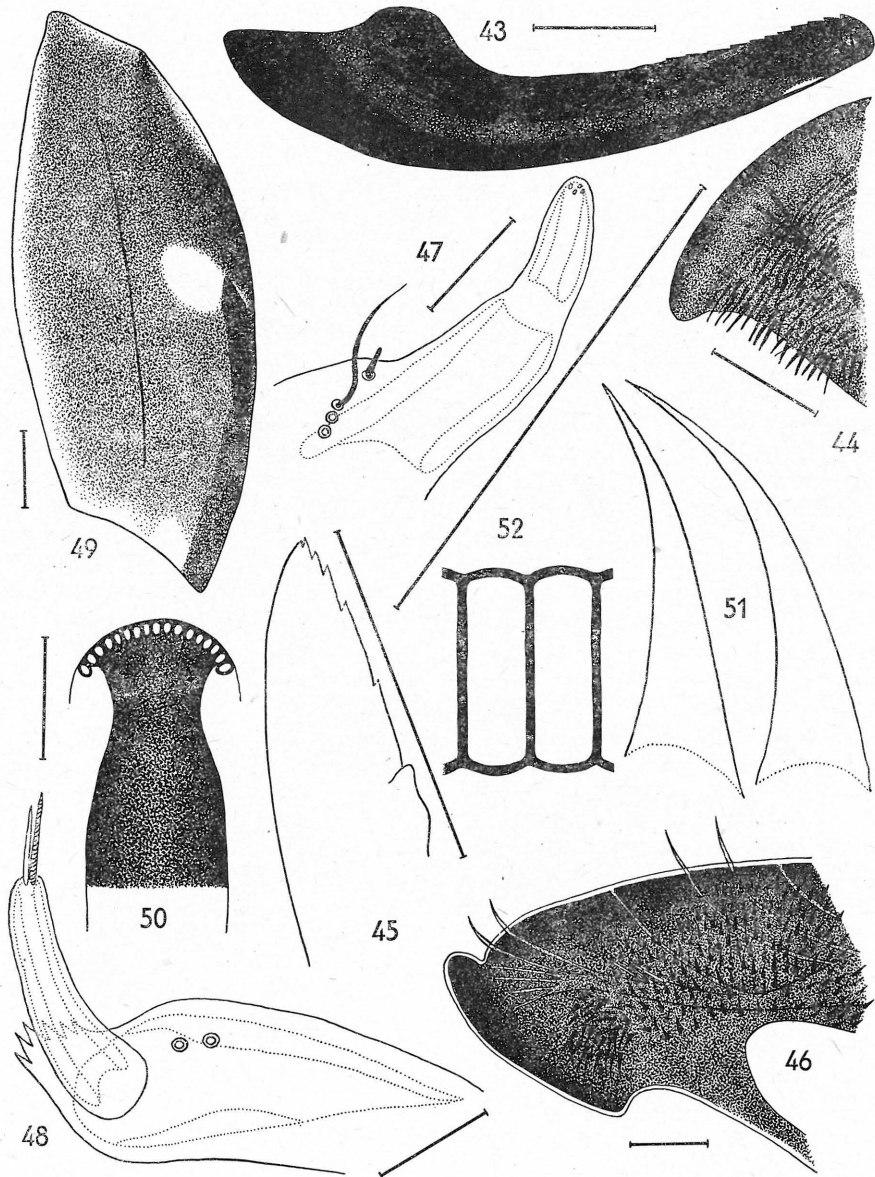
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Figs. 38–42: *Hybomitra nitilifrons confiformis* Chvála & Moucha, 1971 — Pupa of female. 38 — Head shield in frontal view; 39 — Mesonotal spiracle; 40 — Spinose fringe on the 4th abdominal tergite; 41 — Anal aster, caudad view; 42 — The same, lateral view. The scale line 1 mm.

row only. Each tergite predominantly with short and broad spines and on medial third a pair of long and very thin spines, and some additional thin spines on each side. Sides with only thin spines in two rows, but often mixed, sternites with one row of thin spines of various length, but they are as long as the medial pair on tergites or a little shorter. Sides of segment 7 with about 25 spines. Dorsocentral comb with 4–6 spines which are slightly smaller than the 4 spines of lateral comb. Female with 7–10 preanal spines on each side, the spines being longer towards medial gap. Anal aster as figured (Figs. 41, 42). Dorsal prongs of anal aster longer than the ventral one but of the same stoutness at base, lateral prongs more prominent, longer and thicker at base, on apical half upturned.



Figs. 43—52: *Hybomitra distinguenda* (Verrall, 1909) — Last instar larvae. 43 — Mandible; 44 — Maxilla; 45 — Glossa; 46 — Clypeus and Labrum; 47 — Maxillary palp; 48 — Antenna; 49 — Lateral sclerite; 50 — Anterior spiracle; 51 — The largest spines of preanal ridge; 52 — Cuticular rods of posterior spiracle, lateral view. The scale line 0.1 mm.

Material: 1 exuvie of last instar larva, 1 pupal case (♀).

Single larva was taken 5. 10. 1967 at Jabkenice near Nymburk, Central Bohemia on marshy periphery of forest pond with *Quercus*, *Pinus* and *Betula* around, associated with *Hybomitra arpadi* (Szil.). Mentioned larva was reared and the female was recorded 3. 6. 1968.

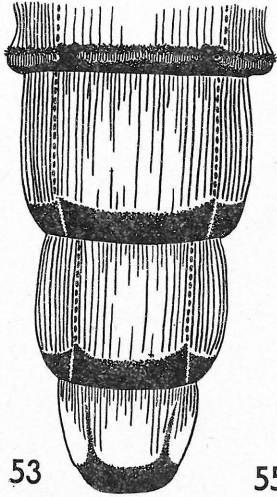
Hybomitra distinguenda (Verrall, 1909)

Last instar larvae (Figs. 53—58)

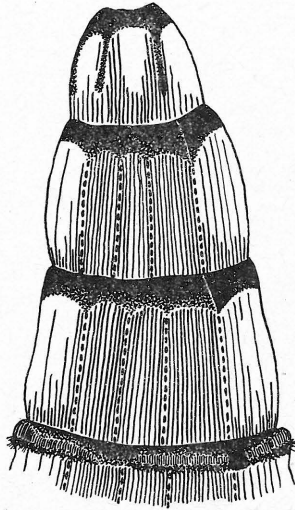
28—34 mm long when extended, the coloration of living larvae reddish-orange with distinct pubescent rings on each segment. Mandibles (Fig. 43) mostly with 10—11 teeth on whole part beneath. Glossae with 6 small teeth or without one (Fig. 45). Basal segment of maxillary palps (Fig. 47) being twice as long as apical segment. Cephalic brush with very closely set spines, polyfurcated apically. First antennal segment (Fig. 48) with about 6 teeth on the inner side near apex. Maxilla, Clypeus and Labrum as figured (Figs. 44, 46). Lateral sclerite (Fig. 49) elliptical-shaped, with one or more blunt teeth anteriorly, superior part of the lateral sclerite very chitinized, aperture distinct. The striations present on usual aspects of all segments except dorsal and ventral area of pro-, meso- and metathorax. The striations a little narrower laterally than on the dorsal parts of the abdominal segments. Prothoracic pubescent annulus dark (Figs. 53, 55, 57), with five narrow longitudinal stripes (2 dorsal, 2 lateral, 1 ventral; lateral and ventral stripes mostly a little expanded apically). Likewise, rings on meso- and metathorax brown, posteriorly with two dorsal projections which are accentuated as distinct dark spots hardly as wide as pubescent ring with 4 lateral and two ventral small projections. The brown dorsal pubescent spots are present on all abdominal segments except the last. Anterior and posterior pubescent rings are connected ventro-laterally on first abdominal segment, by a dark dorsal spot also latero-dorsally. Anterior ring is whole on segments 2 to 7, while posterior one is interrupted at sides of lateral pseudopods with characteristic configuration of pubescent patches on segments 6 and 7 (Figs. 54, 56, 58). The seventh abdominal segment with narrow ring at the hind margin, its maximum width is about 0.2—0.3 mm. Anal segment without any maculations. The largest spines (Fig. 51) of preanal ridge more than 1.5 times longer than the length of transverse cuticular rods (Fig. 52) of posterior spiracle. The base of these spines is about twice as wide as the width of transverse cuticular rods. Siphon, when extended, twice shorter than anal segment. Dorsal part of postanal ring as wide as a half of the length of atrium of posterior spiracle, ventral part is narrower. Atrium of anterior spiracle is mushroom-shaped (Fig. 50), and index of the largest width to length is 1 : 2, in posterior spiracle as well.

Pupa.

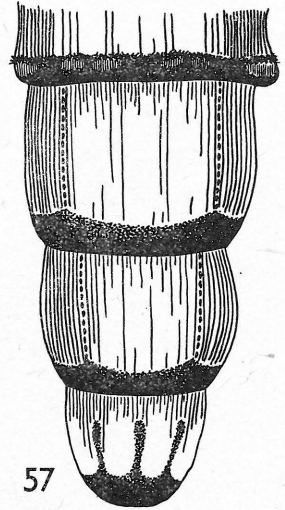
Pupal case 19—24 mm in length, yellowish-brown; dark pigmentation reduced to the area between sheaths of antennae ventrally and almost indistinct between



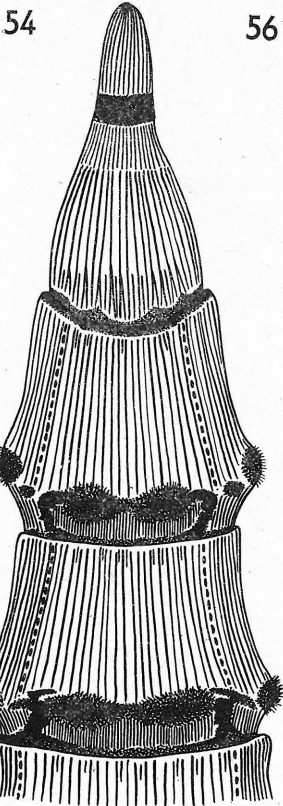
53



55



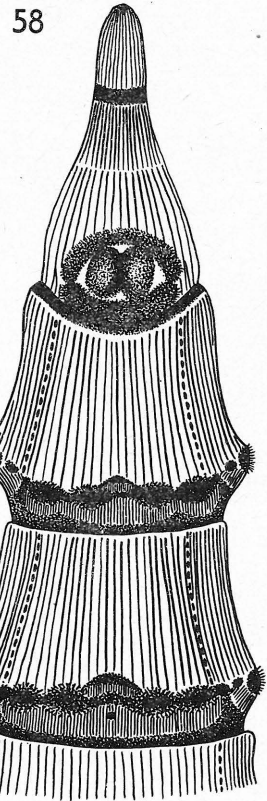
57



54

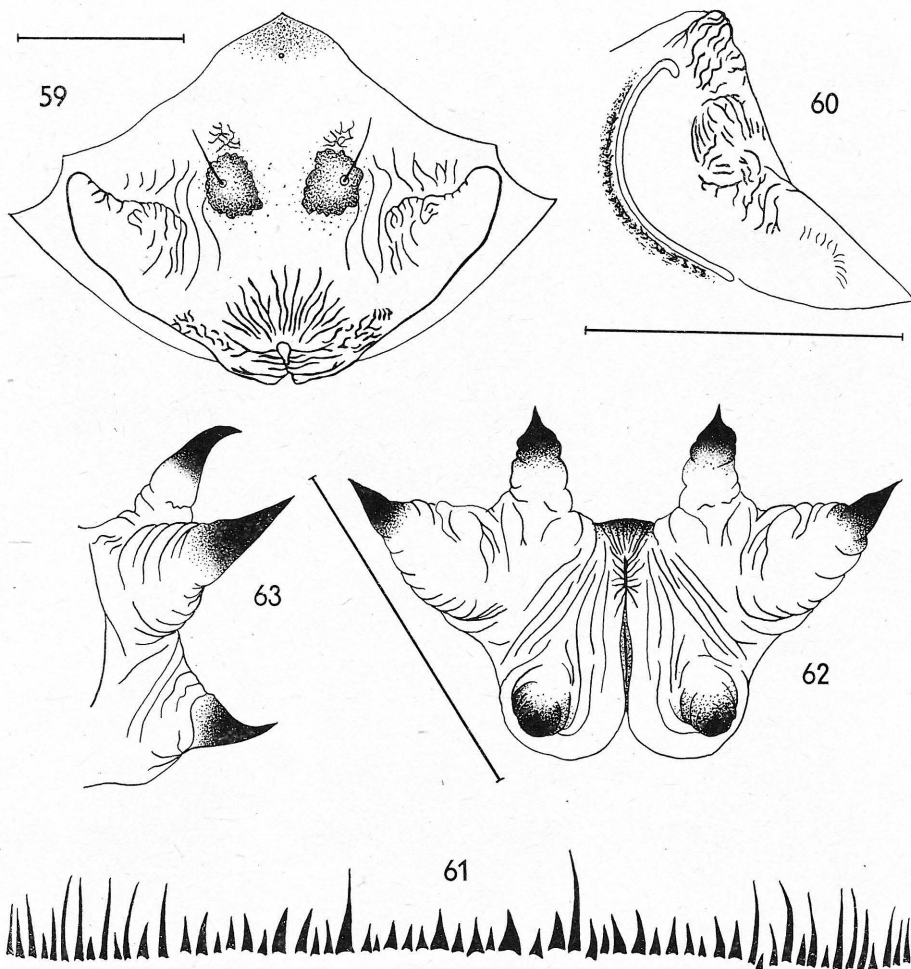


56



58





Figs. 59–63: *Hybomitra distinguenda* (Verrall, 1909) — Pupa of female. 59 — Head shield in frontal view; 60 — Mesonotal spiracle; 61 — Spinose fringe on the 4th abdominal tergite; 62 — Anal aster, caudal view; 63 — The same, lateral view. The scale line 1 mm.

maxillar palps, restricted to dorsum of thorax and to a narrow stripe along dorso-median hatching suture. The venter of thorax and other parts on head with only very pale pigmentation. The median cleft (Fig. 59) between frontal carinae very narrowed anteriorly, with radial rugosities dorsally, sometimes both carinate tubercles touching above. Frontal tubercles smooth apically but with many small rugosities basally. Head shield usually with some irregular striae, its margin with only slightly visible tooth near tip of antennal sheaths, which are very large and almost touching the eclosian line. The back of head only slightly striated. Mesonotal ventrally, rima curved. The spiracular mount much overlaps the end of rima. Spiracle

spiracle (Fig. 60) plain and smooth dorsally but with many strong folds and large pit on first abdominal segment slightly conical with rugose surface, about twice larger than spiracles on following segments. Rima elongate and eccentric. Spiracles on segments 2 to 7 of the same shape but much smaller. Spinose fringes (Fig. 61) on tergites complete, spines in one row only. Each tergite predominantly with short and broad spines, and a pair of long and very thin spines and some additional thin spines laterally. Sides with only thin spines rather in one row, sternites with one row of thin spines of various length but they are mostly as long as the medial pair on tergites; no broad spines on sternites. Sides of segment 7 with about 24–30 spines. Dorsal prongs (Fig. 62, 63) of anal aster longer than the ventral prongs but of the same stoutness, lateral prongs more prominent, longer and thicker at base. Dorsocentral comb with 3 to 9 spines, lateral comb with 5 to 9 spines. Preanal fringe in male with 30 spines almost as long as the length of the long spines on tergite 7; female with 6 to 11 spines on each side, the spines being longer towards medial gap.

Material: 10 exuviae of last instar larvae, 10 pupal cases (9 ♀, 1 ♂).

Larvae were collected in living or dead vegetation at the margins of a marsh, forest ponds, marshy meadows and along the margins of drainage ditches near ranches and cattlepens with *Alnus*, *Phragmites*, *Scirpus* and *Caltha*, often also *Quercus*, *Picea* and *Betula* around (both April to May and October) in the following localities: Jabkenice and Chudř env. Nymburk (Bohemia centr.) in 1968, Havlovice env. Domažlice and Lázně Kynžvart (Bohemia occ.) in 1972. The adults were recorded ex larvae during May and June in 1968 and 1972.

SUMMARY

The present paper is primarily intended to make available in brief form our present knowledge of the last instar larvae and pupae of the genus *Hybomitra* End. in Europa. The author presents the descriptions and figures of the last instar larvae and pupae of three European *Hybomitra* species: *H. nitidifrons confiformis* Chv. & M., *H. distinguenda* (Verr.) and *H. arpadi* (Szil.) and gives key to the last instar larvae and pupae of 8 European *Hybomitra* species. The larva and pupa of *H. nitidifrons confiformis* Chv. & M. and pupa of *H. distinguenda* (Verr.) are described for the first time.

REFERENCES

- Chvála M. & Ježek J., 1969: Immature stages of five European *Hybomitra*-species of the bimaculata- and montana- groups (Diptera, Tabanidae). *Folia parasitologica*, **16** : 329–347.
- Ivanišček P., 1970: K morfologiji i klasifikaciji ličinek slepnej (Diptera, Tabanidae) Ivanovskoj oblasti. *Nasekomye — perenosčiki zaraznyh zabojevanij*, Ivanovo, **46** : 137–153.
- Lutta A. S., 1970: Slepni (Diptera, Tabanidae) Karelii. Leningrad, 313 pp.
- Portschinski J., 1925: Les Taons (Tabanidae) et les moyens simples pour leur destruction (Ed. 6 me). *Trudy Bur. Ent.*, **2** : 8.
- Skufin K. V., 1967: Zаметки по морфологии личинок некоторых видов слепней (Tabanidae, Diptera). *Vrednyje i poleznyje nasekomyje, Izd. Voronež. univ.*, Voronež, **1** : 168–206.
- Skufin K. V., 1973: Metody sbora i izučenija slepnej. *Met. parazitol. issled.*, Leningrad, **8** : 1–104.
- Soboleva R. G., 1971: Opisanije ličinek pjati vidov slepnej (Diptera, Tabanidae) iz primorskogo kraja. *Parazitologija*, **5** (2) : 140–146.
- Stammer H. J., 1924: Die Larven der Tabaniden. *Zeitschr. Morphol. Ökol. Tiere*, **1** : 121–170.
- Surcouf J. M. R., 1924: Les Tabanides de France et des pays limitropes. *Enc. Ent. A*, **5** : 1–261.
- Teskey H. J., 1969: Larvae and pupae of some Eastern North American Tabanidae (Diptera). *Mem. Ent. Soc. Canada*, **63** : 1–147.