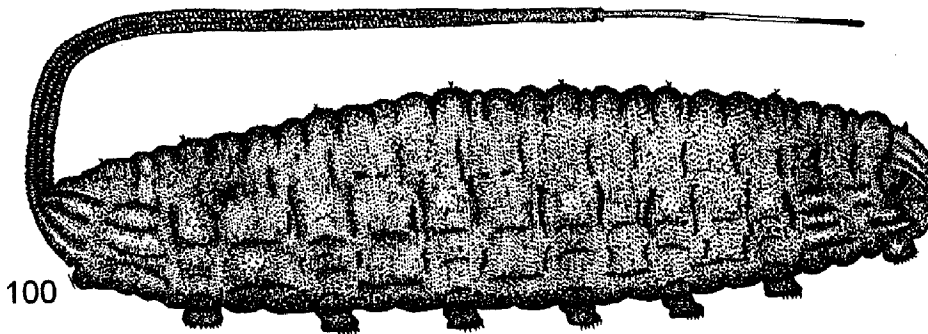
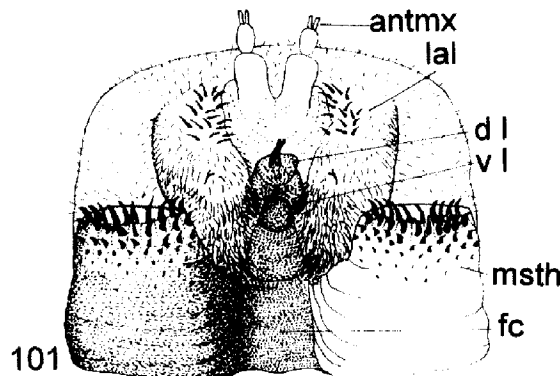
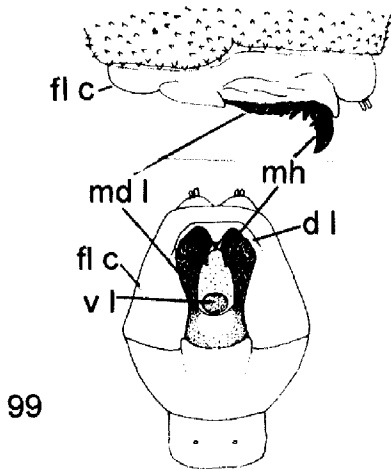
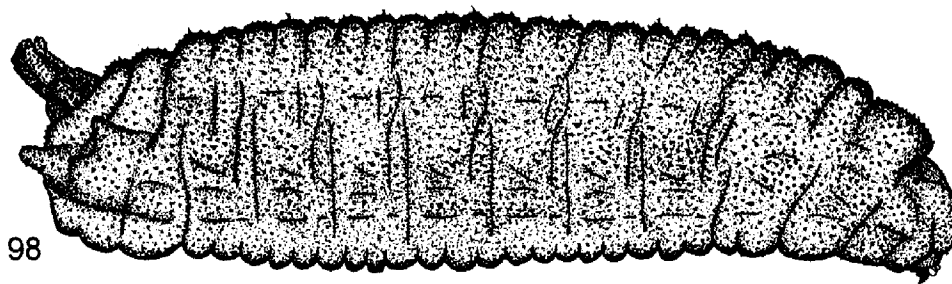


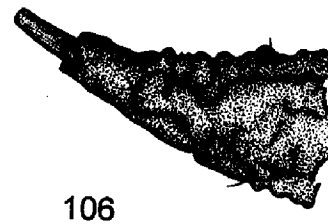
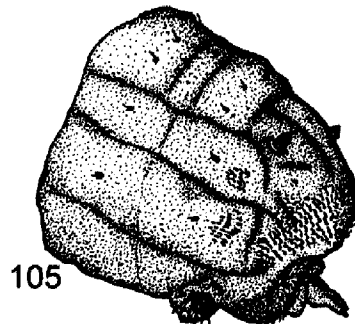
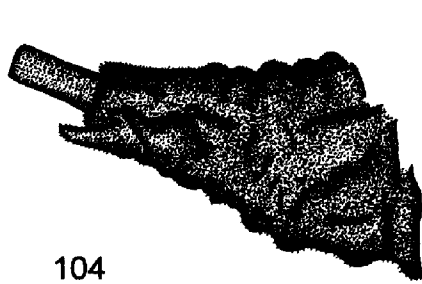
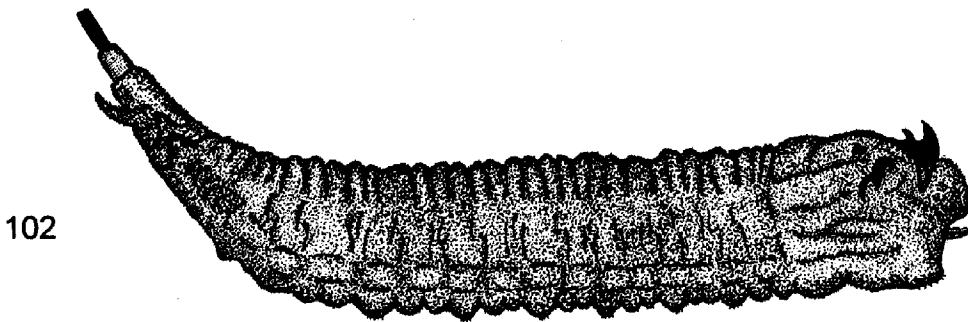
- 8. Larva without anterior spiracles; dorsal lip with setae
V. inflata (Fabricius); in sap-runs. Volucella Geoffroy
- Larva with anterior spiracles 9
- 9. Larva with prolegs bearing crochets on some abdominal segments
In nests of social bees and wasps. Volucella Geoffroy
- Larva without prolegs bearing crochets 10



Figs 5.98–101. Third instar larvae of Syrphidae. 98–99: *Cheilosia corydon* (Harris) (= *grossa* (Fallén)): 98: whole larva, length 15 mm, 99: mouthparts. 101–101: *Myathropa florea* (Linnaeus), whole larva, length 25 mm, 101: mouthparts (abbreviations: antmx: antennomaxillary organs, d l: dorsal lip, fc: food channel, fl c: flexible collar, lal: lateral lip, mh: mouth hooks, md l: mandibular lobe, msth: mesothoracic proleg, v l: ventral lip).

- ffroy
- 9
- ffroy
- 10
- ole larva,
parts (ab-
h: mouth
10. Body with posterior end with sensilla born on black, stick-like projections; body covered with upright spike-like setae **Rhingia Scopoli**
In dung.
- Body with posterior end with sensilla born on short, conical, fleshy projections; body covered with short, flattened, fleshy setae **Ferdinanda Rondani**
In sap-runs and decaying plant roots.
11. Projections bearing antenno-maxillary organs divided medially (Fig. 101) 34
- Projections bearing antenno-maxillary organs not divided medially 12
12. Thorax without hooks on dorsal and lateral margins 22
- Prothorax and mesothorax with hooks; hooks black, conspicuously larger than any spicules on anterior margin of prothorax (Fig. 102) 13
13. Thorax with a single pair of posteriorly directed hooks on anterodorsal margin of prothorax; anal segment dorsoventrally flattened; first lappets separated apically into 2 projections; larva small, up to 12 mm long **Neoscia Williston**
Ponds, streams, bogs, in decaying vegetation.
- Thorax usually with more than a single pair of hooks; if a single pair present, then hooks lateral to anterior spiracular process, not on anterodorsal margin of prothorax; anal segment subcylindrical; first lappets not separated into projections; larva large, more than 12 mm long 14
14. Mesothorax with anterior margin with a row of mostly small hooks, with hooks not much larger than spicules on prothorax; thorax with a few similar hooks on dorsal and lateral margins **Tropidia Meigen**
Ponds, streams, bogs, in decaying vegetation.
- Thorax with hooks elsewhere, not forming rows on anterior margin of mesothorax 15
15. Anterior spiracle with one lateral and one ventral hook; prothorax with anterior margin with dorsal row of spicules larger than other rows **Brachypalpus Macquart**
Rot-holes, under bark.
- Hooks arranged differently 16
16. Anterior spiracle with a pair of reddish brown lateral hooks **Xylota (Brachypalpoides Hippa)**
In wet, decaying heartwood of deciduous trees.
- Hooks black, more than 2 pairs present 17
17. Larva dorso-ventrally flattened; two lateral hooks joined at base near anterior spiracles and, usually, ventrad another small hook on separate base **Chalcosyrphus Curran**
Under bark.
- Larva subcylindrical, not flattened; hooks arranged differently 18
18. Anterior spiracle with a posterolateral group of hooks, with each group consisting of 3–4 hooks; prolegs fused medially **Callicera Panzer**
In rot-holes.

- Hooks arranged differently; prolegs separate, forming pairs of oval structures 19 -
- 19. Dorsum of prothorax with a "Y" or triangular-shaped hook base and a pair of "cow-horn" shaped, laterally directed hooks posterior to anterior spiracle (Fig. 102) *Criorhina* Meigen 22.
In decaying tree-roots and rot-holes. -
- Prothorax without a Y or triangular-shaped hook base and cow-horn hooks 20 23.
- 20. Larva barrel-shaped, short, compact; anterior spiracle with lateral large rasp consisting of 4-5 rows of blunt-tipped hooks; crochets absent *Temnostoma* Lepeletier et Serville
Tunnelling in firm, moist wood in logs and fallen branches.
- Larva elongate, tapering posteriorly; rasp absent; crochets present 21 -
- 21. Thorax with 2 groups of hooks: a group anterior to anterior spiracle consisting of a primary row of 3-4 hooks, 2nd row of intermediate hooks and 3rd row of small hooks; separate group of 4-6 hooks ventral to spiracle *Milesia* Latreille 24.
In rot-holes.



Figs 5.102-106. Third instar larvae of Syrphidae, lateral view. 102: *Criorhina berberina* (Fabricius), length 18 mm. 103: *Eupeodes luniger* (Meigen), length 12 mm. 104: *Xylota segnis* (Linnaeus), end segments. 105: *Caliprobola speciosa* (Rossi), head and thorax. 106: *Psilota anthracina* Meigen, end segments.

- 19 – Thorax with 4 groups of hooks Spilomyia Meigen
In rot-holes.
22. Prothorax with anterior margin with brown, sclerotized spicules (Fig. 105) 24
- Prothorax with anterior margin with soft (not sclerotized), pale setae 23
- 20 23. Prolegs little developed; crochets pale; anterior spiracle reduced or absent; body with posterior end not covered with fleshy papillae 23
Chrysogaster Meigen, Lejogaster Rondani, Orthonevra Macquart
In ponds, streams.
- 21 – Prolegs well-developed; crochets dark brown to black; anterior spiracle present as pale brown sclerotized structures, not reduced; body with posterior end covered with fleshy papillae tipped with setae Myolepta Newman
In rot-holes.
24. Larva with long tail; anal segment extended, longer than body (head to base of anal segment); lappets apparently absent; thorax broader than abdomen; anterior spiracular process dark brown, not retracile into pocket on thorax Sericomymia Meigen
Moorland pools and peat bogs.
- Anal segment less than body length; if anal segment extended to nearly body length, then lappets present at base 25
25. Anal segment with 3 pairs of about equally long, fleshy lappets (Fig. 104) 29
- Anal segment without 3 pairs of equally long lappets, one or more pairs of lappets reduced (Fig. 106) 26
26. Anal segment about half body length, with 3 pairs of sometimes inconspicuous lappets about equidistant from one another 28
- Anal segment about one body length, with anterior 2 pairs of lappets at base, with posterior pair at apex 27
27. Larva about 17 mm long, including extended anal segment; anterior spiracular process with apex bearing large spiracular openings which bulge over lateral margin (view from anterior of larva); pro- and mesothorax with 2 lateral isolated groups of spicules, consisting of about 6 and 8 spicules each Lejota Rondani
Ponds, marshes.
- Larva about 34 mm long, including extended anal segment; anterior spiracular process with small openings which do not extend over lateral margin; pro- and mesothorax with spicule groups consisting of about 18 and 36 spicules each Caliprobola Rondani, Blera Billberg
In decaying heartwood in roots of trees and stumps.
28. Larva about 10 mm long including anal segment; anal segment with apical lappets not much extended, about as long as basally broad Psilota Meigen
In sap-runs.

- Larva about 20 mm long including anal segment; anal segment with apical lappets long, narrow, more than twice as long as broad **Pocota** Lepeletier et Serville 36.
In rot-holes.
29. Prolegs well-developed, protruding from ventral surface with pale brown to black crochets longer than surrounding setae; anal segment with 2 to 3 pairs of ventral sensilla between anus and posterior spiracular process 31 37.
- Prolegs barely developed, with crochets small or absent, little longer than surrounding setae; anal segment with 4 pairs of ventral sensilla between anus and posterior spiracular process 30 –
30. Abdomen with dorsum with either transverse rows of setae or covered with blotches of setae; abdominal segments 2–6 with middorsal sensilla not separated from other dorsal sensilla by oblique groove **Brachyopa** Meigen 38.
In sap-runs and under bark. –
- Abdomen with dorsum evenly covered with setae, setae not forming transverse rows or blotches; abdominal segments 2–6 with middorsal sensilla separated from other dorsal sensilla by oblique groove **Brachyopa (Hammerschmidia)** Schummel 39.
In sap-runs and under bark. –
31. Anterior (first) pair of lappets separated apically into two projections each bearing sensilla; larva small, less than 8 mm **Sphegina** Meigen –
Under bark, sometimes in sap-runs. 40.
- Anterior pair of lappets not separated, each lappet consisting of single fleshy projection 32 –
32. Dorsal surface with groups of small and large setae; larva somewhat dorsoventrally flattened **Ceriana** Rafinesque 41.
In sap-runs and under bark.
- Dorsal surface covered with uniformly sized setae; larva not dorsoventrally flattened 33 –
33. Prothorax with anterior margin covered with equally sized spicules not reaching longitudinal grooves on dorsum; large primary crochets arranged as transverse rows with few associated smaller crochets **Syritta** Lepeletier et Serville 42.
In wet compost and manure. –
- Prothorax with anterior margin covered with variously sized spicules and/or with some scattered spicules between longitudinal grooves; large primary crochets arranged as curved rows with 3–4 rows of smaller crochets behind **Xylota** Meigen 43.
In sap-runs, under bark and in decaying heartwood; *X. segnis* in decaying vegetation.
34. Abdominal segments 2–7 with lateral sensilla arranged in a line; abdomen smooth, not covered with setae **Mallota** Meigen –
In rot-holes.
- Abdominal segments 2–6 with lateral sensillum 4 dorsad to 5 and 6 (segment 7 with sensilla 4–6 in line); abdomen covered with setae 35 44.
35. Posterior prolegs with curved tips of most large, primary crochets facing lateral 38 –
- Posterior prolegs with curved tips of most large, primary crochets facing anterior 36 –

36. Anal segment with 3 pairs of ventral projections between anus and base of tail
Helophilus Meigen
 In wet manure, ponds, ditches, marshes.
- Anal segment with less than 3 pairs of ventral projections between anus and tail 37
37. Abdomen with a line of pubescence along ventrolateral margin *Lejops* Rondani
 In ponds, marshes.
- Abdomen without pubescence or with pubescence more evenly distributed, never reduced to a ventrolateral line
Parhelophilus Girschner
 In ponds, marshes.
38. Abdomen with transverse row of spicules anterior to posterior prolegs *Eristalinus* Rondani
 In ponds, marshes.
- Abdomen without such a transverse row of spicules, although a few scattered spicules may be present between prolegs 39
39. Anterior spiracle pale brown; prolegs with evenly sized ventral spicules *Myathropa* Rondani
 In rot-holes, large sap-runs, decaying tree roots, under bark.
- Anterior spiracle dark brown; prolegs with spicules becoming smaller ventrally *Eristalis* Latreille
 In wet manure, ponds, ditches, wet silage, marshes, bogs.
40. Posterior respiratory process with dorsal spurs 59
- Posterior respiratory process without dorsal spurs 41
41. Posterior respiratory process angular in profile, not dome-shaped, with a central depression at tip 43
- Posterior respiratory process dome-shaped in profile, without a central depression at tip 42
42. Posterior respiratory process with wavy spiracular openings; interspiracular setae absent or short and inconspicuous *Xanthogramma* Schiner
 In ant nests.
- Posterior respiratory process with straight or slightly curved spiracular openings; interspiracular setae long and conspicuous *Doros* Meigen
 In ant nests in decaying wood?
43. Posterior respiratory process in dorsal view pale or dark brown; if pale, then spiracular opening not on a white or black plate 47
- Posterior respiratory process in dorsal view pale brown with spiracular opening on a white or black plate 44
44. Larva bright shiny green, with a pair of sometimes inconspicuous pale dorsal vittae
Sphacrophoria Lepeletier et Serville
 Feeding on ground-layer aphids
- Larva mostly mottled white and pale brown; If green, then with 4 or 5 "V"-shaped maculae dorsally 45

- | | | | |
|-----|--|--|-----|
| 45. | Anal segment with tip with 2 pairs of short tapering projections; projections less than length of Posterior respiratory process
In leaf litter on mountains. | Rohdendorfia Smirnov | 54. |
| - | Anal segment with tip with 1 pair of short projections or without such projections | 46 | - |
| 46. | Larva with two dorsal fat vittae, one of which extends anterior to other
Feeding on ground-layer aphids. | Baccha Fabricius | 55. |
| - | Larva with dorsal vittae meeting at a point
In leaf litter and feeding on ground-layer aphids. | Platycheirus Lepeletier et Serville | - |
| 47. | Anal segment with tip with a pair of short, fleshy, rounded projections; interspiracular setae long, conspicuous, about half as long as spiracular openings | 56 | - |
| - | Anal segment without fleshy projections; interspiracular setae short, inconspicuous, much less than half as long as spiracular openings | 48 | 56. |
| 48. | Posterior respiratory process more than twice as long as broad at base; larva flattened in cross-section, mottled orange and white
Feeding on aphids on fruit trees. | Melangyna (Meligramma) Frey | - |
| - | Posterior respiratory process less than twice as long as broad at base; if flattened, then coloured otherwise | 49 | 57. |
| 49. | Posterior respiratory process at tip with a raised bar connecting both sides; larva sandy coloured
<i>E. nielsenii</i> Dušek et Láška; feeding on aphids on pine trees. | Eupeodes (Metasyrphus) Matsumura | 58. |
| - | Posterior respiratory process at tip without bar connecting sides | 50 | - |
| 50. | Spiracular openings elongate, more than twice as long as broad | 52 | 59. |
| - | Spiracular openings oval shaped, less than twice as long as broad | 51 | - |
| 51. | Posterior respiratory process with apex with a pair of posterior projections; larva large, more than 10 mm long
Feeding on gregarious Lepidoptera caterpillars on trees and shrubs. | Xanthandrus Verrall | 60. |
| - | Posterior respiratory process with apex without posterior projections; larva small, less than 10 mm long
In leaf litter, feeding on some ground-layer aphids. | Melanostoma Schiner | - |
| 52. | Larva covered with dome-shaped papillae | 54 | 61. |
| - | Larva covered with pointed spicules | 53 | - |
| 53. | Posterior respiratory process without mesially sloping spiracular plates; larva subcylindrical, with a mid-dorsal whitish vitta
Feeding on pine tree aphids and other aphids. | Scaeva Fabricius | 62. |
| - | Posterior respiratory process with mesially sloping spiracular plates; larva flattened, without mid-dorsal vitta
Feeding on arboreal aphids. | Didea Macquart | |

length
rnov

54. Posterior respiratory process with a basal rim; spiracular plate in profile sloping posteriorly; if not sloping posteriorly, then posterior respiratory process as long as broad *Meliscaeva* Frey
Feeding mostly on arboreal aphids.

46

- Posterior respiratory process without basal rim, broader than long; spiracular plate not sloping posteriorly 55

ricius

55. Larva covered with black angular papillae; posterior respiratory process dark brown to black *Eriozona* Schiner

rville

Feeding on pine tree aphids.

setae

- Larva covered in translucent dome-shaped papillae; posterior respiratory process pale brown *Episyrrhus* Matsumura et Adachi

56

Feeding on a wide range of aphids.

h less

56. Larva covered with round-tipped setae; larva dorsoventrally flattened in cross-section *Pipizella* Rondani

48

Feeding on root aphids in ant nests.

cross-

- Larva not covered in such setae; larva oval or subcylindrical in cross-section 57

Frey)

57. Larva covered with short, erect setae *Pipiza* Fallén

oured

Feeding on flocculent aphids, ground-layer aphids and aphids in galls.

49

- Larva not covered in such setae 58

oured

58. Larva covered with dome-shaped papillae; larva usually dark brown *Heringia* Rondani

mura)

Feeding on flocculent and gall-inducing aphids in trees.

- Larva smooth, without such papillae; larva whitish *Trichopsomyia* Williston

50

Feeding in psyllid galls on rushes.

52

59. Interspiracular ornamentation cone-shaped between posterior pair of spiracular openings 62

- Interspiracular ornamentation ridge-shaped between posterior pair of spiracular openings 60

51

, more

60. Anal segment with a pair of long tapering projections apically; posterior respiratory process black or dark brown; larva bark-coloured *Dasysyrphus* Enderlein

Verrall

Feeding on arboreal aphids.

- Anal segment without long projections; posterior respiratory process pale brown; larva green or white and brown 61

han 10

61. Larva subtriangular in cross-section, white and brown; spiracular opening extending more than 1/2 their length onto lateral surface of posterior respiratory process *Leucozona* Schiner

Schiner

Feeding on aphids on ground-layer plants and shrubs.

53

- Larva flattened in cross-section, green; spiracular opening extending less than 1/2 their length onto lateral surface of posterior respiratory process *Epistrophe* Walker

ndrical,

abricius

Feeding on arboreal aphids.

without

62. Posterior respiratory process pale brown, about as long as broad, with orange basal rim, with dorsal spurs only weakly indicated and not higher than spiracular openings; spiracular openings black-lined *Meliscaeva* Frey

lacquart

Feeding on aphids on shrubs and trees.

- Not entirely as above 63
63. Larva posteriorly with a transverse row of 4 setae posterior to posterior respiratory process; Posterior respiratory process with dorsal spurs as high as or higher than broad at base; larva 6-8 mm long
Feeding on ground-layer aphids. **Paragus** Latreille
- Larva without such a transverse row of setae; posterior respiratory process with dorsal spurs broader than high; larva more than 8 mm long 64
64. Anal segment with a pair of short, rounded projections apically
Feeding on root aphids in ant nests. **Chrysotoxum** Meigen
- Anal segment without apical projections 65
65. Larva covered with dome-shaped papillae 67
- Larva covered with pointed spicules 66
66. Larva with middorsal whitish vitta; spicules even in distribution on dorsal surface
Feeding on wide range of aphids. **Scaeva** Fabricius
- Larva without middorsal vitta; spicules grouped into patches on dorsal surface
Feeding on wide range of aphids. **Eupeodes (Metasyrphus)** Matsumura
67. Abdomen with lateral margins serrate; anal segment viewed dorsally with apex transverse
Feeding on aphids on shrubs and trees. **Melangyna (Meligramma)** Frey
- Abdomen with lateral margins not serrate; anal segment apex rounded in dorsal view 68
68. Posterior respiratory process broader than long or about as long as broad; spiracular opening more than 6 times as long as broad; larva with 3 pairs of lobes apically on anal segment and with deep grooves dorsally
Feeding on wide range of aphids. **Syrphus** Fabricius
- Posterior respiratory process longer than broad; spiracular openings less than 6 times as long as broad; larva with 1 or 2 pairs of lobes apically on anal segment and without deep grooves 69
69. Posterior respiratory process in profile continuously broadening basally; abdomen widening posteriorly, subtriangular in cross-section
Feeding mostly on arboreal aphids. **Melangyna** Verrall
- Posterior respiratory process in profile with straight sides basally; abdomen equally narrow at anterior and posterior ends, oval or subcylindrical in cross-section
Feeding on aphids or chrysomelid larvae on shrubs and trees. **Parasyrphus** Matsumura

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