KEY TO THE CHIRONOMIDAE PUPAL EXUVIAE IN THE TWIN CITIES METRO AREA LENTIC WATERS

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Introduction

Chironomidae, commonly named “non-biting midges”, are a family of small flies whose larval and pupal stages are mainly aquatic. They make up over 50% of the insects that live at the bottom of streams and lakes as larvae. They are so diverse and widespread that they can live in most climates and a wide range of water qualities. Chironomids also live in most types of aquatic habitats (Coffman and Ferrington 1996).

Chironomids are a very important part of the aquatic food web. Because chironomid larvae are so numerous, they are a food source to most aquatic predators at some point in their lifecycle. Chironomids are also important in nutrient cycling, as many genera live in the sediments and break down course particulate organic matter or filter fine particulate organic matter from the water column (Coffman and Ferrington 1996).

There is a long history of using chironomids to evaluate water quality in streams and lakes. Some species of chironomids are very tolerant to pollution, whereas some species are very sensitive to pollution. These characteristics make them excellent candidates for testing water quality. If the species that are sensitive to pollution are present in a water body, one can conclude that there is not a high amount of pollution. If only the species that are tolerant to pollution are present, one can conclude the water body is polluted (Coffman and Ferrington 1996, Ferrington *et al.* 1991)).

Pupal exuviae

Chironomids are holometabolous, meaning they have an egg, larval, pupal and adult stage. When the pupa is fully developed, it swims to the surface and the adult emerges (Fig. 1). The remaining pupal skin (exuviae) has a waxy outer layer and floats on the water's surface for a few days. The pupal exuviae can be collected easily with a sieve.

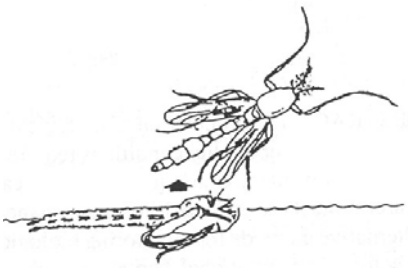

Figure 1. Adult emerging from the pupal exuvium (adapted from Ferrington *et al.* 1991).

Surface floating pupal exuviae (SFPE) take one-third the time to process than do larvae. Processing exuviae includes collecting, picking specimens out of detritus in the lab and slide-mounting. Larvae usually need to be slide-mounted to be identified to genus, and species level identification is usually not possible. SFPE can be identified to genus and sometimes species without slide-mounting and when slide-mounted, can usually be identified to species or species group (Ferrington *et al.* 1991).

Pupal exuviae preparation

For clear identifications, chironomid pupal exuviae must be slide mounted. Euparal® is the mounting medium of choice. Exuviae must be dissected carefully and arranged in a way that the important identification characters are visible. First, separate the cephalothorax from the abdomen. The abdomen is displayed dorsal side up (Fig. 2). Next, open up the cephalothorax at the ecdysial suture, and flip it so that the ventral side is up (Fig. 2).

Morphology

Chironomid pupal exuviae can vary greatly in size and color. Their length can range from 1.5mm to 20mm, while their coloration can range from clear to dark brown. The pupal exuviae has three main body divisions, the head, thorax and abdomen. In many cases, the head and thorax are referred to collectively as the cephalothorax. All the characters on pupal exuviae are located externally, which makes them easier to identify than larvae and adults. Chironomid larvae and adults are characterized by many internal structures.

Head: The head of the chironomid pupal exuviae contains the eyes, antennal and mouthpart sheaths (Fig. 2). Some of the identifying characters in this body region can include cephalic tubercles, frontal warts and frontal setae, which occur on the frontal apotome (Fig. 2). These characters can be present or absent in different combinations, shapes and sizes (Coffman and Ferrington 1996).

Thorax: The thorax of the chironomid pupal exuviae contains the legs, wings and halter sheaths. Some of the important identifying characters in this body region include the thoracic horns, precorneal setae and wing sheaths (Fig. 2). The thoracic horn is one of the most important identifying characters of the whole pupal exuviae. It can vary greatly in size, structure and presence/absence (Coffman and Ferrington 1996).

Abdomen: The abdomen of the chironomid pupa consists of eight segments and additional genital lobes at the posterior end of the eighth segment. The dorsal side of these segments are called terga. The ventral side of these segments are called sterna. The important identifying characters on the abdomen include spines, shagreen, setae and spurs (Fig. 2) (Coffman and Ferrington 1996).

Glossary of morphological terms used in this key

ANAL LOBE: usually broad "swimming fins" located at the posterior end of the abdomen (Fig. 2, Figs. 10-13, Fig. 28, Figs. 30-31, Figs 43-48)

ANAL LOBE FRINGE: a fringe of setae that occur on the anal lobes (Fig. 2, Figs. 10-13)

ANAL LOBE MACROSETAE: usually large setae at the distal end of the anal lobes (Fig. 2). In Tanypodinae there are two anal macrosetae (Fig. 29, Fig. 32) in most Orthocladiinae there are three (Fig. 52, Fig. 75), and in some Orthocladiinae and all Chironominae there are none (Figs. 10-13).

ANTENNAL SHEATHS: long extensions from the anterior part of the pupal head that are the coverings for the adult antennae forming inside the pupa (Fig. 2).

CEPHALIC TUBERCLES: enlarged, cone-shaped extensions of the frontal apotome (Fig. 2). Usually the frontal setae originate from the cephalic tubercles. Sometimes cephalic tubercles can be very ornate (Figs. 117-119, Figs. 145-147, Figs. 155-156).

ECDYSIAL SUTURE: the seam on the dorsal side of the thorax that splits open when the adult is ready to emerge from the pupal skin. The adult then pulls itself out of the pupal skin through the ecdysial suture. This is also the area that one uses to open up the cephalothorax during the slide-mounting process.

FRONTAL APOTOME: the region of the head between the antennal sheaths (Fig. 2). If cephalic tubercles and/or frontal warts are present, they are located on the frontal apotome.

FRONTAL SETAE: a pair of setae located on the frontal apotome, often originating from the cephalic tubercles (Fig. 2, Fig. 167).

FRONTAL WARTS: small welts located on the frontal apotome, sometimes in addition to cephalic tubercles (Fig. 2, Figs. 199-201).

LS SETAE: large, wide, broad setae extending laterally from the lower abdominal segments of some taxa (Fig. 2, Fig. 159, Fig. 161).

L SETAE: simple, hairlike setae extending laterally from the abdominal segments of some taxa (Fig. 2).

MACE: a hatchet-shaped spinous process extending from the middle of the tergite in Glyptotendipes (Figs. 137-139).

NASE: a small "nose-shaped" tubercle on the distal end of the wing sheath (Fig. 86, Fig. 96, Fig. 180). It is present in most Tanytarsini and a few other taxa.

PEARL ROWS: one or more rows of small, round bumps on the distal end of the wing sheath (Figs. 68-69, Figs. 95-96).

PLASTRON PLATE: a circular disk at the end or side of a Tanypodinae thoracic horn that is the surface for gas exchange (Fig. 2, Figs. 21-25).

PRECORNEAL SETAE: usually three setae on a raised bump at the base of the thoracic horn (Fig. 2, Fig. 64, Fig. 67).

SHAGREEN: very short, fine spines present on terga or sterna (Fig. 2, Figs 164-165).

SPINE GROUPS: groups of spines on the terga that can be in any configuration, paired or single (Fig. 79, Figs. 89-92, Fig. 94, Figs. 97-101).

SPINE ROWS: rows of spines usually located at the posterior edge of the tergite, anterior edge of the tergite or both (Fig. 2, Figs. 62-63).

STERNITE, STERNA: singular and pleural words for the ventral plates of the pupal abdomen segments.

TERGITE, TERGA: singular and pleural words for the dorsal plates of the pupal abdomen segments.

THORACIC COMB: a row of wide spines near the base of the thoracic horn in some Tanypodinae (Fig. 2).

THORACIC HORN: a structure extending from the anterior area of the thorax that the pupa uses for respiration under water (Fig. 2, Figs. 3-9). The thoracic horn can be present or absent, and can take on a wide variety of shapes and branches. In some Tanypodinae, it also has a plastron plate (Fig. 2, Figs. 21-25)

WING SHEATHS: the large wing-like extensions from the thorax that are the coverings for the adult wings as they form inside the pupa (Fig. 2, Figs. 68-69).

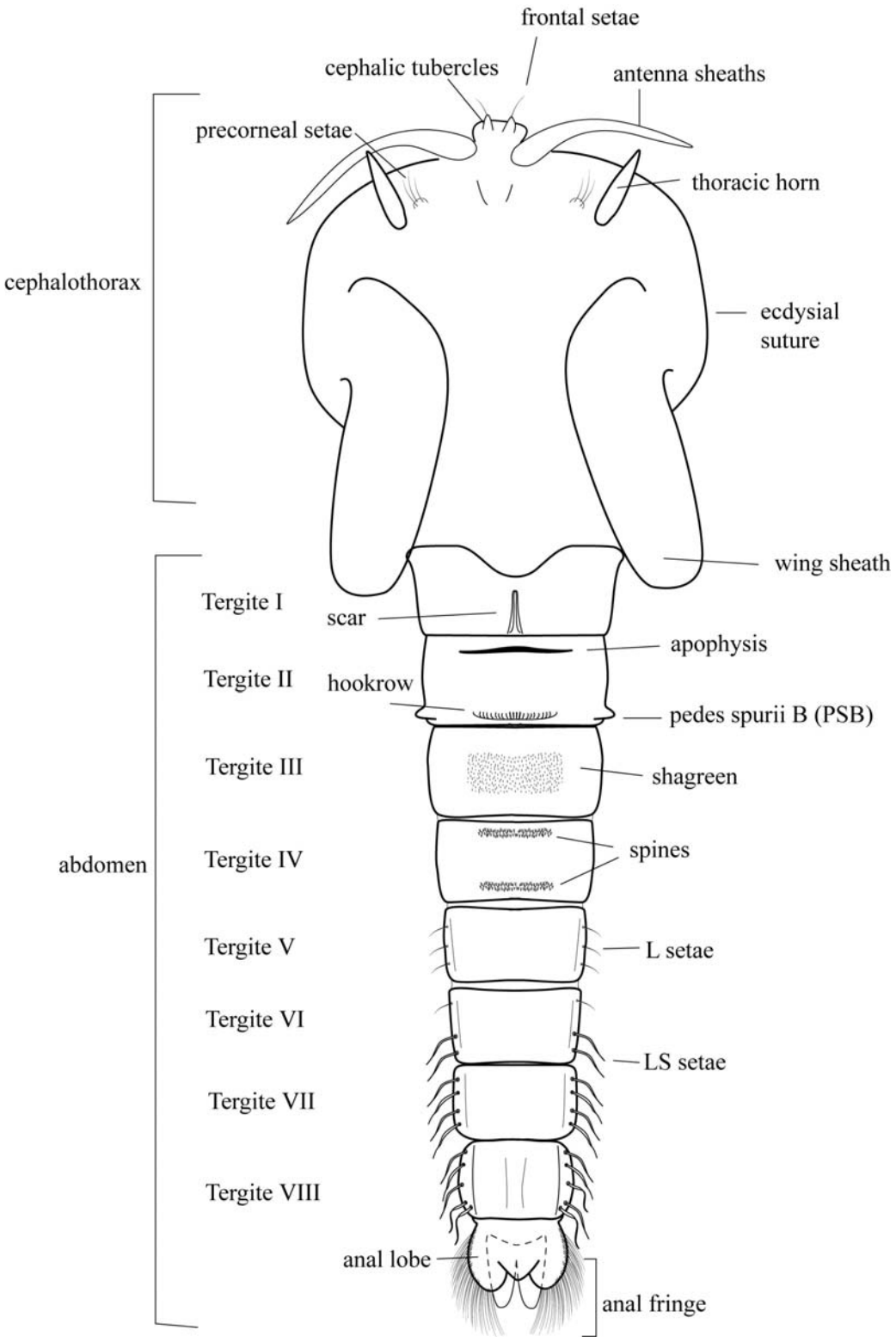

Figure 2. Morphology and terminology of Chironomidae pupae.

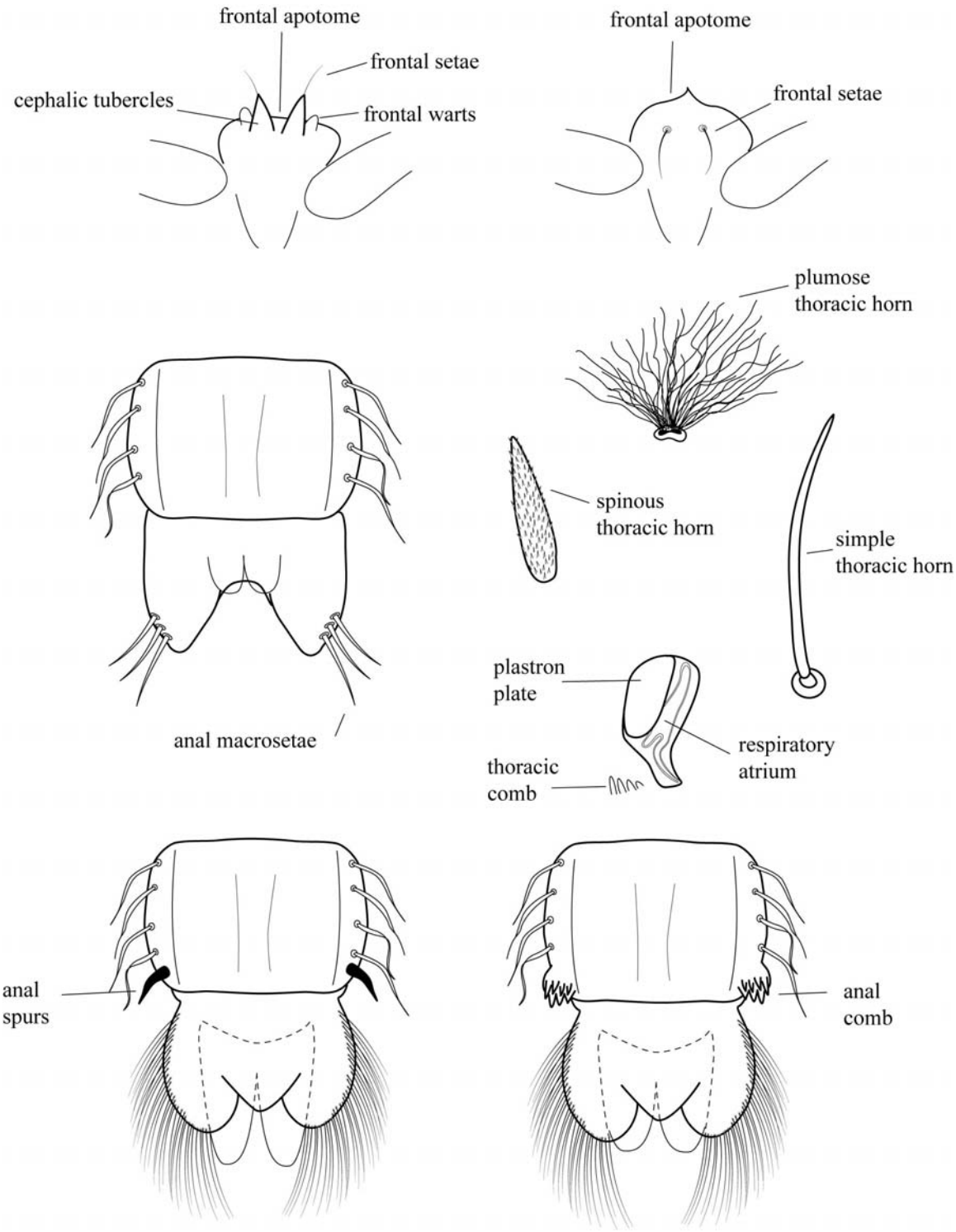

Figure 2 continued. Morphology and terminology of Chironomidae pupae.

KEY TO THE SUBFAMILIES OF CHIRONOMIDAE PUPAE IN THE TWIN CITIES METRO AREA LENTIC WATERS.

1. Thoracic horn with a distinct plastron plate (Figs. 4-5, Fig. 7), or large with a reticulate meshwork (Fig. 3, Fig. 6). No spines on the thoracic horn and it is never branched……..***Tanypodinae*** (p.56)

Figure 3. *Ablabesmyia* thoracic horn.

Figure 4. *Procladius* thoracic horn.

Figure 5. *Conchapelopia* thoracic horn.

Figure 6. *Labrundinia* thoracic horn.

Figure 7. *Psilotanypus* thoracic horn.

1'. Thoracic horn absent or present, without a distinct plastron plate or large reticulate meshwork (Figs. 8-11).....2

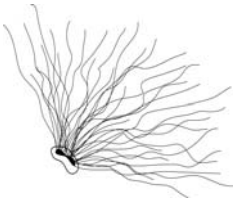

Figure 8. Chironomini thoracic horn

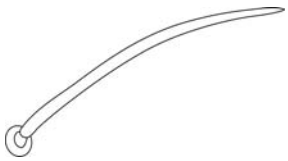

Figure 9. Tanytarsini thoracic horn

Figure 10. *Cricotopus* (*I.*) *sylvestris* thoracic horn

Figure 11. *Psectrocladius* thoracic horn.

2. Thoracic horn branched, often with many branches (Fig. 12). Or, thoracic horn with one long branch (Fig. 13). Anal lobes with fringe, and often with an anal spur or anal comb (Figs 14-17)…….***Chironominae*** (p.68)

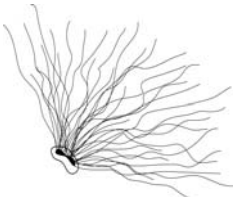

Figure 12. Chironomini thoracic horn.

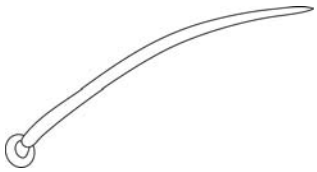

Figure 13. Tanytarsini thoracic horn

Figure 14. *Dicrotendipes tritomus* anal spurs.

Figure 15. *Chironomus* anal brush.

Figure 16. *Stictochironomus* anal spurs.

Figure 17. *Polypedilum* anal spurs.

2'. Thoracic horn usually smaller or absent and sometimes with spines (Figs. 18-20). Species often small, anal lobes usually with 3 anal macrosetae (Fig. 21) ……...***Orthocladiinae*** (p. 62)

Figure 18. *Cricotopus (I) sylvestris* thoracic horn and precorneal setae.

Figure 19. *Psectrocladius* thoracic horn.

Figure 20. *Nanocladius* thoracic horn.

Figure 21. *Psectrocladius* anal macrosetae.

KEYS TO THE GENERA OF CHIRONOMIDAE PUPAE IN THE TWIN CITIES METRO AREA LENTIC WATERS.

Tanypodinae

1. Thoracic horn large with a reticulate meshwork and no plastron plate (Figs. 22-24)….2

Figure 22. *Ablabesmyia* thoracic horn.

Figure 23. *Labrundinia* thoracic horn.

Figure 24. *Tanypus* thoracic horn.

1'. Thoracic horn with a distinct plastron plate (Figs. 25-29)……...10

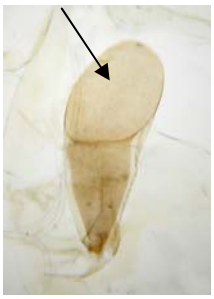

Figure 25. *Clinotanypus* thoracic horn.

Figure 26. *Larsia* thoracic horn.

Figure 27. *Meropelopia* thoracic horn.

Figure 28. *Procladius* thoracic horn.

Figure 29. *Psilotanypus* thoracic horn.

2(1). Thoracic horn kidney bean-shaped (Fig. 30), anal lobes long and narrow (Fig. 31). ……***Labrundinia*** (p.95)

Figure 30. *Labrundinia* thoracic horn.

Figure 31. *Labrundinia* anal lobes.

2’. Thoracic horn and anal lobes not as above. 3

3(2’). Anal lobes short and rounded (Figs. 32-33)……***Tanypus*** (p.100)

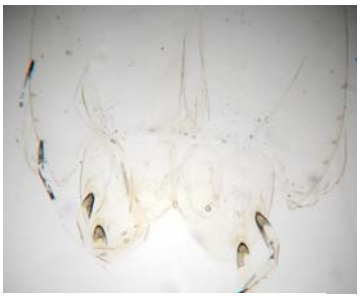

Figure 32. *Tanypus* anal lobes.

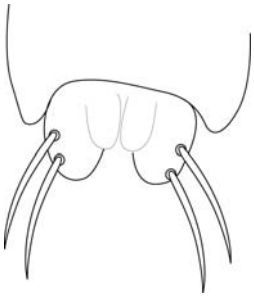

Figure 33. *Tanypus* anal lobes.

3’. Anal lobes pointed (Fig. 34)……...4

Figure 34. *Ablabesmyia* anal lobes.

4(3’). Lateral corners of abdominal segment 8 with lobes extending posteriorly (Figs. 35-36)……***Guttipelopia*** (p.94)

Figure 35. *Guttipelopia* anal lobes.

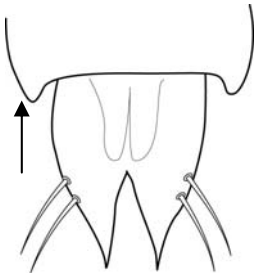

Figure 36. *Guttipelopia* anal lobes.

4’. Posterior margin of abdominal segment 8 horizontally even (Figs. 37-38). ……***Ablabesmyia*** (p.90)

Figure 37. *Ablabesmyia* anal lobes.

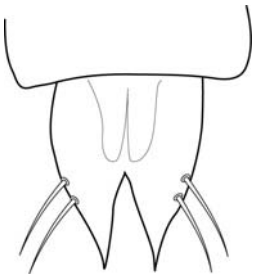

Figure 38. *Ablabesmyia* anal lobes.

5(1’). Thoracic horn with numerous convolutions inside (Fig. 39)……***Larsia*** (p.96)

Figure 39. *Larsia* thoracic horn.

5’. Thoracic horn without numerous convolutions inside……...6

6(5’). Thoracic horn horn-shaped with one wide convolution surrounding one side of the plastron plate. Plastron plate to one side of the thoracic horn (Figs. 40-41)……...7

Figure 40. *Conchapelopia* thoracic horn.

Figure 41. *Meropelopia* thoracic horn.

6’. Plastron plate at the distal end of the thoracic horn, with a wide felt chamber and no large convolution (Figs. 42-44)…….8

Figure 42. *Clinotanypus* thoracic horn.

Figure 43. *Procladius* thoracic horn.

Figure 44. *Procladius* thoracic horn.

7(6). Thoracic horn with a large plastron plate and no distinct clear area surrounding the plastron plate, thoracic comb present (Fig. 45)……..***Conchapelopia*** (p.93)

Figure 45. *Conchapelopia* thoracic horn.

7’. Thoracic horn with a smaller plastron plate with a clear area surrounding the plastron plate, thoracic comb absent (Fig. 46)…….……***Meropelopia*** (p.97)

Figure 46. *Meropelopia* thoracic horn.

8(6’). Anal lobes with a medial invagination ringed with dark brown spines (Fig. 47).
…….***Clinotanypus*** (p.92)

Figure 47. *Clinotanypus* anal lobes.

8’. Anal lobes rounded or horizontal distally without a spined invagination (Figs. 48-50).
…….***Procladius*** 9

Figure 48. *Procladius* anal lobes.

Figure 49. *Procladius* anal lobes.

Figure 50. *Procladius (Psilotanypus)* anal lobes.

9(8’). Distal end of anal lobes rounded (Figs. 51-52).
……..***Procladius (Psilotanypus) bellus*** group (p.98)

Figure 51. *Procladius* (*Psilotanypus*) anal lobes.

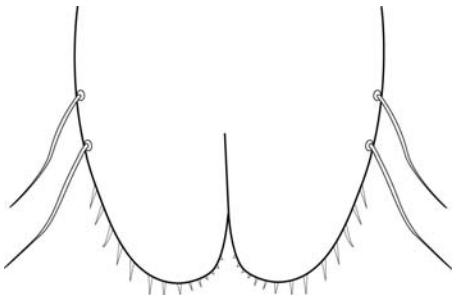

Figure 52. *Procladius* (*Psilotanypus*) anal lobes.

9’. Distal end of anal lobes horizontal or produced (Figs. 53-54).
…….***Procladius (Procladius)*** (p.98)

Figure 53. *Procladius* anal lobes.

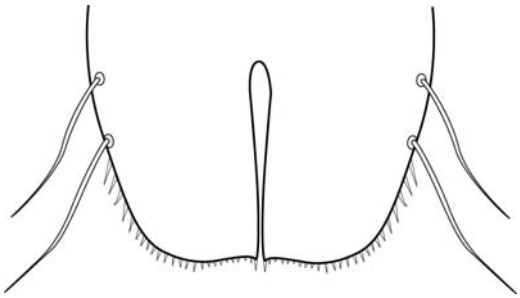

Figure 54. *Procladius* anal lobes.

Orthocladiinae

1. Anal lobes with a fringe of setae (Fig. 55).....2

Figure 55. *Corynoneura* anal lobes.

1’. Anal lobes without a fringe of setae, just 3 anal macrosetae present (Fig. 56). 7

Figure 56. *Diplocladius* anal lobes.

2(1). Thoracic horn present (Figs. 57-60). 3

Figure 57. *Cricotopus* thoracic horn.

Figure 58. *Cricotopus (I.) sylvestris* thoracic horn.

Figure 59. *Nanocladius* thoracic horn.

Figure 60. *Psectrocladius* thoracic horn.

2’. Thoracic horn absent, specimens tiny (2-3mm) 6

3(2). Terga 3-6 with posterior hooks and central spine groups (Figs. 61-62) 4

Figure 61. *Psectrocladius* abdomen.

Figure 62. *Nanocladius* abdomen.

3’. Posterior margins of terga 3-6 with swollen, raised areas that have groups of tiny triangular spines, but no central spine groups (Fig. 63). Single, robust spine on posteriolateral corner of segments 7 and 8 (Fig. 64)……***Zalutschia*** (p.110)

Figure 63. *Zalutschia* spines on posterior margins of tergites.

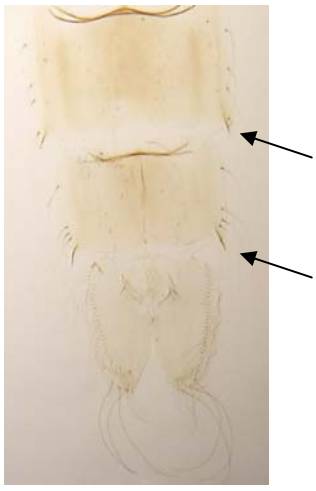

Figure 64. *Zalutschia* single robust spines on posteriolateral corner of tergites VII and VIII.

4(3). Darkly pigmented, small body (2-4 mm) (Fig. 65), with large PSB on tergite 2 (Fig. 66). Two precorneal setae much stronger than the third (Figs. 67-68)***Nanocladius*** (p.106)

Figure 65. *Nanocladius* abdomen.

Figure 66. *Nanocladius* PSB on tergite 2.

Figure 67. *Nanocladius* precorneal setae.

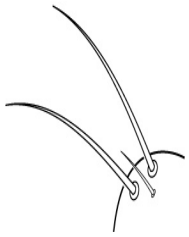

Figure 68. *Nanocladius* precorneal setae.

4’. Clear cuticle, larger body, with little to no PSB on tergite 2 (Fig. 69). All three precorneal setae similar sized (Figs. 70-71)……***Psectrocladius*** (p.108)

Figure 69. *Psectrocladius* abdomen.

Figure 70. *Psectrocladius* precorneal setae.

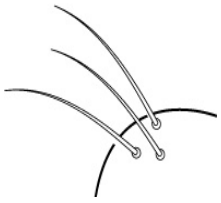

Figure 71. *Psectrocladius* precorneal setae.

5(2’). Wing sheath with pearl rows (Figs. 72-73)……***Corynoneura*** (p.102)

Figure 72. *Corynoneura* pearl rows on wing sheaths.

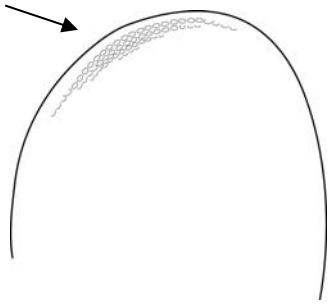

Figure 73. *Corynoneura* pearl rows on wing sheaths.

5’. Wing sheath without pearl rows (Fig. 74)…….***Thienemanniella*** (p.109)

Figure 74. *Thienemanniella* wing sheaths.

6(1’). Tergites 2-8 with long thin spines along the posterior margin (Figs. 75-77), thoracic horn absent……***Limnophyes*** (p.105)

Figure 75. *Limnophyes* spines on posterior margins of tergites.

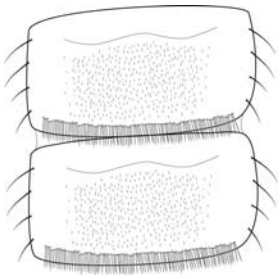

Figure 76. *Limnophyes* spines on posterior margins of tergites.

Figure 77. *Limnophyes* anal lobes and macrosetae.

6’ Tergites not as above.....7

7(6’). Anal lobes terminating in sharp points (Figs. 78-79), thoracic horn usually bulbous (Fig. 80)…….***Parakiefferiella*** (p.107)

Figure 78. *Parakiefferiella* pointed anal lobes.

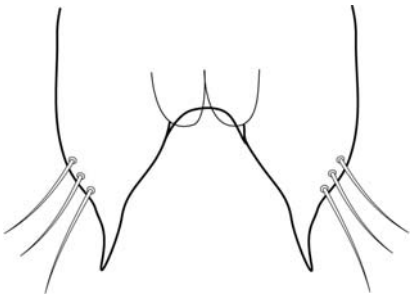

Figure 79. *Parakiefferiella pointed anal lobes*.

Figure 80. *Parakiefferiella thoracic horn*.

7’ Anal lobes not as above.....8

8(7’). Tergites and sternites with anterior transverse dark lines (apophyses) (Fig. 81), anal lobes as below, with no anal fringe (Fig.82)……..***Diplocladius*** (p.104)

Figure 81. *Diplocladius* tergites and sternites with anterior transverse dark lines (apophyses).

Figure 82. *Diplocladius* anal lobes and anal macrosetae.

8’. Terga and sterna without anterior transverse dark lines. 9

9(10’). Tergal shagreen pattern with two central patches and a posterior patch (Fig. 83), thoracic horn long and tapering with spines (Fig. 84)…….***Acricotopus*** (p.101)

Figure 83. *Acricotopus* tergal shagreen pattern.

Figure 84. *Acricotopus* thoracic horn.

9’ Tergal shagreen pattern not as above (Fig. 85), thoracic horn variable (Figs. 86-87) ……...***Cricotopus*** (p.103)

Figure 85. *Cricotopus* tergal shagreen pattern.

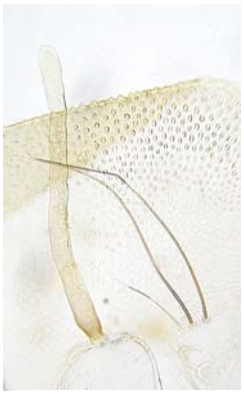

Figure 86. *Cricotopus (I.) sylvestris* thoracic horn and precorneal setae.

Figure 87. *Cricotopus* thoracic horn.

Chironominae

1. Thoracic horn always unbranched (Figs. 88-89), wing sheaths almost always with a subterminal tubercle ("Nase") (Fig. 90), if Nase is absent, then at least some terga with conspicuous spine groups……Tanytarsini, 2

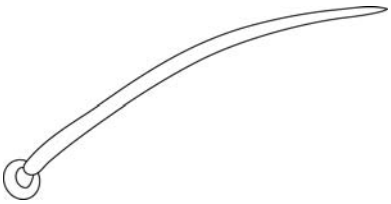

Figure 88. *Tanytarsini* thoracic horn.

Figure 89. *Tanytarsini* thoracic horn.

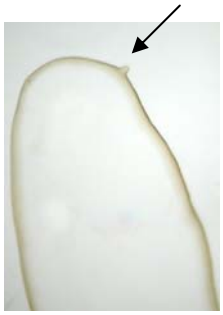

Figure 90. Tanytarsini Nase on wing sheath.

1'. Thoracic horn almost always with 2 or more branches (Fig. 91), if no branches then anal lobes with no fringe. Wing sheaths almost never with a Nase (Fig. 92).
……..Chironomini, 7

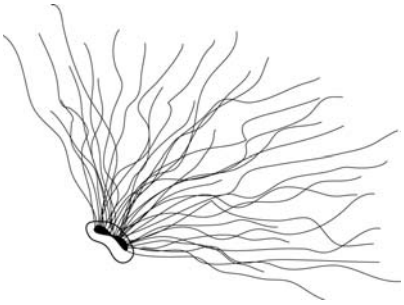

Figure 91. *Chironomini* thoracic horn.

Figure 92. Chironomini wing sheath.

2(1). Tergum IV (and some others) with one or more distinct groups of short and/or long spines (Figs. 93-95).....3

Figure 93. *Tanytarsus* spine groups on tergites.

Figure 94. *Paratanytarsus* spine groups on tergites.

Figure 95. *Micropsectra* spine groups on tergites.

2’ Tergum VI (and others) with no spines, very tiny (2-4 mm), light shagreen patches on tergites facing opposite directions (Fig. 96). Long cephalic tubercles with setae at tips (Fig. 97)……..…...**Tanytarsini genus 1** (p.116)

Figure 96. *Tanytarsini* genus 1 tergites.

Figure 97. *Tanytarsini* genus 1 cephalic tubercles.

3(2). Spine pattern on tergites II-IV as in Fig. 98……***Micropsectra*** (p.112)

Figure 98. *Micropsectra* spine groups on tergites.

3’. Spine pattern not as above.....4

4(3’). Wing sheath with pearl row and nase (Figs. 99-100), spine patches in various patterns on tergites 3-4 or 3-5 (Figs. 101-102)……..…..***Paratanytarsus*** (p.113)

Figure 99. *Paratanytarsus* pearl rows and nase.

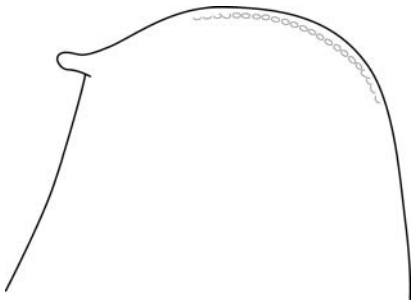

Figure 100. *Paratanytarsus* pearl rows and nase.

Figure 101. *Paratanytarsus* spine patches.

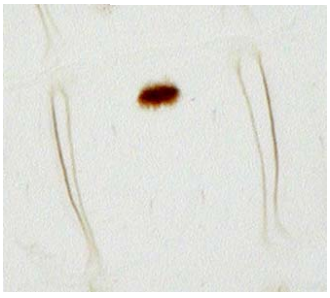

Figure 102. *Paratanytarsus* spine patches.

4’. Wing sheath without pearl row, spine patches are always in pairs with no medial patches on tergites (Figs. 103-105).....5

Figure 103. *Tanytarsus* paired spine groups.

Figure 104.*Cladotanytarsus* paired spine groups.

Figure 105. *Tanytarsus* paired spine groups.

5(4’). Thorax heavily granulated (Fig. 106), spine patches on tergites III-V as below (Fig. 107)…….***Stempellina*** (p.114)

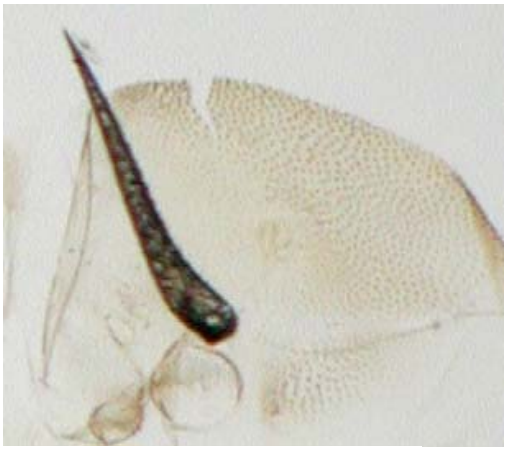

Figure 106. *Stempellina* granulated thorax and thoracic horn.

Figure 107. *Stempellina* paired spine groups.

5’. Characters not as above 6

6(5’). Weak, paired, short spine patches on tergites II-VI (Fig. 108). Thoracic horn usually with long setae (Figs. 109-110)……***Cladotanytarsus*** (p.111)

Figure 108. *Cladotanytarsus* paired spine groups.

Figure 109. *Cladotanytarsus* thoracic horn.

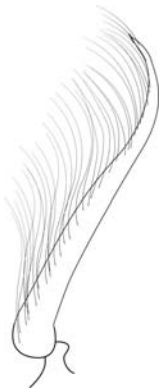

Figure 110. *Cladotanytarsus* thoracic horn.

6’. Strong long or short paired spine patches usually on tergites III-VI (Fig. 111), occasionally on II-VI. Thoracic horn without long setae (Fig. 112)..***Tanytarsus*** (p.115)

Figure 111. *Tanytarsus* paired spine groups.

Figure 112. *Tanytarsus* paired spine groups.

7(1’). Sternite I with 4 spiny tubercles (Fig. 113), anal lobes rounded and weak anal comb present (Fig. 114)…….……***Pseudochironomus*** (p.136)

Figure 113. *Pseudochironomus* sternite 1.

Figure 114. *Pseudochironomus* anal comb and anal lobes.

7’. Sternite I without 4 spiny tubercles although spines may be present, anal lobes with fringe. 8

8(7’). Row of hooklets on posterior margin of segment II distinctly interrupted (Figs. 115-116).....9

Figure 115. *Microchironomus* tergite 2 hookrows.

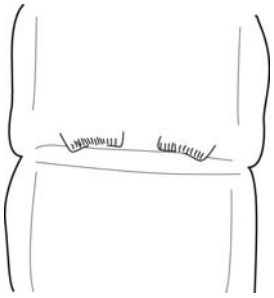

Figure 116. *Microchironomus* tergite 2 hookrows.

8’. Row of hooklets on posterior margin of segment 2 at most narrowly interrupted (Figs. 117-118).....13

Figure 117. *Parachironomus* tergite 2 hookrows.

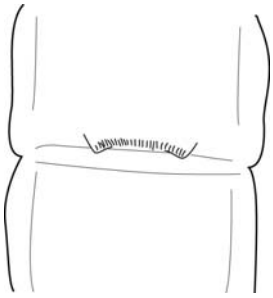

Figure 118. *Parachironomus* tergite 2 hookrows.

9(8). Thoracic horn exceptionally long, as long or almost as long as cephalothorax (Figs. 119-120……..***Cryptotendipes*** (p.120)

Figure 119. *Cryptotendipes* thoracic horns.

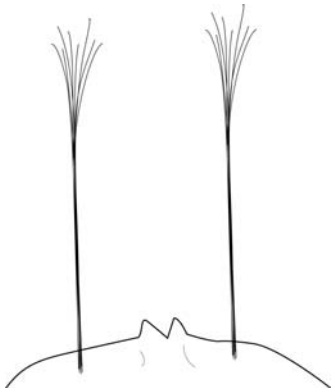

Figure 120. *Cryptotendipes* thoracic horns.

9’.Thoracic horn not long, not as long as cephalothorax.....10

10(9’). Caudal region of anal lobes with a forked posterior extension (Fig. 121), often very ornate cephalic tubercles (Figs. 122-123)…….……***Cryptochironomus*** (p.119)

Figure 121. *Cryptochironomus* anal lobes and forked projection.

Figure 122. *Cryptochironomus eminentia* cephalic tubercles.

Figure 123. *Cryptochironomus* sp. 6 cephalic tubercles.

10’. Caudal region without a forked posterior extension.....11

11(10’). Tergum VI with a round, median tubercle (Figs. 124-125)...***Cladopelma*** (p.118)

Figure 124. *Cladopelma* tergite 6.

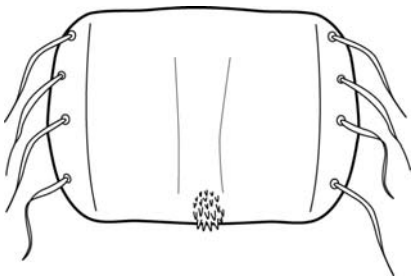

Figure 125. *Cladopelma* tergite 6.

11’. Tergum VI without a round median spiny tubercle.....12

12(11’). Single or double anal spur present (Fig. 126), Cephalic tubercles long (Fig. 127), PSB on tergite 2 developed (Fig. 128)…….***Microchironomus*** (p.128)

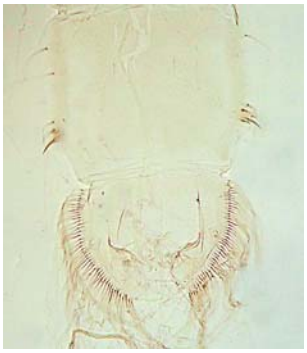

Figure 126. *Microchironomus* anal lobes.

Figure 127. *Microchironomus* cephalic tubercles.

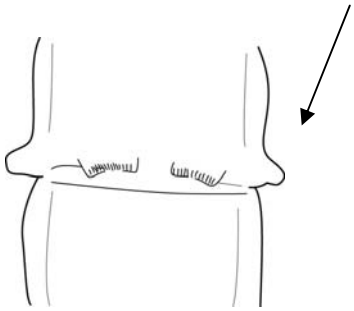

Figure 128. *Microchironomus* PSBII.

12’. Anal spur absent (Fig. 129-130)…….***Harnischia*** (p.126)

Figure 129. *Harnischia* tergite VIII and anal lobes.

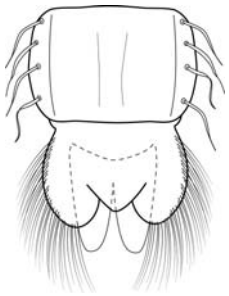

Figure 130. *Harnischia* tergite VIII and anal lobes.

13(8’). Anal spur or anal comb present (Figs. 131-134).....14

Figure 131. *Dicrotendipes* anal spurs.

Figure 132. *Parachironomus* anal spurs.

Figure 133. *Chironomus* anal brushes.

Figure 134. *Stictochironomus* anal comb.

13’. Anal spur or anal comb absent (Figs. 135-137).....33

Figure 135. *Saetheria* segment 8 and anal lobes.

Figure 136. *Parachironomus* segment 8 and anal lobes.

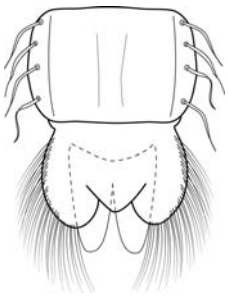

Figure 137. Anal spur or anal comb absent.

14(13). Thoracic horn with only 2 branches (Fig. 138), terga II-V with paired transverse patches of short spines (Fig. 139)……***Lauterborniella*** (p.127)

Figure 138. *Lauterborniella* thoracic horn.

Figure 139. *Lauterborniella* tergites.

14’. Thoracic horn with many branches (Fig. 140), sometimes branches are so thin they look like a pom pom, terga usually without paired spine patches 15

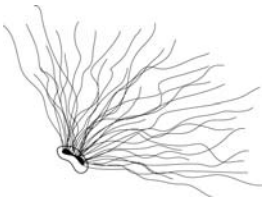

Figure 140. *Chironomini* plumose thoracic horn.

15(14’). Terga II-VI or III-VI with large medial spiny processes, “Maces” (Figs. 141-143).……..***Glyptotendipes*** 16

Figure 141. *Glyptotendipes* mace.

Figure 142. *Glyptotendipes* mace.

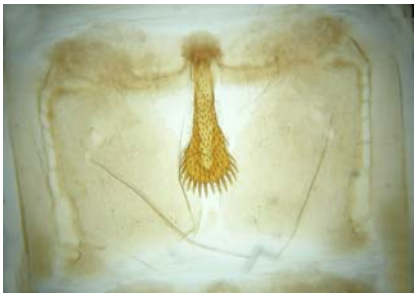

Figure 143. *Glyptotendipes* mace.

15’. Terga II-VI without large medial spiny processes.....17

16(15). Terga II-VI with large “Maces” (Figs. 144-146)
……...***Glyptotendipes (****Glyptotendipes****)*** (p.125)

Figure 144. *Glyptotendipes* (*G.*) mace.

Figure 145. *Glyptotendipes* (*G.*) mace.

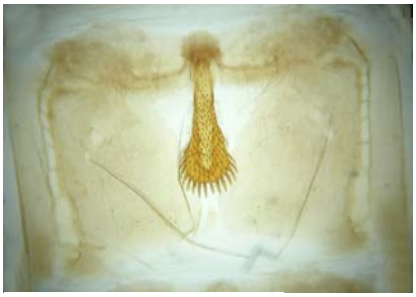

Figure 146. *Glyptotendipes* (*G.*) mace.

16’. Terga III-VI with small “Maces” increasing in size from tergite III-VI (Figs. 147-148)……...***Glyptotendipes (****Caulochironomus****)*** (p.125)

Figure 147. *Glyptotendipes* (*C.*) mace.

Figure 148. *Glyptotendipes* (*C.*) mace.

17(15’). Cephalic tubercles extremely long and tapering (Figs. 149-151), frontal setae attached near the bases of the tubercles……***Polypedilum simulans*** (p.135)

Figure 149. *Polypedilum simulans* cephalic tubercles.

Figure 150. *Polypedilum simulans* cephalic tubercles.

Figure 151. *Polypedilum simulans* cephalic tubercles.

17’. Cephalic tubercles, if present not the above shape.....18

18(17’). Anal spur a single straight or sinuate spine (Figs. 152-153). ……***Dicrotendipes modestus*** (p.122)

Figure 152. *Dicrotendipes modestus* anal spurs.

Figure 153. *Dicrotendipes modestus* anal spurs.

18’. Anal comb with multiple spines or a large compound brush (Figs. 154-156) 19

Figure 154. *Chironomus* compound anal brushes.

Figure 155. *Chironomus* compound anal brushes.

Figure 156. *Stictochironomus* anal combs.

19(18’). Anal spur a single spine with one or two accessory spines (Fig. 157) …….***Dicrotendipes tritomus*** (p.122)

Figure 157. *Dicrotendipes tritomus* anal spurs.

19’. Anal spur not as above, with many spines or a comb-like shape 20

20(19’). Anal lobes with a pair of dark brushes of setae (Fig. 158) and only 1 or 2 LS setae on segment VII……***Endochironomus*** (p.124)

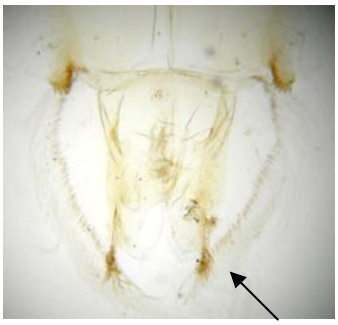

Figure 158. *Endochironomus* anal lobes.

20’. Anal lobes without a pair of dark brushes of setae.....21

21(20’). Cephalic tubercles truncate, with an apical covering of spines (Figs. 159-160).
……..***Phaenopsectra*** (p.134)

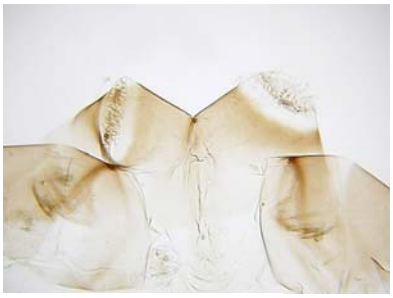

Figure 159. *Phaenopsectra* cephalic tubercles.

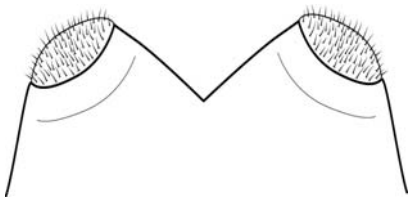

Figure 160. *Phaenopsectra* cephalic tubercles.

21’. Cephalic tubercles not as above or absent.....23

22(21’). Terga II-VI with paired longitudinal groups of spines (Fig. 161).
…….***Zavreliella*** (p.141)

Figure 161. *Zavreliella* terga.

22’. Terga II-V without paired longitudinal groups of spines 24

23(22’). Segment V with 3 LS setae (Figs. 162-163).....25

Figure 162. *Stictochironomus* segment V with 3 LS setae.

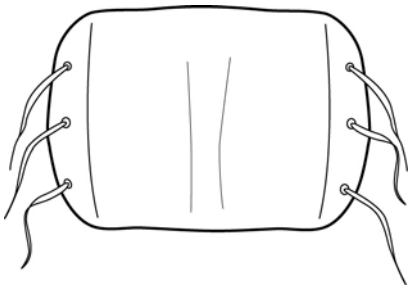

Figure 163. *Stictochironomus* segment V with 3 LS setae.

23’. Segment V with 4 LS setae (Figs. 164-165).....27

Figure 164. *Paralauterborniella* segment V with 4 LS setae.

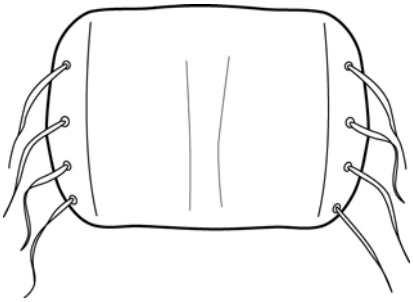

Figure 165. *Paralauterborniella* segment V with 4 LS setae.

24(23). Transverse rows of spines on the anterior region of segments II-VI (Figs. 166-167).....26

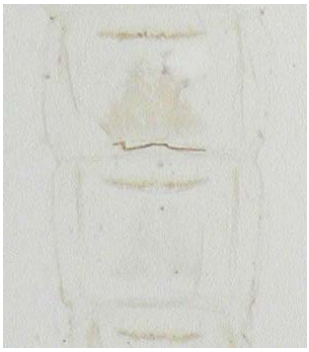

Figure 166. *Microtendipes* terga transverse rows of spines.

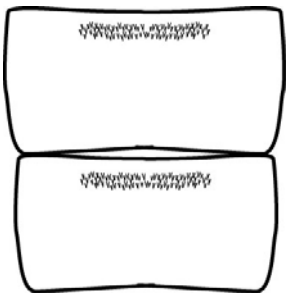

Figure 167. *Microtendipes* terga with transverse rows of spines.

24’. No transverse rows of spines on segments II-VI, just uniform shagreen (Figs. 168-169)……..***Paratendipes*** (p.133)

Figure 168. *Paratendipes* terga with shagreen.

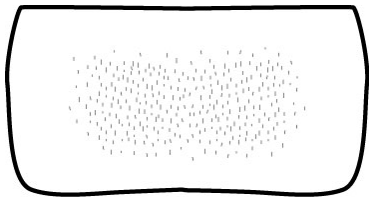

Figure 169. *Paratendipes* terga with shagreen

25(24). Long, robust frontal setae, anal combs as below (Figs. 170-172). ……..***Stictochironomus*** (p.139)

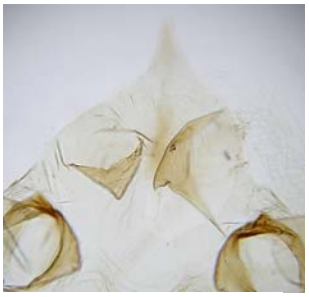

Figure 170. *Stictochironomus* frontal setae.

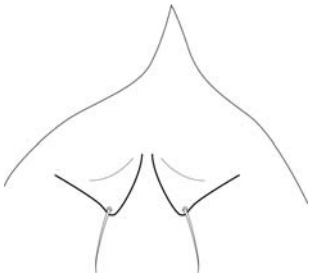

Figure 171. *Stictochironomus* frontal setae.

Figure 172. *Stictochironomus* anal combs.

25’. Frontal setae absent, cephalic tubercles and anal spurs as below (Figs. 173-174). ……...***Microtendipes*** (p.129)

Figure 173. *Microchironomus* cephalic tubercles.

Figure 174. *Microchironomus* anal spurs.

26(25’). Cephalic tubercles present (Figs. 175-177) 28

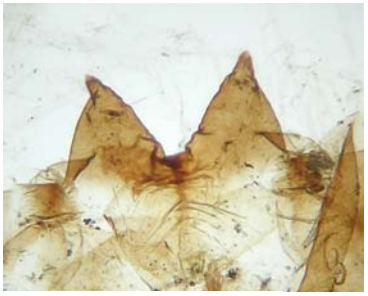

Figure 175. *Chironomus* cephalic tubercles.

Figure 176. *Paralauterborniella* cephalic tubercles.

Figure 177. *Parachironomus* cephalic tubercles.

26’. Cephalic tubercles absent (Fig. 178) 27

Figure 178. *Polypedilum* frontal apotome.

27(26). Segment VIII with 4 LS setae (Figs. 179-180) 28

Figure 179. *Paralauterborniella* segment VIII and anal lobes.

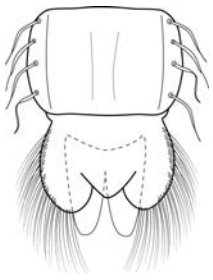

Figure 180. *Paralauterborniella* segment VIII and anal lobes.

27’. Segment VIII with 5 LS setae (Figs. 181-182).....30

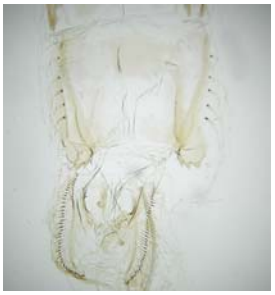

Figure 181. *Stenochironomus* segment VIII and anal lobes.

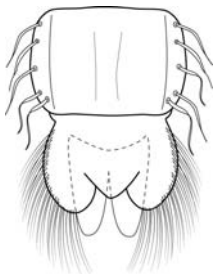

Figure 182. *Einfeldia* segment VIII and anal lobes.

28(27). Cephalic tubercles long with setae extending from the tips (Fig. 183), wing sheath with a tubercle (Fig. 183), long PSBII (Fig. 184).
…….***Paralauterborniella nigrohalteralis*** (p.132)

Figure 183. *Paralauterborniella nigrihalteralis* cephalic tubercles.

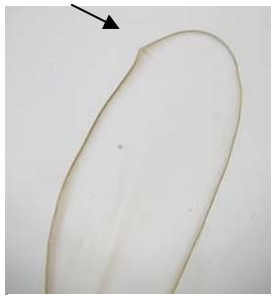

Figure 184. *Paralauterborniella nigrihalteralis* wing sheath.

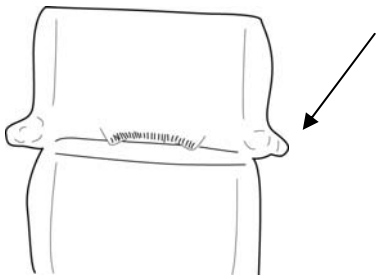

Figure 185. *Paralauterborniella nigrihalteralis* PSBII.

28’. Cephalic tubercles not long, wing sheath without tubercle (Fig. 186), tergites with light uniform shagreen except for a medial patch of stronger shagreen on the posterior end of segment VI (Fig. 188)……...***Parachironomus*** *in part* (p.130)

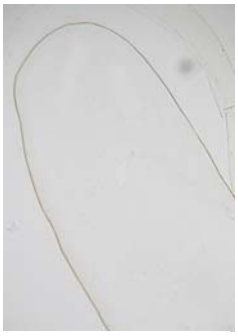

Figure 186. *Parachirono-mus* wing sheath.

Figure 187. *Parachirono-mus* tergite II spine row.

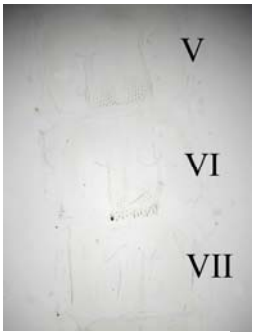

Figure 188. *Parachirono-mus* terga V-VII.

29(28’). Anal spur a strong long compound brush (Figs. 189-190)….***Chironomus*** (p.117)

Figure 189. *Chironomus* compound anal brushes.

Figure 190. *Chironomus* compound anal brushes.

29’. Anal spur small with a few spines (Fig. 191).....31

Figure 191. *Demicryptochironomus* anal spurs.

30(29’). Segment VIII with a pair of posterior medial processes (Fig. 192).
……..Female ***Demicryptochironomus*** (p.121)

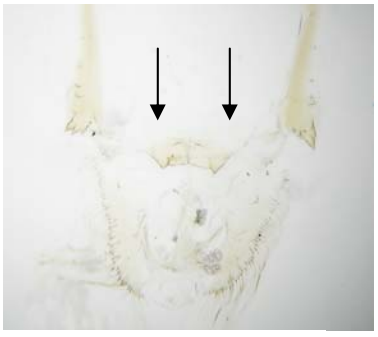

Figure 192. *Demicryptochironomus* segment VIII.

30’. Segment VIII without a pair of posterior medial processes 31

31. Tergal spine patterns as below (Fig. 193)…….***Einfeldia*** species group A (p.123)

Figure 193. *Einfeldia* tergal spine patterns.

31’. Terga with just light shagreen (Fig. 194)…….. Male ***Demicryptochironomus*** (p.121)

Figure 194. *Demicryptochironomus* tergal shagreen.

32. Frontal setae absent (Fig. 195), anal combs with broad horizontally lined-up teeth (Figs. 196-197)…….***Stenochironomus*** (p.138)

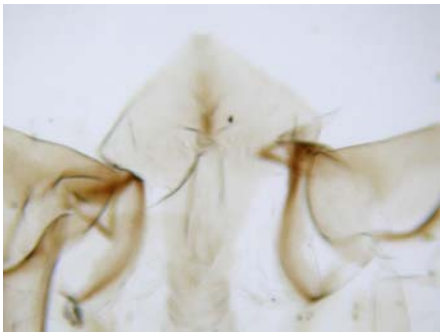

Figure 195. *Stenochironomus* frontal apotome.

Figure 196. *Stenochironomus* anal comb.

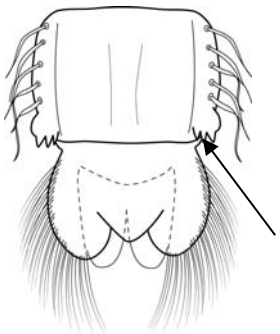

Figure 197. *Stenochironomus* anal comb.

32’. Frontal setae present (Figs. 198-199), anal comb with numerous spines that are not horizontally lined-up (Figs. 200-202)……...***Polypedilum*** (p.135)

Figure 198. *Polypedilum* frontal apotome.

Figure 199. *Polypedilum* frontal apotome.

Figure 200. *Polypedilum* anal comb.

Figure 201. *Polypedilum* anal comb.

Figure 202. *Polypedilum* anal comb.

33(13). Cephalic tubercles and frontal warts present (Figs. 203-205). ……***Einfeldia*** species group B (p.123)

Figure 203. *Einfeldia* cephalic tubercles and frontal warts.

Figure 204. *Einfeldia* cephalic tubercles and frontal warts.

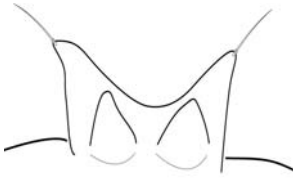

Figure 205. *Einfeldia* cephalic tubercles and frontal warts.

33’. Cephalic tubercles present only.....34

34(33). Tergites with a definite spine pattern (Figs. 206-208) 35

Figure 206. *Saetheria* tergal spine pattern.

Figure 207. *Paracladopelma* tergal spine pattern.

Figure 208. *Xenochironomus* tergal spine pattern.

34'. Abdomen clear, with only very light shagreen except for the medial posterior region of tergite VI, which has slightly darker shagreen and is slightly raised (Fig. 210). ……***Parachironomus*** *in part* (p.130)

Figure 209. *Parachironomus* uninterrupted hookrow on tergiteII.

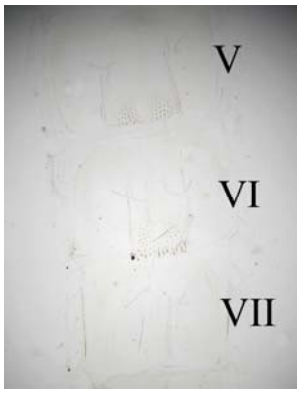

Figure 210. *Parachironomus* terga V-VII.

35(34). Spine pattern on tergites as below (Fig. 211)……...***Xenochironomus*** (p.140)

Figure 211. *Xenochironomus* tergal spine pattern.

35’. Spine pattern on tergites not as above 36

36(35). Segment VIII with 4 LS setae (Figs. 212-213), tergal patterns as below (Fig. 214)…….....***Sætheria*** (p.137)

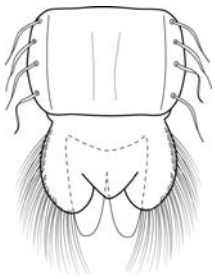

Figure 212. *Saetheria* segment VIII and anal lobes.

Figure 213. *Saetheria* segment VIII and anal lobes.

Figure 214. *Saetheria* tergal spine pattern.

36’. Segment VIII with 5 LS setae (Fig. 215), tergal patterns as below (Fig. 216)…….***Paracladopelma*** (p.131)

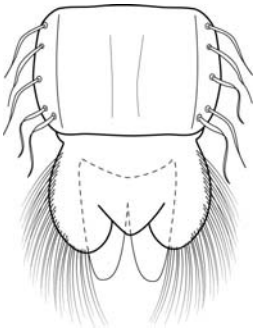

Figure 215. *Paracladopelma* segment VIII and anal lobes.

Figure 216. *Paracladopelma* tergal spine pattern.

TAXON DESCRIPTIONS

TANYPODINAE

Ablabesmyia Johannsen

Ablabesymia species are very common, especially in mid-summer when the water is warm. They can be recognized by their large, bulbous thoracic horns and well-developed thoracic comb. They are most similar to *Tanypus* and *Guttipelopia*. Relatively longer, pointed anal lobes distinguish *Ablabesmyia* from *Tanypus*, which has short, rounded anal lobes. To distinguish from *Guttipelopia*, examine the posterolateral corners of segment 8. In *Guttipelopia*, the corners extend posteriorly in lobes, where as in *Ablabesmyia* the posterior margin of segment 8 is horizontal.

There are many species of *Ablabesmyia* in the TCMA lakes, and they are fairly easily distinguishable. First, look at the thoracic horn (Figs. 218-219). If there is an extension from the distal end, it is the species *A. peleensis* (Fig. 219). Next, look at the wing sheath pattern and match it to Figs. 220-223.

Figure 217. *Ablabesmyia* full body.

Figure 218. *Ablabesmyia* sp. thoracic horn.

Figure 219. *A. peleensis* thoracic horn.

Figure 220. *A. idei* wing sheath.

Figure 221. *A. mallochi* wing sheath.

Figure 222. *A. monilis* wing sheath.

Figure 223. *A. janta* wing sheath.

Roback, S.S. 1985. The immature chironomids of the eastern United States VI. Pentaneurini – Genus *Ablabesmyia*. Proceedings of the Academy of Natural Sciences of Philadelphia 137(2): 153-212.

Clinotanypus Kieffer

Clinotanypus are mainly lentic, occurring in ponds, lakes and slow-moving streams. *Clinotanypus* look most like to *Procladius*, having similar thoracic horns (Fig. 224). The distinguishing character for *Clinotanypus* is the very unique anal lobes; on the posteriomedial margin there is a spiny invagination (Fig. 225). Only one species of *Clinotanypus* was found in the TCMA lakes (Fig. 226).

Figure 224. *Clinotanypus* thoracic horn.

Figure 225. *Clinotanypus* anal lobes.

Figure 226. *Clinotanypus* full body.

Conchapelopia Fittkau

Conchapelopia is widespread in a variety of habitats and prefer cool water. *Conchapelopia* is most similar to *Meropelopia*, however there are two characteristics that will separate these genera. First, the thoracic horn of Conchapelopia does not have a distinct clear area surrounding the plastron plate and the plastron plate is large; second, *Conchapelopia* has a thoracic comb (Figs 227-228). *Meropelopia*'s thoracic horn has more of a clear area around the smaller plastron plate, and the thoracic comb is absent. Only one species of *Conchapelopia* was found in TCMA lakes (Fig. 229).

Figure 227. *Conchapelopia* thoracic horn.

Figure 228. *Conchapelopia* thoracic horn and thoracic comb.

Figure 229. *Conchapelopia* full body.

Roback, S.S. 1981. The immature chironomids of the eastern United States V. Pentaneurini – *Thienemannimyia* Group. Proceedings of the Academy of Natural Sciences of Philadelphia 133:73-128.

Guttipelopia Fittkau

Guttipelopia are most like *Tanypus* and *Ablabesmyia*. The relatively long, pointed anal lobes distinguish *Guttipelopia* from *Tanypus*, which has short, rounded anal lobes. To distinguish from *Ablabesmyia*, the posteriolateral corners of segment VIII are extended posteriorly in *Guttipelopia* (Fig. 230-232), whereas in *Ablabesmyia* the posterior margin of segment VIII is horizontal.

Figure 230. *Guttipelopia* segment VIII and anal lobes.

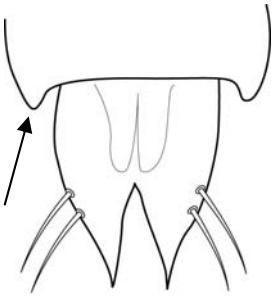

Figure. 231. *Guttipelopia* segment VIII and anal lobes.

Figure 232. *Guttipelopia* full body.

Labrundinia Fittkau

Labrundinia are common in lakes. They are relatively small and a golden brown color. They are easily distinguishable by their kidney bean shaped thoracic horn and their long narrow pointed anal lobes (Fig. 233). There are two species found in TCMA lakes, which are distinguishable by differences in their thoracic horns (Figs. 235-236).

Figure 233. *Labrundinia* anal lobes.

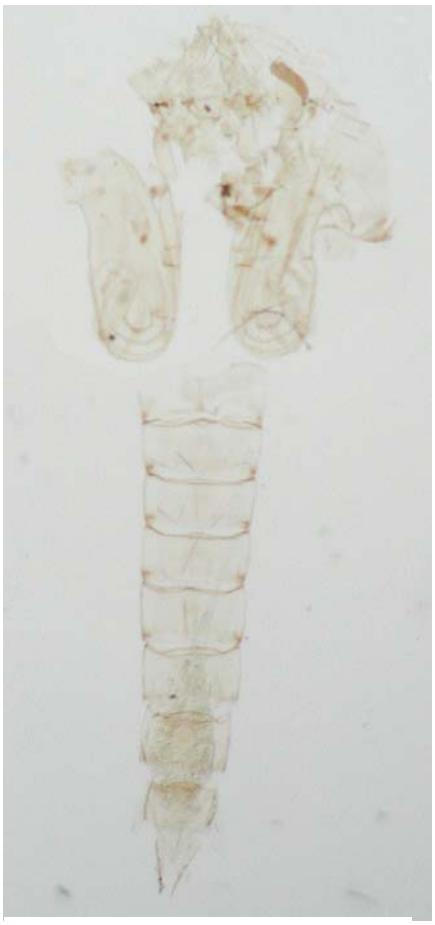

Figure 234. *Labrundinia* full body.

Figure 235. *Labrundinia neopilosella* thoracic horn.

Figure 236. *Labrundinia pilosella* thoracic horn.

Roback, S.S. 1987. The immature chironomids of the eastern United States IX. Pentaneurini – genus *Labrundinia* with the Description of some Neotropical material. Proceedings of the Academy of Natural Sciences of Philadelphia 139: 159-209.

Larsia Fittkau

Larsia are found in a variety of aquatic habitats. In lakes, they are found in the littoral zone. *Larsia* are easily distinguishable by their thoracic horn, which has numerous convolutions in the felt chamber (Fig. 237). There is only one species of *Larsia* found in TCMA lakes (Fig. 238).

Figure 237. *Larsia* thoracic horn.

Figure 238. *Larsia* full body.

Meropelopia Roback

Meropelopia is very similar to *Conchapelopia*. To separate them, first *Meropelopia* has no thoracic comb, while *Conchapelopia* does. Second, their thoracic horns are slightly different. *Meropelopia* has a smaller plastron plate and more clear area surrounding the plastron plate (Fig. 239). There is only one species of *Meropelopia* found in TCMA lakes (Fig. 240).

Figure 239. *Meropelopia* thoracic horn.

Figure 240. *Meropelopia* full body.

Roback, S.S. 1981. The immature chironomids of the eastern United States V. Pentaneurini – *Thienemannimyia* Group. Proceedings of the Academy of Natural Sciences of Philadelphia 133:73-128.

Procladius Skuse

Procladius is a widespread and relatively variable genus that lives in the sediments of slow-moving (lentic) waters. *Procladius* is most similar to *Clinotanypus*, although it is relatively easy to distinguish *Procladius* by its anal lobes. The anal lobes of *Procladius* are wide and rounded with small spines along the margins, whereas *Clinotanypus* has a medial invagination with spines on its anal lobes.

There are two subgenera of *Procladius* present in TCMA lakes. *Procladius (Psilotanypus)* can be distinguished by its rounded anal lobes (Figs. 242-243) and thoracic horn with unclear plastron plate (Fig. 247). *Procladius (Procladius)* has anal lobes that are horizontal long the distal margin, or produced with spines in the medial margin (Figs. 244-245). Also, the plastron plate is much more defined in *Procladius (Procladius)* (Figs. 248-251). There are many species of Procladius in TCMA lakes, but they are hard to distinguish.

Figure 241. *Procladius* full body.

Figure 242. *Procladius (Psilotanypus)* anal lobes.

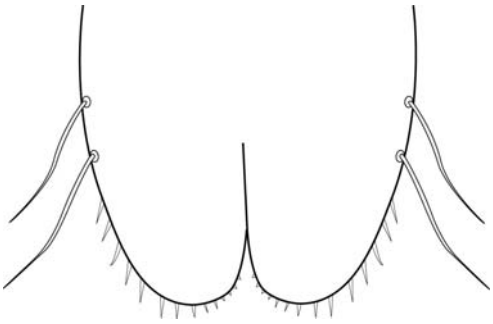

Figure 243. *Procladius (Psilotanypus)* anal lobes.

Figure 244. *Procladius (Procladius)* anal lobes.

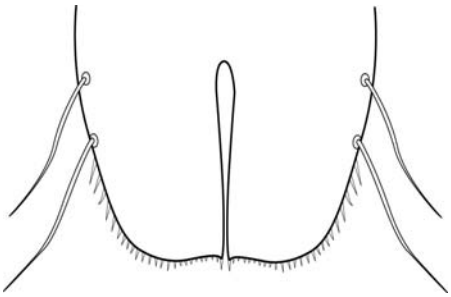

Figure 245. *Procladius (Procladius)* anal lobes.

Figure 246. *Procladius (Procladius)* full body.

Figure 247. *P. (Psilotanypus)* thoracic horn.

Figure 248. *P. (Procladius)* thoracic horn.

Figure 249. *P. (Procladius)* thoracic horn.

Figure 250. *P. (Procladius)* thoracic horn.

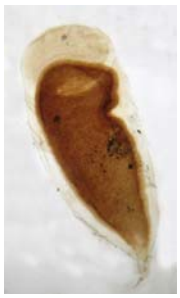

Figure 251. *P. (Procladius)* thoracic horn.

Roback, S.S. 1980. The Immature Chironomids of the Eastern United States IV. Tanypodinae – Procladiinae. Proceedings of the Academy of Natural Sciences of Philadelphia 132: 1-63.

Tanypus Meigan

Tanypus is common to warm slow-moving or standing waters. *Tanypus* has a large, bulbous reticulate thoracic horn (Fig. 252), similar to *Ablabesmyia* and *Guttipelopia*.

Tanypus can be distinguished by the reduced and rounded shape of its anal lobes (Figs. 254-255). *Ablabesmyia* and *Guttipelopia* have pointed anal lobes and their thoracic horns are slightly smaller.

Figure 252. *Tanypus* thoracic horn.

Figure 253. *Tanypus* full body.

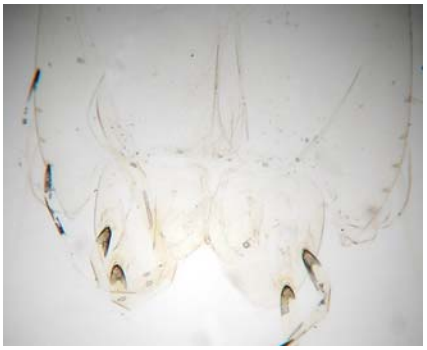

Figure 254. *Tanypus* anal lobes.

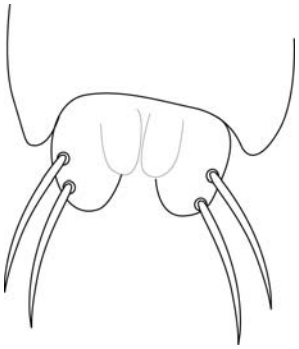

Figure 255. *Tanypus* anal lobes.

ORTHOCLADIINAE

Acricotopus Kieffer

The larvae of *Acricotopus* are found in the littoral zone of lakes. The pupal exuviae have no anal fringe and 3 anal macrosetae (Fig. 256). *Acricotopus* is most similar to *Cricotopus*. *Acricotopus* can be distinguished by the pair of spine patches on each tergite (Fig. 258), while *Cricotopus* just has uniform shagreen. Also, the thoracic horn of *Acricotopus* is long and thin with spines all along it (Fig. 259) , while the thoracic horn of *Cricotopus* is variable, but usually only has spines at the apical half.

Figure 257. *Acricotopus* full body.

Figure 256. *Acricotopus* anal lobes.

Figure 258. *Acricotopus* shagreen pattern.

Figure 259. *Acricotopus* thoracic horn

Corynoneura Winnertz.

Corynoneura is one of the most widespread genera of Chironomidae. *Corynoneura* can be found in any kind of water body and goes through many generations in a year (multivoltine). It is a tiny genus, and is easy to miss if you don't have a small enough sieve aperture (125mm works well). *Corynoneura* looks very similar to *Thienemanniella*, but there is one distinct difference. *Corynoneura* has pearl rows on the distal end of its wing sheaths (Figs. 262-263), while *Thienemanniella* does not. *Corynoneura* can be distinguished from other Orthocladiinae by the absence of a thoracic horn and the long fringe on the anal lobes (Fig. 260). There are a couple species of *Corynoneura* found in TCMA lakes, but they are hard to distinguish.

Figure 261. *Corynoneura* anal lobes.

Figure 260. *Corynoneura* anal lobes.

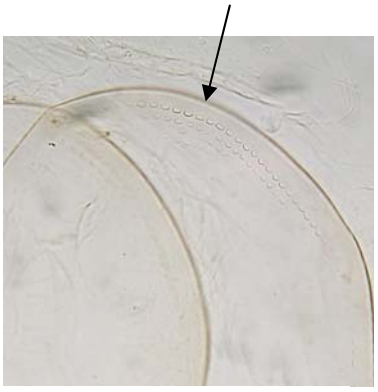

Figure 262. *Corynoneura* anal lobes.

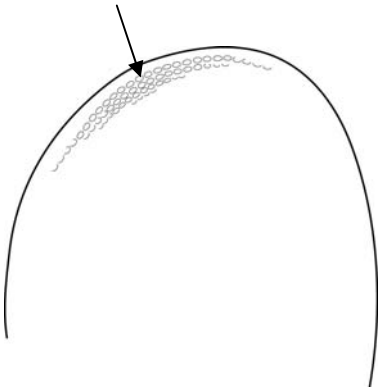

Figure 263. *Corynoneura* anal lobes.

Cricotopus v.d. Wulp

Cricotopus is a widespread genus living in all types of aquatic habitats. *Cricotopus* is commonly associated with aquatic plants and algae as some species are plant miners. *Cricotopus* is nearly indistinguishable from the genus *Orthocladius*, however *Orthocladius* is more common from flowing water and was not found in the TCMA lakes. *Cricotopus* has a variable thoracic horn (Figs. 266-267), and sometimes it is absent. The tergites usually just have uniform shagreen (Fig. 265), and the anal lobes have no fringe, just 3 anal macrosetae. The posterior edge of tergite II usually has one or more rows of curved hooklets (Fig. 264). There are many species of *Cricotopus* found in TCMA lakes, however many of them are not yet described. Distinguishing to the species level is difficult in *Cricotopus*. A few common species are highlighted below.

Figure 264. *Cricotopus* shagreen.

Figure 265. *Cricotopus* shagreen.

Figure 266. *Cricotopus* sp. 2 thoracic horn.

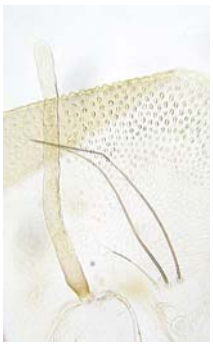

Figure 267. *Cricotopus (I.) sylvestris* thoracic horn and precorneal setae.

Simpson, K.W.; Bode, R.W. and Albu, P. 1983. Keys for the genus *Cricotopus* adapted from Revison der Gattung *Cricotopus* van der Wulp und ihrer Verwandten (Diptera, Chironomidae) by M. Hirvenoja. New York State Museum, The University of the State of New York, Albany, NY. Bulletin 450

Diplocladius Kieffer

The larvae of *Diplocladius* small bodies of cool flowing and still water. *Diplocladius* has no anal fringe and 3 anal macrosetae (Fig. 268). Its abdomen has dark lines (apophyses) between each of the segments (Fig. 269). *Diplocladius* is most distinguishable by the strong setae in the posteriolateral corners of segment VIII and the conical shape of the anal lobes (Fig. 268). There was only one species of *Diplocladius* found in TCMA lakes.

Figure 268. *Diplocladius* segment VII, anal lobes and anal macrosetae.

Figure 269. *Diplocladius* full body.

Limnophyes Eaton

Limnophyes is a widespread genus, living in aquatic and semi-aquatic habitats. It has no anal fringe and 3 macrosetae (Fig. 270). *Limnophyes* is easily distinguishable by the absence of a thoracic horn and the presence of long fine spines at the posterior edge of each tergite (Fig. 272). There was just one species of Limnophyes found in TCMA lakes. This species, *L. pumilio*, is characterized by the absence of spines on the sternites, 4 LS setae on segment VIII, and a tubercle on the genital sheath of the male.

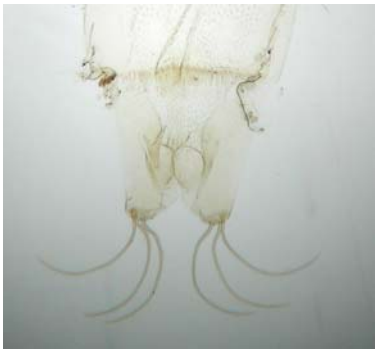

Figure 270. *Limnophyes* anal lobes and anal macrosetae.

Figure 271. *Limnophyes pumilio* full body.

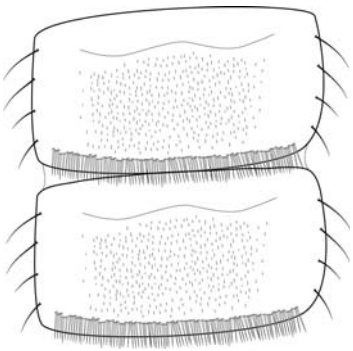

Figure 272. *Limnophyes* tergal spines.

Sæther, O.A. 1985. A review of the genus *Lymnophyes* Eaton from the Holarctic and Afrotropical regions (Diptera: Chironomidae, Orthocladiinae). Entomologica scandinavica Supplement 35: 25.

Nanocladius Kieffer

Nanocladius is a widespread genus that inhabits most aquatic habitats. It is found in the littoral area of lakes without a lot of organic enrichment (phosphorus). *Nanocladius* is very small (2-3mm) and very darkly pigmented (Fig. 273). Its anal lobes have a fringe and it has a variable thoracic horn(Figs. 274-275). It is most similar to *Psectrocladius*, but can be distinguished by the dark cuticle, and the presence of 2 long and one short precorneal seta (Fig. 276). In *Psectrocladius*, the cuticle is clear and the precorneal setae are all of similar lengths. Also, some species of *Nanocladius* have large PSBII (Fig. 277), while *Psectrocladius* does not. There are 3 species of Nanocladius found in TCMA lakes. Species 1 is easily distinguishable by its bulbous thoracic horn (Fig. 274). *N. rectinervis* and *N. spiniplenis* are very similar and difficult to separate (Fig. 275).

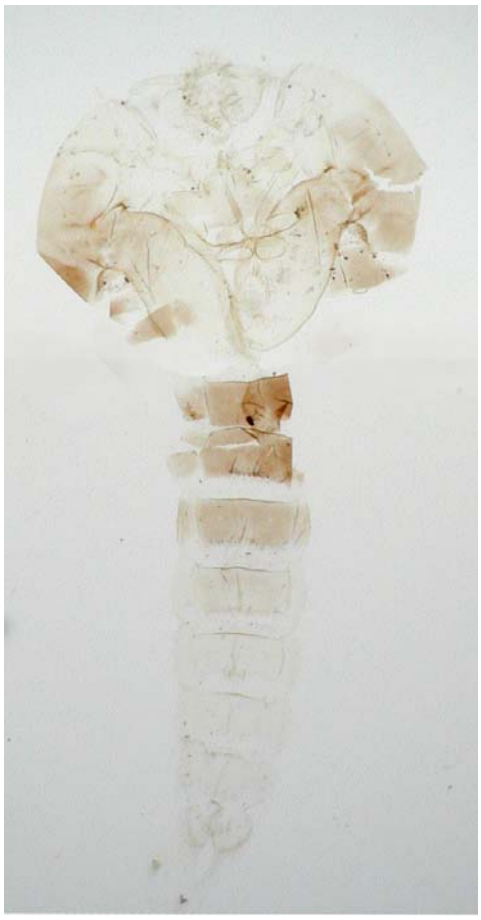

Figure 273. *Nanocladius rectinervis* full body.

Figure 274. *Nanocladius* sp. 1 thoracic horn.

Figure 275. *Nanocladius rectinervis/spiniplenis* thoracic horn.

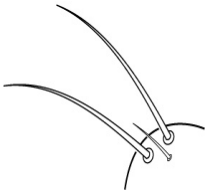

Figure 276. *Nanocladius* precorneal setae.

Figure 277. *Nanocladius* PSB II.

Sæther, O.A. 1977. Taxonomic studies on Chironomidae: *Nanocladius*, *Pseudochironomus*, and the *Harnischia* complex. Bulletin of the Fisheries Research Board of Canada. Bulletin 196.

Parakiefferiella Thienemann

Parakiefferiella is a cool water genus found in both flowing and standing water. *Parakiefferiella* does not have anal fringe (Figs. 280-281). It has a characteristically light globulose thoracic horn (Fig.278) and its anal lobes terminate in sharp points (Figs. 280-281). There are two species found from TCMA lakes. *P.* sp.1 is clear and has just very light shagreen in the following pattern: light shagreen on T I-V, T VI with two posterior shagreen patches and T VII-VIII bare (Fig. 279). *P.* sp.1 was a cool water species as it was found only in April, May and September. *P. coronata* is characterized by median spine patches on sternites II-IV, and its cephalothorax is clear, while abdominal segments I III are very darkly pigmented. *P. coronata* was found in the warmer summer months of June, July and August.

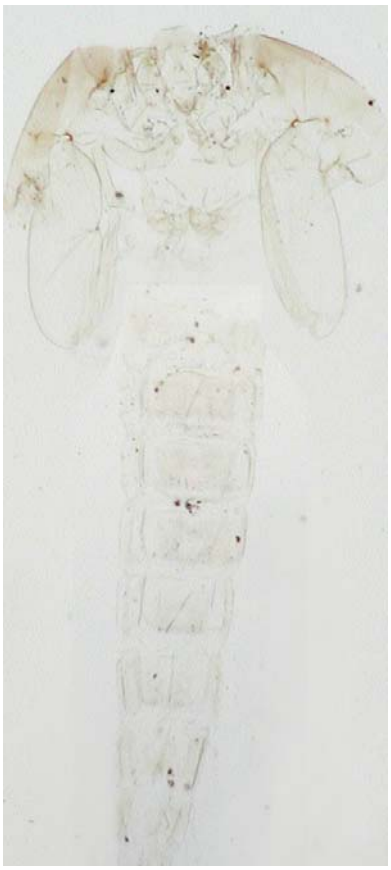

Figure 279. *Parakiefferiella* sp.1 full body.

Figure 278. *Parakiefferiella* thoracic horn.

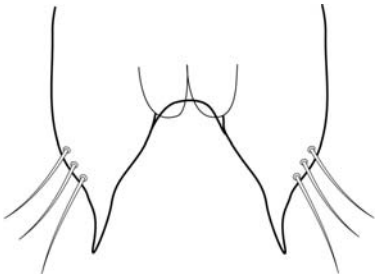

Figure 280. *Parakiefferiella* anal lobes.

Figure 281. *Parakiefferiella* anal lobes.

Sæther, O.A. 1969. Some Nearctic Podonominae, Diamesinae and Orthocladiinae (Diptera: Chironomidae). Fisheries Research Board of Canada, Ottawa. Bulletin 170.

Tuiskunen, J. 1986. The Fennoscandian species of *Parakiefferiella* Thienemann (Diptera, Chironomidae, Orthocladiinae). Annales Zoologici Fennici 23: 175-196.

Psectrocladius Kieffer

Psectrocladius is a widespread genus occurring in a variety of aquatic habitats. *Psectrocladius* has anal fringe and a tapering thoracic horn with spines (Fig. 283). *Psectrocladius* is most similar to *Nanocladius*, but it is distinguishable by its clear cuticle (Fig. 282), while *Nanocladius* has a dark brown cuticle. In addition, the precorneal setae of *Psectrocladius* are all the same size (Fig. 284) where in *Nanocladius* two are long and one is short. There are 3 easily distinguishable species groups of *Psectrocladius* found in TCMA lakes. *P. limbatellus* group has paired medial spine patches on tergites IV-VI (Fig. 285), while the other two species groups have single medial spine patches. *P. sordidellus* can be characterized by the single medial spine patches on T IV-VI (Fig. 282), the presence of frontal setae, and the presence of one or more LS setae on segment VI. *P. psilopterus* can be characterized by the single medial spine patches on tergites IV-VI.

Figure 282. *Psectrocladius* full body.

Figure 283. *Psectrocladius* thoracic horn.

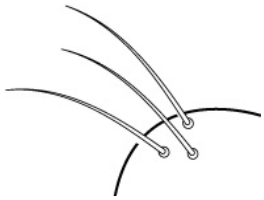

Figure 284. *Psectrocladius* precorneal setae.

Figure 285. *Psectrocladius limbatellus* medial spine patches.

Sæther, O.A. 1969. Some Nearctic Podonominae, Diamesinae and Orthocladiinae (Diptera: Chironomidae). Fisheries Research Board of Canada, Ottawa. Bulletin 170.

Langton, P.H. 1980. The Genus *Psectrocladius* Kieffer (Diptera: Chironomidae) in Britain. Entomologist's Gazette 31: 75-88.

Thienemanniella Kieffer

Thienemanniella is widespread and found in most aquatic habitats. It is also found at all times of the year because it is multivoltine. *Thienemanniella* is very tiny (2-3mm) and has anal fringe (Fig. 287) but no thoracic horn. It is very similar to *Corynoneura*, but can be distinguished by the lack of pearl rows on the distal end of the wing sheaths (Fig. 288). There are three species of *Thienemanniella* found in TCMA lakes. *T. lobapodema* has 3 LS setae on segment II. In addition, segment II has 2 spots of yellowish pigment. *T. xena* can be characterized by the presence of 1 LS seta and 2 hairlike setae on segment 2. *T. boltoni* can be characterized by the presence of 2 LS and 2 hairlike setae on segment 2.

Figure 286. *Thienemanniella* full body.

Figure 287. *Thienemanniella* anal lobes.

Figure 288. *Thienemanniella* wing sheaths.

Hestenes, T.C. and O.A. Sæther. 2000. Three new Nearctic *Thienemanniella* Kieffer species with a review of the Nearctic species. In: Late 20th century research on Chironomidae: an Anthology from the 13th International Symposium on Chironomidae. O. Hoffrichter (ed.). Shaker Verlag, Aachen.

Zalutschia Lipina

Zalutschia is found primarily in oligotrophic and dystrophic lakes. It lacks an anal fringe (Fig. 289), and has a thoracic horn with spines. *Zalutschia* can be characterized by the raised patches of spines on the posterior end of each tergite (Fig. 290). Also, it has a single spine on the posteriolateral corners of segments VII and VIII (Fig. 289). *Zalutschia* does not have a medial patch of spines like *Psectrocladius*. There was just one species of Zalutschia, the *Z. tatrica* group, found in just Square Lake of the TCMA (Fig. 291).

Figure 289. *Zalutschia* anal lobes and anal spurs.

Figure 290. *Zalutschia* raised spine patches.

Figure 291. *Zalutschia* full body.

TANYTARSINI

Cladotanytarsus Kieffer

Cladotanytarsus inhabits a variety of aquatic habitats and is very common. It has very light paired spine patches on tergites II-VI (Fig. 292). It is most similar to *Tanytarsus*, but *Cladotanytarsus* can be distinguished by its unique thoracic horn (Figs. 294-295). The thoracic horn is a single branch with long setae extending off of it. Also, *Tanytarsus* usually has paired spine patches only on tergites II-VI. When *Tanytarsus* has patches on II-VI, the patches are much darker. There are many species of *Cladotanytarsus* in TCMA lakes, but they are hard to distinguish and many are undescribed.

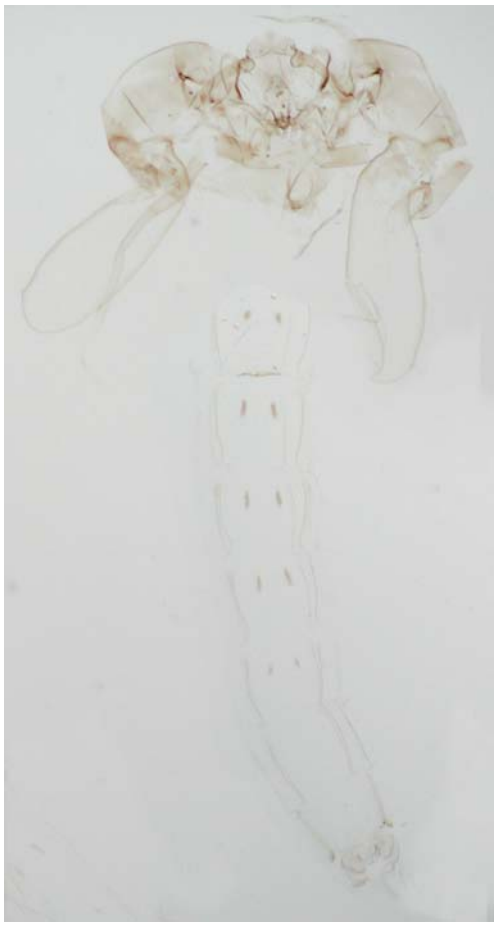

Figure 293. *Cladotanytarsus* full body.

Figure 292. *Cladotanytarsus* spine patches.

Figure 294. *Cladotanytarsus* thoracic horn.

Figure 295. *Cladotanytarsus* thoracic horn.

Bilyj, B. and I.J. Davies. 1989. Descriptions and ecological notes on seven new species of *Cladotanytarsus* (Chironomidae:Diptera) collected from an experimentally acidified lake. Canadian Journal of Zoology 67: 948-962.

Micropsectra Kieffer

Micropsectra is found in both flowing and standing cool water. In the TCMA lakes, it was found only in April, May and September. *Micropsectra* has a long thin single branched thoracic horn and very unique spine patterns on tergites II-IV (Figs 296-297). It is most similar to *Paratanytarsus* and *Tanytarsus*, but *Micropsectra* is the only genus with this particular spine pattern. There were two species of *Micropsectra* found in TCMA lakes. Compare the spine patches on the abdomens below.

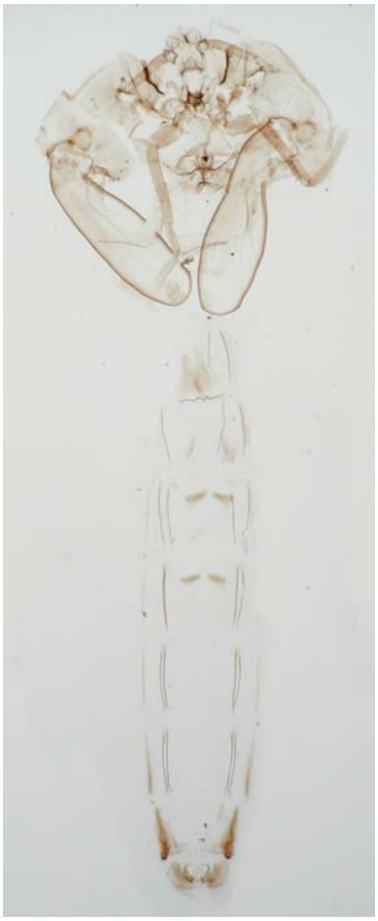

Figure 298. *Micropsectra* full body.

Figure 296. *Micropsectra nigripalia* spine patches.

Figure 297. *Micropsectra* sp. 1 spine patches

Oliver, D.R. and M.E. Dillon. 1994. Systematics of some species of *Micropsectra* (Diptera:Chironomidae) living in low-order streams in southern Ontario, Canada. The Canadian Entomologist 126: 199-217.

Säwedal, L. 1976. Revision of the *notescens*-group of the genus *Micropsectra* Kieffer, 1909 (Diptera:Chironomidae). Entomologica scandanavica 7: 109-144.

Säwedal, L. 1982. Taxonomy, morphology, phylogenetic relationships and distribution of *Micropsectra* Kieffer, 1909 (Diptera: Chironomidae). Entomologica scandanavica 13: 371-400.

Paratanytarsus Thienemann and Bause

Paratanytarsus is widespread and very common in lakes in addition to flowing water habitats. *Paratanytarsus* is similar to *Micropsectra* and *Tanytarsus* and has the same single branch thoracic horn, but it is distinguishable by the presence of pearl rows on the distal end of the wing sheath (Figs. 299-300) and the unique spine patches. *Paratanytarsus* is a variable genus with many species, but the presence of unique spine patterns on tergites II-IV is an easy way to separate species. There are many species of *Paratanytarsus* found in TCMA lakes and some are depicted below (Figs. 301-303).

Figure 299. *Paratanytarsus* wing sheath with pearl rows.

Figure 300. *Paratanytarsus* wing sheath with pearl rows.

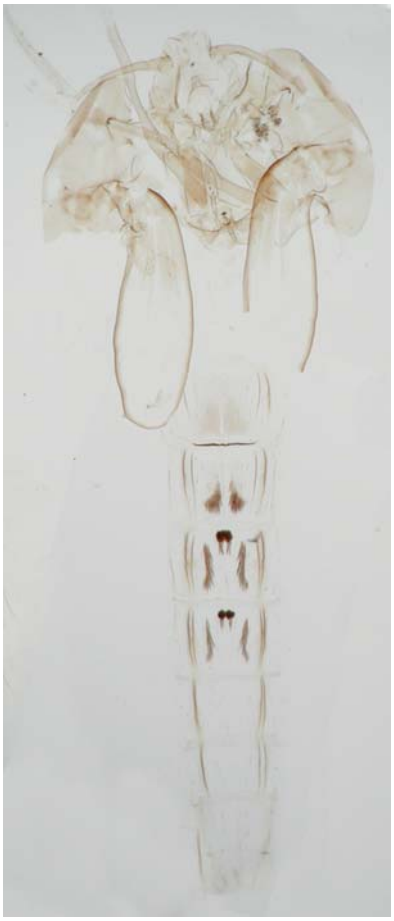

Figure 301. *Paratanytarsus* full body.

Figure 302. *Paratanytarsus* spine patches.

Figure 303. *Paratanytarsus* spine patches.

Reiss, F. and L. Säwedal. 1981. Keys to males and pupae of the Palaearctic (excl. Japan) *Paratanytarsus* Thienemann & Bause, 1913, n. comb., with descriptions of three new species (Diptera:Chironomidae).

Stempellina Thienemann and Bause

Stempellina is a genus common to a variety of aquatic habitats, especially lakes. In the TCMA lakes, it was found in many of the mesotrophic and eutrophic lakes but not in high numbers. It was not found in hypereutrophic lakes (over 60 ppb Phosphorus). It is easily distinguishable from all other Tanytarsini except for *Constempellina*, but *Constempellina* was not found in TCMA lakes. *Stempellina* has a characteristically heavily granulose cephalothorax with long single-branched thoracic horns (Fig. 305). It also has fine frontal setae, while *Constempellina* has very thick robust frontal setae. *Stempellina* has a unique spine pattern on tergites II-IV (Fig. 306). Only one species of *Stempellina* was found in TCMA lakes, and it had 3 large rounded tubercles near where the wing sheath inserts into the cepahlothorax (Fig. 305).

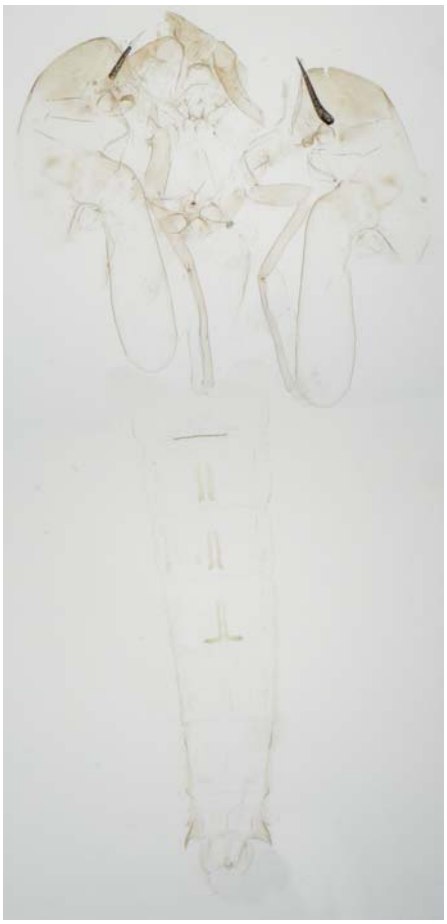

Figure 304. *Stempellina* full body.

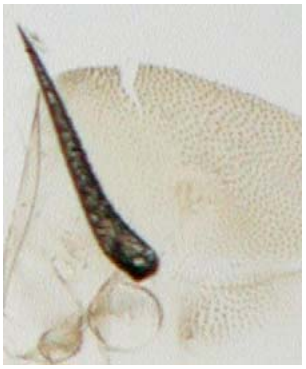

Figure 305. *Stempellina* thoracic horn and granulated cephalothorax.

Figure 306. *Stempellina* spine patches.

Tanytarsus v.d. Wulp

Tanytarsus is one of the most widespread and speciose genera of Chironomidae. It is found in all types of freshwater habitats. Thienemann (1910) and Lenz (1925) used *Tanytarsus* dominance to characterize the chirnonomid community of oligotrophic lakes. I have found *Tanytarsus* in all of the TCMA lakes I've sampled, although not always in high numbers. *Tanytarsus* can be distinguished from *Cladotanytarsus* by the simple elongate thoracic horn, which sometimes has short setae, but lacks the long setae that *Cladotanytarsus* has (Fig. 308). *Tanytarsus* can be distinguished from *Paratanytarsus* by the absence of pearl rows on the distal margin of the wing sheath and the absence of medial spine patches on the tergites. *Tanytarsus* always has paired spine patches usually on tergites III-VI, and rarely on II-VI (Fig. 307-310). There are many species of *Tanytarsus* found in TCMA lakes and their spine patches are variations of Figs. 307-310.

Figure 307. *Tanytarsus* full body.

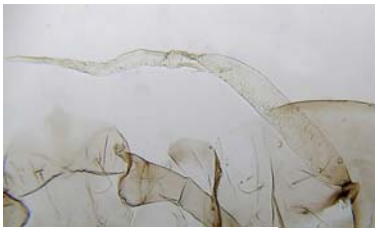

Figure 308. *Tanytarsus* thoracic horn.

Figure 309. *Tanytarsus neoflavellus* abdomen.

Figure 310. *Tanytarsus* sp.1 abdomen.

Ekrem, T., M.F. Sublette and J.E. Sublette. 2003. North American *Tanytarsus* I. Descriptions and keys to species in the *eminulus*, *gregarious*, *lugens* and *mendax* species groups (Diptera: Chironomidae). Annals of the Entomological Society of America 96: 265-328.

Tanytarsini genus 1

This genus is near *Stempellinella*, but may be an undescribed genus. It was found in high numbers in one eutrophic lake in the spring and fall months, therefore preferring cool water. It is characterized by very long cephalic tubercles with setae extending from the tips (Fig. 311) and unique weak spine patches in opposite directions on the tergites (Fig. 312).

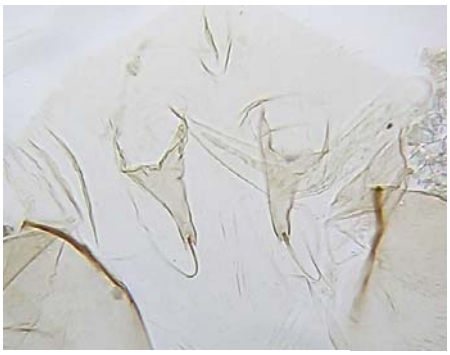

Figure 311. Tanytarsini genus 1 cephalic tubercles and frontal setae.

Figure 312. Tanytarsini genus 1 full body.

CHIRONOMINI

Chironomus Meigan

Chironomus is one of the most widespread genera of Chironomidae. It is most common in standing water, and is so tolerant to low oxygen that it is sometimes the only species present in water bodies with very high phosphorus levels. The larvae of *Chironomus* have hemoglobin, which can bind oxygen for storage in anoxic conditions. The presence of hemoglobin also makes them red, and gives them the common name "bloodworms". Some species of *Chironomus* can be very large, even reaching 2 cm long. The species found in mesotrophic lakes generally tended to be smaller that the species found in eutrophic and hypereutrophic lakes. *Chironomus* is characterized by its anal spur that is a thick brush shape (Figs. 314-315). It also has a plumose thoracic horn (Fig. 316) and conical cephalic tubercles (Fig. 217). *Chironomus* is the most speciose genus in TCMA lakes and many of them may be undescribed. In each lake, the *Chironomus* species looked slightly different, which may be due to local nutrition, rapid speciation, or just highly variable species.

Figure 313. *Chironomus* full body.

Figure 314. *Chironomus* anal brushes.

Figure 315. *Chironomus* anal brushes.

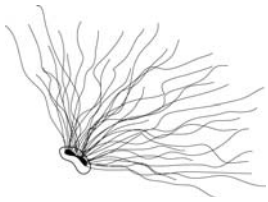

Figure 316. *Chironomus* thoracic horn.

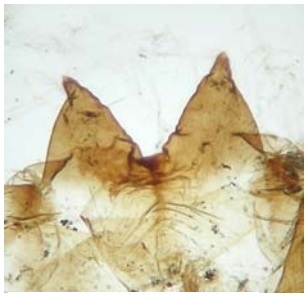

Figure 317. *Chironomus* cephalic tubercles.

Cladopelma Kieffer

Cladopelma reside in sandy and muddy sediments of lakes and streams. In the TCMA, *Cladopelma* was found in the more eutrophic lakes. *Cladopelma* are characterized by the interrupted hookrow on the posterior margin of tergite II (Fig. 318) and the presence of a round spiny knob in the middle of the posterior margin of tergite VI (Figs. 321-322). *Cladopelma* also has a plumose thoracic horn (Fig. 319) and a single anal spur (Fig. 320). There are a couple species of *Cladopelma* in TCMA lakes, but they may not be described. .

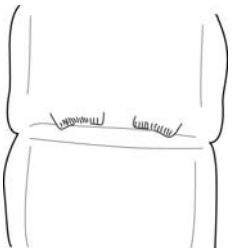

Figure 318. *Cladopelma* tergite II hookrows.

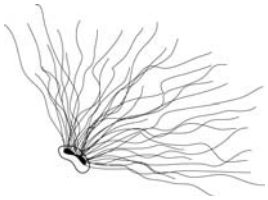

Figure 319. *Cladopelma* thoracic horn.

Figure 320. *Cladopelma* full body.

Figure 321. *Cladopelma* tergite VI.

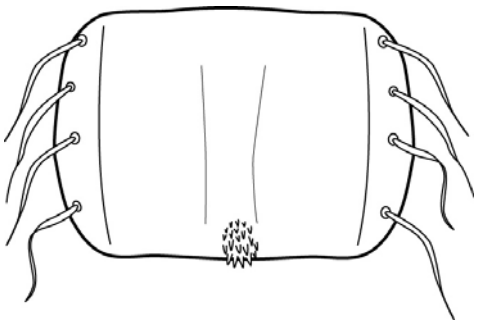

Figure 322. *Cladopelma* tergite VI.

Cryptochironomus Kieffer

Cryptochironomus is a widely distributed genus found in most aquatic habitats. This darkly pigmented genus has a plumose thoracic horn and interrupted hookrow on the posterior margin of tergite II. It is most easily distinguished by the presence of a forked process extending from the anal lobes (Fig. 323). Some species of *Cryptochironomus* also have large ornate cephalic tubercles. There are many species of *Cryptochironomus* depicted below (Figs. 325-327).

Figure 323. *Cryptochironomus* anal lobes and forked process.

Figure 324. *Cryptochironomus* full body.

Figure 325. *Cryptochironomus eminentia* cephalic tubercles.

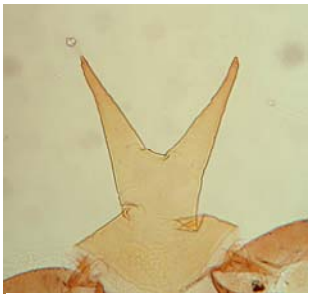

Figure 326. *Cryptochironomus* sp. 6 cephalic tubercles.

Figure 327. *Cryptochironomus ponderosus* cephalic tubercles.

Curry, L.L. 1958. Larvae and pupae of the species *Cryptochironomus* (Diptera) in Michigan. Limnology and Oceanography 3:427-442.

Mason, P.G. 1986. Four new species of the *Cryptochironomus fulvus* (Johannsen) species complex (Diptera: Chironomidae). Entomologica scandanavica 16: 399-413.

Cryptotendipes Lenz

Cryptotendipes are found in sandy and muddy sediments of both flowing and standing water. Its most unique characteristic is extremely long, string-like thoracic horns (Figs. 328-329). *Cryptotendipes* also has an interrupted hookrow on the posterior margin of tergite 2 (Figs. 331-332). This genus can look like *Cladopelma* if its thoracic horns are broken off, but it does not have the spiny knob on tergite 6 that describes *Cladopelma*.

Figure 328. *Cryptotendipes* thoracic horns.

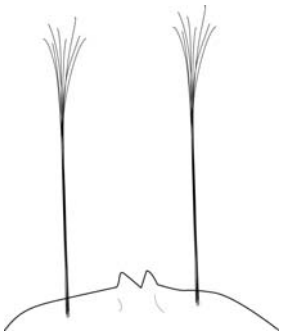

Figure 329. *Cryptotendipes* thoracic horns.

Figure 330. *Cryptotendipes* full body.

Figure 331. *Cryptotendipes* tergite II interrupted hookrows.

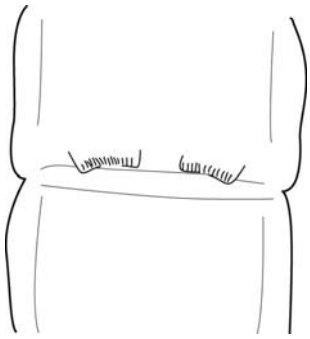

Figure 332. *Cryptotendipes* tergite II interrupted hookrows.

Demicryptochironomus Lenz

Demicryptochironomus are found in the soft sediments of lakes and rivers. Their pupae are very similar to *Paralauterborniella*. The female *Demicryptochironomus* is easy to identify due to the two medial process on the posterior margin of segment VII (Fig. 333). The male is harder to distinguish, but has a plumose thoracic horn (Fig. 336), uninterrupted hook row on the posterior margin of segment II (Fig. 337), 5 LS setae on segment VII (Fig. 334) and pedes spurii B and intersegmental shagreen are absent (Fig. 335).

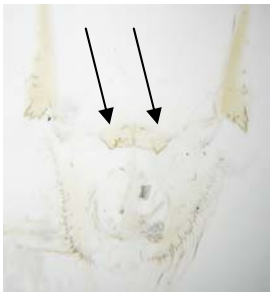

Figure 333. *Demicryptochironomus* female medial processes.

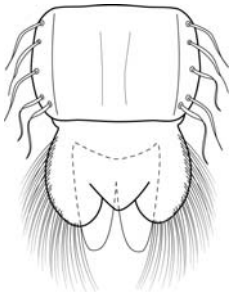

Figure 334. *Demicrypto-chironomus* segment VIII.

Figure 335. *Demicryptochironomus* full body.

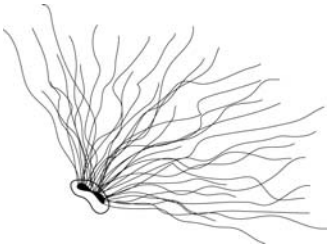

Figure 336. *Demicrypto-*chironomus thoracic horn.

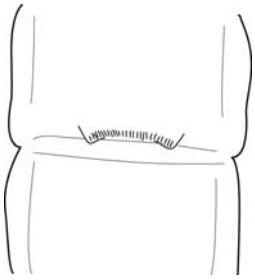

Figure 337. *Demicryptochironomus* segment II uninterrupted hookrows.

Dicrotendipes Kieffer

Dicrotendipes are widespread in the littoral zone of lentic waters. There is not one unifying character for the whole genus, but there are characters for the different species. All *Dicrotendipes* have plumose thoracic horns (Fig. 338), an uninterrupted hookrow on the posterior margin of tergite II (Fig. 339) and conical cephalic tubercles. There are many species of *Dicrotendipes* in TCMA lakes. *D. modestus* has just a single, simple anal spur (Figs. 341-342). *D. nervosus* group has darkened margins of segment VIII and a single anal spur (Fig. 343). *D. tritomus* has a double or triple spur (Fig. 344).

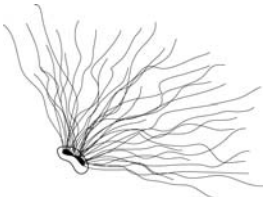

Figure 338. *Dicrotendipes* thoracic horn.

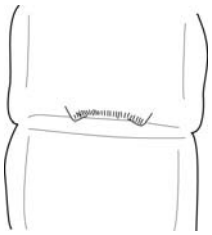

Figure. 339. Dicrotendipes uninterrupted hookrow.

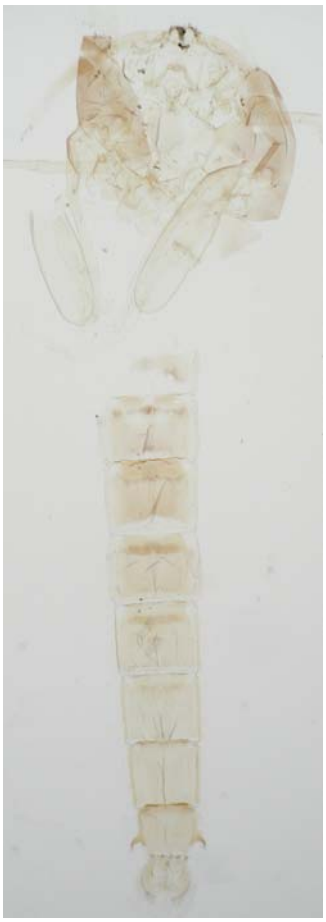

Figure 340. *Dicrotendipes modestus* full body.

Figure 341. *Dicrotendipes modestus* anal spurs.

Figure 342. *Dicrotendipes modestus* anal spurs.

Figure 343. *Dicrotendipes nervosus* grp. anal spurs.

Figure 344. *Dicrotendipes tritomus* anal spurs.

Epler, J.H. 1986. Revision of the Nearctic *Dicrotendipes* Kieffer, 1913 (Diptera: Chironomidae). Evolutionary Monographs 9.

Einfeldia Kieffer

Einfeldia are found in the littoral sediments of small lentic water bodies. They do not have one unifying character in the pupal stage, however there are 2 species groups present in TCMA lakes. All *Einfeldia* have plumose thoracic horns (Fig. 347) and an uninterrupted hookrow on the posterior margin of tergite II. *Einfeldia* species group A has cephalic tubercles, a few weak anal spurs and a characteristic shagreen pattern on the tergites (Figs. 345, 348). *Einfeldia* species group B has both frontal warts and cephalic tubercles (Figs. 349-350) and has no anal spurs (Fig. 346).

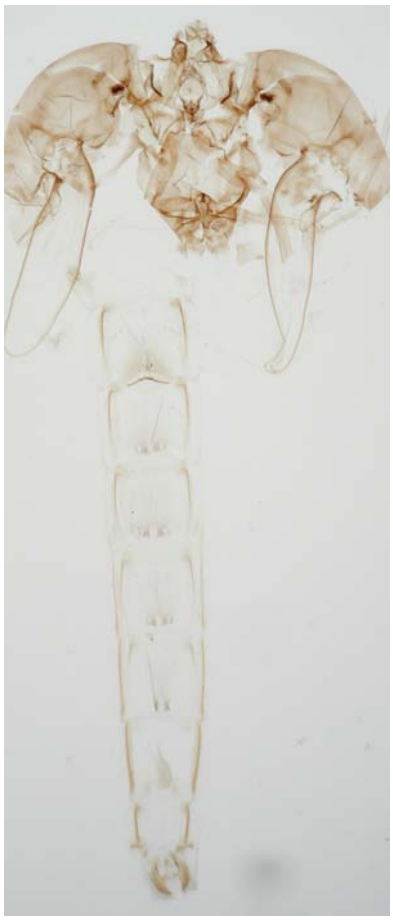

Figure 345. *Einfeldia* group A full body.

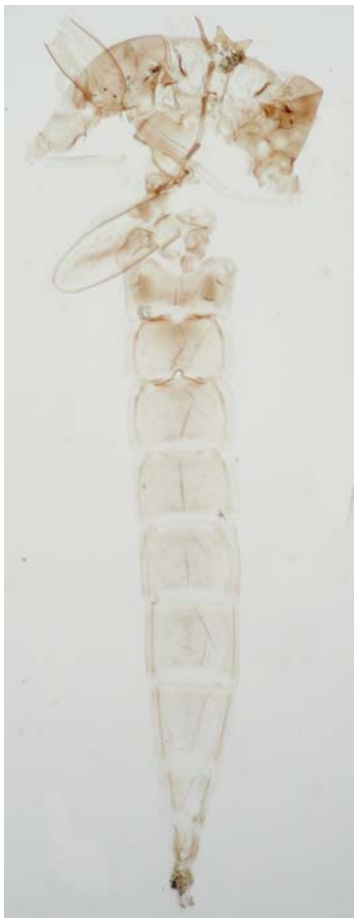

Figure 346. *Einfeldia* group B full body.

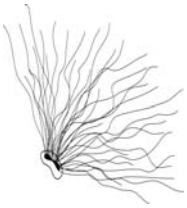

Figure 347. *Einfeldia* thoracic horn.

Figure 348. *Einfeldia* group A spine pattern

Figure 349. *Einfeldia* group B cephalic tubercles and frontal warts.

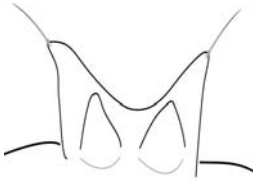

Figure 350. *Einfeldia* group B cephalic tubercles and frontal warts.

Endochironomus Kieffer

Endochironomus is found in the sediments of standing eutrophic water or associated with macrophytes as a leaf or stem miner. A few species overwinter in the sediments in cocoons. *Endochironomus* species group A is easily distinguishable by a pair of dark setal brushes on the anal lobes (Fig. 352). *Endochironomus* species group B was not found in TCMA lakes. There are two species of *Endochironomus* group A in TCMA lakes. *Endochironomus nigricans* is larger and is a golden brown color (Fig. 353), while *Endochironomus subtendens* is smaller and a light, transparent gold color (Fig. 351).

Figure 353. *Endochironomus nigricans* full body.

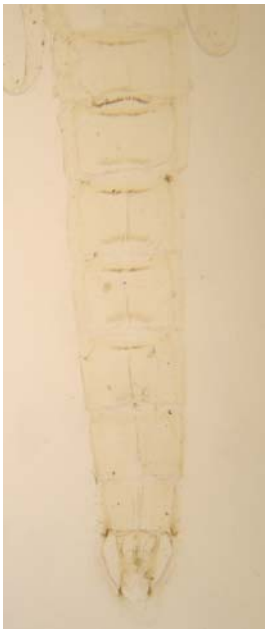

Figure 351. *Endochironomus subtendens* abdomen.

Figure 352. *Endochironomus* anal lobes.

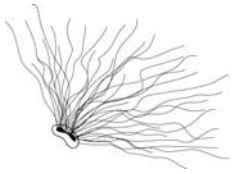

Figure 354. *Endochironomus* thoracic horn.

Grodhaus, G. 1987. *Endochironomus* Kieffer, *Tribelos* Townes, *Synendotendipes*, n. gen., and *Endotribelos*, n. gen. (Diptera:Chironomidae) of the Nearctic Region. Journal of the Kansas Entomological Society. 60: 167-247.

Glyptotendipes Kieffer

Glyptotendipes are found in the detritus-rich sediments of standing water. Most of the species are miners of dead branches or submerged plants. *Glyptotendipes* are easily recognized by the racket-shaped spinous plates (maces) on their tergites (Figs. 356-361). There are two subgenera found in TCMA lakes. *G*. (*Glyptotendipes*) is large and has maces on tergites II-VI (Fig. 357). *G*. (*Caulochironomus*) is smaller and lighter in color and has small maces on tergites III-VI (Fig. 356). Numerous species were found in TCMA lakes and are illustrated below (Figs. 358-361).

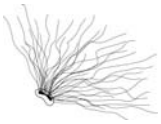

Figure 355. *Glyptotendipes* thoracic horn.

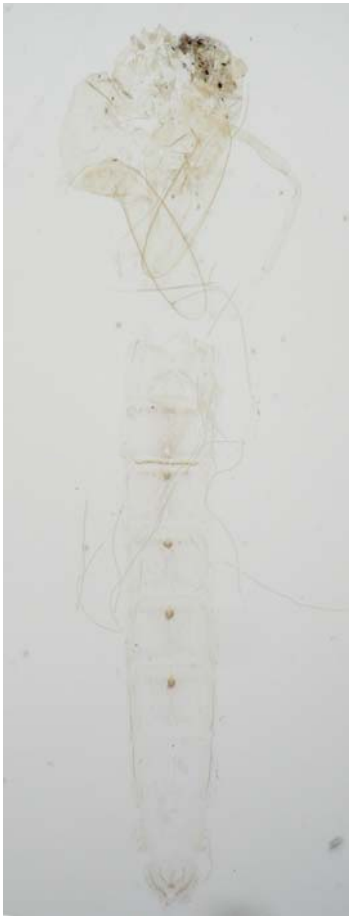

Figure 356. *Glyptotendipes (C.)* full body.

Figure 357. *Glyptotendipes (G.)* full body.

Figure 358. *Glyptotendipes (C.)* mace.

Figure 359. *Glyptotendipes (G.)* mace.

Figure 360. *Glyptotendipes (G.)* mace.

Figure 361. *Glyptotendipes (G.)* mace.

Heyn, M. W. 1992. A review of the systematic position of the North American species of the genus Glyptotendipes. Netherlands Journal of Aquatic Ecology. 26: 129-137.

Harnischia Kieffer

Harnischia is found in the soft sediments of lakes and large rivers. *Harnischia* can be recognized by the interrupted hookrow on the posterior margin of tergite II (Fig. 362), the lack of anal spurs (Fig. 364), the presence of cephalic tubercles (Fig. 365) and a brush-like thoracic horn.

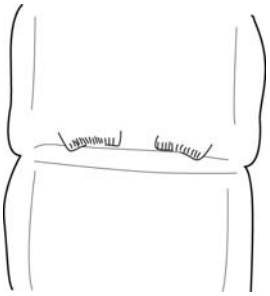

Figure 362. *Glyptotendipes (G.)* mace.

Figure 363. *Harnischia* full body.

Figure 364. *Harnischia* segments VII - VIII.

Figure 365. *Harnischia* cephalic tubercles.

Sæther, O.A. 1977. Taxonomic studies on Chironomidae: *Nanocladius*, *Pseudochironomus*, and the *Harnischia* complex. Bulletin of the Fisheries Research Board of Canada. Bulletin 196.

Lauterborniella Thienemann and Bause

Lauterborniella are found in small lakes and ponds amongst submersed vegetation. *Lauterborniella* are easily recognized by their transverse paired patches of short spines on tergites II-VI (Figs. 366-367) and their two-branched thoracic horn (Fig. 369). *Lauterborniella* is monotypic, meaning there is only one type (Fig. 367).

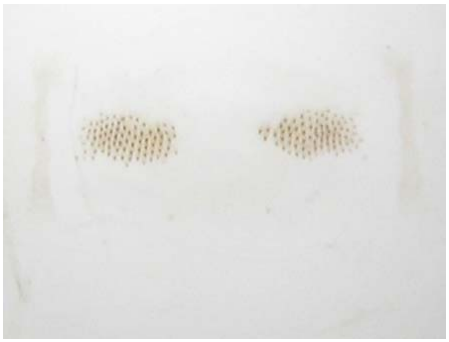

Figure 366. *Lauterborniella* transverse spine patches.

Figure 367. *Lauterborniella* full body.

Figure 368. *Lauterborniella* anal spurs.

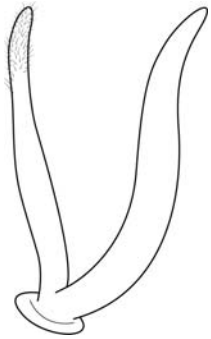

Figure 369. *Lauterborniella* thoracic horn.

Microchironomus Kieffer

Microchironomus are found in lakes, rivers and ditches of fresh or brackish water. *Microchironomus* is small and nearly transparent and has a brush-like thoracic horn, interrupted hookrow on the posterior margin of tergite II (Fig. 370), long cephalic tubercles (Fig. 372) and a single pale anal spur (Fig. 373). *Microchironomus* is most similar to *Cladopelma*, but *Cladopelma* has a spinous medial knob on tergite 6 while *Microchironomus* does not.

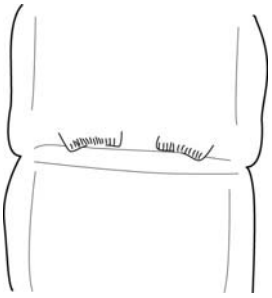

Figure 370. *MIcrochironomus* tergite II interrupted hookrows.

Figure 371. *Microchironomus* full body.

Figure 372. *MIcrochironomus* cephalic tubercles.

Figure 373. *MIcrochironomus* anal spurs.

Microtendipes Kieffer

Microtendipes are found in the littoral to sublittoral sediments of large lentic water bodies. They can also be found in submerged mosses in running water. *Microtendipes* has a 4-7 branched thoracic horn, no frontal setae and dorsally directed frontal warts (look like tubercles) (Fig. 374). *Microtendipes* differ from *Polypedilum* by having only 3 LS setae on segment V instead of 4 LS setae (Fig. 377). *Microtendipes pedellus* group was found in the TCMA (Fig. 376). It has transverse spine rows on the anterior portion of the tergites (Figs. 376, 378).

Figure 376. *Microtendipes* full body.

Figure 374. *MIcrotendipes* frontal warts.

Figure 375. *MIcrotendipes* anal spurs.

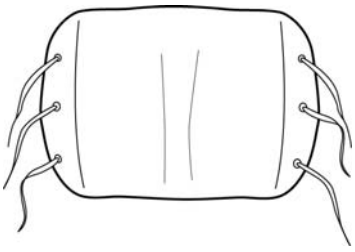

Figure 377. *Microtendipes* segment V with 3 LS setae.

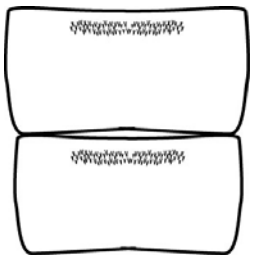

Figure 378. *Microtendipes* transverse spine rows.

Parachironomus Lenz

Parachironomus can be found in most types of water bodies. Their larvae live in the soft sediments, or can be associated with Bryozoa, ectoparasitic on other invertebrates or leaf and stem-miners in submerged macrophytes. *Parachironomus* was one of the most abundant genera in the TCMA. *Parachironomus* are nearly colorless, and have a slightly raised uninterrupted hookrow on the posterior margin of tergite II (Fig., 381). They have a plumose thoracic horn (Fig. 380) and either 1-8 small colorless anal spurs (Fig. 384) or no anal spurs (Fig. 383).

Parachironomus vitiosus group has 5 LS setae on segment VIII and a few colorless anal spurs (Fig. 384).

Parachironomus varus group has 5 LS setae on segment VIII, no anal spurs and a posterior flap on tergite 6 with small points (Figs. 382-383). There were a few specimens found in TCMA lakes with only 4 LS setae and with or without anal spurs. This type could be undescribed.

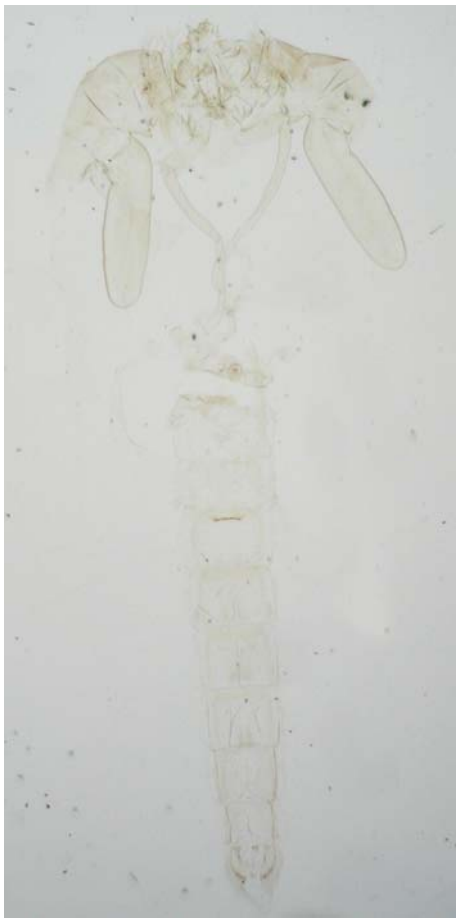

Figure 379. *Parachironomus* full body.

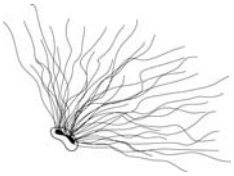

Figure 380. *Parachironomus* thoracic horn.

Figure 381. *Parachironomus* tergite II hookrow.

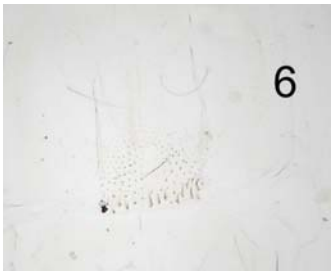

Figure 382. *Parachironomus* tergite VI spines.

Figure 383. *Parachironomus varus* segment VIII and anal lobes.

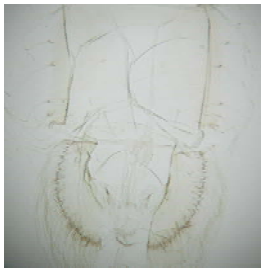

Figure 384. *Parachironomus vitiosus* segment VIII and anal lobes.

Paracladopelma Harnisch

Paracladopelma live in sandy sediments of lakes and streams or in the profundal zone of deep lakes. *Paracladopelma* was rare in TCMA lakes and the specimens found belonged to the *camptolabis* species group characterized by the absence of anal spurs (Fig. 386). *Paracladopelma* can be recognized by a plumose thoracic horn (Fig. 385) and an uninterrupted hookrow on the posterior margin of tergite II (Fig. 389). It also has a circular spine pattern in the posterior area of the tergites (Fig. 388). *Paracladopelma* is most similar to *Sætheria*, however *Paracladopelma* has 5 LS setae on segment VIII (Fig. 390) while *Sætheria* has only 4 LS setae on segment VIII.

Figure 387. *Paracladopelma* full body.

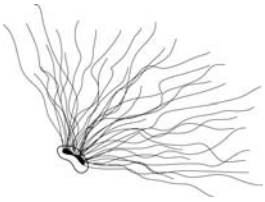

Figure 385 *Paracladopelma* thoracic horn.

Figure 386. *Paracladopelma* anal lobes.

Figure 388. *Paracladopelma* tergal spine pattern.

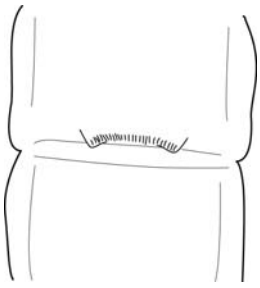

Figure 389. *Paracladopelma* tergite II uninterrupted hookrow.

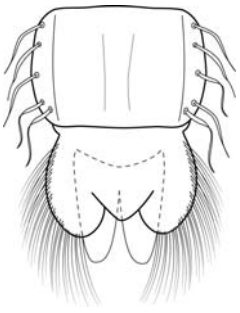

Figure 390. *Paracladopelma* tergite VIII with 5 LS setae.

Jackson, G.A. 1977. Nearctic and Palaearctic *Paracladopelma* Harnisch and *Sætheria* n. gen. (Diptera: Chironomidae).

Paralauterborniella Lenz

Paralauterborniella are found in littoral soft sediments of lakes. *Paralauterborniella* are distinguished by a few-branched thoracic horn, uninterrupted hookrow on the posterior margin of segment II (Fig. 391), 4 lateral setae on segments II-IV (Fig. 395), long narrow cephalic tubercles (Fig. 393), a nose on the wing sheath (usually only found in Tanytarsini) (Fig. 394), long PSB on segment II (Fig. 391) and uniform shagreen (Fig. 392). One species was found in TCMA lakes, *P. nigrohalteralis* (Fig. 392).

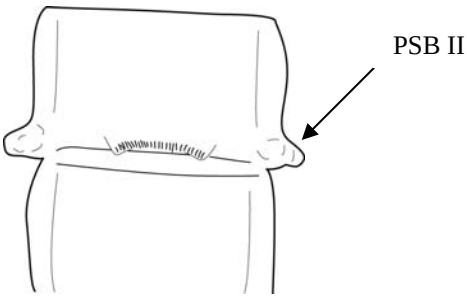

Figure 391. *Paralauterborniella* tergite II with uninterrupted hookrow and large PSB II.

Figure 393. *Paralauterborniella* cephalic tubercles.

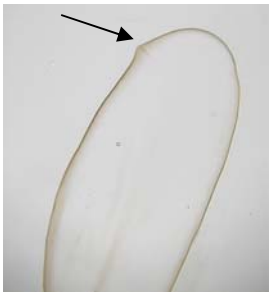

Figure 394. *Paralauterborniella* wing sheath with nose.

Figure 392. *Paralauterborniella nigrihalteralis* full body.

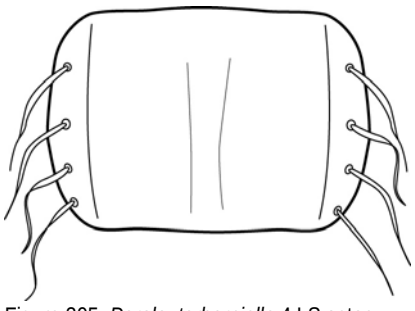

Figure 395. *Paralauterborniella* 4 LS setae.

Paratendipes Kieffer

Paratendipes occur in both standing and flowing waters in soft sediments and sandy bottoms. *Paratendipes* have 6 branches to their thoracic horn, large PSB on segment II (Fig. 396) anal comb present (Fig. 397), segments II-IV with 3 lateral setae (Fig. 399), uniform shagreen (Fig. 400), and cephalic tubercles. *Paratendipes* can look similar to *Paralauterborniella*, but it does not have a nose on the distal end of its wing sheath and *Paratendipes* has 3 LS setae on segments II-IV (Fig. 399) while *Paralauterborniella* has 4. A couple species of *Paratendipes* were found in TCMA lakes, but they didn't conform to any described species.

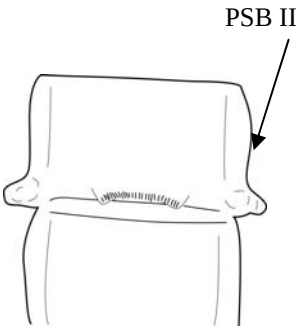

Figure 396. *Paratendipes* PSB II.

Figure 397. *Paratendipes* anal comb.

Figure 398. *Paratendipes* full body.

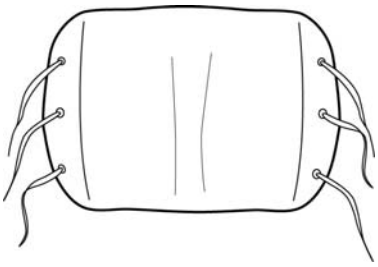

Figure 399. *Paratendipes* 3 LS setae.

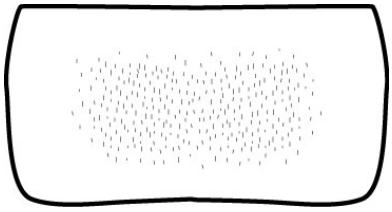

Figure 400. *Paratendipes* tergites with uniform shagreen.

Hayford, B.L. 1998. A systematic revision of *Paratendipes* (Diptera:Chironomidae) with special emphasis on the evolution of thermophily. Unpublished PhD thesis.

Phaenopsectra Kieffer

Phaenopsectra are found in sandy and muddy sediments of small standing waters and flowing waters. *Phaenopsectra* have only a few branches to their thoracic horn and very characteristic cephalic tubercles. Their cephalic tubercles are truncate with an apical covering of small spines (Figs. 402-403). *Sergentia* is the only other genus that has these same cephalic tubercles, but they weren't found in TCMA lakes. *Phaenopsectra* has dark lateral flecks on conjuctives I/II and IV/V (Fig. 401) which are absent in *Sergentia*, and *Phaenopsectra* is much smaller. *Phaenopsectra* can look similar to *Polypedilum*, however *Polypedilum* does not have the truncate cephalic tubercials with apical spines. There was only one species of *Phaenopsectra* in TCMA lakes.

Figure 401. *Phaenopsectra* full body.

Figure 402. *Phaenopsectra* cephalic tubercles.

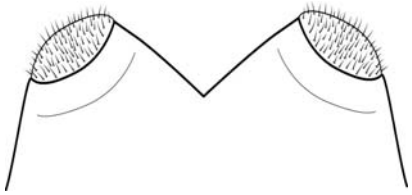

Figure 403. *Phaenopsectra* cephalic tubercles.

Polypedilum Kieffer

Polypedilum are found in all kinds of water bodies nearly everywhere in the world. *Polypedilum* are very diverse and abundant in TCMA lakes. There is no unifying character for this genus, but the majority of species can be recognized by a thoracic horn with few branches, tergites II-VI usually with anterior transverse bands of shagreen, conjunctives II/IV and IV/V usually with a band of shagreen, segments V-VIII usually with 3, 3, 4, 4 LS setae respectively and an anal spur present. One species is easily recognizable by its long, curved cephalic tubercles, *P. simulans* (Figs. 404-405). Other species usually do not have cephalic tubercles (Fig. 406) and are hard to distinguish from each other. Their anal spurs vary greatly between species (Figs. 408-411).

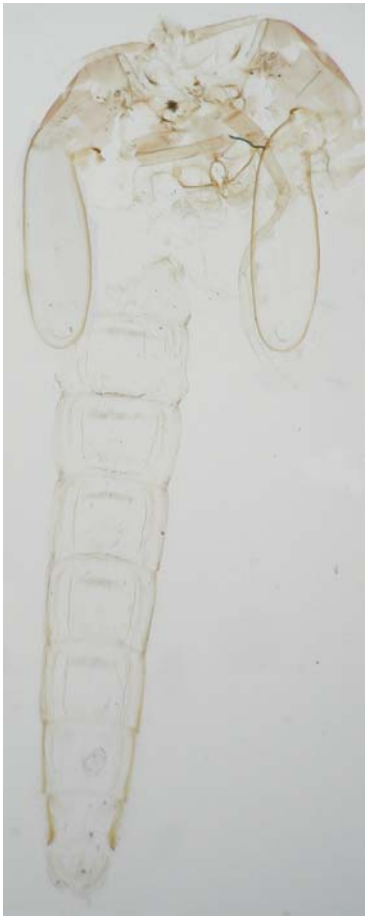

Figure 407. *Polypedilum* full body.

Figure 404. *Polypedilum simulans* cephalic tubercles.

Figure 405. *Polypedilum simulans* cephalic tubercles.

Figure 406. *Polypedilum* frontal apotome.

Figure 408. *Polypedilum* anal spur.

Figure 409. *Polypedilum* anal spur.

Figure 410. *Polypedilum* anal spur.

Figure 411. *Polypedilum* anal spur.

Maschwitz, D.E. and E.F. Cook. 2000. Revision of the Nearctic species of the genus *Polypedilum* Kieffer (Diptera:Chironomidae) in the subgenera *P.* (*Polypedilum*) Kieffer and *P.* (*Uresipedilum*) Oyewo and Sæther. Ohio Biological Survey, Ohio State University.

Pseudochironomus Malloch

Pseudochironomus are found in sandy or gravelly littoral sediments of oligotrophic to mesotrophic lakes or large rivers. *Pseudochironomus* is easily recognized by 4 spiny tubercles on sternite I (Fig. 412). Sometimes this is difficult to see if the specimen wasn't dissected cleanly between the cephalothorax and abdomen when slide-mounting. *Pseudochironomus* is also recognized by its golden color (Fig. 413), a 2-branched thoracic horn, broad anal lobe and short anal comb (Fig. 414).

Figure 412. *Pseudochironomus* sternite I.

Figure 413. *Pseudochironomus* full body.

Figure 414. *Pseudochironomus* anal comb and anal lobes.

Sæther, O.A. 1977. Taxonomic studies on Chironomidae: *Nanocladius*, *Pseudochironomus*, and the *Harnischia* complex. Bulletin of the Fisheries Research Board of Canada. Bulletin 196.

Sætheria Jackson

Sætheria live in the sandy substrata of lakes and streams. *Sætheria* can be characterized by a brush-like thoracic horn, lack of anal spurs (Fig. 415) and uninterrupted hookrow on the posterior margin of tergite II (Fig. 416). They also have a circular spine pattern on the posterior half of the tergites (Fig. 417-418). *Sætheria* is most similar to *Paracladopelma*, but can be separated by just 4 LS setae on segment VIII (Fig. 419) while *Paracladopelma* has 5 LS setae on segment VIII.

Figure 417. *Saetheria* full body.

Figure 415. *Saetheria* anal lobes.

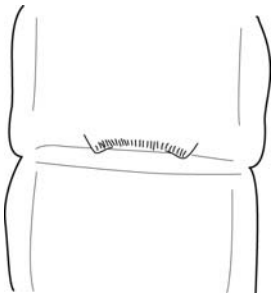

Figure 416. Uninterrupted hookrow on tergite II.

Figure 418. *Saetheria* tergal spine pattern.

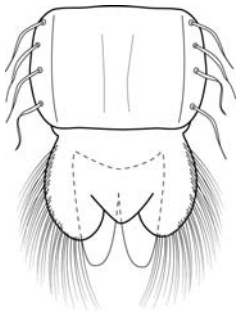

Figure 419. *Saetheria* anal lobes.

Jackson, G.A. 1977. Nearctic and Palaearctic *Paracladopelma* Harnisch and *Sætheria* n. gen. (Diptera: Chironomidae). Journal of the Fisheries Research Board of Canada. 34:1321-1359.

Stenochironomus Kieffer

Stenochironomus are obligate miners in living and dead vegetation. *Stenochironomus* has a plumose thoracic horn with an additional spinous branch, no cephalic tubercles or frontal setae (Fig. 420). They also have a characteristic anal comb that is composed of wide points that are horizontally even along the posterior margin (Figs. 422-423). Only one species of *Stenochironomus* was found in TCMA lakes and it belonged to *Stenochironomus* (*Stenochironomus*).

Figure 420. *Stenochironomus* frontal apotome.

Figure 421. *Stenochironomus* full body.

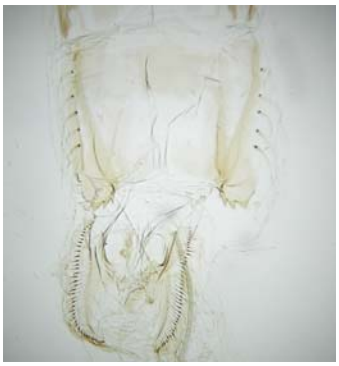

Figure 422. *Saetheria* anal lobes and anal combs.

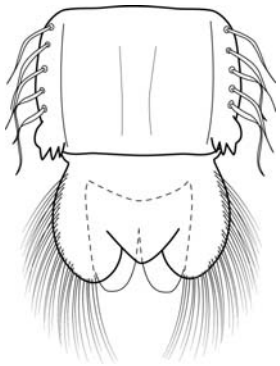

Figure 423. *Saetheria* anal lobes and anal combs.

Borkent, A. 1984. The systematics and phylogeny of the *Stenochironomus* complex (*Xestochironomus, Harrisius,* and *Stenochironomus*) (Diptera:Chironomidae). Memoirs of the Entomological Society of Canada. No. 128.

Stictochironomus Kieffer

Stictochironomus inhabit profundal soft sediments or littoral sand of oligotrophic to mesotrophic lakes. They are also found in streams and slow-flowing rivers. *Stictochironomus* has well developed cephalic tubercles with frontal setae extending from the tips (Figs. 424-425), robust longitudinal anal combs (Fig. 427) and a plumose thoracic horn (Fig. 428).

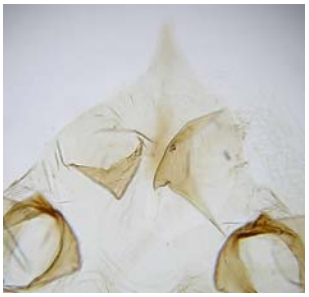

Figure 424 *Stictochironomus* cephalic tubercles and frontal setae.

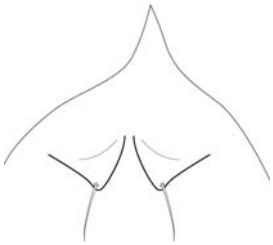

Figure 425. *Stictochironomus* cephalic tubercles and frontal setae.

Figure 426. *Stictochironomus* full body.

Figure 427. *Stictochironomus* anal comb and anal lobes.

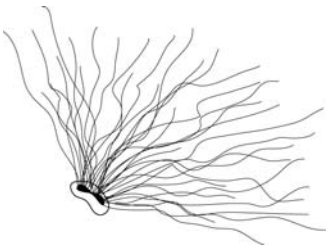

Figure 428. *Stictochironomus* thoracic horn.

Xenochironomus Kieffer

Xenochironomus are obligate miners of freshwater sponges in both lentic and lotic habitats. They are easy to identify by the shagreen patterns on the tergites (Fig. 429). In addition, they have no anal spurs (Fig. 431-432), 4 LS setae on segment VIII (Fig. 432) and low, wrinkled cephalic tubercles (Fig. 433).

Figure 430. *Xenochironomus* full body.

Figure 429. *Xenochironomus* tergal shagreen pattern.

Figure 431. *Xenochironomus* segement VII and anal lobes.

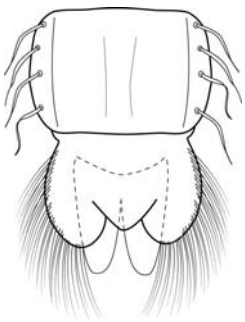

Figure 432. *Xenochironomus* 4 LS setae on segment VII.

Figure 433. *Xenochironomus* cephalic tubercles.

Zavreliella Kieffer

Zavreliella larvae are mobile and live amongst submerged vegetation in small lentic water bodies. *Zavreliella* have characteristic longitudinal paired spine patches on tergites II-VI (Figs. 434-435). Their thoracic horn has four branches and abdominal segment VI has 3 LS setae. *Zavreliella* can be confused for *Tanytarsus* to the untrained eye, however *Zavreliella* has a 4-branched thoracic horn while *Tanytarsus* has just a one-branched thoracic horn. In addition, their spine patches are different in shape.

Figure 434. *Zavreliella* longitudinal spine patches.

Figure 435. *Zavreliella* full body.

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