**Supplementary file 1-List of characters**

**Larvae: general characters**

0. **Larval habitat:** aquatic (0); terrestrial (1).

1. **Head capsule:** smooth (0); with dorsal cuticular spines (1).
2. **Egg bursters:** absent (0); present (1).
3. **Stemmata:** six distinct stemmata (0); closely aggregated in 1 or 2 groups (1); absent (2).
4. **Frontal lines:** converging towards base of head capsule (0); not converging or slightly so, reaching occipital foramen distinctly separated (1).
5. **Shape of the frontal lines: straight or almost straight line (0); with a middle constriction (1); curved (2).**
6. **Coronal line:** absent (0); present (1). (In *Dactylosternum* absent in L3, present but very short in L1).
7. **Posterior tentorial pits:** contiguous to gular suture (0); separated from gular suture (1).
8. **Posterior tentorial pits:** situated on submental sulcus (0), situated slightly posteriorly of submentum (1); situated at midlength or closer to the posterior margin of the head (2).
9. **Nasale:** symmetrical or nearly so (0); distinctly asymmetrical (1).
10. **Shape of the nasale:** straight or slightly curved (0); truncated toward the right (1); subtriangular (2).
11. **Teeth on nasale:** present (0); absent (1).
12. **Number of teeth of nasale:** 5 (0); 1 (1); <5 (2); >5 (3); absent (-).
13. **Size of the teeth on the nasale:** similar (0); dissimilar (1).
14. **Teeth distribution on the nasale:** equidistant (0); one or two teeth on the left side apart from the others (1); without a pattern (2); the one in the middle apart from those on the left and the right (3).
15. **Lateral lobes of epistome:** symmetrical or nearly so (0); distinctly asymmetrical (1).
16. **Inner margin of epistomal lobes with cuticular projections:** absent (0); present (1).
17. **Inner cuticular projections:** setiform (0); spiniform (1).
18. **Left epistomal lobe with pubescent notch:** present (0); absent (1).
19. **A1 surface (L1/L3):** smooth (0); with groups of fine cuticular spicules (1).
20. **A2 surface (L1/L3):** smooth (0); with groups of fine cuticular spicules (1); with few strong cuticular spines (2).
21. **Mandible shape:** symmetrical (0); asymmetrical (1).
22. **Mandible length:** less than or equal to 2x maximum width (0); more than 2x maximum width (1).
23. **Number of retinacular teeth on right mandible:** none (0); one (1); two (2); three (3).
24. **Number of retinacular teeth on left mandible:** none (0); one (1); two (2); three (3).
25. **Groove along inner margin of left mandible:** absent (0); present (1).
26. **Stipes length:** more than or equal to 2x maximum width (0); much less than 2x maximum width (1).
27. **Strong spine on distal inner margin of stipes:** absent (0); present (1).
28. **Cuticular spines on stipes (L1-3):** absent (0); spines only at base of stipes (1); spines along most of inner margin of stipes (2).
29. **Maxillary palpomere one:** ring-like, completely sclerotized (0); incompletely sclerotized, with a membranous area dorsally (1).
30. **Galea:** present (0); absent (1).
31. **Galea, sclerotization:** sclerotized (0); non-sclerotized (membranous) (1).
32. **Mentum and prementum:** normally developed (0); reduced (1).
33. **Labium, sclerotization of prementum mesally (L1-3):** completely sclerotized (0); incompletely sclerotized (1).
34. **Mentum:** less than twice as wide as prementum (0); twice as wide as prementum or more (1).
35. **Armature of mentum:** dorsal surface without cuticular spines (0); with cuticular spines (1).
36. **Anterior margin of prementum with spinulae:** absent (0), present (1).
37. **Ligula:** absent (0); present, clearly visible (1).
38. **Labium, length of ligula:** strongly reduced (0); shorter than or as long as LP1 (1); longer than LP1 but shorter than LP1+LP2 (2); as long as or longer than LP1 + LP2 (3).
39. **Labium, shape of ligula:** Subtriangular or subrectangular (0); globular (1).
40. **Pronotal plate:** smooth, without lateral projections (0); with lateral projections (1).
41. **Thoracic pleural areas (leg articulation):** sclerotized (0); unsclerotized (1).
42. **Hypopharyngeal lobe:** absent (0); present (1).
43. **Number of leg segments:** five (0); three (1); 2 or less (2).
44. **Legs with a row of long setae on trochanter, femur and /or tibiotarsus:** absent (0); present (1).
45. **Abdominal tergites:** present on all segments (0); present on segments I and VIII (1); present only on segment VIII (2).
46. **Abdominal segments with lateral conspicuous lobes:** absent (0), present (1).
47. **Spiracular atrium:** present, well-developed (0); spiracular atrium reduced or absent (1).
48. **Posterior margin of abdominal tergite VIII:** straight or slightly lobate/sinuous (0); trifurcate (1).
49. **Tergite VIII:** entire (0); subdivided (1).
50. **Urogomphi: long,** three-segmented (0); short, one-segmented (1).

**Larvae: chaetotaxic characters**

Unless noticed, these characters are coded for first instar larvae.

1. **Head capsule, presence of numerous short secondary setae lateroventrally:** absent (0); present (1).
2. **Spatulate setae on head capsule:** absent (0); present (1).
3. **Number of setae on gFR1:** 6 (0); 8 (1); 2 (2).
4. **Number of setae on epistomal lobes (gFR2):** absent (0); less than 3 (1); 3 to 5 (2); more than 5 (3).
5. **Shape of the gFR2 sensilla:** setiform (0); spiniform (1).
6. **Inner margin of gFR2 sensilla:** smooth (0); with denticles (1).
7. **Sensilla on gFR2:** equidistant, forming a distinct group (0); forming two well defined groups distinctly separated (1).
8. **FR1, length:** short (0); moderately to considerably long (1).
9. **FR1, shape:** setiform (0); spiniform (1).
10. **FR3, position (L1-3):** posterior to or at level of antennal sockets (0); distinctly anterior to antennal sockets (1).
11. **FR1-3, position (L1-3):** FR2 distinctly closer to FR3 (0); FR2 equidistant to FR1 and FR3 (1); distinctly closer to FR1 (2).
12. **FR4-6, arrangement (L1-3):** arranged in a more or less straight line (0); arranged in a triangle (1).
13. **FR5-6, length (L1):** equally or subequally long (0); FR6 2x or more as long as FR5 (1); FR5 2x or more as long as FR6 (2).
14. **FR7, presence**: absent (0); present (1).
15. **FR7, length:** short (0); rather long (1).
16. **Ratio distance of both FR8 / distance FR8-FR9:** ≤0.6 (0); 0.7-1.8 (1); >2.2 (2).
17. **FR9-10, length:** equally or subequally long (0); FR10 2x or more as long as FR9 (1); FR9 2x or more as long as FR10 (2).
18. **FR12, position (L1-3):** anterior to FR13 (0); posterior to FR13 (1).
19. **FR15, position (L1-3):** anterior to setae FR8 (0); posterior or on same line than FR8 (1).
20. **PA1-5, arrangement (L1-3)**: PA1-3 in a transverse row, not in line with PA4-5 (0); PA1-5 arranged in a more or less organized longitudinal row, at most in zigzag (1).
21. **PA6, position (L1-3):** close to or touching frontal lines (0); distant from frontal lines (1).
22. **PA7, position:** in line with or posterior to PA12 (0); distinctly anterior to PA12 (1); closely aggregated with PA12 (2).
23. **PA7, position (L1-3):** mesal to PA5 (0); in line with or lateral to PA5 (1).
24. **PA7, length:** short (0); rather long (1).
25. **PA9, apex:** simple (0); spatulate (1); multifid (2).
26. **PA11, length:** short (half or less than half the length of PA14) (0); long trichoid seta (distinctly more than half the length of PA14) (1).
27. **PA11, position:** on the lateral side of parietale (0); among stemmata (1); near the frontal suture (2).
28. **PA12-PA14, arrangement:** clustered (0), PA13-PA14 clustered and widely separated from PA12 (1); non-clustered (2).
29. **PA18, position:** closer to PA30 than to PA16 (0); equidistant to or closer to PA16 than to PA30 (1).
30. **PA20, length:** long, not distinctly shorter than PA9 (0); short, distinctly shorter than PA9 (1).
31. **PA26, position:** anterior or lateral to PA17 (0), posterior to PA17.
32. **PA26-28, arrangement:** forming a straight line or almost so (0); PA27 offline, therefore these three sensilla form a distinct triangle (1).
33. **PA27, position:** distinctly closer to PA26 (0); equidistant to PA26 and PA28 (1); distinctly closer to PA28 (2).
34. **PA30, position:** posterior to PA29 (0); in line with or anterior to PA29 (1).
35. **Antennomere 1 with secondary setae (L2-3):** absent (0); present (1).
36. **AN2, position (L1-3):** distal (0); basal (1).
37. **Additional pore-like structures at base of A2:** absent (0); present, 1 (1).
38. **Secondary pores at base of A2:** Absent (0); present (1).
39. **AN6, position (L1-3):** close to distal margin of A2 (0); more basal, ca. at midlength of A2 (1).
40. **Number of sensilla near SE1 (L1-3):** one (0); two (1); three (2).
41. **MX1, length:** shorter than the cardo maximum length (0), longer than the cardo maximum length (1).
42. **MX3, position:** in line with MX2 (0), equidistant to MX2 and MX4 (1), in line with MX4 (2).
43. **MX12-14, arrangement:** clustered (0); non-clustered (1).
44. **Number of setae on inner margin of stipes:** five (0); more than five (1).
45. **Distance of MX3 from basal margin/total length of stipes:** <0.5 (0); 0.51-0.65 (1); >0.68 (2).
46. **MX16, shape (L1-3):** spiniform (0); hair-like (1).
47. **MX17, presence (L1-3):** absent (0); present (1).
48. **MX21, position (L1-3):** closer to outer edge or at midwidth of palpomere (0); distinctly closer to inner edge (1).
49. **MX22, position (L1-3):** close to MX21 (0); not close to MX21 (1).
50. **MN1, length:** minute to very short (0); moderately long to very long (1).
51. **MN1, position (L1):** anterior to retinacular area (0); at level of retinacular area (1); posterior to retinacular area (2).
52. **MN2, Position (L1):** Anterior to MN1 (0); Posterior to or in line with MN1 (1).
53. **MN2-4, arrangement:** forming a distinct triangle (0); arranged in a transverse line (1).
54. **MN4, position (right mandible):** distinctly closer to MN5 (0); distinctly closer to MN1 (1); equidistant or nearly (2).
55. **MN5, position (right mandible):** distinctly closer to MN4 than to distal apex of mandible (0); distinctly closer to distal apex of mandible than to MN4 (1); equidistant (2).
56. **LA1, length:** rather long (0), short (1).
57. **LA3, position (1-3)**: mesal to LA4 (0); on the same line or lateral to LA4 (1).
58. **LA6, position (L1-3):** close to distal margin of prementum (0); closer to midlength (1).
59. **LA8, presence (L1-3):** present (0); absent (1).
60. **LA8, position (L1-3):** distal (0); at about midlength or subbasal (1).
61. **LA10, presence (L1-3):** present (0); absent (1).
62. **LA10, position (L1-3):** on premental sclerite (0); on intersegmental membrane (1); at base of ligula (2).
63. **LA11, presence (L1-3):** present (0); absent (1).
64. **LA 11, position on ligula:** basal (0); at midlength (1); distal (2).
65. **LA12, presence (L1-3):** present (0); absent (1).
66. **LA15, presence (L1-3):** present (0); absent (1).

**Larvae: morphometric characters**

1. **Antenna, length A1/A2 (L1):** less than 2.0 (0); more than 2.2 (1).
2. **Antenna, length of A1/A3 (L3):** less than 1.2 (0); 1.2-1.6 (1); 1.7-2.3 (2); 2.5-3.0 (3); more than 3.1 (4).
3. **Antenna, length A1/A2+A3 (L1):** less than 1.0 (0); more than 1.1 (1).
4. **Antenna, length A1/A2+A3 (L3):** 0.6-1.0 (0); 1.1-1.5 (1); 1.6-2.0 (2); more than 2.1 (3).
5. **Antenna, length of SE1/length A3 (L1):** less than 0.10 (0); 0.11-0.40 (1); 0.41-0.70 (2); more than 0.71 (3).
6. **Antenna, length of SE1/length A3 (L3):** less than 0.4 (0); 0.5-0.9 (1); more than 0.95 (2).
7. **Maxilla, length of stipes/length of palpomere I (palpifer) of (L3):** less than 4 (0); 4.1-7.0 (1); more than 7.2 (2).
8. **Maxilla, length palpus/first palpomere (L1):** less than 3.0 (0); between 3.0 and 4.0 (1); more than 4.0 (2).
9. **Maxilla, length palpus/first palpomere (L3):** less than 3.0 (0); 3.1-4.0 (1); more than 4.1 (2).
10. **Maxilla, length palpus/third palpomere (L1):** less than 4.0 (0); more than 4.0 (1).
11. **Maxilla, length palpus/third palpomere (L3):** less than 3.0 (0); 3.1-4.0 (1); more than 4.1 (2).