# Appendix I: Character List

Characters based on previous studies are marked between brackets (Garcete-Barrett, 2014 – G; Hermes *et al.*, 2014 – H; Lopes & Noll, 2018 - L) .

*Head*

1. Interantennal longitudinal carina: (0) absent; (1) present.
2. Interantennal transversal carina: (0) absent; (1) present.
3. [L] Male, last flagellomere, development: (0) normal; (1) reduced, button-like.
4. [L] Male flagellum, shape: (0) linear; (1) hook; (2) rolled.
5. [L] Female clypeus, microstriae: (0) absent; (1) present.
6. [L] Clypeus, subapical edge: (0) absent; (1) present.
7. [G] Clypeus, free apical region: (0) considerably passes the acetabulum; (1) passes only a little beyond acetabulum.
8. Clypeus, sub-apical area, profile view: (0) gradually narrowed; (1) flattened.
9. Clypeus, female, apical teeth: (0) absent; (1) present.
10. Clypeus, apical margin, median tooth: (0) absent; (1) present.
11. Clypeus, apical margin: (0) straight; (1) convex; (2) concave.
12. Male mandible, teeth number: (0) four; (1) three; (2) two.
13. Stipe, tubercle: (0) absent; (1) present.
14. Maxillary palpi, length: (0) normal; (1) elongated.
15. Maxillary palpomeres, number: (0) six; (1) five; (2) four; (3) three.
16. Galea, length: (0) short – not reaching posterior limit of head; (1) medium – surpasses first coxae; (2) long – surpasses mid coxae.
17. Labial palpi, aspect: (0) normal; (1) psamophore.
18. Labial palpomeres, number: (0) four; (1) three.
19. Labial palpomere I: (0) straight; (1) recurved.
20. [H] Ocelli, disposition: (0) equilateral triangle; (1) isosceles triangle.
21. Vertex: (0) beveled; (1) elevated.
22. Post-ocular carina: (0) absent; (1) present.
23. [L] Gena, margin: (0) regularly convex; (1) sinuous.
24. [L] Gena, dorsal view: (0) convex; (1) angulate.
25. Occipital carina, dorsal portion: (0) contiguous; (1) interrupted medially.
26. Occipital carina, ventral portion: (0) absent; (1) present.
27. Ventral portion of occipital carina [contingent to 24.1]: (0) short branch; (1) complete.
28. Hypostomal carina: (0) absent; (1) present.
29. Hypostomal carina, length [contingent to 27.1] interrupted posteriorly; (2) complete.
30. Angulation of occiput/hypostoma: (0) curved; (1) angled.
31. Post-occipital carina: (0) absent; (1) present.
32. [L] Hypostomal bridge: (0) keel-like; (1) plateau like.

*Mesosoma*

1. Pronotal carina, extension: (0) absent dorsally; (1) interrupted medially; (2) dorsally complete.
2. [L] Pronotal carina, dorsal portion, aspect [contingent to 32.1 and 32.2]: (0) short, keel-like; (1) lamelar.
3. Pronotal carina, median notch [contingent to 32.2]: (0) absent; (1) present.
4. Notch of pronotal carina [contingent to 34.1]: (0) slight; (1) deep, reaching sclerite surface.
5. [L] Pronotal carina, lateral portion: (0) regular; (1) sinuous.
6. Pronotal carina, sinuosity [contingent to 36.1]: slightly sinuous; (2) strongly sinuous.
7. Pronotum, dorsal surface, striae: (0) absent; (1) present.
8. Pronotum, humeral angle: (0) regular; (1) projected.
9. Pronotum, humerus: (0) rounded; (1) angled.
10. [L] Pronotum, sub-humeral area: (0) facing laterally; (1) facing forward.
11. Pre-tegular carina: (0) absent; (1) interrupted; (2) complete.
12. Proepisternum, posterior margin, lamella: (0) absent; (1) present.
13. Mesoscutum, admedial lines: (0) absent; (1) present.
14. Mesoscutum, medial carina: (0) absent; (1) present.
15. Mesoscutum, striae: (0) absent; (1) present.
16. [L] Mesoscutum, welts: (0) absent; (1) present.
17. [L] Mesoscutum, notauli: (0) absent; (1) incomplete; (2) complete.
18. [L] Discoid puncture: (0) absent; (1) present.
19. [L] Discoid puncture, level [contingent to 49.1]: (0) beveled (Fig. 19f); (1) on top of a tubercle.
20. [L] Tegula, outer margin: (0) regularly convex; (1) angled.
21. Tegula, outer margin, border: (0) smooth; (1) raised.
22. Tegula, raised border, extension [contingent to 52.1]: (0) complete; (1) posterior half; (2) medially interrupted.
23. Parategula, anterior projection: (0) absent; (1) present.
24. Epicnemial carina, dorsal portion: (0) absent; (1) present.
25. Epicnemial carina, ventral portion: (0) absent; (1) present.
26. [L] Mesepisternum, dorsal suture posterior to epicnemial carina: (0) absent; (1) present.
27. [L] Mesopleura, grooves and sutures, aspect: (0) lines; (1) differentiated punctation.
28. [L] Posterior mesepisternal carina: (0) absent; (1) present.
29. [L] Mid tibia, apical spurs, number: (0) two; (1) one.
30. Metanotum, lateral view: (0) flat; (1) bent.
31. [G] Metanotum, anterior margin: (0) regular; (1) laterally margined.
32. Metanotum, lateral pits: (0) absent; (1) present.
33. Metanotum, median tubercle: (0) absent; (1) present.
34. Metanotum, posterior surface, aspect: (0) convex; (1) flattened.
35. Metanotum, projections: (0) absent; (1) weak, rounded; (2) strong, acute.
36. Metanotum, lateral carina: (0) absent; (1) present.
37. Metanotum, lateral carina, length [contingent to 67.1]: (0) straight, only in anterior half; (1) straight, surpassing half of sclerite; (2) making inward curve and becoming transverse.
38. Metanotum, lateral carina, aspect [contingent to 67.1]: (0) keel-like; (1) lamella.
39. [L] Foreleg, tarsomere IV, apical spines: (0) absent; (1) present.
40. Hind coxae, carina: (0) absent; (1) complete; (2) interrupted.
41. Hind coxae, carina, aspect [contingent to 71.1 and 71.2]: (0) keel-like; (1) lamellar.
42. [L] Hind coxae, trochanter socket, inner margin: (0) regular; (1) reflexed.
43. Hind tibiae, spines: (0) absent; (1) present.
44. Hind tibiae, spines, distribution [contingent to 74.1]: (0) scattered; (1) row; (2) basally restricted.
45. Fore wing, 2m-cu: (0) curved; (1) straight.
46. Fore wing, marginal cell, apex: (0) far from costal margin; (1) touching costal margin.
47. Fore wing, marginal cell, apical angle: (0) acute; (1) obstuse.
48. Propodeum: (0) regularly convex; (1) anteriorly bulged.
49. [L] Propodeum, dorsal aperture: (0) absent; (1) present.
50. [L] Propodeum, dorsal aperture, dorsal margin [contingent to 80.1]: (0) absent; (1) present.
51. Propodeal angles: (0) rounded; (1) angular.
52. Propodeum, submedian carina: (0) absent; (1) present.
53. Submedian propodeal carina, length [contingent to 83.1]: (0) dorsal half; (1) complete; (2) ventral half.
54. Propodeum, lateral carina: (0) absent; (1) present.
55. Lateral propodeal carina, length [contingent to 85.1]: (0) incomplete, present dorsaly; (1) complete; (2) incomplete, present ventrally.
56. Submedian and lataral carinas [contingent, not applicable to 83.0 and/or 85.0]: (0) separated; (1) connected.
57. Propodeum, sublateral carina: (0) absent; (1) incomplete; (2) complete, reaching spiracle.
58. Propodeal canal, pit: (0) absent; (1) present.
59. Propodeum, subapical rim: (0) absent; (1) present.
60. Propodeal orifice: (0) short; (1) elongated.
61. Propodeal orifice, dorsal margin: (0) rounded; (1) acute.
62. Propodeal orifice, lateral margin: (0) regular; (1) sinuous.
63. Propodeum, apical lamella: (0) absent, (1) present.
64. Apical propodeal lamellar, shape [contingent to 94.1]: (0) triangular; (1) rounded; (2) square.
65. Apical propodeal lamellae, disposition [contingent to 94.1]: (0) separate; (1) contiguous (Fig. 36c).
66. Propodeal valvula, dorsal margin: (0) attached to submarginal carina; (1) attached beneath submarginal carina.
67. Propodeal valvular, number of sides: (0) two; (1) three.
68. Propodeal valvular, length: (0) normal; (1) projected posteriorly.
69. Propodeal valvula, infero-posterior angle: (0) right; (1) obtuse.

*Metasoma*

1. [L] Sub-basal carina: (0) absent; (1) present (Fig. 19j).
2. Sub-basal tubercle: (0) absent; (1) present.
3. T1, stem, base: (0) straight; (1) bent.
4. T1, stem: (0) short – at most 1/3 expansion length; (1) long – more than 1/3 expansion length.
5. T1, basal longitudinal carina: (0) absent; (1) present.
6. [L] T1, dorsal longitudinal carina: (0) absent; (1) present.
7. [L] T1, expansion base, profile view: (0) regularly convex; (1) bent.
8. T1, expansion, width: (0) wide – 2.0x or wider than stem; (1) narrow – less than 2.0x stem width.
9. T1, expansion length: (0) short – at most as long as wide; (1) medium – at most 3x longer than wide; (2) long - at least 3x longer than wide.
10. T1, ventrolaterally: (0) rounded; (1) angled.
11. T1, lateral margins, ventrally: (0) separated; (1) touching.
12. Dorso-ventral constriction: (0) gradual; (1) abrupt.
13. T1, posterior lateral constriction: (0) absent; (1) present.
14. T1, posterior lateral constriction, aspect: (0) weak – apex almost as wide as maximum width; (1) strong – apex clearly narrower.
15. S1, anterior margin: (0) absent; (1) present.
16. [L] S1, anterior margin, shape [contingent to 115.1]: (0) semi-elliptical; (1) semi-circular; (2) square.
17. S1, aspect: (0) flat; (1) constricted into carina.
18. T2, stem: (0) absent; (1) short - at most 1.0x as long as wide; (2) medium – at most 2.0x as long as wide; (3) long - over 3.0x as long as wide.

One character used before, the stem of T2 (Lopes *et al.*, 2015; Lopes & Noll, 2018), has been redefined here, now referred to as present whenever the tergite, in dorsal view, presents sides semi-parallel, disregarding how short they might be, posterior to the articular region.

1. [L] T2, apical lamella: (0) absent; (1) present.
2. T2, lamella length [contingent to 119.1]: (0) normal; (1) reduced.
3. T2, lamella aspect [contingent to 119.1]: (0) straight; (1) reflexed.
4. S2, convexity: (0) flat; (1) regular; (2) angled.
5. S2, base, smooth triangular area: (0) absent: (1) present.
6. S2, tubercle: (0) absent; (1) present.
7. S2, lamella, aspect: (0) straight; (1) reflexed.
8. T3, median depression: (0) absent; (1) present.
9. [L] T3, gradulus: (0) absent; (1) present
10. T3, gradulus, length [contingent to 127.1]: (0) interrupted medially; (1) complete.
11. [L] T3, bridge: (0) absent; (1) present.
12. [L] T3, post-gradular depression: (0) absent; (1) present.
13. [L] T3, tubercle: (0) absent; (1) present.
14. T3, tubercle, position regarding pre-gradular region [contingent to 131.1]: (0) separate; (1) adjacent.
15. [L] T3, apical margin: (0) regular; (1) projected.
16. [L] T3, apical lamella: (0) absent; (1) present.
17. [L] T3, apical lamella, laterally [contingent to 134.1]: (0) regular; (1) tapered.
18. T3, postero-lateral lamellar indent: (0) absent; (1) confluent with tergum margin; (2) perpendicular to tergum margin.
19. T3, secondary lamella: (0) absent; (1) present.
20. [L] T3, lateral lamellar lobes: (0) absent; (1) present.
21. [L] S3, gradulus: (0) absent; (1) present.
22. [L] S3, bridge: (0) absent; (1) present.
23. [L] S3, post-gradular depression: (0) absent; (1) present.
24. [L] S3, apical lamella: (0) absent; (1) present.
25. S3 lamella, development [contingent to 142.1]: (0) reduced; (1) well-developed.
26. S3, medial lamellar lobe: (0) absent; (1) present.
27. Male, S5, transversal carina: (0) absent; (1) present.
28. Male, S6, transverse carina: (0) absent; (1) present.

*Male Genitalia*

1. [L] Gonocoxite: (0) narrow; (1) wide.
2. Gonocoxite, subapical notch: (0) absent; (1) present.
3. Gonogoxite, apex, shape: (0) rounded; (1) truncate; (2) acute.
4. Gonocoxite, apically, longitudinal curl: (0) absent; (1) present.
5. [H] Gonostylus, pilosity: (0) absent; (1) present
6. [L] Aedeagus, basal plate: (0) normal; (1) reduced.
7. Aedeagus, basal plate, apex shape: (0) acute; (1) wide.
8. Aedeagus, basal plate, length: (0) longer than wide; (1) at most as long as wide.
9. Aedeagus, basal plate in profile, convexity: (0) regularly convex; (1) hunched.
10. Aedeagus, basal plate, midpoint compared to base: (0) thinner; (1) same width.
11. Aedeagus, ventral lobe, size: (0) small, at most a small triangular projection; (1) large, nearly as tall as apodemes.
12. Aedeagus, ventral lobe, margin: (0) smooth; (1) teethed; (2) notched.
13. Aedeagus, ventral lobe, anterior portion: (0) regular; (1) reflexed outward.
14. Aedeagus, lateral margin, subapically: (0) smooth; (1) serrated.
15. Volsellar crest, axe-like projection: (0) absent; (1) present.
16. [L] Digitus, basal projection: (0) absent; (1) present.
17. Digitus, basal tuft: (0) absent; (1) present.
18. [L] Digitus, apex: (0) gradually narrower; (1) dilated.
19. [L] Cuspis, baso-ventral projection: (0) absent; (1) present.
20. Cuspis projection, aspect [contingent to 165.1]: (0) wide; (1) apically tapered.
21. Cuspis, apical tuft: (0) absent; (1) present.