**Supp. file 1.** List of characters. <https://doi.org/10.5852/ejt.2021.773.1517.5131>

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Characters and states** | | **L** | **CI** | **Ri** | **Summary** |
| **Adult – Female** | | | | | |
| 1 | Head. Cibarium anteromedial border colour: **(0)** unpigmented (Figs 9–12) or slightly pigmented; **(1)** distinctly pigmented (Figs 13–15) | 3 | 0.33 | 0.83 | Gil-Azevedo *et al.*  (2012): 4 |
| 2 | Head. Cibarium, anteromedial border surface: **(0)** distinctly armed (Figs 9–10, 12–15); **(1)** unarmed (Fig. 11) | 4 | 0.25 | 0.78 | Miranda-Esquivel & Coscarón (2001): 11; Adler *et al.* (2004): 203; Hernández (2011): 2; Gil Azevedo *et al.* (2012): 5 |
| 3 | Head. Cibarium, when armed: **(0)** armed with sharp teeth (Figs 9–10, 12–14); **(1)** armed with small tubercles (Fig. 15) | 1 | 1 | 1 | Miranda-Esquivel & Coscarón (2001):12. Modified from Adler *et al.* (2004): 23; Hernández (2011): 3 |
| 4 | Thorax. Scutum, background colour: **(0)** dark colour - black to dark brown (Figs 3–4, 6–8);  **(1)** light colour – yellow to orange; **(2)** red to light brown (Fig. 4) | 6 | 0.33 | 0.60 | Modified from Gil- Azevedo *et al.* (2012): 7 |
| 5 | Thorax. Scutum, pattern, adorned with silvery spots and/or stripes: **(0)** absent; **(1)** present  (Figs 3–8) | 3 | 0.33 | 0.33 | Modified from Adler *et al.* (2004): 195; Gil-Azevedo *et al.* (2012): 8 |
| 6 | Legs. Colour pattern: **(0)** uniformly coloured, almost homogeneous; **(1)** variously banded | 1 | 1 | 1 | Adler *et al.* (2004): 196 |
| 7 | Legs. Tarsal claws subbasal tooth: **(0)** absent;  **(1)** present | 4 | 0.25 | 0.76 | Adler *et al.*  (2004): 198; Gil-Azevedo *et al.*  (2012): 11 |
| 8 | Legs. Length of the tarsal claw subbasal tooth **(0)** developed, reaching about half of the main tooth length; **(1)** reduced, shorter than a third of the main tooth | 4 | 0.25 | 0.76 | Modified from Miranda-Esquivel & Coscarón (2001): 13; Adler *et al.*  (2004): 198 |
| 9 | Genitalia. Ventral view. Hypoginial valves length relation relative to the sternite VIII width at mid-length: **(0)** shorter or nearly equal (Figs 16, 18, 21); **(1)** conspicuously longer (Figs 17, 19–20) | 2 | 0.50 | 0.92 | Miranda-Esquivel & Coscarón (2001): 26; Hernández (2011): 4 |
| 10 | Genitalia. Ventral view. Hypoginial valves shape: **(0)** subtriangular (Figs 18, 20); **(1)** fine and pointed (Figs 16, 17, 19); **(2)** subovoid (Fig. 21) | 5 | 0.40 | 0.88 | Modified from Miranda-Esquivel & Coscarón (2001): 25; Hernández (2011): 5 |
| 11 | Genitalia. Ventral view. Hypoginial valves orientation: **(0)** inwardly-directed (Figs 16–17, 21); **(1)** forwardly directed (Figs 18–20) | 2 | 0.50 | 0.92 | Cited by Crosskey (1969) |
| 12 | Genitalia. Lateral view. Anal lobe distal border shape: **(0)** hemispheric (with curved distal border); **(1)** subrectangular (ventrally produced) (Figs 22–32); **(2)** triangular (base smaller than high) | 4 | 0.50 | 0.88 | Modified from Miranda-Esquivel & Coscarón (2001): 18; Coscarón *et al.*  (2004): 6; Hernández (2011): 10; Gil-Azevedo *et al.*  (2012): 15 |
| 13 | Genitalia. Lateral view. Anal lobe length (when subrectangular): **(0)** smaller or almost equal than cercus width (Figs 22–23, 25, 27–28, 31–32); **(1)** at least twice longer than the twice as long as cercus width at base (Figs 24, 26, 29–30) | 2 | 0.50 | 0.94 | Modified from Coscarón *et al.*  (2004): 7 |
| **Adult - Male** | | | | | |
| 14 | Genitalia. Gonopod, Gonocoxite width to gonostylus width at point of intersection: **(0)** gonostylus width almost equal or less than gonostylus width (Figs 50–56, 60–62, 64–70); **(1)** gonocoxite double in width than gonostylus (Figs 57\_59, 63) | 1 | 1 | 1 | Modified from Coscarón *et al.*  (2004): 9 |
| 15 | Genitalia. Gonopod, length ratio between gonocoxite and gonostylus: **(0)** gonostylus longer than gonocoxite (double) (Figs 55–68); **(1)** gonostyly subequal in length to or shorter than gonocoxite (Figs 50–54, 69\_70) | 3 | 0.33 | 0.92 | Modified from Adler *et al.*  (2004): 204; Coscarón *et al.*  (2004): 9; Gil Azevedo *et al.*  (2012): 21 |
| 16 | Genitalia. Ratio between the greatest width and the greatest height of the gonocoxite: **(0)** wider than long (rectangular) (Figs 55–68); **(1)** longer or equal than wide (Figs 50–54, 69–70) | 3 | 0.33 | 0.93 | Modified from Adler *et al.*  (2004): 201; Coscarón *et al.*  (2004): 9 |
| 17 | Genitalia. Gonostylus apex spicule: **(0)** absent or very reduced; **(1)** present | 2 | 0.5 | 0.87 | Adler *et al.*  (2004): 69; Hernández (2011): 23; Gil-Azevedo *et al.* (2012): 23 |
| 18 | Gonostylus, longitudinal ridge: **(0)** absent; **(1)** present | 1 | 1 | 1 | Gil-Azevedo *et al.*  (2012): 24 |
| 19 | Gonostylus, shape: **(0)** conical (Figs 64–68); **(1)** cylindrical (Figs 50–63, 69–70) | 1 | 1 | 1 | Modified from Miranda-Esquivel & Coscarón (2001): 29; Adler *et al*. (2004): 73 |
| 20 | Genitalia. Gonostylus shape, lateral view, when cylindrical: **(0)** medial region larger than basal region (Figs 60–62); **(1)** medial region equal in width than basal region (Figs 50–59, 63, 69–70) | 1 | 1 | 1 |  |
| 21 | Genitalia. Gonostylus apex, lateral view: **(0)** acute (Figs 64-70); **(1)** blunt (Figs 50–63) | 9 | 0.11 | 0.60 | Modified from Adler *et al.*  (2004): 202; Hernández (2011): 22 |
| 22 | Genitalia. Ventral plate, relation between length and width: **(0)** twice longer than wide (rectangular) (Figs 34–36, 41–47); **(1)** twice wider than long (Fig. 38); **(2)** sub-equal width and length (Figs 33, 37, 39–40, 48–49) | 13 | 0.15 | 0.62 |  |
| 23 | Genitalia. Ventral plate lateral shoulders: **(0)** absent (Figs 33, 36–38, 42, 48–49); **(1)** present (Figs 34–35, 39–41, 43–47) | 12 | 0.8 | 0.47 | Modified from Hernández (2011): 31 |
| 24 | Genitalia. Ventral plate lateral shoulders development: **(0)** projected (Figs 39–40, 43, 45); **(1)** not projected (Figs 34–35, 41, 44, 46–47) | 8 | 0.12 | 0.53 | Modified from Hernández (2011): 31 |
| 25 | Genitalia. Ventral plate, posteromedial process: **(0)** absent (Figs 33–38, 42–44, 48–49); **(1)** present (Figs 39, 41, 45–47) | 10 | 0.1 | 0.59 | Hernández (2011): 27. |
| 26 | Genitalia. Ventral view. Ventral plate, shape of the posteromedial process when present: **(0)** cylindrical and extensively produced (Figs 39, 41, 46–47); **(1)** globular (Fig. 45) | 1 | 1 | 1 | Modified from Hernández (2011): 29–30 |
| 27 | Genitalia. Ventral plate, posteromedial process length relative to the length from the process base to the ventral plate base: **(0)** lower or equal  (Figs 39, 46–47); **(1)** longer (Figs 41, 45) | 2 | 0.5 | 0.90 |  |
| 28 | Genitalia. Ventral view. Ventral plate, posterior border notched (concave): **(0)** absent (Figs 33–38, 40–42, 44, 46–49); **(1)** present (Figs 39, 43, 45) | 8 | 0.12 | 0.56 | Modified from Adler *et al.*  (2004): 214; Hernández (2011): 33 |
| 29 | Genitalia. Ventral plate, posterior border when notched: **(0)** deep (at least reaching half of the ventral plate body width) (Fig. 43); **(1)** shallow (Figs 39, 45) | 3 | 0.33 | 0.50 |  |
| 30 | Genitalia. Parameres. Parameral spines: **(0)** spines well developed; **(1)** minute to essentially absent | 1 | 1 | 1 | Modified from Miranda-Esquivel & Coscarón (2001): 32; Adler *et al.*  (2004): 182 |
| 31 | Genitalia. Parameres. Parameral spines length, when well developed: **(0)** all spines almost equal in size; **(1)** distinctly large spines and small accessory spines | 5 | 0.20 | 0.69 | Modified from Adler *et al.* (2004): 194; Miranda-Esquivel & Coscarón (2001): 32 |
| **Pupa** | | | | | |
| 32 | Thorax. Thoracic trichomes, aspect: **(0)** only simple; **(1)** multibranched | 10 | 0.1 | 0.43 | Modified from Gil-Azevedo *et al.*  (2012): 26 |
| 33 | Thorax. Thoracic spiniform tubercles: **(0)** absent; **(1)** present | 1 | 1 | 1 | Modified from Hernández (2011): 43 |
| 34 | Gills. Filaments arrangement: **(0)** in different planes (three-dimensional); **(1)** in the same plane (two-dimensional) | 6 | 0.16 | 0.58 | Coscarón *et al.* (2004): 12; Gil Azevedo *et al.* (2012): 30 |
| 35 | Gills. Trunk: **(0)** reduced, gills forming a bundle (Figs 95–97); **(1)** well evident (Figs 91–94, 98–106) | 1 | 1 | 1 |  |
| 36 | Gills. Filaments, inferior branch: **(0)** single  (Figs 95–97, 101–102); **(1)** multibranched  (Figs 91–94, 99–100, 103–105) | 3 | 0.33 | 0.66 |  |
| 37 | Gills. Filaments distal portion: **(0)** acute (Figs 91–97, 99–100, 105–106); **(1)** blunt (Figs 101–104) | 4 | 0.25 | 0.89 | Modified from Coscarón *et al.*  (2004): 20; Miranda-Esquivel & Coscarón (2001): 7 |
| 38 | Gills. Filaments distal portion colour: **(0)** concolorous with rest of gill (Figs 93, 95–100, 103); **(1)** darkened (black tips) (Figs 91–92, 94, 104, 106) | 4 | 0.25 | 0.78 | Modified from Miranda-Esquivel & Coscarón (2001): 8; Coscarón *et al.*  (2004): 16; Hernández (2011): 50, 51 |
| 39 | Gills. Length proportion between gills branches (GB) and pupal body (PB): **(0)** GB smaller than PB (Figs 71–90); **(1)** GB equal or longer than PB | 5 | 0.20 | 0.50 | Modified from Coscarón *et al.*  (1996): 16 |
| 40 | Cocoon. Shape in lateral view: **(0)** opening next to the substratum; **(1)** opening separated from the substratum, upwards directed | 8 | 0.12 | 0.53 | Modified from Adler *et al.* (2004): 205; Coscarón *et al.*  (2004): 28; Gil-Azevedo *et al.*  (2012): 34 |
| 41 | Cocoon. Adorned with various openings anteriorly (corbicular): **(0)** absent; **(1)** present | 2 | 0.50 | 0.75 | Adler *et al.*  (2004): 225; Hernández (2011): 41 |
| 42 | Cocoon. Anterior extension: **(0)** gill totally free of cocoon; **(1)** gills base enclosed by cocoon and gills branches partially free; **(2)** gills totally enclosed by the cocoon | 15 | 0.13 | 0.61 | Modified from Coscarón *et al.*  (2004): 29; Gil-Azevedo *et al.* (2012): 37 |
| **Larva (last instar)** | | | | | |
| 43 | Head. Cephalic apotome spots insertion area, aspect: **(0)** not pigmented (Figs 121, 123); **(1)** pigmented (Figs 114–120, 122, 125–126) | 8 | 0.12 | 0.70 |  |
| 44 | Head. Postocciput: **(0)** extended over the cervical sclerites (Figs 114, 116, 118–122, 124, 126);  **(1)** not extended over the cervical sclerites  (Figs 115, 117, 123, 125) | 7 | 0.14 | 0.71 |  |
| 45 | Head. Antennae. Medial antennomere annulated: **(0)** absent; **(1)** present (Fig. 127) | 1 | 1 | 1 | Adler *et al.* (2004): 210 |
| 46 | Head. Antenna length: **(0)** distal and part of medial antennomere surpassing the labral fan stalk; **(1)** ½ distal antennomere surpassing the labral fan stalk; **(2)** antenna equal or shorter than the labral fan stalk | 14 | 0.14 | 0.70 |  |
| 47 | Head. Postgenal cleft shape: **(0)** triangular  (Figs 136–149); **(1)** rounded (Figs 128–135, 140–143); **(2)** square | 8 | 0.25 | 0.81 | Modified from Coscarón *et al.* (2004): 31; Hernández (2011): 57; Gil-Azevedo *et al.* (2012): 44 |
| 48 | Head. Postgenal bridge height in relation to the hypostomal length: **(0)** longer (Figs 128–131); **(1)** nearly equal or shorter (Figs 132–149) | 5 | 0.20 | 0.73 | Modified from Adler *et al.* (2004): 208; Hernández (2011): 64 |
| 49 | Head. Hypostoma, lateral serrations: **(0)** absent (Figs 156–157); **(1)** present (Figs 150–155) | 2 | 0.50 | 0.90 |  |
| 50 | Head. Hypostoma, lateral serrations when present, form: **(0)** blunt (Figs 152–154); **(1)** sharp  (Figs 150–151, 155) | 3 | 0.33 | 0.85 |  |
| 51 | Head. Hypostoma, form of anterior margin:  **(0)** convex (Fig. 154); **(1)** straight (Figs 150–153, 155–157) | 4 | 0.25 | 0.72 | Coscarón (1987): 102, Coscarón *et al.* (2004): 30; Hernández (2011): 59; Gil-Azevedo *et al.*  (2012): 41 |
| 52 | Head. Hypostoma, median and sublateral teeth: **(0)** arranged below the hypostoma anterior margin (Figs 150, 152, 156); **(1)** extended beyond the hypostoma anterior margin (Figs 151, 153–155, 157) | 3 | 0.33 | 0.84 | Hernandez (2011): 60.  Modified from Miranda-Esquivel & Coscarón (2001): 1 |
| 53 | Head. Hypostoma, medial tooth length relation with lateral teeth: **(0)** reduced (Figs 150, 152, 156); **(1)** same level (Figs 153, 157); **(2)** distinctly longer (Figs 151, 154–155) | 8 | 0.25 | 0.79 | Modified from Hernández (2011): 62 |
| 54 | Head. Hypostoma, paralateral teeth: **(0)** absent or very reduced; **(1)** present, at least one developed | 5 | 0.20 | 0.77 | Adler *et al.* (2004): 50; Gil-Azevedo *et al.* (2012): 42. |
| 55 | Head. Mandibular teeth, preapical teeth length in relation to the apical tooth: **(0)** shorter; **(1)** as long or longer | 7 | 0.14 | 0.81 | Modified from Miranda-Esquivel & Coscarón (2001): 2 |
| 56 | Head. Mandibular teeth, number of mandible serrations: **(0)** two; **(1)** more than two | 3 | 0.33 | 0.77 |  |
| 57 | Head. Mandibular teeth, size of mandible serrations: **(0)** all equal in size; **(1)** varied sizes | 7 | 0.14 | 0.25 |  |
| 58 | Body. Tegument: **(0)** glabrous or with few hairs; **(1)** covered by dispersed single hairs (hairy) | 4 | 0.25 | 0.81 | Modified from Miranda-Esquivel & Coscarón (2001): 5 |
| 59 | Body. Colour. Darker dorsally and whitish ventrally: **(0)** absent; **(1)** present | 3 | 0.33 | 0.88 | Modified from Adler *et al.* (2004): 207 |
| 60 | Body, abdomen, general shape: **(0)** fusiform (abdomen ventrally expanded gradually, then contracts abruptly to the posterior proleg)  (Figs 107–113); **(1)** cylindrical (abdomen not expanded ventrally, softly curved) | 2 | 0.50 | 0.94 | Coscarón (1987): 110.  Modified from Adler *et al.* (2004): 206 |
| 61 | Body, abdomen, 1+1 ventral tubercles: **(0)** absent; **(1)** present | 5 | 0.20 | 0.20 | Coscarón *et al.* (2004): 38; Hernández (2011): 56; Gil-Azevedo *et al.* (2012): 45 |
| 62 | Body, abdomen, rectal papilla lobes: **(0)** simple, undivided lobes; **(1)** multi-branched lobes | 6 | 0.16 | 0.58 | Adler *et al.* (2004): 179 |