

Description of the last instar larva of *Erythrodiplax atroterminata* Ris and *E. corallina* (Brauer) (Odonata: Libellulidae).

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ABSTRACT. The last instar larva of *Erythrodiplax atroterminata* and *E. corallina* are described and illustrated, based on reared specimens from Argentina. A comparative analysis of all hitherto known larvae from Argentina is provided.

KEY WORDS. Odonata, Argentina, immature stages

INTRODUCTION

The American genus *Erythrodiplax* Brauer is mainly neotropical in distribution. It is composed by more than 50 species, 21 of which are presently known from Argentina (von Ellenrieder & Muzón, 2008). At present, the last instar larva of 19 species has been described (Santos, 1988; von Ellenrieder & Muzón, 2000; Needham *et al.*, 2000; Costa *et al.*, 2001; Muzón & Garré, 2005), from which 11 are found in Argentina, *i.e.* *E. anomala* (Brauer), *E. basalis* (Kirby), *E. fusca* (Rambur), *E. juliana* Ris, *E. latimaculata* Ris, *E. lygaea* Ris, *E. melanorubra* Borrer, *E. nigricans* (Rambur), *E. ochracea* (Burmeister), *E. paraguayensis* (Förster) and *E. umbrata* (Linnaeus). Muzón & Garré (2005) provided a comparative table for the larvae of the known species; later Costa *et al.* (2001) re-assigned the larval description given by Carvalho *et al.* (1991) for *E. corallina* to *E. fusca* and provided a key for the Brazilian species.

Erythrodiplax atroterminata Ris and *E. corallina* (Brauer) have a large distribution area in Argentina and Chile, reaching northern and middle Patagonia (Muzón & von Ellenrieder, 1998; von Ellenrieder & Muzón, 2008). They are typical inhabitant of lentic environments in northeastern and central Argentina

MATERIAL AND METHODS

Material - *Erythrodiplax atroterminata*: Argentina, Córdoba prov., Mayu-Sumaj, Río San Antonio, 31° 27' 4'' S, 64° 32' 54.7'' W, 760 m.a.s.l.; 1 -16 -II-2007, coll. Muzón, 1 male (reared) [emergence 15-II-2007]; Río Negro, Chipauquil, Meseta de Samuncurá, 40° 57' 41.1'' S, 66° 38' 20.8'' W, 481 m.a.s.l.; 4-XII-2006, coll. Muzón, 3 males (reared) [emergence 07-15-II-2007] and 1 larva.

***Erythrodiplax corallina*:** Argentina, Buenos Aires prov., Castelli, Laguna La Rosita, 36° 05' 54'' S, 57° 47' 23'' W, 12 m.a.s.l.; 24-X-2005, coll. Ardohain, 1 male (reared) [emergence 25-X-2005], 2 females (reared) [emergence 31-X-2005] and 9 larvae. The specimens are

deposited in the Collection of the Departamento Científico Entomología, Museo de La Plata, Argentina. Mandibular formula according to Watson (1956).

RESULTS

Genus *Erythrodiplax* Brauer

Diagnosis of larvae. Body without long hairs (except on prothorax); head longer than thorax; third segment of antenna the longest; mandibles with four incisives, number of molar teeth variable (2-4) but never with molar crest; distal margin of prementum obtuse and crenulated; abdomen without dorsal hooks (some species with middorsal tubercles bearing tufts of hairs); lateral spines on abdominal segments VIII-IX (also on VII in some species); epiproct, paraprocts and cerci recurved ventrad (except *E. umbrata*).

Erythrodiplax atroterminata

Description of the last instar larva

(Figs. 1 – 7)

Head. Pale, with diffuse dark pattern on dorsum, setose; 2.4 times as wide as long. Occiput with four pale strips, posterior margin concave. Mandibular formula (Figs. 1-2): $L\ 1\ 2\ 3\ 4\ 0\ a\ b / R\ 1\ 2\ 3\ 4\ y\ a\ b\ c$. Labium (Fig. 3-4): articulation of pre- and postmentum between second and third coxae; prementum pale, anterior margin slightly crenulated with 18 or 19 setae, ligula obtuse, ratio of maximum width to maximum length 1.8, lateral setae 12. Labial palp, with 8 setae; anterior margin slightly crenulated with 10 setae, inner margin without crenulations, with two setae at the labial palp articulation.

Thorax. Pale. Wing pads reaching mid-length of abdominal segment VI; femora with two annular dark bands, one subbasal and one subapical.

Abdomen. Brownish, lateral spines on segments VIII and IX brown with a transverse pale stripe at 0.2 from base, ratio of spine length of segments VIII and IX to maximum length of corresponding segment 0.23 / 0.63 (reared specimen) and 0.2 / 0.53 (reared specimen) respectively (Fig. 5). Paraprocts (Figs. 6-7) nearly two times as long as segment X; ratio relative to paraprocts: epiproct 1.48; cerci 0.74. Epiproct wide at the base, apex acute. Tips of paraprocts, epiproct and cerci slightly recurved ventrad.

Measurements (in mm; mean and standar deviation of exuviae in square brackets): Head maximum length: 2 [2.3 ± 0.2]; head maximum width: 4 [4.2 ± 0.14]; prementum maximum length: 2.6 [2.7 ± 0.14]; prementum maximum width: 3.4 [4 ± 0.16]; labial palp maximum length: 2 [2.1 ± 0.17]; labial palp maximum width: 1.7 [1.63 ± 0.12]; movable hook length: 0.5; inner wing pads: 4.4 [4.47 ± 0.09]; length of femora III: 3.5 [3.8 ± 0.12]; length of tibia III: 4 [3.9 ± 0.29]; length of abdominal terga: VI, 1 [1.1 ± 0.12]; VII, 0.8 [0.83 ± 0.15]; VIII, 0.7 [0.6 ± 0.1]; IX, 0.5 [0.5]; X, 0.3 [0.3]; width of abdominal terga: VI, 4.9 [4.7 ± 0.44]; VII, 4.7 [4.43 ± 0.64]; VIII, 4 [4.1 ± 0.5]; IX, 3.2 [3 ± 0.2]; X, 1.4 [1.5 ± 0.06]; lateral spines on abdominal segment VIII: 0.2 [0.23 ± 0.025]; on segment IX: 0.2 [0.2]; cerci: 0.5; paraprocts: 0.7 [0.67 ± 0.05]; epiproct: 1 [1].

*Erythrodiplax corallina***Description of the last instar larva**

(Figs. 8 - 14)

Head. Pale, with diffuse dark pattern on dorsum, setose; 2.4 times as wide as long. Occiput with four pale strips, posterior margin concave. Mandibular formula (Figs. 8-9): $L\ 1\ 2\ 3\ 4\ 0\ a\ b / R\ 1\ 2\ 3\ 4\ y\ a\ b\ d$. Labium (Fig. 10-11): articulation of pre- and postmentum between second and third coxae; prementum pale, anterior margin slightly crenulated, ligula obtuse, ratio of maximum width to maximum length 1.4, lateral setae 12 or 11. Labial palp with 8 setae; anterior and inner margin without crenulations, with four setae at the labial palp articulation.

Thorax. Pale. Wing pads reaching the end of abdominal segment VI; femora with two annular dark bands, one subbasal and one subapical.

Abdomen. Brownish, lateral spines on segments VIII and IX brown with a transverse pale stripe at 0.3 from base, ratio of spine length of segments VIII and IX to maximum length of corresponding segment 0.9 / 0.33 (reared specimen) and 0.42 / 0.3 (reared specimen) respectively (Fig. 12). Paraprocts (Figs. 13-14) nearly four times as long as segment X; ratio relative to paraprocts: epiproct 1, cerci 1. Epiproct wide at the base, apex acute.

Measurements (in mm; mean and standard deviation of exuviae in square brackets): Head maximum length: 3.25 ± 0.09 [3.1 ± 0.04]; head maximum width: 4.78 ± 0.12 [4.7 ± 0.12]; prementum maximum length: 3.76 ± 0.04 [3.99 ± 0.04]; prementum maximum width 4.43 ± 0.09 [4.36 ± 0.04]; labial palp maximum length: 2.36 ± 0.47 [2.72 ± 1]; labial palp maximum width: 2.1 ± 0.47 [3.47 ± 1.7]; movable hook length: 0.5; inner wing pads: 5.26 ± 0.18 [5.2 ± 0.17]; length of femora III: 4.9 ± 0.13 [4.9 ± 0.14]; length of tibiae III: 5.5 ± 0.07 [5.5]; length of abdominal terga: VI, 1.1 ± 0.2 [1 ± 0.03]; VII, 1 ± 0.28 [1 ± 0.3]; VIII, 0.9 ± 0.24 [0.9 ± 0.3]; IX, 0.7 ± 0.2 [0.6 ± 0.2]; X, 0.2 ± 0.05 [0.2 ± 0.1]; width of abdominal terga: VI, 5.5 ± 1.3 [5.3 ± 1.8]; VII, 5.4 ± 1.3 [5.3 ± 1.8]; VIII, 4.9 ± 1.8 [4.8 ± 1.6]; IX, 4 ± 0.9 [3.7 ± 1.2]; X, 1.6 ± 0.4 [1.6 ± 0.5]; lateral spines on abdominal segment VIII: 0.3 [0.3]; on segment IX: 0.3 [0.3]; cerci: 0.83 ± 0.05 [0.83 ± 0.057]; paraprocts: 0.83 ± 0.05 [0.83 ± 0.057]; epiproct: 1.13 ± 0.05 [1.13 ± 0.05].

DISCUSSION

The current knowledge of the immature stages of the genus *Erythrodiplax* is still scarce, with only a third of its species presently known from the larval stage. *Erythrodiplax atroterminata* and *E. corallina* are sympatric in extensive areas of Argentina and also with *E. nigricans*, *E. ochracea* and *E. paraguayensis*. Larvae of all these species are similar in their general aspect. In addition, the last larval instar of *E. atroterminata* and *E. corallina* are similar in number of prementum setae (12) to *E. nigricans* (11-13) and *E. ochracea* (12) and in number of labial palpal setae to *E. nigricans* and *E. paraguayensis* (8). Nevertheless, the last larval instar of *E. atroterminata* and *E. corallina* can be distinguished from *E. ochracea* by the number of labial

palp setae (9); *E. corallina* can be distinguished from *E. atroterminata*, *E. nigricans*, *E. paraguayensis* and *E. ochracea* by the ratio of cerci to paraprocts (0,74, 0,6; 0,7 and less than 1 respectively; 1 in *E. corallina*) and the development of lateral spines in abdominal segments VIII and IX (same length in *E. corallina*, different in the others).

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FIGURES

Fig. 1-7, Last larval instar of *Erythrodiplax atroterminata* Ris: 1, right mandible, inner view; 2, left mandible, inner view; 3, prementum, dorsal view; 4, Labial palp, dorsal view; 5, lateral spines on terga VIII-IX, dorsal view; 6, terminalia, lateral view; 7, terminalia, dorsal view. Scales 0.5 mm, (in figs. 1-4 as in figs. 5-7). Fig. 8-14, Last larval instar of *Erythrodiplax corallina* (Brauer): 8, right mandible, inner view; 9, left mandible, inner view; 10 Labial palp, dorsal view; 11, prementum, dorsal view; 12, lateral spines on terga VIII-IX; 13, terminalia, lateral view; 14, terminalia, dorsal view. Scales 0.5 mm, (in figs. 8-11 as in figs. 12-14).