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DESCRIPTION AND NATURAL HISTORY OF COSTA RICAN DRAGONFLY LARVAE. 1. *HETERAGRION ERYTHROGASTRUM* SELYS, 1886 (ZYGOPTERA: MEGAPODAGRIONIDAE)

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Based on field collected and (in part) laboratory reared material of various instars (incl. exuviae), the larva is described, illustrated, and compared with that of *H. albifrons* Ris. The 2 spp. can be differentiated by body size, ocelli position, and by the shape of the central gill. Some notes on the larval habitat are added.

INTRODUCTION

This paper is the first in a series of papers dealing with the immature stages of the dragonflies of Costa Rica. There is very little knowledge about neotropical dragonfly larvae. The larvae of about 60% of the odonate species of Costa Rica are unknown or undescribed (PAULSON, 1982; R. Novelo, pers. comm.).

There is no collection of identified dragonfly larvae in Costa Rica. The material collected or reared for the present series represents the first basis for such a collection; it is deposited at the Escuela de Ciencias Biológicas of the Universidad Nacional, Heredia, Costa Rica.

There are three megapodagrionid genera in Costa Rica: *Heteragrion*, *Philogenia*, and *Thaumatoneura*. *Heteragrion* and *Philogenia* are the best represented of these. In *Heteragrion*, with 35 species (GARRISON, 1991), the following have been recorded from Costa Rica: *H. albifrons* Ris, *H. erythrogastrum* Sel., *H. mitratum* Wilmsn, *H. majus* Sel. and *Heteragrion* sp. n. (in the process of description by Dr T.W. Donnelly) (PAULSON, 1982; C. Esquivel, pers. comm.). In 1919 WILLIAMSON reported that the larval stage of no species of *Heteragrion* had been described and, since then, only *H. albifrons* has been made

known (NOVELO, 1987).

The larva of *H. erythrogastrum* inhabits primary and secondary dry or wet forest streams. It dwells amongst the organic matter and plant detritus accumulated in the stream wherever there is little or no water current.

The larvae were collected at appropriate sites and taken to the laboratory in the Universidad Nacional. Some of them were reared, some preserved in 70% alcohol.

DESCRIPTION

HETERAGRION ERYTHROGASTRUM SELYS, 1886

Figures 1-4

Material. – COSTA RICA, San José, Ciudad Colón, Zona Protectora El Rodeo (in forest streams): 1 ♂ exuviae, 2 ♂ ultimate instar larvae, 12-II-1990 (C. Esquivel leg.), 16-V-1990 (F. Mejía & A. Ramírez leg.); – Puntarenas Prov., Manuel Antonio National Park (in forest streams), 12-II-1982 (C. Esquivel leg.).

Colour. – Body and caudal gills light brown.

Head (cf. Fig. 1). – Wider than long, occipital margin concave; cephalic lobes with short, thin setae. Compound eyes black with a yellow spot on the posterior margin, in profile this spot extending along the base of the eyes. Ocelli whitish, very close together, on middle of head.

Antennae with seven segments; segments 3-7 glabrous, except at articulations where there are some thin setae; segments 1-2 with setae on the margins. Segments 2-4 of the same length, 6-7 the smallest and light yellow, the rest brown except for the articulations which are yellow.

Anterior margin of labrum rounded with some long setae, the epipharynx with three concentric rows of setae of which the two basal ones are short and a little separate, the distal row with long setae directed towards the posterior area of the epipharynx, the area between the rows of setae glabrous (Fig. 2).

Mandibles two-branched, the external branch with four teeth, the ventral teeth larger than the dorsal ones; the inner branch of the right mandible with two teeth and the left with a row of small teeth, their tips brownish. Laciniae with a dorsal row of three teeth and a ventral row of four teeth, the three at the end smaller, followed by a row of five strong, long setae. Maxillary palps with strong long dark setae, the distal ones the largest. Hypopharynx globose ventrally, with setae on the frontal margin.

Labium longer than wide, its lateral margins with spines and setae progressively smaller toward the labial palp. Prementum-postmentum articulation at level of procoxae; mentum glabrous. Labial palps with three teeth and a movable hook, the inner tooth the smallest and separate from the others; external margin of palps with short setae. Margin of median lobe with claviform setae, the median cleft V-shaped (Fig. 3).

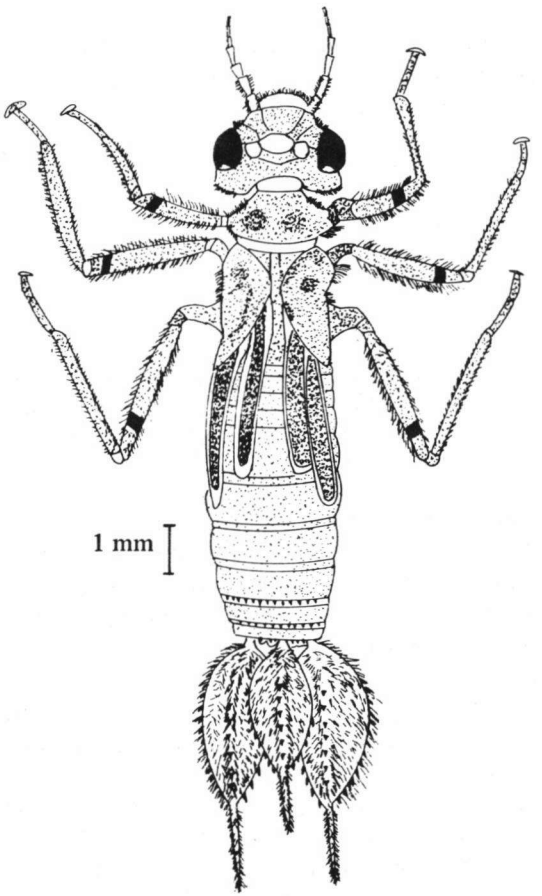


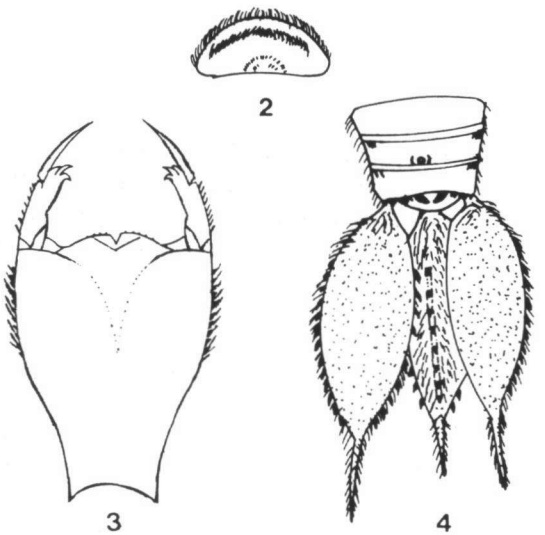
Fig. 1. *Heteragrion erythrogastrum* Sel., ♂ ultimate instar larva: general aspect in dorsal view.

Thorax. – Covered by thin, short setae except for the margins which are covered by setae of different lengths, though generally long. Prothorax widened on its latero-posterior margins. Fore wing pads reach the posterior margin of abdominal segment 5, hind wing pads to basal half of abdominal segment 6. Femora slightly compressed laterally, with long setae along the dorsal and ventral margins and a dark transverse band near the articulation with the tibiae. Tibiae and tarsi yellow, covered with medium-sized, thin setae.

Abdomen. – Lacks both dorsal hooks and longitudinal color lines. Postero--dorsal margins of abdominal segments 1-5 smooth; 6--7 with some short setae and 8-10 with a row of spiniform setae on their posterior margins; ventrally the three last segments with some spiniform setae near the margins, segment 10 with a row of spiniform setae interrupted by a glabrous, central area around the anus.

Male gonoporus evident. Lateral gills three-sided, the central gill four-sided and smaller (Fig. 4). All gills inflated, petiolated and with a distal filament one third the length of the gill. The margins of each gill with strong spines; gill surface covered by setae which become smaller at the center of the gills. Distal filament covered by setae longer than on the rest of the gill.

Measurements, male ultimate instar (mm). – Total length (incl. gills): 18.2; – lateral gills (incl. filament): 6.1-6.0; – central gill (incl. filament): 5.2; – hind femora: 3.8.



Figs 2-4. *Heteragrion erythrogastrum* Sel., details of larval morphology (not to same scale): (2) epipharynx, ventral view; – (3) labium, dorsal view; – (4) caudal gills, ventral view.

Table I

Main morphological differences between larvae of *Heteragrion erythrogastrum* and *H. albifrons*

Characters	*erythrogastrum*	*albifrons*
Ocelli	close	separate
Setae in the external margin of labial palps	present	absent
Femoral setae	long	short
Abdominal band	absent	present
Post-dorsal margin of abdominal segments	1-7 smooth, 8-10 with a row of spines	1-6 smooth, 7-10 with setae, 8-9 with a row of spines
Gill size	larger than in *albifrons*	smaller than in *erythrogastrum*
Shape of central gill	four-sided	3-sided
Gill setae size and location	long on margins and short ond their center	long on entire surface

DISCUSSION

Because the larvae of the only two described species, *H. albifrons* and *H. erythrogastrum*, occur in Costa Rica, their differences should be discussed.

The larvae of both species occupy similar habitats, i.e. forest streams with little flow where organic matter accumulates. Morphologically the larvae are distinguished firstly by size, *erythrogastrum* being larger than *albifrons*. However, at El Rodeo adults of *H. erythrogastrum* show much size variation which suggests that the larvae may also vary greatly in size. The more noticeable morphological differences are summarized in Table I.

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