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SHORT COMMUNICATIONS

DESCRIPTION OF THE LAST INSTAR LARVA OF *PERITHEMIS LAIS* (PERTY) AND COMPARISON WITH OTHER SPECIES OF THE GENUS (ANISOPTERA: LIBELLULIDAE)

J.M. COSTA[1] and L.P.R.B. RÉGIS [2]

[1] Departamento de Entomologia, Museu Nacional, Universidade Federal do Rio de Janeiro, Quinta da Boa Vista, BR-20940-040 Rio de Janeiro, Brazil

[2] Departamento de Biologia, Universidade Federal Rural de Pernambuco, Dois Irmãos, Recife, BR-52171-900 Pernambuco, Brazil

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The external morphology is described, illustrated and compared with that of the congeners. A note on the habitat of *P. lais* is appended.

INTRODUCTION

Perithemis Hagen includes 13 species, eight of which occur in Brazil (DE ALMEDA SPINDOLA et al., 2001). Larvae of five Brazilian species have been described: *P. electra* Ris, 1930 (SANTOS, 1970), *P. icteroptera* (Selys *in* Sagra, 1857) (VON ELLENRIEDER & MUZÓN, 1999), *P. mooma* Kirby, 1889 (SANTOS, 1973; VON ELLENRIEDER & MUZON, 1999), *P. rubita* Dunkle, 1982 and *P. thais* Kirby, 1889 (DE ALMEDA SPINDOLA et al., 2001).

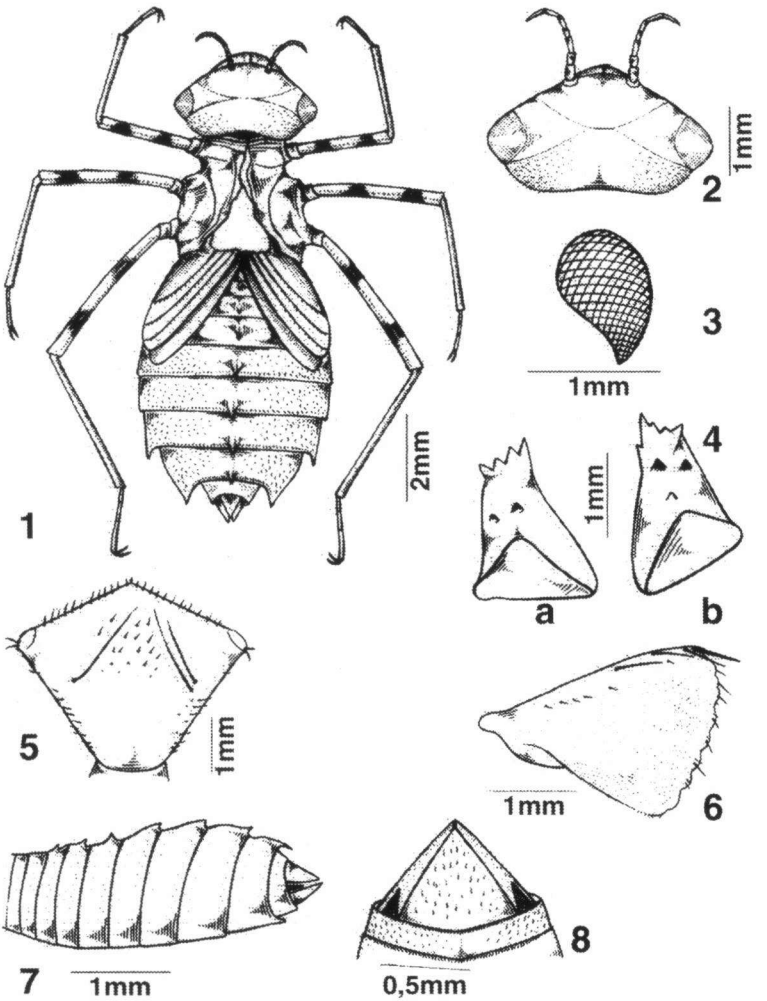
METHODS AND TERMINOLOGY

Collected larvae were reared until eclosion. Species determination was based on the teneral imago according to RIS (1930) and VON ELLENRIEDER & MUZÓN (1999). Exuviae were stored in 75% ethyl alcohol and illustrated using a stereo microscope and camera lucida. Mandibular formula is after WATSON (1956).

PERITHEMIS LAIS (PERTY)

Figures 1-8

Material. – BRAZIL, Pernambuco, Recife, Reserva Florestal do Açude do Prata, Dois Irmãos (08° 01'00"S / 34°56'00"W), 6/7-II-2001, 5 larvae (3♂, 2♀) and 24 adults (18♂, 6♀), J.M. Costa & L.D.R.B. Regis leg. – All material is deposited in the Museu Nacional, Rio de Janeiro, Brazil.



Figs 1-8. *Perithemis lais*, structural features of the last larval instar: (1) last instar, general aspect; – (2) head, dorsal view; – (3) eye, lateral view; – (4) mandibles: (a) left, (b) right; – (5) prementum, dorsal view; – (6) labial palp, dorsal view; – (7) abdomen, lateral view; – (8) anal appendages.

General shape typical of *Perithemis* (Fig. 1); i.e., similar to larvae of the *P. electra, P. icteroptera, P. mooma* and *P. thais*. General colour light brown.

DESCRIPTION. – Head (Fig. 2). – General shape rhomboid, as wide as thorax in dorsal view. Postocular region with small spiniform setae (Figs 1-2). Occipital region with small setae (Fig. 2); eyes small, semicircular with inferior portion narrow in lateral view (Fig. 3) and oval in dorsal view (Figs 1-2); antennae 7 segmented (Fig. 2), 6th antennomere the longest, 1st, 2nd and 4th equal in size, 3rd and 7th also subequal, each bearing small spiniform setae. Mandibles (Fig. 4a-b) with 4 incisor teeth; right mandibles with 3 molar teeth and left with 2; mandibular formula: L 1 2 3 4 0 a b / R 1 2 3 4 y a b d. Labium small and wide, reaching precoxae; prementum (Fig. 5) with 2 premental setae of varying length on right side and 1 on left side; distal margin with 11-12 spiniform setae at each lateral margin; two spines on junction of labial palps. Labial palp (Fig. 6) triangular with 3 setae; movable hook small; distal margin of palp with 8

Table I
Summary of measurements of *P. lais* last larval instar (in mm)

Characters	Male	Female
Total length	11.50-12	11.50
Length of head	2.00	1.80
Width of head	3.50	3.40
Length of eyes	1.0	0.9
Width of eyes	0.50	0.45
Total length of antennae	1.50	1.50
Length of antennomeres	0.22-0.24-0.33-0.19 0.22-0.33-0.31	0.22-0.24-0.33-0.19 0.23-0.32-0.31
Length of prementum	2.0	1.8
Basal width of prementum	0.90	0.90
Maximum width of prementum	2.20	2.20
Length of labial palps	0.90	0.90
Maximum width of labial palps	1.34	1.34
Length of forewings pads	3.75	3.70
Length of hindwing pads	3.50	3.40
Length of femora	F1:2.3-F2:3.0-F3:4.0	F1:2.3-F2:2.9-F3:3.8
Length of tibiae	T1:2.4-T2:2.8-T3:4.0	T1:2.4-T2:2.7-T3:3.9
Length of abdomen	6.0	5.7
Maximum width of abdomen	4.2	4.0
Length of lateral spine VIII	0.26	0.26
Basal width of lateral spine VIII	0.14	0.14
Length of lateral spine IX	0.30	0.28
Basa width of lateral spine IX	0.14	0.13
Length of epiproct	0.80	0.80
Basal width of epiproct	1.00	1.00
Length of paraproct	0.70	0.72
Basal width of paraproct	0.30	0.31
Length of cerci	0.32	0.30
Basal width of cerci	0.14	0.14

crenulations, each bearing 1-2 spiniform setae; internal margin with 10 short spiniform setae; external margin smooth.

Thorax. – Similar to *P. thais*, i.e., general shape of pronotum slightly quadrate. Wing pads divergent (parallel in *P. thais*) reaching proximal margin of abdominal segment 6. Legs long, posterior pair longer than abdomen; femora with two large dark spots (Fig. 1).

Abdomen. – Cylindrical (Fig. 1), widest at segment 7. Middorsal hooks on segment 3-9 decreasing in size from 3rd posteriorly (Fig. 7), those on segments 3-5 with distal end upright, those on segments 6-9 inclined posteriorly (Fig. 7). Short lateral spines on segments 9-10 (Fig. 1); those of segment 9 incurved. Anal appendages conical (Fig. 8), acuminate; epiproct and paraproct similar in length; cerci short, extending to ¼ length of epiproct.

Measurements. – See Table I.

BIOLOGY. – Larvae were collected in a small (2×3 m; depth 0.3 m) temporary, muddy-bottomed puddle. The puddle lacked vegetation, and was approximately 2 m from the dam (Açude do Meio; cf. Fig. 9), which has permanent water and dense aquatic vegetation, primarily Cyperaceae.

Adults were collected near the dam, where they perched on emergent vegetation or near the small puddle where larvae were collected. The locality is near Recife, and is surrounded by an Atlantic tropical formation known as "Mata de Dois Irmãos", bordered to the West by the "Estrada dos Macacos" and "Córrego da Fortuna", to the East by BR-101 highway, to the North by the "Estrada dos Macacos" and to the South by the Universidade Federal Rural de Pernambuco (UFRPE). The climate is humid megathermic (B_2 S_2 A'); the pluviometric precipitation reaches 2000 mm annually and the average temperature is 25°C.

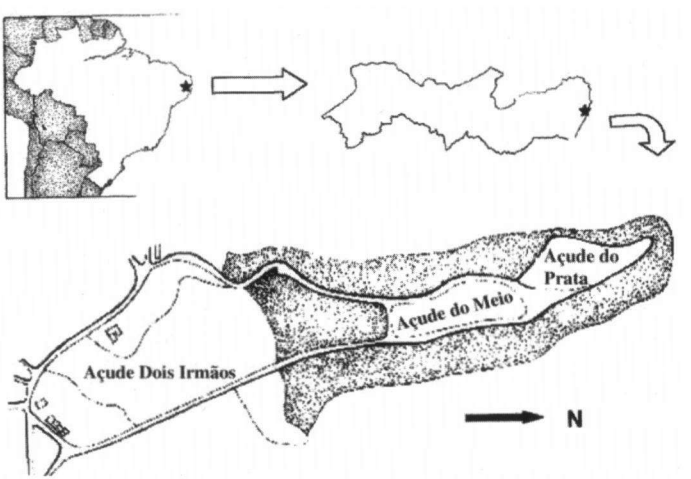


Fig. 9. Reserva Florestal do Açude do Prata, Dois Irmãos, Recife, Pernambuco, Brazil, the collecting site of larval and adult *Perithemis lais*.

Table II
List of species (adults) collected in the area of the Reserva Florestal do Açude do Prata, Dois Irmãos, Recife, Pernambuco, Brazil

Coenagrionidae
ACANTHAGRION Selys, 1876
gracile (Rambur, 1842)
ISCHNURA Carpentier, 1840
capreolus (Hagen, 1861)
LEPTAGRION Selys, 1876
dardanoi Santos, 1968
siqueirai Santos, 1968
METALEPTOBASIS Calvert, 1907
selysi Santos, 1956
TELEBASIS Selys, 1865
corallina (Selys, 1856)
filiola (Perty, 1834)
limoncocha Bick & Bick, 1995
Lestidae
LESTES
bipupillatus Calvert, 1909
Protoneuridae
IDIONEURA
ancilla Selys, 1860
Pseudostigmatidae
MECISTOGASTER Rambur, 1842
amalia (Burmeister, 1839)
Aeshnidae
ANAX Leach, 1815
amazile (Burmeister, 1839)
CORYPHAESCHNA Williamson, 1903
perrensi (McLachlan, 1887)
viriditas Calvert, 1952
GYNACANTHA Rambur, 1842
Bifida Rambur, 1842
nervosa Rambur, 1842
TRIACANTHAGYNA Selys, 1883
septima (Selys, 1857)
Gomphidae
APHYLLA Selys, 1854
janirae Belle, 1994
theodorina (Navás, 1933)
CACOIDES Cowley, 1934
latro (Erichson, 1848)
PROGOMPHUS selys, 1854
intricatus Hagen, 1858
Libellulidae
ANATYA Kirby, 1889
januaria Ris, 1911
BRACHYMESIA Kirby, 1889
furcata (Hagen, 1861)
herbida (Gundlach, 1888)
DASYTHEMIS Karsch, 1889
esmeralda Ris, 1910
DIASTATOPS Rambur, 1842
obscura (Fabricius, 1775)
DYTHEMIS Hagen, 1861
multipunctata (Kirby, 1894)
ERYTHEMIS Hagen, 1861
attala (Selys *in* Sagra, 1857)
credula (Hagen, 1861)
haematogastra (Burmeister, 1839)
peruviana (Rambur, 1842)
plebeja (Burmeister, 1839)
vesiculosa (Fabricius, 1775)
ERYTHRODIPLAX Brauer, 1868
amazonica Sjöstedt, 1918
basalis (Kirby, 1897)
castaenea (Burmeister, 1839)
famula (Erichson, 1848)
fusca (Rambur, 1842)
latimaculata Ris, 1911
maculosa (Hagen, 1861)
media Borror, 1942
ochracea (Burmeister, 1839)
umbrata (Linnaeus, 1758)
IDIATAPHE Cowley, 1934
amazonica (Kirby, 1889)
longipes (Hagen, 1861)
MIATHYRIA Kirby, 1889
marcella (Selys, 1857)
simplex (Rambur, 1842)
MICRATHYRIA Kirby, 1889
didyma (Selys, 1857)
hesperies Ris, 1911
ocellata dentiens Calvert, 1909
tibialis Kirby, 1897
NEPHEPELTIA Kirby, 1889
flavifrons (Karsch, 1889)
phryne tupiensis Santos, 1950
ORTHEMIS Hagen, 1861
discolor (Burmeister, 1839)
PANTALA Hagen, 1861
flavescens (Fabricius, 1798)
PERITHEMIS Hagen, 1861
lais (Perty, 1834)
mooma Hagen, 1861
PLANIPLAX Muttkowski, 1910

Table II, continued

phoenicura Ris, 1912	*imbuta* (Burmeister, 1839)
TRAMEA Hagen, 1881	*ZENITHOPTERA* Selys, 1869
binotata (Rambur, 1842)	*americana* (Linnaeus, 1758)
cophysa (Hagen, 1867)	*anceps* Pujol-Luz, 1993
URACIS Rambur, 1842	

Other Odonata larvae found were *Telebasis filiola* (Perty), *Coryphaeshna perrensi* (McL.), *Erythrodiplax fusca* (Ramb.), *Pantala flavescens* (Fabr.) and *Zenithoptera anceps* Pujol-Luz. Adults of the other species captured by us at this site during our work or collected earlier by Dr Newton Dias dos Santos are listed in Table II.

DISCUSSION

Larvae of *Perithemis* can be characterized as follows: body moderately depressed, oval or cylindric in shape; coloration gray, yellowish-brown to dark-brown; head as long as wide; mandibles with four incisors and three molar teeth; abdomen with cultriform dorsal hooks on segments 3-9 and lateral spines on segments 8-9. They inhabit lotic and lentic environments, although they are usually found in small temporary and permanent puddless, lagoons and lakes.

The larva of *P. lais* is very similar to those of *P. thais*, described by DE ALMEDA SPINDOLA et al. (2001) and *P. mooma*, described by SANTOS (1973) and VON ELLENRIEDER & MUZÓN (1999), from which it differs by the number of prementum setae: 7-12 in *P. thais* and *P. mooma* and 1-2 in *P. lais*, and by the number of palpal setae: 4 in *P. thais* and *P. mooma* and 3 in *P. lais*. In *P. electra, P. icteroptera* and *P. rubita* the labial palp has 5-6 palpal setae, while there are 4 in *P. mooma*. The principal differences between the *Perithemis* larvae are summarized in Table III and in DE ALMEDA SPINDOLA et al. (2001). Adults are easily separated by the characters given by RIS (1930) and VON ELLENRIEDER & MUZÓN (1999).

Table III

Some selected structural and habitat features in the larvae of *Perithemis* species, according to GARMAN (1927), VON ELLENRIEDER & MUZÓN (1999) and DE ALMEDA SPINDOLA et al. (2001)

Characters	*P. domitia*	*P. electra*	*P. icteroptera*	*P. lais*	*P. mooma*	*P. thais*
Palpal setae	6	6	5-6	3	4	4
Prementum setae	11	10	11	1-2	7-12	8
Abdomen shape	oval	cylindrical	cylindrical	cylindrical	cylindrical	cylindrical
Cerci	½ length to epiproct	¾ length to epiproct	¾ length to epiproct	¼ length to epiproct	½ length to epiproct	½ length to epiproct
Total length	14-15	12	13-13.5	11.50-12	13	12.5
Habitat	?	lentic (puddle)	lentic	lentic (puddle)	lentic and slightly lotic	lentic

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REFERENCES

DE ALMEDA SPINDOLA, L., L.O.I. DE SOUZA & J.M. COSTA, 2001. Descrição da larva de Perithemis thais Kirby, 1889, com chave para identificação das larvas das espécies conhecidas do gênero citadas para o Brasil (Odonata: Libellulidae). *Bolm Mus. nac., Rio de J.* (N.S./Zool.) 442: 1-8.

GARMAN, P., 1927. The Odonata or dragonflies of Connecticut. *Bull. Conn. St. geol. nat. Hist. Surv.* 39: 1-331.

RIS, F., 1930. A revision of the Libellulinae genus Perithemis (Odonata). *Misc. Publs Mus. Zool. Univ. Mich.* 21: 1-50.

SANTOS, N.D., 1970. Descrição da ninfa de Perithemis electra Ris, 1930 e notas sobre o macho (Odonata: Libellulidae). *Atas Soc. Biol. Rio de J.* 14(3/4): 49-50.

SANTOS, N.D., 1973. Descrição da ninfa de Perithemis mooma Kirby, 1889 (Odonata: Libellulidae). *Atas Soc. Biol. Rio de J.* 16(2/3): 71-72.

VON ELLENRIEDER, N. & J. MUZÓN, 1999. The Argentinean species of the genus Perithemis Hagen (Anisoptera: Libellulidae). *Odonatologica* 28(4): 385-398.

WATSON, M.C., 1956. The utilization of mandibular armature in taxonomic studies of anisopterous nymphs. *Trans. Am. ent. Soc.* 81: 155-209.