

**THE LARVAE OF *DESMOGOMPHUS PAUCINERVIS* (SELYS, 1873)
AND *PERIGOMPHUS PALLIDISTYLUS* (BELLE, 1972)
(ANISOPTERA: GOMPHIDAE)**

M.J. WESTFALL, Jr.*

Department of Zoology, University of Florida
Gainesville, Florida 32611, United States

Received and Accepted September 27, 1988

The larva of *D. paucinervis* is described from Panama. It has only a single row of dorsal hooks on the abdomen, thus differing from *D. tigrivensis* Williamson which has two dorsolateral rows. The larva and female of *P. pallidistylus* are described from Panama and Costa Rica.

INTRODUCTION

BELLE (1970) described and figured the larva of *Desmogomphus tigrivensis* Williamson 1903 from a reared ♂ collected in Surinam, and which is now in the Florida State Collection of Arthropods (FSCA). In 1977 he published a second figure of the larva drawn from a specimen in alcohol which was better than the 1970 figure because it showed that paired vestigial dorsal hooks were present on abdominal segments 4-9. This was the only gomphid larva known with two rows of dorsal hooks on the abdomen, very prominent on segments 6 and 7. This was so unique that we assumed all larvae in the genus would have two rows of dorsal hooks.

BELLE (1972a) proposed the following subgenera under *Diaphlebia*: (1) *Diaphlebia*, with *angustipennis* Selys 1854, *semilibera* Selys 1869, and *nexans* Calvert 1903, all from Brazil; (2) *Desmogomphus*, with *tigrivensis* Williamson 1920 from Guyana, and *paucinervis* (Selys) 1873 from Colombia, Panama, Costa Rica and Nicaragua; (3) *Perigomphus*, subgenus nov., for the single new

* Research Associate, Florida State Collection of Arthropods, Florida Department of Agriculture and Consumer Services, Gainesville.

species *pallidistylus*, the male of which he described from Costa Rica. He stated, "Our future knowledge of the larvae of the diverse species may corroborate the validity of this subdivision. At present only the larva of *Desmogomphus tigrivensis* is known". BELLE (1972b) described the female of *D. tigrivensis*.

In 1975 Michael L. May brought some larvae from the Panama Canal zone to Gainesville from which I reared a ♂ and ♀ of *Desmogomphus paucinervis* (Selys) (Fig. 1). To our surprise the larvae did not have two rows of dorsal abdominal hooks that characterized *D. tigrivensis*, but otherwise had the same general body form.

Michael May also brought two adult females of a gomphine species that we did not recognize. One he had found emerging 28 June 1975 from a larva that, from the labium and general body shape, broad, flat third antennal segment, and absence of dorsal hooks and lateral spines on the abdomen, reminded me of the North American *Lanthus albistylus* (Hagen). This species had been transferred to *Stylogomphus* Fraser by CHAO (1954). Dennis Paulson sent me identical larvae collected on the Osa Peninsula of Costa Rica by Jean Vandermeer 5 March 1968. I wished to see a ♂ to decide on the genus but Michael May was unsuccessful in getting more on his 1977 trip to Panama. In May 1979 Kenneth Knopf and Paul Miliotis went to Panama and I urged Ken to look for this species. He likewise found only 2 ♀ emerging, one with exuviae, but brought back many live larvae from which we reared 2 ♂ and 3 ♀. To our surprise the males matched perfectly what BELLE (1972a) described as *Diaphlebia* (*Perigomphus*) *pallidistylus*. Because this larva was so distinct from the *Desmogomphus* larvae, I proposed in a paper describing it at the S.I.O. Symposium in Montreal in 1979 that *Perigomphus* be recognized as a full genus. Dr Jean Belle was present at the meeting and agreed. BELLE (1988) has so recognized it. In his key he also recognizes *Desmogomphus* as a full genus.

DESCRIPTION OF LARVA OF *DESMOGOMPHUS PAUCINERVIS* (SELYS)

Figure 1

Material. — Exuviae of ♂ and ♀ larvae, Panama Canal Zone, Quebrada Juan Grande, 28 January 1975, Michael L. May. The ♀ emerged in Gainesville 6 July 1975 and its exuviae were used for Figure 1. The ♂ emerged in June, the adult found dead 19 June. Also I have a penultimate larva and several shed skins of the reared individuals.

Total length of exuviae 19-20 mm; abdomen 11.5-12; hind femur 3.2-3.4; width of head 4; maximum width of abdomen at segment 6, including lateral spines, 5.2.

General color light brown, with obscure muscle scars of abdominal segments darker brown; surface finely granulose.

Head. — Eyes protruding only slightly from sides of head; latero-posterior angles rounded, and hind margin only slightly excavated, a small dorsal tubercle each side of the median line, the tubercles larger in younger instars. Third antennal segment more than twice length of first two segments combined, its width about one-half its length; fourth segment a small rounded rudiment. Antennae and front margin of head with thin hairs. Labium short and stout, reaching posteriorly to the mesocoxae. Prementum only slightly longer than greatest width, sides almost parallel beyond basal hinge; median lobe about two-fifths of total width of prementum, its anterior border distinctly convex, bearing numerous thin hairs and a small tubercle each side of the midline; palpal lobes stout,

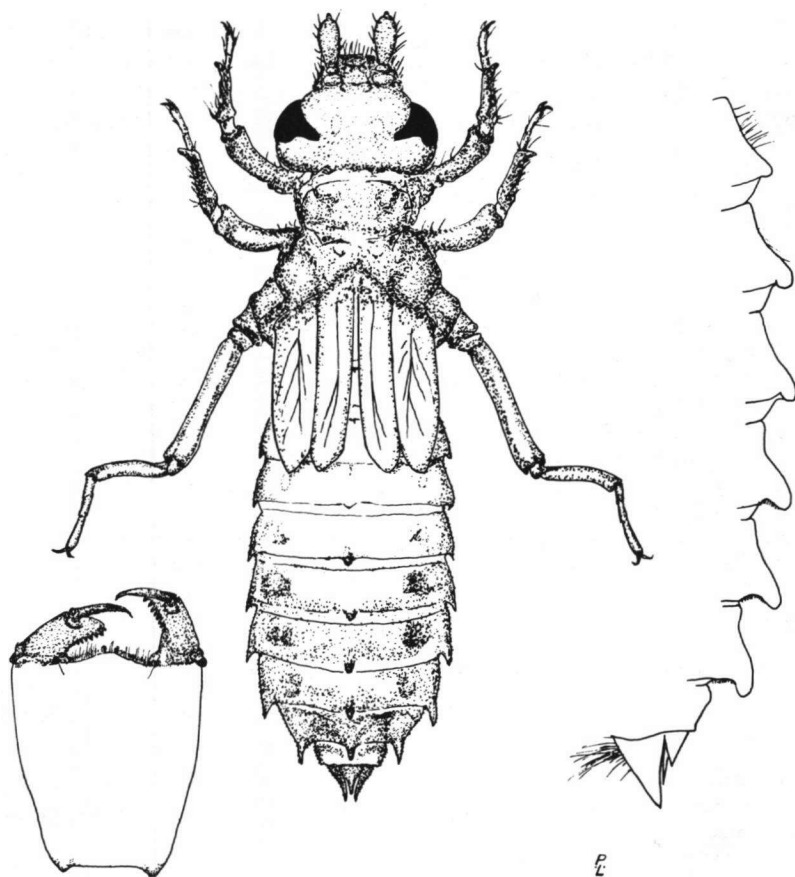


Fig. 1. *Desmogomphus paucinervis* (Selys): dorsal view of exuviae, labium, and lateral view of abdomen showing dorsal hooks and appendages.

ending bluntly, the inner margin with 9-10 conspicuous sharp teeth, each tooth obliquely truncate with sharp point projecting posteriorly. Movable hook of palpal lobe as long as lobe to base of hook.

Thorax. — Surface finely granulose. Prothorax with an inconspicuous mound-like prominence each side of middorsal line. Legs of usual gomphid form, with strong burrowing hooks on tibiae of first two pairs. Wing pads reaching fourth abdominal segment.

Abdomen. — Not strongly depressed. Single row of blunt, middorsal hooks on segments 4-9. Lateral spines increasing in size from segments 3-9, the last about one-half middorsal length of segment 9 and with normal telescoping of abdomen reaching to end of segment 10. Epiproct about four-fifths and cerci

about three-fifths as long as paraprocts. General surface granulose, with coarser granules on posterior segments; 1-3 darker smooth muscle scars each side of abdominal segments close to lateral spines; small setae on lateral margins of abdominal segments, most prominent on 8-10; conspicuous tufts of longer hairs ventrally at base of paraprocts.

DESCRIPTION OF LARVA OF *PERIGOMPHUS PALLIDISTYLUS* (BELLE)

Figure 2

Material. — PANAMA, Canal Zone, 1 ♀ taken in transformation with exuviae, Pipeline Road, Quebrada Juan Grande, 28 June 1975, Michael L. May; 2 ♀, 1 with exuviae, 12 May 1979; 2 ♂ and 3 ♀ reared from larvae collected 17 May 1979, Rio Frijoles, Kenneth W. Knopf, the larvae emerging in Gainesville from May to July 1979, also 1 penultimate larva with its two cast skins, same data. — COSTA RICA, Puntarenas Province, small river 1.5 mi S of Rio Riyito on Pacific Road, mile 9.5, 8°38'N and 83°30'W, 5 March 1968, by J. Vandermeer, 43 larvae in various instars, some ultimate, and one of these used for Figure 2.

Total length of exuviae and ultimate instar larvae 16-16.7 mm; abdomen 9.8-10; hind femur 2.2-2.3; width of head 3.7-3.8; maximum width of abdomen at segment 6, 4.4-4.6.

General color dark brown, lighter on head, thorax and wing pads. Body surface finely granulose.

Head. — Margin of eyes continuous with rounded sides of head; latero-posterior angles rounded and projecting posteriorly beyond median part of rear margin, with projecting occipital "horns" each side of midline; three light smooth rounded areas anterior to "horns" on occiput and three light ocelli on vertex as shown in Figure 2. Conspicuous angulate frontal shelf projects between antennal bases, projecting farther in the midline, the front margin with granules and thin hairs. Antennae with third segment extremely broad and with inner margins straight where they meet, with only a minute fourth segment. Labium short and stout, reaching posteriorly to the procoxae. Greatest width of prementum at anterior end, four-fifths its length at midline, and twice its width at base; median lobe about one-third width of prementum at anterior end, strongly convex, with a prominent tubercle each side of midline, and the front margin with numerous thin hairs. Palpal lobes stout, ending bluntly, the short end hook no longer than the first of 6-7 sharp teeth on the inner margin, which decrease in size toward base; sharp movable hook about four-fifths length of palpal lobe to base of hook.

Thorax. — Pronotum light brown, with raised lateral margins; propleura bulging below and conspicuous in dorsal view. Legs darker brown except tarsi which are cream colored; protibiae, and to a lesser extent the mesotibiae, with short strong spines. Wing pads reach to abdominal segment 5.

Abdomen. — Without dorsal hooks or lateral spines, widest on segments 5

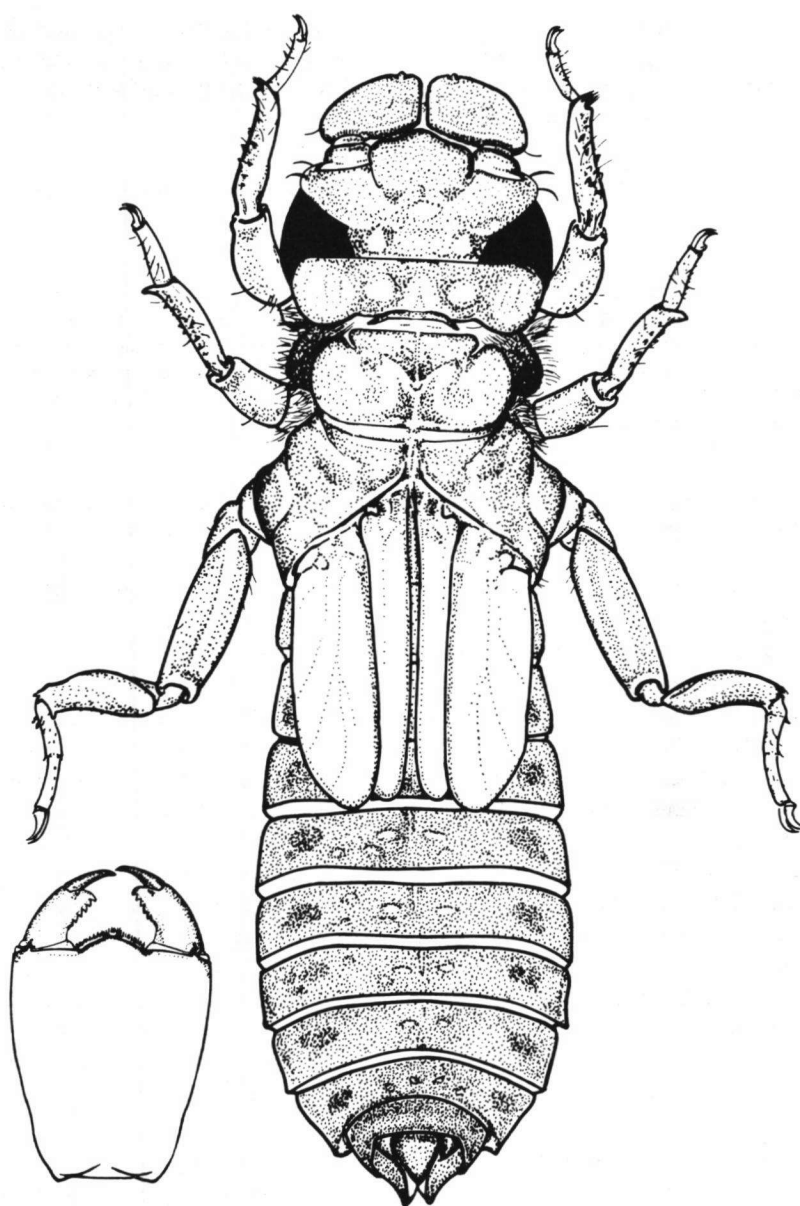


Fig. 2. *Perigomphus pallidistylus* (Belle): dorsal view of larva, and its labium.

and 6, tapering abruptly near end; surface, including lateral margins of segments, dark and granulose, with scattered lighter smooth areas, some paired on each segment lateral to midline; appendages very stout, the paraprocts about twice as long as segment 10 middorsally, the broad epiproct about two-thirds and the cerci about one-third, length of paraprocts.

DESCRIPTION OF ALLOTYPE FEMALE OF *PERIGOMPHUS PALLIDISTYLUS* (BELLE)

Figure 3

Material. — PANAMA, Canal Zone, Rio Frijoles, 17 May 1979 as larva by Kenneth W. Knopf, emerged July 1979, deposited in FSCA, No. 799, designated as allotype; the other 5 ♀ with data mentioned earlier.

Head. — Labium cream colored; labrum cream colored with dark brown spot in middle, a dark cross-stripe at base, and with scattered black hairs; clypeus and front of frons brown with three light spots on clypeus, one in center and one each side; top of head light brown with lighter area on each side of dorsum of frons; back of head light tan.

Thorax. — Prothorax light brown, becoming cream colored on pleura. Synthorax with brown middorsal stripe parallel-sided and about one-half width of dorsum; antehumeral dark stripe half width of middorsal stripe, joined with it above and with collar below, the light stripe between them widened at collar; narrow dark humeral stripe separated from antehumeral by an isolated light stripe; dark stripe on mesopleural suture joined with humeral stripe below, a wide light stripe between them, also another between it and the faint dark stripe on metapleural suture; metepimeron pale. Legs with femora paler than tibiae and tarsi; metafemora with row of 12-13 black spines, tiny at base and increasing in size distally. Forewings with 15 antenodal crossveins, the first and seventh thickened, and 10 postnodals; hindwings with 9-10 antenodals, first and sixth thickened, and 8 postnodals; all triangles and midbasal space without crossveins. One extra cubito-anal crossvein in both forewings and hindwings; trigonal interspace in forewings with two rows of cells from the triangle outwards, that in hindwings starting with a row of three cells against the triangle followed by two rows of cells; two rows of cells behind Cu_2 in forewings, three rows in hindwings; hindwings with four paranal cells and four

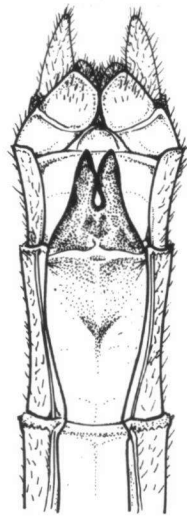


Fig. 3. *Perigomphus pallidistylus* (Belle): ventral view of terminal segments of abdomen of adult female.

postanal cells; anal area in hindwings four cells wide distally, with some rows of five cells. Pterostigma surmounting 4-4½ cells.

Abdomen. — Segments 1-6 dark above, becoming darker apically; 1-8 with a broad yellowish longitudinal stripe each side; 7 with basal third yellowish, darker apically; 9-10 brown; appendages a little longer than segment 10 middorsally, and bright yellow. Subgenital plate full-width of segment 8 at base, as long as segment 9 and divided a little more than half way to base, the tips parallel (Fig. 3).

Measurements. Total length 35 mm; abdomen 25.5; hindwing 23.

Variation among other females.— Coloration essentially as in allotype; specimen taken in transformation 12 May 1979 without exuviae shows the yellowish lateral stripe on the abdomen much better than the reared specimens in alcohol, especially the stripe on segment 8. Antenodal crossveins in forewing 14-16, first and sixth or seventh thickened, postnodals 9-11; antenodals in hindwing 8-10, first and fifth or sixth thickened, postnodals 9-10. The wings of the five females were analyzed further for these characters: one extra cubito-anal crossvein in forewing 9, 2 extra crossveins 1; one extra cubito-anal crossvein in hindwings 10; trigonal interspace of forewings with two rows of cells 10, that of hindwings with two cells from the triangle outwards 4, starting with a row of three cells against the triangle followed by two rows of cells 6; two rows of cells behind Cu_2 in forewings 10, three rows in hindwings 7, four rows 3; hindwings with four paranal cells 9, with five cells 1; hindwings with three postanal cells 2, with four cells 8; anal area of hindwings four cells wide distally 1, with some rows of five cells 9. Total length 34-36 mm; abdomen 24-26; hindwing 24-25.

DISCUSSION

In addition to differences in the penis, hamules and appendages of the male, the larva of *pallidistylus* (Fig. 2) differs markedly from the larvae of *tigrivensis* and *paucinervis*. Further study of all adult and larval characters may help elucidate the relationships of *pallidistylus* to the species now placed in *Diaphlebia* and *Desmogomphus* as well as to reveal the relationship of *Perigomphus* to such genera as *Stylogomphus*, *Lanthus*, and others which have a similar body form and often a broad, flat third antennal segment.

ACKNOWLEDGEMENTS

I wish to thank PAUL LAESSLE and ESTA BELCHER, former staff artists of the Zoology Department, for executing the illustrations, and D. HARRISON, present staff artist, for help with reproducing the illustrations. Also I want to thank those who provided specimens, Drs KENNETH W. KNOPF, MICHAEL L. MAY and DENNIS R. PAULSON. Dr SIDNEY W. DUNKLE read the manuscript and made suggestions for improvement.

REFERENCES

- BELLE, J., 1970. Studies on South American Gomphidae with special reference to the species from Surinam. *Stud. Fauna Surinam* 11: 1-158, pls 1-21 excl.
- BELLE, J., 1972a. On *Diaphlebia* Selys, 1854 from Central America. *Odonatologica* 1(2): 63-7; (4): 279-280.
- BELLE, J., 1972b. Further studies on South American Gomphidae (Odonata). *Tijdschr. Ent.* 115(5): 217-240.
- BELLE, J., 1977. Revisional notes on *Diaphlebia* Selys, 1854 (Anisoptera: Gomphidae). *Odonatologica* 6(2) 111-117.
- BELLE, J., 1988. A synopsis of the species of *Phyllocycla* Calvert, with descriptions of four new taxa and a key to the genera of neotropical Gomphidae (Odonata, Gomphidae). *Tijdschr. Ent.* 131: 73-102.
- CALVERT, P.P., 1903. On some American Gomphinae (Odonata). *Ent. News* 14: 183-192, pl. 8 excl.
- CHAO, H.-f., 1954. Classification of Chinese dragonflies of the family Gomphidae (Odonata). Part II. *Acta ent. sin.* 4(1): 56-66, figs. 233-235.
- SELYS LONGCHAMPS, E. de, 1854. Synopsis des Gomphines. *Bull. Acad. r. Belg.* 21(2): 23-112 [3-93 sep.].
- SELYS LONGCHAMPS, E. de, 1869. Secondes additions au synopsis des Gomphines. *Bull. Acad. r. Belg.* (2)28: 168-208 [5-45 sep.].
- SELYS LONGCHAMPS, E. de, 1873. Troisièmes additions au synopsis des Gomphines. *Bull. Acad. r. Belg.* (2)35: 732-774 [5-46 sep.].
- WILLIAMSON, E.B., 1920. A new Gomphine genus from British Guyana with a note on the classification of the subfamily. *Occ. Pap. Mus. Zool. Univ. Mich.* 80: 1-12; pl. 1 excl.