Odonatologica 6 (2): 111-117 *June 1, 1977*

SHORT COMMUNICATION

REVISIONAL NOTES ON *DIAPHLEBIA* SELYS, 1854 (ANISOPTERA: *GOMPHIDAE*)

JEAN BELLE

Onder de Beumkes 35, Velp 6200, The Netherlands

Received and Accepted February 7, 1977

The species of *Diaphlebia* s. str. are reviewed. Some structural details of *D. angustipennis* Selys and *D. nexans* Calvert are elucidated by figures. *D. semilibera* Selys and *Zonophora rokitanskyi* St. Quentin are considered conspecific with *D. angustipennis*.

INTRODUCTION

When recently collected material of *Diaphlebia* SELYS, 1854, was kindly sent to me for determination by Professor Dr. Angelo B.M. Machado (Belo Horizonte, Brazil), I investigated the original material of this little known genus, as far as it could be traced. As a result several intriguing problems around the identity of some species could be solved. Besides the opportunity has been taken to elucidate some structural details by camera lucida drawings. Most of these illustrations are published for the first time.

The following are the sources of the material studied, in addition to the new one from Brazil, together with the names of those to whose kindness I owe the privilege of examining it:

Dr. Georges Demoulin, Institut Royal des Sciences Naturelles de Belgique, Brussels. – Holotype, male, of *Diaphlebia semilibera* Selys; one pair of *D. angustipennis* Selys in the collection E. de Selys Longchamps.

Professor Dr. Angelo B.M. Machado, collection Machado, Belo Horizonte. – Holotype and paratype, females, of *Zonophora rokitanskyi* St. Quentin; one pair of *D. angustipennis* (St. Quentin det. 1973, Nrs. 116 and 127).

Dr. L.L. Pechuman, Cornell University, Ithaca, New York. – Female of *D. angustipennis*.

Ms. Margaret K. Thayer, Museum of Comparative Zoology, Cambridge, Massachusetts. – Cotype, male of *D. nexans* Calvert.

Mr. Peter H. Ward. British Museum (Nat. Hist.), London. – Holotype, male, and two paratypes, females of *D. angustipennis.*

The female of *Diaphlebia* described by KLOTS (1944) could not be located in The American Museum of Natural History, New York (Randall T. Schuh 1976, personal communication) while the second paratype, female, of *Zonophora rokitanskyi* is probably lost since it is neither in the Vienna Museum of Natural History nor in the possession of Dr. Douglas St. Quentin (Dr. A. Kaltenbach 1976, personal communication).

DIAPHLEBIA ANGUSTIPENNIS SELYS, 1854
Figures 1-12

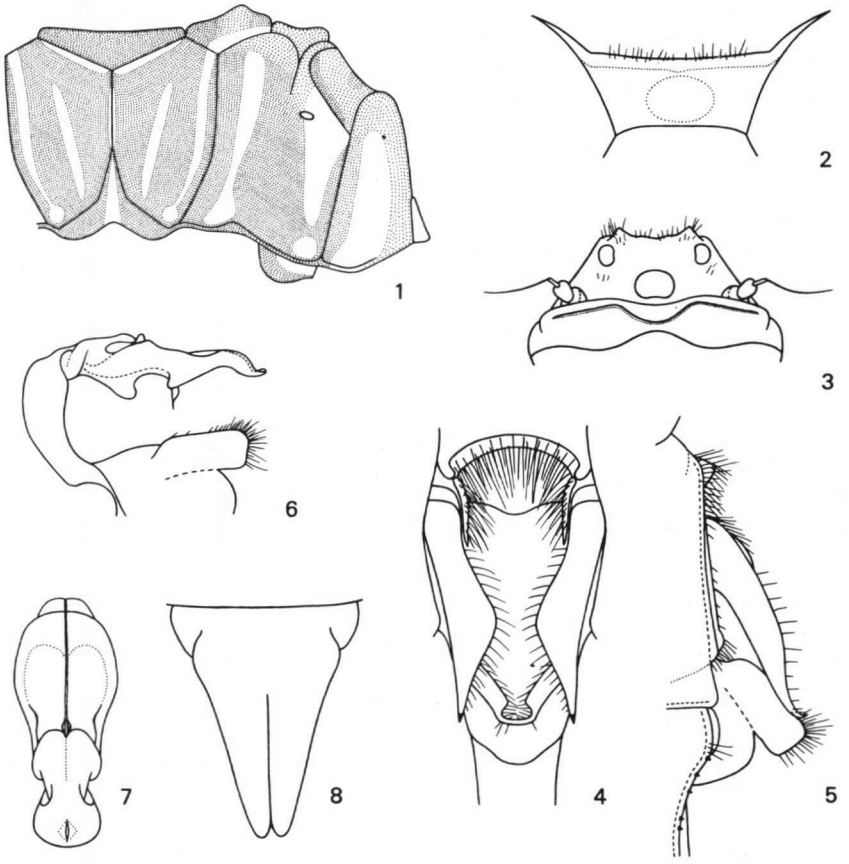
New material. – B r a z i l: Mato Grosso, Sinop (350 m, long. 55° 37′ W., lat. 12° 31′ S.), X.1975, 1 ♂, 2 ♀, (coll. Machado); 2 ♂, 2♀, (coll. Belle), all leg. M. Alvarenga.

This is the type-species of the genus *Diaphlebia* SELYS, 1854 as designated by KIRBY (1890).

All specimens pertaining to the original series are in the British Museum (Nat. Hist.), viz. one male and two females; one of the females from the collection formerly owned by Saunders. KIMMINS (1969) designated the single male as lectotype but in my opinion this is unnecessary. The male is the first described specimen of the original series. Adopting the principle of priority, the male only is forming the basis of this species. Consequently the male has a status equivalent to holotype. The two females, indicated as allotype and paralectotype by Kimmins, are automatically paratypes.

Through the generosity of the staff of the Institut Royal des Sciences Naturelles de Belgique at Brussels I was able to compare directly the holotype, male, of *Diaphlebia semilibera* SELYS, 1869 with the holotype, male, of *Diaphlebia angustipennis* in the British Museum (Nat. Hist.). The only noteworthy difference was found in the triangle of the fore wings which in the holotype of *semilibera* is open and in the holotype of *angustipennis* two-celled. The female of *angustipennis* in the Selys collection has an open triangle in the left fore wing and a two-celled triangle in the right fore wing. Apparently the main characteristic that *semilibera* separates from *angustipennis* is no more than individual variation as already suggested by SELYS (1869) after describing *semilibera.*

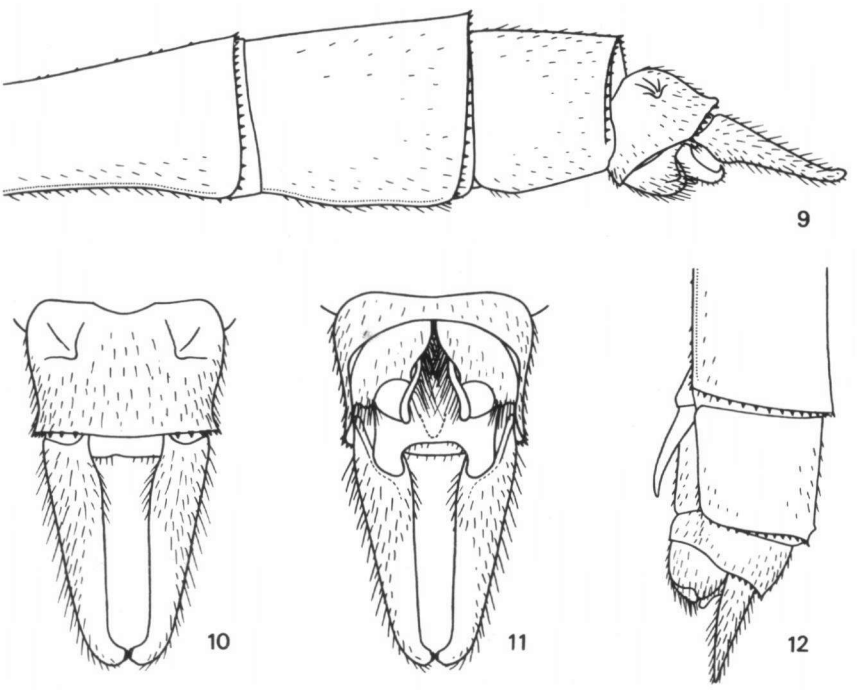
In 1973 ST. QUENTIN described *Zonophora rokitanskyi* on the basis of three females from Manaos, Brazil. As clearly appears from the accompanying figures (his Abb. 5a-b) the diagram of the dorsum of the pterothorax as well as the vulvar lamina of this species agree very well with those of *D. angustipennis.*



Figs. 1-8. *Diaphlebia angustipennis* Selys: (1) diagram of pterothorax of male; – (2) occipital plate of male; – (3) vertex and frons of male, frontal view; – (4) accessory genitalia (except penis), ventral view; – (5) the same, right lateral view; – (6) penis, right lateral view; – (7) end segment of penis, ventral view; – (8) vulvar lamina, ventral view.

Examination of the holotype and paratype, females, of *Zonophora rokitanskyi* has revealed, that they are indeed conspecific with *D. angustipennis*. The specimens are so very similar to the female of *D. angustipennis*, that it is not clear to me which characters have misled Dr. Douglas St. Quentin when he misidentified them. In any case we see, that *D. semilibera* as well as *Z. rokitanskyi* are synonyms of *D. angustipennis*.

KLOTS (1944) described a female of *Diaphlebia* which she could not refer to any known species. The specimen is possibly conspecific with *D. angustipennis*. The differences with the female of *angustipennis* cited for the venation and the



Figs. 9-12. *Diaphlebia angustipennis* Selys: (9) apical segments of abdomen and caudal appendages of male, left lateral view; – (10) tenth abdominal segment and caudal appendages of male, dorsal view; – (11) the same, ventral view; – (12) apical segments of abdomen of female, left lateral view.

coloration of some details seem to be no more than individual variations. The number of antenodal cross-veins in the females of *angustipennis* is generally larger than in the corresponding males. The present males have 14 antenodal cross-veins in four fore wings, 15 in one fore wing, and 16 in one fore wing; the present females 14 in two fore wings, 15 in three fore wings, 16 in two fore wings, and 17 in one fore wing. The labium is brown or blackish brown with a symmetric pair of green spots. The pale middorsal stripe on the second abdominal segment is variable.

The pterostigma of the female described by Klots is larger than that of the present females. The costal edge of the pterostigma in the fore wing of the present females varies from 4.6 mm to 4.9 mm.

The female of *angustipennis* differs slightly from the corresponding male in the conformation of the vertex and occipital plate. The two peaks on the transverse ridge behind the lateral ocelli are lower than in the male, while the central hump of the occipital plate of the female is not distinct.

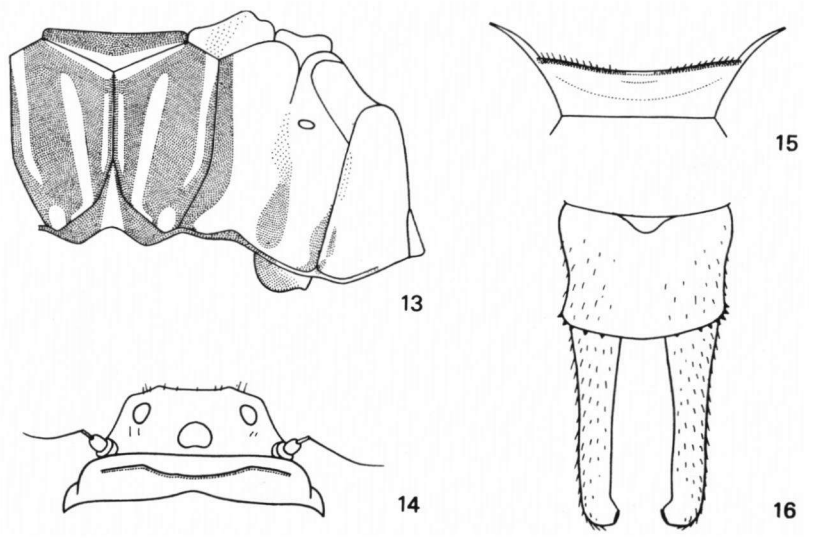
DIAPHLEBIA NEXANS CALVERT, 1903
Figures 13-16

This species was described on the basis of two males, one of which lacks the superior caudal appendages. The complete (pinned) male sent to me for study is lectotype by present designation. This specimen bears at the pin the labels "Chapada", "squalidus", "*Diaphlebia nexans* Calv. cotype Original of figs. 9 and 12. Ent. News XIV, pl. VIII. P.P. Calvert det. 1903", "MCZ", and "Type 12385".

Ms. Margaret K. Thayer informed me that the incomplete male, now the paratype (CRESSON, 1934), has a label saying "Dec" in addition, and that the determination label on that specimen reads: "*Diaphlebia nexans* Calv. cotype Original of fig. 5, pl. VIII, Ent. News XIV P.P. Calvert det. 1903". CALVERT's (1903) figure 5, however, shows the male with intact superior caudal appendages. Thus we see, that these have been broken off after the specimen has served for the photograph (the two males have not been interchanged as clearly appears from the venation of the wings).

D. nexans is a smaller and more delicate species than *D. angustipennis*. Its male exhibits some striking colour and morphological differences from that of *angustipennis*:

(1) Green anterior band on superior surface of frons complete; widely interrupted in middle in *angustipennis*.



Figs. 13-16. *Diaphlebia nexans* Calvert, lectotype male: (13) diagram of pterothorax; – (14) vertex and frons, frontal view; – (15) occipital plate; – (16) tenth abdominal segment and caudal appendages, dorsal view.

(2) Dark metapleural and interpleural stripes weakly developed; well-developed and confluent near subalar carina in *angustipennis.*

(3) Frons slightly concave in middle portion; deeply excavated in middle portion in *angustipennis.*

(4) Behind each lateral ocellus a low tubercle, the two low tubercles being connected by an almost straight ridge; behind each lateral ocellus a distinct peak, the two peaks being connected by a concave ridge in *angustipennis.*

(5) Occipital plate much narrower than in *angustipennis.*

(6) Caudal appendages distinctly different, the branches of the inferior appendage much shorter than in *angustipennis.*

(7) Wings distinctly less blunt-tipped, middle fork much less askew forward, and triangles shorter in axis of wing than in *angustipennis.* Triangle in fore wings: Anterior side shorter than inner side; as long as but generally longer than inner side in *angustipennis.* Triangle in hind wings: Anterior side shorter than one and a half times the inner side; longer than twice the inner side in *angustipennis.*

The accessory genitalia are very similar to those of *angustipennis* and they do not offer any clear basis for the separation of the two species.

The lamina tibialis of the first tibiae is shorter than in *angustipennis* and almost absent.

DISCUSSION

SELYS (1858) stated that the frons of *Epigomphus paludosus* Hagen, *in* SELYS, 1854 is very low as is the case in *D. angustipennis* but in fact the frons of *D. angustipennis* is much lower than that of *Epigomphus* species in general. The frons is distinctly higher in *D. nexans.* The anterior ridge of the frons is well-developed in *D. angustipennis* and *D. nexans*; it is slightly developed in *Desmogomphus* WILLIAMSON, 1920 and *Perigomphus* BELLE, 1972, and slightly or not developed in *Epigomphus* Hagen, *in* SELYS, 1854.

CALVERT (1903) stated that *Diaphlebia* (sensu stricto) and *Epigomphus* agree in not having a median inferior distal carina on the tibiae. But the first tibiae of *D. angustipennis, D. nexans* and *Desmogomphus* have a very short lamina tibialis. *Perigomphus* and *Epigomphus* have no trace of a lamina tibialis.

SCHMIDT (1941) drew attention to the conformation of the paraptera for purposes of generic definition. The paraptera are very acute in *Zonophora* SELYS, 1854; they are obtuse in *Diaphlebia* (sensu lato) and *Epigomphus.* However, the antealar ridge and the posterior ridge of the meso-paraptera (= antealar sinus; cf. CHAO, 1953) are not united at the lateral sides in *D. angustipennis, D. nexans,* and *Epigomphus*; they are united at the sides in *Desmogomphus* and *Perigomphus.*

ST. QUENTIN (1973) stated that the vertex in *Diaphlebia* (sensu stricto) forms a tubercule behind each lateral ocellus. These tubercles are distinct peaks

in *D. angustipennis* but they are low in *D. nexans*. The two points are connected by a ridge in these two species. The vertex also forms a peak behind each lateral ocellus in *Zonophora* but the two points are not connected by a ridge in this genus. *Desmogomphus, Perigomphus,* and *Epigomphus* have no such points on the vertex.

The dorsum of the tenth abdominal segment of *D. angustipennis* exhibits a pair of deep scars in both sexes. These scars are also clearly seen in *Desmogomphus* but they are inconspicuous in *D. nexans* and *Perigomphus*. The abdomen of the male of *Epigomphus* is widely different being clubbed and widest on the tenth segment.

The posterior genital hamules of the male are not provided with denticles in *D. angustipennis, D. nexans*, and *Desmogomphus*; they are denticulated in *Perigomphus* and *Epigomphus*. The anterior genital hamules of the male end in an upcurved, more or less acute point in *D. angustipennis, D. nexans, Desmogomphus*, and *Epigomphus*; they are deeply excised at the tip in *Perigomphus*. Finally, the anterior genital hamules are almost entirely concealed by the posterior hamules in *D. angustipennis* and *D. nexans*; they are not concealed by the posterior hamules in *Desmogomphus, Perigomphus*, and *Epigomphus*.

REFERENCES

BELLE, J., 1972. On Diaphlebia Selys, 1854 from Central America. *Odonatologica* 1 (2): 63-71; figs 1-17; (4): 279-280; figs. A-B.

CALVERT, P.P., 1903. On some American Gomphinae. *Ent. News* 14: 183-192; pl. 8.

CHAO, H.-F., 1953. The external morphology of the dragonfly Onychogomphus ardens Needham. *Smithson. misc. Collns* 112 (6): 1-56; figs. 1-50; tabs. 1-3.

CRESSON, E.T., 1934. Terminology of types. *Ent. News* 45: 122-126.

KIMMINS, D.E., 1969. A list of the type-specimens of Odonata in the British Museum (Natural History) Part II. *Bull. Brit. Mus. nat. Hist.* 23: 287-314.

KIRBY, W.F., 1890. A synonymic catalogue of Neuroptera Odonata or dragonflies. Gurney & Jackson, London: IX + 202 pp.

KLOTS, E.B., 1944. Notes of the Gomphidae (Odonata) with descriptions of new species. *Am. Mus. Novit.* 1259: 1-11; figs. 1-19.

SCHMIDT, E., 1941. Revision der Gattung Zonophora Selys (Odonata Gomphidae neotrop.). *Dt. ent. Z.* 1941: 76-96; figs. 1-12.

ST. QUENTIN, D., 1973. Die Gomphidenfauna Südamerikas. *Annln naturh. Mus. Wien* 77: 335-363; figs. 1-14.

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 & H.A. HAGEN, 1858. Monographie des Gomphines. *Mém. Soc. r. Sci. Liège* 11: 257-720 (VIII + 460 pp. sep); 23 pls; 5 tabs.

WILLIAMSON, E.B., 1920. A new gomphine genus from British Guiana with a note on the classification of the subfamily. *Occ. Pap. Mus. Zool. Univ. Mich.* 80: 1-12; pl. 1.