

SHORT COMMUNICATIONS

ON *AGRIOGOMPHUS TUMENS* (CALVERT, 1905), WITH A DESCRIPTION
OF ITS MALE (ANISOPTERA: GOMPHIDAE)

JEAN BELLE

Onder de Beumkes 35, Velp 6200, The Netherlands

Received and Accepted September 11, 1975

The ♂ of *A. tumens* (Costa Rica) is described and illustrated for the first time. In addition, a historical for this species is provided, and a number of interspecific and intraspecific distinctive characters are considered and discussed.

INTRODUCTION

The species *Agriogomphus tumens* (CALVERT, 1905) is hitherto known only from a single female taken in Mexico. New material from Central America enables me to study and to report on this most intriguing Agriogomphine dragonfly. It now supplies us not only with the knowledge of the male which has remained unknown since the description of the species in 1905 but also with a number of surprising intraspecific characters.

HISTORICAL

1905. CALVERT described the first specimen of *tumens* from a single female taken in Mexico, Atoyac in Vera Cruz, and published figures of the right pair of wings and of the occipital plate and ocelli. He tentatively referred the species to the genus *Cyanogomphus* SELYS, 1873. The type is in the British Museum (Nat. Hist.) (KIMMINS, 1969).
1908. CALVERT gave particulars for the place of capture Atoyac in Vera Cruz, Mexico.
1916. WILLIAMSON noted that the swelling behind the compound eyes in *tumens* is typical of *Cyanogomphus* but that the relative position of the arculus and the proximal angle of the subtriangle is the only reason for holding the generic position of the species in doubt. Further he stated that the species of *Cyanogomphus* are separated from *tumens* by the closely approximated sectors of the arculus of *tumens*.

1918. WILLIAMSON suggested that *tumens* will be found to resemble more his newly created genus *Ischnogomphus* than *Cyanogomphus*.
1944. NEEDHAM defined the *Agriogomphus* Complex comprising the genera *Agriogomphus* SELYS, 1869, *Ischnogomphus*, *Cyanogomphus*, and his newly erected genus *Ebegomphus*. The generic position of *tumens* remained doubtful.
1947. FRASER stated that the border of the occiput behind the compound eyes in his new species *Cyanogomphus uncatus* is tumid as in *tumens* but he did not make any suggestion about the generic position of *tumens* itself.
1966. BELLE published some characters of the venation of the wings and a free-hand sketch of the vulvar lamina of the holotype female of *tumens*.
1970. BELLE divided the Agriogomphine dragonflies into two genera only, *Agriogomphus* and *Cyanogomphus*, the division being based on male characters only. The generic position of *tumens* still remained doubtful.
1972. BELLE re-diagnosed the genera *Agriogomphus* and *Cyanogomphus* with partly new characters and referred *tumens* to the genus *Agriogomphus*.

MATERIAL

G u a t e m a l a : Santa Glumas, 5.IX.1909, 1 ♀, (Museum of Zoology, Ann Arbor). — **C o s t a R i c a :** Prov. Heredia, 1.5 mi. south of Puerto Viejo, Finca La Selva (200', forest path), 12.VIII.1967, 1 ♂, 1 ♀, leg. M.L. Paulson, (coll. Paulson); Prov. Heredia, 1.5 mi. south of Puerto Viejo, Finca La Selva (200'), 5.III.197?, 2 ♂, leg. H. Radclyffe Roberts, (Florida State Collection of Arthropods, Gainesville).

The following colour differences in the present specimens are noteworthy:

- (1) Caudal appendages of female brown or pale.
- (2) Middle joint of posterior tarsi dark brown or yellow.
- (3) Face brown-yellow, green-yellow, green, or bluish-green.
- (4) Labrum with indistinct or distinct triangular, dark brown basal spot.
- (5) First pale antehumeral stripes yellow, light-green, or grey-green.
- (6) Lateral sides of pterothorax without or with rather well developed dark brown stripes.

Very remarkable are the differences in the hind wings of the females as clearly appears from the following comparison:

Female from Guatemala: Hind wings with three rows of cells posterior to Cu2 for a distance of three cells; length of hind wing 27.5 mm; greatest width of hind wing 7.0 mm.

Female from Costa Rica: Hind wings with two rows of cells posterior to Cu2; length of hind wing 27.5 mm; greatest width of hind wing 6.4 mm.

Thus we see that the hind wings with three rows of cells posterior to vein Cu2 are wider.

It is not possible to make comparisons with an other congener. There are always two rows of cells posterior to vein Cu2 in the hind wings of the female of all other *Agriogomphus* species. In the hind wings of the female of *Cyano-*

gomphus demerarae SELYS, 1894, for instance, the number of cell rows posterior to vein Cu2 is also two or three but the hind wings with three rows of cells posterior to vein Cu2 do not show any widening.

The holotype female has also three rows of cells posterior to vein Cu2 in the hind wings. But the wings of the type are relatively shorter and possess a larger pterostigma. Its hind wing measures 25 mm, its abdomen 35 mm, the costal edge of the pterostigma in the fore wing 3.5 mm. In the present females these measurements are 27.5 mm, 33 mm, and 3.0 mm, respectively.

DESCRIPTION OF THE MALE

The male of *Agriogomphus tumens* is hitherto undescribed. The one from Costa Rica taken in August is described below.

Total length 41 mm; abdomen 31 mm; hind wing 24.5 mm; costal edge of pterostigma in fore wing 2.9 mm.

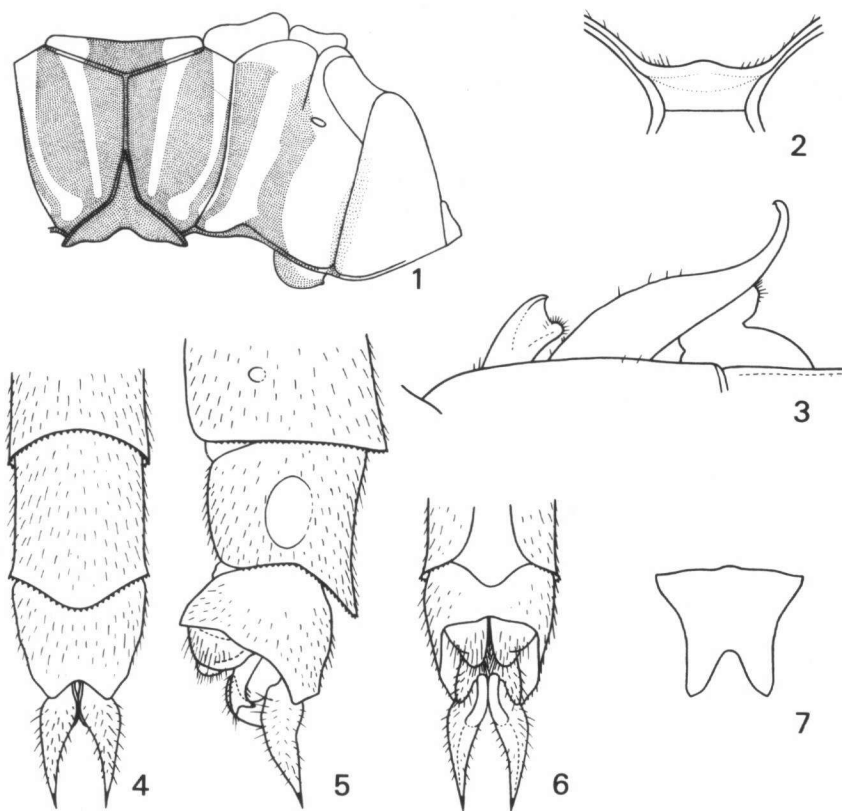
Face largely bluish-green. Labrum with dark brown triangular basal spot. Anteclypeus and middle portion of base of postclypeus brown. Genae and mandibles bluish-green but tip of mandibles black. Superior surface of frons largely bluish-green, the pale band widest at level of lateral ocelli, the base blackish brown. Vertex, occiput, and swelling on rear of head above, behind the compound eyes dark brown. Occiput low and round, the occipital ridge indistinct on somewhat swollen middle of occiput. Temporae green-yellow with a dark brown spot at eye border. Labium and adjacent mouth parts pale green.

Prothorax brown, somewhat greenish on lateral sides.

Pterothorax green with dark brown stripes, its colour pattern shaped as shown in accompanying diagram, the dark lateral stripes rather well developed.

Femora pale, becoming dark brown on distal end. Outer side of tibiae pale yellow, inner side brown. Tarsi dark brown. Claws pale brown.

Abdomen slender, widest on segments 1 and 2, thence narrowing to middle of segment 3, thence uniform in width to base of segment 7, becoming gradually wider to apex of segment 7, being uniform in width on apex of segment 7 and on segments 8, 9 and 10. Abdomen dark brown with pale markings as follows: Sides of segments 1 and 2 green; sides of segments 3 to 6 pale from base to transverse submedian suture, the pale side markings connected on dorsum at base of segment; segment 7 pale on basal half. Ninth segment about one and a third times as long dorsally as ventrally. Tenth segment about twice as long dorsally as ventrally. Auricles of segment 2 each with 6 minute black denticles. Sides of segments 8 and 9 with distinct scar. Superior caudal appendages pale yellow, the tips black and very acute; inferior spur of each appendage pale brown, the tip black. Inferior caudal appendage pale brown, the superior tooth of each branch with black tip.



Figs. 1-7. *Agriogomphus tumens* (Calvert, 1905) from Costa Rica: (1) diagram of pterothorax of male; – (2) occipital plate of male; – (3) accessory genitalia of male, left lateral view; – (4) apical segments of abdomen and caudal appendages of male, dorsal view; – (5) the same, left lateral view; – (6) the same, ventral view; – (7) vulvar lamina of female, ventral view.

Accessory genitalia shaped as shown in figure. Anterior hamules ear-shaped and pale brown. Posterior hamules green, the slender tip long and brown at apex. Penis brown, the flagellae pale. Hood of penial peduncle brown.

Wings clear. Venation of wings blackish brown. Pterostigma blackish brown, surmounting $3\frac{1}{2}$ -4 cells. All triangles, subtriangles and supratrangles open. Trigonal interspace in fore wings starting with two rows of cells from triangle out. Trigonal interspace of hind wings starting with two cells against the triangle followed by a single row of cells three cells long. Basal subcostal cross-vein present. Antenodal and postnodal cross-veins of first series 11:12-13:8/10:10-10:9 in fore and hind wings, respectively. Second primary antenodal

cross-vein the fourth. Intermedian cross-veins 4-4/3-3 in fore and hind wings, respectively. Fore wings with one row of cells in anal field and posterior to Cu2. Hind wings with four (right) and five (left) paranal cells, two rows of cells posterior to Cu2, and an ill-defined male anal triangle.

The sides of the pterothorax possess rather well developed dark brown stripes only in the two specimens from Costa Rica taken in August. It is surprising that the other two males from the same locality differ so greatly in the coloration of some details. Besides having the sides of the pterothorax practically without dark brown stripes (the first dark lateral stripe only very weakly developed) one of them has the face brown-yellow and the other green-yellow. Also the hood of the penial peduncle is much paler in these males than in the male described.

DISCUSSION

Now that the male of Calvert's *tumens* is known the generic reference of this species to *Agriogomphus* is self-evident.

FRASER (1943) emended the definition of the genus *Agriogomphus* but some features in the wings of *A. tumens* fail to conform to his venational characters. *A. tumens* has no trace of an anal loop, the numbers of antenodal and postnodal cross-veins are often greater, and the second primary antenodal cross-vein is sometimes the fourth (like in the male described). Further some characters regarding the form of the triangles, subtriangles, tibiae, etc. in Fraser's definition are also found in *Cyanogomphus*.

WILLIAMSON (1916) rightly stated that the relative position of the arculus and the proximal angle of the subtriangle as well as the closely approximated sectors of the arculus are very striking in *tumens* if a comparison is made with *Cyanogomphus*. The position of the arculus relative to the proximal angle of the subtriangle, however, is striking only in the two species *Agriogomphus tumens* and *Agriogomphus sylvicola* SELYS, 1869, a fact which weakens this character for purposes of generic definition. Regarding the sectors of the arculus near their origin, these are separated by a distance which is about the thickness of each sector in *Agriogomphus sylvicola* and *Cyanogomphus demerarae*. The remoteness is distinctly less than the thickness of each sector in the other species of *Agriogomphus*, and distinctly greater than the thickness of each sector in the other species of *Cyanogomphus*.

The nearest relative of *Agriogomphus tumens* is *A. jessei* (WILLIAMSON, 1918) from Venezuela as clearly appears from the accessory genitalia of the male and the vulvar lamina of the female. The slim posterior genital hamules and the vulvar lamina are longest in *tumens*. The two divisions of the vulvar lamina are separated by an angular interval which is smallest in *tumens*. *A. tumens* is most remote from its congener *A. ericae* (BELLE, 1966) from Surinam. The structure

of the posterior genital hamules and the vulvar lamina is very different in these two species.

ACKNOWLEDGEMENTS

I am most thankful to Dr. DENNIS R. PAULSON (Seattle) and Professor Dr. MINTER J. WESTFALL, Jr. (Gainesville) who were kind enough to supply me with material, both males and females, of *Agriogomphus tumens* from Central America.

REFERENCES

- BELLE, J., 1966. Surinam dragon-flies of the *Agriogomphus* complex of genera. *Stud. Fauna Suriname* 8: 29-60; figs. 51-92; pls. 5-10.
- BELLE, J., 1970. Studies on South American Gomphidae (Odonata) with special reference to the species from Surinam. *Stud. Fauna Suriname* 11: 1-158; figs. 1-264; pls. 1-21.
- BELLE, J., 1972. Further studies on South American Gomphidae (Odonata). *Tijdschr. Ent.* 115: 217-240; figs. 1-39.
- CALVERT, P.P., 1905. Aeshnidae. *Biologica cent.-am.* (Neuroptera): 145-196, 398-399, 410; tabs. 7-8, 10.
- CALVERT, P.P., 1908. The Composition and Ecological Relations of the Odonate Fauna of Mexico and Central America. *Proc. Acad. nat. Sci. Philad.*; 1908 (October): 460-491; tabs. 1-11; pl. 26 (map).
- FRASER, F.C., 1943. Notes on the genera *Agriogomphus* Selys and *Ischnogomphus* Williamson with the description of the male of *Agriogomphus sylvicola* Selys (Odonata). *Proc. R. ent. Soc. Lond.* (B) 12: 161-166; figs. 1-2.
- FRASER, F.C., 1947. The Odonata of the Argentine Republic I. *Acta zool. lilloana* 4: 427-461; figs. 1-4.
- 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.
- NEEDHAM, J.G., 1944. Further studies on Neotropical gomphine dragonflies. *Trans. Am. Ent. Soc.* 69: 171-224; pls. 14-16.
- SELYS LONGCHAMPS, E. de, 1869. Secondes additions au synopsis des Gomphines. *Bull. Acad. Belg.* (2) 28: 168-208 (5-45 sep.).
- SELYS LONGCHAMPS, E. de. 1873. Troisièmes additions au synopsis des Gomphines. *Bull. Acad. Belg.* (2) 35: 732-774 (5-46 sep.); (2) 36: 492-531 (47-87 sep.).
- SELYS LONGCHAMPS, E. de, 1894. Causeries odonatologiques. *Ann. Soc. Ent. Belg.* 38: 163-181.
- WILLIAMSON, E.B., 1916. A new *Cyanogomphus* (Odonata). *Ent. News* 27: 167-172; pls. 8-9.
- WILLIAMSON, E.B., 1918. Two interesting new Colombian Gomphines (Odonata). *Occ. Pap. Mus. Zool. Univ. Mich.* 52: 1-14; pls. 1-2.