

SOME INTERESTING DRAGON-FLY NAIADS FROM TEXAS.

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On October 20, 1920, the writer received from the United States National Museum a small collection of Gomphine naiads for identification. These were collected by J. D. Mitchell and labeled, "From Colleto Creek and sloughs in creek bottom near Victoria, Texas, July 2, 1920." This is in southeastern Texas in the valley of the Guadalupe River. The collection, while small, is of interest, first, because all Gomphine records from this southwestern boundary of the Austro-riparian faunal region are interesting, and, secondly, because it contains at least one new form. It is unfortunate that these were not reared to make their identity positive. All are quite immature, having been collected in July; they would have emerged in the spring and early summer of 1921.

No data are readily available on the nature of the stream in which they were caught, but the evidence is that it is very sandy. This is suspected because the collection includes *Progomphus obscurus*, which is found only in the sandiest streams, and because none of the naiads show traces of mud in their hairy covering, as Gomphine naiads from sandy streams are spotlessly clean, while those from mud bottom are always filthy.

Because our knowledge of Gomphine Odonata is so limited the writer has been to pains to illustrate these fully.

PROGOMPHUS OBSCURUS (Rambur).

Plate 115, figs. 1-7.

The material consists of 35 naiads, ranging in length from 7 mm. to 28 mm. The largest two, 25 and 28 mm. in length, would undoubtedly have emerged during the season of 1920, as the *Progomphus* season is a long one. Whether the numerous smaller examples would have emerged the same season or one or two seasons later it is impossible to say, as so little is known concerning the life history of *Progomphus*. Burrowing insects in general are slow feeders and consequently slow growers. It is impossible to give a table of measurements because about 20 of the specimens are broken.

The small specimens are the smallest *Progomphus* naiads the writer has seen, and are interesting in that they show by the way the mature naiads differ from them, the direction in which the latter are specialized. Figure 1 represents the mature naiad. The specimens 7 mm. long differ from the mature naiad as follows:

1. The wing pads are minute triangular flaps.
2. The dorsal spines on segments 2 and 3 are lacking. (See fig. 7).
3. The superior pair of anal appendages are mere tubercles. (See fig. 7).
4. The fourth segment of the antenna is only one-third as long as the third. (In the mature naiad it is nearly one-half as long as segment 3). (See figs. 2 and 4.)
5. Labium with two triangular teeth on the middle lobe besides the usual row of truncate teeth. (In the adult there are not noticeable triangular teeth). (See fig. 6).
6. Lateral labial lobe with several broad though shallow teeth. (See fig. 5.)

It can be legitimately inferred that these ontogenetic changes point out the phylogeny of this most specialized of burrowing Odonate naiads. They must have developed through a Gomphus-like form that had the characters of these very young naiads. It is interesting to note that these specializations have developed more in the naiad of *borealis*¹, and that on naiadal characters alone *obscurus* is more generalized than *borealis*. This pair of species agrees with *Amphiagion* and a number of other pairs of closely related species of Odonata in which the western form is more specialized than the eastern. It is interesting to those studying distribution to find that these *obscurus* naiads from Texas, where both *obscurus* and *borealis* are found, are in no wise intermediate in characters between the two species but are true *obscurus* naiads.

GOMPHUS (ARIGOMPHUS) SUBAPICALIS Williamson ? or SUBMEDIANUS Williamson. ?²

Plate 115, figs. 8-12.

Four specimens, 14-19 mm. in length. Wing pads minute, triangular, barely reaching beyond the apex of segment 1. Probably 1 year old or half grown.

By Doctor Needham's key,³ to the naiads of the subgenera of the genus Gomphus these run out to the subgenus *Arigomphus*. Muttkowski and Whedon⁴ discuss the naiads of this subgenus to which

¹ See Kennedy, Odonata of Central California and Nevada. Proc. U. S. Nat. Mus., vol. 52, pp. 527-529, 1917.

² In the Bulletin of the Bureau of Fisheries, vol. 36, p. 250, Prof. C. B. Wilson records this species from Illinois opposite Fairport, Iowa. In a letter to the writer he states that exuviae were collected there, but were lost when the Fairport Laboratory burned.

³ Needham, American Gomphinae. Can. Ent., vol. 29, pp. 167-168, 1897.

⁴ Muttkowski and Whedon, On Gomphus cornutus Tough. Bull. Wis. N. H. Soc., vol. 13, pp. 88-101, June, 1915.

they ascribe the species *australis*, *cornutus*, *furcifer*, *pallidus*, *subapicalis*, *submedianus*, *villosipes*, and *whedoni*. The only species of this group known to be regional are *subapicalis* and *submedianus*. I think we can ascribe these naiads to one or the other of these species with little doubt. They were collected from a sluggish stream or sloughs such as are inhabited by members of this group.⁵

The following is a description of this naiad: Head small, body very flat, abdomen lanceolate, broadest at segments 4 and 5, tapering abruptly at segment 8 to the narrow segments 9 and 10.

Head triangular, the eyes noticeably small, though surrounded by a large eyelike area. (See fig. 10.) Labium as in *furcifer*,⁶ with the middle lobe but slightly rounded and bearing a single median tooth among the long needlelike scales. (See figs. 9 and 11.) Lateral lobes with their apices but slightly incurved and bearing six obliquely truncated teeth besides the end tooth. (See fig. 9.)

Abdomen with a low, rounded, and interrupted mid-dorsal keel extending from the apex of segment 3 to the middle of segment 9 and on segments 8 and 9 terminating in a short rounded point. Segments 6 to 9 with lateral spines, short on segments 6 to 8, but those on 9 nearly as long as segment 10. Apex of abdomen upturned; segment 8 slightly more than one and a half times as long as segment 7. Segment 10 longer than wide, one-half as long as 9. Anal appendages less than segment 10 in length. (See fig. 12.)

This naiad differs from those of *australis*, *cornutus*, and *furcifer* in the great length of the lateral spines on segment 9; it differs from the naiads of *pallidus* and *villosipes* in that the abdomen is noticeably suddenly contracted at segment 8. Thus this naiad combines the shape of the abdomen in *australis*, *cornutus*, and *furcifer* with the long spines on segment 9 found in *pallidus*⁷ and *villosipes*.

GOMPHUS (STYLURUS) PLAGIATUS Selys.

A single immature naiad 25 mm. long; its wing cases reaching to the middle of segment 2.

This subgenus has had the following species ascribed to it by Williamson⁸: *Amnicola*, *scudderi*, *plagiatus*, *spiniceps*, and *notatus*. To these we can now add *olivaceus* and *intricatus*. The naiad of *notatus* is unknown. This naiad agrees, except in its immaturity, with a reared *plagiatus* in the writer's collections.

DROMOGOMPHUS SPOLIATUS (Hagan).

A single naiad 25 mm. long. This is immature with the wing cases reaching barely beyond segment 1.

⁵ Muttkowski and Whedon, *Gomphus cornutus* Tough, Bull. Wis. N. H. Soc., vol. 13, p. 99. 1915.

⁶ Walker, The nymph of *Gomphus furcifer*, Can. Ent., Dec. 1904.

⁷ Hagen's description (Trans. Amer. Ent. Soc., vol. 12) does not agree with Cabot's figure in that the figure has short spines on segment 9.

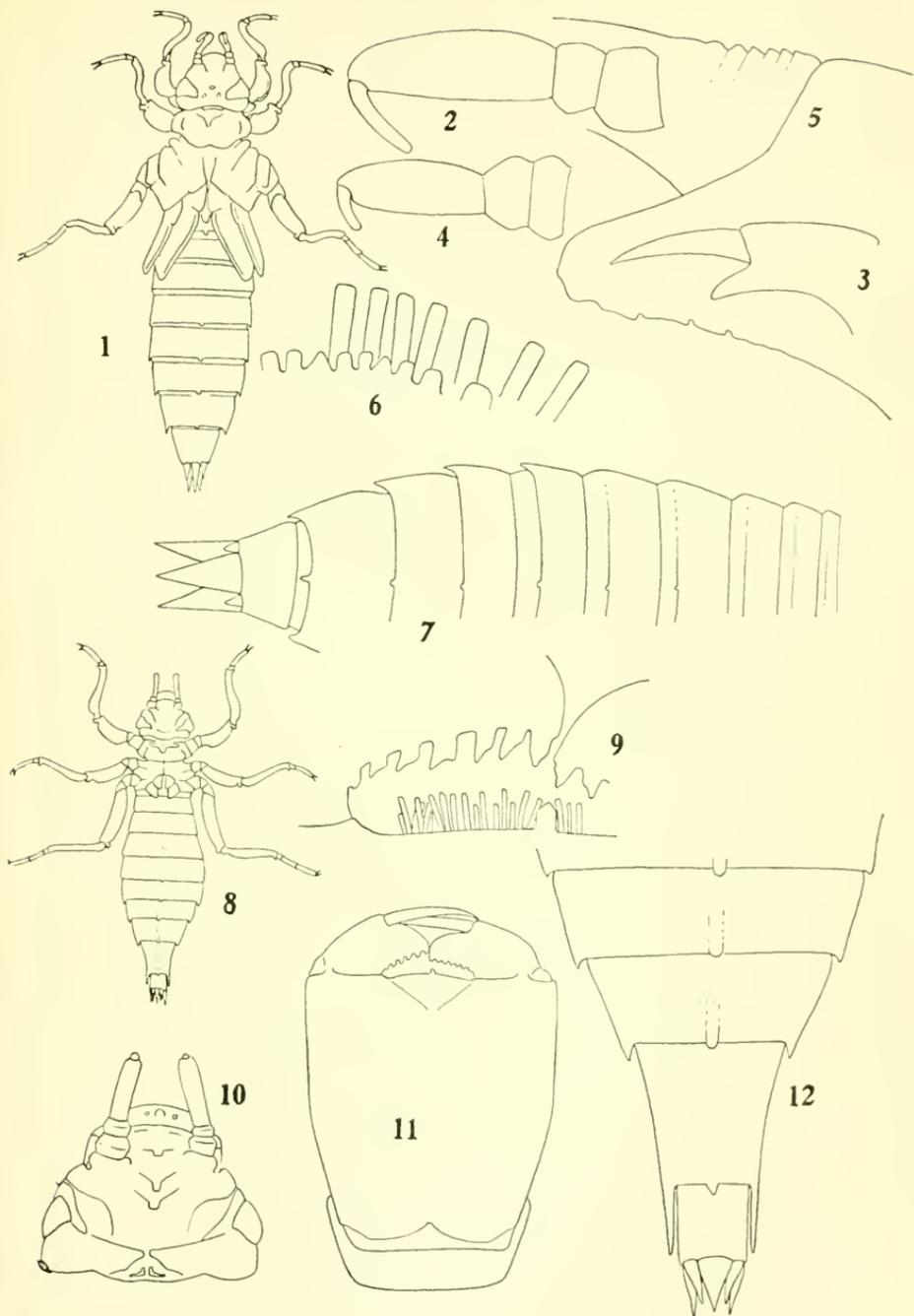
⁸ The subgenus *Stylurus*, Trans. Amer. Ent. Soc., vol. 18, p. 207, 1901.

EXPLANATION OF PLATE 115.

The drawings are by the author.

FIGS. 1-7.—*Progomphus obscurus*.—1, mature naiad; 2, antenna of mature naiad; 3, lateral labial lobe of mature naiad; 4, antenna of young naiad; 5, lateral labial lobe of young naiad; 6, a portion of the armature of the median labial lobe, showing the two triangular teeth; 7, abdomen of young naiad, showing the armature.

FIGS. 8-12.—*Gomphus (Arigomphus)*, species ?—8, naiad; 9, labial armature; 10, head; 11, labium; 12, segments 7-10 of the abdomen.



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FOR EXPLANATION OF PLATE SEE PAGE 598.

