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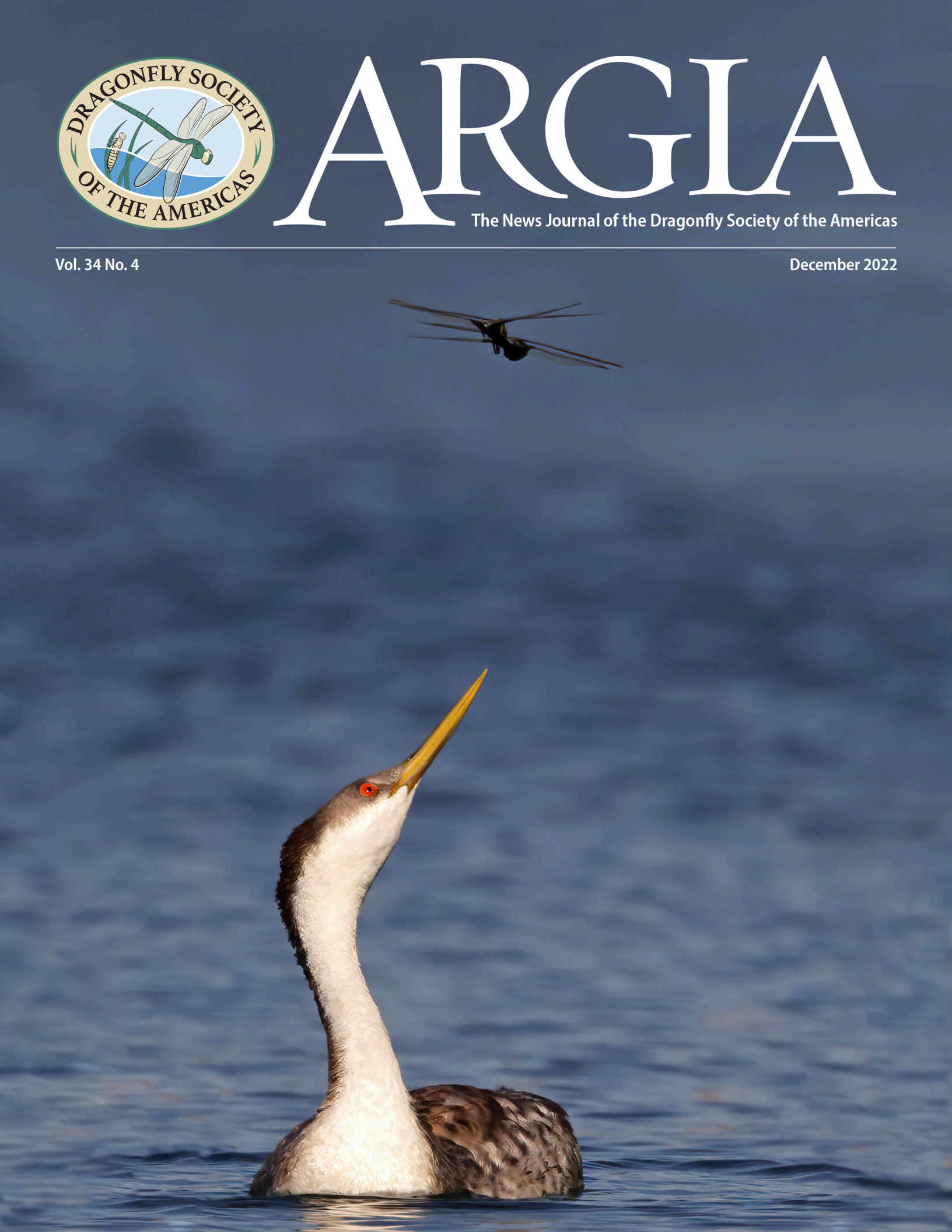


Nymph Cove: IDENTIFICATION TO GENUS: Gomphidae (Part 2)

By Ken J Tennessen

In this installment of Nymph Cove, we continue with gomphid genera that present greater challenges for identification than those we diagnosed in the last issue of *ARGIA*. These genera next up are *Arigomphus*, *Dromogomphus*, *Gomphurus*, *Hylogomphus*, *Phanogomphus*, *Phyllogomphoides*, *Stenogomphurus*, and *Stylurus*.

Stylurus

The first genus we will diagnose is *Stylurus*, as it has some unique characteristics that set it off from the other seven genera. *Stylurus* nymphs have short hind (metathoracic) legs, the length of the femur only about 0.7–0.9 times the width of the head; in the other seven genera, this ratio is 0.9– 1.25 (usually >1.0). Secondly, the labial palp of *Stylurus* has a large end tooth and a concave inner row of only two or three teeth (Fig. 1). The real kicker, however, is the number of sclerites on the venter of abdominal segment 8: in *Stylurus*, there are only three ventral sclerites whereas there are five in the other genera (Fig. 2); in other words, *Stylurus* lacks small anterolateral sclerites on this segment.

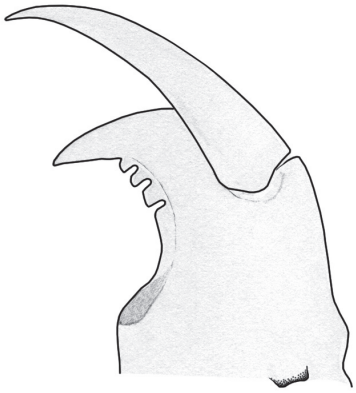


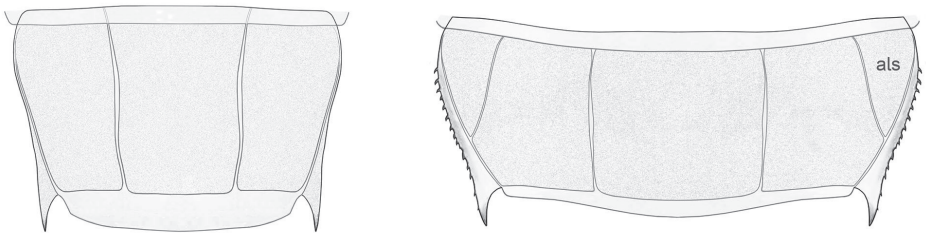
Figure 1. *Stylurus* palp.

Phyllogomphoides

The next genus that stands apart is *Phyllogomphoides*. Again, look ventrally at the abdomen, but this time at segment 7, and see that there are only three main sclerites as compared to five in the remaining six genera. Yes, the other six genera have a small anterolateral sclerite on the venter of segment 7 much like on segment 8. Also, in *Phyllogomphoides* segment 10 is longer than segment 9. Another distinction works for full-grown nymphs of *Phyllogomphoides* —the wing sheaths are slightly divergent, but words of caution here with exuviae: wing sheath divergence might not be reliable, as sheaths that are normally parallel in the nymph stage can become spread apart during emergence and when the exuviae dry they stay divergent. One more note: *Phyllogomphoides* has a darkened middorsal ridge on segments 7–9 that resembles the ridge on *Dromogomphus* and a few species of *Phanogomphus* —the above characters distinguish *Phyllogomphoides* from those genera.

The next six genera are variable in body shape but similar in many ways. They may be distinguished by comparing the lengths, shape, and angles of the posterior abdominal segments and, in a few cases, the length of the prementum.

We consider *Arigomphus* first. While it's true that *Arigomphus* has a narrowly tapered abdomen at the posterior end, so do several species of *Phanogomphus* (mainly due to an elongated segment 9). A distinguishing character of *Arigomphus* is that most inner teeth of the palpal blade are truncate with a sharp proximal corner compared to the other genera in which the teeth are rounded or angled with a more bluntly rounded



Stylurus *Dromogomphus*

Figure 2. Abdominal segment 8, venter (als = anterolateral sclerite).

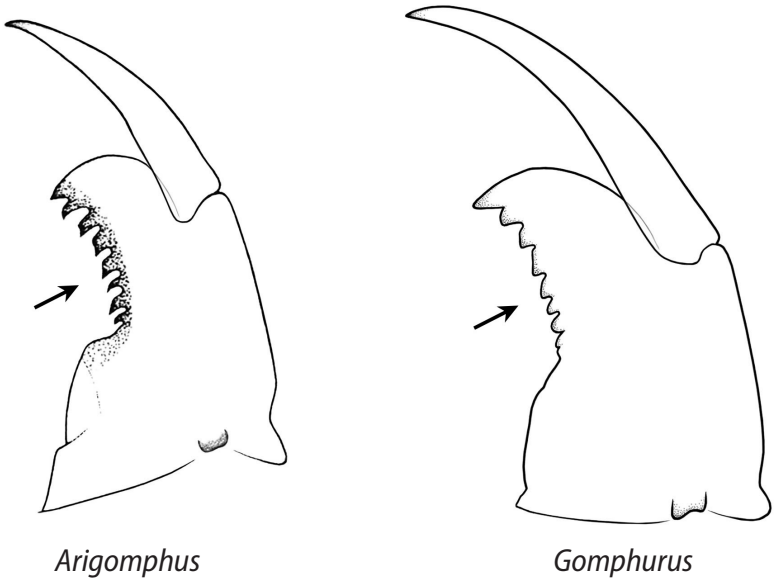


Figure 3. Labial palp of *Arigomphus* and *Gomphurus*.

proximal corner (Fig. 3). Two other helpful differences are 1) abdominal segment 10 is about 1.2 times longer than wide in *Arigomphus* but usually as wide as or wider than long in the remaining genera (exceptions are a few species of *Phanogomphus*), and 2) the posterolateral spine on abdominal segment 9 is close to the lateral margin of segment 10 (almost appressed) in *Arigomphus* but separated by a gap of about 0.2 mm in the other genera.

Dromogomphus, Phanogomophus, Hylogomphus, Gomphurus & Stenogomphurus

We focus attention now on *Dromogomphus*, *Gomphurus*, *Hylogomphus*, *Phanogomphus*, and *Stenogomphurus*. We can split these genera into two groups by circumscribing the angle of taper from segment 7 to the tip of the epiproct. In *Dromogomphus* and *Phanogomphus*, the tip of the abdomen narrows gradually and the angle of taper is usually <55 degrees; in *Gomphurus*, *Hylogomphus*, and *Stenogomphurus*, the tip of the abdomen narrows more abruptly and the angle of taper is >55 degrees, often as high as 70 degrees (Fig. 4). With some field experience, the angle of taper often can be estimated by eye. When in doubt, check the dorsal profile of the abdominal segments: in *Dromogomphus* and *Phanogomphus*, the segments are slightly concave in lateral view (straight in the other three genera), and most *Dromogomphus* and *Phanogomphus* have a small middorsal hook on segments 4 or 5–7 (a few exceptions in *Phanogomphus*) whereas *Gomphurus*, *Hylogomphus*, and *Stenogomphurus* are without a hook on these segments. One more hint: abdominal segment 10 length:width ratio is >0.75 in *Dromogomphus* and *Phanogomphus* but <0.65 in *Gomphurus, Hylogomphus*, and *Stenogomphurus*.

To recognize *Dromogomphus* from *Phanogomphus*, check the dorsum of abdominal segments 8 and 9: there is a well-defined dark ridge in *Dromogomphus* compared to the rounded though slightly raised middorsum of *Phanogomphus* (Fig. 5). The difference can be misconstrued when certain species of *Phanogomphus* are in hand, such as *P. graslinellus* and *P. sandrius* in which the middorsum is more raised (almost ridge-like), but it is not as sharply defined as in *Dromogomphus*. Experience with both genera and comparing reared specimens can be a big help in learning the difference. Another helpful character is hind femur length compared to head width: in *Dromogomphus*, the ratio is >1.2, in *Phanogomphus* ≤1.2.

We are now down to the muddy waters of *Gomphurus*, *Hylogomphus*, and *Stenogomphurus*. *Hylogomphus* lacks a

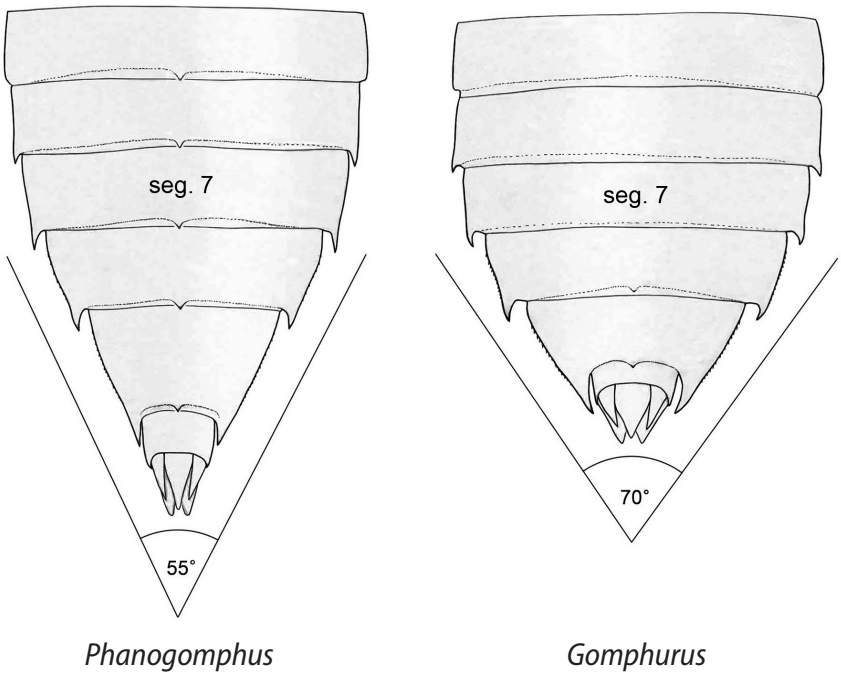


Figure 4. Degree of abdominal taper of *Phanogomphus* and *Gomphurus*.

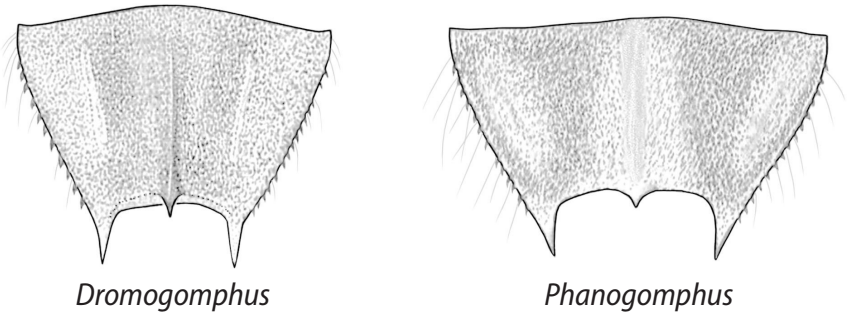


Figure 5. Middorsal ridge on abdominal segment 9 of *Dromogomphus spinosus* and *Phanogomphus graslinellus*.

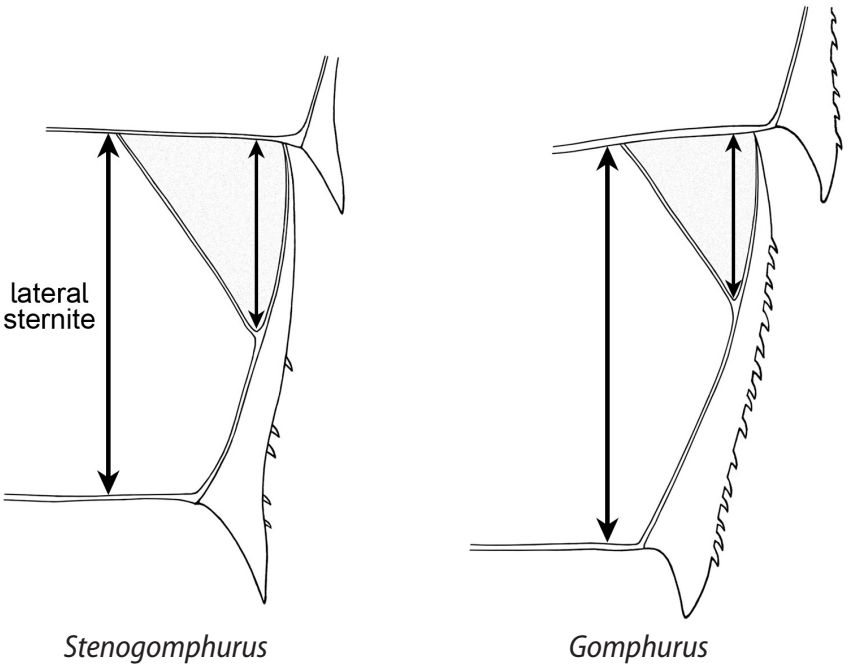


Figure 6. Abdominal segment 8 ventral sclerite comparison of *Stenogomphurus* and *Gomphurus*.

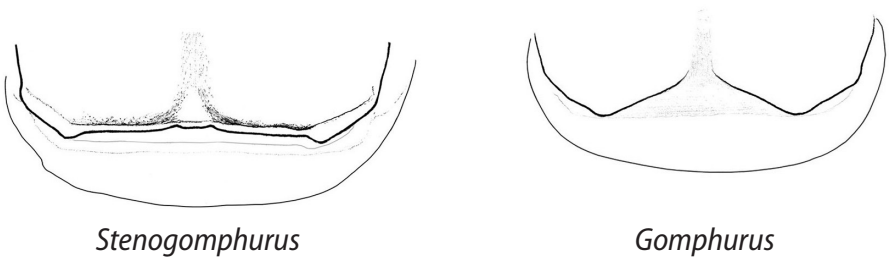


Figure 7. Proximal portion of prementum of *Stenogomphurus* and *Gomphurus*.

middorsal hook on abdominal segment 8, whereas a small one is present in *Gomphurus* and most *Stenogomphurus* specimens. This character is a bit problematic as some *Hylogomphus* have a sharp denticle or two at the middle of the posterior margin of segment 8 which can be misinterpreted as a middorsal hook; also, some specimens of *Stenogomphurus consanguis* have a reduced hook on segment 8. The ratio of abdominal segment 9 length:width is ≤0.38 in *Hylogomphus* versus ≥0.38 in *Gomphurus* and *Stenogomphurus*. And, segments 5–9 are smooth middorsally in *Hylogomphus* versus granulate in the other two genera. Size can help a bit: final instar *Hylogomphus* are usually smaller than the other two genera but there is considerable overlap in total length (*Hylogomphus* 20.0–27.0 mm, *Gomphurus* 22.0–40.0 mm, *Stenogomphurus* 22.5–29.0 mm).

To separate *Stenogomphurus* from *Gomphurus*, there are three characters to check. First, the anterolateral sclerite on the venter of abdominal segment 8 is about half as long as the lateral sternite in *Stenogomphurus* versus less than half as long in *Gomphurus* (Fig. 6) [note that the sclerites in *Hylogomphus* are similar to those in *Stenogomphurus*]. Second, the base of the prementum is complete medially and straight across (transverse) in *Stenogomphurus* versus incomplete medially and angled in *Gomphurus* (Fig. 7). Finally, the ratio of prementum length:distal width is 1.00– 1.07 in *Stenogomphurus* and 1.07–1.30 in *Gomphurus*.

Some of the above characters are pretty detailed and difficult, and we realize it can be a lot to take in. We hope it's not too daunting for you to keep trying! Just remember, the more you work at it, the more familiar it will become and you will have success. In the next issue, we'll start tackling those magnificent aeshnids!!

Ken Tennessen has published over 80 technical papers on Odonata. His recent book, Dragonflies Nymphs of North America, *was published by Springer in 2019.*