



Collecting Odonata Exuviae



Black Saddlebags (Tramea lacerata) exuvia on a cattail stalk. Photo by Darrin O'Brien.

You may have seen them on bridges, cattail stems, or rocks at the water's edge: exoskeletons of dragonfly nymphs affixed to a rigid surface like an ornament. Those shed skins of the final nymph instars are called exuviae.

If you are lucky, you might see a nymph emerge from the water and climb a safe distance from the surface. Within minutes, the back of the thorax splits open and the pale green or white adult slowly begins to emerge from its larval exoskeleton. Metamorphosis has changed the aquatic nymph to an air-breathing adult. Soon the wings of this adult harden enough to allow flight away from the water, leaving the lifeless shell behind.

These exuviae are an excellent means for determining the species that are breeding at a locality. Since they represent the final larval instar, characters needed to identify them are present. Many people are more comfortable collecting these non-living objects, which still have the potential for establishing significant records.

Odonata exuviae are found wherever the nymphs crawl from the water before adult emergence. Depending on the species of dragonfly and the habitat, certain situations are more likely to yield exuviae than others. In streams and rivers, bridge abutments are excellent places to search, especially for families that undergo mass emergence, such

as the Gomphidae (clubtails). If you wear waders or decide to get your feet wet, you'll find more exuviae by looking from the water towards the shore. Larvae of some clubtails such as *Stylurus* and *Ophiogomphus* prefer well-oxygenated shallow riffle areas, so their exuviae can also be found on nearby rocks and debris.

Emergent aquatic vegetation and tree snags are also good places to look for exuviae. In ponds and lakes, cattail stems, as well as rushes, wooden posts, and branches are likely sites. Darners and skimmers (*Aeshnidae* and *Libellulidae*) are most likely to climb vegetation such as cattails and reeds. Most exuviae are found 2 to 12 inches above the water, although some river cruiser (*Macromia*) or spiketail (*Cordulegaster*) exuviae can be found several feet above or away from the water.



A female Arrowhead Spiketail (Cordulegaster obliqua) emerges from her muddy exuvia. Photo by Darrin O'Brien.

Many species emerge in the pre-dawn hours. By the time the sun has risen their soft wings have begun to harden and they can soon fly away. Although these teneral adults are

flightworthy within an hour of emerging, it's several days before they are sexually mature. They often fly to upland areas to feed during this time. Once adults have reached sexual maturity, they return to the breeding habitats near water.

The exuviae the adults leave behind are fragile. They may be dislodged from their substrate by wind, water currents, or passing animals. If you wish to collect exuviae, check various habitats frequently, and handle the exuviae gently. These steps will ensure that the features needed for identification remain intact. No special equipment is needed to collect exuviae – pill bottles, lozenge tins, or other small containers with lids to keep the specimens dry will suffice.

Before leaving the collecting area, place a tag or label in the container which includes the date and location. Upon returning home, place the containers in the freezer overnight to kill any other bugs that may have hitchhiked inside the exuviae. The containers should be kept closed to minimize moisture.



Place each species (or similar-looking specimens, if you are unsure of the identification) in separate containers. Make sure a label is placed inside the container that provides at least the following information: location (state and county, latitude-longitude, and body of water are the most critical locality details), collection date, the name of the collector, and a unique field number.

With good reference material, exuviae (and nymphs) are fairly easy to identify to at least family (see Useful References) and there have been recent advancements for identifying species, although this task remains challenging! Your specimens may represent valuable information on breeding localities, and in many cases can even be used in

genetic analyses. For more information on the distribution of Michigan species and how to submit your specimens to a museum or university collection, go to the Michigan Odonata Survey web pages at: michodonata.org.



A Common Green Darner (Anax junius) exuvia on a pondside flower. Photo by Darrin O'Brien.

USEFUL REFERENCES

Books

DuBois, R. 2019. Damselies of Minnesota, Wisconsin & Michigan. Kollath-Stensaas Publishing, Duluth, MN.

Mead, K. 2017. Dragonflies of the North Woods, 3rd ed. Kollath-Stensaas Publishing, Duluth, MN.

Paulson, D. 2012. Dragonflies and Damselies of the East. Princeton Univ. Press, Princeton, NJ.

Tennessee KJ. 2019. *Dragonfly Nymphs of North America: An Identification Guide*. Springer, Berlin/Heidelberg.

Websites

Michigan Odonata Survey <michodonata.org>

Aquatic insects of Michigan <aquaticinsects.org>

The Atlas of Common Freshwater Macroinvertebrates of Eastern North America <macroinvertebrates.org>

Odonata Central <OdonataCentral.org>

Dragonfly Society of the Americas <dragonflysocietyamericas.org/>

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