Newsletter of the Wisconsin Dragonfly Society

Wisconsin Odonata News

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CONTENTS

Cover photo: Teneral Rusty Snaketail *(Ophiogomphus rupinsulensis)*

By Freda van den Broek

Wisconsin Dragonfly Society

Board Members

President´s Letter

As we all know, 2020 was a year unlike any that we have ever experienced before. The pandemic affected people, families, schools, businesses, and organizations. It also affected the Wisconsin Dragonfly Society. As the board met at the end of February to plan out 2020, little did we know how much the pandemic would affect day to day life. All our in-person events were cancelled or postponed for 2020, and we had to have the annual business meeting virtually.

Although 2021 has started out slow, the availability of vaccines has started to return life closer to the way that it was before the pandemic. This summer we plan to begin having in-person events again. This will include our annual meeting on the weekend of June 25th through the 27th, in Ashland County. Our new research committee also hopes to schedule several in-person dragonfly surveys at different locations around the state. All of these events will take place outside, and we will take precautions to minimize any exposure to participants who have not yet had the opportunity to get vaccinated.

Although we do not anticipate as many indoor educational opportunities this year, our education committee is working to make sure that we will be ready in the future when these opportunities arise.

Even though we were not able to get together as a group last year, it was exciting to find that a record number of people were chasing dragonflies on their own and providing data to the Wisconsin Odonata Survey website. This year we hope that we can build on that enthusiasm with in-person activities, where old friends can meet up with new friends and chase dragonflies together.

Jeff Fischer
President

Wisconsin Dragonfly Society
2021 Annual Meeting
June 25th -27th Gilman Park
Mellen, Wisconsin in Ashland County

WIDragonflysociety.org

Join us as we search bogs, lakes, and rivers in Ashland County for interesting Odonata. Species that we hope to find include Riffle Snaketails, Boreal Snaketails, Dragonhunters, Splendid Clubtails, Mustached Clubtails, Green-faced Clubtails, Eastern Least Clubtails, Twin-spotted Spiketails, Arrowhead Spiketails, Kennedy's Emerald, various Jewelwings, Spreadwings, Bluets, and more. With programs and field trips for odonate enthusiasts of all levels.

Check-in begins at 5pm Friday June 25th and 8:30am on Saturday June 26th at the Gilman Park Pavilion in Mellen, Wisconsin. Advance registration is required.

Due to the pandemic, advance registration is required. Group size will be limited to 32 people. Advance registration will be accepted on a first-come-first-serve basis.

To register, send an email to Registration@WIDragonflySociety.org

All events will be held outdoors. Masks and social distancing will be mandatory.

How to Identify Boreal and Riffle Snaketails

Jeff Fischer

Do you have a favorite family of dragonflies? Maybe your favorite is the large, fast flying Darners with their great big eyes, or maybe you like the secretive, metallic colored Emeralds, or perhaps you prefer the variety of colors and wing patterns of the Skimmers. My favorite family of dragonflies has always been the Clubtail family.

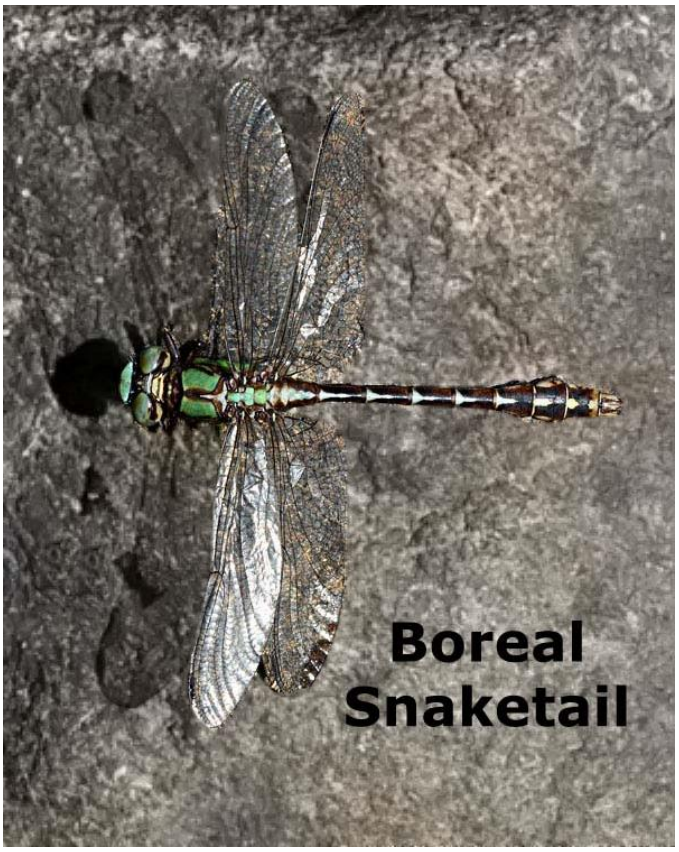
The Clubtail family is split into several genera. The most rare and unique of these genera is probably *Ophiogomphus*, the Snaketails. There are seven species of Snaketail that have been found in Wisconsin. The rarest of these is the Extra-striped Snaketail (*Ophiogomphus anomalus*), which is considered endangered in Wisconsin. The most common species of Snaketail is the Rusty Snaketail (*O. rupinsulensis*). The Rusty Snaketail is easily identified by the lack of a center stripe on the top of the thorax, behind the head, which the other Snaketails all have. It also has a rusty brown colored abdomen with no distinct top spots.

Another Snaketail that is fairly easy to identify is the Pygmy Snaketail *(O. howei*). As its name would suggest, the Pygmy Snaketail is noticeably smaller than the other species of Snaketail. At around 1.3 inches it is the smallest Clubtail found in Wisconsin.

The remaining four Snaketail species are all around the same size and look somewhat similar. The Sioux and St. Croix Snaketails are both found in very specific geographic ranges. So far the St. Croix Snaketail (*Ophiogomphus susbehcha*) has only been found in the St. Croix and Chippewa Rivers and some of their tributaries. They typically begin emerging at the end of May and are usually only seen for 3 to 4 weeks. This species is also considered endangered in Wisconsin. The Sioux Snaketail (*O. smithi*) is typically found along sandy streams and rivers in West Central Wisconsin. They are primarily found around the Eau Claire area along the sandy banks of the Eau Claire River. They are slightly smaller than the St. Croix Snaketail with more brown on the abdomen.

So far there is little overlap between the ranges of these two species. The only place that you might find them both is along the Chippewa River near Eau Claire.

The last two species of Snaketails in Wisconsin are found mostly in the northern part of the state and in similar habitat. The Riffle Snaketail (*O. carolus*) and Boreal Snaketail (*O. colubrinus)* both prefer fast flowing rivers with rocky bottoms.



At first glance these two species look similar, but with a closer look it is easy to distinguish between the two. The first thing to look at is the abdomen. If the abdomen is black and yellow with arrowhead-shaped top spots, then most likely the specimen is a Riffle Snaketail. If the abdomen is brown, black and yellow with top spots that look like golf tees, then you probably have a Boreal Snaketail.

However, it is best not to count on just one field mark when trying to identify the species of a dragonfly. Examining the face can also help in identification. The Riffle Snaketail has a clean face with no markings on the cross face suture. The Boreal Snaketail has a dark cross face suture as well as other facial markings.

Riffle Snaketail

Boreal Snaketail

We'll have a good chance of seeing both the Riffle and Boreal Snaketails at this year's Annual Meeting in Ashland County. Hopefully we will get one of each in a net so that everyone will get a chance to see the differences live and in person. Pictures are great but nothing beats getting outside to see the real thing.

Odonates of Ashland County: Possible Species List for the Annual Meeting Weekend (June 25-27)

Yellow represents 'most likely'; orange represents 'possible if conditions are favorable'.

Compiled by Edgar Spalding and Dan Jackson

Damselflies	Springtime Darner	Ski-tipped Emerald
Broadwings	Fawn Darner	Forcipate Emerald
River Jewelwing	Swamp Darner	Delicate Emerald
Ebony Jewelwing	Harlequin Darner	Incurvate Emerald
	Cyrano Darner	Kennedy's Emerald
Spreadwings	Blue-eyed Darner	Ocellated Emerald
Spotted Spreadwing		Brush-tipped Emerald
Northern Spreadwing	**Clubtails**	Williamson's Emerald
Emerald Spreadwing	Horned Clubtail	Ebony Boghaunter
Amber-winged Spreadwing	Lilypad Clubtail	
Sweetflag Spreadwing	Black-shouldered Spinyleg	**Skimmers**
Elegant Spreadwing	Midland Clubtail	Calico Pennant
Slender Spreadwing	Splendid Clubtail	Halloween Pennant
Lyre-tipped Spreadwing	Skillet Clubtail	Eastern Pondhawk
Swamp Spreadwing	Cobra Clubtail	Chalk-fronted Corporal
	Dragonhunter	Frosted Whiteface
Pond damsels	Mustached Clubtail	Crimson-ringed Whiteface
Variable Dancer	Green-faced Clubtail	Hudsonian Whiteface
Powdered Dancer	Extra-striped Snaketail	Dot-tailed Whiteface
Aurora Damsel	Riffle Snaketail	Belted Whiteface
Subarctic Bluet	Boreal Snaketail	Widow Skimmer
Taiga Bluet	Pygmy Snaketail	Twelve-spotted Skimmer
Northern Bluet	Rusty Snaketail	Four-spotted Skimmer
Boreal Bluet	Lancet Clubtail	Elfin Skimmer
Rainbow Bluet	Ashy Clubtail	Blue Dasher
Tule Bluet	Rapids Clubtail	Wandering Glider
Familiar Bluet	Dusky Clubtail	Spot-winged Glider
Marsh Bluet	Eastern Least Clubtail	Common Whitetail
Stream Bluet	Riverine Clubtail	Variegated Meadowhawk
Hagen's Bluet	Zebra Clubtail	Saffron-winged Meadowhawk
Vesper Bluet	Arrow Clubtail	Black Meadowhawk
Citrine Forktail		Cherry-faced Meadowhawk
Eastern Forktail	**Cruisers**	White-faced Meadowhawk
Sphagnum Sprite	Stream Cruiser	Band-winged Meadowhawk
Sedge Sprite	Swift River Cruiser	Autumn Meadowhawk
		Black Saddlebags
Dragonflies	**Spiketails**	Red Saddlebags
Darners	Twin-spotted Spiketail	
Canada Darner	Arrowhead Spiketail	
Lance-tipped Darner		
Lake Darner	**Emeralds**	
Zigzag Darner	American Emerald	
Subarctic Darner	Beaverpond Baskettail	
Black-tipped Darner	Common Baskettail	
Shadow Darner	Prince Baskettail	
Green-striped Darner	Spiny Baskettail	
Common Green Darner	Racket-tailed Emerald	

Wisconsin Dragonfly Society Research Subcommittee

Ryan Chrouser

For a few years, the WDS board has been discussing the formation of a research subcommittee. And now, with my tenure as president in the rear-view mirror, I am excited to devote my attention to the launching of this subcommittee. The committee's exact goals will be fleshed out in the coming months, but we have several ideas floating around as to what we would like to accomplish. Here are a few ideas.

There are many counties in Wisconsin that have not been adequately surveyed. Additionally, in some counties that have been surveyed, there may be certain habitats that have not been explored. I would like to leverage our growing group of interested Odonatists and see if we can fill in some of those gaps in knowledge. If you live in or near a county that needs some attention, your knowledge may prove invaluable and may help us target the correct areas.

Other field work opportunities may result from the identification of a habitat for a high priority species. A report of a rare species sighting could lead to an organized search of the area to verify it. Potentially, a breeding site may even be identified! All active members of the WDS and our friends in the WDS Facebook group contain a wealth of knowledge of the natural areas in our state.

In addition to expanding our survey footprint around the state, we also have an opportunity to organize periodic surveys of selected habitats to determine how populations change and adapt over time. One can imagine that the changing number and abundance of Odonata species from a specific habitat, surveyed over many years, may be able to tell us something important about different factors affecting said habitat. Changes in water quality, vegetation, new species entering the habitat, and the potential impacts of climate change may all be observed in the populations of Odonata in the area. Careful repeated observations could provide scientists with essential data to evaluate the health of our ecosystems, and potentially identify the best ways to apply conservation efforts in our state. If you have a favorite or interesting site, you could be a part of important long term data gathering.

Stay tuned to the Facebook group and other communications from the WDS for more information. We may very well be looking for some help in your area, with completing surveys or identifying potential survey locations. In addition, please reach out to us if there is an opportunity for the WDS to contribute at a BioBlitz or other activities at your local nature centers and parks. Together, we can use our love of Odonata to help promote conservation of our incredible aquatic ecosystems throughout the state.

Backyard *Pantala flavescens* Observation

Ken Tennessen

Pantala flavescens (Wandering Glider) is not one of the more common dragonflies seen in Wisconsin. Although this famously migrant species has been recorded from more than half the counties in the state (WOS website, accessed 27 Aug. 2020), I have rarely encountered it here. And so I was surprised to see a male at my back yard pond in Wautoma (Waushara County) on Aug. 21, 2020. In fact, this was the first time in 15 years that I had seen this species in my yard. I immediately thought that it was possible that the lack of measurable rainfall in the past six weeks could have decreased the availability of temporal pools in our area and this individual just happened to see the water in my pond and had to inspect it. I was fascinated by how tirelessly the male sallied back and forth over the pond and the lawn; I hoped it would perch so I could get some photographs.

As it kept flying, I was distracted by a flurry of finches in the trees near the pond, and when I looked back toward the pond a female of *P. flavescens* had entered the scene. She and the male flew wildly around for a few seconds then the female flew over the pond and started laying eggs; the male flew around above her. About every three seconds she would lower herself to the water surface, make a tap and release a single egg. She repeated tapping several times, but on about her sixth attempt a green frog leaped off the edge and nabbed her! I got close enough to the frog to see the tip of her wing sticking out of its mouth. I went from elated to sad in a matter of seconds. I wonder if the few eggs she was able to deposit will hatch and if the nymphs will survive (there are a number of *Anax junius* nymphs in my pond).

Ode Hunting in the Throes of a Pandemic: A Silver Lining

Maggie Steinhauer

How lucky we are to have a hobby and passion that can safely occupy our minds and our time during such an uncomfortable and frankly, perilous time in history. With cancelation upon cancelation and a strange rewiring of otherwise routine everyday activities, it was a relief to be able to pick up a net, sling my pack over my shoulder, hop in the car and just go.

Perhaps one of the bright sides of the pandemic was not only the increase in free time to get out into the field aside from work, but also being able to partake in the Wisconsin Dragonfly Society's multiple reformatted, pandemic-adapted, bioblitz weekends. In addition, we were able to survey at a single location throughout the summer with the Urban Ecology Center which made for a close-up look at the park's species.

Due to the pandemic, the surveys at the Urban Ecology Center were closed to the public and restricted to only one of our three branches. Having this one-branch restriction made up for the lack of incoming data at our other locations by allowing for a more robust dataset to come out of the Menomonee Valley branch.

What an exciting season it was! We had twelve noteworthy finds throughout last summer, whether that meant the species were new to the UEC, the first sighting in years, or a new record for Milwaukee County. I'd like to mention just a few of them here and why they made me so giddy.

Elusive Clubtail (*Stylurus notatus*)

Elusive Clubtail *Photo by Matt Flower*

The Elusive Clubtail is a species that is uncommon in Wisconsin and is primarily found throughout the western portion of the state. On July 31st, when the UEC's Matt Flower messaged me saying he had photographed a clubtail at Riverside Park, I was excited to try to identify it since we don't typically see a great abundance of clubtails on our surveys. When I couldn't quite narrow it down I brought it to the WDS Facebook page for some help, and how thrilling it was to be able to call it a first record for Milwaukee County!

Great Spreadwing (*Archilestes grandis*)

Great Spreadwing *Photos by Ethan Bott*

It was my first time ever seeing a Great Spreadwing – and WOW they're impressive! This was not only exciting for me personally, but also because this species is considered "Most Wanted" in Wisconsin. It is the largest North American damselfly *and* is brand new to the Urban Ecology Center species list. They are so large you'd think they'd weigh down the small stems and branches upon which they land. It makes for a truly unique experience to witness a damselfly of this

stature, especially in numbers with both males and females present.

Lyre-tipped Spreadwing (*Lestes unguiculatus*) & **Stream Bluet** (*Enallagma exsulans*)

Lyre-tipped Spreadwings – another odonate I hadn't seen in my two seasons of experience! Apparently Milwaukee County hadn't seen them either, not since 2014. Not only did we see them this year in Milwaukee, but we saw them both consistently and in high numbers. It brings up the question of what could have spurred this population all of a sudden after a six year dry spell, or if limited survey efforts in the county have led to lack of recordings. Either way, what a fun Spreadwing to witness for the first time and have it engrained into memory. I will say, though, that the females still often boggle my brain. Perhaps one trick is to *not* think so much, and if you still can't figure it out, post the picture on the Wisconsin Dragonfly Society Facebook page for incredible identification advice.

Another species that was particularly interesting this season was the Stream Bluet. Since 2014, we have consistently recorded anywhere from one to three sightings per season at Three Bridges Park. On average, each of these sightings yielded less than five individuals – and just one single individual the past two years. I'm not quite sure if it was due to increased survey efforts at this single location or if there was something more going on, some sort of population boom, which led us to seeing handfuls of individuals every single survey for the greater part of this season. Has anyone else noticed an uptick in sightings?

In addition to surveying at Three Bridges Park, I was lucky to explore some other beautiful places last summer in my free time. The Wisconsin Dragonfly Society bioblitz weekends led to discovering new places, seeing new species, and spending some quality time with my dad, who I had been trying to get out looking for odes with me for a while.

Dad holding a Red Saddlebags Photo by Maggie Steinhauer

He wasn't too enthusiastic about getting up close and personal with the flying insects, but he took great pride in his self-selected job of carrying my field guides, or in his words, "holding the books." For the bioblitz in August we decided to make a trip of it and traveled up to Outagamie, Calumet, Juneau, and Columbia counties, some that I identified as having older records. It was a bit late in the season so we didn't see *too* much, but I will share a memorable story about a surprise species I had been dreaming of seeing, and many odonate enthusiasts can probably relate to a situation like this.

On the first day of our outing, my dad and I were walking around Necedah National Wildlife Refuge in Juneau County and were seeing some meadowhawks and a couple skimmers. After a lull in ode activity at both of our survey locations, I remember walking along the boardwalk saying a bit sullenly to my dad, "well, maybe we'll see more tomorrow." Not five seconds later a massive dragonfly landed on a bush about six feet ahead of us, bowing the branch upon which it perched.

I was stopped in my tracks. I immediately pushed away the (much better) idea of pulling out my phone to take a picture of the ode and instead jumped at the opportunity to catch it, despite knowing in the back of my mind that was a terrible choice. As soon as I stepped forward to swing my net, the dragon disappeared into the vegetation and was completely out of sight.

I knew what I saw. A darner-sized green clubtail, a hanging "J" shape at the end of the abdomen, both clunky and commanding in its presence… it had to be a Dragonhunter. My first Dragonhunter! I was heartbroken to have missed it. While searching the Wisconsin Odonata Survey for distinguishing information to help confirm my sighting, I noticed there was no Dragonhunter recorded in Juneau County, and that this would have been a new county record had I gotten a photo.

It had to have been twenty minutes that my gaze was locked into the area where the clubtail was. I called my dad over because he had the binoculars and I needed a better look – it *had* to be somewhere. More time passed, alas, no dragonfly.

"Maggie, is that it?" said my dad as he pointed behind us. Lo and behold there it sat, in all of its robust glory. Now it was about thirty feet ahead of us in the middle of the boardwalk, warmed by the late afternoon sun. We quickly snapped an incredibly grainy, low quality photo from a distance because something was better than nothing, and we didn't want to risk it flying away again. This is quite possibly the worst ode picture to date, but it got the job done thanks to the defining characteristics sported by this species.

Dragonhunter Photo by Maggie Steinhauer

I have learned that I should maybe get a nicer camera than the one on a phone, and also not to get overzealous when seeing an individual that I'd like to catch, especially when it's something different. Patience is key. I have also learned about new species, delved deeper into certain families (I called this summer a "spreadwing summer"), and speaking of families, got to share this passion with someone important to me. Despite the always-present anxieties about the pandemic, being able to look for dragonflies and damselflies in a new light this summer was such a gift and provided much needed respite. I hope that whether you are brand new to the hobby or a seasoned veteran, you were able to spend time this summer out in nature, learning new things and appreciating these magical winged creatures.

Bois Brule River Photo by Freda van den Broek

A Wisconsin Department of Natural Resources Research Report (199 of January 2021) entitled **Dragonflies and Damselflies (Odonata) of the Brule River Watershed and Brule River State Forest, with Considerations for Detecting Species** by Robert B. DuBois, Julie M. Pleski, Kurt L. Schmude, and William A. Smith, can be viewed and downloaded at: https://www.researchgate.net/publication/348847832_Dragonflies_and_Damselflies_Odonata_of_the_Bois_Brule_River_Watershed_and_Brule_River_State_Forest_with_Considerations_for_Detecting_Species

Citizen Science at Work – A Snapshot

Ryan Chrouser

When someone asks me what I do, I often start telling them about my hobbies rather than my paying job. Invariably as I wax on about wading in the river trying to net a low flying clubtail, they interrupt and ask how much I get paid for doing this. I am then forced to admit that I do it for free and for fun. I am what you call a Citizen Scientist. I sometimes wonder if people think that we made up the title so we feel smart and important. I would argue that science volunteers are a vital part of the scientific community. I would like to share one of my own experiences to demonstrate.

In the summer of 2019, a Facebook post in our incredible Wisconsin Dragonfly Society Facebook group caught my eye. The picture was of a Somatochlora in Eau Claire County, and it looked to me like a species I had not seen before anywhere, let alone in my home territory. I contacted the author of the post and let him know that I believed he had found a Plains Emerald, a rare species in Wisconsin. The gentleman was understandably excited to find a rare species in his backyard.

For me, just seeing something rare is not always enough, I often need to go further to understand the deeper implications of a rare species being found. The landowner must have felt much like I did about this interesting find, because he invited me out to his private property to see if we could determine if Plains Emeralds were actively breeding at his location. The original photo he posted was a female that had a noticeably dirty abdomen tip, so it certainly looked like she had been laying eggs. I was thrilled and humbled to accept his invitation.

We met at his land and looked for any adults on the wing, and after a short time with no positive sightings, we decided to try to see if we could find a nymph. In only a matter of minutes we had captured a large Somatochlora nymph. We were extremely excited. I took the nymph home to try and identify it to species. Using Ken Tennessen's incredible nymph ID book, I keyed out the specimen to Plains Emerald. To verify my result, I kept the nymph throughout the winter and to my great delight, a beautiful Plains Emerald female emerged the next June. I contacted my new friend and congratulated him on having a confirmed breeding site for Plains Emerald. Knowing now when and where to look, we were able to find several adult males and females on the wing around his property in the summer of 2020.

All of us can contribute to the scientific community. We have the means and support to apply our love and excitement for nature into an important resource that is very lacking in the professional science community. Boots on the ground, nets in the water and swinging through the air, and cameras focusing on the movement along the riverbank. Our hobbies can produce the vital data that scientists need to focus conservation efforts throughout our state. All your observations are important, and the fact that you do not get paid for your hobby, does not make you any less of a Scientist. Keep exploring everyone! You are all appreciated!

Newly emerged Plains Emerald *(Somatochlora ensigera)* female and exuvia

Photo by Ryan Chrouser

Hine's Emerald Dragonfly: The Backstory

Kate Redmond

*The BugLady's **Bug o 'the Week** collection is archived at http://uwm.edu/field-station/category/bug-of-the-week/.*

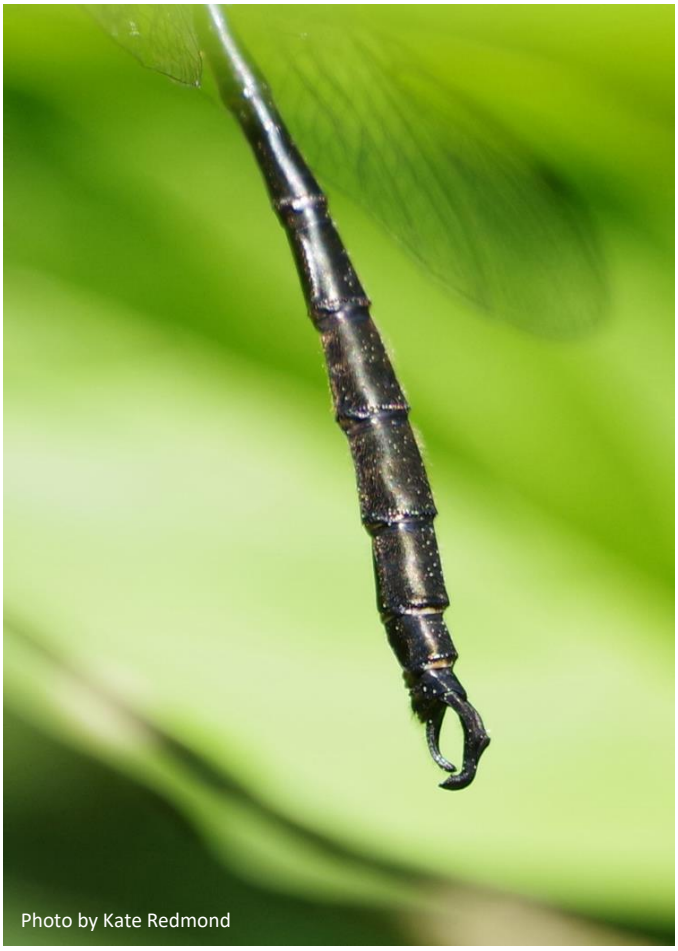
Greetings, BugFans

One of the dragonflies that the BugLady encountered in the summer of 2020 was a Federally Endangered Hine's Emerald. Unlike her usual subjects, there are lots of internet hits about this dragonfly, and many are state and federal informational and management bulletins.

Emeralds are in the dragonfly family Corduliidae, the so-called "Green-eyed Skimmers" (though "Skimmers" commonly refers to a different dragonfly family). There are smaller species in the family, like baskettails, the very rare Boghaunters, and the very **common Racket-tailed Emerald** . And then there are the two dozen North American members of the genus *Somatochlora* (the Striped Emeralds), a group of large dragonflies, many of which have ranges well into Canada. The BugLady included Hine's Emeralds in an overview of the emeralds that she wrote in 2009, after she found a road-killed Hine's Emerald near the UWM Field Station.

The story is legend. It was the final sweep of a two-day dragonfly workshop run by Bill Smith at the Field Station in 1999—early afternoon on a hot day—when someone netted a Hine's Emerald (*Somatochlora hineana*). At that time, there were known populations of Hine's Emeralds in northern Michigan, northern Illinois, and in Door County, Wisconsin.

The species was described in 1931, which seems pretty late in the game for a large dragonfly (2 ½" long with a 3 ½" wingspan) to go unnoticed, but it was hiding in plain sight. It's closely related to the very-similar **Clamp-tipped Emerald** (*Somatochlora tenebrosa*). (Tenebrosa means "dark" or "gloomy.") The two species seek similar habitats, and the Hine's Emerald shares a small bit of tenebrosa's range. The Hines is separated from the rest of the **green-eyed** , green-bodied *Somatochlora* emeralds by the shape of the two yellow stripes on a green thorax and by the shape of the male's claspers.



A paper written by E. B. Williamson describing and naming the new species was published in the Occasional Papers of the Museum of Zoology, University of Michigan, Ann Arbor, June 3, 1931. Williamson wrote: *"Early in June, 1929, Professor Kennedy [both Williamson and Kennedy eventually had emeralds named after them] wrote me that Professor Hine had just come in from a collecting trip with an undescribed Somatochlora male. This was the male taken*

June 7 by Professor Hine, who later showed me the place where it was captured."

He continued: *"In this woods is a heronry which Professor Hine visited on June 7, 1929. Leaving the woods along its northern side where it adjoins a golf course, he saw a dragonfly hovering two or three feet above the ground in an open spot under a bush. This was captured, and was later referred to Professor Kennedy who recognized it as an undescribed species. He and Professor Hine returned to the site on June 14. The day was rainy and apparently unfavorable. They failed to find any Somatochloras in the woods, but on visiting the dredged channel they were able to take five specimens resting on low bushes on the wood's side of the high bank of earth thrown up by the dredge when the channel was dug….."*

Photo by Kate Redmond

In 1930 no Somatochloras were certainly seen by any of us, except the single female taken by Eli Captain. This was first seen soaring at almost tree top height, from which it descended to alight about ten feet high in a small ash tree on the bank of the dredged channel. In 1930 our party divided at each visit and we searched carefully the full length of the creek, including both banks of the dredged channel, the adjacent forest and pools, and the edges of the forest along the golf course, thickets, old meadows, and grain fields. Until we discover where females oviposit, the search for this species promises but little results."

Experts guess that the original range of the Hine's Emerald included Alabama, Indiana, and Ohio, but it is not found in any of those states anymore. Today, it occurs in **Ontario, Wisconsin, Michigan, Illinois, and Missouri** .Kurt Mead, in Dragonflies of the North Woods, speculates that "Hines may have been relatively widespread in the Great Lakes region before many of the wetlands were drained." The Wisconsin Odonata Survey website reports sightings from Columbia, Ozaukee, Iowa, and Door counties, with Door containing the largest breeding population anywhere, estimated at 20,000. It has been suggested that with laboratory rearing, the range of Hine's Emeralds might be expanded to suitable habitat from Minnesota and Maine on the north, to Texas and Georgia on the south.
But, they're pretty picky about habitat, preferring dry fens and sedge meadows with cool, slow-moving, calcareous, spring-fed seepages for their offspring, and open woodland nearby for the adults. The wetlands must contain crayfish burrows. .

Crayfish burrows? Most dragonflies go from egg through adult in the course of a calendar year. Depending on water temperatures and food, Hine's Emeralds spend up to five years as hairy naiads in those calcareous fens (**click on the "Hine's Emerald Nymph"**), and during that time, they shelter in crayfish burrows. As conditions in their shallow wetlands get drier in late summer, the water in the burrow is welcome, and their hairs discourage evaporation of moisture from their body. **See the diagram** . Hunkering down in crayfish burrows has two down-sides; one for the naiads—crayfish do eat them—and one for the researchers—it's hard to count critters that are hiding in crayfish burrows. They must pump the burrows to see what's there. See the videos below.

When they became the first (and, so far, the only) dragonfly placed on the Federal Endangered Species list in 1995, not much was known about their natural history. Since then, researchers at a variety of state and federal agencies in Illinois and Wisconsin have filled in a lot of the gaps.

Threats to the Hine's Emerald include the usual suspects – extreme habitat specialization, habitat loss/degradation, pollution and pesticides that affect both its prey and its naiads, competition for water that affects the water table, and collisions with cars. These are being countered by research, habitat protection (initially, the dragonfly was protected but not its habitat), a recovery plan, education, and, yes, lowered speed limits in some sensitive areas.

Interesting Hine's Emerald fact: in many studies, although there are roughly the same numbers of emerging males and females in an area, flying males greatly outnumber females a short time later. One hypothesis is that the activities around reproduction are more costly for females. Fewer females results in less diversity in the gene pool.

Here are two videos – **one long** , and **one short** .

Finally, Hine's Emeralds were named by E. B. Williamson, an Indiana banker whose heart belonged to dragonflies and who was well-respected by scientists in the field. He identified a number of new dragonfly species (and he also bred award-winning irises). His observations of Spatterdock Darners appeared in a recent BOTW. Who was Hine?

James S. Hine (1866 – 1930) was an Ohio zoologist who published on robber flies, horse flies, and planthoppers, among other groups. Because of his exhaustive field work, he knew intimately the nooks and crannies of Ohio. Williamson's paper describing the emerald and naming it for Hine, was published after Hine's death, and it included a brief obituary. After citing his friend's professional accomplishments, Williamson wrote *"He will be remembered longest for his work on Diptera, especially the Tabanidae. In this group his flair for taxonomy and his unflagging industry for more than a quarter of a century built a temple of Truth for his monument. To that temple I bring this small urn to place in the alcove where rest Rhodopygia hinei Calvert* [a Costa Rican dragonfly] *and Argia hinei Kennedy* [a southwestern damselfly]*, witnesses of his love of dragonflies and of the affection and appreciation of his colleagues."*

Thanks to BugFan Bill, who knows the secret handshake and unearthed a journal article for the BugLady.

The BugLady

Hine's Emerald breeding habitat, Door County

Photo by Freda van den Broek

A Beginners' Guide to Identifying the Exuviae of Wisconsin Odonata to Family

Freda van den Broek and Walter Sanford

The identification of the exuviae (and nymphs) of Wisconsin dragonflies and damselflies to family group is relatively easy once the distinguishing features are known. The ability to recognize these family characters will provide a solid foundation for exploring the more challenging realm of species-level identification. The purpose of this article is to highlight the key family features, and to share some useful resources for further study. A simplified identification key and photo glossary have also been included. We've focused on exuviae because the handling and study of these empty shells does not result in harm to living organisms.

Wisconsin has approximately 165 species of Odonata. Dragonflies form the larger group, with 117 recorded species within 6 overarching families. The Damselflies are represented by 48 species in 3 families. The overview is easily remembered as 'six plus three rhymes with family.'

The six dragonfly (Anisoptera) families are:

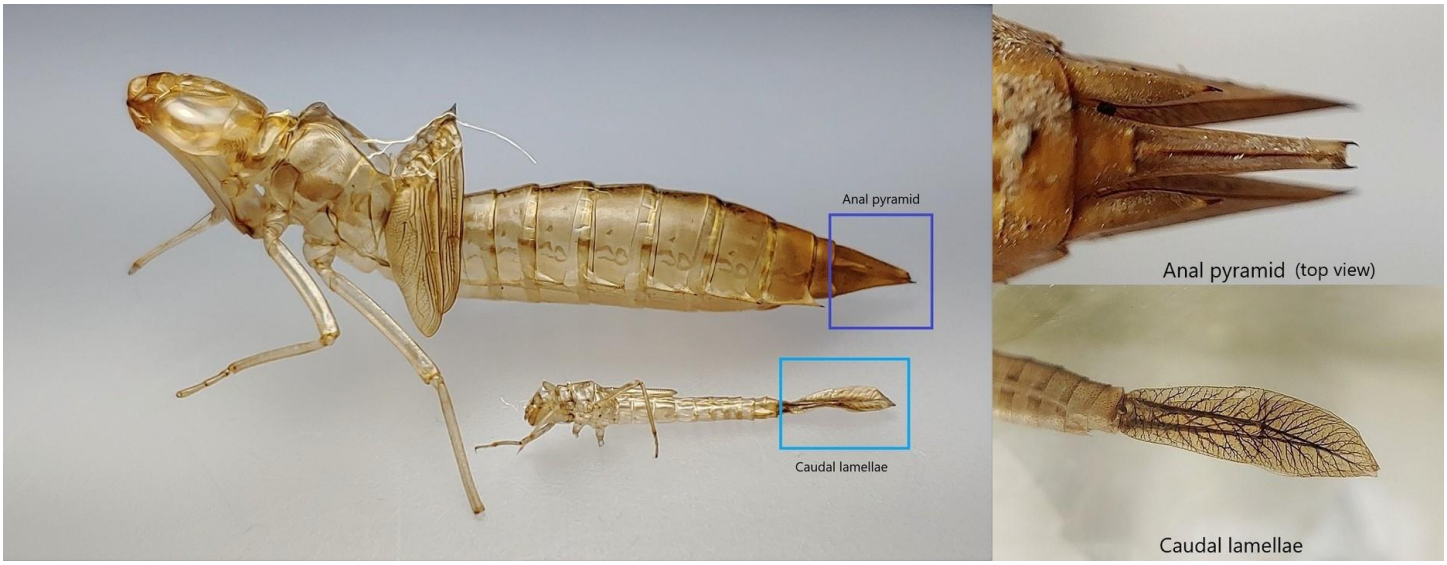
1. Darners (Aeshnidae)
2. Clubtails (Gomphidae)
3. Spiketails (Cordulegastridae)
4. Emeralds (Corduliidae)
5. Skimmers (Libellulidae)
6. Cruisers (Macromiidae)

The three damselfly (Zygoptera) families are:

1. Broad-winged Damsels (Calopterygidae)
2. Spreadwings (Lestidae)
3. Pond Damsels (Coenagrionidae)

Distinguishing between dragonfly and damselfly exuviae:

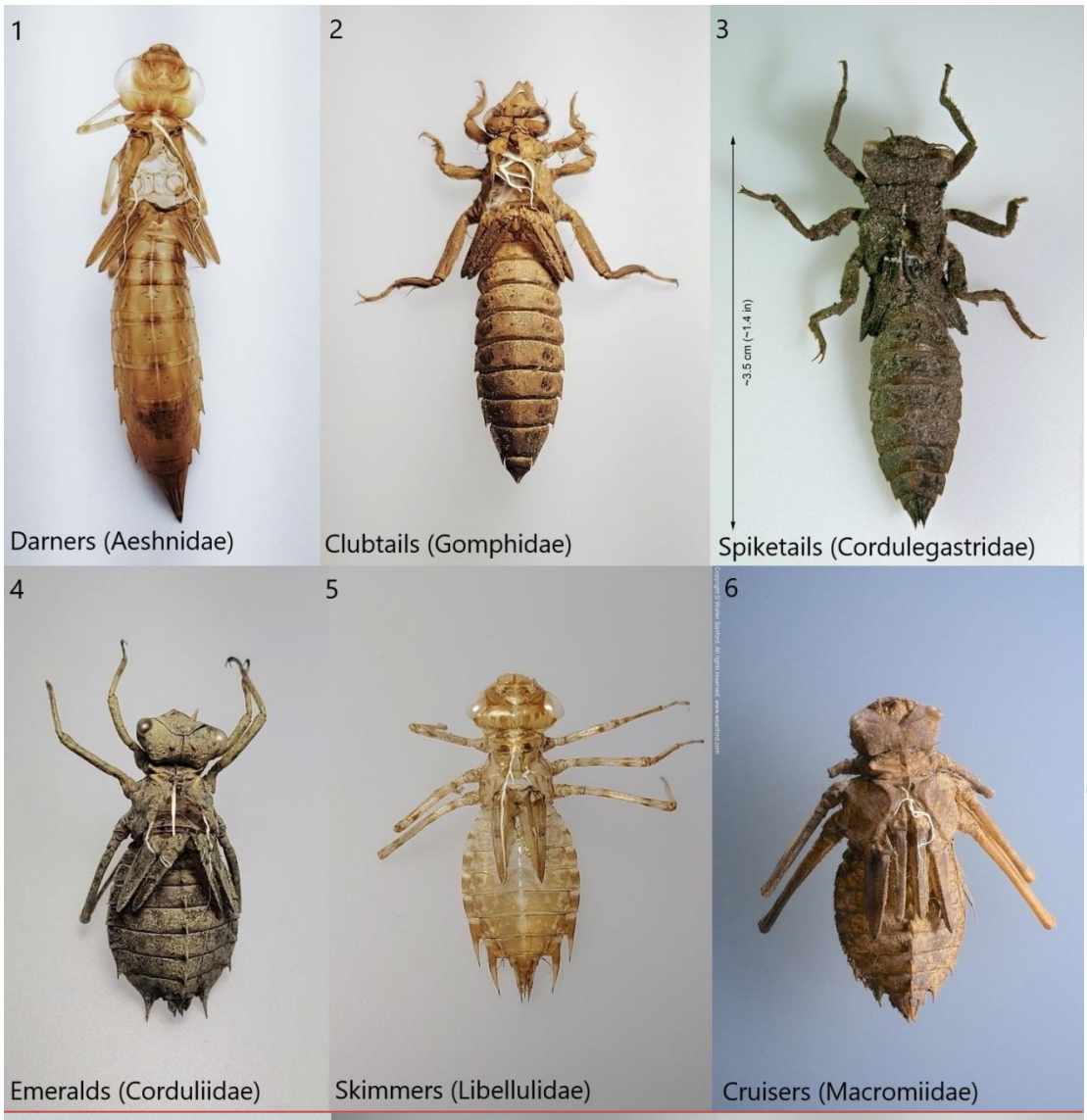
Despite the variability in the shape and size of our dragonfly species, they are distinctly more robust than damselfly species. The abdomen of a dragonfly nymph ends in what is referred to as the **anal pyramid** (comprised of two paraprocts, two cerci and an epiproct); damselfly nymphs on the other hand, have three leaf-like gills called **caudal lamellae** at the tip of the abdomen.



Photos by Freda van den Broek

Overview of the Dragonfly and Damselfly Families of Wisconsin

Dragonflies (Anisoptera)



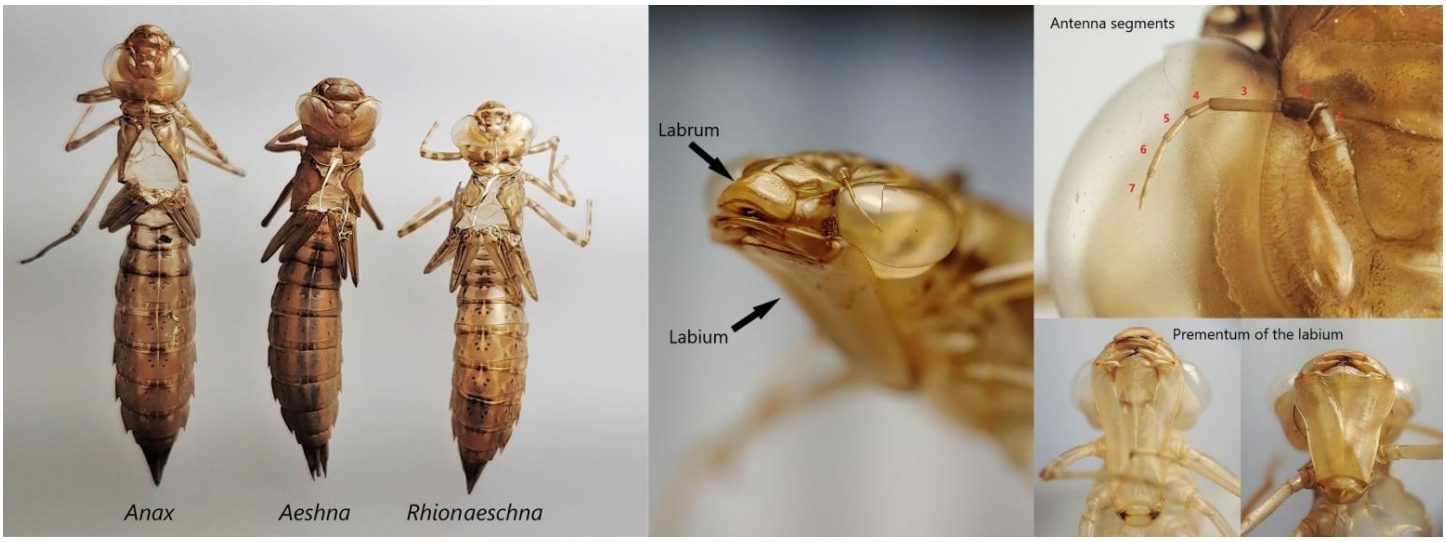
Note that Cruisers are characteristically long-legged when the exuvia is intact.

Damselflies (Zyoptera)

Photos by Walter Sanford (Cordulegastridae, Macromiidae and Broad-winged Damsels) and Freda van den Broek

1. Darners (Family Aeshnidae)

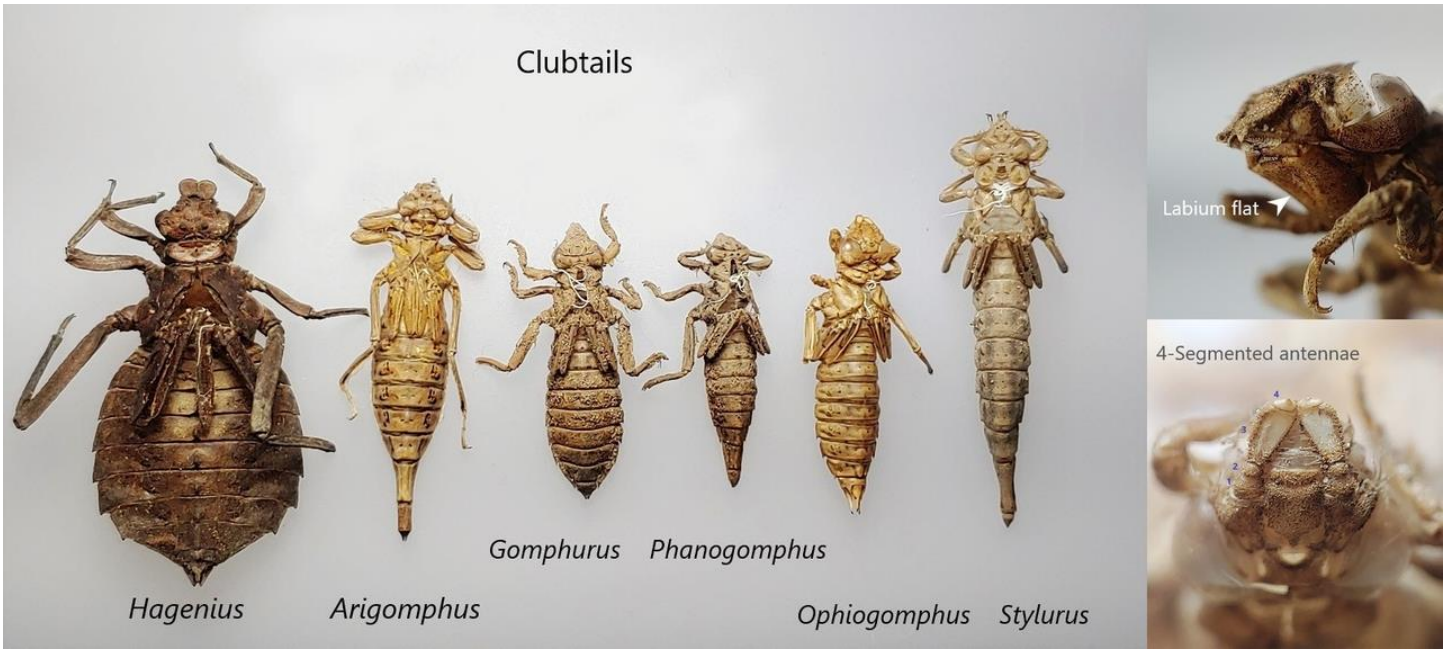
Darners typically have a long, cylindrically shaped body and large compound eyes. The antennae have 6- or 7 segments; each segment is called an antennomere. The labium, which is the prey-catching mechanism (also thought of as the combined knife, fork, and dinner plate) is characteristically flat and doesn't cover the labrum, an upper-lip-like structure.



Photos by Freda van den Broek

2. Clubtails (Family Gomphidae)

Although Clubtails vary in size and shape, they all have 4-segmented antennae. The 3rd antennomere is the largest and it varies in shape. Because of their burrowing habit the antennae are often covered in sediment, making it difficult to see the segments clearly. The labium is flat, and the face is somewhat triangular in shape. The Dragonhunter (*Hagenius brevistylus*) (first image on the left) is an outlier in terms of its unusually large size and rounded, flattened shape. Note also that not all *Stylurus* species have an equally long, pointed abdomen. Clubtails prefer habitats with clean, flowing water; their presence is an indicator of good water quality.



Photos by Freda van den Broek

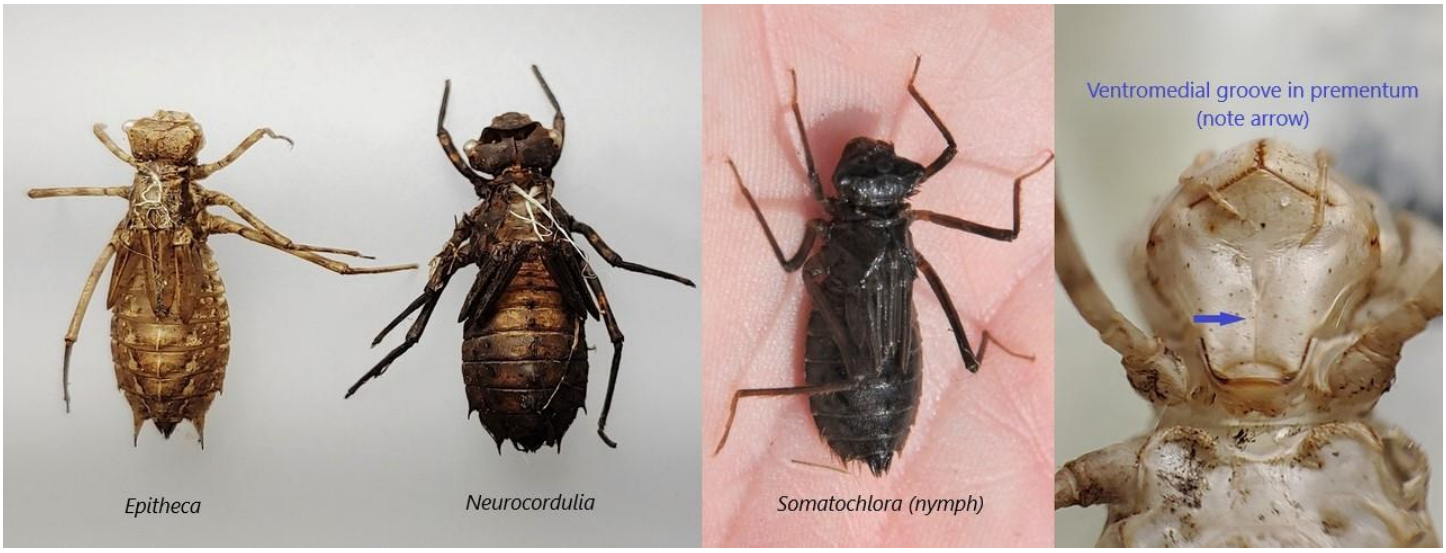
3. Spiketails (Family Cordulegastridae)

Spiketails have a scoop- or mask-shaped labium with deeply incised, irregular crenulations in the palpal lobes. This gives them a unique and easily recognizable appearance. Spiketails are habitat specialists that favor small streams and rivulets.

Photos by Walter Sanford

4. Emeralds (Family Corduliidae)

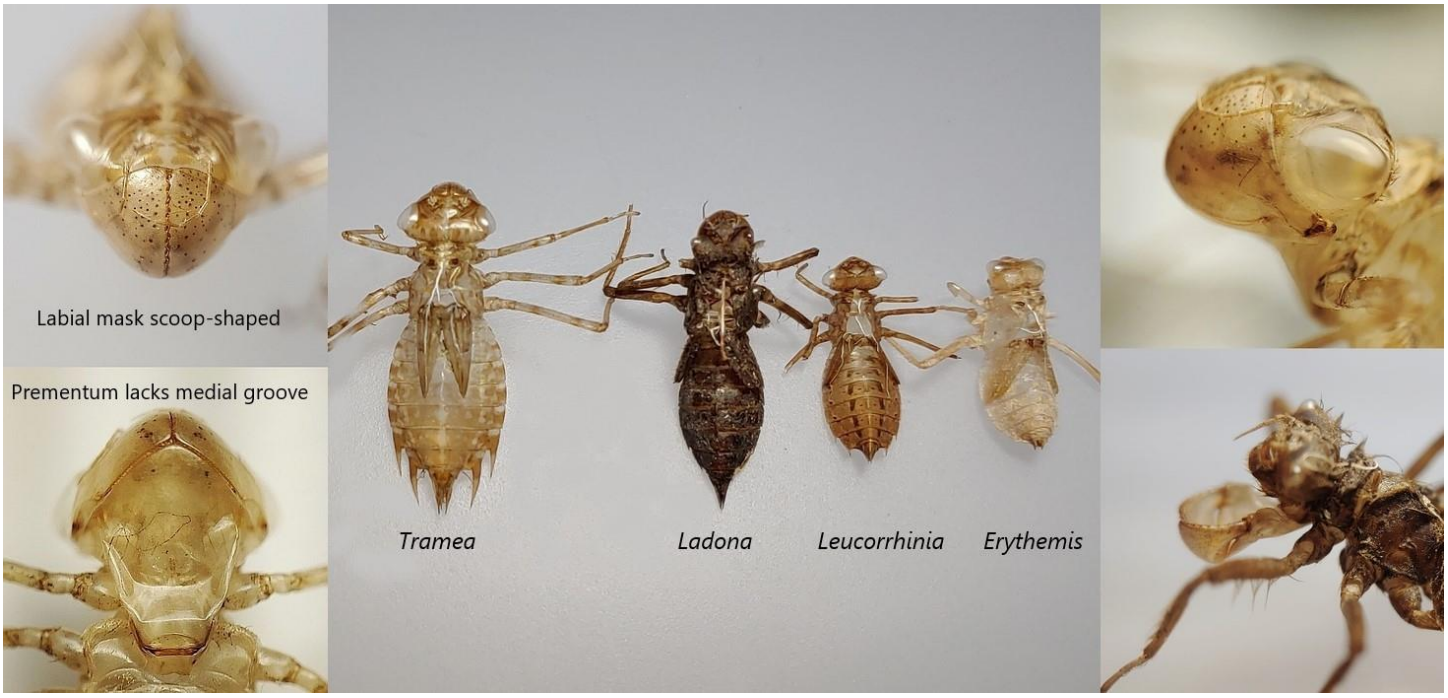
Emeralds have a scoop-shaped labium**,** with a ventromedial groove in the prementum. This groove is the most distinct character shared by all Emeralds. However, it is not always easy to see when there is debris or sediment coating the labium. On a cautionary note, one of our Skimmers, the Eastern Amberwing (*Perithemis tenera*) sometimes has a groove in the prementum. Therefore, some care is required when considering all of the characteristics. Emeralds have relatively long legs (a characteristic that is more clearly visible in the *Somatochlora* nymph shown below).



Photos by Freda van den Broek

5. Skimmers (Family Libellulidae)

Skimmers have a scoop- or mask-shaped labium that lacks a ventromedial groove. As mentioned above, the only possible exception to this is the Eastern Amberwing (*Perithemis tenera*). The crenulations in the labial palps are shallow and regular compared to those of the Spiketails. Their legs are relatively shorter and stouter than those of the Emeralds.



Photos by Freda van den Broek

6. Cruisers (Macromiidae)

Cruisers are most readily identifiable by the long legs and broad abdomen which gives them a spider-like appearance. In addition to the scoop-shaped labium, they also have a horn-like projection on the head – a feature shared only with *Neurocordulia molesta* (in the family Corduliidae) in our region.

Photo by Walter Sanford

Photo by Kate Redmond

Photo by Freda van den Broek

Damselfly Families (Zygoptera)

1. Broad-winged Damsels (Family Calopterygidae)

Broad-winged Damsels (our Jewelwings and Rubyspots) can be separated from other damselfly families by their distinctly long and pointed antennae. The first antenna segment is longer than all the remaining segments combined. The prementum of the labium has an opening or cleft that is unique to this family.

Photos by Walter Sanford

2. Spreadwings (Family Lestidae)

Wisconsin Spreadwings have a noticeably long, stalked labium, reminiscent of a long-handled spoon or a rattle. The labial palps have a characteristic forked opening in the lower portion of the palp.

Photos by Freda van den Broek

3. **Pond Damsels (Family Coenagrionidae)**

This family group represents the largest number of our damselfly species. They're noticeably smaller in size than members of the other two family groups. The prementum of their labium is relatively shorter and more broadly triangular (shaped like a keystone).

Photos by Freda van den Broek

Recommended Resources

- For a clear, user friendly key, see the article entitled "Identifying Odonata Nymphs to Family" by Marla Garrison and Ken Tennessen in the March 2021 edition of **Argia**. https://www.dragonflysocietyamericas.org/s/Argia-v33i1-Free-page.pdf (Paid membership in the Dragonfly Society of the Americas is usually required to download the journal.)

- Ken Tennessen's book **Dragonfly Nymphs of North America: An Identification Guide** is our main resource; it is available as hardcover or e-book via Springer Publications or Amazon.

- Walter Sanford's Photoblog https://waltersanford.wordpress.com/odonate-exuviae/

- For an excellent video entitled "Identifying Dragonfly Larva to Family" see https://vimeo.com/76713446?fbclid=IwAR3ZiLr01CzJ9_M3Y_AM3_EKQ3cQWJ9QadNtHIe87tkOWMBSGegitmvQAlw

- Facebook Group **Odonate Larvae and Exuviae** https://www.facebook.com/groups/odonate.larvae.and.exuviae/

- The downloadable key by Ken Soltesz is very useful even though some of the names are dated. http://dragonfliesnva.com/My%20Documents/KevinPDF/pdf/identify/Dragonfly%20Larvae%20Key-FINAL.pdf

- For information on the Petaltails (Petaluridae), a North American dragonfly family not represented in Wisconsin, see https://waltersanford.wordpress.com/2018/02/14/tachopteryx-thoreyi-exuvia/

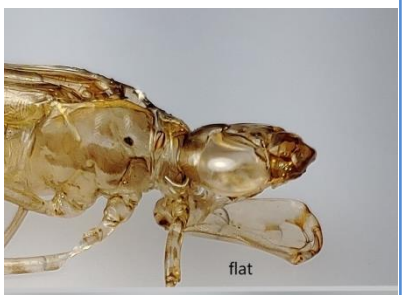
With thanks to Bob DuBois for helpful suggestions and encouragement.

Simplified Key to Identifying Dragonfly Exuviae to Family

1. Is the labium flat or scoop-shaped?

If flat, it could be a Darner (Aeshnidae) or a Clubtail (Gomphidae).

(If you're out of state, it could also be a Petaltail (Petaluridae. See resource list.)



If scoop- or mask-shaped, it could be a Spiketail (Cordulegastridae), a Cruiser (Macromiidae), an Emerald (Corduliidae) or a Skimmer (Libellulidae).

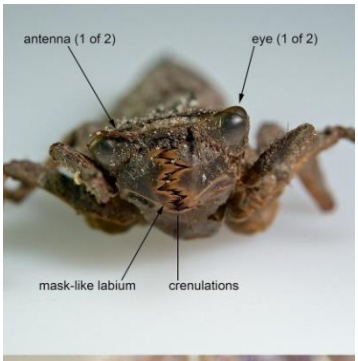
2. If the labium is flat, are the antennae thin, threadlike and 6- or 7 segmented?

If yes, it's a Darner (Aeshnidae).

If no, (the antennae are thicker and 4-segmented) then it's a Clubtail (Gomphidae).

3. If the labium is scoop- or mask-shaped, are the crenlations jagged or even?

If jagged, it's a Spiketail (Cordulegastridae).



If even, but with a prominent frontal horn, it's a Cruiser (Macromiidae).

If even, with no frontal horn, it's either an Emerald (Corduliidae) or a Skimmer (Libellulidae); check for a groove in the prementum.

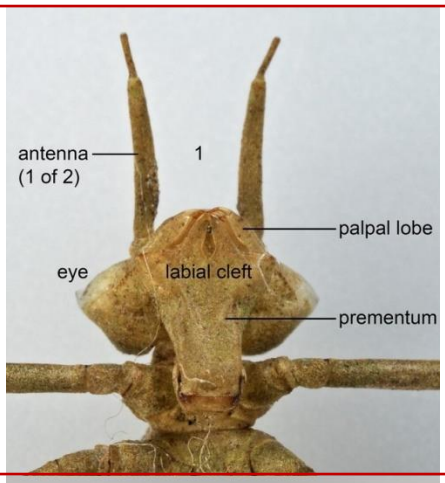
4. Is there a ventromedial groove in the prementum or not?

If yes, it's an Emerald (Corduliidae).

If no, it's a Skimmer (Libellulidae).

Simplified Key for
Identifying Damselfly Exuviae to Family

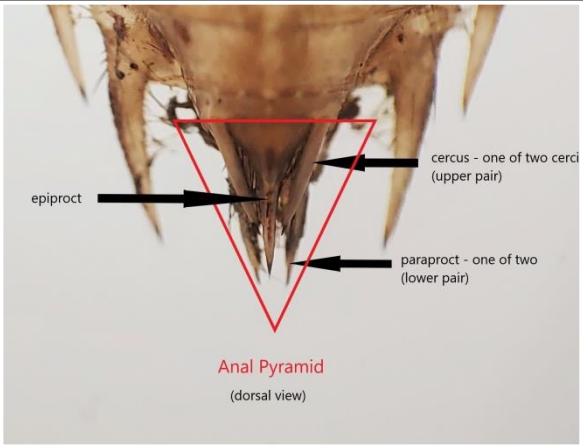
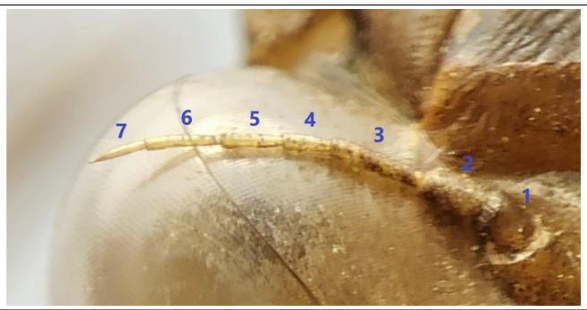
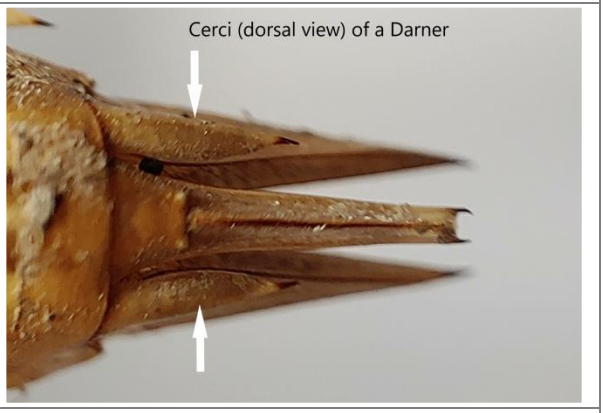
1. Is there an opening or cleft in the prementum?
   Is antenna segment 1 as long as, or longer than the remaining segments?
   If yes, it's a Broad-winged Damsel (Calopterygidae).

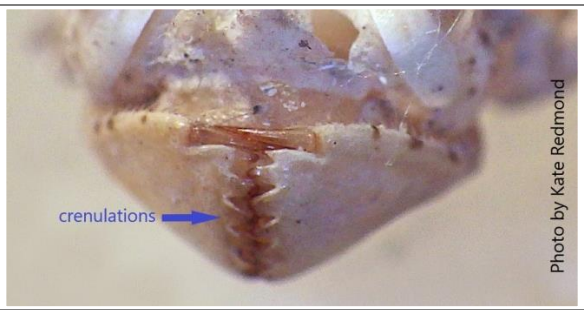
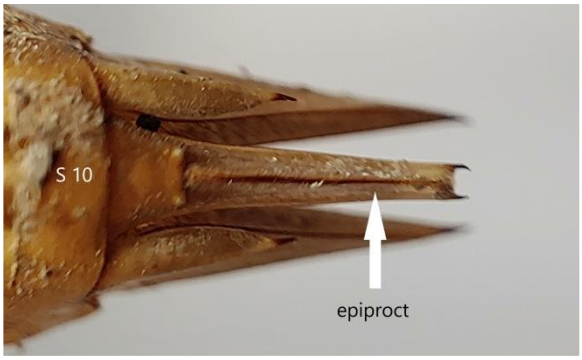
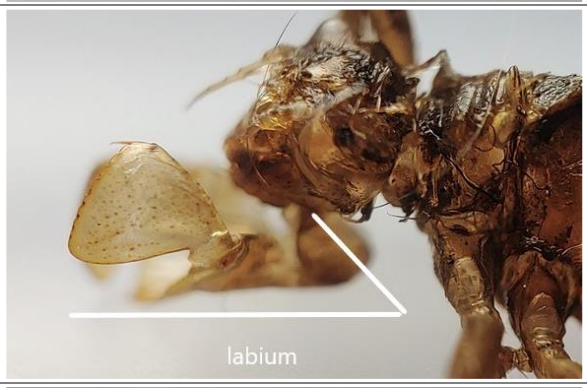


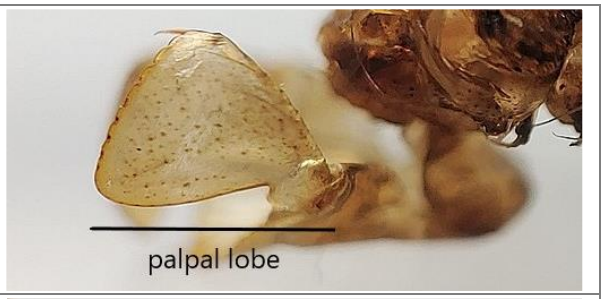
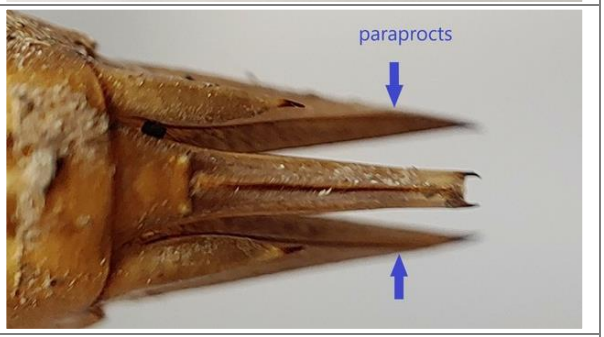
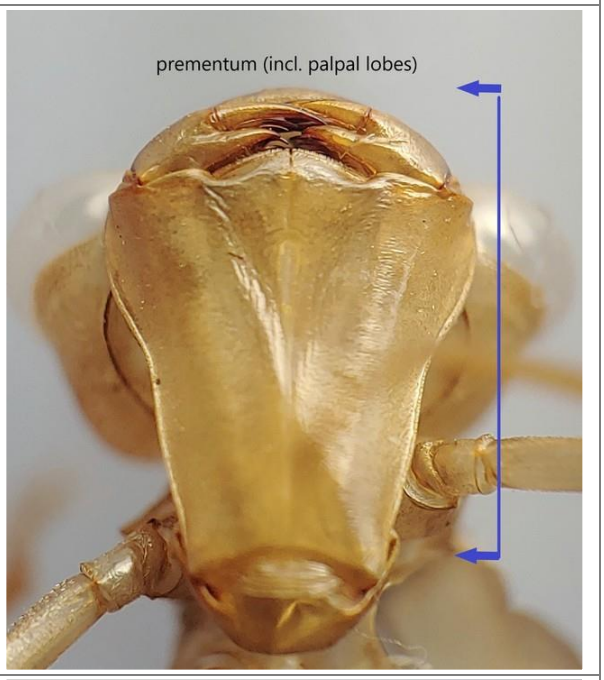
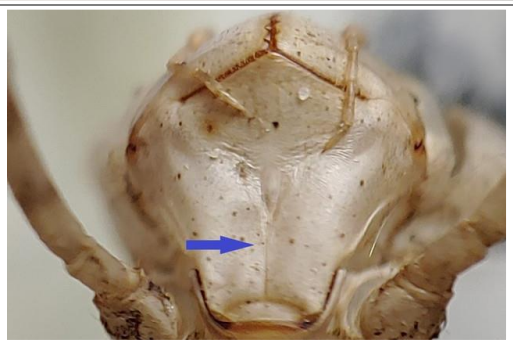
2. Is the prementum long, narrow and stalked?
   If yes, it's a Spreadwing (Lestidae).

3. Is the prementum short and broadly triangular, lacking cleft or opening?
   If yes, it's a Pond Damsel (Coenagrionidae).

Glossary

anal pyramid:	Triangle-shaped group of terminal appendages including two cerci, one epiproct, and two paraprocts.	
antennomere(s):	Segment(s) of an insect antenna. Source Credit: https://bugguide.net/node/view/110174	
appendages:	Structures at the end of the abdomen: 3 in damselfly nymphs (called caudal lamellae); 5 in dragonfly nymphs (see anal pyramid).	See caudal lamellae and anal pyramid
caudal lamellae:	"Three leafy appendages at rear of abdomen in damselflies, for respiration and locomotion; also called caudal gills". Source Credit: https://www.pugetsound.edu/academics/academic-resources/slater-museum/biodiversity-resources/dragonflies/glossary/	
cercus (pl. cerci:)	Superior appendages; "Paired appendages at the tip of the abdomen."; part of the anal pyramid, on either side of the epiproct. Source Credit: https://bugguide.net/node/view/114114	
crenulations:	Pattern of "teeth" where the edges of mask-like labium meet, either smooth/rounded or rough/jagged. Crenulate refers to smaller, more even, perhaps tooth-like, projections (Gordh and Headrick)". Source Credit: https://bugguide.net/node/view/485257	See next page.

		
dorsal:	Refers to the upper side (back) of an exuvia Resource: https://bugguide.net/node/view/150117	
epiproct:	Superior caudal appendage; a single appendage projecting from the tenth abdominal segment, at the center of the anal pyramid.	
exuvia(e):	"Cast skin from any larval molt " Source Credit: https://www.pugetsound.edu/academics/academic-resources/slater-museum/biodiversity-resources/dragonflies/glossary/	
labium:	"Lower 'lip' of larva that is extended during prey capture" Source Credit: https://www.pugetsound.edu/academics/academic-resources/slater-museum/biodiversity-resources/dragonflies/glossary/ https://bugguide.net/node/view/111029	
nymph (pl. nymphs)/larva (pl. larvae):	"Immature stage of Odonata" Source Credit: https://www.pugetsound.edu/academics/academic-resources/slater-museum/biodiversity-resources/dragonflies/glossary/ Note that the term "larva (pl. larvae)" is used worldwide. "Nymph(s)" is the term preferred by some but not all Odonata experts in the USA.	

palpal lobe (s)	One of two lobes at the leading edge of the prementum for dragonfly families with a flat labium, one of two halves of the face mask for families with a scoop- or mask-like labium.	
paraproct(s):	Inferior appendages (lower pair) of the anal pyramid.	
prementum:	The labium (also called the mentum) is a two-segment hinged “jaw” that is used to grab food: the prementum is the segment of the labium closer to the mouth; the postmentum is the segment closer to the base of the head. Usually, only the prementum can be seen when looking at the ventral side of odonate exuviae. “The part of the insect labium lying in front of the mentum and bearing a pair of lobes” Source Credit: https://www.merriam-webster.com/dictionary/prementum.	
ventral	Refers to the underside (of an exuvia). Resource: https://bugguide.net/node/view/150121	
ventromedial groove:	Shallow groove running lengthwise along the middle of the ventral side of the prementum.	

Wisconsin Dragonfly Society (WDS) Membership Application

Membership in the WDS is open to any person in any state.

The WDS dues are as follows: $5 annual individual member; $15 annual individual sustaining member; $50 lifetime individual member; $150 lifetime individual sustaining membership; $7.50 annual family membership; $75 lifetime family membership.

Members must opt-in before WDS will share their e-mail address or other contact information with other members of WDS.

Send check or money order to:

Wisconsin Dragonfly Society

C/O Dan Jackson

S2256 County K Road

Chaseburg, WI 54621

Name _____

Address _____

City, State, Postal Code _____

E-mail _____ Share? _____

Check membership category that applies:

Single Member: $5

Sustaining Member: $15

Family Membership: $7.50

Lifetime Single Member: $50

Lifetime Sustaining Member: $150

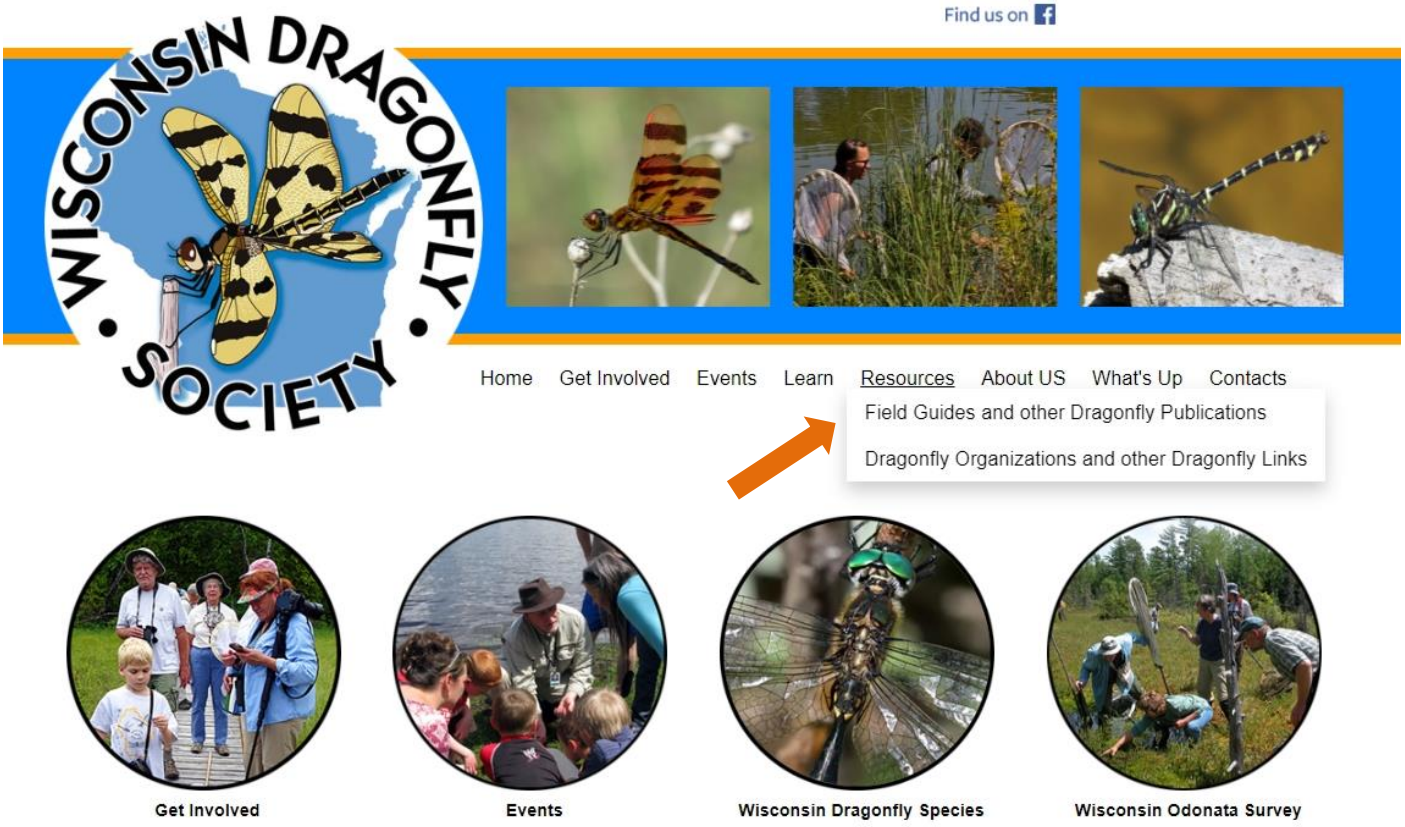
Lifetime Family Membership: $75.00

Total enclosed $ _____

For a downloadable version of this form, see http://widragonflysociety.org/pdf/MembershipApp.pdf

RESOURCES

Please visit the Wisconsin Dragonfly Society webpage for a list of resources and supplies at www.widragonflysociety.org



Field Guides

Color Guide to Common Dragonflies of Wisconsin

by Karl and Dorothy Legler

This new version has been expanded to include all WI species of dragonflies. It is available through the University of Wisconsin Arboretum Bookstore

Dragonflies of the Northwoods

by Kurt Mead

This is a great field guide for Wisconsin dragonflies. The third edition contains most of the species found in the state with very few species that are not found in Wisconsin. Its size also makes it very easy to carry in the field.

Damselflies of Minnesota, Wisconsin, and Michigan

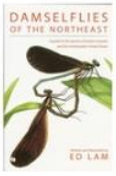
by Bob DuBois

Written by Bob DuBois, a founding member of the WDS, this is the most comprehensive guide for damselflies of Minnesota, Wisconsin and Michigan

Dragonflies and damselflies of the East

by Dennis Paulson

A great resource for identifying dragonflies, especially out of state specimens. Paulson's companion guide, Dragonflies and Damselflies of the West, is also a must have.



Damselflies of the Northeast

Ed Lam

Contains many of the damselfly species in Wisconsin. An excellent companion to Damselflies of the North Woods. Check out Bob Dubois notes on using tis book in Wisconsin -Here-

Dragonflies and Damselflies of Northeast Ohio

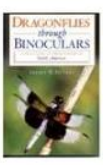
by Larry Rosche with Judy Semroc and Linda Gilbert

Although this book focuses on dragonflies of Northeast Ohio it contains most of the species found in Wisconsin, especially some of the states southern species that are not covered by the North Woods books.

Stokes Beginner's Guide to Dragonflies

by Blair Nikula, Jackie Sones, Donald and Lillian Stokes

A beginners guide, featuring many of the commonly found species of Wisconsin.



Dragonflies Through Binoculars: A Field Guide to Dragonflies of North America

by Sidney W. Dunkle

One of the first dragonfly field guides. A true pioneer.

Other Field Guides

- *Damselflies of Chicagoland: A Photo Field Guide, (PDF) version 2. Garrison, M. 2011. 135 pp.*
- *Waushara County Dragonflies and Damselflies. Tennessen, Ken. 2010. 32 pp. (available from the author: ktennessen@centurytel.net).*