Winter Ecology of Dragonflies and Damselflies in Wisconsin

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Photo by Ken Tennessen
Why focus on dragonflies? They’re exquisitely beautiful, lots of fun to watch or photograph, and they provide a great way for us to interact with the natural world.

Mostly, they’re interesting to learn about!
People of all ages enjoy the beauty and interesting behaviors of odonates.
I wonder in what fields today
he chases dragonflies in play,
my little boy who ran away.

translations of famous haiku by Chiyo
The world of a dragonflier is a pretty special place. These are some of the gifts I’ve received over the years when people saw something with a dragonfly motif and thought of me.
"Got him, Joe! It's something in the Vespula genus, all right—and ooooweeeee does he look mad!"
Lindsey  
Age 11

Collin  
Age 4

Kayla  
Age 6

One of my technicians – Age 21
First, let’s learn a bit about the adults

Four-spotted Skimmer (*Libellula quadrimaculata*)

Photo by Dave Hanson
How do dragonflies and damselflies differ?

- Damselfly bodies are more slender
- Damselflies eyes are well separated
- Dragonflies hold their wings perpendicular to the body at rest
Broad-winged Damselflies – Family Calopterygidae
They love rivers & streams!

American rubyspot
(*Hetaerina americana*)

Photo by Ken Tennessen
Darners – Family Aeshnidae
They are amazing fliers!

Canada Darner
(Aeshna canadensis)
Clubtails – Family Gomphidae

Many species inhabit Rivers

Zebra Clubtail

*(Stylurus scudderii)*
Skimmers – Family Libellulidae
Many are found in slow areas of rivers

Widow Skimmer (*Libellula luctuosa*)
Now the hard part - To understand their winter ecology, you need to know a bit about their biology and life history…

An aquatic nymph transforms into a flying adult
Parts of a Dragonfly

- stigmas
- nodus
- prothorax
- eyes
- face
- A
- tarsus
- tibia
- B
- femur
- abdominal segments
- 1, 2, 3, 4, 5, 6, 7, 8, 9, 10
- anal appendages
- C
Claspers

Secondary Genitalia

Male forcipate emerald
(Somatochlora forcipata)

Claspers
Mating Dragonflies “in wheel”
Autumn Meadowhawks (*Sympetrum vicinum*) in wheel

Photo by Bob DuBois
Stream Bluets (*Enallagma exsulans*) in wheel

Photo by Bob DuBois
Lyre-tipped spreadwings laying eggs into a plant stem – this allows overwintering as eggs

Photo by Mike Reese
Most Dragonflies & Damselflies in Wisconsin Overwinter as Nymphs

Ebony boghaunter
(Williamsonia fletcheri)
mature nymph
New adult Dragonhunter emerging from its exuvia

Shed nymphal exoskeleton is called an “exuvia”
Same species about 20 minutes later

Now called a “teneral”
Mature adult Dragonhunter (*Hagenius brevistylus*)
So, what does this life history information mean for odonates and our enjoyment of them during winter?
The opportunities are still out there, you just have to know how to take advantage of them!
Seriously though, little is known about the winter ecology of Odonata – Why do you suppose this is?
However, ice-free spring-fed streams can be sampled for nymphs during winter with relative safety.
Teneral -exuvia associations are very helpful in learning how to identify nymphs.
Rearing nymphs in aquaria during winter (collected in the autumn) can be very interesting and is a great way to learn about the nymph stage.
This group is searching for exuviae in a sheltered area where they will often persist for a long time, sometimes overwinter.
Ophiogomphus smithi exuviae found at least a month after they emerged
Take-Home Thoughts

- Odonata at our latitude spend winter either in a nymph (usually) or egg stage.

- Overwintering eggs hatch in spring in response to temperature and moisture cues.

- Overwintering nymphs may be in any of many instars depending on when (spring or summer) a species emerges.

- Nymphs are semi-active in winter and may feed, but likely don’t grow much or molt.

- Rearing nymphs during winter can be fun!
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Identification Helps

- **Field guides** (user-friendly; minimal equipment needed; affordable)
- **Keys** (harder to learn to use; more equipment needed; expensive)
- **Internet discussion groups and websites** (show your photos; ask questions)
- **Regional experts** (show photos; ask questions; send specimens)
All data sent to the Wisconsin Odonata Survey (WOS) is added to Website (many other states/provinces have similar programs)

http://inventory.wiatri.net/odonata

Or Google “Wisconsin Odonata Survey”
Welcome to Wisconsin Odonata Survey!
The goal of this survey is to gain more knowledge about the distributions and habitat requirements of our 160+ species of dragonflies and damselflies (Order Odonata). In order for the Wisconsin Department of Natural Resources (WDNR) to protect the natural resources of the state, we need to know what habitats are critical, especially for rarer species. A number of our species are either rare or of a special concern, or are federally listed as threatened or endangered. In addition, many habitats have not been well surveyed. Within the last 15 years, two species new to science have been found in the state.

Citizen volunteers are needed because there are far too many habitats to check for the few professionals who work with Odonata. For more information on how you can participate, please refer to The Odonata Survey.
Photo Credits

- John Arthur
- Loren Ayers
- Ryan Brady
- Glen Corbiere
- Erin Crain
- Dave Hanson
- Frank Koshere
- Mike Reese
- Ken Tennessen
Questions?