Presented By
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WARNING!

Watching dragonflies can become addicting!
So – What do I need to “get into” Dragonflies?

Southern Pygmy Clubtail, *Lanthus parvulus* (reared)
DRAGONFLIES AND DAMSELFILIES OF THE EAST

DENNIS PAULSON
Hello Ohio! *Sticky Post*
December 22, 2017 at 12:38pm by Malisa Springer

The Ohio Odonata Society is working with the Ohio Division of Wildlife to update the original survey that ran from 1991 – 2001. The new survey will run from 2017 through 2019 and culminate in a lay-person book on Ohio Dragonflies and Damselflies.

**Goals** for the second survey of Ohio dragonflies and damselflies include:

- to identify every species known for each county.
- to identify species introduced/established in Ohio since the original survey.
- to determine changes in distribution and abundance, especially rare species

To participate, you can either photograph or collect specimens. No identification skills are required for photo observations and we accept observations from any date. Just take a photo and submit it to iNaturalist. Check out our [Photo Collections](https://www.inaturalist.org) and [Physical Collections Protocols](https://www.inaturalist.org) for more information.

If you are interested in meeting up with excited naturalists, check out our [upcoming events](https://www.inaturalist.org).
First Tachopteryx, Katie & Chris Beatty. Cedar Bog. 7/3/13. RCG  PetaltailBeatty4622
Fig. 2.17 Homer F. Price (1895-1987) and his wife, Gladys, at home in 1963.

Source: Butterflies and Skippers of Ohio. 1992
Need to **KNOW**!

Odonata Natural History
10 abdominal segments
First Basic Note:

Dragonflies and Damselflies are truly

Ferocious Dragons of the Air

With Unquenchable Appetites!
Dragonflies are Predators – part of the Food Chain

Eastern Petaltail eating Giant Swallowtail
Cedar Bog Nature Preserve, June 10, 2002
Bob Glotzhober
Common Green Darner eating a Hummingbird.
Reported in Facebook, Sep 14, 2015 · Public · in Photos from Les Stewart's post in Dead Birds
Originally from Joseph Kennedy, Birds of Texas group; at Smith Point Hawk Watch Tower, Candy Abshier Wildlife Management Area, TX.
Photo by Darrell Ferriss, near Ardbeg which is close to Parry Sound in Ontario. He managed to pick up the pair and had great difficulty in getting the dragonfly to let go of the hummingbird, he gently separated the legs from the bird but the dragonfly was not for letting go with his mouth (or whatever dragonflies have). Once he finally got them separated the dragonfly flew away instantly however the hummingbird took a few minutes to get over the shock but did fly off in the end. Reported e-mail May 31, 2016.
Raptoral legs of *Dromogomphus spoliatus*, Flag-tailed Spineylegs
Common Green Darner (*Anax junius*)

eating fish.  John C. Abbott photo.
How much can a dragonfly larvae eat?

Two larval Black-tipped Darners (*Aeshna tuberculifera*), reared in captivity ate as follows:

1 reared 499 days = 1275 mosquito larvae & pupa

1 reared 492 days = 1480 mosquito larvae & pupa

*averaging 2.8 mosquitoes/day*

Mantis &
Yellow-sided Skimmer
Cympatophlebia longialata, female
Upper Jurassic, Solnhofen, Germany
photo by Dr. Xavier Martinez-Delclos
Dragonflies are *Tough*!

Wandering Gliders (*Pantala flavescens*) were the first insects to appear at Bikini Atoll after the end of the nuclear testing that took place there between 1946 and 1958.

Photo of Castle Bravo test, Bikini Atoll, on 1 March 1954
What is a Dragonfly?

Taxonomically:
Kingdom -- Animalia
   Phylum -- Arthropoda
      Class -- Insecta (Hexapoda)
         Order -- Odonata (“Odon” = Tooth)
What is a Dragonfly?

Taxonomically:

Kingdom -- Animalia
Phylum -- Arthropoda
Class -- Insecta (Hexapoda)
Order -- Odonata ("Odon" = Tooth)
Suborder -- Anisoptera - Dragonflies
Suborder -- Zygoptera - Damselflies
Spatterdock Darner, *Aeshna mutata*
Azure Bluet, Enallagma aspersum
Microstigma rotundataum
(OSU specimen)
"helicopter damselflies" family Pseudostigmatidae
Black-shouldered Spinylegs, *Dromogomphus spinosus*.
Eastern Forktail, *Ischnura verticalis*
Head of Azure Bluet
Southern Pygmy Clubtail, *Lanthus parvulus*. 
Family Gomphidae, The Clubtails
Beaverpond Baseketail
*Epitheca canis*
Bob Glotzhober
Double-striped Bluet, *Enallagma basidens*
Band-winged Meadowhawk, *Sympetrum semicinctum*

Photo at Cedar Bog, by Bob Glotzhober
Hine’s Emerald Dragonfly
Male patrolling territory.
By Glenn Corbiere
## Insect Flight

<table>
<thead>
<tr>
<th>Insect</th>
<th>Wingbeats/Sec</th>
<th>Speed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mosquitoes</td>
<td>600</td>
<td>&lt; 1 mph</td>
</tr>
<tr>
<td>Houseflies</td>
<td>200</td>
<td>4.3</td>
</tr>
<tr>
<td><strong>Damselflies</strong></td>
<td><strong>16</strong></td>
<td><strong>2 - 4.3</strong></td>
</tr>
<tr>
<td>Honeybees</td>
<td>225</td>
<td>4.3 - 6.5</td>
</tr>
<tr>
<td>Bumblebees</td>
<td>130</td>
<td>6.5</td>
</tr>
<tr>
<td>Butterflies</td>
<td>8 - 12</td>
<td>4.3 - 8.6</td>
</tr>
<tr>
<td><strong>Dragonflies</strong></td>
<td><strong>25 - 40</strong></td>
<td><strong>15 - 33</strong></td>
</tr>
</tbody>
</table>
The dragonfly's ancient design has modern aerodynamics aflutter.
Dorsal View of Male Anal Appendages in Lestidae

Lestes inaequalis

Lestes vigilax

L. unguiculatus

L. forcipatus

L. disjunctus

From: Dragonflies and Damselflies of Ohio, 2002. Ohio Biological Survey
Eggs of Clamp-tipped Emerald, 
Somatochlora tenebrosa
Fig. 21. Egg laying from the air: above, *Celithemis* pair (♂ and ♀) hitched together during oviposition; center, *Tramea* male unhitched between dips; below, *Pachydiplax* female ovipositing alone (sometimes led by male) and keeping to one low level.

*In: Needham, Westfall, and May. 2000*
*Aeshna constricta* female ovipositing in reed.
Redrawn by Walker, 1912 by Calvert
In: Needham, Westfall & May.
Tiger Spiketail =
Up to 370 thrusts/event

Adult Life = to 34 days

IF Ovoposit 2x/day/10 days
= 6,000 eggs

Arrowhead Spiketail – 6/7/2016 = 453 thrusts

Ovipositing Pacific Spiketail
(Cordulegaster dorsalis)

After Kennedy, 1917
In: Needham, Westfall, & May
Oviposition Records for other Dragonflies

Common Baskettail (*Epitheca cynosura*)
1,000 – 2,000 eggs per “basket”

Blue Dasher (*Pachydiplax longipennis*)
deposit 300 – 700 eggs in 35 seconds
American Rubyspot larva
Labium of Spiketail larva, by Andrew Boose
Twin-spotted Spiketail,
Cordulegaster maculata
Family Macromiidae, The River Cruisers

Frontal "Horn"

Note: long, spider-like legs & abdomen almost circular

Fig. 319. Macromia taeniolata.
Bromeliad Helicopter,
*Mecistogaster modesta*

Photo from Dennis Paulson & Dave Smallshire
“Canopy Tower Dragonflies & Damselflies”
Canopy Tower, Panama
www.canopytower.com
African Burrowing Gomphidae (Clubtails)

Shallow-Sand Burrower

*Paragomphus hageni*

Deep Burrower

*Lestinogomphus africanus*

Intermediate Depth Mud Burrower

*Lestinogomphus angustus*

*from* Biology of Dragonflies, Philip Corbet. 1962
Update:
Australian, *Petalura gigantea* – burrow up to 75cm = 30 in.
Per Ian Baird
Great Spreadwing, *Archilestes grandis*
by Dave McShaffrey
Timing of Larval Odonate Development

“Average larval time period” = 1 Year

“...there seems to be one brood a year in most temperate zone species; ”

(Intro statement on subject in Needham, Westfall, and May 2000. Widely assumed to be the standard.)
Rapid Development: Larval Span

50 Days  Wandering Glider,  
         *Pantala flavescens*

59 Days  Eastern Pondhawk,  
         *Erythemis simplicicollis*

78 Days  Eastern Forktail,  
         *Ischnura verticalis*
Trivoltine: 3 Generations/Year  Wandering Glider, *Pantala flavescens*  
(in tropical India)

Bivoltine: 2 Generations/Year  Blue Dasher, *Pachydiplax longipennis*  
Eastern Pondhawk, *Erythemis simplicicollis*  
Eastern Forktail, *Ischnura verticalis*

Univoltine: 1 generation/Year  Blue Dasher  
Many others
Semivoltine: 1 Generation/2+Years

2 Years = Blue Dasher ("Plastic")

3-4 Years = Tiger Spiketail,  
*Cordulegaster erronea*

3 Years = Hine’s Emerald,  
*Somatochlora hineana*

10 Years = Nepal’s Spiketail,  
*Anatogaster nipalensis*
Shadow Darner,
*Aeshna umbrosa*
Arrowhead Spiketail
Emerging adult
With exuvia

5/22/2018

Total Odes: NA = 800 species = 70% known (560 known; 240 unknown)
SA = 1400 species = 28% known (392 known; 1008 unknown)
Tiger Spiketail, *Cordulegaster erronea*
Photo by William Hull
Tiger Spiketail, Clark Shiffer

2.5 to 3 inches long
1990 = 3 Known Records – Hocking/Fairfield County boarder area
1995 = State Endangered
2002 = Species of Concern
Primary Headwater Streams

- Depth $\frac{1}{2}$ inch to 2 or 3 inches
- Width variable – often 6 inches
- Sand substrate (~muck)
- Forested – heavy shade
- Typically upstream of any fish
Northwest Hollow Seep, Crane Hollow Nature Preserve, Hocking County, Ohio
2011 Map of Known Tiger Spiketails in Ohio
18 Counties; 4 New since 2007
Hine’s Emerald Dragonfly
Somatochlora hineana
Known Locations for the Hine’s Emerald Dragonfly

- Extant populations
- Historic sites
- Single specimen collected
- Potential survey area
Can you see the rivulet?
Laureen Pintor, showing rivulets at a Wisconsin HED site.
Dwight at Ackland Road Fen, Michigan’s UP
HED Search Sites in 2007

2007 = 74 sites

* Historic Sites
HED Survey 2007 & 2008

2007 = 74 sites
2008 = 18 sites
Total Sites = 92
1. Cedar Bog N. P.
2. Gallagher Fen N. P.
3. Ankeney Fen (pri.)
4. Rick Nelson Fen (pri.)
5. Oak Openings M.P.
6. OOMP, Kathy’s Bathtub
7. Liberty Pk, North Ledges
8. Liberty Pk, South Ledges
Status of Ohio Odonata Species
(164 total species)

- Common: 65 species
- Abundant: 14 species
- Uncommon: 62 species
- Infrequent: 23 species

Abundant > 1000
Common > 100
Uncommon < 100
Infrequent < 10

E = 16
T = 6
SC = 1

167 species 168?
Swamp Darner, *Epiaeschna heros*
Fig. 1 Micro-transmitter and attachment. a Micro-transmitter. b Transmitter attachment method. c Female *C. erronea* with transmitter attached. d Male *C. erronea* with transmitter attached.
Epiophlebia superstes
Suborder: Anisozygoptera
Family: Epiophlebiidae

- Endemic to mountainous areas of Japan
- E. laidlawi in Nepal & nearby regions

“Crawling of Epiophlebia superstes larvae on the snow.”
Family Libellulidae, Pond Skimmers

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