

# Dragonflies 101:



What Every Good  
Dragonhunter Should Know!

Presented By  
**Bob Glotzhober**  
Curator Emeritus,  
Natural History,  
*Ohio*  
*History*  
*Connection*

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# ***WARNING!***

*Watching dragonflies can become addicting!*



**White-faced Meadowhawk. Irwin Prairie NP. 22June12. RCG. MeadowhawkWtFace2119A**





Cheryl Erwin







*So – What do I need to  
“get into” Dragonflies?*



Southern Pygmy Clubtail, *Lanthus parvulus*  
(reared)



**Dragonflies and  
Damselflies** of Northeast Ohio  
Second Edition

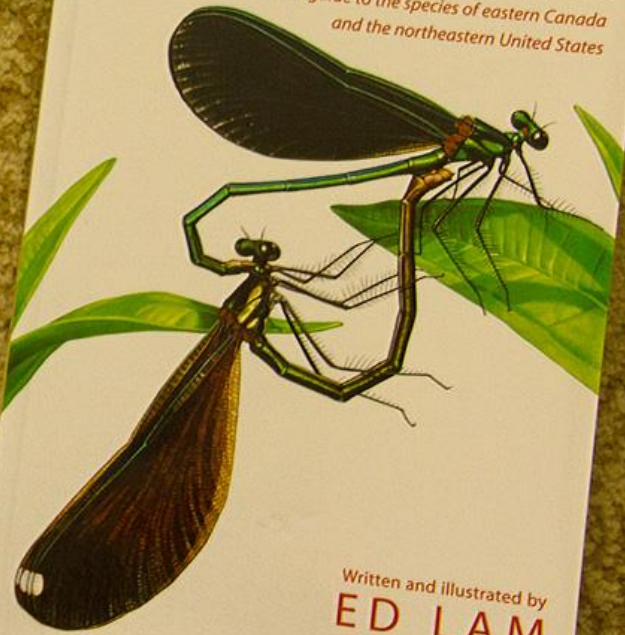


Larry Rosche  
Judy Semroc  
Linda Gilbert  
with illustrations by  
Jennifer Brumfield



**DAMSELFLIES  
OF THE NORTHEAST**

*A guide to the species of eastern Canada  
and the northeastern United States*



Written and illustrated by  
**ED LAM**



PRINCETON FIELD GUIDES

DRAGONFLIES  
AND DAMSELFLIES  
OF THE EAST

DENNIS PAULSON





DRAGONFLIES  
OF  
NORTH AMERICA



JAMES G. NEEDHAM  
MINTER J. WESTFALL, JR.  
MICHAEL L. MAY

The Dragonflies and Damselflies  
of Ohio



Edited by

Robert C. Glotzhober and David McShaffrey

Ohio Biological Survey



# Google “Ohio Dragonfly Survey” or <https://u.osu.edu/ohioodonatasurvey/>

Log In Ohio Dragonfly Survey | X

https://u.osu.edu/ohioodonatasurvey/

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## OHIO DRAGONFLY SURVEY

Check here for updates from the Ohio Dragonfly Survey

THE OHIO STATE UNIVERSITY

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SPECIES DISTRIBUTIONS ACROSS OHIO ▶

OHIO ODONATA

### Hello Ohio! \*Sticky Post\*

December 22, 2017 at 12:38pm by [MaLisa Spring](#)

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](#) and [Physical Collections Protocols](#) for more information.

If you are interested in meeting up with excited naturalists, check out [our upcoming events post](#).

Type here to search

9:25 AM 6/4/2018









**First Tachopteryx, Katie & Chris Beatty. Cedar Bog. 7/3/13. RCG PetaltailBeatty4622**







**2933 records..  
1921 – 1968**



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*

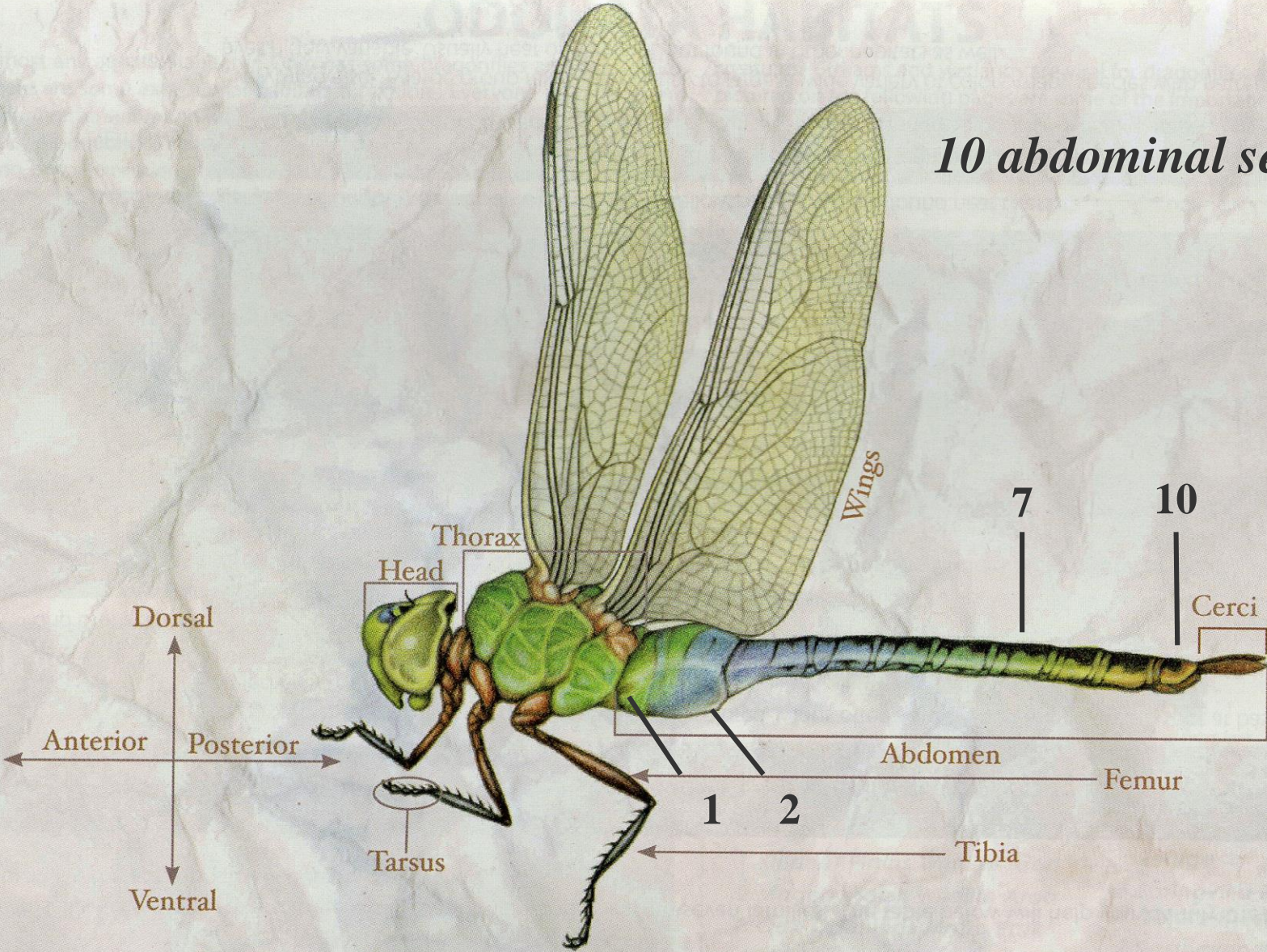


Illustration 1 DRAGONFLY: TRACY L. GREENWALT



**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





**Gray Petaltail eating 2nd male. Cedar Bog, May 31,2014, by Joe Bens. PetaltailJoeBens**





**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.





### **Dragonhunter Eating Hummingbird**

**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..**





Raptorial 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 at follows:

1 reared 499 days = 1275 mosquito larvae & pupa

1 reared 492 days = 1480 mosquito larvae & pupa

*Averaging 2.8 mosquitoes/ day*

Lincoln, Elsie. 1940. Growth in *Aeshna tuberculifera* (Odonata). Proc. Am. Phil. Soc. 83:589-605

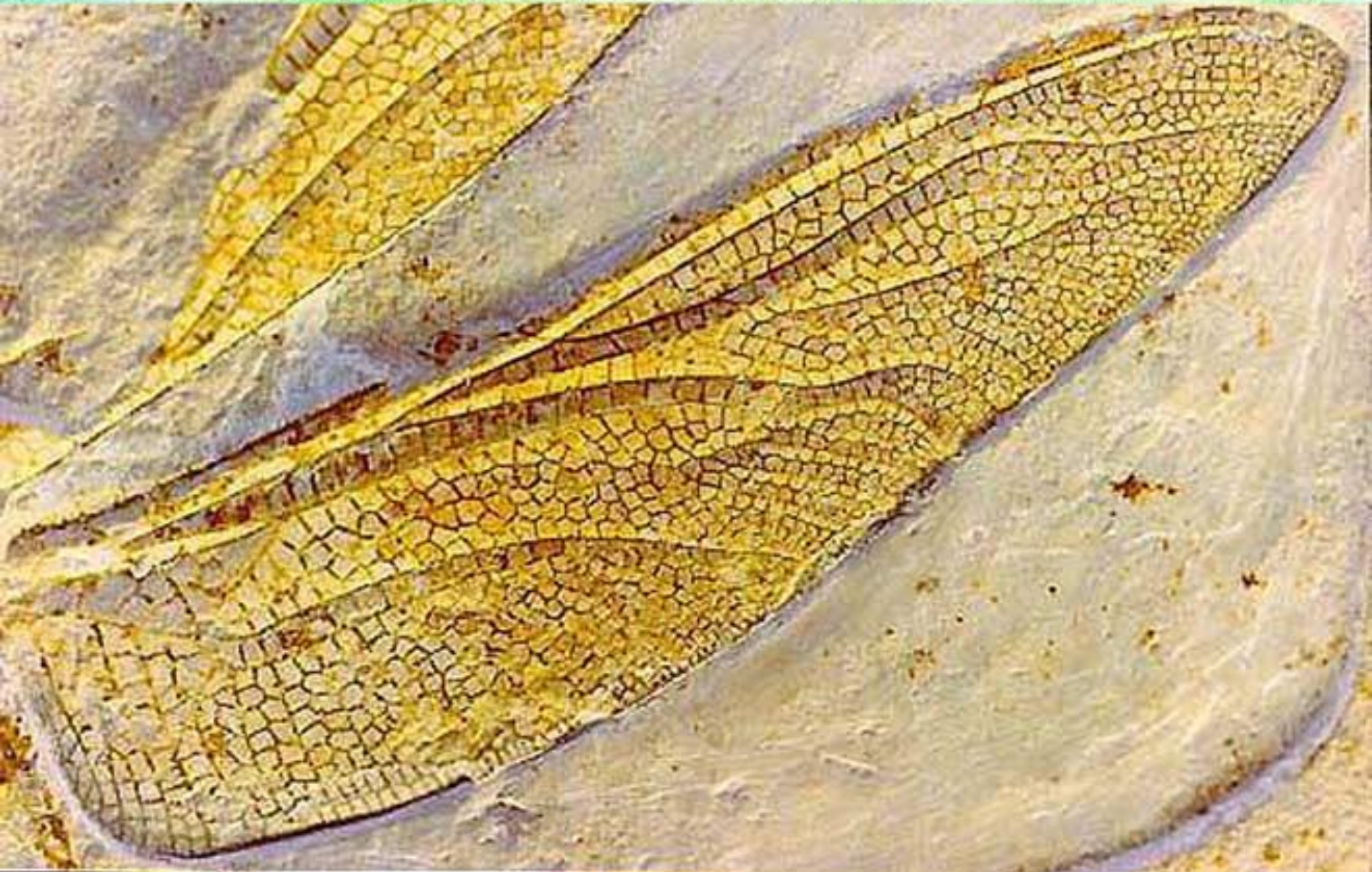


**Mantis &  
Yellow-sided Skimmer**





*Cympatophlebia longialata*, female  
Upper Jurassic, Solnhofen, Germany  
photo by Dr. Xavier Martinez-Delclos







**From: *The Insects*, by Peter Farb  
1962. Life Nature Library**



# 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)



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Order -- **Odonata** (“Odon” = Tooth)

Suborder -- **Anisoptera** - Dragonflies

Suborder -- **Zygoptera** - Damselflies





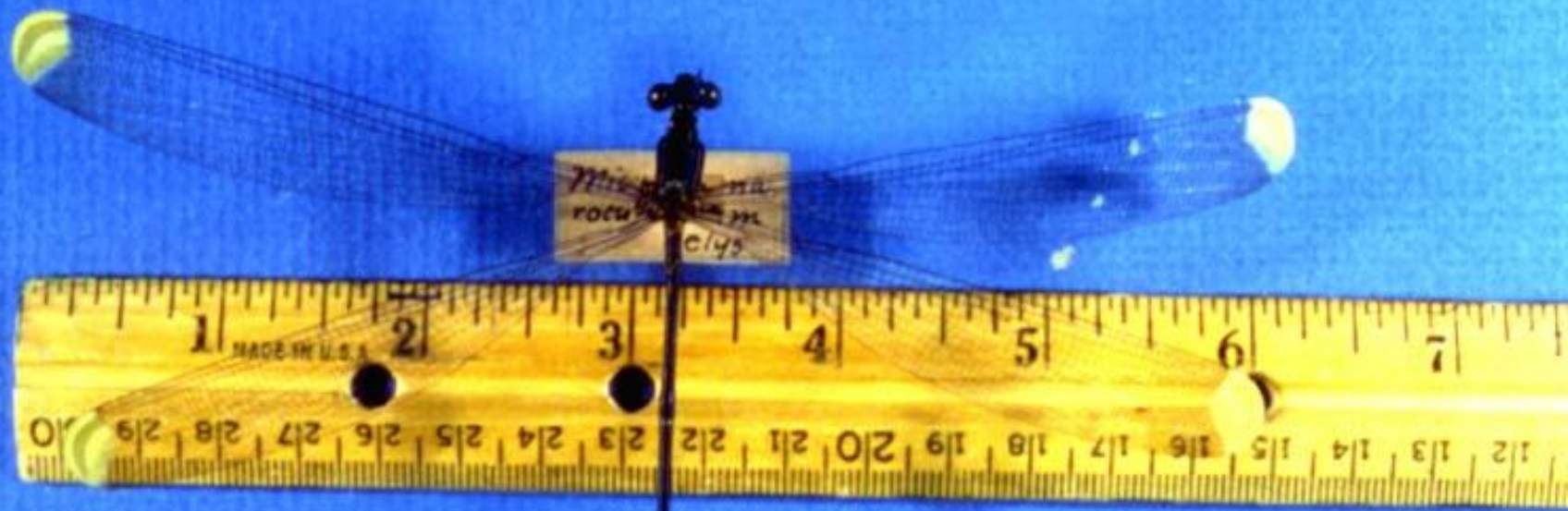
**Spatterdock Darner, *Aeshna mutata***





**Azure Bluet, *Enallagma aspersum***





*Microstigma rotundataum*

(OSU specimen)

"helicopter damselflies" family Pseudostigmatidae





**Elfin Skimmer male. Cedar Bog 7/11/13 RCG. ElfinSkimmer4692a**





**Black-shouldered Spinylegs, *Dromogomphus spinosus*.**





Eastern Forktail, *Ischnura verticalis*





**Head of Azure Bluet**





**Southern Pygmy Clubtail, *Lanthus parvulus*.**



# Family Gomphidae, The Clubtails



McShaffrey



**Beaverpond Baseketail**

*Epitheca canis*

**Bob Glotzhober**











**Double-striped Bluet, *Enallagma basidens***



*Columbus Dispatch photo*





# Band-winged Meadowhawk, *Sympetrum semicinctum*

Photo at Cedar Bog, by Bob Glotzhober







© 2005 Glenn Corbiere

**Hine's Emerald Dragonfly**  
Male patrolling territory.  
By Glenn Corbiere



# Insect Flight

<b>Insect</b>	<b>Wingbeats/Sec</b>	<b>Speed</b>
<b>Mosquitoes</b>	<b>600</b>	<b>&lt; 1 mph</b>
<b>Houseflies</b>	<b>200</b>	<b>4.3</b>
<i><b>Damselflies</b></i>	<i><b>16</b></i>	<i><b>2 - 4.3</b></i>
<b>Honeybees</b>	<b>225</b>	<b>4.3 - 6.5</b>
<b>Bumblebees</b>	<b>130</b>	<b>6.5</b>
<b>Butterflies</b>	<b>8 - 12</b>	<b>4.3 - 8.6</b>
<i><b>Dragonflies</b></i>	<i><b>25 - 40</b></i>	<i><b>15 - 33</b></i>

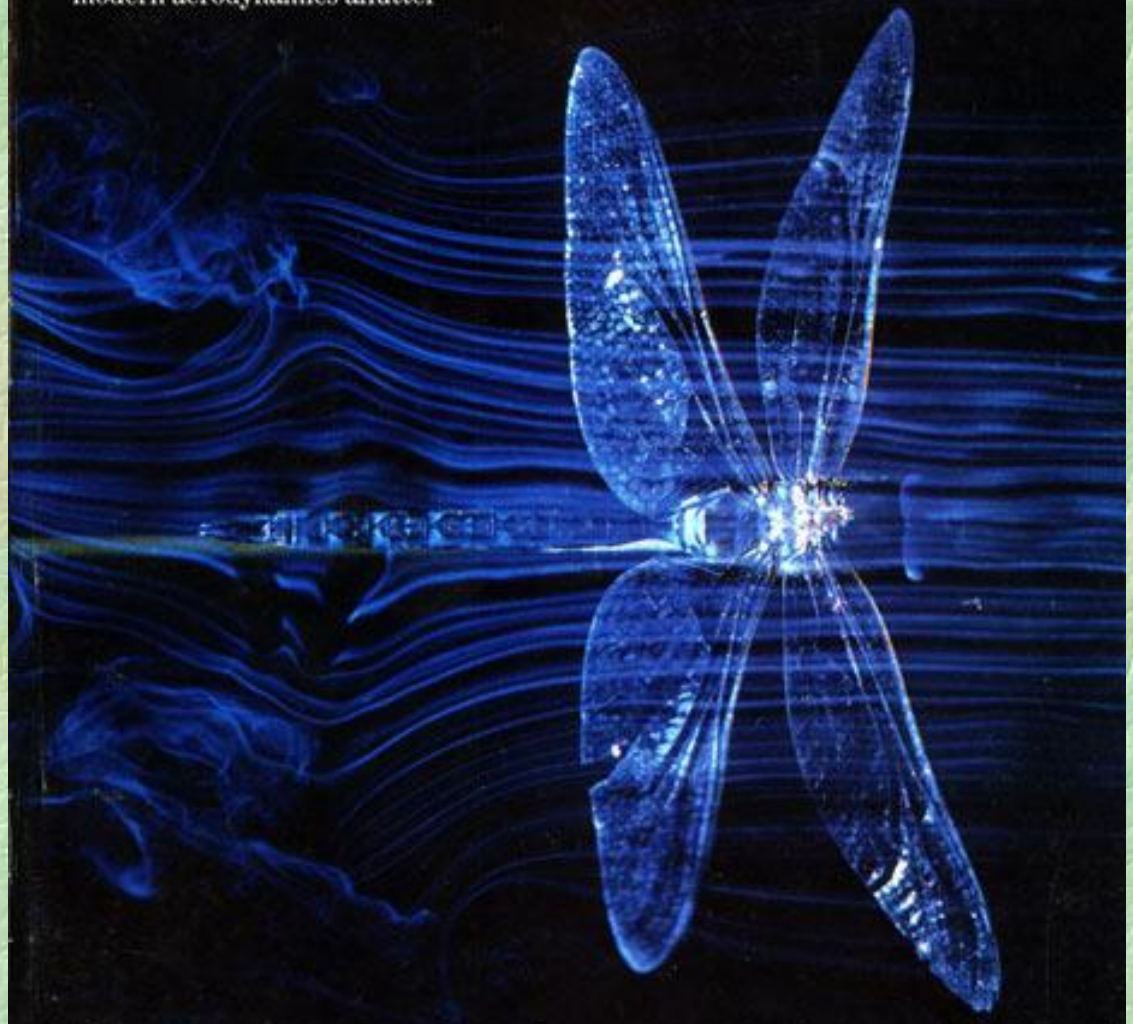


October/November 1986

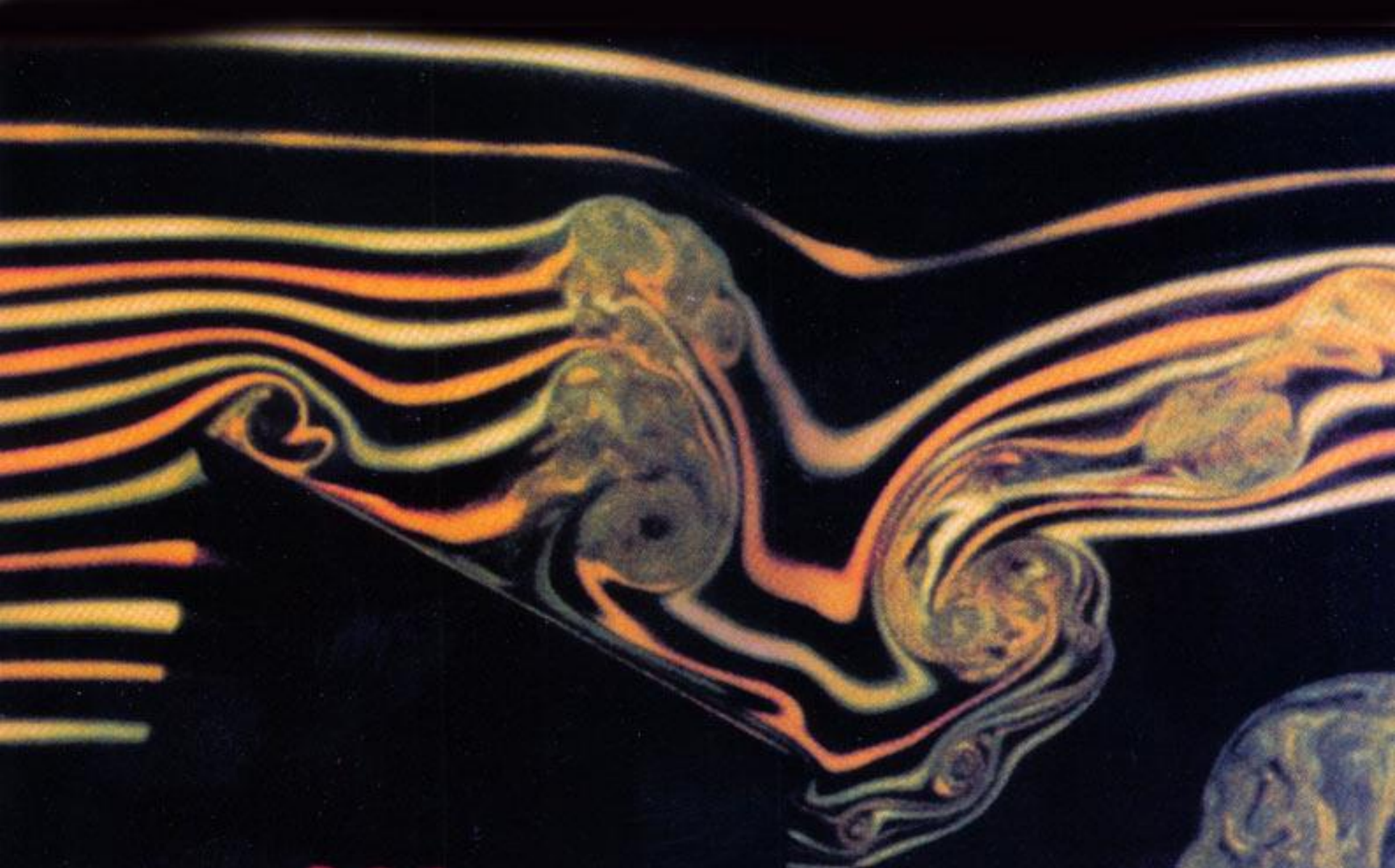
# AIR & SPACE

Smithsonian

The dragonfly's ancient design has  
modern aerodynamics aflutter







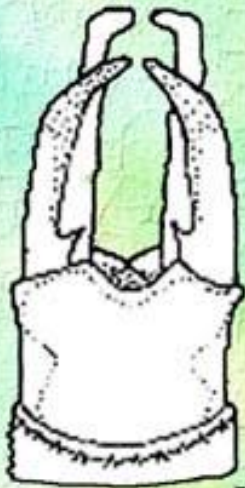
• 296

58 22 22





## Dorsal View of Male Anal Appendages in Lestidae



*Lestes inaequalis*

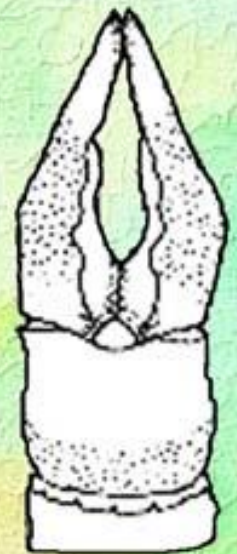
*L. unguiculatus*



*L. forcipatus*



*Lestes vigilax*



*L. disjunctus*



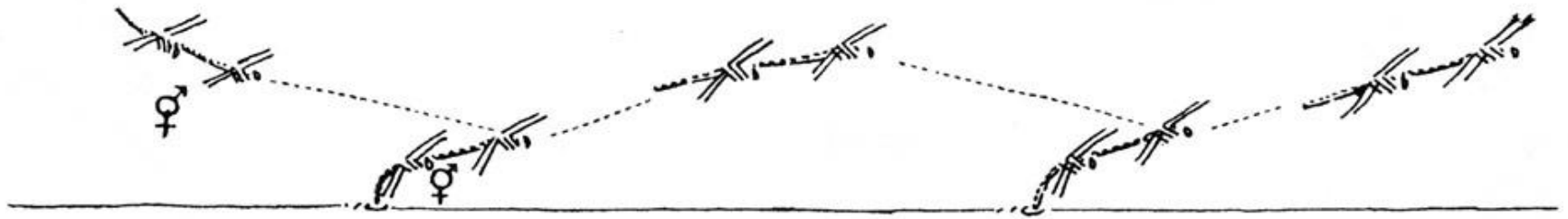
From: *Dragonflies and Damselflies of Ohio*, 2002. Ohio Biological Survey



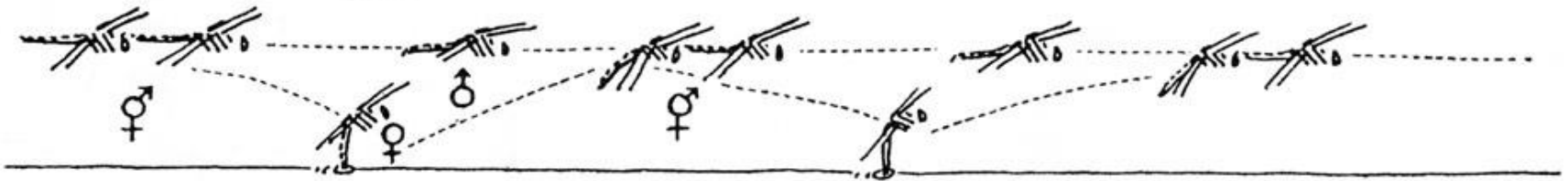


Eggs of Clamp-tipped Emerald,  
*Somatochlora tenebrosa*





Celithemis  
= Pennants



Tramea  
= Saddlebags



Pachydiplax  
= Blue Dasher

Fig. 21. Egg laying from the air: above, *Celithemis* pair ( $\delta$  and  $\text{♀}$ ) 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.





**Ovipositing  
Pacific Spiketail  
(*Cordulegaster dorsalis*)**

After Kennedy, 1917  
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**







Chad Edgar 7/3/07



## **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**





**Larva of Tiger Spiketail**



**Labium of Spiketail larva, by Andrew Boose**











**Twin-spotted Spiketail,**  
*Cordulegaster maculata*







# Family Macromiidae, The River Cruisers

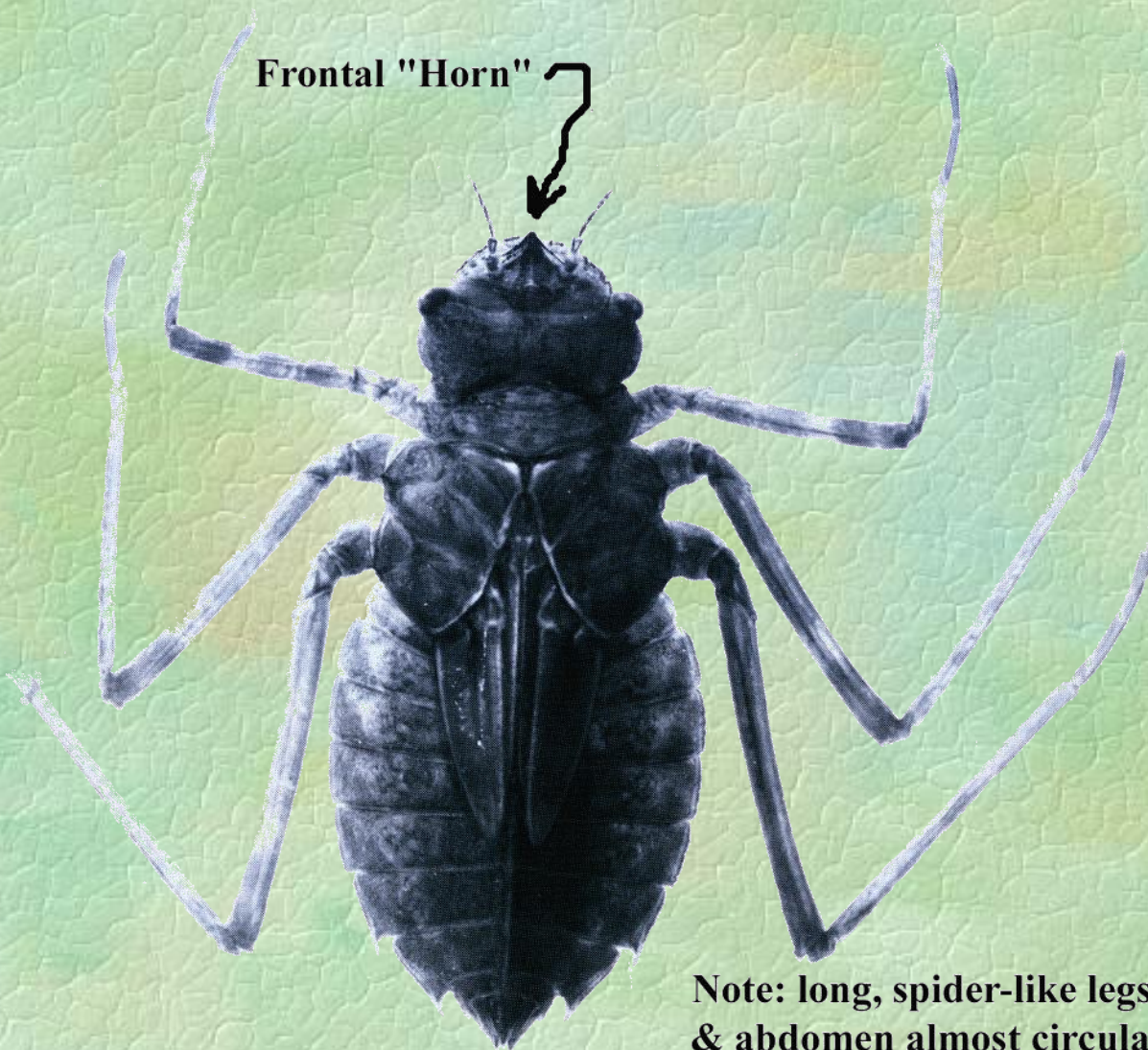


Fig. 319. *Macromia taeniolata*.



**Bromeliad Helicopter,  
*Mecistogaster modesta***



Photo from Dennis Paulson & Dave Smallshire  
“*Canopy Tower Dragonflies & Damselflies*”  
Canopy Tower, Panama  
[www.canopytower.com](http://www.canopytower.com)

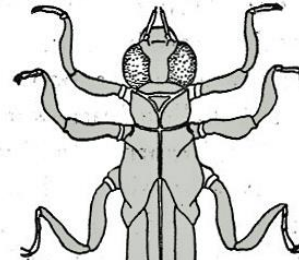
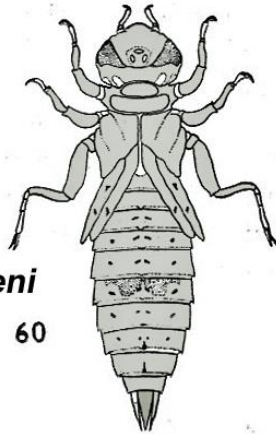


# African Burrowing Gomphidae (Clubtails)

## Shallow-Sand Burrower

*Paragomphus hageni*

60



61

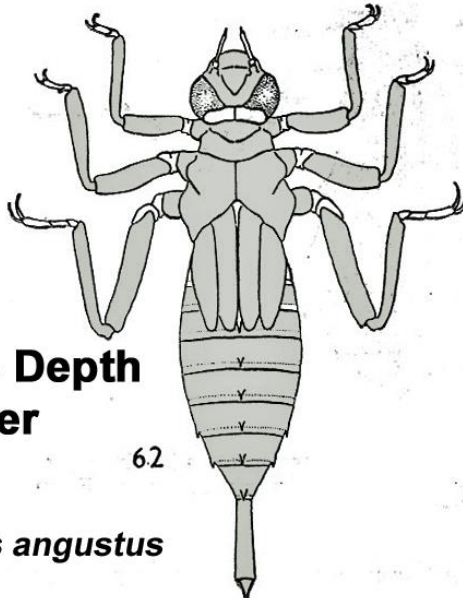
## Deep Burrower

*Lestinogomphus africanus*

## Intermediate Depth Mud Burrower

*Lestinogomphus angustus*

62



from  
*Biology of Dragonflies,*  
Philip Corbet. 1962

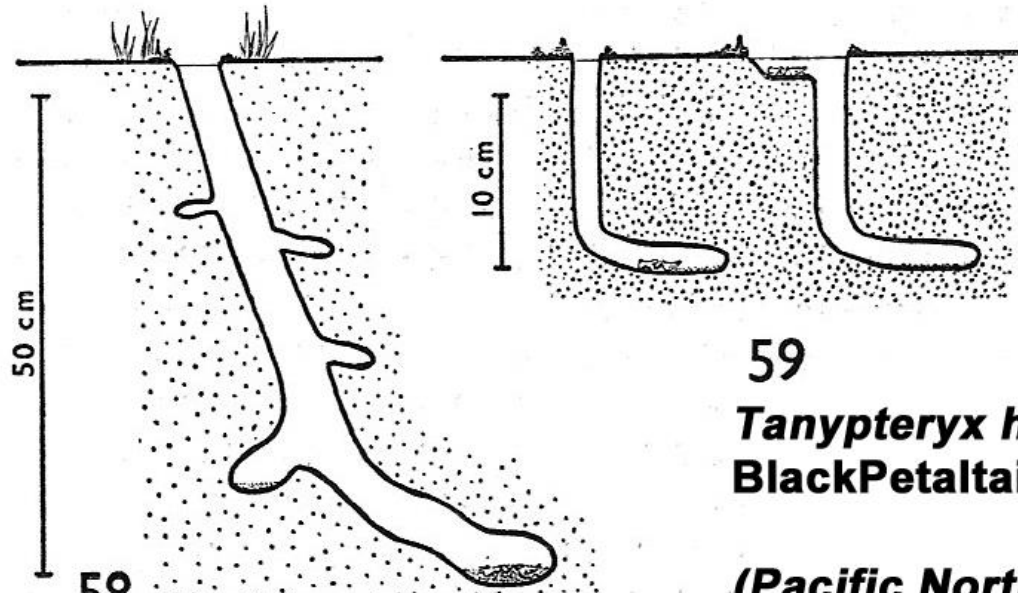




**Larva, Eastern Petaltail. July 2011. RCG PetaltailLarva9844cr2**



# Deep Burrows of Family Petaluridae (Petaltails)



58  
*Uropetala carovei*,  
Bush Giant Dragonfly

(New Zealand)

59  
*Tanypteryx hageni*,  
BlackPetalTail

(Pacific Northwest  
N. Ca to S. British Col.)

*A 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**





**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*



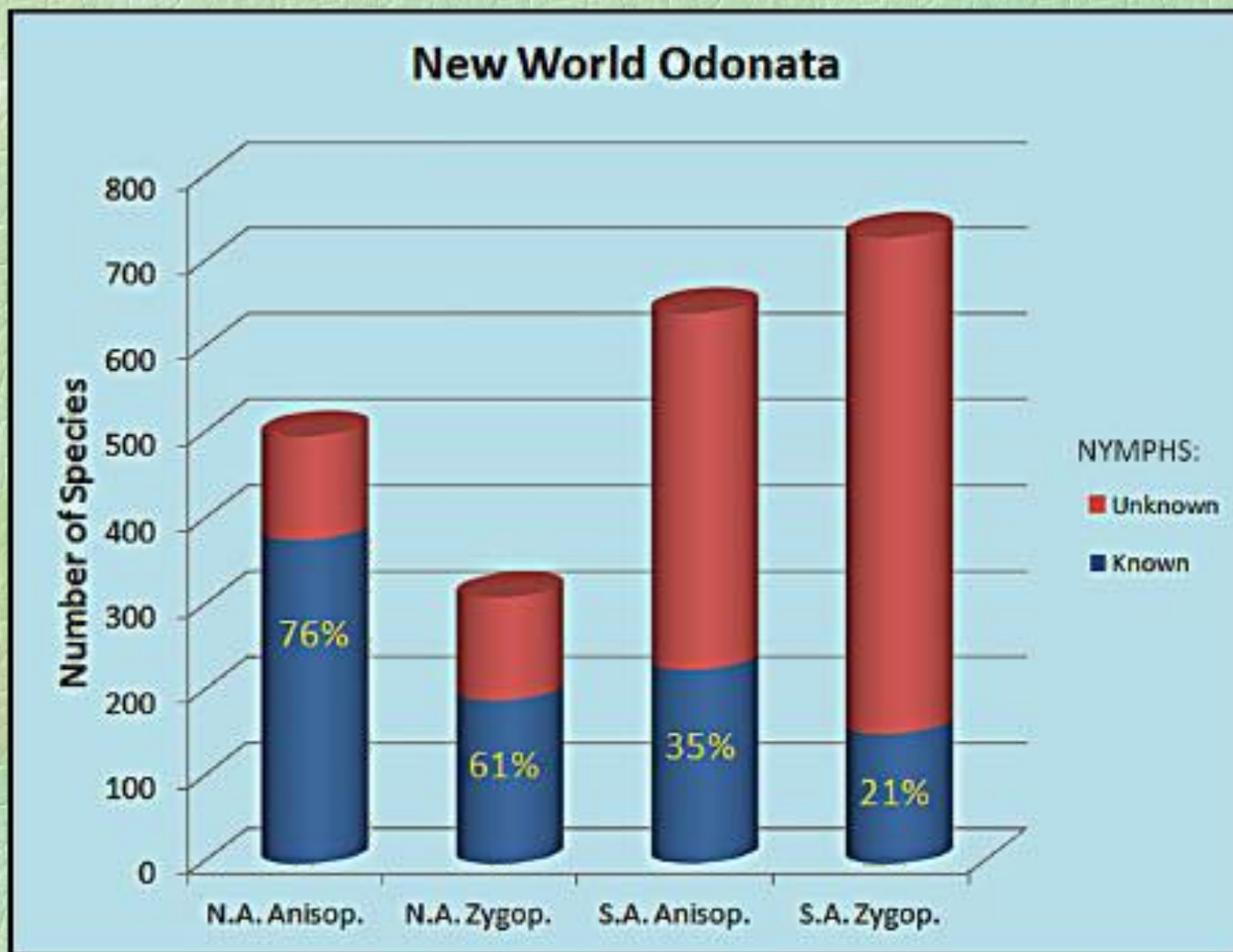


Figure 1. Number of species of Odonata and the percentages of nymphs known in North and South America

**Ken Tennessen. 2011. Argia 23 (4): 22-24**

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





# Patrolling male Tiger Spiketail

Stebbins Gulch, by Chad Edgar, 25 July 2007





**Hine's Emerald Dragonfly**  
*Somatochlora hineana*

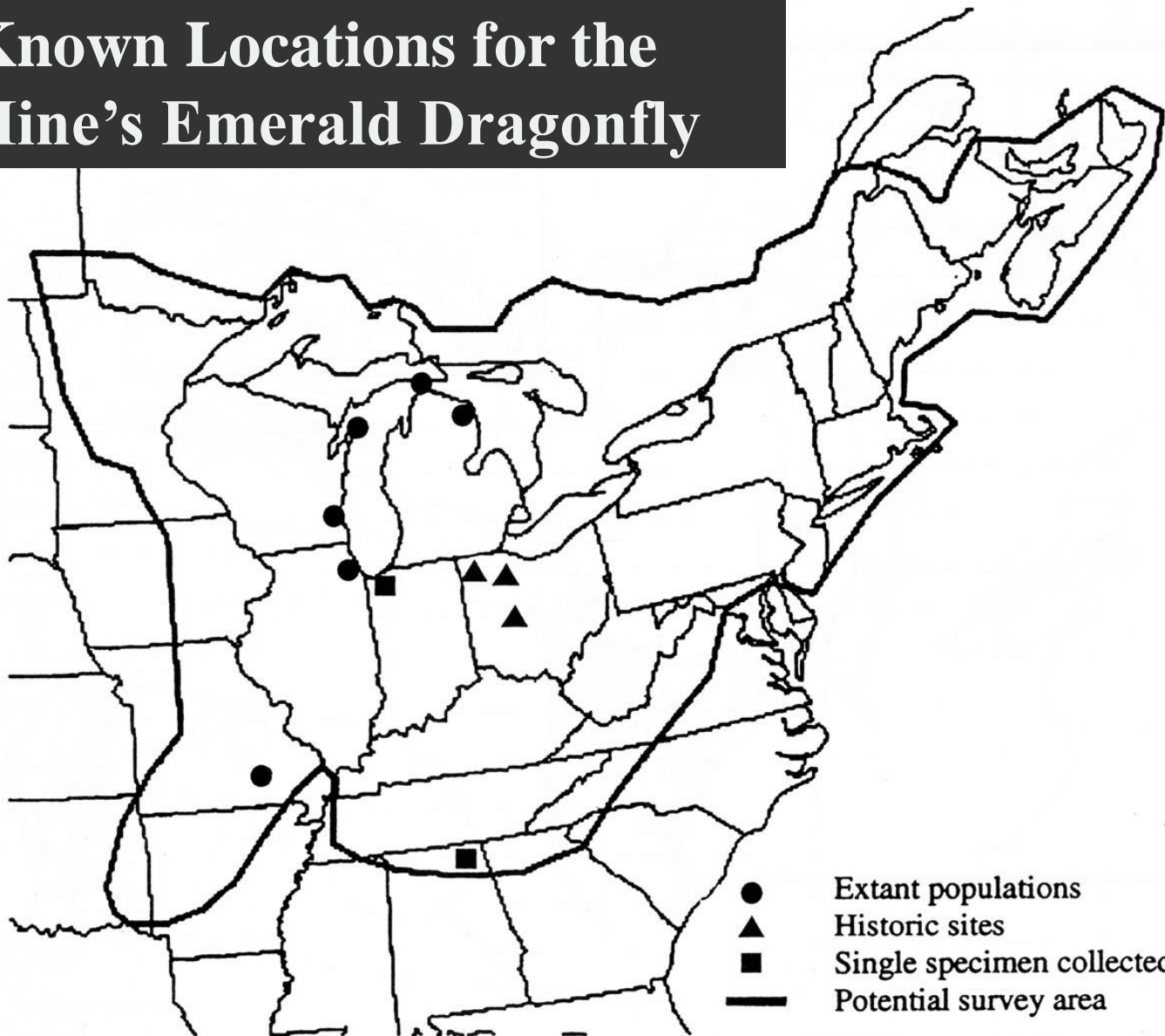








# Known Locations for the Hine's Emerald Dragonfly







*Can you see the rivulet?*



**Lauren Pintor, showing rivulet at a Wisconsin HED site**





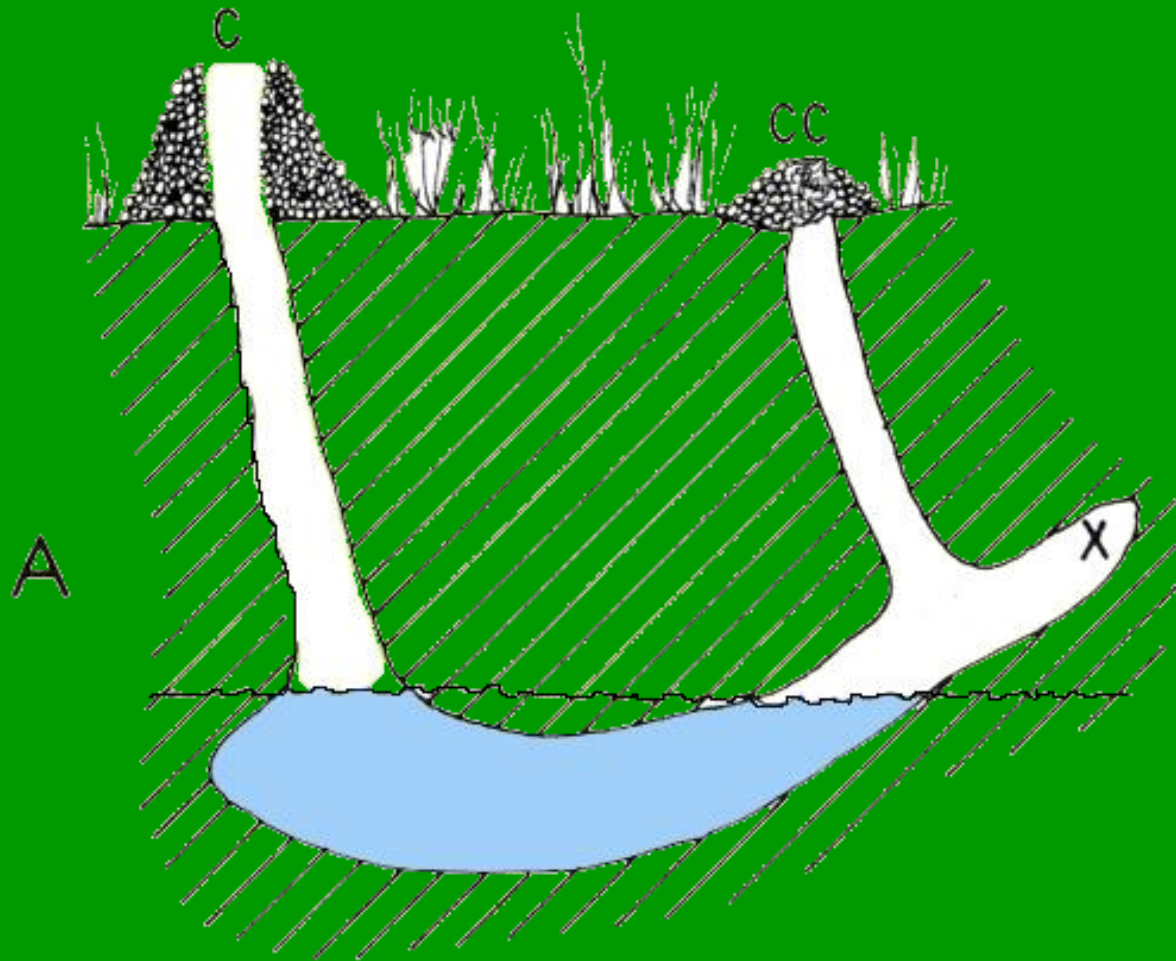
## Dwight at Ackland Road Fen, Michigan's UP





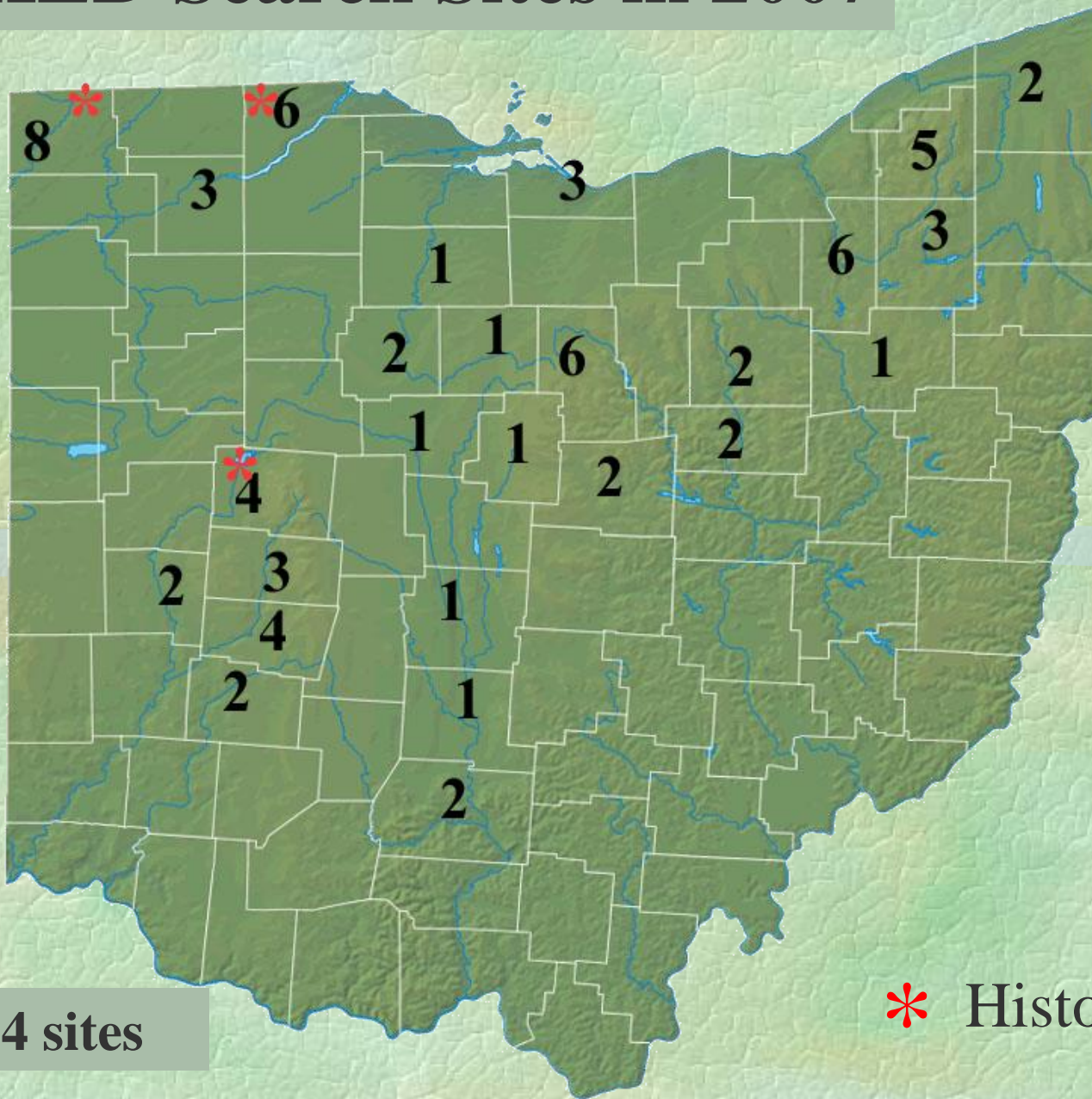








# HED Search Sites in 2007



2007 = 74 sites

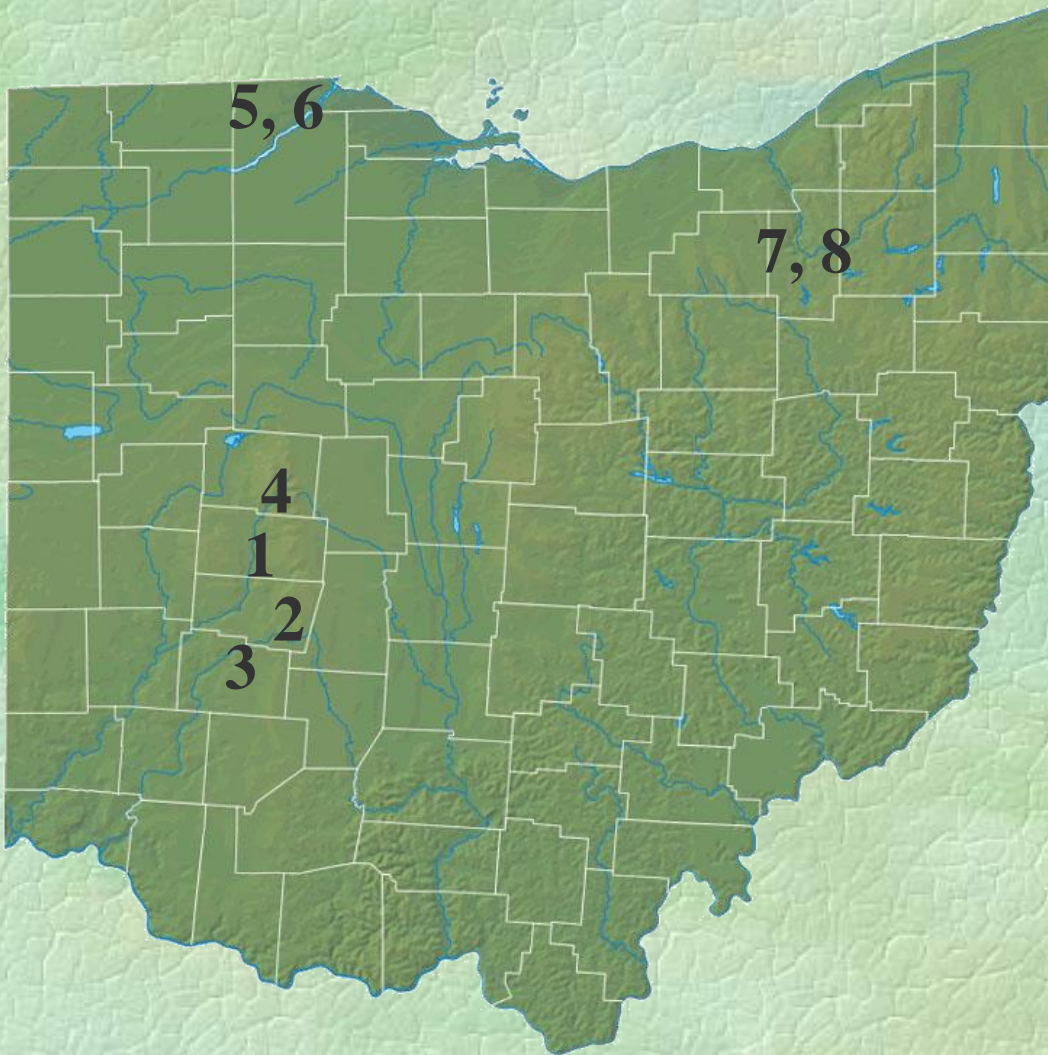
\* Historic Sites







# Watch Sites



- 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)

~~167~~ species *168?*

**Common**  
*65 species*

*E = 16*

*T = 6*

*SC = 1*

**Abundant** -- *14 species*

**Infrequent**  
*23 species*

**Uncommon**  
*62 species*

*Abundant > 1000*

*Common > 100*

*Uncommon < 100*

*Infrequent < 10*





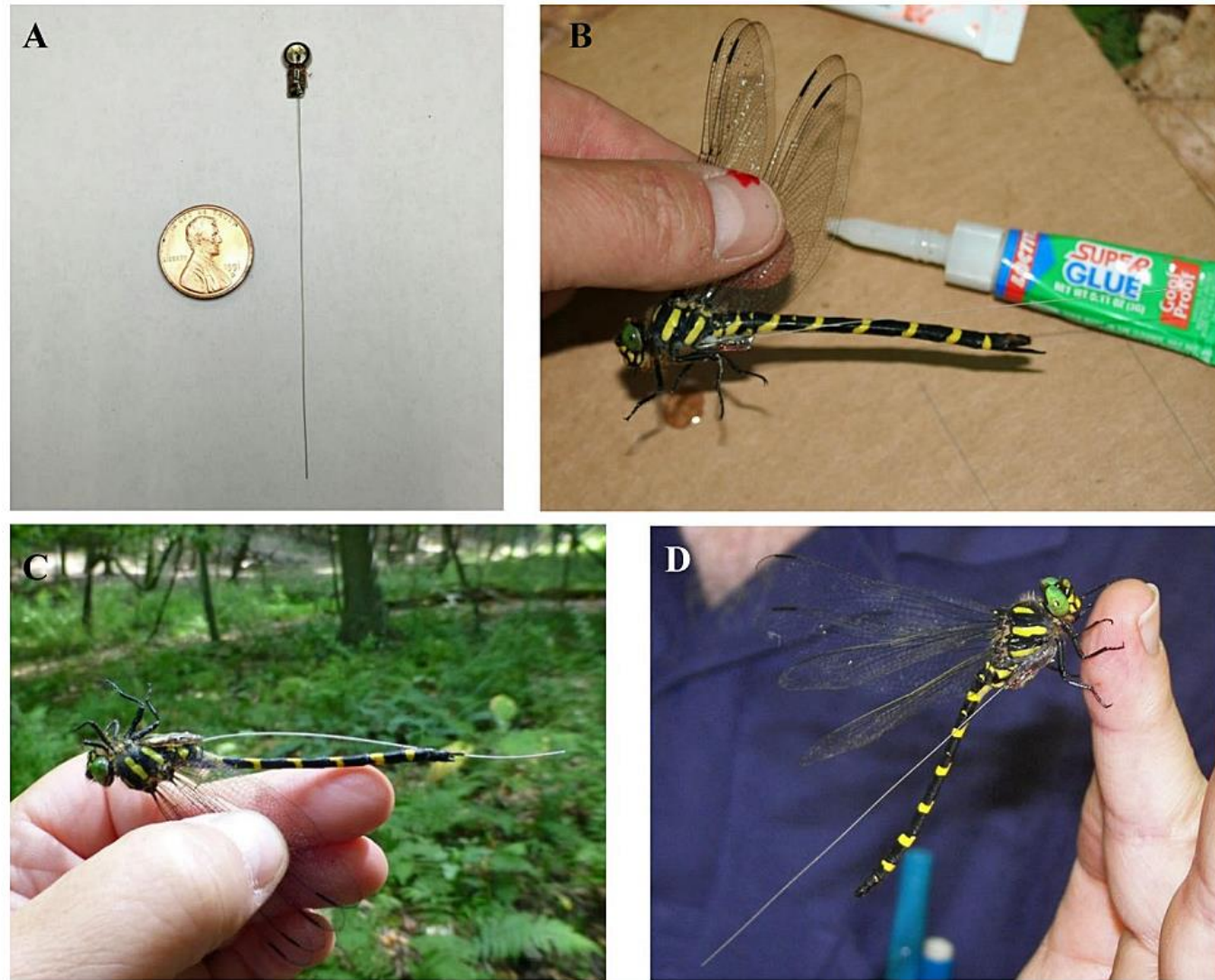
**Swamp Darner, *Epiaeschna heros***



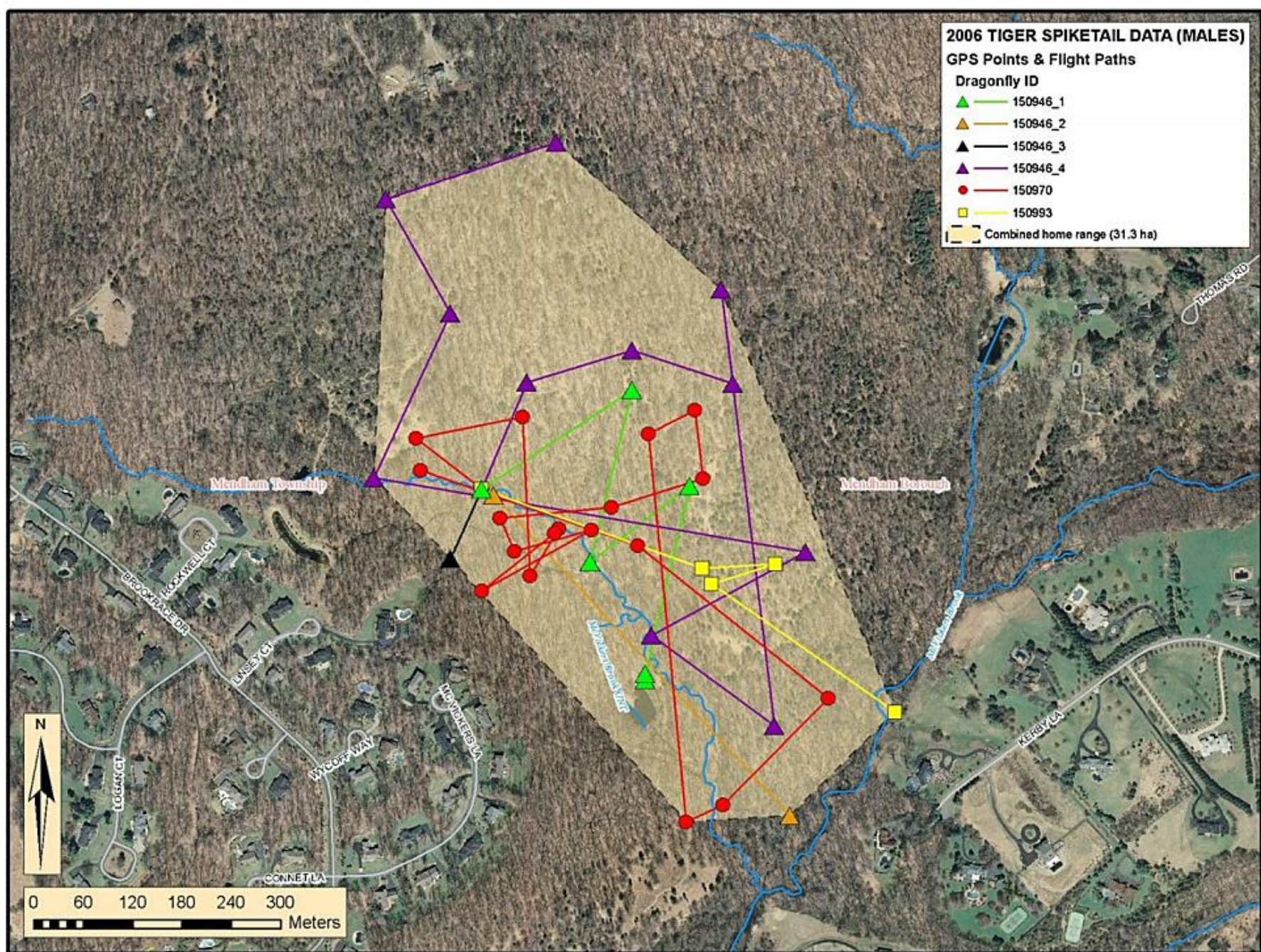




**Fig. 1** Micro-transmitter and attachment. **a** Micro-transmitter. **b** Transmitter attachment method. **c** Female *C. erronea* with transmitter attached. **d** Male *C. erronea* with transmitter attached





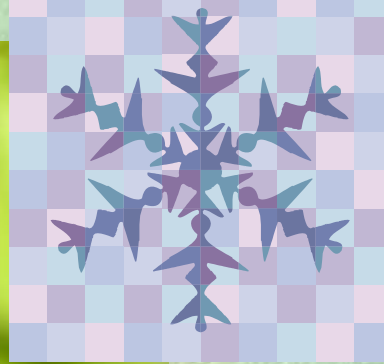


David Moskowitz & Michael May. 2017. Tiger Spiketail Radio-telemetry.

J. Insect Conservation, 21: 885-895

F:\pub\TIGER\11\GIS\Odenotes\_CM\_2015\_Table\Figures\Dragonfly\_male\_flight\_paths\_MCP.mxd





**Digest of Japanese Odonatological  
Short Communications  
January, 2007.  
By Kazunobu Kano  
& Toshihiro Miyahata**

## ***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**



**Widow Skimmer, *Libellula luctuosa*. Male.**



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