

# There's Tigers In Them-Thar Hills!



*Tiger Spiketails, that is.*

**Bob Glotzhober**

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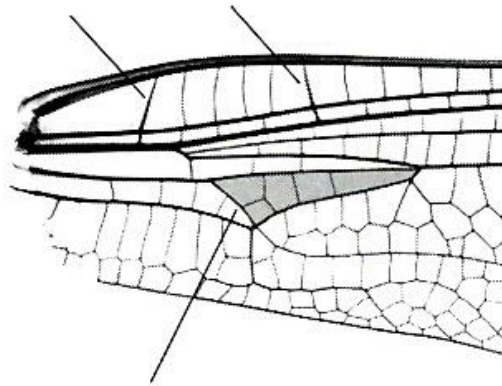
# 1. What is a Spiketail?



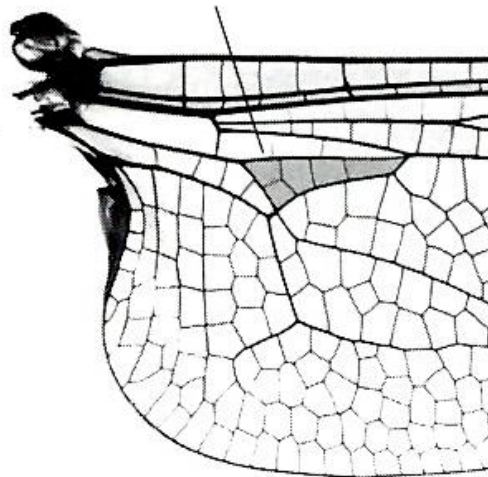
1. A dragonfly with clear wings.

## 2. The triangle in both the forewing and the hindwing have a similar shape

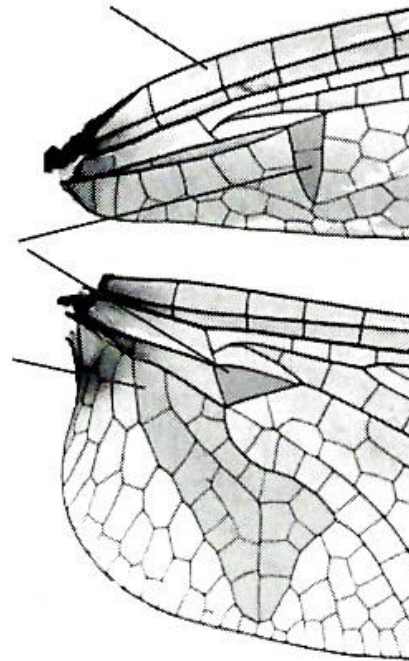
*(Triangles are shown unnaturally shaded)*



7-5



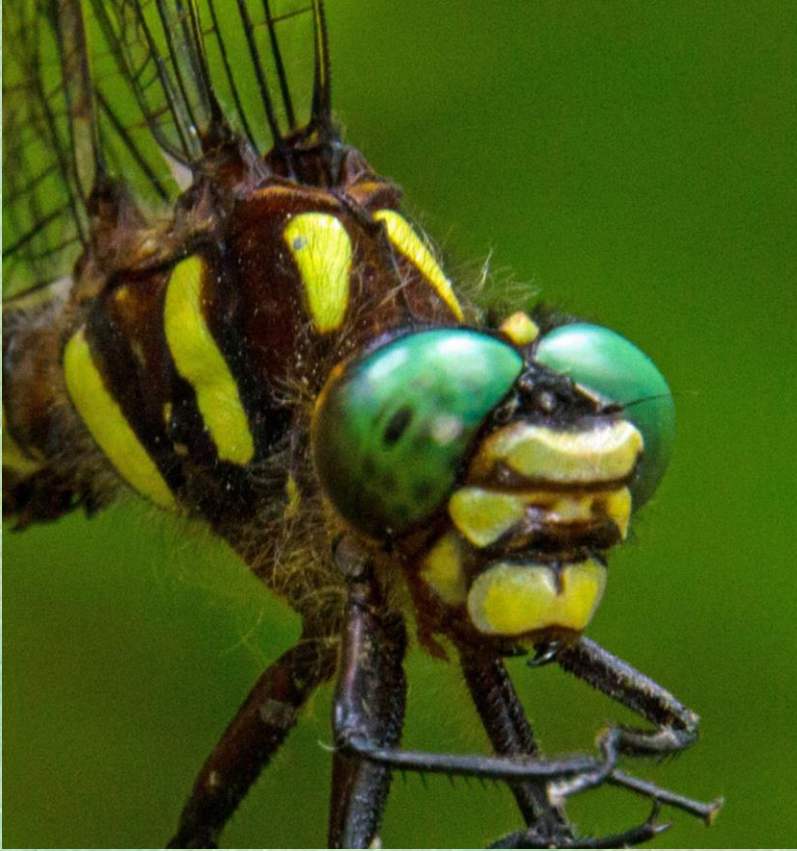
*Anax junius*



7-6

*Sympetrum vicinum*

**3. Eyes are only slightly separated,  
or meet at a single point.**

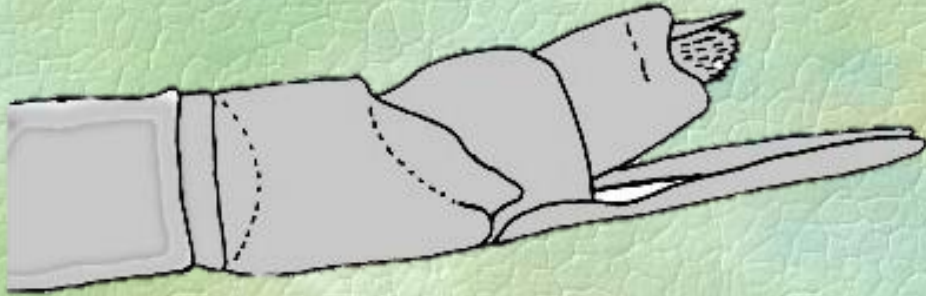


**Arrowhead Spiketail**

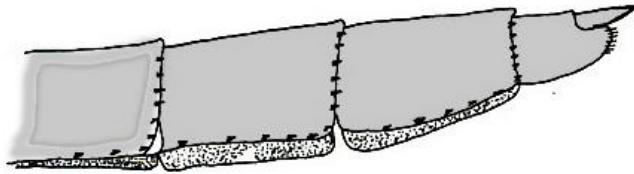
**Unicorn Clubtail**



4. Female has an “spike-like” ovipositor that extends beyond the tip of the abdomen.

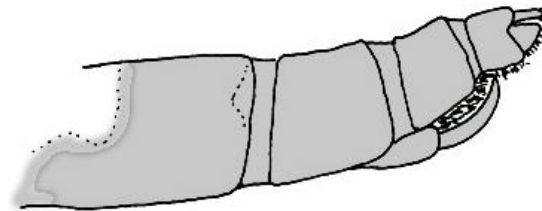


*Cordulegaster sp.*



7-10

**Generic Gomphid**



7-11

*Tachopteryx*

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

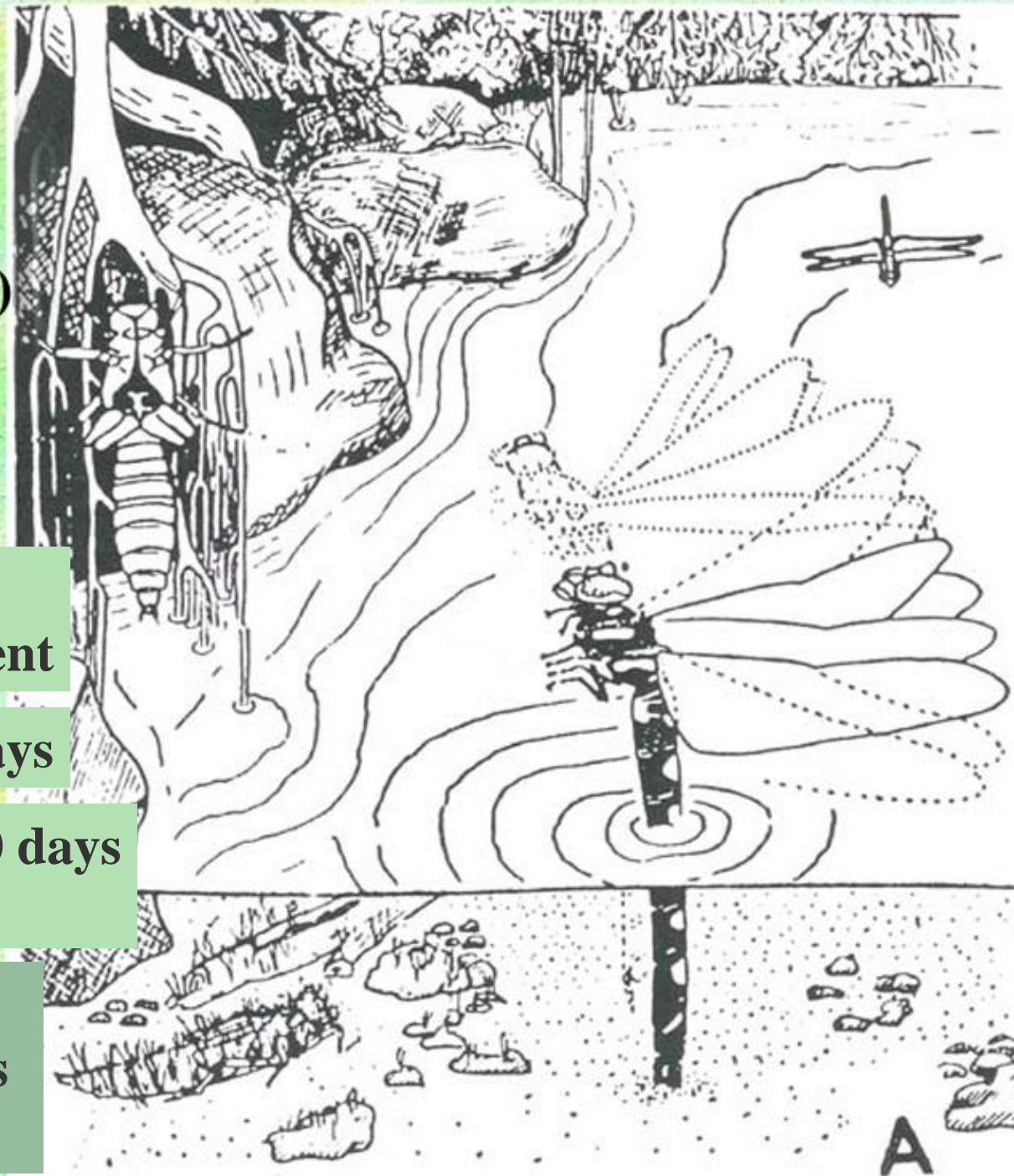
After Kennedy, 1917  
In: Needham, Westfall, & May

**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**



**5. Nymph has a unique, deeply zig-zag toothed labium.**



**Photo by Andrew Boose**



**Arrowhead Spiketail**  
*Recently emerged*



# Updated Taxonomy of Cordulegastriidae

## *Cordulegaster* –

- C. diadema* – – Apache Spiketail
- C. dorsalis* – – Pacific Spiketail
- \* *C. erronea* – – Tiger Spiketail
- \* *C. maculata* — Twin-spotted Spiketail
- \* *C. obliqua* – – – Arrowhead Spiketail

Ohio Species  
Underlined

## *Zoraena* –

- \* *Z. bilineata* – – Brown Spiketail
- \* *Z. diastatops* – Delta-spotted Spiketail
- Z. sarracenia* – Sarracenia Spiketail
- Z. sayi* — – – Say's Spiketail
- Z. talaria* – – – Ouachita Spiketail

*Carle, Frank. 1983 in Annals Ent. Soc. Amer. 76(1): 61-68*

*Tennessee, Ken. 2018. Dragonfly Nymphs of North America*

**Number of New Records  
in 2017 & 2018**

**Tiger Spiketail - - - - - 1**

**Twin-spotted Spiketail - - - - 2**

**Arrowhead Spiketail - - - - -14**

**Brown Spiketail - - - - - 13 (12 = Champaign Co.)**

**Delta-spotted Spiketail - - - - - 7**

**Total = 37 records**

*37/25159 = 0.15% of all records submitted!*

*5 species = 3% of all species      should be 20x this*

## 2. Tiger Spiketails & How We Found Them

Tiger Spiketail, Clark Shiffer



2.5 to 3 inches long

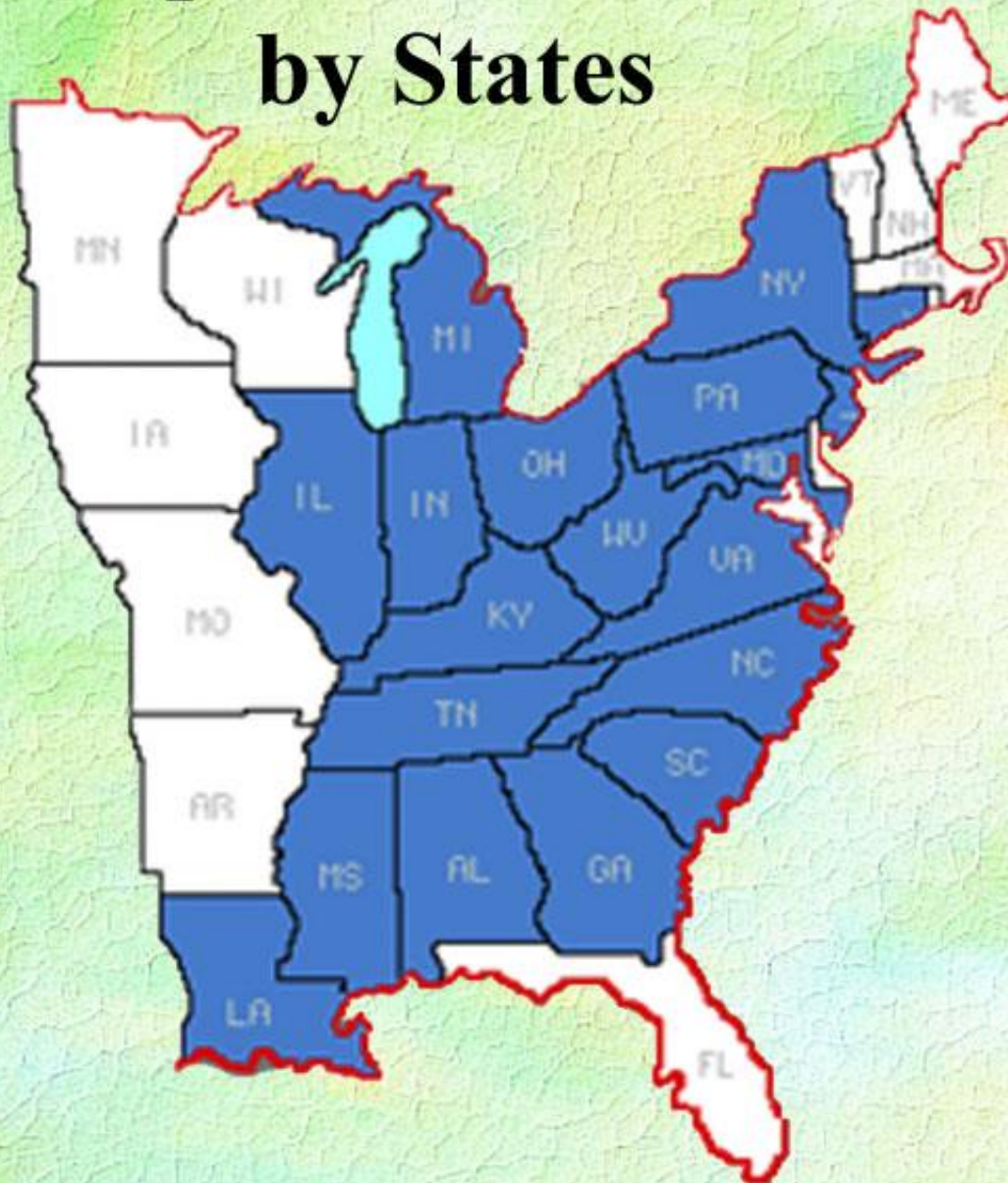


**1990 = 7 Known Records – Hocking/Fairfield County boarder area**

**1995 = State Endangered**

**2002 = Species of Concern**

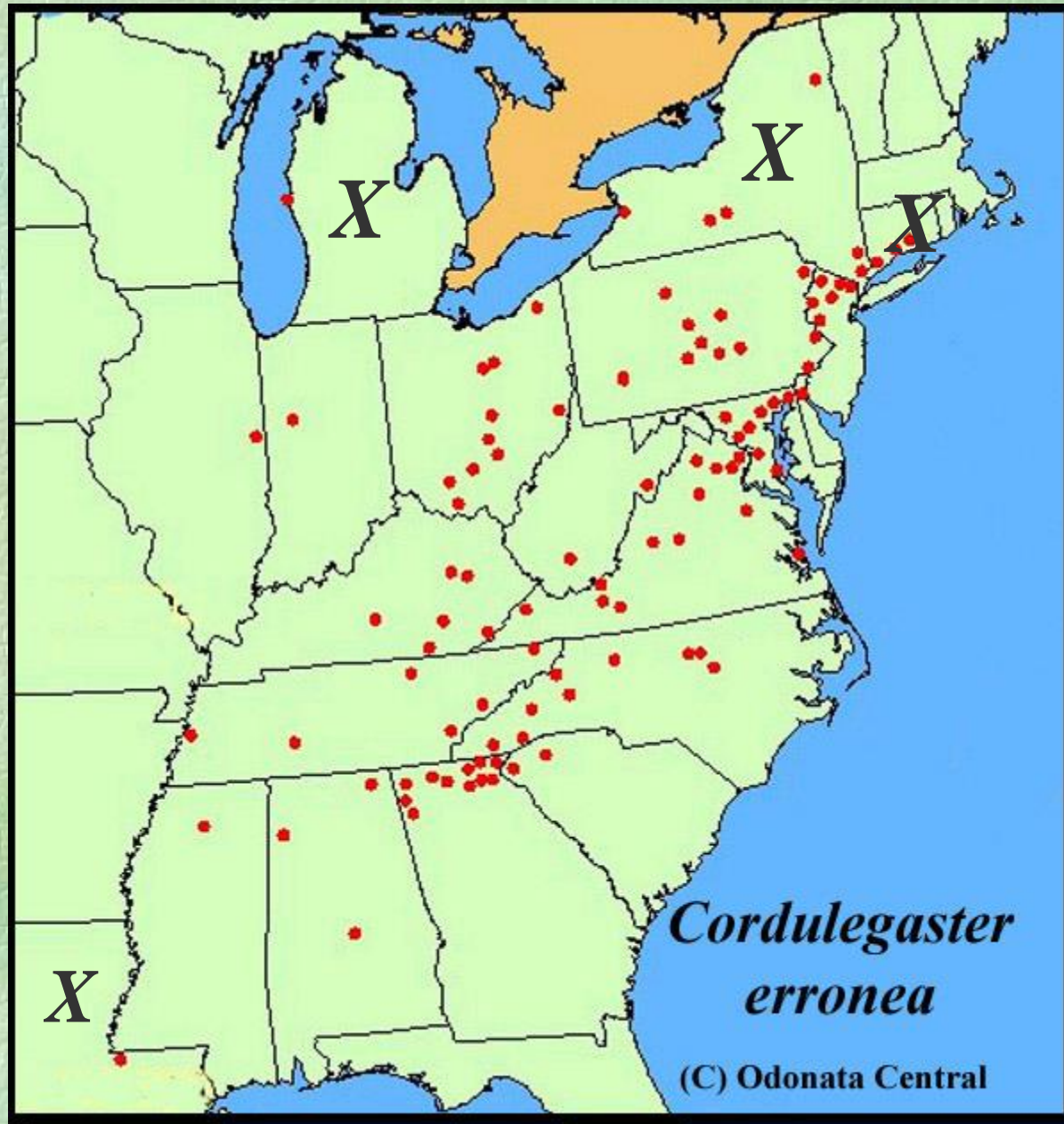
# Tiger Spiketail Distribution by States



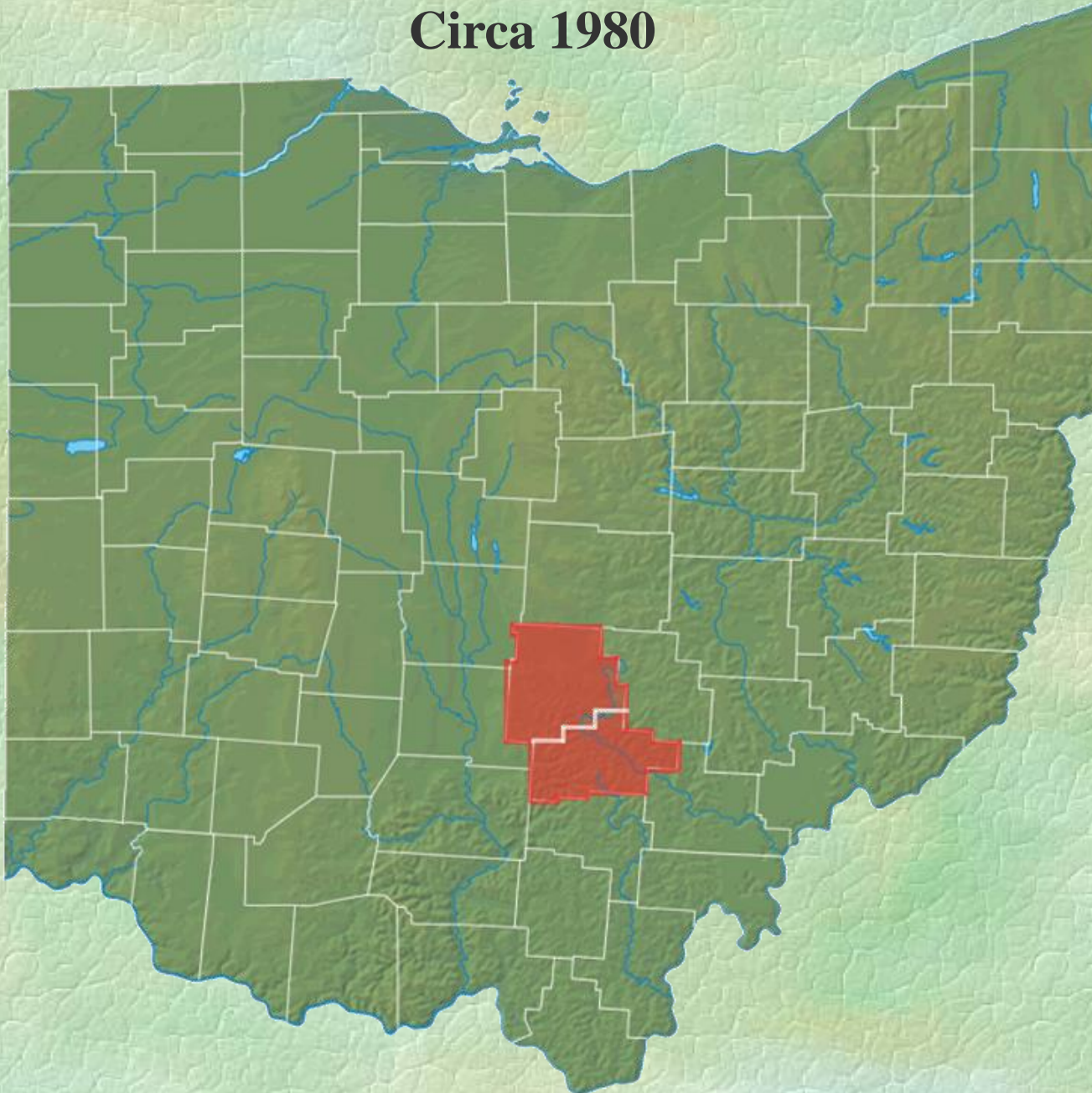
**NOTE:**  
Illinois,  
Indiana and  
Michigan  
= **Single Record**

**Louisiana Report =**  
“rare,  
a northern species”

**Reports from**  
CT, NY, MI =  
“Rare, a southern  
species”



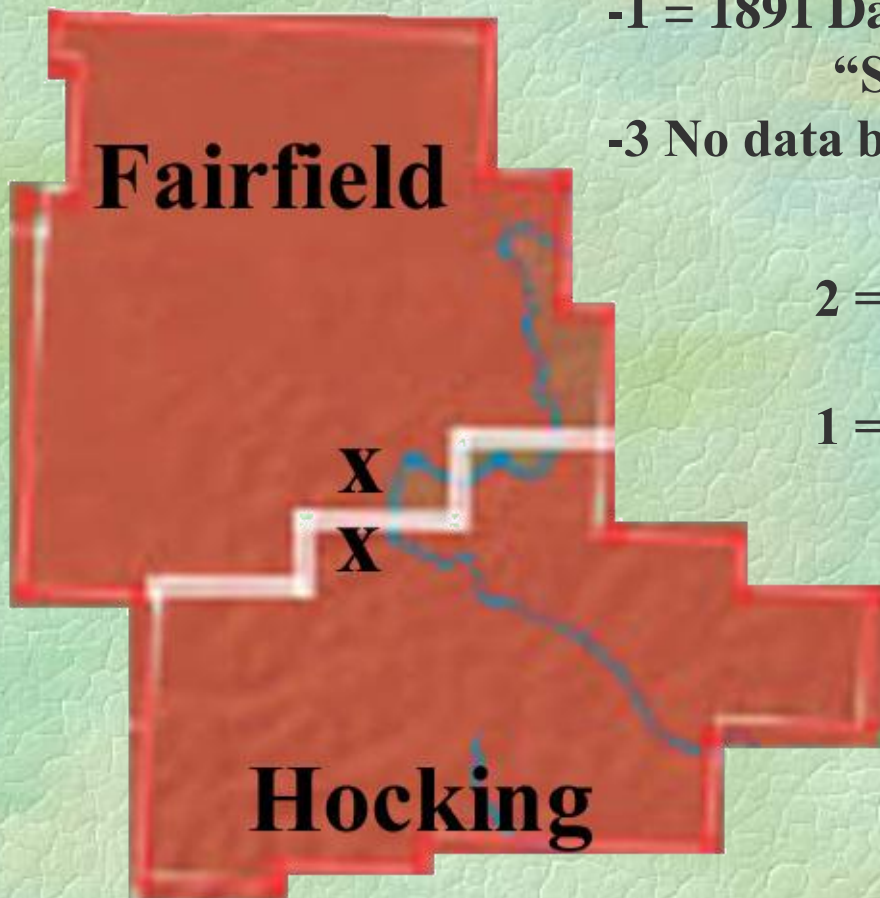
# Ohio Known Distribution of Tiger Spiketails Circa 1980



# Pre-1980 Records of Tiger Spiketails in Ohio

## 7 Total Records

- 1 = 1891 David Kellicott, Published only –  
“Sugar Grove, OH” w/ No County
- 3 No data beyond “Hocking County”



- 2 = “Neotoma” – JS Thomas, 1931  
-- Bob Goslin, 1942
- 1 = “Wahkeena” – Bob Goslin, 1939



# **Habitat Search – Early 1990s**

**Looked in Typical Odonata Habitat – Sunny!**

**1992-93 Pete Kovarik & Norm Johnson –  
Trapping with malaise traps for Diptera  
at Barnaby Center = 3 Tiger Spiketails!**

**Still took several searches by Dan Riggs & Bob Glotzhober**

**Finally – Detailed directions from Kovarik  
– led us to “Right Habitat”**





Crane Hollow, main stream. 5/7/2019. R. C. Glotzhober. CraneHollow1489



Snyder Hollow (Main), in Crane Hollow. 5/7/2019. R. C. Glotzhober. SnyderHollowMain1519

Small Hollow opposite NW Seep, Crane Hollow. 5/28/2019. R. C. Glotzhober. CraneHollowNW1629





Snyder Hollow-2, Crane Hollow. 7/21/1997. (from OHS slide 45-02-06)

CraneHollowSnyder450206

Northwest Seep, Crane Hollow. 5/28/2019. R. C. Glotzhober. CraneHollowNW1628





## 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



# 2011 Map of Known Tiger Spiketails in Ohio

## 18 Counties; 4 New since 2007



2017  
Logan Co.

Flight Dates  
June 1 – Sept. 3

**Preferred Habitat Now Identified**  
**But**  
*Still Little known about Life History*

**Initiated Field and Lab Studies**  
**1996 to 2006**



**Malaise Trap. Deep South Outdoors, Franklin Co., TN. 6/2/2016. R. C. Glotzhober. MalaiseTrap9153**

# All Species of Odonata Captured In Small Ravine Tributaries

<b>Tiger Spiketails</b>	<b>142</b>
<b>Arrowhead Spiketails</b>	<b>1 ♀</b>
<b>Clamp-tipped Emerald</b>	<b>4 ♀</b>
<b>Gray Petaltail</b>	<b>1 ♀</b>

**Main Stream of Crane Hollow**

**And adjacent wet meadow & “boggy” pool =**

**40 Species = *One of the highest in Ohio***

# Numbers of Spiketails in Malaise Traps During 2 Years

Site, Year	N ♂	N ♀	Total N
Barnaby, 1996	8	0	8
Crane Hollow, 1996	6	0	6
Crane Hollow, 1997	60	12	72
Wahkeena, 1996	26	10	36
Wahkeena, 1997	15	5	20
<b>Totals</b>	<b>115</b>	<b>27</b>	<b>142</b>

*(2 deaths overall = aged and multiple recaptured individuals)*

**Total Tiger Spiketails Captured = 142 individuals**  
*( 4 malaise traps in different small tribs)*

**# of Individuals Recaptured = 72**

**Recaptures of Individuals up to 6 or 8 times**

**# of Individuals Captured in Different Small Trib = 2**

**Maximum Adult Life Span Known = 34 days**

**In 1998-99 Survey of Numerous Headwater Streams  
Within Hocking Hills Region**

**64% of Headwater streams had Tiger Spiketails**

**But**

**Inhabited Stream Habitat  
0.013% of Total Acreage of Area**

## 4. Life History of Nymph







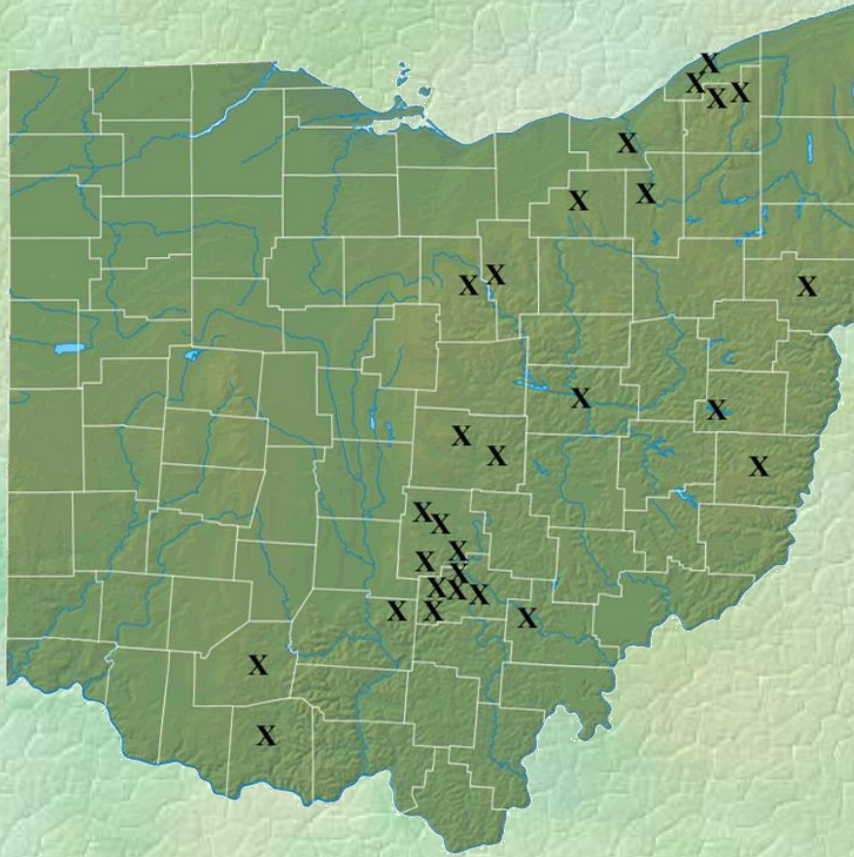
**Tiger Spiketail Larva. in lab. July 15, 2010 CerroneaLarva5613**

R. Glotzhober, 3Ap07

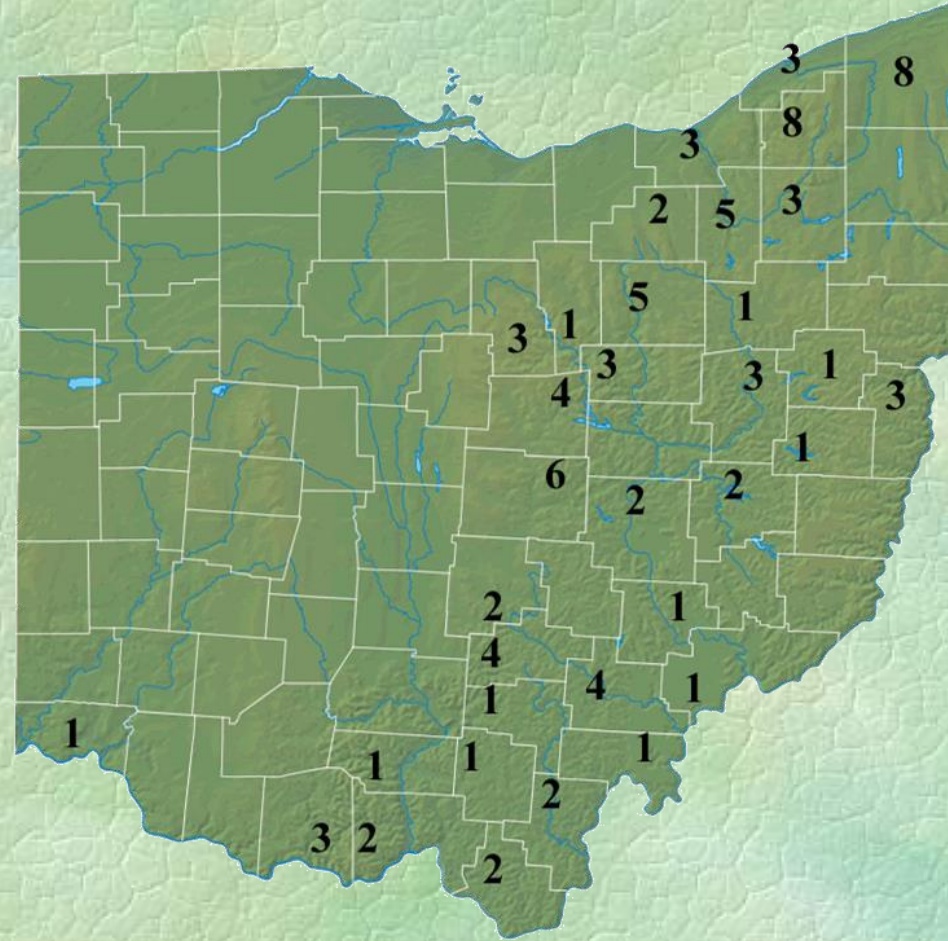


N. Red Salamander. West Woods, Geauga Co. 4/3/2007. RC Glotzhober. SalamanderRed3 4 07

# Tiger Spiketails



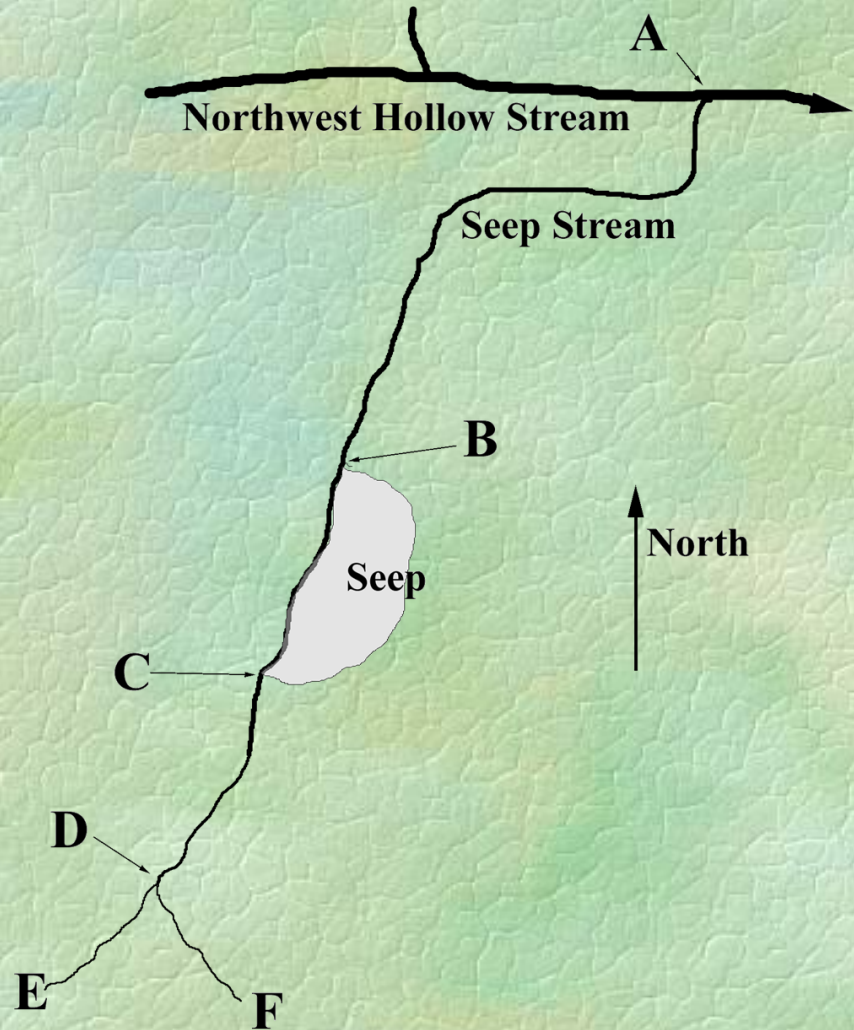
# Northern Red Salamanders *Pseudotriton ruber*



**Northwest Seep -- A to B = 87 feet**

**1/2 to 2 inches deep**

**6 to 12 inches wide**



**Northwest Hollow Seep, Crane Hollow Nature Preserve, Hocking County, Ohio**



# **550 Larvae measured in field**

**over three years.**

**Visits =**

**Spring**

**Summer**

**Fall**

*Multiple size classes of  
Larvae at each season!*

*Indicates development is  
More than one year.*

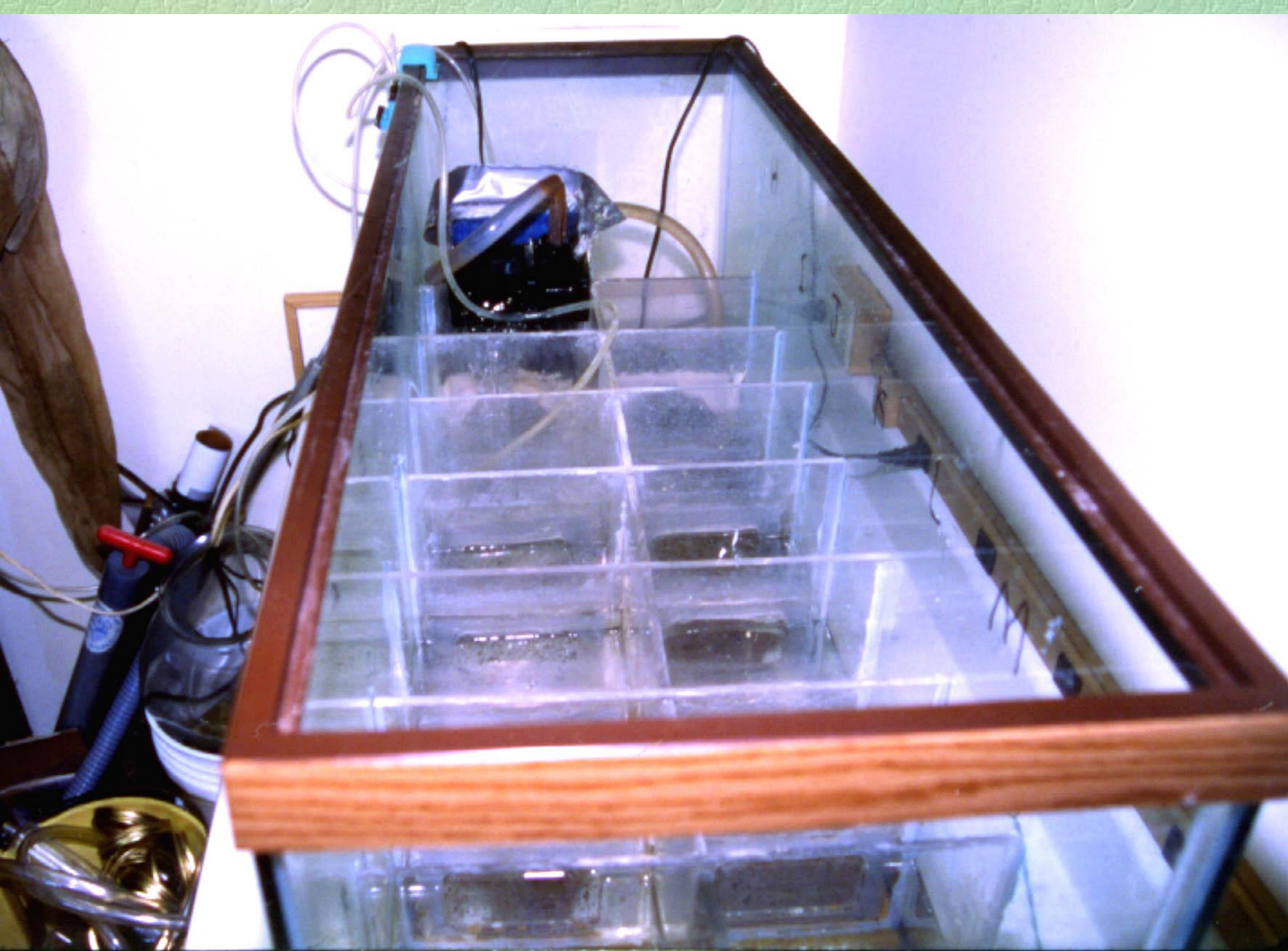
# **72 Larvae Reared in Lab**

**Over eight years**

**21 for Period 105 – 622 day**

**1-7 molts**



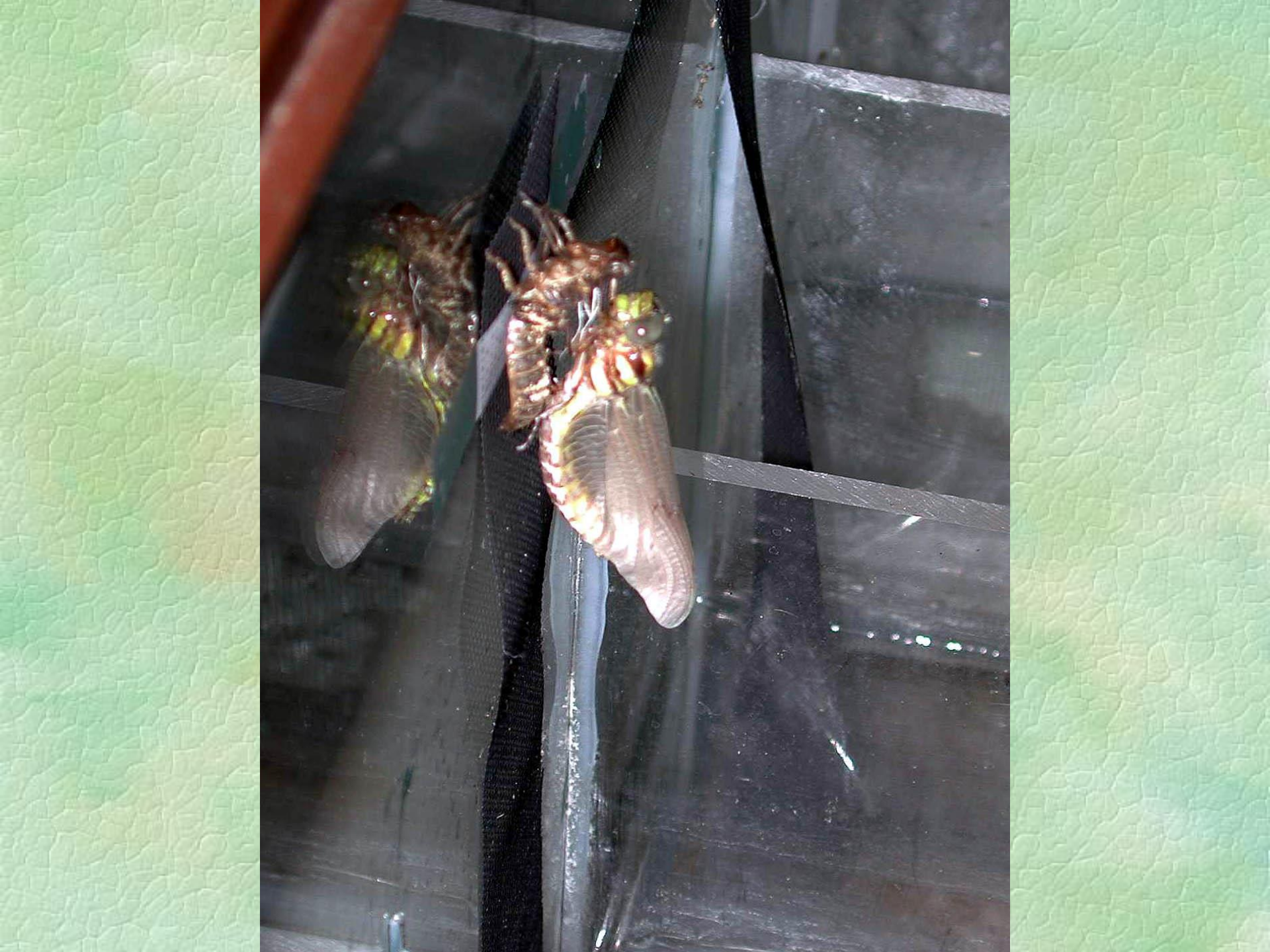














# Tentative Instar Sizes

## for *Cordulegater erronea*

(Based upon 56 reared larvae)

<b>Instar</b>	<b>Head-Width</b>	<b>Total Length</b>	<b>Wing-Pad Length</b>
<b>F0</b>	<b>7.0 - 8.2</b>	<b>28 - 39</b>	<b>7.9 - 9.5</b>
<b>F1</b>	<b>5.8 - 6.5</b>	<b>21.5-27.5 (32.0)</b>	<b>3.8 - 5.9</b>
<b>F2</b>	<b>4.5 - 5.5</b>	<b>17.5 - 21.4</b>	<b>? up to 1.0</b>
<b>F3</b>	<b>3.7 - 4.5</b>	<b>14.3 - 19.1</b>	
<b>F4</b>	<b>3.0 - 3.8</b>	<b>11.0 - 15.0</b>	
<b>&lt; F4</b>	<b>&lt; 3.0</b>	<b>&lt; 10 - 12.2</b>	

**Note 1.** Seven (7) individuals instars confirmed from F0 backwards.

**Note 2.** Field measured 407 larvae. Using HW, 23 did not fit TL on this table.  
Equals 5.65% error.

**Note 3.** Smallest larvae measured equaled <1.0 HW/4.0 TL.

*Data through May, 2003. R.C. Glotzhober*

# Life Span of Larvae

- Presumed 12 to 14 larval instars
- Observed 7 last instars
- Last 7 = 2 or 3 years before adult emergence
- Add 1 Year for egg to F7 Instar  
= 3 to 4 year for Larval Period

*Still unclear how quickly egg hatches.*

*Some Cordulegaster – 24-43 days.*

*Some evidence that might overwinter as egg – if so +1 year.*

# Patrolling male Tiger Spiketail

Stebbins Gulch, by Chad Edgar, 25 July 2007







Chad Edgar 7/3/07

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