



# HOW TO USE A “KEY”

USING A DICOTOMOUS KEY TO IDENTIFY SPECIMENS  
FROM ORDER TO SPECIES LEVEL

A NECESSARY EVIL OR  
INSIDIOUS FRUSTRATION

# Evolution of keys

## ▶ Dicotomous Keys

- ▶ May be in differing formats

  - ▶ Couplets

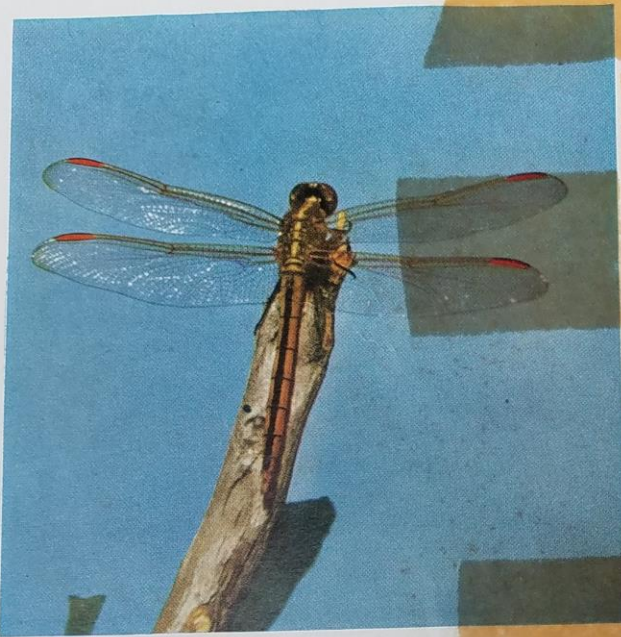
  - ▶ Flow chart

- ▶ Pick one of two options

- ▶ Usually more than one but not more than four characters

- ▶ Usually accompanied by illustrations/pictures

- ▶ Usually uses technical terminology



*Libellula  
auripennis*



*Erythemis  
simplicicollis*

A MANUAL OF THE *Dragonflies*  
*of North America* (ANISOPTERA)

*Including the Greater Antilles  
and the Provinces of the Mexican Border*

JAMES G. NEEDHAM · MINTER J. WESTFALL, JR.

UNIVERSITY OF CALIFORNIA PRESS  
BERKELEY AND LOS ANGELES · 1955



*The* O D O N A T A  
*of Canada and Alaska*

*By*

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VOLUME TWO

PART III: THE ANISOPTERA—FOUR FAMILIES



UNIVERSITY OF TORONTO PRESS: 1958

DAMSELFLIES  
OF  
NORTH AMERICA



MINTER J. WESTFALL, JR.  
MICHAEL L. MAY

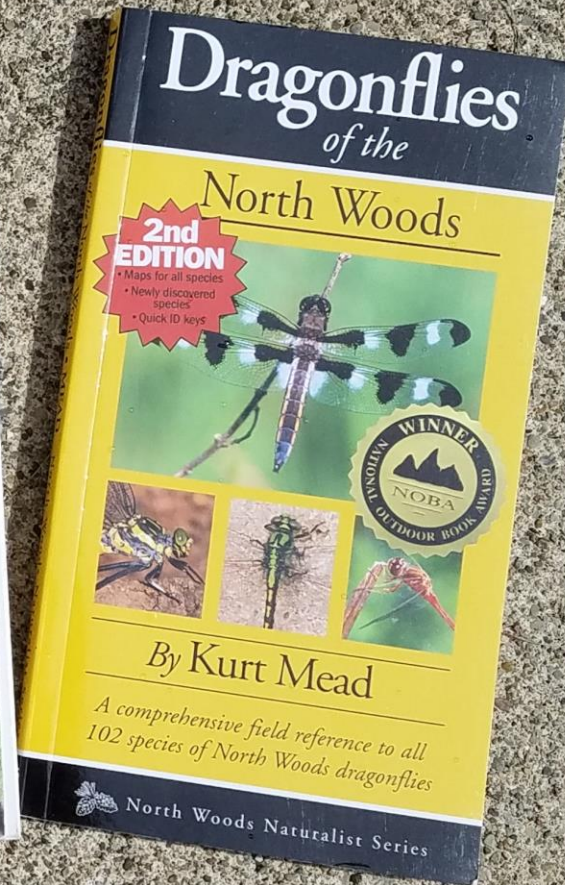
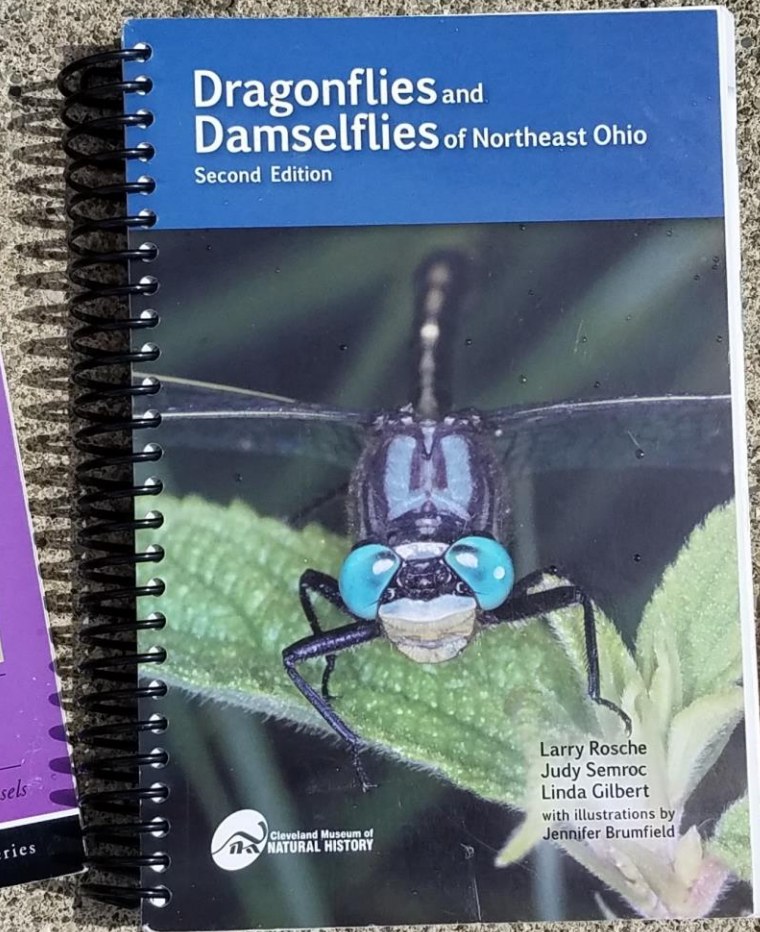
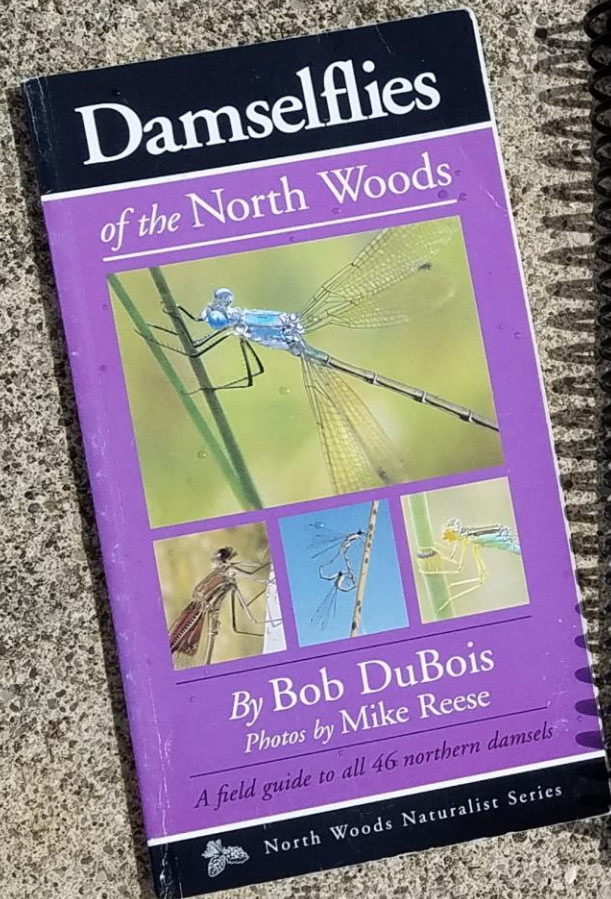
DRAGONFLIES  
OF  
NORTH AMERICA

The Odonata (Anisoptera) Fauna of Canada,  
the Continental United States,  
Northern Mexico and the Greater Antilles

Third Edition

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







PRINCETON FIELD GUIDES

DRAGONFLIES  
AND DAMSELFLIES  
OF THE EAST

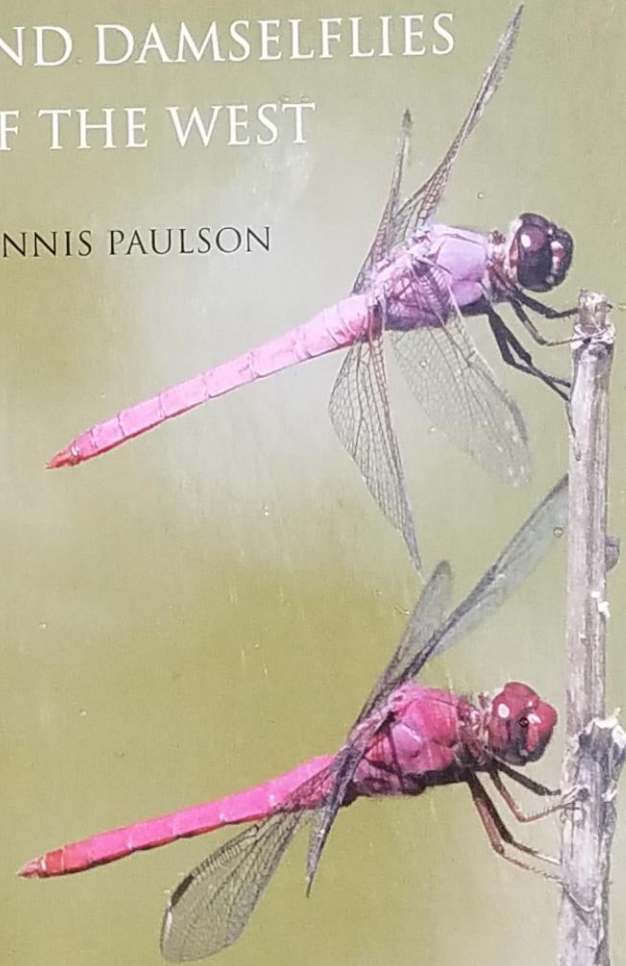
DENNIS PAULSON



PRINCETON FIELD GUIDES

DRAGONFLIES  
AND DAMSELFLIES  
OF THE WEST

DENNIS PAULSON





# The Dragonflies and Damselflies of Ohio



Edited by

Robert C. Glotzhober and David McShaffrey

Ohio Biological Survey









**1a** Eyes large, never separated by a space greater than the width of one eye, often meeting in the center; in life, wings generally held open at rest; hindwings wider than forewings. Suborder **ANISOPTERA** ..... **2**

**1b** Head elongate between eyes, with the eyes wide apart; in life, wings held together at rest, or only partially open; hindwings and forewings approximately the same width, Suborder **ZYGOPTERA** .... **8**







**2a(1a) Triangles in forewings and hindwings similar in shape and location (fig. 7-5); most antenodal cross-veins do not quite line up in front rows; two antenodal cross-veins thickened; wings usually clear, with no spots or bands (Superfamily AESHNOIDEA) . . . . . 3**

**2b Triangles in forewings and hindwings different in shape and location (Fig. 7-6); most antenodal cross-veins do line up in first two rows. Superfamily LIBELLULOIDEA . . . . . 6**





**3a(2a)** Eyes meet at the top of the head for a considerable distance; stigma with a brace vein at the near end . . . . . **Aeshnidae**

**3b** Eyes either separated or meet at only a single spot; stigma may or may not have a brace vein . . . . . **4**

**4a(3b)** Eyes only slightly separated or meet at a single point; female's ovipositor extends beyond the end of the abdomen; stigma has no brace vein . . . . . **Cordulegastridae**

**4b** Eyes widely separated; female's ovipositor never reaches end of abdomen; stigma with a brace vein . . . . . **5**

**5a(4b) Subtriangle of forewing generally  
with 2 or more cells; median lobe  
of labium cleft . . . . . Petaluridae**

**5b Subtriangle of forewing generally 1  
celled, but sometimes 2 or more;  
median lobe of labium entire . . .  
. . . . . Gomphidae**





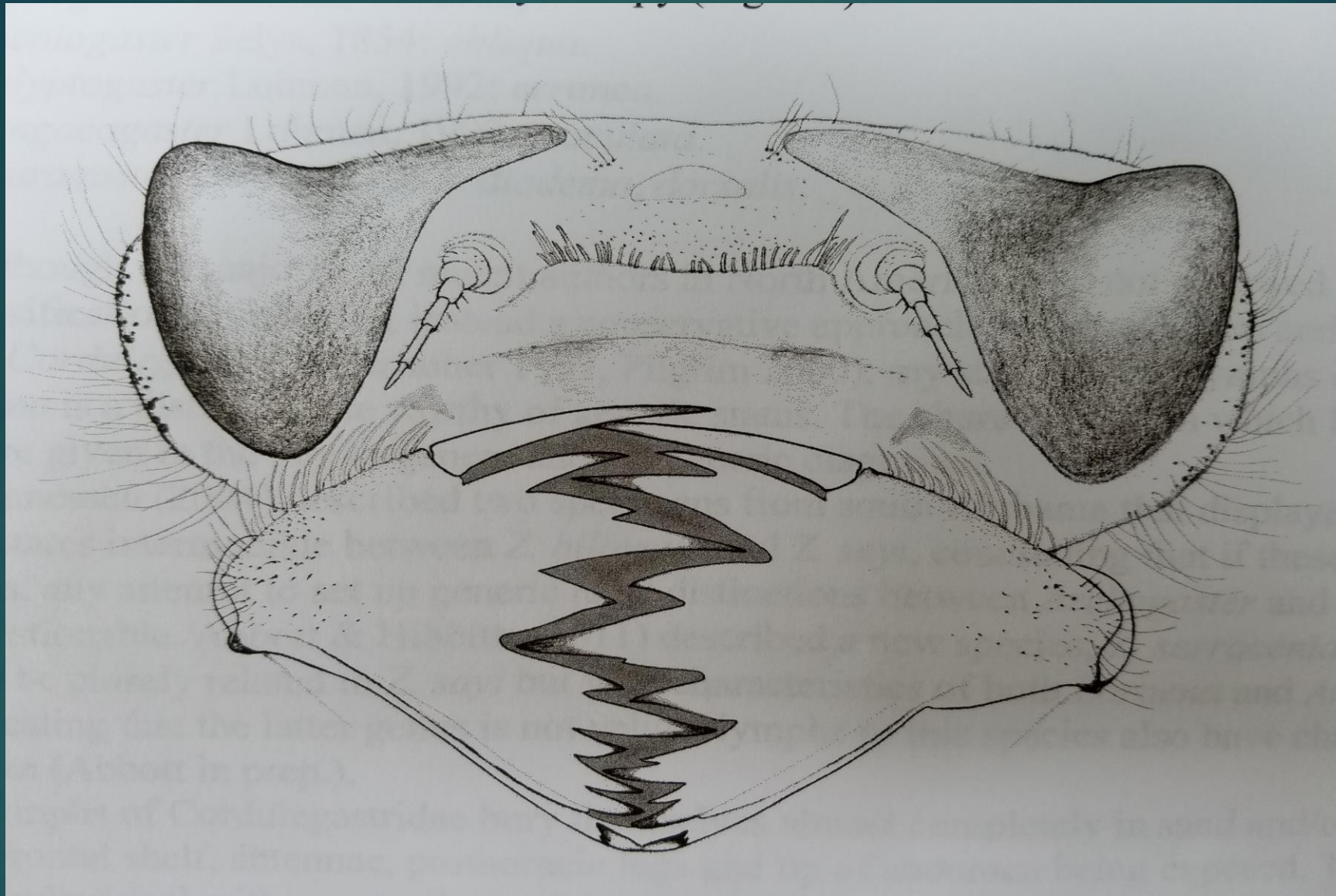
**KEYS GET MORE DIFFICULT THE  
CLOSER TO SPECIES YOU GET**

**KEYS TO FAMILY ARE EASY**

**KEYS TO GENERA FAIRLY EASY**

**KEYS TO SPECIES CAN BE DIFFICULT**

**USE OF VERY SPECIFIC AND TECHNICAL  
TERMINOLOGY (WING VENATION,  
GENITALIA, THORACIC STRIPES)**



DRAWING BY KEN TENNESSEN



# ODONATE IMMATURES

## LARVA VS NYMPH

**LARVA** – LOOKS DIFFERENT THAN THE ADULT –  
COMPLETE METAMORPHOSIS

**NYMPH** – LOOKS LIKE THE ADULT BUT NOT  
SEXUALLY MATURE – INCOMPLETE

**NAIAD** – AQUATIC NYMPH

**ALMOST ALWAYS TRULY AQUATIC  
(INTERNAL GILLS, CAUDAL GILLS (LAMELLAE))**

**LOTIC AND LENTIC ENVIRONMENTS  
(BURROWERS, SPRAWLERS, CLIMBERS)**

**VORACIOUS PREDATORS  
(LABIUM OR LOWER LIP)**







# DRAGONFLY TYPES

## SPRAWLER

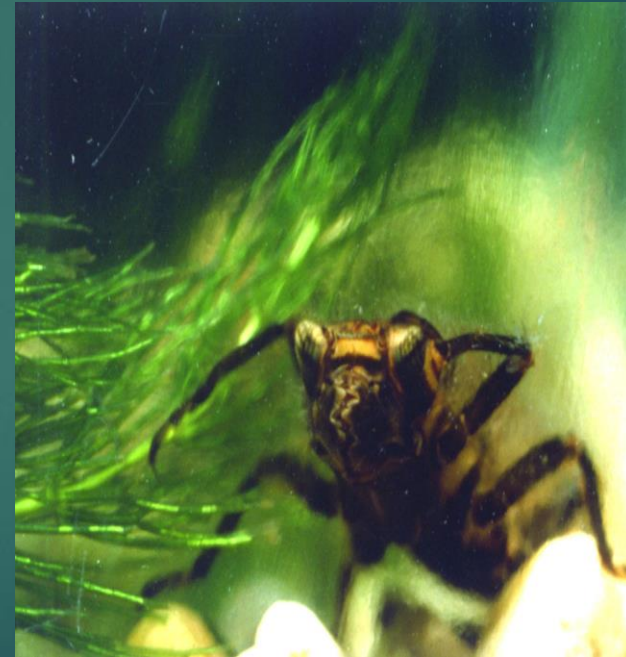


## BURROWER



Twin-spotted Spiketail,  
*Cordulegaster maculata*

## CLIMBER





**Great Spreadwing, *Archilestes grandis***  
by Dave McShaffrey





Cordulegaster



Libellula



Pantala



Archilestes



Anax



Progomphus





**EXUVIUM = CAST SKIN**