

# Insects of Alberta's Wetlands

By Robert Bercha

(Jan 2011)



# Introduction

- The insect body
- Types of metamorphosis
- Wetlands (types and examples)
- Insects found in wetlands

# The Insect Body

What common features do all insects share?



3 sets of legs



3 body divisions

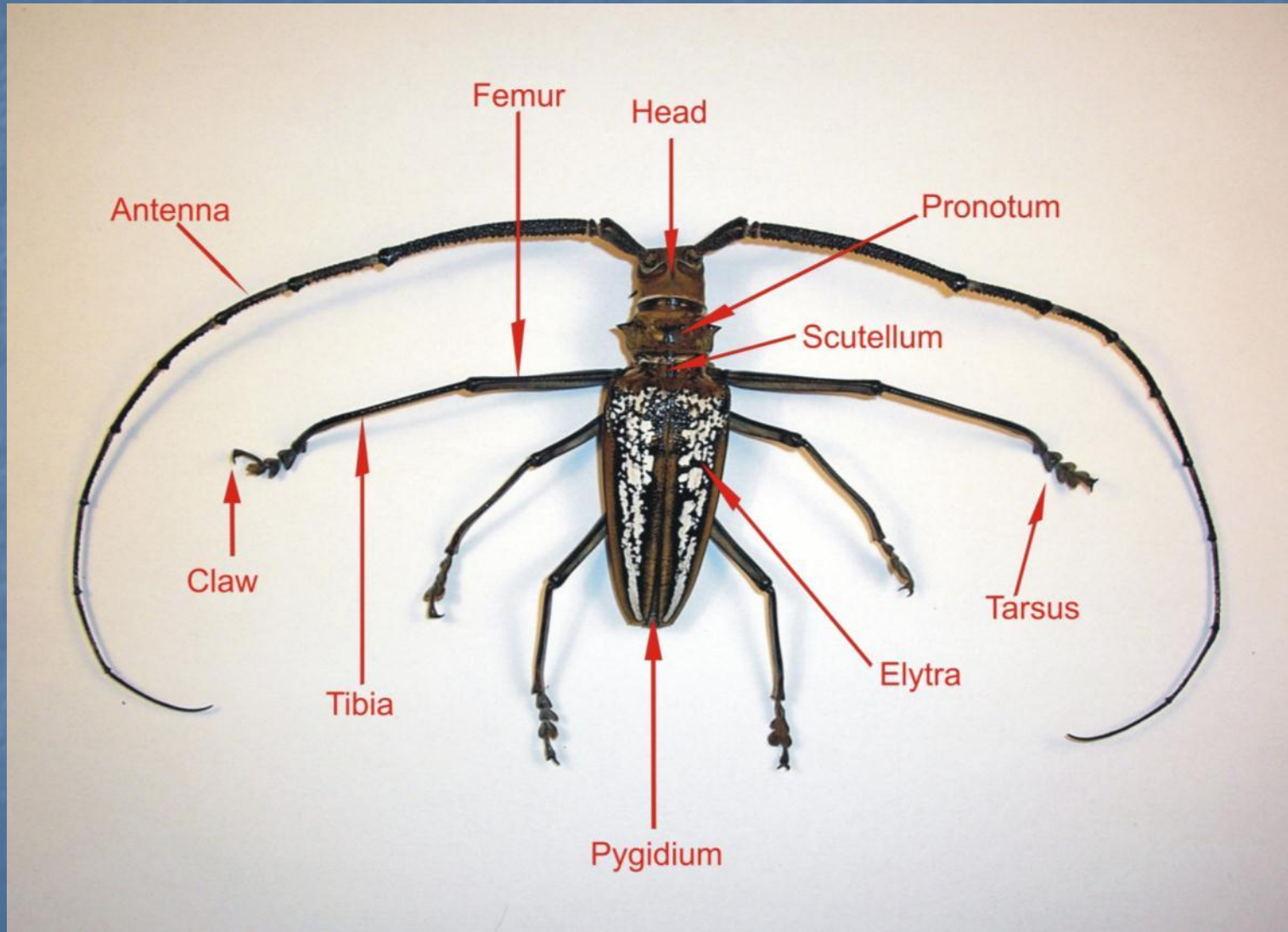


Usually 1 or 2 pairs of wings

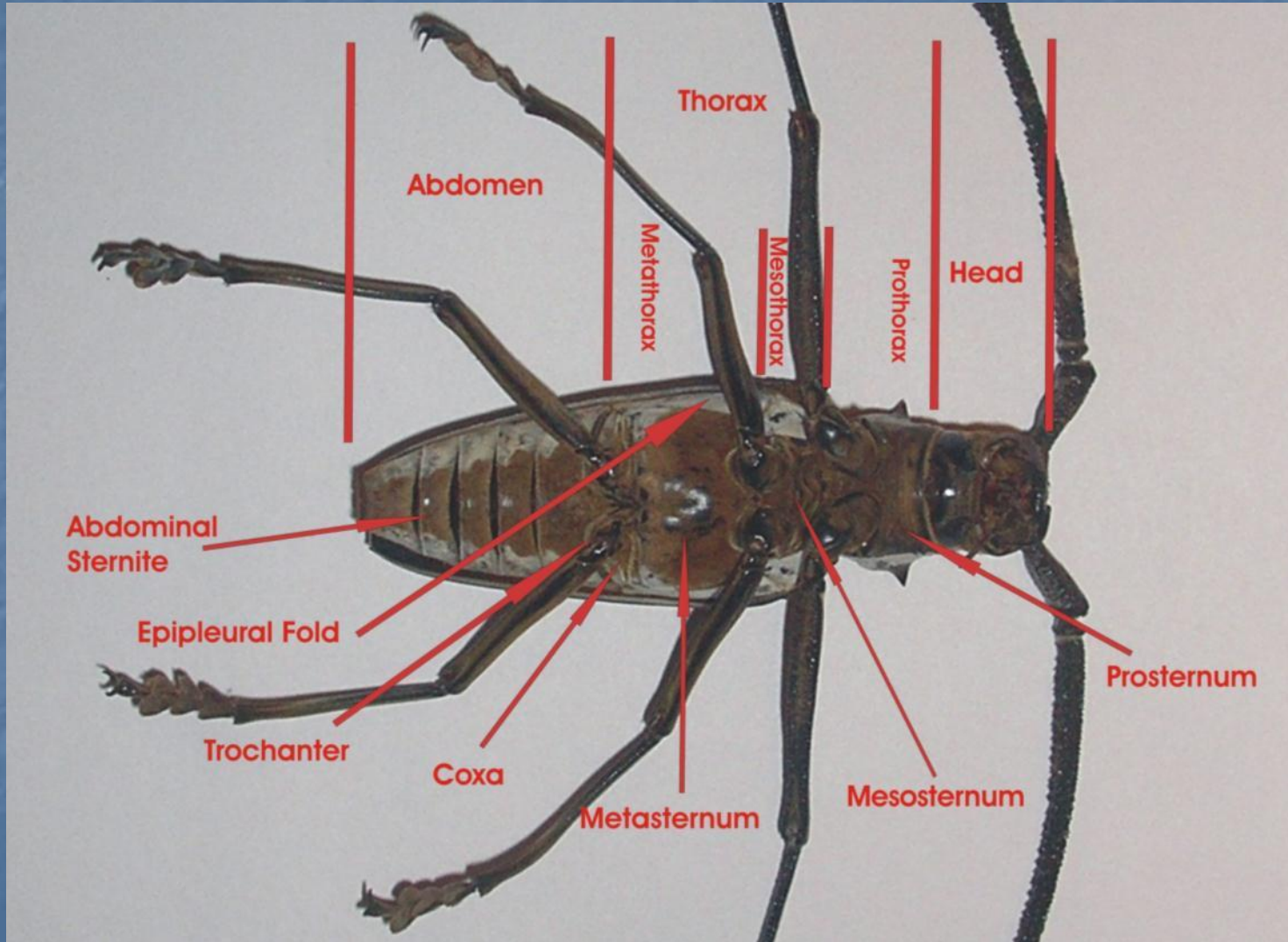


1 pair of antennae

# The Insect Body – Dorsal (Top)



# Insect Body – Ventral (Bottom)



# Metamorphosis

- There are two types of metamorphosis
  - 1) Simple or incomplete metamorphosis
  - 2) Complete metamorphosis

# Simple Metamorphosis

- Immature stage or nymph resembles adult
- Progresses through numerous instars, with each being more developed
- Each instar ends with a molt
- Adult emerges after last molt
- Immature aquatic forms of dragonflies, stoneflies and mayflies are called naiads

# Simple Metamorphosis



Stink Bug



Nymph



Damselfly



Adult

# Complete Metamorphosis

- Larva and adults very different
- Immature stage is a wormlike larva
- Molt a couple times as they grow (instars)
- After final molt changes to a pupa (resting stage)
- Inside of pupa tissue are either broken down or re-organized to form new body parts
- Adult eventually emerges

# Complete Metamorphosis

Butterfly



Larva



Pupa



Adult

Ladybug



# Emergence of Adult

- Adult emerges
- Body is soft, pale colored and wings are crumpled (teneral)
- Wings expand, dry and strengthen
- Exoskeleton dries, hardens and colors
- Adult lives for short to long while

# Teneral



Beetle

Newly  
emerged  
teneral adult



Damselfly



Final adult  
coloration  
after several  
hours



# Wetlands

- Different types:
  - Marshes (Cattail/bulrush and sedge)
  - Small wooded lakes
  - Peatlands
  - Rivers
  - Large Lakes
  - Springs
  - Temporary ponds

(some examples follow)

# Cattail Marsh



- Dense Beds of Cattails
- Rich in plant and animal life
- Still waters

# Wooded Lakes



- Floating plants
- Peaty edges
- Can be spring or creek fed – thus may be cool or warm

# Rivers



- Fast or slow moving water
- Rocky Bottoms
- Generally cool waters unless draining a warm lake or spring

# Big Lakes



- Shores maybe rocky and wave washed
- Generally little emergent vegetation

# Common Insects Found in Wetlands

- Beetles
- True Bugs
- Dragonflies
- Two-winged Flies
- Mayflies
- Caddisflies
- Stoneflies

# Beetles

- Belong to the order Coleoptera
  - “Sheath-winged”
- In North America there ~28,600 species
- In Alberta they range from 0.25 - 40 mm
- Found through-out wetlands
- Predators, herbivores and scavengers
- Common members include: Diving, Whirligig, Tiger and Ground Beetles

# Some Characteristics of Beetles

- Forewings are hard or leathery
- Forewings meet in a straight line down center of back
- Hind wings membranous
- Chewing mouth parts with mandibles
- Two prominent compound eyes
- Complete metamorphosis

# Whirligig Beetle



- Adult beetles found in groups on the surface of various water bodies whirling and gliding about
- 3.5 – 7.5 mm in size
- Wetland types they live in:
  - Ponds and Lakes
  - Streams and Rivers
- Scavengers of dead and dying insects
- Two pairs of compound eyes
  - one above for vision in air
  - and the second below for vision in water

# Diving Beetle



- Strong swimmers
- Up to 17mm in size
- Wetland types they live in:
  - marshes and peatlands
- Adults and larva are predators that hunt other aquatic insects



Water Tiger – diving beetle larva

# Richardson's Ground Beetle



- Forewings have small dimples
- 7 – 11 mm in size
- Wetland types they live in:
  - marshes and peatlands
  - on the banks of rivers
  - sand and mud flats
  - mosses by springs and small streams
- Adults and larva are predators that hunt other small organisms

# Vivid Metallic Ground Beetle

- Forewing covered in fine hairs
- ~13 mm in size
- Adults are predators that hunt other small organisms
- Wetland types they live in:
  - River banks under rocks and debris
  - Around marshes and peatlands



# Tiger Beetle



- Active during hot sunny days
- Good vision
- Fast moving and fly well
- 7 – 11 mm in size
- Wetland types they live in:
  - Sandy river banks
  - Sand and mud flats
- Adults and larva are predators that hunt other insects

# True Bugs

- Belong to the order Hemiptera
  - “Half-wing”
- In North America there ~4,500 species
- In Alberta they range from 2 - 50 mm
- Found through-out wetlands
- Predators and herbivores
- Common members include: Water Boatman, Backswimmers, Giant Water Bugs and Water Striders

# Some Characteristics of True Bugs

- Forewings are hard or leathery at top and membranous at base
- Forewings overlap at tips
- Mouth parts piercing and sucking
- Triangular plate between wings
- Simple metamorphosis

# Water Boatmen

- Very common
- Less than 12 mm in size
- Adults and larva are herbivores
- Wetland types they live in:
  - Marshes
  - Slow moving waterways
  - Ponds



# Common Backswimmer

- Very Common
  - ~11 mm in size
  - Adults and larva are predators that catch insects (aquatic and terrestrial)
- Wetland types they live in:
    - Marshes
    - Slow moving waterways
    - Ponds



# Giant Waterbug



- Common
- ~50 mm in size
- Wetland types they live in:
  - Marshes
  - Slow moving waterways
  - Ponds
- Adults and larva are ambush predators that catch and consume small fish, tadpoles, frogs and other aquatic insects
- Uses front legs to grab prey and thrusts beak into it injecting digestive juices – then sucks the soup out

# Giant Waterbug Nymph



# Water Strider



- Common
- Up to 18 mm in size
- Wetland types they live in:
  - Marshes
  - Slow moving waterways
  - Ponds
- Adults are scavengers of dead insects

# Dragonflies

- Belong to the order Odonata
  - “Toothed jaws”
- In North America there ~400 species.
- In Alberta range in size from 20 - 90 mm.
- Found through-out wetlands
- Naiads and adults predators
- Common members include: Darners, Whitefaces, Skimmers, Clubtails, Meadowhawks and Damselflies

# Some Characteristics of Dragonflies

- Two pairs of similarly shaped elongate membranous wings with numerous veins
- Large compound eyes
- Chewing Mouth parts
- Abdomen slender and long
- Simple metamorphosis

# Dragonfly Naiads

- Claspers, sprawlers or burrowers
- Breathe through gills in the gut
- Are jet propeller
- Moults 10 to 14 times
- No pupal stage



- Predators
- Hunt or ambush aquatic insects, fish, tadpoles
- Life cycle 1 to 6 years

# Variable Darner



- Common and widely distributed
- 66 - 77 mm in size
- Wetland types they live in:
  - Cattail marshes
  - Peatlands
  - Ponds
- Adults and naiads are predators

# Four-Spotted Skimmer



- Early spring dragonfly
- ~43 mm in size
- Wetland types they live in:
  - Bogs
  - Fens
  - Warm ponds
- Adults and naiads are predators

# Meadowhawks

Black  
Meadowhawk

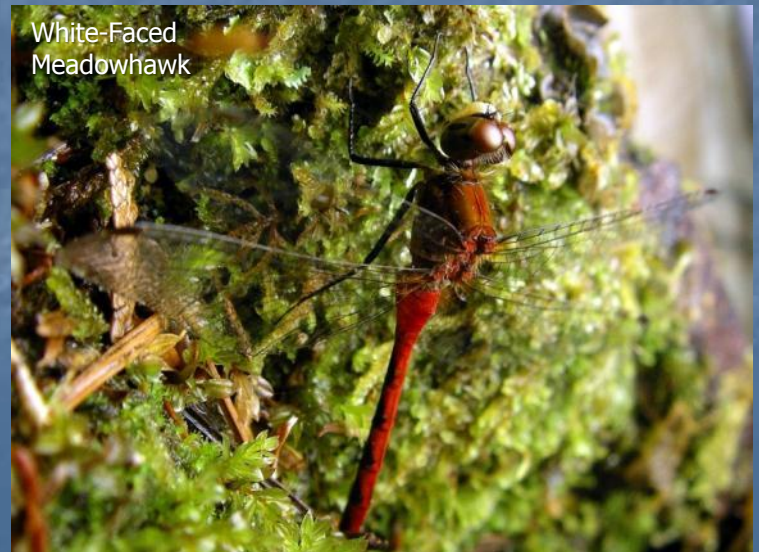


- Common in meadows near wetlands
- 32 - 41 mm in size
- Wetland types they live in:
  - Lakes
  - Ponds
- Adults and naiads are predators

Cherryfaced  
Meadowhawk



White-Faced  
Meadowhawk



# Damselfly Naiad

- Slender bodies
- Use gills as fins
- Stalk prey
- Coloration helps them to blend in with vegetation
- 3 leaf shaped gills on tip of abdomen



# Boreal Bluet



- Wide variety of wetlands
- 33 - 35 mm in size
- Wetland types they live in:
  - Lakes and ponds
  - Peatlands
- Adults and naiads are predators

# Lyre Tipped Spreadwing



- Widely distributed
- 35 to 37 mm in size
- Wetland types they live in:
  - Warm ponds (lower elevations)
  - Peatland
  - Sedge fens
- Adults and naiads are predators



Male Clasper at end of abdomen

# Two Winged Flies

- Belong to the order Diptera
  - “Two wings”
- In North America there ~16,144 species
- In Alberta they range in size from 1 - 20 mm
- Found through-out wetlands
- Predators, parasites, herbivores and scavengers
- Common wetland inhabitants: Midges, Horse and Deerflies, Crane Flies and Mosquitoes

# Some Characteristics of 2 Winged Flies

- One pair of membranous wings
- Hindwings are vestigial knobs called "halteres"
- Large compound eyes
- Sucking Mouth parts
- Short 3-segmented antennae
- Complete Metamorphosis

# Midge



- Widely distributed
- Can occur in large numbers
- Up to 13 mm in length
- Wetland types they live in:
  - Marshes
  - Ponds and Lakes
- Larva are usually aquatic
- Larva live in tubes made from debris

# Horsefly and Deerfly



Deerfly

- Common and widely distributed
- 10 to 25 mm in size
- Females suck blood
- Wetland types they live in:
  - Swamps and ponds
- Larva are mostly aquatic
- Adults strong fliers



Horsefly

# Crane Fly



Adult

- Common and widely distributed
- Up to 10 - 25 mm in size
- Wetland types they live in:
  - Marshes
  - Ponds
- Larva live water or moist areas
- Larva feed on rotting vegetation



Larva

# Mosquito

- Common and widely distributed
- Important disease vector
- Wetland types they live in:
  - Marshes
  - Ponds and pools
- Female adults require blood a protien source for eggs



Female Adult



Larva

# Mayflies

- Belong to the order Ephemeroptera
  - “To live but a day”
- In North America there ~585 species
- In Alberta less than 15 mm in length
- Found through-out wetlands
- Larva – predators and herbivores
- Common members include: Burrowing, Stream and Small Mayflies

# Some Characteristics of Mayflies

- Elongate soft bodies
- 2 or 3 long thin tail hairs
- Triangular wings held together over body when resting
- Mouth parts non-functional
- Nymph aquatic
- Simple Metamorphosis

# Mayfly Nymph

- Widely distributed
- Both herbivores and predators
- Range from free swimming, crawling to burrowing
- Wetland types they live in:
  - Streams
  - Rivers
  - Ponds



# Mayfly



- Short lived
- Up to 18 mm in size
- Wetland types they live in:
  - marshes
  - Slow moving waterways
  - Ponds
- Adults are usually non-feeding

# Caddisflies

- Belong to the order Trichoptera
  - “Hairy wings”
- In North America there ~975 species
- In Alberta range in size from 1.5 - 25mm
- Found in/near rivers, streams, lakes and ponds
- Some larva construct cases

# Some Characteristics of Caddisflies

- 2 pairs of membranous wings
- Moth like appearance
- Wings held roof like at rest
- Chewing mouth parts
- Long threadlike antennae
- Larva aquatic
- Complete metamorphosis

# Caddisfly Larva

- Case builders and free forms
- Wetland types they live in:
  - Rivers and streams
  - Ponds and lakes
- Larva are predators
- Pupate in underwater silken cocoons



# Adult Caddisfly

- Nocturnal – strongly attracted to light
- Up to 25 mm in size
- Brown to grey coloration
- Wetland types they live in:
  - Lakes and ponds
  - Rivers and streams



# Stoneflies

- Belong to the order Plecoptera
  - “Folded wings”
- In North America there ~400 species
- In Alberta range in size from 6 - 65mm
- Found in fast flowing streams and rivers
- Herbivores and predators
- Common members include: Green and Giant Stoneflies

# Some Characteristics of Stoneflies

- Flat elongate body shape
- Four heavily veined membranous wings
- Long antenna
- Cerci present
- Chewing Mouth parts
- Larva aquatic
- Simple Metamorphosis

# Stonefly Nymph

- Widely distributed
- Up to 65 mm in size
- Wetland types they live in:
  - rivers
  - streams
- Are both predators and herbivores
- Takes 1-2 years to develop into an adult



# Green Stoneflies



- Close to water in spring time
- Up to 6 - 15 mm in size
- Wetland types they live in:
  - small streams
- Adults do not eat

# Giant Salmonfly

- Spring to early summer near water
- 35 to 65 mm in size
- Wetland types they live in:
  - rivers
- Adults do not feed
- Come out at night
- Attracted to light



# The End



Visit Insects of Alberta at:  
[www.insectsofalberta.com](http://www.insectsofalberta.com)

# Selected References

- Acorn, John, 2004. Damselflies of Alberta. University of Alberta Press.
- Acorn, John, 2001. Tiger Beetles of Alberta. University of Alberta Press.
- Arnett, R.H. Jr, 2000, American Insects, A Handbook of the Insects of North America North of Mexico, 2nd Edition, CRC
- Borror, Donald et al, 1970. Insects, Houghton Mifflin.
- Cannings, R.A., 2002. Introducing the Dragonflies of British Columbia and the Yukon. Royal British Columbia Museum.
- Eaton R. and Kaufman K., 2007, Kaufman Field Guide to Insects of North America. Hillstar Editions L.C., Houghton Mifflin
- Marshall, S.A., 2006. Insects Their Natural History and Diversity. Firefly Books Ltd.