

# “Ode-to-nata”

(*Aeshna canadensis*)



productions presents

# Taxonomy and Anatomy of



*Apis mellifera*

# What's in a (Latin)name?

Apis= bee

Melli= honey

Ferre=“to bear” “honey bearing bee”

A quick overview of *classification*.

Systematic Biology

# Two major goals of Systematics

Phylogeny (reconstruct evolutionary history of a group of organisms)

molecular phylogenetic (rRNA and proteins)

Cladistics (last common ancestor)

Taxonomy ( identification and naming)

The Linnaean System of taxonomy

(Swedish naturalist Carl von Linne 1707-1778)

**binomial nomenclature** – *Apis mellifera* (Genus-species)

*Genus capitalized, species is not, all italicized*

# TAXONOMY OF THE HONEY BEE

(Traditional evolutionary systematics)

**Domain:** Eukarya (3 domains, Bacteria, Eukaryotes, and archaea)

**Kingdom:** Animalia (4 kingdoms, protista, fungi, plantae, and animalia)

**Phylum:** Arthropoda (2 sub phylum, chelicerata and mandibulata)

**Class:** Insecta (6 classes, merostomata, arachnida, crustacea, chilopoda, insecta, and diplopoda)

**Order:** Hymenoptera (29-34 plus, bees, ants, wasps, hornets)

**Family:** Apidae (949 plus)

**Genus:** Apis

**Species:** millifera (over one million species)

Other sub species of Apis,

cerana (Asiatic – China)

indica (India/Thailand, coconut and palms)

nigrocincta (Philippines)

Africanized-hybrid variety of A. millifera with african honey bee scutellata

# Anatnomooy of *Apis millifera*



## External comparisons of female worker and drone



# Ventral view





# Drone dorsal view



# Female worker ventral view



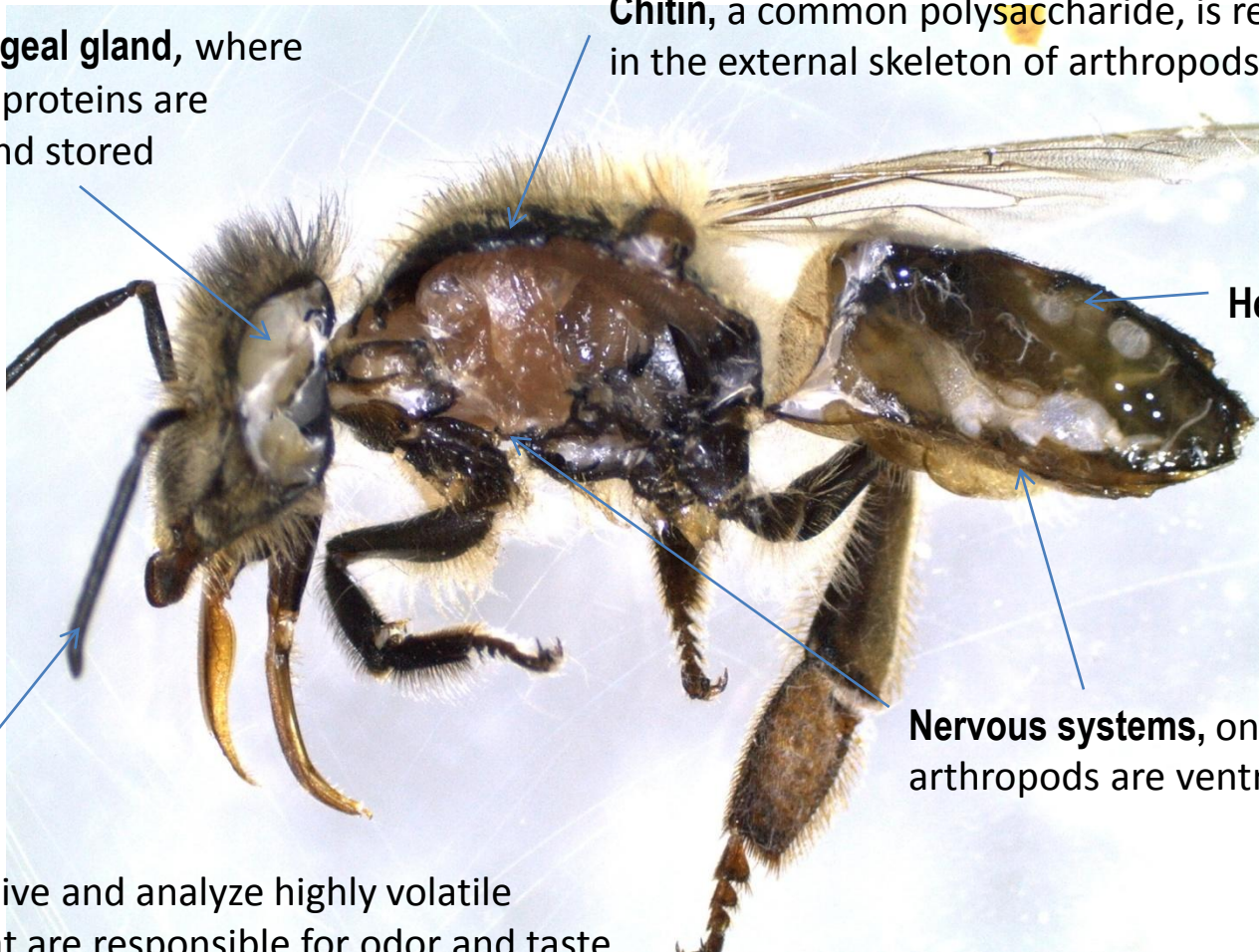
# 3 Main Body Parts



# Longitudinal cut

**Hypopharyngeal gland**, where specializing proteins are produced and stored

**Chitin**, a common polysaccharide, is reinforcing fiber in the external skeleton of arthropods.



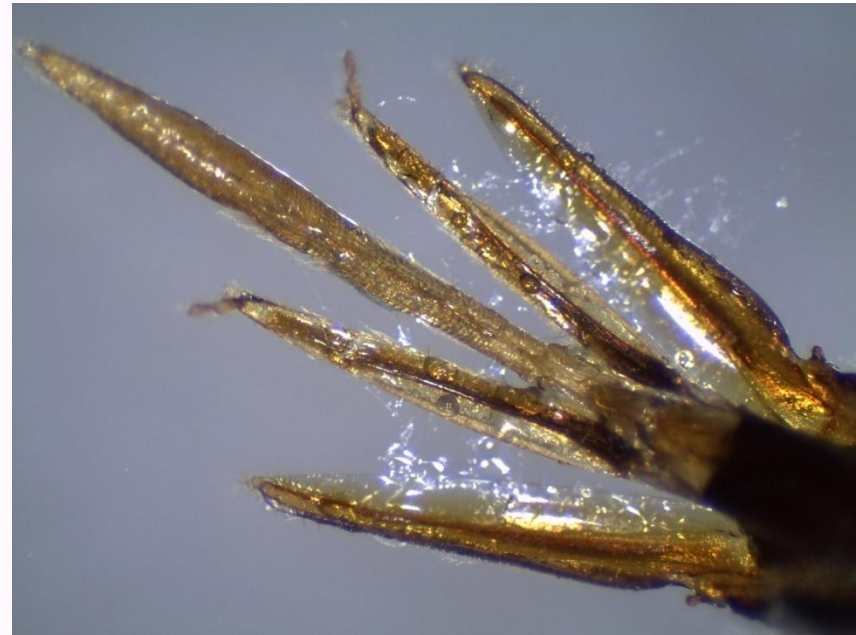
**Heart**, open system

**Nervous systems**, on arthropods are ventral

**Antennae**, receive and analyze highly volatile substances that are responsible for odor and taste. Antennae also perceive vibrations and movement of air, sounds, temperature

# Head

**Ocellus** (or simple) eye, are found near the front and top of the head. Ocelli (3ea.) register intensity, wavelength, and duration of light. At dusk the ocelli estimate extent of approaching darkness, causing the bees to return to their hives.



Two types of mouth parts, **mandibles** for chewing and a **proboscis** for sucking

# Thorax



Dorsal view

Ventral view



# Longitudinal cut of thorax

Wing muscles



Respiration, air sacs

# Hind leg detail

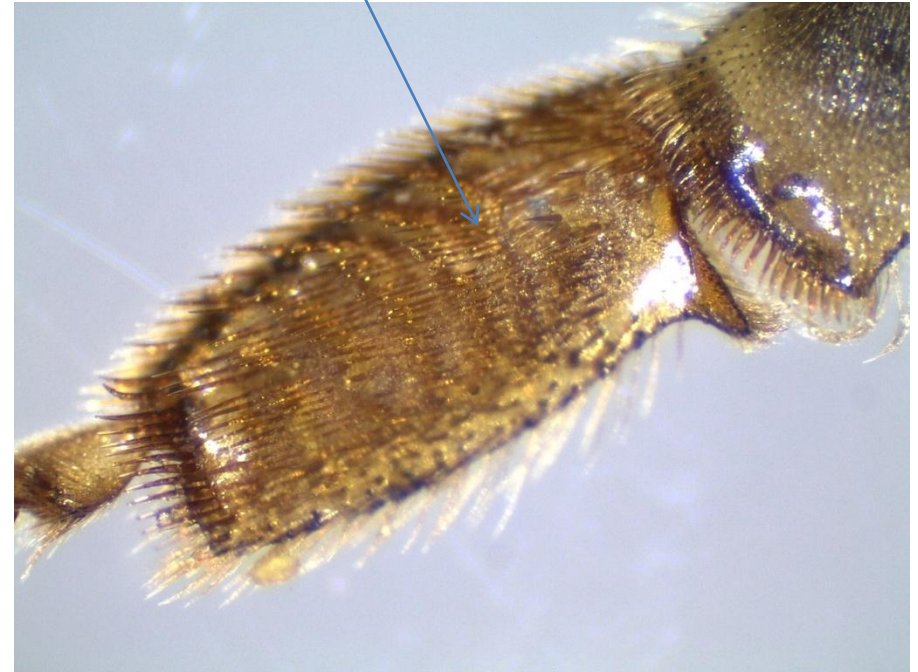


tarsus

tibia

femur

Corbicula (pollen basket)





# Wing details



**Fore wing**

**Hind wing**

**Wing hooks**



# Abdomen



Ventral view

Respiration, spiracles, tracheas and air sacs

Crop (honey stomach)



midgut

Sting poison gland venom sac  
(modified ovary)

# Stinger with barbs



# Wax glands



# Varroa mite on abdomen



# Vespid comparisons

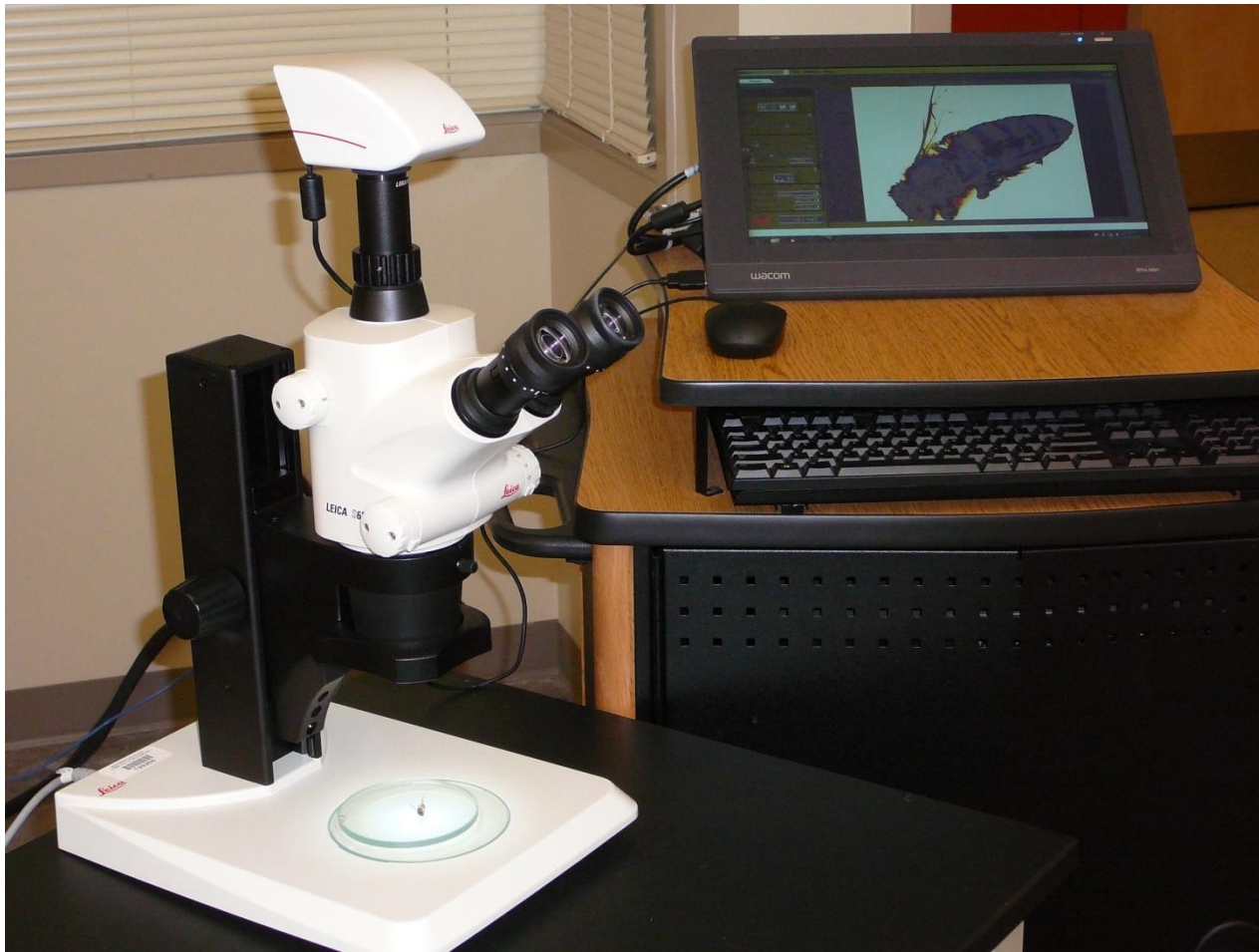


The three ocelli

# Bite and sting



# Leica dissecting microscope with digital camera





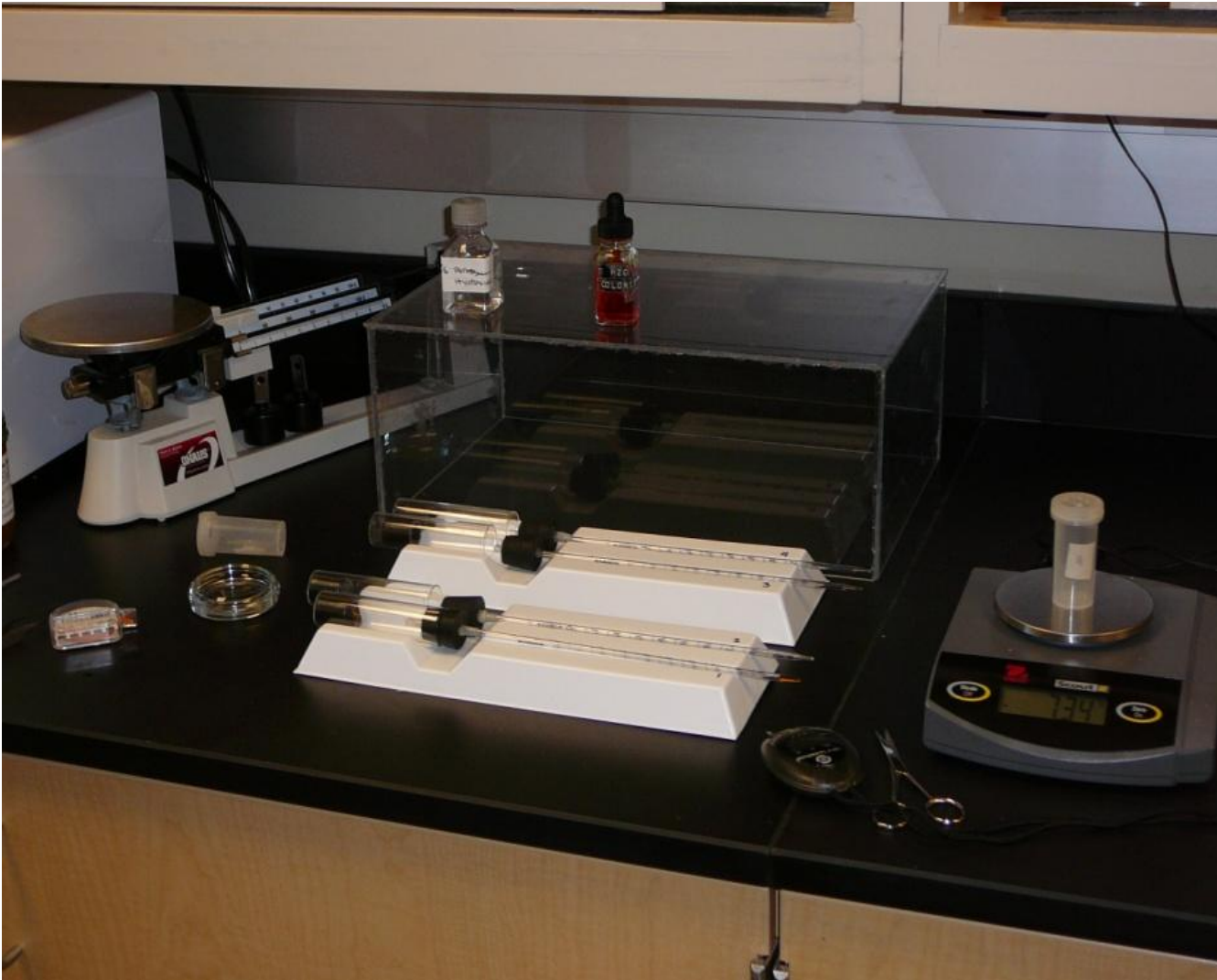
# In the Lab

## Measuring aerobic respiration

(taking in oxygen from the atmosphere and releasing carbon dioxide)

*When you loose weight, where does the weight go?*

By taking the mass of the specimen, the rate at which 1ml of atmospheric gas is converted, and time we can measure metabolic rates



# Metabolic rate of *Apis mellifera*



July 2012 run- 46.33 to 59.7  
Humans running approx. 10

My appreciate to,  
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