

ENTOM 312

General Entomology

**Mike Smith,
Professor of Entomology**

**785-532-4700
cmsmith@ksu.edu
128 Waters Hall**

(Please see the syllabus for office hours.)

Why Should I Care About Insects ?

Course Objectives

Students will be able to...

- Explain the importance of insects
- Describe basic insect structure and function
- Describe the basic classification of economically important insects
- Explain how insects affect humans

Course Outcomes

At the end of the course, you should be able to...

- Explain which order an insect belongs to
- Describe something about an insect's structure and function
- Increase your insect appreciation and decrease your *entomophobia* (ento - insect, phobia - fear)
- Not instinctively want to smash a bug!

Grading/Assessment

- Pop Tests (5 @ 10 points each) = 50 points, keep best 4 (40 pts.)
- In-semester examinations* (3 @ 100 points each) - keep the best 2 scores (200 pts.)
- Comprehensive final (mandatory) (100 pts.)
- Group Report Presentations (60 pts.)

<u>Grade Composition</u>	<u>Grading Scale:</u>
Pop tests 40 pts.	360 - 400 pts. - A
Exams 200 pts.	320 - 359 pts. - B
Final 100 pts.	280 - 319 pts. - C
<u>Group Reports 60 pts.</u>	240 - 279 pts. - D
Total Points 400 pts.	239 pts. & below - F

*Exams (multiple choice, true/false fill-in-the-blank, & short essay questions - based on coherent, complete sentences!). No make-ups, except for true medical emergencies, as explained & verified by physician's letter.

What Do You Do to Succeed in the Course ?

- 1. Come to class. There will always be comments and discussion in class that will not be on the lecture files.**
- 2. Study the class notes before AND after each class. Don't wait to "react" to what's presented. You'll be behind from the start! Read about class lecture & discussion topics ahead of time. Do internet searches of information related to lectures. Read the newspaper. Be ready to ask questions and contribute to each class discussion.**
- 3. DO NOT WAIT UNTIL THE DAY BEFORE AN EXAM TO STUDY !!! 100 years of educational data prove this is a blueprint for failure. Read, re-read, and highlight notes several times before each test.**
- 4. No question is unimportant. Most likely, for every one you think is unimportant, there are several people with the same curiosity.**
- 5. Read "entomocentrically". Try to see the insect angle in news stories and science news you read.**

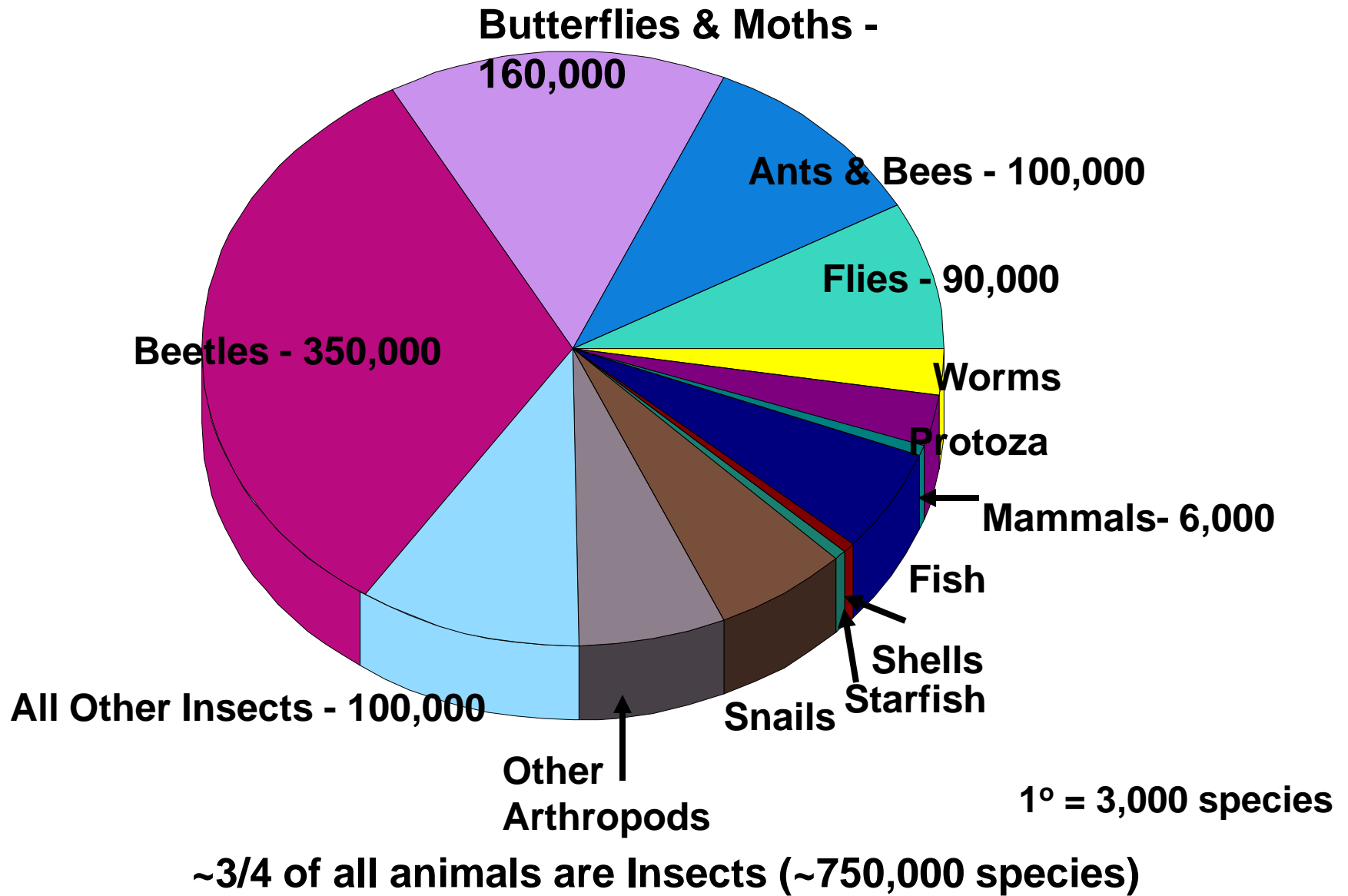
Why Study Insects?

- There are ~ 10 quintillion (10,000,000,000,000,000,000) individual bugs on earth at any given moment !!
- Insects outnumber humans ~200,000,000 to 1.
- lbs/acre (U.S.)

Insects 400

Humans 14





Why Classify Organisms?

- To study anything, we need a system of names - “nomenclature”
- Similarity is the basis for all nomenclature & morphological traits were the first classifying traits.
- Carl Linneaus (b. 1707, Sweden), created a system of animal & plant classification called binomial nomenclature: (bi = two; nome = names), i. e. the genus & the species
- The species is the basic unit of nomenclature; the genus includes several species. ex. Blatella germanica or *Blatella germanica*

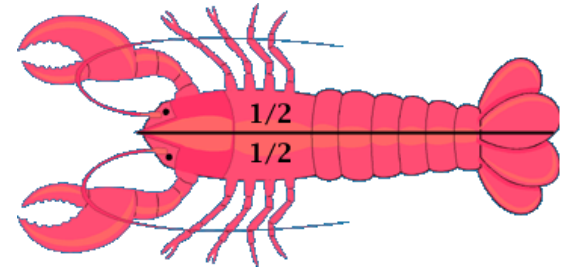
Taxonomic Category Hierarchy

- **Kingdom - Animalia**
- **Phylum - Arthropoda**
- **Class**
- **Order**
- **Family**
- **Genus**
- **Species**

KeeP Putting Coffee On For Good Students

Phylum Arthropoda “jointed-feet”

1. Bilateral symmetry
2. An **exoskeleton** containing **chitin**
3. Segmented body: 20-21 ring-like metamereres
4. Paired, jointed appendages
5. *Dorsal* heart with open circulation & dorsal brain
6. *Ventral* nerve cord & tracheal (air) system



Arachnida

(scorpions, ticks, spiders mites)

cephalothorax & abdomen; no antennae;
4 pairs of legs in adults; 1 pair mouthparts (chelicerae)



Crustacea

(barnacles, crabs, crayfish, lobsters, shrimp, pill bugs)

2 pairs of antennae, 5+ pairs of legs



Chilopoda (centipedes)

wingless, multi-segmented trunk, each with 1 pr. legs (except 1st & last 2); 1 pr. antennae; first segment has poison legs (jaws) - “toxicognaths”



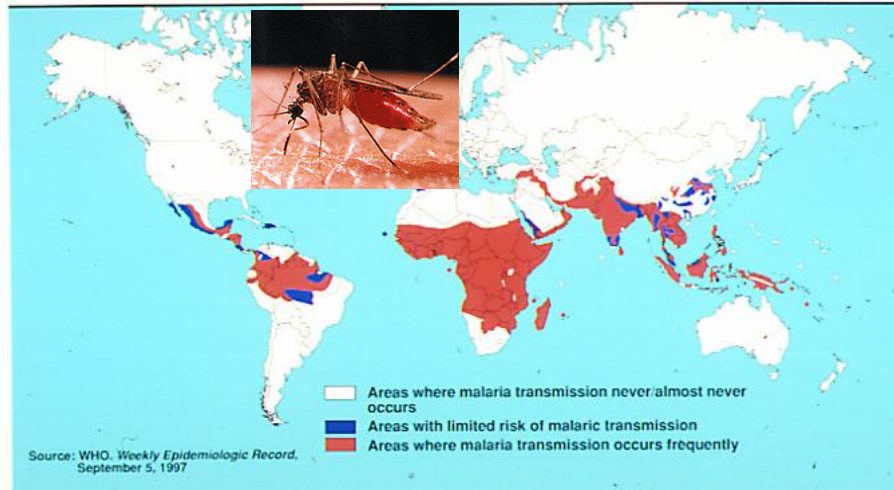
Diplopoda (millipedes)



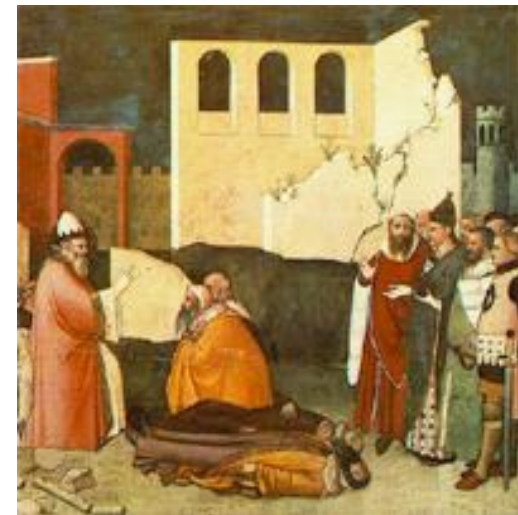
wingless; 1 pr. antennae; multi-segmented trunk, each with 2 pr. legs (except 1st 3); segments fused dorsally; many spp. secrete chemical defense that may contain HCN

Negative Impacts– The Loss of Life, Food, and Homes

- 40% of all world food produced annually is lost to insects
- Over 1 million people die each year of malaria, vectored by mosquitoes



Early bioterrorism/biowarfare □ - 1346,
Tartar army hurled corpses of victims of
flea-vectored plague over the walls of Kaffa
in southern Russia.



Positive Impacts - Food, Clothing, Medicine



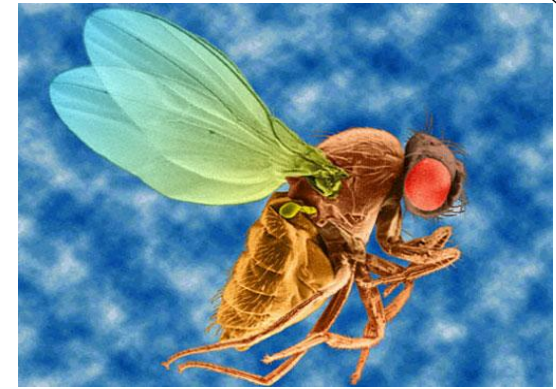
- Allantoin, secreted by maggots, discovered to heal deep wounds in World War I
- ~1/3 of the human diet is the direct result of insect pollination
- Silk production in Asia & Europe
- Scale insects used to make red dyes to color cosmetics, foods, & medicine.
- Soil fertility from decomposers & burrowers; control of pests by predators and parasites (good bugs) -- ~\$20 BILLION per yr. (+) to U.S. economy

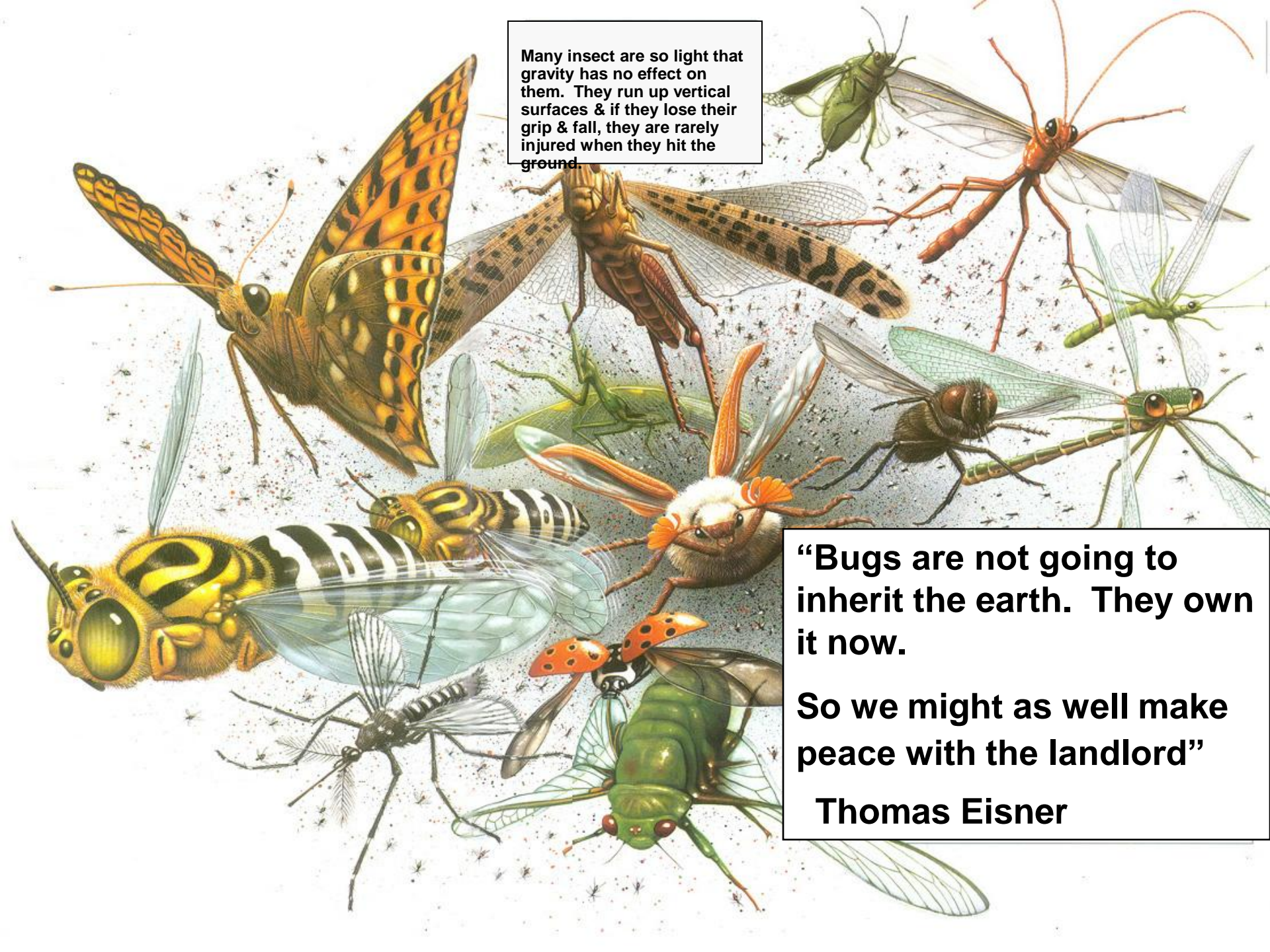
• Insects invading corpses are standard forensic tools used to make accurate estimates of the time and cause of death!



Summary

- More insects than ALL other animals combined
- Crops: the good and the bad
- Vectors of many diseases BUT provide useful products
- Crime solving ability
- Model organisms for research
- Without insects, life as we know it would not be possible.





Many insect are so light that gravity has no effect on them. They run up vertical surfaces & if they lose their grip & fall, they are rarely injured when they hit the ground.

“Bugs are not going to inherit the earth. They own it now.

So we might as well make peace with the landlord”

Thomas Eisner

Conclusion

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