Biology 15.4

Phylum Insecta

1. Largest Class of animals. Over 800,000 species. Almost 3/4 of all animals. Mostly small harmless.
2. Habitat: Ubiquitous.
3. Organization:
    1. Arthropod body plan. Organs bathed in hemolymph in the hemocoel
    2. Three body segments with three pairs of legs on thorax not on abdomen.
        i. flies have claws and sticky pads
        ii. water strider has bristles on legs
        iii. bees: fuzzy legs
    3. Wings
        i. Most have two pairs
        ii. Only invertebrates that can fly
        iii. Bee wings up to 200 beats a second
        iv. flying wings: membranous
        v. protective wings: thick and tough
4. Symmetry: bilateral.
5. Integument: exoskeleton with chitin
6. Skeleton system: invertebrate. exoskeleton of chitin. jointed appendages.
7. Muscle system: striated
8. Movement: walk, crawl, hop, swim, and fly
9. Nervous system/ Senses: one pair of antennae. ganglia and nerve cords, sense organs
    a) ventral nerve cord. anterior ganglion
    b) compound eyes
    c) touch, taste and smell (antennae), hearing
    d) balance and orientation controlled by haltere organs (external dumbbell-shaped miniwings)
10. Behavior/activity: interactive, taxes
11. Nutrition: heterotrophic. Carnivores, herbivores, and omnivores. wide variety of forms and methods.
12. Digestive system: unidirectional, ciliated alimentary canal of foregut, midgut, hindgut; and with mouthparts of upper lip, mandibles, maxillae, and lower lip
13. Respiratory system: trachae: highly branched system of tubules from pores in body to cells.
14. Circulatory system: Open: dorsal, tube heart (with ostia and chambers) pumps blood to head and returns washing over the organs with a nutrient-rich soup.
15. Immune system: innate humoral and cellular non-specific and specific
16. Excretory system: malpighian tubules used to excrete uric acid, etc.
17. Reproductive system:
    a) Dioecious
    b) Seminal receptacle used for future fertilization, and eggs fertilized upon depositing
    c) Thousands of eggs a day
18. Life cycle:
    1. Metamorphosis
        i. change in form, diet, etc.
        ii. Ametaboly is no metamorphsis
        iii. Incomplete metamorphosis: 3 stages: egg, nymph, adult

iv. Complete metamorphosis: egg, larva, pupa, and adult
v. larva: maggots (flies), grubs (beetles), wigglers (mosquitoes), caterpillars (moth and butterflies)
vi. pupa: cocoon (silk casing of moths), chrysalis (butterfly), tumbler (mosquito),

19. Interesting facts about insects
    1. Thirty-two orders of insects including
        a. Beetles: largest order of insects
        b. Bees, wasps & ants: social insects, membrane wings
        c. Butterflies and moths:
        d. Flies, mosquitoes and gnats
    2. Survivability of insects
        a. Disguise and camouflage: walking stick, viceroy butterfly
        b. Weapons: wasp stingers, bombardier beetle
        c. Numbers: termite queen produces 3600 eggs an hour for 15 years (almost half a billion eggs in lifetime).
    3. Control of insects
        a. Quarantine: Do not allow foods etc. to be carried
        b. Insecticides: poisons to kill insects
        c. Environmental control: drain swamps, prevent garbage buildup, crop rotation
        d. Biological controls: ladybugs, spiders, birds, snakes
        e. Pheromones: chemicals that attract insects, very specific
        f. Sterilized insects
        g. Bacteria and viruses to cause disease
    4. Danger of controls
        a. DDT harms other organisms such as the bald eagle
        b. Transporting Mexican frogs could cause other frogs to die out