The Wonderful World of Insects

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Taxonomy
The Insects

Part I
Taxonomy
Scientific classification or biological classification is a method by which biologists group and categorize species of organisms.
Invertebrates (Phyla)
1. Porifera - sponges
2. Cnidaria - jellyfish, corals
3. Platyhelminthes - flatworms, flukes, and tapeworms
4. Nemata - roundworms, Trichina, filaria
5. Mollusca - snails, slugs, clams, and oysters
6. Echinodermata - starfish, sea cucumbers; sea urchin
7. Annelida - segmented worms, leeches, earthworms
8. Arthropoda - insects, spiders, crayfish, millipedes

Vertebrates (Phylum)
9. Chordata - fishes, amphibians, reptiles, birds, and mammals

Phylum Arthropoda
Arthropoda (Classes)
insects, spiders, crayfish, millipedes

body composed of ring like segments, jointed appendages, exoskeleton, bilateral symmetry, ventral nerve cord, dorsal heart.
Classification

Classification of the common housefly:

Kingdom  Animal
Phylum    Arthropoda
Class     Insecta
Subclass  Pterygota
Division  Endopterygota
Order     Diptera
Family    Muscidae
Genus     Musca
Species   domestica
Author    (Linnaeus)

Scientific name = Musca domestica (L.)

What Makes a Bug a Bug?

Three very important characteristics separate insects from all other arthropods and animals.

Six legs

Three body parts

Wings
PART II

The Insects

Insects (Class Insecta) are a major group of arthropods and the most diverse group of animals on the Earth, with over a million described species—more than double the number of all other living organisms combined.

Successful Taxa

The most abundant in numbers of species
3/4 of all animals are insects >1/2 of all living organisms are insects

Largest group are the beetles followed by butterflies and moths; wasps, ants, & bees; flies; true bugs (more species of bees than mammals)

Number of species is only an estimate since many are still not named
- 800,000 to 1 million to 30 million

Enormous diversity and found in most environments

Why are insects so abundant and so diverse?

- Small size
- High reproductive potential
- Short generation time
- Resistance to environmental extremes
  (dormancy = diapause, aestivation)
- Readily adapt to changing conditions
- Dispersal via flight
Bugs are involved in every part of your life

Directly - food, nuisance, bites, stings
Urban Entomology, Medical Entomology

Indirectly - food prices, pollination, crop pests, medical advances, genetics
Agricultural Entomology, Biological Control, Invasive Species

WHY ARE THEY HERE?

Important elements in ecosystems
- plant feeders, predators,
- decomposers, pollinators, vectors
- of disease, forensic entomology

A world without insects?
Pests/Pesticide

• Insects/Insecticide
• Mites/Miticide
• Nematodes/Nematicide
• Snails and Slugs/Molluscicide
• Weeds/Herbicide

Classification of Pests

• Insect has 6 legs, three body parts, wings
• Mites and others have more than 6 legs, two body parts, all are wingless
• Arthropods have exoskeleton
• Snails and slugs are mollusks
• Nematodes are round worms

Metamorphosis

• Insects, like all arthropods, have to shed their skin to grow.
• Two Types of metamorphosis
  • Complete (Holometabolous)
    • Egg, larva (grub, caterpillar), pupa, adult
  • Incomplete (Hemimetabolous)
    • nymph (naiad), adult
Feeding Behavior

Pit Forming Psyllids
Leafhoppers
membracid

Sharpshooters
cicada
cercopid

Thrips
aphid

Psyllids:
Whiteflies
Mealybugs & Soft Scales

Psyllids:

epidermis
parenchyma
xylem
phloem

planthopper
Spider mites