

Lecture 5: Systematics and Taxonomy

Systematics:

Taxonomy:

Hierarchy of categories used in classification ...

Phylum (and subphylum)
Class (and subclass)
Order (and suborder)
Superfamily
Family (and subfamily)
(Tribe)
Genus (and subgenus)
Species (and subspecies)

Names of the people who described a species:

Papilio glaucus Linnaeus (Lepidoptera: Papilionidae)

The scientific name of the tiger swallowtail described by Linnaeus in the genus
Papilio

Leptinotarsa decemlineata (Say) (Coleoptera: Chrysomelidae)

The scientific name of the Colorado potato beetle, originally described by Say, but
using a genus name other than *Leptinotarsa*. (The parentheses around the name of
the descriptor tells you it was first described in a different genus.)

Phylum Arthropoda

Phyla that are most closely related are the Annelida (the segmented worms, including earthworms, sea worms, and leaches) and the Onychophora (wormlike and slug-like creatures that live in moist habitats in the southern hemisphere). Unlike arthropods, annelids do not have segmented appendages, a chitinous exoskeleton, or a tracheal system. Their circulatory system is closed, skeletal muscles are not striated, and excretion is by nephridia. Onychophorans have segmented antennae but not segmented legs or striated muscles; excretion is by nephridia. They do have a chitinous exoskeleton, a tracheal system, and an open circulatory system.

Subphyla:

Trilobita - the trilobites (fossils only). One pair of antennae, paired leg-like appendages, anterior portion covered with a carapace. Marine animals with gill-like structures at the base of the appendages.



Trilobite fossil (New Mexico State University Museum)

Chelicerata – the chelicerates. No antennae; the first pair of appendages are chelicerae (involved in food handling); 2 distinct body regions -- cephalothorax and abdomen.

Classes include:

Merostomata -- horseshoe crabs



Horseshoe crab (www.globalclassroom.org)

Arachnida –



Left: black and yellow argiope (Oklahoma Biological Survey). Right: brown recluse spider (University of Arkansas Arthropod Museum)

Pycnogonida -- sea spiders ... see

http://www.californiabiota.com/cabiota/sea_spider_unid_sfbay.jpg

Crustacea 2 pairs of antennae; most appendages end in a 2-branched segment ("biramous")

Classes include:

Branchiopoda -- fairy shrimp



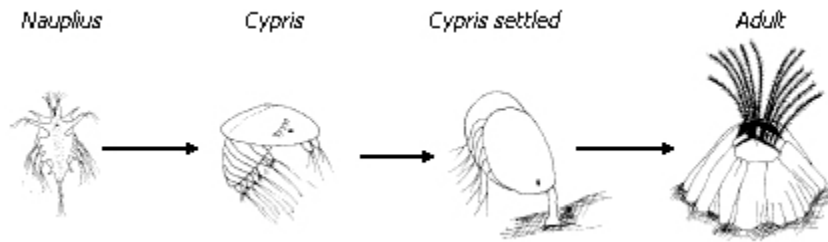
Fairy shrimp (U.S. Fish and wildlife Service)

Copepoda -- copepods (*Cyclops*)



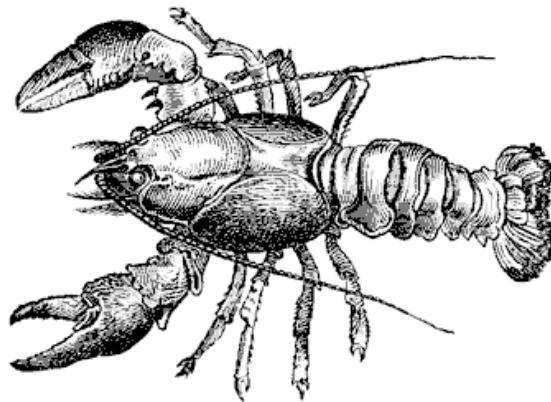
A copepod (University of Florida)

Cirripedia -- barnacles



Barnacle life cycle (Canadian Department of Fisheries and Oceans)

Malacostraca --



A lobster (Florida Educational Technology Clearing House).

Atelocerata

A single pair of antennae, unbranched appendages, unique structure of mandibles (in comparison with the Chelicerata)

Classes include:

Diplopoda –



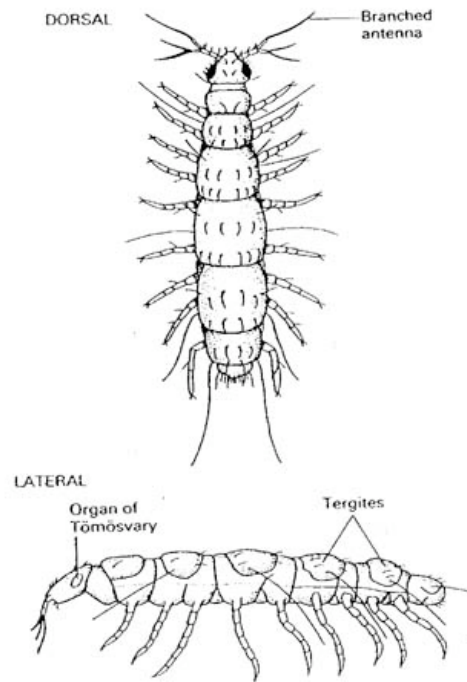
A millipede (University of Illinois)

Chilopoda –



A house centipede (University of Kentucky)

Pauropoda – pauropods



Pauropoda (University of Missouri)

Symphyla – symphylans



Garden symphylan (Oregon State University)

Hexapoda –

For more information, ...

Read and study pages 26-35 in the course textbook, **Photographic Atlas of Entomology and Guide to Insect Identification**, by J.L. Castner, Feline Press, Gainesville, FL (2000).

See also:

An Introduction to Insect Taxonomy at The Wonderful World of Insects
(<http://www.earthlife.net/insects/classax.html>)

Arthropoda, at The Tree of Life
(<http://tolweb.org/tree?group=Arthropoda&contgroup=Animals>)