

Subphylum CRUSTACEA ( $\approx$  42,000 spp)

Class MALACOSTRACA (28,000 spp)

Order DECAPODA (crabs)

Order ISOPODA (Wood lice)

Order AMPHIPODA (beach fleas)

Class BRANCHIOPODA (800 spp.) microcrustacea

Class MAXILLOPODA

Subclass COPEPODA (4,500 spp) microcrustacea

Subclass OSTRACODA (7,000 spp) microcrustacea

Subclass CIRRIPEDIA (900 spp) (barnacles)

Subphylum Crustacea ("hard surface") Known as the "Mandibulates"

Appendages: 1st pair - antennae (homologous w/ insect antennae)

2nd pair - antennae (perhaps homologous w/ arachnid chelicera)

3rd pair - MANDIBLES

4th/5th pairs - maxillae

6th-8th pairs - maxillipeds (food handlers)

9th-13th pairs - walking legs

## EXOPODITE

Biramous appendages: PROTOPODITE

## ENDOPODITE

Head/thorax (usually w/ a carapace) + abdomen/telson

Class Malacostraca ("soft shelled")

Thorax of 8 segments (maxillipeds + legs)

Abdomen of 6 segments (pleopods + uropod)

Order Decapoda ("10 feet") 8,500 spp shrimp, lobster, crayfish

1st pair of walking legs usually modified into CHELIPEDS (claws)

Crab has a reduced & "folded-under" abdomen

No malpighian tubules - Green Gland or Antennal Gland, mostly for

osmoregulation, especially in estuaries -  $\text{NH}_4$  excreted by gills

Gastric Mill & chitin teeth (stomach - mastication)

Hepatopancreas

Compound eyes, statocyst at base of antennae

Reproduction - nauplius larvae

Order Isopoda ("equal feet") pill bugs, wood lice

Flattened dorsal-ventrally

Scavengers

Order Amphipoda ("on both sides feet") beach fleas

Flattened laterally

Detritivores, brood chamber in thorax

Class Branchiopoda ("gill feet") Water fleas, Daphnia, fairy shrimp, brine shrimp

Almost all are filter feeders in freshwater

Epipodite modified gill - also used in locomotion and suspension feeding

Class Maxillipoda

Subclass Copepoda ("oar feet")

Single eye

Small size (1-5 mm)

Some parasitic

Principle link between phytoplankton and higher trophic levels in marine food chains.

Occur in enormous numbers

Subclass Ostracoda ("shelled")

Ancient group (back to Cambrium)

Small size (1-4 mm)

Enclosed in a CaCo<sub>3</sub> bivalve carapace

Appendages reduced to 2 pairs

### Subclass Cirripedia ("curled feet")

Described "like a shrimp standing on its head in a limestone house kicking food into its mouth."

Hermaphrodites

Cirri for filter feeding

Antennule cement gland

Will settle on firm substrates (< hull efficiency by 30%)

### Subphylum Uniramia

One pair of antennae

1st rostral appendage is the mandible

Appendages unbranched (uniramous)

### Class Diplopoda ("two legged) millipedes

Each body "segment" bears 2 pairs of legs (2 fused segments)

Stink glands for defense, some will secrete cyanide compounds

Feed on detritus in leaf litter

### Class Chilopoda ("clawed feet") centipedes

First trunk segment bearing a pair of large poisonous claws

Predaceous on insects, annelids, even toads & lizards

### Class Insecta

3/4 of all species on Earth

Body divided into a head/thorax/abdomen

One pair of antennae

Three pairs of legs

Usually Two pairs of wings

Subclass Apteriygota (wingless) silverfish, springtails

Primitive

Subclass Pterygota (winged or secondarily wingless)

#### Success of insects

1. Small body size - invade numerous habitats
2. Can fly - reach more habitats, disperse depleted areas, escape predators
3. Exoskeleton & chitinous mouth parts - water proof, wide feeding niches
4. Metamorphosis - exploit various food resources w/in a life time, protection from severe weather
5. Fast population turnover & high reproductive potential - 1 pair of fruit flies can beget 25 generations/yr. If all progeny reproduce, 1 ♀ could yield 1041 kin/yr. Rolled into a ball, this mass of fruit fly bodies would have a diameter equal to distance between Earth and

the sun.

6. Symbiosis (e.g., pollinators)