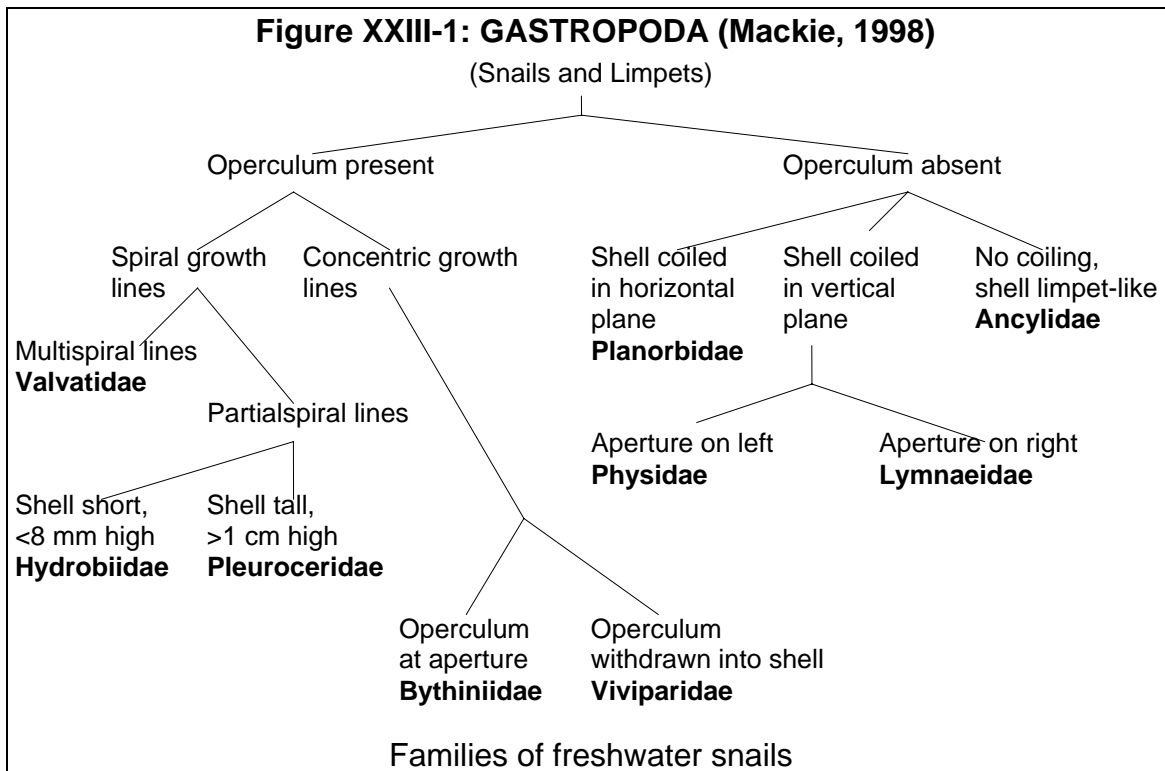


# Chapter XXIII —Class Gastropoda



(Freshwater Snails and Limpets)— Phylum Mollusca



There are approximately 485 species of freshwater gastropods in North America. About 15 of these are introduced but only a few are of socioeconomic concern or have quarantine significance. Freshwater gastropods are classified into two groups, the Prosobranchia and Pulmonata.

Snails possess a single shell that is usually coiled, although sometimes flattened and cone shaped. The freshwater gastropods are found in not more than 20 families of Prosobranchia (gilled) and in 7 families of Pulmonata (lunged) around the world. Most of the freshwater snails in the northeastern United States, prosobranch and pulmonate, feed by scraping algae and organic debris from stones, leaves, and other substrates. Major predators of snails include fish, water-flow, crayfish, leeches, and sciomyzid flies.



The **prosobranchs (gilled)** are gill-breathing snails derived from marine ancestors. The freshwater prosobranchs tend to occur in large and old lakes in tropical regions. The large assemblages of endemic species found in some old lakes are mostly composed of prosobranchs. Because prosobranchs depend on oxygen dissolved in the water for respiration, they are intolerant of sites where dissolved oxygen is scarce, such as sites of organic pollution. They also are absent from temporary waters. Some prosobranchs are long lived, with life spans of three to five years. Although most prosobranch species have separate sexes and lay eggs, there are some conspicuous exceptions to this pattern. Members of the family Valvatidae are hermaphrodites, and members of the family Viviparidae (the “mystery snails”) are ovoviviparous, including one common species, *Campeloma decisum*, that is parthenogenetic.

Gilled snail characteristics include:

- An operculum or plate-like door that protects the opening of the shell and can be quickly closed to avoid predators.
- Coiled shells that usually open on the right-hand side (dextral).

The freshwater **pulmonates (lunged)** are best developed in ponds and eutrophic lakes of small or moderate size and relatively recent origin in temperate regions. Pulmonate snails are descended from terrestrial snails, so they have lungs and breathe air. Although this feature frees them from a dependence on oxygen dissolved in the water (some pulmonates inhabit grossly polluted sites), most pulmonates must come to the water’s surface to breathe. A few pulmonates have developed some kind of secondary “gills”, which enable them to remain submerged indefinitely. In many pulmonates the mantle cavity may be filled either with air or with water, so that the mantle wall can work either as a lung or as a gill.



The limpets (family Ancyliidae) have an external *pseudobranch* that functions as a gill, and in some of the Lymnaeidae, the highly vascularized mantle cavity can be filled with water used as a gill. Many pulmonates are short-lived and are able to complete their life cycles in a year or less. All of the freshwater pulmonates in the northeastern United States are egg-laying hermaphrodites. Pulmonates are common in all kinds of freshwater habitats.

Traits that determine pouch, pond or other groups of snails (pulmonate) include:

- No plate-like covering over the shell opening.
- Has shell that spirals with opening usually on your left side (if tip is pointed upward and opening is facing you), or shell that is coiled in one plane, or shell that is dome or hat shaped with no coils.

The two groups also show some physiological differences in nutrition. The pulmonates are limited to what they can obtain by scraping edible material with their radulae; a number of prosobranchs, however, also can trap food particles from their respiratory current in mucus, which is then ingested.

(Mackie, 1998) Considerable research has been done on the ecological and physiological tolerances and requirements of gastropods. Pulmonates tend to be more tolerant than prosobranchs of enrichment because pulmonates can rise to the surface to obtain oxygen when the dissolved oxygen supply is depleted. Most physids are known to tolerate anoxia for a short period of time but they, like all gastropods, need water well saturated with oxygen for proper development of eggs. Similarly, many prosobranchs, like some pleurocerids and viviparids, can tolerate near-anoxia, but only for short periods of time.

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