

A treatise on non-aquatic gastropod Mollusca, a.k.a. *snails*

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Definitions

If you wish to converse with me define your terms.
— Voltaire

Snails are defined as gastropods that have a shell. Gastropods are a class of invertebrates which include slugs, squids, octupuses and snails. These gastropods belong to a **larger** phylum of animals called *Mollusca*.

Classifications

The gastropod class is the most diverse within the *Molluscs* phylum. Across their aquatic and non-aquatic families gastropods occupy **every** marine environment from high-energy surge zones to ocean floorbeds.

Restricting our study to *non-aquatic* gastropods will mean that we encounter almost exclusively the **prosobranchia** and **pulmonata families**. Interestingly, the pulmonata gastropods respire using lungs whilst the prosobranchia use *gills*. (yes, you can use gills on land as long as they are kept *moist*.)

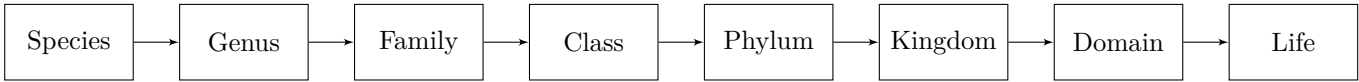


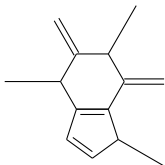
Figure 1: Hierarchy of taxonomic ranks

Habitat

Shelled gastropods can afford to live in more exposed areas than their non-shelled cousins. Gastropods generally prefer to live in damp or wet environments, with the shelled variants preferring forests, wetlands and gardens.

Behaviours

Most snails are herbivores, whilst some are omnivores and few are predatory carnivores. The herbivores use their thousands of microscopic pseudo-teeth to file through plants and algae, ripping food into small pieces. Snails eat at night, and some hibernate through the entirety of winter. Snails can hibernate for up to 3 years. They usually live for 2 - 3 years, but some can live for 10.



*written exclusively
under the influence*

Facts

- Snails are hermaphrodites, they all have pp.
- The field of taxonomy evolves quickly. Organisms classified as being one type are often later realised to be a subset of another type or dissimilar to the class they were initially categorised in.
- The largest land snails grow to 1kg and 38cm in length whilst the largest sea snails can reach 18kg and 90cm in length!
- Some snails eat other snails.
- Gastropods do not possess the sense of hearing!
- Most *terrestrial* (land) snails have shells that are right-handed in their coiling.
- During hibernation a snail will seal its shell shut with mucus to stay *moist*.
- There is a genus of pond snails called *Lymnaea* which only make decisions using two types of neurons: one which decides if it's hungry, and the other deciding if there is food nearby.



Figure 2: the Lymnaea snail.

Mathematics

Let us briefly consider the length of Jamiroquai the Garden Snail (*a.k.a cornu aspersum*). Approximating the shell function to be defined in polar coordinates as $r = e^{-\frac{\theta}{10}}$ we may then use

$$l = \int_{\theta_0}^{\theta_1} \sqrt{[f(\theta)]^2 + [f'(\theta)]^2} d\theta.$$

On



Figure 3: Jamiroquai

Such that the unravelled length of Mr Aspersum's shell becomes

$$\begin{aligned} l &= \int_0^{\theta_1} \sqrt{(e^{-\frac{\theta}{10}})^2 + (-\frac{1}{10}e^{-\frac{\theta}{10}})^2} d\theta \\ &= \int_0^{\theta_1} \sqrt{(1 + \frac{1}{100})e^{-\frac{2\theta}{10}}} d\theta \\ &= \frac{\sqrt{101}}{10} \int_0^{\theta_1} e^{-\frac{\theta}{10}} d\theta \\ &= \sqrt{101}(1 - e^{-\frac{\theta_1}{10}}). \\ &= \sqrt{101} \text{ (as } \theta_1 \rightarrow \infty). \end{aligned}$$

Glossary

animal	Any living thing that is not a plant (basically)
carnivore	An animal that feeds on other animals
herbivore	An animal that feeds on plants
omnivore	An animal that eats <i>both</i> plants and animals
phylum	A level of taxonomic rank
taxonomy	The branch of science concerned with classification of living things

References

- [1] Brian. J. Smith, *Identification keys to the families and genera of bivalve and gastropod molluscs found in Australian inland waters*, 1996
- [2] Brian. J. Smith, *Non-marine Mollusca*, 1992
- [3] Wikipedia, Online: <https://en.wikipedia.org/wiki/Snail>

