

# 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, octopuses 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*.)

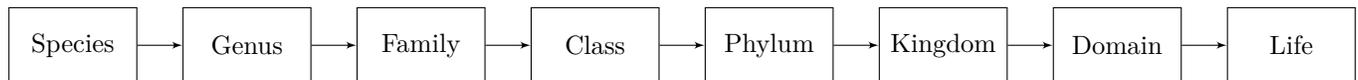


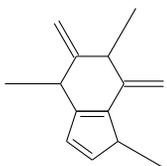
Figure 1: Hierarchy of taxonomic ranks

## 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

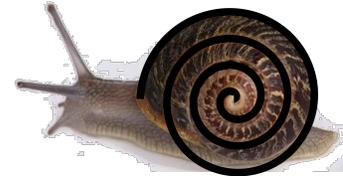


Figure 3: Jamiroquai

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>

