Spirals: dextral and sinistral

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I have noticed that the spirals we find in nature do not all turn the same way. The examples here are things we find in the yard and shells that we have from New Zealand.

Shells

Molluscs with shells are found on land, in fresh water and in the sea. They fall into two groups, gastropods with spiral shells and bivalves with two parts.

Most gastropods, like this 7 mm land snail we find in our garden, have shells that are right-hand spirals.

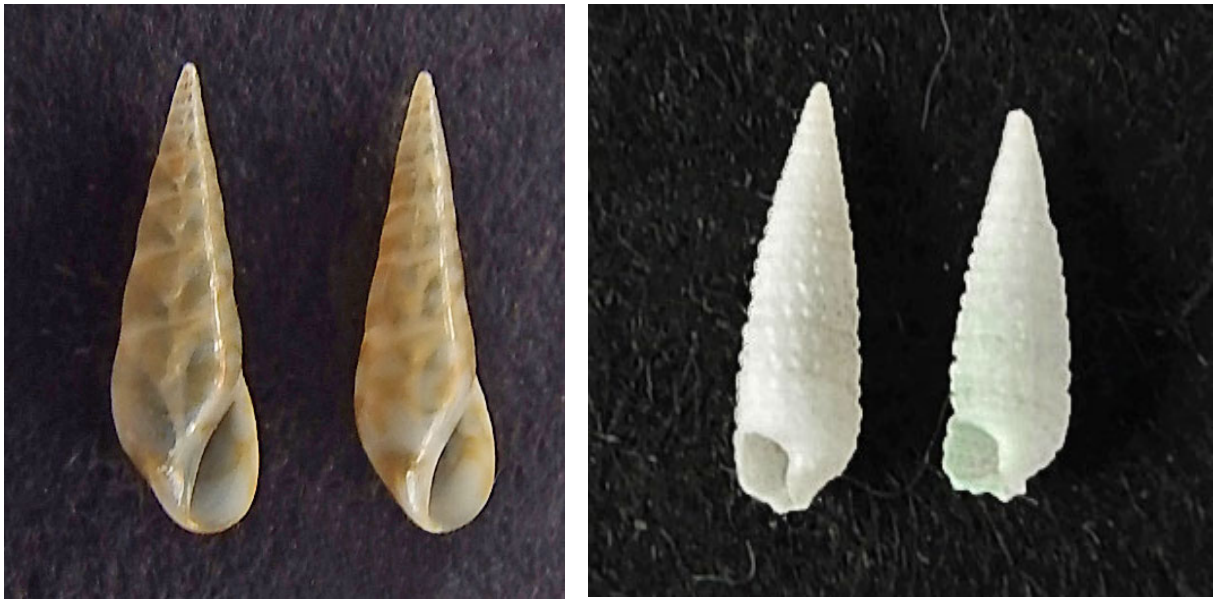
The Awl snail, *Subulina octona*, that we find on the ground under stones or wood after rain, has a shell that's described as being *dextral*, meaning right-handed.

Another small snail that we find in water-lily pots has a semi-transparent shell that's described as being *sinistral*, meaning left-handed.

All water snail sin the *Physidae* family have sinistral shells.

When a dextral shell is placed with the point upwards the opening is on the right. When a sinistral shell has the point upwards the opening is on the left.

The shells below are from the Northeastern coast of NZ.



The mottled, shiny, 7 mm dextral shells on the left are *Eulima perspicua*. The live animal is parasitic on echinoderms (sea eggs). The white sinistral shells on the right belonged in life to a mollusc called *Triphora inflexi*.

Sinistral shells are unusual.

All the tiny gastropod shells in the image above are dextral.

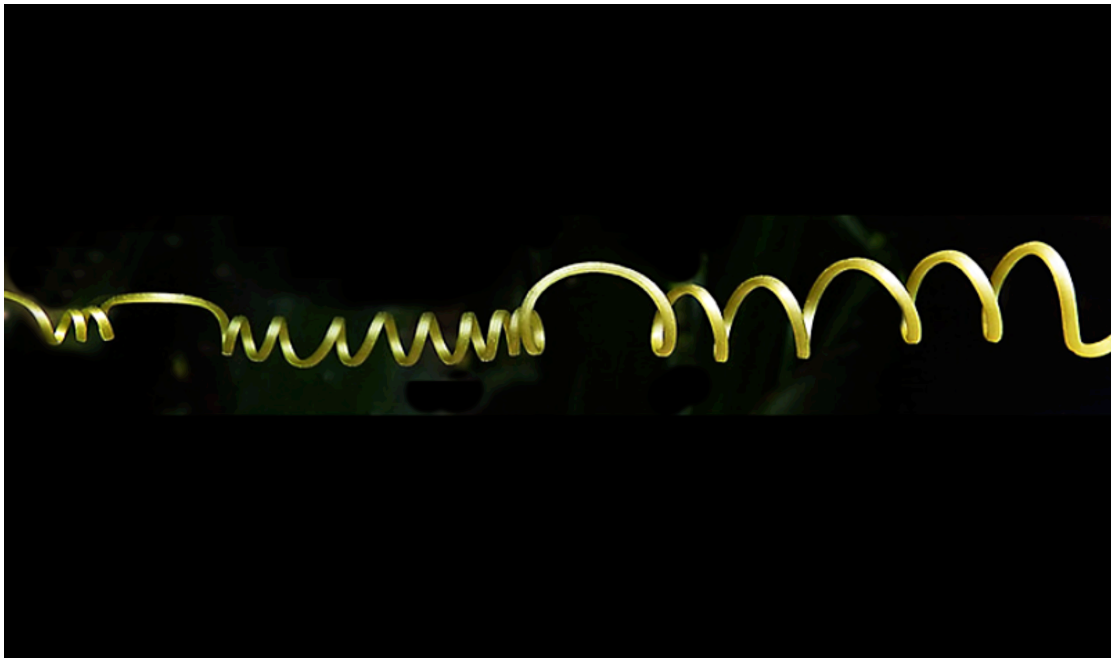
The nymph of the plant hopper *Elasmoscelis perforate*, that escapes from predators by jumping.

The long spiraled extensions act like the tail of a kite. As the insect flies through the air, they turn the body and control the descent so that it lands feet-first on a distant leaf. Stability is achieved with the twin tails: one dextral: one sinistral. A single spiraled extension would rotate the tiny creature in flight.

The adult has wings. The tails are discarded at the final molt.

Tendrils

The image shows a single tendril of the red melon vine, *Momordica cochinchinensis*, which grows wild throughout Southern China, Thailand, Laos, Myanmar, Cambodia, Vietnam and Northeastern Australia. We have a huge plant in our garden that looks after itself. We cook and eat the melons.



The tendril was straight when the growing tip on the extreme left attached itself to another vine. To reduce the length of the newly anchored tendril and pull the vine forwards it first kinked in two places along its length. The kinks then rotated in opposite directions, winding left and right hand spirals on either side.

I wonder how exactly it did that?

The total number of turns must remain zero. In this case …

$$-3 + 9 - 6 = 0$$

The tendrils of this vine are particularly fine examples of this mechanism. It would be interesting to measure the amount by which they shorten and the force generated as they do that.