

Researchers discover that the three known flamingo tongue snail species are in fact just one species

Two researchers at Naturalis and Oxford University Museum of Natural History, Bastian Reijnen and Sancia van der Meij, recently carried out research on flamingo tongue snails and found that the three known species (*Cyphoma gibbosum* – flamingo tongue; *C. signatum* – fingerprint flamingo tongue and *C. mcgintyi* – McGinty's flamingo tongue) are in fact one single species despite differences in their mantle morphology. *Cyphoma signatum* and *C. mcgintyi* have different color patterns than *C. gibbosum* (fingerprint pattern and brown dots) and *C. gibbosum* and *C. signatum* have different shell outlines and color (Reijnen & Van der Meij, 2017).

Flamingo tongue snails are easily recognizable thanks to their light colored coat, known as mantle, which has a pattern of orange dots with an encircling black line (Naturalis, 2017). The mantle is made up of soft tissue that covers the entire shell. The colors and patterns of the snail's coat help protect it against predators by warning predators of its toxicity. Flamingo tongue snails live on gorgonians and feed on them. They consume the living tissue of the gorgonians as they move across it; their digestive system secretes chemicals that break down the octocoral tissue into nutrients. The snail also ingests toxins from the gorgonians but stores them in its tissues and uses them as a defense mechanism against predators.



Reijnen and Van der Meij (2017) collected 31 flamingo tongue specimens from Curaçao and St. Eustatius and obtained material from Florida. The specimens belonged to the three known species as well as one unidentified black morphotype. "We found some patterns that were set between the striped and spotted one" explains Reijnen, "it was therefore not clear which kind of snail species they belonged to, which is why we carried out genetic testing" (Naturalis, 2017). The researchers used data obtained from a previous study on Caribbean *Cyphoma* (Reijnen et al., 2010) and carried out genetic testing on each of the 31 collected specimens to investigate the genetics behind the morphological differences in shell shape, mantle patterns and coloration in *Cyphoma* spp. (Reijnen & Van der Meij, 2017). Four molecular markers were studied: COI mtDNA, 16S mtDNA, 28S tDNA and H3 nDNA.

The results of the study revealed that there is no genetic difference between the three species and that they are in fact a single, genetically homogeneous species (Reijnen & Van der Meij, 2017). "We have now shown that all these patterns are just a variation of one and the same kind." explains Van der Meij. "Instead of describing new species, we synonymize snail species (*Cyphoma signatum* and *C. mcgintyi*) with the oldest available species name (*C. gibbosum*)". These findings are in line with anatomical studies by Ghiselin & Wilson (1966) and Simone (2004), who found that interpretation of the anatomical features in *Cyphoma* are troublesome and observed no clear differences between species. The researchers suggest that the prominent differences in mantle morphology between the species are the result of one of three possible scenarios: rapid divergence, supergenes or incipient speciation (Reijnen & Van der Meij, 2017).



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