

The origin and rapid diversification of carnivorous neogastropod snails: the turnover in gastropod faunas around the Early/Late Cretaceous transition

Neogastropods are carnivorous gastropods, which actively hunt their prey on sea bottom either by drilling their shells or piercing their body with mineral needle-like tooth applying venom. The venoms of some neogastropods are so potent that they can be lethal even for humans. In spite of ubiquitous of fossil neogastropod shells known since the Late Cretaceous their early evolution remains still unclear. They appeared somewhere at the turn of Early and Late Cretaceous and rapidly evolved into nearly all known from today neogastropod families. Now they contribute to one-third of all known living gastropods. From the early Cretaceous, and even earlier, from the Jurassic and Triassic, are known gastropods, which shells are similar to those of neogastropods but they also display characters, especially in their larval conchs, similar to herbivorous cerithiid gastropods.

In the following project we plan to investigate all species of gastropods which supposed to be ancestors of neogastropods. We will look for them in gastropod-bearing outcrops of the age close to beginning of their rapid radiation. We will investigate morphology of these shells, and in particular their juvenile and larval parts, which are very important for gastropod systematics, to answer the question when exactly they appeared, how their evolution proceeded and which Jurassic/Triassic gastropods are their ancestors. In this research we will use geochemical methods based on amino acids preserved in fossil shells. This method will tell us whether the gastropods so far considered to be ancestors of neogastropods (pseudotritoniids and purpurininds), but having some larval shell characters similar to the shells of herbivorous cerithiids, were indeed carnivorous or on the contrary, herbivorous.

We will also try to find out if there was any particular reason that they appeared and so rapidly evolved (e.g. rapid climate change) in this particular period of time. We will check all existing data on Mesozoic neogastropods as well as we will work on new collections, both collected during tenure of this project as well as those which we received from other researchers.

We plan also to address an earlier hypothesis that neogastropods have first evolved in cold waters and then they adapted to tropics that is opposite to majority other marine invertebrates.