

## **Do habitat shifts drive diversification in teleost fishes? An example from the pufferfishes (Tetraodontidae)**

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### **Abstract**

#### **Aim**

Habitat shifts are implicated as the cause of many vertebrate radiations, yet relatively few empirical studies quantify patterns of diversification following colonization of new habitats in fishes. The pufferfishes (family Tetraodontidae) occur in several habitats, including coral reefs and freshwater, which are thought to provide ecological opportunity for adaptive radiation, and thus provide a unique system for testing the hypothesis that shifts to new habitats alter diversification rates.

#### **Methods**

To test this hypothesis, we sequenced eight genes for 96 species of pufferfishes and closely related porcupine fishes, and added 19 species from sequences available in GenBank. We time-calibrated the molecular phylogeny using three fossils, and performed several comparative analyses to test whether colonization of novel habitats led to shifts in the rate of speciation and body size evolution, central predictions of clades experiencing ecological adaptive radiation.

#### **Results**

Colonization of freshwater is associated with lower rates of cladogenesis in pufferfishes, although these lineages also exhibit accelerated rates of body size evolution. Increased rates of cladogenesis are associated with transitions to coral reefs, but reef lineages surprisingly exhibit significantly lower rates of body size evolution.

#### **Main conclusion**

Ecological opportunity afforded by novel habitats may be limited for pufferfishes due to competition with other species, constraints relating to pufferfish life history and trophic ecology, and other factors.

#### **Thematic Areas (choose two among Macroevolution, Populations and Species, Adaptation, Biodiversity)**

Macroevolution, Populations and Species