

How changes in life cycle and associated environment foster functional diversity: A comparative analysis of prey capture kinematic in Caudata

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There have been several transitions between terrestrial and aquatic environments throughout tetrapod history. These environments induce distinct selective pressures due to their radically different physical properties. To better understand these transitions, amphibians are a model of choice because, depending on their life cycle strategy, they can undergo metamorphosis implying drastic changes from one environment to another during their lifetime. The aim of our study was to test whether the environment (water vs. land), developmental stage (adult vs. larva), life history type (biphasic vs. paedomorphic), and prey capture success impacted the kinematics of prey capture in salamanders. To do so, we gathered kinematic data on feeding (changes in the position of key structures during feeding) using high-speed video recordings. We contrasted the feeding kinematics of nine species of Caudata belonging to three families. Our analyses revealed that the feeding environment had the greatest influence on feeding kinematics while the life cycle had no significant effect. The observed differences in kinematics are due to differences in optimal feeding strategies (suction in water vs. tongue prehension in air) resulting in faster hyoid and jaw movements in water compared to on land.