Exaggerated trait evolution in brentid weevils

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The extent of exaggerated trait evolution in animals can inform us about the degree of sexual selection pressure on males between closely related species. In particular, sexual selection is hypothesised to drive the evolution of positive allometries, such that males in highly competitive environments will be expected to increase their relative investment into traits that enhance their mating success. Allometric slopes can evolve rapidly in response to different levels of sexual selection pressure and therefore have the potential to vary among populations and related species. The Brentidae (Coleoptera: Curculionoidea) are a highly diverse family, with more than 290 genera and 1690 species currently described. Brentid weevils are ideal as models for exploring secondary sexual trait evolution because many species exhibit high levels of sexual dimorphism, often due to the possession of exaggerated traits, such as rostrum length in males. Male rostra are likely to be under sexual selection, highlighted by several studies that have demonstrated the importance of this trait as a weapon used between males to fight for access to females. This study determined the extent of exaggerated trait evolution and sexual size dimorphism among brentids using photographs of museum specimens from 55 species across seven subfamilies. We predicted that sexual selection on rostrum length would result in positive allometries in species where rostrum size influences male mating success. Using sexual dimorphism as a proxy for sexual selection pressure, we predicted that those species with exaggerated rostra in males will have the highest levels of sexual dimorphism. By placing this study in a phylogenetic context we can also determine the extent of exaggerated trait evolution across the family and determine the variation in allometric slopes between closely related species. Finally, we explore the diversity in shape of the allometric slopes, highlighting evidence of male polymorphism in some species.