

SNAIL SPEARS AND SCIMITARS: THE STRUCTURE AND FUNCTION OF *CONUS* RADULA TEETH

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The radular apparatus of *Conus* differs from that of most gastropods in that it lacks a functional radular membrane, has rather few rows of teeth, has only two teeth per row, uses only one tooth at a time in feeding, and uses each tooth only once. The individual radular teeth are the structural basis of the conotoxin delivery system members of the genus use to overcome and paralyze prey. Each tooth consists of a rolled up sheet of chitin, with a hollow lumen, a sharp, barbed tip, and a swollen base. Its function combines those of a harpoon and a hypodermic needle, while the tubular proboscis functions analogously

to both harpoon line and hypodermic syringe. I will describe comparative morphological and morphometric analyses of *Conus* radular teeth that have 1) improved species-level systematic knowledge by expanding the set of informative taxonomic characters, 2) advanced understanding of functional morphology of radular teeth in injecting the potent venoms into prey, and 3) added characters that will help generate the first objective phylogenetic hypotheses for this major evolutionary radiation of marine animals. Advances in these directions are particularly important because *Conus* venoms and derivatives from them are rapidly gaining prominence in medicine and neurobiology, so accurate species determination is critical, and the species that are the most important sources of these compounds occur in the TMMP region. I will describe character states and a system for coding them, and estimate the range of variation in characters within and among individuals and species of generalist and specialist predator species and in putatively primitive species. Finally, I test the effectiveness of radular tooth characters in distinguishing very similar species, with particular emphasis on molluscivorous species of *Conus*.