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Anthropogenic changes, such as pollution, can significantly impact coastal communities by reducing organismal diversity and survival and can result in habitat loss. Amongst many pollutants, pesticides represent one such threat to coastal ecosystems. Currently, pesticides enter estuarine systems through run-off and freshwater inputs. While the concentrations of these chemicals may be low, they can still significantly impair the structure and function of many ecological communities through sublethal impacts on non-target animal physiology and behavior, including the ability of organisms to consume prey and avoid predators. Ultimately these impacts to behavior are important as they affect the magnitude and direction of trophic cascades which structure important coastal habitats. In coastal marsh systems, blue crabs (Callinectes sapidus) play a dominant role by consuming periwinkle snails (Littoraria irrorata) and by causing snails to climb out of the water to escape predation. Fewer numbers of snails, or fewer snails in the water, can result in more cordgrass growth and higher marsh productivity. Although the interactions of blue crabs and snails on cordgrass growth and marsh productivity is well known, it is unclear how or if pesticides may affect this trophic cascade. In this study, I propose to study the sublethal effects of fipronil on this coastal marsh food web by creating mesocosms with three treatments mimicking the three trophic levels in this system: cordgrass only, cordgrass and snails, and cordgrass, snails, and crabs. The effects of fipronil exposed crabs on consumptive and non-consumptive effects on snails will be assessed by snail death and snail foraging behavior. Impacts of fipronil on cordgrass consumption will be quantified by measuring cordgrass shoot growth, change in number of cordgrass live and dead leaves, and number of grazing scars. The results of our experiment are important as planned freshwater diversions in the Mississippi may lead to decreased cordgrass growth and increased marsh erosion.