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Effects of parasitic castration
on the salt marsh snail, *Cerithidea californica*

A Dissertation submitted in partial satisfaction
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by

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ABSTRACT

Effects of parasitic castration on the salt marsh snail, *Cerithidea californica*

by

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The salt marsh snail, *Cerithidea californica*, is commonly parasitized by larval trematodes. Like predators or parasitoids, these parasitic castrators eliminate the future reproduction of their hosts and should, therefore, affect host populations. To investigate the effects that parasitic castrators have on their hosts, I developed mathematical models of parasitic castration. I tested the assumptions of the models with field experiments, and then tested the predictions of the models in natural populations. The models were sensitive to assumptions of host and parasite immigration but generally predicted that parasitic castrators could substantially reduce host density. In the models, parasitic castrators reduced the density of unparasitized hosts even more than otherwise similar parasitoids. The models also indicated that competition between parasitized and unparasitized hosts usually led to a decline in the density of parasitized hosts and an increase in the density of uninfected hosts. Field manipulations of snail and parasite populations revealed that larval trematodes reduced the egg production of the snail population and increased the mortality of parasitized hosts. In addition, the growth of unparasitized snails was significantly reduced by the presence of parasitized snails, presumably due to competition for micro-algae. No effect of competition was detected on the fitness of larval trematodes. Within a salt marsh, there was a negative correlation between the prevalence of larval trematodes and snail density. This indicated that larval trematodes may depress host density. However,

there was no correlation between prevalence and snail density when comparisons were made among 18 geographically separated salt marshes. This may have been due to a wide variation in the carrying capacity for snail abundance among salt marshes. Snail populations that had a high prevalence of parasitic castrators were likely to have a high proportion of males. This was partially explained by the observation that male snails appeared to be more susceptible to parasitic castration than female snails. Finally, snail maturation size and the prevalence of parasitic castrators were negatively correlated. Snails from populations with high and low prevalence retained differences in maturation size after a reciprocal transplant between sites. This suggested that castration by larval trematodes had selected for early maturation.

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