

AN ABSTRACT OF A THESIS

IMMUNOSUPPRESSION OF NONHOST FISH SPECIES AND
ITS EFFECT ON GLOCHIDIAL METAMORPHOSIS

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Intraperitoneal implants of cortisol suspended in liquid cocoa butter were administered to nonhost fish species. Fish were then infested with glochidia of freshwater mussels to determine if inducement of transformation on nonhost species was possible after immune system manipulation.

Glochidia from *Venustaconcha sima* transformed on orangethroat darters (*Etheostoma spectabile*) after injection of cortisol at concentrations of 0.005, 0.010, 0.020, and 0.040 mg cortisol per gram of fish weight. Juvenile mussels were collected from orangethroat darters from experiments conducted between late March and July; however, no juveniles were collected from experimental fish during August through February. Creek chubs (*Semotilus atromaculatus*) similarly treated failed to produce juveniles of *V. sima* or *Villosa taeniata*. Banded sculpins (*Cottus carolinae*) transformed glochidia of *V. taeniata* after injections of cortisol at concentrations of 0.005, 0.010, and 0.020 mg/g. Juveniles were collected from experiments that began in November and June. No juveniles were collected from sham injected fish during any trial.

Results of some experiments suggest that cortisol-induced immunosuppression can facilitate metamorphosis of glochidia of freshwater mussels on nonhost fish species. However, a seasonal as well as a species-specific effect possibly exists. Orangethroat darters transformed glochidia during the spring and early summer only. Banded sculpins transformed fewer juveniles than orangethroat darters during the winter and early summer. Cortisol concentrations tested had no effect on creek chubs.