Dissertation Defense

of

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THE INFLUENCE OF THE SOCIAL ENVIRONMENT ON PHENOTYPIC PLASTICITY, FLEXIBILITY, AND EVOLUTION

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ABSTRACT

This dissertation describes the ways in which social environment shapes animal phenotype through phenotypic plasticity, flexibility, and evolutionary change. I investigated phenotypic plasticity in response to conspecific social environment using the mangrove rivulus (*Kryptolebias marmoratus*). I measured reaction norms for growth, behavior, and hormonal physiology for two isogenic lineages of mangrove rivulus raised from hatching to maturity in isolation and with conspecifics. I found that social environment increased growth, particularly in dominant individuals and that animals raised in a social environment exhibited greater flexibility in aggressive behavior towards a mirror or model, but showed no change in boldness or in hormone production. The two isogenic lineages exhibited different reaction norms, with one showing greater response to social environment than the other. I investigated phenotypic flexibility in response to social environment using the nesting behavior of male longear sunfish (*Lepomis megalotis*). I found that male longear sunfish showed a nonsignificant trend toward

reduction of nest construction when potential egg predators (juvenile sunfish) were present. However, sunfish did not alter the size or placement of their nests relative to cover. Finally, I proposed a novel conceptual model to describe how the evolution of sexual signals can be shaped by selection by heterospecific eavesdroppers. This model accounts selection by traditionally neglected eavesdroppers such as eavesdroppers that avoid signals, prey, and mutualists. I tested the response of bluenose shiners (*Pteronotropis welaka*), a potential mutualist, to a sexual signal (opercular flap length) of their host, longear sunfish. I found that bluenose shiners exhibited a preference for males with longer opercular flaps, the first experimental evidence of eavesdropping in a nest associate and potential mutualist. I then measured the morphology of the opercular flaps of sunfish from watersheds where bluenose shiners were present, watersheds where shiners were not present, and watersheds distant from shiners. Opercular flap morphology did not vary between these treatments, providing evidence that eavesdropping by bluenose shiners had not selected for changes in sunfish sexual signals.