MS Thesis Defense

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Title: Histological Analysis of Threespot Damselfish (*Stegastes Planifrons*) Gastrointestinal Tract and Implications for Staghorn Coral (*Acropora Cervicornis)* Health

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ABSTRACT

During the past three decades, Caribbean coral reefs have experienced a 98% decline in historic population levels of the primary reef-building corals, staghorn coral (*Acropora cervicornis*) and elkhorn coral (*Acropora palmata*). The threespot damselfish (*Stegastes planifrons*) is a Caribbean reef fish species that preferentially inhabits staghorn and elkhorn coral thickets. Threespot damselfish maintain algal lawns on local coral thickets by biting coral tissue to expose the calcium carbonate skeleton to promote the growth of macroalgae, which is then used as a major food source. This study examined the health impacts of damselfish habitation of staghorn coral thickets and investigated the potential of the threespot damselfish to serve as a vector for the coral pathogen identified as a *Rickettsia*-like organism (RLO). Gross observations coupled with histological analyses were used to determine a baseline coral health assessment for damselfish-colonized corals gathered from the Florida Keys and Broward County, Florida. Threespot damselfish samples were collected from respective Florida Keys thickets and the gastrointestinal tract was examined histologically for the presence of potential pathogens. Fluorescent *in situ* hybridization (FISH) was used to specifically identify the presence of RLOs within the damselfish gastrointestinal tract. The results of this study indicated that damselfish occupation of staghorn coral thickets had no effect on the overall health of the coral colony. Damselfish predation of resident coral thickets showed a minor decrease in overall coral health associated with the growth of algae through skeletal spaces. RLO infection levels of damselfish-occupied corals were similar to those seen in corals occupying thickets outside of damselfish territories. RLO presence was not detected in any sample of damselfish gastrointestinal tract with either basic histology or FISH.