LIFE HISTORY AND FEEDING ECOLOGY OF A SPECIALIZED NUDIBRANCH PREDATOR (*PHYLLODESMIUM POINDIMIEI*) WITH IMPLICATIONS FOR BIOCONTROL OF AN INVASIVE OCTOCORAL (*CARIJOA RIISEI*) IN HAWAI'I

A THESIS SUBMITTED TO THE GRADUATE DIVISION OF THE UNIVERSITY OF HAWAI'I IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF

MASTER OF SCIENCE

IN

OCEANOGRAPHY (MARINE BIOLOGY)

AUGUST 2008

By
Daniel Wagner

Thesis Committee:

Robert J. Toonen, Chairperson
Jeffrey C. Drazen
Matthew J. Church

CHAPTER 5. CONCLUSION

Since its initial discovery in 1966, *Carijoa riisei* has rapidly spread and proliferated throughout the Main Hawaiian Islands (Kahng and Grigg 2005; Kahng and Kelley 2007; Kahng et al. 2008). The specialized association between *P. poindimiei* and *C. riisei* (Rudman 1981, 1991), and the fact that *P. poindimiei* populations are already established in Hawaii (Wagner et al. 2007), make this nudibranch a logical candidate for an augmentative biocontrol agent of *C. riisei* in Hawaii. Ideally biocontrol agents should be host specific in order to minimize impact on non-target species, and maximize damage to the target pest species (Murdoch and Briggs 1996; Secord 2003; Sax et al. 2005). The results of this study indicate that *P. poindimiei* is a specialized *C. riisei* predator. However, several factors appear to limit the effectiveness of *P. poindimiei* at controlling *C. riisei* and hence its applicability as a biocontrol agent: (1) *P. poindimiei* has a planktotrophic larval phase, which might disperse larvae away from their parents, and hence away from local *C. riisei* populations; (2) there is at least one natural predator of *P. poindimiei* in Hawaii, and hence artificial augmentation of *P. poindimiei* populations can be counteracted by predation on this nudibranch; (3) epizoic sponges provide *C. riisei* with an effective predation refuge, and consequently portions of *C. riisei* populations that are sponge overgrown, which are typically abundant in shallow water (Kahng 2006), cannot be controlled through nudibranch predation; (4) *P. poindimiei* predation on *C. riisei* is incomplete as portions of *C. riisei* colonies (i.e. stolons) are left unharmed after nudibranch predation. Thus *C. riisei* is able to regenerate even after large predation events. These factors taken together indicate that *P. poindimiei* would be a poor biocontrol agent, and hence biocontrol of *C. riisei* using *P. poindimiei* should not be pursued.