Managing *Miconia calvescens* in Hawaii: Biology and Host Specificity of *Cryptorhynchus melastomae*, a Potential Biological Control Agent

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Abstract

*Cryptorhynchus melastomae* Champion (Coleoptera: Curculionidae) is a stem boring weevil from Costa Rica under evaluation as a potential biological control agent for the invasive tree miconia, *Miconia calvescens* DC. (Melastomataceae). Adult *C. melastomae* feed externally on miconia foliage and stems, and larvae bore stems. Under lab rearing the life cycle of *C. melastomae* averages 218 days from egg deposition until death. Eggs hatch within two weeks; larvae undergo rapid growth for the first 70 days and pupate around day 111. Adult eclosion occurs at day 140, and the mean adult lifespan is 75 days, although it is not unusual for adults to survive 4-6 months. Adults reach sexual maturity at one month, and females lay large eggs at a rate of 3-6 per week up until death. Larval feeding can result in death of the distal portion of stem, and adult feeding can severely impact growing tips and leaf veins. Thirty two plant species, including a variety of natives and non-natives within the order Myrtales, were tested to assess potential non-target impacts of this weevil. No-choice and multi-choice tests with adult *C. melastomae* revealed a host range restricted to melastomes (family Melastomataceae), all of which are invasive weeds in Hawaii. In addition to miconia, adults fed mainly on arthrostemma (*Arthrostemma ciliatum* Pav. ex D. Don), Koster’s curse (*Clidemia hirta* (L.) D. Don), false meadowbeauty (*Pterolepis glomerata* (Rottb.) Miq.), princess flower (*Tibouchina urvilleana* (DC.) Cogn.), Asian melastome (*Melastoma septemnervium* Lour.), pearlflower (*Heterocentron subtriplinervium* (Link & Otto) A. Braun & Bouché), and cane tibouchina (*Tibouchina herbacea* (DC.) Cogn.). Egg laying was largely restricted to a subset of these species. Ideally, *C. melastomae* might contribute to management of several species of weedy melastomes, but the actual consequences of such interactions with multiple hosts are difficult to predict.