

Artificial Diet for Completing Development of Internal Feeding Insects of Plant Stems and Roots as an Aid for Foreign Exploration

L. Smith¹, M. Cristofaro², C. Tronci²,
N. Tomic-Carruthers³, L. Gültekin⁴ and J. M. Story⁵

¹USDA-ARS, 800 Buchanan Street, Albany, CA 94710, USA link.smith@ars.usda.gov

²ENEA C.R. Casaccia, UTAGRI-ECO, Via Anguillarese 301, 00123 S. Maria di Galeria (Rome), Italy

³USDA-APHIS-PPQ-CPHST, National Weed Control Laboratory, 800 Buchanan Street, Albany, CA 94710, USA

⁴Atatürk University, Faculty of Agriculture, Plant Protection Department, 25240 TR Erzurum, Turkey

⁵Montana State University, Western Agricultural Research Center, 580 Quast Ln., Corvallis, MT 59828, USA

Abstract

Internal-feeding insects can be effective biological control agents of invasive alien weeds, but it is usually difficult to rear field-collected immature stages to the adult stage to facilitate identification and establishment of laboratory colonies. The development of effective diets and rearing systems could greatly aid the discovery and evaluation of root- and stem-feeding insects for biological control. We developed and tested a system for rearing adult insects from field-collected larvae that is useful for foreign exploration. We adapted a previously developed artificial diet for *Hylobius transversovittatus* Goeze, the purple loosestrife root weevil, and tested the system on a root-feeding weevil, *Ceratapion basicorne* (Illiger), dissected from *Centaurea solstitialis* L. (yellow starthistle) plants in Turkey. The diet ingredients were modified to reduce microbial contamination, and the container size and style of top were chosen for ease of use and to reduce diet desiccation. Gouging the diet at the container sides facilitated insect survival and permitted easier monitoring of developmental progress. The method also worked with varying success for a variety of other beetles (Buprestidae, Cerambycidae, Chrysomelidae, Curculionidae), moths (Noctuidae, Pyralidae) and flies (Chloropidae) dissected from a variety of plant species (Apiaceae, Asteraceae, Brassicaceae, Chenopodiaceae, Elaeagnaceae). However, the diet was not successful for rearing adults of the yellow starthistle stem-boring flea beetle, *chalconera* Illiger, which normally pupates in soil. The diet probably can be further modified to better suit insects associated with a particular plant species and/or plant parts that differ in critical physical and/or chemical properties.