

Does Nitrogen Influence Host Choice by a Biological Control Insect?

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Abstract

Previous studies have demonstrated the importance of nitrogen as a component of host plant quality for phytophagous insects, with some insects preferring and performing better on hosts of higher nitrogen content. Although some researchers have investigated the role of nitrogen in host species choice by insect pests, there has been little exploration of how nitrogen may influence host choice patterns, and thus risk assessment, for insects used in weed biological control. The root weevil, *Mogulones crucifer* Pallas (Coleoptera: Curculionidae), was first released in Canada in 1997 against the rangeland weed, houndstongue (*Cynoglossum officinale* L.) (Boraginaceae). Both pre and post-release investigations have documented non-target attack on closely-related Boraginaceae species, albeit at a lower level than on houndstongue. Field and laboratory studies also have shown how fertilization of houndstongue with nitrogen can increase *M. crucifer* population size and weevil feeding and oviposition. As a next investigative step, laboratory studies were conducted using houndstongue and the native North American borage species, *Hackelia floribunda* (Lehm.) I.M.Johnst., to determine how the addition of nitrogen may alter non-target choice by *M. crucifer*. Two single-choice experiments (adult feeding and oviposition) were conducted using greenhouse grown houndstongue and non-target plants of either low or high nitrogen content. Leaves from individual plants were paired in small containers so that all possible combinations of plant species and nitrogen level were replicated for each experiment. Laboratory-reared female weevils at their ovipositional peak were added to each container and left for 24 hours to feed (1 female) or 48 hours to oviposit (2 females), before data collection. The results showed no effects of either species or nitrogen level on the amount of feeding by weevils. Although there was some oviposition preference shown for high nitrogen houndstongue, overall, the preference for houndstongue was greater than for the non-target species regardless of nitrogen level.