



Methyl Salicylate Can Benefit Ornamental Pest Control, and Does Not Alter *Per Capita* Predator Consumption at Close-Range

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Methyl salicylate (MeSA) is an herbivore-induced plant volatile widely tested for attracting natural enemies for pest control. MeSA is commercially sold as slow-release lures or as a spray. While MeSA application has increased the abundance of natural enemies in numerous food crops, its ability to reduce pests for crop protection is not as frequently demonstrated. Our first objective was to test MeSA lures in ornamental fields where few studies have been done, and monitor natural enemies, pests, and crop protection. A 2-year study in spruce container yards revealed more aphid parasitoids (*Pseudopraon* sp.), fewer aphids (*Mindarus obliquus*) on shoot tips, and less shoot tip damage in MeSA plots during the first year. A 2-year study in red maple fields revealed more predatory lady beetles and rove beetles, and parasitic Ceraphronidae, Diapriidae, and Chalcidoidea in one or both years with MeSA. Fewer pest thrips were also captured in MeSA plots, though it is not clear whether this was due to enhanced predation or reduced colonization. Maple growth as measured by stem diameter change did not differ with MeSA use. A 2-year study examining predation on sentinel *Halyomorpha halys* eggs in various mature ornamental stock blocks found no increase in predation except for 1 month, though green lacewings, lady beetles, and predatory thrips occurred more in MeSA plots in the first year. While MeSA is expected to enhance biological control by herding in natural enemies, the impacts that applied volatiles have on predator efficiency is mostly unknown. Thus, our second objective examined how volatiles would impact feeding rates at close-range. Adult carabid *Pterostichus melanarius*, adult coccinellids *Coccinella septempunctata* and *Harmonia axyridis*, and larval lacewing *Chrysoperla rufilabris* consumed their prey at similar rates in the presence/absence of MeSA when food was presented directly in a 28 cm² or 30 ml arena, or when foraging in a 520 cm² outdoor soil arena or 946 ml arena with aphids on leaves.

Keywords: aphid, biological control, foraging, *Halyomorpha halys*, herbivore induced plant volatile (HIPV), maple, spruce, thrips

INTRODUCTION

When herbivores feed on plants, herbivore-induced plant volatiles (HIPVs) are released that attract natural enemies and are considered as an indirect defensive response. While many HIPVs have been identified, methyl salicylate (MeSA) is often studied for biological control (rev. by Khan et al., 2008; Rodriguez-Saona et al., 2011) and is commercially available as slow-release lures or tank mix