The Possible Use of Two Endemic Natural Enemies for Canada Thistle (*Cirsium arvense*) Biological Control in the USA

R. Hansen and M. Sullivan

USDA-APHIS-PPQ-CPHST, Fort Collins Laboratory, 2301 Research Blvd., Suite 108, Fort Collins, CO 80526 USA    richard.w.hansen@aphis.usda.gov   melinda.j.sullivan@aphis.usda.gov

Abstract

Canada or creeping thistle, *Cirsium arvense* (L.) Scop. (Asteraceae), is a widespread exotic weed in most of the continental USA. Since the 1960s, five classical biological control agents have been introduced into the USA for thistle management; generally, introduced agents have not been reliably effective. We are examining the possible role of native arthropods and pathogens in controlling Canada thistle populations. One is the distinct lace bug, *Corythucha distincta* Osborn & Drake (Hemiptera: Tingidae), a native insect often found on *C. arvense* in Colorado and adjacent states. Field observations indicate that *C. distincta* periodically reaches outbreak populations on Canada thistle, and may kill leaves and shoots. To assess the possible applied biocontrol potential of the distinct lace bug, we documented host specificity using laboratory no-choice and host choice tests and field host choice tests in 2009 and 2010. These experiments employed nine native US *Cirsium* thistles, sunflower (a native crop plant), two introduced crop plants related to thistles (safflower and cardoon), and three introduced weedy thistles (including Canada thistle). *C. distincta* readily utilized all native thistles tested, with feeding levels similar to, and often exceeding, those on *C. arvense*. Other weedy thistles were very rarely fed upon, and plants outside the subtribe Carduinae (i.e. the 'true' thistles) in Asteraceae were not utilized at all. Thus, the host range of the distinct lace bug apparently consists of native *Cirsium* spp., while introduced weedy *Cirsium* thistles (e.g. Canada thistle and bull thistle, *C. vulgare*) are also utilized. A second endemic organism attacking Canada thistle is the pathogenic fungus *Alternaria cirsinoxia* Simmons & Mortensen (Ascomycetes: Pleosporales: Pleosporaceae). *A. cirsinoxia* was first discovered on *C. arvense* in western Canada and has also been reported from Montana, USA; we have identified it for the first time in Colorado. *A. cirsinoxia* causes Canada thistle foliar chlorosis and necrosis, frequently leading to shoot death, but little is known of its biology under field conditions and, thus, its potential as an applied biocontrol agent. Host specificity of the fungus was assessed by inoculating two native *Cirsium* spp., two crop plants (sunflower and safflower), and Canada thistle. All tested plants developed disease symptoms, though severity was greater on *C. arvense*, safflower, and sunflower (>60% necrosis) than on the two native thistles (<30%). Thus, though *C. distincta* and *A. cirsinoxia* may cause significant damage to Canada thistle under field conditions, both have fairly broad host ranges; they present risks to nontarget native and crop plants, and thus should not be developed as Canada thistle biocontrol agents in the USA.