Dispersal and Impact of *Larinus minutus* among *Centaurea diffusa* Patches in Alberta, Canada

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Abstract

Although *Larinus minutus* Gyllenhal has been implicated in the successful control of diffuse knapweed (*Centaurea diffusa* L.) in western North America, most studies have been confounded to some extent by the presence of root feeders. Furthermore, relatively little is known regarding its rate of dispersal and its impact on its host plant in the first few years post release. To address these knowledge gaps we initiated a study in 2005 in Alberta, Canada, to measure the spread and impact of this agent in an area that had no previous history of intentional biocontrol releases against diffuse knapweed. In 2005, 300 *L. minutus* were released along the Oldman River at a riparian site that was infested with diffuse knapweed. Three additional knapweed patches at 2, 7, and 9 km downstream were identified at that time. For five years, beginning in 2006, the density of knapweed stems and rosettes as well as the density of *L. minutus* was measured at each patch. We found that after five years post-release, *L. minutus* had colonized the downstream patches at a rate of approximately 1.9 km/yr. At the release patch, *L. minutus* numbers grew quickly reaching densities of 400 beetles/m^2 after three years. At the patch 2 km downstream, populations grew more slowly but reached a density of 166 beetles/m^2 five years after the initial release. The patches 7 and 9 km downstream were colonized 3 and 4 years after release respectively and populations there are still growing quickly. At all of the sites, both knapweed stem and rosette densities are significantly higher five years post-release than they were in 2006. These results suggest that while *L. minutus* populations can grow and spread quickly, impact on diffuse knapweed densities, at least at some sites, may take more than five years.