

*Berteroa incana*  
Hoary Alyssum

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### History

Hoary alyssum was first observed in North America in Wallbridge, Ontario in 1893. Native to Europe, hoary alyssum is believed to have arrived in North America as a contaminant in clover and forage seed. In 1938, the Association of Official Seed Analysts of North America recorded finding hoary alyssum seed in vegetable and agricultural seed samples in a report submitted to the US Congress. It was not until the 1950s and 1960s, however, that hoary alyssum gained attention and began to be regarded as a pest. By this time the plant was becoming more common in overgrazed and drought stricken pastures and in hayfields with poor soil fertility. In 1951 hoary alyssum was identified as a noxious weed by the Association of Official Seed Analysts of North America. The species came into the spotlight in the 1990s when it was discovered that hoary alyssum is toxic to horses.<sup>1</sup>



Figure 1. Hoary alyssum. Source: Minnesota Wildflowers, Available from Minnesota Wildflowers, <http://www.minnesotawildflowers.info/flower/hoary-alyssum>.

In 1996 hoary alyssum was identified as an invasive species present in Rocky Mountain National Park, but it was not designated as a “species of concern.” However, by 2000 manual removal had begun. In the 2003 Invasive Exotic Plant Management Plan hoary alyssum was recorded as being present on 2.5 acres or less in the developed and historic zones of the park and not at all in the natural zone. The species appeared to become more dominant beginning in 2004, as the Year-End Report for that year stated that hoary alyssum was “noticeably more prolific than normal.” Gaps in records make it difficult to fully piece together the species’s spread throughout the park, but time spent treating hoary alyssum noticeably increased by 2012.<sup>2</sup>

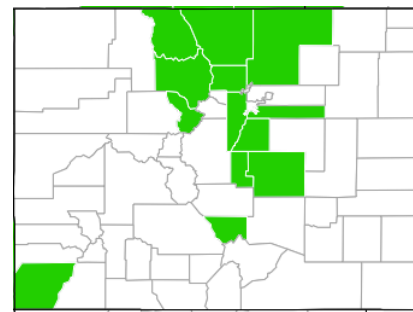
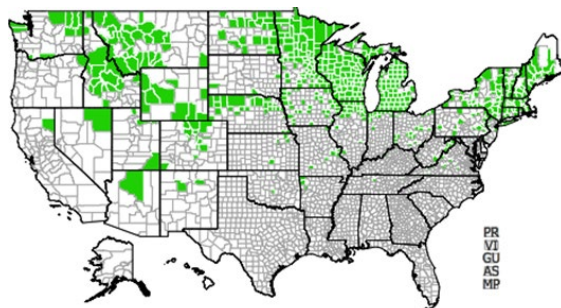


Figure 2 and 3. Distribution of hoary alyssum by county across the United States (left) and Colorado (right). Source: US Department of Agriculture PLANTS database, Available from: US Department of Agriculture, <http://plants.usda.gov/core/profile?symbol=BEIN2>.

### Biological Concerns

Hoary alyssum is not listed as a noxious weed in Colorado, but it was recently listed as a noxious weed in Larimer County. It is capable of growing in poor dry sandy and gravelly soils and is adapted to endure a range of climatic conditions. Hoary alyssum is a xerophyte, meaning that it

can withstand drought, which is due to its low water requirements and deep taproot. Its deep taproot allows it to access precipitation after it percolates down into the soil; an increasingly important adaptation in the face of climate change. Seedlings establish in the fall and are hardy enough to resist cold temperatures and avoid winterkill. Water-soluble compounds extracted from the leaves of hoary alyssum have been found to have allelopathic properties by inhibiting the germination and root growth of other species. Hoary alyssum is described as a “prolific seed producer” and creates seeds that can be viable for nine years, allowing the plant to create its own seed bank. Multiple sources highlight concerns about hoary alyssum’s impact on biodiversity and native pollinators. In Minnesota hoary alyssum was found to cause a decrease in the species richness of pollinator communities as it “attracted a minimal number of pollinating insects.” The species is a poor forage crop as it is low in crude protein and digestible carbohydrates. More importantly, hoary alyssum can be toxic to horses when it comprises 30% or more of horse forage.<sup>3</sup>

### **Management Strategies**

Given that it reproduces only by seed, control of hoary alyssum through dedicated mechanical removal is possible. Hand pulling or digging to extract the root crown is the most recommended method of mechanical removal. Removal is preferably completed prior to flowering; if removal is after flowering, the flowers and seed head of the plant need to be collected and bagged. Mowing has been tested as a method for removal but was not found to be effective as plants were able to generate new shoots and seed following test mowing at all stages of plant development. Additionally, mowing has the possibility of disseminating seed and exacerbating the hoary alyssum population.<sup>4</sup>

Herbicide use has also been found to control hoary alyssum, so long as chemicals are applied prior to the flowering stage. Scientific literature and Larimer County recommend an herbicide of dicamba with 2,4-D. Atrazine, terbacil, simazine, and 2,4-D alone have been used successfully to treat hoary alyssum. To be successful, treatment with herbicide must be completed in early fall to prevent the plant from storing carbohydrate sugars, which allow hoary alyssum to develop cold hardiness.<sup>5</sup>

Hoary alyssum has primarily been treated in ROMO through manual removal by hand pulling and digging. In 2000, the species was removed using a mechanical line cutter, but this method does not appear to have been successful as it has not been replicated. The current ROMO Invasive Exotic Plant Management Plan does not allow for herbicide use on hoary alyssum. According to the Montana State University Extension, the best way to prevent spread of hoary alyssum is to reseed following disturbances and “maintain healthy stands of vegetation.”<sup>6</sup>

### **Recommendations**

Continued manual treatment of hoary alyssum through hand pulling and digging is recommended as manual removal has the possibility of success. Achieving full control of hoary alyssum through manual means may be a lofty goal as its range is expanding and manual removal is exceedingly time consuming. With this in mind, this author recommends manual removal of small, isolated areas and herbicide spraying with 2,4-D and dicamba in larger areas. Ideal treatment through spraying would involve spraying areas that are infested with hoary alyssum and other exotics that need to be treated using the same herbicide.

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## Endnotes

<sup>1</sup>G. A. Mulligan, “Weedy introduced mustards (*Brassicaceae*) of Canada,” *Canada Field Naturalist* 116 (2002): 623-631; S. I. Warwick and A. Francis, “The Biology of Invasive Alien Plants in Canada 6. *Berteroa incana*,” *Canadian Journal of Plant Science* 86 (2006): 1297–1309; C.A. Stahl, “The Occurrence of Weed Seeds in Commercial Vegetable Seeds: For the Legislative Committee,” *Proceedings of the Association of Official Seed Analysts of North America* 30 (1938): 64-67; Hilary Parkinson, Jane Mangold, and Jim Jacobs, “Biology, Ecology, and Management of Hoary Alyssum,” *Montana State University Extension, Bozeman, MT, (March 2010): 3-11*; O.A. Ulvin, “Report of the Legislative Committee,” *Proceedings of the Association of Official Seed Analysts* 41 (1951): 13-18; Gregory James Stopps, “Biology of the Rangeland Weed Hoary Alyssum,” (Masters diss., University of British Columbia Vancouver, April 2012).

<sup>2</sup>Julie Knudson, Matt Ounsworth, Michael Prowatzke, Jamie Dahlkemper, Jim Bromberg, and Brian Kolokowsky, “Rocky Mountain National Park Exotics Year-End Reports,” *Rocky Mountain National Park: Division of Resource Stewardship, 2000-2013*.

<sup>3</sup>S. I. Warwick and A. Francis, “The Biology of Invasive Alien Plants in Canada 6. *Berteroa incana*,” *Canadian Journal of Plant Science* 86 (2006): 1297–1309; Gregory James Stopps, “Biology of the Rangeland Weed Hoary Alyssum,” (Masters diss., University of British Columbia Vancouver, April 2012); Chris R. Rutledge and Terry McLendon, “An Assessment of Exotic Plant Species of Rocky Mountain National Park,” *Colorado State University Department of Rangeland Ecosystem Science* (1996): 18, 66, 90; Shannon Clark, George Hockman, Karin Edwards, Paula Edwards, and Tim D’Amato, “Fourteen Most Unwanted Weeds in the Estes Valley Identification and Management Guide,” (Estes Land Stewardship Association, 2014); Hilary Parkinson, Jane Mangold, and Jim Jacobs, “Biology, Ecology, and Management of Hoary Alyssum,” *Montana State University Extension, Bozeman, MT, (March 2010): 3-11*.

<sup>4</sup>Hilary Parkinson, Jane Mangold, and Jim Jacobs, “Biology, Ecology, and Management of Hoary Alyssum,” *Montana State University Extension, Bozeman, MT, (March 2010): 3-11*; Gregory James Stopps, “Biology of the Rangeland Weed Hoary Alyssum,” (Masters diss., University of British Columbia Vancouver, April 2012);

<sup>5</sup>Cyril A. Kust, “Selective Control of Hoary Alyssum in Alfalfa,” *Weed Science* 17, no. 1: 99-101; R. E. Hastings and Cyril A. Kust, “Reserve Carbohydrate Storage and Utilization by Yellow Rocket, White Cockle, and Hoary Alyssum,” *Weed Science* 18, no. 1 (January 1970): 140-141; Petr Dostál, “Plant Competitive Interactions and Invasiveness: Searching for the Effects of Phylogenetic Relatedness and Origin on Competition Intensity,” *The American Naturalist* 177, no. 5 (May 2011): 655.

<sup>6</sup>Julie Knudson, Matt Ounsworth, Michael Prowatzke, Jamie Dahlkemper, Jim Bromberg, and Brian Kolokowsky, “Rocky Mountain National Park Exotics Year-End Reports,” *Rocky Mountain National Park: Division of Resource Stewardship, 2000-2013*; Hilary Parkinson, Jane Mangold, and Jim Jacobs, “Biology, Ecology, and Management of Hoary Alyssum,” *Montana State University Extension, Bozeman, MT, (March 2010): 3-11*.