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MONTANA STATE UNIVERSITY EXTENSION

MontGuide

Orange Hawkweed and Meadow Hawkweed Complex

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Covers origin and distribution of these weeds as well as identification and biology, impacts and suggestions for management.

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ORANGE HAWKWEED (*HIERACIUM AURANTIACUM*) and the meadow hawkweed complex (a group of hawkweeds very similar to one another that includes *H. caespitosum* (synonym *H. pratense* and *Pilosella caespitosa*), *H. floribundum*, and *H. piloselloides* (synonym *H. praealtum*)) are problematic hawkweeds that have been introduced to the United States from Europe. The ancient Greeks believed that the sap of hawkweeds was responsible for the keen eyesight of hawks. Other common names such as red devil, king devil and devil's paintbrush more accurately describe the sentiment of many toward these highly invasive weeds.

The hawkweeds are a very large genus of plants with about 260 species recognized in Europe and approximately 25 species in North America. Hawkweeds are members of the sunflower (*Asteraceae*) family and are closely related to dandelion, chicory, prickly lettuce and sowthistle. Like some of their relatives, hawkweeds can rapidly colonize and dominate forest meadows, pastures and roadsides. In addition to reproducing by seeds, hawkweeds are capable of spreading by rhizomes, stolons and adventitious root buds. These methods of vegetative reproduction and a tolerance for sites with low productivity are probably responsible for the ability of these plants to quickly establish and dominate new areas.

Origin and Distribution

Meadow hawkweed, or yellow hawkweed, is indigenous to northern, central and eastern Europe and it occurs in abundance in the foothills of the Alps. It is believed to have been introduced into the United States in 1828 as an herbal remedy and an ornamental. It is currently found from Quebec to Ontario and southward to Georgia and Tennessee. Meadow hawkweed was first reported in the Pacific Northwest in Pend Oreille County, Washington in 1969. The largest infestations are now centered in northern Idaho, northeastern Washington and west of the Cascades, and northwestern Montana (Figure 1A). This weed is considered to be spreading rapidly in these areas. Meadow hawkweed has also been reported in Alaska, Oregon, Utah, Wyoming, British Columbia, most states east of the Mississippi River, and eastern Canadian provinces.

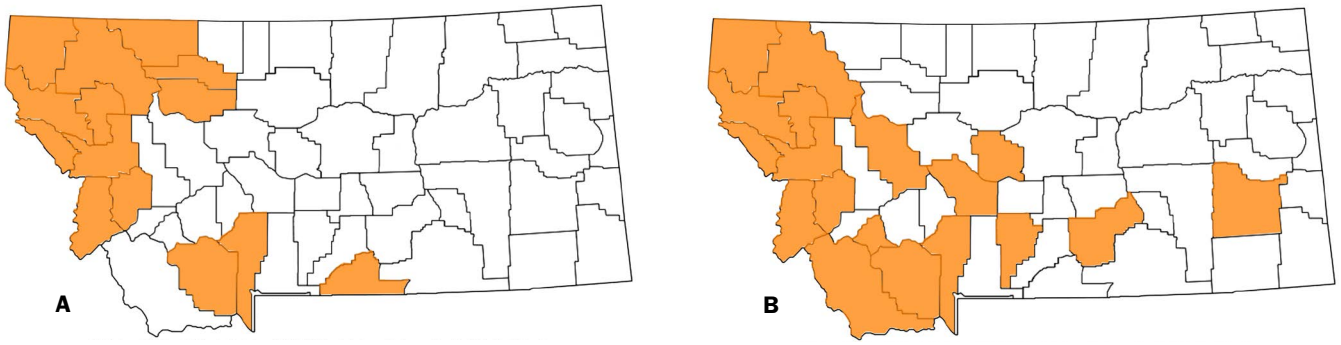

FIGURE 1. Counties in Montana where meadow (A) and orange (B) hawkweed have been reported (Compiled records from INVADERS Database System, EDDMapS West, Consortium of Pacific Northwest Herbaria, Intermountain Region Herbarium Network, and MSU Schutter Diagnostic Laboratory).

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Orange hawkweed is native to restricted areas in northern and central Europe where it is usually found in mountain meadows and on hillsides. It was first introduced into the United States in the early 1800s as an ornamental due to its bright, flashy flowers. Since that time, this weed has escaped from flower gardens and cemeteries across the country. Orange hawkweed can be found in pastures, cleared timber units, abandoned farm land and meadows. It appears to do well in areas where the soil is well-drained, coarse textured and moderately low in organic matter. Orange hawkweed is closely associated with habitats that support oxeye daisy, sulfur cinquefoil and spotted knapweed. To date, it has not proven to be invasive in dry, shrub-steppe habitats. The potential for orange and meadow hawkweed to spread into new areas is difficult to predict, but anecdotal evidence suggests it is increasing in western Montana (Figure 1B).

FIGURE 2. Dense rosettes of meadow hawkweed (*Hieracium caespitosum*). Photo credit King County, WA.

FIGURE 3. Meadow hawkweed (*Hieracium caespitosum*). Photo credit University of Maine.

Identification and Biology

In the vegetative stage, orange and meadow hawkweed complex appear as low-growing rosettes with many hairy leaves. These spatula-shaped leaves are dark green on top and light green underneath (Figure 2). The leaves are typically 4 to 6 inches long and excrete a milky sap when they are injured.

Each hawkweed rosette generally produces 1 flowering stem (but can produce up to 30) that is 10 to 36 inches tall. Although the stems are often bare, they sometimes develop one to three small clasping leaves. Each stem is capable of producing between 5 and 30 flower heads. Like the leaves, the stems are hairy and contain a milky sap (Figure 3).

The flower heads are one-half to three-quarters of an inch in diameter. Each flower head consists of many small tiny flowers – orange (orange hawkweed) or yellow (meadow hawkweed complex) florets that are each capable of producing one seed (Figure 4). A single flower head is capable of producing between 12 and 50 tiny black seeds. Each seed has a tuft of hairs (pappus) attached to one end that allows it to be carried by the wind (Figure 4). Each seed is ribbed with minute barbs that enable them to stick to hair, fur, clothing and vehicles. Seeds are often moved in contaminated soil associated with transplanting new plants into gardens and flowerbeds. The mature seeds do not have an after-ripening period and are capable of germinating immediately after dropping from the plant. Seedlings that emerge in March can produce flowers by mid June and viable seeds by early August. Research has shown that seeds can remain viable in the soil for up to 7 years.

The invasive hawkweeds have shallow fibrous root systems and underground creeping stems called rhizomes. Like seeds, rhizomes serve as over-wintering structures for the perennial hawkweeds. New plants can arise from buds on the rhizomes and, in the case of meadow hawkweed, plants can develop from root buds. Each flowering plant can develop several creeping stems called stolons that are also capable of producing new plants. The timing and rate of seed and stolon production are dependent on population density, with production decreasing as population density increases. Therefore, most of the reproduction occurs on the periphery of an infestation where plant density is typically lower, and these areas should receive priority during hawkweed management.

Impacts

Orange hawkweed and the meadow hawkweed complex are very competitive with desirable plants. Once introduced into an area, they can quickly form dense patches. If they are not controlled, these patches can expand into large areas and displace desired native and forage species. Hawkweeds can also become a problem in lawns and gardens.

FIGURE 4. Orange hawkweed flowers. Photo credit Michael Shephard, Bugwood.org.

Livestock, deer and elk consume hawkweed foliage and buds. Research has shown that the hawkweeds have moderate to high nutritive values, and digestibility data suggest that species in the meadow hawkweed complex may be used by cattle and sheep, although questions about palatability and utilization still remain to be answered. However, under intensive grazing, hawkweeds displace nearly all other vegetation.

Management

Integrated Weed Management (IWM)

IWM refers to weed management that employs a variety of control measures. The management of hawkweeds will benefit from a program that integrates multiple management procedures such as fertilizers, herbicides, seeding, biocontrol and other techniques that decrease hawkweed spread while increasing the competitive ability of desired species. There is no single management practice that can be implemented just once to manage hawkweeds. The response of hawkweeds to a variety of control measures is discussed below.

Prevention

Proper land management is effective in preventing the establishment of hawkweeds. If patches are discovered when they are small, they can be successfully controlled with herbicides. As patches expand in size they become more difficult to control. Because hawkweeds often establish in remote mountain meadows and forest habitats, new populations sometimes go unnoticed. Attempts should be made to prevent seed dispersal by vehicles, hay, animals and other vectors.

Mechanical

Mechanical control of hawkweed is generally not very effective in rangeland and pastures. Activities that disturb the plant such as digging or tillage can stimulate the growth of new plants from fragmented roots, stolons and rhizomes. However, small infestations can be dug up when soil is moist as long as care is taken to remove stolons and the area is monitored through the growing season to remove any new plants. In lawns, mowing of hawkweeds is ineffective because the low-lying rosettes are missed by mower blades. Mowing can prevent seed production, but disturbing the flowering shoots encourages increased vegetative growth. Hawkweeds do not persist in annual cropping systems because of continued cultivation combined with herbicides and crop competition.

Chemical

Several herbicides are listed as providing good to excellent control of hawkweed. Herbicide recommendations vary by region and site. Remember to read and follow the herbicide label to determine whether the herbicide applies to your situation and what rates are appropriate. Aminopyralid (Milestone®) is effective when applied at 4 to 6 ounces/acre to plants in the bolting stage of development. Use caution as aminopyralid may damage or kill pasture legumes. Aminopyralid + 2,4-D (ForefrontR&P®) will control hawkweeds when applied at 2 to 2.6 pints/acre or 1.5 to 2.1 pints/acre (Forefront HL®). Picloram (Tordon®) may also provide effective control of hawkweed in open terrestrial applications. The herbicide 2,4-D is most effective when applied early in the season in combination with other herbicides and may be used in situations (e.g. lawns) where other herbicide options are not available. Plants should be treated in the spring when they are in the rosette stage, unless timing of control is indicated otherwise in the label, in order

Native versus Non-native Hawkweeds

Hawkweeds are notorious for their complex and confusing classification and distinguishing among hawkweed species is difficult because they sometimes interbreed and exhibit variation due to environment and genotype. It is, however, important to be able to distinguish between the native and introduced species. Unlike the invasive hawkweeds, native hawkweeds lack stolons, they have branched stems with many leaves, and they bear flowers in an open panicle. There are no orange-flowered native hawkweeds in Montana. There are three yellow-flowered and one white-flowered native hawkweed in Montana. None of the native hawkweeds are considered invasive. For more information regarding hawkweed identification, see the MSU Extension Bulletin *Hawkweed Identification* (EB0187) available online at www.msuextension.org or at your county Extension office. Also check out *Key to Identification of Invasive and Native Hawkweeds* (*Hieracium* spp.) in the Pacific Northwest at https://www.for.gov.bc.ca/hfp/publications/00230/hawkweed%20key_pnw_r3-june06.pdf

to prevent seed production. Surfactants increase the adherence of these herbicides to the hairy leaf and stem surfaces of hawkweeds, and they should be included in all herbicide mixtures. Use caution to avoid herbicides coming in contact with trees and other desirable vegetation.

Fertilization

Fertilizers can be used to increase the competitiveness of perennial grasses and beneficial forbs. This method is most effective in pastures and rangeland where nitrogen levels are not high enough for optimum grass performance. Fertilizer alone has been effective in reducing hawkweed density in some areas of the United States. One study demonstrated that repeated fertilization did not affect dense stands of hawkweed in an area where there were few grasses and other forbs. If an infested area currently has very few perennial grasses and beneficial forbs remaining, revegetation with competitive grasses and forbs may be necessary to reduce hawkweed and move the plant community closer to a desired condition. If other weeds are present that increase with fertilization, these weeds should be controlled prior to fertilization.

Biological Control

Biological control is the use of natural enemies such as insects and diseases to control pests. Although several biological control agents have been released on an invasive hawkweed in New Zealand, North America has several native species related to exotic hawkweeds that deemed most biocontrol agents unsafe for introduction to North America. However, the gall wasp (*Aulacidea subterminalis*) has been approved for use against orange hawkweed and some species in the meadow hawkweed complex. This biocontrol agent is in the early stages of release and monitoring in the United and States and Canada and has yet to be officially confirmed as "established."

Grazing Management

Grazing animals will eat hawkweeds but this may increase the vegetative growth of hawkweed, similar to mowing. Proper grazing management, early detection and control are central to the prevention of further spread of orange hawkweed and the meadow hawkweed complex.

Note: Information in this document is provided for educational purposes only. Reference to commercial products or trade names does not imply endorsement by MSU Extension. Common chemical and trade names are used in this publication for clarity. Inclusion of a common chemical or trade name does not imply endorsement of that particular product or brand of herbicide and exclusion does not imply non-approval. This publication is not intended to replace the product label.

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