

Oregon Department of Agriculture
Plant Pest Risk Assessment for
Meadow Hawkweed, *Hieracium caespitosum*
King Devil Hawkweed, *Hieraceum piloselloides*
Yellow Devil Hawkweed, *Hieraceum X floribundum*
2011

Name: Meadow hawkweed, *Hieracium caespitosum* (= *Hieracium pratense*) a.k.a. yellow hawkweed, yellow paintbrush, devil's paintbrush
King devil hawkweed, *Hieraceum piloselloides*, a.k.a. Glaucous king devil, tall hawkweed
Yellow devil hawkweed, *Hieraceum X floribundum*
Family: Aster, *Asteraceae*

Findings of This Review and Assessment: Hawkweeds, *Hieracium spp.*, were evaluated and determined to be a category “**A**” rated noxious weeds, as defined by the Oregon Department of Agriculture (ODA) Noxious Weed Policy and Classification System. This determination was based on a literature review and analysis using two ODA evaluation forms. Using the Noxious Qualitative Weed Risk Assessment v.3.8, hawkweeds spp. scored **66** indicating a Risk Category of **A**; and a score of **17** with the Noxious Weed Rating System v.3.2, indicating an “**A**” rating.

The *Hieracium* genus is very complex genus to describe and understand. European botanists as late as 1976 named over 700 hawkweed species (Tutin et al. 1976). This number is a result of ascribing different names to a single species and the excessive splitting of variation within a single species that would more appropriately be described as varietal or subspecies differences. Currently about 260 species (Mangold et al. 2009) are recognized in Europe but consistent and accurate identification at the species level is still difficult because vegetative characteristics have considerable overlap between species. Hybridization between invasive and native hawkweed is likely not possible, however, hybridization between invasive hawkweeds could be possible, but to date, not scientifically documented. Wilson (2006) has helped clarify hawkweed identification with the Key to Identification of Invasive and Native Hawkweeds (*Hieracium spp.*) in the Pacific Northwest. Therefore this risk assessment describes meadow hawkweed, *H. caespitosum*, but is intended to address the risk associated *H. piloselloides*, *H. X floribundum* as well. This assessment will address specifically meadow hawkweed. The other two species behave similarly to meadow hawkweed and will be referred to as meadow hawkweed throughout the assessment though they are distinct genetically.

Introduction: Members of the sunflower family, these showy perennials rapidly infest susceptible habitats utilizing both seed production and stoloniferous growth. The ancient Greeks believed that the sap of the hawkweeds was responsible for the keen eyesight of hawks and they have been cultivated through the centuries as herbal remedies. Meadow hawkweed was introduced into North America in the 1828 as an herbal remedy and an ornamental. Escaping cultivation, it now occurs in many east coast states and eastern Canadian providences. It was first reported in the Pacific Northwest in 1969 in Pend Oreille County, Washington.

The plant is very invasive and can rapidly dominate open fields, forest meadows, forest clearings, permanent pastures, abandoned farms and roadsides where the soil is well drained, coarsely-textured, low in nutrients and moderately low in organic matter. Meadow hawkweed is not a USDA federally listed noxious weed. King devil and yellow devil hawkweeds populations have not been identified in Oregon though they are present in the Pacific Northwest.

Growth Habits, Reproduction, and Spread: Meadow hawkweed is a yellow herbaceous perennial plant, flowering in late spring to early summer (May- June). Each rosette produces at least one flowering stem (possibly up to 30 stems) and from 10 to 30 flower heads in clusters atop each stem. Stems are usually single and unbranched and mostly leafless in the upper half or two-thirds. Plants typically grow from 10 to 36 inches tall. The stems contain a milky fluid similar to dandelion flower stems arising from a basal rosette of eight to ten and persistent leaves. Seeds are ribbed with minute barbs and a tuft of hairs (pappus) enabling the seed to attach itself to a passing human or animal or to be carried by the wind allowing for long distance dispersal. Seeds are produced either sexually by pollination, or asexually without. Hawkweeds are capable of completing their life cycle very quickly. Seedlings emerging in March and April can produce flowers by June and viable seeds by early August. Mature seeds do not have an after-ripening period and are capable of germinating immediately after being dispersed and can remain viable in the soil up to seven years. Meadow hawkweed like almost all of the invasive hawkweeds has a shallow fibrous root system and stolons. Patch expansion is accomplished primarily through stolons and new seedlings, while long distance dispersal is accomplished with windblown seed, in hay, on recreational vehicles, logging equipment, wool and by water.



Hawkweed by roadside, photo by Glenn Miller, ODA



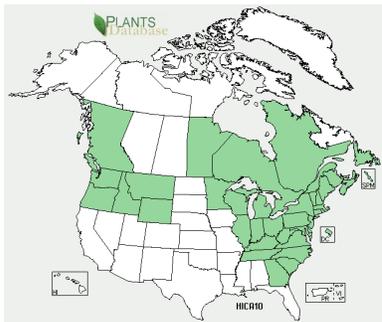
Hawkweed flowers, photo by Tom Forney, ODA

Biological Factors Effecting Growth and Establishment: Grazing animals often eat the flower heads of hawkweed, but ignore the rosettes. Grazing may stimulate increased production of stolons and decrease competition with the removal of competitive grasses. Over-grazing can make areas more susceptible to weed expansion and invasion through the reduction of competition. In Europe, hawkweeds are subjected to diseases; fungus infections and insect herbivory, together, can reduce seed production, vegetative growth and stand density. These biological agents are not present in the Pacific Northwest allowing for meadow hawkweed to grow and reproduce to its full biological potential.

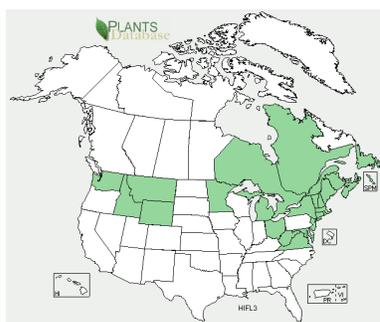
Native Range: Meadow hawkweed is native to Northern, Central and Eastern Europe. It grows at mid elevation commonly in the foothills of the Alps.

World Distribution: Meadow hawkweed has spread worldwide from Europe to North America, New Zealand and Australia.

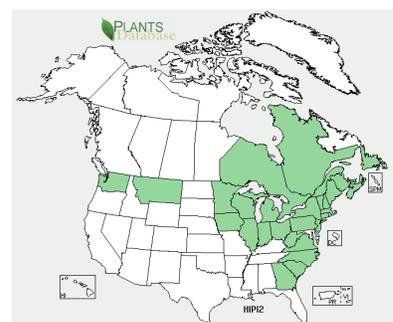
Distribution in North America: Meadow hawkweed was originally introduced into eastern North America in the early 1800's. It is now recorded all but 19 states (it is only listed as noxious in 4 states) with infestations focused in the northeastern U.S. and eastern Canada. All the bordering Canadian provinces but Alberta, Saskatchewan, and Manitoba have escaped populations. The first reported sighting in the Pacific Northwest was in 1969 in Pend Oreille County, Washington.



Heiraceum caespitosum

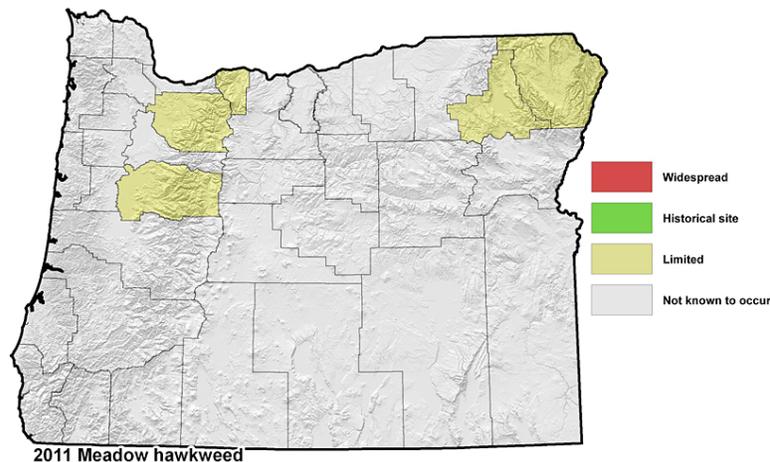


Heiraceum floribundum



Hieraceum piloselloides

Oregon Populations: Western Oregon's original meadow hawkweed site is located at LoLo Pass near Mt. Hood. Additional populations are in Wallowa County (northeast Oregon) located mostly in forest openings and meadows and until recently, in Conservation Reserve Program lands. Union County had confirmed multiple locations in 2007 with several new sites in 2008. (Dan Sharratt, pers. comm). A small patch was located in Umatilla County on the Umatilla NF in 2009. Yellow devil and king-devil hawkweed populations have not been identified in Oregon (2012).



Oregon's meadow hawkweed distribution on WeedMapper

Hardiness Zones: Hawkweeds thrive in a wide range of 4+ hardiness zones but are primarily a plant of cool temperate climates. They can be found in the southern half of the eastern seaboard but don't demonstrate the dominant nature they exhibit in the northern climates. See Attachment A.

Probability of Detection: The plants are generally not large but can be showy and similar in appearance to many other yellow-flowered weeds. They can disperse long distances and establish in remote locations, escaping notice for years. Hawkweeds thrive well under canopies of bracken fern and do well in the partial shade of conifer forests.

Positive Economic Impact: There are few if any economic benefits attributed to hawkweed spp. Some minor herbal use may occur in the U.S.

Negative Economic Impact: Hawkweeds are very invasive in natural areas and pastures prompting the need for expensive control programs. Infested areas lose forage production and require inputs of fertilizer or herbicide treatments or both to bring pastures back to original conditions before hawkweeds invaded. Monocultures of hawkweed degrade natural areas reducing forage available to wildlife and domestic livestock.

Ecological Impacts: Meadow Hawkweed invades a wide variety of habitats throughout Oregon including roadsides, pastures, meadows and open forested areas. It can create dense populations of rosettes replacing desirable and native vegetation. In extreme cases, natural areas are severely impacted reducing plant, invertebrate and vertebrate biodiversity. Much of Oregon is vulnerable to invasion by meadow hawkweed.

Control: Meadow Hawkweed can be controlled selectively with herbicides. The plants are easy to control with herbicides with nearly 100% control in a single application. Seed can remain viable for up to seven years requiring long-term commitment and monitoring for successful control. Mowing can prevent flowering to some extent. Mowing must be frequent as the plant can quickly regrow a short flower stalk. Mowing does not prevent stolon production resulting in populations that continue to expand vegetatively. Small infestations may be dug out in sandy, loose and/or light soils. Biocontrol is not currently an option in the Pacific Northwest. The presence of native hawkweeds (14 natives- Wilson L et al. 2006) complicates the task of releasing biocontrol agents for the hawkweed species complex and the potential hybridization of non-native hawkweeds may complicate finding species-specific agents.

Noxious Weed Qualitative Risk Assessment Oregon Department of Agriculture

Common name: Meadow, yellow devil, king devil hawkweeds

Scientific name: *Hieracium caespitosum*, *H. floribundum*, *H. piloselloides*

Family: Aster, *Asteraceae*

For use with plant species that occur or may occur in Oregon to determine their potential to become serious noxious weeds. For each of the following categories, select the number that best applies. Numerical values are weighted to increase priority categories over less important ones. Choose the best number that applies, intermediate scores can be used.

Total Score: 66

Risk Category: A

GEOGRAPHICAL INFORMATION

1) 6 Invasive in Other Areas

- 0 Low- not known to be invasive elsewhere.
- 2 Known to be invasive in climates dissimilar to Oregon's current climates.
- 6 Known to be invasive in geographically similar areas.

Comments: Known to be invasive in geographically similar areas.

2) 6 Habitat Availability: Are there susceptible habitats for this species and how common or widespread are they in Oregon?

- 1 *Low* – Habitat is very limited, usually restricted to a small watershed or part of a watershed (e.g., tree fern in southern Curry County).
- 3 *Medium* – Habitat encompasses 1/4 or less of Oregon (e.g., oak woodlands, coastal dunes, eastern Oregon wetlands, Columbia Gorge).
- 6 *High* – Habitat covers large regions or multiple counties, or is limited to a few locations of high economic or ecological value (e.g., threatened and endangered species habitat).

Comments: Habitat covers large regions or multiple counties.

3) 0 Proximity to Oregon: What is the current distribution of the species?

- 0 *Present* – Occurs within Oregon.
- 1 *Distant* – Occurs only in distant US regions or foreign countries.
- 3 *Regional* – Occurs in Western regions of US but not adjacent to Oregon border.
- 6 *Adjacent* – Weedy populations occur adjacent (<50 miles) to Oregon border.

Comments: Occurs in Oregon.

4) 7 Current Distribution: What is the current distribution of escaped populations in Oregon?

- 0 *Not present* – Not known to occur in Oregon.
- 1 *Widespread* – Throughout much of Oregon (e.g., cheatgrass).
- 5 *Regional* – Abundant (i.e., occurs in eastern, western, central, coastal, areas of Oregon) (e.g., gorse, tansy ragwort).
- 10 *Limited* – Limited to one or a few infestations in state (e.g., kudzu).

Comments: Regionally abundant.

BIOLOGICAL INFORMATION

- 5) 4 **Environmental Factors:** Do abiotic (non-living) factors in the environment effect establishment and spread of the species? (e.g., precipitation, drought, temperature, nutrient availability, soil type, slope, aspect, soil moisture, standing or moving water).
- 1 *Low* – Severely confined by abiotic factors.
 - 2 *Medium* – Moderately confined by environmental factors
 - 4 *High* – Highly adapted to a variety of environmental conditions (e.g., tansy ragwort, Scotch broom).

Comments: Highly adapted to a variety of environmental conditions.

- 6) 6 **Reproductive Traits:** How does this species reproduce? Traits that may allow rapid population increase both on and off site.
- 0 *Negligible* – Not self-fertile, or is dioecious and opposite sex not present.
 - 1 *Low* – Reproduction is only by seed, produces few seeds, or seed viability and longevity are low.
 - 3 *Medium* – Reproduction is vegetative (e.g., by root fragments, rhizomes, bulbs, stolons).
 - 3 *Medium* – Produces many seeds, and/or seeds of short longevity (< 5 years).
 - 5 *High* – Produces many seeds and/or seeds of moderate longevity (5-10 years) (e.g., tansy ragwort).
 - 6 *Very high* – Has two or more reproductive traits (e.g., seeds are long-lived >10 years and spreads by rhizomes).

Comments: Has two or more reproductive traits.

- 7) 4 **Biological Factors:** Do biotic (living) factors restrict or aid establishment and spread of the species? (What is the interaction of plant competition, natural enemies, native herbivores, pollinators, and pathogens with species?)
- 0 *Negligible* – Host plant not present for parasitic species.
 - 1 *Low* – Biotic factors highly suppress reproduction or heavily damage plant for an extended period (e.g., biocontrol agent on tansy ragwort).
 - 2 *Medium* – Biotic factors partially restrict or moderately impact growth and reproduction, impacts sporadic or short-lived.
 - 4 *High* – Few biotic interactions restrict growth and reproduction. Species expresses full growth and reproductive potential.

Comments: Few biotic interactions restrict growth and reproduction.

- 8) 5 **Reproductive Potential and Spread After Establishment - Non-human Factors:** How well can the species spread by natural means?
- 0 *Negligible* – No potential for natural spread in Oregon (e.g., ornamental plants outside of climate zone).
 - 1 *Low* – Low potential for local spread within a year, has moderate reproductive potential or some mobility of propagules (e.g., propagules transported locally by animals, water movement in lakes or ponds, not wind blown).
 - 3 *Medium* - Moderate potential for natural spread with either high reproductive potential or highly mobile propagules (e.g., propagules spread by moving water, or dispersed over longer distances by animals) (e.g., perennial pepperweed).
 - 5 *High* – Potential for rapid natural spread throughout the susceptible range, high reproductive capacity and highly mobile propagules. Seeds are wind dispersed over large areas (e.g., rush skeletonweed).

Comments: Produces large numbers of wind-dispersed seeds.

- 9) 5 **Potential of Species to be Spread by Humans.** What human activities contribute to spread of species? Examples include: interstate or international commerce; contaminated commodities; packing materials or products; vehicles, boats, or equipment movement; logging or farming; road maintenance; intentional introductions of ornamental and horticultural species, or biofuel production.
- 1 *Low* – Potential for introduction or movement minimal (e.g., species not traded or sold, or species not found in agricultural commodities, gravel or other commercial products).
 - 3 *Medium* – Potential for introduction or off-site movement moderate (e.g., not widely propagated, not highly popular, with limited market potential; may be a localized contaminant of gravel, landscape products, or other commercial products) (e.g., lesser celandine, Canada thistle).
 - 5 *High* – Potential to be introduced or moved within state high (e.g., species widely propagated and sold; propagules common contaminant of agricultural commodities or commercial products; high potential for movement by contaminated vehicles and equipment, or by recreational activities) (e.g., butterfly bush, spotted knapweed, Eurasian watermilfoil).

Comments: High potential for movement by contaminated vehicles and equipment, or by recreational activities.

IMPACT INFORMATION

- 10) 5 **Economic Impact:** What impact does/can the species have on Oregon's agriculture and economy?
- 0 *Negligible* – Causes few, if any, economic impacts.
 - 1 *Low* - Potential to, or causes low economic impact to agriculture; may impact urban areas (e.g., puncture vine, pokeweed).
 - 5 *Medium* – Potential to, or causes moderate impacts to urban areas, right-of-way maintenance, property values, recreational activities, reduces rangeland productivity (e.g., English ivy, Himalayan blackberry, cheatgrass).
 - 10 *High* – Potential to, or causes high impacts in agricultural, livestock, fisheries, or timber production by reducing yield, commodity value, or increasing production costs (e.g., gorse, rush skeleton weed, leafy spurge).

Comments: Significant impacts to native forage production.

- 11) 5 **Environmental Impact:** What risks or harm to the environment does this species pose? Plant may cause negative impacts on ecosystem function, structure, and biodiversity of plant or fish and wildlife habitat; may put desired species at risk.
- 0 *Negligible* – None of the above impacts probable.
 - 1 *Low* – Can or does cause few or minor environmental impacts, or impacts occur in degraded or highly disturbed habitats.
 - 4 *Medium* – Species can or does cause moderate impacts in less critical habitats (e.g., urban areas, sagebrush/ juniper stands).
 - 6 *High* – Species can or does cause significant impacts in several of the above categories. Plant causes severe impacts to limited or priority habitats (e.g., aquatic, riparian zones, salt marsh; or T&E species sites).

Comments: Significant impacts to native forage production.

- 12) 0 **Impact on Health:** What is the impact of this species on human, animal, and livestock health? (e.g., poisonous if ingested, contact dermatitis, acute and chronic toxicity to livestock, toxic sap, injurious spines or prickles, causes allergy symptoms).
- 0 *Negligible* – Has no impact on human or animal health.
 - 2 *Low* – May cause minor health problems of short duration, minor allergy symptoms (e.g., leafy spurge).
 - 4 *Medium* – May cause severe allergy problems, death or severe health problems through chronic toxicity, spines or toxic sap may cause significant injury. (e.g., giant hogweed, tansy ragwort).
 - 6 *High* – Causes death from ingestion of small amounts, acute toxicity (e.g. poison hemlock).

Comments: Has no impact on human or animal health.

CONTROL INFORMATION

- 13) 7 **Probability of Detection at Point of Introduction:** How likely is detection of species after introduction and naturalization in Oregon?
- 1 *Low* – Grows where probability of early detection is high, showy and easily recognized by public; access to habitat not restricted (e.g., giant hogweed).
 - 5 *Medium* – Easily identified by weed professionals, ranchers, botanists; some survey and detection infrastructure in place. General public may not recognize or report species (e.g., leafy spurge).
 - 10 *High* – Probability of initial detection by weed professionals low. Plant shape and form obscure, not showy for much of growing season, introduction probable at remote locations with limited access (e.g., weedy grasses, hawkweeds, skeletonweed).

Comments: Easily identified. Introduction probable to remote locations with limited access.

- 14) 6 **Control Efficacy:** What level of control of this species can be expected with proper timing, herbicides, equipment, and biological control agents?
- 1 *Negligible* – Easily controlled by common non-chemical control measures (e.g., mowing, tillage, pulling, and cutting; biocontrol is very effective at reducing seed production and plant density) (e.g., tansy ragwort).
 - 2 *Low* – Somewhat difficult to control, generally requires herbicide treatment (e.g., mechanical control measures effective at preventing flowering and but not reducing plant density; herbicide applications provide a high rate of control in a single application; biocontrol provides partial control).
 - 4 *Medium* – Treatment options marginally effective or costly. Tillage and mowing increase plant density (e.g., causes tillering, rapid regrowth, spread from root fragments). Chemical control is marginally effective. Crop damage occurs or significant non-target impacts result from maximum control rates. Biocontrol agents ineffective.
 - 6 *High* – No effective treatments known or control costs very expensive. Species may occur in large water bodies or river systems where containment and complete control are not achievable. Political or legal issues may prevent effective control.

Comments: Herbicide applications provide a high rate of control in a single application.

Category Scores:

19 Geographic score (Add scores 1-4)

24 Biological Score (Add lines 5-9)

10 Impact Score (Add lines 10-12)

13 Control Score (Add Lines 13-14)

66 Total Score (Add scores 1-14 and list on front of form)

Risk Category: 55-89+ = **A** 24-54 = **B** < 24 = unlisted.

This Risk Assessment was modified by ODA from the USDA-APHIS Risk Assessment for the introduction of new plant species.

1/15/2013 v.3.8

Oregon Department of Agriculture
Noxious Weed Rating System

Common Name: Meadow, king devil, yellow devil hawkweeds

Scientific Name: *Hieraceum caespitosum*, *H. piloselloides*, *H. floribundum*

Point Total: 17 Rating: A

- 1) 2 **Detrimental Effects:** Circle all that apply, enter number of circles.
1. *Health:* causes poisoning or injury to humans or animals
 2. *Competition:* strongly competitive with crops, forage, or native flora
 3. *Host:* host of pathogens and/or pests of crops or forage
 4. *Contamination:* causes economic loss as a contaminate in seeds and/or feeds
 5. *Interference:* interferes with recreation, transportation, harvest, land value, or wildlife and livestock movement
- 2) 5 **Reproduction & Capacity for Spread:** Circle the number that best describes, enter that number.
1. Few seeds, not wind blown, spreads slowly
 2. Many seeds, slow spread
 3. Many seeds, spreads quickly by vehicles or animals
 4. Windblown seed, or spreading rhizomes, or water borne
 5. Many wind-blown seeds, high seed longevity, spreading rhizomes, perennials
- 3) 3 **Difficulty to Control:** Circle the number that best describes, enter that number.
1. Easily controlled with tillage or by competitive plants
 2. Requires moderate control, tillage, competition or herbicides
 3. Herbicides generally required, or intensive management practices
 4. Intensive management generally gives marginal control
 5. No management works well, spreading out of control
- 4) 3 **Distribution:** Circle the number that best describes, enter that number.
1. Widely distributed throughout the state in susceptible habitat
 2. Regionally abundant, 5 or more counties, more than 1/2 of a county
 3. Abundant throughout 1- 4 counties, or 1/4 of a county, or several watersheds
 4. Contained in only 1 watershed, or less than 5 square miles gross infestation
 5. Isolated infestation less than 640 acres, more than 10 acres
 6. Occurs in less than 10 acres, or not present, but imminent from adjacent state
- 5) 4 **Ecological Impact:** Circle the number that best describes, enter that number.
1. Occurs in most disturbed habitats with little competition
 2. Occurs in disturbed habitats with competition
 3. Invades undisturbed habitats and crowds out native species
 4. Invades restricted habitats (i.e. riparian) and crowds out native species

17 TOTAL POINTS

Note: Noxious weeds are non-native plants with scores of 11 points or higher. Any plants in 4.1, 4.2, and 4.3 should not be classified as "A" rated weeds. *Ratings:* 16 + = A, 15 – 11= B
ODA Weed Rating System 1/15/2013 v.3.8

RA produced by Dave Langland, ODA, 2011
Edited by Glenn Miller, Tom Forney, ODA

References:

Hawkweed Identification, Montana State Extension Bulletin EB 0187, Available at <http://msuextension.org/publications/AgandNaturalresources/eb0187.pdf>

Jacobs, J. et al. 2007. Ecology and Management of Invasive Hawkweeds (*Hieracium* spp.)
Natural Resources Conservation Service. Invasive Species Technical Note No. MT 16

Plant Profile for *Hieracium pilosella* (Mouse-ear Hawkweed) from the USDA PLANTS database.
Available at plants.usda.gov/java/profile?symbol=HEPI

Sharratt, Dan., Oregon Department of Agriculture. 2011. Personnel communication

Wilson, L. et al. 2006. A new invasive hawkweed, *Hieraceum glomeratum* (Lactuceae, Asteraceae),
in the Pacific Northwest. *Canada Journal of Botany*. 84:133-142 (2006)

Wilson, L. 2006. Key to Identification of Invasive and Naïve Hawkweeds (*Hieracium* spp.) in the
Pacific Northwest. B.C. Ministry For. Range, For. Prac. Br., Kamloops, B.C.

Attachment A

