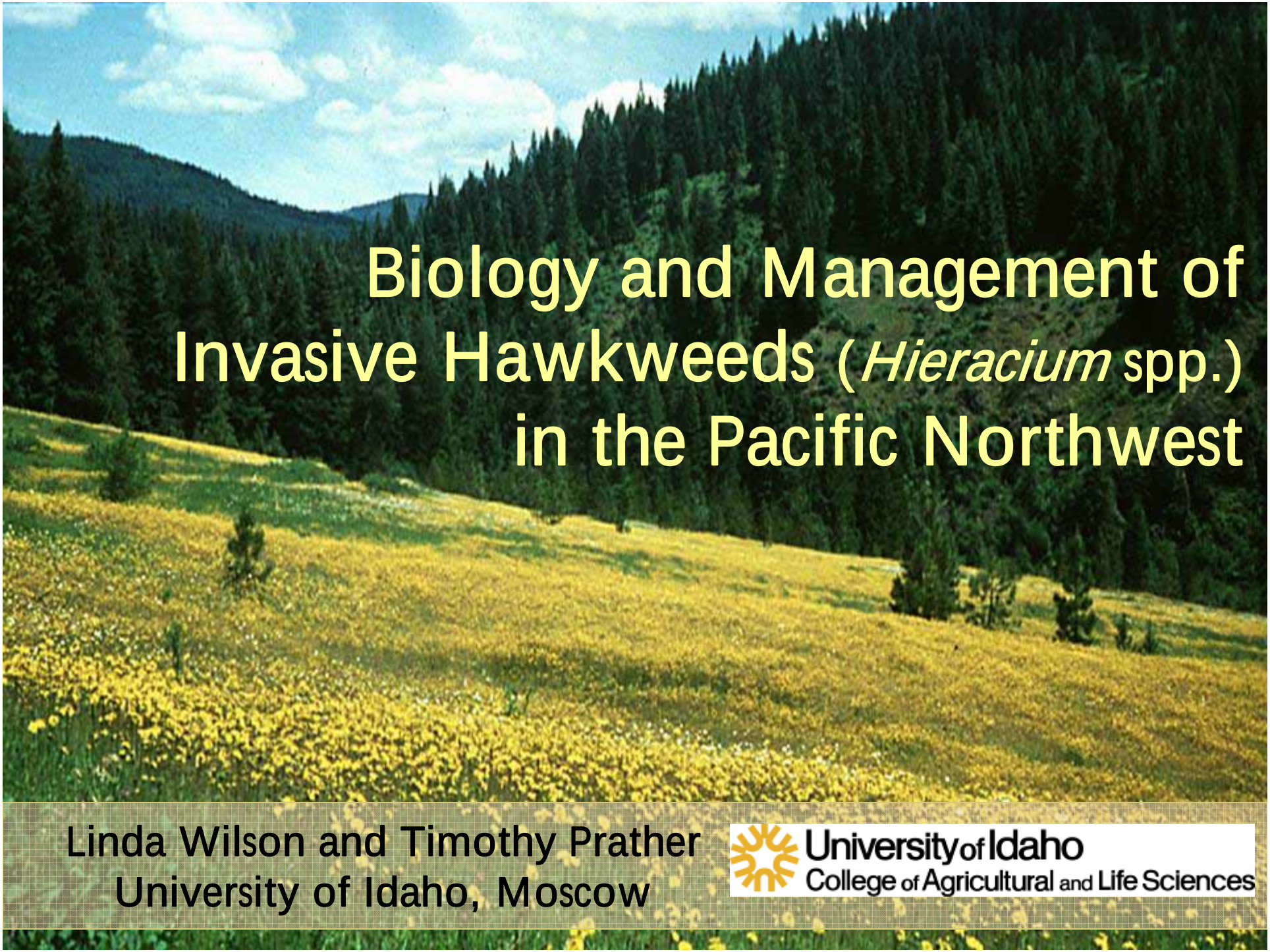


Biology and Management of Invasive Hawkweeds (*Hieracium* spp.) in the Pacific Northwest

Linda Wilson and Timothy Prather
University of Idaho, Moscow

University of Idaho
College of Agricultural and Life Sciences

Description of Hawkweeds

- Genus *Hieracium*, tribe Lactuceae
- Stoloniferous, rhizomatous, shallowly fibrous-rooted, perennial plants.
- Bristly hairy to hairless, narrow, elongated leaves to broad serrate leaves.
- Flowering stalks are usually singular and leafy or leafless, rising from a basal rosette and can be 6 to +50 inches in height.

Meadow hawkweed

Complex of Invasive Hawkweeds

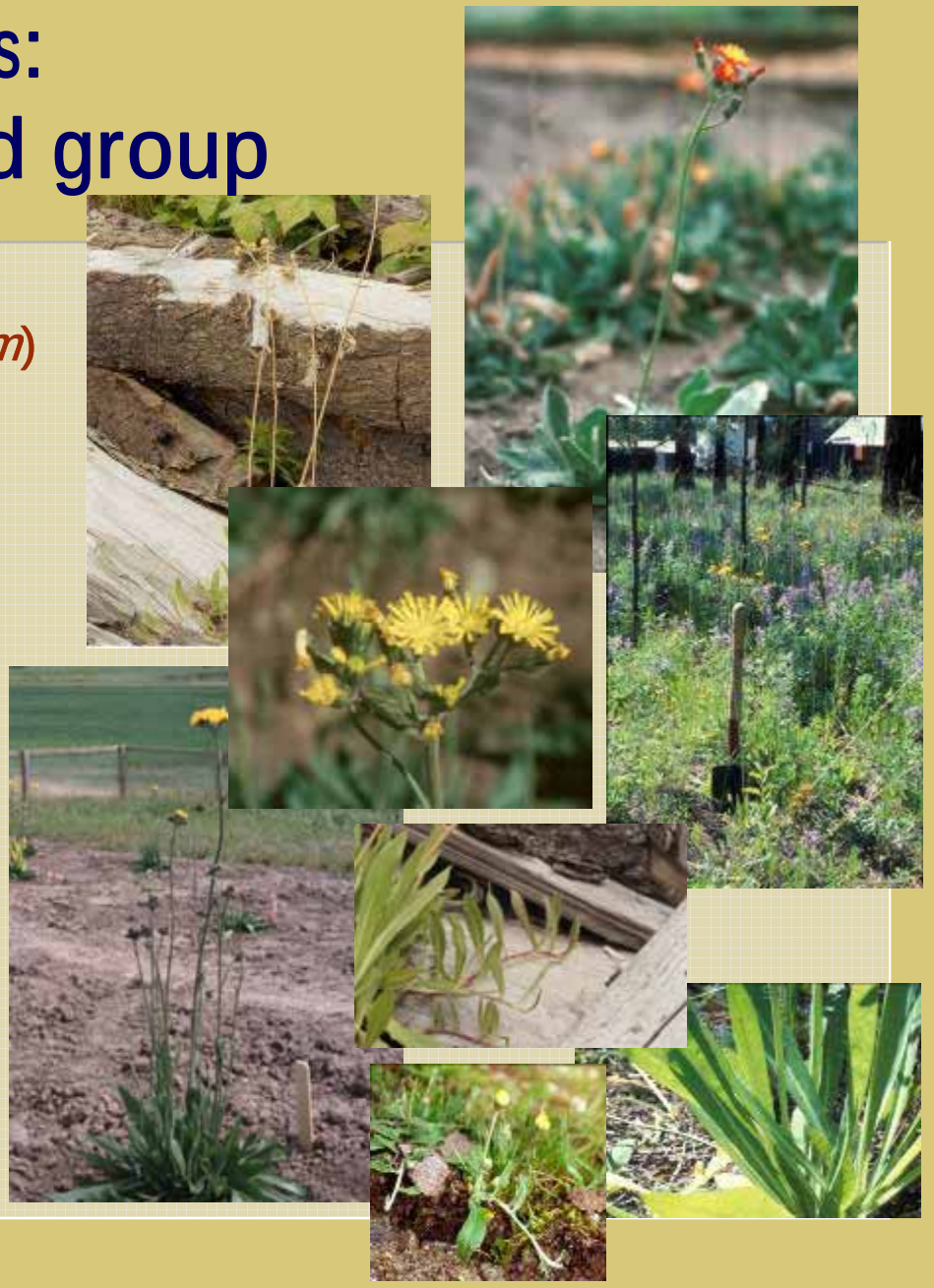
14 species of non-native, invasive hawkweeds within 2 subgenera

Subgenus *Pilosella*
All invasive, 8 spp

Subgenus *Hieracium*
Invasive and Native, 6 spp

Invasive hawkweeds: Meadow hawkweed group

- Meadow h. (*Hieracium caespitosum*)
- Orange h. (*H. auranticaum*)
- Kingdevil h. (*H. floribundum*)
- Tall h. (*H. piloselloides*)
- Mouse ear h. (*H. pilosella*)
- Yellowdevil h. (*H. glomeratum*)
- Queendevil h. (*H. praealtum*)
- Whiplash h. (*H. flagellare*)

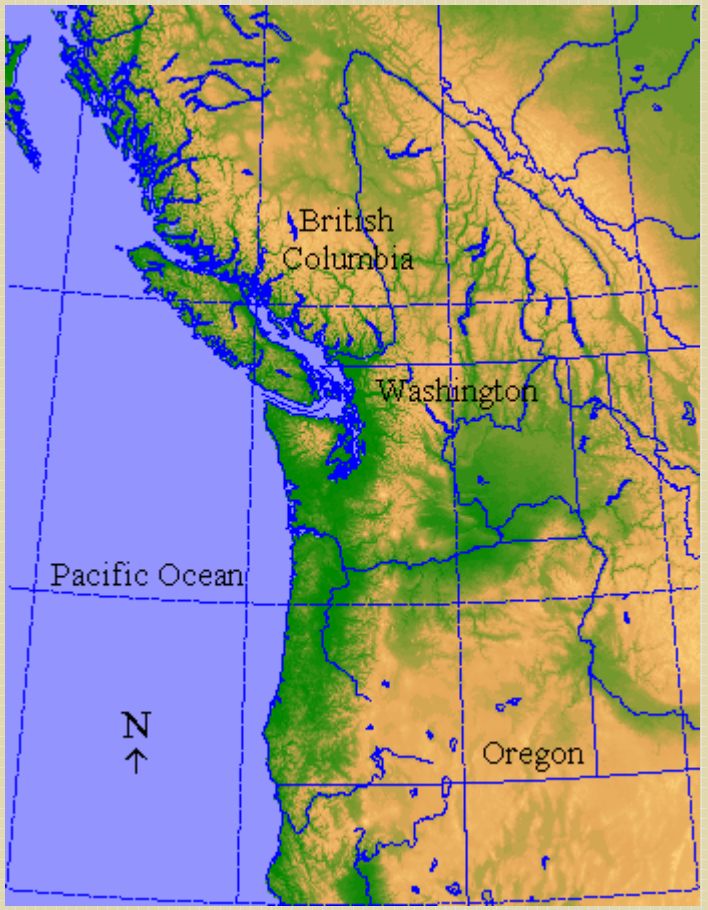


History of Invasion in the PNW

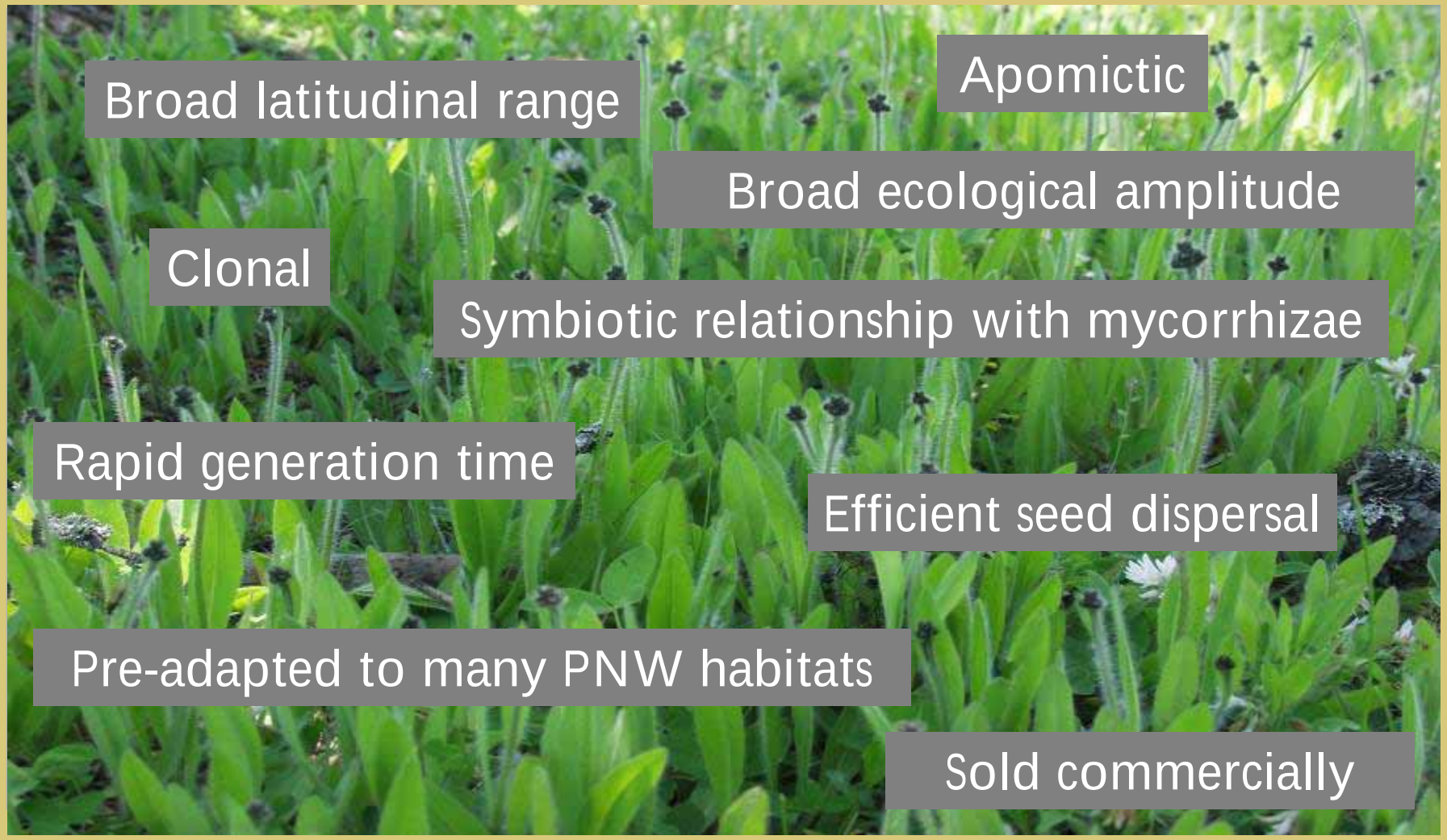
First reported in 1945-1960 near Spokane, WA, likely from wartime armory near Sandpoint, ID.

Established in most susceptible habitats in ID, WA, and BC. Also established in OR, MT, WY, CO, AK.

Estimated to infest over 2.5M ac and spread at a rate of 16% per year.



Invasion potential of non-native hawkweeds



The Invasive Hawkweed Consortium

- Idaho Department of Agriculture
- Hawkweed Action Committee
- US Bureau of Land Management
- British Columbia Ministry of Forests and Range
- Washington St. Weed Board
- Kootenai County Weed Board
- Palouse CWMA
- Stevens County Weed Board
- US Forest Service
- Selkirk CWMA
- Panhandle Lakes CWMA
- Idaho Department of Lands
- Rimrock Hawkweed Cooperative
- Benewah County Weed Board
- British Columbia Min. of Agric. & Lands
- Montana Weed Trust Fund
- Nez Perce BioControl Center
- Potlatch Corp., Crown Pacific
- University of Idaho
- Pend Oreille Co. Weed Board
- Dow AgroSciences
- USDA ARA, APHIS

Goals of the Consortium

Education and Awareness

Biological Control

Funding

Management

Develop local strategies

Surveys and mapping

Genetic studies

Reproduction

Stolons and rhizomes

Asexual seed production, occasional outcrossing

Adventitious root buds

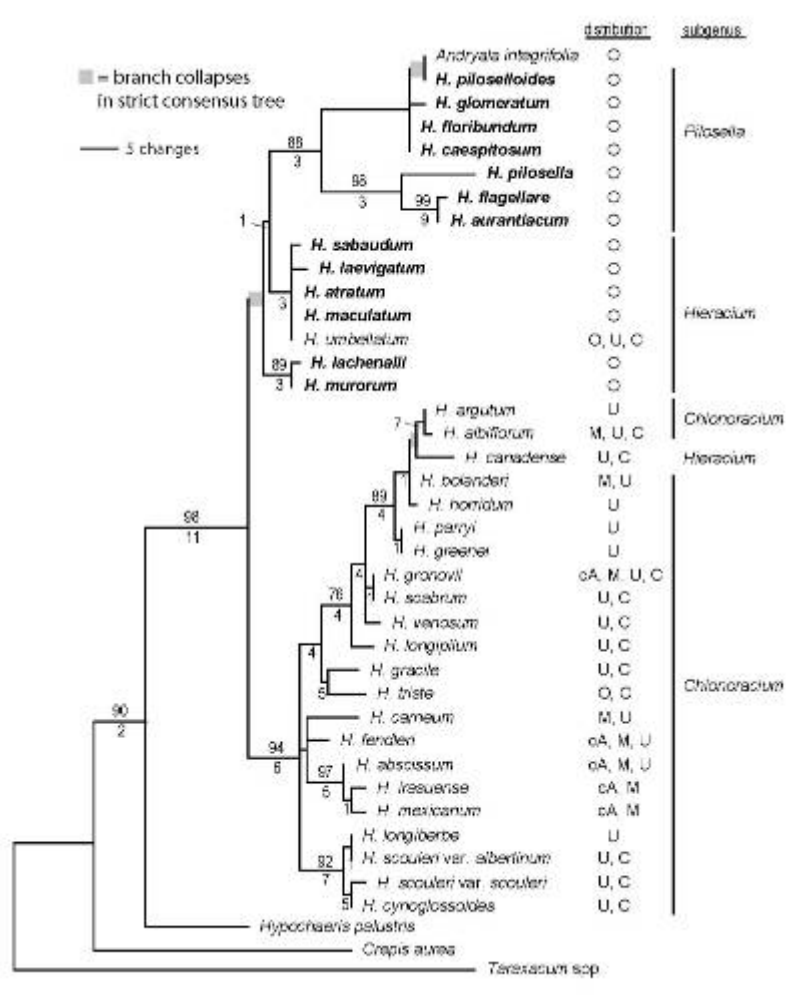
April-Sept: 15 rosettes, 25 stolons (15cm), 324 root buds, 13,500 seeds, 5 daughters plants

Species relationships among invasive hawkweeds

- Determine hybridization potential and extent
- Determine which species are hybridizing

L. Fishman and E. Loomis, University of Montana, Missoula

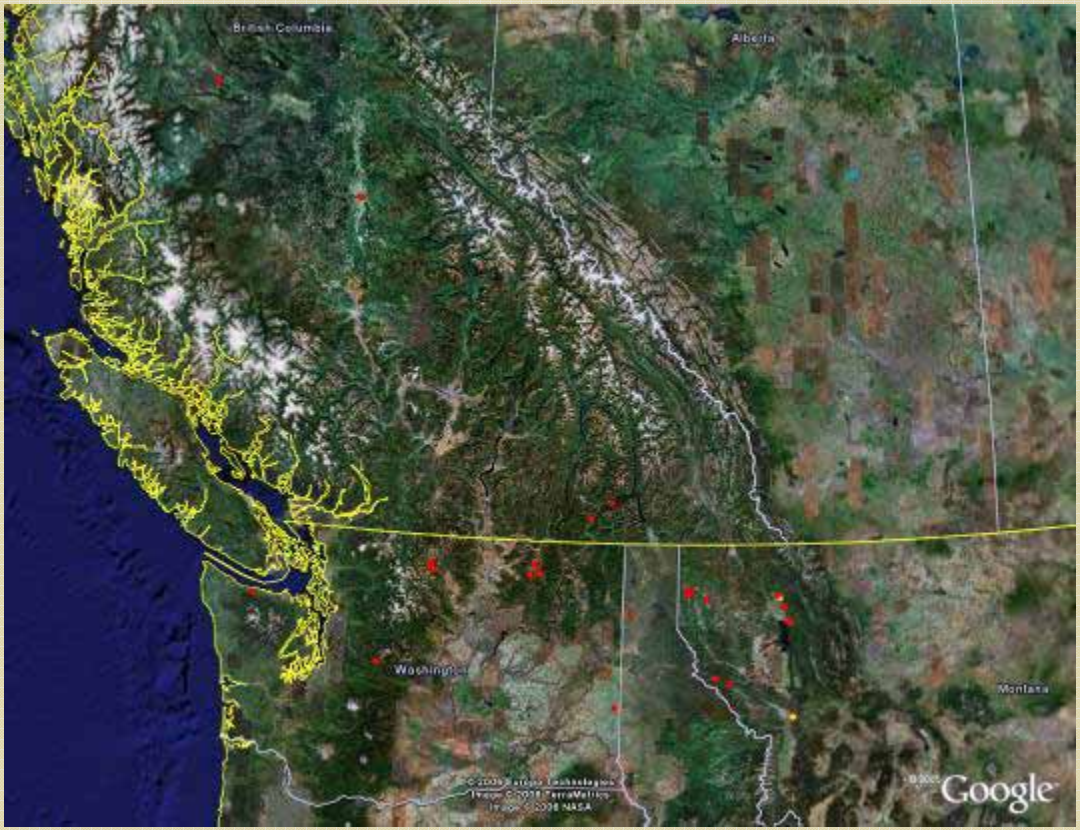
Hawkweed Phylogeny Studies



Genetic variability within orange hawkweed

All populations examined to date are the same genotype

Similar studies began this year on the yellow-flowered complex

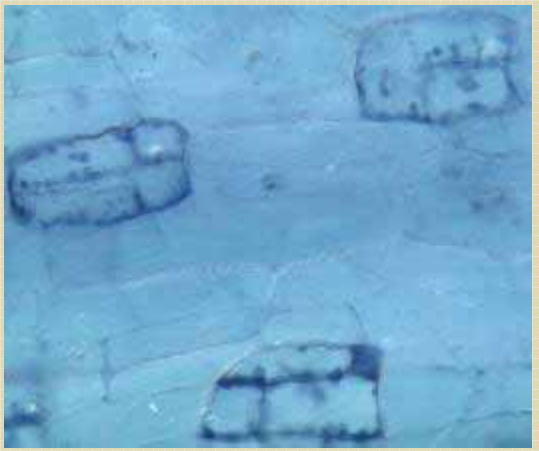


Hawkweed Assocation with Arbuscular Mycorrhizal Fungi

CRISSP
Center for Research on Invasive Species and Small Populations,
University of Idaho

- Mouse-ear hawkweed has an obligate association with AMF.
- Studies underway with meadow hawkweed.
- Four spp. invasive hawkweed established mycorrhizae within 3 weeks of germination, before native species.
- Competitive advantage by plugging into common mycorrhizal network early.

Mycorrhizal structures



Management

Herbicides
selective, effective

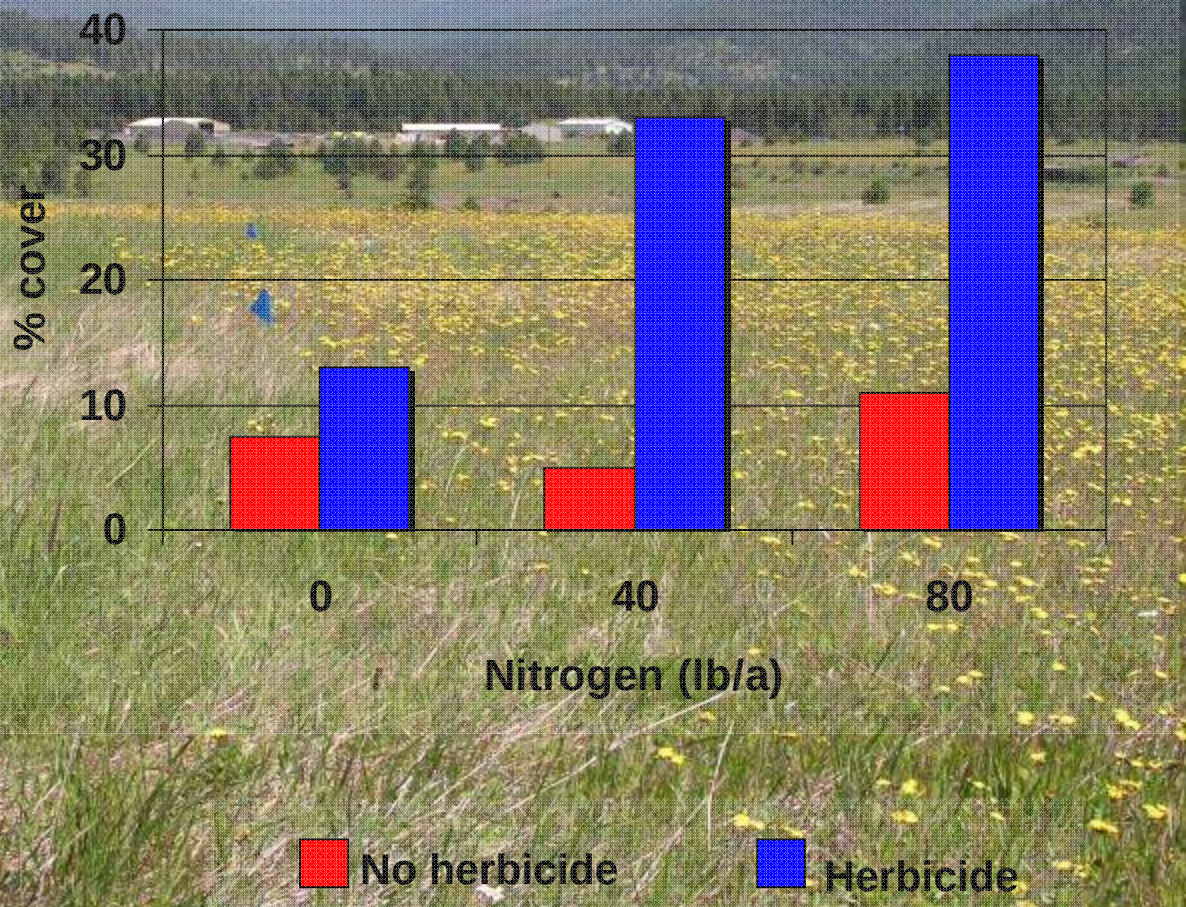
Fertilizer
reduce h. competition with grasses

Biological Control
ongoing studies CABI Bioscience, CH
1-2 years

Cultural/Mechanical Control
encourages vegetative spread

Effect of fertilizer + herbicide on grass production

- Transline (clopyralid) @ 11 oz/ac
- Ammonium sulfate

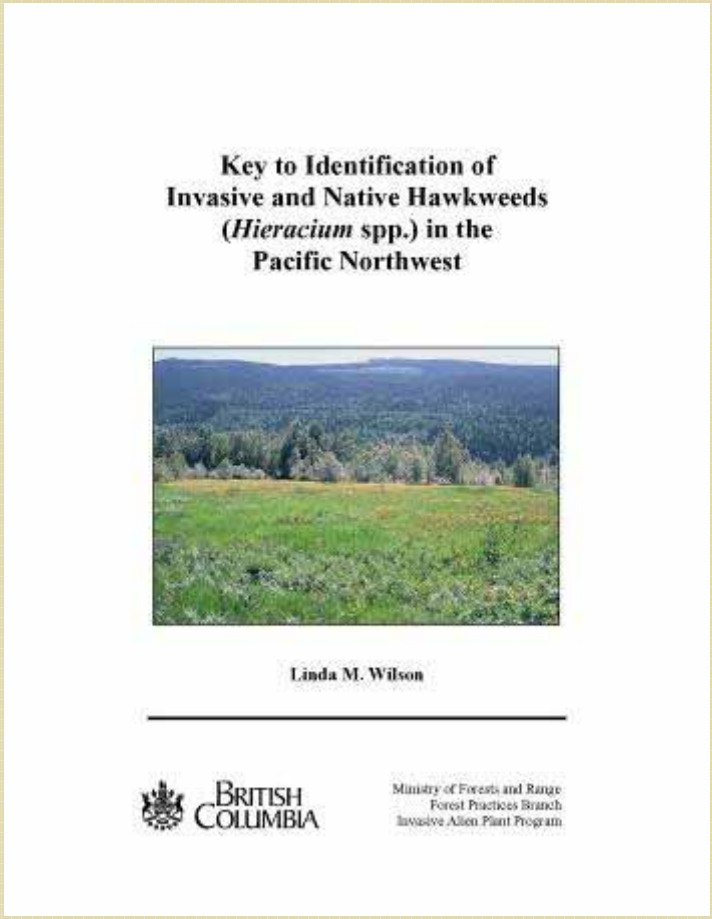


Herbicide and fertilizer studies

- 2003, 98-100% control with clopyralid (Transline) and N fertilizer
- Hawkweed has not reinvaded sites four yr after treatment
- 2005-6 studies with aminopyralid (Milestone)

Collaboration with Dow AgroSciences

Identification Key


Key to Identification of
Invasive and Native Hawkweeds
(*Hieracium* spp.) in the
Pacific Northwest

Linda M. Wilson

BRITISH COLUMBIA

Ministry of Forests and Range
Forest Practices Branch
Invasive Alien Plant Program

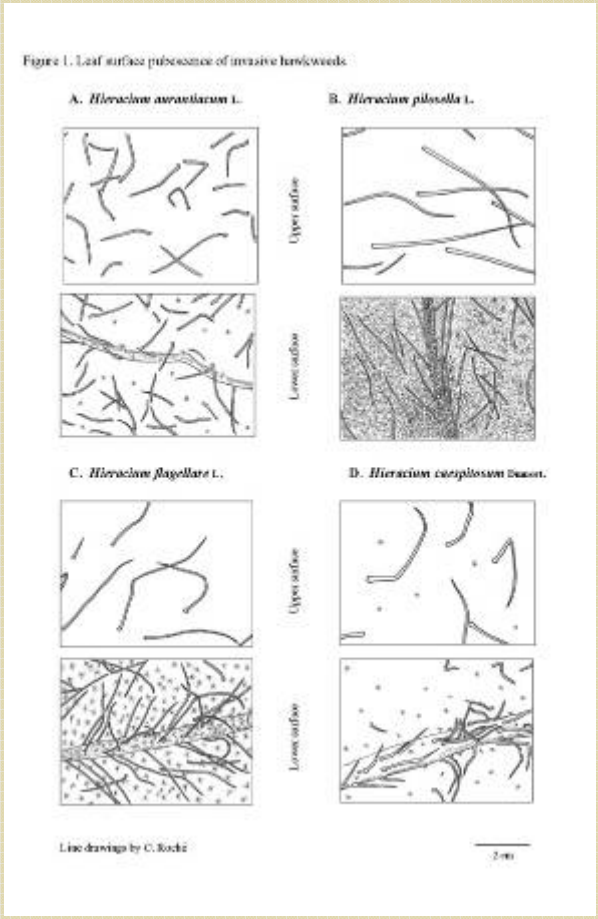


Figure 1. Leaf surface pubescence of invasive hawkweeds.

A. *Hieracium aurantiacum* L.

B. *Hieracium pilosella* L.

C. *Hieracium flagellare* L.

D. *Hieracium caespitosum* Dumort.

Upper surface

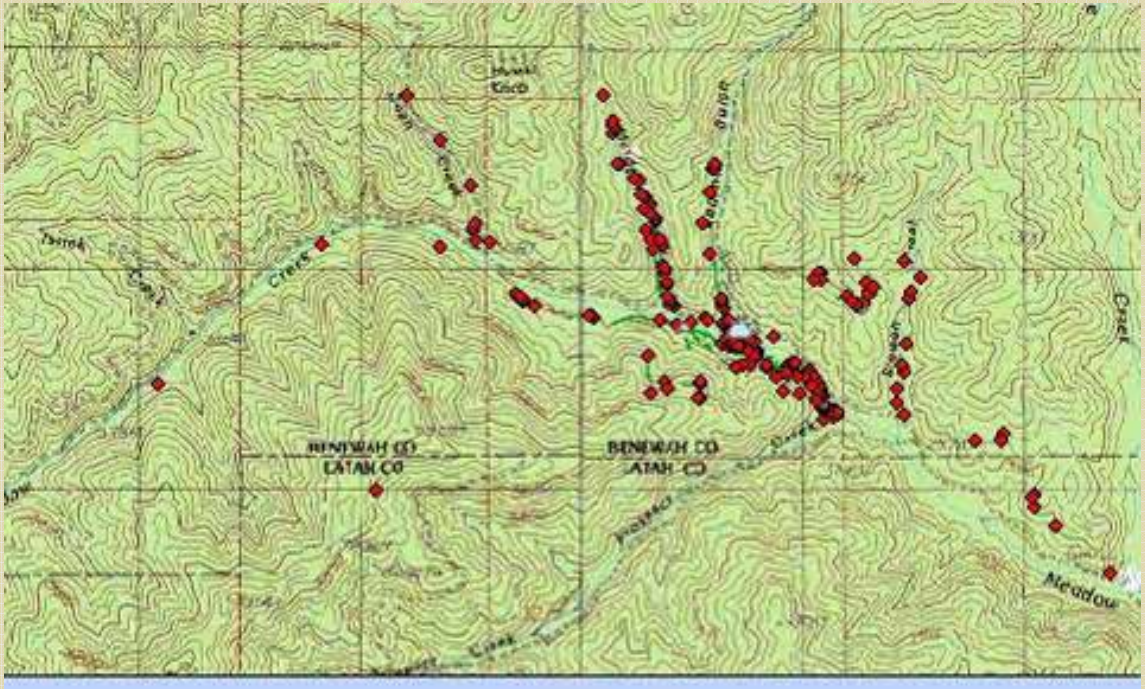
Lower surface

Line drawings by C. Roche

2 mm

http://www.for.gov.bc.ca/hfp/invasive/index.htm

Surveys and Mapping



Meadow Creek

Biological Control

- Seven insects species and one rust fungus have been tested.
- Insects damage stolons, roots and stems.
- Problems with feeding on native hawkweed species has disqualified 4 species.
- Four species are potential.

Conclusion

- Invasive hawkweeds are diverse and widespread in PNW.
- Education and awareness.
- Fringe and isolated infestations containable.
- Long-term control may hinge on soil fertility management where applicable.

Thank you

Cariboo near McBride, BC