

ALASKA NON-NATIVE PLANT INVASIVENESS RANKING FORM

Botanical name: *Hypochaeris radicata* L.

Common name: hairy cat's ear

Assessors:

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Date: 11/30/2010

Date of previous ranking, if any: 6T

OUTCOME SCORE:

CLIMATIC COMPARISON

This species is present or may potentially establish in the following eco-geographic regions:

Pacific Maritime	<u>Yes</u>
Interior-Boreal	<u>Yes</u>
Arctic-Alpine	<u>Yes</u>

INVASIVENESS RANKING

	Total (total answered points possible ¹)	Total
Ecological impact	40 (<u>40</u>)	<u>14</u>
Biological characteristics and dispersal ability	25 (<u>25</u>)	<u>14</u>
Ecological amplitude and distribution	25 (<u>25</u>)	<u>13</u>
Feasibility of control	10 (10)	<u>3</u>
Outcome score	100 (<u>100</u>) ^b	<u>44</u> ^a
Relative maximum score ²		<u>44</u>

¹ For questions answered “unknown” do not include point value for the question in parentheses for “total answered points possible.”

² Calculated as $a/b \times 100$

A. CLIMATIC COMPARISON

1.1. Has this species ever been collected or documented in Alaska?

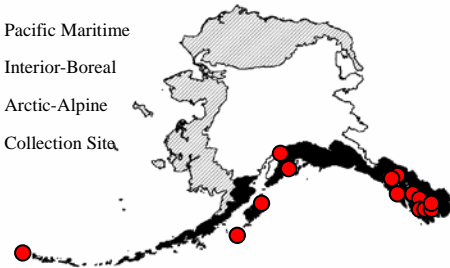
- Yes - continue to 1.2
 No - continue to 2.1

1.2. From which eco-geographic region has it been collected or documented (see inset map)?

Proceed to Section B. INVASIVENESS RANKING

- Pacific Maritime
 Interior-Boreal
 Arctic-Alpine

- Pacific Maritime
□ Interior-Boreal
▨ Arctic-Alpine
● Collection Site



Documentation: *Hypochaeris radicata* has been documented from the Pacific Maritime ecogeographic region of Alaska and from Anchorage in the Interior-Boreal ecogeographic region (Hultén 1968, AKEPIC 2010, UAM 2010).

2.1. Is there a 40 percent or higher similarity (based on CLIMEX climate matching, see references) between climates where this species currently occurs and:

- a. Juneau (Pacific Maritime region)?
 Yes – record locations and percent similarity; proceed to Section B.
 No
- b. Fairbanks (Interior-Boreal region)?
 Yes – record locations and percent similarity; proceed to Section B.
 No
- c. Nome (Arctic-Alpine region)?
 Yes – record locations and percent similarity; proceed to Section B.
 No

If “No” is answered for all regions; reject species from consideration

Documentation: *Hypochaeris radicata* is known to grow in Missoula, Montana, which has a 41% climatic similarity with Nome (CLIMEX 1999, Invaders 2010). In Scandinavia, this species grows as far north as 62°47'N but only in warmer coastal areas (Turkington and Aarssen 1983).

B. INVASIVENESS RANKING

1. Ecological Impact

1.1. Impact on Natural Ecosystem Processes

- | | | |
|----|--|----|
| a. | No perceivable impact on ecosystem processes | 0 |
| b. | Has the potential to influence ecosystem processes to a minor degree (e.g., has a perceivable but mild influence on soil nutrient availability) | 3 |
| c. | Has the potential to cause significant alteration of ecosystem processes (e.g., increases sedimentation rates along streams or coastlines, degrades habitat important to waterfowl) | 7 |
| d. | Has the potential to cause major, possibly irreversible, alteration or disruption of ecosystem processes (e.g., the species alters geomorphology, hydrology, or affects fire frequency thereby altering community composition; species fixes | 10 |

- substantial levels of nitrogen in the soil making soil unlikely to support certain native plants or more likely to favor non-native species)
- e. Unknown
- U
Score 3

Documentation: *Hypochaeris radicata* grows in recently disturbed sites and grasslands that are repeatedly disturbed, mown, or grazed (Turkington and Aarssen 1983). The deep taproots can draw considerable amounts of water and may limit the soil moisture available to native species (GOERT 2005). *Hypochaeris radicata* rapidly uptakes and incorporates soil nitrogen, limiting the nitrogen available to native species and increasing the retention of nitrogen in nitrogen-poor ecosystems (Schoenfelder et al. 2010).

1.2. Impact on Natural Community Structure

- a. No perceived impact; establishes in an existing layer without influencing its structure 0
- b. Has the potential to influence structure in one layer (e.g., changes the density of one layer) 3
- c. Has the potential to cause significant impact in at least one layer (e.g., creation of a new layer or elimination of an existing layer) 7
- d. Likely to cause major alteration of structure (e.g., covers canopy, eliminating most or all lower layers) 10
- e. Unknown
- U
Score 3

Documentation: *Hypochaeris radicata* may increase the density of vegetation in early successional grasslands, disturbed areas, and heavily grazed pastures (de Kroon et al. 1987, DiTomaso and Healy 2007).

1.3. Impact on Natural Community Composition

- a. No perceived impact; causes no apparent change in native populations 0
- b. Has the potential to influence community composition (e.g., reduces the population size of one or more native species in the community) 3
- c. Has the potential to significantly alter community composition (e.g., significantly reduces the population size of one or more native species in the community) 7
- d. Likely to cause major alteration in community composition (e.g., results in the extirpation of one or more native species, thereby reducing local biodiversity and/or shifting the community composition towards exotic species) 10
- e. Unknown
- U
Score 3

Documentation: *Hypochaeris radicata* may displace native species and alter community composition in disturbed areas and repeatedly mown or grazed grasslands (Turkington and Aarssen 1983, Warner 2003). However, a study in which *Hypochaeris radicata* was removed from primary successional sites on Mount Saint Helens suggested that this species has limited effects on the composition of surrounding vegetation (Schoenfelder et al. 2010).

1.4. Impact on associated trophic levels (cumulative impact of this species on the animals, fungi, microbes, and other organisms in the community it invades)

- a. Negligible perceived impact 0

- b. Has the potential to cause minor alteration (e.g., causes a minor reduction in nesting or foraging sites) 3
 - c. Has the potential to cause moderate alteration (e.g., causes a moderate reduction in habitat connectivity, interferes with native pollinators, or introduces injurious components such as spines, toxins) 7
 - d. Likely to cause severe alteration of associated trophic populations (e.g., extirpation or endangerment of an existing native species or population, or significant reduction in nesting or foraging sites) 10
 - e. Unknown U
- Score 5

Documentation: Shoots of *Hypochaeris radicata* are eaten by wild and domesticated animals, including sheep, pigs, snowshoe hares, slugs, snails, birds, and ants (Aarssen 1981, Turkington and Aarssen 1983, Weiner 1993). Sheep and snowshoe hares show a preference for this species over other plant species (Turkington and Aarssen 1983). When ingested in large quantities by horses, *Hypochaeris radicata* is known to cause stringhalt, a disease involving high-stepping with hyperflexion of the hind limbs. The toxicity of the plant likely depends on the habitat in which it grows (Araújo et al. 2008). Roots form associations with mycorrhizal fungi. Numerous insect species visit the flowers for pollen or nectar (Turkington and Aarssen 1983). The presence of *Hypochaeris radicata* may alter native plant-pollinator interactions. *Hypochaeris radicata* is associated with many nematodes, plant pests, parasites, and diseases (Turkington and Aarssen 1983).

Total Possible 40
Total 14

2. Biological Characteristics and Dispersal Ability

2.1. Mode of reproduction

- a. Not aggressive (produces few seeds per plant [0-10/m²] and not able to reproduce vegetatively). 0
 - b. Somewhat aggressive (reproduces by seed only [11-1,000/m²]) 1
 - c. Moderately aggressive (reproduces vegetatively and/or by a moderate amount of seed [<1,000/m²]) 2
 - d. Highly aggressive (extensive vegetative spread and/or many seeded [>1,000/m²]) 3
 - e. Unknown U
- Score 3

Documentation: *Hypochaeris radicata* can reproduce sexually by seeds or vegetatively by overwintering buds (Turkington and Aarssen 1983). Each rosette can produce from 300 to 6,000 seeds (de Kroon et al. 1987). In British Columbia, this species produced an average of 2,329 seeds per plant (Turkington and Aarssen 1983). Multiple rosettes can be produced from a single taproot. Vegetative propagation primarily contributes to increasing the density of rosettes in established populations rather than to establishing new or maintaining existing populations (de Kroon et al. 1987).

2.2. Innate potential for long-distance dispersal (wind-, water- or animal-dispersal)

- a. Does not occur (no long-distance dispersal mechanisms) 0

- b. Infrequent or inefficient long-distance dispersal (occurs occasionally despite lack of adaptations) 2
 - c. Numerous opportunities for long-distance dispersal (species has adaptations such as pappus, hooked fruit coats, etc.) 3
 - d. Unknown U
- Score 3

Documentation: Each seed has a pappus of feathery bristles and is well suited to wind-dispersal (Turkington and Aarssen 1983). Seeds have a terminal velocity of 0.34 m/s, and 95% of seeds land at least 10 m from the parent plant in a 12 m/s wind. More rarely, seeds can land 100 m from the parent plant (Soons et al. 2004). Seeds can stick to and be dispersed by birds and are sometimes moved by ants (Turkington and Aarssen 1983).

2.3. *Potential to be spread by human activities (both directly and indirectly – possible mechanisms include: commercial sale of species, use as forage or for revegetation, dispersal along highways, transport on boats, common contaminant of landscape materials, etc.).*

- a. Does not occur 0
 - b. Low (human dispersal is infrequent or inefficient) 1
 - c. Moderate (human dispersal occurs regularly) 2
 - d. High (there are numerous opportunities for dispersal to new areas) 3
 - e. Unknown U
- Score 2

Documentation: *Hypochaeris radicata* has been documented as a contaminant in commercial grass seed (Turkington and Aarssen 1983). Seeds can attach to clothing and can be transported on agricultural equipment (Warner 2003, DiTomaso and Healy 2007). Infestations in Alaska have spread primarily along road systems (AKEPIC 2010).

2.4. *Allelopathic*

- a. No 0
 - b. Yes 2
 - c. Unknown U
- Score 2

Documentation: *Hypochaeris radicata* is autotoxic and has allelopathic effects on some grassland plant species (Aarssen 1981, Turkington and Aarssen 1983).

2.5. *Competitive ability*

- a. Poor competitor for limiting factors 0
 - b. Moderately competitive for limiting factors 1
 - c. Highly competitive for limiting factors and/or able to fix nitrogen 3
 - d. Unknown U
- Score 1

Documentation: *Hypochaeris radicata* rapidly incorporates soil nitrogen, limiting the amount of nitrogen available to native species (Schoenfelder et al. 2010), and it competes well in early successional grassland communities (Turkington and Aarssen 1983). This species often dominates newly established grassland habitats within a few years, but populations decline

significantly after 10 to 15 years. Although *Hypochaeris radicata* is a perennial plant, established populations only maintain their size in repeatedly disturbed areas (de Kroon et al. 1987).

2.6. *Forms dense thickets, has a climbing or smothering growth habit, or is otherwise taller than the surrounding vegetation.*

- a. Does not grow densely or above surrounding vegetation 0
- b. Forms dense thickets 1
- c. Has a climbing or smothering growth habit, or is otherwise taller than the surrounding vegetation 2
- d. Unknown U

Score

Documentation: Although *Hypochaeris radicata* can dominate disturbed grasslands, it rarely forms pure or dense stands. Plants are usually solitary or in small groups of clones (Turkington and Aarssen 1983, de Kroon et al. 1987).

2.7. *Germination requirements*

- a. Requires sparsely vegetated soil and disturbance to germinate 0
- b. Can germinate in vegetated areas, but in a narrow range of or in special conditions 2
- c. Can germinate in existing vegetation in a wide range of conditions 3
- d. Unknown U

Score

Documentation: *Hypochaeris radicata* establishes on exposed mineral soil and is common in early-seral communities (Klinkenberg 2010). Disturbances increase the survival rates of seedlings (de Kroon et al. 1987).

2.8. *Other species in the genus invasive in Alaska or elsewhere*

- a. No 0
- b. Yes 3
- c. Unknown U

Score

Documentation: *Hypochaeris brasiliensis*, *H. glabra*, and *H. microcephala* are known to occur as non-native weeds in North America (USDA 2010). *H. glabra* is considered a weed in California (DiTomaso and Healy 2007) and is known to occur in British Columbia (USDA 2010).

2.9. *Aquatic, wetland, or riparian species*

- a. Not invasive in wetland communities 0
- b. Invasive in riparian communities 1
- c. Invasive in wetland communities 3
- d. Unknown U

Score

Documentation: *Hypochaeris radicata* has not been documented invading riparian or wetland communities.

Total Possible

Total 14

3. Ecological Amplitude and Distribution

3.1. Is the species highly domesticated or a weed of agriculture?

- | | | |
|----|---|---|
| a. | Is not associated with agriculture | 0 |
| b. | Is occasionally an agricultural pest | 2 |
| c. | Has been grown deliberately, bred, or is known as a significant agricultural pest | 4 |
| d. | Unknown | U |

Score 2

Documentation: *Hypochaeris radicata* occasionally grows as a weed in ploughed fields and blueberry and raspberry patches in Canada (Aarssen 1981). It grows in pastures in the U.S., Australia, New Zealand, and Brazil (Araújo et al. 2008).

3.2. Known level of ecological impact in natural areas

- | | | |
|----|---|---|
| a. | Not known to impact other natural areas | 0 |
| b. | Known to impact other natural areas, but in habitats and climate zones dissimilar to those in Alaska | 1 |
| c. | Known to cause low impact in natural areas in habitats and climate zones similar to those in Alaska | 3 |
| d. | Known to cause moderate impact in natural areas in habitat and climate zones similar to those in Alaska | 4 |
| e. | Known to cause high impact in natural areas in habitat and climate zones similar to those in Alaska | 6 |
| f. | Unknown | U |

Score 1

Documentation: *Hypochaeris radicata* can dominate and reduce the quality of pastures in Britain (Turkington and Aarssen 1983). It has been associated with stringhalt in horses when growing as a weed in pastures in the U.S., Australia, New Zealand, and Brazil (Araújo et al. 2008). It displaces native species and alters the community composition in coastal terrace prairies in California (Warner 2003) and in Garry oak ecosystems in Washington and British Columbia (GOERT 2005).

3.3. Role of anthropogenic and natural disturbance in establishment

- | | | |
|----|---|---|
| a. | Requires anthropogenic disturbance to establish | 0 |
| b. | May occasionally establish in undisturbed areas, readily establishes in naturally disturbed areas | 3 |
| c. | Can establish independently of natural or anthropogenic disturbances | 5 |
| e. | Unknown | U |

Score 2

Documentation: *Hypochaeris radicata* often invades overgrazed, underfertilized pastures, and its establishment is most successful on bare soil (Aarssen 1981, Turkington and Aarssen 1983). In Australia, occurrences of *Hypochaeris radicata* decline as the distance from roads (into forests) increases (Aarssen 1981). This species has been documented growing in naturally disturbed areas in Canada, such as beaches, outcrops, and rocky shores (Turkington and Aarssen 1983). In Alaska, however, 98% of recorded infestations are associated with anthropogenic disturbances;

the remaining 2% of infestations do not have enough information to identify the disturbance type (AKEPIC 2010).

3.4. *Current global distribution*

- a. Occurs in one or two continents or regions (e.g., Mediterranean region) 0
 - b. Extends over three or more continents 3
 - c. Extends over three or more continents, including successful introductions in arctic or subarctic regions 5
 - e. Unknown U
- Score

3

Documentation: *Hypochaeris radicata* is native to Europe, North Africa, and northern Asia. It has been introduced to North America, South America, southern Africa, Australia, New Zealand, Taiwan, and Japan (Aarssen 1981, Turkington and Aarssen 1983, Bogler 2006, eFloras 2008). This species has not been documented from arctic or subarctic regions, although it grows as far north as 62°47'N in coastal Norway (Turkington and Aarssen 1983).

3.5. *Extent of the species' U.S. range and/or occurrence of formal state or provincial listing*

- a. Occurs in 0-5 percent of the states 0
 - b. Occurs in 6-20 percent of the states 2
 - c. Occurs in 21-50 percent of the states and/or listed as a problem weed (e.g., “Noxious,” or “Invasive”) in one state or Canadian province 4
 - d. Occurs in more than 50 percent of the states and/or listed as a problem weed in two or more states or Canadian provinces 5
 - e. Unknown U
- Score

5

Documentation: *Hypochaeris radicata* is considered a noxious weed in Washington (Invaders 2010, USDA 2010). It grows in 41 states of the U.S. (USDA 2010).

Total Possible	25
Total	13

4. Feasibility of Control

4.1. *Seed banks*

- a. Seeds remain viable in the soil for less than three years 0
 - b. Seeds remain viable in the soil for three to five years 2
 - c. Seeds remain viable in the soil for five years or longer 3
 - e. Unknown U
- Score

0

Documentation: Less than 1% of seeds germinated after dry storage for 12 months (Turkington and Aarssen 1983). This species does not form long-lived seed banks (de Kroon et al. 1987).

4.2. *Vegetative regeneration*

- a. No resprouting following removal of aboveground growth 0
- b. Resprouting from ground-level meristems 1
- c. Resprouting from extensive underground system 2

- | | | | |
|----|--------------------------------------|--|---|
| d. | Any plant part is a viable propagule | 3 | |
| e. | Unknown | U | |
| | | Score <table border="1" style="display: inline-table;"><tr><td>1</td></tr></table> | 1 |
| 1 | | | |

Documentation: *Hypochoeris radicata* does not resprout from any root fragment that does not contain a portion of the crown, which extends 2 to 3 cm below the soil surface (Turkington and Aarssen 1983).

4.3. Level of effort required

- | | | | |
|----|--|--|---|
| a. | Management is not required (e.g., species does not persist in the absence of repeated anthropogenic disturbance) | 0 | |
| b. | Management is relatively easy and inexpensive; requires a minor investment of human and financial resources | 2 | |
| c. | Management requires a major short-term or moderate long-term investment of human and financial resources | 3 | |
| d. | Management requires a major, long-term investment of human and financial resources | 4 | |
| e. | Unknown | U | |
| | | Score <table border="1" style="display: inline-table;"><tr><td>2</td></tr></table> | 2 |
| 2 | | | |

Documentation: Although mowing reduces the vegetative propagation of *Hypochoeris radicata*, it is an ineffective control method because it stimulates the growth of flowering stalks, which can double in number and increase the overall seed production of the population (de Kroon et al. 1987). Roots can be destroyed by tilling. Digging plants out below the crown in early spring effectively controls this species. *Hypochoeris radicata* is resistant to several types of herbicides but can be controlled using MCPA-salt, 2,4-D-amine and -ester, and mecoprop-salt (Turkington and Aarssen 1983).

Total Possible	10
Total	3

Total for four sections possible	100
Total for four sections	44

References:

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