

ALASKA NON-NATIVE PLANT INVASIVENESS RANKING FORM

Botanical name: *Alopecurus geniculatus* L.

Common name: water foxtail

Assessors:

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Date: 2/5/2011

Date of previous ranking, if any: 5T

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>12</u>
Biological characteristics and dispersal ability	25 (<u>25</u>)	<u>14</u>
Ecological amplitude and distribution	25 (<u>19</u>)	<u>15</u>
Feasibility of control	10 (7)	4
Outcome score	100 (<u>91</u>) ^b	<u>45</u> ^a
Relative maximum score ²		<u>49</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?

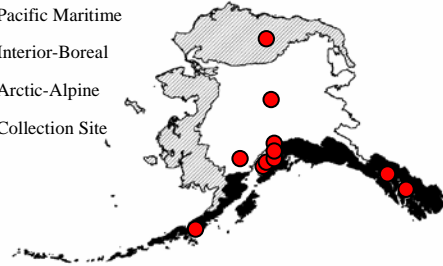
- Yes - continue to 1.2
 No - continue to 2.1

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: *Alopecurus geniculatus* has been documented from all three ecogeographic regions of Alaska (Hultén 1968, AKEPIC 2011, UAM 2011)

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:

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 substantial levels of nitrogen in the soil making soil unlikely to support certain native plants or more likely to favor non-native species) | 10 |
| e. | Unknown | U |

Score 3

Documentation: Although no impacts on ecosystem processes have been documented for *Alopecurus geniculatus*, it has occurred at up to 10% ground cover in Alaska (AKEPIC 2011) and may reduce nutrient availability, as it is moderately to very demanding for soil nutrients (Peeters 2004). A similar species, *Alopecurus pratensis*, is thought to have little impact on ecosystem processes (Rutledge and McLendon 1996).

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: Infestations of *Alopecurus geniculatus* have occurred at up to 10% ground cover in Alaska (AKEPIC 2011) and therefore may increase the density of forb/graminoid layers in wet areas.

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: *Alopecurus geniculatus* is often the sole occupant of wet microsites (Peeters 2004) and may reduce populations of other species on nutrient-rich soils (Kalusová et al. 2009). However, it is not highly competitive (Peeters 2004) and probably has only minor impacts on natural community composition.

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

3

Documentation: *Alopecurus geniculatus* forms sterile hybrids with the native *A. aequalis* (Crins 2007). It is used as a forage grass in Russia (Malyshev 2009) and is possibly palatable to wildlife, although it has little nutritive value (Peeters 2004). *Alopecurus geniculatus* grown for hay has been associated with several fungi species that can contribute to pulmonary diseases in horses (Seguin et al. 2010).

Total Possible

40

Total

12

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

2

Documentation: *Alopecurus geniculatus* reproduces sexually by seeds and vegetatively by rooting at stem nodes (Clayton et al. 2006, Klinkenberg 2010). The amount of seeds produced per plant has not been quantified.

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

2

Documentation: Each seed has a mass of approximately 0.8 mg (USDA 2011) and can likely be transported short distances by wind.

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

Documentation: Most infestations of *Alopecurus geniculatus* in Alaska are associated with fill importation and are located near areas of high human traffic (AKEPIC 2011, UAM 2011), suggesting that this species can be spread by human activities. This species has been identified as a contaminant in ryegrass straw imported from Washington and Oregon (Conn et al. 2010).

2.4. *Allelopathic*

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

Documentation: No evidence suggests that *Alopecurus geniculatus* is allelopathic.

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

Documentation: Although it is nutrient-demanding, *Alopecurus geniculatus* is a poor competitor (Peeters 2004).

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: *Alopecurus geniculatus* does not form mats or significantly overtop surrounding vegetation (Klinkenberg 2010).

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: *Alopecurus geniculatus* has been found growing in natural areas in British Columbia and Yukon (Stewart and Hebda 2000, Cody et al. 2003, Klinkenberg 2010). However, in Alaska, most infestations occur in areas disturbed by fill importation (AKEPIC 2011).

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

- | | | | |
|----|---------|--|---|
| a. | No | 0 | |
| b. | Yes | 3 | |
| c. | Unknown | U | |
| | | Score <table border="1" style="display: inline-table;"><tr><td>3</td></tr></table> | 3 |
| 3 | | | |

Documentation: *Alopecurus pratensis* is known to occur as a non-native species in Alaska with an invasiveness rank of 52 (AKEPIC 2011). *A. myosuroides* is considered a noxious weed in Washington (Invaders 2011, USDA 2011).

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 <table border="1" style="display: inline-table;"><tr><td>3</td></tr></table> | 3 |
| 3 | | | |

Documentation: *Alopecurus geniculatus* has invaded open wet meadows, stream banks, shores, and shallow water in North America (Ling 2011) and wet ground near streams and lakes in New Zealand (Johnson 1982). It is known to grow along the Slocan River in British Columbia (Stewart and Hebda 2000) and in the Horseshoe Slough Habitat Protection Area in Yukon (Cody et al. 2003). This species grows in wet areas near lakes in several locations in Alaska (UAM 2011).

Total Possible	<table border="1" style="display: inline-table;"><tr><td>25</td></tr></table>	25
25		
Total	<table border="1" style="display: inline-table;"><tr><td>14</td></tr></table>	14
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 <table border="1" style="display: inline-table;"><tr><td>2</td></tr></table> | 2 |
| 2 | | | |

Documentation: *Alopecurus geniculatus* is grown as a forage grass in Russia (Malyshev 2009). In Scandinavia, this species frequently occurs as a weed in reduced tillage systems (Tørresen et al. 2006). It has been associated with imported straw in Alaska (Conn et al. 2010).

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 U

Documentation: *Alopecurus geniculatus* is introduced to British Columbia, where it grows in natural wet areas, especially on the Queen Charlotte Islands (Stewart and Hebda 2000, Klinkenberg 2010). In Yukon, it was found growing in a clump of *Stellaria longifolia* in the Horseshoe Slough Habitat Protection Area (Cody et al. 2003). However, no ecological impacts have been documented from these locations.

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 3

Documentation: *Alopecurus geniculatus* can establish in vegetated, wet areas (Stewart and Hebda 2000, Cody et al. 2003, Klinkenberg 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 5

Documentation: *Alopecurus geniculatus* is native to Eurasia and parts of western North America (Crins 2007). It has been introduced to Australia, New Zealand, South America, and parts of North America (Johnson 1982, Clayton et al. 2006, Crins 2007). It is known to grow in arctic regions of western Russia (Malyshev 2007) and occurs as far north as 71°N in Norway (Vascular Plant Herbarium Oslo 2011).

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: *Alopecurus geniculatus* grows in 34 states of the U.S. and much of Canada (USDA 2010). It is not considered a noxious weed in any states of the U.S. or provinces of Canada.

Total Possible	19
Total	15

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 | | U |

Documentation: Seeds remain viable in the soil for at least three years (Roberts 1986), but the maximum period of seed viability is unknown.

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 | | 1 |

Documentation: As a grass, vegetative regeneration in *Alopecurus geniculatus* is expected to occur from ground-level meristems. Consequently, this species is tolerant of cutting, grazing, and trampling (Peeters 2004).

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 | | 3 |

Documentation: Frequent cutting and mowing can reduce plant yield and prevent seeding of *Alopecurus pratensis* (OSU Rangeland Ecology and Management 2005). These methods will likely contain *Alopecurus geniculatus* as well. Digging and hand pulling methods have not been investigated but may be effective because the plants lack rhizomes (Klinkenberg 2010). The effectiveness of herbicides in controlling *Alopecurus geniculatus* is unknown.

Total Possible	7
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Total

4

Total for four sections possible

91

Total for four sections

45

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