WEED RISK ASSESSMENT FORM

Botanical name: *Lappula squarrosa* (Retz.) Dumort.

Common name: European stickseed, bristly sheepburr

Assessors:

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Outcome score:

A.	**Climatic Comparison**		
	This species is present or may potentially establish in the following eco-geographic regions:		
1	South Coastal	Yes	
2	Interior-Boreal	Yes	
3	Arctic-Alpine	Yes	

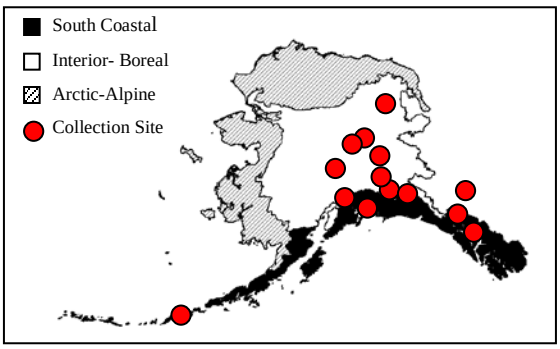
B.	**Invasiveness Ranking**	Total (Total Answered*) Possible	Total
1	Ecological impact	40 (40)	10
2	Biological characteristic and dispersal ability	25 (25)	12
3	Ecological amplitude and distribution	25 (25)	17
4	Feasibility of control	10 (10)	5
	Outcome score	100 (100)[b]	44 [a]
	Relative maximum score†		0.44

* For questions answered "unknown" do not include point value for the question in parentheses for "Total Answered Points Possible."

† Calculated as [a]/[b].

A. CLIMATIC COMPARISON:

	1.1. Has this species ever been collected or documented in Alaska?
Yes	Yes – continue to 1.2
	No – continue to 2.1
	1.2. Which eco-geographic region has it been collected or documented (see inset map)? *Proceed to Section B. Invasiveness Ranking.*
Yes	South Coastal
Yes	Interior-Boreal
	Arctic-Alpine



Documentation: *Lappula squarrosa* has been collected in South Coastal and Interior-Boreal ecogeographic regions of Alaska (AK Weed Database 2004, Densmore et al. 2001, Hultén 1968, UAM 2004, Welsh 1974).

Sources of information:

AK Weeds Database. 2004. Database of exotic vegetation collected in Alaska. University of Alaska, Alaska Natural Heritage Program – US Forest Service – National Park Service Database. Available: http://akweeds.uaa.alaska.edu/

Densmore, R.V., P.C. McKee, C. Roland. 2001. Exotic plants in Alaskan National Park Units. Report on file with the National Park Service – Alaska Region, Anchorage, Alaska. 143 pp.

Hultén, E. 1968. Flora of Alaska and Neighboring Territories. Stanford University Press, Stanford, CA. 1008 p.

University of Alaska Museum. University of Alaska Fairbanks. 2004. http://hispida.museum.uaf.edu:8080/home.cfm

Welsh, S.L. 1974. Anderson's flora of Alaska and adjacent parts of Canada. Brigham University Press. 724 pp.

2.1. Is there a 40% or higher similarity (based on CLIMEX climate matching) between climates any where the species currently occurs and

a. Juneau (South Coastal Region)?

Yes – *record locations and similarity; proceed to Section B. Invasiveness Ranking*

No

b. Fairbanks (Interior-Boreal)?

Yes – *record locations and similarity; proceed to Section B. Invasiveness Ranking*

No

c. Nome (Arctic-Alpine)?

Yes

Yes – *record locations and similarity; proceed to Section B. Invasiveness Ranking*

No

– If "No" is answered for all regions, reject species from consideration

Documentation: The CLIMEX computer matching program indicates the climatic similarity between Nome and areas where *Lappula squarrosa* is documented is moderately high. The range of this species includes Zlatoust, Bogolovsk, and Kirov, Russia (Gubanov et al. 2004), which have 71%, 67%, and 66% climatic match with Nome, respectively. The native range of European stickseed also includes Dombås, Norway (Lid and Lid 1994), which has a 63% climatic match with Nome. On the basis of these matches establishment of *Lappula squarrosa* in Arctic-Alpine ecogeographic region may be possible.

Sources of information: CLIMEX for Windows, Version 1.1a. 1999. CISRO Publishing, Australia.

Gubanov IA, Kiseleva KV, Novikov VS, Tihomirov VN. An illustrated identification book of the plants of Middle Russia, Vol. 3: Angiosperms (dicots: archichlamydeans). Moscow: Institute of Technological Researches; 2004. 520 p.

Lid, J. and D. T. Lid. 1994. Flora of Norway. The Norske Samlaget, Oslo. Pp. 1014.

B. INVASIVENESS RANKING

1. ECOLOGICAL IMPACT

1.1. Impact on Natural Ecosystem Processes

A.	No perceivable impact on ecosystem processes	0
B.	Influences ecosystem processes to a minor degree (e.g., has a perceivable but mild influence on soil nutrient availability)	3
C.	Significant alteration of ecosystem processes (e.g., increases sedimentation rates along streams or coastlines, reduces open water that are important to waterfowl)	7
D.	Major, possibly irreversible, alteration or disruption of ecosystem processes (e.g., the species alters geomorphology; hydrology; or affects fire frequency, 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

U. Unknown

Score 3

Documentation:
Identify ecosystem processes impacted:
As an early colonizing species, European stickseed is important to successional processes on disturbed soil. Dense stands of European stickseed reduce evaporation and soil erosion. Senescent plants persist over winter and trap snow which, increases soil moisture (Frick 1984).
Rational:

Sources of information:
Frick, B. 1984. The biology of Canadian weeds. 62. *Lappula squarrosa* (Retz.) Dumort. Canadian Journal of Plant Science 64: 375-386.

1.2. Impact on Natural Community Structure

A.	No perceived impact; establishes in an existing layer without influencing its structure	0
B.	Influences structure in one layer (e.g., changes the density of one layer)	3
C.	Significant impact in at least one layer (e.g., creation of a new layer or elimination of an existing layer)	7
D.	Major alteration of structure (e.g., covers canopy, eradicating most or all layers below)	10
U.	Unknown	

Score 3

Documentation:
Identify type of impact or alteration:
European stickseed is capable of forming dense stands on bare ground (Frick 1984), however dense stands of European stickseed have not been observed in Alaska (M. Densmore et al. 2001, Carlson – pers. obs., I. Lapina – pers. obs.).
Rational:

Sources of information:
Carlson, M. L., Assistant Research Professor - Botany, Alaska Natural Heritage Program, University of Alaska Anchorage, 707 A Street, Anchorage, Alaska. Tel: (907) 257-2790.
Densmore, R.V., P.C. McKee, C. Roland. 2001. Exotic plants in Alaskan National Park Units. Report on file with the National Park Service – Alaska Region, Anchorage, Alaska. 143 pp.
Lapina, I. Botanist, Alaska Natural Heritage Program, University of Alaska Anchorage, 707 A Street, Anchorage, Alaska. Tel: (907) 257-2710 – Pers. obs.
Frick, B. 1984. The biology of Canadian weeds. 62. *Lappula squarrosa* (Retz.) Dumort. Canadian Journal of Plant Science 64: 375-386.

1.3. Impact on Natural Community Composition

A.	No perceived impact; causes no apparent change in native populations	0
B.	Influences community composition (e.g., reduces the number of individuals in one or more native species in the community)	3
C.	Significantly alters community composition (e.g., produces a significant reduction in the population size of one or more native species in the community)	7
D.	Causes major alteration in community composition (e.g., results in the extirpation of one or several native species, reducing biodiversity or change the community composition towards species exotic to the natural community)	10
U.	Unknown	

Score 1

Documentation:
Identify type of impact or alteration:
European stickseed has not been reported from native communities in Alaska (UAM 2003). It presumably competes for limited moisture and nutrients with adjacent plants in disturbed areas (Frick 1984).
Rational:

Sources of information:
Frick, B. 1984. The biology of Canadian weeds. 62. *Lappula squarrosa* (Retz.) Dumort. Canadian Journal of Plant Science 64: 375-386.
University of Alaska Museum. University of Alaska Fairbanks. 2003. http://hispida.museum.uaf.edu:8080/home.cfm

1.4. Impact on higher 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.	Minor alteration	3
C.	Moderate alteration (minor reduction in nesting/foraging sites, reduction in habitat connectivity, interference with native pollinators, injurious components such as spines, toxins)	7
D.	Severe alteration of higher trophic populations (extirpation or endangerment of an existing native species/population, or significant reduction in nesting or foraging sites)	10
U.	Unknown	

Score 3

Documentation:
Identify type of impact or alteration:
European stickseed is occasionally eaten by wildlife species. The plant hosts fungus species and attracts a large numbers of herbivorous insects (Frick 1984).
Rational:

Sources of information:
Frick, B. 1984. The biology of Canadian weeds. 62. *Lappula squarrosa* (Retz.) Dumort. Canadian Journal of Plant Science 64: 375-386.

Total Possible 40
Total 10

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2. BIOLOGICAL CHARACTERISTICS AND DISPERSAL ABILITY

2.1. Mode of reproduction

A.	Not aggressive reproduction (few [0-10] seeds per plant and no vegetative reproduction)	0
B.	Somewhat aggressive (reproduces only by seeds (11-1,000/m^2)	1
C.	Moderately aggressive (reproduces vegetatively and/or by a moderate amount of seed, <1,000/m^2)	2
D.	Highly aggressive reproduction (extensive vegetative spread and/or many seeded, >1,000/m^2)	3
U.	Unknown	

Score 3

Documentation:
Describe key reproductive characteristics (including seeds per plant):
European stickseed reproduces exclusively by seed. Summer annuals can produce 200 to 500 seeds, while winter annuals may produce as many as 40,000 seeds (Frick 1984, Royer and Dickinson 1999). It is unlikely that European stickseed can behave as winter annual in Alaska (M. Carlson – pers. com, J. Conn – pers. com.).
Rational:

Sources of information:
Carlson, M.L., Assistant Research Professor - Botany, Alaska Natural Heritage Program, University of Alaska Anchorage, 707 A Street, Anchorage, Alaska. Tel: (907) 257-2790.
Conn, J., Weed Scientist, USDA Agricultural Research Service PO Box 757200 Fairbanks, Alaska 99775 tel: (907) 474-7652; fax (907) 474-6184. – Pers. com.
Frick, B. 1984. The biology of Canadian weeds. 62. *Lappula squarrosa* (Retz.) Dumort. Canadian Journal of Plant Science 64: 375-386.
Royer, F., and R. Dickinson. 1999. Weeds of the Northern U.S. and Canada. The

University of Alberta press. 434 pp.

2.2. Innate potential for long-distance dispersal (bird dispersal, sticks to animal hair, buoyant fruits, wind-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
U.	Unknown	

Score 3

Documentation:
Identify dispersal mechanisms:
The primary mechanism of long-distance dispersal is by attachment of the hooked seeds to animal hair, but seeds may also be carried by the wind, either alone or as detached portions of the plant (Frick 1984, Royer and Dickinson 1999).
Rational:

Sources of information:
Frick, B. 1984. The biology of Canadian weeds. 62. *Lappula squarrosa* (Retz.) Dumort. Canadian Journal of Plant Science 64: 375-386.
Royer, F., and R. Dickinson. 1999. Weeds of the Northern U.S. and Canada. The University of Alberta press. 434 pp.

2.3. Potential to be spread by human activities (both directly and indirectly – possible mechanisms include: commercial sales, use as forage/revegetation, spread along highways, transport on boats, contamination, etc.)

A.	Does not occur	0
B.	Low (human dispersal is infrequent or inefficient)	1
C.	Moderate (human dispersal occurs)	2
D.	High (there are numerous opportunities for dispersal to new areas)	3
U.	Unknown	

Score 2

Documentation:
Identify dispersal mechanisms:
Seeds readily attach to clothing and farm animal hair (Frick 1984).
Rational:

Sources of information:
Frick, B. 1984. The biology of Canadian weeds. 62. *Lappula squarrosa* (Retz.) Dumort. Canadian Journal of Plant Science 64: 375-386.

2.4. Allelopathic

A.	No	0
B.	Yes	2
U.	Unknown	

Score 0

Documentation:
Describe effect on adjacent plants:
Allelopathy has not been documented for this species.
Rational:

Sources of information:

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 nitrogen fixing ability	3

U. Unknown

Score 1

Documentation:
Evidence of competitive ability:
European stickseed presumably competes for limited moisture and nutrients with adjacent plants (Frick 1984).
Rational:
European stickseed is adapted to conditions of deficient moisture and nutrients. It is able to produce seed under poor growing conditions and maximizes seed production under optimum conditions (Frick 1984).
Sources of information:
Frick, B. 1984. The biology of Canadian weeds. 62. *Lappula squarrosa* (Retz.) Dumort. Canadian Journal of Plant Science 64: 375-386.

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

A. No 0
B. Forms dense thickets 1
C. Has climbing or smothering growth habit, or otherwise taller than the surrounding vegetation 2
U. Unknown

Score 0

Documentation:
Describe grow form:
European stickseed can grow up to two feet tall and is not characterized by a climbing or smothering growth habit (Douglas et al. 1998, Frick 1984, Royer and Dickinson 1999).
Rational:

Sources of information:
Douglas, G.W. G. B. Straley, D. Meidinger, and J. Pojar, editors. Volume 2. Decotyledons (Balsaminaceae through Cuscutaceae). Illustrated flora of British Columbia. British Columbia: Ministry of Environment, Lands and Parks, Ministry of Forest; 1998. 401 p.
Frick, B. 1984. The biology of Canadian weeds. 62. *Lappula squarrosa* (Retz.) Dumort. Canadian Journal of Plant Science 64: 375-386.
Royer, F., and R. Dickinson. 1999. Weeds of the Northern U.S. and Canada. The University of Alberta press. 434 pp.

2.7. Germination requirements

A. Requires open soil and disturbance to germinate 0
B. Can germinate in vegetated areas but in a narrow range or in special conditions 2
C. Can germinate in existing vegetation in a wide range of conditions 3
U. Unknown

Score 0

Documentation:
Describe germination requirements:
This plant typically germinates and establishes on disturbed areas. Seeds germinate best in light and in the top 1 inch of soil. Presumably mechanical disturbance of soil that brings seeds to the surface induces germination (Frick 1984, Royer and Dickinson 1999).
Rational:

Sources of information:
Frick, B. 1984. The biology of Canadian weeds. 62. *Lappula squarrosa* (Retz.) Dumort. Canadian Journal of Plant Science 64: 375-386.
Royer, F., and R. Dickinson. 1999. Weeds of the Northern U.S. and Canada. The University of Alberta press. 434 pp.

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

A. No 0
B. Yes 3
U. Unknown

Score 3

Documentation:
Species:
Flatspine stickseed (*Lappula occidentalis* (S.Wats.) Greene) is a native annual of western North America, is a serious weed in western Europe (USDA 2002, Whitson et al. 2000).
Sources of information:
USDA (United States Department of Agriculture), NRCS (Natural Resource Conservation Service). 2002. The PLANTS Database, Version 3.5 (http://plants.usda.gov). National Plant Data Center, Baton Rouge, LA 70874-4490 USA.
Whitson, T. D., L. C. Burrill, S. A. Dewey, D. W. Cudney, B. E. Nelson, R. D. Lee, R. Parker. 2000. Weeds of the West. The Western Society of Weed Science in cooperation with the Western United States Land Grant Universities, Cooperative Extension Services. University of Wyoming. Laramie, Wyoming. 630 pp.

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
U. Unknown

Score 0

Documentation:
Describe type of habitat:
European stickseed can be found on roadsides, in disturbed and waste areas, and cultivated fields (Frick 1984, Royer and Dickinson 1999). It can also inhabit dry to mesic rocky slopes, grasslands, shrublands, and forest openings in lowland, steppe, and montane zones (Douglass et al. 1998).
Rational:

Sources of information:
Douglas, G.W. G. B. Straley, D. Meidinger, and J. Pojar, editors. Volume 2. Decotyledons (Balsaminaceae through Cuscutaceae). Illustrated flora of British Columbia. British Columbia: Ministry of Environment, Lands and Parks, Ministry of Forest; 1998. 401 p.
Frick, B. 1984. The biology of Canadian weeds. 62. *Lappula squarrosa* (Retz.) Dumort. Canadian Journal of Plant Science 64: 375-386.
Royer, F., and R. Dickinson. 1999. Weeds of the Northern U.S. and Canada. The University of Alberta press. 434 pp.

Total Possible 25
Total 12

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3. DISTRIBUTION

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

A. No 0
B. Is occasionally an agricultural pest 2
C. Has been grown deliberately, bred, or is known as a significant agricultural pest 4
U. Unknown

Score 4

Documentation:
Identify reason for selection, or evidence of weedy history:
European stickseed was reported as a wheat field pest in Canada as early as 1895. It is common in crops of wheat, barley, oats, rye, flax, and rape (Frick 1984).

Rational:

Sources of information:
Frick, B. 1984. The biology of Canadian weeds. 62. *Lappula squarrosa* (Retz.) Dumort. Canadian Journal of Plant Science 64: 375-386.

3.2. Known level of impact in natural areas

A.	Not known to cause impact in any other natural area	0
B.	Known to cause impacts in natural areas, but in dissimilar habitats and climate zones than exist in regions of Alaska	1
C.	Known to cause low impact in natural areas in similar habitats and climate zones to those present in Alaska	3
D.	Known to cause moderate impact in natural areas in similar habitat and climate zones	4
E.	Known to cause high impact in natural areas in similar habitat and climate zones	6
U.	Unknown	

Score 3

Documentation:
Identify type of habitat and states or provinces where it occurs:
European stickseed is known to invade rocky slopes, grasslands, shrublands, and forest openings in British Columbia (Douglass et al. 1998).
Sources of information:
Douglas, G.W., G.B. Straley, D. Meidinger, and J. Pojar, editors. Volume 2. Dicotyledons (Balsaminaceae through Cuscutaceae). Illustrated flora of British Columbia. British Columbia: Ministry of Environment, Lands and Parks, Ministry of Forest; 1998. 401 p.

3.3. Role of anthropogenic and natural disturbance in establishment

A.	Requires anthropogenic disturbances to establish	0
B.	May occasionally establish in undisturbed areas but can readily establish in areas with natural disturbances	3
C.	Can establish independent of any known natural or anthropogenic disturbances	5
U.	Unknown	

Score 0

Documentation:
Identify type of disturbance:
European stickseed typically establishes in disturbed areas and may become abundant in overgrazed pastures (Royer and Dickinson 1999). In Denali National Park it was found only on sites disturbed within the last 3 years or sites regularly disturbed (Densmore et al. 2001).
Rational:

Sources of information:
Densmore, R.V., P.C. McKee, C. Roland. 2001. Exotic plants in Alaskan National Park Units. Report on file with the National Park Service – Alaska Region, Anchorage, Alaska. 143 pp.
Royer, F., and R. Dickinson. 1999. Weeds of the Northern U.S. and Canada. The University of Alberta press. 434 pp.

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
U.	Unknown	

Score 5

Documentation:
Describe distribution:
European stickseed is native to the eastern Mediterranean region. Its modern-day distribution extends from Europe (including the North Pacific islands of Spitsbergen and Iceland) to North America, Asia and Japan between approximately 30° and 70° N

latitude. European stickseed occurs in comparable southern hemisphere regions in South Africa and Australia (Frick 1984). It is known from arctic Norway (Lid and Lid 1994).
Rational:

Sources of information:
Frick, B. 1984. The biology of Canadian weeds. 62. *Lappula squarrosa* (Retz.) Dumort. Canadian Journal of Plant Science 64: 375-386.
Lid, J. and D.T. Lid. 1994. Flora of Norway. The Norske Samlaget, Oslo. Pp. 1014.

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

A.	0-5% of the states	0
B.	6-20% of the states	2
C.	21-50%, and/or state listed as a problem weed (e.g., "Noxious," or "Invasive") in 1 state or Canadian province	4
D.	Greater than 50%, and/or identified as "Noxious" in 2 or more states or Canadian provinces	5
U.	Unknown	

Score 5

Documentation:
Identify states invaded:
European stickseed has been reported from every Canadian province and nearly all American states (Royer and Dickinson 1999, USDA 2002). It is declared a Federal noxious weed in Canada. This species is a restricted noxious weed in Alaska (Alaska Administrative Code 1987, Royer and Dickinson 1999).
Rational:

Sources of information:
Alaska Administrative Code. Title 11, Chapter 34. 1987. Alaska Department of Natural Resources. Division of Agriculture.
Royer, F., and R. Dickinson. 1999. Weeds of the Northern U.S. and Canada. The University of Alberta press. 434 pp.
USDA (United States Department of Agriculture), NRCS (Natural Resource Conservation Service). 2002. The PLANTS Database, Version 3.5 (http://plants.usda.gov). National Plant Data Center, Baton Rouge, LA 70874-4490 USA.

Total Possible 25
Total 17

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4. FEASIBILITY OF CONTROL

4.1. Seed banks

A.	Seeds remain viable in the soil for less than 3 years	0
B.	Seeds remain viable in the soil for between 3 and 5 years	2
C.	Seeds remain viable in the soil for 5 years and more	3
U.	Unknown	

Score 2

Documentation:
Identify longevity of seed bank:
Although 95% of European stickseed seedlings emerge in the first year, seedling emergence may continue for 4 years (Chepil 1946).
Rational:

Sources of information:
Chepil, W.S. 1946. Germination of weed seeds. I. Longevity, periodicity of germination, and vitality of seeds in cultivated soil. Scientific agriculture 26: 307-346.

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
U.	Unknown	

Score 1

Documentation:
Describe vegetative response:
Mowing or grazing frequently results in forming numerous axillary inflorescences produced below the injury, which can increase seed production (Frick 1984).
Rational:

Sources of information:
Frick, B. 1984. The biology of Canadian weeds. 62. *Lappula squarrosa* (Retz.) Dumort. Canadian Journal of Plant Science 64: 375-386.

4.3. Level of effort required

A.	Management is not required (e.g., species does not persist without repeated anthropogenic disturbance)	0
B.	Management is relatively easy and inexpensive; requires a minor investment in human and financial resources	2
C.	Management requires a major short-term investment of human and financial resources, or a moderate long-term investment	3
D.	Management requires a major, long-term investment of human and financial resources	4
U.	Unknown	

Score 2

Documentation:
Identify types of control methods and time-term required:
European stickseed is easily pulled up by hand, although several weedings may be necessary to eliminate population (Densmore et al. 2001). In cultivated crops it may be controlled by a wide range of commonly used herbicides. Mowing or grazing is usually not effective (Frick 1984).
Rational:

Sources of information:
Densmore, R. V., P. C. McKee, C. Roland. 2001. Exotic plants in Alaskan National Park Units. Report on file with the National Park Service – Alaska Region, Anchorage, Alaska. 143 pp.
Frick, B. 1984. The biology of Canadian weeds. 62. *Lappula squarrosa* (Retz.) Dumort. Canadian Journal of Plant Science 64: 375-386.

Total Possible	10
Total	5

Total for 4 sections Possible	100
Total for 4 sections	44

References:

Alaska Administrative Code. Title 11, Chapter 34. 1987. Alaska Department of Natural Resources. Division of Agriculture.

AK Weeds Database. 2005. Database of exotic vegetation collected in Alaska. University of Alaska, Alaska Natural Heritage Program – US Forest Service – National Park Service Database. Available: http://akweeds.uaa.alaska.edu/

Carlson, M.L., Assistant Research Professor - Botany, Alaska Natural Heritage Program, University of Alaska Anchorage, 707 A Street, Anchorage, Alaska. Tel: (907) 257-2790.

Chepil, W.S. 1946. Germination of weed seeds. I. Longevity, periodicity of germination, and vitality of seeds in cultivated soil. Scientific agriculture 26: 307-346.

Conn, J. Weed Scientist, USDA Agricultural Research Service PO Box 757200 Fairbanks, Alaska 99775 tel: (907) 474-7652; fax (907) 474-6184. – Pers. com.

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Densmore, R.V., P.C. McKee, C. Roland. 2001. Exotic plants in Alaskan National Park Units. Report on file with the National Park Service – Alaska Region, Anchorage, Alaska. 143 pp.

Douglas, G.W. G. B. Straley, D. Meidinger, and J. Pojar, editors. Volume 2. Decotyledons (*Balsaminaceae* through *Cuscutaceae*). Illustrated flora of British Columbia. British Columbia: Ministry of Environment, Lands and Parks, Ministry of Forest; 1998. 401 p.

Frick, B. 1984. The biology of Canadian weeds. 62. *Lappula squarrosa* (Retz.) Dumort. Canadian Journal of Plant Science 64: 375-386.

Gubanov IA, Kiseleva KV, Novikov VS, Tihomirov VN. An illustrated identification book of the plants of Middle Russia, Vol. 3: Angiosperms (dicots: archichlamydeans). Moscow: Institute of Technological Researches; 2004. 520 p.

Hultén, E. 1968. Flora of Alaska and Neighboring Territories. Stanford University Press, Stanford, CA. 1008 p.

Invaders Database System. The University of Montana. 2003. Montana Noxious Weed Trust Fund. Department of Agriculture. http://invader.dbs.umt.edu/

Lapina, I., Botanist, Alaska Natural Heritage Program, University of Alaska Anchorage, 707 A Street, Anchorage, Alaska. Tel: (907) 257-2710 – Pers. obs.

Lid, J. and D.T. Lid. 1994. Flora of Norway. The Norske Samlaget, Oslo. Pp. 1014.

Royer, F., and R. Dickinson. 1999. Weeds of the Northern U.S. and Canada. The University of Alberta press. 434 pp.

University of Alaska Museum. University of Alaska Fairbanks. 2003. http://hispida.museum.uaf.edu:8080/home.cfm

USDA (United States Department of Agriculture), NRCS (Natural Resource Conservation Service). 2002. The PLANTS Database, Version 3.5 (http://plants.usda.gov). National Plant Data Center, Baton Rouge, LA 70874-4490 USA.

Welsh, S.L. 1974. Anderson's flora of Alaska and adjacent parts of Canada. Brigham University Press. 724 pp.