WEED RISK ASSESSMENT FORM

Botanical name: *Chenopodium album* L.

Common name: lambsquarters, white goosefoot

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	
	This species is unlikely to establish in any region in Alaska		

B.	**Invasiveness Ranking**	Total (Total Answered*) Possible	Total
1	Ecological impact	40 (40)	5
2	Biological characteristic and dispersal ability	25 (25)	10
3	Ecological amplitude and distribution	25 (25)	15
4	Feasibility of control	10 (10)	5
	Outcome score	100 (100)[b]	35 [a]
	Relative maximum score†		0.35

* 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

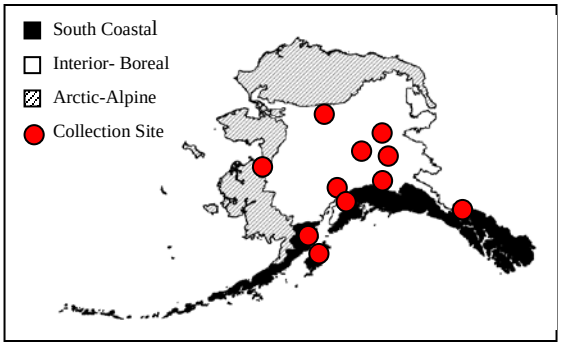
1.2. Which eco-geographic region has it been collected or documented (see inset map)?

Proceed to Section B. Invasiveness Ranking.

Yes — South Coastal

Yes — Interior-Boreal

Yes — Arctic-Alpine



Documentation: *Chenopodium album* has been collected from all Alaskan ecoregions: South Coastal (Afognak, Kodiak, Middleton Island, and Skagway), Interior-Boreal (Anchorage, Bettles, Big Delta, Circle, Fairbanks, Gulkana, Ophir), and Arctic-Alpine (Nulato) (Hultén 1968, Welsh 1974, Densmore et al. 2001, UAM 2003)
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.
Hultén, E. 1968. Flora of Alaska and Neighboring Territories. Stanford University Press, Stanford, CA. 1008 p.
University of Alaska Museum. University of Alaska Fairbanks. 2003. 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 – *record locations and similarity; proceed to Section B. Invasiveness Ranking*
No
– *If "No" is answered for all regions, reject species from consideration*

Documentation:
Sources of information:

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 1

Documentation:
Identify ecosystem processes impacted:
Chenopodium album has not been observed in undisturbed areas in Alaska (Densmore et al. 2001, Hultén 1968, Welsh 1974). It is unlikely that measurable impacts to ecosystem processes occur due to its presence.
Rational:

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

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 1

Documentation:
Identify type of impact or alteration:
Lambsquarters establishes in a sparsely vegetated herbaceous layer, increasing the density of the layer in south central Alaska (I. Lapina and M. L. Carlson – 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 – Pers. obs.
Lapina, I., Botanist, Alaska Natural Heritage Program, University of Alaska Anchorage, 707 A Street, Anchorage, Alaska. Tel: (907) 257-2710) – Pers. obs.

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 0

Documentation:
Identify type of impact or alteration:
Lambsquarters has not been observed in undisturbed areas in Alaska, no perceived impact on native populations has been documented (Densmore et al. 2001).
Rational:

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

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:

Plants are reported to be poisonous to sheep and pigs, but no data is present regarding its toxicity to native herbivores (CU-PPID 2004). It is an alternate host for a number of viral diseases of barley, beet, potato, turnip, and tobacco – a number of these crops are grown commercially in Alaska (Royer and Dickinson 1999).

Rational:

All parts of the plants contain nitrate.

Sources of information:

Cornel University: Poisonous Plants Informational Database. http://www.ansci.cornell.edu

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

Total Possible	40
Total	5

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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):

Lambsquarters reproduces entirely by seed. Each plant can produce over 500,000 seeds (Royer and Dickinson 1999).

Rational:

Sources of information:

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 2

Documentation:

Identify dispersal mechanisms:

Chenopodium album lacks any seed dispersal adaptations and most seeds are deposited near the parental plant. Seeds may be washed into ditches and can be moved long distances despite lacking buoyancy. Also, seeds remain viable after passing through digestive tract of animals (Rutledge and McLendon 1996).

Rational:

Sources of information:

Rutledge, C.R., and T. McLendon. 1996. An Assessment of Exotic Plant Species of Rocky Mountain National Park. Department of Rangeland Ecosystem Science, Colorado State University. 97 pp. Northern Prairie Wildlife Research Center Home Page. http://www.npwrc.usgs.gov/resource/othrdata/Explant/explant.htm (Version 15DEC98).

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:
The seeds can be a contaminant in grass and cereal seed. Has been reported to be spread as contaminant of the topsoil and horticultural stock. It appears to spread along off road vehicle trails and road edges in Alaska (M. L. Carlson – 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 – Pers. obs.
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.
Hodkinson, D., K. Thompson. 1997. Plant dispersal: the role of man. Journal of Applied Ecology, 34: 1484-1496.

2.4. Allelopathic

A.	No	0
B.	Yes	2
U.	Unknown	

Score 2

Documentation:
Describe effect on adjacent plants:
Leachates from *Chenopodium album* significantly reduce tomato shoot biomass and accumulation of N, P, K, Ca, and Mg (Qasem et al. 1989). The allelopathic effects were separated from competitive effects.
Rational:

Sources of information:
No records concerning allelopathy.

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 0

Documentation:
Evidence of competitive ability:
Lambsquarters is moderately competitive for moisture and nutrient in cultivated fields. However, it competes poorly with native species (Densmore et al. 2001, Royer and Dickinson 1999, Rutledge and McLendon 1996).
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., R. Dickinson. 1999. Weeds of the Northern U.S. and Canada. The University of Alberta press. 434 pp.
Rutledge, C.R., and T. McLendon. 1996. An Assessment of Exotic Plant Species of Rocky Mountain National Park. Department of Rangeland Ecosystem Science, Colorado State University. 97 pp. Northern Prairie Wildlife Research Center Home Page. http://www.npwrc.usgs.gov/resource/othrdata/Explant/explant.htm (Version 15DEC98).

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:
Lambsquarters can grow up to 3 ½ feet tall (Royer and Dickinson 1999), but usually does not form dense stands in Alaska (I. Lapina – pers. obs.).
Rational:

Sources of information:
Lapina, I., Botanist, Alaska Natural Heritage Program, University of Alaska Anchorage, 707 A Street, Anchorage, Alaska. Tel: (907) 257-2710) – Pers. obs.
Royer, F., 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:
Seeds must be in the top 3 cm of soil to germinate. Light has also been reported as necessary for germination. Germination is inhibited in areas shaded by other plants (Densmore et al. 2001, Royer and Dickinson 1999, Rutledge and McLendon 1996).
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., R. Dickinson. 1999. Weeds of the Northern U.S. and Canada. The University of Alberta press. 434 pp.
Rutledge, C.R., and T. McLendon. 1996. An Assessment of Exotic Plant Species of Rocky Mountain National Park. Department of Rangeland Ecosystem Science, Colorado State University. 97 pp. Northern Prairie Wildlife Research Center Home Page. http://www.npwrc.usgs.gov/resource/othrdata/Explant/explant.htm (Version 15DEC98).

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

A.	No	0
B.	Yes	3
U.	Unknown	

Score 3

Documentation:
Species:
Chenopodium murale L. is considered invasive (USDA, NRCS 2002).
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.

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:
Lambsquarters is found in cultivated fields, roadsides, and waste areas (Densmore et al. 2001, Gubanov et al. 2003).
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.
Gubanov I.A., Kiseleva K.V., Novikov V.S., Tihomirov V.N. An Illustrated identification book of the plants of Middle Russia, Vol. 2: Angiosperms (dicots: archichlamydeans). Moscow: Institute of Technological Researches; 2003. 666 p.

Total Possible: 25
Total: 10

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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:
Lambsquarters is a cosmopolitan weed of cultivated areas (Royer and Dickinson 1999).
Rational:

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

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 1

Documentation:
Identify type of habitat and states or provinces where it occurs:
Chenopodium album is found in river bottoms and eroded areas associated with overgrazing, burns, or logging in the desert or desert grassland, pinyon- juniper, and yellow pine forests in Arizona (Parker 1990).
Sources of information:
Parker, K.F. 1990. An illustrated guide to Arizona weeds. The University of Arizona Press, Tucson. Available http://www.uapress.arizona.edu/online.bks/weeds/titlweed.htm

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:
Lambsquarters is a short-lived colonizer of disturbed areas and will be present for only 1-3 years unless the site is repeatedly disturbed (Densmore et al. 2001, Royer and Dickinson 1999).
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., 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:
Introduced from Europe. Its current distribution is worldwide, including Africa, North and South America, Australia, Hawaii, Greenland, and New Zealand (Hultén 1968).
Rational:

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

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:
Chenopodium album is listed as “Noxious” in Minnesota and as a “Weed” in Kentucky, Nebraska and Florida, Manitoba, and Quebec (Invaders Database System 2003, Royer and Dickinson 1999, USDA, NRCS 2002).
Rational:

Sources of information:
Invaders Database System. The University of Montana. 2003. Montana Noxious Weed Trust Fund. Department of Agriculture. http://invader.dbs.umt.edu/
Royer, F., 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	15

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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	3

Documentation:
Identify longevity of seed bank:
Viability of seeds was 35% after 4.7 years, and 4% after 9.7 years in seed viability experiment conducted in Fairbanks, Alaska (Conn and Deck 1995). Seeds have been reported to remain viable for at least 6 years in cultivated soil (Chepil 1946). Other authors suggested survival of seeds for 17, 20, and 24 years (Burnside et al. 1996, Lewis 1973, Chippindale and Milton 1934). 143-years old viable seeds of lambsquarters were extracted from adobe bricks of historic buildings in California and Northern Mexico (Spira and Wagner 1983).
Rational:

Sources of information:
Burnside, O.C., R.G. Wilson, S. Weisberg, and K.G. Hubbard. 1996. Seed longevity of 41 weed species buried 17 years in Eastern and Western Nebraska. Weed Science 44: 74-86.
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.
Chippindale, H.G. and W.E.J. Milton. 1934. On the viable seeds present in the soil beneath pastures. The Journal of Ecology 22(2): 508-531.
Conn, J.S. and R.E. Deck. 1995. Seed viability and dormancy of 17 weed species after 9.7 years of burial in Alaska. Weed Science 43: 583-585.
Lewis, J. 1973. Longevity of crop and weed seeds: survival after 20 years in soil. Weed Research 13: 179-191.
Spira, T. and L.K. Wagner. 1983. Viability of seeds up to 211 years old extracted from adobe brick buildings of California and Northern Mexico. American Journal of Botany 70(2): 303-307.

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 0

Documentation:
Describe vegetative respond:
Lambsquarters does not resprout after removal of aboveground growth (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.

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:
The plants are easily pulled up by hand. However, because of a long-lived seed bank several weedings may be necessary to eliminate plants germinating from buried seeds (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.

Total Possible	10
Total	5
Total for 4 sections Possible	100
Total for 4 sections	35

References:

Burnside, O.C., R.G. Wilson, S. Weisberg, and K.G. Hubbard. 1996. Seed longevity of 41 weed species buried 17 years in Eastern and Western Nebraska. Weed Science 44: 74-86.

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

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.

Chippindale, H.G. and W.E.J. Milton. 1934. On the viable seeds present in the soil beneath pastures. The Journal of Ecology 22(2): 508-531.

Conn, J.S. and R.E. Deck. 1995. Seed viability and dormancy of 17 weed species after 9.7 years of burial in Alaska. Weed Science 43: 583-585.

Cornel University: Poisonous Plants Informational Database. http://www.ansci.cornell.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.
Gubanov IA, Kiseleva KV, Novikov VS, Tihomirov VN. An Illustrated identification book of the plants of Middle Russia, Vol. 2: Angiosperms (dicots: archichlamydeans). Moscow: Institute of Technological Researches; 2003. 666 p.
Hodkinson, D., K. Thompson. 1997. Plant dispersal: the role of man. Journal of Applied Ecology, 34: 1484-1496.
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.
Lewis, J. 1973. Longevity of crop and weed seeds: survival after 20 years in soil. Weed Research 13: 179-191.
Parker, K.F. 1990. An illustrated guide to Arizona weeds. The University of Arizona Press, Tucson. Available http://www.uapress.arizona.edu/online.bks/weeds/titlweed.htm
Royer, F., R. Dickinson. 1999. Weeds of the Northern U.S. and Canada. The University of Alberta press. 434 pp.
Rutledge, C.R., and T. McLendon. 1996. An Assessment of Exotic Plant Species of Rocky Mountain National Park. Department of Rangeland Ecosystem Science, Colorado State University. 97 pp. Northern Prairie Wildlife Research Center Home Page. http://www.npwrc.usgs.gov/resource/othrdata/Explant/explant.htm (Version 15DEC98).
Spira, T. and L.K. Wagner. 1983. Viability of seeds up to 211 years old extracted from adobe brick buildings of California and Northern Mexico. American Journal of Botany 70(2): 303-307.
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.