

WEED RISK ASSESSMENT FORM

Botanical name:	<i>Alnus glutinosa</i> (L.) Gaerth.	
Common name:	European alder, black alder, European black alder	
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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

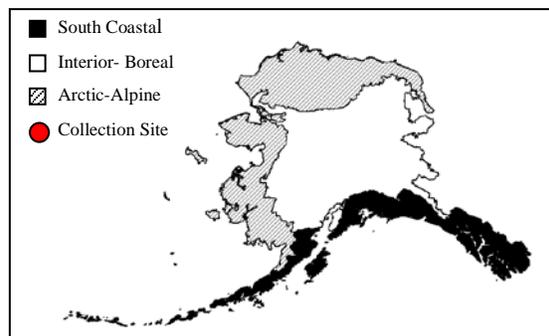
B. Invasiveness Ranking	Total (Total Answered*)	Total
	Possible	
1	Ecological impact	40 (40)
2	Biological characteristic and dispersal ability	25 (25)
3	Ecological amplitude and distribution	25 (25)
4	Feasibility of control	10 (7)
	Outcome score	100 (97) ^b
	Relative maximum score†	59 ^a
		0.61

* 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?	
No	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)? <i>Proceed to Section B. Invasiveness Ranking.</i>	
	South Coastal
	Interior-Boreal
	Arctic-Alpine



Documentation: *Alnus glutinosa* has not been collected in Alaska (AK Weed Database 2004, 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/>

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://hispidamuseum.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 Yes – record locations and similarity; proceed to Section B.
Invasiveness Ranking

No

b. Fairbanks (Interior-Boreal)?

Yes 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: Using the CLIMEX matching program, climatic similarity between Juneau and areas where *Alnus glutinosa* is documented is high. Native range of the species includes Bergen, Kristiansand, and Krakenes (Lid and Lid 1994), which has 73%, 60%, and 55% climatic matches with Juneau, respectively. The range of this species includes also Røros and Dombås, Norway, which have 76% and 63% climatic matches with Nome, and 55% and 52% climatic matches with Fairbanks, respectively. Thus, establishment of *Alnus glutinosa* in South Central, Interior-Boreal, and Arctic-Alpine ecogeographic regions may be possible.

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

7

Documentation:

Identify ecosystem processes impacted:

European alder is a pioneer species capable of colonizing of exposed soil. It produces copious litter and fixes nitrogen, thereby altering soil conditions (Funk 2005, USDA 2002).

Rational:

European alder produces biomass abundantly. Six-year-old European alder produced more than six times the volume of litter per tree compared to native trees of the same age. Alder leaf litter decomposes easily, which quickly increases soil fertility (Funk 2005).

Sources of information:

Funk, D.T. 2005. *Alnus glutinosa* (L.) Gaerth. European alder. USDA Forest Service, Northeastern Area, State and Private Forestry. Available: <http://www.na.fs.fed.us/> via the INTERNET. Accessed 2005 March 3.
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.

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

5

Documentation:

Identify type of impact or alteration:

European alder colonizes bare ground and creates an initial layer of vegetation (Funk 2005, McVean 1953).

Rational:

Sources of information:

Funk, D.T. 2005. *Alnus glutinosa* (L.) Gaerth. European alder. USDA Forest Service, Northeastern Area, State and Private Forestry. Available: <http://www.na.fs.fed.us/> via the INTERNET. Accessed 2005 March 3.
McVean, D.N. 1953. *Alnus glutinosa* (L.) Gaerth. The Journal of Ecology 41(2): 447-466.

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

5

Documentation:

Identify type of impact or alteration:

European alder is capable of creating a pure stands in its native range. In North America it is usually present in association with willow (McVean 1953).

Rational:

Sources of information:

McVean, D.N. 1953. *Alnus glutinosa* (L.) Gaerth. The Journal of Ecology 41(2): 447-466.

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

7

Documentation:

Identify type of impact or alteration:

European alder has been found associated with nitrogen-fixing *Frankia* (Hall et al. 1979). A portion of this fixed nitrogen becomes available for other species. European alder provides food for deer, rabbits, hares, and several bird species. Dozens of insects and diseases have been observed in association with European alder but few cause serious damage. European alder hybridizes readily with many other alders, particularly with *Alnus incana* and *A. rubra*. Establishment of European alder leads to increases in earthworm population which, via bioturbation increase the rate of soil development (Funk 2005, McVean 1953).

Rational:

Sources of information:

Funk, D.T. 2005. *Alnus glutinosa* (L.) Gaerth. European alder. USDA Forest Service, Northeastern Area, State and Private Forestry. Available: <http://www.na.fs.fed.us/> via the INTERNET. Accessed 2005 March 3.
 McVean, D.N. 1953. *Alnus glutinosa* (L.) Gaerth. The Journal of Ecology 41(2): 447-466.

Total Possible

40

 Total

24

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/m²) 1
- C. Moderately aggressive (reproduces vegetatively and/or by a moderate amount of seed, <1,000/m²) 2
- D. Highly aggressive reproduction (extensive vegetative spread and/or many seeded, >1,000/m²) 3
- U. Unknown

Score

3

Documentation:

Describe key reproductive characteristics (including seeds per plant):

European alder reproduces almost entirely by seed. The average number of seeds per catkin is 60, the number of female catkins is estimated to be about 4,000 per tree, thus a single tree could produce a total of 24,000 seeds. Root suckers are rare. Fallen green branches beginning to take root in soft swamp mud have been observed in Britain (McVean 1953).

Rational:

Sources of information:

McVean, D.N. 1953. *Alnus glutinosa* (L.) Gaerth. The Journal of Ecology 41(2): 447-466.

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:

Fruits float and are therefore efficiently dispersed by flowing water and wind drift over standing water. Dispersal by birds is possible although seeds are generally split open and the embryo consumed. Wind dispersal occurs but is not very effective (McVean 1953).

Rational:

The fruits of European alder are small and light. They possess two lateral float corky outgrowths and an oily, water-resistant coat. They can float for over 12 months in still water (McVean 1955).

Sources of information:

McVean, D.N. 1953. *Alnus glutinosa* (L.) Gaerth. The Journal of Ecology 41(2): 447-466.

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:

European alder has been recommended for planting for coal mine remediation (Funk 2005). It has escaped from reclaimed mine soils and now grows naturally in surrounding areas. There are numerous horticultural varieties in cultivation in Britain but none have been released in the United States (USDA 2002).

Rational:

Sources of information:

Funk, D.T. 2005. *Alnus glutinosa* (L.) Gaerth. European alder. USDA Forest Service, Northeastern Area, State and Private Forestry. Available: <http://www.na.fs.fed.us/> via the INTERNET. Accessed 2005 March 3.

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.

2.4. Allelopathic

- | | |
|------------|---|
| A. No | 0 |
| B. Yes | 2 |
| U. Unknown | |

Score **0**

Documentation:

Describe effect on adjacent plants:

European alder is not listed as an allelopathic (USDA 2002).

Rational:

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.

2.5. 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 alder is capable of competing with willow, larch, poplar, and birch. Pure alder stands can form, although other species colonize simultaneously (Funk 2005, McVean 1956).

Rational:

European alder possesses an extensive root system, which enables it to survive in waterlogged soils (McVean 1955) and access deep-lying soil moisture. In Europe, alder is considered to be the deepest rooting tree species and more shade tolerant than willow, larch, poplar, and birch (Funk 2005).

Sources of information:

Funk, D.T. 2005. *Alnus glutinosa* (L.) Gaerth. European alder. USDA Forest Service, Northeastern Area, State and Private Forestry. Available: <http://www.na.fs.fed.us/> via the INTERNET. Accessed 2005 March 3.
 McVean, D.N. 1956. Ecology of *Alnus glutinosa* (L.) Gaerth: V. Notes on some British alder populations. *The Journal of Ecology* 44(2): 321-330.

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 2

Documentation:

Describe grow form:

European alder is a shrub or tree that reaches heights up to 60-70 feet. Pure stands are common its native range; in its introduced range it often occurs in thickets with willows (McVean 1953).

Rational:

Sources of information:

McVean, D.N. 1953. *Alnus glutinosa* (L.) Gaerth. *The Journal of Ecology* 41(2): 447-466.

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 2

Documentation:

Describe germination requirements:

European alder can germinate in light or darkness, but successful establishment of seedlings requires relatively high light intensity (McVean 1953). Germination of alder seeds may be depressed by the presence of tannins in alder litter (McVean 1955).

Rational:

Sources of information:

McVean, D.N. 1953. *Alnus glutinosa* (L.) Gaerth. *The Journal of Ecology* 41(2): 447-466.
 McVean, D.N. 1955. Ecology of *Alnus glutinosa* (L.) Gaerth.: II. Seed distribution and germination. *The Journal of Ecology* 43(1): 61-71.

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

- A. No 0
- B. Yes 3
- U. Unknown

Score

0

Documentation:

Species:

No other weedy alder species are known (USDA 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

3

Documentation:

Describe type of habitat:

The native habitat of European alder is stream and lake sides (Gubanov et al. 2003, McVean 1953).

Rational:

Sources of information:

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.
McVean, D.N. 1953. *Alnus glutinosa* (L.) Gaerth. The Journal of Ecology 41(2): 447-466.

Total Possible

25

Total

16

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

0

Documentation:

Identify reason for selection, or evidence of weedy history:

European alder is not domesticated and or known as an agricultural weed (Funk 2005, McVean 1953).

Rational:

Sources of information:

Funk, D.T. 2005. *Alnus glutinosa* (L.) Gaerth. European alder. USDA Forest Service, Northeastern Area, State and Private Forestry. Available: <http://www.na.fs.fed.us/> via the INTERNET. Accessed 2005 March 3.
McVean, D.N. 1953. *Alnus glutinosa* (L.) Gaerth. The Journal of Ecology 41(2): 447-466.

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 alder has invaded forests and wetlands in Wisconsin (Wisconsin DNR 2004). European alder has been naturalized in Tennessee and has the potential to become a problem in the future (SE-EPPC 2001).

Sources of information:

SE-EPPC – Southeast Exotic Pest Plant Council. 2001. Invasive Exotic Pest Plants in Tennessee. Report from the Tennessee Exotic Pest Plant Council. Available: <http://www.se-eppc.org/states/TN/TNList.html> via the INTERNET. Accessed 2005 March 4.

Wisconsin Department of Natural Resources. 2004. Non-native plants. Available: <http://dnr.wi.gov/> Accessed 2005 March 7.

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 3

Documentation:

Identify type of disturbance:

European alder is a pioneer species readily colonizing open ground. Natural and human-made disturbances might promote infestation. In particular, grazing may favor the spread of trees by reducing the shading and smothering effect of tall vegetation on the seedlings, and breaking the turf and litter mat (McVean 1953).

Rational:

Sources of information:

McVean, D.N. 1953. *Alnus glutinosa* (L.) Gaerth. The Journal of Ecology 41(2): 447-466.

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 3

Documentation:

Describe distribution:

European alder has a broad natural range that includes most of Europe except the Arctic and extends into North Africa and Asia. The species is naturalized throughout the northeastern United States and maritime Canada (Funk 2005, McVean 1953).

Rational:

Sources of information:

Funk, D.T. 2005. *Alnus glutinosa* (L.) Gaerth. European alder. USDA Forest Service, Northeastern Area, State and Private Forestry. Available: <http://www.na.fs.fed.us/> via the INTERNET. Accessed 2005 March 3.

McVean, D.N. 1953. *Alnus glutinosa* (L.) Gaerth. The Journal of Ecology 41(2): 447-466.

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 alder is naturalized throughout the northeastern United States and maritime Canada (Funk 2005, McVean 1953). This species considered invasive in Tennessee and Wisconsin (ES-EPPC 2001, USDA 2002, Wisconsin DNR 2004).

Rational:

Sources of information:

Funk, D.T. 2005. *Alnus glutinosa* (L.) Gaerth. European alder. USDA Forest Service, Northeastern Area, State and Private Forestry. Available: <http://www.na.fs.fed.us/> via the INTERNET. Accessed 2005 March 3.

McVean, D.N. 1953. *Alnus glutinosa* (L.) Gaerth. The Journal of Ecology 41(2): 447-466.

Total Possible

25

Total

14

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

U

Documentation:

Identify longevity of seed bank:

In study of McVean (1955). Seeds were viable after three winters of storage in stoppered bottles at room temperature. Longevity of seeds buried in the soil is unknown.

Rational:

Sources of information:

McVean, D.N. 1955. Ecology of *Alnus glutinosa* (L.) Gaerth.: II. Seed distribution and germination. The Journal of Ecology 43(1): 61-71.

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

2

Documentation:

Describe vegetative response:

European alder commonly sprouts from the stump after cutting or burning (Funk 2005,

McVean 1953). Fallen green branches have been observed to take root in soft mud (McVean 1953).

Rational:

Sources of information:

Funk, D.T. 2005. *Alnus glutinosa* (L.) Gaerth. European alder. USDA Forest Service, Northeastern Area, State and Private Forestry. Available:

<http://www.na.fs.fed.us/> via the INTERNET. Accessed 2005 March 3.

McVean, D.N. 1953. *Alnus glutinosa* (L.) Gaerth. The Journal of Ecology 41(2): 447-466.

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

3

Documentation:

Identify types of control methods and time-term required:

Mechanical or chemical methods are acceptable for European alder control (USDA 2002).

Rational:

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.

Total Possible

10

Total

5

Total for 4 sections Possible

97

Total for 4 sections

59

References:

- 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/>
- CLIMEX for Windows, Version 1.1a. 1999. CISRO Publishing, Australia.
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- Hultén, E. 1968. Flora of Alaska and Neighboring Territories. Stanford University Press, Stanford, CA. 1008 p.

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- McVean, D.N. 1953. *Alnus glutinosa* (L.) Gaerth. The Journal of Ecology 41(2): 447-466.
- McVean, D.N. 1955. Ecology of *Alnus glutinosa* (L.) Gaerth.: II. Seed distribution and germination. The Journal of Ecology 43(1): 61-71.
- McVean, D.N. 1956. Ecology of *Alnus glutinosa* (L.) Gaerth: V. Notes on some British alder populations. The Journal of Ecology 44(2): 321-330.
- SE-EPPC – Southeast Exotic Pest Plant Council. 2001. Invasive Exotic Pest Plants in Tennessee. Report from the Tennessee Exotic Pest Plant Council. Available: <http://www.se-eppc.org/states/TN/TNList.html> via the INTERNET. Accessed 2005 March 4.
- 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.
- University of Alaska Museum. University of Alaska Fairbanks. 2003. <http://hispidamuseum.uaf.edu:8080/home.cfm>
- Welsh, S. L. 1974. Anderson's flora of Alaska and adjacent parts of Canada. Brigham University Press. 724 pp.
- Wisconsin Department of Natural Resources. 2004. Non-native plants. Available: <http://dnr.wi.gov/> Accessed 2005 March 7.