

Perennial pepperweed

Lepidium latifolium L.

Synonyms: *Cardaria latifolia* (L.) Spach

Other common names: broadleaved pepperweed, broadleaved peppergrass, peppergrass mustard, perennial peppergrass, tall whitetop, Virginia pepperweed

Family: Brassicaceae

Description

Perennial pepperweed grows from a widely spreading root system. Stems are numerous, erect, 1 to 3 feet tall. Basal leaves are entire to evenly toothed, up to 12 inches long, 2-3 inches wide, petioles nearly equal the blades. Stem leaves are reduced and lack petioles. Plants form dense clusters of flowers in pyramidal panicles. Flowers are very small, white, approximately 1.5 mm long. Fruits are silicles, with 2 seeds per fruit (Douglas et al. 1998, Renz 2000, Whitson et al. 2000).



Perennial pepperweed is unlikely to be confused with other small, white flowered mustards.

Ecological Impact

Impact on community composition, structure, and interactions: Perennial pepperweed creates large monospecific stands that displace native plants and animals (Corliss 1993, Renz 2000). Stands of perennial pepperweed increase soil salt content. This favors halophytes and eliminates other species, thereby shifting plant composition and diversity. This

species causes significant amounts of litter to build up, reducing light availability. This prevents the emergence of annual plants (Renz 2000). It also interferes with regeneration of important riparian plant species such as willows and cottonwoods (Young et al. 1995). Perennial pepperweed is also believed to degrade animal nesting and foraging sites (Howald 2000).

Impact on ecosystem process: Perennial pepperweed may retard natural succession on previously disturbed areas. Perennial pepperweed roots fragment easily, which allows soil erosion to occur more frequently in infested areas (Renz 2000). This plant also takes salt ions from deep in the soil profile, and transports them near the soil surface, drastically increasing soil salinity (Blank and Young 2002, Blank and Young 2004).

Biology and Invasive Potential

Reproductive potential: Perennial pepperweed reproduces by seed or vegetatively from intact root system or from pieces of underground stems. The plant is capable of producing thousands of seeds annually (Howald 2000, Renz 2000). Seeds lack a hard coat and do not seem to be capable of surviving long periods in the soil, thus seed viability is likely to be short (Renz 2000).

Role of disturbance in establishment: Perennial pepperweed can establish on disturbed areas and may disperse into minimally managed or undisturbed habitats (Howald 2000).

Potential for long-distance dispersal: The seeds have no adaptations for long-distance dispersal, but they are capable of being transported by wind, water, and possibly by waterfowl (Howald 2000). Root fragments can be transported in streams and establish new populations (Renz 2000).

Potential to be spread by human activity: Perennial pepperweed was likely introduced to North America as a contaminant of sugar beet seed. It is often transported in hay or straw used as a forage or mulch (Howald 2000). It is also transported by vehicles.

Germination requirements: The seeds rapidly germinate in laboratory conditions, but few seedlings

are observed in the field. Reasons for this are unknown (Renz 2000). Germination rates are high in laboratory conditions under alternating temperatures (Miller et al. 1986).

Growth requirements: Perennial pepperweed normally grows in full sun in heavy, moist soils that are often saline or alkaline. However, it can be found in drier sites and different soil types (Howald 2000).

Congeneric weeds: *Lepidium campestre* (L.) Ait.f., *L. densiflorum* Schrad., *L. perfoliatum* L., *L. ruderale* L. (Royer and Dickinson 1999, USDA 2002).

Listing: *Lepidium latifolium* is declared a noxious weed in 13 American states, including Alaska (Alaska Administrative Code 1987, USDA 2002, Invaders Database System 2003).

Distribution and abundance

Native and current distribution: Perennial pepperweed is native to southeastern Europe and southwestern Asia. It is now naturalized throughout Europe and North America. Infestations have also been found in Australia. It can invade a wide range of habitats including riparian areas, wetlands, marshes, estuaries, irrigation channels, and floodplains. It can thrive in roadsides, hay meadows, crop fields, and rangelands (Renz 2000). Perennial pepperweed has

not been recorded in Alaska (AK Weed Database 2005, UAM 2002).

Management

Once established, perennial pepperweed can be very difficult to remove. Mechanical methods are unlikely to control perennial pepperweed because new plants quickly regenerate from pieces of rootstock.

Chemical methods have been used successfully; however, most effective herbicides cannot be applied near or over water. No biological control agents have been introduced to control perennial pepperweed due to several important cultivated crops within this family (canola, mustard, cabbage, and kale), and several threatened and endangered native species of *Lepidium* in the United States. Old stems and litter take several years to degrade, and it may be necessary to remove the litter, which prevents germination and establishment of desirable plant species. If soil salinities are dramatically increased, an intensive soil remediation program may be necessary before native species can reestablish. Areas must be monitored since it can recover from dormant root fragments (Howald 2000, Renz 2000).

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/>
- Alaska Administrative Code. Title 11, Chapter 34. 1987. Alaska Department of Natural Resources. Division of Agriculture.
- Blank, R.R. and J.A. Young. 2002. Influence of the exotic invasive crucifer, *Lepidium latifolium*, on soil properties and elemental cycling. *Soil Science* 167(12): 821-829.
- Blank, R.R. and J.A. Young. 2004. Influence of three weed species on soil nutrient dynamics. *Soil Science* 169(5): 385-397.
- Corliss, J. 1993. Tall whitetop's crowding out the natives. *Agricultural Research* 41: 5.
- Douglas, G.W., G.B. Straley, D. Meidinger, and J. Pojar. 1998. Illustrated flora of British Columbia. Volume 2. Dicotyledons (Balsaminaceae through Cuscutaceae). British Columbia: Ministry of Environment, Lands and Parks, Ministry of Forests. p. 336-342.
- Howald, A. 2000. *Lepidium latifolium* L. In: Bossard, C.C., J.M. Randall, M.C. Hoshovsky, editors. Invasive plants of California's wildlands. Berkeley, CA: University of California Press: 222-227.
- Invaders Database System. The University of Montana. 2003. Montana Noxious Weed Trust Fund. Department of Agriculture. <http://invader.dbs.umt.edu/>
- Miller, G.K., J.A. Young, and R.A. Evans. 1986. Germination of seeds of perennial pepperweed (*Lepidium latifolium*). *Weed science* 34: 252-255.
- Renz, M.J. 2000. Element stewardship abstract for *Lepidium latifolium* L. perennial pepperweed, tall whitetop. The Nature Conservancy. Arlington, Virginia. Available: <http://tncweeds.ucdavis.edu/esadocs/lepilati.html> [2005, May 2].
- 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://hispidamuseum.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.

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.

Young, J.A., C.E. Turner, and L.F. James. 1995.
Perennial pepperweed. Rangelands 17: 121-
123.

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