

Leafy spurge

Euphorbia esula L.

Synonyms: None

Other common names: None

Family: Euphorbiaceae

There is no consensus among taxonomists as to whether leafy spurge is a single species or a complex of several species, varieties, and hybrids. The invasive leafy spurge in North America may be a hybrid or series of hybrids of two or more species (Crompton et al. 1990, Kreps 2000).

Description

Leafy spurge is a perennial herb with an extensive rootstock, which can reach depths of 15 ft or more. Numerous buds on horizontal roots give rise to new shoots. Stems are erect to 3 feet tall, glabrous, branched above, somewhat woody. The entire plant contains milky sap from the seedling stage onward. The leaves are bluish green, alternate, but often crowded enough to appear opposite or whorled, stalkless, broadly linear, and up to 3 inches long and ¼ inches wide. The flowers are very reduced: the female flower is a single pistil and the male flower is a solitary stamen. Generally one female flower is surrounded by 11-21 male flowers and arranged inside a cup-like involucre of five fused bracts. Four crescent-shaped glands are present in each floral cluster. Three floral clusters are enclosed by paired, heart-shaped, yellow-green bracts. The seeds are ovate to oblong, smooth, light gray to yellow-brown, with yellow flecks (Kreps 2000, Royer and Dickinson 1999, Koutnik 1993).

Cypress spurge (*Euphorbia cyparissias* L.) introduced into North America as an ornamental and cultivated in gardens differs in having narrower and shorter leaves, leaves crowded on numerous axillary branches, and slender stem (Alex and Switzer 1976). It is unlikely for this species to be mistaken for any native species in Alaska.

Ecological Impact

Impact on community composition, structure, and interactions: Leafy spurge can reduce species richness and even exclude native forbs and grasses (Butler and Cogan 2004, Kreps 2000). Leafy spurge is unpalatable and often toxic to most native herbivores, including deer, elk, and antelope. Insect herbivores also avoid feeding on leafy spurge (Kreps 2000). The milky juice may cause severe skin rashes to humans (Royer and Dickinson 1999, Whitson et al. 2000). Over sixty species of pollinating insects have been observed on leafy spurge flowers (Butterfield et al. 1996). Decomposing plant tissue releases

allelopathic chemicals that inhibit the growth or development of other species (Butterfield et al. 1996, Royer and Dickinson 1999, Steenhagen and Zimdahl 1979).



Impact on ecosystem process: Impact on ecosystem processes is unknown. It is very likely that leafy spurge infestation will promote establishment of other weeds (Belcher and Wilson 1989).

Biology and Invasive Potential

Reproductive potential: Leafy spurge spreads by seed, rhizomes, and root fragment. Root buds can regenerate new shoots if upper portion of plant is damaged. Pieces of root as small as 0.5 inches long can produce a new plant. Seeds of leafy spurge are mature 30 days after the first flowers appear. Each stem is capable of producing 250 seeds. Seeds can remain viable for 5 to 8 years (Butterfield et al. 1996, Kreps 2000, Royer and Dickinson 1999, Selleck et al. 1962).

Role of disturbance in establishment: Any disturbance will promote establishment of leafy spurge (Belcher and Wilson 1989, Selleck et al. 1962). However, it is also known to invade undisturbed prairies and woodlands (Kreps 2000, Dunn 1979, Frankton and Mulligan 1970, Selleck et al. 1962).

Potential for long-distance dispersal: Fruits open explosively and scatter seeds up to 15 ft from the parent plant (Whitson et al. 2000, Selleck et al. 1962). Long-distance seed dispersal by animals is also suspected (Best et al. 1980). Also, seeds can float and germinate in water (Masters and Kappler 2000).

Potential to be spread by human activity: There was multiple introduction of leafy spurge into North America with ship ballast and contaminated crop grain from Russia (Dunn 1985). Leafy spurge is also spread with commercial seed, forage, and hay. Fragments of roots and rhizomes can be carried on road maintenance of farm equipment (Butterfield et al. 1996, Kreps 2000, Masters and Kappler 2002).

Germination requirements: Temperatures between 68° and 85°F are optimal for germination. Alternating freezing and thawing and prolonged dark periods promote germination. With adequate soil moisture germination is continuing throughout the growing season. Leafy spurge seedlings can emerge through several inches of soil, but optimum depth ranges from 0.5 to 2 inches (Selleck et al. 1962).

Growth requirements: Leafy spurge grows on all types of soils, but it is most abundant in coarse-textured soil. It will tolerate flooding for over 4 months and it is only slightly shade intolerant (Selleck et al. 1962).

Congeneric weeds: *Euphorbia cyparissias*, *E. myrsinites*, *E. oblongata*, *E. serrata*, *E. terracina*

have State Noxious Status in various states (USDA 2002).

Listing: *Euphorbia esula* is declared a Federal Noxious Weed in the United States and Canada. It is a noxious weed in 22 states and 6 provinces (Invaders Database System 2003, Royer and Dickinson 1999). Leafy spurge is a prohibited noxious weed in Alaska (Alaska Administrative Code 1987).

Distribution and abundance

Native and current distribution: Leafy spurge is native to Eurasia and is presently found worldwide, except in Australia. It has spread into over 30 states and into almost every Canadian province. Leafy spurge is more problematic in Colorado, Idaho, Minnesota, Montana, Nebraska, North and South Dakota, Oregon, Wisconsin, and Wyoming. It is most commonly found in pastureland, rangeland, woodland, prairies, roadsides, stream and ditch banks, and waste areas (USDA 2002, Biesboer 1996, Butterfield et al. 1996). This noxious species has not been recorded in Alaska (Weeds of Alaska Database 2005, UAM 2004).

Management

Leafy spurge is extremely difficult to control, and the best approach is the early detection and elimination of new infestations. Mechanical, chemical, cultural, and biological control methods have all been used with varying levels of success. Most control methods will have a detrimental effect on other plant species, and they all constitute a disturbance that will promote reestablishment of leafy spurge or other exotic species. The site requires 10 years of monitoring after eradication (Masters and Kappler 2002, Biesboer 1996, Lym 1998).

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Last Updated November 4, 2005