LEAFY SPURGE
(*Euphorbia esula*)

Description: Leafy spurge is a member of the Euphorbiaceae or spurge family. Leafy spurge is a perennial that grows up to 3 feet tall. Stems of the plant are hairless, pale green or blue-green and usually thickly clustered. Leaves are narrow, hairless, and are alternate on the stem. Both leaves and stems exude a milky latex substance when the plant is damaged. Leafy spurge flowers are yellowish-green, small, arranged in numerous small clusters and surrounded by a pair of yellow-green, heart-shaped bracts that are often mistaken for flowers. Roots of the plant are brown and contain several pink buds that can produce new shoots. Seeds of leafy spurge are round-oval, smooth, and vary in color from grayish to purple.

Leafy spurge is considered a noxious weed under North Dakota state law, thus landowners are required to eradicate or control the spread of the plant.

Leafy spurge

Plant Images:

Sprouting

Roots

Latex

Flowers

Distribution and Habitat: Leafy spurge is native to Eurasia. The plant can easily adapt to local growing conditions and thrive in a variety of soil types and ecological settings. Leafy spurge infestations can be found along river banks, floodplains, slopes, open woodlands, roadsides, and grasslands. Some investigators have linked the establishment of new infestations with soil disturbance activities.

Life History/Ecology: Leafy spurge is a long-lived, deep-rooted perennial that reproduces both vegetatively and by seed production. Seeds usually germinate in the spring when conditions are favorable but some can germinate in the summer. Seedlings develop root buds a short time after emergence and new shoots can develop quickly from these buds if the main shoot is removed or injured. Leafy spurge develops the yellow-green bracts in May or early June and the true flowers are produced a few weeks later. Flowering is usually completed by mid-July. Each plant produces an average of 140 seeds, some of which can remain viable in the soil for a period of eight years or longer.

The milky latex exuded from the plant can be an irritant to cattle and horses. A severe irritation of the mouth and digestive tract has been reported in cattle.

History of Introduction: Leafy spurge is native to Europe and Asia. Leafy spurge was first recorded in North America in 1827, in Newbury, Massachusetts, as a seed impurity and is now widely distributed in the Northern plains. In North Dakota, leafy spurge is found extensively throughout the state and has been reported in all counties.

Effects of Invasion: Leafy spurge is a highly adaptive, tenacious plant. The plant reduces livestock carrying capacity by competing with desirable forage species. Land value can also be reduced due to difficulty associated with management and control expenses. In prairie settings, infestations of leafy spurge have been linked to diminished plant diversity and can be associated with other invasive species such as Kentucky bluegrass and smooth brome. In time, leafy spurge seeds along with the seeds of other invasive species can come to dominate a seed bank and pose continued problems regarding efforts to revegetate a site or restore native vegetation. Studies of the effects that leafy spurge invasions have on wildlife are extremely limited. One recent study on grassland birds completed on the Sheyenne National Grasslands highlights that the response of wildlife to leafy spurge infestations are likely to vary between sites and from one species to the next as opposed to being universally negative.

Control:
Leafy spurge control is a vexing issue due to the wide distribution of the plant in the northern plains and the tenacious, perennial nature of the plant. Successful management often requires a persistent, proactive, long-term management program that is tailored for the specific situation on hand. Early detection and rapid response are the most important management tools a land manager has in the control of this particular species. Depending upon the environmental constraints or management objective associated with a tract of land, small infestations of leafy spurge can be controlled or eradicated with the selective use of herbicides. Large infestations may require additional control measures. Researchers have found that a combination of management strategies can be more effective than one strategy alone.

Traditionally, a limited suite of herbicides were used to control leafy spurge. Due to concerns over cost, the potential for groundwater contamination and environmental effects, a wider range of chemical applications and an assortment of non-chemical treatments have emerged in the last 15 years. Recent investigations in North Dakota have also explored the time of year herbicides are used and other opportunities regarding herbicide application. For example, fall applications of some herbicides have the advantage of not only being effective but also being compatible with flea beetle biocontrol measures and posing fewer adverse affects on non-target plant species.

Mechanical – Hand pulling leafy spurge is usually ineffective because of the depth of the root system and numerous root buds. Two types of tillage programs, intensive throughout the growing season and fall-only cultivation, have been used to control leafy spurge on cropland. Mowing leafy spurge will not provide long-term control but can reduce seed production if repeated during the growing season.

Burning leafy spurge is ineffective at reducing spurge density but in some instances can improve herbicide efficacy or enhance the subsequent establishment of flea beetle populations. Prescribed burning in the fall or spring has also been found to significantly reduce germination rates of leafy spurge seed.

Chemical – Herbicides provide an effective means to manage leafy spurge infestations. The most common herbicides used are picloram, dicamba, imazpaic, and 2,4-D. Dicamba and picloram are most effective when applied in June during the true flower growth stage, during seed development, or in early to mid-September after the stems have developed new fall regrowth. Imazapic provides optimum control when applied in the fall. Proper timing of herbicide applications and the timing of one management technique relative to another, such as the application of herbicide and the use of flea beetles, is essential.

Contact your local county extension agent for recommended use rates, locations, and timing.

Biological – Several insects have been released in the United States for leafy spurge control. These insects include a leafy spurge hawkmoth, *Hyles euphorbiae* L.; a stem-boring beetle, *Oberea erythrocephala* Schrank; a gall midge, *Spurgia esulae* Gagné; several root-feeding flea beetles, including *Aphthona flava* Guill, *A. cyparissiae* Koch, *A. czwalinae* Weise, *A. lacertosa* Rosenhauer, *A. nigriscutis* Foundras, and *A. abdominalis* Duftschmid; and a root-boring moth, *Chamaesphecia hungarica* Tomala. The most successful biological agents for leafy spurge control in North Dakota have been *Aphthona nigriscutis, A. czwalinae,* and *A. lacertosa*. Although a relatively recent tool, significant reductions in leafy spurge infestations have been observed in areas where flea beetle populations have taken hold. Biological control using flea beetles may not be possible in all environments and leafy spurge reduction may range from poor to excellent dependent upon location. Flea beetles may take several years to establish, therefore they are not a panacea. The flea beetles however, are increasingly looked at as an indispensable and essential tool in the growing arsenal against leafy spurge.

Leafy spurge is palatable to sheep and goats. Sheep and goats graze the top growth of the plant inhibiting flower and seed yield which potentially stresses the plant and slows the spread of leafy spurge. In leafy spurge infested areas, sheep and goats can also make forage available to other species of domestic livestock which might otherwise be unavailable.

Cautionary measures must be taken concerning the decision of whether or not to graze sheep and goats in leafy spurge infested areas. While sheep and goats may consume significant amounts of leafy spurge, they may actually prefer other non-target species. For example, studies on the Sheyenne National Grasslands have found that angora goats relish the western prairie fringed orchid, a rare species, as well as preferentially consume warm season grasses, trees, and shrubs. Domestic sheep and goats may also carry and transmit a variety of diseases which are fatal to native ungulates such as bighorn sheep. These diseases can quickly spread throughout an entire population or herd of bighorns, leading experts to recommend that wide buffers be used between native and wild sheep. In addition, the feces of domestic sheep and goats can contain viable leafy spurge seeds which can contribute to new infestations if not properly managed.

References:

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Leafy spurge photograph courtesy of Washington State Noxious Weed Control Board.

Sprouting photograph courtesy of T. Breitenfeldt, Jefferson Co., MT (mtwow.org).

Roots photograph courtesy of R. D. Richard (USDA-APHIS) (mtwow.org).

Latex photograph courtesy of Stevens County Noxious Weed Control Board, Washington.

Flower photograph courtesy of Eleanor Saulys, Connecticut Botanical Society.