SPECIES ACCOUNT FOR LEAFY SPURGE (EUPHORBIA ESULA)

1.0 BACKGROUND

Leafy spurge (Euphorbia esula (L.)) was introduced into North America from Europe and Asia. There are now six invasive species of spurges in British Columbia (MAFF 2002). Leafy spruge has become a plant of concern in the Prince George Timber Supply Area (PGTSA) for a variety of reasons. This species, like all spurges, produces a milky latex that causes dermal irritation in humans, and can be toxic. It has also caused a loss of usable range land for ranchers and farmers, as cattle will avoid this species.

Since its first reported sighting in Newbury, Massachusetts, in 1827, leafy spurge has spread throughout North America negatively impacting rangeland (Whitson et al. 1996). By 1970, leafy spurge was located within each of the provinces in Canada (USDA 1999). No information is available for the territories of Canada, though there are reports of spurge in the Yukon (US National Park Service, undated).

1.1 Taxonomic Overview

Scientific Name

Euphorbia esula (L.) Synonym: E. virgata (Wald. and Kit.)

Family

Euphorbiaceae

Common Name(s)

Leafy Spurge

2.0 DESCRIPTION

The following description is modified from A Guide to Weeds BC (MAFF 2002).

The flowers of leafy spurge are yellowish-green, small, and arranged in numerous small clusters with distinctive paired bracts underneath. Bracts are heart shaped and yellow-green. Seeds are oblong, greyish to purple in colour, and contained in a three celled capsule. Leaves are narrow and 2-6 cm long, and they alternate along the stem. Plants can reach heights of 90 cm, and mature plants are seldom less than 20 cm. Stems are generally tightly clustered. Leafy spurge has an extensive lateral root system, and all of the foliage on the plants is smooth and hairless. Leafy spurge exudes milky latex when cut or broken.

3.0 DISTRIBUTION

Leafy spurge is a competitive and aggressive invasive that “once established…is practically impossible to eradicate” (Clute 1937). In 1962 it was estimated that the infestation in Canada was 35,000 to 40,000 acres (14,000 – 16,000 ha; Selleck et al. 1962). Leafy spurge is listed as a noxious weed in all western and prairie provinces, Ontario, and all western and northern states (USDA 1999).
3.1 North America
After being introduced into North America as a seed impurity in the early 1800s, leafy spurge began a steady movement west (Whitson et al. 1996). One hundred fifty years after its discovery on North American soil it had spread through every province in Canada. Currently, spurge is located in most US states.

3.2 British Columbia
Excluding the Peace Region, the Lower Mainland, and Vancouver Island, leafy spurge is located throughout the province of BC. Open rangeland provides an ideal setting for the weed.

3.3 Regional
Current IAPP inventory records (MOFR 2007) suggest there are 22 known sites in the PGTSA. Based on field surveys leafy spurge currently occurs on only two-thirds of these. Current confirmed locations in the PGTSA include sites near Hixon, within the municipality of Vanderhoof, and south of Vanderhoof. The majority of the sites are south of Prince George on Hwy 97 South, near Hixon. Other spurge sites are located throughout the TSA and require verification and prompt treatment.

4.0 PLANT CHARACTERISTICS

4.1 Habitat
In BC, leafy spurge grows from low- to mid-elevations, on dry roadsides, fields, grasslands, open forests, and disturbed habitats. Leafy spurge has a wide range of ecological tolerances from very dry to very wet (MAFF 2002). It grows on a range of soil types but is most abundant in coarse-textured, sandy-loam soils (Selleck et al. 1962) and least abundant on clayey soils (Butterfield et al. 1996).

Field assessments suggest that aspect plays little role in spurge distribution, and low slopes appear to encourage establishment. Most sites visited existed on shallow slopes (< 10%) in open areas. The majority of sites were on coarse sandy soils in drier BEC subzones (SBSdw1). Sites were not limited to areas close to vectors, and some sites existed at distances of 150 m from roadways.

4.2 Life Cycle
Leafy spurge is a perennial forb that emerges in the spring and develops flowers shortly after stem elongation (1-2 weeks) (Butterfield et al. 1996). Flower clusters have 8-16 branches, and plants generally flower in late June to mid-July. Seeds mature about 30 days after pollination.

Leafy spurge has had relatively high success in establishing and maintaining populations, and this can be attributed in part to prolific seed production and extensive root networks. Leafy spurge root networks can reach 9 m horizontally, and 4.5 m in depth (Saskatchewan Agriculture and Food 2007). Spurges then grow from these roots, root segments and adventitious buds in the spring. Rosette growth begins early in the spring and is quickly followed by stem development. Plants flower each year from June to mid-July. Pollination occurs in early fall or late summer, and seeds reach maturity 30 days later (MAFF 2002). Plants are cross pollinated, and following pollination mature seed pods explode spreading seeds up to five metres from the plant (MAFF 2002). Each plant can produce as many as 130,000 seeds.
Seeds float on water and are easily transported by livestock and wildlife. Seeds can then remain viable in the soil 5–8 years, although most seeds will germinate in the first two years (Butterfield et al. 1996).

4.3 Impacts

Though recent population estimates have been difficult to locate there is data suggesting that leafy spurge has increased from infesting 16,000 hectares in 1962 (Selleck et al.), to more than 2 million hectares of land in North America in 1999 (USDA).

The latex produced by leafy spurge is an irritant. It causes sores, weakness, and can lead to death, so cattle will preferentially avoid it. Sheep, however, appear to be able to consume spurge with no adverse effects.

Due to its toxic latex, and the potential for causing sores on livestock and wildlife, leafy spurge is having very significant impacts on wildlife habitat and agricultural fields. Without reasonable control efforts, there will likely be a steady increase in spurge numbers. There is an estimated $40.2 million dollars lost annually just in Montana, Wyoming and North and South Dakota, as well as 1,433 jobs and a possible $89 million lost in indirect causes (Northern Plains Agricultural Research Laboratory 2004).

5.0 CONTROL

Populations of *E. esula* have been subjected to a number of treatments, and, where economically feasible, chemical treatments have been moderately effective and biological treatments have worked with varying degrees of success. Grazing is an option for mechanical treatment.

5.1 Biological Treatments

There are seven biological control agents that have been released in BC for the control of leafy spurge: *Aphthona cyparissiae, A. czwalinae, A. flava, A. lacertosa, A. nigriscutis, Hyles euphorbiae,* and *Lobesia euphorbiana* are the five beetles and two moths respectively (Powell et al. 1994; MAFF 2002). These biological controls have been used with varying success rates (Harris et al. 1985). More biological control agents are being studied as well.

5.2 Chemical Treatments

Picloram has been used successfully on small infestations (Lajeunesse et al. 1999). Spring and fall applications of a combination of picloram and sulfometuron also were effective when the herbicide was applied before flowers emerged (Beck et al. 1993). Similarly, annual applications of dicamba and sulfometuron in combination have also provided good management (Beck et al. 1993). Beck (1996) found that applications of glyphosate were effective when applied at one-month intervals and followed by autumn grass seeding.

5.3 Mechanical Treatments

Tillage, mowing, pulling, and fire are generally ineffective control treatments because of the plant’s extensive root system (MAFF 2002). An available mechanical option is targeted grazing. When sheep and goats become accustomed to consuming spurge, they will select it for up to 50% of their diet, as it is a high nutrient forb (Seefeldt et al. 2007). Sheep and goat grazing cannot eradicate a population of leafy
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spurge, but properly managed sheep and goat grazing at specific time intervals can help limit seed distribution of leafy spurge, and limit spurge nutrient uptake. Although not natural predators of the plant, selected grazers have had success in decreasing spurge populations in Montana, US, but this has not been considered a viable option in BC (MAFF 2002).

6.0 REFERENCES


