

# WEEDS

## LEAFY SPURGE (*Euphorbia esula* L.)

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### INTRODUCTION

Leafy spurge, also known as wolf's milk or leafy Euphorbia, is native to regions in Asia and Europe. This plant has rapidly spread throughout North America since its introduction into the United States in the late 1820s. Leafy spurge occupies over 1 million hectares in North America and is expanding its range in Canada at a significant rate. It was first recorded in eastern Canada in 1889 and was documented in British Columbia by 1939.

It displaces native vegetation and degrades grazing lands. Research in the United States suggest that spurge reduces the cattle carrying capacity by 50-75 % by reducing forage production and because cattle tend to avoid spurge-infested areas.

In BC, leafy spurge occurs in isolated pockets in the Thompson, Cariboo, Boundary, east Kootenay, Nechacko, Similkameen and North Okanagan areas. Spurge has a wide variety of ecological tolerances and is associated primarily with grasslands and open forests of the Bunchgrass, Ponderosa Pine and Interior Douglas-fir biogeoclimatic zones.

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Leafy spurge is a toxic weed. It has a milky-coloured latex juice found throughout all its parts which is used to heal the plant if damaged.

The latex can cause a skin rash in humans and severe irritation to the mouth and digestive tract in cattle. It can result in death when ingested in large amounts by cattle. Sheep, however, can graze infested areas without injury, which consequently makes them useful in controlling leafy spurge.

### IDENTIFICATION

Leafy spurge is a member of the spurge family (Euphorbiaceae). It is an erect, hairless perennial herb, growing to a height of 1 m. The bluish-green, narrow leaves are alternate, 3-7 cm long and less than 5 mm wide with a narrow base attached directly to the stem. A whorl of leaves marks the start of the flowering portion of the stem.

The extensive root system reaches depths of up to 5 m, while the horizontal roots may grow to be several metres long. This brown woody root system develops new buds to form new plants. It has an extensive carbohydrate reserve of starch.

Leafy spurge has small, green flowers that appear in mid-June and yellow bracts that look like flowers which appear in late May to early June. The sharply-pointed bracts are 1 cm wide and 1.2 cm long and occur in pairs on flowering stems. The true flowers lack petals and sepals, and are clustered with a pair of surrounding bracts such that the group resembles a single flower. Three 2 mm long seeds are produced per cluster.

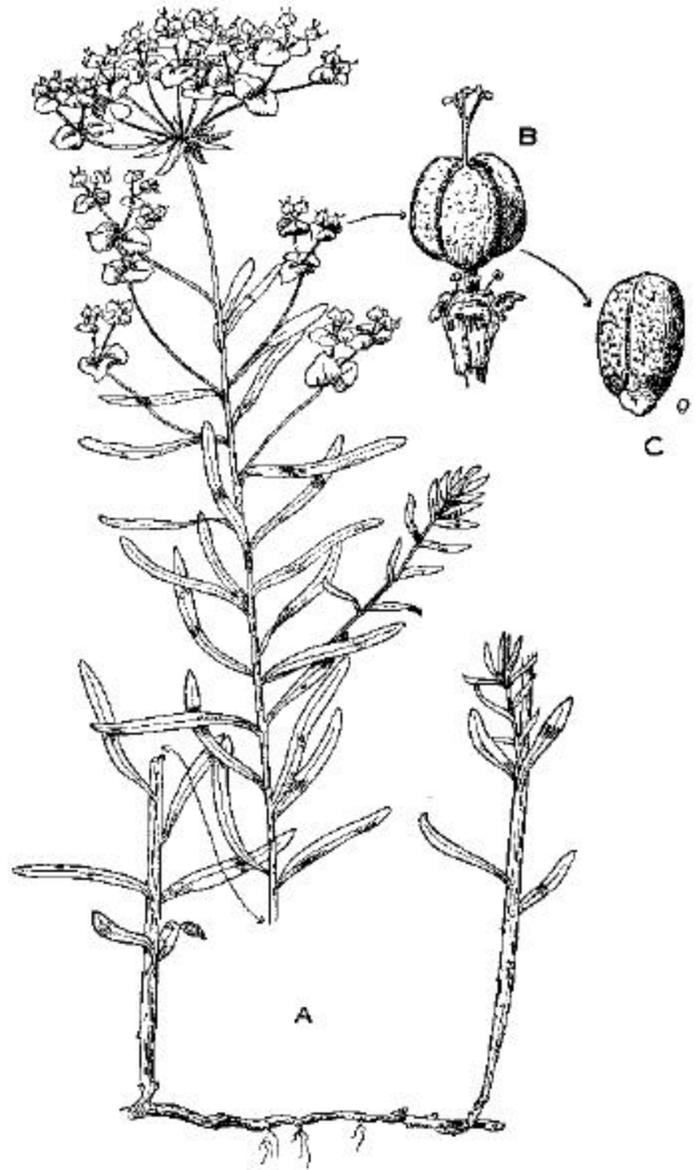
## BIOLOGY

Leafy spurge is one of the first plants to emerge in the spring, giving it a competitive edge. Once established, the weed is extremely dominant, decreasing the diversity and abundance of desirable plants.

The flowers of this plant are almost entirely insect pollinated. A single shoot may produce up to 250 seeds with each capsule producing 10-50 of those seeds. When temperatures are hot enough, the 3-celled capsules explode, launching individual seeds up to 15 metres. The seeds are viable in the soil for up to 8 years, making plant eradication a long process. The seeds may also be dispersed by insects, birds and other wildlife, livestock, humans and machinery.

Spurge populations also expand due to persistent vertical and horizontal underground root systems. The aggressive roots have numerous pink buds, each capable of producing new plants. The large nutrient reserve that this root system carries, enables the plant to sustain itself for many years, again making lasting control extremely difficult.

Young seedlings develop their root systems in a very short time, especially in areas with minimal competition. In four months, these roots can penetrate the soil up to 1 metre in depth and 90 cm in lateral length. In addition, seedlings have the ability to re-grow from vegetative buds when only seven days old.



*A. Plant; B. A single female flower with several male flowers at its base; C. Seed.*

## PREVENTION

The most effective way to ensure that your lands do not become infested with leafy spurge is by prevention. Here are some recommendations to prevent leafy spurge invasion on your property:

- Maintain grasslands in a healthy, vigorous condition to ensure a productive plant community; competitive perennial grasses and forbs utilize water and nutrients that would otherwise be readily available to spurge.
- Follow a well-designed grazing plan; excessive livestock grazing reduces competition from grass and favours weeds.
- Regularly patrol your property for leafy spurge plants and immediately treat new infestations.
- Cooperate with adjacent landowners and encourage them to control leafy spurge and other weeds.
- Immediately revegetate seed disturbed, bare soils with a suitable seed mix that provides dense, early colonization to prevent weed invasion.
- Clean your vehicles and machinery of plant material and soil after leaving a spurge infestation.

## CONTROL METHODS

Control of leafy spurge is extremely difficult and requires a long-term commitment. A combination of chemical and cultural treatments is recommended to stop the spread of leafy spurge.

## PHYSICAL CONTROL

Mowing and burning have a very limited effect on leafy spurge because the root system can re-sprout. Although burning does make the weed more vulnerable to follow-up herbicide treatment,

there is still little benefit.

Hand-pulling, digging and tilling are ineffective as well; small parts of the root system can re-sprout. In fact these control techniques can encourage the growth of spurge. The soil disturbance created during these methods also eliminates any competition for leafy spurge resulting in an expansion of the weed population.

## BIOLOGICAL CONTROL

Domestic sheep grazing can provide effective control of leafy spurge, as sheep prefer spurge to grass when the spurge is still young. Goats have also been used successfully to control leafy spurge.

Presently there are expanding investigations toward biological control of leafy spurge. Several *Aphthona* species have been released on leafy spurge. The choice of species depends on the microhabitat of the spurge infestation. For example, one species, *Aphthona nigriscutis* has successfully resulted in spurge reductions on hot, dry open sites as opposed to shady, moister sites. Two moth species *Hyles euphorbiae* and *Lobesia euphorbiana*, have had limited success elsewhere on spurge, but have been successful in BC.

Additionally, there is research being conducted on test fungi that may be pathogenic to leafy spurge. Biological control methods may be a valuable supplement to chemical control.

## CHEMICAL CONTROL

As with most control, early detection and treatment is the key. When leafy spurge is found in small areas, treatment should begin as soon as possible. Small patches generally mean that the plants are young and have just recently become established. The root system of young plants generally is not as embedded into the soil as older plants are. More importantly, young plants

have not had as much time to build up a nutrient reserve in the roots, one of the key factors in this weed's persistence.

The most commonly used herbicides to control leafy spurge are 2,4-D, Banvel and Tordon 22K. For optimum control, 2,4-D should be applied to infested areas in mid-to-late June when true flowers begin to appear. Banvel and Tordon 22K also provide good control when spot-sprayed during the seedling, bud or early flower stage. Tordon 22K is the most effective herbicide for spot treatments. Tordon treatment zones should extend 1-2 metres beyond spurge plants to control regenerative rootstocks. If late summer or early fall rains are sufficient to initiate re-growth from stem bases, spurge can alternatively be sprayed with Tordon 22K in the fall. Seedlings may re-appear within 2 to 3 years of herbicide application and require re-treatment.

Research has shown that a cost-effective option is a mix of Tordon 22K and 2,4-D applied in June and re-treated annually. This method has shown to reduce leafy spurge infestations gradually up to 90% in 3-5 years.

*Consult your local Ministry of Agriculture and Food office for the most current information on appropriate chemical controls. As with all pesticide treatment, herbicide applicators must handle and apply herbicides in a safe and responsible manner, as dictated by legislation and guidelines under the Pesticide Control Act.*

## INTEGRATED MANAGEMENT

The best overall method of control for leafy spurge is an integrated program. For agricultural lands, a combination of herbicides and competitive crops would be needed and for natural areas, judicious herbicide treatment and biological control are the best options.

## POST-TREATMENT GRAZING MANAGEMENT

During early spring, perennial bunchgrasses are growing from root reserves and are more susceptible to competition from invasive weeds. Native grass seedlings are often poor competitors with weeds so it is important to maintain weed control until the grass stand is vigorous and competitive. It is essential that enough leaf area remains after grazing to allow re-growth when soil moisture is available. Failure to alter land management practices to allow the native plant community time to recover and resist competition from weeds will lead to a reduction of forage available for grazing animals. Management practices that will assist the recovery of the native plant community include:

- delay spring grazing until range readiness has been achieved<sup>1</sup>
- avoid compaction of wet soils
- avoid congregations of livestock whenever possible, to ensure there are no areas of high soil disturbance
- employ appropriate grazing systems that maintain the vigor and health of the range plants

<sup>1</sup>Range Management Handbook for BC. 1998. Available from the BC cattlemen's Association (250) 573-3611

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