WEEDS

SULPHUR CINQUEFOIL

(*Potentilla recta* L.)

INTRODUCTION

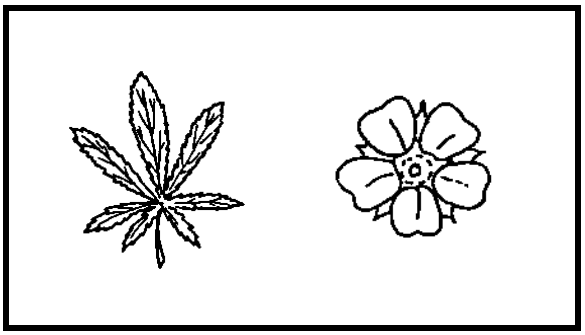
Sulphur cinquefoil, a native of Europe, Asia and northern Africa, was introduced into North America before 1900. It is naturalized across much of the United States and southern Canada. It occurs from British Columbia east to Newfoundland and Nova Scotia, south to Florida, and west to eastern Texas. In the western United States, it extends south to northern California and south in the Rocky Mountains to Wyoming.

This long-lived perennial infests disturbed areas, meadows, pastures and rangelands and can dominate a site within two to three years of first appearance. Sulphur cinquefoil is commonly found on sites containing diffuse and spotted knapweed (*Centaurea diffusa* and *C. maculosa*). Recent increases in sulphur cinquefoil density may be associated with density reductions in knapweed due to stress resulting from attack by knapweed biological control agents. In British Columbia, sulphur cinquefoil is most common in the Southern Interior where it has invaded grasslands, ponderosa pine parkland, and open forests of Interior Douglas-fir and Interior-Cedar Hemlock. In the south Okanagan, this aggressive weed has invaded rangelands largely unnoticed and has rapidly become abundant in the last decade. Sulphur cinquefoil is now so widespread that eradication from the region is now impractical.

The insidious nature of sulphur cinquefoil poses both a significant environmental and economic threat. Once established, this weed can produce dense populations that reduce or eliminate forage production and biodiversity. It is unpalatable to most livestock and wildlife due to a high concentration of bitter tasting compounds in the leaves and stems.

IDENTIFICATION

Sulphur cinquefoil is a member of the rose family (Rosaceae), and is one of over 20 herbaceous cinquefoils in BC. Sulphur cinquefoil plants are erect, 15-70 cm (6.0-27.5 in) tall, with one or more hairy stems.
Leaves are divided into 5-7 hairy toothed leaflets, each 5-10 cm (2-4 in) long. Some leaves arise from the stem base at ground level, but most occur on the stem and stand erect. The leaflets decrease in size, and the length of the leafstalks get shorter near the top of the stem. Uppermost leaves are attached directly to the stem. Pale yellow flowers have five heart-shaped petals around a bright yellow centre. During the fall and winter, thick patches of sulphur cinquefoil are brownish in color and easy to identify among the tan-colored dry bunchgrasses.



BIOLOGY

Sulphur cinquefoil begins growth very early in the spring from a woody root. The plant begins to bloom in mid-June and can produce flowers throughout the summer if growing conditions are favourable. Plants set seed during late July. Above-ground portions of the plant completely desiccate by late August. Fall regrowth of basal leaves is possible and rapid under moist, mild conditions.

Although sulphur cinquefoil reproduces primarily by seed, it also has an unusual method of vegetative reproduction. Annual regrowth each spring causes individual plants to become several closely spaced, independent plants. Each year new shoots appear on the outer edge of the woody roots. The old, central root eventually rots away and can completely disintegrate within 6 to 8 years. The remaining living portions form a ring-shaped clump composed of several new individuals.

Plants commonly live for 20 years, however, individual plants 25 to 30 years old have been found in the United States. The seeds of sulphur cinquefoil remain viable in the soil for at least 3 years.

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Sulphur cinquefoil most closely resembles graceful cinquefoil (Potentilla gracilis), a native plant which is shorter; has white woolly hair on the undersurface of the leaves; more basal leaves; deeper, less uniform leaf serrations; bright yellow flowers;

Graceful cinquefoil
(*Potentilla gracilis*)

Sulphur cinquefoil
(*Potentilla recta*)

PREVENTION

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

- Maintain grasslands in a healthy, vigorous condition to ensure a productive plant community
- Follow a well-designed grazing plan; excessive livestock grazing reduces competition from grass and favors sulphur cinquefoil
- Confine livestock for five days after they have grazed in a infested pasture to ensure that undigested seeds are not spread to new areas with their manure
- Regularly patrol your property for establishing cinquefoil plants and immediately treat new infestations
- Cooperate with adjacent landowners and encourage them to control cinquefoil and other weeds
- Immediately seed any 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 an infestion

PHYSICAL CONTROL

Individual plants and small patches of sulphur cinquefoil can be hand-pulled. This treatment is effective only when the upper portion or crown of the root system is removed. Sulphur cinquefoil is not controlled by mowing. Although seed production may be reduced, plants develop low, bulky, spreading roots when mowed and are able to send up new shoots. Sulphur cinquefoil is not a serious weed in cropland because it does not tolerate frequent cultivation. However, a single cultivation may increase sulphur cinquefoil cover.

BIOLOGICAL CONTROL

No biological controls have been approved for sulphur cinquefoil in North America, but surveys for potential agents have begun in Europe. Acceptable biological control agents are difficult to find because insects and diseases damaging to this weed may also attack closely related native or ornamental potentillas and strawberries (*Fragaria* spp.).

CHEMICAL CONTROL

Herbicide treatment is the most effective control method for sulphur cinquefoil currently available to land managers. While chemical treatment is not practical on a large scale, herbicides are an appropriate tool for containment of fringe areas or spot-treatment of small patches.

Spot-treatment using Tordon 22K at a rate of 1.1 L/ha or 2,4-D Amine 500 at 2.2 L/ha can effectively control cinquefoil. These herbicides should be applied to actively growing plants during the spring or fall. Annual treatments may be required with 2,4-D. Seedlings may re-appear within 3 to 4 years of a Tordon 22K application and require retreatment.

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*.

POST-TREATMENT GRAZING MANAGEMENT

During early spring, perennial bunchgrasses are growing from root reserves and are more susceptible to competition from invasive weeds, such as sulphur cinquefoil. Native grass seedlings are often poor competitors with weeds so it is important that effective weed control is maintained until the grass stand is vigorous and competitive. It is essential that enough leaf area remains after grazing to allow regrowth 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 could ultimately displace forage available for livestock.

Land managers should develop a specific grazing system that meets their needs; however, some situations may warrant specific grazing management regimes.

Management practices that will assist the recovery of the native plant community include:

- delay spring grazing until range readiness has been achieved[1]
- 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 vigour and health of the range plants

A better understanding of how sulphur cinquefoil develops, reproduces and survives is necessary to further our understanding and control of the situation in the southern Interior. In the meantime, land managers should employ integrated weed management practices, particularly preventive measures, to continue the challenge of controlling this weed. Early detection and treatment is the key to slowing the spread of sulphur cinquefoil.

[1]Rangeland Handbook for BC. 1998. Available from the BC Cattlemen's Association (250) 573-3611

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