

Cinquefoils (*Potentilla* spp.)—The Five Finger Weeds¹

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INTRODUCTION

In 1753 Linneaus named the genus *Potentilla* in his *Species Plantarum* (4). The common name five finger is used frequently for this group of plants (18, 29). The genus, in the rose family (Rosaceae), is composed of about 500 north temperate species (50 in North America, 75 European species) of mostly boreal herbs and shrubs. Indeed, *Potentilla* extends far into arctic regions (22, 29). However, a few species are south temperate. And although less common, some species are also found in alpine and high mountain regions of the tropics and South America; *P. anserinoides* Lehm. is a New Zealand native (27).



Cinquefoil, which means five leaves, is an old herb, full of mystery and magic, which matches the charm of its name. The plant protects its fragile blooms in bad weather by contracting the leaves so that they curve over and shelter the flower (11). Cinquefoil was credited with supernatural powers, and was an essential ingredient in love divination. According to Alice Elizabeth Bacon, frogs liked to sit on this plant—"the toad will be much under Sage, frogs will be in Cinquefoil" (11).

Some *Potentilla* species are cultivated, being common garden species (20). The roots of a few species are edible, while the dried rhizomes of others are medicinal.

ECONOMIC USES

Potentilla has only diminutive economic value, but it does have its uses. Numerous medicinal virtues are attributed to cinquefoil. And the reputation of silverweed cinquefoil (*P. anserina*) and related genera as medicinal plants or astringents originally gave the genus its name, *Potentilla*, which is the diminutive of Latin *potens*, powerful (10, 26). In herbal medicine the active agents in silverweed cinquefoil were used for treating cirrhosis of



Rough cinquefoil, *Potentilla norvegica* L.

the liver in humans (29). It was prescribed as a tea or in wine for diarrhea, leukorrhea, kidney stones, arthritis, cramps, and reducing fever (22). However, in recent times the roots are being used for a gargle and mouthwash (11).

In America the outer root bark of creeping cinquefoil (*P. reptans* L.) is used to stop nosebleeds. The roots, dug in April, are dried immediately, then made into a decoction with water. It also is used to bathe tired eyes. The crushed juice of fresh roots, mixed with the crumbs of boiled wheat bread, is a styptic (11).

Additionally, several species were used for tanning hides (28). Silverweed cinquefoil is a rich source of tannins and a derivation of red dyes for wool (22, 27). Because it reproduces vegetatively, silverweed cinquefoil also is used as a ground cover to assuage erosion along road cuts and river banks, particularly in wet areas (22). Several species, i.e., *P. fruticosa*, *P. sterilis* (barren strawberry), and *P. lineata* (*P. fulgens*), are quite ornamental and Darlington and Wylie (9) classify them as horticultural plants, defining their uses as "decoration, instruction, experiment, protection, curiosity or religious edification."

Fleshy silverweed cinquefoil roots are edible raw or cooked and taste similar to sweet potatoes or parsnips when harvested in early spring (24). The young shoots also are eaten as salad (22); a few furnish honey (27). Siberians use

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the dried leaves of shrubby cinquefoil (*P. fruticosa* L.) as a substitute for tea. At times Native Americans and natives of Siberia and the Scottish islands of Tiree and Coll relied on silverweed cinquefoil roots as an emergency food (14, 27). And when ground it is used as fodder for domestic animals, including geese; the leaves are rich in vitamin E (22). Mediocre pasture for livestock is provided by several species (27).

Creeping cinquefoil (*P. reptans*) was used as one of the ingredients in an old fisherman's bait reputed to ensure a good catch. It was prepared by boiling the cinquefoil with corn in thyme and marjoram water and mixed with stinging nettles and the juice of houseleek (11). How could fish resist such a delicacy?

SOME HISTORICAL ASPECTS

In a 1868 catalogue of the plants that grow wild along the Rhone River, only one species of *Potentilla*, silverweed cinquefoil (*P. anserina*), is listed (27). However, some authors consider it strictly a North American native (8).

The first introduction of sulfur cinquefoil (*P. recta*) to North America from Europe occurred prior to 1900; it was referred to initially in the 1897 edition of Britton and Brown. *Gray's Manual of Botany* mentioned its Canadian distribution and noted that it was rapidly spreading. Yet, the exact time and place of the original introduction remains unknown (13).

Rough cinquefoil (*P. norvegica*) probably is native to both Eurasia and North America. But there is some confusion as to whether the North American *P. norvegica* is in the same species as the European one (29). In his 1898 monograph on *Potentilla*, Rydberg recognized two subspecies of *P. monspeliensis* L., one of which is var. *norvegica*, the European variety (originally *P. norvegica* L.) (27). Most literature now refers to both forms simply as *P. norvegica* L. Undefined differences exist between native North American and Old World forms (16). Rough cinquefoil is recognized as a taxon in the earliest North America floras and no significant changes in its distribution have occurred in the last century (29).

COMMENTS ON SOME WIDESPREAD SPECIES

Rough cinquefoil, *Potentilla norvegica* L.

P. norvegica L. also is known as *P. monspeliensis* L. and *P. monspeliensis* L. var. *norvegica* (L.) Rydb. (29). It grows

from 0.1 to 0.2 m high. Often its root is quite thick, and in biennial and perennial forms, produces several stems from a single rootstock. The stems are robust, hairy, branched, becoming tough and woody with age, when they change from green to a dingy reddish purple. Its trade mark five-finger leaves are hairy and green on both sides. It blooms from June to September, its yellow flowers borne in cymose clusters. After ripening the achenes are scattered readily when the wind sways the tall stems (9, 16, 17).

In the Western hemisphere, rough cinquefoil extends south from Canada to Maryland, South Carolina, Texas, and Mexico, northward to Ohio and North Dakota, westward to Kansas, Oregon, Washington, the Rocky Mountains and California. In the Old World it is found in southeastern England; from Scandinavia to Switzerland; central Spain, Italy and Greece; Hungary and central Russia; and northern Asia, Turkistan, to Lake Baikal and Kamchatka (24, 27).

Rough cinquefoil's life history varies. For example, plants from the Kolyma River area, Siberia, have perennial roots, but the plant usually is an annual in cultivated ground or a biennial in dry waste areas (9). Rough cinquefoil thrives in open sandy areas of abandoned fields, meadows, pastures and lawns (29). It is common in agricultural fields of clover, timothy, and red top. And in North America its seed has been among the most common early contaminants in these crops (29). *Rhizoctonia solani* Kuehn, a species of parasitic fungus reported on *P. norvegica*, causes root rot and seedling blight of flax, peas, sweet clover and alfalfa in Canada (5).

In 1859 Darlington remarked that "it has very much the appearance of an introduced plant, and has not yet, so far as I know, acquired a common name. It is only entitled to the notice of the farmer, as being a coarse, homely, worthless intruder in his pasture fields" (10).

Silvery cinquefoil, *Potentilla argentea* L.

Silvery cinquefoil, a native perennial, develops a hard, woody and deep root from which arises one to several radially branched, whitish, coarse and woody stems, up to 0.1 m long, covered with woolly white hair. The leaves divided into 5 (or 7) wedge-shaped pinnatifid leaflets, dark green above, silvery white and densely woolly below. It blooms from May to September. The flowers are similar in size and color to those of rough cinquefoil but are borne in an open cyme rather than in tight clusters. The brown achenes are smooth and minute; they ripen and disseminate all summer (9, 16, 17).

Silvery cinquefoil inhabits dry soils in fields, meadows, and pastures from Nova Scotia to the Dakotas, and southward to Maryland and Kansas. It also is native to Europe and Asia.

Shrubby cinquefoil, *Potentilla fruticosa* L.

Shrubby cinquefoil is a native North American perennial. Other common names include yellow hardhack and black brush. The young shoots are clothed in white down, but they soon mature into hard, woody stems covered with hairy, ragged, grayish brown bark. These old "hardhack" stems are incredibly tough (17). The leaves are pinnately five to seven foliate, and gray-green with silky hairs. Blossom time is May to October, the numerous bright yellow flowers being produced in terminal cymose clusters. The achenes are small, light, hairy-coated, and are disseminated widely over crusted snow (17).

Shrubby cinquefoil ranges from Labrador to Alaska, southward to New Jersey, Illinois, and Minnesota. In the west it occurs in the Rocky Mountains, the Sierra Nevada, and Arizona. But the plant has shown its weedy qualities chiefly in New England and in parts of Colorado, Indiana, and Ohio, where it thrives in dry open ground, meadows, and pastures (17).

In the "good old days" shrubby cinquefoil was controlled by cutting or burning off the tops before leaf emergence in the spring, and then, with a strong team and a heavy plow, exposing the roots, dragging them from the soil with a harrow, piling and drying them for a few days, and then burning them. Using this method, some of the largest roots proved too much for the plow and the harrow so had to be pulled by a horse with a chain, aided by a man with a crowbar! Farmers who reclaimed cinquefoil fields believed that the land was left in excellent condition for crops, apparently being improved rather than exhausted by its weedy occupant (17).

Angora goats provided successful biological control. Goats browse the twigs, preventing all seed development. But as Ada Georgia wrote, "There is probably more than enough black brush in Colorado to supply all the goats in the country" (17).

There are numerous horticultural selections of shrubby cinquefoil, including 'Gold Drop,' 'Klondike,' 'Moonlight,' 'Mount Everest,' 'Snowflake,' and 'Sutter's Gold.' They are hardy and useful plants for borders; they require full sun. However, they will tolerate part shade in hot summer areas (6).

Silverweed cinquefoil, *Potentilla anserina* L.

Silverweed cinquefoil is a native herbaceous perennial, stoloniferous, rosette plant. Its common name originates from the distinctive silvery aspect of the lower surface of the leaves. And the plant's pinnately compound leaves distinguish it from the palmate leaved cinquefoils (22, 23).

It has a slender taproot, and its leaves are thickly tufted, with 7 to 25 oblong, sharply serrate leaflets, dark green and smooth above but underneath distinctively silvery-grey and silky pubescent. The solitary bright yellow flowers develop on both the mother plant and on stolon internodes (12, 17, 22). It also spreads vegetatively much like strawberries by numerous jointed stolons which emerge from among the leaves and take root at the nodes (23).

Silverweed cinquefoil occurs in North America, Europe, Asia, South America, and Australia (22). In North America it is found along the Atlantic coast to Greenland, north to Alaska, Yukon and the Northwest Territories, west to British Columbia and California, and south to New Mexico (4). Although recorded north of the Arctic Circle, silverweed cinquefoil generally is considered to be non-arctic and non-alpine (25).

Its favorite sites are wet grasslands, banks of streams, and lake and sea shores. If its chief requirement of damp soil is met, the plant is equally at home on the Gulf of Mexico tropic shores or in an Alaskan or Greenland marsh (17). It is also a weed of waste areas, roadsides and lawns (21), northern human settlements (25), and pastures and meadows (12) and has been considered an important weed of horticultural crops in England (7).

Attempts to cross silverweed cinquefoil and *Fragaria* spp. (cultivated strawberry) in the hope of producing an economically important plant have been unsuccessful to date (2).

Oldfield cinquefoil, *Potentilla simplex* Michx.

P. simplex Michx. is often confused with *P. canadensis* L., a name that was used earlier for oldfield cinquefoil. *P. pumila* Poir. is another widely used synonym (30). Some authors regard *P. simplex* as only a variety of *P. canadensis*. Both varieties are rather worthless, and are merely indicative of a poor soil, or a thriftless farmer (10). It is common in dry soils, especially in old "worn-out" soils, hence its common name of oldfield cinquefoil. Its presence indicates that the soil is sterile or lacking in some element of fertility (17). Novices often call it "wild strawberry," which its foliage closely resembles, but its fruit is not fleshy (3). Its

range is extensive: Maine and Quebec to Minnesota, southward to Georgia and Oklahoma.

Oldfield cinquefoil is a native perennial that propagates by achenes and stolons. Its stems are tufted, spreading, stoloniferous, and very slender; the runners are thin as wire, often reddish, and finely hairy. The leaves are palmately five foliate, the leaflets green and smooth above and sparsely hairy beneath. The golden yellow flowers occur solitary in the axils, on long slender, wiry peduncles. It flowers from April to August, with the achenes ripening from June to September (17).

Showy cinquefoil, *Potentilla fruticosa* L.

Showy cinquefoil, a woody perennial, produces erect, shrubby stems from 0.3 to 1.3 m high; it bears pinnate leaves of 5 to 7 leaflets and yellow flowers. It is cultivated as an ornamental plant, but becomes weedy in some parts of the eastern states, especially in Vermont, where Prof. L. R. Jones commented in 1925: "It is the most aggressive weed invader known, taking almost complete possession of the pastures and even pushing into tilled lands." It produces a great abundance of achenes, which are scattered by the wind as freely as are dandelion seeds. And when cut back, the plant also sprouts freely from the crown (23).

Creeping cinquefoil, *Potentilla reptans* L.

Creeping cinquefoil is a perennial, trailing, prostrate plant. Its leaves are palmate with five dentate leaflets and its roots are stoloniferous, rooting at the nodes. The solitary yellow flowers are produced from June to September. It inhabits roadsides and waste places (11).

Since creeping cinquefoil makes a net of runners, successful control means that it is essential to find and remove the parent plants, so that all the progeny will be removed too. The leaves and whole plants are very good additions to a compost-heap (11).

Sulfur cinquefoil, *Potentilla recta* L.

P. sulphurea Lam. is a synonym for sulfur cinquefoil, named for its pale to sulfur yellow flowers. It is a perennial, reproducing by achenes. It grows 30 to 70 cm high, with a woody rootstock and one to several erect stems. Its stems are simple, very leafy, stout, and hairy. The leaves, with 5 to 7 coarsely serrate oblong leaflets, are green and hairy both above and below. The inflorescence is many-flowered and the achenes are numerous, ovate, and dark brown (13, 16).

Annual regeneration of sulfur cinquefoil is by new shoots emerging near the edges of the root mass; the old central core slowly rots away, probably taking six years or more to disintegrate completely. Thus long-lived plants form in a circle of upright stems with only old stem and leaf tissue in the center (29).

Because of its five-parted leaves, sulfur cinquefoil is confused sometimes with hemp (marijuana, *Cannabis* sp.) and is often laboriously exterminated by zealous officials (9). The best distinguishing characteristic in the vegetative state is cinquefoil's hairiness, since hemp is smooth, and in the flowering state the inflorescences and the dioecious nature of *Cannabis* are strikingly different from *Potentilla* (29).

Sulfur cinquefoil often infests large areas of roadside, waste places, and abandoned fields; it is not controlled by occasional mowing. It flourishes best in limey or stony soils (15). However, according to Darlington et al. (9), it is not a serious agricultural weed.

Downy cinquefoil, *Potentilla intermedia* L.

Downy cinquefoil resembles silvery cinquefoil (*P. argentea*), but has deeply toothed five-parted leaves which are more grayish and hairy below than white and woolly as in silvery cinquefoil. Also the cyme is leafier and more woolly than in silvery cinquefoil (19).

Downy cinquefoil may be a hybrid, resulting from a cross between *P. argentea* and *P. norvegica*. However, such crosses have been unsuccessful when attempted artificially in the laboratory; there is no evidence that such crosses actually occur in nature (1).

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