

Ficaria verna

Ficaria verna (formerly *Ranunculus ficaria* L.), commonly known as lesser celandine or pilewort,[3] is a low-growing, hairless perennial flowering plant in the buttercup family Ranunculaceae native to Europe and Western Asia. It has fleshy dark green, heart-shaped leaves and distinctive flowers with bright yellow, glossy petals.[4][5] It is now introduced in North America, where it is known by the common name fig buttercup and considered an invasive species.[6][7][8][9] The plant is poisonous if ingested raw and potentially fatal to grazing animals and livestock such as horses, cattle, and sheep.[10] For these reasons, several US states have banned the plant or listed it as a noxious weed.[7][11] It prefers bare, damp ground and is considered by horticulturalists in the United Kingdom as a persistent garden weed;[12][13] nevertheless, many specialist plantsmen, nursery owners and discerning gardeners in the UK and Europe collect selected cultivars of the plant, including bronze-leaved and double-flowered ones. Emerging in late winter with flowers appearing late February through May in the UK, its appearance across the landscape is regarded by many as a harbinger of spring.[12]

Lesser celandine is a hairless perennial plant to about 25 cm high, growing in clumps of 4-10 short stems, on which the leaves are spirally-arranged or all basal. The leaf stalks have sheathing bases, no stipules, a groove along their upper surface, and two hollows within. The leaves are cordate, 1-4 cm across, dark-green above with a distinctive variegated or mottled pattern, and pale green below. Purple-leaved varieties are common. The margins of the leaves are sometimes entire (rounded) but more often angled or weakly lobed, with hydathodes at the tips. There are two types of roots: dense clusters of thick, pale-coloured elongated tubers surrounded by patches of short, fibrous roots. Some clumps give rise to long stolons to 10 cm or more, allowing vegetative spread to produce extensive carpets of plants.[14]

It produces large actinomorphic (radially symmetrical) flowers, up to 3 (or even 5) cm diameter, on long stalks arising individually from the leaf axils or in loose cymes at the top of the stem. There are no bracts. The flowers have a whorl of 3 sepaloid tepals and 7 to 12 glossy[4] yellow petaloid tepals, which are sometimes tinged purple or grey on the back. Double flowered varieties also occur. The stamens and carpels are numerous, and the fruit is a single-seeded, shortly hairy achene with a very short style. In several subspecies, tubers are formed in the leaf axils after flowering.[15]: 118 It blooms between March and May in the UK.[16]

Ficaria verna sensu lato is native to central Europe, north Africa and the Caucasus. It has been introduced into Iceland and North America.[17]

Lesser celandine grows on land that is seasonally wet or flooded, especially in sandy soils, but is not found in permanently waterlogged sites.[18] In both shaded woodlands and open areas, *Ficaria verna* begins growth in the winter when temperatures are low and days are short.[19] The plants mostly propagate and spread vegetatively,[20] although some subspecies are capable of producing up to 73 seeds per flower.[12] Germination of seeds begins in the spring, and continues into summer.[12] Seedlings remain small for their first year, producing only one or two leaves until the second year.[12]

Growth and reproduction is poor in dry or acidic conditions, though the plants can handle

drought well once dormant.[12] By emerging before the forest canopy leafs out, *Ficaria verna* is able to take advantage of the higher levels of sunlight reaching the forest floor during late winter and early spring.[21] By late spring, second year plants quickly age as daylight hours lengthen and temperatures rise.[12] By the end of May, foliage has died back and plants enter a six month dormancy phase.[20]

If disturbed, separation of the plant's numerous basal tubers is an efficient means of vegetative propagation.[19] The plants are easily spread if the prolific tubers are unearthed and scattered by digging activities of some animals and humans.[21][12] Erosion and flood events are particularly effective means of spread, as the plants are very successful at colonizing low-lying floodplains once deposited.[19][22]

Ficaria verna exists in both diploid ($2n=16$) and tetraploid ($2n=32$) forms which are very similar in appearance.[12] However, the tetraploid types prefer more shady locations and can develop up to 24 bulbils at the base of the stalk.[12][20] Subspecies *F. verna* ssp. *verna*, and *F. verna* ssp. *ficariiformis* are tetraploid and capable of colonizing new areas much faster because they produce bulbils in their leaf axils[23]: 126 [20] in addition to root tubers. Subspecies *F. verna calthifolia* and *F. verna verna* are diploid[10][24] and hybrids between subspecies often create sterile triploid forms.[10]

In many parts of the Eastern and Northwestern United States and Canada, lesser celandine is cited as an invasive species.[18] It poses a threat to native wildflowers, especially those ephemeral flowers with a spring-flowering lifecycle.[19] Since *Ficaria verna* emerges well before most native species, it has a developmental advantage which allows it to establish and dominate natural areas rapidly.[21] It is mainly a problem in forested floodplains, where it forms extensive mats, but can occur on upland sites as well.[21] Once established, native plants are displaced and ground is left barren and susceptible to erosion, from June to February, during the plant's six-month dormancy phase.[25]

In the United States, where lesser celandine is considered a plant pest to gardens, lawns, and natural areas, many governmental agencies have attempted to slow the spread of this species with limited success.[9] As of 2014, the species was reported to be invasive and established in 25 states.[26] USDA APHIS considers *Ficaria verna* to be a high-risk weed that could spread across 79% of the United States, anticipating possible impacts to threatened and endangered riparian species.[9] The U.S. National Park Service's Plant Conservation Alliance recommends avoiding planting lesser celandine, and instead planting native ephemeral wildflowers such as *Asarum canadense*, bloodroot, the native twinleaf (*Jeffersonia diphylla*), and various species of *Trillium* as alternatives.[21]

Christopher Lloyd is one of several horticulturists who have recommended one of the double-flowered Flore Pleno Group for planting at the base of a hedge next to a lawn.[27] The Daily Telegraph has even given advice on how to plant them, provided by the Royal Horticultural Society.[28] Double-flowered plants were noted as long ago as 1625 when one was found by John Ray.[29] The RHS specialist quarterly publication *The Plantsman* published a lengthy, well-illustrated article on double-flowered lesser celandine cultivars by Belgian gardener and alpine plant specialist Wim Boens in December 2017.[30] "RHS Plant Finder" online lists around 220 named cultivars (many of these may well be very similar; nevertheless, this indicates the interest in the species among gardeners).

(Double-flowered and semi-double cultivars are unlikely to be invasive as they either cannot set seed or do not often do so. Semi-doubles may occasionally cross with single cultivars,

which is probably how some of the most desirable cultivars originally arose.)

Alba Group

'Brambling'

'Brazen Hussy'

'Collarette'

'Coppernob'

Flore Pleno Group

'Salmon's White'

All plants of the buttercup family (Ranunculaceae) contain a compound known as protoanemonin.[33] When the plant is wounded, the unstable glucoside ranunculin turns into the toxin protoanemonin.[34] Contact with damaged or crushed *Ficaria* leaves can cause itching, rashes or blistering on the skin or mucosa.[35] Ingesting the toxin can cause nausea, vomiting, dizziness, spasms, or paralysis.[34] In one case, a patient experienced acute hepatitis and jaundice when taking untreated lesser celandine extracts internally as an herbal remedy for hemorrhoids.[36]

On drying of these plants, the protoanemonin toxin dimerizes to non-toxic anemonin, which is further hydrolyzed to non-toxic dicarboxylic acids.[37][38] Cooking of the plants also eliminates the toxicity of the plants and the plant has been incorporated in diets or herbal medicine after being dried, and ground for flour, or boiled and consumed as a vegetable.[18][38][39]

The plant is known as pilewort by some herbalists because it has historically been used to treat piles (hemorrhoids).[40][41] Lesser celandine is still recommended in several "current" herbal guides for treatment of hemorrhoids by applying an ointment of raw leaves as a cream or lanolin to the affected area.[18][41][42] Supposedly, the knobby tubers of the plant resemble piles, and according to the doctrine of signatures this resemblance suggests that pilewort could be used to cure piles.[43]

Nicholas Culpepper (1616 – 1654), is claimed to have treated his daughter for 'scrofula' (or Kings evil) with the plant.[16]

The German vernacular skorbutkraut ("scurvy herb") derives from the use of young leaves, which are high in vitamin C, to prevent scurvy.[18][44] However, use of lesser celandine to prevent scurvy could be considered a misnomer, tied to its similar appearance to common scurvygrass (*Cochlearia officinalis*), which shares similarly shaped leaves as well as sharing the German name skorbutkraut.[45] The German Hager's Manual of pharmacy practice of 1900 states *Ranunculus ficaria* [sic] and *C. officinalis* both share this name and use,[45] though there was little documentation of the toxicity of untreated *Ficaria* species at the time.

Most guides today point out that medicines should be made from the dried herb or by heat extraction as the untreated plants and extracts will contain protoanemonin, a mild toxin.[40][41] The plant has been widely used in Russia and is sold in most pharmacies as a

dried herb.[46] The protoanemonin found in fresh leaves is an irritant and mildly toxic but is suggested to have antibacterial properties if used externally.[40] The process of heating or drying turns the Ranunculaceae toxin to anemonin which is non-toxic and may have antispasmodic and analgesic properties.[40]

Mesolithic Hunter gatherers in Europe consumed the roots of the plant as a source of carbohydrates boiled, fried or roasted.[47]

The poet William Wordsworth was very fond of the flower, which inspired him to write three poems: "To the Small Celandine," "To the Same Flower," and "The Small Celandine." The third poem begins thus:

There is a Flower, the lesser Celandine,
That shrinks, like many more, from cold and rain;
And, the first moment that the sun may shine,
Bright as the sun himself, 'tis out again![48]

Upon Wordsworth's death it was proposed that a celandine be carved on his memorial plaque inside St Oswald's Church, Grasmere, but unfortunately the greater celandine *Chelidonium majus* was mistakenly used.[49]

Edward Thomas wrote a poem entitled "Celandine".[50] Encountering the flowers in a field, the narrator is reminded of a past love, now dead. He also remarked on banks of celandines in his early prose work "In Pursuit of Spring" (1913).[51]

C. S. Lewis mentions celandines in a key passage of *The Lion, the Witch and the Wardrobe*, when Aslan comes to Narnia and the whole wood passes "in a few hours or so from January to May". The children notice "wonderful things happening. Coming suddenly round a corner into a glade of silver birch trees Edmund saw the ground covered in all directions with little yellow flowers - celandines".[52]

D. H. Lawrence mentions celandines frequently in *Sons and Lovers*. They appear to be a favorite of the protagonist, Paul Morel:

...going down the hedgeside with the girl, he noticed the celandines, scalloped splashes of gold, on the side of the ditch.

'I like them,' he said, 'when their petals go flat back with the sunshine. They seem to be pressing themselves at the sun.'

And then the celandines ever after drew her with a little spell.[53]

