

# Perfoliate (Cotswold) Pennycress

*Microthlaspi perfoliatum*



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Cotswold Pennycress is a member of the Cabbage (Brassicaceae) family and gets its common name from the location where it is mostly found in the UK. It has oval waxy grey-green leaves. The base-leaves have stalks while the stem leaves clasp the stem making it look like the stem perforates the leaf, leading to the alternative common name Perfoliate Pennycress. The small pure-white flowers form rounded heart-shaped fruits 4-6 mm long by 3.5 mm wide. The short style, which is still present at the top of the fruit, is shorter than the top of the notch formed by the wings of the fruit.

There are two similar species that may be found on similar habitats. Alpine Pennycress *Noccaea caerulescens* grows on limestone soils, often associated with Calaminarian grassland. The leaves are similar, but the fruits are much longer, not rounded heart-shaped, and there is no notch for the much longer style to sit within. Field Pennycress *Thlaspi arvense* has clasping stem leaves that are toothed, and the round coin-shaped fruits are much larger, 10 mm across.

## Lifecycle

Cotswold Pennycress is an autumn germinating annual of bare soils and field margins. It particularly prefers shale / brashy soil within the limestone oolite, and is almost entirely confined to the Cotswold. Is it likely to grow during warm spells during the winter, but generally remains fairly inactive during the coldest months – January and February – before springing into growth in late February and March. It reaches peak flowering in the first half of April.

## Habitat

It grows in bare substrate and cannot tolerate soils with much organic matter, requiring a small-sized slatey stone and mineral soil mix that is well-drained. Cotswold Pennycress often grows on dumped soils within quarries, as well as colonising live quarry faces (i.e. unquarried rock). Within quarries, the plant has not been found on more clayey soils. It also grows on arable soils with similar brashy Cotswold soils.

**Distribution**

Cotswold Pennycress is almost entirely restricted to the Cotswold and the limestone oolite soils. There are three other recently recorded populations, of which the Somerset and Dorset populations are on railway embankments, while the Ecclesfield population was growing on a roadside verge.

**GB status and rarity**

Vulnerable

**Protection under the law**

This plant is included as a species “of principal importance for the purpose of conserving biodiversity” under Section 41 (England) of the Natural Environment and Rural Communities Act 2006.

Cotswold Pennycress was classified as **Vulnerable** in the Great Britain Vascular Plant Red List and the England Vascular Plant Red List. It is protected under Schedule 8 of the Wildlife and Countryside Act 1981.

**Survey method**

The number of individual Cotswold Pennycress plants should be counted from late March through April when it flowers and is the easiest to locate.

**Reasons for decline**

The main reasons for the decline in Cotswold Pennycress is the loss and overgrowth of quarries, slate pits, screes and areas of rubble destruction. Within other areas of disturbed ground situations, such as rubble within grasslands or natural areas that remain bare and exposed, lack of grazing has led to encroachment of coarse vegetation.

Cotswold Pennycress was probably never a common species of field margins in the UK, but where it is present on this habitat the use of fertiliser, competitive cereal crop varieties and the grassing over of margins for other conservation priorities has reduced populations further.



Perfoliate Pennycress distribution across Britain and Ireland. The data used to create this map has been provided under license from the Botanical Society of Britain and Ireland (BSBI) and accessed from the Society's online database.



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**Habitat management for Cotswold Pennycress**

Management work for this annual should ideally be undertaken between late May and end of September for germinating seed in October. Restoration works should focus on the creation of open areas on nutrient-poor freely-draining basic soils through cultivation and scrapes. Ground should be cleared in late summer so that it is ready as a seed bed for germination as the autumn rains dampen summer-dry soils. The number of plants is often proportional to the amount of bare ground available.

In quarries, vigorous annuals and perennial herbaceous plants should be controlled as Cotswold Pennycress does not tolerate any shade. Clearing and scraping areas that are in full sun, open and airy above and below the rock face on limestone shale / brashy soil would provide the right conditions into which this plant can set seed. Where scrub has developed creating leaf mulch and richer / loamy soil, this would need to be scraped off to expose the oolite or liassic limestone underneath. Maintain the light, open, freely-draining soils that warm early in spring, and are subject to summer droughting. Compacted soils, such as those along tracks, have low soil aeration and tend to remain wetter and colder for longer which is detrimental to the growth of Cotswold Pennycress.

In arable, creation of bare ground should be undertaken at least every other year, if not annually, along arable margins where natural processes do not facilitate this process. The cultivated strip, plot or field corner should be as wide as possible and not sown with a cereal crop or other crop such as wild bird mixture as this will complete and shade-out Cotswold Pennycress. Compaction should also be avoided. The area should not fulfil a dual role, such as an access track for tractors, or a permissive footpath / bridleway as the bare ground created through foot/hoof fall or tractors will not create the loose, open stony / instantly draining ground that Cotswold Pennycress requires. Soils should be maintained in a free-draining state, especially if on more loam-clay substrate which has the tendency to

become poorly drained, especially if compacted. This triggers germination of this annual plant. Ploughing to the conventional depth of 4-6 inches (10-15 cm) is recommended at extant populations while deep ploughing at historical sites could bring buried seed to the soil surface, restoring populations. Cotswold Pennycress does not like compaction, and where bare ground is created the surface may need to be roughed-up if the mechanical works create a hard plane. The site should remain free of fertilisers, and should be as low in nutrients as possible. Herbicides should not be used when the plant is above ground, but some herbicide control of coarser weeds, particularly perennials, could be undertaken when Cotswold Pennycress has set seed.

