

## *Lathyrus aphaca* L.

### Yellow Vetchling

*Lathyrus aphaca* is a scrambling plant with slender unwinged stems, solitary yellow flowers, true leaves reduced to long, simple tendrils and large, broadly-triangular waxy grey-green stipules paired up the stem. It is a species of chalk soils, boulder clay and limestone, found on road verges and grassy waysides, cliff tops and sheltered undercliffs by the coast. It is also a casual species of waste ground, railway banks and arable field margins. The status of this species is questionable at many inland sites, but is probably native in old grassland and at coastal locations. It is assessed as 'Vulnerable' in Great Britain, although historical decline almost certainly includes the loss of casual populations.



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#### IDENTIFICATION

*Lathyrus aphaca* is a scrambling hairless vetchling with slender, solid, ±square and unwinged stems (Poland & Clement, 2009). Mature plants have leaves reduced to long simple tendrils (Stace, 2010), and large and broadly-triangular (ovate-hastate) waxy grey-green stipules (more than 3 mm, and often as large as 30 mm or more) paired up the stem and giving the plant its distinctive appearance.

The solitary small yellow flowers (10–13 mm long) have long calyx teeth (two or three times as long as the tube) and are held on long pedicels. Seed pods (2–3 cm in length) are curved and light brown when mature.



*Lathyrus aphaca* flowering at Crayford Rough, West Kent.  
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#### SIMILAR SPECIES

The shape and size of the glabrous stipules together with true leaves reduced to simple tendrils combine to make this plant quite distinct from other species.

*Lathyrus nissolia* has leaves reduced to a fine blade as opposed to long tendrils, and has much smaller stipules (less than 3 mm) and bright pink or crimson flowers. *Lathyrus pratensis* has large stipules but has clusters of 5–12 yellow flowers and true leaves with a single pair of leaflets.

#### HABITATS

*Lathyrus aphaca* is a species of dry calcareous grasslands, particularly over chalk loams and occasionally over limestone at coastal locations (Rumsey, 1994).

It is found on road verges, grassy waysides, sea walls, cliff tops and sunny and relatively sheltered undercliffs by the coast. It also occurs quite widely as a casual of waste ground, by docks and mills, railway banks, rough disturbed ground and arable field margins, where it can be found with threatened archaeophytes such as *Scandix pecten-veneris* and *Valerianella dentata* (Rumsey, 1994; Wilson & King, 2003). In grasslands *L. aphaca* is often a part of a rich legume flora, with associate species including *Vicia bithynica*, *V. lutea* and *V. parviflora* (Bowen, 1988; Rumsey, 1994).

In western and central Europe it occurs on alkaline soils rich in calcium and is a species of rocky limestone slopes, stream banks, meadows, glades and Garrigue plant communities (Nobis *et al.* 2011). It is also a characteristic species of cereal, legume and winter-rape crops in warm areas of the temperate to submeridionale zones of the Euro-Siberian region, growing

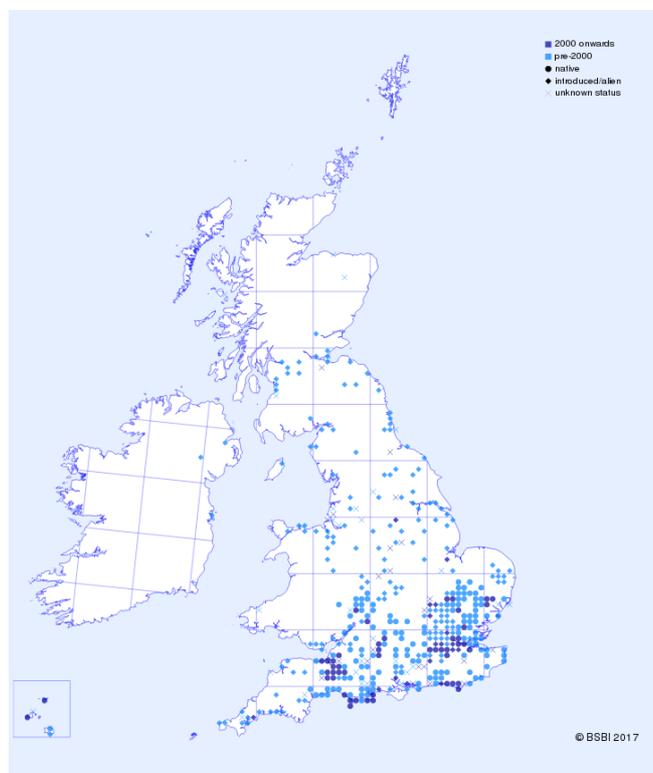
## *Lathyrus aphaca* L.

with species of fertile calcareous soils e.g. *Euphorbia exigua*, *Kickxia elatine*, *K. spuria*, *Legousia speculum-veneris*, *Ranunculus arvensis*, *Valerianella dentata*, and *V. rimosa* (Kropáč, 2006).

### BIOGEOGRAPHY

*Lathyrus aphaca* has a Submediterranean-Subatlantic distribution (Preston & Hill, 1997), occurring widely across Europe, North Africa, South-western and Central Asia, and is a naturalised species in North America. It is also considered a naturalised species in Poland (Nobis *et al.* 2011) and in other countries at the northern limits of its range e.g. Belgium and the Netherlands (Rumsey, 1994), but is assessed as an archaeophyte in Red Lists for Germany, the Czech Republic, Hungary and Slovakia.

In Britain *L. aphaca* is a nationally scarce plant of lowland southern and south-eastern England. Numerous casual occurrences have been reported from within its core geographic range and elsewhere, and the loss of such sites accounts for much of the historical decline detected since the mid-20<sup>th</sup> century. Doubts over its native status have led to speculation that it may be a long-established archaeophyte on calcareous soils, especially in grassland near to the coast (Pearman, 2002; Edwards & Pearman, 2004), with most inland populations probably neophyte.



Distribution of *Lathyrus aphaca* in Great Britain and Ireland.

The confusion over its status is in part based on historical accounts of *L. aphaca* seed arriving in the UK via a variety of means. For example, Lentil seeds originating from Turkey have been found to contain seeds of *L. aphaca* (Clement, 1979a), and in Cornwall, *L. aphaca* has been recorded as a tan-bark alien, with the contaminated plant material sold locally as a peat substitute after being imported from Turkey and Africa (Clement, 1975). In Dorset and Cambridgeshire it has occurred inland as a bird-seed alien (Clement, 1979b; Alan Leslie, pers. comm.), but it is considered to be probably native at coastal localities in Dorset and on the clays to the west of Cambridge and the chalk from Cherry Hinton to Swaffham Prior in Cambridgeshire. In Suffolk, the species persists on several protected road verges on the boulder clay, where it is probably native (Sanford & Fisk, 2010).

In Essex, although now well-established, it may have been introduced originally with legume (possibly Lucerne or Sainfoin) seed (Adams, 2016), and seed contamination most likely accounts for many inland records elsewhere. For example, in Kent *L. aphaca* was first recorded in cornfields, and roadside records are possibly a result of either colonisation from arable, or sowing after roadworks, although equally some of these records may represent the continuance of old grassland (Kitchener, 2016). In Hampshire, it is thought to be casual inland, but with a probable relict native distribution around Portsmouth (Rand & Mundell, 2011). Somerset populations are mainly found in disturbed habitats (e.g. arable, allotments, a disused airfield; Helena Crouch pers. comm.). In Wiltshire, populations considered native are found in rank, calcareous grassland, with other localities (e.g. arable fields, waste ground) probably casual (Pilkington, 2007).

Adams (2016) writes that the persistence of populations appears to depend upon the temperature not dropping below a mean of 1.5°C in February and getting warm enough (average of 17°C or greater) in summer for it to outcompete or scramble over other grassland species, as it does in crops in Pakistan, for example (Waheed *et al.*, 2009). The widespread loss of the species in parts of England is likely a result of it being unintentionally introduced to areas unsuitable for its long-term persistence (i.e. too cold, or too exposed). Losses from arable habitat may also be as a result of improved seed-cleaning techniques (Wilson & King, 2003).

### ECOLOGY

*Lathyrus aphaca* is a winter-green annual, flowering from April until the end of August. The flowers are hermaphrodite and are pollinated by Bees and other insects. The plant is also self-fertile. Seeds germinate in the late summer and early autumn months. Seedlings persist over the winter months, but appear not to survive hard winters (Adams, 2016; Peter Strohm, pers. obs.). A series of mild winters might be responsible for the recent spread of the species in north-west Kent.

## *Lathyrus aphaca* L.

Seeds (3.2-3.6 mm x 2.6-3 mm) are ellipsoid to globose, usually flattish with a glossy, smooth, dark purple-brown to black surface that is sometimes spotted or marbled (Bojňanský & Fargašová, 2007). Dormancy is imposed by an impermeable seed coat, with scarification of the surface necessary to allow imbibition. However, in a seed burial experiment by Van Assche *et al.* (2003), a small fraction of naturally 'soft seeds' (a result of climatic effects e.g. cool wet summers – see Roberts & Boddrell, 1985) germinated immediately and up to a depth of 7 cm in the soil. The majority of seeds in separate *ex situ* studies by the same authors germinated at 10°C, confirming others studies (e.g. 15°C; Tanveer *et al.* 2012) that found a relatively low temperature optimum for germination, favouring autumn or early spring. In the study by Van Assche *et al.* (2003) the majority of buried seed germinated in the first year, with a steep decline in viability thereafter. This, together with a relatively large seed size, suggests that *L. aphaca* may have a short-term persistent seed bank (see Thompson *et al.*, 1993) although no other seed bank studies specifically concerning *L. aphaca* could be found to support this assumption.

Globally, there are a number of varieties based on differences in flower size, corolla colour and the number of flowers per peduncle, with maximum variability in Anatolia (Davis, 1970; Sahin *et al.*, 2000). Sharmar & Kumar (2012) found that the large stipules of *L. aphaca* act as the principal photosynthetic organs, as they possess all the cells and tissues that characterise photosynthetic leaves, whilst the true leaves (reduced to tendrils) are devoid of palisade tissue.

*Lathyrus aphaca* is cultivated for human consumption (although ingesting large quantities of seed can cause a serious disease of the nervous system known as 'lathyrisim') and feed for livestock in South Asia and the Mediterranean. However, crops are susceptible to attack and infestation from the broomrape *Orobanche crenata* (Sillero *et al.*, 2005).

### THREATS

Populations in coastal areas and in old calcareous grassland inland appear to be stable, and the majority of decline is from inland areas where, in large part, the species was probably only ever casual. Application of herbicide or the loss of marginal habitat is likely to have led to the loss of some arable populations, and a lack of management leading to scrub encroachment, or conversely too much cutting in the summer and early autumn, may have resulted in the loss of some grassland populations.

### MANAGEMENT

Extant, long-term persistent sites are either cut in late autumn, grazed by livestock or, particularly at coastal undercliff sites, grazed by rabbits and otherwise left unmanaged.

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### AUTHOR VERSION

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### SUGGESTED CITATION

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