

## *Vicia orobus* DC.

### Wood Bitter-vetch

*Vicia orobus* is a tall, perennial legume with an erect habit, pointed leaves lacking tendrils, and 6-20 drooping pinkish-cream flowers with purple veins. It is found on sloping, free-draining neutral to mildly-acid soils across a range of habitats, including low fertility pastures and hay meadows, mires, stream banks, ravines, sea cliffs, limestone heath and woodland margins. The majority populations in the British Isles occur in Wales but it is also scattered throughout the southern uplands and along the west and north coast of Scotland. It is extremely rare in Ireland and England. *V. orobus* is assessed as Near Threatened in Great Britain as a whole, Vulnerable in England, but of Least Concern in Wales.



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#### IDENTIFICATION

*Vicia orobus* is a tall (~60 cm), pubescent perennial with erect, long-stalked racemes of 6-20 drooping pinkish cream flowers with purple veins. The glabrous pods are 2-3 cm long and pointed. The leaves are pinnate with 7-15 pairs of leaflets. The leaflets are net-veined and lack tendrils. Unlike other perennial bitter vetches the leaves of *V. orobus* lack tendrils and the stipules are only slightly toothed.

#### SIMILAR SPECIES

In upland habitats *V. orobus* can be confused with *Lathyrus linifolius* subsp. *montanus*, which also lacks tendrils, but *L. linifolius* only has four pairs of leaflets and they lack the net-



*Vicia orobus* at Ganllwyd, Merionethshire. ©Trevor Dines

veination of *V. orobus* (Poland & Clement 2009).

#### HABITATS

Although not listed with any NVC types, recent surveys in Wales have shown *V. orobus* to be a relatively frequent component of unimproved, and often species-rich, neutral to mildly acid hay-meadows and pastures in the lowlands and upland fringes (Stevens et al. 2010). In these habitats it occurs in NVC U4c *Festuca ovina-Agrostis capillaris-Galium saxatile* and MG5c *Cynosurus cristatus-Centaurea nigra* grassland, sometimes in vegetation showing affinities to MG3 *Anthoxanthum odoratum-Geranium sylvaticum* grassland (Richard Jefferson, pers. comm.).

Extant populations occur most frequently on free-draining soils on rocky banks and slopes towards the edges of pastures, meadows and in similar vegetation on unmanaged roadsides, tracksides and stream banks (Chater 2010). In south-west Wales it is found in similar niches within much wetter rhos/culm pastures, but also occasionally in M25b *Molinia caerulea-Potentilla erecta* mires (Kay & John 1994), a habitat in which it probably occurs throughout the western seaboard of Europe (Pryce 2004).

In Scotland it is more typical of ungrazed sea-cliffs, grassy slopes and ravines, often growing amongst dry H10 *Calluna vulgaris-Erica cinerea* heathland, as on the Island of Rum (Pearman et al. 2008). In Ireland *V. orobus* grows in woodland margins on partially drowned drumlins in Lough Corrib, in limestone heath (*sensu* Ivimey-Cooke & Proctor 1966) with 'Burren' specialities such as *Gentiana verna*, and on the edges of forestry tracks in conifer plantations (Roden 1995).

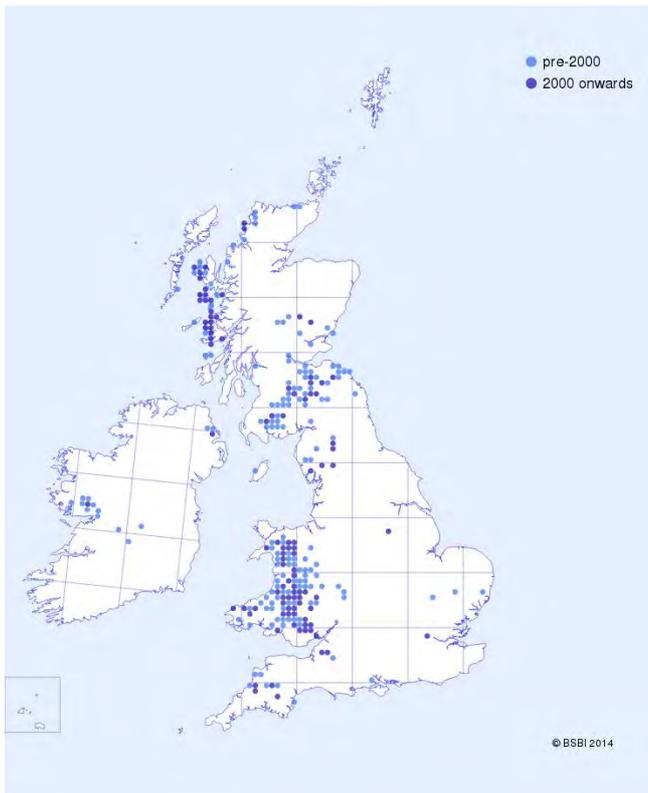
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### BIOGEOGRAPHY

*V. orobus* is confined to western Europe and has an Oceanic distribution (Eu-Atlantic *sensu* Roisin 1969), extending from northern Spain to Denmark and south-west Norway, with scattered populations in the mountains of France and Switzerland (Kozłowski et al. 2009). It is closely allied to *V. cassubica*, which replaces *V. orobus* from central France eastwards (Pearman & Benoit 1994).

Wales represents the British and Irish stronghold for the distribution of this species with around 62% of the population and extant locations in 72 hectads across eleven of the thirteen vice-counties (Dines 2008). In Scotland, it is thinly scattered throughout the southern uplands and along the west and north coast, including the Hebridean islands of Mull, Skye and Rum. In central and eastern Scotland it has declined to two sites in Perthshire and one in Angus where only a single inaccessible clump survives (Hogarth 2012). Likewise, *V. orobus* is extremely rare in England with just a handful of colonies surviving in Cornwall, Devon, Somerset, Herefordshire, Yorkshire and Cumbria. In Ireland most populations occur in Galway and Mayo (Rosen 1995) with outliers in the Derry Hills in Laois and near to Larne in County Antrim (Curtis & McGough 1988).

*V. orobus* is primarily an upland species, usually found between 200 and 300 m altitude, but it occurs down to sea level in Sutherland, and reaches 455 m in Cumbria (Pearman 2002).



Distribution of *Vicia orobus* in Great Britain and Ireland.

### ECOLOGY

*V. orobus* is a long-lived herbaceous perennial with a little-branched rootstock which produces 1 to many leafy shoots each year. It lacks a leafy rosette at ground level and shoots last for less than one year, usually from March to October (Kay & John 1995; Poland & Clement 2009). Vegetative spread is by division of the root-stock and appears to be very limited, although large, many-branched plants do occur in ungrazed sites and may be long-lived (K.J. Walker pers. obs.).

The 6-20 pink-flushed or pinkish-cream, purple-veined flowers are produced on a dense raceme in late-May and June, sometimes continuing until September. The flowers appear to be self-compatible (Kay & John 1995), but most are likely to be pollinated by specialist long-tongued bumblebees, mainly *Bombus pascorum*, which are likely to promote pollen transfer between flowers on the same plant or near neighbours (Kay & John 1997). A high proportion of flowers produce pods and most pods contain 1 or 2 seeds, not 4-5 as suggested in many floras (Kay & John 1994). Most seeds remain in the pods for at least a few weeks but have usually been shed by late August (Kay & John 1994). The heavy seeds have no specialized structures and are probably not dispersed very far from parent plants, although mowing and flowing water may disperse seeds over greater distances.

Seeds germinate readily if scarified and free from fungal infection, which appears to infect the seed-coats of many legume seeds (Kay & John 1994). Limited tests suggest that *V. orobus* does not form a seed bank (Kay & John 1994). Seedlings have been observed in many sites, even in fairly deep swards, but probably only where burning has created open conditions for seedling establishment (Kay & John 1994). Populations in Wales show high levels of genetic variation, although with markedly differing levels of gene diversity, allele number and heterozygosity (Kay & John 1997). Indeed, some large populations display quite severe genetic impoverishment, whereas smaller ones have surprisingly high levels of variation for their size, perhaps because plants forming these populations were long-lived survivors rather than recruits from depleted, inbred gene-pools (Kay & John 1997).

### THREATS

Although more widespread in its core areas than previously thought, *V. orobus* appears to be intolerant of both over-grazing and competition from scrub, and thus affected both by too much and too little management. Chater (2010) suggests that it has declined in hay-meadows in Cardiganshire due to grassland improvement and more intense sheep-grazing and is now typically confined to marginal areas of meadows such as banks or stream-sides that are less intensively managed. In contrast, populations on ungrazed banks and verges have disappeared following invasion by invasive bracken and scrub. Mismanagement and poorly timed cutting of roadside verges has also led to declines in this habitat in Wales. In Scotland, as a result of heavy grazing by sheep and deer, the majority of coastal populations are confined to inaccessible cliffs (Evans

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et al. 2002; Pearman et al. 2008). In Ireland some populations are threatened by land reclamation (Roden 1995).

### MANAGEMENT

*V. orobus* is intolerant of heavy-grazing and competition from coarse grasses and scrub. Ideal meadow/pasture management should aim to maintain low fertility and a light to moderate grazing regime, substantially reducing or excluding grazing pressure during the main flowering/fruiting period (June to August). For example, at Vicarage Meadow SSSI in Wales, arguably the best site for *V. orobus* in the British Isles, a combination of light to moderate grazing with ponies, cattle and sheep is thought to be ideal, with the grassland 'shut-up' between May and September and cut for hay in the late summer. On verges and banks where grazing is not possible, the grassland should be cut in the spring and/or late summer, with arisings removed, to keep coarse grasses and scrub in check.

### REFERENCES

- Chater, A.O. 2010. *Flora of Cardiganshire*. Privately published, Aberystwyth.
- Curtis, T.G.F. & McGough, H.N. 1988. *The Irish Red Data Book. Volume 1. Vascular Plants*. Wildlife Service Ireland, Dublin.
- Dines, T.D. 2008. *A Vascular Plant Red Data List for Wales*. Plantlife, Salisbury.
- Evans, P.A., Evans, I.M. & Rothero, G.P. 2002. *Flora of Assynt*. Privately published.
- Hogarth, B. 2012. *The flowering plants and ferns of Angus*. Privately published.
- Ivimey-Cooke, R.B. & Proctor, M.C.F. 1966. The plant communities of the Burren, County Clare. *Proceedings of the Royal Irish Academy* 64B: 211-301.
- Kay, Q.O.N. & John, R.F. 1994. *Population genetics and demographic ecology of some scarce and declining species of lowland grassland and related habitats*. Countryside Council for Wales Science Report No. 93, Bangor.
- Kay, Q.O.N. & John, R.F. 1995. *The conservation of scarce and declining plant species in lowland Wales: population genetics, demographic ecology and recommendations for future conservation in 32 species of lowland grassland and related habitats*. Countryside Council for Wales Science Report No. 110, Bangor.
- Kay, Q.O.N. & John, R.F. 1997. Patterns of variation in relation to the conservation of some rare and declining plant species, in T.E. Tew, T.J. Crawford, J.W. Spencer, D.P. Stevens, M.B. Usher & J. Warren (eds) *The role of genetics in conserving small populations*, pp.41-55. Joint Nature Conservation Committee, Peterborough.
- Kozłowski, G., Bürcher, S, Fleury, M. & Huber, F. 2009. The Atlantic elements in the Swiss flora: distribution, diversity and conservation status. *Biodiversity Conservation* 18, 649-662.
- Pearman, D.A. & Benoit, P.M. 1994. *Vicia orobus* DC. In: Stewart, A.L., Pearman, D.A. & Preston, C.D. 1994. *Scarce Plants in Britain*. pp. 434. Joint Nature Conservation Committee, Peterborough.
- Pearman, D.A. 2002. *Vicia orobus* Wood Bitter-vetch. In: Preston, C.D., Pearman, D.A. & Dines, T.D. (eds & comps). *New Atlas of the British and Irish Flora*. pp.379. Oxford University Press, Oxford.
- Pearman, D.A., Preston, C.D., Rothero, G.P. & Walker, K.J. 2008. *The Flora of Rum: an Atlantic island reserve*. Henry Ling, Dorchester.
- Poland, J. & Clement, E. 2009. *The Vegetative Key to the British Flora*. Botanical Society of the British Isles, London.
- Pryce, R.D. 2004. The Rhos pastures of South-west Wales and their conservation. *Watsonia* 25: 1-16.
- Roden, C. 1995. *Wood Bitter Vetch Vicia orobus DC. on Lake Islands and Limestone Heath in Cos Galway (H16, H17) and Mayo (H26)*. The Irish Naturalists' Journal 25: 128-134.
- Rodwell, J. (1991-2000). *British Plant Communities. 5 volumes*. Cambridge University Press, Cambridge.
- Roisin, P. 1969. *Le domaine phytogéographique atlantique d'Europe*. Editions J. Duculot, Gembloux.
- Stevens, D.P., Smith, S., Blackstock, T., Bosanquet, S.D.S., Stevens, J. 2010. *Grasslands of Wales: A Survey of Lowland Species-rich Grasslands, 1987-2004*.

### AUTHOR VERSION

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### SUGGESTED CITATION

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