

## *Epipactis atrorubens* (Hoffm.) Besser

### Dark-red Helleborine

*Epipactis atrorubens* is an orchid with wine-red flowers and two-ranked leaves that are mostly twice as long as wide, with the lower often tinged purple on the underside. It is associated with thin, infertile soils on a variety of base-rich substrates, with habitats including limestone pavement, open *Sesleria* grassland, *Dryas octopetala* heath, and fixed dune grasslands. *E. atrorubens* is confined to limestone regions of northern England and Wales, north and west Scotland, and western Ireland. It is a Nationally Scarce species, assessed as of Least Concern in Great Britain.



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#### IDENTIFICATION

*Epipactis atrorubens* is a shortly rhizomatous orchid with distinctive wine-red flowers and two-ranked leaves, mostly twice as long as wide, the lower ones suffused with purple on the underside.

#### SIMILAR SPECIES

*Epipactis atrorubens* is unlikely to be confused with any other species, the two-ranked leaves and dark-red flowers being characteristic. Some plants may approach *E. helleborine* in leaf arrangement and flower colour, possibly due to introgression between the two species in the past (Foley & Clarke 2005).



The habitat of *Epipactis atrorubens* on Cronkley Fell, north-west Yorkshire. Plants grow in open *Sesleria* grassland adjacent to bare patches of sugar limestone. © Kevin Walker.

#### HABITATS

*Epipactis atrorubens* is confined to limestone habitats ranging from exposed scree to well-wooded limestone pavement with moderate shade, but its preferred habitats are shallow grikes, filled with small, broken scree (Wilson 1994; Foley & Clarke 2005).

In northern England it is found in open NVC CG9 *Sesleria albicans-Galium sternerii* grassland on shallow rendzina soils amongst eroded patches of sugar limestone (Pigott 1978), and on magnesian limestones at lower altitudes in CG8 *Sesleria albicans-Scabiosa columbaria* grassland (Graham 1998; Abbott 2005). In North Wales and Scotland it also occurs on narrow cliff ledges amongst CG13 *Dryas octopetala-Carex flacca* heath and in SD8 *Festuca rubra-Galium verum* fixed dune grassland where the limestones have been covered by wind-blown sands (JNCC 2004).

#### BIOGEOGRAPHY

*Epipactis atrorubens* is a Boreo-temperate species with a Eurasian distribution, occurring throughout much of mainland Europe from Spain eastwards to central Asia, and from Greece northwards to Arctic Scandinavia. It occurs as an established introduction in a few states in North America.

In Britain it is confined to limestone regions of North Wales, northern England (Cumbria, Derbyshire, Durham, Yorkshire) and North and West Scotland with a few outlying populations in Perthshire. In Ireland it is confined to Clare and Galway. Most English and Welsh populations occur below 270 m, but it ascends to 400 m in eastern Cumbria and 530 m on Cronkley Fell. In Scotland it occurs from sea-level to 610 m in Glen Beg.

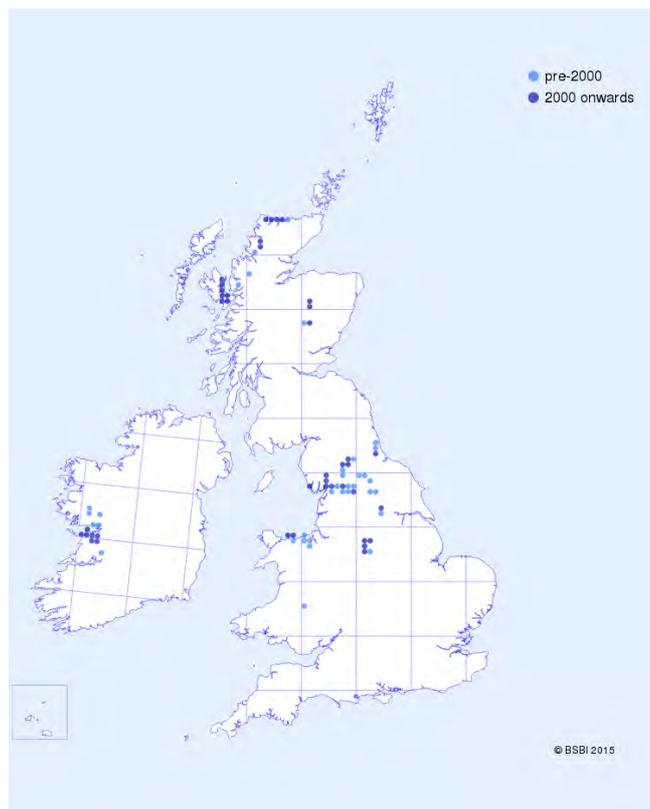
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### ECOLOGY

*Epipactis atrorubens* is a rhizomatous perennial, 20-80 cm tall, flowering between June and July and reproducing primarily by seed. New shoots produced from the tips of the rhizome are thought to be rare. Most populations are small and have a high proportion of non-flowering individuals although flowering can be prolific in some years.

*E. atrorubens* has an out-crossing type of floral morphology (Hollingsworth *et al.* 2006): experiments have shown that although it is self-compatible (autogamy), spontaneous selfing is rare because the position of the pollinia in relation to the well-developed rostellum, which serves as a barrier between the male and female parts of the flower, limits self-pollination (Talaaj & Brzosko 2008). However, *E. atrorubens* shows a lower level of heterozygosity than other allogamous species, possibly due to higher levels of geitonogamy/autogamy or lower pollinator availability than in the other species (Hollingsworth *et al.* 2006; Talaaj & Brzosko 2008).

The flowers emit a strong vanilla scent in warm weather and are pollinated by wasps, bees and hoverflies. The viscidium is exuded from the tip of the rostellum (Richards 1982) and this serves as a glue to bind the pollinia to visiting insects (Hollingsworth *et al.* 2006). The fruit is a capsule out of which the dust-like seeds are spread by the wind. The phenology of the leaves and buds is unknown.



Distribution of *Epipactis atrorubens* in Great Britain and Ireland.

### THREATS

The main threats to *E. atrorubens* are damage caused by grazing animals (mainly defoliation by deer, sheep and rabbits), thereby reducing reproductive capacity. The quarrying of limestone is an additional threat in some areas (e.g. Craven region of Yorkshire).

### MANAGEMENT

Where plants occur in open grassland, livestock grazing ensures that open conditions are maintained, with plants allowed to flower and set seed in the summer months. However, due to the damage occasionally caused to plants by grazing rabbits, plants are sometimes protected by wire cages during the flowering season.

### REFERENCES

- Abbott, P.P. 2005. *Plant Atlas of Mid-west Yorkshire*. Privately published.
- Foley, M.J.Y. & Clarke, S. 2005. *Orchids of the British Isles*. Griffin Press, Cheltenham.
- Graham, G.G. 1998. *The Flora and Vegetation of County Durham*. Durham County Conservation Trust.
- Hollingsworth, P.M., Squirrell, J., Hollingsworth, M.L., Richards, A.J. & Bateman, R.M. 2006. Taxonomic complexity, conservation and recurrent origins of self-pollination in *Epipactis* (Orchidaceae). In: J. Bailey & R.G. Ellis (eds), *Current Taxonomic Research on the British and European Flora*, pp.27-44. Botanical Society of the British Isles (BSBI), London
- JNCC 2004. *Common Standards Monitoring Guidance for Vascular Plant Species: Version February 2004*. Joint Nature Conservation Committee, Peterborough.
- Pigott, C.D. 1978. Soils and vegetation. In: A.R. Clapham (ed.), *Upper Teesdale: The Area and its Natural History*, pp. 129-140. Collins, London.
- Richards, A.J. 1982. The influence of minor structural changes in the flower on breeding systems and speciation in *Epipactis* Zinn. (Orchidaceae), in J.A. Armstrong, J.M. Powell & A.J. Richards (eds), *Pollination and Evolution*, pp.47-53. Royal Botanic Gardens, Sydney.
- Talaaj, E. & Brzosko, E. 2008. Selfing potential in *Epipactis palustris*, *E. helleborine* and *E. atrorubens* (Orchidaceae). *Plant Systematics and Evolution* 276, 21-29.
- Wilson, R. 1994. *Epipactis atrorubens* (Hoffm.) Besser. In: A. Stewart, D.A. Pearman & C.D. Preston (eds), *Scarce Plants in Britain*, p.150. Joint Nature Conservation Committee, Peterborough.

### AUTHOR VERSION

Kevin Walker. Version 1: 12 December 2015.

## *Epipactis atrorubens* (Hoffm.) Besser

### SUGGESTED CITATION

Walker, K.J. 2015. *Epipactis atrorubens* (Hoffm.) Besser. Dark-red Hellebroine. Species Account. Botanical Society of Britain and Ireland