

Pseudorchis albida (L.) Á. and D.
Löve

Small White Orchid

As the common name suggests, *Pseudorchis albida* is a diminutive orchid with tiny, creamy-white, scented flowers that attract a variety of day-flying insects. It is able to tolerate a wide range of ecological conditions, having a pH range of between 4 and 7, but is most often found in low fertility mesotrophic grasslands and acid heathlands, and more rarely in base-rich mires, limestone heath, and cliff ledges. It is most widespread in the north and west of Scotland but has experienced substantial declines across its range, particularly in Ireland, England and Wales. *Pseudorchis albida* is assessed as Vulnerable in GB and Critically Endangered in Wales.



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IDENTIFICATION

Pseudorchis albida is a diminutive orchid with a dense spike of very small, creamy-white flowers (2-4 mm across) with a deeply three-lobed lip. Its leaves have translucent longitudinal streaks, are glossy green above, silvery below, and have a hooded tip (Poland & Clements, 2009). Throughout its range *P. albida* is probably overlooked due to its small stature, short flowering period, erratic appearance and tendency to form small populations (Duffey *et al.*, 2008).

SIMILAR SPECIES

Coeloglossum viride, *Goodyera repens*, *Spiranthes romanzoffiana* and *Neotinea maculata* occur in similar habitats to *P. albida* but are easily separated from it by the colour, shape and arrangement of the flowers (Harrap & Harrap, 2005). The leaves of *S. romanzoffiana* differ in



Pseudorchis albida habitat at Stainmore, Cumbria. ©Jeremy Roberts

having stomata above (only on the underside of the leaf in *P. albida*), *G. repens* by the presence of petioles and *C. viride* by the absence of longitudinal streaking (Poland & Clements, 2009). In Britain, hybrids with *Gymnadenia borealis* have been widely reported from Scotland and northern England and with *Dactylorhiza maculata* in Skye and Orkney. Reported hybrids with *Platanthera chlorantha* are now thought to be aberrant forms of the latter.

HABITATS

In Britain and Ireland *P. albida* is largely restricted to nutrient-poor grasslands and heathlands on acidic peaty to mesotrophic soils with a pH ranging from 4 to 7 (Jersáková *et al.*, 2011). It is also more rarely found in base-rich mires, limestone heath, Juniper scrub, scree, and montane rock ledges.

Although many sites are on limestone, often on slopes with some surface flushing, it usually occurs where there has been significant leaching of the base-rich components (Cotton *et al.*, 1994; Foley & Clarke, 2005; Forbes & Northridge, 2012). Similarly it appears indifferent to soil moisture, with some Scandinavian populations occurring on acid bogs and wet heaths (Reinhammer *et al.*, 2002), although it is absent from these habitats in the British Isles. *Pseudorchis albida* frequently occurs in transitional communities, and consequently has a wide range of associates, often making it difficult to separate and classify the communities in which it occurs (Reinhammer *et al.*, 2002). In the British Isles it appears to be most frequently associated with *Calluna vulgaris*-*Erica cinerea* heathland (H10) and the *Anthoxanthum odoratum* sub-community of *Molinia*

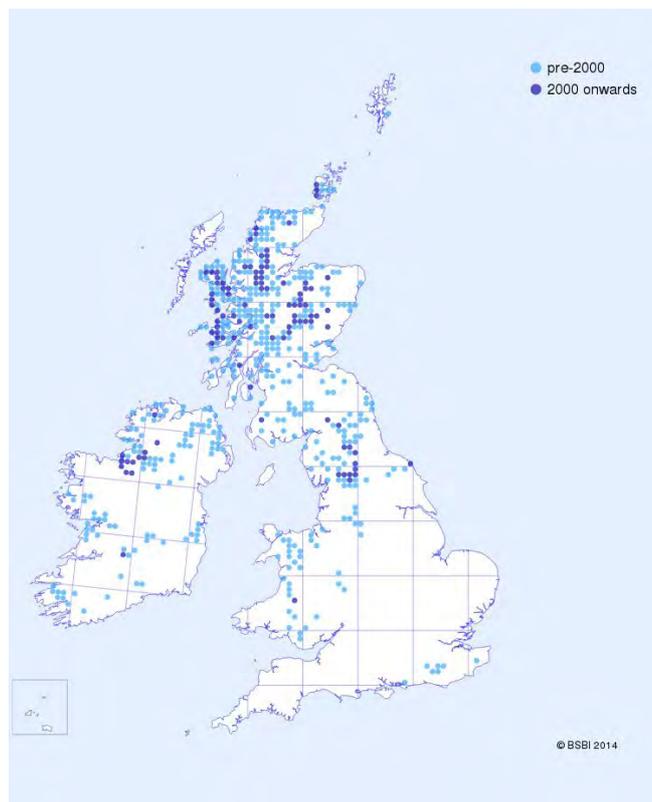
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cearulea-*Potentilla erecta* mire (M25b).

BIOGEOGRAPHY

Pseudorchis albida has a wide boreal-montane distribution in the northern Hemisphere, extending from north-west Siberia, across Scandinavia to Iceland, Greenland and Newfoundland extending southwards to the Pyrenees, Apennines, Balkans and Carpathians. In Britain *P. albida* has a mainly submontane distribution, ranging from close to sea-level on the west coast of Scotland to 600 m on rock ledges in Argyll. It occurs at much higher altitudes in Scandinavia (1100 m, Central Sweden) and Continental Europe (2700 m, Apennines; Jersáková *et al.*, 2011).

In the British Isles it is commonest in northern and western Scotland, including the Inner Hebrides and Orkney, but is now absent from much of the Central and Southern Uplands. In England it only survives in Cumbria, Durham, Northumberland and Yorkshire (north-west, mid-west & north-east), having been last recorded in the Midlands and southeast England in 1939 (Derbyshire) and 1943 (East Sussex) respectively (Hall, 1980). In Wales there are now less than 50 individuals in a handful of sites (Dines, 2008). It has undergone a similar decline in Ireland and now only occurs in very small numbers in about half of the counties (c. 16) where it has been recorded in the past (Duffey *et al.*, 2008). However, increased recording in Ireland in recent years has revealed new populations, suggesting that it is under-recorded in some areas (e.g. Forbes & Northridge, 2012).



Distribution of *Pseudorchis albida* in Great Britain and Ireland.

ECOLOGY

Pseudorchis albida is a tuberous perennial geophyte with limited capacity to spread vegetatively. The root tuber is replaced entirely each year; this then gives rise to the flowering plant in the following year (Jersáková *et al.*, 2011). However, some tubers may remain dormant and fail to produce flowering stems for one or two years. This transition to dormancy is triggered by the cost of flowering/fruitletting, as plants with aborted flowering stems are more likely to flower in the following year (Jersáková *et al.*, 2011).

In Britain and Ireland the flowering period is short, usually for just a few weeks between mid-May and mid-July; alpine populations flower later from mid-June to August. The flowers fade extremely quickly from the base of the spike upwards, making detection difficult even where populations are large. The flowers are very small (c. 2.5 mm in diameter) and range from greenish to yellowish white in colour. They produce nectar and have a pleasant scent, attracting a variety of day-flying insects, including both micro- and macro-moths, butterflies and solitary bees, which readily remove the pollinia and effect cross-pollination.

The breeding system is poorly understood but is thought to be almost entirely sexual with pollinator-mediated geitonogamous self-pollination playing an important role (Jersáková *et al.*, 2011). Unvisited flowers are probably self-fertilised by the pollinias falling onto the stigmas. The majority of fruits appear to produce abundant seed (c. 700 per capsule) and capsules are usually fully ripe by the end of July, with the seeds disseminated gradually from the partially opened capsules from August onwards. The seeds are wind-dispersed but the majority fall within 50m of the mother plant (Jersáková & Malinová, 2007). Most seeds germinate without a mycorrhizal fungus association but this is required for further growth. The precise associate is unknown but is likely to belong to the polyphyletic basidiomycete group, collectively called 'rhizoctonia', which are typically found in photosynthetic orchids of open habitats (Jersáková *et al.*, 2011).

The period from seed germination to appearance above-ground lasts about four years; plants then need to produce four to five leaves before they will flower (plants with six leaves always flower). *Pseudorchis albida* appears well adapted to disturbance that creates open patches for seedling establishment, such as areas cleared for skiing in the Alps or, in the case of one site in Yorkshire, the edges of shallow 'grips' created to increase drainage of pasture.

British populations belong to subsp. *albida* which occurs across Scandinavia and in the mountains of south and central Europe. Subsp. *straminea* appears to be confined to Iceland, Faeroes, Greenland, Scandinavia and Canada and subsp. *tricuspis* to alpine regions of central Europe, although it is probably best treated as a variety (Jersáková *et al.*, 2011). The suggestion that subsp. *straminea* is a separate species (Reinhammer, 1998; Reinhammer & Hedrén, 1998) is not

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supported by phylogenetic analyses (Bateman *et al.*, 2003) although the two subspecies are segregated ecologically (Reinhammer, Olsson & Sormeland, 2002)

THREATS

Throughout its British and European range *P. albida* is threatened by agricultural improvement, agricultural abandonment and afforestation (Reinhammer *et al.*, 2002; Foley & Clarke, 2005; Forbes & Northridge, 2012). The cessation of traditional grazing and mowing is probably the greatest threat due to overgrowth by more competitive species (Reinhammer *et al.*, 2002; Holland *et al.*, 2008), whereas over-grazing by sheep, deer and cattle has also been reported to reduce seed set and recruitment (Duffey *et al.*, 2008; Jersáková *et al.*, 2011). In Europe, wild boar and rodents have been also known to damage tubers (Jersáková *et al.*, 2011).

MANAGEMENT

The optimum management appears to be light grazing or mowing after flowering (Reinhammer *et al.*, 2002) as in both Scotland and Scandinavia the removal of grazing has led to a rapid decline in numbers (Reinhammer *et al.*, 2002; Holland *et al.*, 2008). In Ireland the best populations are in areas that are lightly grazed by cattle, and not areas over-grazed by sheep, and in rocky pastures not amenable to improvement (Cotton *et al.*, 1994).

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