

Dryas octopetala L.

Mountain Avens

Dryas octopetala is a long-lived dwarf-shrub. It has large white flowers with 8(-10) petals and leaves with a distinctive crenate margin. These are dark-glossy-green above but have a dense covering of white hairs on the underside. It is associated with open, base-rich calcareous heath and limestone grassland habitats on thin infertile soils, and also with rock-ledge communities on limestone and mica-schist. It is locally abundant in parts of Scotland and western Ireland but is rare in England and Wales. It is assessed as of Least Concern in Great Britain, but as Vulnerable in England and Endangered in Wales.



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IDENTIFICATION

Dryas octopetala is a prostrate dwarf shrub with large white flowers that have 8(-10) petals and numerous yellow carpels. The fruit has a distinctive long, persistent and feathery style. The leaves are dark glossy green above with a crenate margin and are densely white-tomentose on the underside.

SIMILAR SPECIES

Dryas octopetala is unmistakable in all stages of growth and is unlikely to be confused with any other British or Irish species. There is, however, considerable variation in leaf size and hairiness between British populations, some of which appear to be genetically controlled (Elkington 1971; Bradshaw & Doody 1978). Plants in Teesdale have small leaves that most closely resemble plants in exposed locations in the Arctic (Pigott 1956) but they have not been recognized as a separate



Fruiting *Dryas octopetala* on sugar limestone at Cronkley Fell, north west Yorkshire. ©Pete Stroh, 2013.

variety or subspecies by British botanists (e.g. Stace 2010).

HABITATS

In the British Isles *D. octopetala* is a very localised plant of open base-rich habitats, mainly in the uplands, but also at sea-level in north and west Scotland and Ireland (Elkington 1971). It grows on substrates derived from basic rocks (limestones, basalts, mica-schists), usually where the soil is not too deep and drainage is very good.

In Britain '*Dryas*-heath', represented by NVC CG13 *Dryas octopetala* – *Carex flacca* heath occurs on limestone and calcareous shell-sand at low to moderate altitudes in Scotland. It also forms a major component of CG14 *Dryas-Silene acaulis* rock ledge community found on mica-schists on mountains in Scotland and very locally amongst open CG9d *Selseria albicans* – *Galium sternerii* grassland on Cronkley Fell in Teesdale and Wharfedale in the Yorkshire Dales.

BIOGEOGRAPHY

Dryas octopetala has a circumpolar distribution in Arctic, sub-Arctic and Alpine regions of Asia, North America and Europe as far south as central Italy.

In the British Isles it is locally abundant in parts of Scotland and Western Ireland but very rare in England and Wales. In England it has been recorded from about nine sites, including one in Derbyshire where it is likely to have been introduced in the early nineteenth century (Clapham 1969). Of the five surviving populations the most extensive are in Wharfedale, where 1000s of patches occur in a single valley, and on Cronkley Fell, Teesdale, where it is abundant on a single outcrop of sugar limestone. In the Lake District two small

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patches survive at two sites where they have been known for many years (Ratcliffe 1960).

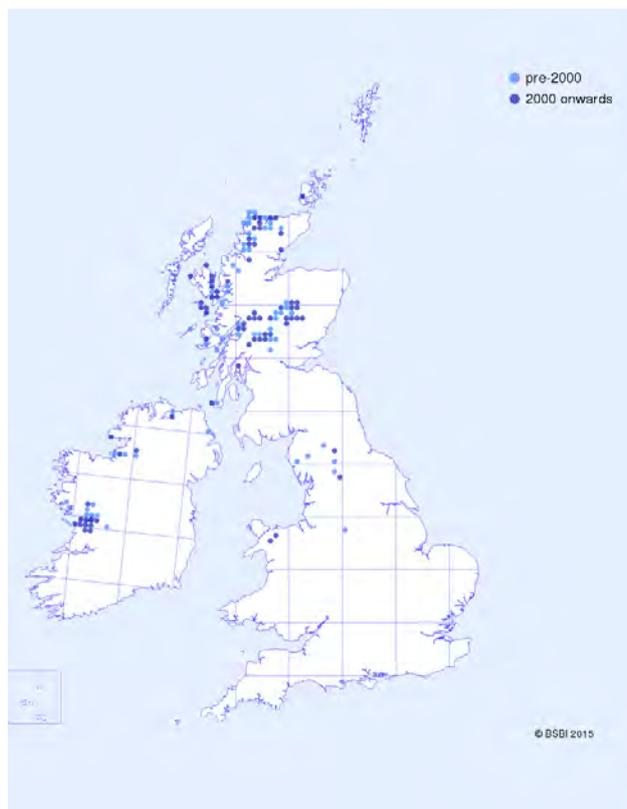
In Snowdonia less than 200 plants are currently known from two separate localities (Dines 2008). *D. octopetala* is found from sea level in the extreme north west of Scotland, as at Durness, to about 1035 metres on Ben Avon. In Ireland, core populations are found on the limestones of County Clare, most notably on the Burren.

ECOLOGY

Dryas octopetala is a clonal mat-forming dwarf-shrub that commonly lives for more than 100 years, although some large genets have recently been aged (genetically using AFLP markers) at over 500 years (de Witte et al. 2012).

At high altitudes and latitudes horizontal growth rates are very small irrespective of growing season (5-6 mm per year; de Witte et al. 2012; but see Elkington 1971 who gives between 13-39 mm for low altitude populations in England), thereby enabling individuals to persist in environments where sexual proliferation is often unsuccessful and/or in regions where the climate may be warming (de Witte & Stöcklin 2011).

D. octopetala has a stout woody root-stock that penetrates rock crevices, with finely divided lateral roots terminated by coralloid root systems that are heavily infected by a high diversity of ectomycorrhizal fungi regardless of latitude or altitude (Bjorbaekmo et al. 2011). Vegetative growth occurs primarily by the sympodial extension and branching of individual prostrate ramets, with each ramet having between



Distribution of *Dryas octopetala* in Great Britain and Ireland.

two and five leaves (de Witte & Stöcklin 2011). The leaves are retained over the winter in either a living or dead state.

Flowering usually commences when plants are three years old. The flower primordia are produced in the season before flowering which takes place in late April and May in the lowlands and June-July in the uplands. *D. octopetala* is a diploid ($2n = 18$), mainly outcrossing insect-pollinated species with hermaphrodite, usually homogamous flowers (McGraw & Antonovics 1983). Selfing can occur but results in much lower seed production than in plants that are cross-pollinated.

Flowers produce nectar and are mainly pollinated by flies. The fruit is an achene with a long, persistent and feathery style that aids dispersal by wind (and adhesion), especially in exposed sites (McGraw & Antonovics 1983). In more closed habitats, however, such as snow-beds, dispersal is likely to be more limited with achenes retained on the capsule and/or falling very close to the parent plant (McGraw & Antonovics 1983).

Germination occurs in the spring but low germination rates have been reported under field conditions (e.g. Müller *et al.* 2011). This indicates that seedling establishment does not occur readily despite the fact that *D. octopetala* is a colonising species of unvegetated areas in semi-desert Arctic environments (Wookey et al. 1995).

THREATS

In most regions the major threat to *D. octopetala* appears to be overgrazing, particularly by rabbits which are prolific at several sites. The experimental exclusion of sheep and rabbits on Cronkley Fell, Teesdale, dramatically improved growth and flowering performance (Elkington 1981) and suggests that recent reductions in stocking densities in the uplands may improve conditions for the species in the longer term. Small populations in England are also vulnerable to rock-falls, lack of recruitment, presumably due to low seed production, and a lack of suitable niches (Jeremy Roberts pers. comm.).

MANAGEMENT

Although *D. octopetala* can survive for many years under heaving grazing pressure, such plants are smaller, more prostrate and seldom flower. This was shown on Cronkley Fell when an enclosure erected to exclude sheep and rabbits led to a dramatic increase in flowering and seed production (Elkington 1981). This has led to the suggestion that *Dryas*-heath was probably much more widespread before the introduction of sheep grazing across much of the uplands (McVean & Ratcliffe 1962).

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