**Dwarf birch**

*Betula nana*

Dwarf birch is an important component of the montane shrub community in the Highlands, forming part of the mountain tree line where woodland gives way to open moorland. This tree-line contains a unique assemblage of species and should be a miniature, waist-high species-rich woodland. However, due to overgrazing, deforestation and burning it now exists only in scattered fragments in Scotland.

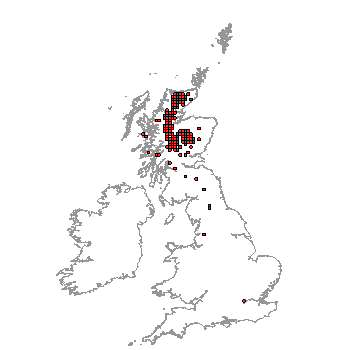
Description

Dwarf birch is a small shrub, growing up to one metre in height, although in Scotland heavy grazing means it rarely reaches more than 30 cm. Its branches are a dull dark brown colour, covered in a fine down and are quite stiff. The leaves are small, round in shape and have a few large, rounded and regularly-spaced teeth on their margins. They have dark green upper surfaces, while the undersides are a slightly lighter shade. The male flowers are catkins up to 0.8 cm long, which are erect when young, but then droop as they mature. The female flowers are slightly larger and broader, becoming cone-like in appearance as they mature.

Distribution

Dwarf birch grows in areas with wet and cold climates and is circumpolar in distribution. Two distinct subspecies are recognised: *Betula nana ssp. nana*, which grows in western coastal Greenland, Iceland, Scotland, Scandinavia, the Alps and across northern Asia to western Siberia; and *Betula nana ssp. exilis*, which is found in Siberia, Alaska, northern Canada and Greenland.  In Scotland, Dwarf birch is restricted to the Highlands, and occurs from Perthshire, northwards through the Cairngorms and the hills of Inverness- and Ross-shire to the Flow Country of Caithness and Sutherland. Further south in Britain, there are two outlying populations, one in the North Pennines and one at Kielder in Northumberland.

In Scotland Dwarf birch grows exclusively on blanket peat, where the soil conditions are typically wet, acidic and lacking in nutrients. Elsewhere in its range, however, it also occurs in more rocky sub-arctic and alpine locations, growing on steeper slopes and where the soils are better drained.



Distribution of *Betula nana* in the UK. (From NBN Gateway, accessed 13/09/13)

Ecology

Dwarf birch is deciduous. The new leaves appear in April or early May, and turn a dull yellow colour before being shed in October. Dwarf birch is monoecious, so each individual plant has both male and female flowers. Flowers are wind pollinated. Tiny seeds with a small crescent-shaped wing on each side of them ripen by September or October and are dispersed by the wind.

Germination occurs the following spring (about mid-May in Scotland), triggered by rising temperatures and increasing daylight. The initial growth rate is very slow and seedlings reach a maximum height of three centimetres in their first year, with four to six true leaves. Dwarf birch can also reproduce vegetatively, with new shoots growing from underground root sections, or via adventitious roots which grow off stems that have been overgrown by moss.

There are a few species of insect that are associated with Dwarf birch in Scotland: the larvae of the moths *Swammerdamia passerella* and *Stigmella nanivora* and three sawfly larva, one of which (*Nematus pravus*) had never been recorded in the UK until it was found at Dundreggan in 2011. Other insects which feed on Dwarf birch, but not exclusively, include the larvae of a Moorland moth (*Argyrotaenia pulchellana*) and the Northern winter moth (*Operophtera fagata*).

Threats

Formerly much more abundant in Scotland, Dwarf birch has declined because of deforestation, overgrazing and burning of heather moorland. Grazing, in particular by sheep and Red deer, continues to be its main threat.

# Management

Dwarf birch is part of the montane scrub community; a habitat that is an integral part of the overall upland forest ecosystem and as such must be fully incorporated into any ecological restoration project of native forests in the uplands

* Areas of Dwarf birch should be fenced off to protect from grazing, until the montane scrub community has become established. This has proved very successful at Dundreggan Estate, where Dwarf birch is now flourishing following fencing off in 2002.
* Dwarf birch grown in specialist tree nurseries can be planted to expand dwarf birch habitat.
* Further survey work is required to discover the extent of Dwarf birch, which is often overlooked due to its diminutive size. Changes in grazing intensity will probably reveal new populations.

Current work

* **Trees for Life[[1]](#footnote-1)**

As part of its Million More Trees campaign, Trees for Life has launched an appeal to restore the ‘wee trees’, which includes Dwarf birch. It is hoped such restoration work in the Caledonian Forest, will create a woodland link between Glen Affric and Glen Moriston, providing an expanded habitat for many species. In 2002, the charity fenced an area of dwarf birch to protect it from grazing by deer, and dwarf birches now grow healthily above the surrounding vegetation.

* **Mountain Woodland Restoration Project 2011-2016[[2]](#footnote-2)**

Working with a range of people, from schools and community groups to land managers, this project is focusing on raising awareness of the missing tree line across our Scottish hills. **It involves a landscape scale planting project, which aims to grow and plant 500,000 mountain woodland trees through partnership working with land managers and nurseries.**

* **Montane Scrub Action Group (MSAG)**

This group started in 1996 with the principal objective of developing and promoting the vision for the restoration of montane scrub in Scotland. The group is formed from a number of organisations including Scottish Natural Heritage, Forestry Commission Scotland, Scottish Agricultural College, the Macaulay Institute and the Centre for Ecology and Hydrology, the National Trust for Scotland, Highland Birchwoods, the Caledonian Partnership and the Borders Forest Trust as well as recreation groups such as the Mountaineering Council of Scotland.

Wider context

Dwarf birch is a component of montane scrub forest in Scotland, a fragmented and poorly managed habitat that forms at the tree line where woodland gives way to open upland moors. The mosaic of scrub not only includes Dwarf Birch, but rare willows, Rowan and Juniper. Many other plant and invertebrate species are also part of this community and it provides important cover for small mammals and breeding birds such as black grouse, ptarmigan and golden plover. Restoration and expansion of montane scrub could have wide ranging ecological benefits enhancing the biodiversity of adjacent forest habitat networks.

Quick facts

* The most westerly record of Dwarf birch in Scotland is at Loch Nell in Argyll but this has not been relocated in recent years.
* There are no records of Dwarf birch in the Scottish Lowlands.
* Dwarf birch is also known as 'the bog birch'.
* Outside the UK, Dwarf birch commonly forms thickets and extensive stands.
* The leaves can be used to make a yellow dye and Dwarf birch was once particularly sought after as it produces the brightest yellow of any of the birches
* Dwarf birch are relatively short lived trees, which are quick to colonise open areas
* After the last Ice Age, Dwarf birch was amongst the first species to colonise the UK.

**Key reference:** Watson Featherstone, A. (2000) Dwarf Birch (*Betula nana*) Caledonian Forest species profile. Trees for Life.

www.treesforlife.org.uk/tfl.dwarf\_birch.html [Accessed 30.08.13]

Selected References

**de Groot WJ, A. TP, Wein RW.  (1997).**[**Biological Flora of the British Isles. No. 194. *Betula nana* L. and *B. glandulosa Michx***](http://www.brc.ac.uk/plantatlas/index.php?q=content/biological-flora-british-isles-no-194-betula-nana-l-and-b-glandulosa-michx)**. Journal of Ecology. 85:241-264.**

**Stewart A, Pearman DA, Preston CD.  (1994).**[**Scarce plants in Britain**](http://www.brc.ac.uk/plantatlas/index.php?q=content/scarce-plants-britain)**.**

**MacKenzie, N.A. (2000). Low Alpine, Subalpine and Coastal Scrub Communities in Scotland, Highland Birchwoods, Munlochy**

[**Wang N**](http://www.ncbi.nlm.nih.gov/pubmed?term=Wang%20N%5BAuthor%5D&cauthor=true&cauthor_uid=23167599)**,** [**Thomson M**](http://www.ncbi.nlm.nih.gov/pubmed?term=Thomson%20M%5BAuthor%5D&cauthor=true&cauthor_uid=23167599)**,** [**Bodles WJ**](http://www.ncbi.nlm.nih.gov/pubmed?term=Bodles%20WJ%5BAuthor%5D&cauthor=true&cauthor_uid=23167599)**,** [**Crawford RM**](http://www.ncbi.nlm.nih.gov/pubmed?term=Crawford%20RM%5BAuthor%5D&cauthor=true&cauthor_uid=23167599)**,** [**Hunt HV**](http://www.ncbi.nlm.nih.gov/pubmed?term=Hunt%20HV%5BAuthor%5D&cauthor=true&cauthor_uid=23167599)**,** [**Featherstone AW**](http://www.ncbi.nlm.nih.gov/pubmed?term=Featherstone%20AW%5BAuthor%5D&cauthor=true&cauthor_uid=23167599)**,** [**Pellicer J**](http://www.ncbi.nlm.nih.gov/pubmed?term=Pellicer%20J%5BAuthor%5D&cauthor=true&cauthor_uid=23167599)**,** [**Buggs RJ**](http://www.ncbi.nlm.nih.gov/pubmed?term=Buggs%20RJ%5BAuthor%5D&cauthor=true&cauthor_uid=23167599)**. (2013). Genome sequence of dwarf birch (*Betula nana*) and cross-species RAD markers. *Molecular Ecology* 22(11):3098-111.**

This paper is full of molecular biology, but sequencing the genome (identifying the complete DNA sequence of an organism) lays the foundations for genetic research into the birch genus, and could be of use to studies on the conservation of dwarf birch. A better understanding of tree genomes is essential for our long-term ability to conserve and grow tree species in the UK.

**Wood, C. (2002). The Effect of Burning and Grazing on Dwarf Birch (*Betula nana*). Unpublished honours thesis, University of Stirling.**

The effects of burning and grazing on dwarf birch (*Betula nana*) were studied. This comprised the sampling of plots at a site in Glen Moriston, where four different treatment types had been utilised to encourage regeneration of dwarf birch. The four different treatment areas were: burned and grazed; burned and ungrazed; not burned and grazed; and not burned and ungrazed.

It was found that the most productive site, according to the physiognomic measurements taken, was the burnt and ungrazed site.

The exclosures were successful in allowing better regeneration within them, and also in promoting vertical height of the dwarf birch, rather than horizontal spread.

**Ashmole, P. (2006). The lost mountain woodland of Scotland and its restoration. *Scottish Forestry*, 60 (1): 9-22**

**Aston. D. (1984). *Betula nana* L., a note on its status in the United Kingdom. *Proceedings of the Royal Society of Edinburgh* 85B: 43-47.**

1. www.treesforlife.org.uk/tfl.dwarf\_birch.html [↑](#footnote-ref-1)
2. www.mountainwoodlands.org [↑](#footnote-ref-2)