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Scotland's finest flora

Becky Cross

Fig. 1 The Trossachs, Scotland

Since moving to Edinburgh recently, I have discovered an array of plants endemic, and important, to Scotland. The Royal Botanic Garden Edinburgh (RBGE), part of the Scottish Plant Conservation Programme, has a nursery in which a section is devoted to native plants of Scotland. This is the Target 8 Project, part of the Global Strategy for Plant Conservation (GSPC). The nursery has been successful in propagating many of Scotland's threatened plants, helping to conserve native flora and sustain Scotland's unique landscape. Plants are not part of the environment; they are the environment.

Learning about this tremendous conservation project has heightened my interest in native plants, and my eagerness to explore Scotland's flora. A few of my favourites are included below.

Scots pine – *Pinus sylvestris*

The Scots pine (figs 2 & 3) is the national tree of Scotland, and the only pine native to

northern Europe. It has a lifespan of up to 300 years, with the oldest recorded specimens found in Norway and Sweden. It formed the basic framework of the highly biodiverse Caledonian forests, once covering much of the Scottish Highlands, supporting thousands of species of flora and fauna. Cutting for timber, overgrazing, and even deliberate clearance to deter wolves all contributed to the decline of these forests, and it is estimated that only one percent of this ancient habitat remains today¹. Surviving remnants of old-growth Scots pine forest in

Scotland include Abernethy Forest and Glen Affric, which still provide habitats for some of Scotland's rarest



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Fig. 2 *Pinus sylvestris*, Spittal of Glenmuick, Cairngorms National Park



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Fig. 3 *Pinus sylvestris* treeline, Cairngorms National Park

¹Scottish Natural Heritage, 2019



Fig. 4 *Juniperus communis*, Litlandstabben, Moskenesøya, Lofoten, Norway

wildlife, such as the black grouse and Scottish wildcat.

It is hard to mistake a mature *P. sylvestris* for any other tree, due to its distinctive appearance: a long, bare, straight trunk, topped with a mass of foliage, its canopy often wind-pruned. I will never forget the first time I saw a red squirrel scurrying up the orange, flaky bark

of a Scots pine, with rays of the setting sun making the creature and plant almost indistinguishable. For me this tree, set in the wilderness of open skies and mountain peaks, represents one thing: freedom.

Juniper – *Juniperus communis*

The many uses of juniper throughout history have contributed to it being one of

the most widely distributed woody plants in the world, extending across Northern America, Europe and Asia (fig. 4). Balnaguard Glen Wildlife Reserve, just above the River Tay, has one of the best examples of wild juniper in Tayside, and is worth a visit.

Unfortunately, in Scotland numbers have been decreasing for the last few decades, adversely affecting biodiversity. Juniper provides dense cover for nesting birds such as the goldcrest, firecrest and black grouse, and is a food plant for caterpillars of many species of moth. Waterlogging has contributed to the spread of the pathogen *Phytophthora austrocedrae*, which has been found in Scotland since 2012. It primarily attacks juniper roots, and forms lesions that lead to dieback and eventual death.

Juniper is closely associated with gin; its berries are used to flavour this famous spirit, though strictly speaking the berries are actually tiny, fleshy cones (fig. 5). In the 19th century, Highland juniper bushes were prolific enough for their berries to be collected by the bagful and taken to the Inverness and Aberdeen markets, to be exported to Dutch gin distillers.

The herbalist Nicholas Culpeper recommended juniper for a wide variety of conditions including the treatment of flatulence, for which juniper oil is still used today. Chemicals in the



Fig. 5 *Juniperus communis*, Lammermuir Hills, East Lothian

cones were used to abort an unwanted pregnancy, and the phrase used in Lothian in the Middle Ages, of giving birth 'under the savin (aka juniper) tree' was a euphemism for juniper-induced miscarriage.

Juniper wood was not burnt for its heat, but rather for its smoke; although it gives off minimal visible smoke, it is highly aromatic, and in ancient times was used for the ritual purification of temples. The smoke was said to aid clairvoyance, and was burned for purification and to stimulate contact with the Otherworld at the autumn Samhain fire festival at the beginning of the Celtic year. Juniper was also burned during outbreaks of the plague, and in Scotland the house and occupants would be fumigated with juniper smoke; afterwards the house was aired and the occupants revived with whisky.

The use of juniper cones and wood come together cohesively in the tales of illicit Highland whisky stills hidden away in the glens, which used juniper wood for fuel so that the near-absence of smoke would not attract the suspicions of the local excise man.

The rowans of Arran – sorbus species.

After the island of Arran emerged from the last ice age, something special happened between

two species of tree that re-colonised the area: the rowan (*Sorbus aucuparia*) hybridised with the rock whitebeam (*Sorbus rupicola*), and they produced a new species, intermediate between the two, found only on the island. This is known as the Arran whitebeam, *Sorbus arranensis*: a small, slender, broadleaf tree, rarely growing above 2m tall, because of the harsh weather conditions and overgrazing. These stunted, often multi-stemmed specimens produce neither flowers nor fruit. They remain genetically uniform because seedlings are clones of the parent plant, produced from asexual seeds (technically known as agamospermy), that have no genetic contribution from the pollen (the male parent). However, this also makes them vulnerable to changes in the environment, hence conservation is vital to ensure their survival.

The Arran whitebeam is found in several glens in the north of the island, on steep-sided riverbanks and cliffs, where it is beyond the reach of grazing sheep and deer. Some enclosures have been built around larger populations to provide extra protection. While this protects the trees from voracious herbivores, it also creates excessively dense vegetation, in which seedlings struggle to survive. Striking the right balance in grazing certain habitats is a conservation challenge, and requires human intervention.



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Fig. 6 *Sorbus pseudofennica*

The Arran whitebeam went on to hybridise again, with the common rowan. The result of this union is the Arran service-tree (*Sorbus pseudofennica*, fig. 6). There has been no further hybridisation with the rock whitebeam, as this no longer occurs in the north of Arran, but a third species was formed when a cross occurred between *S. aucuparia* and *S. pseudofennica*, resulting in the Catacol whitebeam (*S. pseudomeinichii*).

In 1949 the Catacol whitebeam was collected in Glen Catacol but misidentified as the Arran whitebeam; in the year 2000 a botanist at RBGE saw this pressed (herbarium) specimen and strongly felt it was a new hybrid between the Arran service-tree and the common rowan, because of its leaf form. In 2006 a specimen was found on Arran that matched the pressed one collected in 1949, and a molecular study at Edinburgh University proved it to be this hybrid.

These rare species have been planted by RBGE in a fenced area near the road at the foot of Glen Catacol. Arran's rowan hybrids are a unique aid in understanding evolutionary diversity in trees.

Lichen

The number of vascular species endemic to Scotland is relatively low, but lichens and bryophytes are abundant, with the latter forming a population of global significance. Neither plant nor fungus, lichens are a rare example of symbiosis between fungi and photosynthetic cells (often algae), or cyanobacteria.

Though they are found on every continent, lichens have a special place in Scottish culture. The country's distinctive and popular tweeds, celebrated in heraldry and the clan tartans, are reliant on this most diminutive organism.

Usually observed as tattoo-like growths on rocks and trees, lichens are the source of a distinctive array of hues, used as natural dyes. Most sought-after are species from the genera *Parmelia* (figs 7 & 8), *Ochrolechia* and *Evernia*; it is these that provide the famous earthy colours of tweed garments, whose popularity completely

transformed the economy of the Scottish islands. Originally the pigments were not well held by the wool, and it was necessary to fix them chemically – a process traditionally achieved by soaking the fabric in stale human urine. Initially undetectable by those drawn to this Highland fashion, the origin of the lichen fixative became clearer when the fabric got wet...

Scottish primrose – *Primula scotica*

This small plant (fig. 9) is one of the very few species found in Scotland and nowhere else in the world. It grows along the north coast of Scotland in Sutherland and Caithness, and in Orkney, rarely growing taller than 10cm. Because it is so small it cannot compete with taller vegetation, and therefore benefits from selective grazing of its habitat. The Scottish Wildlife Trust uses conservation grazing to encourage the survival of *P. scotica* on Orkney: livestock are released into the fields after the plants have had a chance to flower and seed. This is an example of the benefits well-planned grazing regimes can bring to conservation programmes.

P. scotica leaves grow in a basal rosette with a farinose underside (a flour-like waxy secretion that is thought to provide extra protection). The pinkish-purple flowers with a yellow eye appear in clusters on top of a farinose

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Fig. 7 *Parmelia saxatilis*

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Fig. 8 *Parmelia sulcata*

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Fig. 9 *Primula scotica*

stem, between May and August. Colonies vary in size from a few hundred plants to many thousands, but only a minority in each flower in any one year; so luck is needed to find this beguiling plant in flower. And part of the beauty of the Scottish primrose is that its flowers are tiny - you could easily fit one on your smallest fingernail.

**Heather/ling –
*Calluna vulgaris***

Heather, also known as ‘ling’, is the best-known native Scottish heather, found in abundance on heathland, moors, bogs and even woodland with acidic or peat soils. It turns the moors and Munros a dazzling pink-purple haze when in flower from July to October (fig. 10); in some areas the combination of heather and gorse (*Ulex europaeus*) creates a colourful yellow and mauve patchwork on the landscape. The flowers are an important food source for several species of butterfly; they are occasionally white, hence the saying ‘lucky white heather’. Historically, heather has been used as fuel, fodder, building material, packing, ropes, dye, tanning and even alcohol – archaeologists have found traces of an alcoholic drink made from heather on 3,000 year-old pottery shards.

The genus name *Calluna* is derived from the Greek verb *kalluno*, which means ‘to sweep’ - a reference to the tradition of using ling to

make brooms and brushes, which were standard household items many years ago, and are still portrayed as ‘witches’ brooms’ today. The most endearing value of heather is as a source of honey: during late summer, hives are transported to heather moorland, where the bees gather nectar from the flowers and produce a much-prized honey.

**Douglas fir –
*Pseudotsuga menziesii***

Although not an endemic plant itself, the roots of the person who introduced this species to the UK are very much Scottish (and Archibald Menzies, who first described it in 1793 on the west coast of North America, was also a Scotsman). David Douglas, a stonemason’s son from Perthshire, was responsible for introducing over 200 species of trees and shrubs to Great Britain, and his legacy lives on in parks and gardens across the country. The Douglas firs at Dawyck Botanic Garden, some of the first to be grown in Britain, originate from seed he collected on the North American Pacific coast around the year 1827. Many of Douglas’s original collections still grow in this garden, and are commemorated by an eponymous woodland trail, providing a beautiful insight to one of the world’s great plant explorers.

There is a whimsical story behind the shape of the



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Fig. 10 *Calluna vulgaris*

Douglas fir cone (fig. 11). The tale goes that a mouse running away from a wildfire was refused safe sanctuary first by a maple, then by a cedar, and was finally offered protection by a Douglas fir. As the flames engulfed the tree the mouse climbed into a cone, which then snapped shut in response to the heat and saved it from an unpleasant end. To this day you can see the rear legs and tail of the mouse sticking out of the cone.



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Fig. 11 *Pseudotsuga menziesii* cone



Fig. 12 *Cirsium vulgare*

Thistle – *national emblem of Scotland*

I couldn't write about Scotland's flora without mentioning the humble thistle; generally a non-native, but second only to tartan in Scottish symbolism. '*Nemo me impune lacessit*' is the Latin motto of the Order of the Thistle, translating as 'no one attacks me with impunity'!

It was adopted as the national emblem of Scotland during the reign of Alexander III (1249-1286). There is no direct evidence on how the purple thistle achieved its stature; however one legend has it that a sleeping party of Scots warriors was saved from ambush

by an invading Norse army when one of the enemies trod on this prickly plant. The enemy's cry roused the slumbering warriors, who duly vanquished the invader and thus adopted the thistle as their national symbol. Which particular thistle is rightly the symbol of Scottish heraldry for over 500 years is the subject of hot dispute, as Scotland is home to many species; however the native spear thistle, *Cirsium vulgare*, seems to be the most likely candidate (fig. 12).

In terms of historical significance, this plant is responsible for one of the most influential poems in Scottish literature: Hugh MacDiarmid's *A drunk*

man looks at the thistle.

This is an epic, stream-of-consciousness poem that touches on everything from the mysteries of the nation to the dizzying joy of whisky (essential reading for anyone planning a trip to Scotland).

The thistle also represents one of the highest honours the country can give an individual. Founded by James III in 1687, the Most Ancient and Most Noble Order of the Thistle is an order of chivalry which is bestowed on those who have made an outstanding contribution to the life of Scotland and the greater United Kingdom.

I hope reading this has inspired you to cross the border, and if you make it, do pop into RBGE for a wee hello! 🌿

Becky Cross is a horticultural student at the Royal Botanic Garden Edinburgh. Her main interests are plants from Mediterranean climates, alpine species and British natives; she is also a passionate tree-lover.