

# Caledonian Forest – Species Profile

## Holly

*(Ilex aquifolium)*

With its prickly, evergreen leaves and bright red berries, holly is a distinctive but uncommon small tree in the understorey of the Caledonian Forest.

### Worldwide Distribution

Holly, or European holly as it sometimes known, occurs naturally in western, central and southern Europe, where its range includes the coastal region of Norway, Denmark, Germany, Britain, Ireland, Portugal, Spain and across the Mediterranean to Bulgaria and Turkey. It also occurs in North Africa, in Morocco, Algeria and Tunisia, and further east, in the Caucasus Mountains and northern Iran.

Holly has also been introduced to a number of other countries, including New Zealand, temperate parts of Australia and the Pacific Northwest of North America, in all of which it has caused problems as an invasive species.

### Distribution in Scotland

Holly is widely distributed in Scotland, and occurs all throughout the mainland, except for Caithness, and in Orkney, Lewis, Harris and Skye. It is most common as an understorey species in oakwoods, particularly on the west coast, but also occurs in other forest types, including amongst the native pinewoods of the Caledonian Forest.



*Holly tree growing amongst Scots pines and birches on Dundreggan.*

### Physical characteristics

Holly is an evergreen, broadleaved tree in the Aquifoliaceae family, which consists of the single genus, *Ilex*, with over 400 species worldwide. In Scotland it typically grows up to 10 metres in height, although it can be as tall as 25 metres. Its trunk can be up to 40-80 cm in diameter, but it frequently divides near the ground, giving rise to multiple smaller stems growing close together. The lower branches from these are often tangled amongst each other, and, where they touch the ground will take root, making the central part of the tree relatively inaccessible.

The bark of holly is grey and smooth, becoming somewhat fissured with age. The leaves are from 5-12 cm long and 2-6 cm wide, and deep green in colour above, but paler underneath. The leaves are leathery and



shiny, and, on the lower part of the tree, have three to seven sharply pointed spines on each margin, that alternate in pointing upwards and downwards. Higher up, where they are out of reach of grazing herbivores, the leaves tend to have fewer or no spines. Individual leaves persist on a tree for 2 – 3 years, and when they are shed (usually in the spring) they take a long time to decay, so that skeleton leaves can often be seen on the ground.



*Female flowers.*



*Male flowers.*

Holly is dioecious, so individual trees are either male or female (in contrast to most trees, such as Scots pine or oak, for example, where male and female flowers occur on the same tree). Flowering begins when a tree is about 20 years old, and the flowers appear in clusters near the base of the leaves. They are pinkish-red as buds, opening in May or June to reveal white flowers with 4 petals. The male flowers have stamens covered in pollen and sterile stigma that are reduced in size, whilst the females have larger stigma and smaller, sterile stamens with no pollen.



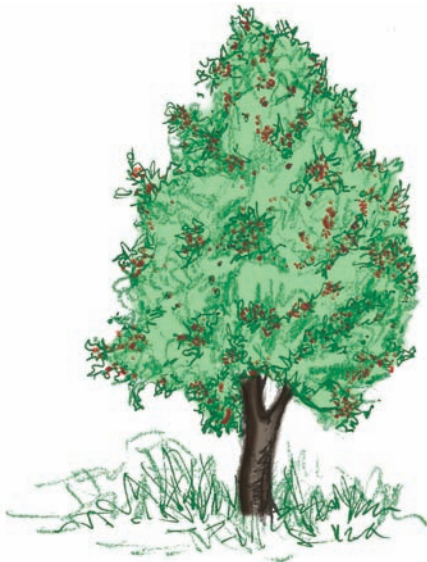
*Leaves from higher up on a holly have relatively few spines on them.*



Berries and leaves of a holly tree on Dundreggan.

Pollination is mainly by bees, which are attracted by the fragrance of the flowers. Fertilised female flowers develop into berries 6-10 mm. in diameter, and these are initially green in colour, ripening to a bright red by mid-winter. Each berry contains four seeds, and the birds that eat the fruit disperse these in their droppings. However, the berries are initially very bitter, and it is only after frost that they become softer and more palatable, so they can persist on a tree for many months. The seeds will not germinate in their first year, and in nurseries they need to be stratified in sand for two winters in order to break down the tough seed coat. Seed production is greatest in trees over 40 years old, especially in a mast year, when large quantities of berries will be produced. Such a year is usually followed by one or more years when the tree has few fruits on it.

Holly can also reproduce vegetatively, by means of shoots growing off the root system of a tree. This appears to be more common in dense woodland, where pollination is perhaps less likely to occur. A holly tree can live up to 250 or 300 years, although the oldest hollies in the UK, in the Shropshire Hills in England, are thought to be possibly up to 400 years old.



### Ecological relationships of holly

Unlike many other tree species in the Caledonian Forest, holly has relatively few fungi associated with it. However, one saprotrophic species that grows exclusively with holly is the holly parachute fungus (*Marasmius hudsonii*), which occurs on the dead leaves, helping to break down their tough, leathery structure. Various microfungi are associated with holly, and the most commonly seen is the holly speckle (*Trochila ilicina*), which appears as small black spots on fallen leaves.

There are also comparatively few phytophagous (plant-eating) insects that feed on holly, with less than a dozen recorded in the UK. Of these, the holly leaf miner (*Phytomyza ilicis*) is the most common, and the larvae of this fly produce distinctive trails, or mines, in the leaves. The larvae of the micro-moth, holly tortrix (*Rhopobota naevana*), specialise in feeding on the tender young shoots of holly, while the larvae of two other moth species, the double-striped pug (*Gymnoscelis rufifasciata*) and the yellow-barred brindle (*Acasis viretata*), feed on the flowers of holly, as well as on other plants. Caterpillars of the holly blue butterfly (*Celastrina argiolus*) also feed on the flowers and buds. However, this species is mainly confined to the southern half of the UK, where its numbers exhibit dramatic fluctuations every few years, due, it is thought, to the impact of a wasp (*Listrodomus nyctemerus*) that parasitises the butterfly's larvae.



Skeleton holly leaf – the black spots in the upper right of the leaf are microfungi involved in the decomposition process.

Through its nectar, holly provides a source of food to the bees and other insects that pollinate its flowers, and the berries are food for a variety of birds, especially thrushes such as the redwing (*Turdus iliacus*), fieldfare (*Turdus pilaris*) and mistle thrush (*Turdus viscivorus*). Because of its dense foliage and the prickly nature of its leaves, holly also provides a good nesting site for birds.

As one of the only evergreen broadleaved trees in the UK, holly is an important food source in winter, and, despite its spiked, leathery leaves, it is browsed by mammals including red deer (*Cervus elaphus*) and domesticated herbivores such as sheep. Considered to have protective powers in the Gaelic culture, holly has been widely cultivated for a long time, and as a result many different forms now exist with variegated leaves etc.



Mines in a holly leaf, made by the holly leaf miner (*Phytomyza ilicis*).