....and some fungi that you probably won't see.

These species are rare and are listed in the UK Biodiversity Action Plan.

White Stalkball
Tulostoma niveum

This puffball is very rare. In Britain it is known only on two Scottish mountains where it grows amongst mosses on exposed limestone boulders.

AUTUMN AND WINTER

© Liz Holden

Hazel Gloves
Hypocreopsis rhododendri

In the UK, this amazing rubber glove-like rare fungus has mainly been found on standing, dead stems of Hazel, but also on living Hazel branches and living and dead branches of Blackthorn. It is known in coastal woodland sites in western Scotland.

ALL YEAR ROUND

© Liz Holden

Devil's Tooth
Hydnellum peckii

Often found beneath conifers, in damp weather Devil's Tooth produces ruby-like drops of liquid on its cap. This liquid contains a mushroom pigment called atromentin, which has anticoagulant properties similar to heparin. Look underneath the cap of a tooth fungus and you will see tooth-like structures as opposed to gills or tubes. The native pinewoods of Scotland are a hotspot for tooth fungi in the UK.

SUMMER AND AUTUMN

© Mark Gurney and David Genney (top right)

Ebony Cup
Pseudoplectania nigrella

This fungus grows on decaying wood, litter and soil in coniferous, usually pine, forests. Fruiting in late winter, its shiny black cups make a stunning contrast to the melting snows in March.

WINTER AND SPRING

© Liz Holden

Fascinated by fungi and want to know more?

To find out more about fungi in your area, contact your local council rangers, the British Mycological Society (www.britmycolsoc.org.uk), or Plantlife Scotland. There are several local fungus recording groups across Scotland that you could join.

Fairy Inkcap (*Coprinus disseminatus*) © Liz Holden

The Scottish Wild Mushroom Code gives up to date information on collecting mushrooms sustainably, and can be viewed on the Forest Harvest Website: www.forestharvest.org.uk

Join Plantlife today to help us protect our fantastic Scottish fungi

Scottish Natural Heritage
All of nature for all of Scotland

SEPA
Scottish Environment Protection Agency

Forestry Commission Scotland

BRITISH LICHEN SOCIETY

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our plants *our* planet *our* future

Plantlife Scotland, Balallan House, Allan Park, Stirling FK8 2QG
Tel **+44 (0)1786 478509**
Email **scotland@plantlife.org.uk**
www.plantlife.org.uk

Massive!

One of the largest, heaviest and oldest living things known on earth is a mushroom growing in North West America. It weighs in at an estimated 150 metric tonnes, covers 890 hectares and is at least 2,400 years old. Now that's a monster and the same Honey Fungus (*Armillaria ostoyae*) is widespread in Scotland!

Honey Fungus (*Armillaria ostoyae*) © Joe Sutton, Plantlife

Giant Wood Wasp (*Urocerus gigas*) © Holger Grosch

Beastly connections

Just as there are close associations of fungi with plants, there are also close associations with invertebrate animals. In Scotland, some wood wasps and beetles use fungi to help break down food for their larvae. Oyster Mushrooms (*Pleurotus ostreatus*) use special sticky knobs on their mycelium to capture eel-worms, using their body fluids as food.

Mushroom or toadstool?

There is no scientific difference between the meanings of the words mushroom and toadstool, and although modern usage suggests that a mushroom is edible and a toadstool is not, both terms can be used to describe any fleshy fruiting body with a cap and stem. The Scots term for mushroom or toadstool is puddock-stool, puddock being a Scots word for toad.

Thank fungi for cakes

Without yeast, itself a fungus, there would be no beer, which was of incalculable benefit to early civilisations for sterilising contaminated water. Nor would we have bread, some cakes and meat substitutes, all made by the fermenting ability of fungi.

Twig gluing – an amazing adaptation

The Glue Crust fungus (*Hymenochaete corrugata*) keeps dead Hazel twigs for itself by gluing them to living branches in the canopy, thus preventing them from falling to the ground where many other fungi would be competing for the nutrients.

© Liz Holden

Scottish Wild Mushroom Code © Plantlife

Witches Broom (*Taphrina betulina*)
© Alan Watson/Forest Light

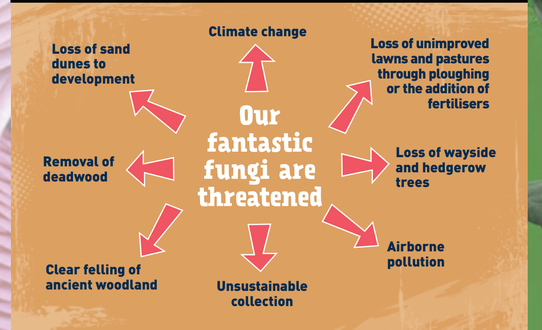
Fairies and witches

Think of 'dingly dells' and toadstools, and you will almost certainly conjure up fairytale imagery, with perhaps a hint of sinister unease. Fungi have held a strong and evocative place in British folklore, much more so than in other European countries, which perhaps partly explains why we eat them less. If comparing the number of species on sale for eating, in the UK there are hardly any, in Switzerland there are 78 and in Sweden there are at least 300!

Witches have played a part in fungi myths. Look for the growths on trees that are a mass of small twigs growing in a cluster, known as Witches' Broom, resembling a huge bird's nest. In folklore these were thought to be caused by witches flying overhead on broom sticks but actually this is a fungi from the *Exoascus* family.

A fungus called Witches' Butter (*Exidia glandulosa*), is a nasty-looking olive-black gelatinous growth on decaying twigs, and it was thought that witches and trolls scattered this about when they milked cows during the night.

Fairies are important too. There was an old superstition that a girl could improve her appearance by bathing her face in the dew on a May morning, but woe betide her if she did this inside a fairy ring! It was said that fairies could avenge themselves by spoiling her complexion with spots and blemishes. A fairy ring, which can often appear overnight, was apparently the result of fairies dancing in a circle whilst humans slept.



The wild and wonderful world of Scottish Fungi

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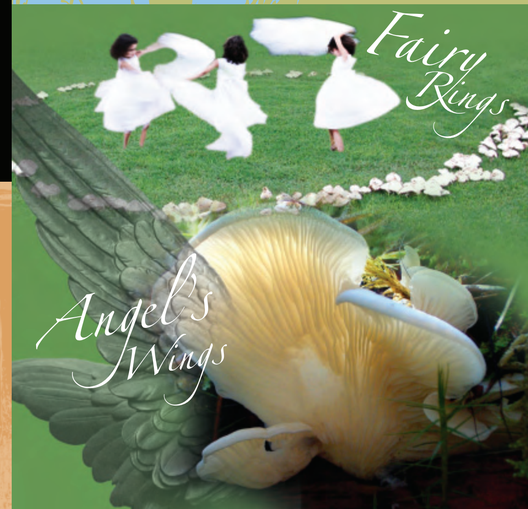


Scotland's secret kingdom

Scotland's astonishing variety of fungi often goes unnoticed. Spectacular species grow in our majestic Caledonian pine forests, in our Celtic rainforests of the west, on our dramatic 'alpine' mountains of the highlands, among our sand dunes and amidst our lovely ancient pastures as well as thriving in parks and gardens.

What are fungi?

A kingdom of their own

Fungi are unlike plants and animals. In fact they are so different that they are put into a special kingdom of their own.

Unlike plants, fungi can't photosynthesize. In other words they lack the ability to make their own food from sunlight and simple nutrients. Instead, fungi absorb nutrients released by chemical action on the material on which they grow, whether this is the bark of a tree, or soil, or leaves.

Mushrooms and toadstools – the tip of the iceberg

The mushrooms and toadstools that you see above ground are just the tip of a great biological iceberg. They are merely the large and obvious reproductive structures – the 'fruit' of the fungi world. Below the surface of the soil, under the bark of a tree or over its leaves stretches an immense growth of microscopic structures, hidden beyond our sight.

These hidden parts of fungi are composed of vast masses of filaments known as **hyphae** which, bunched together, form a **mycelium**. The mycelium produces a reproductive structure, which is a spore bearing body. **Spores** are the fungal equivalent of seeds. Mushrooms and toadstools are the most familiar form of this reproductive structure but there are also brackets, cups, coral-like shapes, puffballs, flat sheets of tissue or gelatinous blobs.

Many, like the single-celled yeast fungi, are so small they are known as 'micro-fungi'.

A mushroom shape we all know well is the cap shape, as in the Fly Agaric (*Amanita muscaria*), the bright red toadstool with white spots which often appears in the autumn, and in fairy tales.
© Laurie Campbell

Lined up the roots of an ancient oak tree and its end to end and they would travel three times around the earth.

Lined up the fungal hyphae growing on the same tree and its end to end they might stretch the length of a football pitch.

PRINT COVER PHOTO: Angel's Wings (*Pleurocybella porrigens*) © David Genney

Background photo: Dyer's Saddle (*Polyporus squamosus*) © Laurie Campbell

Eco-heroes

Fungi are the planet's natural recyclers. Many prevent the accumulation of dead plants and animals by breaking them down into nutrients. These are then used by growing plants, providing a sustainable environment not just for nature, but for humans and their crops.

As well as breaking down dead material, some fungi can exist in partnership with living things. Over 90 percent of our trees, shrubs and wild flowers depend upon fungi located within or upon their roots to survive. These fungi scavenge mineral salts and other nutrients such as organic phosphate from the surrounding soil, which they in turn make available to their host plant. Fungi can also protect host plant roots from grazing by invertebrates. In exchange the fungi receive sugars, carbohydrates and vitamins created by their host plants during photosynthesis. These associations are called mycorrhizas, and many mushrooms and toadstools we see in the autumn are involved in these processes.

Fungi also help humans fight disease and are the source of some of our most successful antibiotics. They provide food and shelter for many insects and other creatures and of course, mushrooms are used in some of the best restaurants in the world.

Not all fungi are heroes. Some fungi kill some of their host's cells, be they plant, animal, other fungi or even humans. These attacks can be commercially damaging or cause illness but are generally not fatal. However eating fungi can prove fatal if you make a mistake and eat the wrong variety as some are poisonous.

The beautiful Chanterelle mushroom (*Cantharellus cibarius*) is a favourite delicacy in Scottish meals.
© Lorrie Gill

How do they multiply?

Many fungi reproduce sexually by shedding minute spores. These tiny bodies are the fungal equivalent of plant seeds. A single mushroom sheds millions of spores, which are usually dispersed by wind, rain or contact with insects and other animals.

Some species have developed more complex methods. Truffles 'hide' underground but emit an odour which attracts mammals to dig them up and eat them. The spores are then liberated in their dung. Truffles are considered a great delicacy and in mainland Europe pigs and dogs are trained to find them.

False Truffle (*Elaphomyces granulatus*) disperses its spores in the dung of animals that eat it.
© Mavi Rodriguez Garcia

Stinkhorns, growing erect in the woodland floor, emit a smell of rotting flesh. Attracted by the smell, carrion flies and beetles visit the mushroom. The spores are embedded in mucus which sticks to the visitors' feet. Spores are then deposited wherever the insect lands and so are widely dispersed.

Some fungi don't reproduce sexually but rely on hyphae which divide or break into many parts. These grow into separate but genetically identical individuals.

The Stinkhorn (*Phallus impudicus*) uses flies to distribute its spores
© Laurie Campbell

Background photo: Waxcap (*Hygrocybe*) © Laurie Campbell

Fungi you might see in Scotland

Wrinkled Fieldcap *Agrocybe rivulosa*
Growing on rotting wood chips, this beautiful species was unknown to science before 2003 and probably came into the UK on bark chippings imported from overseas.
AUTUMN
© www.wildaboutBritain

Amethyst Deceiver *Laccaria amethystina*
Common and found growing in soil under trees.
SUMMER AND AUTUMN
© Laurie Campbell

Common Bird's Nest *Crucibulum laeve*
Like a delicate bird's nest containing 'eggs', this fungus grows on woodland debris such as sticks, leaves, nutshells, needles, woodchips and dung. When a raindrop falls into the 'nest', the 'eggs' are projected out of the cup and use tiny, sticky cords to attach themselves to new homes.
SUMMER AND AUTUMN
© Walter Burns

Artist's Bracket *Ganoderma applanatum*
This bracket fungus, often found near the base of or on the stumps of old Beech trees, releases millions of rusty-coloured spores. It produces enzymes to break down living wood. ALL YEAR ROUND
© Laurie Campbell

Bitter Beech Bolete *Boletus calopus*
Appearing in coniferous and deciduous woodland, the flesh of this fungus stains blue when broken or bruised. Unlike some other Boletus mushrooms it is not edible.
SUMMER AND AUTUMN
© David Genney

Jelly Ear *Auricularia auricula-judae*
This jelly fungus is conspicuously ear shaped, and ranges in colour from purple to dark brown or black, with a rubbery texture. It is most often found on dead Elder trees but also on Elms.
ALL YEAR ROUND
© Laurie Campbell

Turkeytail *Trametes versicolor*
This is a stunning fungus found on fallen logs or stumps of deciduous trees; in the late afternoon light its white crinkly edges glow like ice-rimmed cocktail glasses.
ALL YEAR ROUND
© Laurie Campbell

Common Puffball *Lycoperdon perlatum*
This puffball mushroom has a top covered in short spines which quickly rub off leaving a mosaic like pattern. At maturity, a hole in the top opens, releasing spores in a cloud-like burst when the body is compressed by rain drops, a human touch or by a passing animal. It grows on the ground in woods under hardwoods or conifers, but is also common along roadsides and in urban settings.
SUMMER AND AUTUMN
© Laurie Campbell

Sulphur Tuft *Hypholoma fasciculare*
This small gill fungus grows prolifically in large clumps on stumps, dead roots or the rotting trunks of broadleaved trees.
ALL YEAR ROUND
© Laurie Campbell

Bog Beacon *Mitrula paludosa*
This fungus grows in old ditches with slowly moving water.
SPRING AND SUMMER
© Laurie Campbell

An Earthtongue *Geoglossum cookeanum*
The Earthtongues are found in the short grass of unimproved grasslands.
AUTUMN © Liz Holden

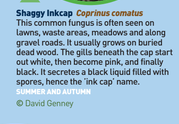
False Morel *Gyromitra esculenta*
This handsome fungus is usually found in sandy pine forests. Not to be mistaken for the edible morel, this fungus contains gyromitrin, which the human digestive system breaks down into the same substance as rocket fuel so it is definitely one to avoid eating! DEATH
© Mary Bain

Orange Peel Fungus *Aleuria aurantia*
The brilliant orange, cup-shaped fruit bodies of this fungus often resemble orange peel strewn on the ground. It is found on bare clay or disturbed soil, for example along forest tracks, or even piling up between the flag stones in your garden!
SUMMER AND AUTUMN
© David Genney

Porcelain Fungus *Oudemansiella mucida*
Found on dead Beech, the shiny cream caps of this delicate species look like upturned fine china.
AUTUMN
© Laurie Campbell

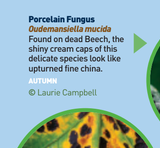
Yellowdrop Milkcap *Lactarius chrysorrheus [right]* and **Woolly Milkcap** *Lactarius torminosus [left]*
These are both milkcap fungi, identified by the milky substance that oozes out of the gills if they are damaged. Woolly Milkcap grows only below Birches, mainly on acid and moist soil. Yellowdrop Milkcap is found in deciduous woodland, usually under Oak or Sweet Chestnut. AUTUMN
© Liz Holden

Shaggy Inkcap *Coprinus comatus*
This common fungus is often seen on lawns, waste areas, meadows and along gravel roads. It usually grows on buried dead wood. The gills beneath the cap start out white, then become pink, and finally black. It secretes a black liquid filled with spores, hence the 'ink cap' name.
SUMMER AND AUTUMN
© David Genney



Dryad's Saddle *Polyporus squamosus*
'Dryad's Saddle' refers to the tree nymphs of Greek mythology called Dryads who could conceivably fit and ride on this mushroom. It plays an important role in woodland ecosystems by decomposing dead logs or tree stumps, including Elm and Sycamore, but is also occasionally a parasite on living trees.
SUMMER AND AUTUMN
© Laurie Campbell

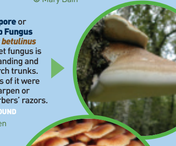
Sycamore Tarspot *Rhytisma acerinum*
Growing as black dots on the leaves of Sycamore trees and other maples, this fungus is an indicator of clean air. It is sensitive to sulphur dioxide, a common urban pollutant, so it is a welcome sight in cities, especially as it does not damage the host tree.
ALL YEAR ROUND
© Laurie Campbell



Yellow Stagshorn *Calocera viscosa*
Look carefully and this species can be seen very commonly on dead coniferous wood, and as a survivor of frost, it makes a bright and cheery sight on gloomy winter days.
AUTUMN AND WINTER
© Laurie Campbell

Wood Cauliflower *Sparassis crispa*
Found around the stumps of old conifer trees, it can be as large as a football and looks a bit like a cauliflower.
AUTUMN
© Liz Holden

Pinewood Gingertail *Xeromphalina campanella*
Look out for clustered masses of small caps of this delicate fungus, which fruits on rotting conifer logs, usually old pine. AUTUMN
© Liz Holden



Fly Agaric *Amanita muscaria*
Common under Birch trees, this familiar red, spotted, poisonous mushroom was used in times past as a fly killer, broken up into milk or sprinkled with sugar.
SUMMER AND AUTUMN
© Laurie Campbell

Glistening Inkcap *Coprinellus micaceus*
This pretty mushroom appears in clumps on stumps and logs of old broadleaved trees.
Not just found in wooded countryside, it is also common in urban parks and gardens.
ALL YEAR ROUND
© Laurie Campbell

Pink Waxcap *Hygrocybe calyptriformis*
This belongs to the group of the often brightly-coloured wax associated with unimproved grassland. Its main habitats include lawns, grassy meadows, pastures and woodland margins.
SUMMER AND AUTUMN
© Ray Woods