

Plantlife



Waxcaps and grassland fungi

A guide to identification and management



This guide aims to raise awareness of waxcaps and other fungi that appear in grasslands and lawns in the late summer and autumn.

Known as “waxcap grassland fungi”, this is a group of fungi for which the UK, particularly Wales and Scotland, is globally important. It is characterised by the colourful waxcaps, but includes other charismatic species like the coral fungi and earthtongues.

Any grassland with fungi appearing in late summer and autumn is likely to be of interest and worth investigating further with the use of this guide. It will help you to:

- Identify some of the more distinctive waxcap grassland fungi.
- Identify a waxcap grassland and assess how important it may be by using a simple scorecard.
- Manage a waxcap grassland by giving guidance on management practices.

What is a fungus?

Fungi form a biological kingdom, separate from plants, animals and bacteria, and include familiar organisms like moulds, yeasts and mushrooms. The grassland fungi live below ground forming intricate networks of fine threads, known as **mycelia**. It is only the fruiting body, the spore-producing “mushroom” or “fungus”, that is visible above ground at certain times of the year. To add further mystery, the fungus does not necessarily produce fruiting bodies each year, so finding fungi can sometimes be difficult.

What are waxcaps and waxcap grasslands?

Waxcaps are familiar-shaped fungi that are often brightly-coloured with a waxy or slippery-looking cap. They are found in grasslands that are generally poor in nutrients – such as old pasture, sand dunes, heathland, lawns and cemeteries – alongside other fungi, such as club and coral fungi, pinkgills and earthtongues. A “waxcap grassland” is a pasture, meadow or grassy area where these fungi are found.

Why are waxcap grasslands important?

The grasslands of the UK, particularly those found in Wales and Scotland, are amongst the most important in the world for grassland fungi. The latter’s preference for ancient, pastures and grassland that has not been agriculturally improved means that many species are rare and declining. Five species of grassland fungi appear on list of “Species of Principal Importance to the Conservation of Biodiversity in Wales”(Section 42). Public bodies have a duty to take due regard of their conservation. These species are indicated by “S42” in this guide..

Identifying grassland fungi with this guide

Identification of waxcaps is best carried out by examining a small number of fresh specimens in good condition and at different stages of growth, as their size, shape and colour often changes with age.

Key features to look for:

Colour of the cap, stem and gills of fruiting bodies.

The overall shape and dimensions of the fruiting body; what is the diameter of the cap? Is it conical (pointed), domed (rounded), convex or flattened? Does it have any other features such as a distinct bump in the centre (known as an **umbo**)?

The method of attachment of the gills to the cap. Gills may be described as narrowly or barely attached to the stem, broadly attached, or **decurrent** (where the gills are fluted down the stem like a vaulted ceiling).

The texture of the cap and stem: fresh specimens observed in dry weather can be slimy, sticky, moist or dry and can appear smooth, break up into coarse feather-like scales or are made up of distinct parallel fibres (termed **fibrillose**).

The smell of the specimen after gently warming a portion in the hand or placing in a closed container for a short while. Although only a few species have a distinctive smell, this can be an important clue. Particular smells relevant to waxcaps are oil, honey and cedar.

Photographs can be very helpful if submitting details to specialists or internet forums for advice, but remember to include in the photograph an object for scale and attempt to capture as many features as possible, including the underside of the cap.

Always wash your hands after handling fungi and please note that this guide is not intended to aid identification of edible species; always seek expert advice in that regard.

Further information

Books

The *Genus Hygrocybe*. David Boertmann, 2nd edition (2010). Published by the Danish Mycological Society and available from specialist natural history booksellers in the UK. This is the best identification guide for waxcap fungi in Europe.

Websites

www.aber.ac.uk/waxcap Aberystwyth University's waxcap website provides extensive information on waxcaps, including their ecology, conservation and identification.

www.first-nature.com/fungi/index.php First Nature provides an excellent online resource for the identification of grassland (and other) fungi.

1. RED WAXCAPS

Hygrocybe coccinea Scarlet Waxcap



Cap: Red, moist and domed at first, becoming flatter with age.

Diameter of cap: To 60mm.

Gills: Red or yellow, broadly attached to the stem.

Stem: Red or orange, dry and smooth.

Notes: A common species in unfertilised grassland, often appearing in large groups known as troops.

Hygrocybe punicea Crimson Waxcap



Cap: Blood-red, moist and domed or convex. Older weathered specimens develop a distinctly two-tone cap colour with a paler yellow-buff centre.

Diameter of cap: To 150mm.

Gills: Brownish-red to yellow, narrowly attached to the stem.

Stem: Yellow to orange, dry and fibrillose.

Notes: A robust and striking species mostly restricted to long-established nutrient-poor grassland where it can appear in good numbers.

2. PINK WAXCAPS

Hygrocybe splendidissima Splendid Waxcap



Cap: Red and dry. Usually broadly conical at first, becoming flat or slightly convex with a broad umbo.

Diameter of cap: To 70mm.

Gills: Red or yellow, narrowly attached to the stem.

Stem: Red or orange, dry and smooth.

Notes: An uncommon species in long-established nutrient-poor grassland. Drying specimens have a distinctive smell of honey which helps distinguish from large specimens of *H. coccinea*.

Hygrocybe calyptriformis Pink or Ballerina Waxcap



Cap: Pink, moist and narrowly conical at first but the margin splits and turns upwards with age.

Diameter of cap: To 100mm.

Gills: Pale pink, free or narrowly attached to the stem.

Stem: White, dry and smooth.

Notes: Readily identified and widely reported from unfertilised grassland.

3. YELLOW OR ORANGE WAXCAPS

Hygrocybe chlorophana Golden Waxcap



Cap: Yellow or orange, wet and/or sticky, domed at first, becoming flatter with age.
Diameter of cap: To 70mm.
Gills: Narrowly or barely attached to the stem.
Stem: Yellow or orange, usually dry, but occasionally moist.
Notes: A common species in unfertilised grassland. A similar species, *H. ceracea* (Butter Waxcap), is usually smaller and has gills which are broadly attached to the stem.

Hygrocybe conica Blackening Waxcap



Cap: Yellow, red or orange then blackening with age or damage. Initially moist but becoming dry. Distinctly conical at first, changing little with age.
Diameter of cap: To 100mm.
Gills: Greyish-white at first, narrowly attached to the stem.
Stem: Yellow or orange, initially moist, later dry, and turning black.
Notes: A common species in unfertilised grasslands and sand-dunes. Although treated as one species, it may actually represent a number of similar species.

Hygrocybe laeta Heath Waxcap



Cap: Dull greenish-orange and slimy. Convex at first, becoming flatter with age.
Diameter of cap: To 50mm.
Gills: Greyish-white with clear margin (best seen with a magnifying glass).
Stem: Dull greenish-yellow and slimy.
Notes: Not uncommon on acidic soils and amongst moss in damp areas. Specimens are relatively tough when crushed and have a characteristic smell said to resemble burnt rubber.

Hygrocybe reidii Honey Waxcap



Cap: Orange and dry. Flattened or slightly convex, often with a wavy margin.
Diameter of cap: To 50mm.
Gills: Yellow to orange, and broadly attached or slightly decurrent.
Stem: Yellow to orange, dry and smooth.
Notes: An occasional species in unimproved grassland. Specimens smell of honey when rubbed or when drying.

4. BROWN OR BUFF WAXCAPS

Hygrocybe glutinipes Glutinous Waxcap



Cap: Yellow, orange or red and very slimy. Domed at first, becoming bell-shaped and then more or less flat.
Diameter of cap: To 30mm.
Gills: Broadly attached to the stem.
Stem: Colour as cap, very slimy – sometimes with conspicuous blobs of slime.
Notes: A common species in unfertilised grassland, often appearing early in the season from mid-summer if conditions are suitably moist.

Hygrocybe quieta Oily Waxcap



Cap: Dull orange and dry or greasy. Convex then flattening with age, often distorted and cracking at the centre.
Diameter of cap: To 80mm.
Gills: Orange to salmon-coloured, and narrowly or broadly attached to the stem.
Stem: Orange, smooth and dry. Specimens usually have a faint oily smell.
Notes: An occasional species in unfertilised grassland.

Hygrocybe spadicea Date-coloured Waxcap S42



Cap: Distinctive date brown colour over a yellow-fleshed fruiting body. The cap is broadly conical, becoming dry and split at the margin with age.
Diameter of stem: To 80mm.
Gills: Yellow or pale orange and narrowly or barely attached to the stem.
Stem: Yellow or pale orange and fibrillose.
Notes: Rarely found except during occasional favourable years.

Hygrocybe pratensis Meadow Waxcap



Cap: Brownish-orange fading to a very pale buff colour, dry. Domed at first, becoming flatter with age.
Diameter of cap: To 120mm.
Gills: Cream to pale buff, decurrent.
Stem: White, dry, finely fibrillose.
Notes: A conspicuous and robust waxcap often persisting for several weeks. Common in unfertilised grassland, occasionally in large rings.

5. GREEN WAXCAPS

Hygrocybe psittacina Parrot Waxcap



Cap: Usually predominantly green turning yellow-green or completely yellow with age, and very slimy. Domed at first, sometimes with a distinct bump on the top of the cap (known as an umbo), becoming flatter with age.

Diameter of cap: To 40mm.

Gills: Rather broad, but narrowly attached to the stem.

Stem: Colour as cap but almost always a trace of green present near the top, slimy.

Notes: A common and rather variable species in unfertilised grassland. Purple and brick-red examples are sometimes seen.

6. WHITE WAXCAPS

Hygrocybe virginea Snowy Waxcap



Cap: White, moist, and initially domed, becoming flatter with age.

Diameter of cap: Generally to 50mm, occasionally up to 70mm.

Gills: Decurrent.

Stem: White and moist.

Notes: One of the most widely recorded waxcaps in unfertilised grassland. A variable species which includes varieties having pale buff-brown colours on the cap. A similar species is *H. russocoriacea* (**Cedar Waxcap**) which has a distinctive and pleasant cedar wood smell.

8. BLUE-GREY MUSHROOMS

Entoloma bloxamii Big Blue Pinkgill S42



Cap: A distinctive blue-grey colour when fresh. Conical at first becoming convex and developing an umbo.

Diameter of cap: To 100mm.

Gills: White, becoming salmon pink, and broadly attached.

Stem: Colour as cap, sometimes paler at the base, and fibrillose.

Notes: Most likely to be found in unfertilised, long-established grasslands, usually on neutral or calcareous soils.

9. CORAL FUNGI

Clavaria zollingeri Violet Coral S42



Fruiting body: Coral shaped and of a distinctive purple-violet colour.

Fruiting body size: 30-100mm tall and up to 80mm across.

Individual stems are typically 4-7mm in diameter at the base, branching upwards and outwards.

Notes: A rare species of unfertilised grassland, most frequently found in Wales and England.

7. EARTHTONGUES

Microglossum olivaceum Olive Earthtongue S42



Fruiting body: Like dark reddish, brown or olive green coloured clubs, or tongues, emerging from the soil.

Fruiting body size: Up to 70mm in height.

Stem: Usually with shades of olive-green.

Notes: Unlike the majority of the 12 dark-coloured earthtongue species, typical examples of this species can often be identified in the field without the need for microscopic examination.

Geoglossum atropurpureum Dark-purple Earthtongue S42



This is a rarely recorded earthtongue which superficially looks like several other related species and requires microscopic examination to be identified with confidence.

How do I know if I have a good waxcap grassland?

Look for the different coloured mushroom-like fungi and for each colour-group add together the relevant points.

Red (eg <i>H. coccinea</i> , <i>punicea</i> , <i>splendidissima</i>)	5 points
Pink (eg <i>H. calyptriformis</i>)	5 points
Orange (eg <i>H. reidii</i> , <i>quieta</i> , <i>laeta</i>)	2 points
Buff/brown (eg <i>H. pratensis</i>)	2 points
Yellow (eg <i>H. chlorophana</i> , <i>glutinipes</i>)	2 points
Orange/yellow turning black (eg <i>H. conica</i>)	1 point
Green (eg <i>H. psittacina</i>)	1 point
White (eg <i>H. virginia</i>)	1 point

Are there other grassland fungi? Add the points for the following groups.

Violet coral (<i>Clavaria zollingeri</i>)	5 points
Yellow/white coral (not illustrated)	1 point
Beige/brown coral (not illustrated)	2 points
Earthtongue (any)	2 point

What is your final score?

Scores of 0-4 indicate more intensively managed grasslands, probably with low grassland fungi interest. But, be aware that this is not always the case; fungi do not always fruit e.g. if the vegetation is too dense, or the weather too dry. **You should not dismiss a site with a low score straight away**, as sites are best visited over several years to assess their fungi interest. Scores of 5-11 would indicate sites that may be of grassland fungi interest and may be worth further investigation (see below). Scores of 12-29 would indicate sites that are good for grassland fungi and worth further survey, especially by an expert (see below).

What to do if you find an interesting waxcap grassland?

If you find an interesting site for grassland fungi eg scoring 5+ please inform the landowner and one of the two fungi organisations mentioned in the "Information and advice" section. The site may be worth further investigation and these organisations will be able to find a local expert to undertake a more comprehensive survey.

Management for grassland fungi

Habitats rich in grassland fungi, especially old grasslands with low fertility, are susceptible to change, for example through the application of fertilisers, ploughing, cessation of grazing, scrub encroachment, tree planting and development. The following guidelines are recommended

On agricultural grasslands:

Avoid the use of fertilisers, manures and herbicides as these are detrimental to grassland fungi.

Ensure existing drainage is not impaired as many species require free-draining conditions.

Retain permanent grassland as cultivation of the soil disrupts or destroys the underground networks of the fungi – the “mycelia”. Grassland fungi can take decades to recover from this.

Avoid activities that cause soil compaction which may affect the soil structure and damage the mycelia.

Avoid stock feeding in sensitive areas as this may damage soil structure and cause excessive enrichment of the soil.

Maintain grassland through livestock grazing and/or grass cropping as the removal of excess growth helps to maintain a low nutrient level. A short sward should be maintained where practicable.

Prevent the encroachment and establishment of trees and scrub which will render the habitat less suitable for grassland fungi.

On lawns, cemeteries and amenity grasslands:

Keep the grass short through regular mowing.

Remove all cut grass. This is really important in ensuring nutrients do not build up and damage the grassland fungi interest.

Avoid the use of pesticides, fungicides or proprietary lawn treatments; mosses may not be very welcome in lawns, but they are present in the best grassland fungi sites. Treatment is likely to damage the grassland fungi.

Do not reseed or carry out other actions which significantly damage the soil structure or affect drainage; compaction by vehicles can be especially damaging to the soil structure and trampling, especially in late summer/autumn, can damage young fungi and reduce fruiting.

Information and advice

The study of fungi is called “mycology”. There are two mycological organisations in the UK which promote the recording and conservation of fungi: The British Mycological Society (www.britmycolsoc.org.uk) and the Association of British Fungus Groups (www.abfg.org).

Both organisations support networks of groups and enthusiasts across the UK and can provide links to local groups and training opportunities.

Local Biological Records Centres and Wildlife Trusts can provide details of fungus specialists and county recorders in your area.

Plantlife Cymru

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