



Survival of a waxcap grassland: Holy Trinity Churchyard Nature Reserve, Prestwood, Buckinghamshire

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It is only through a happy series of accidents that this ecologically remarkable site exists at all: a rare example of pristine acid grassland in the middle of the chalk hills of the Chilterns. Although part of the Chilterns AONB it is only 30 miles from London, with all the usual population and transport pressures. Protected status did not prevent the building of the M40 through the middle of the Aston Rowant NNR; a massive gash of bare white chalk now splits the reserve in two, disrupting the escarpment and two ancient thoroughfares, the Ridgeway and the Icknield Way (see Adey & Wilson 2010). Nor has it prevented the proposed HS2 high-speed rail link, which has been vigorously opposed by local environmental and heritage bodies and councils because of its potential damage to wildlife and the countryside, its effects on the water table, and noise pollution.

The village of Prestwood sits between the M40 and the route of HS2. The agriculturally unproductive Prestwood plateau was for centuries common land, a heathy grassland with Gorse *Ulex europaeus*, where agricultural labourers gathered Bracken *Pteridium aquilinum* for bedding and brushwood for fires. The common was gradually

whittled away by enclosure from the 18th century onwards, the final remnants disappearing in the 1860s (Marshall 2016). With it went one of the last Buckinghamshire sites for Heath Dog-violet *Viola canina*, now extinct in the county. The second half of the 20th century saw the construction of a large housing estate, transforming the village into a commuter settlement. Little of the flora typical of the old common has survived.

The land where Prestwood's Holy Trinity Church stands was once part of ancient Knives (Neaves's) Farm. The land for building and supporting a new church was sold by the farm in 1849. It consisted of small pasture plots – such as Long Field and Barn Meadow – which had never been ploughed. Although the land was regularly grazed, the plants and fungal diversity of the natural acid grassland survived along with their invertebrate eco-community. The few plots of the old Prestwood Common that had been kept in public ownership became allotments and recreation grounds in the 20th century, losing their last vestige of heathland ecology, while surviving pastureland was fertilised and 'improved' for agriculture. The churchyard, meanwhile, occupying the old Long Field, in the

East side of the church, with clipped Yews and part of the waxcap grassland. Tony Marshall



Mouse-ear Hawkweed (left) and Harebell (right). Tony Marshall

middle of which stood the new church, was a place for graves. These, however, were added slowly and between them the original grassland survived, even returning eventually, after many decades, to cover older graves as they became neglected.

The need for access and a desire for 'tidiness' meant that the grass was regularly mown. When I first encountered the churchyard, in the 1980s, I found that there was a regular crew of volunteers who maintained the mowing regime. Crucially, there was an enlightened manager of the churchyard who provided several large compost bins and ensured that cuttings were always removed. Not only did this mean that the soil was never enriched – indeed, nutrients were gradually being reduced – but the compost heaps provided a safe, warm habitat for Slow-worms *Anguis fragilis*. Other churchyards in the area, although much older, were not so fortunate.

Mowing was relatively intensive, so taller plants such as Harebell *Campanula rotundifolia* and Pignut *Conopodium majus* survived only near a fence or a grave or under the protection of a Yew bush *Taxus baccata*, although Cuckooflower *Cardamine pratensis* and Bluebell *Hyacinthoides non-scripta* were allowed to flower each spring, along with planted daffodil cultivars. But

low-growing species such as Tormentil *Potentilla erecta*, Heath Bedstraw *Galium saxatile*, Heath Speedwell *Veronica officinalis*, Mouse-ear Hawkweed *Pilosella officinarum*, Heath-grass *Danthonia decumbens*, Sheep's Fescue *Festuca ovina* and Field Woodrush *Luzula campestris* survived extensively. Even patches of Heather *Calluna vulgaris* clung on in a prostrate form, flowering close to the ground, the tiny leaves almost invisible among the mosses – Creeping Feather-moss *Amblystegium serpens*, Pointed Spear-moss *Calliergonella cuspidata*, Heath Star-moss *Campylopus introflexus*, Broom Fork-moss *Dicranum scoparium*, Common Haircap *Polytrichum commune* and Springy Turf-moss

Rhytidiadelphus squarrosus. Mingled with the bryophytes are the stiff grey branching stalks of the lichen *Cladonia rangiformis*, one of the 'reindeer mosses'. To those who live in the extensive wet acid regions of the north and west, such an assemblage will seem an everyday affair, but in the Chilterns today it is very rare: some of these species exist in only a few other places.

The clinching feature ecologically, and what makes this little churchyard so special, is apparent for only a few weeks each autumn, when most of the fungi appear. The mowing regime has left a low-nutrient acid grassland thick with springy moss ideal for fungi such as waxcaps, pinkgills and clubs. The ecology of these families is little understood, but there appear to be mycelial connections with mosses such as Springy Turf-moss, or with deep humic soil layers of decomposing plant and bryophyte vegetation. These connections appear to enable some species to extract nitrogen for development of fruit bodies in what are generally low-nitrogen habitats, thus outcompeting those fungi not so adapted (see Griffith et al. 2002). Many of these fungi are unpredictable, producing fruit bodies only once every few years or even decades. It is generally agreed that recording needs to take place for more than ten years before a complete picture



1, Prostrate Heather; 2, Good Friday Grass; 3, Wall-rue in church porch; 4, *Cladonia rangiformis* and *Polytrichum commune*; 5, Gall on tormentil (*Xestophanes brevitarsis*); 6, Yew in flower with artichoke gall; 7, Citrine Waxcap; 8, Crimson Waxcap; 9, Persistent Waxcap; 10, Earthy Waxcap; 11, Fibrous Waxcap; 12, Bitter Waxcap. Tony Marshall



1, Indigo Pinkgill; 2, Butter Waxcap; 3, Dotted Fanvault; 4, Scarlet Waxcap; 5, Pink Waxcap (with Drab Bonnet); 6, Golden Waxcap; 7, Meadow Waxcap; 8, Blackening Waxcap; 9, Parrot Waxcap; 10, Slim Coral.
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of the species present begins to emerge. Given the exacting conditions and the length of time taken to establish them, such grasslands – generally termed waxcap grasslands, from their most prominent species – are rare in this country, even more so in mainland Europe and the rest of the world. They are priorities for conservation in both national and county Biodiversity Action Plans (BAPs).

I started sporadically recording fungi here in 2000. There was a Bucks Fungus Group visit in 2005, and in the autumn of 2016 I carried out an intensive survey involving weekly visits. Altogether, 23 waxcap *Hygrocybe* taxa have been recorded (22 species plus one variety), nine clubs, corals and spindles, four pinkgills *Entoloma*, and 20 miscellaneous fungi associated particularly with

such unfertilised acid grasslands. The *Entoloma* species, being particularly difficult to distinguish, certainly remain under-recorded. On the basis of its waxcaps, Prestwood's churchyard qualifies as internationally important according to the criteria adopted by what was then English Nature (Evans 2004). A waxcap grassland takes centuries to reach maturity but only minutes to be destroyed, so it is little wonder that they are a priority for conservation.

The bulk of any terrestrial fungus is underground and difficult to study, appearing to our eyes only sporadically, as fruiting bodies bursting through the soil surface. When they do appear, waxcaps can be very striking, mostly brightly coloured and having shiny, glutinous caps. One November day in 2016, I found 15 different *Hygrocybe* taxa and altogether, over September to November that year, I saw 21 of the 23 ever recorded at the site. For the purposes of the study, I asked for mowing to be suspended in the autumn, but in most years this marvellous display is lost because fruit bodies are demolished before they can be appreciated. Even when they were visible most passers-by did not notice, or dismissed them as nasty. One person even asked me 'what use are fungi, anyway?'. Toadstools have unfortunately garnered a bad press from the few destructive species such as honey fungus *Armillaria* or Shaggy Bracket *Inonotus hispidus*, the latter present at one corner of the churchyard and responsible for a mature Beech *Fagus sylvatica* shedding a large bough on a section of the graves.

If the question is legitimate (and one could equally ask what use are humans), then fungi are the easiest of biological kingdoms to justify. Without their mycelial interactions with the roots of plants, 90% of the latter would be unable to obtain all the nutrients they need, and we should not have woodlands or flower-rich meadows. Moreover, without their action of breaking down tough plant materials, the earth would be covered by a suffocating layer of refuse. Life depends on the work of the mycological kingdom.

One of those present is the Pink (or Ballerina) Waxcap *Hygrocybe calyptiformis*, which has a national BAP of its own, more perhaps for its character than for its rarity as, although uncommon, it is far from the rarest of our waxcaps. It is found particularly in old churchyards, where its colour and conical form, gradually developing a tutu-like

fringe as the cap margins turn up and split, make it conspicuous. It grows also in the churchyard in the nearby village of Penn Street, but I do not know of it anywhere else in the surrounding region. In Prestwood, it has been restricted for many years to a single small area (perilously close to a regular Badger *Meles meles* latrine), but was very regular in appearing every year. Reassuringly, I have since found it also in two other patches well separated from the first.

Other *Hygrocybe* species not encountered elsewhere in the area are: Citrine Waxcap *H. citrinovirens*, bright yellow with lime-green tints on long stout stems that appear too large for the size of the conical cap; Toasted Waxcap *H. colemanniana*, dark grey-brown or deep red-brown caps that soon flatten (seen here only twice in 13 years); Fibrous Waxcap *H. intermedia*, very demonstrative in extensive colonies with orange and yellow cap and stem, the cap looking scurfy from raised scales over the central boss (another species seen here only twice, in 2015 and 2016); Crimson Waxcap *H. punicea*, very conical, blood-red with a dull patina, and scaly orange stem (appears in most years, but later than some of the other species); Oily Waxcap *H. quieta*, with a greyish-yellow or -orange domed cap with orange gills on a long, narrow yellow stem.

Also found in the churchyard but nationally uncommon are Earthy Waxcap *H. fornicata*; Glutinous Waxcap *H. glutinipes*, very shiny with a thick layer of sticky gluten; Slimy Waxcap *H. irrigata*, like an eel, so slimy and slippery it is almost impossible to pick up; Bitter Waxcap *H. mucronella*, a red cap with a yellow rim and pale orange gills; Nitrous Waxcap *H. nitrata*, common here, a dull grey but with a strong nitrous smell, somewhat like hospitals; and Persistent Waxcap *H. persistens*. One of my favourites is the ivory-coloured Cedarwood Waxcap *H. russocoriacea* (easily overlooked as the commoner Snowy Waxcap *H. virginea*), with its distinctive smell, like fresh pencils, so pleasant that it is almost addictive.

Apart from the waxcaps, there are plenty of other notable species. In 2016, I recorded for the first time: Slim Coral *Ramariopsis subtilis*, like a mass of pale grey-brown slender twisting club fungi; Dotted Fanvault *Camarophyllopsis atropuncta*, with gills arcing down the stem like a fan vault and the tapering stem dotted with black warts; Moss Oysterling *Arrhenia acerosa*, small, white,

close to the turf, but having a stem to one side of the cap like a tiny oyster mushroom; and Scarlet Caterpillar-club *Cordyceps militaris*, small bright orange-red ‘clubs’ growing from the remains of underground larvae or pupae (in this instance, the pupa of a noctuid moth). Adding splashes of contrasting colour are two abundant species, namely Indigo Pinkgill *Entoloma chalybaeum* var. *lazulinum*, with a dark blue-grey cap and blue stem, the gills changing from bluish-grey to pink from the spores, and White Spindles *Clavaria fragilis*, along with various yellow club *Clavulinopsis* species.

A particular rarity in the Chilterns is a knobby swelling caused by the tiny gall-wasp *Xestophanes brevitarsis* on the lower stems of Tormentil, which has to be sought on hands and knees deep within the mossy turf. The Prestwood find appears to be the first record of this gall for the south and midlands of England, although it is not uncommon farther west and north (where Tormentil is far more frequent).

As with most churchyards, there are plenty of other micro-habitats supporting a large range of species, such as lichens on tombstones and ferns on the church walls. Collapsing graves provide shelter for Common Toads *Bufo bufo*, slugs, woodlice, and Bank Voles *Clethrionomys glareolus* and their predator the Weasel *Mustela nivalis*. An area with taller plants includes Dark Mullein *Verbascum nigrum*, foodplant of the endangered Striped Lychnis moth *Shargacucullia lychnitis*, for which this area is a prime location. A wide variety of trees surrounds the grass areas, providing associations with a large range of mycorrhizal toadstools such as webcaps *Cortinarius*, milkcaps *Lactarius* and brittlegills *Russula*, some of them quite scarce. One large unclipped Yew planted in 1850 supports a growing number of species, such as the Yew Artichoke Gall of the fly *Taxomyia taxi* and fungi such as *Cystoderma carcharias*, *Mycena adscendens* and Sulphur Polypore *Laetiporus sulphureus*. This close association of trees and grassland is a fine example of the ‘wood-meadow’ habitat proposed by Peterken (2017). Even the ubiquitous Cherry Laurel *Prunus laurocerasus* hedge surrounding much of the churchyard has been found to be congenial shelter by a recent arrival, the Box Bug *Gonocerus acuteangulatus*, which for much of its history in Britain was confined to Box Hill, in Surrey. We also await another possible immigrant:

in two next-door fields grows abundant Corky-fruited Water-dropwort *Oenanthe pimpinelloides*, at its only extant site in Buckinghamshire (Marshall & Marshall 2009).

This little gem of a site on the edge of a residential area has survived for a long time without full recognition of its biodiversity and ecological importance, although in 2004 its management earned an award from the Berkshire, Buckinghamshire and Oxfordshire Wildlife Trust. It is now also recognised as a Local Wildlife Site by Buckinghamshire County Council and is being treated as a nature reserve by the church management. With some fine tuning of the management regime it is hoped to increase its value still further, while efforts are being made to publicise the churchyard and to inform visitors and residents of the wonders it contains.

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