

UK BAP Grassland Fungi in Pembrokeshire: a status update

**Pembrokeshire Fungus Recording Network
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This report is based on data held by the Pembrokeshire Fungus Recording Network. Please contact us for details if you require any further information.

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Introduction

Semi-natural grasslands with diverse fungus assemblages, popularly known as ‘waxcap grasslands’, have risen in the conscience of conservationists in the last two decades thanks to the publication of a book detailing waxcap identification (Boertmann, 1995) and a series of papers assessing their status in Europe (e.g. Rald, 1985; Dahlberg & Croneborg, 2003) and The British Isles (Rotheroe *et al.*, 1996; McHugh *et al.*, 2001). Increasingly, fungi are used to identify grasslands that have a history of unintensified management. In some cases, grassland fungus diversity coincides with overall species richness across many biological groups; in others it does not. Assessment of grassland fungi can therefore identify interesting sites that would otherwise be overlooked by conventional vegetation, floristic or invertebrate surveys.

Current data suggest that the UK supports many sites with grassland fungus assemblages of European importance (Ainsworth, 2004; Griffith *et al.*, 2004). Some are vast; others comprise just a handful of traditionally managed fields. A wide-ranging survey commissioned by the Countryside Council for Wales (Griffith *et al.*, 2006) found that 14 of the top 30 known UK sites for waxcaps are in Wales. Unfortunately, this survey focussed primarily on known fungus-rich sites. Some new sites were visited in north Wales and, to some extent, in the south-east, but a total of just three Pembrokeshire sites were included. The Pembrokeshire Fungus Recording Network (PFRN) aims to fill in the gaps in recording in Pembrokeshire, allowing a more accurate assessment of our grassland fungi to be made in the future.

Three grassland fungi were included on the UK Biodiversity Action Plan (BAP) list, partly because of the UK’s importance in a European context and partly because the individual species were thought to be rare or declining. They are Pink Waxcap (*Hygrocybe calyptiformis*), Date-coloured Waxcap (*H. spadicea*) and Olive Earth-tongue (*Microglossum olivaceum*). Following the 2006 review of BAP, it has been proposed that two new species are added - Bloxam's Blue Pink-gill (*Entoloma bloxamii*) and Purple Earth-tongue (*Geoglossum atropurpureum*). The Pink Waxcap (*Hygrocybe calyptiformis*) is likely to be dropped from the UKBAP priority species list, but retained as a flagship species for ‘waxcap-grassland’ fungi. All three of the original BAP species and one of the additions have been recorded in Pembrokeshire. This document gives an update on the local status of all five.

For each species we present details of identification, local status (with tetrad maps) and local ecology, followed by lists of sites at which the fungus has been recorded, in hectad order.

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Bloxam's Blue Pink-gill

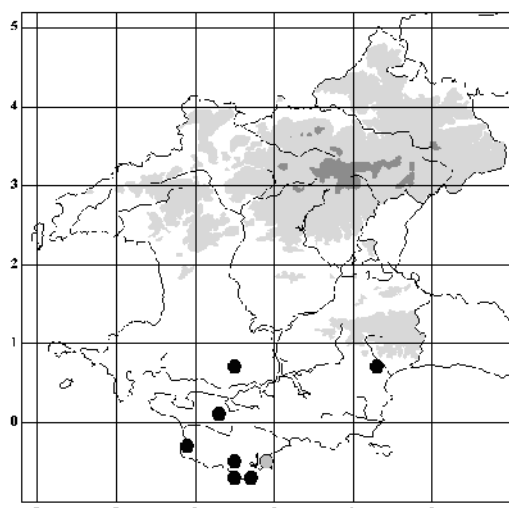
Entoloma bloxamii

Identification



This chunky dark blue toadstool is unique in a grassland context. Its cap, stem and flesh are all blue; its gills are off-white or pinkish. Other dark blue *Entoloma* in subgenus *Leptonia* are much slenderer. The Blewits (*Lepista* spp.), which sometimes grow in grasslands, are lilac or purple rather than dark blue.

Local Distribution



This is the second rarest of the four BAP grassland fungi currently known from Pembrokeshire. Records come from five fungus-rich sites in the southern half of the county, four of which are known to be among the best waxcap grasslands in Pembrokeshire, whilst the fifth (Sardis Chapel) has only

been visited once, but clearly supports a diverse grassland fungus assemblage.

Records run from 4th October to 23rd November, but most come from the last two weeks of October.

Local Ecology

Bloxam's Blue Pink-gill has relatively wide ecological preferences, occurring in neutral and calcicolous grasslands, but is entirely restricted to sites with low nutrient levels. Two colonies are in calcicolous grassland on the south coast; the others are in grazed unimproved neutral grassland at Somerton Farm, and mown remnants of unimproved grassland in two cemeteries.

Entoloma bloxamii has been found on some of the richest of Pembrokeshire's grassland fungus sites. All five support at least 16 CHEGD species and they include the richest grassland fungus site in the county, Somerton Farm, where the colonies were found near the top of west-facing slopes of tightly-grazed, unimproved, neutral grassland on Old Red Sandstone, in which Birdsfoot Trefoil (*Lotus corniculatus*), Ribwort Plantain (*Plantago lanceolata*) and Rough Hawkbit (*Leontodon hispidus*) are all frequent. The southern calcicolous swards show a maritime influence and include some Sea Plantain (*Plantago maritima*) and Spring Squill (*Scilla verna*) as well as Lady's Bedstraw (*Galium verum*), Betony (*Stachys officinalis*) and Devil's Bit Scabious (*Succisa pratensis*). The turf at the other two sites is a moderately forb-rich sward of Common Bent (*Agrostis capillaris*), Ribwort Plantain (*Plantago lanceolata*) and Red Clover (*Trifolium pratense*).

Population Details

SM90

Site 1: Honeyborough Cemetery

A single fruitbody was photographed by Sam Bosanquet near the eastern end of the main open lawn on 3rd October 2005, in an area that also supports *Hygrocybe ovina* and *H. ingrata*. More than 10 other visits have failed to reveal any more examples of *E. bloxamii*.

Site 2: Somerton Farm

Bloxam's Blue Pink-gill was first recorded in 2005, with fruitbodies observed in two compartments. Six fruitbodies were produced in 2006 (see photograph), though at only one location.

SN10

Site 3: Sardis Chapel

The first PFRN visit to this site, by Sam Bosanquet on 23rd November 2006, revealed two fruitbodies of *E. bloxamii* in the graveless western corner of the chapelyard.

SR89/99

Site 4: Castlemartin Ranges

There are five records of *E. bloxamii* from the coastal calcicolous grasslands of the Castlemartin Ranges, from five different sites running from Linney Head (Range West) to St Govan's (Range East). Four were made by Shelley Evans (Griffith *et al.*, 2006), the fifth by the PFRN. This is clearly a key site of Bloxam's Blue Pink-gill in Pembrokeshire and maybe in the UK as a whole.

Site 5: Stackpole NNR

Peter James reported *E. bloxamii* from Compartment 62 at Stackpole in November 2000. This is an area of wooded dunes, but the *Entoloma* presumably occurred in an open section.

Pink Waxcap

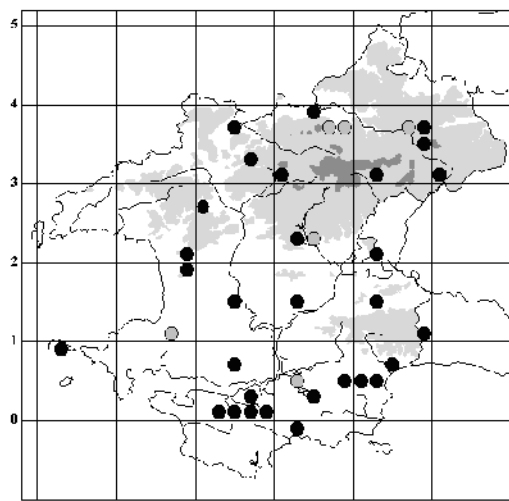
Hygrocybe calyptriformis

Identification



No other British fungus looks like Pink Waxcap, thanks to its combination of a bright pink, conical cap and a white stem. Because of this, and its tendency to grow in at least moderately species-rich sites, it makes an ideal ‘flagship’ species for the waxcap grasslands habitat.

Local Distribution



Prior to the formation of the PFRN in 2004, there were just seven Pembrokeshire records of Pink Waxcap. Most of these came from the northern half of the county and they included three made by Matt Sutton and singles by Sarah Andrews and Nigel Stringer during visits from Carmarthenshire. At this stage, *H. calyptriformis* appeared to be genuinely scarce in Pembrokeshire.

We now have over 50 records of Pink Waxcap from an astonishing 42 sites scattered all over the county. The number of fruitbodies varies considerably from site to site, and many only hold a few at a time. The highest counts come from Brambley Lays and Carew Castle, but there are also reasonably large colonies at Crymych Cemetery, Hayscastle Cross Chapel and Somerton Farm. The lack of records from some of our most species-rich waxcap grasslands – notably the Castlemartin Ranges and Milford Haven Cemetery – is remarkable.

Local Ecology

Pink Waxcap grows in unimproved or semi-improved neutral grassland throughout Pembrokeshire. Over half the records (24 sites) are from cemeteries, chapelyards and churchyards, reflecting Sam Bosanquet’s focus on these sites; the remainder come from pastures, including on SSSIs at Carew Castle, Ty Canol and Wyndrush.

Most of the known Pembrokeshire colonies of *H. calyptriformis* are in reasonably species-rich grassland, but some of those in churchyards are pushing their fruitbodies up through dense, species-poor grass swards. Despite the popular impression that “if you find Pink Waxcap, you’ll find at least another seven species”, it is one of just a handful of grassland fungi at some sites and the only one recorded at a couple of sites. Pink Waxcap is by no means a common fungus – it is absent from great swathes of improved grassland in Pembrokeshire – but it cannot really be regarded as the great rarity that people once took it to be.

Population Details

Because there are records of Pink Waxcap from 42 sites, there is insufficient space to go into the details of each one. For that reason we give just the maximum one-day count for each site (n/c indicates no count made).

SM70

Site 1: Skomer (1 Well Field, 4 Calves Park, n/c Shearing Hayes)

SM81

Site 2: Naples Farm, Keeston (n/c)
Site 3: Rosemoor, Walwyn's Castle (n/c)

SM82

Site 4: Roch Church (14)

SM90

Site 5: Goldborough Farm (n/c)
Site 6: Honeyborough Cemetery (3)
Site 7: Monkton Cemetery (10)
Site 8: Pembroke Cemetery (1)
Site 9: Pembroke Dock Military Cemetery (11)
Site 10: Somerton Farm (18)

SM91

Site 11: Haverfordwest Cemetery (9)

SM92

Site 12: Capel-y-bedyddwr, Hayscastle Cross (21)

SM93

Site 13: Fishguard Cemetery (7)
Site 14: Goodwick Moor, playing field behind (n/c)
Site 15: Goodwick, The Drim (n/c)
Site 16: Trecwn Church (4)

SN00

Site 17: Carew Castle (70)
Site 18: Paskeston (n/c)
Site 19: Wyndrush Pastures (10)

SN01

Site 20: Rosehill, Slebech (n/c)

SN02

Site 21: Step-aside Bridge (n/c)
Site 22: Walton East Church (2)

SN03

Site 23: Cwm Clydach (n/c)
Site 24: Newport Cemetery (1)
Site 25: Puncteston Cemetery (n/c)
Site 26: Ty Canol NNR (n/c)

SN10

Site 27: Brambley Lays (120)
Site 28: Churchton Church (2)
Site 29: Colby Lodge Meadow (2)
Site 30: Saundersfoot, Valley Rd (n/c)

SN11

Site 31: Crunwre Church (11)
Site 32: Narberth Crematorium (14)

SN12

Site 33: Llandissilio Cemetery (3)
Site 34: Llandissilio Chapel (1)
Site 35: Nantyffin Cemetery (1)

SN13

Site 36: Blaenffos Chapel (n/c)
Site 37: Crymych Cemetery (24)
Site 38: Llanfair Nant Gwyn Church (n/c)
Site 39: Mynachlogddu Cemetery (4)
Site 40: Rhos Fach (2)

SN23

Site 41: Hermon Cemetery (4)

SS09

Site 42: Cleggar's Farm, Lamphey (n/c)

Date-coloured Waxcap

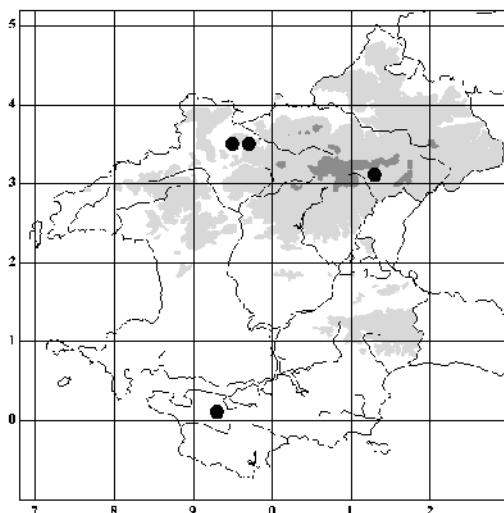
Hygrocybe spadicea

Identification



The combination of a brown cap and a yellow stem is unique to *H. spadicea* in a grassland fungus context. Various much commoner species go brown as they decay, especially *H. chlorophana*, so records should be based on fresh specimens. The more slender Mouse-pee Pink-gill (*Entoloma incanum*) has a yellow stem and a dark cap, but bruises green (*H. spadicea* does not change colour on bruising) and is very smelly.

Local Distribution



This is the rarest of our BAP grassland fungi. The first Pembrokeshire record was from Esgyrn Farm in October 2004 (wrongly reported as Somerton Farm by Griffith *et al.*, 2006 p. 20). The others from Rhos Fach and Somerton Farm in autumn 2006, a good year for *H.*

spadicea fruiting in Wales. A rumour that *H. spadicea* was recorded during the CCW Phase II survey of Jeffreyston Pastures SSSI was based on misinterpretation of a record of *H. intermedia* (G.S. Motley pers. comm.). Colonies of Date-coloured Waxcap are scattered throughout Britain (BMS database), and far more are now known than at the time when the BAP list was originally drawn up. The Esgyrn colony is relatively large, but those at Rhos Fach and Somerton are small and appear sporadically.

Local Ecology

Unlike almost all the other grassland fungi recorded in Pembrokeshire, which are regular on mown sites, Date-coloured Waxcap is known here only from grazed land. Whether this is a genuine reflection of its ecological requirements or just an artefact of its local rarity is uncertain. The grazing stock varies between the three sites – guanaco at Esgyrn; sheep and ponies at Rhos Fach; and organic cattle at Somerton – but all sites have short swards in the autumn.

All three of the Pembrokeshire sites that hold *H. spadicea* are known to support over 20 grassland fungus species, so it is restricted to truly exceptional localities. Both Esgyrn and Rhos Fach have semi-improved acid swards that include Common Bent (*Agrostis capillaris*), Fescues (*Festuca* spp.) and Tormentil (*Potentilla erecta*) and both also support the uncommon *Hygrocybe splendidissima*. The grassland at Somerton Farm is neutral and more forb-rich with Birdsfoot Trefoil (*Lotus corniculatus*), Ribwort Plantain (*Plantago lanceolata*) and Rough Hawkbit (*Leontodon hispidus*) present in the same compartment.

Population Details

SM90

Site 1: Somerton Farm

A compact group of 4 fruitbodies was observed and photographed (see photo) by David Harries on a north-facing, unimproved, neutral grassland slope on 20th November 2006.

SM93

Site 2: Esgyrn Farm

Shelley Evans recorded 19 fruitbodies of *H. spadicea* in the grassland fungus recording quadrat on 22nd October 2004 (Griffith *et al.*, 2006). Associates in the quadrat include several species that are uncommon in Pembrokeshire, including *H. mucronella*, *H. nitrata*, *H. reidii* and *H. splendidissima*.

SN13

Site 3: Rhos Fach

A single fruitbody of Date-coloured Waxcap was photographed by Sam Bosanquet in semi-improved acid grassland north of the road across the Rhos Fach common on 14th October 2006.

Purple Earth-tongue

Geoglossum atropurpureum

Identification



Purple Earth-tongue is intermediate in appearance between other *Geoglossum* spp. and the (usually) green *Microglossum olivaceum*. Its stem and fertile area are relatively less well differentiated than in most other *Geoglossum* and it also tends to look uniformly matt black when dry. A microscope is needed for confident identification.

Local Distribution

There are currently no Pembrokeshire records of this BAP species.

Local Ecology

Most of the other south Wales colonies of *G. atropurpureum* are on steep calcicolous grassland (eg. in the Brecon Beacons National Park; see photo). In Northern Ireland, Purple Earth-tongue grows in old semi-natural grasslands in habitats ranging from upland acidic grassland to sand dunes to neutral grasslands (including a churchyard). It is highly likely that a colony will be found in Pembrokeshire some time soon. Microscopic checking of all *Geoglossum/Trichoglossum* specimens is essential for identification, so members of the PFRN regularly check any earthtongues that they encounter.

Olive Earth-tongue

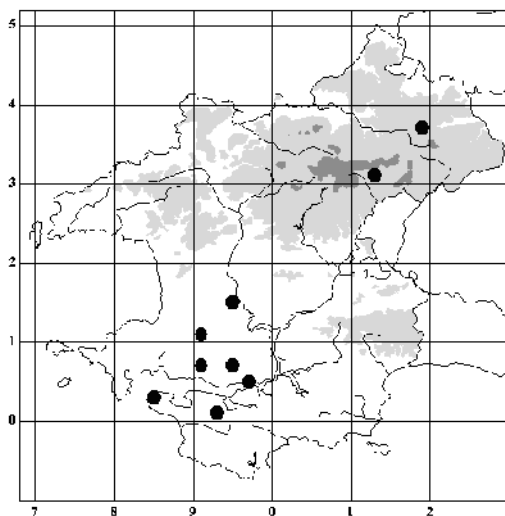
Microglossum olivaceum

Identification



Olive Earth-tongue is one of only two British members of the genus *Microglossum* and is the only green or mid-brown Earth-tongue recorded from Pembrokeshire. The remaining Pembrokeshire Earth-tongues are black in colour and belong to the genera *Geoglossum* and *Trichoglossum*.

Local Distribution



Most of the 9 known colonies of Olive Earth-tongue in Pembrokeshire are in the county's lowlands, around the towns

of Haverfordwest, Milford Haven and Pembroke Dock. All were found for the first time in 2004 or 2005. Two outlying colonies near Mynachlogddu were discovered in 2006, suggesting that *M. olivaceum* might be more widespread in north Pembrokeshire than had been thought.

The Pembrokeshire colonies reflect the South Wales bias to the UK population: most of the British colonies listed in the BMS database are in South Wales, with a concentration in the Brecon Beacons National Park. From this standpoint, the Pembrokeshire sites are significant for the species' conservation.

Local Ecology

All of the Pembrokeshire colonies of Olive Earth-tongue are in very short, mown or tight-grazed neutral grassland. Most of those in the south are in remnants of unimproved grassland that are now managed through mowing, either as cemeteries (4 sites) or amenity grassland (1 site), although the others are an organic cattle farm and an area of coastal grassland. One of the northern colonies is on a secondary bank, supporting semi-improved grassland, on common land fringing Mynydd Preseli. Olive Earth-tongue is restricted to some of the richest of Pembrokeshire's grassland fungus sites. All support at least 14 CHEGD species and they include the best grassland fungus site in the county, Somerton Farm. The sward around the colonies is consistently very short, typically being composed of Common Bent (*Agrostis capillaris*), Field Woodrush (*Luzula sylvatica*), various herbs, such as Rough Cat's-ear (*Leontodon hispidus*), and the moss *Rhytidiadelphus squarrosus*. This grassland composition reflects the very low nutrient levels at all sites.

Population Details

SM80

Site 1: East Block House, Angle

A few very small specimens were recorded by Holly Harries and Jane Hodges in October 2004. Fruitbodies were observed in a patch of bare soil with close-cropped, short vegetation near the coast path, in an area with Old Red Sandstone bedrock.

SM90

Site 2: Honeyborough Cemetery

This is the second largest known colony of Olive Earth-tongue in Pembrokeshire, with a maximum count of 150+ fruitbodies on 1st November 2005. It comprises at least two sub-colonies: one in turf near the cemetery's south-eastern corner and one towards the south-eastern corner of the central lawn. The latter has even colonised a grave from 1966, suggesting that the colony will be able to persist even when the fungus-rich central lawn is filled with new graves.

Site 3: Llanion Park

The population sits on the lawn at the top of a low bank beside the PCNP Office in Llanion Park. A maximum of 55 fruitbodies of Olive Earth-tongue have been counted there. Records come from late October and early November 2004 and 2005. None were recorded in 2006, despite checking. The photo is from this colony.

Site 4: Milford Haven Cemetery

Three patches of 21, 15 and 9 fruitbodies were recorded near the middle of the cemetery on 23rd October 2005. All were in very short turf mixed among graves. A return visit in November 2006 failed to find any *M. olivaceum*, backing up the feeling that 2006 was a poor year for this species in Pembrokeshire.

Site 5: Somerton Farm

Pembrokeshire's first colony was recorded at Somerton Farm by Shelley Evans on 24th October 2004. The species occurs in three compartments, with the largest total (350+, including 190 in one compartment) recorded in 2004. Similar numbers were recorded in 2005 but, although present in all three compartments, numbers were much reduced in 2006.

SM91

Site 6: Haverfordwest Cemetery

Two small colonies of Olive Earth-tongue have been found here, on 22nd October 2005 and 23rd November 2006. They are near each other in the cemetery's north-east corner: in short turf among old graves and on a bank by the main cemetery track.

Site 7: Tier's Cross Cemetery

The colony of Olive Earth-tongue at Tier's Cross Cemetery is restricted to the far (south) end of the short-turf 'path' that divides the cemetery into two parts. There it is locally abundant: Sam Bosanquet counted 90+ fruitbodies on 2nd November 2005.

SN13

Site 8: Blaenffos Chapel

This was the last colony of Olive Earth-tongue to be found in Pembrokeshire. Two patches of *ca.*10 fruitbodies were noted in short turf just east of the chapel and near the middle of the chapelyard on 9th December 2006.

Site 9: Rhos Fach

On 11th November 2006, Sam Bosanquet counted 18 fruitbodies of *M. olivaceum* on a grassy mound at the east end of the common, immediately east of a track running south from the road to a house. This site is a long way from other known colonies of Olive Earth-tongue, suggesting that it might still be overlooked in north Pembrokeshire.

Discussion

The status of individual species of grassland fungi in Pembrokeshire is now much better known than it was even three years ago. The PFRN grassland fungus database now holds over 2200 records from over 200 sites. However, much remains to be done before we can be confident that we have found almost all of the top waxcap grasslands in Pembrokeshire. Some of the most important sites were identified by the CCW contracted survey (Griffith *et al.*, 2006), but many others with diverse assemblages that qualify as at least of Welsh importance were not included. The PFRN will produce a more detailed assessment once our data are complete enough.

For the moment, the National BAP fungi identify relatively successfully the most diverse grassland fungus sites in the county, providing small colonies of Pink Waxcap are discounted. Date-coloured Waxcap is restricted to three of our undoubted outstanding sites, only one of which is currently a (partial) SSSI. Bloxam's Blue Pink-gill is characteristic of the south Pembrokeshire limestone, which may hold a nationally significant population, with outlying colonies on three species-rich sites elsewhere in the south of the county. Olive Earth-tongue is present at almost all of our richest cemetery sites, as well as a few grazed grasslands. 2006 was a poor year for the last of these species and it seems likely that further colonies will be found in some of the richest northern cemeteries, such as at Maenclochog, Crymych, Mynachlog-ddu and Puncheston, which have so far only been visited in autumn 2006.

Most of Pembrokeshire's BAP grassland fungi are well protected thanks to appropriate management on the key pasture sites, particularly the Castlemartin Ranges, Esgyrn Farm and Somerton Farm. This is through the goodwill of the owners and managers rather than through any management agreements tailored to benefit the fungi. Part of the Castlemartin Ranges is SSSI for various features and most of the current fungus interest lies within the SSSI. Both Esgyrn and Somerton are currently managed sympathetically, the latter with waxcap-grassland fungi particularly borne in mind, but the importance of both sites is not otherwise recognised, despite Somerton clearly sitting high up the top 30 UK sites.

The richest cemeteries, especially those with Olive Earth-tongue, are managed through regular mowing and removal of grass clippings, a practise that keeps them looking neat and also benefits their fungi. How aware the cemetery managers are of the rarity of their fungi is uncertain. It is an unfortunate and inevitable fact that although cemeteries protect patches of unimproved grassland from fertilisers and the plough, their managers end up digging those grasslands up and putting graves in them. Three colonies of Olive Earth-tongue are mixed among the graves at Haverfordwest, Honeyborough and Milford Haven Cemeteries, showing that this species can recolonise/survive when graves are put in. However, visits make it strikingly clear that the richest parts of all our cemeteries are those in which there are currently no graves.

In conclusion, our initial recording efforts suggest Pembrokeshire compares well with other Welsh counties in the distribution and numbers of UKBAP waxcap-grassland priority species. This appears to be mirrored in the wider range of grassland fungi, with Clavariaceae and certain *Hygrocybe* species particularly well represented.

Acknowledgements

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