Welsh Government

M4 Corridor around Newport

Environmental Statement Volume 3: Appendix 10.33

Waxcap Survey 2015

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Summary

S.1 Dr Peter Sturgess has undertaken a survey of grassland fungi at two grassland sites along the route of the proposed M4 Corridor around Newport (M4CaN) between Castleton and Magor to inform the ecological baseline for the Environmental Impact Assessment (EIA) of the M4CaN Scheme. The EIA is reported in the M4CaN Environmental Statement (ES) of which this document is an appendix to the chapter on Ecology and Nature Conservation.

S.2 This survey involved two visits to each grassland site located at Pwll Diwaelod and Pound Hill, which were timed to coincide with the main fruiting period for waxcaps. A total of eight waxcap species were observed at Pwll Diwaelod and seven at Pound Hill. No nationally rare species were recorded.

S.3 The waxcaps at Pwll Diwaelod were limited to common species at a relatively low density and none were found in the damper parts of the site. The nature conservation value of the waxcap population has been assessed as being important in a local context.

S.4 The grassland at Pound Hill has not been grazed by horses since 2014, so the vegetation was in a sub-optimal condition at the time of the survey and waxcaps were only observed in a few patches that had been grazed by rabbits. A relatively high density of waxcaps was recorded in the few short-grazed parts, and these included *Hygrocybe punicea* and *H.calyptriformis*, which are usually associated with sites of higher value for fungi. The nature conservation value of the waxcap population at Pound Hill has been assessed as being important in at least a local context. However, it is possible that some additional waxcap species may be present that were inhibited from fruiting by the cessation of management prior to the survey.

1 Introduction

1.1.1 Dr Peter Sturgess has undertaken a grassland fungi survey at two sites along the route of the proposed M4 Corridor around Newport (M4CaN) between Castleton and Magor to inform the ecological baseline for the Environmental Impact Assessment (EIA) of the Scheme. The selected grassland sites were located at Pound Hill and Pwll Diwaelod, near the western end of the proposed new section of motorway. These sites were selected as being potentially suitable for supporting grassland fungi following vegetation surveys undertaken during 2014 and 2015. The EIA is reported in the M4CaN Environmental Statement (ES) of which this document is an appendix to the chapter on Ecology and Nature Conservation.

1.1.2 This document describes the methodology used (Section 2) and summarises the key findings (Section 3). It also provides an assessment of the biodiversity value of the fungi communities (Section 4).

2 Survey Method

2.1.1 The fieldwork and assessment were undertaken by Dr. Peter Sturgess CEnv MCIEEM, who is experienced in surveys for grassland fungi. Peter Sturgess was already familiar with both survey sites, having undertaken vegetation surveys during 2014 (Pound Hill) and 2015 (Pwll Diwaelod).

2.1.2 Both sites were visited twice during the autumn, with visits timed to coincide with peak fruiting periods for grassland fungi. The survey dates were 13th October and 10th November 2015. The weather during both visits was favourable for this type of survey: i.e. mild and damp, with no frost prior to either visit.

2.1.3 The survey was undertaken using a simple walk-through method, walking a series of transects, aiming to pass within 5 m of all potentially suitable grassland. The surveyor stopped to make longer, more detailed study of any areas judged to be particularly favourable habitat. The best areas for waxcaps are typically areas of short grass on well-drained soils with a low nutrient status, and which have not been subject to agricultural improvement (Boertmann, 2010).

2.1.4 Survey effort was focussed on recording waxcaps (Hygrocybe spp.). The surveyor identified most species of waxcap fungi in the field, but in some cases it was necessary to collect specimens for microscopic examination. In addition to waxcaps, the surveyor also recorded fairy-club fungi (Clavariaceae) and earth-tongues (Geoglossaceae), because these can also be good indicators of nature conservation value for fungi (Griffiths *et al.,* 2013). Other readily identifiable fungi were noted incidentally, although no attempt was made to record them all to species level.

2.1.5 Recording was carried out by mapping the distribution of fruiting bodies using a simple dot on a map to mark the location of each species (either for an individual fruiting body or a group of them in the same location). The exact numbers were not counted. The fungi were mapped by eye onto a detailed aerial photographic base plan. It was not always possible to identify waxcaps that were very old or damaged.

3 Survey Findings

3.1 Introduction

3.1.1 Survey findings are presented separately for each site, with tabulated data and a short summary account. The results are also presented diagrammatically in Figures 1 and 2, which show the locations of the species of grassland fungi recorded during the survey. Photographs of specimens of fungi from the two sites are attached to this report.

3.2 Pwll Diwaelod, Castleton

3.2.1 The fields are grazed by horses and cattle. They have a gently undulating topography and a range of grass heights. The area to the north east of the pond appears to be the driest, and supports the greatest range of waxcap species. Other concentrations of waxcaps were seen at the margins of the central valley and on the slope at the south western boundary. Much of the site is very damp, or heavily trampled, and no fungi were noted in these conditions.

Table 3.1: Observations from Pwll Diwaelod

Species	13th Oct	10th Nov
Waxcaps		
Hygrocybe chlorophana		+
Hygrocybe conica	+	+
Hygrocybe glutinipes	+	+
Hygrocybe insipida	+	+
Hygrocybe pratensis		+
Hygrocybe psittacina	+	+
Hygrocybe quieta	+	+
Hygrocybe virginea	+	+
Fairy-clubs		
Clavaria fragilis		+
Clavulinopsis helvola	+	+
Clavulinopsis laeticola	+	
Clavulinopsis luteoalba		+
Earth-tongues		
Geoglossum fallax		+
Additional species		
Conocybe sp.	+	
Coprinus commatus		+
Coprinus sp.		+
Cordyceps militaris		+
Entoloma spp.	+	+
Entoloma conferendum	+	
Galerina sp.		+
Hebeloma sp.		+
Lactarius quietus		+
Marasmius oreades	+	
Panaeolus sp.	+	+
Russula spp.	+	+

3.3 Pound Hill

3.3.1 When the site was surveyed during 2014, the grassland was grazed by horses and a high proportion of it appeared to be very favourable for fungi. However, the field does not appear to have been grazed during 2015, and the short grassland most suitable for waxcaps is limited to a few patches maintained by rabbit grazing.

Table 3.2: Observations from Pound Hill

Species	13th Oct	10th Nov
Waxcaps		
Hygrocybe calyptriformis		+
Hygrocybe chlorophana	+	+
Hygrocybe coccinea	+	+
Hygrocybe insipida	+	+
Hygrocybe pratensis	+	+
Hygrocybe punicea	+	
Hygrocybe reidii	+	+
Fairy-clubs		
Clavaria fragilis		+
Clavulinopsis helvola	+	
Additional species		
Bolbitius titubans		+
Entoloma spp.		+

4 Assessment

4.1.1 There are various ways of assessing the value of waxcap grasslands, but most focus on the total number of waxcap species, or the number seen in a single visit.

4.1.2 The Guidelines for the Selection of Wildlife Sites in South Wales (South Wales Wildlife Partnership, 2004) includes a section on fungi and states that the following should be considered for selection:

- *"all grassland sites supporting eight or more species of waxcap (Hygrocybe spp.);*
- *any site which supports a species, which is listed in the UK Red Data Book (NCC, 1987) or in the "Section 74 List" (WAG 2003);*
- *any site which supports a species recorded from ten or fewer 10 km grid squares in Wales (where the distribution is well known);*
- *any site which supports a species which is recorded from three or fewer sites within a Watsonian Vice County (where the distribution is well known); and*
- *any site which support a significant population of a National or Local Priority Species as listed in a Local Biodiversity Action Plan."*

4.1.3 It is noted that Section 74 of the Countryside and Rights of Way (CRoW) Act 2000 has now been superseded by the Section 42 List of the Natural Environment and Rural Communities (NERC) Act 2006.

4.1.4 On this basis, the Pwll Diwaelod site (a total of eight species of waxcap) would be considered for selection and the Pound Hill site (a total of seven species) would not. Neither site would qualify on the species rarity criteria (no Red Data Book, Biodiversity Action Plan or other nationally rare species).

4.1.5 The more recent Wales Wildlife Sites Guidelines (Wales Biodiversity Partnership, 2008) includes a system specifically for waxcaps, which is summarised below in Table 4.1.

Table 4.1: Summary of Wales Wildlife Sites Guidelines for Waxcap Grasslands

Conservation value	Number of waxcap species
National Importance	17-32 (or 11-20 during a single visit)
Regional (= County) Importance	9-16 (or 6-10 during a single visit)
Local Importance	4-8 (or 3-5 during a single visit)
No Importance	1-3 (or 1-2 during a single visit)

4.1.6 Based on this guidance, the survey findings indicate that both sites would qualify as being of at least Local Importance for nature conservation for their grassland fungi. If the number recorded in a single visit is used, then both sites would appear to reach the County Importance threshold, with eight species seen during a single visit to Pwll Diwaelod and six at Pound Hill. However, this is a rather crude method and very dependent on the conditions and time of year of the visit, so this has not been used for this assessment.

4.1.7 The Site of Special Scientific Interest (SSSI) selection criteria, for identifying sites that are important in a national context, include a similar approach, but require a

total of at least eighteen species, or twelve in a single visit. Neither site is close to this threshold.

4.1.8 If the relative rarity of species is considered, the waxcaps recorded at Pwll Diwaelod are generally amongst the more common and widespread species within waxcap grasslands in Wales (as identified by Griffiths *et al.*, 2003). Pound Hill, however, includes *Hygrocybe punicea* and *H.calyptriformis*, which are species with a more restricted occurrence. Although not especially rare, these latter species are generally confined to grasslands that have been free from agricultural improvement or disturbance for many decades. Their presence at Pound Hill suggests a generally higher quality site, and it may well be that if the grassland had remained grazed by horses as it had been in 2014, then several more species might have been recorded and it may have crossed the threshold for county nature conservation significance. Bratton (2003) identifies grazing or frequent mowing as being the best management for grassland fungi. Allowing grass to grow long appears to inhibit waxcaps from fruiting, but it is not known how long their mycelium is able to persist in the soil without suitable management.

4.1.9 The erratic nature of fungi fruiting inevitably means that a survey in any one year might not record all of the waxcap species at any particular site. This survey should therefore be regarded as a record of waxcaps seen during two visits in 2015, rather than a comprehensive list. It is possible that more species would be found if surveyed in other years. The year 2015 generally appears to have been a good year for waxcaps, although the unusually wet summer may have resulted in some species fruiting early and some species may have finished appearing before the first of the visits carried out for this survey.

4.1.10 There is currently no formally recognised standard survey methodology for grassland fungi. The current survey was based on transect walking and this is a sampling exercise which cannot guarantee to find every individual fruiting body. It is heavily influenced by the degree of survey effort, particularly the number and timing of survey visits, the distance between transect lines and the ability of the recorder to spot small fungi, especially within a dense grass sward. More survey visits would undoubtedly have resulted in additional fungi observations, but in this case, it is considered unlikely to have significantly altered the overall assessment.

4.1.11 Taking all of the observations and survey limitations into account, Pwll Diwaelod is considered to be of nature conservation value in a Local Context. Pound Hill appears to be important in at least a Local Context, but the presence of uncommon waxcaps, despite the recent cessation of management, suggests that it may have previously been of county significance and that the fruiting of additional species may have been inhibited by the tall, ungrazed vegetation.

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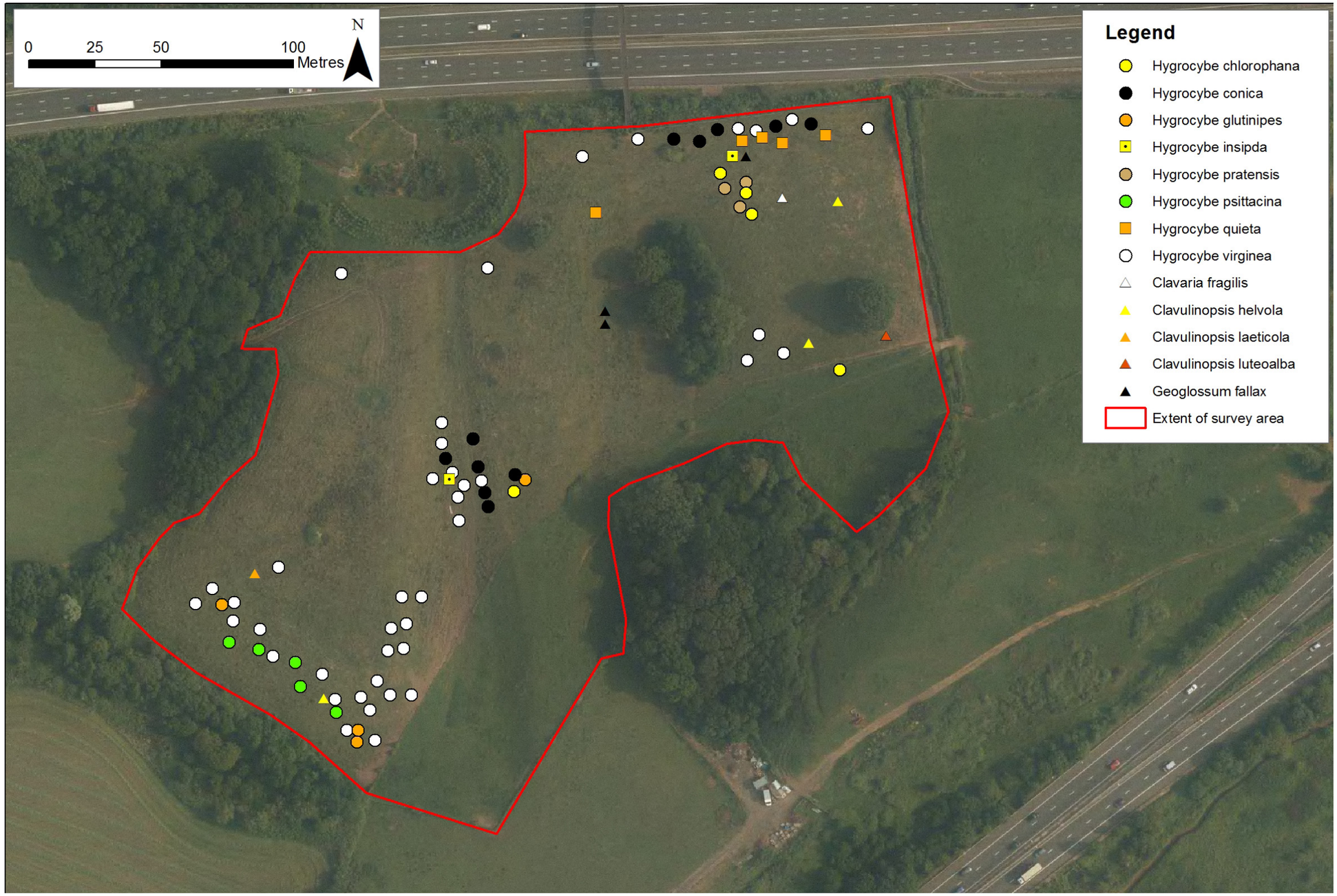
Figures



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Appendix 10.33 Waxcap Survey

Waxcap survey findings: Pwll Diwaelod

Figure: 1	Revision:
Date: March 2016	Status: AT ISSUE
Drawn: RM	Checked: NF

Scale: A3 @ NTS

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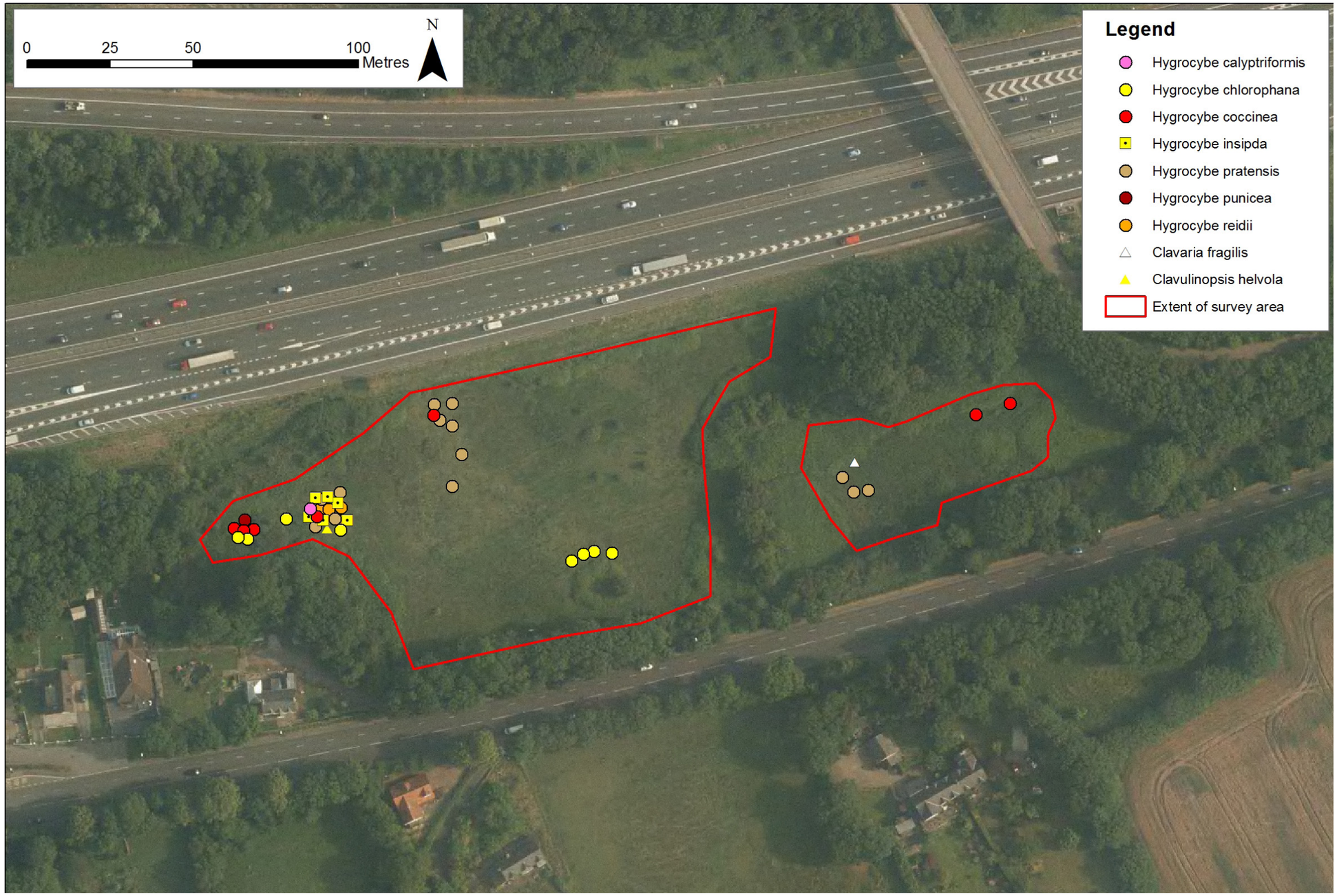

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Appendix 10.33 Waxcap Survey

Waxcap survey findings: Pound Hill

Figure: 2	Revision:
Date: March 2016	Status: AT ISSUE
Drawn: RM	Checked: NF

Scale: A3 @ NTS

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Photographs

Photo 1: Cattle-grazed grassland at Pwll Diwaelod.

Photo 2: Grassland beside motorway at Pwll Diwaelod, where the greatest diversity of waxcaps were found.

Photo 3. Ungrazed field at Pound Hill, showing short rabbit-grazed patch where waxcaps were observed.

Photo 4. Ungrazed grassland at Pound Hill, largely unsuitable for waxcap fruiting in its current condition.

Photo 5. *Hygrocybe calyptriformis* at Pound Hill (damaged specimens).

Photo 6. *Hygrocybe chlorophana* at Pound Hill.

Photo 7. *Hygrocybe coccinea* at Pound Hill.

Photo 8. *Hygrocybe conica* at Pwll Diwaelod.

Photo 9. *Hygrocybe glutinipes* at Pwll Diwaelod.

Photo 10. *Hygrocybe insipida* at Pound Hill.

Photo 11. *Hygrocybe pratensis* at Pound Hill.

Photo 12. *Hygrocybe psittacina* at Pwll Diwaelod.

Photo 13. *Hygrocybe punicea* at Pound Hill.

Photo 14. *Hygrocybe quieta* at Pwll Diwaelod.

Photo 15. *Hygrocybe reidii* at Pound Hill.

Photo 16. *Clavaria fragilis* at Pound Hill.

Photo 17. *Clavulinopsis luteoalba* at Pwll Diwaelod.

Photo 18. *Geoglossum fallax* at Pwll Diwaelod.