

Tyntesfield Waxcaps 2005 -2013

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Introduction

Tyntesfield is a Gothic Revival country house, on a ridge a few miles to the SW of Bristol. There was an earlier manor house, but the present buildings date from developments in the 1860s by William Gibbs, who, at the time, was one of the richest men in the UK. His money was based on the importation of guano from South America^{1,2}.

The house remained in the ownership of the Gibbs family until the death of Richard Gibbs in 2001. With no one in the family able to take on the Estate, it was put up for open auction. After a frantic few months the National Trust purchased the Estate in 2002. At this time the Tyntesfield Estate comprised 650 hectares. The present NT house and garden, now called simply Tyntesfield, is only 218 hectares, the remaining farmland and woodlands having been sold.

Initial visits

Our first visit in 2002 was as one of those privileged to be among the first to view the House. We made another visit in 2003. Both visits were made in November, and we well remember being impressed by seeing mushrooms as we disembarked from the bus. But, being largely ignorant of such things we took no action. However, in 2004, as a retirement present, I was presented with a book "Edible and Poisonous Mushrooms of the World" and our real interest in fungi began. Soon afterwards, we visited Tyntesfield again and again there were large numbers of fungi. So, when we joined the North Somerset and Bristol Fungus Group, we asked Roy Betts if he would be interested in surveying the fungi at Tyntesfield as part of the Group's conservation activities. Despite our ignorance, but perhaps influenced by our enthusiasm, he agreed and almost everything we know about fungi is down to him and to our visits to Tyntesfield. It has proved to be an excellent learning experience. We began surveying Tyntesfield in October 2005 and have visited the site at least once a month ever since, with supplementary visits when required.

We should acknowledge here the support we have received from Tyntesfield, especially the efforts made by the Garden Team to maintain the lawns, as much as they are able, in a fungus-favourable way. In particular, the lawns have been cut regularly and have not received any direct fertilizer or pesticides, though it has not been possible to remove the grass clippings.

Tyntesfield exhibited a startling display of fungi on our very first visit in October 2005. We found the lawns covered in richly coloured Waxcap fungi, including the Pink (Ballerina) Waxcap (Fig. 1), which at the time was one of only four BAP fungi in the UK. Subsequently Tyntesfield was to reveal two more BAP species.

We soon began a rapid and extensive learning curve. By the time the frosts came we had learnt to recognise several other species of Waxcap, including *H. chlorophana* (Golden Waxcap) and *H. coccinea* (Scarlet Waxcap) (Fig. 1), which were present in large numbers on several lawns. During the next few years the list of Waxcaps alone rose to 26, establishing Tyntesfield as an Internationally Important Site for Waxcap Fungi.



Figure 1. (Left to Right) *Hygrocybe calyptriformis* (Pink (Ballerina) Waxcap), *H. chlorophana* (Golden Waxcap) and *H. coccinea* (Scarlet Waxcap)

Following our wider studies of the fungi throughout the lawns, parkland and woodlands, the list of fungi at Tyntesfield has now risen to nearly 1000 – this does not include the lichens that have also been found there. A full list of these fungi can be found at:

<http://www.northsomersetandbristolfungusgroup.co.uk/tyntesfield-audits/>

Waxcaps and other grassland fungi

It should be emphasised that Tyntesfield is now a small site. These are mostly woodland (57 hectares) and pasture (141 hectares), with small gardens and lawns (20 hectares) around the house. The lawns that support the grassland fungi provide an area of less than 3 hectares. The site is calcareous and at a height of between 100 and 150 metres.

The full list the 26 Waxcap species^{3,4} is shown in Table 1. Amongst the rarer species are *Hygrocybe citrinovirens*, *H. flavipes* and *H. punicea*. The other grassland fungi, including Clavaroids, Entolomas and Earth Tongues are listed in Table 2. Most notably, these include *Entoloma incanum* and two BAP species *E. bloxamii* (recently reassigned as *E. madidum*) and *Microglossum olivaceum*. Other species commonly found on the lawns are *Dermoloma cuneifolium* and *D. pseudocuneifolium*, *Cystoderma amianthinum*, *Stropharia caerulea*, *S. inuncta* and *S. pseudocyanea*⁵.

Table 1: Waxcap Fungi at Tyntesfield

<i>Hygrocybe aurantiosplendens</i>	<i>Hygrocybe mucronella</i>
<i>Hygrocybe calyptriformis</i> var. <i>calyptriformis</i>	<i>Hygrocybe phaeococcinea</i>
<i>Hygrocybe ceracea</i>	<i>Hygrocybe pratensis</i> var. <i>pallida</i>
<i>Hygrocybe chlorophana</i>	<i>Hygrocybe pratensis</i> var. <i>pratensis</i>
<i>Hygrocybe citrinovirens</i>	<i>Hygrocybe psittacina</i> var. <i>perplexa</i>
<i>Hygrocybe coccinea</i>	<i>Hygrocybe psittacina</i> var. <i>psittacina</i>
<i>Hygrocybe conica</i>	<i>Hygrocybe punicea</i>
<i>Hygrocybe flavipes</i>	<i>Hygrocybe quieta</i>
<i>Hygrocybe glutinipes</i> var. <i>glutinipes</i>	<i>Hygrocybe reidii</i>
<i>Hygrocybe helobia</i>	<i>Hygrocybe russocoriacea</i>
<i>Hygrocybe insipida</i>	<i>Hygrocybe splendidissima</i>
<i>Hygrocybe intermedia</i>	<i>Hygrocybe virginea</i> var. <i>ochraceopallida</i>
<i>Hygrocybe irrigata</i>	<i>Hygrocybe virginea</i> var. <i>virginea</i>

The importance of the site was recognised a few years ago when the late Justin Smith proposed the site to Natural England as an SSSI, based solely on the grassland fungi found there.

It should be noted that because the lawns support several large trees, many mycorrhizal species also occur on the lawns, clearly associated with the oaks and cedars. These include *Russula parazurea*, *R. cuprea* and *R. luteotacta*, *Amanita rubescens*, *Lactarius fulvissimus* and *L. semisanguifluus*, as well as many species of *Agaricus*.

Table 2: Other Grassland Fungi at Tyntesfield

<i>Clavaria acuta</i>	<i>Entoloma incanum</i>
<i>Clavaria fragilis</i>	<i>Entoloma infula</i> var. <i>infula</i>
<i>Clavaria fumosa</i>	<i>Entoloma lampropus</i>
<i>Clavulina cinerea</i>	<i>Entoloma longistriatum</i> var. <i>longistriatum</i>
<i>Clavulinopsis corniculata</i>	<i>Entoloma longistriatum</i> var. <i>sarcitulum</i>
<i>Clavulinopsis fusiformis</i>	<i>Entoloma poliopus</i> var. <i>parvisporigerum</i>
<i>Clavulinopsis helvola</i>	<i>Entoloma poliopus</i> var. <i>poliopus</i>
<i>Clavulinopsis laeticolor</i>	<i>Entoloma porphyrophaeum</i>
<i>Clavulinopsis luteoalba</i>	<i>Entoloma rhombisporum</i> var. <i>floccipes</i>
<i>Dermoloma cuneifolium</i>	<i>Entoloma rhombisporum</i> var. <i>rhombisporum</i>
<i>Dermoloma pseudocuneifolium</i>	<i>Entoloma sericeonitens</i>
<i>Entoloma ameides</i>	<i>Entoloma sericeum</i> var. <i>sericeum</i>
<i>Entoloma atrocoeruleum</i>	<i>Entoloma serrulatum</i>
<i>Entoloma atomarginatum</i>	<i>Entoloma sodale</i>
<i>Entoloma bloxamii</i> (madidum)	<i>Entoloma turci</i>
<i>Entoloma chalybeum</i> var. <i>chalybeum</i>	<i>Entoloma vernum</i>
<i>Entoloma cocles</i>	<i>Geoglossum fallax</i>
<i>Entoloma exile</i>	<i>Geoglossum umbratile</i>
<i>Entoloma griseocyaneum</i>	<i>Microglossum olivaceum</i>

Tyntesfield Audits

Our initial aims were to learn about the fungi, to map them so that NT staff knew where they were and so able to take steps to conserve them. This led to a detailed survey of each of the different sites on the Estate. Data on the identification of the fungi and their precise location(s) on the Estate has been maintained on an Excel Database, thus allowing the analyses described below.

A map of the estate is shown in Fig. 2 and this lists some of the particular sites that have been studied. For example, individual parts of the South Lawns, the Aviary Lawn and Chapel Lawns, as well as to other parts of the site, eg, the East and West Plantation.

Figure 2. Map of Tyntesfield, showing important Waxcap lawns

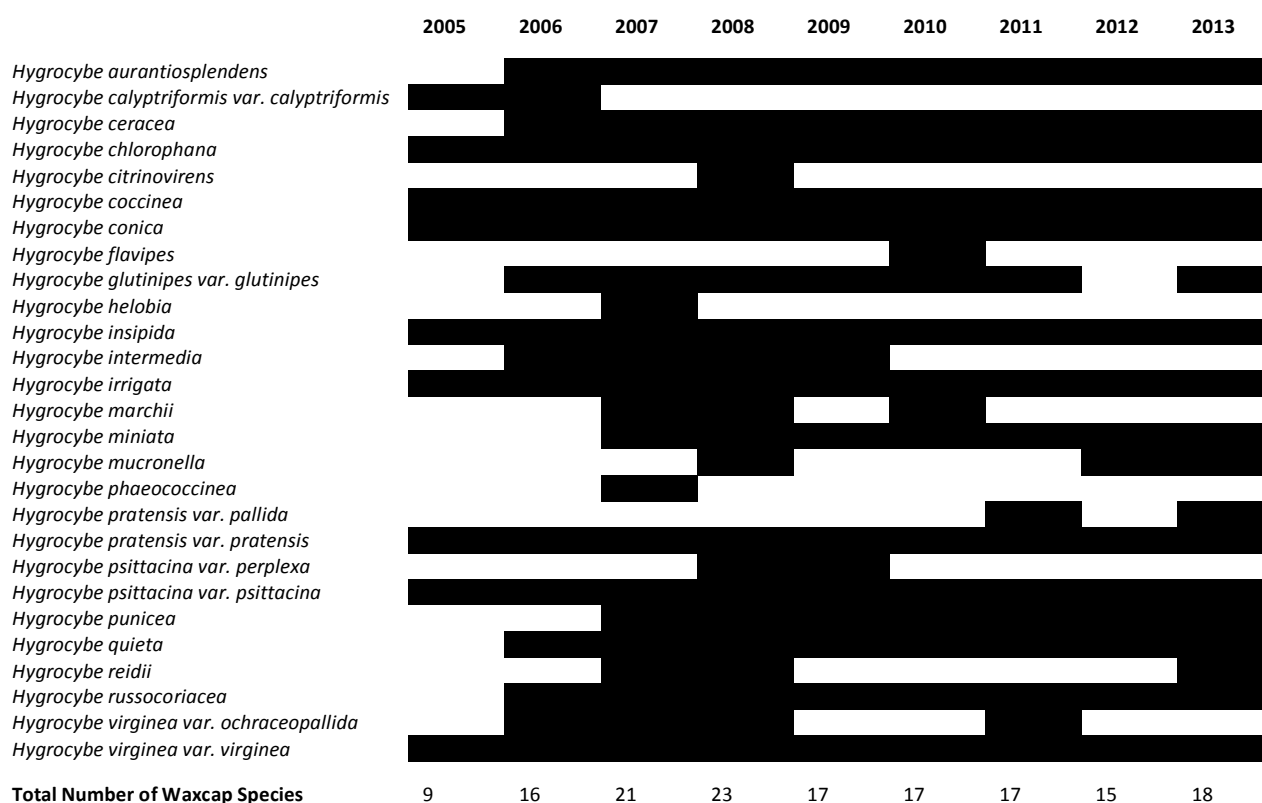


Please note that although emphasis has been placed on the Waxcap fungi on the lawns, some of these, including *H. ceracea*, *H. chlorophana*, *H. coccinea*, *H. psittacina* and *H. virginea* also prosper in the woodlands above the House.

Occurrence of Waxcaps 2005 -2013

A useful consequence of the data we have collected is that it allows us to assess the distribution of species over time. Thus, for example, we can plot the presence of waxcaps over the 9 year time scale (Fig. 3).

Figure 3. Occurrence of Waxcap fungi at Tyntesfield 2005 - 2013

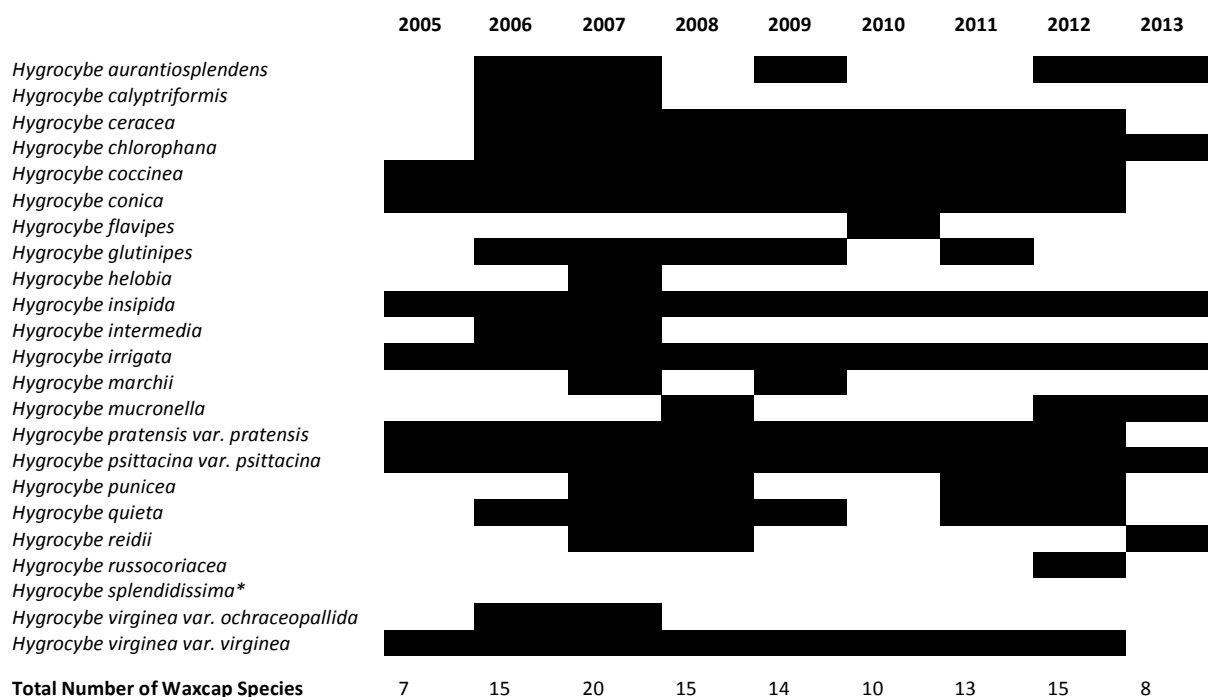


Such analyses clearly show that the occurrence of Waxcap fruiting bodies is extremely variable. Some species are recorded most years, eg. *H. chlorophana*, *H. ceracea*, *H. coccinea*, *H. insipida*, *H. irrigata*, *H. psittacina* and *H. virginea*, but others occur less frequently, and some, for example, *H. citrinovirens* and *H. flavipes* were only found in one year. It should also be noted that *H. calyptriformis* has not been seen since 2006. The numbers of individual species was greatest in 2007.

However, of much greater importance, this database allows us to look at individual parts of the Site and this we hope this will help local management of the lawns to optimise fungi conservation. The great variation in Waxcap numbers can be illustrated by reference to three lawns around the house.

South Lawns (Fig. 4). These two lawns are at the front of the house and both are typical lawn grass and moss with large cedars and an oak. Twenty-three Waxcap species have been found, including *H. aurantiosplendens*, *H. irrigata* and *H. flavipes*. The total number of species on this lawn was greatest (20) in 2007, only 8 appearing in 2013.

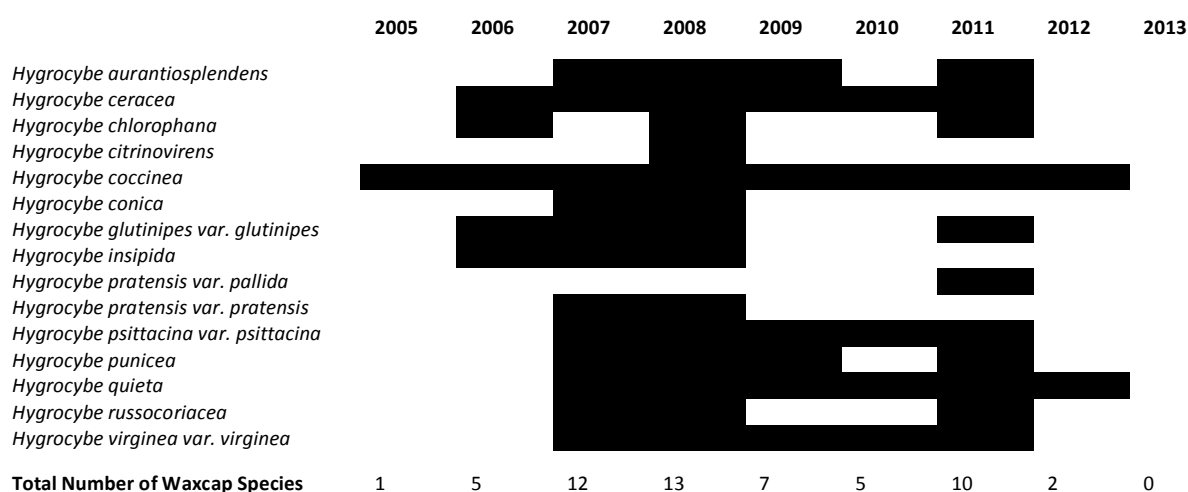
Figure 4. Occurrence of Waxcap fungi on the South Lawns 2005 – 2013



* Found for the first time in 2014

Aviary Lawn (Fig. 5). A similar story is seen on the Aviary Lawn where we have identified 15 species. In some years there were large numbers of Waxcap fungi, often including many fruiting bodies of *H. punicea*. This lawn showed a maximum number of species (13) in 2008, 10 in 2011, but we saw no waxcaps in 2013.

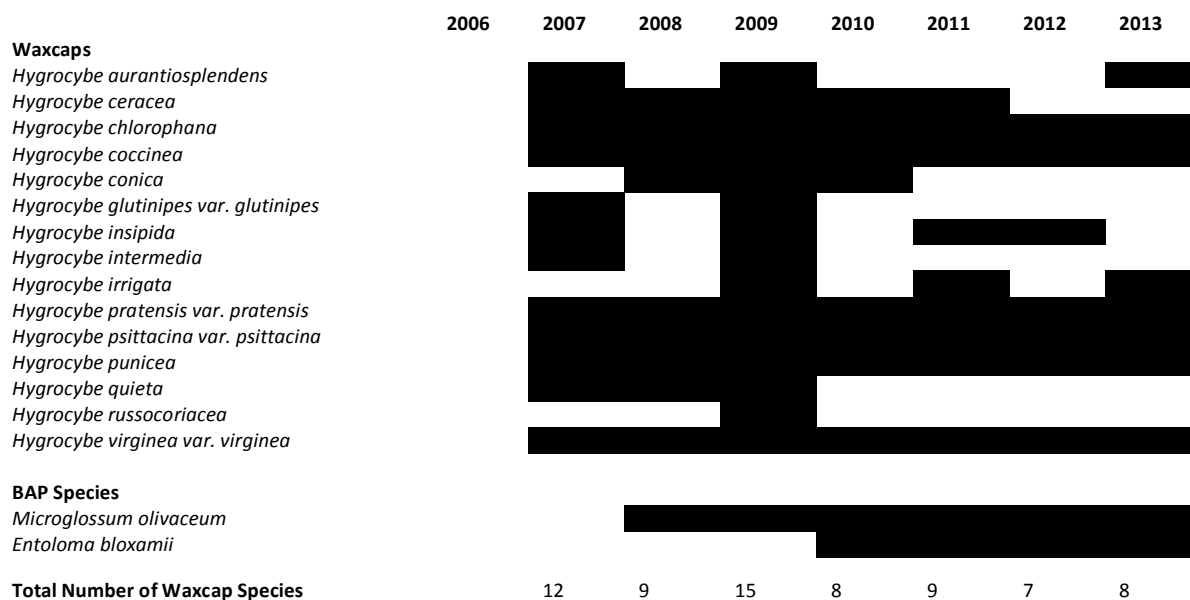
Figure 5: Occurrence of Waxcap fungi on the Aviary Lawn 2005 - 2013



Chapel Lawns (Fig. 6) : The final example features the Chapel Lawn which is split into two halves at the back of the House. The Western side has had some Waxcap fungi, but these largely disappeared following major excavations which were required when a new drain had to be installed. However, the

eastern part of the Chapel Lawns is becoming increasingly exciting. Fifteen waxcap fungi have been found to date, along with some woodland species. The very significant discoveries were 2 BAP species, *Entoloma bloxamii* and *Microglossum olivaceum*, the latter being present in very large numbers which appear to be increasing every year. The maximum number of Waxcap species was found in 2009.

Figure 6. Occurrence of Waxcap fungi, and other rare fungi, on the Chapel Lawn East 2006 – 2013



Causes of Waxcap Variation

Unfortunately our data is purely qualitative and we do not have quantitative data on the number of fruiting bodies produced each year. However it is clear that, from year to year, all these sites show considerable variation in the number of Waxcap species. What is the cause of this variation in waxcap fruiting bodies? Several factors may be involved.

a. Inherent variation in ability of different species to produce fruiting bodies. The most difficult aspect to understand and one that must have a very strong influence is the inherent ability of waxcaps to produce fruiting bodies. It is quite possible that one Waxcap species may be considered as rare simply because it fruits infrequently. We have no information as to the presence or otherwise of Waxcap mycelium in these lawns, though recent studies at Aberystwyth University have revealed the presence of waxcap DNA in grasslands that were not producing the corresponding fruiting bodies. It is not known what controls the production of fruiting bodies.

b. Changes to Tyntesfield. A great deal has changed since 2002, most notably the number of visitors to the House and Gardens, from just a few thousand in the first year to nearly 200,000 per year (Fig 7). There have also been small changes to many of the lawns. Prior to 2002, the lawns were cut with an old fashioned mower that removed the cuttings. Since 2002 the mowing of the lawns has been mostly contracted out and all the cut grass has been returned after cutting. It is well established that increased nutrients can reduce waxcap numbers and returned cuttings are one such source of nutrients. Additionally, although the lawns have not had any fertilizers or pesticides added to them directly, the old Portuguese Laurel Walk has been removed and replaced with young trees, This involved some disturbance of the South Lawns and local application of fertilizer to the newly planted trees. Disturbance and added fertilizer have both been reported to affect Waxcap numbers.

Figure 7: Visitor Numbers at Tyntesfield 2002 -2014

Year	No. of Visitors
2002	3,059
2003	26,117
2004	35,843
2005	51,424
2006	103,088
2007	114,301
2008	100,151
2009	104,451
2010	123,640
2011	218,551
2012	192,774
2013	220,318
2014 (to mid Dec)	195,723
Total	1,463,461

c. Changes to the local environment, such as changes to the weather, possibly influenced by climate change and aerial pollution may also be involved. In recent years the level of Nitrogen pollution in the air has risen steadily in Europe, due to car emissions and agriculture. In addition the weather has been extremely variable over the last 10 years, including the driest, the wettest and the coldest years “on record”.

Conclusions

When considering the various sites, it is clear that the Waxcaps on some areas of Tyntesfield have been more consistent in producing fruiting bodies than others. For example, The Aviary Lawn and some of the South Lawns seem to have fewer species than a few years ago, whilst the small Chapel Lawn East may actually have more Waxcap fungi, especially in terms of the numbers of fruiting bodies being produced, and the continuing prosperity of two BAP species.

We mentioned earlier our good relations with the Garden Team. Since 2012, they have improved the fencing around the Chapel Lawn to prevent casual use by the public. There are also no plans to improve this area. This area of the garden is thus protected from both over-exploitation and changes in use etc. Several waxcaps, including *H. punicea*, along with the two BAP species, *Entoloma bloxamii* and *Microglossum olivaceum*, seem to be safe and we expect them to thrive there. However, nothing can be done to control the vagaries of weather conditions to which they will be exposed in the future.

References

1. <http://www.nationaltrust.org.uk/tyntesfield/>
2. Miller, James (2004) Fertile Fortune: The Story of Tyntesfield National Trust, 192 pp
3. Boertmann, D. (2000), The Genus *Hygrocybe*. Fungi of Northern Europe - Volume 1. Svampetryk, Copenhagen, 184 pp.
4. Bas, C., Kuyper, T.W., Noordeloos, M.E. and Vellinga, E.C. (eds.) (1990), Flora Agaricina Neerlandica, Volume: 2. Rotterdam, 137 pp.
5. Knudsen, H and Vesterholt, J (2008) Funga Nordica. Nordsvamp, Copenhagen, 965 pp.