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## The Myco-herbarium at Hampshire County Council Museums Service: Storage and Preparation Issues

*Presentation given by Simon Moore*

*(Natural Sciences Conservator, Hampshire County Council Museums, Libraries and Archives Service)  
on 17<sup>th</sup> November 2005 to the NatSCA Botany Collections Seminar.*

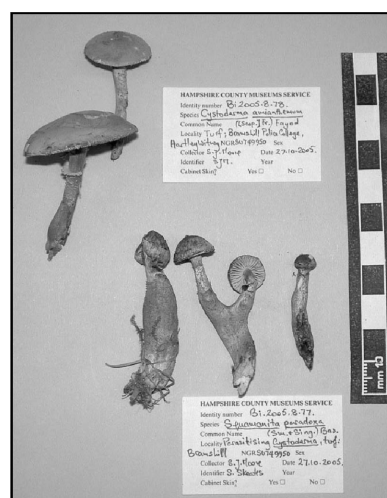
**Abstract**

The herbarium of macrofungi at HCCMS now contains over 2000 specimens. Of these, 90% are from Hampshire and over half of these are from the fungal rich New Forest. Apart from 345 specimens prepared by controlled air-drying, collected in 1974 by the then Keeper of Biology Simon Davey, the remainder of the collection has been freeze-dried. The advantages of using this technique over air-drying are shown.

**Introduction**

Hampshire has one of the richest and most diverse mycotae in the UK, largely due to the presence of the New Forest, which combines a mix of differing habitats – pinewood, deciduous, heathland, grassland, marsh and the ubiquitous presence of horse dung. Over 2,500 species have been recorded from there alone (about 88% of the British mycota) and the number increases each year. There are several groups of local experts, notably the Hampshire Fungus Recording Group (HFRG) comprising knowledgeable amateur mycologists who obtain permits to search the most remote and often restricted areas of the County. The resulting finds frequently comprise some unusual or rare species, many of which find their way to the HCCMS collections if the author is present on a particular foray day.

Figure 1: Archival photo of the rare and ominously named Powdercap Strangler, *Squamanita paradoxa* and its host the Powdercap, *Cystoderma amianthemum*



**Preparation**

Specimens are quickly frozen to prevent deterioration, although spore prints are taken from some to aid in identification. The spore prints are left to dry so that they adhere to the appropriately-coloured background. After at least 24 hours freezing at -23°C, the specimens are moved into an Edwards EF2 freeze-dryer (c. 1970) and freeze-dried at -25°C and at a vacuum decreasing to 0.01 atmospheres. After a few days the smaller fungi are ready, the larger and fleshier specimens or hardened brackets can take up to 2 weeks. The specimens are weighed once or twice a week to check their weight loss and once constant weight has been achieved they are transferred to a dehydration chamber (30% RH) to warm up to room temperature. They are then transferred to airtight polystyrene boxes, identified and labelled with all of their data recorded. Spore prints are stored with them as well.

Slide preparations of spores mounted in lactophenol blue will soon also become part of the collection.

About 10% of the specimens are sliced sagittally down the mid line and mounted on herbarium sheets within folders so that the generative cells can be examined more easily.

**Pros and Cons of freeze-drying**

Despite the sensitivity of freeze-dried specimens (see below), they are no more light or moisture sensitive than air-dried specimens. The chief advantage of this process is that the overall morphology of each fruiting body is unaltered from the day it was collected.

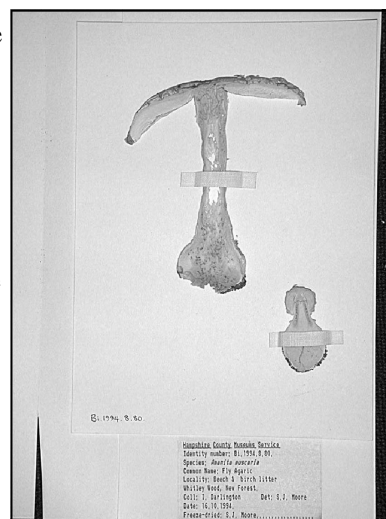


Fig. 2 Sagittal slice of *Amanita muscaria*, mounted on herbarium sheet with linen straps

There are those who have misconceptions about freeze-drying and worry that cell walls will collapse during the process. Bear in mind that freeze-drying maintains cell walls at exactly the same dimension as when the specimen was part of the living fungus. These do not thaw during the process so that exact cellular dimensions are correctly maintained.

Quenching specimens in liquid nitrogen will prevent tissue rupture through gradual growth of ice crystals (as in a freezer) and is certainly an advantage if available.

Purchasing a new freeze dryer is expensive and beyond the budgets of many smaller heritage organisations. Most will go for reconditioned models and these can be expensive to maintain, but over a long period, as compressors and vacuum pumps eventually need replacing and refrigerant gas leaks need topping up.

**Storage**

Fungal specimens are stored in airtight polystyrene boxes, the more fragile on beds of acid-free tissue or polyester batting for larger specimens. Batting is not used for specimens with characters that could snag. The boxes are stored in Treston plastic drawers arranged systematically in metal cupboards.

These units are kept in a room that is maintained at 45% RH to prevent partial rehydration of the specimens. The low RH also discourages pests from coming near although wooden cabinets and shelving would warp slightly in the longer term.

Some myco-pigments are light sensitive or slightly change their chemical composition on drying. Pale hydroids (hedgehog fungi) become mid brown after a few weeks and other genera (cf. *Maramiellus*) are similarly affected. The bright red pigment of the Fly Agaric (*Amanita muscaria*) fades to orange.



Fig. 3 Storage drawers of mycenoid fungi.

**Recording and data-basing**

Specimen finds are initially put into an Excel spreadsheet and then transferred onto a MODES database. For each specimen entry, the accession number is added together with its scientific name and authority, its synonyms or outdated classification, its English name, its locality split into five parts: parish, site name, association, Watsonian Vice County and grid reference. The finder's and identifier's names are also recorded and the date of its find together with any notes about the individual specimen and a cross-reference for its pictorial file since each entry, for a different species, is accompanied by a photograph with a scale and the find label .

The data is now available on our website:  
[www.hants.gov.uk/museum/biology/index.html](http://www.hants.gov.uk/museum/biology/index.html)

**Suppliers**

For polystyrene boxes: Stewart Plastics, The Stewart Company, Stewart House, Waddon Marsh Way, Purley Way, Croydon, Surrey. CR9 4HS. Tel.020 8603 5700.

For plastic shelving units: Treston, Finland - via Key Industrial: [www.keyind.co.uk](http://www.keyind.co.uk) Tel. 0845 6040660.