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## NatSCA News

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**NATSCA Seminar at RBG Kew 17<sup>th</sup> November, 2005**  
**- John Hunnex, Andrea Hallaway, Felipe Dominguez-Santana,**  
**Herbarium Technicians, NHM**

### **Introduction**

This is the fourth NatSCA seminar (Geology, Fluid-preservation, Entomology) and was hosted by the Adult Education Centre at the Royal Botanic Gardens at Kew. There were 23 attendees comprising conservators, curators, collection managers and herbarium technicians. For some it was a revisit of their own technological knowledge, with Kew's modifications, but for most it gave new insight into the care and maintenance of Botanical specimens, however preserved.

### **Herbarium Tour**

A group of 14 early arrivals first saw all four blocks of the Herbarium. Depending on which block you are in you will find either wooden cabinets or the more modern metal type with rubber seals. The fruits are in glass-topped boxes, which are then stored in wooden draws. We were given details of the accession system, which has at its starting point a strict regime of freezing all incoming specimens. Digitisation of Type specimens is now high on Kew's agenda and equipment for the task was well in evidence. Kew's photographer has recently invented the "Herbscan" which enables a Herbarium Sheet to be brought up against an inverted scanner, specimens are then scanned and the images saved in Photoshop. The mounting room looks out on to the Thames and has workstations for at least six mounters. Freshly glued specimens are pressed down with sandbags. . Perhaps the highlight of the tour was a set of Herbarium Sheets holding Lamiaceae specimens collected by Charles Darwin.

### **Cleaning Herbarium Sheets**

Jonathan Farley of Kew's conservation unit gave a detailed talk of how Herbarium Sheets are cleaned at Kew. The proximity of Kew to Central London used to present problems with Kew being downwind from the old Battersea Power Station and hence suffering from its pollutants. Jonathan categorised the two main types of deposits on sheets: surface dirt and ingrained dirt. To remove surface dirt he recommended the use of compressed air (taking extreme care if using the canned type) and then perhaps the use of "Groomstick" a putty like substance which can be rolled lightly over the sheet to pick up the surface dirt ('Blu-tak' was advised against as it contains linseed oil and spreads grease). For ingrained dirt Draftclean (rubber granules) was recommended. Draftclean is applied to the sheet and then rubbed in with cotton wool using light circular motions. Also recommended was the use of a mechanical eraser. Removed ingrained dirt and rubber particles could then be removed from the sheet using compressed air. Jonathan argued against the general use of smoke sponges saying that since they contain diatoms; this could be too abrasive besides depositing diatoms onto the paper, which causes an adverse reaction. Applying a thin coat of Paraloid B72 could consolidate information in pencil.

Minor tears in sheet could be repaired using "Filmoplast" tape that can be applied to the rear of the sheet and then rubbed with a "bone folder" (a piece of solid plastic about 5"x 3/4" x 1/4" sometimes known as a burnisher). 'Post-it' notes should never be put on sheets as the adhesive that they contain is corrosive.

Groomstick, Draftclean, mechanical erasers and "Filmoplast" tape are available from Conservation by Design Ltd. or Preservation Equipment Ltd. As regards adhesives Jonathan advised that we buy direct from source, as wholesalers tend to dilute the original products lightly. H Marcel Guest ([www.hmgpaint.com](http://www.hmgpaint.com)) are Kew's suppliers of adhesives. A good and reasonably priced supplier of bespoke brushes for cleaning herbarium sheets can be found at [www.rosemaryandco.com](http://www.rosemaryandco.com)

For treating sheets infested with mould Jonathan felt that it would be best to first determine whether or not the mould was active by putting the sheet under an ultraviolet light (although a specialist may have to be on hand to give a positive or negative result). Freezing could then be employed to neutralise the mould.

### **Mounting Techniques**

Barry Blewett gave a session on mounting techniques recommended by Kew.

Only one Herbarium, Riga, does not mount specimens and they hold them in Helsinki folders (basically "Type" folders without the red markings). This is ok for the scientific study of specimens but it does not give them any

physical security (they may fall out and be accidentally trampled).

Barry raised the question of strapping versus mounting. Both methods had advantages and disadvantages but for larger institutions where specimens were constantly being loaned around the world by post gluing minimised specimen movement. Examples of bad mounting and strapping were shown from China and Thailand respectively.

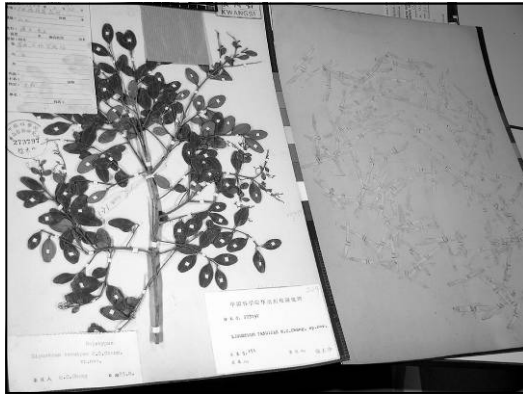


Figure 2: Chinese mount

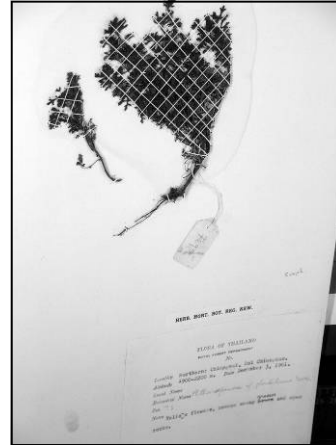


Figure 1: Thai mount

He then gave a demonstration of Kew's mounting method. Most relevant points were that delicate tissues (such as petals) should never be glued as they may crack when the Herbarium Sheet is handled or frozen. Large flowers should (where possible) be covered with a 'window' of greaseproof paper. When putting specimens in packets, flowers should never go into Glassine envelopes, as taking them out will cause damage. Paper clips on packets should be the type with the flat top as they minimise the risk of tears and damage to packet contents. If specimens are stitched on to the sheet a gummed paper label should be put on over the knot back on the sheet to prevent damage to other sheets in the species folder.

For limp specimens, in particular algae, Barry recommended that a line should be drawn around the specimen on the Herbarium sheet; then remove the specimen, apply glue directly to the sheet and then place the specimen on to the glue. After pressing and drying the pencil lines could then be erased.

Barry finished his talk by pointing out that when conserving specimens Kew staff not only had to take into account the scientific value of specimens but their value to humanity. In this connection Barry showed some plants that had been collected, dried and mounted on prison wallpaper by a Russian botanist while he was a political prisoner in the old Soviet Union.

### Fungal Collections

Brian Spooner Curator of Kew's Mycology collections gave a talk on the Kew Fungal collections.

The Herbarium holds approximately 800,000 specimens, a figure that includes approximately 35,000 types. Being of great global significance it is being moved to a new, more modern facility in the Jodrell Laboratory where a temperature of 20°C and a Humidity of between 40-60% can be maintained. Kew also holds a large selection of slime moulds.

Fungal specimens are heat dried at around 40 degrees Celsius and put into packets made from archival paper (the same as used on flowering plant herbarium sheets). Accompanying labels and drawings are put on to the front of the packet and these packets are mounted on to Kew Herbarium sheets. Larger specimens are kept in glass-topped boxes (the same ones as in carpological collections). If maintaining shape is a priority then storing in spirit may be an answer but not if colour need to be preserved.

As for putting Fungi on public display Brian said that light levels might be a problem for certain species.

Simon Moore, Conservator of Natural Sciences at Hampshire County Council then spoke on his experience of freeze drying of fungal collections. Simon felt that most fungal colours were maintained very well by freeze drying, although some of the paler species quickly browned. Hampshire CC was fortunate to have an old Edwards EF2 Freeze specimen dryer. He did find that the process did not kill certain pests, even at 0.1 atmospheres. Liquid Nitrogen immersion produces ice that does not rupture cell membranes but since the specimens are never de-frosted until totally dry this did not matter. Impor-

tant taxonomic micro-features were still perfectly preserved by the process.

An important point to come out of the session was that holding certain fungi in museum collections is equivalent to holding class A drugs and a license must be obtained from the Home Office. More information is available from:

[mvcology@kew.org](mailto:mvcology@kew.org)

### **Pests**

Ruth Clarke of Kew gave us an outline of Kew's strategy for dealing with pests in their Herbarium.

The main problems at Kew are with *Stegobium paniceum* (Biscuit Beetle), *Lasioderma serricornis* (Cigarette Beetle) and Varied Carpet Beetle (*Anthrenus verbasci*). Carpet beetles were known to damage Pitcher Plant specimens as they eat their way through the plant material to get to trapped dead insects. They will also eat pollen and nectar. Booklice and Silverfish are more grazers and damage labels.

In Kew's new wing there will be a sealed unit to protect particularly sensitive specimens (Asteraceae particularly) from damage from Biscuit and Cigarette Beetle. Temperatures will be a constant 15°C at which these beetles can function but not breed.

Kew has a pest awareness training programme for all staff and take the precaution of disallowing eating in the Herbarium. There is a strict cleaning regime paying particular attention to the removal of dead House flies as they provide food for pest insects. Pest proof cardboard boxes are used to transport specimens between rooms in the Herbarium. Pest Monitoring is carried out using strategically placed sticky 'blunder' traps that are checked every three months. Every year a report showing the results of the trapping is then issued. The only insecticides now permitted for use are the Pyrethrins such as 'Constrain', which contains Permethrin. Treatment of infested materials is either by freezing, by the use of heat or by use of a controlled atmosphere. Infested material is frozen to -30 °C for over 72 hours. Heat treatments can be used but temperatures reaching 55°C for 18 hours could cause problems for certain specimens. Flooding an area with Carbon Dioxide is an option but it could take the area out of commission for three weeks. Registered specialist companies carry out this practice. There is also the option of putting infested specimens in a sealed plastic bag with an Oxygen Scavenger ('Ageless'). There are specific pheromone lures available for specific pests and also desiccant powders that can be put down (these may be particularly useful in "dead" spaces).

Central Science Laboratory publishes a useful set of cards giving images and details of insect pests and how to deal with them ([csl.gov.uk](http://csl.gov.uk)) and Kew have made use of these.

Kew's strategy for Pest Management will be outlined in a new edition of their *Herbarium Handbook* that is currently being prepared for publication.

### **Conserving the Lightfoot Collection of Marine Algae**

Jenny Bryant, Curator of Algae at the Natural History Museum, spoke on the conservation of a collection of c. 600 algae made by the Reverend John Lightfoot, the 18<sup>th</sup> Century Botanist who recognized and named 18 new species of marine algae.

By a circuitous route the collection ended up in the attic of Saffron Waldron Museum where it lay in extremely poor conservation conditions for many years. It finally arrived at the NHM by way of Kew and was recently incorporated into the collections having been stabilized and conserved by Emma Ruffle.

The specimens were first taken out of the 18<sup>th</sup> century paper covers and any information removed from the covers and kept with the specimen. Some of the specimens were so delicate or fragmented that they had to be put into folds of special Japanese tissue before they could be put into Herbarium packets and mounted ready for bar-coding and data-entry. Packets were often lined with the material from the original folders. Bespoke packets, prepared from archival paper, were made for the large specimens. None of the algal specimens were put in the press and all were encapsulated using the original or archival paper. Labels were repaired using Japanese tissue and some were held in Melinex sleeves when either too fragile to mount or with annotation on both sides. The main conservation aim was to minimize future handling of the fragile material.

During the conservation and incorporation of the collection the BM curator found some previously unrecognised Type specimens and two of the earliest named algal records for the greater London area. An interesting development on the day was that the conference delegates from Plymouth Museum recognized some

of the writing on the Lightfoot material as being the same as for some collections in their charge.

### Self-destruct Acidification in Carrageenophyte Algae

Jenny Bryant went on to show acid-damaged marine algae specimens that were suffering from a self-destruct process caused by spontaneous hydrolysis of sulphate half-ester groups associated with carrageenans, a commercially important algal product. The deterioration has no known trigger and if the acidification remains unchecked it destroys the specimen and the sheets above and below. Physical removal of the affected parts and re-mounting can halt the process, but not in all cases. In order to monitor this problem photocopies are made before and after remedial curation and a regular check of the affected carrageen containing genera is carried out. The phenomenon is a worldwide problem in herbaria and was *not* noted prior to the 1980's.

### The Kew Spirit Collection

Emma Tredwell who is collections manager of the Kew Spirit Collection was the last speaker for the day and outlined the pros and cons of keeping Botanical Collections in Spirit: keeping certain specimens in spirit could be advantageous. The three dimensional aspect is maintained and there is no problem with degradation or insect damage. The down side was of course that jars take up comparatively large amounts of space and spirit evaporates over time.

Orchids, particularly, are better kept in spirit than as pressed specimens on paper. Araceae specimens are also often better studied in three dimensions.

Emma found that jars with rubber tops were the best of those available. As for label writing, Emma particularly recommended the Mitsubishi Unipen.

Information on Kew's spirit collection is available from [spiritcollection@kew.org](mailto:spiritcollection@kew.org)

All attendees thanked all presenters and organiser Simon Moore for their efforts on what turned out to be a most informative and useful day.

