

# A different kind of SPA day...



Pamela and Thomas sorting sample tubes.

It's a little-known fact that the Natural History Museum has its own spa. But you might be a bit disappointed if you go there expecting to find a swimming pool or a sauna, since this is the SPA (Specimen Preparation Area). It's a modern laboratory within the Darwin Centre used for the extraction and preparation of a variety of specimens, with the added bonus of a window for the public to view the science in action.

The SPA is part of the Museum's Cocoon experience, and seeks to bring our science, scientists and collections to life so that our five million-plus visitors understand the breadth and depth of our work. For Museum staff, it's also a chance to advance their work most often alongside the public (as volunteers), highlight sometimes little-known collections and research, and draw attention to their important role as a curator or researcher.



Arboreal canopy fogging

## At home in SPA

The SPA can be used for all kinds of specimen preparation – from sorting rainforest invertebrates to recording and identifying British bryozoans. The following projects are currently in residence at the SPA.

- the Woodeaton project
- plant mounting
- V Factor: focusing on British Bryozoa
- The Rainforest Canopy Project
- Soil Biodiversity Group
- British Earthworm Society

Find out what's on and when here

[www.nhm.ac.uk/visit/whats-on/day](http://www.nhm.ac.uk/visit/whats-on/day)

# Into the Rainforest Canopy by Derek Croucher

For a couple of days each week, you'll find a small team of volunteers in the SPA, helping to sort and identify invertebrate specimens for a PhD research project led by Thomas Creedy. The research seeks to study communities living in the rainforest canopy in Honduras in Central America, and the specimens were collected in the summer of 2014 using arboreal canopy fogging.

What is arboreal canopy fogging then? To get an accurate picture of the distribution of invertebrates within the canopy, a series of cones, one-metre in diameter, are suspended directly below the canopy. Setting this up involves climbing the tree and rigging up a series of ropes so that the cones gather samples from a variety of areas. The tree is then fogged with insecticide, and the specimens fall into collecting pots at the base of each cone.

A number of trees were sampled for this study, but all were the same species of Liquidambar, which is also common in UK gardens. One important point is that the trees were chosen at varying altitudes, in order to study ecological differences at various temperatures. It's hoped this will give some insight into the possible effects of global warming.

Once they were back in the UK, the samples – stored in tubes filled with alcohol preservative – were kept frozen to preserve the DNA, and the sorting could begin. That's where we come in as volunteers.

There were nearly 500 tubes to work through, and without the additional support, it would take substantially longer to get to the next level of research – DNA profiling. Each tube contained detritus that fell into the cone during collection, and the invertebrates needed to be picked out from this. We tipped the tube into a petri-dish, and searched for the beasties using a microscope and forceps.

It was all a bit disconcerting at first. Many of the creatures were so small they were difficult to find, and I was worried about damaging them when picking them up in the forceps. But, with a bit of practice, we soon got used to it.



Sample tubes with specimens preserved in alcohol (as they come back from Honduras)



From chaos to order: specimens sorted to Order level in petri dishes.

The next task was to identify things from this invertebrate soup. I was worried about how I might fare at identification – I imagined coming across lots of weird and wonderful creatures that I'd never seen before. It was certainly true that we found some beautiful animals, and they were all the more spectacular under the microscope's magnification. At this stage, the specimens needed to be grouped by taxonomic order, and once Thomas had explained the basic features used to identify each group, things became much clearer.

Beetles are a numerous and easily identifiable group – they have elytra (hardened wings) covering most or all of the abdomen. Crickets and spiders meanwhile, are easy to pick out. Bugs come in a variety of shapes and sizes, but their long sucking mouthparts, normally tucked beneath the head, give them away. Ants and wasps, on the other hand, are often confused, particularly since you get winged ants and wingless wasps, and most wasps are much smaller and less colourful than our common wasp. The best clue is their narrow “waists, which in ants have an extra projecting node. Plus, it might not be very scientific, but ants are very, well, ant-like.

Flies are another common group. They only have one pair of wings, but the surest way of picking them out is to look for the halteres, which are the small knobbed structures modified from a pair of hind wings. Springtails are also common, and their tail is normally tucked underneath the body. Another fascinating group is the pseudoscorpions, which look very striking under the microscope. They are just like miniature scorpions, but without a tail and with huge, dangerous-looking pincers. Larvae can occasionally be awkward to identify. Flies are generally very featureless, beetles have an obvious head with strong mouthparts, butterflies and moths have extra false legs, and bugs have sucking mouthparts like the adults.

The next stage was to sort each group into three broad specimen sizes, and put them in small tubes of alcohol with labels. Once all 500 tubes had been sorted, the real science could begin. The project is all about ecological diversity, so identifying each specimen down to species level using traditional taxonomic methods is not the highest priority.

This is just as well, since Honduras is not a well-studied area, and Thomas estimates that a substantial proportion of what we're finding is new to science. The main method of analysis is going to be cutting-edge DNA profiling. A number of specimens can be pooled to be analysed, and the results will show how closely related the species are to each other in evolutionary terms. The DNA can't be matched to the exact specimen it came from, but the results will come from looking at the communities in different parts of the canopy and at different altitudes. Science has certainly come a long way from the days of Victorian collectors with simple nets and magnifying glasses.

Once sorted to order level, specimens are put in alcohol in small tubes ready for DNA analysis.



This is the view the public gets of us, but our view is slightly darker. This is just as well – looking down a microscope requires a lot of concentration.

# Woodeaton Wednesdays by Emma Bernard

Woodeaton Quarry, now disused, is designated as a geological Site of Specialist Scientific Interest, and exposes one of the most complete rock sections of Middle and Late Bathonian (Middle Jurassic Age) in southern England.

Museum scientists and volunteers are working together to pick through the residue and sort it into categories – including the type of animal or skeletal element – for further scientific study. The team has already found microscopic evidence of dinosaurs, amphibians, lizards, crocodiles and primitive mammals.



The Woodeaton team (left to right) Alfie, Michael, David, Javier, Emma, Marian, Pip, Simon.

On our SPA days, there are two curators (Pip and I) and one PhD student, Simon – along with a small team of volunteers in the lab. We decide who will sit in front of the viewing window, and there is a screen with a looped PowerPoint presentation explaining more about the Woodeaton project. Michael, one of our volunteers, has happily adopted using the microphone, and busily discusses the project and work with visitors. Pip, Simon and I are on hand to answer any complicated questions and to help with identifications.

We also have a poster that explains why we went to Woodeaton, as well as a bit about the processing phase – reducing six tonnes of microinvertebrate-rich rock to 30kg of residue to pick.



IMG Woodeaton residue and Filipa picking and sorting through a sample.

It is good to engage with the public about what we are doing, and why this project is important. We explain to the public that the work feeds into current academic research at the Museum, as well as enhancing our collections.

Although we are still looking through the residue, it's likely that we will find new species or new occurrences of the different species we have found (e.g. the first time we have found a species in that age of rock). Visitors are interested in the different types of digs and methods of excavating material, rather than just the typical TV dino-dig.

When several volunteers pick through the residue together, they can learn from each other and share knowledge. Some do this because they have an interest in the subject matter, and want to do something different alongside their jobs. Others do it to add to their CVs or help with their studies. All the volunteers bring something different to the table and we can learn from each other.

Next SPA day with the Woodeaton team:  
**Wednesday 23 September**



## Vox pop 1

### John Hunnex, Herbarium Technician

#### What is the set-up in SPA on your day?

I set up an interesting specimen as a talking point – it could be old, large or unusual, like a sea bean seed pod, or the seed capsule from a grapple plant. Things like this get people asking questions which is what the SPA is really about – getting the public to come and talk to science staff and engage with our work and collections.

#### What do you enjoy most about this slightly unusual set up in SPA?

The SPA invites visitors to come in and ask questions. What's been really interesting to me is how reticent adults are to ask questions, and how proactive I need to be to get people talking. Younger folk are great – they have no problems coming forward, and seem to really enjoy the interactions.

#### What can visitors expect if they come along to your next SPA day?

When I'm doing a session, I try to think of a topic or specimen that will be of public interest. Algae specimens work well, for example, as it's not common knowledge that algae are not now considered to be plants. They are also very attractive, and provide a good talking point. One of the things I'm keen to put over to folk is the way science works – it's not a belief system, and there will always be another observation that challenges our present understanding. The history of our knowledge of algae is really good for this.

Next SPA date with John: **Monday 28 September.**



## Vox pop 2

# Mary Spencer-Jones, bryozoologist and current V Factor project leader

On a typical V Factor day, me and a group of 10 volunteers are in the SPA, recording and identifying British bryozoans and epifauna. At the same, a small team of volunteer leaders are outside SPA talking about the project with the visiting public.

### What do you enjoy most about this slightly unusual set up in SPA?

I have enjoyed the interaction between volunteers and volunteer leaders the most. It's great to see each group of V Factor volunteers enthused about bryozoans, and see how they take this information forward and disseminate it to a wider public audience.

### What can visitors expect if they come along to your next SPA day?

If you come along to the SPA, you see and meet groups of keen volunteers peering down microscopes, measuring shells and counting to themselves. They will tell you more about the settlement project in general and hopefully show you some bryozoan colonies through the microscope.

### What would you say to future SPA users?

Make use of this great space. Come along and see the variety of projects being processed in the area, and talk to the people participating.

Next SPA day with Mary and the V Factor team:  
**Thursday 24 September**



Mary confirms a British Bryozoan identification by a V Factor volunteer

## Dates for your diary

### Science Uncovered Returns

Friday 25 September, 16.00–22.30  
South Kensington and Tring

Science Uncovered is a unique chance for visitors to interact with the latest scientific research, and experience the Museum in a festival atmosphere. The format of the evening is fun, informal and relaxed, with more than 350 scientists and visiting experts coming together in a fabulous show of displays, tours, experiments, challenges, discussions and more.

The event will run at the South Kensington site in London and at Tring in Hertfordshire.

### Diagnosis Volunteer!

Be a part of this exciting event: Staff and volunteers are invited to volunteer and help support Science Uncovered – we hope you can get involved! Full details have now been sent out to you.

### Volunteers Tea Party

Wednesday 21 October, 15.45–17.00  
Darwin Centre Common Room,

Eat biscuits and cakes, drink tea and be merry! No need to RSVP, please just turn up! Invite your manager along too, and bring a mug if you have one.

## Publications

The new issues of **evolve** and **WILD WORLD** are out now. Copies can be found outside the staff restaurant. Please help yourself.



### Contact

For more information on anything in this newsletter, please contact Ali Thomas, Volunteers Project Manager at [a.thomas@nhm.ac.uk](mailto:a.thomas@nhm.ac.uk) or on **020 7942 6048**.