

Society gets silver medal at Chelsea for taking microbes to the gardening masses

Gardening enthusiasts at this year's RHS Chelsea Flower Show were keen to learn how microbes in the soil are helping their plants to thrive. The Society for General Microbiology's exhibit, *Plants and microbes living in harmony*, also impressed the judges, who awarded it a silver medal.

Many visitors were surprised to learn that microbes don't just cause plant diseases. The display, designed and set up by **Dariel Burdass** and **Janet Hurst** of the External Relations Office, was situated in the Lifelong Learning section in the Great Pavilion. It explained two fascinating plant-microbe interactions: mycorrhizal fungi and rhizobial bacteria. Gardeners were amazed to find that 90% of land plants form mycorrhizal associations with fungi, enabling the plants to obtain vital nutrients scavenged by the fungal hyphae from the soil and providing an energy source from photosynthesis for the fungus in return. As much as 20% of the carbon a tree obtains through photosynthesis can be transferred to its mycorrhizal fungi. Whilst most people know that the little lumps on the roots of legumes are involved in some way in helping the plants to grow, many were not aware that the nodules are full of rhizobia bacteria that fix nitrogen from the atmosphere into ammonia, a form that the plant can use to make proteins essential for growth. In exchange the plant supplies nutrients and energy for the activities of the bacteria.



All of the plants demonstrating these associations in the Society's exhibit were those found in many British gardens – grasses, fruit trees, shrubs, ferns, herbs and vegetables – displayed against an attractive country landscape. This was a huge undertaking by the Society and many thanks are due to the staff and also members of the SGM who helped to man the stand from 8am to 8pm each day. Their enthusiasm for the subject shone through as they talked to the many hundreds of gardeners, growers and members of the media who visited the stand over the 6 days the show was open. More than 3,000 copies of the May issue of *Microbiology Today* focusing on 'Microbes in the Garden' and the booklet written specially for the show were distributed to the visitors, making this an enormously successful event for promoting the public understanding of microbiology.

Janet Hurst & Dariel Burdass

- ▲ Janet Hurst, Ron Fraser and Dariel Burdass in front of the SGM stand at the 2005 RHS Chelsea flower show, holding the silver medal awarded to the Society. *Nigel Kaye*
- ◀ Part of the SGM stand in the Lifelong Learning section at Chelsea. *Nigel Kaye*
- ◀ A page from the booklet produced for the show.
- ▼ A lily on display at Chelsea. *Ian Atherton*

Going with the glow 7th Wrexham Science Festival 19 March 2005

The Wrexham Science Festival was started in 1998 by a group of enthusiastic amateurs keen to convey their passion for science. Seven years on, it has grown into one of the flagship events in the science communication calendar. Each Festival culminates in 'Scientriffic', a family day of exploration and experiment centred on the North East Wales Institute for Higher Education. For the first time, this included a stand from the SGM, designed and run by postgraduate students from the School of Biological Sciences at Bangor.

It is easy to be put off getting involved in science communication activities because of concern that it will take a lot of time to organize. The SGM stand illustrated how much can be achieved with very simple ideas. The centrepiece was a display on bioluminescence, which worked well across all age groups and involved just a few plates of *Photobacterium phosphoreum* and some rolled-up tubes of black cardboard. The display was supported by the excellent SGM factsheet on *Bioluminescence* written by Janet Hurst and Faye Jones, and our bilingual 'Glow-Bug' badges were the talk of the Festival. The stand also illustrated some of the microbiological research work at Bangor, with a colourful display of bacteria involved in bioremediation of acid mine drainage and a bank of microscopes through which



participants could see for themselves the diversity of microbes. There was plenty more to excite the budding microbiologist in the other 50 or so exhibits dotted around the campus. Visitors to the display from Wrexham Maelor Hospital could learn about the role of the Biomedical Scientist and the tests used in clinical laboratories to detect pathogenic microbes, whilst the *Magic of Mushrooms* stand from the British Mycological Society illustrated the role of fungi in everyday life using models, posters and hands-on activities.

Occasions like the Wrexham Festival give the SGM the chance to reach a large and diverse audience and, if success can be judged by our hoarse voices and tired feet, we did a good job. By the end of the day, we may not have seen all of the 10,000+ visitors to Scientriffic, but it certainly felt like it! *Sue Assinder, Education Officer*



The World of Microbes

Portland College is a leading residential college for adults with a wide range of physical disabilities and learning difficulties. I paid a visit there in April to introduce 34 adult learners to the world of microbiology. By adapting some of the ideas in the SGM primary school booklet *The World of Microbes* we developed two 3-hour sessions of activities linked to everyday life experiences and to our curriculum. 'Practical science provides an ideal vehicle for the development and use of a wide range of transferable skills', according to Dr D.E. Green, Director of Studies at Portland College.

We began by discussing what microbes are, the different types of micro-organism and where they are found. This provided the theme for the practical elements, which investigated the presence of microbes on the skin before and after hand washing, microbes projected into the air by coughing and microbes in the environment. For the latter task the students collected samples from around the College, including kitchen tables, telephone receivers, hand basins and a flower pot. When I returned the following week with the incubated plates, the students were able to see at that microbes were fewer in number after washing, but that most of us could make a better job of washing our hands. They also found that the hand basin in the toilets carries fewer microbes than at least one kitchen table! As student Claire Griffiths commented, 'I thought this was quite good and interesting because I've learnt something about bacteria and that I must wash my hands to get rid of germs.'

Another activity was focused on food spoilage and investigated consequences of storing different foodstuffs at a variety of temperatures. This was linked to a tutor-led discussion of the requirements



▲ Portland College students busily recording the results of their experiments. *Jeff Green*

for microbial growth and simple measures to avoid food spoilage and poisoning. Examination of the foods after 1 week revealed some beautiful moulds growing on the non-refrigerated samples, and in combination with the evidence of the microbial zoos residing on most of the fingers in the room, the experiments strongly reinforced lessons on good food storage and hygiene. The session continued with students sampling foods from a 'microbial menu' and attempting to identify how microbes contributed to the flavour, texture and preservation of the various foods. The students were very enthusiastic about this exercise, 'I thought it was brilliant when we did experiments because we got to eat some food and store some food which went mouldy and looked gooey', said student Jodie Birch.

We ended by discussing how our new friends, the microbes, deal with the inevitable products of our consumption down at the sewage works.

I greatly enjoyed my time with the highly motivated and enthusiastic Portland College students and staff. The feedback was very positive and is summed up by Daniel Martin: 'I thought it was fun, I enjoyed the science workshops'.

Professor Jeffrey Green
Department of Molecular Biology and Biotechnology, University of Sheffield

Crucible: a new challenge for scientists

In 2004 a group of 30 young UK scientists was given the opportunity to expand their horizons and be challenged in new ways, as participants in a pilot of the National Endowment for Science, Technology and the Arts (NESTA) Crucible scheme. They took part in a series of thematic laboratories led by world-renowned speakers. The labs were held over residential weekends and were designed to offer the scientists a unique programme of career and personal development.

During the first weekend they explored ethics in its widest sense from medical ethics to dilemma resolution. The second lab on science and politics started rather appropriately at the National Liberal Club in Westminster. It continued with talks from journalists and a scientist-turned-peer, and included a selection of workshops on management, entrepreneurship and lobbying policymakers. The group decided to respond to the Government's *Ten Year Framework on Science and Innovation*. The final lab in the beautiful surroundings of Dartington Hall in Devon featured entertaining talks on public speaking punctuated by extended sessions on drawing and painting. The organizers

▼ Neil Stokes (left) and Gail Preston (right), two of the NESTA Crucible awardees at one of the labs held in 2004. *Lee Mawdsley*



sought detailed feedback on the pilot that will help to develop future programmes. Several microbiologists took part.

Gail Preston, who works on plant diseases and plant growth-promoting micro-organisms at the Department of Plant Sciences, Oxford University, has long been interested in the interface of science with the arts and humanities, in science communication, and in the innate creativity of science, which the programme promised to address.

'I didn't approach the labs with a lot of preconceptions, as little information was available beforehand and the programme itself was evolving as the year progressed. The first lab provided an interesting framework in which to meet the other awardees, who were a diverse mix of postdoctoral scientists working in academia and industry. The first meeting was based around short explanations of inspirational objects. From the start, we weren't just chemists and engineers and biologists, but musicians, athletes, film-makers and voluntary workers. We were encouraged to push back the frontiers of knowledge, but to be more than just 'boffins', to think about our impact on the communities we live and work in, and to think about the role of creativity and ethics in our lives.

For myself a defining moment was in the final lab on creativity where we experimented with life drawing in different media. My drawings, paintings and sculptures in school art classes never seemed to be worth much so I wrote off the artistic side of the curriculum and focused on science, history and literature. Now in a room full of scientists and engineers I was encouraged to express myself without the constrictions of grades and technique. I loved it. I was exercising a part of my brain that I hadn't used in a long time, and yet, in some respects, the feeling was very familiar. There was the same focused energy, the same intellectual and emotional excitement that I've felt in response to a discovery that turns ideas inside out, to a challenging question or to a new solution that could solve an intractable problem.

This was, I think, what the Crucible organizers hoped to achieve. To enable scientists and engineers to step outside their routines



Crucible was designed as a new element of NESTA's existing fellowship programme, which gives tailored support to creative and innovative individuals who need the time and resources to fulfil their potential. For further details see www.nesta.org.uk

and expectations, and to become increasingly aware of their connections to a wider world, whether to scientists in other disciplines, to politicians, to artists, to friends and family or to the next generation. For some it meant realizing that they wanted to take a new path, explore new career options. I came away feeling that I was part of a larger community, with a shared passion for exploration and innovation. I was ready to reaffirm my commitment to science, better equipped to communicate the excitement of scientific research, keen to make new interdisciplinary connections and delighted that I had taken part.'

Neil Stokes, a microbiologist at Prolysis Ltd, a biotechnology company in Oxfordshire, does not consider creativity to be one of his strong points and he was attracted by a scheme that gave the opportunity to improve this, alongside the chance to enhance his career and personal development.

'The labs expanded my thinking in relation to the themes as I contemplated issues that I had previously not considered. In this respect Crucible met my expectations. Certain sessions were not what I had envisaged as topics that I had assumed would be covered, such as the moral implications of cloning, genetic modification or nanotechnology, were not. Crucible also achieved its objectives of offering an individual programme of career and personal development. For me the greatest benefit was the opportunity to meet and interact with scientists and engineers working in diverse fields whom I am unlikely to have encountered in my work. I enjoyed learning about these disciplines and the backgrounds and aspirations of different members of the group. Efforts to maintain this network are ongoing.

I learned little during the labs of direct relevance to my thinking about microbiology or which has impacted upon my day-to-day research. But I did not expect to and I do not think this is what NESTA intended. However, I enjoyed the opportunity to explore issues outside the laboratory, yet still related to science and research in the wider sense. For other microbiologists interested in considering the implications of their research or understanding the interface between science, art and the humanities this is a programme unlike any other and I would recommend it.'

Janet Hurst, External Relations Office