

Promoting microbiology in schools and colleges since 1969

CHAIRMAN'S ANNUAL REPORT 2016-2017

Summary

The 29th MiSAC Annual Competition 2017, *The Antibiotic Crisis*, was this year sponsored by MiSAC. The Committee has been instrumental in promoting the study of microbiology in Thailand and China. MiSAC's Treasurer has been awarded the Benefactor's Medal by the British Mycological Society. MiSAC has continued to offer authoritative advice to schools, colleges and other organisations, including the Microbiology Society, which has continued with its *Antibiotics Unearthed* project to investigate antibiotics produced by soil bacteria. Members contributed to a range of meetings, courses and exhibitions in various parts of the UK and abroad. The Committee held four meetings, one of which involved judging the competition entries.

**MiSAC Annual Competition 2017,
*The Antibiotic Crisis***

The requirement of the 29th MiSAC Annual Competition was to produce information for a section of a new science web site for teenagers to promote a better understanding of the nature and consequences of the ever-growing occurrence of antibiotic resistance among bacteria. This maintained the well-established approach of basing the competition topic on a subject that is linked to school curricula but with requirements so framed as to draw students beyond the confines of the curriculum. MiSAC provided the special sponsorship for this year's competition.

The topic proved to be particularly popular. Entries were received from many newcomers to the competition as well as from our pool of regular participants. As usual, there were two entry groups: Key Stages 3 and 4 (Secondary 1/2 and 3/4 in Scotland). Entries came from 92 schools throughout the UK of which 19 made submissions to both entry groups. In total there were 564 entries consisting of 339 from KS3 (S1/2) and 225 from KS4 (S3/4). The entries to the KS4 (S3/4) group represented 40% of the total, a record level and almost double the encouraging level of recent years. The large majority of the 564 entries were individual submissions but a substantial proportion represented the work of groups of students, which meant that a total of 961 students participated in the competition.

The judging panel consisted of the officers of MiSAC and representatives of our regular sponsors. The judges looked for close adherence to the specified format of entry which included presentation on one A3 sheet (or two A4 sheets attached side-by-side), arranged in two parts. The first half of the entry required a summary of the main issues behind the increase in resistance of bacteria to antibiotics and suggestions for possible solutions. The second half had to be a description of the science behind some of the main issues. Suggestions for inclusion in both parts were

provided. There was also a requirement to name one disease caused by bacteria and the genus and species of the causative organism.

Many hand- and computer-produced entries were presented to a high standard which made adjudication very challenging. On the whole, the stringent entry requirements were followed closely and entrants showed a good knowledge of the issues involved and understanding of the underlying science. In addition, and most encouragingly, there was a widespread understanding of the need for urgent action if infectious diseases are to continue to be successfully treated. Credit was given for the effective use of data such as illustrations, statistics and sources of further information, and for good design. Participants appeared to have enjoyed the experience and used imagination and humour to attract the interest of the intended teenage readership. A small but important point to be learnt in scientific writing is the need to observe the rules of nomenclature regarding use of upper & lower case initial letters for, respectively, genus and species, and italic font, e.g. *Escherichia coli*. Regarding grammar, there is also a need to appreciate the correct use of the singular and plural case, e.g. bacterium (singular) and bacteria (plural).

This year a higher proportion of schools than last year's disappointing level (30% vs 25%) did not fully observe the rules about attaching two A4 sheets side-by-side and labelling the back of the entry with the identification details necessary for keeping track of nearly 600 entries. For example, in some submissions, two A4 sheets were held together by only a paper clip and had identification details on only one of the two sheets; one school neither submitted an entry form nor added any identification details. The organisers remedied the omissions where possible so as not to disadvantage the students but this help severely hampered the administration of the competition and will be reconsidered in the future.

Money awards totalling £1,325 were made to prize winners and their establishments, and some entries

were awarded a commendation. Each participating establishment received some microbiology teaching resources and all students who did not receive an award had their contribution acknowledged by receiving a certificate of entry.

MiSAC warmly thanks the students for making the competition such a success and their teachers for their support and messages of appreciation. We hope that students' interests in microbiology have been stimulated and we look forward to a similarly strong response to the 2018 MiSAC Annual Competition which will be entitled *The Commercial Uses of Fungi* and generously sponsored by the British Mycological Society.

Prizes and commendations were awarded to students from the following schools.

Key Stage 3 Group: *First Prize* - Harriet Fraser, Ipswich School; *Joint Second Prize* - Catherine Harris, St Nicholas' School, Fleet, Hampshire and Ria Kejarawal, Durham High School for Girls; *Third Prize* - Talia Rubin and Lottie Cannon, Haberdasher's Aske's School for Girls, Elstree, Hertfordshire; *High Commendation for Design* - Lucy Langdale, James Meyrick, Jessica Richard and Matthew Smith, Cox Green School, Maidenhead, Berkshire.

Key Stage 4 Group: *First Prize* - Aishwarya Anand, St Nicholas' School, Fleet, Hampshire; *Second Prize* - Elleka Dean, Shrewsbury High School, Shropshire; *Special Mention for Infographic Design* - Sabrina Torris, The Cotswold School, Bourton-on-the-Water, Gloucestershire.

MiSAC web site and publications

Developments of the web site, generously hosted by the Society for Applied Microbiology (SfAM), have been much slower than envisaged. The SfAM Communications Specialist, Nancy Mendoza, was responsible for the web site but then left the Society's employment. However, although she kindly agreed to continue with her work for MiSAC, the time available for the task has proved to be inadequate, added to which a period of ill health has intervened. Thus the existing web site is not being kept fully up-to-date and her work on developing a new web-site design using the *WordPress* software package has not yet progressed to completion. The failure, for technical reasons, of an earlier attempt to create a new web site using *Drupal* software has been reported previously.

The purpose of the new design is to allow management of the web site to be transferred into the hands of the MiSAC web-site working party. This will bring updating and maintenance 'in-house', thereby removing dependence on external support. We are urgently pressing for completion of the new web-site design and for the necessary period of training for the relevant MiSAC officers to be implemented.

As a result of the Chairman's illness, and his recuperation, finalising publications nearing completion has inevitably taken a back seat. For

MiSACmethods 1: Sourcing, maintaining and using microbes, images have still to be added. It will provide valuable guidance on the routine tasks involved in preparing for, and conducting, microbiology practical work.

The Chairman has produced **MiSACmethods 2: Looking at microbes**, drawing on the text which provided supplementary guidance for the 2015 competition *What do microbes really look like?*

MiSACactivities 5: Spoilage of oranges

This practical guide, which is still under development, will explore factors which encourage the growth of the mould *Penicillium expansum* on the surface of oranges.

Microbe Bite-size practicals provides outlines of some simple practical activities which illustrate the ubiquity and importance of microbes in everyday life.

Finance and sponsorship

MiSAC finances remain healthy, thanks to prudence in expenditure and the much-appreciated support from its sponsors:

- *British Mycological Society (BMS)*,
- *CLEAPSS*,
- *Microbiology Society (MS)*,
- *NCBE*,
- *The Quekett Microscopical Club*,
- *Society for Applied Microbiology (SfAM)*,
- *SSERC*.

Their generosity provides an annual financial contribution or meeting rooms and laboratory facilities.

MiSAC has limited its expenditure by reducing commitments at exhibitions and conferences which would not be cost effective. For example, we chose not to have a stand in the main exhibition area at the 2017 annual meeting of the Association for Science Education (ASE). The annual return was made to the Charity Commissioners.

Advisory work

The Treasurer has continued her work in Thailand and China. Recently she has been working on STEM activities in Thai schools, particularly using MuEye, a 'portable microscope' for smartphones in order to magnify images of microbes. So far, the images proved to be acceptable for lower secondary work but not for microbiological work at higher levels. She represented the Institute for the Promotion of Science and Technology Teaching (IPST) on the STEM collaboration project between IPST and the publisher Cambridge University Press.

She has also arranged a strategic partnership between IPST and Liverpool John Moores University for staff training of IPST officers at LJMU STEM centres and partner schools. More recently the Treasurer has organised a workshop (*Micro Camp*) for Thai teachers in bilingual and international schools. The aim was to produce simple, fun microbiological investigations, based on

MiSAC's *Microbe bite-size practicals*, which teachers can use with children and also produce some posters which could be used as teaching resources. The workshop was well received, especially because encouraging children to learn independently is not generally the norm throughout Thailand. The work of the Micro Camp is being digitised for access to all schools in the country.

In addition, a third microbiological competition is being run in Thailand (co-sponsored by BMS, MiSAC and IPST, as in previous years). The forthcoming competition (with prize money from the BMS) has the theme: *Commercial Uses of Fungi*.

The Microbiology Society has continued with its *Antibiotics Unearthed* project to investigate antibiotics produced by soil bacteria. To solve the normally-proscribed opening of incubated agar plates in schools, MiSAC's Vice Chairman devised a novel mechanism for bending a blunt syringe needle, sterilising it and inserting this into a Petri dish to allow the addition of a liquid agar overlay to incubated plates.

CLEAPSS has conducted a trial of the product *Petrifilm*, manufactured by 3M, responding to the decision of a scientific equipment supplier to list the item in its educational catalogue. *Petrifilm* aerobic count plates are an alternative to Petri dishes for the growth of microbes. They consist of rectangular plastic sheets which sandwich a nutrient gel, a sample of the microorganism to be cultured and an indicator molecule which is taken up by live cells. Colony counting is easier with *Petrifilm* than with agar plates because the microbes are stained by the indicator. CLEAPSS reports that *Petrifilm* plates are easy to use but require different skills to the handling of agar plates. It seems likely that schools will find that their large-scale use, as an alternative to Petri dishes, will be too expensive. However, they could be useful for certain activities, particularly for use with smaller numbers of pupils.

Other activities

MiSAC is saddened to report the tragic death of Dean Madden, the director of its sponsor, the NCBE. The Vice Chairman, recently retired as co-director of the NCBE, is currently employed part time while its future structure and management within Reading University is under discussion.

MiSAC is delighted to announce that the Treasurer has been awarded the Benefactor's Medal by the BMS, in recognition of her long-standing support of BMS activities at MiSAC and her outstanding achievement of organising four competitions for school students in Thailand and China.

The Association for Science Education is revising its publication *Topics in Safety*. MiSAC was one of the organisations involved in the writing of the second edition. It has been invited, because of its expertise in microbiology & biotechnology, to consider appropriate changes to the guidance in the third edition of Topic 15. In the first instance,

MiSAC will revise its own version of Topic 15 guidance which are on the Health & Safety page of its web site. These changes will, inevitably, also amend the ASE publication.

At the ASE annual conference at Reading University in January 2017, MiSAC and the MS co-sponsored a lecture in the *Biology in the Real World: a Global Perspective* programme, organised by NUCLEUS. Prof. Wendy Barclay of Imperial College, London gave a talk: *Influenza: discoveries and controversies*, which was well received. In addition, the Chairman provided a microbiological talk entitled *Roots, eats, soils and leaves*, which he then repeated; this was much appreciated by the combined audience of 35 people.

The MiSAC Chairman was invited to contribute to an exhibition for the general public entitled "All of a Twist", organised by RG Spaces. This took place in September in the Turbine House, part of Reading Museum, on the River Kennet. The exhibition gave examples of the science, technology and other activities associated with Reading's rivers that have a twist to them. The Chairman provided a photographic display of various aquatic microbes which show a spiral shape or structure. 1000 visitors attended during the run of the exhibition.

Future activities

The 30th Annual MiSAC Competition in 2018 will mirror the Thai competition and explore the *Commercial Uses of Fungi* as its theme; it will be sponsored by the British Mycological Society. MiSAC plans to organise an evening microscopy workshop for teachers and technicians at Reading University in the summer of 2018, with the cooperation of the Quekett Microscopical Club.

Acknowledgements

MiSAC is most grateful to its sponsors for their continued support. The generous amount of voluntary time, willingly given by the MiSAC Officers and the other Committee members, is also gratefully acknowledged. In addition, we greatly appreciate the work of the Honorary Auditor.

Committee membership 2016-2017 (with affiliations)

Chairman:	John Grainger (University of Reading)
Vice-Chairman:	John Schollar (NCBE)
Secretary:	John Tranter (ASE)
Treasurer:	Margaret Whalley (BMS)
Assistant Secretary:	Phil Bunyan (ASE)
Lay members:	Jason Harding (CLEAPSS) Hannah Forrest (MS) Kit Brownlee (QMC) Paul Sainsbury (SfAM) Linda Thomas (SfAM) Kath Crawford (SSERC)

SPONSORS: British Mycological Society || CLEAPSS || Microbiology Society || NCBE || The Quekett Microscopical Club || Society for Applied Microbiology || SSERC