

Promoting microbiology in schools and colleges since 1969

CHAIRMAN'S ANNUAL REPORT 2017-2018

Summary

The 30th MiSAC Annual Competition 2018, *Commercial uses of fungi - What fungi do for us*, was this year generously sponsored by the British Mycological Society. The BMS also sponsored, along with IPST and MiSAC, the third Thai schools mycology competition, also on the *Commercial uses of fungi*. Work has continued in promoting the study of microbiology in Thailand by the production of a manual for teachers, *Microbiology for Schools*. The Royal Society of Biology has awarded the President's Medal to the MiSAC Chairman for his support of the Society's activities. The MiSAC Vice Chairman has been awarded honorary membership of the Microbiology Society. MiSAC has been instrumental in revising the microbiology topic in the ASE publication *Topics in Safety*. To celebrate MiSAC's 50th anniversary in 2019, a series of articles has been commissioned on aspects of microbiology. MiSAC has continued to offer authoritative advice to schools, colleges and other organisations. 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 30th Annual Competition 2018, Commercial uses of fungi

The requirement of the 30th MiSAC Annual Competition was to produce information for a new teenagers' web site called *What fungi do for us*, with the purpose of increasing an understanding of the wide range of commercial uses of fungi in everyday life. This maintained our well-established approach of basing the competition on a topic that is associated with school curricula but with specifications that require students to explore material beyond the curriculum. The British Mycological Society generously provided special sponsorship for the competition and also, with MiSAC and IPST (a Thai government agency), concurrently sponsored a competition with the same title for secondary school students in Thailand.

The MiSAC competition continues to attract newcomers as well as maintaining strong support from regular participants. The popularity of this year's topic is particularly encouraging because, despite the wide significance of fungi, this very important group of microbes tends to be neglected in school (and university) education. As usual, there were two entry groups, KS3 and KS4 (Secondary 1/2 and 3/4 in Scotland). The 63 establishments that took part were from schools throughout the UK but also included one from the Netherlands; 15 schools made submissions to both entry groups. In total, there were 405 entries consisting of 307 in the KS3 (S1/2) group and 98 at KS4 (S3/4). Many entrants took the opportunity to work together in groups of up to 4, making a total of 608 students having had the experience of contributing to the competition.

Members of MiSAC were joined on the judging panel by three representatives of the competition sponsor, the British Mycological Society: Ms Carol Hobart, Vice-President, Professor Stefan Buczacki, past-President and Dr Margaret Whalley, also

Treasurer of MiSAC. This year, the overall requirement was to design material for a web site for teenagers; this would be arranged in two parts. The first half of the entry required an overview of the extraordinary range of fungal activities that are of commercial importance; the second half had to be a description of the scientific details of one of those processes and include the name of the fungus responsible. The competition entry had to be printed on one A3 sheet (or two A4 pages attached side-by-side). Examples of relevant processes were provided for guidance but entrants were encouraged to consider others.

As the judging procedure always includes attention to the requirements of the competition, it is important that entrants take careful note of the specifications. The judges noted that the entry requirements were generally well observed, with many hand- and computer-produced entries that achieved high standards of presentation and with some demonstrating innovative approaches. Entrants showed a good awareness of the range of commercially-important fungal activities and, in the second part of the entry, of the scientific details of the chosen process.

Credit was given for illustrating a good factual account with photographs, diagrams or data and for presenting a design which is appropriate for a web site and is both informative for, and attractive to, the intended interest group, i.e. teenagers. Only a small number of entrants revealed their wide-ranging research by referring to activities other than those suggested in the competition guidance, e.g. the use of a fungal mycelium in building materials. The guidance also drew attention to the rules of biological nomenclature, i.e. the use of italic font (or underlined if hand written) for the formal name of an organism and upper case for the genus and lower case for the species, e.g. *Saccharomyces cerevisiae*. In addition, the judges observed the

need for improvement in the correct use of the singular and plural cases, e.g. fungus, mycelium (singular); fungi, mycelia (plural).

It was encouraging to receive appreciative comments from teachers regarding the benefits for their students in taking part in the competition and on the interest and enjoyment that was generated. We also thank teachers for their attention to the request to record full identification details on each entry which eases the administration of several hundred entries, many involving more than one student.

Money awards totalling £1,255 were made to prize winners and their establishments, and some entries were awarded a commendation. All students who did not receive an award have had their work acknowledged by receiving a certificate of entry and each participating establishment will receive some microbiology teaching resources.

MiSAC warmly thanks the students for making the competition a success and their teachers for their support. We look forward to an even stronger response to the next competition which will mark the 50th anniversary of MiSAC's foundation.

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

Key Stage 3 Group: *First Prize* - Isabella Jain, Haberdashers' Aske's School for Girls, Elstree, Hertfordshire; *Second Prize* - Maya Schaefer, Heathfield School, Ascot, Berkshire; *Third Prize* - Brody Evans, Eltham College, London; *Commendation:* Abigail Manning, Colchester County High School for Girls, Essex and Hope Gray, St Francis' College, Letchworth Garden City, Hertfordshire.

Key Stage 4 Group: *First Prize* - Jenny Zhao, Altrincham Grammar School for Girls, Greater Manchester; *Second Prize* - Mithun Jay, Overton Grange School, Sutton, Greater London; *Third Prize* - Lucy Langdale, James Meyrick, Oliver Shiel and Jessica Richard, Cox Green School, Maidenhead, Berkshire; *Commendation:* Chimno Irluh, Altrincham Grammar School for Girls, Greater Manchester.

3rd Thai Schools Mycology Competition, Commercial uses of fungi

The requirement for the third Thai schools mycology competition, sponsored by the BMS, IPST and MiSAC and held in Bangkok in January 2018, was to produce an infographic presentation on the *Commercial uses of fungi*. The aim was to improve students' understanding of the economic and environmental importance of fungal processes, together with how fungi are used in the production of new products and applications.

Entries were invited from two groups: lower and upper (16-18 years) secondary school students. There was a good response with a total of 319 entries. Judging, which took place at IPST Bangkok, was carried out by 8 mycologists and microbiologists from universities and IPST, representing all competition sponsors.

The judges looked for entries which followed the specifications given in the guidance (e.g. focusing

on the *commercial* uses of fungi) and evidence of individual research on fungi or processes additional to those provided in the guidelines. Attention-grabbing infographic layouts were viewed favourably, as long as the science was correct and an adequate explanation of the commercial use had been provided in the entrant's own words. It was pleasing to see that some entrants had investigated scientific texts not provided in the guidelines.

A majority of entries chose food- & drink-related fungi but there were several which described fungi involved in less-obvious fermentation and bioremediation activities. The fungus responsible for the process had to be correctly named.

Money awards, provided by BMS and IPST, were made to all prize winners and highly-commended entries. In February, winners attended a Thailand-UK-China symposium on fungi, held at Chulalongkorn University, Bangkok where their infographics were displayed and awards were made.

Finance and sponsorship

MiSAC finances remain relatively 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*,
- *SSERC*.

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

The Microbiology Society has appointed Rachel Exley to serve as its representative on MiSAC. She works at the Sir William Dunn School of Pathology, University of Oxford. Similarly, Nathan Smith from Churchill College, Cambridge will represent the British Mycological Society at MiSAC meetings.

The Society of Applied Microbiology (SfAM) decided that support for microbiology in schools would no longer be a priority in its activities and has therefore withdrawn its sponsorship. MiSAC is grateful for its long association with SfAM, which was one of its founding organisations.

MiSAC continues to limit its expenditure by reducing commitments at exhibitions and conferences which would not be cost effective. For example, we have chosen not to have a stand in the main exhibition area at the annual meetings of the Association for Science Education (ASE).

The annual return was made to the Charity Commissioners.

MiSAC web site

Prolonged periods of ill health experienced by the web-site manager have hampered the existing web site being kept fully up-to-date and also the delivery of the previously-reported new design using the WordPress software package, which would allow

MiSAC officers to manage the site themselves. Urgent revision of the existing web site is now essential, so new arrangements for the management of the web site have been initiated.

MiSAC publications

Work is in progress on a number of new titles which are outlined below.

MiSAC methods 1: Looking at microbes

This provides information on preparing material for practical studies, such as hay infusions and pond & vase water, together with guidance on microscopy, the recording of observations and health & safety.

MiSAC methods 2: Sourcing, maintaining and using microbes It will provide valuable guidance on the routine tasks involved in preparing for, and conducting, microbiology practical work.

MiSAC activities 5: Spoilage of oranges

This practical guide will explore factors which encourage the growth of the mould *Penicillium digitatum* 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.

Advisory work

In 2018, the Treasurer has continued her work at IPST, Thai Ministry of Education, Bangkok, to produce a teachers' resource book, *Microbiology for Schools*. This will be a joint IPST / MiSAC publication which will provide a guide on microbiology teaching for secondary schools. It will also increase awareness and knowledge of microbiology amongst students.

The book was based on the Micro Camp workshop and Microbe bite-size practical activities prepared during the treasurer's previous visits to Thailand. *Microbiology for Schools* has two sections: a manual of techniques for teachers, to be used on courses for upper secondary school students, and a collection of over 40 microbiology activities for lower & upper secondary school work. The book is illustrated with colour photographs and diagrams, together with appendices of useful recipes, identification guides, flow diagrams and tables of data. The plan is that the book should also be the basis of a series of training sessions which would result in teacher accreditation by IPST.

SSERC is expecting that its revision of *Safety in Microbiology - A Code of Practice for Scottish Schools and Colleges*, will soon be available. Scottish secondary schools should receive a copy in the autumn term and it will also be available via the SSERC web site.

In the revision of the ASE's third edition of Topic 15, *Microbiology & Biotechnology*, in *Topics in Safety*, MiSAC was invited to provide its expertise in updating the information. It hosted several meetings of a subcommittee to consider appropriate changes to the guidance in the text. It was decided that there was no need for a separate

section headed 'Biotechnology', largely because there are two other *Topics* on DNA and Enzymes (written by the late Dean Madden of the NCBE). The revised discussion on bioreactors was incorporated into the section headed 'Microbiology'. The table of selected microorganisms was updated and a third appendix, on risk assessment, reinstated. The revised Topic 15, *Microbiology* was later approved by the ASE's Health & Safety Group and is available to ASE members on its web site. MiSAC has now revised its own versions of Topic 15 guidance and pdf documents have been prepared. These are waiting to be uploaded to the Health & Safety page of the MiSAC web site, from where they can be downloaded.

The future of the National Centre for Biotechnology Education at the University of Reading now seems assured, with the appointment in August of Professor Bob Rastall as its new director and Dr Nandini Vasudevan as deputy director. The NCBE will become part of both the School of Food and Nutritional Sciences and the School of Biological Sciences.

The Microbiology Society has offered to use its social media outlets to publicise MiSAC activities, particularly the annual competition. It has been suggested that MiSAC could contribute an article for the MS journal *Microbiology Today* on the history of its links with the MS, as part of its 50th anniversary celebrations. Discussions have commenced on the provision of support materials for primary microbiology activities.

CLEAPSS has reported that it has reorganised the structure of the microbiology advice on its web site for secondary schools, in order to make it more accessible. The number of technicians in schools is decreasing, often alongside a reduction in microbiological expertise. This has created pressures on the work of technicians that the newly-structured materials are intended to help dissipate. An initial contact by the Eden Project has led to the development of practical activities using yeast and extracts from various *Allium* plants; the AQA has shown an interest in this work. CLEAPSS has also investigated using yeast as an alternative, safer organism for schools with limited facilities and resources for microbiology practicals.

MiSAC officers' achievements

Congratulations are offered to two of MiSAC's senior officers. The Royal Society of Biology has awarded the President's Medal to the MiSAC Chairman for his support of the society's activities. In addition, the MiSAC Vice Chairman has been awarded honorary membership of the Microbiology Society for his work in providing training on practical courses organised by the society.

Future activities

The 31st Annual MiSAC Competition in 2019 will explore how the involvement of microbes is vitally important in the production of food in agriculture.

Students will be asked to produce a poster to illustrate the theme: "*How microbes help farming*". It is hoped that the competition will be sponsored by the National Farmers Union.

The evening microscopy workshop for teachers and technicians at Reading University, which MiSAC and the Quekett Microscopical Club had planned for the summer, has been postponed until the summer term of next year.

2019 marks the 50th anniversary of the founding of MiSAC. To celebrate this achievement, MiSAC has commissioned leading microbiologists to produce 30 articles to provide an invaluable collection of informative essays on a wide range of topics. A foreword to these articles has been written by Nobel Laureate, Sir Paul Nurse, FRS. This material will be published next year on the MiSAC web site. In addition, MiSAC will organise a celebratory event to be held at Reading University.

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 2017-2018 (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: Nathan Smith (BMS)
Jason Harding /
Ai-Linh Tran (CLEAPSS)
Rachel Exley (MS)
Kit Brownlee (QMC)
Kath Crawford (SSERC)