MICROBIOLOGY IN SCHOOLS ADVISORY COMMITTEE
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Promoting microbiology in schools and colleges for more than 50 years

CHAIRMAN'S ANNUAL REPORT 2024-2025

Summary

MiSAC's 37th UK annual competition, *Human Fungal Diseases and Antifungal Drug Resistance*, was sponsored by the British Mycological Society. A new MiSAC*briefings* 6 guide, *The rising threat of fungal diseases and antifungal resistance,* provided information for students to help in preparing their entries for this competition. The 38th annual competition has an agricultural theme and will focus on *How Microbes Make Milk*, sponsored by MiSAC. MiSAC*matters Articles* have now reached no. 40, *Improving Rice Production Through Sustainable Agriculture: A study of the impact of biostimulants on plant growth*. Ten schools were awarded funds in the MiSAC *Microbiology in Schools* Grant. Darwin Biological plans to produce and distribute a collection of practical activities. MiSAC continued to offer authoritative advice to schools, colleges and other organisations in the UK and abroad, including continued collaborations with schools in SE Asia. The Committee held 4 meetings, one of which was face-to-face and involved judging competition entries; the others used Zoom.

MiSAC 37th UK Annual Competition 2025 *Human Fungal Diseases & Antifungal Drug Resistance*.

The aim of the 37th MiSAC Annual Competition was to increase understanding among teenagers of those fungi which cause a wide variety of diseases and the threat of antifungal drug resistance which impedes effective treatment. Each year, more than 1 billion people experience a fungal infection but, with limited resources and under-funded health systems, around 2 million deaths occur.

The requirements of the 2025 competition maintained the 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. It was evident that students had enjoyed researching the topic and demonstrated their enthusiasm in producing an illustrated web-page report in a variety of imaginative ways to convey their findings. Overall, the judges were impressed by both the quantity and quality of the entries.

On the publicity flyer, the *Object of the competition* provided the remit for the students' entries. One named human fungal pathogen had to be identified and described, with its associated disease and symptoms. Comments were required on how often the disease is encountered and its effects on different groups of patients, for example, those with a compromised immune system. In addition, students were required to discuss the antifungal drug treatments that are used, the factors that contribute to drug resistance and future ways of combatting the emergence of such resistance.

Around 20 different fungal diseases were selected by the students. These included common ailments such as athlete's foot, ringworm and thrush but students regularly researched other less-familiar diseases. Aspergillosis caused by *Aspergillus fumigatus*, sporotricosis or rose handler's disease involving *Sporothrix schenkii*, cryptococcal meningitis and Valley fever (coccidioidomycosis) were among the examples chosen.

Whilst MiSAC is pleased to welcome back entries from regular, established school participants, we were delighted by the very large number of newcomers to the competition, as well as schools returning to submit entries after an absence last year. As usual, there were two groups, KS3 and KS4 (S1/2 and S3/4 in Scotland). Entries were received from a total of **104** establishments; from England (92), Wales (4), Scotland (2) and Northern Ireland (1), plus 5 schools in Azerbaijan, Cyprus, Switzerland, the Philippines and Indonesia.

30 schools submitted entries to both entry groups. In total, there were **454** separate entries consisting of 255 in the KS3 group and 199 at KS4. Many participants took the opportunity to work together in groups of up to 4, making a total of **744** students who entered the competition. The judging took place at the Chesham headquarters of CLEAPSS, one of MiSAC's sponsors, which hosted the event. The judging panel consisted of Mark Ramsdale, Associate Professor of Molecular Microbiology, University of Exeter, representing the British Mycological Society - sponsors of the competition - and Emeritus Professor Anthony Whalley, Liverpool John Moores University, together with officers & members of MiSAC.

Entries from students in the KS3 group provided a strong field with some very detailed accounts of a wide range of medical mycology topics. The entry produced by the first-prize winner was considered exceptional, not only for a student at KS3, but for a student of any age. Mark Ramsdale thought the entry would not have looked out of place as an undergraduate student's submission; it provided detailed information in an accessible way and linked to supplementary content online via a QR code, which was cohesive, well-presented and engaging. The entries for KS4 were also very

strong and led to prolonged discussion amongst the judges on potential prize winners. Around 20 entries closely met the remit and provided a great example of good scientific communication.

Several contenders in this group, however, didn't quite address all the key areas required in the remit, in particular future ways of combatting the emergence of antifungal resistance. A number of entries in both age groups were commended not only for their artistic merit but also for their clarity of presentation. However, students should be discouraged from using dark background colours which make it difficult to read the information.

Entries covered a broad range of medical mycology topics, extending beyond those highlighted in the background information of the publicity flyer. Most (but not all) discussed named organisms, as required. Occasionally, there were factual errors in the text of the entries, but these were surprisingly rare, indicating a good sifting of reliable and robust information sources. Many students wrote correctly the genus and species names of the fungi they described, eg, *Aspergillus fumigatus* (which can be abbreviated to *A. fumigatus* after its first use). However, they had ***not*** learned to be consistent in their proper use of naming these organisms. (Teachers still need to emphasise the use of an upper-case initial letter for the genus name and a lower-case initial letter for the species. This should be in *italics* when printed and underlined when hand-written.)

Examples of symptoms and treatments were detailed in many cases. Insights into the causes of drug resistance were, however, missing from all but the best entries but some had summarised complex material to produce useful guidance for treatment options. Many did not bring together causes of resistance, mechanisms and suggestions for future developments required to manage effectively the local or global threats of antifungal drug resistance.

The judges continued to be impressed by the imagination and creativity of the students as they compiled their entries. Many students showed remarkable technical skills in using their computer to design their submission. In 2023, judges first commented on the skill of some students who created a *working* QR code for use with a smartphone to connect to URLs giving further information. This year, the number of entries that incorporated functioning QR codes showed a significant increase. Those who chose to work by hand could also achieve notable results.

We should also like to thank teachers for responding to the request to record full identification details on the back of each entry which eases the administration of several hundred entries, many involving more than one student. A total of £1240 was awarded to prize winners and their establishments. Winning and commended entries are displayed on the MiSAC web site www.misac.org.uk which includes a list of the prize-winning students and their schools. MiSAC thanks all the students for making the 2025 competition an outstanding success and their teachers for their support. We look forward to entries for the next MiSAC competition in 2026, which will explore the agricultural theme of *How Microbes Make Milk*.

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

Key Stage 3 Group: *First Prize*: Tariq Ouchefoune - King Edward Camp Hill School for Boys, Birmingham; *Second Prize*: Jovanie Jr. Banez, Althea Gwen Valdez, Rhode Cristine Loren Ribaton, Eisha Lois Pino - Salvacion National High School, The Philippines; *Third Prize*: Maya Crown - St Albans High School for Girls, Hertfordshire; *Commended for Creativity & Design*: Ananya Bhat - Farnborough Hill, Hampshire; *Commended for Hand-drawn Originality***:** Omaira Amarasekara-Somaratne, Karin Tolentino, Lois Johnston - St Albans High School for Girls, Hertfordshire; *Commended for Graphic Design*: Rakeb Sofonias - Bloxwich Academy, Walsall.

Key Stage 4 Group: *First Prize*: Tania Cheng - Brighton College, East Sussex; *Second Prize*: Zaara Travadi - British School Jakarta, Indonesia; *Third Prize*: Tanvi Kedia - The Tiffin Girls' School, Kingston upon Thames, Surrey; *Commended for Creativity & Design*: Lau Cho Lam Jocelyn - Brighton College, East Sussex; *Commended for Creativity & Design*: Ella Cheung - Channing School, Highgate, London; *Commended for Graphic Design*: Ines Koshoni - Heathfield School, Ascot; *Commended for Hand-drawn Design*: Leila Abley, Trinity Cheung, Amara Deen, Aerin Russell - Haberdashers' Girls' School, Elstree, Hertfordshire.

MiSAC *Microbiology in Schools* Grant

90 schools applied for a grant up to £250, or one up to £1000, to enhance their teaching of microbiology; 10 schools were chosen to receive an award. Applicants itemised basic microbiological equipment, incubators, microscopes and digital cameras that they needed, along with specific microorganism cultures and media. In addition, support for technician training featured in many of their bids.

Before offering further grants in future, MiSAC is considering ways of simplifying the administration of the grant scheme. With the help of committee members, Blades Biological, Darwin Biological, the NCBE and Brunel Microscopes have been asked to provide 'packages' of selected equipment, kits or cultures/media at discounted prices.

MiSAC publications

The collection of **MiSAC*matters Articles*** has now reached no. 40, ***Improving Rice Production Through Sustainable Agriculture: A study of the impact of biostimulants on plant growth*** written by P. Thamvithayakorn.

The sixth title in the **MiSAC*briefings*** collection: ***The rising threat of fungal diseases and anti-fungal resistance*** explored the topic of the 2025 annual competition and provided students essential research material for inclusion in their entry for the competition.

MiSAC web site

Work has continued with Indent Design Ltd to update pages on the site. New publications, described earlier, are now available for download. On the Annual Competition page, the publicity flyer for the 2026 competition: *How Microbes Make Milk*, is now available to download. The Microbiology grant page explores MiSAC's responses to administering the grants awarded to 10 schools to improve their teaching of microbiology.

The MiSAC News page includes a report of a Wellcome Trust study that reflects on the success of recent MiSAC competition themes in highlighting the dangers of climate change. Two pathogenic species of *Aspergillus* have extended their range and occurrence in northern Europe as the world has becomes hotter. This has exposed a potential 1-9 million more people to infection.

Also featured is the ***Fungi Connect*** download, produced by the British Mycological Society, to promote its UK Fungus Day initiative in October 2025.

Darwin Biological new initiative

Darwin Biological is planning to produce and distribute to all secondary schools in the UK a free collection of practical activities produced by various contributors, including MiSAC.

- Extracting strands of DNA from peas - ASE
- Do Slime Moulds eat Jelly Babies? - CLEAPSS
- Investigating Photosynthesis - Culture Collection of Algae & Protozoa (CCAP)
- Antibiotic Zones of Inhibition - Darwin Biological
- Drosophila Sex-Linked Cross - Darwin Biological
- Sampling - Field Studies Council
- How Rich is Your Habitat? - Linnean Society
- Owl Pellets - Mammal Society
- Microbes on Plant Leaves (MiSAC)
- Pitfall Trapping - Royal Entomological Society (RES)
- Understanding Magnification - Royal Microscopical Society (RMS)
- Pondweed Top Tips - Science & Plants for Schools (SAPS)

Advisory work

The collective range of experience in microbiology held by the members of the MiSAC Committee continued to provide expert advice in response to a wide range of enquiries.

Margaret Whalley has collaborated with UNESCO South-East Asia Ministries of Education Organisation (SEAMEO) STEM-Ed, the International Association for the Future Stem Workforce (IAFSW), the King Mongkut University of Technology Thonburi (KMUTT) and the Institute for the Promotion of Science & Technology (IPST) Foundation as the Senior Specialist in Microbiology and lead organiser in the production of microbiology materials for secondary schools in its ASEAN partner countries. It has now been agreed that a version of next year's MiSAC competition, *How Microbes Make Milk*, will be held in schools in Thailand.

The BMS has also chosen October 4th 2025 as its **UK Fungus Day**. School children up to age 18 are encouraged to become inspired by fungi and to submit their own pieces of work to celebrate the fungal kingdom. The deadline for submissions to the BMS is October 15th 2025.

Future activities

In 2026, the 38th UK annual competition has an agricultural theme and will focus on *How Microbes Make Milk*, sponsored by MiSAC.

Finance and sponsorship

The special sponsorship provided for our competitions in 2023 and 2024 has consolidated MiSAC finances. Costs of the competition have been reduced by requiring schools to print the certificates that entrants receive.

MiSAC also relies on the much-appreciated support from its annual sponsors:

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

Their generosity provides an annual financial contribution, meeting rooms &/or laboratory facilities.

The annual return was made to the Charity Commissioners.

MiSAC Committee

Committee membership 2024-2025 (with affiliations)

Chairman:	John Grainger, MBE (University of Reading)
Vice-Chairman:	John Schollar (NCBE)
Secretary:	John Tranter (ASE)
Treasurer:	Margaret Whalley (BMS)
Lay members:	Christian Von-Trotha-Taylor (BMS)
	Rebecca Shears (BSP)
	Ai-Linh Tran/Ben Chantrell (CLEAPSS)
	Tansy Hammarton (MS)
	Fiona Lane (NCBE)
	Phil Greaves (QMC)
	Johnathan Doran (SSERC)

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, Mr Lindsay Hicks who has now retired and welcome our new auditor, Jane Hicks.