Editorial

Are your children taught *anything* about fungi at school?

Fungi play an essential role in the environment, in human nutrition and health, and are indispensable model organisms in basic biological research. Mycology has never been as important as it is today and this is undoubtedly the most exciting time to be studying the enormous diversity, functions and roles of fungi.

Knowing what you know about fungi, you will probably expect that any educational presentation of "biology" will include a balanced description of prokaryotes (bacteria and archaea), eukaryotic protists and fungal, animal, and plant biology. After all, leave out any of these components and the story of life on Earth is incomplete and defective. But when the children walk through the doors into school what they are taught depends on the developers of the school curriculum. In the United Kingdom, unfortunately, the developers of the National Curriculum don't seem to know what we mycologists know about fungi. Indeed, they seem to be totally ignorant about "our" Kingdom of organisms. The situation is similar in Austria, where, within a framework of school autonomy, the individual Secondary Academic Schools may modify their curricula and develop their own specific profiles. These schools should provide pupils with standard entry qualifications for university, but in biology, which is one of their core subjects, fungi are marginalized or totally ignored. What is also alarming is that evidence suggests an inadequate mycological education at universities too. For example, try a quick search on the internet for "fungi and yeasts" (and *vice versa*) and you will get more than 120 000 hits, most of them from scientific institutions. Aren't yeasts fungi?

As a result, children in the UK and in other European countries, from primary level onwards are taught about bacteria, animals, and plants. No fungi. In fact, in England alone, more than a million children each year complete their statutory National Curriculum with no knowledge of Kingdom Fungi (Moore *et al.* 2005). The purpose of this note is to ask European mycologists what the situation is like in their countries.

Children get an incomplete and defective story of life on Earth in school. And if the children are not given a proper understanding of the importance of fungi as crucial components of the natural world, where are future generations of mycologists to come from? How can we foster an interest in fungi if generations of schoolchildren are kept in ignorance of them? And the ignorance certainly extends through

the generations. Recent questionnaire returns suggest that most 16-year-olds in Manchester think that fungi are bacteria. The school curricula promise little to correct this misconception prior to university entrance. At university the decline of organismal biology and rise of systems biology can almost guarantee that the best we can expect is that some yeast molecular biology will survive the current lurch towards too narrowly focused medical/biotechnological topics in both teaching and research. With trends like these, can we look towards the future and confidently expect to recruit knowledgeable graduates into mycological research in five years? Ten years?

You might suggest that mycology could become a postgraduate speciality and we could compensate for the problem with a few intensive Masters Courses. We may need such things in the short term, but they would be short-term, first-aid solutions. The real problem is not that hundreds of thousands of university students in Europe are not being taught enough about fungi. The real problem is that *millions* of school children are not being taught anything about fungi. If we can get awareness of fungi into schools, and disturb the cosy, comfortable notion that higher organisms are either animals or plants, then the process of improvement will become self-driving. Sixteen-year-olds who know what fungi are and how fungi affect our daily lives, will expect to learn more in pre-university courses. University entrants who know a balanced amount of fungal biology will expect the same balance in their university courses. In time, graduates with a good education in the whole of biology will become university teachers and then the teaching of animal, plant *and fungal* biology will be a natural part of a good scientific education.

It will take time, but the British Mycological Society is making a start by publishing a range of classroom tested teaching resources through a new school-oriented website at http://www.fungi4schools.org/. This offers to teachers classroom materials, which range in suitability from primary level to post-16, for free download.

We doubt that the UK and Austria are the only countries where statutory school biology is limited to animals, plants and bacteria. Does the majority of 16 year-olds in your country think that fungi are some kind of bacteria? Do your school curricula call for comparisons only between animals and plants? Do they offer details about animal and plant cells only? Do they only ever mention fungi (and always linked with bacteria) as 'degraders'? These are the symptoms of the disease afflicting the national curricula. Do you recognise them?

Reference

Moore D., Fryer K., Quinn C., Roberts S., Townley R. (2005) How much are your children taught about fungi in school? *Mycologist* 19: 152 – 158.

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