

Preface

This *Dictionary*, now in its 65th year, aims to provide an entry point into the sum total of our accumulated knowledge on systematic mycology for all those who work with fungi. All organisms traditionally studied by mycologists are covered, including lichens, mushrooms, slime moulds, water moulds and yeasts.

As more molecular data have become available it has been possible to attain greater certainty about the higher-level relationships of fungi and to see some enigmatic taxa at last find a home. While many of the classes and phyla recognized in the ninth edition of this *Dictionary* are retained here, we are aware that further significant change is likely among the fungi *sensu stricto*, with the proposal of several new high-level taxa in the near future. Likewise, we can expect further significant changes in the chromistan and protozoan fungus-like analogues as sequence data for more taxa become available. It has been our aim to recognize such changes while at the same time maintaining a servicable and comprehensive hierarchy for users.

In preparing the tenth edition, therefore, our efforts have been directed most of all to revision of the classification of higher ranks within the *Fungi*, largely based on the results from the AFTOL (Assembling the Fungal Tree of Life) project to which several of the Editors of this *Dictionary* had inputs. Phylogenetic information gained from multi-gene sequence analyses, culminating in 2006-7 with the results of the first phase of the AFTOL project, have revolutionized our understanding of how this kingdom should be classified. Phylogenetic analyses tend to stimulate recognition of many levels of the systematic hierarchy, and in partial response to this trend we now recognize the rank of subphylum in addition to classes and subclasses for the kingdom *Fungi*.

The second major development area for Edition 10 of the *Dictionary of the Fungi* has been to incorporate taxa at family level into the new classificatory framework, as the AFTOL project focused only on ranks at order and above. Where possible this has been carried out using molecular data, but there still remains a substantial number of fungal families for which sequence information is not available. More information may be found in the *Dictionary's* new sister publication, *Fungal Families of the World* (CABI, 2007).

Many recent phylogenetic studies have been hypothesis-driven, designed to test the accuracy in evolutionary terms of traditional morphology-based classifications. As anamorph taxa have only recently started to be incorporated fully into holomorphic systems, they are substantially under-represented in molecular phylogenetic studies. Edition 9 of this *Dictionary* was the first to abolish separate classification systems for anamorphs and teleomorphs, though for the overwhelming proportion of genera it was only possible to assign them at subphylum level – i.e. to the filamentous *Ascomycota* or *Basidiomycota*. Recent studies have allowed more accurate placement of many asexual taxa, but today we still cannot place two thirds of the 3000-odd anamorph genera included in Edition 10 even to class level. Now the basic classificatory framework has been established to an acceptable degree of certainty, we hope that attention will be shifted towards insertion of these orphan taxa into their rightful place within the fungal system.

The already large and rapidly increasing body of evidence from molecular studies has also led us to the radical decision that this edition should comprise three parts – a *Dictionary of the Fungi*, a *Dictionary of the chromistan/stramenopile fungi-like organisms*, and a *Dictionary of the protozoan fungi-like organisms*. Many people, unfamiliar with classifications which have now been accepted by systematists for many years, still think of fungi as 'plants'. But in reality fungi are a disparate assemblage of organisms from at least three different kingdoms, their unifying characteristic being that they are studied by mycologists. In terms of evolutionary origin, the sister group of the kingdom *Fungi* is *Animalia*: *Fungi* are more closely related to the humans who study them than to green plants which they were previously classified with. But this statement also hides the fact that chromistan fungus-like organisms, of which *Phytophthora infestans* (the causal agent of potato blight) is perhaps the best known example, are only very distantly related to *Fungi*, being instead more allied with the brown seaweeds, among others – a clear indication that the mycelial way of life evolved on at least two separate occasions. Surprisingly, however, protozoan fungus-like organisms are closer to the *Fungi*, being classified in the *Amoebozoa* with other protozoan amoebae. *Fungi*, together with *Animalia* and a

few other protozoan groups constitute the *Opisthokonta*; and this group and the *Amoebozoa* form the first major branches at the base of the *Eukaryota*.

In earlier editions, for historical reasons, some biographies and longer entries (i.e. the essay-style accounts of topics relevant to mycologists) seem to have been written from the viewpoint of a native speaker of English and to have treated the fungi as an adjunct of botany. Given that the *Dictionary* is now truly international in character and its theme is clearly not botanical, some effort has been made to adjust these entries so that, in addition to being updated, they are seen from a global and explicitly mycological perspective. One result of this has been a considerable increase in the number of eminent but deceased mycologists commemorated by a biography in these pages, notably from India, Japan and Russia, but also including for the first time scientists native to Argentina, China, Cuba, Pakistan, Portugal, Puerto Rico, Spain and Ukraine. Another has been a sprinkling of new topics covered by long entries, in particular covering the new technologies which have come in, and the gradually developing infrastructure of mycology as a science. Limited resources have meant that the work of updating the essay-style accounts has been incomplete and imperfect, in a few cases to the extent that it has been necessary to flag the entry with a warning note. For this edition, all of the biographies, definitions and other longer entries are located in the first part, even when they might more appropriately belong in one of the other two parts. Resources have also, again, not allowed us to update the keys to families and these continue to be omitted. As higher taxa of fungi are increasingly defined using molecular rather than morphological characteristics, it remains to be seen whether morphology-based keys at this level of the new systematic hierarchy can be made workable.

The overall style of the individual entries in this *Dictionary* remains similar to those of previous editions. References are cited in full throughout the taxonomic name entries. Much bibliographic information is becoming available on the Internet and the tenth edition of this *Dictionary* reflects the increasing availability of information from this source. CABI has been producing the *Bibliography of Systematic Mycology* since 1943 and production was computerized in the late 1980s. This database has been available on the internet since late 1999 and users of this *Dictionary* should visit that web site (www.indexfungorum.org) for up-to-date bibliographic references on the systematics of fungi.

Having been intimately involved in the compilation and proof-stage revisions, we are acutely aware of imperfections and improvements that we would have liked to have made. We can do no more than repeat the comment in the ninth edition that our aspiration is that this edition will at least prove to be the same 'marvellously imperfect work needed by all'.

Do send us your corrections and comment so that the database, and whatever product succeeds this book, will be less imperfect and of even more value to mycologists of all disciplines world-wide.

The tenth edition may well be the last 'ink-on-paper' version of Ainsworth & Bisby's *Dictionary of the Fungi* – it will certainly be the last for which three of the main editors are at the helm. For like the tenth, in its 65th year, the next edition, if there will be one, will be produced after the retirement from formal, full-time employment of these editors. As such, like so many good things, ...

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