

Fungal Conservation: Issues and Solutions

Edited by David Moore, Marijke M. Nauta, Shelley E. Evans, and Maurice Rotheroe. 2001. Cambridge University Press, Cambridge, UK and New York. x + 262 pp., illus. U.S. \$95.00.

The realization that fungal species (with few exceptions the book concentrates on the macrofungi, such as mushrooms and allies) are experiencing significant declines has made conservation a major concern. Fungi are ubiquitous, they make up a significant part of the microflora in soils, and the roots of most higher plants have a beneficial association (mycorrhizae) with the fungi.

Key words and phrases from some of the chapter titles are: trends and perspectives, nature management, forest fungi, ecosystem, future of fungi, fungi as indicators, threats to biodiversity, valuable, rural economies, survey, national mycological societies, and optimism.

Economically the wild mushroom industry is mushrooming. In 1992, nearly 2 million kg were harvested in the Pacific Northwest of the USA, bringing over US\$40 million to the economy (Molina et al.). And the global trade in matsutake alone is estimated at US\$3 to 5 billion annually; for chanterelles it is about US\$1.5 billion (Aurora). In some communities in China, Bulgaria, Italy, and Zimbabwe wild mushrooms provide 50 to 100% of a family's annual income (Aurora). In Champa (Tibet) the intact, healthy forests are perceived as the key to rural development rather than as an impediment to it (Aurora). Thus sustainable management of the wild mushrooms is critical to the welfare of many towns and villages. Regarding sustainability of harvests, Aurora comments that wild mushrooms, like pine nuts and huckleberries, can be harvested without significantly damaging our forests and that buying them in a gourmet restaurant probably comes at less cost to biodiversity than wine, beef, or almost any other item on the menu.

From committees focusing on global conservation to the effects of wild mushrooms on rural economies, the 22 chapters in this book provide an introduction to the varied problems and proposed solutions to fungal conservation. In the introductory chapter the editors present an overview of the threat to microorganisms and establish that fungi are important. In giving readers perspective on their importance, Staley (1997, *Current Opinion in Biotechnology* 8: 340-345) is quoted "the tree of life is largely a tree of microorganisms ... much of the diversity on Earth is microbial with the plants and animals appearing as small, terminal branches."

Before solutions can be implemented it is essential

to define the problem, and in the case of fungi this has not been easy. Several authors emphasize that effective conservation programs need the input of mycologists (those who know and study fungi) and mycologists are seen in many parts of the world as an endangered species. Public education is discussed as the key to gaining the necessary resources and this is a long term effort. In the more immediate future, Molina et al. argue for the development of a cadre of parataxonomists (those of less formal mycology schooling but trained in fungal identification and methods of study) that can evaluate the mycologically valuable sites.

Courtecuisse, in a chapter titled "Current trends and perspectives for the global conservation, of fungi" gives an overview of the main tools being used by fungal conservationists; i.e., inventories, mapping programs, and Red Data Lists. And these items appear in various forms in all chapters. Several authors bemoan the lack of base-line data on which to judge the present status of diversity or frequency. Jalink and Nauta show how such data can be used to calculate the mycological value of a site. At least 20 European countries have Red Lists for fungi (essentially mushrooms and allies) and, although the criteria for listing may differ, these have been valuable in managing species (Arnolds). Arnolds in an intriguing chapter titled "The Future of Fungi in Europe" presents a wide ranging discussion of many facets of fungal conservation. His discussion of checklists concludes with "Any checklist is better than no checklist." *Nota bene* colleagues who hesitate!

It is disappointing that only one contribution focuses on the Western Hemisphere. However, that seems to reflect the importance given to fungal conservation in the area. Molina et al., in a detailed, thoughtful presentation, deal with the problems, logistical and legal, of conservation in the United States' Pacific Northwest. The presentation concludes with eight guidelines for mycologists to consider when embarking on fungal conservation efforts.

This is a well written book, broad in mycological scope, and the topics are concisely presented. It is a good starting point for anyone interested in fungal conservation and should be required reading for North American ecologists, plant diversity researchers, land managers, and foresters.

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