Book reviews

The Lives of Fungi
A Natural History of our Planet's Decomposers

Britt A. Bunyard

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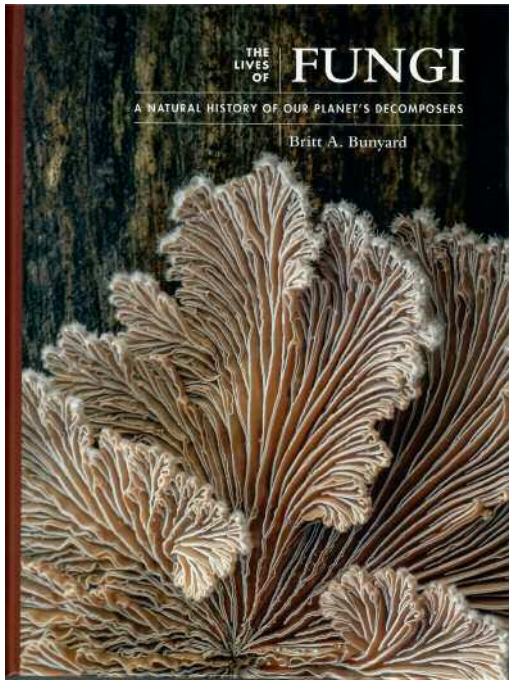
This fascinating account of the natural history of fungi could not have come at a more appropriate time with fungi being a hot topic among the world's chief climate scientists, moving centre stage and into the environmental limelight. Not least for their ability to help store carbon in the soil, a big worry during these climate-warming decades.

I love this book's simple introductory, opening statement, "Everything depends on everything else" which then goes on to state that all living things have a reliance on fungi.

The book strives and largely succeeds in unveiling the mysterious, often hidden world of fungi, how they live and what they do, bringing the reader a wide range of fascinating examples and enlightening facts.



Each chapter has a number of sub-chapters that then describe particular fungi associated with the area/subject being discussed.

The introduction, What are Fungi? is an overview of what the book later goes on to cover in more depth, with topics such as biology, reproduction, diversity of form, survival modes, fungi and the future. The book is interspersed with wonderful, clear photographs, illustrating the various topics. One such picture in the introduction is a full page showing stages of a Red Palm Weevil being slowly engulfed by the insect killing fungi, *Beauveria bassiana* and *Metarhizium anisopliae*.

Fungal reproduction describes the myriad of strategies fungi have evolved to release their spores into the environment, from simply dropping them, to actively firing them or by producing the odour of rotting meat to attract flies to help disperse them. Zoochory, a word I'd not come across before, included in this chapter, is animal-mediated spore dispersal, our current knowledge of which is scant. The book asserts that as we learn more about this association, we may reveal that some of these associations are underpinning whole ecosystems.

Chemistry and Physiology draws the readers' attention to various, fascinating examples whose chemistry/physiology has brought the fungus notoriety, be it fungi that glow in the dark, fungi that resemble fruit, supposed aphrodisiac fungi, *Cordyceps* which fruits from caterpillar larvae in the ground, or the disturbing, historic trail of *Claviceps purpurea*, Ergot, an ascomycete fungus that grows on various cereal grains and which made its way into bread and caused absolute mayhem during the 1600's in America. Ergot poisoning causes strong hallucinations, madness and loss of limbs. It is now strongly believed that the witches of Salem were a result in part of Ergotism; where some 200 people were accused and 19 were executed for witchery.

The strange Corn Smut, *Ustilago maydis* and Beech Orange Fungus, *Cyttaria gunnii* are just two of the fungi covered in **Saprobes and Parasites**: **Parasites of Animals** and **Parasites of Plants**. The former fungus is now

considered a prized, edible pathogen of maize, especially in Mexico, where it is commonly known as Huite le Coche. The latter, first found by Charles Darwin in 1839 during a stop over in Tierra del Fuego, is restricted to the Southern Hemisphere and to its host tree *Nothofagus*.

Pathogens, Pandemics and Scourges: **World Changing Fungi**, **Fungi through history** and **Human impact**, could not be a more apt chapter in these times of COVID 19 and the take-away message here is, despite scientific advances that have kept humans ahead of the race, just like with COVID, it's only a matter of time before the next microbe or human pathogen strikes, perhaps wiping out important sources of food, much like the potato blight did two centuries ago. An import statistic here is that food enough to feed 600 million people is destroyed every year just by the combination of Rice Blast, Wheat Stem Rust, Soybean Rust and Corn Smut.

Mutualistic Symbionts, fungus animal mutualisms, fungus plant mutualisms. This chapter discusses the all important, mutually beneficial fungus-plant and fungus-animal relationships. Termites cultivating a fungus to feed young grubs or *Cerrena unicolor* and its close relationship with a 7.5 inch wasp (female) *Megarhyssa atrata*, Giant Ichneumonid Wasp (most of this length is from the extremely long ovipositor). Thankfully we don't have such wasps in Britain, these are in North America but we do have the fungus. Mycorrhizal fungi are discussed, both ecto- and endomycorrhizal and their importance for healthy trees, plants and forests.

The final two chapters, **Fungi & Humans** and **Fungi & The Future**, really bring to the fore the importance of fungi in our changing world, with particular emphasis on the carbon crisis and the potentially crucial role of arbuscular mycorrhizal fungi (AM).

AM are soil fungi which partner with most plants across the planet, including important crop species. Scientists are now looking at producing crops based around AM fungi, as the nutrient uptake via AM fungi is unsurpassed. More crucially the ability of AM fungi to pull carbon dioxide out of the environment and into the soil. Glomalin is a sticky protein produced by AM and their associated soil microorganisms, it's like an organic glue, it binds and helps structure soil. 30-40% of a glomalin molecule is carbon and could account for as much as one third of the worlds soil carbon. This is more than plants and environment combined. Scientists are now revisiting their climate change model as a consequence of this finding.

This is a book for those that are interested in the role of fungi, what they actually do in the natural world, how they have evolved and co-evolved, our dependent relationship with fungi and how fungi could be our saviour.

All this is brought to the reader with a clear, easily understandable approach, supported by excellent photography.

Given that the book covers so much ground, imparting both common knowledge (to the already initiated) and more cutting edge information, the price is more than reasonable.

Although the focus of this book is fungi, it reflects on all living things and how we all depend on each other for our survival. Everything depends on everything else.

Andy Overall

The genus Cortinarius in Britain

Geoffrey Kibby & Mario Tortelli

Self Published April 2022
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ISBN 9 780957 209480
£44.99 Summerfield Books, NHBS & other online book sellers

Historically, the genus *Cortinarius* would have brought dismissive shrugs and lots of head shaking among field mycologists, especially species belonging to subgenus *Telemonia*. These are the most often encountered *Cortinarius* that give away very little in their subtle differences from one another, being often small and some shade of brown.

This book begins with a look at the history of the study of *Cortinarius* with special mention of the works of Peter Orton, a brilliant British Mycologist who produced in 1955 & 1958 *The genus Cortinarius* parts I & II. In the intervening years, very little has happened with the genus in Britain until now, this, the first major work on *Cortinarius* in Britain for over 60 years.

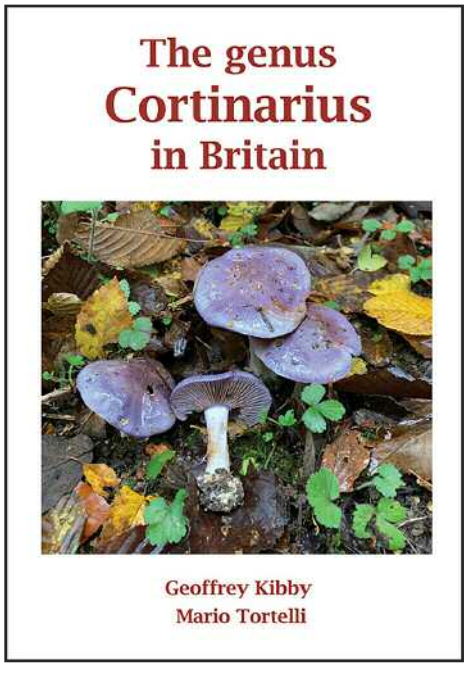
Compared to Kibby's other publications the layout of this book is closer to his recent volume guides, *Mushrooms and Toadstools of Britain & Europe*, rather than his keys to certain British

genera, although that is essentially what this book is. The guide layout with good keys before each subgenus, with three species described and pictured per page, helps make this more ordered, concise and clearer to the user.

One notable difference with this publication is that Kibby is not alone; he is joined by the very knowledgeable and experienced field mycologist of 40 years, Mario Tortelli, who has a special interest in *Cortinarius* having studied them in Britain and across Europe. Three very important works are cited as the basis for past British identifications: *Cortinarius Flora Photographica* (5 volumes), *Atlas des Cortinaires* (24 Vols) and *Il Genere Cortinarius in Italia* (5 vols). These works were mostly produced pre-DNA sequencing, which makes this current work, in which 43% of collections illustrated were confirmed via DNA sequencing particularly valuable. Those species confirmed as British by molecular sequencing are indicated by a large red dot.

Mention is made of the crucially important work currently being carried out on the genus by Liimatainen *et al* and others, which the authors acknowledge helped give them the confidence to approach such a difficult topic. Following this molecular revolution, interest in *Cortinarius* is now at an all time high, making this volume a timely publication.

With use of quality photographs, chief characteristics are then covered, highlighting stem shape, veil types, cap surfaces, gill colour or any colour changes due to bruising or when KOH is applied. The various spore shapes and ornamentation are nicely portrayed with the use of clear micrographs.



A thorough glossary helps the user navigate any unfamiliar terms and the 'bibliography with further reading', points the user towards important works and papers on *Cortinarius*.

Importantly, the authors explain that they have not attempted to over complicate and confuse by using numerous sections and subsections and go for a more practical approach utilizing the various characters of the subgenera. A key to the four subgenera, *Myxacium*, *Phlegmacium*, *Cortinarius* and *Telemonia* follows with an overview and key to each of these subgenera as they appear. Over 330 species are covered, some of which are illustrated for the first time. And as well as presenting us with a wonderful pictorial account of these species the authors state that the book was conceived or can be viewed as a visual baseline checklist of all presently known British species, bar a very few omissions.

There are three species per page, illustrated in most cases by both a photograph and a Kibby illustration and a spore drawing. Most books will not have both photographs and illustrations of species. The meaning of each Latin or Greek species name is interpreted e.g. venetus = sea blue. All photographs are taken by the authors unless otherwise listed in acknowledgments.

Descriptions include general info on size, colour, taste & smell, any chemical reaction, spore size and ornamentation. Notes give you info on habitat, distribution and anything important attributable to the given species. Species with two stars are not authentically British but are considered likely to be here.

To say that this book is eagerly awaited among British mycologists, especially those with a special interest in *Cortinarius*, would be a massive understatement. Compared to other recent and not so recent works on Cortinarius, this book represent excellent value for money.

This will undoubtedly be the go-to book on British *Cortinarius* for many years to come. A super achievement and crucial piece of work from two of our foremost British Field Mycologists. Let's hope its not another 60 years before we see the likes of such work again.

Andy Overall