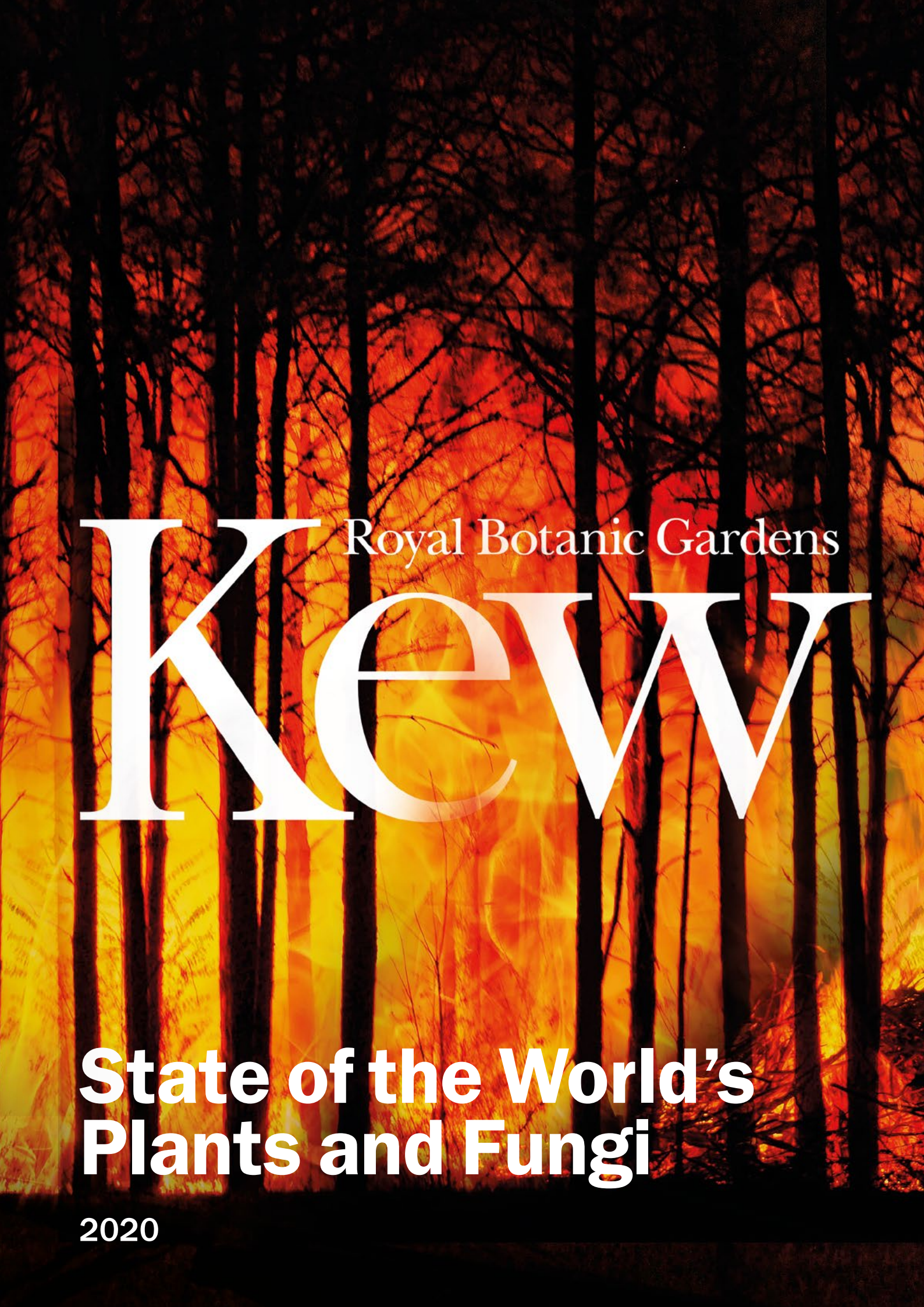

State of the World's Plants and Fungi

2020

Introduction

Never before has the biosphere, the thin layer of life we call home, been under such intensive and urgent threat. Deforestation rates have soared as we have cleared land to feed ever-more people, global emissions are disrupting the climate system, new pathogens threaten our crops and our health, illegal trade has eradicated entire plant populations, and non-native species are outcompeting local floras. Biodiversity is being lost – locally, regionally and globally.

Yet this biodiversity sustains our lives. Open your fridge, peek into your medicine cupboard, examine your living room, feel your clothes. For thousands of years, we have searched nature to satisfy our hunger, cure our diseases, build our houses, and make our lives more comfortable. But our early exploration of useful traits in species relied on rudimentary tools, and indigenous knowledge was lost as local traditions were downplayed and globalisation emerged. As a result, humanity is still a long way from utilising the full potential of biodiversity, in particular plants and fungi, which play critical roles in ecosystems. Now, more than ever before, we need to explore the solutions they could provide to the global challenges we face.

New species are still being scientifically named and described each year, but, at the same time, others are moving towards extinction – losing the battle against the threats they face. A detailed understanding of these two sides of the coin is critical to conserving plants and fungi, along with the useful characteristics they hold. The responsible exploration of natural products, through advances in biotechnology and other techniques, will help us identify and utilise the useful features of plants and fungi to fight new diseases and deal with the emerging challenges facing our planet. Many species that are new to science are already known and used by people in the region of origin – people who have been their primary custodians and often hold unparalleled local knowledge. It is therefore critical that any benefits derived from those species primarily contribute to the well-being of those people.

This report tackles the knowledge gaps and unlocks the known and potential benefits of fungi and plants for us and our planet. Drawing upon the expertise of 210 researchers in 97 institutions across 42 countries, this unparalleled collaborative effort, generously funded by the Sfumato Foundation, aims to tell the world where we might find solutions to the challenges we face. Although there is no single or easy way out of the environmental crisis, the relevance of plant and fungal science cannot be understated.

This is the fourth report in Kew's *State of the World's* series, which focused on plants in 2016 and 2017, and fungi in 2018. This is the first time that plants and fungi have been combined in one report, to highlight their intrinsic links and joint benefits. It is also the first time that the report is accompanied by a full volume of expert-reviewed scientific publications in the New Phytologist Foundation's journal *Plants, People, Planet* (which can be accessed at https://nph.onlinelibrary.wiley.com/toc/25722611/2020/2/5). These freely accessible articles provide the references, background data, analyses and interpretations for this report, which has been written in a way that I hope you will find accessible and engaging.

In a publication that focuses on the sustainable uses of plants and fungi for humankind, it is important to state an obvious but increasingly forgotten aspect: that nature has a value of its own. We share this planet with millions of other species, many of which existed long before us. Despite the fact that an exploitative view of nature has deep roots in our society, most people today would agree that we have no moral right to obliterate a species – even if it has no immediate benefit to us. Ultimately, the protection of biodiversity needs to embrace our ethical duty of care for this planet as well as our own needs.

I hope you will share my enthusiasm for the findings presented in the next 12 chapters and that your appreciation for, and engagement with, fungi and plants will not be the same afterwards. Our challenges may be large, but as long as plants and fungi remain there is hope and opportunity.

Professor Alexandre Antonelli
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NOW, MORE THAN EVER BEFORE, WE NEED TO EXPLORE THE SOLUTIONS THAT PLANTS AND FUNGI COULD PROVIDE TO THE GLOBAL CHALLENGES WE FACE

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This report is accompanied by a special issue of expert-reviewed scientific publications in the New Phytologist Foundation's journal *Plants, People, Planet*. The chapters in this report are based on the open access articles in this special issue, entitled *Protecting and Sustainably Using the World's Plants and Fungi*. Further information, data and references for the material presented here can be found at: https://nph.onlinelibrary.wiley.com/toc/25722611/2020/2/5

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