

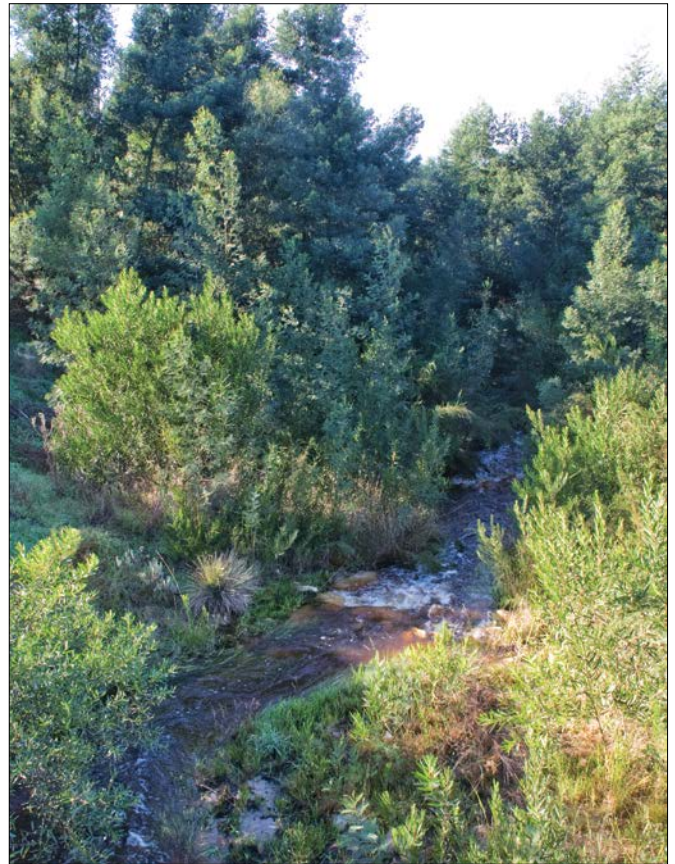
Spotlight on INVADERS

A team of researchers from 13 countries around the world, including South Africa, have warned that the threats posed by invasive alien species are increasing. They say that urgent action is required to prevent, detect and control invaders at both local and global levels.

In an open access paper published in the journal *Biological Reviews* on 26 June 2020, they present a comprehensive overview of environmental change due to invasion by alien species, noting that the intention is to support global initiatives addressing the loss of biodiversity and ecosystem services. Their study found that the number of invasive alien species is increasing rapidly, with more than 18 000 currently listed around the world.

The escalation can be attributed to the increase in the number and variety of pathways along which species spread, and to the increasing volume of traffic associated with those pathways. Emerging pathways include the online trade in unusual pets as well as plants for ornamental horticulture, and the transport of species across oceans on rafts of plastic pollution.

The study also shows how other drivers of global change, such as climate change, land-use change, and international trade are exacerbating the impacts of biological invasions. For example, species transported by shipping can now thrive in new regions due to climate or ocean warming. And diminishing Arctic sea ice is expected to create a year-round passage between the Atlantic and Pacific Oceans by mid-century, allowing marine species to move between the two.



Sue Matthews

By replacing indigenous shrubs and grasses on the banks of watercourses, invasive wattle trees increase erosion, resulting in siltation downstream.

Biological Invasions in South Africa

A comprehensive account of all aspects of biological invasions in South Africa has recently been published as an open access e-book. *Biological Invasions in South Africa* synthesises knowledge gained and lessons learnt over the past three decades, during which time government made a substantial investment in research and management relating to invasive species. Most prominent has been research on alien plants and the control efforts of the Working for Water programme, but the book deals with animals in terrestrial environments too, as well as plants, animals and pathogens in marine and freshwater environments.

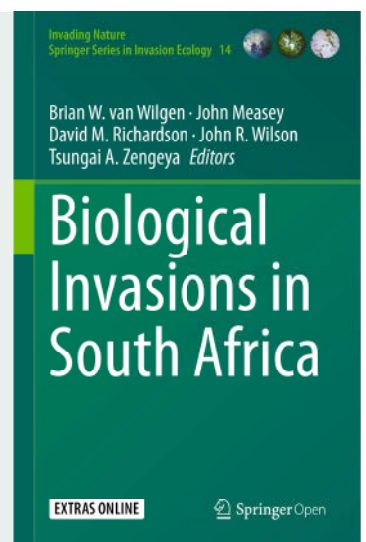
The 31 chapters are grouped into sections dealing with the drivers of invasions, the impacts of invasion, the management of invasions, new insights and the way forward, but they cover a broad range of topics, such as policy development and implementation, ecological theory and the social dimensions of invasions.

Since each chapter was written by multiple authors, more than a hundred researchers, practitioners and postgraduate students were involved. Lead editor, Prof. Brian van Wilgen from the Centre of Excellence for Invasion Biology (CIB) and the Department of Botany and Zoology at Stellenbosch University, says that it's hoped

the book will be used as a teaching tool and as a source of information for managers in the field, apart from being a key reference work for researchers. His co-editors were colleagues Prof. John Measey and Prof. Dave Richardson as well as fellow CIB members Prof. John Wilson and Dr Tsungai Zengeya of the South African National Biodiversity Institute (SANBI).

South Africa is considered a global leader in the invasive species field, so the experience documented in the book will likely also be of immense value to researchers, students, managers, and policymakers in other parts of the world.

The entire e-book or individual chapters can be downloaded at <https://link.springer.com/book/10.1007/978-3-030-32394-3>



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The Nile perch, introduced to Lake Victoria to improve fishing, is thought to have caused the extinction of 200 endemic species of cichlid fish.

The impact of invasions on indigenous species is enormous, whether through predation, competition, habitat alteration or a variety of other mechanisms. An analysis of the 2017 IUCN Red List of Threatened Species database revealed that alien species contributed to 25% of plant extinctions and 33% of animal extinctions.

What's more,

annual environmental losses caused by introduced species in the United States, United Kingdom, Australia, South Africa, India and Brazil have been calculated at more than \$100 billion.

In South Africa, an assessment conducted for the book on biological invasions below listed 1 422 alien species that are naturalised or invasive. Some of these have serious impacts on ecosystems, such as the 'thirsty' alien tree species that take up large quantities of water.

"South Africa has invested heavily in a massive national programme focused on reducing the negative impacts of widespread invaders on ecosystem services, especially the delivery of water from catchments invaded by alien trees," says Prof. David Richardson of the Centre for Invasion Biology at Stellenbosch University, who was a co-author of the paper. "But action is needed more widely at both national and international levels in order to tackle the challenges effectively."

The authors stress that biological invasions can be managed and their impacts mitigated. They point to approaches that are working around the world and make specific recommendations for improved management. For example, the introduction of more stringent border controls, including X-ray machines and detector dogs, has led to a progressive decline in the rate of fungal plant pathogens entering New Zealand.

"As our knowledge about invasive alien species increases, the problems associated with biological invasions are becoming clearer," notes lead author of the paper, Prof. Petr Pyšek of the Czech Academy of Sciences and Charles University in Prague. "The threats posed by invasive alien species to our environment, our economies and our health are very serious, and are getting worse. Policymakers and the public need to prioritise actions to stem invasions and their impacts."

- The paper is available at <https://onlinelibrary.wiley.com/doi/full/10.1111/brv.12627>

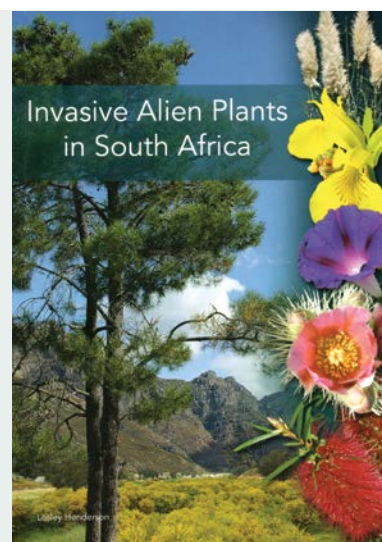
Compiled from media releases issued by Stellenbosch University and University of Rhode Island

Invasive Alien Plants in South Africa

This book marks the culmination of the remarkable career of Lesley Henderson of the Agricultural Research Council – Plant Health and Protection (ARC-PHP). In 1979 she began conducting roadside surveys to identify and map invasive alien plants, racking up 150 000 km as she criss-crossed the country. The data she collected gave rise to the Southern African Plant Invaders Atlas (SAPIA) database, launched in 1994 as an initiative of the Weeds Research Division of the ARC-PHP. The SAPIA database now holds 96 000 georeferenced records of approximately 850 alien plant taxa growing outside of cultivation, and has provided crucial data on plant invasions for scientific studies.

Lesley served as the SAPIA coordinator from the outset, but following her retirement in March 2020, responsibility for SAPIA has been transferred to the South African National Biodiversity Institute (SANBI). Before she signed off, Lesley compiled this book as a follow-up to her previous one, *Alien Weeds and Invasive Plants*, published in 2001. The new book provides descriptions, distributions and illustrations of more than 400 species, and includes all listed invasive plant species that are covered by the Alien and Invasive Species Regulations of the National Environmental Management: Biodiversity Act (NEM:BA) (10/2004).

The book begins with a section on the impacts of invasive species, the various categories of invasive status – such as transformers, special effect weeds or emerging weeds – and control methods, but the bulk of the book is devoted to the identification of the species, presented in typical field-guide format. Each species account, with accompanying photos and maps, includes its legal and invasive status, biological control if available, region of origin, cultivated uses, habitats invaded, potential threats or impacts and other harmful properties. A quick guide to identification is provided inside the back cover for the major groups of plants.



The book costs R230, excluding courier cost. To order a copy, contact Hendrieta Moletsane at MoletsaneH@arc.agric.za.

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