

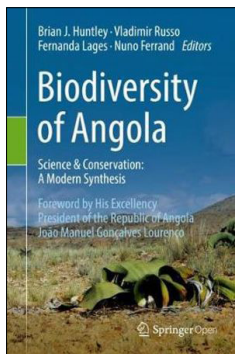


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## Updated account of Angola's remarkable biodiversity

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Biodiversity of Angola. Science and conservation: A modern synthesis



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Angola is one of the most biologically diverse countries in the world, yet relatively little is known about the species that occur there, or the ecosystems in which they live. There were, compared to southern and eastern Africa, relatively few naturalists who documented the biota of the country, and much of what they published is difficult to access or is now out of print. Just when the world started to take ecological research seriously in the mid-1970s, Angola was plunged into a devastating civil war that was to last for more than a quarter of a century. A peace settlement was finally reached in 2002, but in the intervening years almost no scientific activity was possible. The situation has changed for the better since then, and scientific exploration and research have resumed, albeit under challenging circumstances. This book provides a modern synthesis of what is known about Angola's biodiversity from early work that was published in 'extinct journals and inaccessible official reports' as well as more recent findings, and outlines opportunities for further work and collaboration in an exciting and relatively unexplored part of the world. The book has 20 chapters by 45 contributing authors, and is divided into five parts: an introductory part that sets the scene; chapters dealing with flora, vegetation and landscape change; two parts on invertebrate (two chapters) and vertebrate (seven chapters) diversity respectively; and a concluding part examining research and conservation opportunities. The book is well illustrated, with many colour photographs and maps.

Angola is a large country (1.2 million km<sup>2</sup>), and its ecosystems range from deserts receiving less than 60 mm rainfall annually, to rainforests with mean annual rainfall exceeding 1600 mm. It has seven of Africa's nine recognised biomes and 15 of the continent's ecoregions – placing it second only after South Africa for its diversity of African ecoregions. Starting with the flora, approximately 6850 native species are known, of which about 14.8% are endemic. However, these numbers are based on a very patchy level of exploration, particularly in the eastern half of the country. There are a further 230 alien plant species that have naturalised in Angola, 4 of which are highly invasive. One of the most peculiar vegetation types is a grassland dominated by geoxyllic suffrutices, where there has been an 'astonishing radiation' of species (there is a separate chapter on this). These low shrubs are characterised by large, extensive underground root systems, sometimes referred to as 'underground trees' or 'underground forests' which persist almost in perpetuity in the face of severe disturbances. Another conundrum is posed by the phenomenon of 'fairy forests', possibly akin to the 'fairy circles' of the Namib. Illustrations show markedly rounded blocks of miombo forest that appear to have been isolated by fire, and for which no explanation yet exists. Rates of clearing of natural vegetation – harvesting for fuel or timber, clearing for crops, or conversion of woodlands to grasslands by frequent fires – are very high, which places many unique areas at risk.

The coverage of invertebrate fauna is of necessity restricted to those groups for which information is readily available. These include the dragonflies, damselflies, butterflies and skippers, and complete checklists for these groups are included as appendices. Each class of vertebrates has its own chapter, and marine and terrestrial mammals are treated separately. As for the invertebrates, there are complete checklists for each group (except birds, for which other modern lists can presumably be found elsewhere). Interestingly, the chapter on birds provides the usual list of sources cited in the text, but also includes a list of 'publications post-1975 not cited in the text' – a useful resource. Angola is home to 940 bird species, with 29 endemics, and the country has in recent years become a favoured destination of bird enthusiasts, both professional and amateur. The longest chapter by far is an exhaustive assessment of the status of Angola's 291 mammal species, and a rather sorry tale it is. While the small mammals presumably persist, Angola's civil war resulted in the almost complete annihilation of large mammals. We read, for example, that the near-endemic black-faced impala 'is likely on the verge of extinction', that wildebeest are 'likely extinct in the western areas of their Angolan range', and that plains zebras that used to be 'relatively common and widespread in Angola' in the 1970s, are now reduced to 'only a few animals [that] may still linger in Bicular National Park'. Other examples include the national extirpation of *inter alia* black rhinos, forest elephants, western gorillas, chimpanzees, giraffes and forest buffaloes. Angola's iconic national symbol – the giant sable antelope – has fortunately been relocated, and about 200 survive today. In a separate chapter devoted to this species, Pedro Vaz Pinto recounts how an isolated group of surviving female giant sables hybridised with a roan antelope bull in the absence of a conspecific mate. This hybridisation has contributed further to conservation problems, which are being addressed by translocations, the sterilisation of hybrids, and the constitution of a breeding nucleus.

Despite decades of enforced neglect with regard to biodiversity conservation, there is now cause for optimism, and the book concludes by examining the opportunities for further exploration, research, and conservation initiatives under a new and strengthened administration. The system of protected areas was greatly expanded in 2011, and increasing resources are being directed towards improved management. A concluding chapter points to many opportunities for fundamental research, including for example genetic studies of Angola's two elephant species, or distinct baobab phenotypes, unravelling to population dynamics and resilience of the once vast populations of the unique desert conifer *Welwitschia mirabilis*, solving the puzzle of fairy forests, and understanding the ecological role of fog along the coast. Many of these questions may appear academic, but it is pointed out that 'every element of applied science and technology rests on the fundamentals of curiosity-driven enquiry'.

The coverage in this book is as good as the available information allows, and Brian Huntley, his co-editors and the authors are to be congratulated on producing this volume. What is not in this book is almost certainly not yet known, as the coverage is comprehensive. For anyone wanting to embark on research or biological exploration in Angola, this book will be an indispensable resource.

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