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A biogeographic island

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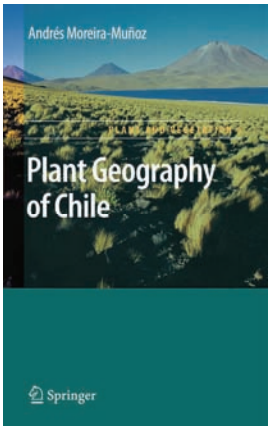

It is of some surprise that we have had to wait just over a century, since the appearance of Karl Friedrich Reiche's celebrated work *Grundzüge der Pflanzenverbreitung* in 1907, for a new look at the plant geography of Chile. It is quite surprising because this long, thin country, covering more degrees of latitude than any other, has some of the most fascinating physical geography of any country on the planet. In fact its geography was once described as 'crazy', in the title of the much-cited work by the Chilean author Subercaseaux (1940): "Chile o una loca geografía". Contained by the imposing Andean chain and the vast Pacific Ocean, continental Chile is a biogeographic island of extraordinary contrasts. The extremes are the Atacama Desert in the north, which is the driest and coolest, and to the south the sub-Antarctic forests are some of the wettest in the world. What a 'scientific playground' for biologists from all disciplines, particularly those interested in biogeography! But what makes it even more mouth-watering are its Gondwanan origins and the fact that the Chilean territory includes the fascinating and famous Pacific offshore islands of Rapa Nui (Easter Island), the Juan Fernández Archipelago and the lesser known Islas Desventuradas.

The present volume is rightfully dedicated to Karl Friedrich Reiche, by the author, who himself comes from an important Chilean botanical dynasty. Carlos Muñoz Pizarro, the grandfather of Andrés Moreira-Muñoz, is well known for his dedication to the Chilean flora and passion for its conservation—he published widely on both subjects. His dedication was such that he named his three daughters after Poaceae (grass family) genera. One of them, Melica Muñoz-Schick, the mother of the author, followed in her father's footsteps and became curator of the National Museum of Natural History in Santiago for a period of 42 years where she researched and published widely on the Chilean flora. This lineage has of course been very influential on the author's chosen career as a plant scientist and has now led to this authoritative work on the plant geography of Chile, which was also the subject of his recent PhD (Moreira-Muñoz 2007).

Each chapter within the five main sections of the book commences with an abstract and concludes with a comprehensive list of references. The layout is pleasing, with use of high-quality colour photographs, line drawings and very informative and often comparative maps. The first chapter gives an overview of the physical geography (past and present) which has influenced the vascular flora and its biogeographical patterns. The second chapter is a very useful chronology of the discovery of the Chilean flora, tracing the history of the botanists and naturalists who helped to shape Chilean botany. It starts with the arrival of Hernando de Magallanes (Ferdinand Magellan) in the Magellan Straits in 1520 and details the many Europeans from France, Germany and Spain in particular. It includes the young Charles Darwin, whose visit to south and central Chile most influenced his famed Theory of Evolution. Rightfully, much is made of the extraordinarily high levels of endemism within the Chilean flora: 4 families, 84 genera and 1933 species. The number of endemic species equates to 45% of the flora and represents the highest percentage of any South American country. Because of these high levels of endemism (and because of the immense threats it faces) 40% of continental Chile has been declared a Biodiversity Hot Spot, which is known as the Chilean Winter Rainfall–Valdivian Forests (Moreira-Muñoz 2005). These integral links exemplify the relatively new field of conservation biogeography (Whittaker et al. 2005). In Chapter 6 the author discusses the challenges of conservation biogeography effectively. The recent (last 40 years) rapid

loss and degradation of native forests in Chile has presented the author with many opportunities to discuss a wide range of scenarios.

The second section deals with geographic relationships and embraces the chorological approach; this comparative biogeography with the use of maps gives a useful insight into some fascinating floristic relationships. Particular attention is given to disjunct distributions (a very common pattern for the Chilean flora) and detailed interpretation of how these came about, with the main discussion centred on dispersal versus vicariance. Unsurprisingly it has been the Pacific offshore islands that have seen the greatest degree of biogeographical study. The combination of high levels of endemism, including primitive endemic families and taxa which share a distribution with continental Chile, has made them a great attraction for biogeographers.

The third part of the book deals with the three main island groups of Rapa Nui (Easter Island), the Juan Fernández archipelago and the Islas Desventuradas. The Juan Fernández islands are world-famous because of the Scottish castaway, Alexander Selkirk, who was marooned there for four years, and is widely thought to have been the inspiration for the story of Robinson Crusoe. Among biologists, this archipelago is noted for its unique levels of endemism, with almost 65% of its flora being endemic (Danton & Perrier 2006), and for its fascinating biogeography. Sadly today it is rapidly gaining a reputation for having one of the most severely threatened island floras in the world. The fear is that the many endemic species that have already become extinct will be followed by scores more in the near future, if the continuing problems of grazing and the devastating effects of invading non-native species continue. The demise of the now-extinct sandal tree is detailed using a shaded text box, an effective style that is used throughout the book in order to highlight salient subjects.

Towards the end of the book several case studies are presented which are used to highlight important aspects of Chilean biogeography. The two families used for this are the Cactaceae and Asteraceae, with a third chapter on the southern beeches (*Nothofagus*), a group which has helped to fuel the vicariance versus dispersal debate.

On reading this book, I was surprised to come across quite a lot of incomprehensible English, which spoils what is an excellent piece of work. This is perhaps my main criticism and one that lies firmly at the door of the publisher. I would also prefer a less fragmented approach to the layout whereby the references are towards the end of the book instead of at the end of each chapter. Having said this, I have to congratulate the author on producing a very readable book which brings together disparate information on plant geography and related disciplines. One can tell by the way it is written that the author has extensive knowledge of his vast country and the plant biodiversity it contains. It is written with passion and a clear understanding of the subject, and his views are clearly laid out without dogma. This work is thoroughly recommended to students of all plant disciplines (if they can afford it) and researchers alike. I for one will certainly be referring back to this work on a regular basis.

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References

Danton, P. & Perrier, C. (2006) Nouveau catalogue de la flore vasculare de l'archipel Juan Fernández (Chili). Acta Botanica Gallica, 153, 399–587.

Moreira-Muñoz, A. (2005) Conservation in a changing world: biodiversity hotspots and the distracting paradigm. Journal of Conservation Planning, 1, 1–6.

Moreira-Muñoz, A. (2007) Plant geography of Chile: an essay on postmodern biogeography. Doctoral thesis, University Erlangen-Nürnberg. Germany.

Reiche, K.F. (1907) Grundzüge der Pflanzenverbreitung in Chile. Ib Series: Engler A, Drude O, (eds) Die Vegetation der Erde: Sammlung Pflanzengeographer Monographien, vol. VIII. Verlag von V. Engelmann. Leipzig.

Subercaseaux, B. (1940) Chile o una loca geografía. Ercilla S, (ed). English translation from 1943: Chile, a geographic extravaganza. Macmillan Co. New York.

Whittaker, R.J., Araújo M.B., Jepson, P., Ladle, R.J., Watson, J.E.M. & Willis, K.J. (2005) Conservation biogeography: assessment and prospect. Diversity and Distributions, 11, 3–23.

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