

He writes in the Conclusions about the geographies of despair and hope. Given the environmental damage throughout the rest of the world, I see the polar regions still as geographies of hope. Howkins provides us with thought provoking comparisons, not all of which work well for me, and some very depressing facts, but in general the polar regions seem have fared much better than elsewhere, and in conservation and governance terms have pioneered new initiatives in conservation and sustainability, shown the value of science in policy development and illustrated that consensus between widely differing national approaches is possible for a common goal. Of course, we can do better and this very interesting book provides much worth thinking about on how to shape the future.

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References

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Flora marina Antarctica: patrimonio de biodiversidad

Iván Gómez Ocampo
 Ediciones Kultrún, Valdivia, Chile, 2015.
 ISBN: 978-956-344-058-4, 243 pp.
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Antarctica has long held a beguiling charm. Mere mention of the name and the imagination is swept away to the vast, white continent and its penguins, whales and krill. More rarely, though, do people remember those algal inhabitants that dwell just below the surface, key constituents in the marine ecosystem.

Macroalgae, or seaweeds, are understudied in comparison to their terrestrial and aquatic animal and plant counterparts. However, inroads into understanding macroalgae and their importance in marine communities are being made in Antarctica, and are summarized in this new book by Iván Gómez Ocampo.

Accompanying algal blades, drifting through rays of sunlight, an excerpt from Pablo Neruda's *Oda a las Algas del Océano* opens Gómez's own ode to algae in the Antarctic, *Flora marina Antártica patrimonio de biodiversidad*. Gómez sets a rather ambitious goal of

distilling decades of work into a few short chapters, while simultaneously making everything from the history of Antarctic algal exploration to the impacts of global climate change accessible to the non-specialist reader. Though the focus is on macroalgae, the thoughts presented by Gómez can easily be extrapolated to other groups of organisms.

The book starts with a hitchhiker's guide to the 'last frontier', from the Greeks to the Heroic Era of exploration, concluding with present day phycologists who dive beneath the frigid surface. The first chapter closes with the Chilean contribution to our knowledge of the Antarctic benthic flora, starting with Parmenio Yáñez, who led the first Chilean Antarctic expedition in 1947. In the 1980s, María Eliana Ramírez catalogued the algal biodiversity along the Antarctic Peninsula and adjacent islands, establishing herself as an important Antarctic algal taxonomist. At the same time, the likes of Juan Carlos Castilla, among others, were beginning to study the ecosystem as a whole using modern ecological theories.

The next few chapters outline the what, where and why of Antarctic macroalgal miscellany. The majority of the examples highlighted in the chapters focus on work from Gómez and his colleagues in the South Shetland Islands, particularly King George Island.

Algae are not a monophyletic group, but are spread across the eukaryotic tree. The red, green and brown seaweeds all have their own quirks from life cycle variation to importance for industrial, nutritional or medicinal purposes. In the case of Antarctic seaweeds, many species are endemic, though the frequency of endemism across the three macroalgal groups is probably largely underestimated due to poorly resolved taxonomic affinities. For example, the red alga *Plocamium cartilagineum* is known to be distinct from the other taxa around the world that also bear the name *P. cartilagineum* (Hommersand *et al.* 2009), but proper taxonomic resolution is yet to be completed.

The penultimate chapter focuses on the effects of climate change, including changes in temperature, acidity and UV radiation, the latter a problem that is exacerbated in Antarctica. As in any of the world's ecoregions, the speed of climate change is particularly troubling, and Gómez condenses a large amount of information into a few pages.

The final chapter concludes with Gómez's vision of the next steps we must take in order to advance our knowledge of Antarctic marine organisms and the ecological and evolutionary processes that shape this fascinating ecosystem. While new technology can be used to augment our understanding of these processes, a large part of the future lies in communicating more than just the natural beauty of Antarctica. Gómez highlights the importance of Antarctic science communication,

particularly to young people who will inherit the issues we have today, including climate change and other anthropogenic threats to the environment.

The second part of the book serves as a photographic guide to common macroalgae, accompanied by photographs of common invertebrates, terrestrial plants, birds and mammals to round out the ecosystem. All the images serve as a perfect basis towards a better acquaintance with Antarctic marine flora and fauna. However, there are two tiny faults. The herbarium specimen used to illustrate *Pantoneura plocamioides* is *Cystoclonium obtusangulum*, though this is an easy mistake to make (Hommersand *et al.* 2009, C. Amsler, personal communication 2017). The *in situ* image of *P. plocamioides* is correct. The second error is in the marine invertebrate images. The amphipod pictured under *Gondogeneia* sp. is not in that genus; it is probably *Bovallia gigantea*, although one diagnostic feature necessary to be certain, the gnathopods, are not visible in the image (M. Amsler, personal communication 2017). Page numbers in the photographic guide would make it

easier to find specific species, although they are arranged alphabetically.

At the end of the photographic guide is a glossary of terms, something very important if this book is to serve as an entrée into the world of Antarctica. Biology is full of jargon, and phycology is no exception. Thus, definitions of unavoidable key terms help even accomplished scientists diving into another field.

Overall this is an excellent book for understanding key components of the macroalgal flora and for preserving the biodiversity heritage of this fascinating place.

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References

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