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Book Reviews

THE BIOLOGY OF ALPINE HABITATS. By Laszlo Nagy and Georg Grabherr. New York: Oxford University Press, 2009. 376 pp. $55.00 (paperback). ISBN 0198567049.

Having a long-time interest in alpine areas around the world, I was excited to read this book. THE BIOLOGY OF ALPINE HABITATS is unique in providing a global overview of alpine habitats, describing the factors that have shaped these habitats over both ecological and evolutionary time scales. While the biology of habitat series is designed to cover a large geographic area to provide a synthesis of common features, I found the book somewhat overwhelming. The book is perhaps too grand in its scope. By covering so much material, the authors sacrifice both significant details and clarity for the reader. It seems to me that the book lacks details necessary to understand the dynamics of any specific alpine area. Fortunately the book's extensive bibliography will guide people to papers describing different alpine areas in greater detail.

Chapter 1 starts with a general introduction defining alpine areas occurring above treeline and below the nival zone. Alpine areas follow a latitudinal pattern in which the lower limits of the zone are found at lower elevations at high latitudes and higher elevations closer to the equator. In Chapter 2 alpine regions are categorized as belonging to one of the following groups: Arctic mountains, boreal mountains, temperate zone mountains (with both dry and mesic types), subtropical mountains, and tropical mountains.

Chapter 3 describes the striking changes in vegetation from lowlands to high mountain summits. For example in the Andes of northern Colombia, a 25 °C drop in temperature occurs within a horizontal distance of less than 30 km. The chapter illustrates the large variety in regional and global climate patterns and ecosystem properties in relation to altitude. Unfortunately, in this chapter a great number of the figures are so small and hard to read that their effectiveness is reduced.

Chapter 4 describes the energy environment in alpine areas, stating "the Equator receives 43% more direct irradiance than the North Pole." Frequent cloudiness and steep topography, however, greatly restrict direct radiation. Temperature as well as precipitation are important in the distribution of vegetation and associated fauna in the alpine. Chapter 5 continues to describe habitat-creating factors: landforms, hydrology, and soils. This chapter covers a great deal of information from plate tectonics to volcanoes, the effects of glaciation and periglacial features, the role of water in shaping landscapes, and the role of water availability in forming alpine soils and vegetation types.

I found Chapter 6 on alpine terrestrial habitats and community types, with an overview of the variety of alpine ecosystems in the world, to be the most interesting chapter in the book. The contrasts between the alpines of North and South America and of the Himalaya to Europe and North America were fascinating with different growth forms—shrubs, graminoids, heaths, and rosettes. Chapter 7 goes on to give historical biogeographic explanations regarding the formation of alpine flora in relation to historic events.

Chapter 8 provides a discussion of dynamics particularly in reference to succession (both primary and secondary) while Chapter 9 tackles global change impacts on alpine habitats. Past reconstruction and future projections of temperature fluctuations, while tenuous at best, give pause for thought especially in light of many narrow specialists among alpine species. A number of changes in alpine species distributions and vegetation have been reported recently; increases in dwarf-shrub cover and treeline altitude increase may be a sign of a general shrinking of alpine ecosystems in the future.

Finally, Chapter 10 discusses land use issues and conservation, a growing problem in many areas. Because alpine areas comprise only 3% of the terrestrial surface of the Earth and 4% of the world's flora, one might think that it is of little importance. However, the traditional use of mountains has changed with the rapid development of communications and transport networks that are increasingly connecting mountains to the global economy. I might add that alpine areas are also indicators of the health of our planet's ecosystems and may forewarn us of changes that we need to make to preserve these precious areas.

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