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## Preface

This book is about trees, upright woody plants taller than a person, unable to grow in cold conditions where lots of other plants can. What makes trees different from those other plants? What causes them to form an abrupt high elevation boundary that looks like the shore line of a mountain reservoir from great distance? This book will adopt that 'great distance view' at a global phenomenon, in an attempt to arrive at its biological explanation.

To understand a global phenomenon, the theory to be developed must not lean on regional peculiarities such as the occurrence of certain taxa, or certain climatic phenomena (such as snow or seasonality) and must not get disguised by disturbances that could occur anywhere. The task is to relate the global low temperature limit of tree growth in mountains to some overarching biological principles. The regionally important modulations of the tree-specific climatic boundary by all sorts of local drivers such as herbivores, lack of substrate, fire, avalanches, landslides, storms can be handled by more regional treatises.

The advancement of science results from a furthering of theory and moving from the particular to the general. Once a field of science has had a century of collecting and compiling data, these data need to be weighted by their curiosity *versus* their generality in order to lift the mist. As in other fields, treeline research has suffered and still suffers from a rather biased, in this case geographically and phylogenetically biased, sample of data. Because most of the data are for cool temperate conifers, any means of traits, responses, growth conditions will reflect this skewed base of knowledge, not permitting hypothesis testing and generalization. I wrote this book in an attempt to overcome some of these biases and to advance the biological understanding of the patterns observed, beyond the northern hemisphere temperate zone perspective. Yet, readers will notice that this became difficult at times when no data other than cool temperate treeline data were available.

This attempt at a synthesis of treeline biology is rooted in Chap. 7 of *Alpine Plant Life* (Springer 1999/2003), written in the late 1990s. I found it extremely difficult at that time to offer a functional explanation for the lower limit of the alpine life zone, the treeline. A lot of new research has surfaced since I started writing this book, more intensively, over the last 6 years.

Whoever engaged in such a long winding task will understand the difficulties of keeping all chapters up to date with references. I guess I failed at places. My deadline for including references by other authors was 1 May 2011. However, this book was not meant to be an exhaustive review. This rather is a book of ideas, supported by examples, some of which are timeless.

This project materialized only because I received immense help from lots of people. The University of Basel gave me paid leave during the final phase, my family allowed me to disappear at times into remote writing refugia, the publisher (A. Schlitzberger) kept encouraging me, my colleagues at Botany in Basel provided instrumental support. Susanna Riedl is responsible for all artwork. She translated my suggestions, hand sketches, old photocopies and diagrams in all sorts of shapes and quality into a coherent and clear style of visual communication, and she managed my photograph collection. Her help with literature retrieval was also immense. Jens Paulsen handled and analysed over all these years a huge data base on mountain climatology. Chaps. 4 and Chap. 5 are largely built on these data. Günter Hoch was my sparring partner on scientific matters and greatly contributed to the advancement of this field and Chap. 11. Erika Hiltbrunner critically corrected much of the text, and many colleagues commented on specific sections or contributed unpublished data or photographs (M. Bernoulli, S. Burkhard, F. Cohen, P. Fonti, K. Green, F. Hagedorn, A. Hemp, E. Hiltbrunner, G. Hoch, B. Holmgren, A. Lenz, S. Leuzinger, A. Lotter, N. Marinos, A. Mark, S. Mayr, A.C. Medeiros, G. Neuner, J. Paulsen, F. Rada, M.D. Rafiqpoor, C. Rixen, D. Sarris, L. Schüler, F. Schweingruber, R. Sharma, P. Shi, R. Siegwolf, W. Tinner). Urs Weber helped with the final text works. The publisher did a great job to get this 'twin' book to *'Alpine Plant Life'* laid out in a similar fashion and permitted a lot of colour printing. To all my great thanks!

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