



# Plant Physiological Ecology

By Hans Lambers, F Stuart Chapin III, Thijs L. Pons

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Box 9E. 1 Continued FIGURE 2. The C–S–R triangle model (Grime 1979). The strategies at the three corners are C, competi- winning species; S, stress-tolerating species; R, ruderal species. Particular species can engage in any mixture of these three primary strategies, and the mixture is described by their position within the triangle. comment briefly on some other dimensions that Grime's (1977) triangle (Fig. 2) (see also Sects. 6. 1 are not yet so well understood. and 6. 3 of Chapter 7 on growth and allocation) is a two-dimensional scheme. A C?S axis (Com- tition-winning species to Stress-tolerating species) reflects adaptation to favorable vs. unfavorable sites for plant growth, and an R- Five traits that are coordinated across species are axis (Ruderal species) reflects adaptation to leaf mass per area (LMA), leaf life-span, leaf N concentration, and potential photosynthesis and dark respiration on a mass basis. In the five-trait Trait-Dimensions space, 79% of all variation worldwide lies along a single main axis (Fig. 33 of Chapter 2A on photo- A recent trend in plant strategy thinking has synthesis; Wright et al. 2004). Species with low been trait-dimensions, that is, spectra of varia- LMA tend to have short leaf life-spans, high leaf tion with respect to measurable traits. Compared nutrient concentrations, and high potential rates of mass-based photosynthesis. These species with category schemes, such as Raunkiaer's, trait occur at the "quick-return" end of the leaf e- dimensions have the merit of capturing cont- nomics spectrum.

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## **Editorial Review**

### Review

"This book must be regarded as the most integrated, informative and accessible account of the complexities of plant physiological ecology." -- *Plant Science*

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The growth, reproduction, and geographical distribution of plants are profoundly influenced by their physiological ecology: the interaction with the surrounding physical, chemical, and biological environments. This textbook describes mechanisms that underlie plant physiological ecology at the levels of physiology, biochemistry, biophysics, and molecular biology. At the same time, the integrative power of physiological ecology is well suited to assess the costs, benefits, and consequences of modifying plants for human needs and to evaluate the role of plants in ecosystems.

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"This is a remarkable book, which should do much to consolidate the importance of plant physiological ecology as a strongly emerging discipline. The range and depth of the book should also persuade any remaining skeptics that plant physiological ecology can offer much in helping us to understand how plants function in a changing and complex environment." - *Forestry*

"This book must be regarded as the most integrated, informative and accessible account of the complexities of plant physiological ecology. It can be highly recommended to graduate students and researchers working in all fields of plant ecology." - *Plant Science*

". . . there is a wealth of information and new ideas here, and I strongly recommend that this book be on every plant ecophysiolgist's shelf. It certainly represents scholarship of the highest level, and many of us

will find it a useful source of new ideas for future research." - *Ecology*

#### About the Author

**Hans Lambers** is Professor of Plant Ecology and Head of School of Plant Biology, Faculty of Natural and Agricultural Sciences at the University of Western Australia. **F. Stuart Chapin III** is Professor of Ecology at the Institute of Arctic Biology, University of Alaska Fairbanks. **Thijs L. Pons** recently retired as Senior Lecturer in Plant Ecophysiology at the Institute of Environmental Biology, Utrecht University.

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