Plant Biomechanics: An Engineering Approach to Plant Form and Function. by Karl J. Niklas
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scribing the array of anthocyanidin mutants available in Petunia, demonstrate the power of genetics for revealing both the sequence of a complex pathway and the pattern of regulatory mechanisms that govern its operation.

Regulation is also dealt with at other levels in the chapters by Douglas et al. on promoter analysis of key genes in the general phenylpropanoid pathway, by Hrazdina on the physical organization of the enzymes of this pathway into large catalytic complexes, and by Ibrahim on the subcellular localization of both phenolic metabolites and their related enzymes. The technical challenges associated with these kinds of analyses are daunting, but the fact that such studies are being seriously attempted speaks for the maturity of the field and the continuing interest in resolving the many intriguing questions still associated with plant phenolic metabolism, an area that Hrazdina describes as "...a unique and fascinating process that has no counterpart in avian or mammalian systems" (p. 1).

This volume points the way both to numerous challenging problems and to the technologies that will undoubtedly provide many of the answers over the next few years.

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PLANT BIOMECHANICS: AN ENGINEERING APPROACH TO PLANT FORM AND FUNCTION.


True to its subtitle, Plant Biomechanics: An Engineering Approach to Plant Form and Function provides an overview of how physics and engineering can be used to study the evolution of form in plants. The book is written with an adaptationist's perspective (which Niklas handles with care) and a terrestrial bias. The mechanical behavior of plant materials and tissues and the basic principles of solid mechanics are covered in depth, but chapters on the mechanical attributes of organs, the structure of whole organisms, and even the discussion of fluid dynamics are focused on terrestrial plants. I do not recall that phytoplankton are ever mentioned, and aquatic macrophytes are discussed only briefly.

This lack of breadth would be only a minor inconvenience if the selected topics were presented with sufficient clarity and insight to inspire the reader. Unfortunately, in this regard the text suffers from a variety of misjudgments and errors. For example, the lengthy exploration of plants as beams and cantilevers is based on the Elastica (rather than on simpler, though less exact, approximations), and the resulting welter of equations is confusing even to one schooled in beam theory. Errors in typography and logic are worrisomely common throughout the text; I found more than 20 just among the topics with which I am personally familiar. Two examples are typical. In the very first table (Table 1.1, p. 10), the value cited for the kinematic viscosity of water is in error by two orders of magnitude. Much of the discussion of pollen and seed dispersal (which would otherwise be lively and interesting) relies on information about the friction velocity, but the short definition of this term is wrong (p. 453).

Considered separately, the severity of these errors is not great, but their mere presence is made worrisome by Niklas's tendency to present equations without derivation and without providing a reference to the primary literature. The presence of errors removes one's fundamental trust in the formulas, and all too often the lack of references blocks the easy route to verification.

In summary, this book contains a large and potentially valuable store of information regarding the role of mechanics in the evolution of plants. Unfortunately, Niklas has placed on the reader the large burden of sorting the correct information from the spurious.

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MICROPROPAGATION OF ORCHIDS.


This work, by two of the world's experts, comprises an exhaustive summary of methodology for the multiplication of 83 orchid genera. The detailed discussions on the background of tissue culture and propagation using aseptic procedures, the rationale for the use of specific media additives and components, and minutaie of technique and optional strategies and procedures are provided in highly readable form. Tabulations of amounts of medium components are included. They are comprehensive and easy to follow. The format allows for ready preparation of the medium in the laboratory. A few spot checks of media composition disclosed no errors—a remarkable feat in itself! The references are a gold mine of information and the author, subject, and organism indexes are comprehensive. This volume will be the definitive work on the topics discussed, and should serve as the guide to aseptic culture of orchids for many years to come.