Greenhouse Operation and Management. 6th ed. Paul V. Nelson. 2003. Prentice Hall, Upper Saddle River, N.J. 07458. p. 692, over 250 illustrations, some color plates. \$110.00 hardcover. ISBN 0-13-010577-5.

Greenhouse Operation and Management by Paul V. Nelson is now published in the 6th edition. The text covers the essential tenets, skills, and relationships required to manage most modern greenhouses. Nelson's book is useful as an upper-level college textbook, and as a long-term reference book for growers and greenhouse managers. With respect to the latter, the procedures and exercises are easily followed and apply to both daily and long terms management issues. The editorial improvements and illustration upgrades of this 6th edition are significant, with expanded chapters on the global industry, marketing and growth regulators and many chapter-by-chapter adjustments, diagrams, and photos that nicely support the text. The new cover is attractive and the binder easily spotted in a bookshelf.

Nelson's text has traditionally been used at universities as one in a

pair, the other being an excellent, crop-specific text titled *Introduction to Floriculture* by the late Roy A. Larson. The content of the greenhouse management text reflects Nelson's decades-long understanding of courses in this subject area. To evaluate *Greenhouse Operation and Management* properly, the average reader needs to realize that there are several configurations to teaching greenhouse management. Many universities offer a one-semester review course in floriculture crop production that includes some greenhouse management. This book is not, in my opinion, designed to support that format. Other institutions offer a two-semester package consisting of one intense semester of greenhouse management, and one rather more entertaining semester of greenhouse crop production. Nelson's publication fits neatly into the course plans of the dedicated management semester.

Within the text is an updated review of the floriculture industry that will likely be excellent for that first class lecture, or any commodity update for the next few years. Following chapters include the basics of greenhouse site analysis, construction, heating, cooling, and an improved section on environmental control systems. From there, it delves into the physical and environmental mechanics of crop production, including excellent chapters on soil, watering, fertility, cropping systems, light, temperature, and CO₂ application. The last third of the book reviews insect and disease control, plant growth regulation, postproduction quality issues, and a useful marketing discussion.

Drawbacks to the text are few, although students using the text have varied opinions. Students who are very interested in the subject love the book. Some students, especially those whom have been raised on short PowerPoint lectures, and are taking the course as an unwelcome academic requirement, feel the book is long, a bit dry, and full of details that get in the way of the main points. As an instructor, I have found the level of detail to be necessary and welcome. Setting up a supporting Web site that provides the PowerPoint lectures and summary notes can alleviate student criticism. I have also experienced that growers and students alike balk at the pricetag of \$110.00, perhaps not realizing this truly is a reference book, not just a text to support a course.

The only true weakness of this book is the very short and basic review of business management issues that desperately needs to be expanded or, given the size of the text, likely needs to be dropped to become the subject of a new book by the author. In our industry, the understanding of business management is a chronic student deficiency. This is especially noticeable at the university level, where we tout the training of management-level candidates, which differentiates us from vo-tech schools. This is a point of frustration with business owners and students once they enter the business world.

There are, as expected, many other books that carry the title of greenhouse management. Most skirt the engineering, heating, cooling and fertilization calculations issues, and focus on greenhouse production mechanics or the crops. Only one other book exceeds Nelson's in its coverage of the important management subjects, but that text requires calculus, engineering and physics as prerequisites to its being read and understood, and not surprisingly, most students hate it with a visible passion. Books that have attempted to cover the subjects of fertility, heating and cooling calculations often cause faculty and students difficulty in the classroom setting. The problem lies in dealing with the level of detail and process necessary to complete these objectives across students with varying levels of understanding. A good example is the greenhouse heating calculation chapter in Nelson's book. We use the text because Nelson's chapter is the most accurate and accepted method out there, but we do add to the course a spreadsheet devised by Dr. Bailey and myself to support the process. The spreadsheets allow clear data input options, visible analysis organization, and rapid what-if analysis. This format captures the student's interest once they have mastered the procedures the book using the spreadsheet. Perhaps, someday, this kind of software support can be added to the text.

In summary, for the greenhouse manager or the faculty member serious about providing management-level academic training, rather than vocational or technical skill training, Nelson's book is the best of the group. I recommend it for professional growers and true students of greenhouse management.

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