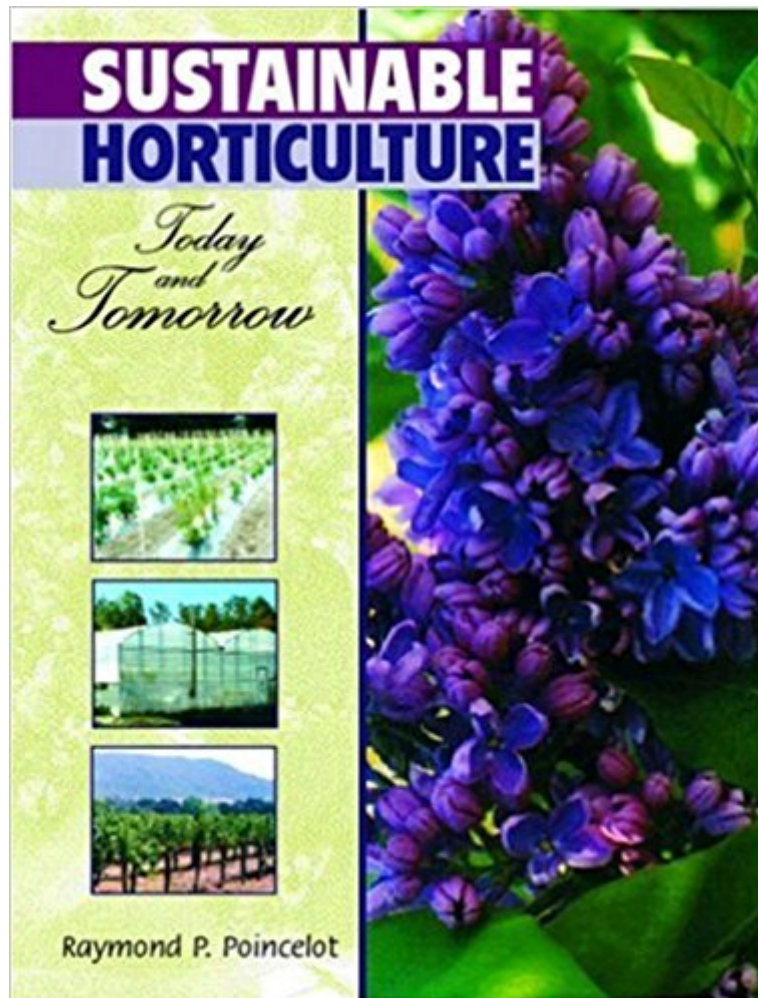




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# Sustainable Horticulture: Today And Tomorrow



## Synopsis

This comprehensive introduction to the emerging discipline of sustainable horticulture provides readers with the foundations of horticultural science that underlie all forms of horticulture from conventional through sustainable to organic. The book leads readers through practices and production, and provides the necessary information to support a more sustainable and environmentally friendly horticulture. The volume explains moving to sustainability, provides an introduction to horticultural science and horticultural practices including plant propagation, crop breeding, biotechnology, energy sustainability and sustaining soil, water and environment, home horticulture basics, integrated pest management and an introduction to horticultural crops. For horticultural professionals, policy makers, consumers and future farmers.

## Book Information

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## Customer Reviews

Presenting a new paradigm, *Sustainable Horticulture: Today and Tomorrow* offers the reader a contemporary approach for horticultural production. The text guides the reader through horticulture as it undergoes the transformation from non-sustainability to sustainability. It provides a logical progression, moving from basic horticultural science to sustainable horticultural practices, and finally to crops and their cultivation. **FEATURES** Includes the latest published research on sustainable ways to produce horticultural crops Balanced coverage; provides a national approach to practices and horticultural crops Learning tools; each chapter lists learning objectives and key topics to be covered, as well as Internet sites for more in-depth exploration Comprehensive but

flexible; the book is divided into four sections, providing sufficient material for a two-semester course on sustainable horticulture

This book is a comprehensive introduction to the emerging discipline of sustainable horticulture. Students with minimal background in the plant sciences or those students with horticultural experience will both find this book a useful introduction to all aspects of sustainable horticulture. This textbook can be used for a one- or two-semester course in sustainable horticulture for either nonscience students or students majoring in horticulture or a related area. Education, extension, and research professionals interested in sustainable horticulture will find this book to be a good introduction and resource handbook for their professional activities. The first section, meant to be an introduction to sustainable horticulture, consists of Chapter 1. This chapter helps the reader to understand the driving force behind sustainable horticulture and its *raison d'être*. All students, regardless of their background, should read this chapter, which sets the tone for the rest of the book. In the second section (Chapters 2 through 6), the student is introduced to the foundations of horticultural science that underlie all forms of horticulture, from conventional through sustainable to organic. Little or no background in science is needed to understand this section. Students with botanical, horticultural, or plant science backgrounds can bypass this first section, except for Chapter 6. Chapter 6 emphasizes environmental interactions and their effects on plant growth. It also offers a thorough coverage of soil properties and the importance of organic matter. It is recommended that students with plant science backgrounds look over the summaries for Chapters 2 through 5 and read Chapter 6 before moving to the third section. The science behind horticulture, once mastered, enables the student to comprehend the factual basis for applied horticultural science, that is, the horticultural practices in the third section. The emphasis in Section Three is on sustainable approaches to practicing horticulture. Sustainable practices are environmentally sound, resource conserving, economically reasonable, and socially acceptable ways to practice horticulture today and many tomorrows from now. In logical sequence this leads the student to the fourth section, horticultural production, with its special emphasis on horticultural crops. The sections on horticultural practices and horticultural production are sufficiently detailed to provide a stimulating challenge to those students who already possess some background in horticultural science. My belief is that sustainable horticulture can only be understood and properly practiced when it is seen as the sum of the foregoing four parts. However, a holistic appreciation of horticulture depends on the final weaving of one more element into the horticultural fabric: artistry. Landscaping and ornamental horticulture are not complete without the artistic touch. It is my hope that the student

will achieve both an understanding and appreciation of sustainable horticulture through the use of this text. The following text features will help to achieve the foregoing purpose and set it apart from other horticultural texts.

**General Features**

1. **Designed for Learning.** I have attempted a logical progression of informative chapters that moves from basic horticultural science to sustainable horticultural practices and finally to crops and their cultivation. Connections are made between science and practice to help explain the "why" of plants or sustainable activities. For example, the two types of photosynthesis (C3 and C4) are made more understandable when the competition between Kentucky bluegrass and crabgrass is shown to be a C3 and C4 photosynthetic battle. My goal is to maintain readability throughout, even in the most complex and difficult areas of science such as photosynthesis or biotechnology. Difficult concepts are presented in a concise, simplified manner without sacrificing accuracy. The flow is often initially general followed by specific detail and examples. I have endeavored to provide definitions (italicized entries) and examples throughout to enhance comprehension and to maintain reading flow. Many figures, photographs, and tables are included to illustrate, explain, and expand on subjects. Coverage is especially heavy for practices, equipment, and horticultural crops. My goal is to accelerate learning and to improve retention. Each chapter provides several features to facilitate the learning process. All chapters first present the reader with a list of key topics to be covered and a list of learning objectives for the chapter. To reinforce the learning process for each chapter, I have summarized key materials at the chapter's end. Immediately after the summary is a list of exercises (key questions) that test your new knowledge and refer you back for further study, if needed. Additional learning aids and a means to explore chapter topics in greater depth are also found at the end of the chapter. A list of Internet resource sites helps you learn and explore. Each site was checked for content and reliability at the time of writing this book. Sites were not always found for all key topics or were sometimes deemed unacceptable. If you experience difficulty with any site over time, please let me know by e-mail (see end of preface). Even the best of sites can move to a new URL, or not be kept up, or vanish altogether. An extensive bibliography is given at the conclusion of each chapter for an in-depth exploration of the chapter's topics. The listings are complete and recent, except for certain older books that have become "horticultural classics." The range is such as to include both simple and highly technical references to satisfy the needs of all students.
2. **Contemporary Nature.** The latest published research and research in progress on sustainable ways to produce horticultural crops are both included. For example, the environmental impact of conventional horticulture in the United States, the events that led to the newly emerging field of sustainable horticulture, the emergence of low-input and sustainable ways to grow crops, improved ways to utilize natural resources, natural

control of plant pests, the advent of genetically modified organisms, and increased energy conservation are just some of the recent developments cited here. This text will take you on a contemporary, ground-floor tour through horticulture as it undergoes the transformation from nonsustainability to sustainability

3. Comprehensive, but Flexible. Much subject matter is presented overall in order to give a detailed and comprehensive picture of sustainable horticulture. While some might view the basic sciences in the second section as unnecessary, horticultural practices are better understood and managed when their scientific underpinnings are known. The four sections provide sufficient material for a two-semester course in sustainable horticulture. It is also possible to conduct a one-semester course by concentrating on Sections One, Three, and Four.

4. Scientifically Correct, but Pragmatic. Plants are cited by common and scientific names. Plant nomenclature is based on the authority established by *Hortus Third: A Concise Dictionary of Plants Cultivated in the United States and Canada* (the staff of the Liberty Hyde Bailey Hortorium, Macmillan Publishing Co., Inc., 1976). In certain cases, more recent specialized publications were utilized. Scientific names were used for insects and diseases, as well as for plants, whenever possible. Pesticides and growth regulators are cited by chemical and trade or common names. Although Chapters 2 through 6 contain basic science, Chapters 7 through 18 contain pragmatic sustainable practices and plant cultural information that follow from, and are directly related to, the earlier science, leading to a better understanding of these applied practices.

5. Balanced Coverage. This book provides a national approach to practices and horticultural crops, unlike the somewhat regionalized coverage provided in some other books. Coverage of both home gardening and commercial horticulture is presented to satisfy the needs of both types of horticulturists. Some division exists between horticulturists favoring the "organic" or natural approach versus those favoring the "chemical" approach. Both sides are presented here. The author believes both sides have pros and cons, and the best path is the blending of the good from both into an integrated, sustainable horticultural practice. Technology from the simplest to the most complex is included. For example, conventional plant breeding and biotechnology receive equal treatment. Crops are covered uniformly and completely: fruits, herbs, nuts, ornamentals, and vegetables. All are important to horticulture. City, suburban, and country horticulture are discussed. All exist and the well-trained horticulturist must have a knowledge of all of them.

Specific Features

1. Section One: (Introduction to Sustainable Horticulture.) Chapter 1 explores the historical foundations of sustainable agriculture, horticultural implications, the problems of current conventional horticulture, and what steps are needed to approach sustainability. This chapter also provides the compelling case for why sustainable horticulture has emerged in the professional and public domains. It also

answers the question of what exactly is sustainable horticulture. 2. Section Two: (Introduction to Horticultural Science.) This section consists of Chapters 2 through 6, which contain the basic plant science behind horticulture and its practices. First is plant classification (Chapter 2) with special emphasis on scientific classification and taxonomy as it applies to horticulture. The naming and classification of plants is presented as simply as possible to make it easier to understand. Horticultural classification, a valuable communication tool, is also examined. Plant structures (Chapter 3) are next with special attention being placed on macrostructures rather than microstructures. Plant metabolic processes (Chapter 4), particularly those associated with good productivity of plants, come next, followed by plant development (Chapter 5). Emphasis is placed on macroaspects: vegetative and reproductive cycles. The section concludes with the relationships between environmental factors and how the plant responds to them (Chapter 6). Soils, organic matter, and erosion receive special attention. Completion of this section enables the student to understand why certain practices are used and how they influence sustainability 3. Section Three: (Introduction to Horticultural Practices.) This section contains the applied aspects and is divided into nine chapters. We begin with comprehensive coverage of asexual and sexual propagation and interim care (Chapter 7), a basic and important horticultural practice. Propagation leads into conventional plant breeding (Chapter 8), the source of new horticultural cultivars. Biotechnology and its application to the production of genetically modified plants (Chapter 9) is covered next because of its current potential and its critical role in tomorrow's horticulture. Next energy conservation (Chapter 10), now a critical factor in horticultural management, is given special attention. Chapter 11 provides an in-depth analysis of sustainable environmental and resource management practices from a commercial perspective. Chapter 12 does the same, but from a home garden viewpoint. Chapter 13 looks at indoor environments, greenhouses, and homes and their sustainable management. Chapter 14 concentrates on the control of plant development, with a focus on pruning practices. Plant protection (Chapter 15) comes next and provides an examination of vectors causing plant problems and how to treat them. Treatments stress IPM and organic approaches. 4. Section Four: (Introduction to Horticultural Production.) This section deals largely with horticultural crops, which are grouped by ornamentals (Chapter 16), vegetables and herbs (Chapter 17), and fruits and nuts (Chapter 18). Chapter 17 includes a discussion of herbs and plants grown for natural products, which are sometimes ignored or minimized in other texts. Career opportunities in the horticultural industries associated with these crops are explored. The economic significance of these fields and their basic thrust is examined. A large amount of plant cultural information is concisely expressed in this last section. Comments are welcome. If possible I will incorporate responses in future editions

of this text. For those who wish to communicate by e-mail, I am available at [rpoincelot@mail.fairfield.edu](mailto:rpoincelot@mail.fairfield.edu). My closing thought is, hopefully, your inspiration. The fields of horticulture are a joy to the eye and mind, but a deeper appreciation is yours only through questioning, study, and involvement. Acknowledgments My special thanks go to Betsy, who with her love and encouragement, helped me through the long, busy preparation of this text. Thank you to my grown children, Ray, Daniel, and Wendy; Daniel's wife, Tina; and Betsy's son, Josh, for adding to my life. To my first grandson, Jacob Scott: Your future is why I wrote this book. I thank all those professionals, friends, and students who discussed horticulture with me. You are too numerous to be cited here, but your thoughts can be found here. Thank you to Laura and the Biology Department for their patience. I thank the following professors who critically reviewed parts or all of the entire manuscript: April Hill, Fairfield University; Richard Durham, University of Kentucky; Charles Francis, University of Nebraska; Christopher Gunter, Purdue University; John Preece, Southern Illinois University; Judith Hough-Goldstein, University of Delaware; Mary Ann Gowdy, University of Missouri-Columbia; Lewis Jett, University of Missouri; Richard Evans, U.C. Davis; Steve Gustafson, University of Tennessee at Martin; Edward W Bush, Louisiana State University; Robert R. Dockery, Western Piedmont Community College; Brian Maynard, University of Rhode Island; and Vern Grubinger, University of Vermont-Extension. Many thanks to those individuals, organizations, institutions, and industries that supplied photographs or permission to quote from their publications. Finally, my thanks to all those people at Prentice-Hall, Inc., who helped make this book possible: Sandy Hakanson, Janice Stangel, Charles Stewart, Jr., Debbie Yarnell, and Kimberly Yehle. Thanks also to Lori Dalberg at Carlisle Publishers Services. Raymond P. Poincelot

Copy is overall good, but the description did not disclose that the title page had been excised.

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