



Preface

Our fourth edition of *Plants in Our World: Economic Botany* is very different from earlier versions, reflecting the dramatic changes in many aspects of our lives. Most visibly, this edition has color throughout because the Internet and mobile devices have led to the expectation of vivid images. Many of the new photos reflect another decade of our own research and travel and those of our generous friends and colleagues. Long tables of production figures and ornamental plant species have been eliminated from the text because such data are continually updated and almost instantly available online.

Molecular data have also immensely altered our understanding of the relationships among flowering plants and have recently pinpointed the origin of numerous crops. We have updated the taxonomy of species discussed using the system of the Angiosperm Phylogeny Group. Names of taxa follow *Mabberley's Plant Book*. We incorporate this new information throughout the text. The growing appreciation of plant-derived chemicals, such as pigments (flavonoids, beta carotene, etc.) and sulfur compounds, and their contribution to health has led us to increase coverage of phytochemicals and their roles wherever possible.

As in the past, we focus primarily on plants of major importance in the world today, although we include historical information and minor enterprises when they illustrate a process or highlight an issue. Although primarily concerned with how we use plants, we try to include enough basic information on morphology, anatomy, and taxonomy to provide a foundation of general botany.

In response to comments by users, we have completely revised Chapter 1, dividing it into two chapters. It now provides an introduction to plants and our utter dependence on them for basic needs including their vital role in ecosystem functions. Chapter 2 includes new data on when, where, and how people adopted an agricultural way of life. The historical importance of this revolution is highlighted in myths from various cultures. Chapter 3 now provides a more dramatic and sweeping overview of how people have manipulated plants since the adoption of agriculture, including the newest techniques in genetic engineering

that have the potential to create a new revolution in plant manipulation.

Chapters 4 and 5 begin the discussion of plants that provide edible fruits in temperate and tropical regions. Both chapters feature many new color pictures and, because of keen interest in nutrition, new boxes on the health benefits of fruits have been included.

Because grains are specialized fruits that are most important for sustaining humans, they merited a lengthy discussion. To make it manageable, we separated this subject into two chapters, Chapter 6 on Old World grains and Chapter 7 on those from the New World. In both chapters, the discussions are now organized by worldwide importance and not (as previously) by area of domestication. A discussion of celiac disease and of the recent surge in gluten-free foods is among the updates in Chapter 6.

Chapter 7 now covers "nixtamalization," the process that allowed Native Americans to use corn to make dough, the basis of tortillas and tamales. Corn is now grown worldwide for so many purposes that we have included a new table on corn uses as well as in-depth coverage of high fructose corn syrup, pointing out misconceptions in labeling including the connotation of the term "high."

Legumes, the nutritional complements to grains, are the subjects of Chapter 8 where, again, we have tried to tie the science concepts to everyday experiences. Here we accompany our treatment of nitrogen fixation (an important contribution of leguminous crops) with a discussion of deciphering fertilizer labels. The subjects have been reordered to reflect economic importance, not (as before) areas of domestication.

Stems, leaves, roots, rhizomes, and tubers were previously lumped together in one chapter on edible vegetative plant parts. In this edition, they have been separated; Chapter 9 covers foods from aerial stems and leaves, and Chapter 10 discusses those from underground stems and roots. Chapter 10 features a box titled "Sugar, Slavery, and Sweet Teeth" that discusses the sinister history involved in satisfying our sugar cravings. A new illustration and legend highlight the notable characteristics of various sweeteners, including stevia and agave nectar that are new to the market.

Chapters 11 and 12 pertain to some of the plant extracts that enhance our foods, cushion our rides, give us the only jewels of plant origin, and enter our lives in myriad mysterious ways. Chapter 11, on vegetable oils and waxes now includes an expanded discussion of olive oil, including terminology and labeling practices. Chapter 12, covers hydrocolloids, elastic latexes, and resins, has been shortened but retains its emphasis on the ubiquity of plant-derived extracts in our daily lives (notably the expanding market of diet and calorie-reduced products).

In this edition, we have grouped together the chapters that focus on the physiological effects of plant compounds. As a result, Chapter 13 on herbs, spices, and perfumes serves as an introduction to bioactive plants. New research on our perception of flavor as well as the health benefits of many spices is highlighted in new boxes "The Spice of Life" and "Perfumes, Potions, Plant Aphrodisiacs, and Aromatherapy."

Chapters 14 and 15 present medicinal and psychoactive plants, respectively. We have provided updated information on plant-derived medicines both as raw materials and as templates for synthetic drug production. Chapter 15 now includes newcomers to the underground market in psychoactive substances including synthetic cannabinoids and diviner's sage. Photos and information on common poisonous plants, and information on plants that affect pets in particular are also new.

The two most ubiquitous psychoactive compounds, caffeine and alcohol, are discussed in Chapters 16 and 17. Both chapters contain numerous new pictures. Chapter 16 presents the use of caffeine to create energy drinks with potentially lethal consequences. Topics include sun- versus shade-grown coffee, the health benefits and types of tea, coffee roasts, and grades of coffee as well as information on some of the more exotic brews such as mate, guaraná, and coffee collected from civet cat excrement. Chapter 17 includes new tables on the effects of blood alcohol levels as a factor of time, consumption, and gender following new research on the difference in metabolic breakdown of alcohol between men and women. A new box on absinthe, once vilified and now back on the market, is provided. The role of resveratrol found in red wine in heart health is also discussed.

We have updated and shortened our discussions of fiber plants (Chapter 18) and wood and woodlike products from plants (Chapter 19). In Chapter 19, we point out the increased use of bamboo and composed wood for solid wood.

In Chapter 20, on ornamental plants, all pictures in the previous edition have been replaced by new color figures. We have eliminated the numerous tables of ornamental plants and instead mention the major species used for ornamental shrubs, bedding plants, and so on. A new box on colors, "Across the Spectrum," appears in response to heated interest and research on the mystery of color, how it is perceived, and how it affects us.

Finally, Chapter 21 discusses future trends, giving us the opportunity to look at upcoming challenges and potential solutions to the way we cultivate and market plants to meet the needs of a growing population with limited resources.

As before, any line drawing or colorized illustration not specifically credited to another person is the work of Molly Ogorzaly. When fresh material was not available, Ogorzaly often relied on the botanically precise drawings in the works of Henri Ernest Baillon (1827–1895), a French botanist, physician, and professor of natural history. As always, friends and family facilitated revising chapters and provided several new illustrations. Topping the list are our partners, Jack Neff, who took photos and spent hours generously scanning scores of slides, and Bob Ogorzaly, who patiently scanned the original line drawings and printed them onto watercolor paper for hand painting. Other contributors to the final product include Romey Haberle, who made relevant comments on Chapter 2; Richard Matzner, who kindly read drafts of many of the chapters, pointing out better ways to present data; Xiao Wei, who artfully composed photographic collages from our collected images; Debra Hansen, who created new computer-generated illustrations; and Marianna Grenadier, who provided several graphs. We also appreciate the many colleagues who shared their expertise and photo archives. They include Brian Bond of Virginia Tech; Maureen Bonness; Dennis Cornejo; Marie-Ange Cortellino; Sadeva Dharmadas of Villa des Canelles; John Dromgoole of the Natural Gardener, who allowed us to photograph its edible landscapes and innovative gardening products; Wayne Ellisens; Bevin Etheridge of Cohune River Cabanas; Jose Martin Fernandes; Jim Folsom; John Greenberg; Anna Hoppmann; Mattie Hendrick; Rob McClure, co-owner of Hilltop Community Farm; Andrew McDonald; Dairen McLaughlin; David Millard; Gina Ogorzaly; Suizu Tetsuyoshi of Gekkeikan Sake Co., Ltd.; Billie Turner; Derek White of Calamari Press; Rod Waterfield of Bodfari Environmental, UK; Oscar Vargas; and Jamie Vreeland.

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