Preface

In his 1996 paper on the history of problems in botany education, Hershey noted that “As a result of plant neglect, the general public, most precollege teachers, and many college-level biology teachers are generally illiterate about botany.” While botany once held a principal role in biology education—even at the high school level—its presence in the curriculum as a core focus topic has been in decline since the early 1900s (Hershey 1996). Moreover, this steady decline in botany education has been compounded by the overall challenges faced in STEM (science, technology, engineering, and mathematics) education. We have reached a critical state in botany education and creative solutions to reinvigorating this field in the classroom are in order.

Awareness of the need for integration of more innovative teaching methods in the biological sciences to boost interest in STEM at large has grown among biology educators since the publishing of the recent landmark document *Vision and Change in Undergraduate Biology Education: A Call to Action* (Brewer and Smith 2011). This document, which was the result of a series of professional meetings and workshops by science educators across the United States (USA), was published by the American Academy for the Advancement of Science (AAAS) and funded by the USA National Science Foundation (NSF). One of the key areas recommended for change included a call for better integration of core concepts and competencies throughout the curriculum and a focus on student-centered learning. Moreover, the document called for engagement of the biology education community in the implementation of the proposed changes.

These changes are of particular importance for the field of botany, which is arguably becoming progressively neglected by educational institutions. This is underscored by recent trends towards the “phasing out” of botany lessons, courses, and even entire botany programs and departments at institutions across the United States. Unfortunately, this may not only result in a critical shortage of new scientists with expertise in this field, but it also comes at a time when trained botanists are most needed to address important emerging issues concerning biodiversity management, biotechnology, food security, and climate change.

Another challenge that we face as botany educators is that for those students who do have access to botany lessons, it can be difficult to cultivate interest in the
material. Pedagogical techniques that rely heavily on rote memorization of plant names and characteristics are hardly stimulating to students, and in many cases, they may walk away from a course without ever seeing the “big picture” of why plants matter both to them as individuals and the world at large. In other words, without context, it is incredibly difficult—or even impossible—for students to become engaged with the plant world and make those crucial connections that are necessary for integration of knowledge into their long-term memory. The truth of the matter is that we need to foster student enthusiasm for the plant sciences in order to both encourage the growth of future experts in this field and to cultivate a global community of citizen scientists with an appreciation for and connection to their environment that is mostly plant-based. Ethnobotany, which is the interdisciplinary study of how people interact with plants, can be used to fill in this contextual gap in plant science education by helping students understand their personal and cultural relationship with plants, revealing the practical and persistent value of plants on an individual level.

In 2007, a group of scientists that were developing interdisciplinary undergraduate curricula in ethnobiology met to discuss some common problems encountered in this process. They decided to form the Open Science Network (OSN) to foster both the exchange of ideas and sharing of educational resources. Over the years since it was founded and with the financial support of the NSF, the OSN has brought educators from the natural and social sciences together in a series of workshops with the aim of developing educational standards and compiling resources for teaching initiatives in the field of ethnobiology. One major product of these efforts was the OSN’s report, *Vision and Change for Ethnobiology Education in the USA: Recommended Curriculum Assessment Guidelines* (McClatchey et al. 2013), which was modeled after the AAAS *Vision and Change* document. Like the original V&C document, the OSN report emphasized the need for the inclusion of core concepts and competencies in the curriculum. The idea of using ethnobotany as a tool to bring botany into context for students was highlighted as a means of meeting several of the core competencies listed in V&C, including those concerning the ability to tap into the interdisciplinary nature of science, the ability to communicate and collaborate with other disciplines, and the ability to understand the relationship between science and society. The importance of ethnobotany in the advancement of education in the plant sciences is further developed in a series of case studies in the present volume.

This volume brings together a collection of papers addressing the challenges of botanical education in the twenty-first century, while highlighting novel approaches to engaging students in botanical curricula with the aim of inspiring a new generation of students and instructors. While the approach to education in the plant sciences is explored from varying perspectives, a common focus here is on the innovative ways through which educators can both enrich the plant science content being taught and improve upon student engagement in the study material. Drawing on contributions from scholars from the United States, Europe, and Canada, various teaching methods are demonstrated and both the successes and challenges of different methods are explored. Uniquely to this volume, several chapters describe
how core principles from ethnobotany can be used to foster the development of connections between students, their environment, and other cultures around the world.

The 18 chapters included here are organized into five focus areas: (1) defining the needs of educators and students, (2) introducing fundamental skills, (3) connecting students to plants, (4) teaching through field experiences, and (5) integrating technology. These contributions represent a broad spectrum of approaches in botanical education, ranging from community outreach efforts, K-12 education, distance learning, and university programs and courses. Central to the theme of the volume is the concept of creating a sense of connectivity to nature as a tool for capturing student interest in the study material, and helping them to appreciate the critical role that the plant sciences play in everyday life. Perhaps most useful to educators is that many of the contributions also include examples of how a wide range of teaching techniques can be used in plant science education, including authentic learning, student-centered learning, active learning, research-based learning, and mind/brain-based techniques, among others. Ranging from veteran teachers to new faculty, the contributing authors discuss their vision for the future of plant science education and provide concrete examples of how they incorporate local resources and technology into a hands-on approach to teaching and learning in this field.

Cassandra L. Quave
Assistant Professor and Herbarium Curator
Emory University, School of Medicine,
Department of Dermatology
Emory College of Arts and Sciences,
Center for the Study of Human Health

References


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