

A Germplasm Resource Repository: The Book Review of *Illustrated Flora of Food Crops and Their Wild Related Plants in China*

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Abstract *Illustrated Flora of Food Crops and Their Wild Related Plants in China* systematically examines the botanical and morphological characteristics of China's major food crops, such as rice, wheat, corn, sweet potato, potato, mung bean, and buckwheat. Featuring more than 5 000 color photos and 200 line drawings, it offers a comparative study that highlights the kinship and internal connections between cultivated and wild species. The book is an invaluable resource for breeders, offering a comprehensive morphological and genetic database that aids in the development of high-yielding, high-quality, and disease-resistant crop varieties.

Key words Food security, Crop improvement, Wild relatives, Breeding resource, Plant illustrations

From the perspective of thousands of years of history, food security has been essential for human life and social stability. Food production is irreplaceable and fundamental to human survival; it nourishes the bodies of hundreds of millions and carries the memory and tradition of human civilization. However, with the growth of the global population and changes in the ecological environment, the issue of food security has become increasingly prominent. This situation requires us to re-examine the plant world closely related to us, particularly the wild relatives that may influence agricultural production. Those growing in adverse conditions often possess many excellent genes that cultivated varieties lack, such as disease and insect resistance genes, stress resistance genes, and high-yield genes. They constitute a natural gene pool for crop germplasm innovation and variety improvement. Mining these genes from wild species and transferring them to cultivated crops represents a new approach to crop breeding, significant to modern agricultural practices. Recently, the National Publication Foundation project undertaken by Anhui University Press, *Illustrated Flora of Food Crops and Their Wild Related Plants in China* (published in May 2024), is a study guided by such ideas. It aims to provide technical support for seed breeding from the source, offering significant value for ensuring food security.

This book, grounded in over 5 000 color photos and approximately 200 line drawings, systematically explores China's main cultivated grain crops from a botanical perspective, including rice, wheat, corn, sweet potato, potato, mung bean, and buckwheat, as well as their wild relatives. It meticulously examines and illustrates the intricate morphological traits of various plant components—roots, stems, leaves, inflorescences, flowers, fruits, seeds, and more—through a comparative study. This approach offers a nuanced understanding of their botanical features, showing the kinship between cultivated crops and their wild relatives, revealing their internal connections, and exploring the excellent traits needed for food crop breeding. By integrating botany with breeding science, the book serves as a highly valuable germplasm

resource repository, enhancing the scientific and effective application of breeding science.

Firstly, this book serves as a comprehensive pictorial database of plant resources, meticulously compiled into a compendium of crops. It utilizes a rich collection of over 5 200 visual images, including color photos, anatomical color photos of specimens, and line drawings, to provide an engaging view of the diverse forms and structures of agricultural species. The selection and arrangement of these images are crucial to the book's compilation. Color photos of plants constitute the majority of the images, making up 90% of the total. They are followed by anatomical color photos and line drawings of specimens, with painted drawings being the least numerous. These various forms of images reflect the morphological structure of plants from different perspectives, with line drawings summarizing and vividly displaying the external morphology and anatomical structure of crops, specimen color photos offering a macro view of plant characteristics, and anatomical drawings or photos giving an intuitive understanding of internal structures and functions.

Secondly, this book serves as a morphological database of crop traits, detailing the transformation from wild plants to cultivated crops. Humans have shaped crops through continuous exposure to various environments, targeted breeding, and domestication practices, distinguishing them from their wild counterparts. Understanding the origins and evolution of these crops is crucial for germplasm collection and variety improvement strategies. The book provides a systematic and comprehensive description of the morphological features and internal structures of both food crops and their wild relatives, enhanced by a wealth of visual illustrations. It adopts botanical terminology while integrating and elaborating on relevant agricultural terms in a comparative approach, marking a significant contribution to the field where few works have achieved such interdisciplinary harmony.

Furthermore, this book serves as a gene database for crop breeding, highlighting the domestication of crops from their wild

relatives. To develop high-yielding, high-quality, and highly resistant food crop varieties, it emphasizes the importance of a broad collection of wild relatives. The book meticulously illustrates and analyzes the morphological features, structures, and the nuanced similarities and differences between cultivated crops and their wild species, enriched by precise scientific descriptions and detailed images. It aims to establish a comprehensive morphological knowledge system for food crops and their wild relatives, fostering interdisciplinary communication in plant morphology research between botany and agronomy. This system is designed to enhance the understanding of crop variety improvement and assist breeding experts in selecting and developing superior grain crop varieties based on their exceptional traits.

Overall, this book is richly illustrated, scientifically rigorous, innovative, and practical, offering a direct view of the biological characteristics of food crops. It serves as a valuable re-

source for crop variety improvement, designed for ease of consultation by breeders. However, the book's scope could be expanded; for instance, not all food crops in China are covered. For instance, while the book covers some edible legumes, it does not encompass all; it includes only three common types, despite there being 14 genera in total. The limited representation of wild relatives may stem from their unique growth conditions and the difficulty in documenting them, especially during missed flowering and fruiting periods, which are crucial for capturing the full range of growth stages. The book strives for a harmonious integration of text and illustrations to enhance comprehension, mastery, and application of the material, thereby improving the content's effectiveness and presentation's user-friendliness—a central challenge for the book. Anticipating that the writing team will consider these aspects in their future revisions and enhancements.

