CROP QUALITY, STORAGE, AND UTILIZATION
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FOREWORD

The accelerated pace of research, augmented by sophisticated instrumentation and techniques, and new opinions, imparts to crop science a rapidly changing character as new discoveries replace and/or add to former concepts. New findings force us to reevaluate and often reconstruct the foundations on which crop science rests.

The Teaching Improvement Committee of the Crop Science Society of America identified the urgent need for developing contemporary reading materials aimed at upper level undergraduate college students. A current presentation of the dynamic state of modern crop science is a formidable challenge worthy of the best talents of eminent research and teaching personnel in the field. This task necessitates assembling the most capable representatives of the various disciplines within crop science and bringing them together in teams of writers to prepare a series of publications based on contemporary research. The Crop Science Society of America and the American Society of Agronomy have undertaken this large assignment by selecting more than 100 specialists who will contribute to making the Foundations of Modern Crop Science books a reality.

The authors and editors of this series believe that the new approach taken in organizing subject matter and relating it to current discoveries and new principles will stimulate the interest of students. A single book cannot fulfill the different and changing requirements that must be met in various programs and curricula within our junior and senior colleges. Conversely, the needs of the students and the prerogatives of teachers can be satisfied by well-written, well-illustrated, and relatively inexpensive books planned to encompass those areas that are vital and central to understanding the content, state, and direction of modern crop science. The Foundations for Modern Crop Science books represent the translation of this central theme into volumes that form an integrated series but can be used alone or in any combination desired in support of specific courses.

The most important thing about any book is its authorship. Each book and/or chapter in this series on Foundations for Modern Crop Science is written by a recognized specialist in his discipline. The Crop Science Society of America and the American Society of Agronomy join the Foundations for Modern Crop Science Book Writing Project Committee in extending special acknowledgment and gratitude to the many writers of these books. The series is a tribute to the devotion of many important contributors who, recognizing the need, approach this major project with enthusiasm.

A. W. Burger, chairman
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What is satisfactory crop quality? Many factors shape our definition of quality for a particular crop. The condition of a crop may make it totally unsuitable for one purpose but highly desirable for another use. Crop quality is dependent on many factors, such as ultimate use of the crop, level of economic development, human and animal preferences, diet, government policies, and the climate in which the crop is grown and stored. This diversity is illustrated by our attitudes toward polished vs. unpolished rice, high vs. low protein grain cultivars, and long vs. short staple length of cotton fibers. Thus, crop quality is interpreted on the basis of physical, nutritional, aesthetic, and other characteristics.

Quality has long been recognized as important in determining the value of crops for specific uses. Plant fiber for cloth and cordage, malting barley for brewing, and wheat for bread and pasta have been evaluated and sold on the basis of quality characteristics. In contrast, the nutritive value of food and feed grains have generally received little consideration until the last several decades. Forage quality has received even less attention than in other crops until recent years. Too often, crop production has been concerned with yield alone rather than yield of a high quality product.

Standards of quality needed for particular uses of the crop have been better defined in recent years with knowledge gained from research. Crop quality improvement during production and maintenance of quality during harvesting and storage are often under control of man. Plant breeding, to select specific quality characteristics, has made substantial advances in fiber, oilseed, and grain crops. In contrast, it is only recently that breeding for improved forage quality has shown the enormous potential in this area. Quality of many crops is greatly affected by the conditions under which they are grown, some of which can be managed by man. Harvesting and storage further affect the quality of crops, sometimes determining whether it has any value at all.

This book deals with three major areas of crop quality: 1) quality requirements and utilization, 2) genetic and environmental effects on quality, and 3) harvesting and storage effects on quality. Principles of crop quality are illustrated by three groups of crops: 1) food and feed grains, oilseeds, 2) fiber crops, and 3) forage crops. The omission of other important crops, such as sugarcane, sugarbeets, manioc, potatoes, rubber, tobacco, cacao, coffee, food legumes, fruits, vegetables, and tea is intentional. The original planning committee felt that the objectives of the book should be to cover principles for some major crops rather than specifics on each particular crop species. Therefore, a limited approach was used.
The authors of these chapters have labored to meet these objectives. This book, developed for students in crop quality, should be useful to students in agronomy, food science, and animal nutrition. It may also serve as a general reference for persons interested in broad technical aspects of crop quality.

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