Yield Gains in Major U.S. Field Crops
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Foreword

Few books in history have been planned with the focus and detail included in Yield Gains in Major U.S. Field Crops. From the beginning the book was based on a critical assessment of the yield gains across the crops essential for feeding a future population of 9 billion. Crafted as an intellectual challenge impossible for an individual scientist or team to answer, it relied on bringing together 65 scientists and their teams to develop the background data for the book.

There is no doubt that this book will be fundamental to predicting future gains from plant breeding and will be an instant classic for its powerful assessment of breeding efforts to this point in time. While each crop is a story in itself, the unique coverage of so many crops in one book provides a vision of the power of plant breeding never before assembled.

We hope that this CSSA Special Publication is a difference-maker for our scientific societies and our society at large.

David D. Baltensperger, 2014 CASA President
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Some 8,000 to 10,000 years ago humankind crossed a crucial threshold as groups began to save seed to plant for harvest during the next season. A bond of codependence between domesticated cultivated varieties and not only farmers, but also the whole of society, was created. Today, the dependence of society on this bond of codependence has become more critical due to increasing human populations and the need to farm more sustainably by making the most effective use of available resources while conserving biodiversity and protecting the environment from pollution. However, this bond becomes increasingly tenuous as an increasing proportion of society loses touch with even an elementary understanding of how or where food is created. Consequently, policy makers, the public at large, and even prospective plant breeders, agronomists, soil scientists, statisticians, information management experts, conservationists, physiologists, pathologists, and experts in sequencing and reading genomic information—to name but a few—fail to engage positively in the field of plant breeding and agriculture. Yet the quality and sustainability of life on Earth are in very large measure connected with how food, fiber, and fuel are produced. It is therefore imperative to encourage a greater understanding and informed debate regarding how food and fiber are produced to ensure continued productivity through long-term stewardship and the most effective use of critical resources such as water, soil, genetic resources, and human intellect.

In 1984 the Crop Science Society of America (CSSA) published the proceedings of a 1981 symposium as Genetic Contributions to Yield Gains of Five Major Crop Plants. These crops were corn, cotton, potato, sorghum, and wheat. This was a seminal publication stimulating the publication of further research in numerous other countries and on additional crops to determine the elements contributing to advances in crop productivity, their interactions, and to monitor the rate of progress. In 2012 a group of us decided that it was time to revisit the status of productivity including genetic gain in each of these five major crop species. But why stop there? We developed a proposal for a book that would include all major U.S. field crops. We were fortunate to gain the enthusiastic support of numerous authors who agreed to contribute the chapters, many other experts who agreed to be reviewers, and CSSA, who agreed to sponsor and to publish the book.

This book provides a fascinating snapshot-in-time account of the productivity status of all major U.S. field crops. Each crop has a different story to tell. Much has changed in the field of plant breeding, biotechnology, and agronomy during the 30 years that have passed since the previous CSSA book was published. We earnestly hope that these chapters will provide insights for many from various fields into how each crop is being bred and produced today, with some historical perspective and also a look at future challenges and opportunities.

In closing, we are well aware that we have not covered productivity of crops using organic farming methods. This subject is a gap that should be
filled. However, we would make a plea that methods of farming be examined more scientifically and less from the perspective of marketing. The more that is known about how food is produced and the resources necessary to sustain a productive agriculture, the better the quality of debate. Quality discourse is imperative to rebuild and strengthen the bond of codependence we have with the cultivated plant species upon which each of us depends for health, economic, and political security.

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