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DEDICATION

It is fitting that this book is dedicated to two of the early pioneers in clover investigations, Dr. E. A. Hollowell and Dr. E. N. Fergus. Both had long and successful careers and gathered and transmitted much information on clovers, but their most important accomplishment probably was in the stimulation and recruitment of a group of scientists who now, in part, form the editorial committee of Clover Science and Technology.

Eugene Arthur Hollowell obtained B.S. (1923) and M.S. (1924) degrees from Iowa State University and the Ph.D. (1928) from the University of Illinois. From 1928 until his retirement in 1962, Dr. Hollowell was responsible for USDA clover investigations. Because of his tremendous enthusiasm and initiative, he stimulated and coordinated clover research by both federal and state scientists. He was aware of research in the USA, Canada, and many foreign countries. He shared this information with other scientists so that he became the one source of information about clovers and other forages throughout the world. ‘Midland’ and ‘Cumberland’ red clover cultivars are early examples of his research. He also advised on the development of ‘Kenland’ red clover and ‘Tillman’ and ‘Regal’ white clover cultivars.

Dr. Hollowell was also instrumental in the development of the National Foundation Seed Project. He established cooperation with foreign scientists, especially in Scandinavia, and by securing and maintaining seed stocks of cultivars and experimental lines, aided in the evaluation of clover cultivars for forage and seed in the USA.

Ernest Newton Fergus (1892–1985)
Eugene Arthur Hollowell (1900–1977)
Dr. Hollowell had planned to assemble a text on clovers but finally contented himself with writing articles, many in USDA Yearbooks, on various aspects of clover production. He was named Fellow of the American Society of Agronomy in 1946. He was one of the founding fathers of the *Trifolium* Conference, which now has expanded to the national level and meets biennially.

After his retirement in 1962, Dr. Hollowell still continued to meet and consult with fellow scientists, particularly at meetings, while living in Port Republic, MD.

Ernest Newton Fergus was born in Shelby County, OH. He graduated from Ohio State University with the B.S. degree in 1916, and with an M.S. degree in 1918. He received his Ph.D. from the University of Chicago in 1931. Dr. Fergus was assistant in Soils and Crops Department, Purdue University, and agent, Bureau of Plant Industry, USDA located at Purdue, 1918 to 1920. In 1920, he was appointed assistant in Farm Crops in the Department of Agronomy, where he advanced to professor of farm crops and agronomist in charge, Crops Section, in 1954 to 1962. During his long and productive career, he probably was the most influential faculty member at the University of Kentucky in guiding the direction of crops research and teaching. As a collaborator in Forage Crops Research, USDA, 1936 to 1961, he developed and released the Kenland red clover cultivar. He was a member of the planning conference of the National Foundation Seed Project (1951–1956) and under his guidance, Kenland became the pilot cultivar for the program, after which seed of many other cultivars of forages were increased in the western USA, thus enabling usage in the forage producing states that would not have otherwise been possible.

A few of the many awards Dr. Fergus received are as follows: Fellow, AAAS (1931) and ASA (1949); Merit Certificate Award, AFGC (1954); and Distinguished Grasslands Award, AFGC (1981). After his retirement in 1964, Dr. Fergus remained active consulting with many of his colleagues who he was instrumental in employing at the University of Kentucky, and with various aspects of church activities. Although his accomplishments in research, teaching, and extension were many, his single most important contribution probably was in creating a favorable environment for and an appreciation of legume-based grassland agriculture.

It is in grateful appreciation of the enthusiasm, leadership, and stimulation of Dr. Hollowell and Dr. Fergus that this monograph is dedicated.
FOREWORD

*Clover Science and Technology* is an important addition to the Monograph series of the American Society of Agronomy. This publication signifies that the Society continues to be a vigorous and vital influence in present-day research in the agricultural sciences. This text is somewhat unique in that as a monograph it deals with an entire genus of plants, the true clovers. These forage legumes are extremely important to the economy of the USA, Canada, and other countries. They contribute to agriculture through improvement of yield and quality of forages, the fixation of atmospheric nitrogen, and by improving soil tilth and water-holding capacity. Their significance to animal production is inestimable. This monograph brings together the expertise of a group of authors who have accumulated a store of knowledge on clovers not generally available from any other source. The contributions provide a foundation and direction for further research into the basic, biological and agricultural sciences which support clover production, utilization, development, and technology. The quality, yield, and N-fixing capability of forage clovers ensures this genus of an everlasting role in the agricultural economy of North America and the world.

The Society is indebted to the editor, the editorial committee, and the authors for their diligence in bringing this monograph to fruition.

Kenneth J. Frey, *President*
American Society of Agronomy

Wayne F. Keim, *President*
Crop Science Society of America

Donald R. Nielsen, *President*
Soil Science Society of America
PREFACE

Clovers (Trifolium) are an important group of species of one genus that are used for hay, pasture, silage, and soil improvement. This book is an outgrowth of discussions by a group of research and extension personnel who meet periodically under the auspices of an organization termed the Trifolium Conference. These scientists recognized that an abundant store of published and unpublished knowledge of potential value to scientists, students, technicians, and growers was available that had not been assembled in one treatise. The objective of the book is to provide a condensation of all available information on a group of species that is important to the livestock economy of the USA and Canada. Therefore, the coverage is limited to use of clovers in North America, whatever their origins. The scope of the book is intended to be comprehensive and to summarize the present state of knowledge of the clovers and to provide a basis on which future knowledge can be built. However, it was impossible to consider in detail all the approximately 240 species of the genus. Therefore, most detail is given on species of agricultural importance in North America. It is not a text on methods of growing clovers, but is a scientific treatment written in a style, we hope understandable, at the college undergraduate level.

Clover Science and Technology consists of 27 chapters contributed by authors in North America who are the most knowledgeable on the subject. Many of the authors contributed to more than one chapter. The first 15 chapters are of a general nature applying to the clovers as a genus, whereas the remaining 12 deal with individual species or groups of species that are of agricultural importance in North America. Efforts were made to eliminate redundancy, but not at the expense of clarity. The editor acknowledges the contribution of the editorial committee: Pryce Gibson, Bill Knight, Erlene Rupert, Dick Smith, and Bob Van Keuren who formulated the outline of the monograph, selected authors, and reviewed the individual chapters. The editor also wishes to express his appreciation to the authors, and to all scientists who were helpful in reviewing the chapters. He also wishes to acknowledge the efforts of Ms. Diana Nunley who handled correspondence, typed copies of many of the manuscripts, and generally coordinated the mailing of manuscripts throughout North America. The editor also wishes to acknowledge the help and guidance of Domenic Fuccillo, Managing Editor, and other personnel at the headquarters office of the American Society of Agronomy, which sponsored this volume.

N. L. Taylor, Editor
Lexington, Kentucky
CONTRIBUTORS

O. W. Barnett  Professor, Department of Plant Pathology and Physiology, Clemson University, Clemson, South Carolina

W. G. Blue  Professor, Soil Science Department, University of Florida, Gainesville, Florida

Steve R. Bowley  Assistant Professor, Crop Science Department, University of Guelph, Guelph, Ontario, Canada

Joe C. Burton  Vice President, Research and Development, The Nitragin Company, Inc., Milwaukee, Wisconsin; presently Niftal, University of Hawaii, Maui, Hawaii

V. W. Carlisle  Professor, Soil Science Department, University of Florida, Gainesville, Florida

Richard W. Cleveland  Professor of Plant Breeding, Department of Agronomy, The Pennsylvania State University, University Park, Pennsylvania

G. B. Collins  Professor, Agronomy Department, University of Kentucky, Lexington, Kentucky

Will A. Cope  Research Agronomist, Agricultural Research Service, U.S. Department of Agriculture, North Carolina State University, Raleigh, North Carolina

Beecher Crampton  Senior Lecturer and Specialist, Department of Agronomy and Range Science, University of California, Davis, California

Stephen Diachun  Emeritus Professor of Plant Pathology, Department of Plant Pathology, College of Agriculture, University of Kentucky, Lexington, Kentucky

H. W. Essig  Professor, Department of Animal Science, Mississippi State University, Mississippi State, Mississippi

Pryce B. Gibson  Research Agronomist, Agricultural Research Service, U.S. Department of Agriculture, Clemson University, Clemson, South Carolina (now retired)

John M. Gillett  Curator, Botany Division, National Museum of Natural Sciences, National Museums of Canada, Ottawa, Canada (now retired)

Carl S. Hoveland  Professor, Agronomy Department, University of Georgia, Athens, Georgia


William E. Knight  Supervisory Research Agronomist, Agricultural Research Service, U.S. Department of Agriculture, Crop Science Research Laboratory, Mississippi State, Mississippi
Kenneth T. Leath  
Research Plant Pathologist, Agricultural Research Service, U.S. Department of Agriculture, U.S. Regional Pasture Research Laboratory, University Park, Pennsylvania

William Orvid Lee  
Research Agronomist, Agricultural Research Service, U.S. Department of Agriculture, Corvallis, Oregon (now retired)

Otto J. Loewer  
Professor of Agricultural Engineering, Agricultural Engineering Department, University of Kentucky, Lexington, Kentucky

R. Merton Love  
Professor Emeritus, Department of Agronomy and Range Science, University of California, Davis, California

George R. Manglitz  
Research Entomologist, Agricultural Research Service, U.S. Department of Agriculture, Department of Entomology, University of Nebraska, Lincoln, Nebraska

William S. McGuire  
Professor in Crop Science, Crop Science Department, Oregon State University, Corvallis, Oregon

John D. Miller  
Research Agronomist, Agricultural Research Service, U.S. Department of Agriculture, Department of Agronomy, Coastal Plain Station, Tifton, Georgia

H. H. Rampton  
Associate Professor Emeritus of Agronomy, Crop Science Department, Oregon State University, Corvallis, Oregon

Clarence M. Rincker  
Research Agronomist, Agricultural Research Service, U.S. Department of Agriculture, Department of Agronomy, Coastal Plain Station, Tifton, Georgia

E. A. Rupert  
Professor of Agronomy, Department of Agronomy and Soils, Clemson University, Clemson, South Carolina

Edward M. Smith  
Professor of Agricultural Engineering, Agricultural Engineering Department, University of Kentucky, Lexington, Kentucky

R. R. Smith  
Research Geneticist, Agricultural Research Service, U.S. Department of Agriculture, Department of Agronomy, University of Wisconsin, Madison, Wisconsin

William C. Stringer  
Assistant Professor of Crop Science, Agronomy Department, The Pennsylvania State University, University Park, Pennsylvania

Norman L. Taylor  
Professor of Agronomy, Department of Agronomy, University of Kentucky, Lexington, Kentucky

C. E. Townsend  
Research Geneticist, Agricultural Research Service, U.S. Department of Agriculture, Crops Research Laboratory, Colorado State University, Fort Collins, Colorado

Robert W. Van Keuren  
Professor of Agronomy, Department of Agronomy, Ohio Agricultural Research and Development Center, Wooster, Ohio

Homer D. Wells  
Research Plant Pathologist, Agricultural Research Service, U.S. Department of Agriculture, Department of Plant Pathology, Coastal Plain Station, Tifton, Georgia