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Soil Testing: Sampling, Correlation, Calibration, and Interpretation

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FOREWORD

Developing the concepts of and formulating the scientific basis for soil testing has been one of the most important contributions made by soil scientists to the production of food and fiber. Much progress has been made toward the evaluation of the natural fertility of soils, understanding the mineral nutrition of plants, and increasing the efficiency of mineral fertilizers applied to the soil.

Many questions remain, however. Better analytical tools, refined experimental techniques, and new statistical tools continue to provide insights and interpretations that enhance the value of soil testing. New demands are placed on soil testing. Changes in farm management practices have been dramatic and have important consequences for soil testing. Reduced tillage requires a reevaluation of soil sampling procedures and soil test calibrations. The role of soil testing for evaluation of environmental pollution may be considered.

All these activities are being supported by traditional soil testing research. This book reports progress on many aspects of this research and attempts to satisfy the long standing need for a book setting forth the scientific principles upon which soil testing is based. The material in this book was first presented at a symposium sponsored by the Soil Testing and Plant Analysis Committee (S-877) and Divisions S-4, S-8, A-1, and A-4, held in conjunction with the annual meeting in Chicago, IL, 1-5 Dec. 1985.

May 1987

L. BOERSMA, *president,*
Soil Science Society of America

PREFACE

A special symposium on soil test calibration was held at the August 1975 American Society of Agronomy meeting in Knoxville, TN. The proceedings of that symposium were published in 1977 as ASA Special Publication no. 29 entitled *Soil Testing: Correlating and Interpreting the Analytical Results*.

The impact of the energy crisis of the 1970s, the grain embargo in response to USSR activities in Afghanistan, and other international and national activities all served to put a severe damper on export of U.S. agricultural products. This reduced the markets for agricultural products and the prices received. Environmental pressures have also mounted and there has been public concern for the protection of water quality and prevention of pollution from chemical fertilizers. The net result was a severe economic crisis in agriculture, which has placed increased emphasis on the efficient use of all agricultural inputs, including fertilizer. Soil testing plays a key role in the efficient use of fertilizer and its economic benefit.

Soil testing also plays an important role in the prevention of environmental degradation through providing guidelines to protect both surface, groundwater, and water quality.

A joint meeting between soil testing and plant analysis professionals from the Southeast and the North Central Regions in Memphis, TN, in October 1984 resulted in a resolution to update ASA Special Publication no. 29. The appeal was forwarded to the ASA planning committee.

This action resulted in a symposium held at the 1985 ASA meeting in Chicago, IL. This publication is the result of that symposium.

The Editorial Committee, the Planning Committee, and the many authors feel that much progress has been made in the 10 years since the Knoxville symposium. The interpretation of soil tests, however, often leads to confusion when the recommendations of different laboratories for samples from the same field are compared. This publication should reduce confusion surrounding interpretations of soil tests. Much remains to be done in sampling of soils and calibration of soil tests to ensure the efficient use of fertilizers in crop production.

January 1987

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