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Soil Fertility and Organic Matter as Critical Components of Production Systems

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Foreword

This book is about the science of managing the soil and raising crops; specifically about the dynamics of organic matter in the soil and its role in soil fertility. It appears at an appropriate point in time. The chapters in this book develop the thread of information needed to understand the complex interactions between physical and biological soil factors, climatic factors, and farm management. Understanding the science of organic matter in the soil has progressed rapidly in recent years. There is a new appreciation for the essential presence of this soil component, there is a better understanding of the relationship between the organic and inorganic components of the soil production systems. Renewed interest comes from rapidly developing changes in soil management. Current farm management emphasizes economic yields. Pressures of pending environmental legislation are of concern as are the Soil and Water Conservation Provisions of the 1985 Farm Bill.

The American Society of Agronomy and the Soil Science Society of America are pleased to have sponsored the symposium "Soil Fertility and Organic Matter as Critical Components of Production Systems" at the 1985 Annual Meeting on 3 Dec. 1985 and this publication that resulted from it. The symposium was jointly sponsored by the Div. S-2, S-3, S-4, and S-8.

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Preface

This special publication represents the current thinking of scientists concerned with soil fertility and organic matter as critical components of production systems. Soil, climate, organic matter and nutrient requirements of crops affect soil management. Biological, physical, and chemical processes are involved in the balance between concurrent mineralization and immobilization, and nutrient availability. Thus, carbon inputs impact the supply of N, P, and S and the timing of their release in mineral form for both fertilized and unfertilized soils. Knowledge of these processes and their controls provides the basis for improved management practices to maintain or increase productivity of our soil resources. Because of the complexity of many of these relationships, improvements in soil fertility management and fertilizer recommendations will increasingly involve the use of computer models as part of the total technical support system.

This publication: (i) documents the important role of soil, climate, and management to the prediction of nutrient availability and use, (ii) describes controls on nutrient cycling and organic matter dynamics, and (iii) considers approaches for advisory services to use new technologies and to integrate information on organic matter dynamics and nutrient availability into models of crop production systems.

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