

Micronutrient Symposium

INTRODUCTION

The subject of minor element, trace element, or micronutrient deficiencies in soils, plants, and animals is well documented in the technical literature. These nutrient elements frequently are of major importance in efficient crop production. They are required in measurable proportions rather than in true trace quantities. Hence, the accepted term has become micronutrient, implying that the required amounts of these nutrients are generally small in comparison with crop demand for macronutrients.

Research has been an invaluable aid in dealing with micronutrient problems in many regions of the world. Certain of these nutrients have been applied regularly to specific areas of soil and to particular crops for a long time. The use of micronutrients is increasing—as direct additions to the soil, as foliage sprays, and as constituents

of mixed fertilizers. New data on their chemistry, manufacture, and use are continually being revealed by able scientists in research and development. The participants in this symposium are outstanding leaders in the micronutrients field.

In developing the symposium, the purpose was to correlate the subject matter in the form of a survey of the present-day needs for micronutrients, the properties of materials supplying these needs, and the routes by which the needs are satisfied. The following contributions to the symposium meet this goal in an admirable manner.

JOHN O. HARDESTY, Symposium Chairman
U. S. Department of Agriculture,
Beltsville, Md.

MICRONUTRIENT RESEARCH

Introduction to Micronutrient Elements

PERRY R. STOUT
University of California,
Davis, Calif.

DURING THE PAST TWENTY YEARS micronutrient elements have gained new prominence as indispensable contributors to agricultural productivity. From crude beginnings and casual recognition as trace elements, they have developed to the point that they are now considered quantitatively as agricultural chemicals of commercial importance.

Besides aiding in maintaining productivity of important land already under cultivation, the introduction of micronutrient elements in fertilizer form has made possible the opening of many new tracts. Zinc, copper, and molybdenum have been responsible for spectacular land developments involving many millions of acres. In the semi-arid West, for example, zinc (though

small in tonnage) has become second only to nitrogen in frequency of use as a fertilizer.

The history of micronutrient research and the carrying of new information into management practice have interesting parallels with other advances in contemporary science in making energy sources available for human use. Practical field demonstrations with molybdenum fertilizer applications have revealed that a gram of molybdenum may harness more energy through greater conversion of sunlight into plant materials than can be obtained from a gram of uranium as converted to TNT equivalents.

New research on the relationship of microchemical quantities of elements to life processes continues to produce

exciting new developments and increased understanding of plant and animal physiology. Within the past year or so, for instance, cobalt has become implicated unequivocally with the nitrogen fixing capabilities of leguminous plants, and it now appears nearly certain that selenium is essential for mammalian life.

Cognizance of the micronutrients and their origin from soils has resulted in a surge of analytical attention to crops of many species, to animal rations, and to broadening research interests. Better analytical techniques, sharpened in both sensitivity and precision, will allow examination of other chemical elements which are found in plants and animals, but for which no significance has yet been recognized or defined.