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and Their Effects on Soils and Water

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Foreword

The people of our nation are becoming more aware that population growth is imposing an increasing strain on our natural resource base, on our agricultural production, and on the ability of the peoples of the world to feed themselves. Public concern is mounting rapidly not only for the millions of acres being lost or immobilized each year by erosion or by use for commercial developments, but also for the "quality" of our environment and the increasing pollution of our soils, water, and air. To meet these situations, we must increase our production effort and at the same time maintain a clean and healthy environment. Intensification of agriculture has resulted in greater and greater use of chemicals to control pests. This in turn has intensified research efforts on new methods of pest control, on proper usages of selective chemicals, on the significance of "residues" from the public health standpoint, and on the persistence of chemicals in the natural soil and water environment of the plant complex.

A major objective of modern soil science in its support of research is to maximize the efficiency of food production. It is also aimed at conserving and prolonging the productive life and protecting the quality of our diminishing soil and water resources, thus safeguarding the well-being of our citizenry.

This publication sets forth the comprehensive treatment given the subject of pesticides and soil and water quality in symposia held during the annual meetings of the Soil Science Society of America at Columbus, Ohio, Nov. 4, 1965. It is representative of several activities on the part of the society to review objectively in depth this and other important subjects related to our discipline so as to keep laymen and scientists alike abreast of modern developments.

The society is much indebted to the participants, the members of the organizing committee, the editors, and the headquarters staff, for the dedicated efforts that have made this fine review possible.

W. P. Martin, President
Soil Science Society of America

July 25, 1966
Preface

Much of man's success has been the result of his ability to understand and control his environment to some extent. Had it not been possible to observe, understand, and then modify the environment to serve his interests and needs, then man would still be living in the dark ages. Historically, he has attempted to manipulate nature to his advantage which has created unnatural situations in the necessity to produce food and fiber. As a result, many agricultural pests have followed and entered the struggle for control. To prevent this, man has found that it has become necessary to keep the ecological balance of nature in his favor by using many things that have been made available to him through the development of the agricultural sciences. These have included better adapted crops for a given locality, agronomic practices best fitted to the situation at hand, increased use of fertilizers, varieties of crops that are resistant to certain diseases and insects, and during more recent years the increased use of chemical control. However, in spite of all the advancements made to date, no one method of pest control has been, or can be expected to be, totally effective alone.

According to the latest statistics on population growth, the earth's population will double perhaps by the turn of this century. Therefore, producing food and fiber necessary for the increased population will likely necessitate the continued, and even accelerated, use of chemicals for the control of insects, diseases and weeds.

As with other scientific advancements that have been made especially for the welfare of mankind, agricultural chemicals require careful and intelligent use if they are to be integrated into modern, scientific agriculture. Therefore, to use them properly, the scientists must know the many interrelations of a given chemical following application to plants or the soil. Such questions as toxicity to plants; is it soluble in water; can it be transplanted by water and erosion; persistence in plants and soil; can it be leached to the ground water; can it be adsorbed on the clay complex; is it rendered ineffective by microbial activity in the soil; and what is its mode of action in soils and plants, must be answered. Numerous other problems such as these must be solved before safe tolerances and final approval can be given a chemical for wholesale use by mankind in his environment.
Therefore, to keep both scientists and the general public abreast of this all-important problem, the Soil Science Society of America believes it has part responsibility in keeping these, as well as other closely related groups of our society, informed on the use of pesticide chemicals in the production of our food, feed and fiber. This publication is the first step to share this responsibility and to bring forth the latest information available concerning pesticides and their interrelations with the dynamic soil-plant-water system. As new information becomes available through scientific advancements in this field, other symposia will be sponsored in the future by the society.

M. E. Bloodworth, Chairman
Committee on Pesticides and Soil and Water Quality
College Station, Texas
June 30, 1966