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1933 - 1983

ADVANCES IN RESEARCH ON PLANT-GROWTH BIOREGULATORS

AGROSTEMIN

New Source of Natural Allelopathic Chemicals
for Better Plant Growth and Plant Productivity Regulation

A COMPILATION
of Reports on its Use and Efficiency

Edited by
E.WELTE and I. SZABOLCS

INTERNATIONAL SCIENTIFIC CENTRE OF FERTILIZERS
BELGRADE • GOETTINGEN • VIENNA

Published by CIEC editorial board in Goettingen and Budapest

Printed by Goltze-Druck, Goettingen 1987

Printed in Germany (Fed. Rep.)

ISBN 3-88452-627-7

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(selected contributions from WORKING GROUP 10 of the 9th WORLD FERTILIZER CONGRESS of CIEC 11-16 June 1984 in BUDAPEST, Hungary)

I INTRODUCTION

F O R W O R D

It is with great pleasure, pride, and satisfaction that I hereby introduce the CIEC SPECIAL EDITION of scientific papers on advances in research on plant growth bioregulators, especially "Agrostemin" as a natural allelopathic chemical invented and named by Dr. Danica Gajić, Yugoslavia. These papers were presented at the 9th CIEC World Congress 1984 in Budapest to the field of interaction between fertilizers and natural plant growth bioregulators affecting the whole nutrient uptake process. This special issue is published at the request of CIEC members and supplemented with papers on the subject of the "Mechanism of assimilate distribution and plant growth regulators" presented at an international conference in 1981 in Piestany, Czechoslovakia.

With pleasure because the International Scientific Center of Fertilizers (CIEC) is so alive that through regular scientific and technical activities since its foundation in Rome 1932/33 it gives birth to new roots of science and technology for further progress in food production and fertilizer management.

With pride because CIEC contributes to research on plant nutrition as an international organization for more than 50 years on a worldwide scale, independent of national or industrial interests, only feeling responsible for improvements in food production as a fundamental demand for the existence of mankind.

With satisfaction because the proceedings of CIEC's numerous conferences and symposia offer the many results and experience made by its members in various countries of the world to all who are interested in studies on plant nutrition problems under various regional, climatic, ecological, and economic aspects.

I therefore hope that this brochure will close the gap at the interference between natural growth factors in the soil-plant system and plant nutrients added to the soil through fertilizers, contributing in the most efficient way to food production in the world.

Belgrade, July, 1987

Prof. Dr. Djurdje B. JELENIC
President of CIEC

PREFACE

to the CIEC Special Edition
"Advances in Research on
Plant Growth Bioregulators"

The International Scientific Center of Fertilizers, CIEC (Centre International des Engrais Chimiques), founded in Rome 1932/33, is a wellknown international and independent organization dealing on a scientific level with the agrochemical, agrotechnical, and agroecological aspects of fertilizer use and fertilizing technology.

In view of the increasing need for food in the struggle against famine in the world, a more thorough knowledge of and extensive experience in agricultural production methods are the most important instruments in protecting people from hunger and misery. In coping with this worldwide task fertilizers occupy a key position among the factors influencing plant food production.

CIEC has pursued these important goals since its foundation more than 50 years ago. The success achieved so far is reflected in many resolutions, congresses, additional scientific meetings, and symposia in conjunction with CIEC's general assemblies (see reverse side of cover).

At the 9th World Fertilizer Congress of CIEC held in Budapest, Hungary, on June 11-14, 1984, the 50th anniversary (golden jubilee) of the CIEC was dedicated especially to the most pressing and critical problem of today:

"Fight Against Hunger Through Improved Plant Nutrition"

A special group of scientific papers of this congress dealt with the application of natural bioregulators in connection with the phenomenon "allelopathy" affecting the effectiveness of fertilizer use, as well as the productivity of plants in many lines (germination, nutrient uptake, biomass synthesis, yield, quality of harvested products, etc.).

Major effects of plant growth regulators are mediated through the biosynthesis, metabolism, translocation, and action of the endogenous hormones by controlling the pattern of growth and the distribution of assimilates within the plant. However, essential results applicable in farming practice are as yet relatively scarce.

More basic research should be focussed on the regulatory role of these natural substances and on the mechanism of their action.

An interesting plant growth regulator with allelopathic effects, studied recently by a group of Yugoslavian scientists, is the extract from the corn cockle seed (Agrostemma githago L.) called "AGROSTEMIN", invented and named by Dr. Danica Gajić, Yugoslavia. Their findings seem to be very promising, having indicated that this bioregulator of natural origin exerts a broad spectrum of distinct activities.

Due to the positive results in the application of Agrostemin reported from field experiments of various cultivated plants and under controlled growth conditions CIEC's Editorial Board was encouraged to publish a special issue on this plant bioregulator with strong allelopathic effects by compiling all reports on this subject held at the 9th World Fertilizer Congress of CIEC of June, 1984, in Budapest. This publication will be supplemented by other related papers presented at an international conference 1981 in Piestany, CSSR, on the mechanism of the assimilate distribution affected by plant growth regulators.

It is hoped that this compilation will emphasize the need for more research in the field of allelopathic chemicals - a research sector which has really been neglected in the past and which deserves more attention in the future.

Prof. Dr. Istvan SZABOLCS
Editor-in-Chief of CIEC

Prof. em. Dr. Erwin WELTE
Vice President of CIEC

BUDAPEST - GOETTINGEN
July, 1987