

**Review of the monograph “Ecological Aspects of Crops Fertilization Systems” by V.V. Volkogon, O.M. Berdnikova, V.I. Lopushniak
(edited by V.V. Volkogon)**

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Modern fertilization systems used in agriculture are oriented mainly on the productivity of agrocenoses (trophic function) and do not reflect the value of biological components in solving problems of preservation of soil fertility, optimization of processes of degradation and synthesis of organic matter, transformation of nitrogen and other biogenic elements. Therefore, introduction of the new monograph “Ecological Aspects of Crops Fertilization Systems” is an important step both for understanding of the agricultural production-related complex environmental anthropogenic situations, and for their optimal settlement. It should be noted that this is the first book in Ukraine that reviews the microbiological approaches used to solve problems of optimization of crop nutrition and increase the efficiency of mineral and organic fertilizers utilization in agricultural technologies.

The authors of the monograph are well-known scientists in the fields of soil microbiology (V.V. Volkogon) and agrochemistry (O.M. Berdnikov and V.I. Lopushnyak). Their work is based on the corresponding principles and balancing methods used in feasibility study of different crop fertilization strategies. Collaboration of the authors helped to emphasize the importance of biological principles of indication in determination of ecologically expedient doses of mineral fertilizers, the need to supplement traditional fertilizer systems with biological factors aimed at preserving soil fertility and optimizing the crops nutrition.

The first section of the monograph analyzes the principles applied to crop fertilization systems, emphasizing the need to ensure the improvement of the environment and preservation of biodiversity in addition to the increased productivity of agrocenoses and remediation of soil fertility.

The analysis of the biological aspects of crop fertilization as well as their importance for optimization of soil processes is shown in second section. Authors emphasized the need in the systematic intake of raw organic material into the

soils of agrocenoses and the optimization of the processes of nitrogen compounds microbiological transformation in soil, as imbalances in the carbon/nitrogen ratio can lead to significant losses of humus and further ecological problems. The section reviews the sources of organic material in soils, their importance for the formation of both potential and effective soil fertility, the impact on the phytosanitary state of agrocenoses and the formation of phytohormonal pool in soils of agrocenoses.

The important (and the largest) part of the second section is devoted to the control of the processes of nitrogen compounds biological transformation in agrocenoses. The authors present the peculiarities of the symbiotic and associative nitrogen fixation, ammonification, immobilization, nitrification and denitrification using the agrochemical approaches, preserving, in the same time, the fundamental provisions, which is undoubtedly a significant gain of the monograph.

The section describes in detail the methodological principles for determining the physiologically acceptable norms of mineral nitrogen using the indices of two opposite directed processes – nitrogen fixation and emission of nitrous oxide. The authors provide specific examples for application of the developed methods, as well as the prospects of their use in the design of crops fertilization systems.

An important part of the section is the materials on the effectiveness of microbial preparations that improve the root nutrition of cultivated plants. Their characteristics, principles of effective application, etc. are described.

Unlike the second section of the monograph, where the features of each of the biological factors of crops fertilization optimization are examined in detail, the third and fourth sections are devoted to their systematic application and efficiency determination in the conditions of three stationary experiments on black soil, sod podzolic soil and dark-grey podzolic soils respectively.

The monograph conclusions generalize the effect of biological factors on soil fertility and plant mineral nutrition, thus underlining the necessity for corresponding adjustment of crop fertilization systems and minimization of environmental and economic risks.

As the book summarizes the research data related to different disciplines, it will be useful to a wide range of readers – students, PhD students, researchers, teachers of biological and agricultural profiles.

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