

**МІНІСТЕРСТВО ОСВІТИ І НАУКИ УКРАЇНИ
ПОЛТАВСЬКИЙ ДЕРЖАВНИЙ АГРАРНИЙ УНІВЕРСИТЕТ
University of Opole (Poland)
International Slavis University (Macedonia)
Cooperative Trade University of Moldova
Institute of Soil Science and Plant Cultivation
State Research Institute (Poland)**

Кафедра рослинництва

**МАТЕРІАЛИ V МІЖНАРОДНОЇ НАУКОВО-ПРАКТИЧНОЇ
ІНТЕРНЕТ-КОНФЕРЕНЦІЇ**

**Актуальні напрями та проблематика у
технологіях вирощування продукції
рослинництва**

25 листопада 2025 року

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Актуальні напрями та проблематика у технологіях вирощування продукції рослинництва

Матеріали V Міжнародної науково-практичної
інтернет-конференції

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У збірнику тез висвітлено результати досліджень, які присвячені сучасним аспектам із розв'язання проблемних питань в аграрній науці, зокрема біологізації рослинництва, інноваційним заходам у технологіях вирощування сільськогосподарських культур. Видання адресоване науковим та науково-педагогічним працівникам, аспірантам, здобувачам вищої освіти, фахівцям агрономічної служби агроформувань різного виробничого напрямку.

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Відповідальність за зміст поданих матеріалів, точність наведених даних і відповідність принципам академічної доброчесності несуть автори. Матеріали видані в авторській редакції.

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THE EFFECT OF MINERAL ELEMENTS ON SUNFLOWER YIELD

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Human population growth in the context of global climate change has exacerbated the problem of food security. Today, about two-thirds of the world's population suffers from a constant shortage of food. One way to solve this problem could be to increase the area of sown areas, improve the biological productivity and quality of crops that are highly resistant to adverse environmental factors. One of these crops is sunflower. The production and processing of its seeds, as the main source of cooking oil in the world, have gained significant perspectives in the agricultural and food sectors of Ukraine. An increase in sunflower productivity is closely related to the availability of nutrients for the plants throughout their growth and development. Nitrogen plays a key role in the growth of plant biomass. Its physiological role is associated with the synthesis of amino acids, nucleotides, phospholipids, and chlorophyll. Phosphorus is a key element for the normal functioning of photosynthesis, metabolism, and respiration. It participates in energy storage, cell division, and growth. The presence of sufficient amounts of potassium in the rhizosphere promotes the absorption of nutrients and maintains water balance in plant tissues, ensuring photosynthetic activity in plants and the movement of sugars in tissues and organs, and activation of enzymes. The presence of this element in plants is associated with the regulation of their water balance, which is expressed in the effect on the opening and closing of stomata under environmental factors. Boron is an important element that directly ensures the development of the generative sphere of plants. Along with root development, its effect is manifested in improving pollen germination, the processes of fertilization, and seed formation. The use of this element in foliar plant application can be a significant factor in significantly reducing fruit abortion. Sulfur is a key element that determines the intensity of the processes of amino acids and proteins, as well as enzymes and chlorophyll formation. Its presence in the nutrient supply plays a significant role in the absorption and assimilation of nitrogen by the root system of plants, increasing their resistance to diseases and pests, and improving their quality characteristics by increasing the level of oil and sugar synthesis.

The aim of the experiment was to determine the effect of different doses of mineral fertilizers ($N_0P_0K_0$, $N_{40}P_{40}K_{40}$, $N_{65}P_{65}K_{65}$) and the use of microfertilizers with B and S on the sunflower yield.

Field experiments were conducted on the area of the state enterprise “Experimental Farm ‘Stepne’ of the Institute of Pig Breeding and APV of the NAAS” during 2024 and 2025. The results of the study indicate the positive effect of the factors and their complex interaction on the biological productivity of sunflower plants. The highest values were obtained in the variant of complex application $N_{65}P_{65}K_{65}$ and foliar fertilization of plants with B at the beginning of flowering and S during seed filling.

The increase in elements of the sunflower yield structure led to an increase in the overall seed yield of its crops. The application of mineral fertilizers ensured an increase in sunflower seed yield by an average of 0.49-0.62 t/ha over 2 years compared to the control. The increase in seed yield from foliar application of boron at the beginning of flowering was 0.14 t/ha, and in the variants combining the application with B at the beginning of flowering and S during seed filling, its level increased by 0.26 t/ha compared to the control. The stimulating effect of the used technology elements on the formation of seed productivity of sunflower crops was most pronounced with the complex application of B and S in combination with $N_{65}P_{65}K_{65}$.

Thus, optimization of the nutrient regime of plants by combining the application of $N_{65}P_{65}K_{65}$ and foliar application with B at the beginning of flowering and S during filling is the most effective method of increasing sunflower seed yield.

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THE EFFECT OF BIOLOGICAL AND MINERAL FERTILIZERS ON THE BIOLOGICAL PRODUCTIVITY OF GRAIN SORGHUM VARIETIES OF DIFFERENT MATURITY GROUPS

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The basis for the introduction of new agronomic methods of crop cultivation is an increase in yield and profits resulting from the production of grain crops that have high plasticity and adaptability to the combined effects of drought and elevated air temperatures. In this regard, sorghum is unique in its biological characteristics and economically valuable features. Among the main crops, sorghum is characterized by high drought resistance, stable yields, and universal use of grain and biomass. Due to the high starch content in the grain, sorghum grain is characterized by high energy content. The starch obtained from the grain during refining does not contain anti-nutritional components and, therefore, can be used in the preparation of various sauces and stuffings used in the manufacture of bakery and confectionery products. It is also used in the textile and medical industries. Currently, manufacturers are quite interested in grain sorghum as a bioenergy crop from which bioethanol, biogas, and liquid biofuel can be produced. To ensure the high competitiveness of this crop on the market, it is essential to ensure production using high-yielding varieties and hybrids that are characterized by maximum adaptation to environmental factors and the use of elements of modern cultivation technologies. Important factors for the success of this system are the use of mineral chemical fertilizers in connection with the characteristics of the variety. However, excessive increases in mineral fertilization levels can lead to many problems related to environmental pollution and harmful effects on the health of humans and other organisms in the ecosystem. One of the promising methods that can reduce this problem is the use of biofertilizers based on nitrogen-fixing, phosphorus- and potassium-mobilizing microorganisms, which can increase plant productivity by improving their nutritional regime. Biofertilizers, also known as microbial inoculants, are organic products containing specific microorganisms that are secreted from plant roots and root zones. These bioinoculants colonize the rhizosphere and the interior of