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

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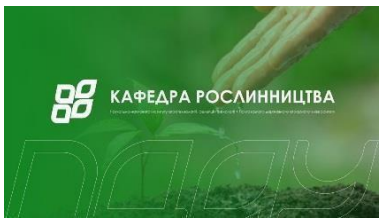

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Матеріали V Міжнародної науково-практичної інтернет-конференції

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Актуальні напрями та проблематика у технологіях вирощування продукції рослинництва: матеріали V Міжнародної науково-практичної інтернет-конференції (25 листопада 2025 року, м. Полтава). / Редкол.: В.В. Гангур (відп. ред.) та ін. Полтава: ПДАУ, 2025. 120 с.

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.

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 ROLE OF SOME ELEMENTS OF MINERAL NUTRITION IN THE FORMATION OF THE PRODUCTIVITY OF SUNFLOWER AS A VALUABLE OIL CROP

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Ensuring a high level of food security for the country's population is closely

related to increasing crop production. An important role in this regard is due to expanding the sown area and increasing the production of crops that have a high resistance to the impact of negative environmental factors. One of these crops is sunflower. Due to the formation of a well-developed branched root system, sunflower plants are capable of absorbing moisture and nutrients from deeper soil layers, thus reducing the adverse effects of drought on crop formation. Sunflower is one of the main crops in global oil production. Its content in dry seed matter is about 35–42%. The main components of sunflower oil are oleic and linoleic acids [1]. Oleic acid is a monounsaturated omega-9 fatty acid, the presence of which increases the oil's stability against oxidative degradation under high temperatures and extends its useful time. This makes it possible to use oil with a high oleic acid content as a food processing additive [2]. Oleic acid is also known to have a positive effect on human health. It manifests itself in the ability to lower triglyceride and cholesterol levels, low-density lipoproteins, and increase high-density lipoprotein cholesterol levels in the blood, thereby reducing the risk of developing cardiovascular disease and cancer [3]. Linoleic acid is an essential polyunsaturated omega-6 fatty acid with two cis double bonds. It plays an important role in maintaining lipid metabolism in the organism, stimulating the immune system, and moisturizing and regenerating the skin. A negative correlation between omega-6 fatty acid consumption and the risk of coronary heart disease has been proven [4]. Sunflower seeds contain proteins that act as antioxidants and play an important role in metabolic processes in the human body, particularly in the development of muscle and bone cells, and insulin production. It also contains amino acids, fiber, vitamins, phytochemical compounds such as tocopherols, choline, betaine, lignan, phenolic acids, flavonoids, and trace elements, including calcium, magnesium, phosphorus, potassium, selenium, iron, zinc, and copper. Sunflower seeds and plantlets are characterized by valuable antioxidant, antimicrobial, anti-inflammatory, antihypertensive, and healing properties, which are due to the presence of phenolic compounds, flavonoids, polyunsaturated fatty acids, and vitamins [5].

Increasing sunflower productivity is closely related to the supply of nutrients to plants throughout their growth and development. Nitrogen is an element that is important for the development of the assimilation surface of plants, their photosynthetic activity, and the formation of high-quality seed properties. Studies have shown that an adequate level of nitrogen supply to plants has a positive effect on the synthesis of oleic and linoleic unsaturated fatty acids, which are directly related to the high quality of sunflower oil. However, applying increased doses of this element can lead to a decrease in oil concentration in the seeds and increase the risk of plant lodging caused by excessive vegetative growth [6]. The application of phosphorus is necessary for the formation of full seeds, with the level of its remobilization from leaves and stems during seed maturation ranging from 30 to 60% [37]. Its deficiency, especially in the early stages of sunflower development, leads to a slow growth of the above-ground part of plants, delayed flowering, smaller seeds, and reduced oil content in seeds [7]. Potassium is a critical macronutrient and osmotically active agent that helps plants adapt by reducing water potential during drought. Potassium deficiency in plants can lead to slow growth, reduced yields, and increased susceptibility to pests and

diseases [8]. Sulfur plays an important role in nitrogen and potassium metabolism. Its presence promotes the conversion of carbohydrates into oil. It is estimated that for good quality and quantity of nuclei production, approximately 16–25 kg of this element must be added to the soil [9]. To increase productivity and seed quality, sunflowers need sufficient boron supply. According to the results of the study, its foliar application in the BBCH 15–16 phase (5–6 unfolded leaves) contributed to an increase in the nitrogen content in the plant and an increase in the yield and productivity of sunflower seeds [10].

The absorption of nutrients by sunflower plants is quite uneven throughout the growing season. In the early stages of development, plants usually require a small amount of mineral nutrients, but their absorption may exceed the rate of growth of completely dry biomass. It is known that in the first month of vegetation, sunflowers use 15% of nitrogen, 10% of phosphorus, and 10% of potassium, although the accumulation of organic matter during this time does not exceed 5% of the maximum value. Despite the fact that sunflowers grow slowly in the initial stage (2-3 leaves), the sunflower basket is formed during this period. Over the next 1.5 months, when the baskets are formed and until the end of flowering, sunflowers consume nutrients intensively. Their plants absorb about 80% of nitrogen, 70% of phosphorus, and only 50% of potassium. The remaining 40% of potassium is supplied to the plants from the seed filling phase to the beginning of ripening. The nitrogen absorbed at this time activates the formation of tissues that store oil, and the increased level of phosphorus nutrition promotes its accumulation in the seeds. After the formation of baskets is complete, the absorption of nutrients by sunflowers decreases. At the same time, nitrogen supplied to plants during the seed filling phase stimulates the formation of proteins instead of fats, while phosphorus contributes to the increased synthesis of nucleic acids and phospholipids and increases the content of linoleic acid and water-soluble protein fractions in oil. Potassium activates metabolic processes in plants and promotes more intensive oil accumulation in sunflower seeds [11].

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THE FORMATION OF BIOMETRIC PARAMETERS OF SUNFLOWER HYBRID PLANTS OF DIFFERENT MATURITY GROUPS DEPENDING ON THE LEVEL OF MINERAL NUTRITION

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Sunflower is one of the leading oil crops in both global and domestic agriculture and occupies a leading position in the structure of commercial products in Ukraine's agricultural sector. This is due not only to the high productivity potential and actual yield of the crop, but also to the significant sown areas. Over the past ten years, there has been a steady increase in the gross harvest of sunflower seeds, as well as growth in the volume of its industrial processing. Analysis of the dynamics of statistical