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AGROCLIMATIC CONDITIONS AS THE MAIN FACTOR IN REALIZING THE PRODUCTIVE POTENTIAL OF SUNFLOWER

The influence of agro climatic indicators on the formation of oilseed productivity, in particular sunflower, is a determining factor in the stability of agricultural production. In conditions of climate change, the rational selection of hybrids that are able to maximize their genetic potential in specific soil and climatic conditions becomes particularly relevant.

Among the important characteristics of sunflower hybrids that directly affect the level of yield, their genetic potential occupies an important place. Under optimal growing conditions, it determines the maximum possible yield level, but its implementation depends on weather conditions [1]. Important indicators of a hybrid are resistance to diseases and pests, adaptability to soil and climatic conditions, drought resistance and tolerance to soil acidity. In the zone of unstable moisture, it is the ability of oilseed crops to withstand moisture deficit that becomes a decisive condition for yield formation.

Mineral nutrition plays an important role in shaping the productivity of oilseed crops. The rational use of fertilizers allows to increase the efficiency of soil resources use, increase plant resistance to stress factors and ensure the formation of high yields and product quality [2]. In conditions of moisture deficiency, the efficiency of fertilizers may decrease, however, properly selected nutrition systems can partially compensate for the negative impact of drought [3].

The practical significance of rational selection of sunflower hybrids lies in maximizing the potential of soils, reducing crop losses and increasing production stability. Adaptive hybrids provide a more predictable result even under adverse weather conditions, which is a key factor in economic efficiency. In particular, the use of disease- and drought-resistant hybrids allows you to reduce costs for plant protection products and reduce the risks of crop failure.

The results of field research and analysis of the temperature regime according to the Poltava Meteorological Station indicate a significant interannual change in weather conditions during the growing season. In 2023, temperatures in the key months of sunflower development (May–August) were moderately high – from 15.6°C in May to 22.0°C in August, which generally created favorable conditions for plant growth. In 2024, a sharp increase in temperature in June to 24.2°C was observed, which, combined with moisture deficiency, caused stressful conditions for the oilseed crop. But 2025 was characterized by lower temperatures in the spring (6.1–7.6°C in April–May),

which could slow down the initial stages of growth, but more moderate temperatures in the summer (19.9–20.4°C) contributed to more stable development of sunflower plants.

The distribution of atmospheric precipitation showed even greater contrast. In 2023, the amount of precipitation was sufficient and uniform: during the period of active vegetation, it was from 32.9 mm to 75.4 mm per month, which ensured optimal moisture supply for plants. In 2024, a critically low level of precipitation was recorded - in the summer months, their amount did not exceed 4–5 mm, which created conditions for severe drought. In 2025, the situation partially stabilized: the amount of precipitation was moderate (from 12.9 to 44.3 mm), but its distribution remained uneven.

The indicated agroclimatic factors directly affected the yield of sunflower. Thus, the Biloba hybrid provided a yield of 2.54 t/ha in 2023, which increased to 2.77 t/ha in 2024 and slightly decreased to 2.62 t/ha in 2025. Despite the dry conditions of 2024, this hybrid demonstrated a sufficiently high level of adaptability, which indicates its resistance to stress factors.

The sunflower hybrid Suvex was characterized by higher productivity in all years of the study: 2.65 t/ha in 2023, 2.82 t/ha in 2024 and 2.76 t/ha in 2025. This allows us to conclude that it has a higher genetic potential and better adaptation to changing climatic conditions. The difference in yield between the hybrids was on average 0.1–0.15 t/ha, which is a significant indicator in production conditions.

Thus, the results of the research confirm that agroclimatic indicators – air temperature and precipitation – have a decisive influence on sunflower productivity. The most favorable conditions are moderate temperature regime and sufficient moisture, while precipitation deficit and temperature stresses reduce the efficiency of realizing the genetic potential of hybrids. At the same time, the right choice of hybrid, adapted to specific growing conditions, in combination with an optimal mineral nutrition system, allows minimizing the negative impact of climatic risks and ensuring a consistently high level of yield.

Список використаних джерел

1. Гамаюнова В. В., Кудріна В. С. Формування надземної маси і врожайності соняшнику під впливом окремих елементів технологій вирощування. *Вісник Аграрної науки Причорномор'я*. Миколаїв, 2020. Вип 1. (105). С. 50-57.

2. Домарацький Є.О., Добровольський А.В., Базалій В.В., Пічура В.І., Домарацький О.О. Соняшник: екологічні шляхи оптимізації його живлення: монографія. Херсон: Олді-плюс, 2020. 160 с.

3. Сидякіна О.В., Павленко С.Г. Ефективність застосування мікроелементів у системі живлення рослин соняшнику (огляд літератури). *Таврійський науковий вісник*, 2021 № 118. С. 152–158. DOI https://doi.org/10.32851/2226-0099.2021.118.19