МІНІСТЕРСТВО ОСВІТИ І НАУКИ УКРАЇНИ

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«АКТУАЛЬНІ ПРОБЛЕМИ СУЧАСНОЇ НАУКИ: ТЕОРЕТИЧНІ ТА ПРАКТИЧНІ ДОСЛІДЖЕННЯ МОЛОДИХ УЧЕНИХ»

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Актуальні проблеми сучасної науки: теоретичні та практичні дослідження молодих учених: *Матеріали II Всеукраїнської науково-практичної конференції*. м. Полтава, 14 – 15 травня 2024 р. Полтава, 2024. 433 с.

У збірнику тез доповідей висвітлюються результати наукових досліджень з актуальних питань науки, освіти та технологій.

Тематика конференції охоплює актуальні проблеми: агрономії; ветеринарної медицини; галузевого машинобудування; економіки; менеджменту; публічного управління та адміністрування; технології виробництва та переробки продукції тваринництва.

Матеріали викладено в авторській редакції з незначними коректорськими правками. Відповідальність за точність поданих фактів, цитат, цифр і прізвищ несуть автори та їх наукові керівники. Електронна копія збірника безоплатно розміщується у відкритому доступі на сайті Полтавського державного аграрного університету (https://www.pdau.edu.ua/news/kruglyy-stil-aktualni-pytannya-vyshchoyi-osvity-dosvid-problemy-innovaciyi) у розділі «Аспірантура», «Події», а також у репозитарії ПДАУ (https://dspace.pdau.edu.ua/home).

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SUNFLOWER WATER CONSUMPTION DEPENDS ON FACTORS GROWING

In agriculture, a very important indicator is the coefficient of total water consumption, which characterizes how much water is used to form one ton of products, and the lower it is, the better.

In the conditions of Ukraine, a moisture deficit during the entire growing season of crops is characteristic, therefore, the optimization of water consumption is one of the most important factors that determines yield. In the conditions of arid Ukraine, moisture is at the first minimum and acts as a limiting factor in the formation of productivity and the most common stress factor that limits the growth processes of plants.

Therefore, an important condition for increasing the efficiency of sunflower cultivation is the introduction of intensive technologies and the implementation of agrotechnical methods taking into account agrometeorological factors. That is, in the conditions of farming crops, it depends on environmental factors, the potential productivity of the variety or hybrid and agrotechnical means.

Sunflower is a crop that is very demanding on climatic conditions and requires a significant amount of moisture and solar energy in a certain ratio in different growing seasons. From the beginning of development to the formation of baskets, sunflower consumes 20-25% of moisture from the total need, absorbing it mainly from the upper layers of the soil. It absorbs the most moisture (60%) in the interphase period of basket formation - flowering, with a lack of moisture during this period baskets and seeds may be underdeveloped [1, 2].

In the period from flowering to seed ripening, sunflower consumes 30-40 % of moisture. The accumulation of moisture is the key to obtaining high yields, therefore, technological methods should be directed to the accumulation and preservation of moisture in the soil, since water supply is the main limiting factor that has the maximum impact on the productivity of agricultural crops [3].

The dynamics of yield is considered as a change in the culture of agriculture, against the background of which there are fluctuations, mainly related to the peculiarities of the weather conditions of individual years.

Moisture supply is a key factor for the vital activity of plants. As K. A. Timiryazev noted: "The productivity of agricultural crops is directly proportional to their moisture availability. With a sufficient amount of soil moisture, favorable conditions for the life of plants are formed" [2].

Moisture determines the living conditions of microorganisms, the biogenicity of the soil, the intensity of decomposition of organic compounds and the accumulation

of mobile nutrients in the soil. It is a limiting factor in determining the yield level of field crops.

Water makes up 75-90 % of the plant organism. All life processes, such as swelling, germination, growth, supply and movement of nutrients, photosynthesis, root nutrition, formation of organic compounds, crop formation are related to the supply and movement of water. In hot weather, water prevents the death of plants, cools and increases their resistance to high temperatures, supports cell turgor, places assimilation products in individual organs. Lack of moisture leads to a lack of harvest, causes suppression, and sometimes even death of plants.

Some special features of sunflower - a deep root system, a stiff pubescent stem and leaves - are characteristic of drought-resistant plants. However, it is not entirely true to claim that sunflower is a drought-resistant crop. It can really withstand fairly long atmospheric and soil drought at a young age (before the formation of baskets), and in dry years it gives larger yields, compared to other spring crops. At the same time, the formation of one part of dry matter consumes a significant amount of moisture, more than grain crops, including corn; because of which it can simultaneously be attributed to the group of moisture-loving cultures [1].

Total water consumption depends on weather conditions, mineral nutrition regime, sowing density, level of agricultural technology and moisture availability of the field. Thus, the total water consumption of the same crop in different areas is different. The level of water consumption depends on the variety, weather conditions, etc. and can fluctuate quite strongly [2].

The conditions of moisture supply during 2021-2023 differed both in soil moisture reserves during the sowing period and in the amount of precipitation during the growing season (Table 1).

Table 1

Total water consumption of sunflower and its balance during the years of research

Years of research	Components of water consumption, m^3/ha			Share in total water consumption, %	
	soil moisture	precipitation during the growing season	total water consumption	soil moisture	precipitation during the growing season
2021	980	2293	3273	29,9	70,1
2022	670	1636	2306	29,1	70,9
2023	1026	1931	2957	34,7	65,3
average	892	1953,3	2845	33,5	66,5

The issue of determining and studying the degree of influence of various elements of sunflower cultivation technology on reducing water consumption remains relevant. The maximum total moisture balance was in 2021 – 3273 m^3/ha. It was the lowest in 2022 and amounted to 2,306 m^3/ha due to a smaller supply of accumulated soil moisture and the amount of precipitation during the growing season.

According to the averaged data for 2021-2023, the total water consumption of sunflower was 2845 m^3/ha, of which 892 m^3/ha was due to soil moisture and 1953.3 m^3/ha was precipitation during the growing season.

The components of the balance of total water consumption changed to a great extent. Our research has established that the share of soil moisture in the total water consumption was 33.5%, and 66.5% of precipitation during the growing season was on average over the years of research.

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