THE EFFECT OF SOWING SYSTEMS AND MINERAL AND ORGANIC FERTILIZER APPLICATION RATES ON THE DRY MASS ACCUMULATION RATE OF SUNFLOWER PLANTS

Kuramatova Shakhlo Azizjon qizi
Ferghana state university ash.8496.@gmail.com ORCID ID /0009-0005-2631-7334

Annotation: *This article discusses the effect of organic and mineral fertilizers applied to sunflower plants on the dry mass accumulation rate. An increase in the amount of dry mass is closely related to the expansion of the leaf surface, good development of the stem and root system. The dry mass accumulated in crops ensures the formation of yield elements (ear, pod, fruit and seed).*

Keywords: *Sunflower, dry mass, yield, physiological indicator, vegetative phase, reproductive phase*

INTRODUCTION

The accumulation of biological dry mass in agricultural crops is one of the main physiological indicators that determine the level of plant growth and development and its photosynthetic activity. The increase in the amount of dry mass is closely related to the expansion of the leaf surface, good development of the stem and root system. The dry mass accumulated in crops ensures the formation of yield elements (ears, pods, fruits and seeds). The dynamics of dry mass accumulation varies depending on the phases of plant development: in the vegetative phase it accumulates more in leaves and stems, and in the reproductive phase - in seeds and fruits [Nikolaev, V.G., Kononova, L.N. Physiology of plants: photosynthesis and productivity of agricultural crops. - M.: Kolos, 2003. - 288 p.].

The use of mineral and organic fertilizers, water supply, and the selection of optimal planting dates significantly increase the accumulation of dry mass. The accumulation of dry mass is greatly influenced by the characteristics of the species and variety, climatic conditions, and agrotechnical measures. A high level of this indicator leads to an increase in the net productivity of photosynthesis and, as a result, an increase in grain or biomass yield.

From the above comments, it can be seen that the biological and morphological characteristics of the variety, the soil and climatic conditions of the growing region, and the agrotechnical measures used during the growing season have a significant effect on the accumulation of biological dry mass of the plant.

We also conducted our analyses in the cross-section of variants in order to study the effect of the agrotechnical measures used in our research conducted during 2023-2025 on the formation of dry mass in sunflower plants.

The results obtained show that seeds 70x20-1; 70x25-1; The accumulation of biological dry mass in sunflower plants grown in the 1-2-3 variants, planted in the 70x30-1 system and fed with mineral fertilizers N150P105K150 kg/ha during the growth period, was 3.0-2.6-2.3 c/ha in the phase of formation of one pair of leaves, 8.4-7.0-6.3 c/ha in the phase of formation of three pairs of leaves, 26.6-21.8-19.3 c/ha in the phase of basket formation, 33.2-28.1-25.4 c/ha in the phase of flowering, 32.7-27.1-24.2 c/ha in the phase of seed setting, and 31.3-22.6-18.2 c/ha in the phase of ripening, and the seeds were 10 times higher than in the variant

planted in the 70x20-1 system. In the variants planted in the 70x25-1 and 70x30-1 system, dry mass accumulation is 0.5-0.7 t/ha in the phase of one pair of leaves, 1.3-2.0 t/ha in the phase of three pairs of leaves, 4.7-7.2 t/ha in the stage of basket formation, 5.1-7.9 t/ha in the flowering phase, 5.6-8.5 in the seeding phase ts/ha, it was observed that it decreased to 8.7-13.2 ts/ha in the ripening phase.

Seeds 70x20-1; 70x25-1; When analyzing the 22-23-24 variants planted in 70x30-1 systems and applying 10-15-20 tons of manure per hectare in addition to the rates of mineral fertilizers N210P145K210 kg/ha during the growth period, the accumulation of biological dry mass in plants was 5.0-5.0-5.1 c/ha in the phase of formation of one pair of leaves, 13.7-13.6-14.1 c/ha in the phase of formation of three pairs of leaves, 44.0-42.7-43.6 c/ha in the phase of basket formation, 54.8-54.9-57.0 c/ha in the phase of flowering, 54.6-53.5-54.9 c/ha in the phase of seed setting, and 53.0-45.2-41.8 c/ha in the phase of ripening, and the seeds 70x20-1; 70x25-1; It was found that the accumulation of biological dry mass was higher in the 4-5-6 variants, in which 10-15-20 tons of manure per hectare were applied in addition to the rates of mineral fertilizers N150P105K150 kg/ha, in the phase of formation of one pair of leaves 1.2-1.5-1.7 c/ha, in the phase of formation of three pairs of leaves 3.3-4.0-4.6 c/ha, in the phase of formation of baskets 10.8-12.6-14.4 c/ha, in the phase of flowering 13.4-16.1-18.7 c/ha, in the phase of seed setting 13.6-15.9-18.2 c/ha, and in the phase of ripening 13.5-13.7-14.0 c/ha.

Seeds 70x20-1; 70x25-1; When analyzing the accumulation of biological dry mass of plants in variants 25-26-27, planted in 70x30-1 systems and applying 5-10-15 tons of biohumus per hectare in addition to the rates of mineral fertilizers N210P145K210 kg/ha during the growth period, it was found that in the phase of formation of one pair of leaves it was 5.8-5.8-6.0 c/ha, in the phase of formation of three pairs of leaves it was 15.9-16.1-16.4 c/ha, in the phase of formation of baskets it was 51.4-50.5-50.8 c/ha, in the phase of flowering it was 64.0-64.8-66.5 c/ha, in the phase of seed setting it was 64.0-63.5-64.2 c/ha, and in the phase of ripening it was 62.4-53.9-49.1 c/ha, and the seeds 70x20-1; 70x25-1; It was found that the accumulation of biological dry mass was higher in the 70x30-1 systems, in which 5-10-15 tons of biohumus per hectare were applied in addition to the mineral fertilizers N150P105K150 kg/ha during the growth period, compared to the 7-8-9 variants, in the phase of formation of one pair of leaves - 1.6-1.9-2.1 c/ha, in the phase of formation of three pairs of leaves - 4.4-5.2-5.7 c/ha, in the phase of formation of baskets - 14.4-16.5-17.9 c/ha, in the phase of flowering - 17.9-21.1-23.3 c/ha, in the phase of seed setting - 18.1-20.9-22.7 c/ha, and in the phase of ripening - 18.0-18.0-17.5 c/ha.

Conclusion. When analyzing the results obtained, the highest results were obtained when planting in a 70x30-1 cm planting system, applying mineral fertilizers at a rate of N180P125K180 kg/ha, and additionally applying 20 tons of cattle manure, the yield was 35.4-37.8 c/ha, and the profitability index was 100%. The next planting in a 70x30-1 planting system, applying mineral fertilizers at a rate of N180P125K180 kg/ha, and additionally applying 15 tons/ha of biohumus, yielded 36.8-38.5 c/ha, and the profitability index was 105%.

Based on the recommendations of Sh.A. Kuramatova, due to the high efficiency of the agrotechnics used in the farms of the districts in the production conditions, it was observed

that an additional yield of 9.0-10.0 t/ha was obtained in the sunflower fields compared to the control (23.2 t/ha), and the level of profitability increased by 11-12%.

From the obtained results, it can be seen that the accumulation of biological dry mass in the sunflower plant changes according to the formation of the leaf surface, and it was found that the high biological dry mass is higher in the flowering phase.

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