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Current research on the influence of some technological links on grain production in sunflower crop

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Abstract: Known as one of the main European countries producing sunflower seeds, Romania, through its agricultural sector, must capitalize its own potential and ensure the continuity of this distinguished agricultural crop, due to the high demand for edible oil, on our continent. From this perspective and also because of the remarkable fodder importance of the grains, as well as the secondary product obtained, namely the sunflower grit, it is necessary that the cultivation technology of this valuable species to be improved and constantly adapted, to ensure high productions, while respecting the current ecological concerns. Ordinarily, in the area of the Western Plain of Romania, sunflower cultivation gives good seed productions without the use of irrigation water or from the underground water found near the surface in lower regions, because of the sufficient precipitations from seed germination to the ripeness of the grains. At the same time, the high fertility of the soils from the researched area played an equally important role, with reference to the physical and chemical properties, which favor an aero-hydric regime beneficial to the growth and development of plants. Through this research, it was followed the behavior of two sunflower hybrids respectively *Pioneer P64LE137* and *Subaru HTC*, cultivated in two different tillage systems (the first one including discing, scarification and combiner and the second one discing, plowing and combiner) and using two different levels of fertilization: the first one included NPK compound fertilizer - 300 kg/ha + 15-15-15+10 sulphur at crop sowing, as well as a fertilizer based on nitrogen, calcium and magnesium - 250 kg/ha during the growing season and the second one included NPK compound fertilizer - 250 kg/ha + 15-15-15+10 sulphur at crop sowing and a fertilizer based on nitrogen, calcium and magnesium - 150 kg/ha + 150 kg/ha during the growing season.

Key words: sunflower, hybrids, tillage, fertilization, production

Introduction

Sunflower is a well-known and very appreciated oil plant, due to the special quality of the oil extracted from the achenes, to which is added its high content in vitamins (A, D, E, K) and mineral substances, but also through the color, taste of the seeds and pleasant smell of the species.

In addition to its primarily utility, there are also other secondary parts of the plant, such as the oil cakes left after oil extraction, which have a remarkable content in proteins and vitamins (B complex) and can be used in the feed of some animal species. Also, the calatidies left after harvesting are a valuable fodder, especially for sheep.

In the last years, due to the support offered to young farmers and apiculture in accessing European funds, sunflower has become more and more appreciated as a honey plant. For our country, sunflower continues to remain one of the most important agricultural crop plants, as a proof being the wide areas occupied by this species in the national structure of field crops.

Material and method

For the research carried out during the agricultural years 2022-2023, in the Low Plain of Timiș, part of the great Western Plain of Romania, two different sunflower hybrids were used as the genetic material, respectively P64LE137 developed by Pioneer and Subaru HTS by Syngenta. The first hybrid is known as a early one, as for the second one is semi-late, both being recommended for cultivation in all low areas, as well as in natural and irrigated conditions.

The experience carried out was a bifactorial one, in which:

Factor A - the cultivated hybrid

a1 - P64LE137 developed by Pioneer company

a2 - Subaru HTS developed by Syngenta company

Factor B - Fertilization level

b1 - N15P15K15 = 300 kg/ha + 10 kg sulphur fertilizer based on nitrogen, calcium and magnesium = 250 kg/ha foliar fertilizer Lebosol boron - 2 l/ha

b2 - N15P15K15 = 350 kg/ha + 10 kg sulphur fertilizer based on nitrogen, calcium and magnesium = 300 kg/ha foliar fertilizer Lebosol boron - 2 l/ha

Conclusions

In conclusion, the additional harvest was achieved due to the higher production potential of the **PT64LE137 hybrid**, combined with an additional 50 kg of phosphorus and potassium from variant 1.



Results and discussions

Production synthesis 2022-2023				
Cultivated hybrid	Fertilization level	Achenes production kg/ha	Difference of production compared to the control variant kg/ha	% compared to the field average
PT64LE137	Level b1	4187	+202	105,06
	Level b2	4018	+33	100,82
Average production of the hybrid		4103	+118	102,96
Subaro HTS	Level b1	3928	-57	98,56
	Level b2	3805	-180	95,48
Average production of the hybrid		3867	-118	97,03
Average production of the field variants kg/ha		3985	Control variant	100

- ✓ The research carried out in the two agricultural years, 2022 and 2023, on a the chernozem type of soil, with high fertility, presents us in summary a different behavior of the two cultivated hybrids, related to the applied fertilization.
- ✓ The highest achene production, among the four analyzed variants, was recorded by the **Pioneer PT64LE137** hybrid, in the first variant - 4187 kg/ha, higher than the average of the control variant by over 200 kg/ha, respectively a percentage of 5%.
- ✓ For the same hybrid, a harvest of over 4000 kg/ha was recorded, in the second cultivation variant, which also exceeded the average production of the field of the control variant by 33 kg/ha.
- ✓ The average production of the two hybrids grown in the two experimental years and on two levels of fertilization was of 3985 kg/ha.