

MINIMIZATION OF BASIC SOIL CULTIVATION UNDER CONFECTIONERY SUNFLOWER IN CONDITIONS OF SOUTHERN STEPPES OF UKRAINE

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The study was conducted on the southern black soil research in the field of Petrovsky State Agricultural College. It is proved that under the conditions of 2011-2012 agricultural year, the average for all varieties of sunflower seed yield was higher - 2.69 t / ha, with a plant density of 25 thousands plants per 1 ha was obtained precisely by moldboard plowing to a depth of 25- 27 cm. The use of boardless plowing at 14-16 cm and disking to a depth of 10-12 cm led to a decrease in productivity of sunflower on 0,34-0,36 t / ha seed yield, respectively - 2,35-2,33 t / ha.

Keywords: confectionary sunflower, plant density, cultivar, soil treatment methods.

Introduction Since Ukraine gained access to the European market, farmers will have to reconsider the area sown sunflower towards the increase in the area under its confectionery varieties whose products are used for the production of halva, sunflower milk, almonds and other products. Production of husk sunflower will increase which market segment was captured by the processing companies. The main feature of confectionery sunflower plants is a high protein content (20%), large seeds (weight of 1,000 seeds 100 g) and the ratio of peeling (yield pure core is not less than 0.6 - 0.7) [1,3,11]

Basic technological features of growing confectionery sunflower are determined by requirements to the obtained raw material. Therefore the differences in technology of its growing compared to an oily sunflower are: 1) use of pastry sorts and hybrids; 2) forming large and balanced seed in terms of contained oil and albumen of; 3) obtaining seed without bits and pieces of harmful substances.

The main factors of obtaining large and balanced seed are optimal areas of feed, top-dressing and system of tilling soil. In conditions of droughty South Steppe of Ukraine aforementioned factors acquire a decisive value, especially taking into account circumstance that lately this culture was not properly attended to. Extensive research has found that optimal density for obtaining high-quality raw material must be less compared to density for growing oil-bearing sunflower[2,6]. The measure of reduction of density of standing of plants proportionally rises with an amount and mass of seed from one plant, from 1000 things of seed and 1000 kernels. This tendency is fully obvious and predetermined by the increase in moisture, elements of feed and surface of fluidizing of sowing. In addition, a burst performance is had plant of sunflower, standing formed at density 30 thousands/and... [5,7]. An elementary requirement is preparation of soil under sowing of sunflower from a previous year, that is on land plough in autumn for spring sowing. Comparison of harvests of the sunflower sown on land plough in autumn for spring sowing and after the spring ploughing, is always in behalf on land plough in autumn for spring sowing - a difference presents from 1,5 to 4,4 metric centner/ha. Especially large advantage of land plough in autumn for spring sowing is in droughty years. [4,8,9]

The fact that ploughing on land plough in autumn for spring sowing is an obligatory agro-technical event for sunflower growing, is under no doubt among agrarians. But, some specialists consider that fields clean from weeds well loosened it is

possible to be limited to multiple superficial till - shelling or disking. Question of limiting to superficial till of soil under a sunflower was thoroughly studied on Erastiv experimental station, in the research institute of oil-bearing cultures [2,4,10]. It was found that replacement of ploughing superficial till brings, first of all to the sharp increase of weeds particularly long-term. There are not experimental data about advantages of shallow basic till of soil under a sunflower cook in the conditions of south Steppe of Ukraine. Our researches are devoted exactly to the study of these enumerated questions .

Materials and method of researches. Three-factor experience was established in 2011 in the field crop rotation of Petrovskiy state agrarian college.

Factor A - autumn tillage methods:

A1 - plowing to a depth of 25-27 cm (O) control;

a2 - Boardless conventional cultivation soil to a depth of 14-16 cm (BR);

a3 - disking, cultivation shallow soil to a depth of 10-12 cm (M);

Factor B varieties and hybrids of sunflower:

B1 -variety Ranok;

B2 - variety Nutcracker;

B3 - variety Lacomka;

Factor C _ sunflower plant stand:

C1 - 20 th. plants per1 hectare;

c2 - 25tis. plants per 1 hectare;

C3 - 30 th. plants per1 hectare;

C4 - 35 th. Plants per1 hectare;

C5 - 40 th. plants per 1 hectare;

Options are available in 4 repetitions splitting method plots. Plot area in the experience: the cultivation of the soil - 3360 m², grade - 1120 m², plant density - 224 m². The predecessor of sunflower in experience was winter wheat. After harvesting winter wheat disking BDT- 3 was conducted to a depth of 10-12 cm in the two traces. After the growth of weeds and volunteer grain appearance stairs winter wheat field cultivator KPS- treated with 4 harrow to a depth of 6-8 cm. At the end of September autumn cultivation of the soil according to the scheme of experience was carried out. Ploughing was carried out by plow PLN- 4-35 in the unit with ringed rink and heavy harrow BZTU- 1.0 at a depth of 25-27 cm (control), cultivation - plow - ripper PRPV- 3-50 needle harrow big-3 and ringed rink to a depth of 14-16 cm, shallow cultivation - BDV- 6.3 at a depth of 10-12 cm. below the main cultivation fertilized at the rate of N60 P80K60.

In early spring harrowing harrows BZTU- 1.0 and deep cultivation with harrowing cultivator CPS - 4 at a depth of 12-14 cm. was done. Before sowing to all variants of the experiment were added compactor herbicide Pioneer 900 and was performed after pre-sowing soil cultivation cultivator KPS- 4 with harrows on the driving depth sunflower seeds 5-6 cm. seeded sunflower seed drill SUPN- 8 seeding rate according schemes experience in optimal time on 24 April. After sowing the field was treated Kotka ZKVG- 1.4 and harvested by harvester Don 1500.

The results of research. The data shown in Table indicate that the growing conditions significantly affect the formation of sunflower seed production of confectionery. In addition, different varieties in terms of ripeness react differently to the growing conditions.

Effect of autumn tillage methods and plant stand on yield of confectionary sunflower seeds, t / ha. in 2012

tillage methods (Factor A)	variety(factor B)	Plant stand, thousands.. (factor C)					Average
		20	25	30	35	40	
plowing to a depth of 25-27 cm	Ranok	2,10	2,57	1,91	1,60	1,28	1,89
	Nutcracer	2,11	2,55	2,34	2,26	2,16	2,28
	Lacomka	2,90	2,95	3,05	2,60	2,54	2,81
	Average	2,37	2,69	2,43	2,15	1,99	2,33
Boardless conventional cultivation soil to a depth of 14-16 cm	Ranok	1,64	1,93	1,83	1,58	1,21	1,64
	Nutcracker	2,06	2,52	2,12	2,11	2,05	2,17
	Lacomka	2,20	2,60	2,64	2,57	2,44	2,49
	Average	1,97	2,35	2,20	2,09	1,90	2,10
disking	Ranok	1,62	1,89	1,63	1,45	1,14	1,56
	Nutcraker	1,72	1,94	2,05	2,04	1,94	1,94
	Lakomka	1,65	2,03	2,46	2,38	2,23	2,14
	Average	1,66	1,95	2,05	1,96	1,77	1,88
Average		2,00	2,33	2,23	2,07	1,89	2,10
HIP ₀₅ (after factor A)	0,10						
HIP ₀₅ after factor B	0,10						
HIP ₀₅ after factor C	0,10						
HIP ₀₅ after factor A BC	0,26						

Data from the table prove, that the terms of growing substantially influence on forming of the seminal productivity of sunflower. In addition, different sorts after the terms of ripeness differently react on the terms of growing.

Regardless of method of basic till of soil in difficult terms 2011-2012 agricultural year (extremely droughty period during pouring and forming of seed of sunflower, namely combination of atmospheric and ground drought) the greatest harvest of seed was got on the variety of Lacomka - 2,48 т/ha, then, as in the last year it was higher on the early riping sort of Ranok - 2,71 т/ha. At the same time, the early riping sort of Ranok and early riping sort of Nutcraker at the same terms formed only - 1,70 and 2,13 т/ha accordingly.

Examining influence of density of standing of plants of sunflower on the level of the productivity of seed, it is set that at weather terms 2011-2012 agricultural year, dense sowing on researched sorts was effective only to 30 thousand plants on 1 hectare and only the early ripening sort of Ranok provided the greatest harvest of seed only at density in 25 thousand plants on 1 hectare, and the further increase of closeness of sowing resulted in substantial reduction to the productivity of sunflower. Thus, on a background of the moldboard ploughing on a 25-27 cm on the sort of Ranok of increase of closeness of sowing from 20 thousands plants on 1 hectare where the productivity laid down - 2,1 т/and, the greatest harvest was got at density of standing of plants in 25 thousands on 1 hectare, and leading to of standing density to 40 thousand plants on 1 hectare resulted in reduction to the productivity on 0,83 т/and. Such exactly conformity to law was observed and for to the early riping sorts of nutcracker and Lacomka, where the productivity grew from 2,11-2,90 т/and (standing density is 20 thousand plants of ha1 and) to 2,55 т/and at density of standing in 25 thousand plants on 1 hectare on the sort of netcracer and - 3,05 т/and at density of standing in 35 thousand plants on 1 hectare on the sort of Lacomka.

Increase of density of standing of plants of sunflower on these sorts to 40 thousand plants on 1 hectare decreased the productivity already on 0,39-0,51 т/and. At the same time, on the fast-ripening sort of Ranok, densifying of sowing to 40 thousand plants on 1

hectare provided in the conditions of 2011-2012 agricultural reduction to the harvest of seed on 0,82 т/and, that on 0,31 - 0,43 т/and more than for to the middle-ripening sorts of Lacomka and Nutcracker.

Based on that we found that the reaction of sorts different in the terms of ripeness to densifying of sowing was different. If on the fast-ripening sort of Ranok at density of standing in 40 thousand plants on 1 hectare the productivity diminished on 0,72-1,29 т/and depending on the method of basic till of soil, then for this index was the early-ripening sorts of Nutcracker and Lacomka already within the limits of 0,23-0,47 т/and and 0,20-0,51 т/ha accordingly.

Certain dependence of the productivity of seed of sunflower from a method basic till of soil is also set in experience. So, on the average there is the greatest harvest of seed on all sorts - 2,69 т/ha at density of standing in 25 thousand plants on 1 hectare was got in experience exactly on the moldboard ploughing on a depth a 25-27 cm . Application of boardless plowing of soil on a 14-16 cm and disking on a depth a 10-12 cm resulted in reduction to the productivity on 0,34-0,36 т/and at the productivity of seed accordingly - 2,33-2,35 т/ha.

Thus, reaction of sunflower on densifying of sowing on shallow and to boardless plowing in the conditions of 2011-2012 agricultural at different sorts took place differently. Thus, on the early ripening sort of Ranok, substituting of ploughing by a depth a 25-27 cm by boardless plowing on a 14 - 16 cm and shallow till of soil on a 10-12 cm, at density of standing in 40 thousand plants on 1 hectare, decreased the productivity of seed in experience on 0,07-0,14 т/and, then, as on the sorts of Nutcracker and Lacomka, this reduction was considerably anymore and presented according to 0,11-0,22 and 0,10-0,31т/ha.

In the same time at density of standing in 20 thousand plants on 1 hectare all sorts on boardless plowing on a 14-16 cm and disking on a 10-12 cm considerably diminish the productivity of seed and on the early ripening sort of Ranok it presented 0,46-0,48 т/and, and for to the early ripening sorts of Nutcracker Lacomka 0,05-0,39 and 0,70-1,25 т/ha accordingly.

Thus, for realization of productive possibilities of sunflower it is necessary to create the most favourable terms of height and development of plants, i.e it needs to be provided with all factors of life in optimal correlations.

In the conditions of South Steppe of Ukraine, where crucial factor which influences on agricultural machinery is a level of moisture circulation, realization of the moldboard plowing on a depth a 25-27 cm at density of standing in 25-30 thousand plants with introduction of early ripening and early sorts of sunflower will provide the high and permanent harvests.

Conclusion.

On the basis of undertaken scientific studies and obtained results it is possible to make the following preliminary conclusions, that in the conditions of 2011-2012 realization of the moldboard ploughing on a depth a 25-27 cm provided the increase of the productivity of seed of sunflower on all sorts regardless of density of standing of plants on the average a posteriori in comparing to boardless plowing on a 14-16 cm and disking on a 10-12 cm accordingly on 0,23-0,45 т/ha

Examining influence of density of standing of plants of sunflower on the level of the productivity of seed, it is set that in weather conditions 2011-2012 agricultural year, densifying of sowing on all sorts in experience was effective only to 30 thousand plants on 1 hectare, and the further increase of closeness of sowing resulted in substantial reduction to the productivity of sunflower on ploughing on 0,26-0,70 т/ha, on boardless plowing - on 0,15- 0,45 т/and and on disking - on 0,09-0,28 т/ha.

Realization of the moldboard ploughing on a depth a 25-27 cm at density of standing in 30 thousand plants with introduction of early ripening sunflower of sort Lacomka provided the greatest harvest - 3,05 т/га.

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Анотація

Юркевич Є.О., Бакума А.В. Мінімізація основного обробітку ґрунту під соняшник кондитерський в умовах південного степу України. Дослідження проведено у стаціонарному багатофакторному досліді на чорноземі південному дослідного поля Петрівського державного аграрного технікуму. Доведено, що в умовах 2011-2012 сільськогосподарського року, в середньому по всіх сортах соняшнику найвищий урожай насіння - 2,69 т/га при густоті стояння у 25 тис. рослин на 1 га був отриманий в досліді саме по полицевій оранці на глибину 25-27 см. Застосування безполицевого обробітку ґрунту на 14-16 см і дискування на глибину 10-12 см призвело до зменшення продуктивності соняшнику на 0,34-0,36 т/га при врожайності насіння відповідно – 2,35-2,33 т/га.

Ключові слова: соняшник кондитерський, густина стояння, сорти, способи обробітку ґрунту.

Аннотація

Юркевич Е.А., Бакума А.В. Минимизация основной обработки почвы под подсолнечник кондитерский в условиях южной Степи Украины. Исследования проведены в стационарном многофакторном опыте на черноземе южном опытного поля Петровского государственного аграрного техникума. Установлено, что в условиях 2011-2012 сельскохозяйственного года, в среднем по всем сортам подсолнечника, наибольший урожай семян – 2,69 т/га при густоте стояния в 25 тыс.растений на 1 га был получен в опыте именно по отвальной вспашке на глубину 25-27 см. Применение безотвальной обработки почвы на 14-16 см и дискования на глубину 10-12 см привело к уменьшению продуктивности подсолнечника на 0,34-0,36 т/га при урожайности соответственно – 2,35-2,33т/га.

Ключевые слова: подсолнечник кондитерский, густота стояния, сорта, способы обработки почвы.