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Density of Standing of Plants at Cultivation of Cauliflower Seeds in Uzbekistan

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Abstract: The results of researches aimed to establish the optimum growing space and density of standing of plants at cultivation of cauliflower seeds in Uzbekistan are stated in the article. Researches were spent in the suburb of Tashkent with a mid-early grade "Domestic". In experiences were compared 5 densities of standing (31746, 35714, 40806, 47620 and 57142 pieces/hectare) received at planting of sprouts with row-spacing of 70 sm and distance between plants in a row 25, 30, 35, 40 and 45 sm. Experiences were pawned in quadruple frequency with the area of an allotment 10 M^2. 60-65 day sprouts were planted under film tunnel shelters on February 11-12. Film shelters were kept over plants till the end of March. Seed plants were grown up without formation. Experiences were accompanied by phonological control, calculation of leaves quantity, an establishment of average weight of a head, definition of quantity of the plants, which have given seeds, the account of a crop of seeds from a bush and of a unit of area. It has been defined that reception of seeds of a cauliflower at cultivation under film tunnels is quite possible in Uzbekistan. It is established that with representation of the big growing space the plants form more leaves, earlier and larger form the heads, develop the testicles acceleration and increase their seed efficiency. It has been revealed that the more plants thickness is, the bigger share of them does not give seeds. In this connection the greatest crop of seeds has been received at growing space 70×45 sm at which 31.7 thousand Pl/ha had been planted. It is proved that in the conditions of Uzbekistan it is possible to cultivate high-grade seeds of cauliflower with productivity of 127-147 kg/ha.

Key words: Cauliflower, density of standing, growing space, leaves, heads, flower-bearing shoots, seed efficiency, productivity.

1. Introduction

The cauliflower in Uzbekistan has become more popular lately. Expansion of its areas is restraining by the high prices for import seeds. That is why technology of seeds cultivation in local conditions is getting more actual.

It is known that the cauliflower demands moderate temperatures during all vegetation. Heats interfere formation of heads and especially of seeds [1-3]. Considering it, a cauliflower in Uzbekistan is grown up at early-spring and late-summer terms of sprouts planting. At the first term the heads have time to be generated before summer heats, and at the second, are formed during the autumn cool period after recession of summer temperatures [4].

To extend the growth period at moderate temperatures and to receive seeds before heats, a cauliflower for reception of seeds is planted early in the spring under film shelters [1, 3, 5, 6].

The growing space and density of standing of seed plants of a cauliflower appreciably depends on grade features and cultivation conditions. In various soil-climatic zones of seeds cultivation, the seed plantings of a cauliflower are placed with various densities of standing [1, 3, 6].

In the conditions of Uzbekistan, the technology of cultivation of cauliflower seeds is not developed and carrying out of researches in this direction is the actual scientific problem having the important practical value.

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2. Materials and Methods

Researches were spent at the Tashkent State Agrarian University with the grade "Domestic" of the Russian selection zoned in Uzbekistan. For an establishment of optimum density of standing of seed plants of a cauliflower at its cultivation during the early-spring period under film shelters, we have compared 5 densities of standing (31746, 35714, 40806, 47620 and 57142 p/ha) at row planting with row-spacing in width of 70 sm and with distance 25, 30, 35, 40 and 45 sm in a row. Planting of 60-65 day sprouts under time film shelters was spent on February 11-12. Film shelters were kept over a plant till the end of March. Seed plants were grown up without formation. Experiences pawned in quadruple frequency with the registration allotment of 10 M^2, allotments-two-row by the length of 7.15 M.

Experiences were accompanied by definition of quantity of the formed leaves and average weight of a head, quantity of the plants which both had given and had not given flower-bearing shoots and seeds, the account of productivity of seeds from a bush and from a unit of area. Data on productivity of seeds were exposed to the statistical analysis by a dispersive method.

3. Results and Discussion

Definition of leaf-bearness of plants and average weight of a head has shown that with representation to plants a bigger growing space the more they formed leaves, and earlier and larger formed heads. It is quite coordinating with the statements of V.F. Pivovarov [3] and G.I. Vibe [1] about dependence of the size of a head on a quantity of leaves formed.

At the most rarefied tested plantings in comparison with most thickened ones the quantity of leaves was formed on 27% more and an average weight of heads–on 88% more. Thus formation of heads was accelerated for 8 days (Table 1).

Earlier formation of heads by plants of more rarefied plantings caused development of testicles acceleration. So at the most rarefied seed plantings in comparison with most thickened ones the heads falling off occurred on–8 days, flowering–on 10 and maturing of seeds–for 14 days earlier. If seeds on plants of the rarefied plantings ripened on July 1-5, on plants of most thickened plantings–on July 15-16.

Forming larger heads, plants of more rarefied plantings had higher seed efficiency. Productivity of seeds from a bush at testicles, grown up at growing space of 70×45 sm and density of standing of 31746 p/ha, was on 67.4% above, than at grown up at the placing scheme 70×25 and density of standing 57142 pieces/hectare.

Productivity of seeds from area unit depends not only on productivity from a bush, but also from quantity of fruit-bearing seed plants on it which happens to be much less, than sprouts planted since the part of plants does not give fruit-bearing shoots of seeds. As many researchers pointed out [1-3] in the conditions of a hot arid climate after heads falling off the part of plants does not give fruit-bearing shoots and rots.

By our researches it is established that the more was plants thickness and heads were smaller formed, the big share of plants did not give fruit-bearing shoots. In this connection the difference in number of plants giving seeds between the tested variants was considerably reduced.

The spent accounts of a crop of seeds from a unit of area have shown that its size correlated neither with productivity of seeds from a bush, nor with quantity of the landed sprouts, and depended on both of these indicators (Table 2).

The highest crop of seeds from a unit of area has been received at the planting scheme 70×45 sm, demanding planting of sprouts in number of 31746 pieces/hectare. Bigger thickness reduced productivity of seeds from a unit of area. The difference in productivity of seeds between the named best most rarefied scheme of planting and other variants of experience in the majority of years of researches exceeded LED and were authentic.

Table 1 Quantity of leaves, average weight of heads, duration of the inter-phase periods at seed plants of a cauliflower at various density of standing (2007-2009).

Planting schemes, sm	Density of standing of plants, p/ha	Number of leaves, piece/plants	Average weight of heads, gr	Number of days from planting of sprouts till				Data on seeds maturing
				Heads forming	Heads falling off	Flowering	Seeds ripening	
70×25	57142	18.4	324	65	85	115	165	15-16.08
70×30 the control	47620	18.7	362	63	83	113	163	13-14.07
70×35	40816	19.2	487	61	80	110	160	10-11.07
70×40	35714	21.4	527	59	78	108	155	5-6.07
70×45	31746	23.5	609	57	77	105	151	1-2.07

Table 2 Productivity of seeds from a bush and a unit of area at various density of standing of cauliflower plants.

Planting schemes, sm	Density of standing of plants at sprouts planting, p/ha	Crop of seeds from a bush, gr	Quantity of the plants to give seeds		Crop of seeds, kg/ha				
								Average	
			p/ha	From quantity of the landed sprouts (%)	2007	2008	2009	kg/ha	To the control (%)
70×25	57142	4.3	29713	52.1	127.1	128.2	126.4	127.2	95.7
70×30 the control	47620	5.4	25429	53.4	137.3	131.7	133.0	133.6	100
70×35	40816	5.7	24571	60.2	140.0	134.5	137.2	137.1	102.6
70×40	35714	6.3	22106	61.9	139.2	142.2	138.5	139.6	104.5
70×45	31746	7.2	20222	63.7	145.5	149.3	147.3	147.2	110.2
$LED_{0.5}$					3.6	4.1	4.4		
P %					0.9	1.0	1.1		

Difference in productivity about 1 hectare at densities of standing in 35714, 40816 and 47620 p/ha in the majority of years of researches did not exceed LED, i.e. it did not exceed a limit of experience errors. Therefore, it is necessary to consider productivity of seeds at these three densities of standing of plants identical, more low than at the scheme 70×45 sm (31746 p/ha) and above than at the scheme 70×25 sm (57142 p/ha).

It is necessary to notice that at more rarefied plantings owing to the best leaf-bearness of plants and formation of larger heads the seeds were formed larger than at thickened plantings. So on the average for three years the weight of 1000 seeds made: at the planting scheme 70×25 sm–3.21 gr, 70×30 sm–3.33, 70×35 sm–3.45, 70×40 sm–3.58 and 70×45 sm–3.64 gr.

4. Conclusions

(1) The carried out researches testify that in the conditions of a dry hot climate of Uzbekistan at cultivation during the early-spring period under time film shelters it is possible to receive a crop of seeds of a cauliflower in 1.2-1.5 centners/ha.

(2) The more is growing space of seed plants and the less of them are placed on a unit of area, the more they form leaves, form heads larger, accelerate rates of the development more strongly and the larger form seeds. At density of standing of 31.7 thousand pl/ha the quantity of leaves increases by 27%, the average weight of a head on 88%, and heads formation and falling off is accelerated for 8 days and maturing of seeds–for 14 days.

(3) The more densely the plants are placed, the bigger share of them does not form seeds owing to absence of flower-bearing shoots. Therefore, the difference in density of standing of fructifying plants between most thickened and the rarest plantings happens to be less, than a difference in density of standing of the landed sprouts.

(4) The highest crop (147 kg/ha) of seeds from a unit of area is formed at cultivation of plants under the scheme 70×45 sm, demanding planting of sprouts of

31746 p/ha. In comparison with density of standing of 57.1 thousand pl/ha productivity increases by 15.8%.

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