EFFICACY OF GROWTH REGULATORS IN COVER CROPS OF AMARANTH SREDNESHIROTNYKH ON IRRIGATED LANDS OF FLAT DAGESTAN

DOI:10.24411/2588-0209-2018-10013

UDC 631. 811.98: 635.49

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Summary

In 2015-2017, in the context of the Tersk-Sulak subprovince of the Republic of Dagestan on irrigated saline lands, studies aimed at the study of adaptive potential of amaranth varieties (Kizlyar (standard), Valentine, Iriston) with the use of growth regulators were conducted. As a result, it is revealed that the applied growth regulators contribute to the reduction of the vegetation period of the studied varieties. In addition, the regulators have increased the area of the leaf surface and net productivity of crops. In the analysis of the harvest data found that the higher the

data provided a variety of Iriston and lows of Valentine's day. Applied growth regulators increased the yield on average by 13.4-15.3% for varieties.

Keywords: irrigated saline lands, irrigated crops, amaranth varieties, growth regulators, leaf surface, yield.

In today's difficult economic conditions, the goal of agricultural production has long been not only to provide the population with high-quality food and raw materials, but also to increase profits per unit of cultivated area. Only profitable agricultural enterprises have the opportunity to purchase new equipment without external support, to master modern technologies and to improve the quality and quantity of products, thereby ensuring not only the welfare of their employees, but also the food security of the country as a whole. In recent years, in connection with the global violations of the processes of the cycle of main nutrients in the artificial agricultural lands, increasing the importance of ecologization of agricultural production. In this situation, the way out is the cultivation of new non-traditional forage crops against the background of the use of growth regulators, which are able to stimulate the bioproduction process, the immune system and resistance to diseases [5].

One of the directions of realization of this task is the introduction of new high – productive and cost-effective forage crops, which give high-grade food. In this regard, it is advisable to study in the Republic of Dagestan the culture of amaranth paniculate. Forage quality of amaranth is not reduced before flowering, in addition, it can be sown in a 2-3 period with the interval of 10-15 days. Apply it in the form of green feeding, silage and for the preparation of herbal flour. It is estimated that to feed the green mass and silage 2-3 cows or 4-5 pigs, you need to take amaranth only 6 acres. Animals that the feed is added 25 percent amaranth (by weight), less sick, and quickly put on weight. The cows increase the milk yield and milk fat content, better rush chickens, and chickens are growing by leaps and bounds. Amaranth grain is a good feed for cellular birds.

This culture is extremely plastic, easy to adapt, unpretentious, resistant to pests and diseases, has a high productivity and gives in different regions of Russia from 18 to 65 and even up to 200 t/ha of green mass, which is used for green food and for the preparation of silage, haylage, herbal flour and granules. Seed yield up to 2 t/ha, contains 16-20% protein, balanced in amino acids. From them receive oil which on quality comes nearer to sea-buckthorn, and on a number of indicators surpasses it. Seeds are used for food purposes: flour-for the preparation of cookies, biscuits, bread; cereals – for cooking porridge. At the same time, it is an excellent forage and an excellent component for the production of feed. In the current conditions, the development of new technologies of non-traditional highly profitable crops – the only way farmers not only survive and develop in the modern Russian economy, but also to preserve and increase the fertility of their land. Especially in cases where the new technology is easy to learn and is based on widely used equipment in farms. This is exactly the technology of amaranth cultivation.

As shown by the data of studies, when powdering amaranth seeds with Trichoderma harzianum spores, they increase the germination energy and germination compared to the control option. This is due to the fact that the metabolism of seeds with the external environment is very limited, especially in the period of rest, and the intensive metabolism and biochemical transformations begin with them from the moment of preparation for germination and in the process of it, so the influence of nutrients on the plant itself is directly related to their penetration into the seeds already. Thus, many researchers note the high efficiency of presowing treatment of amaranth seeds with Albite [1, 4, 6]. In the Penza region, the yield of amaranth using growth regulators increased by 6.2 t/ha [7]. The increase in the yield of green mass in the experiments [2, 3] was 15-30% with inoculation of seeds of strains and a single strain of Azotobacter of amaranth seeds.

In Dagestan, the amaranth culture has not received proper distribution, mainly due to the lack of varieties and undeveloped elements of its cultivation technology. Why in irrigated conditions, with the aim of selecting promising varieties of

amaranth on the background of different growth regulators in 2015-2017, studies have been conducted according to the following scheme:

Factor A. Varieties amaranth: Kizlyarets (standard), Valentine, Ariston.

Factor V. Efficiency of application of Albite and potassium HUMATE growth regulators.

The experiments were carried out in a four-fold repetition, placement of plots was rendomized, and repetitions were systematic.

It is known that the length of the growing season is of great practical importance. Phenological observations indicate that the total length of the growing season of amaranth does not remain constant over the years and varies depending on the climatic conditions of the year of cultivation.

Sowing of seeds of the studied varieties was organized in 2015 – April 30, 2016 – may 6, 2017 – may 4. Studies have found that the average over the years, the duration of the growing season, on the version without growth regulators was 118 days in the standard, 111 days-in the variety of Iriston and 107 days-in the variety Valentine. On plots with growth regulators observed a reduction in the growing season. Thus, when processing Albite by the regulator, this period was reduced by 2-4 days, and when using the potassium HUMATE regulator – by 2-3 days.

Among the studied varieties, the largest indicators of leaf surface area and net productivity of crops were noted in the variety Iriston, and the smallest – in the variety Valentina. Applied regulators, in addition, had an impact on the performance of photosynthetic activity of crops. On average, in the studied varieties, on plots with regulators, the leaf area index increased by 3.5-2.5%, and the net productivity of crops – by 31.5-30.2%, compared with the options without treatment by regulators.

On the control without the use of growth regulators, the highest yield was observed in the variety of Iriston-28.0 t / ha, which exceeds the data on the variety of Kizlyarets and Valentine, respectively, by 6.5-15.2 %. Approximately such dynamics in yield is also recorded on plots with Albite and potassium HUMATE growth regulators (table 1).

According to many researchers, the use of biostimulants in agriculture is of great interest as a method of controlling a plant organism and the use of its biological potential in General. Pre-sowing inoculation of seeds of amaranth biological preparations based on associative nitrogen-fixing bacteria in most cases it increases the productivity and improves product quality [1].

Our data are consistent with the data of the above authors. So, if the average for varieties, on the option without treatment by growth regulators, the yield was 26.2 t / ha, then using the Albit regulator, the yield increased by 15.3%, and when using potassium HUMATE - by 13.4 %.

Table 1-Productivity of amaranth varieties depending on the studied growth preparations, t/ha

Biological product	Grade	Years of research			Average for three years
		2015	2016	2017	
Without treatment (control)	Kizlarin (standard)	26,7	24,9	27,4	26,3
	Valentine	24,8	22,4	25,6	24,3
	Iriston	28,1	26,6	29,3	28,0
Albite	Kizlarin (standard)	30,6	28,7	31,8	30,4
	Valentine	28,5	26,0	29,3	27,9
	Iriston	32,4	31,1	33,5	32,3
Potassium HUMATE	Kizlarin (standard)	29,9	28,1	30,7	29,6
	Valentine	28,0	25,4	29,0	27,5
	Iriston	31,8	30,9	33,0	31,9
LSD_{05}, tons/hectare		1,2	1,5	1,4	

In addition to increasing the yield of amaranth varieties, the regulators contributed to an increase in quality indicators. Higher productivity of green mass on the control provided variety Iriston-28.0 t/ha. This is 6.5% higher than these varieties of Kizlyarets and 15.2% more varieties of Valentine. The applied growth

regulators had a positive impact on the productivity of the studied amaranth varieties. So, if the yield on average for varieties, under control without treatment by growth regulators was 26.2 t/ha, then in the case of the Albit regulator, the yield increased by 15.3%, and in the case of the potassium HUMATE regulator – by 13.3%. There is a close correlation between the leaf area and yield, which is expressed by the regression equation-y = 1,4552 x-42,291; R^2 = 0,8788 (table 2).

Table 2 – Qualitative characteristics of amaranth cultivars (2015-2017 years)

Biological product	Grade	Dry matter, t/ha	Feed units, t/ha	Digestible protein, t/ha	Exchange energy, GJ/ha
Without treatment (control)	Kizlarin (standard)	4,81	4,07	0,72	48,65
	Valentine	4,41	3,60	0,67	45,20
	Iriston	5,11	4,33	0,77	51,52
Albite	Kizlarin (standard)	5,57	4,70	0,83	57,15
	Valentine	5,06	4,13	0,76	52,45
	Iriston	5,89	4,99	0,89	60,08
Potassium HUMATE	Kizlarin (standard)	5,42	4,58	0,81	55,35
	Valentine	4,99	4,07	0,75	51,15
	Iriston	5,82	4,93	0,87	59,66

Seed treatment controller Albite values of dry substance, feed units, digestible protein and metabolizable energy content of varieties Kizlari, Valentine, Iriston increased, respectively, 15,8; 6,4; 15,3%; 15,5; 14,7; 15,2%; 15,3; 13,4; 15,6%; 17,5; 16,0; 16,6%, and if the processing of the drug potassium HUMATE – 12,7; 13,1; 13,9%; 12,5; 13,0; 13,8%; 12,5; 11,9; 13,0 %; 13,8; 13,2 and 15.8%.

Conclusion. Thus, the above data indicate the effectiveness of the use of growth regulators Albite and potassium HUMATE for different varieties of amaranth in

irrigated conditions of the Republic of Dagestan. Consequently, the treatment of plants of amaranth varieties with growth regulators of Albite and potassium HUMATE not only increase the productivity of crops of amaranth varieties, but also improve the quality of products. The applied growth regulators contributed to the increase of economic indicators. Thus, when applying the growth regulator Albit net income increased on average by 17.9 %, with the regulator of potassium HUMATE- by 14.7%. The profitability of production in the first case increased by 12%, and in the second – by 10.0 %. Consequently, the economic calculations of the results of the second experiment show the effectiveness of growing the variety of Iriston application of the growth regulator Albit.

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