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The Effect Of Sowing Scheme And Rate Of Biostimulitators On Dry Mass Accumulation Of The "Uzbekistan-83" Variety Of Fodder Beet

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Abstract
This article studies the effect of planting scheme and biostimulant rate on the dry mass of the sugar beet variety Uzbekistan-83. In the experiment, three planting schemes of 70x15, 70x20, 70x25 were used, and the Tandem biostimulant was applied in three different rates, before planting the seeds were treated and foliar fed twice during the growing season. The Fitavak biostimulant was used as a standard for this biostimulant. It was observed that the dry mass accumulation was better in the 70x20 cm sowing scheme and the Tandem biostimulant rate of 0.4 + 0.7 + 0.9.
Keywords: Beet, variety, leaf, root fruit, biostimulant, standard, sowing scheme, phase.

Introduction

Introduction. With a potential yield of 12,000-15,000 feed units per hectare, according to Moule, sugar beet is "the most productive crop available to European agriculture." In addition, it is a crop with high yields from year to year, high energy content and high nutrient digestibility [1]. Currently, in Russia, along with pure fodder varieties, single-seeded semi-sugar fodder beet varieties are also grown. Varieties and hybrids obtained by crossing sugar and fodder beet combine high root yield (fodder beet properties) and high sugar content (sugar beet properties). Increased root weight, increased dry matter content, resistance to diseases (rootworm, cercospora leaf spot, pinworm, etc.), uniform root shape and root penetration, they meet the requirements of intensive cultivation technologies [2].

It is known that 60-70% of the fat in milk is obtained from carbohydrates. Therefore, root fruits are very important for increasing the milk fat yield of dairy farms, especially in spring. This crop is resistant to diseases and pests, yields 100 or more centners of feed units per hectare, and its roots are well preserved in winter, suitable for feeding all types of livestock and poultry [3]. Fodder beet improves the digestibility of roughage and is a lactation aid to stimulate the mammary glands. One kilogram of fodder beet contains 0.12 feed units, and semi-sweet varieties contain 0.15 feed units. Russia has one of the largest fodder beet growing areas in the world. It is grown in a vast area from Vologda to the Far East. [4]. According to the shape of the root, the varieties of sugar beet are divided into four groups: bag-shaped or cylindrical, elongated, conical and round. On the other hand, fodder beet is less demanding in terms of growing conditions and has a shorter growing period: 4-5 months from sowing to harvest. They grow well in different soil types and can withstand changes in moisture. One root can weigh 5 kg or more. The yield of food beet can reach 900 centners per hectare, which makes their cultivation very profitable for livestock farms [5].

Research method and place. Field experiments for scientific research were conducted at the experimental farm of Tashkent State Agrarian University during 2023. Field experiments were conducted in 4 replicates, with 15 variants, 60 plots, and a total area of 0.20 ha. The variants were placed in a randomized method.

Research results. The effect of different rates of different biostimulants on the dry mass of a leaf and the dry mass of a root fruit in a single plant was determined by growth phases (see Table 1).

The dry mass of a leaf in a single plant in a 70x15-1 planting scheme was 7.3 grams in the control variant in the phase of formation of 6-7 pairs, and increased in the subsequent phases of the plant, reaching the heaviest weight of 30.4 grams in the phase of closing the internodes with leaves. In the phase of opening the internodes, the dry mass decreased and amounted to 19.2 grams. In the variant where the Fitovak 20% immunostimulant was used as the reference variant, a greater accumulation of dry mass was determined compared to the control, and the growth phases were heavier by 0.3, 0.6, 1.1 and 1.1 grams.

In the variant where Tandem 10% biostimulant was applied at a rate of 0.4+0.7+0.9 l/ha, it was found that compared to the variant where the biostimulant rate was applied less, the dry mass accumulation was 0.6, 1.2, 2.2 and 1.6 grams more in growth phases. In the variant where the biostimulant rate was increased to 0.5+0.9+1.0 l/ha, the dry mass accumulation was 0.4, 0.6, 0.7 and 0.8 grams less in growth phases compared to the variant where the biostimulant rate was applied more than 0.4+0.7+0.9 l/ha. In the above optimal variant, it was determined that the dry mass accumulated by 1.4, 2.1, 3.9 and 3.3 grams less than the control in the growth phases and by 1.1, 1.5, 2.8 and 2.2 grams less than the reference variant.

The above pattern was repeated in the 70x20-1 planting scheme, and in the variant where the Tandem 10% biostimulant was applied at a rate of 0.4+0.7+0.9 l/ha, compared to the variant with a low rate, it was determined that the dry mass of a leaf in one plant in the phase of closing the inter-rows with leaves was 7.0 grams heavier than in the variant with an increased rate of biostimulants. A decrease in dry mass was observed in the phase of closing the inter-rows. In the variant where Tandem 10% biostimulant was applied at a rate of 0.4+0.7+0.9 l/ha, it was found that the dry mass of a leaf per plant in the phase of closing the rows with leaves was 11.7 grams more than in the control variant, and 9.7 grams more than in the reference variant.

In the 70x25-1 planting scheme, the variant where Tandem 10% biostimulant was applied at a rate of 0.4+0.7+0.9 l/ha also achieved high results, and the dry mass of a leaf per plant in the phase of closing the rows with leaves was 57.6 grams

Table 1. Dry mass accumulation of beet leaves and roots, 2023

Options	Sowing schemes	Name of biostimulators	Rates of biostimulators, l/t, l/ha	Dry mass of a leaf per plant, grams				Dry mass of one root fruit, grams				
				Phases				Phases				
				6-7 pairs leaf formation	leaves connection in rows	covering rows with leaves	opening between rows	6-7 pairs leaf formation	leaves connection in rows	covering rows with leaves	opening between rows	harvesting
1	70x15-1	Control	-	7.3	13.5	30.4	19.2	80.4	137.3	228.5	305.5	441.7
2		Fitovak 20% (standard)	0.3+0.3+0.4	7.6	14.1	31.5	20.3	85.5	145.7	239.6	322.3	455.1
3		Tandem 10%	0.3+0.5+0.7	8.1	14.4	32.1	20.9	90.8	150.8	248.2	337.5	477.4
4		Tandem 10%	0.4+0.7+0.9	8.7	15.6	34.3	22.5	98.3	163.8	270.2	371.7	513.7
5		Tandem 10%	0.5+0.9+1.0	8.3	15.0	33.6	21.7	94.1	156.5	258.3	356.4	495.8
6	70x20-1	Control	-	9.2	18.9	38.9	28.8	101.6	174.2	290.4	379.9	687.1
7		Fitovak 20% (standard)	0.3+0.3+0.4	10.2	20.1	40.9	30.1	113.9	188.0	311.2	404.8	723.9
8		Tandem 10%	0.3+0.5+0.7	10.9	21.1	43.6	31.1	123.3	202.7	330.8	426.6	734.5
9		Tandem 10%	0.4+0.7+0.9	13.1	24.1	50.6	32.7	151.9	235.8	375.2	483.8	758.6
10		Tandem 10%	0.5+0.9+1.0	12.2	22.6	45.2	31.8	140.1	219.0	349.0	446.5	743.1
11	70x25-1	Control	-	9.8	20	45.7	29	109.1	186.6	303.2	395.2	696.0
12		Fitovak 20% (standard)	0.3+0.3+0.4	10.6	21.2	49.8	30.1	120.8	200.3	320.0	423.4	735.4
13		Tandem 10%	0.3+0.5+0.7	11.2	22.3	52.7	31.1	128.7	212.9	338.2	453.0	761.0
14		Tandem 10%	0.4+0.7+0.9	12.4	24.6	57.6	33.0	156.7	245.3	380.7	509.7	821.6
15		Tandem 10%	0.5+0.9+1.0	11.7	23.9	55.5	31.8	144.8	229.8	361.9	487.3	789.1

and accumulated a dry mass that was 5.1 grams heavier than the variant with a lower biostimulant rate, and 2.1 grams heavier than the variant with an increased biostimulant rate. In this variant, it was found that in the phase of closing the rows with leaves, the dry mass of a single plant accumulated 11.9 grams more dry mass than the control variant, and 7.8 grams more dry mass than the reference variant.

In the 70x20-1 planting scheme, compared to the 70x15- and 70x25-1 planting schemes, it was found that the application of Tandem 10% biostimulant at a rate of 0.4+0.7+0.9 l/ha created optimal conditions for leaf dry mass accumulation in sugar beet, increasing dry mass weight.

The dry mass of one root fruit in the control variant in the 70x15-1 planting scheme was 80.4 grams in the phase of formation of 6-7 pairs of leaves, 137.3 grams in the phase of contact of leaves in the row, 228.5 grams in the phase of closing the inter-rows with leaves, 305.5 grams in the phase of opening the inter-rows and 441.7 grams in the harvest phase. In the reference variant, the effect of the immunostimulant on the increase in weight by 5.1 grams, 8.4 grams, 11.1 grams, 16.8 grams, 13.4 grams in the growth phases compared to the control variant was determined.

In the 70x15-1 planting scheme, in the variant where Tandem 10% biostimulant was applied at a rate of 0.4+0.7+0.9 l/ha, the dry mass of one seedling accumulated 8.5 g, 13.0 g, 22.0 g, 34.2 g, and 36.3 g higher dry mass in growth phases compared to the variant where a lower biostimulant rate was applied, while in the variant where the biostimulant rate was increased, it was found that the dry mass accumulated by 4.2 g, 7.3 g, 11.9 g, 15.3 g, and 17.9 g less than the optimal rate in phases. In this variant, the dry mass was found to be 66.2 gr. in the opening phase of the furrows, 72.0 gr. during the harvest period, and 49.4 gr. and 58.6 gr. lighter than the reference variant.

In the variant where Tandem 10% biostimulant was used at a rate of 0.4+0.7+0.9 l/ha in the 70x20-1 planting scheme, the dry mass of one root fruit was 483.8 grams in the opening phase of the furrows, 758.6 grams during the harvest period, and it accumulated 57.2 gr. and 24.1 gr. higher dry mass than the variant where the biostimulant rate was used in a small amount, while in the variant with an increased biostimulant rate, it was found that the dry mass accumulated 37.3 gr. and 15.5 gr. less. In this variant, the dry mass was found to be 84.8 gr. in the opening phase of the furrows, 71.5 gr. during the harvest period, and 79.0 gr. and 34.7 gr. lighter than the reference variant.

In the variant where Tandem 10% biostimulant was used at a rate of 0.4+0.7+0.9 l/ha in the 70x25-1 planting scheme, the dry mass of one root fruit was 509.7 grams in the opening phase of the furrows, 821.6 grams during the harvest period, and it accumulated 56.7 gr. and 60.6 gr. higher dry mass than the variant where the biostimulant rate was used in a small amount, while in the variant with an increased biostimulant rate, it was found that the dry mass accumulated 22.4 gr. and 32.5 gr. less. In this variant, the dry mass was found to be 114.5 gr. lighter in the row-opening phase than the control variant, 125.6 gr. lighter during the harvest period, and 86.3 gr. lighter and 86.2 gr. lighter than the reference variant.

In the 70x20-1 planting scheme, where Tandem 10% biostimulant was used at a rate of 0.4+0.7+0.9 l/ha, the dry mass of one root fruit was 53.6 gr., 72.0 gr., 105.0 gr., 112.1 gr., 244.9 gr. heavier in growth phases than the 70x15-1 planting scheme. Compared to the 70x25-1 planting scheme, it was found that the dry mass was lower, weighing 4.8 g, 9.5 g, 5.5 g, 25.9 g, and 63.0 g less, but the difference between them was not very large.

Conclusion. It was concluded that the dry mass of a single plant leaf and net photosynthetic productivity were higher in the 70x20-1 planting scheme, while the dry mass accumulation of a single root crop was higher in the 70x25-1 planting scheme with biostimulants.

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