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EFFECT OF BIOLOGICALLY ACTIVE SUBSTANCES ON THE STEM HEIGHT OF SAREPTA MUSTARD (Brassica juncea L.) CULTIVARS

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ABSTRACT

The article presents data on the effects of treating seeds before sowing and applying biopreparations to plants at the rosette-leaf and inflorescence formation stages on the stem height of the Sarepta mustard (Brassica juncea L.) cultivars ‘Gorlinka’ and ‘Yunona’. The highest results were observed in treatments where the Yer malhami biopreparation was applied at 1.5 L/t to seeds before sowing, 2.0 L/ha at the 4–6 rosette-leaf stage, and 2.5 L/ha at the inflorescence formation stage, while the Isabion and Green Amin 27 biofertilizers were applied at 1.0 L/t before sowing, 1.5 L/ha at the 4–6 rosette-leaf stage, and 2.0 L/ha at the inflorescence formation stage. In the Gorlinka cultivar, plant height reached 44.2, 45.0, and 44.6 cm at the stem formation stage; 107.9, 109.0, and 108.1 cm at flowering; 141.0, 143.6, and 142.3 cm at silique formation; and 147.1, 149.8, and 148.4 cm at maturity, respectively. In the Yunona cultivar, the corresponding values were 46.1, 47.0, and 46.6 cm at stem formation; 110.7, 112.0, and 111.3 cm at flowering; 146.3, 149.2, and 147.9 cm at silique formation; and 152.6, 154.7, and 153.3 cm at maturity.

Keywords. Sarepta mustard (Brassica juncea L.), stem height, Gorlinka, Yunona, biopreparation, Yer malhami, Isabion, Green Amin 27.

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Introduction

According to statistical data, mustard is one of the most widely used spices in the world, ranking third after salt and black pepper. Mustard oil is used for food and technical purposes, including lubrication. It is also used in canning, textile and leather production, soap manufacturing, pharmaceuticals, perfumery, the chemical industry for the production of semi-ester alkyd resins, metallurgy, and as a lubricating oil. In engineering applications, mustard oil is regarded as a valuable, low-temperature, slow-drying lubricant for motors and equipment [1, 3, 4, 8].

State of research on the problem

When mustard is sown using a narrow-row method, the seeding rate should be determined according to the soil moisture supply and the degree of weed infestation in the cultivation area. In areas with adequate moisture, sowing 2.5–3.0 million viable seeds per hectare is effective, whereas in areas with relatively lower moisture availability, 1.5–2.0 million viable seeds per hectare provides good results [1].

In agriculture, stimulants are used because of their high effectiveness and performance in plants. They can shorten the vegetation period, improve crop condition, increase resistance to unfavorable environmental conditions, provide protection against the adverse effects of various diseases and pests on plant organs, and positively influence plant growth and development. In some cases, the use of stimulants also reduces the required amounts of mineral fertilizers and pesticides while improving product quality [6, 7].

Research conditions and methods

Our field experiments were conducted in 2026 under meadow-sierozem soil conditions in the Syrdarya Region.

The field experiment comprised 20 treatments, and mustard was sown in spring. Each treatment occupied 60 m², of which 30 m² constituted the accounting area. The experiment was conducted in four replications; the total experimental area was 4,800 m² and was arranged in four tiers.

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The research was carried out under field and laboratory conditions. The layout of field experiments, measurements, and observations were conducted in accordance with the methodological guidelines "Methods of Conducting Field Experiments," while plant analyses were performed according to "Methodology of State Variety Testing of Agricultural Crops" [1, 5].

In the experiment, the Sarepta mustard (Brassica juncea L.) cultivars 'Gorlinka' and 'Yunona' were sown during the first ten days of March at a rate of 1.5 million viable seeds per hectare and at a depth of 2–3 cm.

Research results

The effects of pre-sowing seed treatment with biopreparations and foliar feeding at the 4–6 rosette-leaf and inflorescence formation stages on stem height were studied at the stem formation, flowering, silique formation, and maturity stages.

According to the data obtained, the highest results were observed in treatments where Yer malhami was applied at 1.5 L/t to seeds before sowing, 2.0 L/ha at the 4–6 rosette-leaf stage, and 2.5 L/ha at inflorescence formation, while Isabion and Green Amin 27 were applied at 1.0 L/t before sowing, 1.5 L/ha at the 4–6 rosette-leaf stage, and 2.0 L/ha at inflorescence formation. In Gorlinka, plant height was 44.2, 45.0, and 44.6 cm at stem formation; 107.9, 109.0, and 108.1 cm at flowering; 141.0, 143.6, and 142.3 cm at silique formation; and 147.1, 149.8, and 148.4 cm at maturity. In Yunona, the corresponding values were 46.1, 47.0, and 46.6 cm; 110.7, 112.0, and 111.3 cm; 146.3, 149.2, and 147.9 cm; and 152.6, 154.7, and 153.3 cm, respectively (Table 1).

Positive results were also recorded when Yer malhami was applied at 1.5 L/t before sowing, 1.5 L/ha at the 4–6 rosette-leaf stage, and 2.0 L/ha at inflorescence formation, and when Isabion and Green Amin 27 were applied at 1.0 L/t before sowing, 1.0 L/ha at the 4–6 rosette-leaf stage, and 1.5 L/ha at inflorescence formation. In Gorlinka, plant height was 43.5, 44.0, and 43.7 cm at stem formation; 106.2, 107.4, and 106.9 cm at flowering; 139.7, 140.3, and 139.6 cm at silique formation; and 145.7, 146.4, and 145.3 cm at maturity. In Yunona, the respective

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values were 45.0, 45.8, and 45.3 cm; 109.0, 110.5, and 109.8 cm; 142.6, 145.3, and 144.6 cm; and 148.8, 150.6, and 149.8 cm.

At the lower application rates, Yer malhami was used at 1.5 L/t before sowing, 1.0 L/ha at the 4–6 rosette-leaf stage, and 1.5 L/ha at inflorescence formation, while Isabion and Green Amin 27 were used at 1.0 L/t before sowing, 0.5 L/ha at the 4–6 rosette-leaf stage, and 1.0 L/ha at inflorescence formation. Under these treatments, Gorlinka plant height was 41.8, 42.6, and 42.1 cm at stem formation; 103.9, 105.9, and 105.0 cm at flowering; 134.1, 136.7, and 135.8 cm at silique formation; and 140.8, 142.6, and 141.8 cm at maturity. In Yunona, the corresponding values were 43.7, 44.5, and 44.1 cm; 106.7, 108.2, and 107.8 cm; 138.3, 141.0, and 140.2 cm; and 144.3, 147.1, and 146.3 cm, respectively.

Table 1 Effect of biopreparation application on mustard stem height, cm, 2026

No.	Sarepta mustard (Brassica juncea L.) cultivars	Biopreparation	Seed treatment rate, L/t	At the 4–6 rosette-leaf stage, L/ha	At inflorescence formation, L/ha	Development stages			
						Stem formation	Flowering	Silique formation	Maturity
1	Gorlinka	Control	Treated with water			39,2	98,4	128,2	**133,1**
2		Yer malhami	1,5	1,0	1,5	41,8	103,9	134,1	**140,8**
3			1,5	1,5	2,0	43,5	106,2	139,7	**145,7**
4			1,5	2,0	2,5	44,2	107,9	141,0	**147,1**
5		Isabion	1,0	0,5	1,0	42,6	105,9	136,7	**142,6**
6			1,0	1,0	1,5	44,0	107,4	140,3	**146,4**
7			1,0	1,5	2,0	45,0	109,0	143,6	**149,8**
8		Green Amin 27	1,0	0,5	1,0	42,1	105,0	135,8	**141,8**
9			1,0	1,0	1,5	43,7	106,9	139,6	**145,3**
10			1,0	1,5	2,0	44,6	108,1	142,3	**148,4**
11	Yunona	Control	Treated with water			41,4	102,3	132,4	**138,3**
12		Yer malhami	1,5	1,0	1,5	43,7	106,7	138,3	**144,3**
13			1,5	1,5	2,0	45,0	109,0	142,6	**148,8**
14			1,5	2,0	2,5	46,1	110,7	146,3	**152,6**
15		Isabion	1,0	0,5	1,0	44,5	108,2	141,0	**147,1**
16			1,0	1,0	1,5	45,8	110,5	145,3	**150,6**
17			1,0	1,5	2,0	47,0	112,0	149,2	**154,7**
18		Green Amin 27	1,0	0,5	1,0	44,1	107,8	140,2	**146,3**
19			1,0	1,0	1,5	45,3	109,8	144,6	**149,8**
20			**1,0**	**1,5**	**2,0**	**46,6**	**111,3**	**147,9**	**153,3**

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In the control treatments, where no biopreparations were used in mustard cultivation, Gorlinka plant height was 39.2 cm at stem formation, 98.4 cm at flowering, 128.2 cm at silique formation, and 133.1 cm at maturity. For Yunona, the corresponding values were 41.4, 102.3, 132.4, and 138.3 cm.

Conclusion

The highest results were observed in treatments where Yer malhami was applied to seeds before sowing at 1.5 L/t, at 2.0 L/ha during the 4–6 rosette-leaf stage, and at 2.5 L/ha during inflorescence formation, while Isabion and Green Amin 27 were applied at 1.0 L/t before sowing, 1.5 L/ha at the 4–6 rosette-leaf stage, and 2.0 L/ha during inflorescence formation. In Gorlinka, plant height reached 44.2, 45.0, and 44.6 cm at stem formation; 107.9, 109.0, and 108.1 cm at flowering; 141.0, 143.6, and 142.3 cm at silique formation; and 147.1, 149.8, and 148.4 cm at maturity. In Yunona, the corresponding values were 46.1, 47.0, and 46.6 cm; 110.7, 112.0, and 111.3 cm; 146.3, 149.2, and 147.9 cm; and 152.6, 154.7, and 153.3 cm, respectively.

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