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The Effect of Timing and Application Rates of Biostimulants on the Growth Stages and Vegetation Period of Crotalaria

Ph.D. in Agricultural Sciences, [1]Berdikulov Khudoyshukur Keldiyorovich.,
Student, [2]Jurayeva Iroda Muminovna.,
Jizzakh State Pedagogical University.

Аннотация. В данной статье рассматривается влияние сроков и норм применения различных биостимуляторов (UzGumi и Геогумат) на продолжительность вегетационного периода и фазы развития растения кроталярия. Исследование проведено на лугово-сероземных почвах Джизакской области, где биостимуляторы применялись как при посеве, так и в различные фазы роста растения. Результаты эксперимента показали значительное влияние биостимуляторов на сроки прорастания, появления настоящих листьев, колошения, цветения и созревания кроталярии. Варианты с применением биостимуляторов позволили сократить сроки перехода между фазами на 2–4 дня по сравнению с контролем и ускорили темпы роста растений.
Ключевые слова: кроталярия, биостимуляторы, UzGumi, Геогумат, фазы развития, вегетационный период, агротехника.
Abstract. This article explores the effect of timing and rates of biostimulants (UzGumi and Geohumat) on the growth phases and vegetative period of the Crotalaria plant. The study was conducted on meadow sierozem soils in the Jizzakh region, with biostimulants applied both at sowing and during different vegetative stages. Experimental results revealed that biostimulants significantly influenced the timing of germination, true leaf formation, heading, flowering, and pod formation. Compared to the control, treatments with biostimulants led to earlier phase transitions (by 2–4 days) and accelerated the growth rate of Crotalaria plants.
Keywords: Crotalaria, biostimulants, UzGumi, Geohumat, growth phases, vegetative period, agro-techniques.

Each plant has certain development periods. Crotalaria is a tropical and subtropical crop, and its duration of action is 180-220 days in the conditions of our Republic. When crotalaria is grown in tropical regions, due to high air temperatures, the duration of the action period is naturally reduced. The experiment also revealed the effect of the sowing date and rate, fertilizer rate, irrigation system and other agrotechnical measures, as well as the duration and rates of biostimulants on the duration of the action period.

In the experiment, when crotalaria plants were used in 2023 at different rates and times, the duration of the action period was 190-195 days (see Table 1).

When crotalaria was planted on April 23, 2023, it fully germinated in 14-15 days and formed 3-4 leaflets on 26-27 days. Each new leaf formed within 4-5 days. These simple leaves are green, oblong-lanceolate, unbranched, and arranged in a sessile manner on the plant. When the biostimulants Ugumi and Geohumate were used together with the planting, germination and the formation of cotyledons were observed 1 day earlier than the control.

In early June, 3-5% of the plants began to bud, that is, the plant entered the bud on day 49-51. Up to 3-4 buds appeared on one plant, and it was observed that it went to full bud on June 10-12.

According to the literature, the flowering period in crotalaria begins when 1 flower appears on 50% of the plants, which corresponds to 65-70 days after planting. Harvesting is carried out 133, 140, 148 and 155 days after flowering [1].

In the conditions of gray soils of the Jizzakh region, 3-5% of plants began to bloom on June 10-12. On June 20-22, the growth rate of the plant accelerated, and on the 60-64th day of the action period, the flowering period began to be fully established, and this flowering period continued until the end of the action period. It was noted that in the variants where biostimulants were applied

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simultaneously with sowing and also in the 3-4th leaf and comb stages, the transition to the flowering period was 2-4 days earlier than in the control variant.

In early July, the plant produced 2-3 pods, and by July 10-15, i.e., on days 83-89 of the growing season, it had entered the pod-forming stage. The appearance

Table 1

The effect of biostimulants application period and norms on the duration of the Crotalaria plant's life cycle, days (2023)

№	Name of biostimulants	Duration and norms of biostimulants			Full Emergence	3rd–4th True Leaf Stage	Budding	Flowering	Pod Formation	Ripening, 20–30%	Ripening, 80–90%
		With sowing, l/t	During the period of 3-4 chinbarg, l/ha	During plowing, l/ha							
1	Control	-	-	-	15	27	51	64	89	147	195
2	UzGumi	0,4	-	-	14	26	50	62	85	145	193
3	UzGumi	0,4	0,3	0,4	14	26	50	62	85	145	192
4	UzGumi	0,4	0,5	0,6	14	26	50	61	84	143	191
5	UzGumi	0,4	0,7	0,8	14	26	50	62	85	145	192
6	Geohumat	1	-	-	14	26	50	62	85	145	192
7	Geohumat	1	1,4	1,4	14	26	49	60	83	141	189
8	Geohumat	1	1,6	1,6	14	26	49	60	83	141	188
9	Geohumat	1	1,8	1,8	14	26	49	60	83	142	190

Table 2

The effect of biostimulants application period and rates on the sum of beneficial temperatures during the transition of Crotalaria plant development phases, °C (2023)

№	Name of biostimulants	Duration and norms of biostimulants			Full Emergence	3rd–4th True Leaf Stage	Budding	Flowering	Pod Formation	Ripening, 20–30%	Ripening, 80–90%
		With sowing, l/t	During the period of 3-4 chinbarg, l/ha	During plowing, l/ha							
1	Control	-	-	-	157,6	299,7	701,0	949,8	1427,2	2370,6	2700,5

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2	UzGumi	0,4	-	-	148,2	276,6	657,6	893,4	1323,6	2328,6	2654,3
3	UzGumi	0,4	0,3	0,4	148,2	276,6	657,6	893,4	1323,6	2328,6	2652,2
4	UzGumi	0,4	0,5	0,6	148,2	276,6	657,6	868,9	1295,3	2300,1	2665,3
5	UzGumi	0,4	0,7	0,8	148,2	276,6	657,6	893,4	1323,6	2328,6	2652,2
6	Geohumat	1	-	-	148,2	276,6	657,6	893,4	1323,6	2328,6	2652,2
7	Geohumat	1	1,4	1,4	148,2	276,6	637,0	864,2	1286,8	2291,4	2663,8
8	Geohumat	1	1,6	1,6	148,2	276,6	637,0	864,2	1286,8	2291,4	2657,0
9	Geohumat	1	1,8	1,8	148,2	276,6	637,0	864,2	1286,8	2301,8	2670,6

Note: ℃ is the useful temperature used by the plant in each development period, UFH is the total useful temperature used by the plant during the period of operation

of a panicle, flower, and pod was observed simultaneously on each Crotalaria bush, as well as the shedding of the seed coat. [2] Thus, the seed coat lives on the plant for 50-60 days. In late July and early August, the air temperature was high, and the plant continued to develop rapidly, forming panicles, flowering, and pod-forming.

For example, in the control variant, the total sum of useful temperatures was 2700.5 ℃, while in the variants where biostimulants were used, it was 2652.2-2670.6 ℃, and when the Uzgumi biostimulant was used, the total useful temperature was 2654.3-2665.0 ℃, and in the variants where the Geohumate biostimulant was used, it was up to 2652.2-2670.6 ℃, and the useful temperature was used less, up to 29.9-43.8 ℃. That is, the crop was harvested 3-7 days earlier.

Thus, the timing and rates of application of biostimulants to crotalaria affected the duration of its action period, and when biostimulants were applied simultaneously with sowing and in the 3-4 leaf and budding periods, germination, flowering, podding and ripening of the crop were accelerated, reducing the duration of the action period to 2-7 days. [3] Also, during the application period, the amount of beneficial temperature utilization decreased with the application of biostimulants at planting and at the 3-4 leaf and budding stages.

In September, on days 141-147 of the application period, 25-30% of crotalaria seeds were ripe, and flowering and pod formation were continuing.

In mid-September, 3-5% of leaves began to turn yellow to a height of 15-20 cm above the ground. In the second half of October, crotalaria flowering decreased, and 80-90% of seeds were ripe.

The effect of biostimulants on the duration of the application period was observed, and it was found that the duration of the application period was reduced to 2-7 days in the variants where biostimulants were used compared to the control variant. [5] As a result of the acceleration of plant growth and development when biostimulants were used, the duration of the application period was reduced to 2-3 days compared to the control when biostimulants were used only with sowing; when biostimulants were used together with sowing and also in the 3-4 leaf and budding stages, it was reduced to 4-7 days.

In the experiments, along with the duration of the action period, the total useful temperatures used by the plant during each development period were also studied. Among all factors, the effect of the duration and rates of biostimulants application on the use of useful temperatures was determined [4]. In the experiment, the useful temperature used by crotalaria during the action period was 2652.2-2700.5℃ according to the variants, and the plant used the most useful temperature (2700.5 ℃) in the

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control variant where the biostimulant was not used. The total UVF decreased depending on the duration and rates of biostimulants application.

For example, in the control variant, the total sum of useful temperatures was 2700.5 ℃, while in the variants where biostimulants were used, it was 2652.2-2670.6 ℃, and when the Uzgumi biostimulant was used, the total useful temperature was 2654.3-2665.0 ℃, and in the variants where the Geohumate biostimulant was used, it was up to 2652.2-2670.6 ℃, and the useful temperature was used less, up to 29.9-43.8 ℃. That is, the crop was harvested 3-7 days earlier.

Thus, the timing and rates of application of biostimulants to crotalaria affected the duration of its action period, and when biostimulants were applied simultaneously with sowing and in the 3-4 leaf and budding periods, germination, flowering, podding and ripening of the crop were accelerated, reducing the duration of the action period to 2-7 days. Also, during the application period, the amount of beneficial temperature utilization decreased with the application of biostimulants at planting and at the 3-4 leaf and budding stages.

List Of References Used

1. Berdikulov Khudoyshukur Keldiyorovich, Negmatova Surayyo Teshaevna, Normat Durdiev Khasanovich, & Artikova Lola Soatovna. (2024). THE SIGNIFICANCE OF BIO-STIMULATORS IN NON-TRADITIONAL CROP GROWING. The Bioscan, 19(Special Issue-1), 356–360.
2. Keldiyorovich, B. K. (2024). THE EFFECT OF STIMULANTS ON CROTALARIA HAY YIELD AND QUALITY INDICATORS. Cotton Science, 4(1).
3. Бердикулов, Х. К., Ортиқова, Л. С., & Негматова, С. Т. (2024). КРОТАЛАРИЯ КЎК МАССА ҲОСИЛИГА БИОСТИМУЛЯТОРЛАРНИНГ ТАЪСИРИ. Science and innovation, 3(Special Issue 21), 93-97.
4. Keldiyorovich, B. X. (2023). Species of the Genus Crotalaria L. and Their Biological Significance. Web of Agriculture: Journal of Agriculture and Biological Sciences, 1(4), 1-7.
5. Keldiyorovich, B. X., & Khushnazarova, N. D. (2023). BIOGEN STIMULATORS DESCRIPTION AND CLASSIFICATION, TECHNOLOGY.
6. Keldiyorovich, B. K., & Khushnazarova, N. D. BIOLOGY ECOLOGY AND ECONOMIC IMPORTANCE OF CROTALARIA JUNCEA.
7. Keldiyorovich, B. K. (2024). THE EFFECT OF STIMULANTS ON CROTALARIA HAY YIELD AND QUALITY INDICATORS. *Cotton Science*, *4*(1).
8. Бердикулов, Х. К., Ортиқова, Л. С., & Негматова, С. Т. (2024). КРОТАЛАРИЯ КЎК МАССА ҲОСИЛИГА БИОСТИМУЛЯТОРЛАРНИНГ ТАЪСИРИ. *Science and innovation*, *3*(Special Issue 21), 93-97.
9. Keldiyorovich, B. X. (2023). Species of the Genus Crotalaria L. and Their Biological Significance. *Web of Agriculture: Journal of Agriculture and Biological Sciences*, *1*(4), 1-7.