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SALT VARIETY OF THELLUNGIELLA PARVULA TO GROW BELOW THE CONCENTRATION EFFECT OF BLUE LIGHT (*BLUE LIGHT* BL) SPECTRA

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Annotation
This article presents the experimental results of the effect of the blue light spectra of the model plant Thellungiella parvula in different concentrations of saline environments.

Keywords. Thellungiella parvula, model plant, growth, NaCl, salt concentration, blue light, soil, petri dish, hypocotyl, root, stratification, thermostat, imageJ software.

Enter. Usually, blue light (BL) controls the photosynthetic reactions of plants. BL is just as important as green and red light. BL wavelengths are 400-500nm, and its energy is less absorbed in photons. Under the influence of blue light, branching and leaf formation of some plants are effectively changed. Therefore, BL serves as a growth regulator for greenhouse plants. In addition, a sufficient amount of BL has a positive effect on the formation of green pigment in the plant, and at the same time ensures a short flowering phase. For example, plants react differently to different colors of light. Although blue light is not as effective as other wavelengths of electromagnetic energy, its presence is still necessary for the growth process. Blue light is responsible for regulating the "stomata" of plants. Stomata are openings in the epidermis of leaves and stems in plants that facilitate gas exchange. These pores open and close to take in carbon dioxide and release oxygen. This feature is essential for photosynthesis to occur and therefore requires the presence of blue light. That is, blue light accelerates the growth of most plants. Plants grown with BL were generally observed to have shorter and smaller, thicker, and dark green leaves than plants grown with BL. In addition, wavelengths can affect leaf color and stimulate vegetative growth. BL and shorter wavelengths can be very useful in developing compounds that increase vitamin levels, quality, and overall crop health. Furthermore, BL, which acts as a regulator, can be used in combination with red light to increase plant flowering.

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RESEARCH MATERIALS AND METHODS

Research on the model plant Thellungiella parvula is still insufficient. For this reason, we have taken as a basis the study of growth mechanisms and factors affecting growth processes in saline conditions.

Nowadays, it is no secret that different concentrations of soil salinity are related to relief conditions and water reserves. According to the literature, stress-resistant species of the Brassicaceae family retain the ability to grow even in 500 mM saline media. Thellungiella parvula, which we are studying, is one of these types of plants. Based on similar studies, we observed the growth mechanisms of this plant under the influence of light in 4 different nutrient environments. We also witnessed the differences between control and NaCl in 200mM, 300mM, 400mM mediums and the cases of light exposure. The roots and hypocotyls of the plant were measured based on our experiments using the imageJ program. Thellungiella seeds were sterilized, planted in a normal nutrient medium, stratified and grown in a special cabinet with 12/12 hours of light for 3 days. Then it was planted in petri dishes with 4 different nutrients in a special sterile cabinet. We put each of our petri dishes to grow in 3 different lights for 5 days. During this time, our experiments were exposed to white, blue and red light during the day, and darkness at night. Thellungiella parvula was grown in a special cabinet for 5 days. The lengths of the roots and hypocotyls of plants in different light conditions in 4 different nutrients were measured in IMAGE at the beginning and after 5 days, and the average value was calculated using Microsoft Excel.

ko'k nurga qo'yilgan th.parvulaning ildiz uzunligining dastlabki va 5 sutkadan keyingi o'rtacha qiymati

			BL			
			05.май		10.май	mm
	lineyka		90,393	10	93,062	10
control		1	103,608	11,46195	194,738	20,92562
		2	124,173	13,73702	203,533	21,87069
		3	132,953	14,70833	189,524	20,36535
		4	134,145	14,8402	202,743	21,7858
			o'rt	13,68687		21,23686
NaCl	200mM	1	118,534	13,11318	118,045	12,68455
		2	81,236	8,986979	100,097	10,75595
		3	72,245	7,992322	95,587	10,27132
		4	94,133	10,41375	76,465	8,216565
			o'rt	10,12656		10,4821
NaCl	300mM	1	83,814	9,272178	124,529	13,38129
		2	101,396	11,21724	101,807	10,9397
		3	93,427	10,33565	136,547	14,67269
		4	97,032	10,73446	118,767	12,76214
			o'rt	10,38988		12,93895
NaCl	400mM	1	131,921	14,59416	154,67	16,6201
		2	90,401	10,00089	119,837	12,87711
		3	119,434	13,21275	141,448	15,19933
		4	108,427	11,99507	118,474	12,73065
			o'rt	12,45072		14,3568

Figure 1. Root length of the model plant Thellungiella parvula under the influence of blue light

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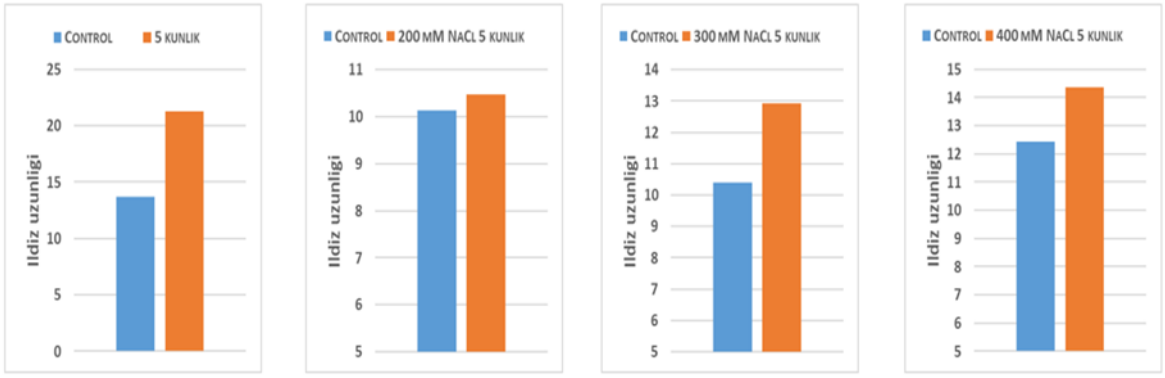
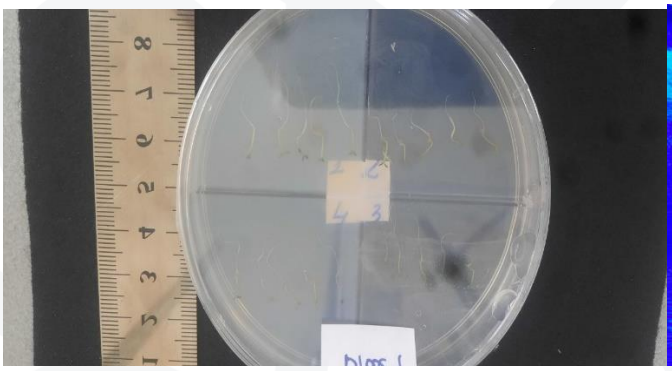
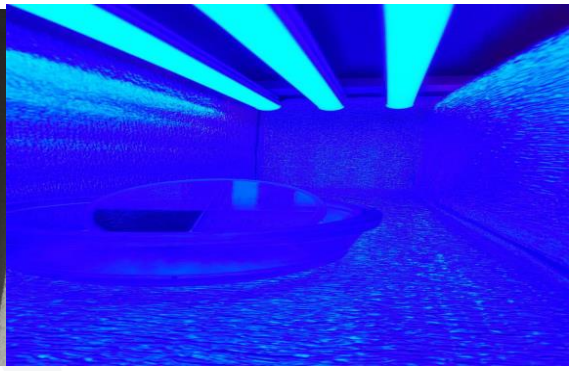


a b c d

A. Initial and 5-day value of th. parvula root grown in Control nutrient medium under the influence of blue light.
B. Initial and 5-day value of th. parvula root grown in 200mM NaCl medium under the influence of blue light.
C. Initial and 5-day value of th. parvula root grown in 300mM NaCl medium under the influence of blue light.
D. Initial and 5-day value of th. parvula root grown in 400mM NaCl medium under the influence of blue light.

Based on the above information, we can say that thellungiella parvula blue light has a positive effect on the growth of the plant. This showed that th. parvula seedlings in the control medium grew very effectively. The average length has increased by 7 mm. Seedling roots grown in 200mM nutrient medium increased by 0.36mm. The average value of root lengths increased by 2.6 mm in 300 mM nutrient medium, and 1.9 in 400 mM nutrient medium. Therefore, under the influence of blue light, the length of roots in 300mM nutrient medium increased better. This is important for increasing salt concentration and maintaining growth. These obtained data and conclusions are also important for our use in future scientific research.





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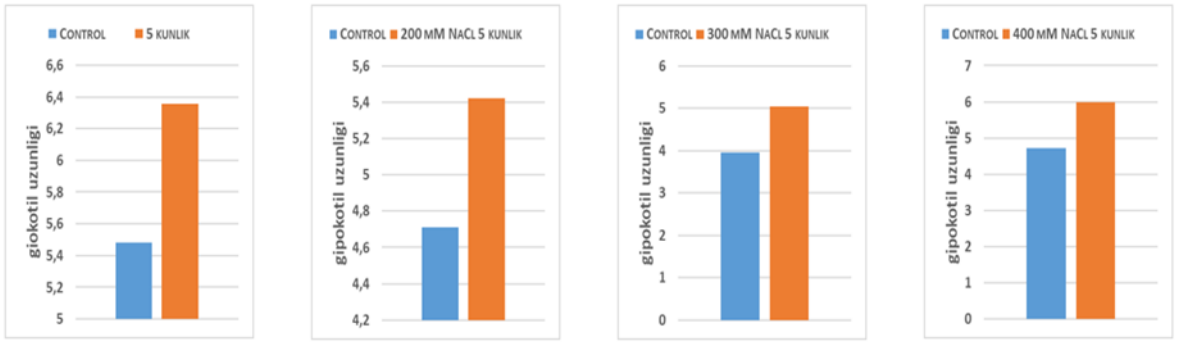
		BL			
			05.май		11.май
lineyka	1	90,006	10	98	10
control	2	53,31	5,922938	57,899	6,908061
	3	46,278	5,141657	55,2	5,632653
	4	46,597	5,177099	63,625	6,492347
	5	51,091	5,676399	52,766	6,384286
		o'rt	5,479524		6,354337
200mM	6	47,268	5,25165	53,74	5,483673
	7	42,708	4,745017	52,088	5,315102
	8	47,032	5,225429	45,344	5,626939
	9	32,555	3,616981	51,513	5,256429
		o'rt	4,709769		5,420536
300mM	10	26,652	2,961136	32,681	3,334796
	11	40,416	4,490367	58,625	5,982143
	12	35,449	3,938515	44,818	4,573265
	13	39,592	4,398818	61,705	6,296429
		o'rt	3,947209		5,046658
400mM	14	36,18	4,019732	64,364	6,567755
	15	51,861	5,761949	47,893	5,887041
	16	46,3	5,144102	54,808	5,592653
	17	35,523	3,946737	57,978	5,916122
		o'rt	4,71813		5,990893

The values presented in the above table showed that the average growth values of the hypocotyl, as well as the root, changed under the influence of blue light. In control, hypocotyl increased to 0.88mm, 0.72mm at 200mM, 1.1mm at 300mM and 1.28mm at 400mM. Blue light had a positive effect on hypocotyl length. Based on this table, we present the following graph as information:



a b c d

A. Initial and 5-day value of Th. parvula hypocotyl grown in Control nutrient medium under the influence of blue light.

B. Initial and 5-day value of th. parvula hypocotyl grown in 200mM NaCl medium under the influence of blue light.
C. Initial and 5-day value of th. parvula hypocotyl grown in 300mM NaCl medium under the influence of blue light.
D. Initial and 5-day value of th. parvula hypocotyl grown in 400mM NaCl medium under the influence of blue light.

CONCLUSION

In conclusion, according to the results of the research conducted on the model plant Thellungiella parvula, blue light has a positive effect on the growth of the plant. This showed that th. parvula seedlings in the control medium grew very effectively. The average length has increased by 7 mm. Seedling roots grown in 200mM nutrient medium increased by 0.36mm. The average value of root lengths increased by 2.6 mm in 300 mM nutrient medium, and 1.9 in 400 mM nutrient medium. Therefore, under the influence of blue light, the length of roots in 300mM nutrient medium increased better. This is important for increasing salt concentration and maintaining growth.

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