THE EFFECTS OF POLYMERIC HYDROGELS ON THE GROWTH AND YIELD OF *LACTUCA SATIVA* L. UNDER VARYING WATERING CONDITIONS

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Introduction: Lettuce *(Lactuca sativa L.)* represents one of the most consumed fresh vegetables in the world and it is also known as an important source of phytonutrients, phenols and vitamins. At the same time, lettuce is one of the most sensitive vegetable species to drought, which represents a natural disaster with an extremely complex, damaging and costly effect. Hydrogels with a very higher water retention capacity represent one of the alleviating methods that could be used regarding this issue.

Aims: This study was conducted to asses the effects of different hydrogel compositions regarding different parameters in the lettuce growth process under controlled drought and regularly irrigating conditions.

Materials and Methods: The hydrogels were obtained from National Institute for Laser, Plasma and Radiation Physics and the lettuce seedlings were acquired from SCDL Buzău. Four different compositions of hydrogels based on acrylic acid, sodium alginate and montmorillonite were used in two different forms: granular and beads. The hydrogels were placed in the soil at the root level of the lettuce seedlings. Over a period of 40 days, the drought stress conditions were simulated with no watering applied compared to the regularly irrigated plants.

Code	Type of hydrogel		Montmorillonite concentration (%)
	Bead	Granular	
V1	V1B	V1G	0
V2	V2B	V2G	0.25
V3	V3B	V3G	0.5
V4	V4B	V4G	1
M	Control sample with no hydrogel		

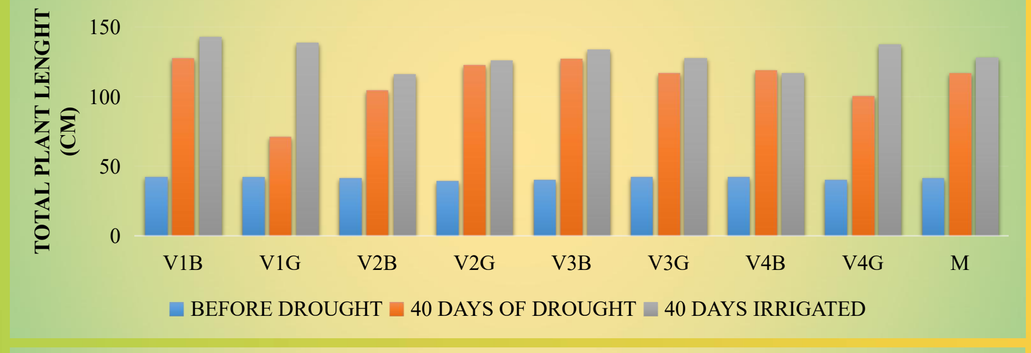
Lactuca sativa before induced drought stress

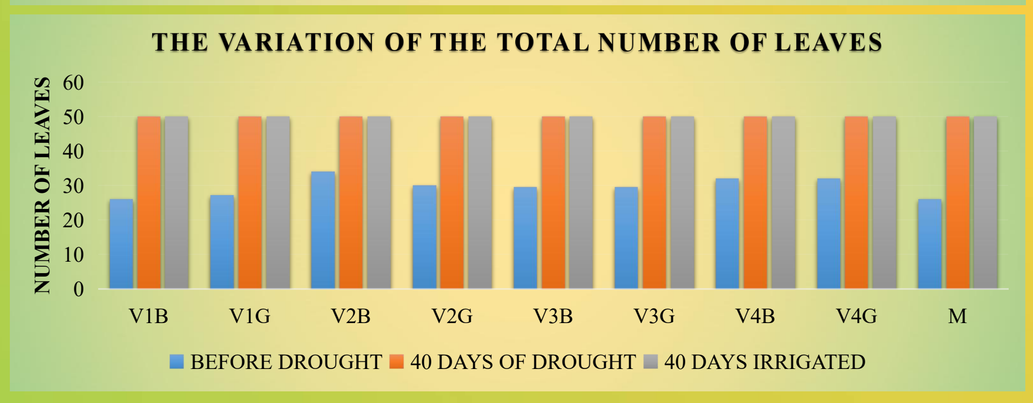
V1B V1G V2B V2G V3B V3G V4B V4G M

Lactuca sativa under induced drought stress

V1B V1G V2B V2G V3B

V3G V4B V4G M





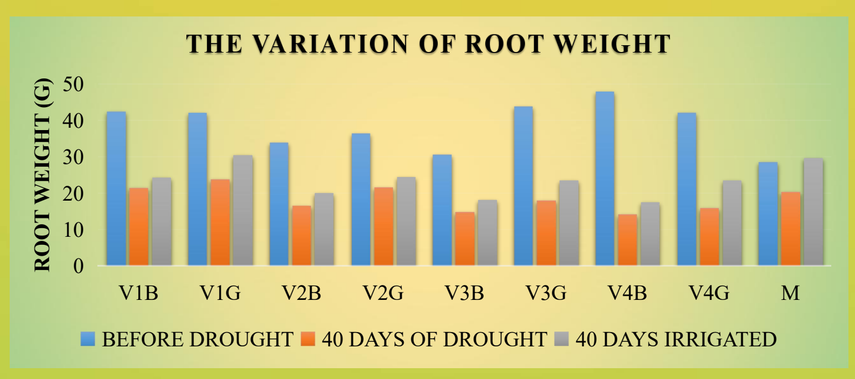
Results: Upon the drought induced stress, the results showed that the variation of the total lenght of the lettuce samples was slightly higher for the plants under irrigated conditions. The total number of leaves was mentained over 50 in the 40 days trial in either condition of growth (drought and irrigated). Regarding the variation of root lenght, root weight, root volume and stem diameter, slightly better results were obtained for the lettuce samples under drought stress over the 40 days period trial.

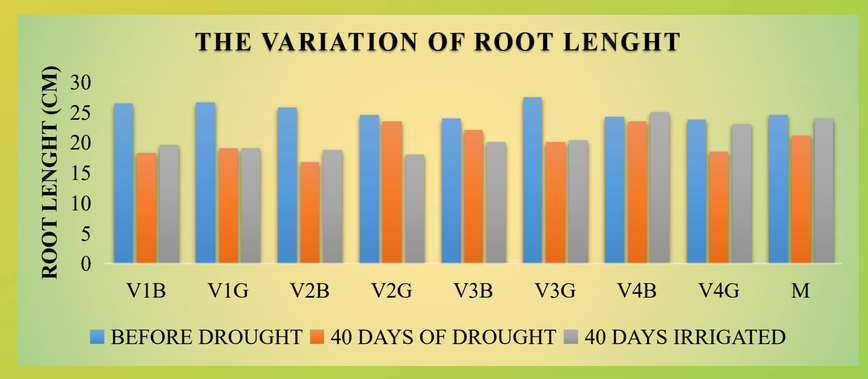
Lactuca sativa after induced drought stress

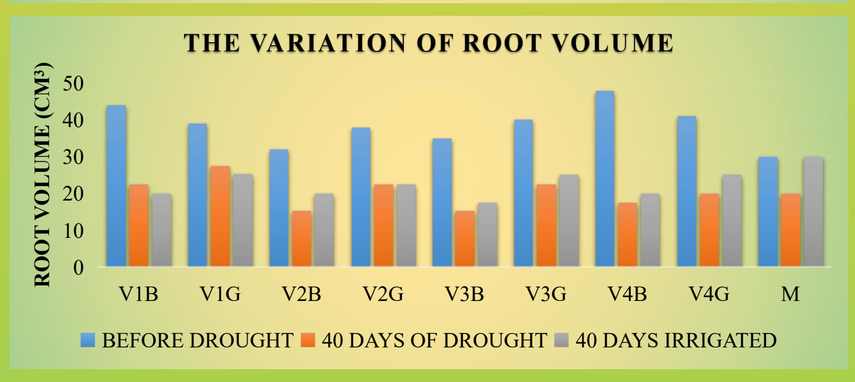
V1B V1G V2B

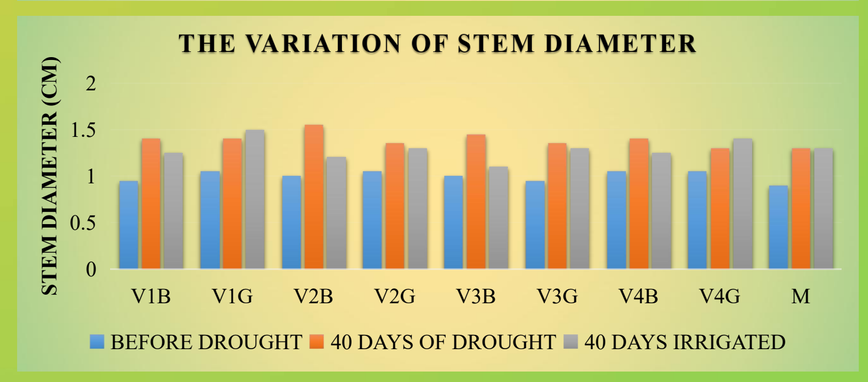
V2B V3G V3B

V4B V4G M









Conclusion: The results of the study showed a great potential of the polymeric materials regarding the growth of lettuce in the stressed induced drought conditions. After the 40 days trial, the total lenght of the plants showcased better results compared to the control sample. There were no significant differences regarding the number of leaves of the samples in either conditions (irrigated or under drought) or regarding the polymeric material used in either form (bead or granules). Slightly better results were showcased regarding the lenght, weight and volume of the roots and stem diameter for the samples under induced drought stress. The study showcased promising results regarding the usage of hydrogels for the growth and yeald of *Lactuca sativa* under varying watering conditions and further research regarding the efficiency of diffent compositions of the polyemeric material is required.

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