

## Overcoming Salt Stress in Ryegrass with HUMA GRO® ENCAPSALT™

### Research Report

University of Arizona  
Tucson, AZ  
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#### A Summary of:

*Interactive Effects of HUMA GRO® ENCAPSALT™ and Salinity Stress on Growth and General Quality of Ryegrass (Lolium perenne L.), by Mohammad Pessarakli and Reza Dehghani Bidgoli, School of Plant Sciences, University of Arizona, Tucson, AZ*

#### Description

Perennial ryegrass (*Lolium perenne* L.) cultivar Galileo was studied hydroponically using Hoagland solution No. 1 in a greenhouse to evaluate growth responses to a control (without ENCAPSALT™) and to the recommended application rate of ENCAPSALT™ (2 oz per 1000 sq ft) and one-half and two times the recommended rate of ENCAPSALT™ (1 and 4 oz per 1000 sq ft) at two levels of salinity stress 5,120 and 7,680 parts per million (ppm) using sodium chloride [NaCl]. Root and shoot length and shoot fresh and dry matter were measured weekly and root fresh and dry matter were measured at the end of the experiment.

A randomized complete block design with 4 replications was used in this study. Shoot and root lengths and shoots' (clippings) fresh and dry matter weights were determined weekly. After the fresh weight determination, shoots were oven-dried at 65° C and dry matter weights were recorded. At the last harvest, roots were harvested and fresh weights were determined. The roots were then oven-dried at 65° C and dry matter weights were recorded. The grass general quality was also evaluated every other day or weekly at each salinity stress level and at each ENCAPSALT™ application rate.



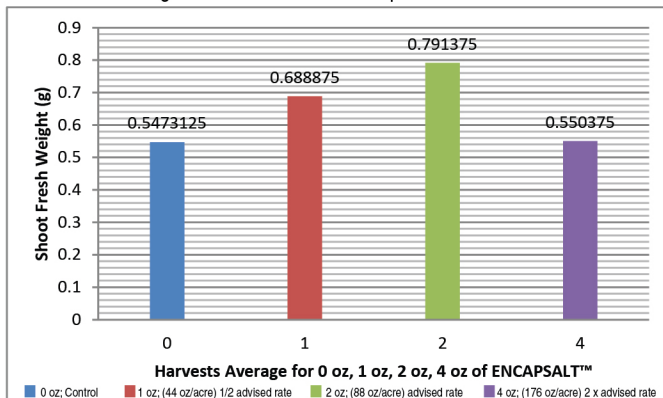
Table: Ryegrass root fresh and dry weights influenced by different application rates of ENCAPSALT™ under salinity stress.

Treatments		At Harvest 8 = Root Weight	
Salinity	Encapsalt	Fresh	Dry
PPM	oz/1,000 sq ft	----- (g) -----	
5,120	0	0.532b	0.048a
5,120	1	0.622a	0.053a
5,120	2	0.575ab	0.049a
5,120	4	0.522b	0.047a
7,680	0	0.251c	0.036b
7,680	1	0.230c	0.030b
7,680	2	0.237c	0.034b
7,680	4	0.235c	0.032b

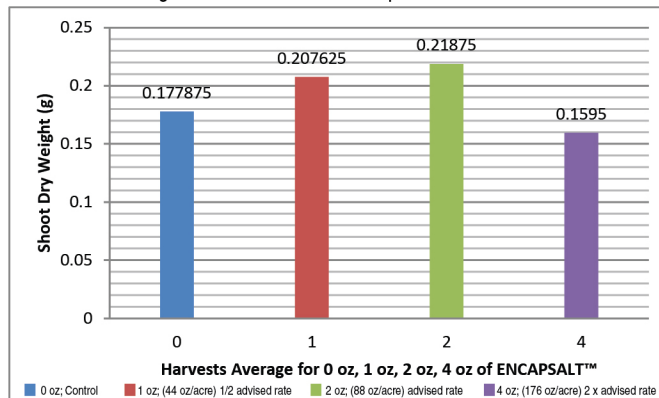
Encapsalt application rates (0, no Encapsalt; 1 oz, ½ the recommended rate; 2 oz, recommended rate; 4 oz, double the recommended rate). The values are cumulative for 8 weeks growth period and means of 4 replications. All the values followed by the same letter in each column are not statistically different at the 0.05 probability level.

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Ryegrass Shoot **Fresh** Weight, Salinity Stress at 5,120 ppm.  
Values are averages of 8 harvests with 4 replications.



Ryegrass Shoot **Dry** Weight, Salinity Stress at 5,120 ppm.  
Values are averages of 8 harvests with 4 replications.



## Results

ENCAPSALT™ had a significant effect on enhancing root lengths and weights under salinity stress. The results showed that shoot length and (fresh and dry) weight of the ryegrass were stimulated under all applied rates of ENCAPSALT™ at the 5,120 ppm level of salinity with no difference in the effect of the rates between 1oz/1000 sq ft and 2oz/1000 sq ft treatments on the ryegrass. Applying the product at 4oz/1000 sq ft resulted in insignificant increases in shoot length compared to the untreated plants. The grass general quality followed essentially the same pattern as the shoot dry weights. Ryegrass general quality was more beneficially affected at rates of 1 or 2 ounces per 1,000 square feet with no difference under these two application rates. These application rates of the product changed the unacceptable quality scores of 5 and 4.5 to acceptable scores of 6.5 and 5.5, respectively.



## Conclusion

Based on the results of this study, ENCAPSALT™ bio-stimulant generally exhibited a significant beneficial effect on ryegrass growth under salinity stress condition.

