

## **Changes Chlorophyll a in Response to Drought**

### **Stress in alfalfa (vs. Nick Urban) in Climatic**

### **Conditions of the South West Iran**

**Ebrahim Fani**

Department of Biology

Behbahan Khatam alanbia University of Technology, Iran

ebrahim\_710@yahoo.com

#### **Abstract**

To investigate the effects of water stress on the chlorophyll a content of alfalfa (vs. Nick Urban) on the climate South-West of Iran, Randomized complete block design experiment With three replications performance. To induce drought stress, irrigation treatments (natural irrigation, irrigation to cut off last water and irrigation to cut off the last two of water) was considered. The results of data analysis showed that drought stress on chlorophyll a content cultivar of experimental very effect was so the five percent level between the three levels irrigation there was a significant difference in of chlorophyll a and with increasing drought stress on chlorophyll a content to cope with drought was added. Study the effect of drought stress on chlorophyll a concentration in alfalfa varieties in good

urban climate of the south west using randomized complete block design with three treatments and three replications deals thus was seen as a repetition of the irrigation work and it was revealed in normal conditions (normal) was fully. Repeating the last two steps were deprived of water (one strain). third irrigation was cut in the last two stages (two times of stress) . Results of this study indicate a significant difference between the three tratments in chlorophyll a exists and chlorophyll a much in higher stress level increases..

**Keywords:** alfalfa, drought stress, chlorophyll a

## 1- Introduction

Drought is a natural phenomenon that occurs in plants. Dehydration occurs when the plant transpiration rate of water absorption is more, In other words the main cause of water stress in plants Increase water loss or inadequate water intake or a combination of both The amount of water loss due to transpiration by the roots and if the situation continues to be the most stressful. Iran is located in the dry and semi-arid region with low rainfall is considered one of the most arid countries in the world, As the crisis has a serious shortage of agricultural water. In recent years, excessive exploitation of ground water, effects of drought are more tangible (1) . Stress is usually an external factor that has negative effects on plant is defined as (5). Drought stress is the most common environment with almost 0/025 of the underlying limit. Drought stress in crops such as wheat, can be compared to identify effective mechanisms to help resist drought.Drought stress actually is reduced of soil water potential. In this situation the plant to absorb more water, the concentration of osmotic agens such as soluble carbohydrates and prolin, osmotic

regulation is done(2). Reports on crops with a chlorophyll response in susceptible varieties resistant to drought or lack of water stress on chlorophyll concentration is presented. Seems to stress, partly due to a decrease in photosynthesis that is associated with decrease of chlorophyll concentrations (4 and 6). The study examined the impact of drought on some plants. Findings of this study, the effect of drought stress on chlorophyll a, chlorophyll b, proline, soluble sugars confirmed(1). They are greenish pigments chlorophyll has a porphyrin ring with an electron are released from the electrons to other molecules is established which this early stage is to trap energy from the sun. There are several types of chlorophyll, most notably chlorophyll a, a molecule that provides the possibility of photosynthesis to make sugar.

## **2- Materials and Methods**

This study, in 2011 year in an experimental field on Khuzestan Privance (South-West of Iran) was conducted with randomized complete block design on alfalfa (vs. Nick Urban). Irrigation levels as main treatment Repeat the last step in the water was cut effects were considered. To be the first iteration of irrigation did not enter any tension. Repeat the last step, two-thirds were deprived of irrigation. Spectrophotometry method for measuring chlorophyll a from acetone was used. In this way, one gram of plant sample weight is. After grinding, in centeryfuge with 8000 rpm and about 15 minutes to put away. Extract volume of 100 ml with 80% acetone and then top it off with two wavelengths 633 and 645 nm using a chlorophyll content to determine. Statistical calculation needed have been done with the use of “ mstat-c & excel soft ware. To compare the averages Duncan multi dimensional test has been used.

### 3- Results and discussion

Analysis of variance indicated that between the three environments in the amount of chlorophyll a in the five percent level, there is a significant difference (Table 1). Comparison also shows that in normal environmental the amount of chlorophyll a in comparison with environmental of stress significantly increased (Table 2). With increasing stress, to escape the harsh conditions and the type of plant resistance to drought, the amount of chlorophyll a increase which with using of more photosynthesis and better food processor can tolerate dry conditions. This condition causes the amount of plant material built to accommodate supply and enhance performance Spending to combat drought conditions that will ultimately reduce yield.

Table1- ANOVA variance for total error meanof square chlorophyll a of three irrigation treatments

SOV	df	ms
Replicate	2	-
Treatment	2	-
Total Error	4	0.558*

\*:Significant at the five percent level

Table2- Comparison of mean chlorophyll a of three irrigation treatments

Normal	Once the water cut	Water cut twice
2.81 c	5.30 b	9.59 a

a,b,c: Significant difference between the means

#### 4- Conclusions

According to the above experiments it can be concluded that due to the high yield alfalfa, hay at all periods of the growing season irrigation is completed and cut off one or two of the last water stop. It should also be noted that if the irrigation is completed Palatability of hay for livestock due to lowering the amount of woody material is greater.

#### References

- 1-*Abbaszadeh,B.2006.Effect of drought stress on proline, soluble sugars, chlorophyll and relative water in plant. Journal of Medicinal and Aromatic Plants. No38.*
- 2-*Ahmadi,A.2004.Effect of drought stress on soluble carbohydrates, chlorophyll and proline four varieties with different climatic conditions of Iran. Journal of Agricultural Sciences of Iran. Volume 25.No2 .Pages 752-762*
- 3- *Blum,A.1998.Improving Weat Grain Filling under Stress by Stem Reservers Mobilization.Euphytica,100:77-83*

4-Castrillo,M.&A.M.Calcargo.1989.Effects of Water Stress and Rewatering on Rebulose-I,5-Biphosphate Carboxylase Activity, and Protein Contents in Two Cultivars of Tomato.J.of Horticultural Science.64(6) :717-724

5- *Farshadfar,A.&R.Mohammadi .2006.* Evaluation of drought tolerance of plant genotypes with physiological indices *Journal of Agricultural of Iran* . Volume 29. No 1

6 - Kulshreshth,S.,D.P.Mishra,&R.K Gupta.1987.Changes in Content of Cholorphill,Protein and Lipids in Whole Chloroplast and Chloroplast Membrane Fractions at Different leaf Water Potentails in Drought Resistant and Sensetive Genotypes of Weat .*Photosynthetica*.21(1) :65-70

**Received: August, 2012**