Studying Physiological-Morphological Chanages of *Agropyron cristatum* against Water Deficiency

Fakhireh
University of Zabol, Iran

A. Tavili
University of Tehran, Iran

The 21st International Grassland Congress / 8th International Rangeland Congress took place in Hohhot, China from June 29 through July 5, 2008.

Proceedings edited by Organizing Committee of 2008 IGC/IRC Conference

Published by Guangdong People's Publishing House

Studying physiological-morphological chanages of *Agropyron cristatum* against water deficiency

Fakhireh[1] *Tavili*[2]
1-Assistant Professor, Range Management Department, College of Natural Resources, University of Zabol, fakhire@yahoo.com
2-Assistant Professor, Range Management Department, College of Natural Resources, University of Tehran, Karaj, Iran, P.O. Box: 31585-4314, E-mail: atavili@ut.ac.ir

Introduction Water is the principal constituent of plant cells, usually composing over 80% of the fresh weight of herbaceous plants. Water is the primary solvent in physiological processes by which gases, minerals, and other materials enter plant cells and by which these materials are translocated to various parts of the plant. Water is the substance in which processes such as photosynthesis and other biochemical reactions occur and a structural component of proteins and nucleic acids. Water is also essential for the maintenance of the rigidity of plant tissue and for cell enlargement and growth in plants (Brown 1995). During periods when rainfall is lower than evapotranspiration demand, a water deficiency exists. Under water deficiency conditions, the rate of water loss from transpiration exceeds the rate of water absorption by the roots, and plants undergo water stress. Water stress can vary from a small decrease in water potential to the lethal limit of dessication. Range plants have mechanisms that help reduce damage from water stress. This research focuses on mechanisms (changes) of *Agropyron cristatum* when facing water stress.

Materials and methods The study was carried out at the greenhouse condition. Under study species was *Agropyron cristatum* from Gramineae family. The experimental plan was completely randomized design (CRD). The mentioned species seeds were planted in plastic pots with three irrigation treatments; 3 (control), 6 and 12 days intervals in four replications. During the study period wilting percentage and water potential were assessed. Shoot and root weight in addition to root:shoot ratio were measured at the end of study period. A Duncan Test was used to compare the means.

Results and discussion Results showed that wilting percentage of understudy species increased with increment of drought stress. Also, it was shown that 12 days irrigation treatment had the highest leaf water potential. Shoot dried weight of species decreased during the study, while root dried weight and root:shoot ratio increased. When plant encounters the drought stress, lessens the volume of the aerial part to reduce the amount of transpiration. But, at the same time expands the root system to absorb water from depths of soil. In this case the volume of root might be ten times more than what is in wet condition (Larcher 1995). The studies of Saeedian (1997), Sharifi Kashan (2000) and Jafari & Firouzabadi (2001) showed that the growing up of stress causes the decrease in shoot dried weight and increase in root dried weight and root:shoot ratio.
Totally, abovementioned changes help *Agropyron cristatum* to tolerate watre stress successfully. Regarding this, mentioned species could be used in reclamation of semi arid rangelands with more confidence.

Table 1 *Comparison of understudy characteristics means using Duncan test ($P<0.05$).*

	Water potential (bar)	Shoot dry weight (gr)	Root dry weight (gr)	Shoot/root
3 days (control)	−21.5a	1.53a	0.76b	0.48c
6 days	−21.25a	0.95b	0.87b	0.92b
12 days	−16.5a	0.52c	1.25a	1.93a

Means within a column that have different capital letter are significantly different from each other.

References

Brown, R.W. 1995. The water relations of range plants: adaptations of water deficits. pages 291-413. *in* D.J. Bedunah and R.E. Sosebee (eds.). Wildland plants: physiological ecology and developmental morphology. *Society for Range Management*. Denver, CO.

Jafari, M. & A. Gh. Firouzabadi, 2001. Resistance to drought in Shore elurope (*Aeluropus littotalis*) and weeping alkaligrass (*Puccinelia distance*), *Proceedings of the XIX International Grassland Congress*, 2001.

Larcher, W. 1995. Physiological plant ecology, 3rd ed, Springer Verlag, New York.

Saeedian, F. 1997. Investigation on drought resistance and water use efficiency of *Eragrostis curvula* and *Dactylis glomerata*, MSc. thesis, Natural Resources College of Tehran University.

Sharifi Kashan, M. 2000. Investigation of drought and salinity stress on *Agropyron intermedium*, *Avena barbata* and *Panicum antidotale*, M.Sc. thesis, Natural Resources College of Tehran University.