



University of Kentucky
UKnowledge

International Grassland Congress Proceedings

XXI International Grassland Congress / VIII
International Rangeland Congress

Response of Activated Oxygen Metabolism to Water Stress in Different Drought-Tolerant Alfalfa (*Medicago sativa*) at Seedling Stage

Ruihong Han
South China Agriculture University, China

Follow this and additional works at: <https://uknowledge.uky.edu/igc>



Part of the [Plant Sciences Commons](#), and the [Soil Science Commons](#)

This document is available at <https://uknowledge.uky.edu/igc/21/1-4/47>

The XXI International Grassland Congress / VIII 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

This Event is brought to you for free and open access by the Plant and Soil Sciences at UKnowledge. It has been accepted for inclusion in International Grassland Congress Proceedings by an authorized administrator of UKnowledge. For more information, please contact UKnowledge@lsv.uky.edu.

Response of activated oxygen metabolism to water stress in different drought-tolerant alfalfa (*Medicago sativa*) at seedling stage

HAN Rui-Hong

College of Life Science, South China Agriculture University, Guangzhou, Guangdong Province 510642, China.

Key words : water stress, alfalfa, activated oxygen metabolism, drought tolerance, response

Introduction Plant growth and productivity are affected by various abiotic stresses such as heat, cold, drought and high salinity and so on. Water stress is considered to be the main environmental factor limiting plant growth and yield worldwide, especially in semi-arid areas (Boyer, 1982). Alfalfa (*Medicago sativa*) is an important legume forage with high drought resistance. However, drought stress is still the main adverse factor limiting alfalfa production. The aim of the present study was to assess response of activated oxygen metabolism to water stress in different drought-tolerant alfalfa at seedling stage in order to provide theoretical basis for drought-tolerance alfalfa breeding.

Materials and methods Plant materials and water treatments. Two Alfalfas varying in their tolerance to drought were used, Longdong with high drought resistance and BL-02-329 with low drought resistance were grown in plastic pots (40 cm in diameter, 30 cm long, ten plants per pot). Each pot had eight plants and each material replicated six times. The plants were divided two groups when the plants were in the ramification periods. One group was control and the other group was treatment. Control was watered normally and the treatment was not watered until the twelfth day when it was rewatered. The O₂ generation rate, MDA, AsA, Car, SOD activity and POD activity were tested on the 0d, 4d, 8d, 12d and the fourth day after rewatering.

Results Under drought stress, the O₂ generation rate, MDA content and damage of cell membrane increased. Compared with weak drought-resistance alfalfa there were low O₂ generation rate, less accumulation of MDA content and lighter damage of cell membrane in the leaves of strong drought-resistance alfalfa when stressed by drought, and strong drought-resistance alfalfa can recovery faster after rewatering.

POD activity and SOD activity enhanced in the leaves of two alfalfas under drought stress. AsA content and Car content increased in the leaves of two alfalfas under drought stress.

Discussion From the response of activated oxygen metabolism to water stress in different drought-tolerant alfalfa at seedling stage we can see that there are higher endogenous coordination of antioxidation enzyme system and nonenzyme system in strong drought-resistance alfalfa than that of low drought resistance alfalfa at seedling stage.

References

- Boyer, J. S. (1982). Plant productivity and environment. *Science* 218: 443-448.
- Li, W. R., Zhang, S. Q., Shan, L. L. (2007). Physiological and biochemical responses of leaves and roots of alfalfa (*Medicago sativa* L.) to water stress. *Acta Agronomica Sinica* 34: 301-305.