



University of Kentucky
UKnowledge

International Grassland Congress Proceedings

21st International Grassland Congress / 8th
International Rangeland Congress

Dynamics Change of Water-Soluble Carbohydrate Contents in Roots System during Greening Stage of *Leymus chinensis* Populations in Saline-Alkaline Soil on the Songnen Plains of China

Y. S. Ye

China Agricultural University, China

S. Pan

China Agricultural University, China

J. B. Wang

China Agricultural University, China

Kun Wang

China Agricultural 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/21/1-6/13>

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

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.

Dynamics change of Water-Soluble Carbohydrate contents in roots system during greening stage of *Leymus chinensis* populations in Saline-Alkaline Soil on the Songnen Plains of China

Y .S .Ye , S .Pan , J .B .Wang , K .Wang¹*

Institute of Grassland Science , China Agricultural University , Beijing 100094 ;E-mail wangkun@cau.edu.cn

Key words : *Leymus chinensis* populations , Water-Soluble Carbohydrate , contents , greening stage , roots system , Saline-Alkaline soil

Introduction Water-soluble carbohydrate(WSC) plays an important role in metabolism of the plant . It is reported that it is indispensable for plants to turn green and to endure stresses . In spring , the growth of plants strongly depends on the reserves accumulated during the previous seasons . In late April , *Leymus chinensis* began to turn green , during the process , a considerable amount of WSC from its roots system (including rhizomes , tillering nodes and adventitious roots) must be consumed to growth . The dynamics change of WSC contents in roots system can be used as an indicator of its growth .

Materials and methods The experiment was conducted in a large area with single dominant *L . chinensis* populations in saline-alkaline soil in Daqing city , in Heilongjiang province (125°09' E , 46°35' N) . The chemical characteristics of the saline-alkaline soils have been measured first (Figure 1) . During late April and Mid-May (no rainy days) , A sampling every 3 days excavated up to a depth of 0.2m below the ground in the same area (25×25cm²) . Contents of WSC were determined quantitatively using the colorimetric anthrone method . Each sample was tested three times . The WSC content was obtained using the flowing formula : $C = (SC \cdot SV \cdot DSR / SM \cdot 10^{-3}) \times 100\%$, where *C* is the content (%) , *SC* is the sample concentration (mg/L) , *SV* is the solution volume (mL) , *SDR* is sample dilution ratio , and *SM* is sample mass (mg) .

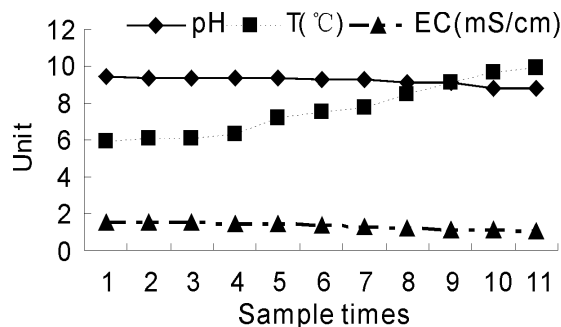


Figure 1 The chemical characteristics of the saline-alkaline soils (0-20cm) .

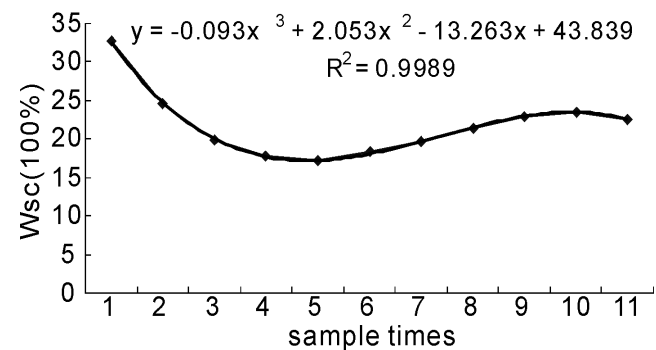


Figure 2 Dynamic change of water-soluble carbohydrate contents in roots of *L . chinensis* .

Results WSC contents in roots system of *L . chinensis* significantly decreased at first , then slowly to increase from germination period to greening growth (Figure 2) . The trend of changes in WSC contents shows the regression equations : $y = -0.093x^3 + 2.053x^2 - 13.263x + 43.839$ ($R^2 = 0.9989$) .

Conclusions From germination period to greening stage , abundant stored matter was consumed . WSC stored were continuously supplied to the aboveground for growth . So the contents significantly decreased . With the growth of plants , the species can get certain photosynthetic products which prevent WSC from continuing to decrease , but weaken to store and almost balance between growth and decline . Besides in response to initial growth , the contents of WSC still need to resist the adverse conditions , such as low soil temperature , high pH and salty stress . The experiment confirmed that the *L . chinensis* population environmental adaptability and can improve the Saline-Alkaline soil .

References

X .M .Ding , Y .F .Yang .(2007) . Variations of water-soluble carbohydrate contents in different age class modules of *L . chinensis* , Populations in Sandy and Saline-Alkaline Soil on the Songnen Plains of China *Journal of Integrative Plant Biology* , 49 (15) :576-581 .