



University of Kentucky
UKnowledge

International Grassland Congress Proceedings

21st International Grassland Congress / 8th
International Rangeland Congress

Study on Soil Properties of Degraded Desert Plain Grassland in North Tianshan of Xinjiang

Yanmin Fan
Xinjiang Agriculture University, China

Jinzhong Zhu
Xinjiang Agricultural University, China

Caihong Wang
Xinjiang 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/21/6-1/14>

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.

Study on soil properties of degraded desert plain grassland in north Tianshan of Xinjiang

Fan Yan-min , Zhu Jin-zhong , Wang Cai-hong

College of Grassland Science , Xinjiang Agriculture University ; Key Laboratory of Grassland Resource and Ecology of Xinjiang , Urumqi , China , 830052 ; E-mail : ymfark@sohu.com

Key words degraded desert grassland , degradation stage , grazing , livestock , soil properties

Introduction Xinjiang is one of China's main pastures , but its grassland has been degraded as a result of overloading grazing . In this study , the soil physical and chemical properties of the degraded desert grassland were studied to reveal the relationship of livestock-vegetation-soil .

Materials and methods The study was conducted in *artemisia* desert grassland at Ashili rural of Changji city in Xinjiang . Through field investigation of the status of species , the degraded series were divided into three stages : moderate degradation , heavy degradation and over degradation (Liu Hong-lai , et al . 2007) , and 12 representative plots were set . From moderate degradation to over degradation , the predominance species is : *Gagea bulbifera* + *Seriphidium transillense* → *Gagea bulbifera* + *Geranium pratense* → *Petrosimonia sibirica* + *Trigonella arcuata* + *Geranium pratense* . Soil samples of 0-30 cm depth were dug for analyzing the mechanical composition , bulk density , density , organic matter , total salt , total nitrogen , total phosphorus , total potassium , available nitrogen , available phosphorus , and available potassium .

Results and discussion From moderate to over degradation stage , the soil clay content increased gradually , the sand / clay ratio descended significantly , decrease was 85 .9% , which indicates that the surface soil is not rough so as to emerge the land desertification . Soil bulk density increased , and porosity decreased , the two were very significant negative correlation . Compared the soil bulk density of moderate degradation stage with heavy and over degradation stage , the difference was significant . In over degradation stage , the total salt content was minimum , but in the other stages , it was rather high , but soil had not yet reached the soil salinization .

Due to the number of livestock was large , a large number of animal manure were added into the soil , the organic matter was gradually accumulated , which caused soil organic matter and soil nitrogen content to gradually increased , the total nitrogen increased 31 .8% , available nitrogen increased 35 .9% , the three were very significant positive correlation , Some researches consider that grazing accelerates N cycle of grassland , especially heavy grazing (Unkovich M , et al . 1998) , so that the amount of available nitrogen conversion to the total nitrogen is increased , this study also proved this opinion .

Soil phosphorus and potassium levels were reduced and then increased followed the degraded series , and the relation of total and available nutrient was significantly positive correlation . The influence of grazing intensity and livestock excretion on soil phosphorus and potassium was great (Yu Jun-ping , et al . 2000) .

Conclusions With the intensification of grassland degradation , soil physical properties changed bad , bulk density increased significantly . The soil organic matter , available nitrogen and total nitrogen gradually increased . The contents of available phosphorus , total phosphorus were undulate . The stability of grassland ecosystems has been depressed , so measures should be taken to reduce grazing intensity for promoting grassland ecosystems to benign development .

References

- Liu Hong-lai , et al . 2007 . Division on degraded successional series of *Seriphidium transillense* desert grassland . *Xinjiang Agricultural Science Journal* , 44(2) : 137-141 .
Unkovich M , Sanford P , Pate J , et al . 1998 . Effects of grazing on plant and soil nitrogen relations of pasture crop rotations . *Aust J Agric Res Journal* , 49(3) : 475-485 .
Yu Jun-ping , Lan Yun-feng , Wu Li-ji , et al . 2000 . Nitrogen circling of the grassland ecosystem in "soil-grass animal" . *Neimongol Prataculture Journal* , 3 : 53-56 .