



University of Kentucky
UKnowledge

International Grassland Congress Proceedings

21st International Grassland Congress / 8th
International Rangeland Congress

Effect of Artificial Grassland on Soil and Water Conservation in Beijing

T. J. Sun

Beijing Academy of Agriculture and Forestry Sciences, China

J. Y. Wu

Beijing Academy of Agriculture and Forestry Sciences, China

W. J. Teng

Beijing Academy of Agriculture and Forestry Sciences, 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/21/7-1/27>

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.

Effect of artificial grassland on soil and water conservation in Beijing

T .J .SUN , J .Y .WU , W .J .TENG

Beijing Research & Development Center of Grass and Environment ,Beijing Academy of Agriculture and Forestry Sciences ,
Banjing ,Haidian District ,Beijing 100097 ,China , E-mail : stj_cau@163.com / gjhy_sui@126.com

Key words : barren lands , meadow brome , artificial grassland , soil and water conservation , Beijing

Introduction There are severe soil erosion and water loss problems that are exacerbated by livestock production around Beijing . Drought-resistant and barren-tolerant perennial grass is a good forage that promotes soil and water conservation (Adekalu et al . , 2007) .The main objective of this study was to reduce soil erosion and water loss on barren lands in Beijing by planting perennial grass in different areas .

Materials and methods The experiment was conducted with in Yanqing , Miyun , and Changping in Beijing .Their soil textural classifications were sandy loam , sand clay loam and clay loam .Rainfalls were 393 .5mm , 579 .7mm and 613 .7mm .Treatments were imposed in a randomized complete block design with three replicates .There were one CK (control) that was a barren slope and one treatment that was artificial grassland sowed in autumn with meadow brome (*Bromus riparius*) in one experimental area .Surface runoff and soil erosion was observed on plots in 2006 , and grass height , cover and biomass of artificial grassland were measured with three replicates in the August .

Results and discussion Ground covers and biomasses of artificial grasslands in Miyun and Changping were over 97% and 5321kg/hm² , and higher (p<0.01) than those in Yanqing .This was due mainly to rainfall and soil textural classification (Table 1) . Meanwhile , soil erosion and water loss of artificial grassland was lower significantly (p<0.01) than that in CK in every experiment area .Amounts of surface runoff and soil erosion of artificial grasslands were only 3090 .3 t/km² and 2 .6 t/km² in Changping in 2006 , and the effect of soil and water conservation was highest there , 98 .22% and 99 .99% .This site had clay loam soil and high ground cover of grassland (Table 2) .

Table 1 Artificial grassland background of three areas in Beijing in 2006 .

| Areas | Overground biomass(kg/hm ²) | Ground cover (%) | Grass height (cm) |
|-----------|---|------------------|-------------------|
| Yanqing | 4867 .7b | 85 .3b | 36 .2a |
| Miyun | 5569 .3a | 97 .7a | 38 .7a |
| Changping | 5321 .9a | 97 .9a | 39 .9a |

Note : Different letters of each column in an area are significant differences at 0 .01 level (p<0 .01) . * AG indicated artificial grassland .

Table 2 Yearly amount of surface runoff and soil erosion of three areas in Beijing in 2006 .

| Areas | Treat-ments | amount of surface runoff (t/km ²) | Soil erosion (t/km ²) | water conservation (%) | soil conservation (%) |
|-----------|-------------|---|-----------------------------------|------------------------|-----------------------|
| Yanqing | CK | 44331 .9a | 7423 .6a | — | — |
| | AG * | 14233 .2b | 57 .8b | 67 .89 | 99 .22 |
| Miyun | CK | 182979 .5a | 3591 .1a | — | — |
| | AG | 14110 .3b | 8 .1b | 92 .29 | 99 .77 |
| Changping | CK | 173909 .9a | 25806 .7a | — | — |
| | AG | 3090 .3b | 2 .6b | 98 .22 | 99 .99 |

Conclusions Surface runoff and soil erosion in barren fields was decreased effectively by planting drought-resistant and barren-tolerant perennial grass .Ground biomass and cover increased , and vegetation restored rapidly after grass planting .This benefited livestock and had positive effects on soil and water conservation in Beijing .

Reference

Adekalu K .O . , Olorunfemi L .A . , Osunbitan J .A . , 2007 .Grass mulching effect on infiltration , surface runoff and soil loss of three agricultural soils in Nigeria . *Bioresource Technology* 98 : 912-917 .