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## Grazing and Drought Interactively Influence Total Plant Density

Y. Z. Gao

*Christian-Albrechts University of Kiel, Germany*

M. Giese

*Christian-Albrechts University of Kiel, Germany*

Z. Y. Zhou

*Chinese Academy of Sciences, China*

X. G. Han

*Chinese Academy of Sciences, China*

Friedhelm Taube

*Christian-Albrechts University of Kiel, Germany*

*See next page for additional authors*

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**Presenter Information**

Y. Z. Gao, M. Giese, Z. Y. Zhou, X. G. Han, Friedhelm Taube, H. Brueck, and S. Lin

## Grazing and drought interactively influence total plant density

Y . Z . Gao<sup>1,2,3</sup> , M . Giese<sup>1,2</sup> , Z . Y . Zhou<sup>4</sup> , X . G . Han<sup>4</sup> , F . Taube<sup>1</sup> , H . Brueck<sup>1</sup> , S . Lin<sup>2</sup>

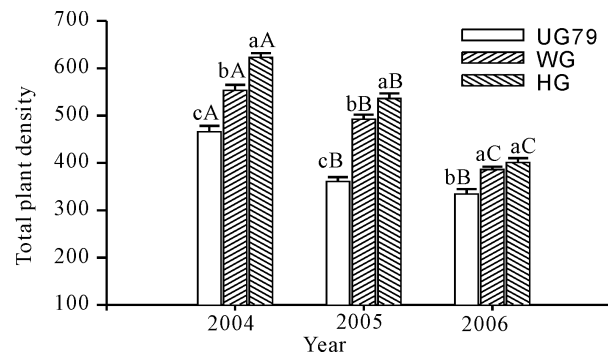
<sup>1</sup>Institute of Plant Nutrition and Soil Science , Christian-Albrechts University of Kiel , D-24118 , Kiel , Germany , E-mail : gaoyz108@nenu.edu.cn ; <sup>2</sup>Department of Plant Nutrition , China Agricultural University , Yuanmingyuan West Road 2 , 100094 Beijing , China ; <sup>3</sup>Key Laboratory of Vegetation Ecology , Northeast Normal University , Changchun , 130024 China ; <sup>4</sup>Laboratory of Quantitative Vegetation Ecology , Institute of Botany , Chinese Academy of Sciences , 100093

**Key words :** heavy grazing , Inner Mongolian steppe , net primary productivity , plant height

**Introduction** Great changes have taken place in vegetation in Inner Mongolian steppe due mainly to overgrazing in the past four decades . Overgrazing and N losses in combination with altered soil physical parameters and water availability further have been shown to exert strong impact on plant productivity , total density and height (Cingolani *et al.* , 2005) . In addition to grazing disturbance , drought also can significantly affect species height and density due to different drought resistant or tolerant ability . However , drought and grazing always interactively influence the ecosystem processes in grazing ecosystems .

**Material and methods** Our experiment was conducted at one site protected from grazing since 1979 (UG79) , at one moderately grazed (MG) and one heavily grazed (HG) site in Inner Mongolian steppe . At peak biomass time in 2004 , 2005 and 2006 , plant material of 1 m x 1 m ground area was cut with grass shears down to the soil surface at these three experimental sites . 10 replications were done in each site . Additionally to the number of species , height , number of tillers and number of individuals were recorded before harvesting .

**Results** There was no significant interaction of plant height between grazing and year ( $P < 0.001$ ) (Table 1) . Plant height decreases with increasing grazing intensity . Plant height has no significant difference in two dry years 2005 and 2006 . Grazing and year interactively affect total plant density ( $P < 0.001$ ) (Figure 1) . In all three years , total plant density was highest at site HG and lowest at site UG79 and was higher in 2004 than in 2005 and 2006 .



**Figure 1** Total plant density at three differently managed sites . Symbols are as Table 1 .

**Table 1** The average height of community (cm) at differently managed sites . Significant differences between grazing and years are indicated by different small and capital letters , respectively .

Sites	2004	2005	2006	Average
UG	31.0	25.0	22.7	26.2 a
WG	29.3	20.6	23.1	24.3 a
HG	11.0	7.0	6.8	9.0 b
Average	23.8 A	17.5 B	17.6 B	

**Conclusions** Heavy grazing leads to lower plant height and more small individuals . Drought reduces total plant density more at site HG than site UG79 , suggesting heavy grazing with a prolong drought can seriously deteriorate grassland .

### Reference

Cingolani , A . M . , Noy-Meir I . & Díaz S . (2005) . Grazing effects on rangeland diversity : a synthesis of contemporary models . *Ecological Applications* 15 , 757-773 .