Effects of grazing on reproductive characteristics of *Stipa breviflora* in desert steppe

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Introduction As one of main plants in *Stipa breviflora* Desert Steppe , *Stipa breviflora* turns green in early spring , and has good palatability , and drought resistance . Different grazing intensity affected reproductive methods of *Stipa breviflora* (Zhang *et al* , 2006) .

Materials and methods Two grazing and one surrounding plots , which areas were 8 .75 , 8 .81 , and 1 hm^2 respectively , were set up in *Stipa breviflora* desert steppe in Siziwang Banner of Inner Mongolia in spring 2002 . Stoking rates of zero , light , and heavy grazing plot were 0 , 0 .686 , and 1 .477 sheep hm^{-2} a^{-1} , respectively with 2-year old Mongolia sheep of similar body weight . Ten 50×50 cm^2 quadrats at each plot were sampled to investigate seed yields in 2004 . Inflorescence , mature seed and reproductive shoot per unit area were recorded . Seed yields were calculated as the multiplication value of bunch , reproductive shoot , and mature seed per unit area . The data was analyzed with step-wised regression method and a General ANOVA mode with SPSS 11 .0 software .

Results and analysis Vegetative shoot density in heavy grazing plot was higher significantly ($P<0.05$) than that of zero and light grazing plot (Table 1) . There was no difference of reproductive shoot density in different plots . With the increase of grazing intensity , the inflorescence and mature seed decreased . The seed yields were significantly higher with zero and light than that of heavy grazing plot ($P<0.05$) .

Table 1 *The seeding comparison of Stipa breviflora under different grazing intensity .*

Treatments	Vegetativeshoot density	reproductive shoot density	Inflorescence perreproductive shoot	Mature seed perreproductive shoot	Seeding ratio	Seed yields(number per unit area)
Zero grazing plot	34 .1^{a}	6 .1^{a}	111 .8^{a}	53 .3^{a}	47 .7^{a}	3044^{a}
Light grazing plot	31 .6^{a}	5 .1^{a}	90 .1^{ab}	36 .0^{b}	40 .0^{a}	2929^{a}
Heavy grazing plot	48 .8^{b}	4 .8^{a}	80 .2^{b}	37 .4^{b}	46 .6^{a}	2192^{b}

Note : Different letters in the same column indicate significant differences at $P<0.05$ level .

The correlation analysis of seed yield per unit area and seed yields components showed that the correlation coefficient was the highest between seed yields and reproductive shoot density (Table 2) . The regressive equation of reproductive shoot (X_1) as the independent variables and seed yields(Y) as the dependent variable was $Y=801.500\ X_1-1553.000$ ($R=0.879$) .

Table 2 *Correlation between seed yield of Stipa breviflora and correlation factors .*

Correlation factors	Correlationcoefficient R	Significantlevel
Vegetative shoot density	0 .063	P>0 .05
Reproductive shoot density	0 .879	P<0 .05
Inflorescence per reproductive shoot	0 .404	P>0. 05
Mature seed per reproductive shoot	0 .425	P>0. 05

Conclusions The seed yields decreased with the increase of grazing intensity . Reproductive shoot was the main factor of influencing seed yields in *Stipa breviflora* .

Reference

Zhang Y .F . , Zhang D .Y . , (2006) . Asexual and Sexual Reproductive Strategies in Clonal Plants . *Journal of Plant Ecology* 30(1) :174-183 .