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## Responses of vegetative propagation of *Reaumuria soongorica* to grazing and fenced non-grazing

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**Key words** : split propagation , adventitious-root propagation , genet , ramet , arid desert rangeland

**Introduction** Overgrazing has been resulting in serious degradation of grassland in northwest China . The present study was conducted to investigate overgrazing and fenced non-grazing treatments on vegetative propagation performances of *R. soongorica* , one of the extensively distributed , dominant xerophile species in northwest China . The shrub has two kinds of vegetative propagation : split propagation and adventitious-root propagation ( Liu , *et al* , 1982 ; Zeng , *et al* . 2002) .

**Research area and methods** The research area located in Alashan region of Inner Mongolia , northwest of China ( 105° 34' E ; 39° 05' N ) . The study was conducted on a lightly degraded and a highly degraded zone respectively in an overgrazed arid desert grassland in August , 2004 . In each zone 6 plots ( 25m×25m ) were selected at random , of which three were grazed up to and during the trial period as used to be , whereas the other plots had been fenced since 2000 . All-together this amounted to 4 treatments : lightly degraded-grazing ( T1 ) , lightly degraded-non-grazing ( T2 ) ; highly degraded-grazing ( T3 ) , highly degraded-non-grazing ( T4 ) , and 3 replicates per treatment . In each plots 3 genets were selected at random and each genet were dug out , ramet and adventitious root of vegetative propagation of each genet were checked and recorded by criterions as following : split ramets ( SR ) \_ ramet split from top root ; adventitious-root ramet ( ARR ) \_ ramet developed from adventitious-root propagation ; elder adventitious roots ( EAR ) \_ adventitious root developed before 2004 but root belonged to ARR not included ; new adventitious-root \_ adventitious root developed during 2004 , and sand cover depth ( SCD ) on each genet were measured . The statistical analysis of data was based on Statistica for Windows 4 . 5 D ( Stat Soft Inc . USA ) .

**Results and discussions** A significant difference was observed for the amount of SR between T3 and all other treatments ( Table 1 ) , which indicated that serious overgrazing accelerated the split process . However , these ramets were most often abnormal , with some of them close to death . No significant differences between treatments could be observed for the characteristic ARR , which can be explained by the longer time needed for the formation of this characteristic than available in this experiment . In both , the amount of EAR and the amount of NAR , significantly higher amounts were observed in T4 versus all other treatments . That no NAR was observed on genets of T3 is explained by the need for sand cover in the development of adventitious root ( Liu , *et al* , 1982 ) . Regression analysis confirmed the positive correlation between NAR and soil cover depth on genets (  $y=1.1912x^2-12.435x+5.5406$  ,  $N=30$  ,  $R^2=0.8254$  ) . There were no SCD observed on genets of T3 which may be due to over-disturbance by sheep and wind erosion . In the plots of T4 , SCD were significantly higher than all other treatments , that because the growth of damaged genet have been recovering since be fenced in 2000 and the nearby over-hoofing of sheep .

**Table 1** Responses of the amounts of split ramet ( SR ) , adventitious-root ramet ( ARR ) , elder adventitious-root ( EAR ) , new adventitious root ( NAR ) of *R. soongorica* genet and sand cover depth ( SCD ) to grazing and fenced non-grazing on different degraded zones .

Item	Treatment			
	T1	T2	T3	T4
SR ( ramet/genet )	1.7±1.4b	3.2±2.5b	7.8±3.9a	2.4±0.5b
ARR(ramet/genet)	2.8±2.9	4.0±2.1	4.3±3.5	3.6±2.9
EAR ( root/genet )	5.5±4.0b	7.5±4.9b	4.7±5.7b	21.0±6.4a
NAR ( root/genet )	22.5±39.7b	33.4±42.0b	0.0b	210.8±141.5a
SCD ( cm )	8.5±6.1b	10.8±6.1b	0.0c	18.2±2.9a

For an individual item , means ( ± SD ) which share the different letters of lower case indicate significant differences (  $P<0.05$  , Duncan's multiple range test ) .

**Conclusions** Serious overgrazing was unfavorable for both split and adventitious-root propagation ; Whereas in the fenced non-grazing polts on the highly degraded zone the positive effect was observed for development of ERR and NAR .

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