Clonal Morphology of *Artemisia frigida* in the Grassland with Different Degradation

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Key points: Artemisia frigida population, degraded grassland, clonal architecture, clonal growth, patchiness of resource

Introduction Overgrazing caused the degradation of grassland and affected the structure of plant communities. Grazing-induced degradation leads to the essential resource for growth and reproduction of plants are heterogeneously distributed. Clonal growth enables chonal plants to vigorously spread in horizontal space in many stoloniferous and rhizomatous plants, the connections (i.e., stolons and rhizomes) between the ramets may occupy patches differing in resource supply. Phenotypic plasticity is assumed to be a strategy for clonal plants to cope with resource heterogeneous environments. Clonal plants through clonal growth and chonal morphology to acquiere heterogeneously-distributed resource efficiently. *A. frigida* is a native perennial shrub that occurs primarily on degradated rangelands. It has the ability to produce offspring through clonal propagation and sexual reproduction. in degradated grassland. through its clonal growth it not only to acqire resource but also play important role in sand fixation and wind erosion control.

Materials and methods The study area locates near the national grassland ecosystem research station (116°14′E, 41°37′N, and 1430m in altitude). According to the communities types, divided four degeneration gradations. There were 10 subsamples for the *Artemisia frigida* in each plot. In order to identify the branches, plants were sampled with shoots and roots connected. Other species were disposed of. For the target species, the number of modules (including genets and ramets) per sample was counted. Internode lengths were measured. The combined data from each degeneration gradation, subsamples were subjected to a one-way ANOVA for degeneration and Duncan Multiple range test.

Table 1 *The basic situation of plots.*

Degradation Gradation	Communities types
Light Degradation	*L.chinensis + Agropyron cristatum + A.frigida + tussock grass*
Middle Degradation	*L.chinensis + S.grandis + A.frigida + tussock grass*
High Degradation	*A.frigida + Cleistogenes squarrosa + P.acaulis + tussock grass*
Extreme Degradation	*P.acaulis + A.frigida + small tussock grass*

Table 2 *Clonal morphology of A.frigid.*

Degradation Gradation	Spacer Length (cm)	Branching Intensity (indm^{-1})
Light Degradation	3.40^{a}	1907.2^{a}
Middle Degradation	2.63^{b}	2184.5^{a}
High Degradation	1.15^{c}	2675.6^{b}
Extreme Degradation	1.07^{c}	2850.4^{b}

NOTE: Treatments with different letters in one column are significantly different at the $p<0.05$ level.

Results ANOVA results showed highly significant effects of degeneration on internode length of stolons and branching intensity, indicating that internode length of stolons and branching intensity responded to each habitat. Internode length decreased in *A.frigida* and branching intensity increased with the aggravation of degradation

Conclusions Clonal growth and clonal morphology of *A. frigida* responded markedly to degradated grassland, in different habitats, the species responded differently. The plasticity of *A. frigida* of clonal growth and clonal morphology in response to resource heterogeneity corresponds partially to the alternations of the number and magnitude of modules

References

de Kroon H.; Hutchings M J. (1995). Morphological plasticity in clonal plants: the foraging concept reconsidered. *Journal of Ecology*, 83, 143-152.

Li jinhuaLi zhenqing, Ren jizhou. (2005). Effect of grazing intensity on clonal morphological plasticity and biomass allocation patterns of *Artemisia frigida* and *Potentilla acaulis* in the Inner Mongolia steppe. *New Zealand Journal of Agricultural Research*, 48, 8228-8233.