Affect of Fencing on Community Structure and Species Diversity of *Eragrostis nigra* on Degraded Grassland in Karst Area

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Introduction Backspiked lovegrass (*Eragrostis nigra*) played a very important role in grassland resources in Karst area . However , because of over grazing in the long past , it caused a serious degradation of grassland and heavy soil erosion , leading to the continual expansion of bare land in the area . The trial , through three-year observation , was aimed at effect of restoration of *Eragrostis nigra* vegetation on the degraded grassland by means of fencing so as to provide theoretical foundation and practical measures for sustainable utilization of the grassland in karst area .

Materials and method the trail was conducted at hill site in Qiubei county , Yunnan(East longitude 103°52′ , north latitude 24° 04′ , elevation 2300 meters , annual rainfall 1120mm , annual temperatures 13 .4℃) with 1hm^2 fenced to compare with natural grazing without fencing . The vegetation of the trial land was dominated with *Eragrostis nigra* and Shiny cinqueflil (*Potentila fulgense*) and the total coverage of the community was about 60% -70% with sward height about 15cm in average . The coverage , density , height and biomass of the vegetation community were measured before the trial and the same items were recorded in September each year during the trial phase .

Results The results showed that :(1) Coverage of pasture was increased from 60% (before fencing) to 100% after fencing . The quantity characters and spatial characters of dominant species changed regularly , such as sward height was increased significantly ,both blackspiked lovegrass and Shiny cinqueflil (*Potentila fulgense)* wereincreased significantly and dominated upper synusia gradually . The density of blackspiked lovegrass was decreased annually . (2) Comparing with control ,richness index of community and indexes of Margalef were increased significantly during three years by fencing . Indexes of Menhiniek was increased significantly in the second and third years . Diversity indexes of Shannon-Weaver was increased significantly in the second year ,but it was not significant in the third year . There was no significant difference on Pielou evenness index in the restoration processing of degraded pasture . (3) Clustering between community of different fencing phase , 5 communities cluster 3 kinds , Ⅰ (before fencing and without fencing) , II(second year and third year) , III(first year after fencing) .(4) Second years and third year after fencing ,the total above-ground biomass ,grass and forbs were increased significantly . The legume biomass after four months of fencing was higher than those of control , sixteen months and twenty-eight months after fencing . After twenty-eight months of fencing , the total biomass of pastures increased 4 times (comparing with control) ,and reached to 5 .8 t/hm^2 (DM) . There was also a obvious change in community of vegetation with ratio of grass and legume increased from 21% to 55% ,forbs decreased from 76% to 43% , and legume decreased from 6% to 1% .

Conclusions With fencing , the vegetation coverage in the trial grassland was greatly improved , which effectively controlled the soil erosion . At the same time , after fencing , the sward height , output of the biomass and the productivity of the grassland all were improved in large standard . The ratio of perennial grass in the vegetation was largely increased , while that of the fords decreased after fencing , which , in turn , significantly improved the quality of the grassland , maintaining the sustainable utilization of the grassland . Fencing treatment improved the species diversity in the community of the grassland , maintaining the stability and capability to stressing of the community of the grassland . Therefore , on the degraded grassland dominated with *Eragrostis nigra* , fencing was an effective technical measure for restoration . In the actual practice , it was suggested that degraded grassland could be used again after third year of fencing . Rotational grazing with adequate grazing was recommended .

References

Zhou Huakun , Zhou Li , Liu Wei . Affect of Fencing on Degraded and Undegraged Artemisia L . Sward . [J] *China Grassland* 2003 ,(5) ,15-22 .

K .A . Wolkort ,J .C .Gorden . Eco-system—the Science of Balance and Management[M] Translated by Ouyan Hua ,Wang Zhenquan . Science Press , Beijing , 2002 ,40-49 .