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Analysis on the rangeland degenerate gradient of Bayanbulak

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Key words : degenerate gradient ; rangeland degeneration ; dominant ; overloaded ; primal synusia

Introduction The Bayanbulak rangeland, located in the southern slope Tianshan mountain in Hejing County, Xinjiang, is 2400 ~ 3800 m above sea level. It is a perch and close mountain basin, with a total area of 13998 km² (Xu Peng, 1993). It is not only the important animal husbandry production base, but also the important water source of Kaidu River. However, influenced by global climate warming, unreasonable use and the overloaded herds, a series of ecological questions appeared such as rangeland degeneration, soil desertification, weeds spreading and so on.

Research methods The study takes the degenerate gradient rangeland as the sample and the plant community characteristic should be consistent with obvious and general or light degeneration. The study was initiated from 5 to 15 of August in 2005, determined the coverage, height, density, abundance and yield of the plant community. The sample area is 1m², and each degenerated rank replicates 5 times.

According to $SDR_2 = (C' + Y') / 2$ (C' is relative coverage, Y' is relative weight), the study can calculate the degree of dominance of each investigated sample, define the dominant species, companion species, and confirm the different degenerated gradient.

Results and discussion *Stipa purpurea* and *Festuca kryloviana* are the primary dominant and subdominant species in Bayanbulak, the dominance is 0.6~0.7 and 0.3~0.6, respectively. As the result of the growing degeneration, the dominance of these two plants drops from 0.6 to 0.2, even to zero. But the dominance of those plants like *Astragalus alpinus* and *Leymus ovatus* which have a bad palatability and are suitable to grow in the sandy soil increase from 0.3 to 0.6, even forms the sole community. In the mild, moderate and serious degenerated rangeland, the ground biomass are 1500~2250, 750~1500 and 750kg/hm²; the proportions which *S. purpurea* occupies are above 85%, 65% and below 50%; the dominance are 0.6~0.7, 0.3~0.6 and below 0.3, respectively. Mild degenerated rangeland: The primal synusia of community has not got obvious change, but the fine grass yield reduces. The dominance of *S. purpurea* is above 0.6, and the total coverage is above 50%. Moderate degenerated rangeland: the herbage synusia becomes constructive species, the percentage of participating increases to 70% above; the fine grass steps down for the associated synusia, the percentage of participating falls to 30% below. The primal vegetation is replaced by other inferior herbages; as a result the fine grass proportion drops. The dominance of *S. purpurea* is 0.3~0.6, and the total coverage is 30~50%. Serious degeneration rangeland: The typical characteristics are soil desertification, basification, and surface exposition. The percentage of participating is smaller than 50%; inferior herbages become the dominant synusia. The dominance of *S. purpurea* is below 0.3, the total coverage is below 30%.

Conclusions (1) Taking *S. purpurea* as the dominant species, with the consideration of the total coverage, Bayanbulak rangeland may be divided into the mild, the moderate and the serious degeneration. (2) degeneration area of Bayanbulak rangeland reaches as high as 291400 ha, accounts for the total area 64.38%, in which the serious degeneration takes 91867 ha, accounts for 20.3%, Moderate degenerated is 96698 ha, 21.36% and Mild degenerated covers 102835 ha, 22.72%.

Besides climatic factor, the main reasons for the degeneration of Bayanbulak rangeland are the unreasonable herds system and the overloaded domestic animal. Regarding rangeland degeneration, some countermeasure should be proposed initially: for the serious degenerated, herd is forbidden; for the moderate degenerated, herd should be adjusted of seasonal variations and be rotational grazing; for the mild degenerated, herd should be in the delimited area with rotational grazing.

Reference

Xu Peng, 1993. Grassland Resources and Utilization of Xinjiang. Urumqi: Xinjiang Science & Technology & Hygiene Publishing House.