Diversity of Desert Rodent Communities under Different Disturbances and Scales in Alashan Desert, Inner Mongolia

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Introduction The diversity characteristics and biomass dynamics of rodent communities were studied under the scales of 10 hm^2 and 40 hm^2 from 2002 to 2005. It is known that the same disturbance elements can lead to different impacts, depending on the properties, characteristics and activities of the disturbance. In this study, four types of disturbances were evaluated: farmland, rotational grazing, over grazing and forbidden grazing. The study was in the Alashan Desert of Inner Mongolia.

Materials and methods The studied area is N 37°24′～38°25′, E 104°10′～105°30′, The vegetation was scarce and scattered, with a uniform coverage as low as to 1%～20%. The plant species were all drought and salt resistant species, mostly shrub, half-shrub, small shrub, and half small shrub. The annual precipitation ranges from 45 mm to 215 mm, chiefly concentrated in July-August, whereas the annual evaporation ranges from 3000 mm to 4700 mm. Rodents were captured in the sites by trap-day where the traps were set up 5m away from each other in 50 m transects, which remaind throughout the day and night. There were two sites, 10hm^2 and 40 hm^2, in each disturbance habitat.

Results The results (Table 1) show that the diversity indices of farmland and over grazing disturbances are higher than that of rotational grazing and forbidden grazing disturbances; also the rotational grazing disturbance is the lowest under two scales. The evenness index of farmland disturbance is the highest under the scale of 10hm^2, that of forbidden grazing disturbance is the highest under the scale of 40hm^2, and that of rotational grazing disturbance is the lowest under two scales. The dominant indices of rotational grazing disturbance are the highest under two scales. The richness indices of over grazing disturbance are the highest, and that of forbidden grazing disturbance are the lowest under the two scales (Table 1).

Table 1 *Diversity characteristics of desert rodent communities in different habitats and scales.*

Disturbance	Species		Diversity index		Evenness index		Dominance index		Richness index	
	A	B	A	B	A	B	A	B	A	B
Ⅰ	8	8	1.562	1.404	0.751	0.675	0.261	0.326	1.427	1.110
Ⅱ	7	9	1.140	1.172	0.586	0.533	0.449	0.431	1.214	1.214
Ⅲ	9	10	1.528	1.554	0.695	0.675	0.280	0.265	1.580	1.384
Ⅳ	6	7	1.303	1.355	0.727	0.696	0.331	0.310	1.036	0.969

A: Small scale sites of 10hm^2; B: Large scale sites of 40hm^2; Ⅰ Farmland area; Ⅱ Rotational grazing area; Ⅲ Over grazing area; Ⅳ Forbidden grazing area

Conclusions The species of high biomass of rodent communities changed significantly in rotational grazing and over grazing disturbances; species numbers increased from 2 to 5 under two scales, from 10hm^2 to 40hm^2, however, the species indices of high biomass (rodent communities) did not change ebwteeen farmland and forbidden grazing disturbances, which also showed the disturbance effect of rodent communities under different disturbances and scales. The evenness indices of rodent communities appeared significant scaling effect.

Reference

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