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***Trigonella arcuata* responds to *Seriphidium transillense* desert degraded grassland**

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Keywords: *Trigonella arcuata*, *Seriphidium transillense* desert, degraded grassland, response, adaptation

Introduction Xinjiang has 5 730 10⁴ hm² natural grassland including 1083.4 10⁴ hm² spring-autumn pasture and *S. transillense* is the main spring-autumn pasture which belongs to middle Asiatic climate desert that concentrates in northern Xinjiang plains and low mountains. The grassland has commonly degraded and some places have become over-degradation because of unreasonable use through many years. With the increase of degraded degree, *T. arcuata* replaces *S. transillense* and becoming the dominant species. Fundamental researches have been done but lots of detailed researches are required including some species' strategies and mechanism for adapting natural environment of the degradation.

Materials and methods The study area locates in the middle of the northern slope of the Tianshan Mountains, N43°49'~43°56', E87°02'~87°05', which is an open flat alluvial plain and its altitude is 754~942m. The area has middle Asian desert climate characters, annual rainfall of 180~190 mm, evaporation of 1760mm and drying of 4~10, with an average annual temperature 6.5 °C, the frost-free period 160~190 days. The soil is gray desert soil and the soil parent material is the loess-like material. *S. transillense* desert is the zonal vegetation in the region, with short-live plants in the spring and annuals forming dominant synusia. In the time sequence, the plant community composition, structure as well as some life-economic traits of middle asiatic climate desert is more complex than that of central asiatic climate desert. In April 2006, 15 samples (1 1m²) are selected in each degraded degree area and the height, coverage and density of every species are recorded and the biomass is measured.

Results The response of *T. arcuata* to different degradation of *S. transillense* desert is shown in the table below. *T. arcuata* becomes the dominant species with the worsening of degradation and it is considered the indicator species, its coverage, biomass and density obviously increase while its height becomes lower.

degraded stage	coverage (%)	biomass (g/m ²)	relative density (individual/m ²)	height (cm)	important value IV=(RC+RY)/2
non-degradation	0.40	0.94	6	1.77	0.01
media-degradation	0.93	0.91	9	0.84	0.04
heavy-degradation	1.55	2.21	16	0.49	0.07
over-degradation	5.12	7.86	60	0.50	0.24

Note: RC means relative coverage and RY means relative yield.

Conclusions *T. arcuata* prevents livestock's eating through lowering its height and inhibits the grassland from completely overwhelming degradation through expanding its population. Through observation we find that it avoids the arid environment of the over-degradation by shortening its life cycle.

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