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Introduction Plant senescence is an internally regulated and orderly degenerative process leading to the death of single cells, organs or even whole plants during their life cycle (Deborah, 1993). Senescence may occur in annual plants and monocarpic perennials abruptly and in iteroparous plants gradually (Silvertown *et al.*, 2001). *Elymus sibiricus* is a perennial bunchgrass. The objective of this study was to explore the effects of population characteristics on senescence of *Elymus sibiricus* by researching tillering ability, biomass, modular structures and propagation in *Elymus sibiricus* at different ages, in order to supply some evidences and material for forage production and also establishing a basis for more detailed research on perennial senescence.

Materials and methods The sampling sites were selected in places where *Elymus sibiricus* were grown in 2002, 2003, 2004, 2005, 2006. The independent tufts of *Elymus sibiricus* population in five sites were large sampled on August 20, 2007. The plant number, aboveground biomass, number of sexual plant, weigh of tapering spikes per tuft and so on were measured and recorded. Data were analyzed using an ANOVA modal.

Results The numbers of tillers, sexual tillers and potential population per tuft of *Elymus sibiricus* planted in 2005 (grown 3 years) were the highest. These were decreasing gradually with advancing ages (Table 1). Also, the weight of tillers and tapering spikes per tuft of *Elymus sibiricus* planted in 2005 was the heaviest. The ratio of sexual tillers to weight of tapering spikes per tuft was the highest in *Elymus sibiricus* planted in 2006. The number of tillers and potential population presented vegetative propagation ability; thus the others quantitative characters may present sexual reproduction ability.

Table 1 *Quantitative characters of* Elymus sibiricus *population with different ages.*

Quantitative characters (per tuft)	Planting years				
	2006	2005	2004	2003	2002
Tillers	16.4±2.6	39.0±5.0**	32.4±3.8**	28.4±4.2*	20.4±3.3
Sexual tillers	12.4±2.1 (75.4%)	26.0±4.3** (65.4%)	18.0±3.3* (54.3%)	10.8±2.0 (38.6%)	6.6±2.4 (28.5%)
biomass (g)	5.8±0.9	14.9±3.2**	5.6±1.1	5.0±0.8	3.0±0.7
Weigh of tapering spikes (g)	1.4±0.3** (22.0%)	2.3±0.9** (14.2%)	0.5±0.1 (8.3%)	0.4±0.1 (7.4%)	0.1±0.07 (4.3%)
Potential population	8.2±2.5	55.4±10.6**	49.6±6.5**	34.3±4.1*	29.4±8.2*

* $P<0.05$, ** $P<0.01$, potential population means the total of tiller buds and tiller seedlings.

Conclusions The best time for using *Elymus sibiricus* is after 3 years growth when production and propagation ability are the highest. There was a deteriorative phenomenon observed related to quantitative characters of *Elymus sibiricus* with respect to senescence.

References

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