Dynamics of Module Structures in *Puccinellina tenuiflora* Clones in Alkalinized Meadow in the Songnen Plains, China

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Dynamics of module structures in *Puccinellina tenuiflora* clones in alkalinized meadow in the Songnen Plains , China

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Key words : *Puccinellina tenuiflora* , clone plant , module , vegetative tiller , reproductive tiller , alkalinized meadow , structure dynamics

Introduction *Puccinellina tenuiflora* , a perennial tuft grass (Puccinellia) , is broadly distributed in alkali meadows on the Songnen Plains , tolerates salt and alkali stress , and forms large-area monodominant communities in alkali-patches that have low levels of surface soil (Yang et al , 1995) . Previous studies have characterized vegetative propagation and sexual reproduction , the effect of different methods of utilization on the dormancy , and phenotypic plasticity and prolonged reproductive growth (Yang et al , 1995 ; Zhang et al , 2006 ; Sun et al , 2007) . The objective of this study was to characterize the relationships between vegetative and , reproductive tiller production and their biomass at heading and ripening stages of *P . tenuiflora* clones . These relationships may improve our understanding of *P . tenuiflora* population ecology and provided scientific guidance for grassland management in this region .

Materials and methods The research was conducted in natual alkali meadows , located at the Pasture Ecology Research Station of Northeast Normal University , Changling , Jilin province of China (44°45′N , 123°31′E) which has a temperate , half-humid , continental-monsoon climate . Sample plots were located in mono-communities of *P . tenuiflora* . Whole clones were sampled at heading and ripening stages of *P . tenuiflora* . Thirty clones were taken from random locations at each growth stage . The tuft diameters were measured , and the number and biomass of total tillers , vegetative tillers and reproductive tillers were counted and weighted , respectively . The number and biomass of each module were analyzed and tested by one-way ANOVA .

Results The tuft diameters of *P . tenuiflora* clones were 11 .0±1 .9 cm and 13 .6±2 .2 cm at heading and ripening stages , respectively . The numbers and percents of vegetative and reproductive tillers were not significant ($p>0$ .05) at two stages (Table 1) , indicating the quantitative structures of clones didn't change with growth stages . The biomass of each module was significantly higher at ripening stage than that at heading stage ($p<0$ .05) , and the biomass of vegetative and reproductive tillers at ripening stages were 1 .56 and 1 .45 times compared with that at heading stage . The differences in percent of the biomass in vegetative and reproductive tillers was not significant ($p>0$ .05) . This indicated that the biomass structures of *P . tenuiflora* clones didn't change during different growth stages .

Table 1 *Quantitative characters of the modules of* P . tenuiflora *clones in different growth stages .*

Quantitative characters	Growth period	Vegetative tiller		Reproductive tiller		Total	
		Mean±SD	Percent (%)	Mean±SD	Percent (%)	Mean±SD	Percent(%)
Tillers	Heading	33 .6±15 .0a	32 .3±79 .0a	72 .4±29 .1a	67 .7±0 .1a	106 .0±33 .9a	100
(clone^{-1})	Ripening	32±19 .0a	30 .3±0 .1a	70 .7±26 .3a	69 .7±0 .1a	102 .7±35 .2a	100
Biomass	Heading	1 .7±0 .9a	15 .4±0 .1a	8 .7±4 .7a	84 .6±0 .1a	10 .5±4 .0a	100
(g · clone^{-1})	Ripening	2 .6±1 .8b	17 .5±0 .1a	12 .6±4 .26b	82 .5±0 .1a	15 .2±4 .6b	100

Conclusions The reproductive tillers were dominant in *P . tenuiflora* clones , and the dominance of biomass was much more obvious than that of tiller numbers . From heading to ripening stage , both the number and biomass of *P . tenuiflora* clonal modules were relatively stable . The clones could regulate the vegetative propagation , sexual reproduction , production and allocation of nutrition substance as plant populations .

References

Sun J . , Yang Y . F . (2007) . Phenotypic plasticity and its regulation of tillers prolonged reproductive growth of Puccinellia tenuiflora population on alkalized meadow in Songnen Plains of China . *Chinese Journal of Ecology* , 18(4) : 771-776 .

Yang Y .F . , Zhu L . , Li J .D . (1995) . Quantitative characters of vegetative propagation and sexual reproduction of Puccinellia tenuiflora population on alkalized meadow of Songnen Plain , China . *Chinese Journal of Applied Ecology* , 6(2) : 166-171 .

Zhang L . H . , Zhao J . M . , Yang Y . F . (2006) . Influences of the dormancy modules of Puccinellia tenuiflora population under using for grazing and cutting in alkaline meadow . *Pratacultural Science* , 23(4) : 8-11 .