Dynamic Study on Inter-Species Competition in Mix-Sowing Community of White Clover and Bermudagrass

H. Tian
Hubei Academy of Agricultural Science. China

Y. Liu
Hubei Academy of Agricultural Science. China

H. Cai
Hubei Academy of Agricultural Science. China

H. Zhang
Hubei Academy of Agricultural Science. China

The 21st International Grassland Congress / 8th International Rangeland Congress took place in Hohhot, China from June 29 through July 5, 2008.

Proceedings edited by Organizing Committee of 2008 IGC/IRC Conference

Published by Guangdong People's Publishing House

Dynamic study on inter-species competition in mix-sowing community of white clover and bermudagrass

TIAN H , Liu Y , Cai H , Zhang H .SH
Institute of Poultry and Veterinarian , Hubei Academy of Agricultural Science , Wuhan , Hubei , 430209 , China ,
E-mail :thdzq@126 .com

Key words : mix-sowing community ,inter-species competition ,biomass ; white clover ,bermudagrass

Introduction The dynamic relationship of the two species , white clover and bermudagrass , contest in mix-sowing sward was studied within three years . The purposes were to test if the two species can grow together harmoniously , and find theoretical basis for constructing mix-sowing sward with good properties (yield , quality and longevity) .

Materials and methods White clover , *Trifolium repens* L .cv . Emu No .1 and SS_{21} , a cultivar of bermudagrass were selected as materials .Experimental treatments were : A (White clover , 100%) , B (White clover , 75% ; Bermudagrass , 25%) , C (White clover , 50% ; Bermudagrass , 50%) , D (White clover , 25% ; Bermudagrass , 75%) , E (Bermudagrass , 100%) . The inter-species competition ability of the two species was calculated by the relative yield total (*RYT*) and competition ratio (*CR*) (Jonathan ,1982 ;Masresha , 2003) .

Results Three-year results showed the herbage mass in mix-sowing sward was higher than monoculture with white clover and bermudagrass , except for treatment B and D with lower herbage mass in mix-sowing sward (3872 g/m^2 and 3482 g/m^2) than mono-sowing bermudagrass in the first year . The whole herbage mass in the three years was highest in treatment C (18158 g/m^2) (Figure 1) .The value of RYT of treatment B , C and D was larger than 1in March and April every year (Table 1) , which indicated that white clover and bermudagrass had different ecological niche and used different resources . However , as the experiment progressed , the ecological niche of white clover and bermudagrass overlapped and a resistance relationship appeared . The appearance of resistance was earlier in treatment D than B and C . Because of the strong stoloniform stems of white clover , it outcompeted bermudagrass at the beginning of experiment every year , but as temperature started to increase , white clover stopped growing and bermudagrass was not affected . For that reason , bermudagrass had the stronger competing ability in the last growing period . The competing relationship became more significant as the experiment progressed .

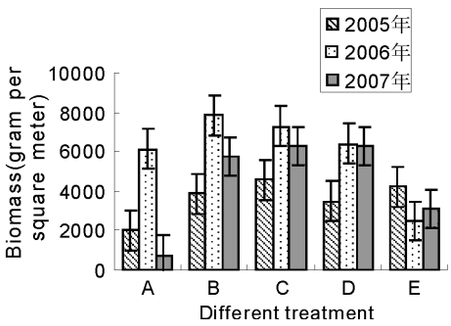

Figure 1 *Biomass dynamic in 3 years .*

Table 1 *Relative yield total and competitive ratio of mixed community (2006) .*

Treatment		3—27	4—19	5—17	7—24	9—6
	RYT	1 .17	1 .08	1 .01	0 .87	0 .88
B	CR_W	11 .0	9 .80	8 .56	0 .23	0 .00
	CR_B	0 .12	0 .16	0 .32	4 .50	23 .0
	RYT	1 .25	1 .05	1 .03	0 .95	0 .89
C	CR_W	4 .65	2 .23	2 .40	0 .16	0 .00
	CR_B	0 .87	0 .45	0 .42	6 .31	infinity
	RYT	1 .06	1 .03	0 .98	0 .84	0 .81
D	CR_W	0 .48	0 .46	0 .23	0 .16	0 .00
	CR_B	2 .05	2 .13	6 .85	12 .5	infinity

Conclusions If only herbage mass was considered , treatment C (White clover 50% +Bermudagrass 50%) is the best in the mix-sowing pasture . If the stability of community is considered , under high cutting frequency , the combination of white clover and bermudagrass for mix-sowing was not recommended .

References

Jonathan W S ,(1982) .Introduction to plant population ecology . Published in the United States of American ,1982 ,147-155 .
Masresha Fetene ,(2003) . Intra-and inter-specific competition bentween seedling of *Acacia etbaica* and a perennial grass (*Hyparrenia hirta*) . *Journal of Arid Environments* , 55 , 441-451 .