Photosynthesis and Productivity of New Lines and Released Cultivars of Whipgrass in a Southwest China Environment

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Photosynthesis and productivity of new lines and released cultivars of Whipgrass in a southwest China environment

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Key words : *Hemarthria compressa* , genotypes , productivity , photosynthetic rate , yield

Introduction Whipgrass (*Hemarthria compressa*) is a warm season stoloniferous perennial grass which is very popular in southwest China for hay production(Yang , 2006) . Genetic variability of leaf net photosynthesis rate (A_n) and its relation to productivity in whipgrass is not well defined . The research objectives were to determine whether there were genotypic differences in A_n and yield between new lines and two released cultivars of whipgrass .

Materials and methods Field experiments were conducted in 2005-2006 at the Teaching and Research Center in Sichuan Agricultural University , Ya'an , China(38°08′ N , 103°14′ E) . New lines H2002-1 , H2002-3 , H2002-6 , H002 , H019 , and released cultivars Chonggao and Guangyi were choosed as materials . Yield of whipgrass was measured by weight of dry matter (DM) . A_n of leaf was measured by Li-6400 from Jul . to Aug . (LI-COR Biosciences , Inc . , Nebraska , U . S .) .

Results Cumulative DM productivities in two years were significant higher in H2002-1 than others . The new lines exhibited higher A_n than the released cultivars , but the extent of variability was not great . High A_n was correlated with high stomatal conductance (g_s) , but there was no correlation between A_n and the ratio of internal [CO_2] to atmospheric [CO_2] . H2002-1 , H2002-3 and H2002-6 had higher A_n , maximal net photosynthesis (MNP) , apparent quantum efficiency (AQE) , light saturation point (LSP) , light compensation point (LCP) , and yield than Chonggao and Guangyi (Table 1) .

Table 1 *The average of biomass , net photosynthesis rate , gas exchange characteristics and light-response curves in two years (2005-2006) .*

Materials	Biomass (t/hm^2)	A_n ($\mu molm^{-2}s^{-1}$)	g_s ($mol\ m^{-2}s^{-1}$)	C_i/C_a	A_n/C_i	MNP ($\mu molm^{-2}s^{-1}$)	LSP ($\mu molm^{-2}s^{-1}$)	LCP ($\mu molm^{-2}s^{-1}$)	AQE
H2002-1	24 .26	20 .45	0 .174	0 .207	0 .247	34 .1	1800	4 .4	0 .0566
H2002-3	22 .26	20 .65	0 .177	0 .204	0 .252	32 .9	1750	5 .2	0 .0425
H2002-6	23 .1	20 .63	0 .183	0 .197	0 .261	33 .7	1780	6 .4	0 .0476
H002	20 .72	20 .08	0 .164	0 .212	0 .236	31 .3	1645	7 .3	0 .0384
H019	22 .5	19 .98	0 .158	0 .218	0 .228	27 .4	1600	5 .3	0 .0496
Chong gao	19 .11	19 .08	0 .152	0 .229	0 .207	28 .7	1490	7 .1	0 .0372
Guang yi	20 .79	19 .53	0 .155	0 .224	0 .217	32 .2	1700	4 .8	0 .0382

Conclusions There were significant differences in forage productivity between new lines and released cultivars of whipgrass . Because of the potential to adapt wider range of environmental conditions with higher LSP and lower LCP , new lines H2002-1 , H2002-3 and H2002-6 showed higher potential for forage productivity , and will available for hay production in southwest China .

Reference

Yang C .H . , Zhang X .Q , 2006 . *Hemarthria compressa* : Growth behavior and multipurpose usages . *ACTA Prataculturae Sinica* , 15(suppl .) :215-216 .