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Genetic study on the biological characteristics of F1 hybrids between *Sorghum bicolor* and *Sorghum sudanense*

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Key words : *Sorghum bicolor* × *Sorghum sudanense* , hybrid , heterosis , growth period , biology character , genetic study

Introduction The hybrid between *Sorghum bicolor* and *Sorghum sudanense* exhibits obvious signs of heterosis . , It is not only in good resistance and adaptability but also has excellent yield and quality . However , there is a few successful *Sorghum bicolor* × *Sorghum sudanense* varieties in China , and also few genetic studies about restrict aspects on yield and quality . Study the hybrid variety of *Sorghum bicolor* and *Sorghum sudanense* could benefit to forage breeding development (Zhan Qiuwen *et al* , 2004) .

Materials and Methods In 2007 , the genetic test which include 5 *Sorghum* sterile lines and 4 *Sorghum sudanense* and their hybrids . were arranged in Hebei , China (37°44' N , 115°42' E) . Each was sown 3 6m long rows spaced 0 .4m apart . Growth periods , heighth and tiller number and leaf midrib colour were measured .

Results In growth period , all hybrids inherited premature nature from their parents . The earlier parents matured (1076A/yan) , the faster hybrids booted ; the stronger the tillering ability of Male parent is , the stronger that of hybrids is . The tillering ability of hybrids from female parents SendyaA and Heg4A is stronger than that from 1076A . This suggests that promoting the tiller ability of parents can promote that of their hybrids . Moreover , hybrids are obviously taller than the tallest parent . Generally , female parents are shorter , so the plant height of hybrids was decided by male parents , resulting in the increase of the stem growth quantity . Many data suggest (Table 1&2) , the midrib colours of hybrids were decided by a pair of genetic genes . Most parents are homozygotes . White and white is white , white and waxy is white , waxy and waxy is waxy , so white is dominant , waxy recessive .

Table 1 The biology characters of parents .

Parents	Boot days	Tiller /plant	Height (cm)	Midrib colour
TX623A	77	1	145	waxy
A3343A	74	1	115	white
Heg4A	62	4	115	waxy
SendyaA	62	4	137	waxy
1076A	59	1	80	white
Sud	72	7	162	waxy
JS1	64	4	296	white
Sor	54	6	130	waxy
Yan	49	8	240	white

Table 2 The biology characters of F1 hybrids between *Sorghum bicolor* and *Sorghum sudanense* .

New hybrid compounding	Boot days	Tiller No ./m ²	Height (cm)	Midrib colour	New hybrid compounding	Boot days	Tiller No ./m ²	Height (cm)	Midrib colour
TX623A/Sud	64	13 .3	189 .0	waxy	TX623A/JS1	60	23 .9	228 .5	white
A3343A/Sud	59	11 .0	189 .0	white	A3343A/JS1	64	19 .9	233 .4	white
Heg4A/Sud		38 .2	180 .0	waxy	Heg4A/JS1	69	28 .6	202 .5	white
SendyaA/Sud	75	34 .4	169 .0	waxy	SendyaA/JS1	74	32 .1	201 .7	white
1076A/Sud	57	24 .9	193 .7	waxy	1076A/JS1	44	27 .2	226 .5	white
TX623A/Sor	51	31 .0	173 .0	waxy	TX623A/Yan	55	23 .9	221 .0	white
A3343A/Sor	52	27 .9	198 .8	white	A3343A/Yan	55	16 .9	228 .6	white
Heg4A/Sor	52	38 .9	168 .3	waxy	Heg4A/Yan	58	36 .9	198 .0	white
SendyaA/Sor	55	35 .3	183 .4	waxy	SendyaA/Yan	58	35 .7	228 .5	white
1076A/Sor	41	28 .9	161 .2	white	1076A/Yan	45	9 .4	182 .9	white

Conclusions Analyses of growth periods and height and tiller development showed that the male parent is key factor for the biological character of hybrids . Effects on stem diameter , internode length to yield and nutrient level of hybrid need further study .