Evaluation of new locally developed forage sorghum hybrids

Rashieda A. Mohammed[1], Maarouf I. Mohammed[*1] and Ahmed A. Osman[2]

1. Shambat Research Station, P.O. Box 30. ARC. Khartoum North, SUDAN
Station, P.O. Box 30. ARC. Khartoum North, SUDAN
[2] *Department of Agronomy, College of Agricultural Studies, University of Sudan for Science and Technology

Abstract: The study was conducted in the Experimental Farm of the Collage of Agricultural Studies - Sudan University of Science and Technology Shambat for two years (2009-2010) to evaluate the performance of 12 locally developed forage sorghum hybrids (*Sorghum bicolor* L. Moench) together with their parents and 3 standard checks including two commercial exotic hybrids and the released Abu Sabin cultivar 'Kambal'. The materials were arranged in Alpha Lattice design and evaluated for some agronomic and forage quality traits. Highly significant differences among genotypes were encountered for all characters except leaf to stem ratio. Some of the locally developed hybrids significantly outyielded the introduced commercial ones. The hybrid S.148xSG32-2A was unique in combining high forage yield with earliness and, was therefore, expected to meet the farmer's preference in producing high quantities of forage in a relatively short period of time. Another late flowering, highly productive and leafy hybrid S.148xANKSSS may not meet the requirements of the traditional system, but was considered suitable under grazing systems in the modern dairy and fattening schemes. Some of the locally developed hybrids scored reasonable values for protein content. The hybrid S.148xSG32-2A which was leading in forage yield, appeared to be of less digestibility and low protein content. This calls for screening the nutritional aspects in an earlier stage of the breeding program.

Keywords: Shambat, Sudan, Breeding, NDF, DMY

Introduction

Sorghum (*Sorghum bicolor* L. Moench) is a crop of world-wide importance. The tremendous increase in demand for animal products has led to great expansion in the area allocated for fodder crops. Sorghum is the most important irrigated forage crop in the Sudan The traditional sorghum cultivar 'Abu Sabin' is the most important cultivar grown for forage in the Sudan. In Khartoum State, for example, it represents more than 60% of the total area cultivated. According to the statistics of the Ministry of Agriculture in 2009, the area cropped with fodder crops in Khartoum State estimated to 200000 fed., in the River Nile and Northern States for the same year, were 55000 and 29000 fed, respectively. Research efforts aiming at developing improved forage types were very few. The seed of all forage sorghum hybrids currently in use are imported. Of these, four hybrids were tested and released by Agricultural Research Corporation (Mohammed, 2007). Although these hybrids proved to be good yielders, yet the farmer's preference is in favor of the traditional cultivar Abu Sabin. One of the reasons behind the limited adoption of exotic hybrids relates to their unsuitability to the local production system as they were mostly designed to suit the grazing or silage-making systems prevailing in countries other than Sudan. On the other hand, the high cost and unavailability of their seeds has also contributed to the limited adoption of the exotic hybrids.

Work on the potential of locally developed forage sorghum hybrids was initiated byMohammed who used exotic female parents (Mohammed, 2007). Although the resulting hybrids outperformed the local checks and the commercial hybrids in forage yield, yet the exotic parents were found responsible for transmitting undesirable traits to their progenies. The choice for developing local x local hybrids was therefore, thought crucial in resolving problems pertaining to the poor adoption of forage sorghum hybrid in Sudan. In response to this situation, Mohammed (2004) was able to develop local females selected from the traditional cultivar Abu Sabin and crossed them to carefully selected local males chosen from Sudan Grass (Garawi) and Ankolib populations. Thus, a number of local x local hybrids were produced. Such hybrids are expected to greatly enhance the adoption process by making available cheap seed source of better adapted hybrids. The objective of this study was to evaluate the performance of some of these new locally developed forage sorghum hybrids in comparison to their parents, exotic hybrids and local checks.

Materials and Methods

The experiment was conducted for two years 2009 and 2010 in the Farm of the Collage of Agricultural Studies- Shambat (lat.15˚39' N; Long. 32˚31'E). The soil at Shambat is heavy clay with pH 8.5. Twelve locally developed forage sorghum hybrids (Table 1) were evaluated together with their parents against two commercial hybrids: Pannar888 and SafedMoti; and one local check: 'Kambal' (the recommended Abu Sabin cultivar). The hybrids were developed by. Mohammed-Forage Improvement Program-Shambat Research Station, ARC/ Sudan. The land was disc ploughed, disc harrowed and leveled by scraper to obtain a flat and fine seed bed. Ridging was done at 0.75 m spacing. Planting date of the first season was on 9.July.2009, whereas that of the second season was on 14.Oct.2010. Sowing was done manually by placing five seeds in holes spaced 10 cm on both sides of the ridge. Nitrogen fertilizer (urea) was added at the second irrigation at the rate of 54.7 kg N/ha. Irrigation water was applied at 10 to 15 days interval. Weed population was kept at minimum by hand weeding. Harvesting was done manually by cutting the plants at 5 to 7 cm above soil surface using hand sickle. Harvesting was carried out 5-7 days after each entry in each replication has completed 50% flowering, which simulates the local practice of harvesting forage sorghum. The treatments were arranged in Alpha lattice design (Patterson and Williams, 1976).

The green matter yield (GMY) was recorded from 4 m row harvested from each plot leaving 0.5 m at each side. Cutting was done at 5 to 7 cm above ground. The Dry matter yield (DMY) estimated from a random sample of 0.5 kg taken from the GMY of the harvested plot and air dried. Days to flowering were taken when 50% of the plants in the whole plot started to shed pollens. Plant height was measured from three randomly chosen plants. Leaf to stem ratio recorded from three plants randomly selected from the harvested plot. Using approximate analysis, three forage quality traits were determined viz: Neutral detergent fiber (NDF), acid detergent fiber (ADF) and crude protein (CP).

Single analysis of variance was performed for all characters before doing the combined analysis. The data were analyzed by both Alpha lattice and RCBD, and the results were found identical. Accordingly the results of Randomized Complete Block Design (RCBD) were considered (Patterson and Williams, 1976). Duncan's Multiple Range Test was used to separate the means. The statistical software package GenStat for windows (2006) was used to run the ANOVA in single years. The combined analysis and Duncan's Multiple Range Test were performed using the Agrobase Gen II (2008).

Table 1. The 12 local forage hybrids used in the study.

No.	Hybrid name	Type
1	S.134 × SG32-2A	Local × Local
2	S.134 × SG51	Local × Local
3	S.148 × SG32-2A	Local × Local
4	S.148×SG34	Local × Local
5	S.148×ANKSSS	Local × Local
6	S.3×SG32-2A	Local × Local
7	S.3×SG34	Local × Local
8	S.3×SG50	Local × Local
9	S.79×ANK42	Local × Local
10	S.93×SG34	Local × Local
11	S.134×Hastings	Local × Exotic
12	Hastings×S.70	Local × Exotic

Results

Agronomic Performance

Table 2 indicated that the effect of years was highly significant ($p < 0.01$) for all characters except leaf to stem ratio and plant height. Differences among entries were highly significant ($p < 0.01$) for all characters other than leaf to stem ratio. The interaction between years and entries was non-significant for all characters other than number of days to flowering.

Table 2. Mean squares from combined data over years for 5 characters in forage sorghum (Shambat, 2009 - 2010).

Source of variation	D.f.	Leaf to stem ratio	Days to flowering	Plant height (cm)	Dry matter yield(t/ha)	Green matter yield(t/ha)
Rep	2	23.95	17.87	754.0	0.399	11.46
Years (Y)	1	45.34	11092.05**	669.7	754.184**	6457.57**
Residual	2	7.89	4.47	443.3	0.729	2.41
Treatment (T)	29	25.42	375.39**	1249.4**	17.234**	315.28**
Y × T	27	15.25	125.46**	230.8	2.256	27.52
Residual	112	11.65	18.32	212.6	2.607	43.45

****, = significant at 0.01 probability level**

Forage yield

Table 3 shows the combined data for green matter yield and dry matter yield. The hybrids S.148×SG32-2A and S.148×ANKSSS showed the highest GMY averaging 43.5 and 37.7 t/ha, respectively. The DMY obtained by both hybrids was 9.8 and 9.2 t/ha, respectively. The best yielding parent ANKSSS averaged 32.3 and 7.7 t/ha in GMY and DMY, respectively. The check Kambal averaged 29.9 t/ha and 7.3 t/ha in GMY and DMY, respectively. The exotic hybrid Pannar888 ranked 6th in GMY averaging 33.7 t/ha. Its DMY was 7.8 t/ha. The exotic hybrid SafedMoti ranked 21st in GMY (26.8 t/ha) and 18th in DMY (7 t/ha).

Table 3.Green (GMY) matter yield, dry (DMY) matter yields from combined data (Shambat, 2009-2010).

Code	Name	Mean.GMY(t/ha)#	Code	Name	Mean.DMY(t/ha)#	Rank
5	S.148XSG32-2A	43.5 A	5	S.148XSG32-2A	9.8 A	1
6	S.148XANKSSS	37.7 AB	6	S.148XANKSSS	9.2 AB	2
8	S.3XSG32-2A	35.0 ABC	10	S.79XANK42	8.8 ABC	3
10	S.79XANK42	34.9 ABC	3	S.134XSG51	8.2 ABCD	4
11	S.93XSG34	34.6 ABC	12	E-35-1XS.70	8.2 ABCD	5
27	Pannar888(check)	33.7 BCD	7	S.3XSG34	8.0 ABCDE	6
12	E-35-1XS.70	33.4 BCD	27	Pannar888(check)	7.8 ABCDE	7
3	S.134XSG51	33.1 BCD	9	S.3XSG50	7.7 ABCDE	8
2	S.134XSG32-2A	32.7 BCD	8	S.3XSG32-2A	7.7 ABCDE	9
23	ANKSSS	32.3 BCD	23	ANKSSS	7.7 ABCDE	10
9	S.3Xsg50	31.0 BCDE	11	S.93XSG34	7.5 BCDE	11
4	S.148xSG34	30.8 BCDE	29	Kambal	7.3 BCDEF	12
7	S.3xSG34	30.7 BCDE	4	S.148XSG34	7.3 BCDEF	13
13	S.3	30.5 BCDEF	14	S.134	7.3 BCDEF	14
29	Kambal	29.9 BCDEFG	18	HastingsxS.70	7.3 BCDEF	15
20	SG32-2A	29.4 BCDEFG	2	S.134XSG32-2A	7.3 BCDEF	16
18	HastingsxS.70	29.0 BCDEFG	13	S.3	7.2 BCDEF	17
24	ANK42	28.8 BCDEFG	28	SafedMoti(check)	7.0 BCDEF	18
14	S.134	28.6 BCDEFG	20	SG32-2A	6.8 CDEF	19
15	S.148	28.3 CDEFG	19	SG34	6.5 DEF	20
28	SafedMoti(check)	26.8 CDEFG	15	S.148	6.5 DEF	21
1	S.134xHastings	25.8 CDEFG	24	ANK42	6.3 DEF	22
21	SG50	25.8 CDEFG	1	S.134XHastings	6.3 DEF	23
19	SG34	24.9 DEFG	26	S.70	5.8 EF	24
22	SG51	22.6 EFG	21	SG50	5.8 EF	25
26	S.70	21.5 FG	22	SG51	5.8 EF	26

16	S.79	21.2	G	25	Hastings	5.2	F	27
25	Hastings	19.7	G	16	S.79	5.0	F	28
17	S.93	19.0	G	17	S.93	3.8	F	29
30	E-35-1	11.7	G	30	E-35-1	3.3	F	30
	Mean	**28.898**			**Mean**	**6.956**		
	S.E±	**2.6**			**S.E±**	**0.637**		
	C.V (%)	**22.42**			**C.V (%)**	**22.43**		

#: Means with letter in common are not significantly different at 0.05 Probability level according to Duncan's multiple range test

Yield related traits

The combined data over the two years (Table, 4) showed that the plant height for hybrids ranged from 176 cm (obtained by S.93 × SG34) to 200 cm (obtained by S.148xSG32-2A). Plant height for parents ranged from 128 to 192 cm shown by E-35-1 and S.134, respectively. For checks, Kambal scored the highest value for plant height (204 cm) whereas the check hybrid Pannar 888 showed the lowest value (188 cm). For leaf to stem ratio, the hybrids ranged from 36.6 % to 45.1% scored by S.148×SG32-2A and S.134×SG32-2A, resp-ecttively. The parents ranged from 40.6 % to 48%. The checks ranged from 39.8%, to 42.2 shown by Kambal and Pannar 888, respectively.

Table 4.Performance of forage sorghum hybrids, their parents and checks for yield related traits from combined data. (Shambat. 2009-2010).

Name	Leaf to stem Ratio (percentage)	Plant height(cm)	Days to flowering
S.134xHastings	43.6	197	66.3
S.134xSG32-2A	45.1	188	58.8
S.134xSG51	40.6	195	64.8
S.148xSG34	42.9	190	59.5
S.148xSG32-2A	36.6	200	57.5
S.148XANKSSS	40.1	197	76.5
S.3xSG34	41.1	189	62.5
S.3xSG32-2A	40.1	196	58.3

S.3xSG50	41.1	188	55.5
S.79xANK42	42.8	186	56.0
S.93xSG34	42.6	176	55.5
E-35-1xS.70	43.4	196	72.7
HastingsxS.70	43.9	192	71.0
S.3	42.9	187	65.3
S.134	41.0	192	67.5
S.148	44.5	182	61.0
S.79	42.9	166	54.0
S.93	40.8	161	54.5
SG34	48.0	175	66.2
SG32-2A	41.4	185	59.3
SG50	43.2	179	60.5
SG51	42.5	187	61.5
ANKSSS	40.6	178	81.3
ANK42	42.1	183	61.2
Hastings	40.6	182	72.7
E-35-1	43.1	128	81.5
S.70	42.3	172	77.7
Pannar888	42.2	188	58.3
SafedMoti	40.7	192	63.3
Kambal	39.8	204	69.7
Mean	**42.1**	**184.8**	**64.4**
S.E±	**1.4**	**5.98**	**1.75**
C.V (%)	**7.97**	**7.9**	**6.7**
LSD(0.05)	**3.83**	**16.7**	**4.9**

Table 5 shows the percentages of crude protein (CP), neutral detergent fiber (NDF) and acid detergent fiber (ADF) of forage sorghum hybrids, their parents and the checks. The mean of CP percentage was 6.5%, the highest hybrid in the percentage of

CP was E-35-1×S.70 (8.6%) and the lowest was S.134×SG32-2A (4.9%). Among parents S.134 was the highest (8.3%) and SG50 was the lowest (5.1%). The CP shown by the check SafedMoti was 6.5% higher than the checks Kambal (5.8%) and Pannar888 (5.1%).

Table 5. Percentage neutral detergent fiber (NDF), crude protein (CP) and acid detergent fiber (ADF) of forage sorghum hybrids and their parents, grown at (Shambat 2009)

Name	NDF	CP	ADF
S.134xHastings	59.0	7.2	32.5
S.134xSG32-2A	66.0	4.9	36.0
S134xSG51	74.0	6.3	37.0
S.148xSG34	63.0	7.9	40.5
S.148xSG32-2A	62.0	5.5	57.5
S.148xANKSSS	64.0	6.4	37.0
S.3xSG34	61.0	7.2	33.0
S.3xSG32-2A	67.0	7.9	39.5
S.3xSG50	61.5	5.8	34.0
S.79xANK42	59.0	6.2	35.0
S.93xSG34	63.0	7.6	32.5
E-35-1xS.70	67.0	8.6	33.5
HastingsxS.70	71.0	6.2	45.0
S.3	65.0	6.2	37.0
S.134	60.0	8.3	35.0
S.148	63.0	6.5	33.0
S.79	58.0	7.6	36.0
S.93	63.0	7.2	32.0
SG34	75.0	5.8	45.0
SG32-2A	71.0	5.5	43.0
SG50	63.5	5.1	40.0

SG51	64.0	5.8	49.0
ANKSSS	75.0	5.5	45.0
ANK42	59.0	6.2	35.0
Hastings	61.0	7.2	41.5
S.70	64.0	7.6	45.0
Pannar888	60.0	5.1	35.0
SafedMoti	72.0	6.5	44.0
Kambal	60.5	5.8	35.0
E-35-1	58.0	7.2	37.0
Mean	**64.3**	**6.5**	**38.7**
S.E±	**0.2158**	**0.2921**	**0.3399**

The mean of NDF was 64.3%. The hybrids S.79×ANK42 and S.134xHastings were the lowest in NDF percentages than the other hybrids scoring similar values of 59%. The highest NDF value was shown by S.134×SG51 (74%). The hybrid S.148×SG32-2A gave 62% NDF value. Among parents, the lowest NDF value was expressed by S.79 (58%) whereas ANKSSS and SG34 were the highest (75%). The checks Pannar888 and Kambal showed comparable NDF values (61.0%) whereas the NDF shown by the check SafedMoti was high (72%). The mean of ADF percentage was 38.7%. The hybrid S.148×SG32-2A showed high ADF value amounting to 58%. The hybrids S.134 x Hastings and S.93×SG34 expressed the lowest ADF percentage values (32.5%). Among parents the female S.93 was the best in ADF (32%). The checks Kambal and Pannar888 gave similar ADF values (35%) better than the check SafedMoti (44%).

Discussion

Differences between genotypes for forage yield, plant height and days to flowering appeared to be due to genetic effects as pointed by the highly significant differences ($p < 0.01$) detected among them for these characters. On the other hand, the genotypes differed insignificantly for leaf to stem ratio in the combined analysis. It could be noticed that mean squares for leaf to stem ratio, when compared to that obtained for other traits, were not large enough relative to interaction and error mean squares. Interaction between years and genotypes for days to flower was highly significant ($P < 0.01$) indicating that performance of genotypes for this character is inconsistent across years. Some of the local hybrids significantly excelled the introduced commercial hybrids in forage yield. The hybrid S.148xSG32-2A merits special consideration. While it was leading in forage yield, (out-yielding Pannar888 the best performing commercial hybrid) it was also the earliest hybrid to flower. Bringing together high forage yield with earliness in one cultivar is not an easy task due to unfavorable association encountered between the two characters (Ross et al., 1983). However, in case of the hybrid S.148xSG32-2A, this might be explained by the successful parental choice involved in this hybrid. Both the female (S.148) and the male (SG32-2A) were reported to be good combiners for earliness and high forage yield (Mohammed, 2010). Earliness is a highly valued character under the local forage production system that requires fast growing, highly productive cultivars to minimize costs of production (Mohammed et al, 2009). Thus, the hybrid S.148xSG32-2A could largely meet the farmer's preference in producing high quantities of forage in a relatively short period of time. The comparatively low leaf to stem ratio observed for this hybrid might be one of the drawbacks observed for this hybrid, nonetheless, this trait is not essential in the prevalent production system in which quality attributes are not largely appreciated due to the fact that fodders are mainly produced as cash crops. The local hybrid S.148xANKSSS ranked second in forage yield with acceptable leaf to stem ratio; however, it was the latest to flower. The male parent ANKSSS was reported by Mohammed (2010) to be poor combiner for earliness but among the best combiners for high forage yield. Late flowering hybrids might not be adopted by farmers growing fodders as cash crops under cut-and carry system, but are usually preferred under grazing system to allow for prolonged utilization of the pasture before the nutritive value is lowered by flowering. Grazing systems are not yet adopted in the Sudan but are likely to be in the near future in view of the increased attention given to modern dairy and fattening schemes whereby new production systems are needed to maximize productivity of milk and live-weight gain. Some of the newly developed hybrids scored comparatively reasonable values for protein content (> 7.5%), NDF (< 65%) and ADF (< 40%). The NDF measures intake potential while ADF predicts digestibility. Dry matter intake is negatively related to NDF content in high producing dairy cows (Mertens,1987) and was also found to be negatively related to digestibility (Argillier et al.,2000). The hybrid S.148xSG32-2A showed NDF value below 65% and was better in this regard than the exotic commercial hybrid SafedMoti that scored above 70%. Mohammed and Talib, (2008) reported that hybrids low in NDF percentage appear to be attainable in forage sorghum without sacrificing high yield levels. However, the ADF value shown by this hybrid is fairly high (57%) and may possibly points to its poor digestibility. The protein content shown by S.148xSG32-2A was low (5.5 %), yet it was similar or even better than the commercial hybrid Pannar888 (5.1%). The adverse relationship of forage yield and protein content is common in the literature (Mohammed and Talib, 2008; Scapim et al, 1998; Sanderson et al; 1994). Quality aspects are more crucial in breeding for forage crops. Therefore, in future programs, screening for the nutritional value should be carried in the earlier stages of the breeding program. Although this will be more expensive, yet it is the only way to achieve tangible improvement in forage quality.

Conclusion

The study carried for evaluation of 12 locally developed forage sorghum hybrids revealed highly significant differences among genotypes for all studied traits other than leaf to stem ratio. Interaction between years and genotypes for days to flower was highly significant indicating the inconsistency of genotypes over years for this trait. The study revealed that some of the local hybrids significantly excelled the introduced commercial hybrids in forage yield. The hybrid S.148xSG32-2A was unique in combing high forage yield with earliness. This has been explained by the successful parental choices involved in this hybrid which were reported to be good combiners for forage yield and earliness. The hybrid was expected to meet the farmer's preference in producing high quantities of forage in a relatively short period of time. The low leaf to stem ratio observed for this hybrid was considered to have little or no impact in a production system appreciating quantity rather than quality attributes. Another locally developed late flowering, highly productive and leafy hybrid (S.148xANKSSS) was considered suitable under grazing systems which are due to emerge in view of the increased attention given to modern dairy and fattening schemes. Some of the locally developed hybrids scored comparatively reasonable values for protein content (> 7.5%), NDF (< 65%) and ADF (< 40%). The hybrid S.148xSG32-2A which was leading in forage yield appeared to be of less digestibility (ADF = 57%) and low protein content (5.5%). This calls for screening the nutritional aspects in an earlier stage of the breeding program. Although this will be more expensive, yet it is the only way to achieve tangible improvement in forage quality.

References

Agrobase Gen II (2008) version 18.5.1 Agronomix software, inc. Canada.

Argillier, O.; Mèchin, V. and Barrière, Y. (2000). Inbred line evaluation and breeding for digestibility-related traits in forage maize. *Journal of Crop Science* **40**:1596-1600.

Genstat. (2006). Ninth edition, Version **9**.1.0.174. Lawes Agricultural Trust (Rothamsted Experimental Station) VSN International, Hertfordshire. UK.

Mertens. D. R. (1987). Predicting intake and digestibility using mathematical models of ruminal function *J. Anim. Sci*. **64**: 1548-1558.

Mohammed, Maarouf, I. (2004). Development of male sterile forage Sorghum genetic stocks in A3 cytoplasm. *Sudan Journal of Agricultural Research* **4**: 89-92

Mohammed, Maarouf, I. (2007). Potential of locally developed forage Sorghum hybrids in the Sudan. *Scientific Research and Essay* **2**: 330-337.

Mohammed, Maarouf, I. and Nuha H. Talib (2008). Heterosis and combining ability for quality traits in forage sorghum. *Australian Journal of Basic and Applied Sciences.* **2**: 99-104.

Mohammed, Maarouf I. Ghada H. Abdulrahman, Moataz A. Mohamed, Nuha H. Talib and Hassan A. A. Tambal (2009). Proposal for the release of introduced sweet sorghum genotypes for forage production in the Sudan. A paper submitted to the Variety Release Committee, Khartoum. Sudan.

Mohammed, Maarouf, I. (2010). Proposal for the release of new local by local (Abu Sabin X Garawi) forage Sorghum Hybrid. A paper submitted for the Variety Release Committee. October, 2009, Khartoum. Sudan.

Patterson, H. D. & Williams E. R. (1976). new class of resolvable incomplete block designs. *Biometrika,* **63**: 83-92.

Ross, W. M.; Groz, H. J.; Haskins, F. A.; Hookstra, G. H.; Rutto, J. K. and Ritter, R. (1983). Combining ability effects for forage residue traits in grain sorghum hybrids. *Crop Science* **23**: 97-101.

Sanderson, M. A., Miller, F. R., and Jones, R. M. (1994). Forage quality and agronomic traits of experimental forage sorghum hybrids. MP-1759. Texas Agricultural. Experimental Station

Scapim, C. A.; Rodrigues, J. A. S.; Cruz, C. D.; Cecon, P. R.; Ribeiro Junior, J. I. and Braccini, A. de L. (1998). Genetic effects, heterosis, and inbreeding depression in forage sorghum characters. *Bragantia. Journal.* **57**: 81-94.

تقويم سلالات جديدة من اعلاف الذرة الرفيعة المطورة محلياً

رشيدة عبدالله[1] ، معروف إبراهيم[1] ، أحمد على عثمان[2]

1. هيئة البحوث الزراعية محطة ابحاث شمبات – السودان

2.جامعة السودان للعلوم والتكنولوجيا . شعبة علوم المحاصيل

المستخلص

تم اجراء التجربة بمزرعة كلية الدراسات الزراعية جامعة السودان للعلوم والتكنولوجيا شمبات لعاميين متتاليين (2009–2010) لدراسة الاداء الحقلى لعدد من هجن اعلاف الذرة الرفيعة التى تم تطويرها محلياً تم تقييم 12 هجين مقارنة مع الاباء و ثلاثة شواهد أثنان منها هجن تجارية مستوردة بالأضافة للصنف المجاز "أبو سبعين كمبال". تم ترتيب المعـــاملات داخل تصميم الفا الشبكي (Alpha Lattice). تضمنت الدراسة تقييم الاداء الحقلى والصفات التغذوية . تم العثـــور علـــى فروقات معنوية عالية بين الأنماط الوراثية لكل الصفات قيد الدراسة عدا نسبة الاوراق للسا ق. اوضحت الدراســـة تفـــوق بعض الهجن المحلية على المستوردة فى الانتاجية وبالتحديد الهجين S.148 x SG32-2A حيث انه جمـــع بـــين صـــفتى الانتاجية والتبكير فى الازهار ومن المتوقع ان يجد القبول من المزارعين حيث انه يعطى كمية عالية من الكتلة العلفية فـــى وقت وجيز و هو ما يرغبه المزارعون. انخفاض نسبة الاوراق للساق لهذا الهجين ليس لها تأثير سالب بالنظر الـــى أن نظام الانتاج السائد يهتم بالكمية أكثر من النوعية . الهجين المحلى S.148XANKSSS متاخر فى الازهار عالى الانتاجيـــة ومورق و هو بهذا لا يصلح تحت نظام الأنتاج التقليدى و لكنه يناسب نظام الرعى و النظم السائدة فى المشاريع الحديثـــة التى تهتم بالتسمين وانتاج الالبان و التى بدأت فى الظهور هذه الأيام. احتوت بعض الهجن المحلية على نسبة معقولة من البروتين . الهجين S.148 x SG32-2A عالى الانتاجية الا انه ابدى قلة فى الهضميه والمحتوى البروتينـــى. هـــذا يـــدعو لتحرى الجوانب التغذوية فى مرحلة مبكرة من برنامج التربية الخاصة بتحسين الأعلاف.