



SPH-1635 – A dual purpose high yielding *Kharif* sorghum hybrid

R.B. GHORADE, V.V. KALPANDE AND S.A. BHONGLE*

All India Coordinated Sorghum Improvement Project, Sorghum Research Unit (Dr.P.D.K.V.), AKOLA (M.S.) INDIA
(Email : sabhongle@rediffmail.com)

Abstract : SPH 1635 is the new, dual purpose *Kharif* sorghum hybrid developed by using a new diverse ms line AKMS 30 A with restorer AKR 456. It is a mid late maturity hybrid maturing in 108 days. In the project trials it had recorded 2.23 % more grain yield over CSH 16 and 14.37 % more over CSH 23 on all India basis. While, for fodder yield it gave 14.58 % and 19.55 % increase in yield over CSH 16 and CSH 23, respectively. Similarly in the state trials, this hybrid gave 25.10 % increased grain yield over CSH 14 and 7.32 % over CSH 16 while for fodder yield this hybrid showed 14.76 % and 6.07 % more yield over CSH 14 and CSH 16, respectively. In the university trials SPH 1635 exhibited 8.95 %, 24.92 % and 25.23 % increased grain yield over CSH 9, SPH 840 and CSH 16, respectively and for fodder yield the increase was 15.35 %, 16.71 % and 23.07 % over popular hybrid CSH 9, SPH 840 and national release CSH 16, respectively. This hybrid gave higher grain and fodder yield over the check CSH 9 in the adaptive trials on farmers field. Similarly this hybrid recorded promising performance against major pest and diseases as compared to the checks. Further, the grain and stover quality parameters of the said hybrid have been promising and comparable with widely used checks. Therefore SPH 1635 has been identified for release for commercial cultivation in the Vidarbha region of Maharashtra at joint agrosco held at Akola during 2012.

Key Words : Dry fodder yield, Grain yield, Grain mold, Shoot fly

View Point Article : Ghorade, R.B., Kalapande, V.V. and Bhongle, S.A. (2014). SPH-1635 – A dual purpose high yielding *Kharif* sorghum hybrid. *Internat. J. agric. Sci.*, 10 (1): 134-137.

Article History : Received : 20.03.2012; Revised : 01.10.2013; Accepted : 27.10.2013

INTRODUCTION

Sorghum [*Sorghum bicolor* (L) Moench] is one of the important food crops of the world. Sorghum is the fifth most important cereal crop on the global level. In India sorghum is cultivated during both rainy (*Kharif*) and post rainy (*Rabi*) season. Maharashtra is the largest sorghum grower (54% area) and produces (49.5%) followed by Karnataka, Madhya Pradesh and Andhra Pradesh (Anonymous, 2010). In Maharashtra area under *Kharif* sorghum is 8.82 lakh hectare out of which 2.23 lakh hectare area is in the Vidarbha region (Anonymous, 2011). Because of the dual purpose utility of the sorghum as food and fodder crop and with the increasing bovine population, the farmers of this region will continue to grow the sorghum. Further, this is the most assured crop of the rainfed agriculture with highest biomass production

even under scarcity seasons. Being C4 plant it can utilize sunlight and water efficiently. It is unique to adopt to environmental extremes of a biotic and abiotic stresses. Over the decades hybridization has increased the yield levels of sorghum. MS 296 A is the most extensively used female for hybrid development. There is need to exploit superior hybrid combinations with diverse female lines other than MS 296 A.

Keeping this fact in consideration, a superior dual purpose new *Kharif* sorghum hybrid SPH 1635 has been developed by this unit by using new male sterile line AKMS 30 A and restorer AKR 456. Seed production of this hybrid is easy and no staggered sowing of male and female is required for hybrid seed production. This hybrid has been released for the Vidarbha region of Maharashtra state by the varietal release committee of joint agrosco – 2012 at Akola

(Anonymous, 2012). It required about 69 days to 50 % flowering and 108 days for maturity and hence, categorized under mid late group maturity.

MATERIAL AND METHODS

The breeding programme for development of new diverse male sterile lines and restorer lines suitable for *Kharif* season has been undergoing at this station and as a result superior hybrid SPH 1635 has developed by using a new diverse female line AKMS 30 A with restorer AKR 456. This hybrid has been tested in University multilocation trials from 2005-06 to 2011-12. Similarly, in the state trials the hybrid has been tested from 2005-06 to 2007-08 and in the project coordinated trials it has been tested during 2008-09, 2009-10 and 2011-12.

The hybrid has been tested for reaction to major pest and diseases. Similarly the grain and stover quality parameters were also assessed. Thus the performance of this hybrid has been tested along with the checks across various

experimental trials as well as on farmers field in adaptive trials. The statistical analysis was carried out according to Panse and Sukhatme (1967).

RESULTS AND DISCUSSION

The promising hybrid SPH 1635 developed by combination of AKMS 30 A and AKR 456 was tested in various project, state and university multilocation trials.

Performance of SPH 1635 across different trials:

In the project coordinated project hybrid trials (Table 1), the hybrid SPH 1635 has been tested at national level for three years across 45 locations for grain yield and 50 locations for fodder yield along with the checks. On the Maharashtra basis the hybrid has been tested on 15 locations for grain yield and 17 locations for the fodder yield. For grain yield, considering the average of three years, the hybrid SPH 1635 recorded 2.23 % more grain yield over CSH 16 and 14.37 % more over CSH 23. While for fodder yield SPH

Table 1 : Summary of grain and fodder yield (q/ha) in project trials (Maharashtra basis) during *Kharif* 08-09, 09-10 and 11-12

Years	No. of trials (locations)	Proposed hybrid SPH -1635	Checks	
			CSH - 16	CSH -23
Grain yield (q/ha)				
2008-09	3	54.41	43.73	3.85
2009-10	5	38.80	42.20	38.79
2011-12	7	46.18	46.33	44.05
Overall Average	15	45.36	44.37	39.66
% increase or decrease over the checks	15	-	2.23	14.37
Fodder yield (q/ha)				
2008-09	3	151.57	118.36	111.89
2009-10	7	132.04	112.47	118.96
2011-12	7	120.86	114.21	98.95
Overall average	17	130.88	114.22	109.47
% increase or decrease over the checks	17	-	14.58	19.55

Table 2 : Summary of grain and fodder yield (q/ha) in state trials during *Kharif* 2005-06, 2006-07 and 2007-08

Years	No. of trials (locations)	Proposed hybrid SPH -1635	Checks	
			CSH - 14	CSH -16
Grain yield (q/ha)				
2005-06	9	37.90	32.73	34.06
2006-07	8	45.67	32.14	42.41
2007-08	8	37.81	31.82	36.79
Overall average	25	40.36	32.26	37.61
% increase or decrease over the checks	25	-	25.10	7.32
Fodder yield (q/ha)				
2005-06	6	109.00	97.00	97.00
2006-07	7	127.7	109.8	122.8
2007-08	5	114.00	99.0	111.00
Overall average	18	117.66	102.53	110.92
% increase or decrease over the checks	18	-	14.76	6.07

1635 gave 14.58 % and 19.55 % increased yield over CSH 16 and CSH 23, respectively (Table 1).

In the state trial (Table 2), this hybrid was tested for three years (2005-06 to 2007-08) across 25 locations for grain yield and 18 locations for fodder yield along with the checks. Considering the average of three years, for grain

yield the hybrid SPH 1635 showed 25.10 % increased grain yield over CSH 14 and 7.32 % over CSH 16. While for fodder yield, this hybrid showed 14.76 % and 6.07 % more yield over CSH 14 and CSH 16, respectively (Table 2).

In the University trials (Table 3), the hybrid was tested for seven years across 19 locations along with the checks.

Table 3 : Summary of grain and fodder yield (q/ha) in university multilocation trials from 2005-06 to 2011-12

Years	No. of trials (locations)	Proposed hybrid SPH -1635	Checks		
			CSH - 9	CSH -16	SPH - 840
Grain yield (q/ha)					
2005-06	2	48.08	42.03	44.04	40.01
2006-07	3	44.62	43.35	40.98	40.66
2007-08	3	39.50	40.47	35.63	34.72
2008-09	3	53.97	51.56	35.65	39.96
2009-10	3	50.49	45.86	-	38.69
2010-11	2	46.06	39.41	30.86	36.44
2011-12	3	57.77	48.20	44.32	42.50
Overall Average	19	48.81	44.80	38.72*	39.07
% increase or decrease over the checks	19	-	8.95	25.23*	24.92
Fodder yield (q/ha)					
2005-06	2	113.96	84.76	91.41	89.63
2006-07	3	120.41	115.98	111.39	122.62
2007-08	3	147.54	110.20	100.56	116.01
2008-09	3	128.04	130.42	101.14	115.38
2009-10	3	136.28	117.83	-	111.74
2010-11	2	121.56	107.79	117.76	108.02
2011-12	3	125.59	103.59	98.84	100.66
Overall Average	19	128.66	111.53	103.38*	110.23
% increase or decrease over the checks	19	-	15.35	23.07*	16.71

(* - figures for six years only)

Table 4 : Adaptive trials of SPH 1635 during *Kharif* 2011-12

Hybrid	Average performance (q/10 R) in 15 adaptive trials			
	Grain yield (q/10 R)		Fodder yield (q/10 R)	
	SPH 1635	CSH 9	SPH 1635	CSH 9
Average	4.88	3.94	15.07	13.09
% increase /decrease over the check	-	23.85	-	15.12

Table 5 : Summary of reaction to major pest & diseases under artificial epiphytotic conditions (Average of three years of project trials)

Pest / Diseases	No. of trials	SPH - 1635	Checks	
			CSH 16	CSH 23
Major pest				
Shoot fly dead hearts (%) 28 DAE	21	57.12	64.50	60.86
Shoot fly eggs per 5 plants numbers	7	3.3	3.71	5.11
Stem borer dead hearts (%) 45 DAE	19	16.32	13.37	17.86
Major diseases				
Grain mold field grade (1 to 9 rating)	15	3.50	4.15	4.64
Grain mold threshed grade (1 to 9 rating)	6	2.69	4.32	4.76
Grain affected %	4	30.07	41.62	44.10
Germination %	6	64.26	56.18	57.81
Ergot %	4	6.9	8.22	8.65

Table 6 : Summary of grain and stover quality parameters of SPH 1635 in AICSIP trials – Kharif 2009-10 and 11-12

Traits	No. of locations	SPH -1635	Checks	
			CSH - 16	CSH -23
Grain quality parameters				
Starch %	7	66.79	65.36	66.29
Protein %	7	8.65	8.56	8.50
Fat %	5	2.46	2.82	2.45
Stover quality parameters				
Ash %	9	11.32	11.71	11.45
CP %	8	6.98	6.75	6.92
NDF %	9	66.44	66.81	65.33
ADF %	9	45.66	46.49	44.70
IVOMD %	9	46.91	45.10	47.33

Considering the average for seven years, the hybrid SPH 1635 exhibited 8.95 % higher grain yield over the check CSH 9 and 24.92 % over another check SPH 840. Another check CSH 16 was tested for six years over 16 locations and the hybrid SPH 1635 was superior by 25.23 % over CSH 16 for grain yield. For fodder yield, the hybrid SPH 1635 was superior over CSH 9 by 15.35 % and over SPH 840 by 16.71 %. While this hybrid showed 23.07 % increase over CSH 16 (Anonymous, 2012).

The hybrid SPH 1635 was evaluated along with popular check CSH 9 on farmers field in adaptive trials. The data of 21 trials indicated that the hybrid SPH 1635 yielded higher grain yield (4.88 q/10 R) than the check CSH 9 (3.94 q/10 R) which was higher by 23.85 %. Similarly fodder yield of SPH 1635 (15.07 q/10 R) was higher by 15.12 % as compared to that of the check CSH 9 (13.09 q/10 R) (Table 4).

Reaction to major pests and diseases:

The hybrid SPH 1635 recorded promising performance against major pest and diseases as compared to the checks in the project entomology and pathology trials during 2008-09, 2009-10 and 2011-12 (Table 5).

Grain and stover quality of SPH 1635:

The grain and stover quality of the hybrid SPH 1635 along with the checks was assessed in the project trials during 2009-10 and 2011-12 (Table 6). The hybrid SPH 1635 has shown comparable values of grain and stover quality parameters as that of the checks.

Taking into consideration increased grain and fodder yield along with promising performance against major pest and diseases, comparable grain and stover quality parameters and ease in seed production, the dual purpose *Kharif* hybrid SPH 1635 was recommended for release for Vidarbha region of the Maharashtra State by the varietal release committee of the joint agrosco 2012 held at Akola.

REFERENCES

- Anonymous (2010). Agricultural statistical at a glance. Dept. of Agriculture and Co operation, Ministry on Agriculture, agricoop.nic.in
- Anonymous (2011). Joint AGROSCO report 2012.
- Anonymous (2012). Joint AGROSCO Report- 2012.
- Panse, V.G. and Sukhatme, P.V. (1967). *Statistical methods for agricultural workers*. 6th Edn. CAR publication, New Delhi, 117-186.

10th
Year
★★★★★ of Excellence ★★★★★