Progress and achievements in forage Sorghum Breeding: 2016-17

Trial	No.
Multi-location	3
Collaborative experiments	2

Team

North zone: Anand, Hisar, Pantnagar, Udaipur, Deesa, Ludhiana, Surat, Jhansi, Diggi

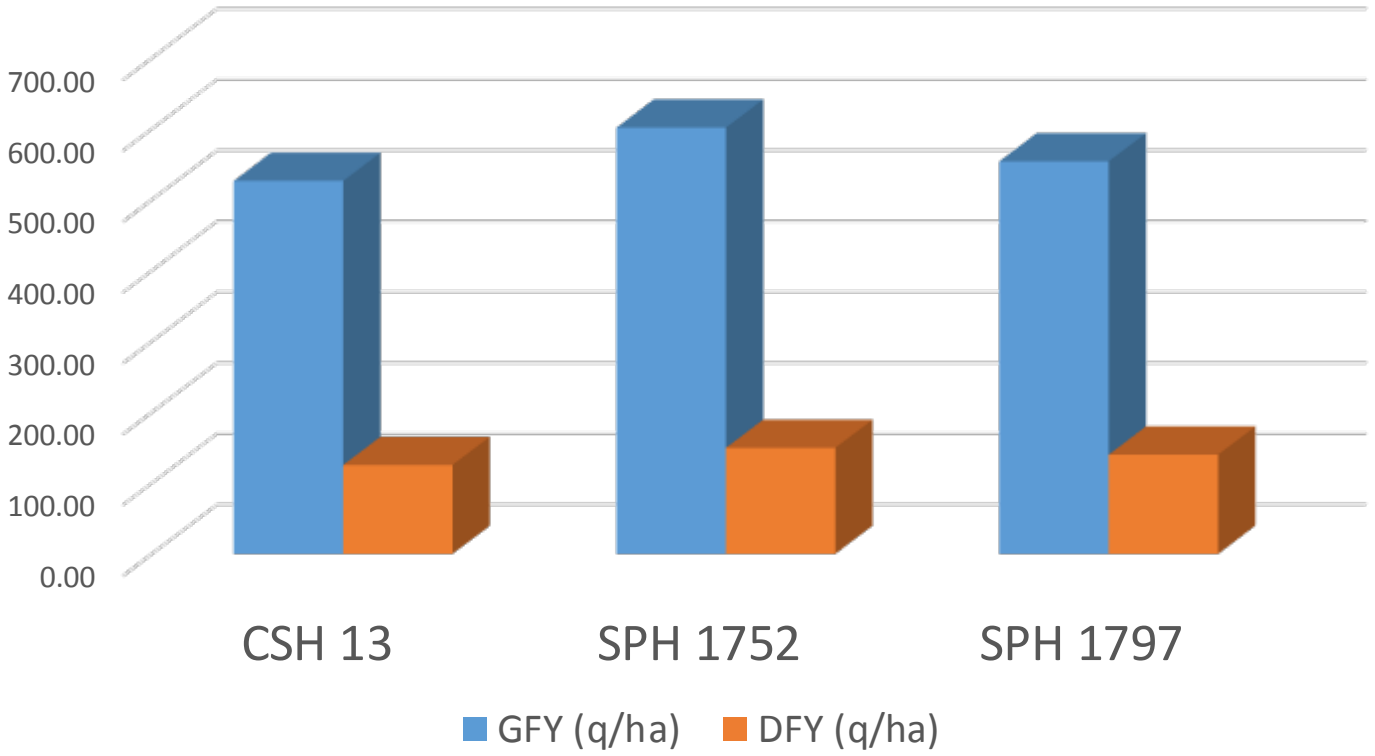
South zone: Coimbatore, Solapur, Akola, Rahuri, Mandya, Urulikanchan, Chamarajanagar, Vellayani

Major Recommendations & action taken

Recommendation	Action taken
The plot size mentioned in the technical program should be strictly followed by all the centres.	Now followed by most centres; emphasized again
The population per meter row length should be mentioned while sending the data.	Data received from all centres
The hybrids made under inter-institutional hybrid making program will be evaluated at the centres Pantnagar, Hisar, Ludhiana, Akola and IIMR based on the quantity received.	Was taken up by three of the centres based on the quantity of seed available.
The selections made out of the segregating material of the crosses made to improve multicut and single cut forages should be advanced a generation by the respective centres.	Followed by respective centres; to be evaluated in more centres next year
Hisar centre will conduct forage quality analysis for the samples from Udaipur, Surat, Pantnagar, Coimbatore and Deesa.	Was followed

Single Cut- AVHT

Across zones



Hybrid	% > over check CSH 13	
	GFY	DFY
SPH 1752	14.29	19.24
SPH 1797	5.23	11.57

Single-cut: AVHT Zone II

Genotype	GFY (q/ha)	% Increase over check	DFY (q/ha)	% Increase over check
CSH 13	451.14		142.58	
SPH 1752	542.06	**20.15**	180.65	**26.70**
SPH 1794	482.08	**6.86**	153.25	**7.48**
SPH 1797	503.44	**11.59**	163.58	**14.73**
CSV 21F	449.37		144.88	
SPV 2316	485.23	**7.98**	154.72	**6.79**
SPV 2387	479.02	**6.60**	155.88	**7.59**
SPV 2388	492.72	**9.65**	159.86	**10.34**

Forage Sorghum Trials

Single-cut Hybrid - 4 years evaluation

Entry	Year	Yield								Quality			
		GFY (q/ha)		DFY (q/ha)		GFY/day (q/ha)		DFY/day (q/ha)		PY (q/ha)		DDM (q/ha)	
			R		R		R		R		R		R
SPH 1752	2013	553	1	181	1	7.04	1	2.31	1	12.7	1	89.0	1
	2014	564	2	166	2	6.91	3	2.03	3	13.4	2	80.8	2
	2015	517	3	153	1	6.52	4	1.96	1	11.3	2	60.3	4
	2016	602	1	150	1	7.90		1.90	1	8.08	5	79.7	1
	Mean	**559**		**163**		**7.1**		**2.1**		**11.4**		**77.5**	
CSH 13	2014	536	4	154	11	6.95	2	1.99	6	11.8	10	70.8	12
	2015	484	5	132	6	6.6	3	1.86	4	7.83	9	46.2	9
	2016	527	7	126	8	7.4	5	1.7	4	8.52	2	78.2	8
	Mean	516		137		7.0		1.85		9.38		65.1	
% Increase		**8.33**		**18.98**		**1.43**		**13.51**		**21.54**		**19.05**	

SPH 1752 recorded 8.33% superiority for GFY and 18.98% superiority for DFY

Single-cut Hybrid - 3 years evaluation

Entry	Year	Yield		Quality	
		GFY (q/ha)	DFY (q/ha)	Protein yield (q/ha)	Digestible dry matter (q/ha)
SPH 1797	2014	566	177	14.61	82.3
	2015	559	149	13.01	73.2
	2016	554	140	8.46	75.3
	Av	**560**	**155**	**12.67**	**77.9**
% Increase		**8.01**	**12.95**	**16.36**	**18.82**
CSH 13	2014	536	154	11.8	70.8
	2015	484	132	7.83	46.2
	2016	527	126	8.52	78.2
	Av	**516**	**137**	**9.38**	**65.1**

SPH 1797 recorded 8% superiority for GFY and 13% superiority for DFY

Forage hybrid with **A_2 cytoplasm based male sterility system (11A_2 x Pant Chari 5)**

Single-cut variety - 3 years evaluation

Year of testing	GFY (q/ha)			DFY (q/ha)		
	SPV 2317	CSV 21F	CSV 30F	SPV 2317	CSV 21F	CSV 30F
2014	512.9	453.9	488.7	155.6	138.2	146.1
2015	537.1	466.3	447.6	149.9	130.1	131
2016	538.33	517.82	512.43	129.32	125.84	124.22
Mean	528.78	480.44	485.75	144.81	131.39	133.85
% Increase		**10.06**	**8.86**		**10.21**	**8.19**

SPV 2317 test variety

- more than 10% superiority over check CSV 21F for fodder yield
- more than 8% superiority over check CSV 30F for fodder yield
- on par with checks for stress resistance and forage quality

Multi-cut Trial- IAVHT MC

Performance of hybrids/varieties - All India

Entry	GFY (q/ha)	% +/- over SSG 59-3	% +/- over CSH 24 MF	DFY (q/ha)	% +/- over SSG 59-3	% +/- over CSH 24 MF
CSH 24MF	878.2			222.3		
SPH 1807	938.3		**6.84**	243.2		**9.40**
SPH 1840	910.0		**3.62**	231.6		**4.18**
SPH 1841	875.5		**-0.31**	225.2		**1.28**
SPV 2422	871.4	**0.37**		220.7	**0.16**	
SSG 59-3	868.2			220.3		
CD(5%)	107.0			32.3		

SPH 1807 recorded 6.8 % increase in green fodder yield and 9.4 % increase in dry fodder yield across zones

IVAHT-MC Zone I

Performance of hybrids/varieties – Zone I

Entry	GFY (q/ha)	% +/- over SSG 59-3	% +/- over CSH 24 MF	DFY (q/ha)	% +/- over SSG 59-3	% +/- over CSH 24 MF
SPH 1768	773.9		2.48	174.6		6.37
SPH 1807	771.0		2.10	183.8		12.00
SPH 1838	764.1		1.18	169.8		3.47
SPH 1840	830.7		10.00	184.4		12.34
SPH 1841	777.9		3.01	183.0		11.52
SPV 2422	917.9	13.55		209.2	10.48	
SSG 59-3	808.4			189.4		
CD(5%)	106.9			28.4		

SPV 2422 & SPH 1840 exceeded the check >10% for fodder yield

Single-cut: IVHT

Performance of hybrids/varieties in (AVHT-SC) – Zone II

Entry	GFY (q/ha)	Rank	% increase over CSH 13	% increase over CSV 30F	DFY (q/ha)	Rank	% increase over CSH 13	% increase over CSV 30F
CSH 13	433.75	2			128.87	2		
CSV 21F	361.82	18			106.14	18		
CSV 30F	377.11	16			112.92	12		
SPH 1858	481.98	1	11.12		139.30	1	8.10	
SPV 2445	406.58	6		7.82	115.33	9		2.13
SPV 2449	403.39	7		6.97	118.99	7		5.37
SPV 2451	418.37	5		10.94	121.43	5		7.53
SPV 2452	401.23	8		6.40	119.76	6		6.06
SPV 2454	397.50	9		5.41	117.96	8		4.46
CV(%)	13.8				14.61			
CD(5%)	66.36				19.47			

Across zones, SPH 1858 exceeded the check for green forage yield by 5.1%

Advanced seed yield trial

- **Entries- 11 (SC + MC); Checks- 3; Locations- 5**

Entry	Grain yield (kg/ha)	R	Days to 50% flowering	Days to maturity	Plant height (cm)
CSV 21F	1376	7	80	123	249
CSV 30F	1202	10	82	125	288
SPV 2316	1616	4	75	118	241
SPV 2317	1139	12	80	123	261
SPV 2353	680	14	77	120	276
SPV 2375	1680	3	78	120	231
SPV 2376	1449	5	76	119	260
SPV 2383	1379	6	87	130	239
SPV 2385	1245	8	84	127	246
SPV 2387	1237	9	81	125	269
SPV 2388	1186	11	82	125	260
SPV 2389	**2026**	**1**	**74**	**117**	**237**
SPV 2391	1965	2	77	119	227
SSG 59-3	729	13	72	115	280
Mean	1351		79	122	255
CV(%)	14.36		4.89	2.95	11.45
CD(5%)	499		8	9	25

Evaluation of sorghum x maize intergeneric derivatives

Sl.		GFY 2 cuts (q/ha)		DFY 2 cuts (q/ha)		TSS (%)		HCN (ppm)		Protein (%)		IVDMD(%)	
No	Entry		R		R		R		R		R		R
1	T1-2251-3-8	275.5	17	54.2	17	3.75	7	68.2	7	8.03	18	55.6	8
2	T2-2251-3-12	692.2	1	160.0	2	5.75	1	64.3	8	8.80	2	56.9	3
3	T3-2252-7-1	617.3	4	127.2	8	5.25	2	54.6	17	8.37	10	53.0	15
4	T4-2252-7-2	570.8	10	120.9	12	4.75	4	79.5	2	8.30	13	57.2	1
5	T5-2252-7-8	671.5	2	141.3	4	5.00	3	56.6	15	8.80	1	55.8	7
6	T6-2253-12-2	603.4	5	125.7	9	5.00	3	55.7	16	8.40	9	56.3	6
7	T7-2253-12-6	494.7	15	112.4	14	4.75	4	58.4	12	8.57	5	56.4	5
8	T8-2253-12-16	585.9	7	131.6	6	4.50	5	63.6	9	8.25	15	52.8	16
9	T9-2254-8-?	527.0	14	111.7	15	4.50	5	54.1	18	8.26	14	57.0	2
10	T10-2254-10-3	555.2	11	124.0	10	4.00	6	57.2	14	8.49	7	54.8	9
11	T11-2254-10-8	453.6	16	104.5	16	4.50	5	73.2	5	8.24	16	53.0	13
12	T12-2254-10-12	554.6	12	119.3	13	5.75	1	74.3	4	8.77	3	54.6	10
13	T13-2276-14-1	218.7	18	43.6	18	4.75	4	86.7	1	8.05	17	56.7	4
14	T14-2316-3-3	602.0	6	149.4	3	5.00	3	75.2	3	8.51	6	53.7	12
15	T15-2316-3-7	530.1	13	121.4	11	4.75	4	57.7	13	8.34	11	54.0	11
16	T16-SSG59-3	571.3	9	128.3	7	5.00	3	71.3	6	8.67	4	53.0	14
17	T17-CSV22F	576.0	8	139.7	5	4.50	5	60.6	11	8.33	12	52.3	17
18	T18-2222-8-8	661.9	3	166.5	1	4.00	6	63.3	10	8.45	8	52.2	18
	LOC. MEAN	542.3		121.2		4.75		65.3		8.42		54.7	
	C.D. (5%)	185.6		53.4		2.21		8.2		0.71		5.4	
	C.D. (1%)	255.0		73.3		3.04		11.3		0.97		7.4	
	C.V. (%)	16.2		20.9		22.09		6.0		3.98		4.7	
	F (Probability)	0.00		0.02		0.91		0.00		0.54		0.54	

T2, T18, T5, T3 and T14 were the top 5 entries with higher fodder yield with green fodder yield in the range of 602-692 q/ha compared to 571-576 q/ha in checks.

Inter-institutional Forage Hybrid Trial

(Entries- 14; Checks- 1; Location: Hisar)

	GFY (q/ha)		DFY (q/ha)		TSS (%)		HCN (ppm)		Protein (%)		IVDMD (%)	
Entry		R		R		R		R		R		R
IIHPAU-2	781.3	1	117.7	2	3.75	9	122	11	10.7	3	53.7	10
IIHPAU-3	491.7	7	71.7	13	4.75	6	189	1	10.2	9	53.0	12
IIHPAU-4	596.9	5	93.4	5	4.50	7	133	9	10.4	7	55.6	4
IIHPAU-5	567.7	6	82.4	9	4.75	6	148	6	10.6	4	51.9	14
IIHPAU-6	457.3	8	83.5	8	4.75	6	128	10	10.4	7	55.9	2
IIHPAU-7	736.5	3	112.0	3	4.00	8	150	4	9.7	12	53.5	11
IIHPAU-9	633.3	4	108.9	4	4.00	8	104	15	10.4	7	54.8	6
IIHPAU-10	760.4	2	130.7	1	5.00	5	141	7	10.5	6	54.6	7
AKMS30A x UPMC539	443.8	9	90.9	6	3.50	10	115	14	10.1	10	57.7	1
CSH 24MF	396.9	12	85.8	7	5.50	3	116	13	10.6	5	54.5	8
C.D. (5%)	155.1		31.0		2.04		92		1.3		2.6	

IIHPAU-2, IIHPAU-10, IIHPAU-7 and IIHPAU-9 hybrids recorded highly significant forage yield compared to check CSH 24MF

Future plans

- Promising genotypes from initial trials of both single-cut and multi-cut types will be evaluated in the advanced trials during kharif 2016
- The promising inter-institutional forage hybrids identified in the trial will be utilized in the forage sorghum improvement program
- Programme on utilization of sorghum for silage making would be initiated

Thank you