



Progress and achievements in kharif grain Sorghum Breeding: 2016-17



Aruna C.
IIMR, Hyderabad

Trial	No.
Multi-location	4
Collaborative experiments	3



Team

Zone I (N&S): Bhilwara, Bapatla, Deesa, Diggitonk, Udaipur, Coimbatore, Kovilpatti, Palem (8)

Zone II:

Akola, Aurangabad, Buldhana, Chamarajnar, Dharwad, Indore, Mangrol, Parbhani, Somnat hpur, Surat, Yavatmal, Ajeet seeds, Devgen, Hytech seeds (14)



Major Recommendations & action taken- Agm16



Recommendation	Action taken
Plot size should be uniform across locations	Most of the centres have followed the recommended plot size
Testing centers should report plant population correctly at the time of thinning and time of harvest.	All the centres have given the plant population data and the data from the centres with low plant population was not included in the analysis.
F ₂ populations developed at IIMR will be shared with the centers	69 F ₂ populations were shared with 6 centres- Chamaraj Nagar (15), Indore (8), Udaipur (8), Diggionk (15), Bapatla (15), Deesa (8) for making appropriate selections
Efforts to continue on sorghum breeding for red grain	Efforts on red sorghum is being taken up at IIMR and Akola



Progress report

- **Multi-location AICSIP trials**
- **Coordinated sorghum breeding research**
- **Publications**



Multi-location AICSIIP yield trials

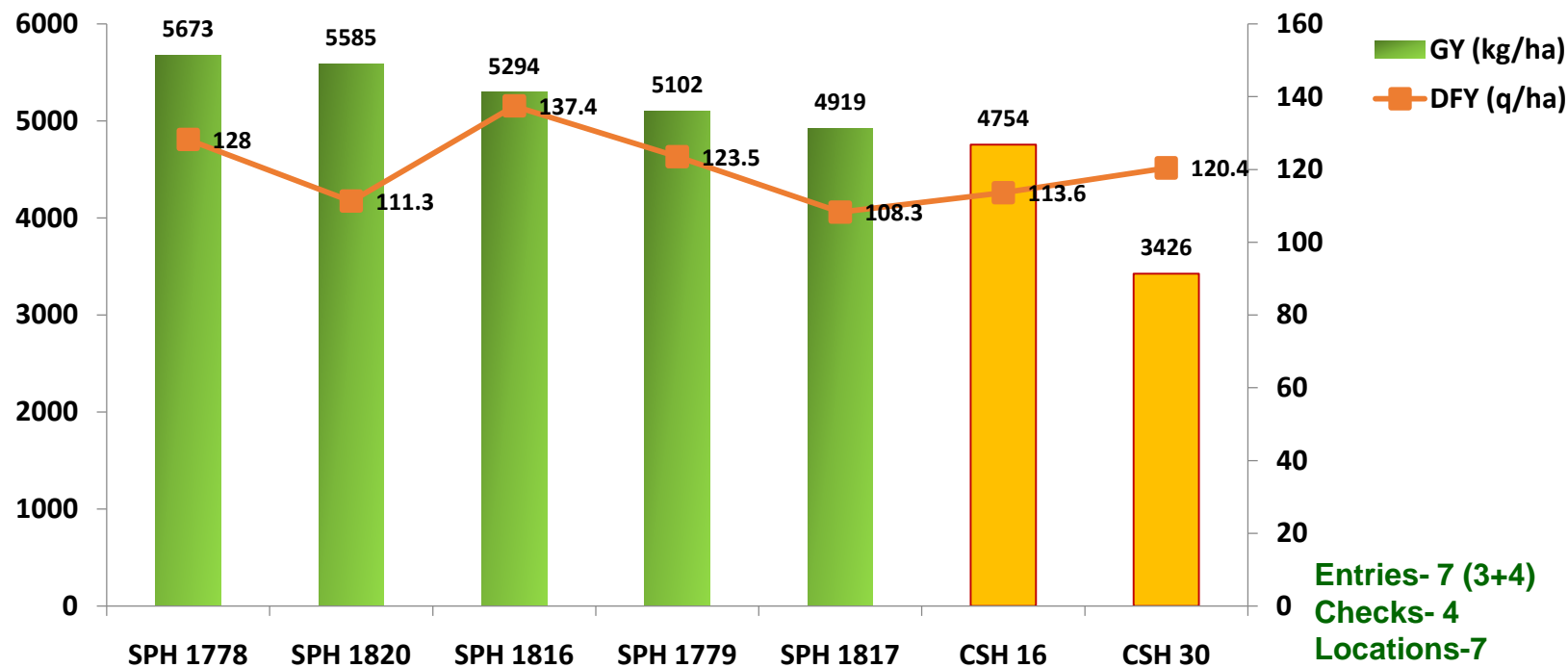


Kharif trials

- **Advanced Hybrid Trial (AHT: 11 entries at 28 locations – 21 reported)**
- **Advanced Varietal Trial (AVT: 19 entries at 21 locations – 16 reported)**
- **Initial Hybrid Trial (IHT: 14 entries at 11 locations – 10 reported)**
- **Initial Variety Trial (IVT: 25 entries at 11 locations – 10 reported)**

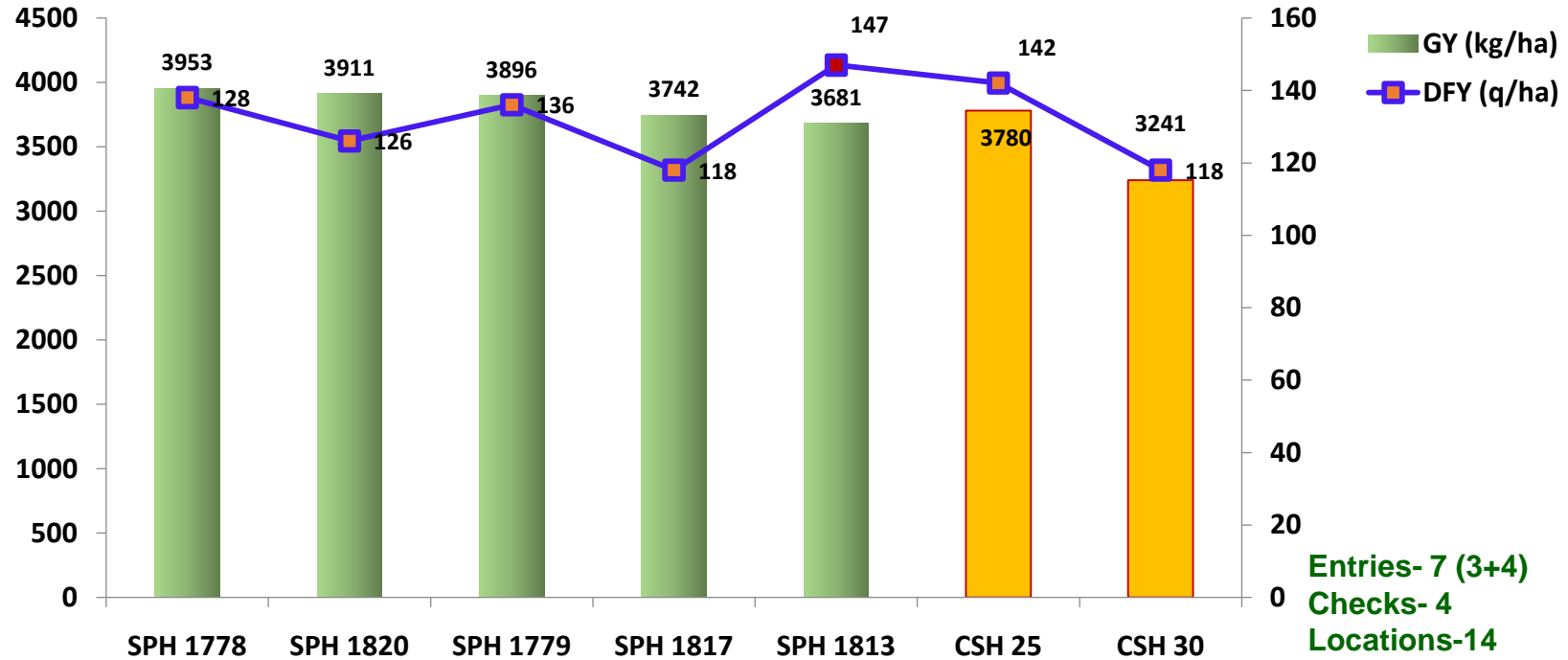
Efficiency of trial execution: 83.3%

Performance of hybrids in AHT Zone I



- SPH 1778 and SPH 1820 were promising with >15% increase in grain yield over the checks
- SPH 1779 is early with >20% increase in GY over early check, CSH 30

Performance of hybrids in AHT Zone II

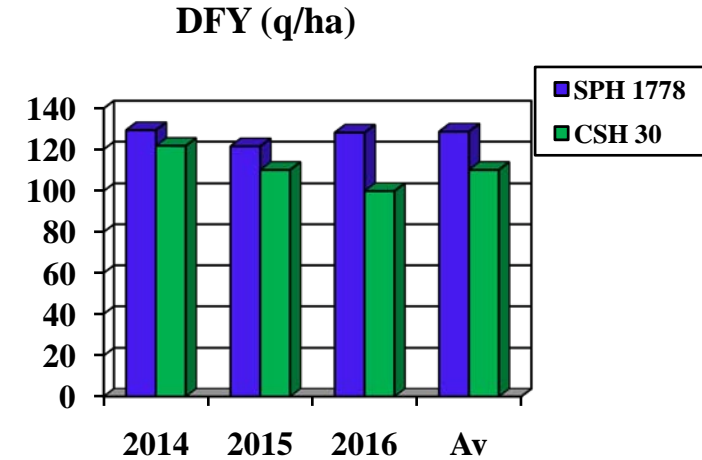
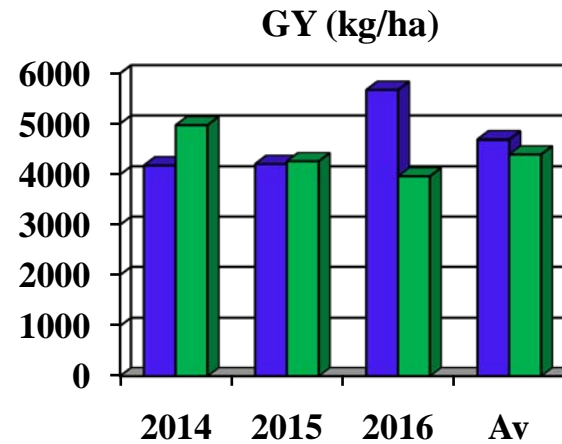


- SPH 1778 and SPH 1820 were promising with >5% increase in grain yield over the check
- SPH 1779 and SPH 1817 are early with >15% in GY over early check, CSH 30
- SPH 1813 recorded better level of resistance to grain molds (3.3 GMS vs 3.8 in CSH 25)

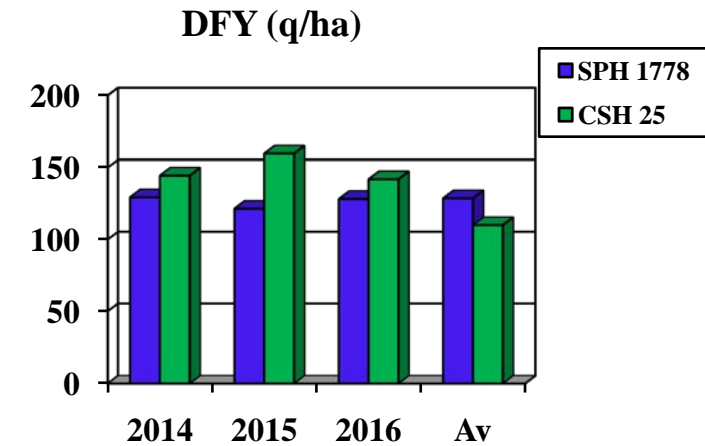
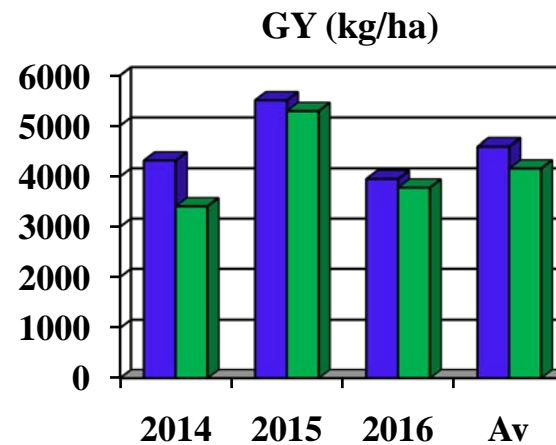
Hybrids evaluated over 3 years- SPH 1778

Performance of SPH 1778 over 3 years

- Zone I- **7% increase** in grain yield and **14% increase** in dry fodder yield over CSH 30



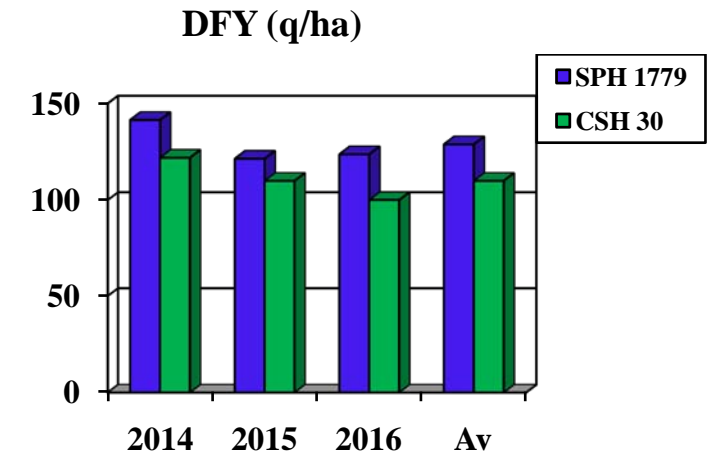
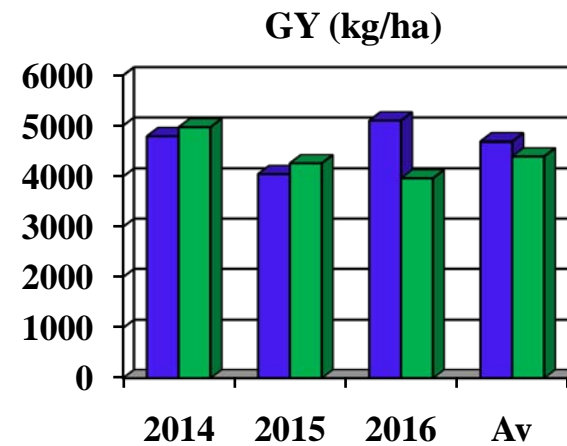
- Zone II- **10.5% increase** in grain yield and **6% increase** in dry fodder yield over CSH 25



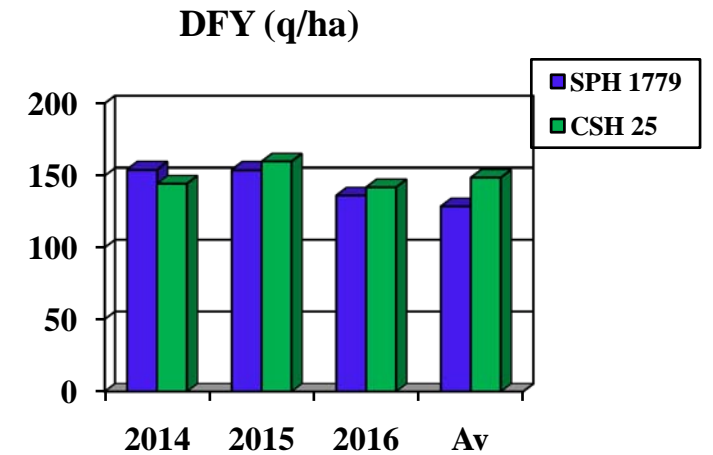
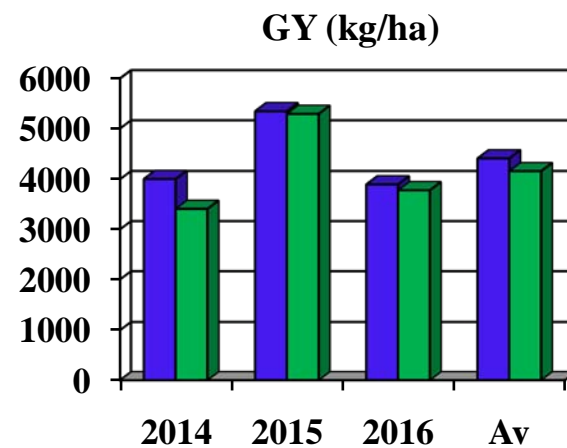
Hybrids evaluated over 3 years- SPH 1779

Performance of SPH 1779 over 3 years

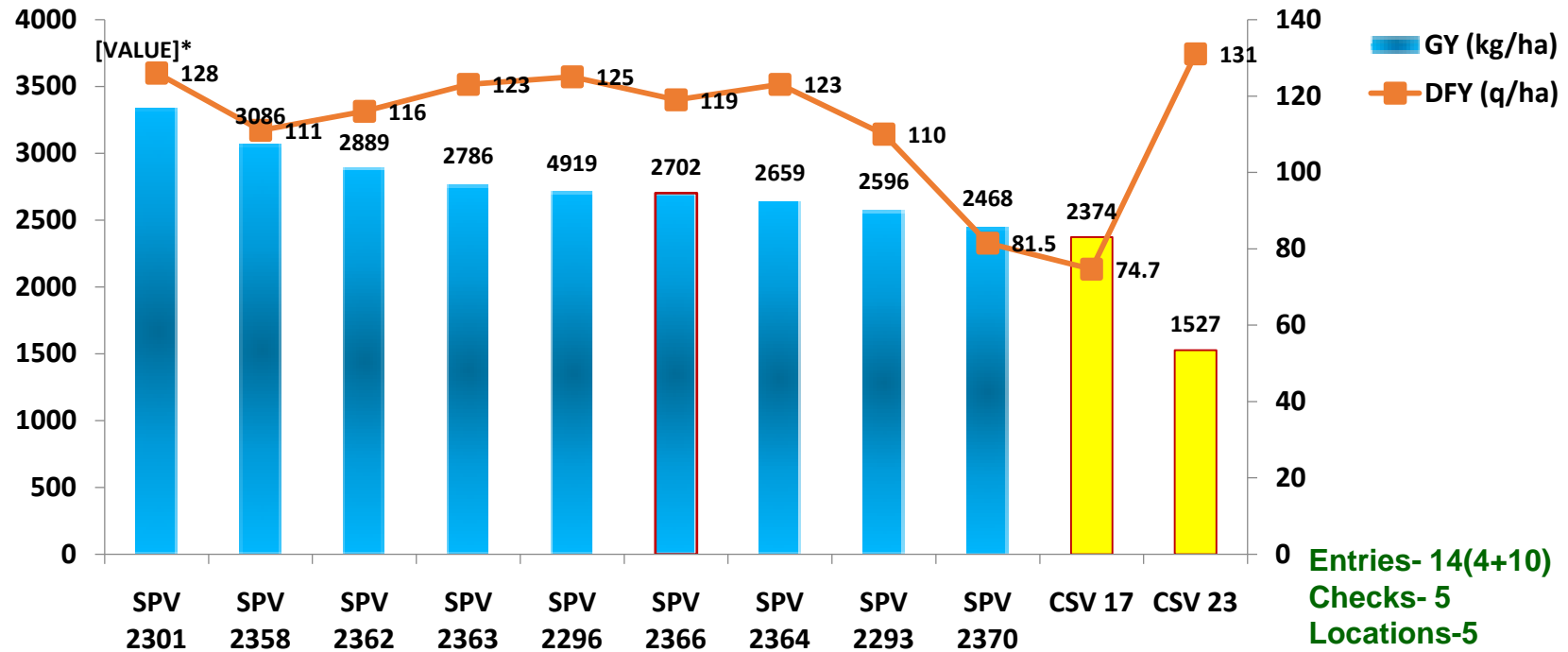
- Hybrid based on A2 cytoplasm
- Zone I- **6% increase** in grain yield and **20% increase** in dry fodder yield over CSH 30



- Zone II- **7% increase** in grain yield and **on par for** dry fodder yield over CSH 25

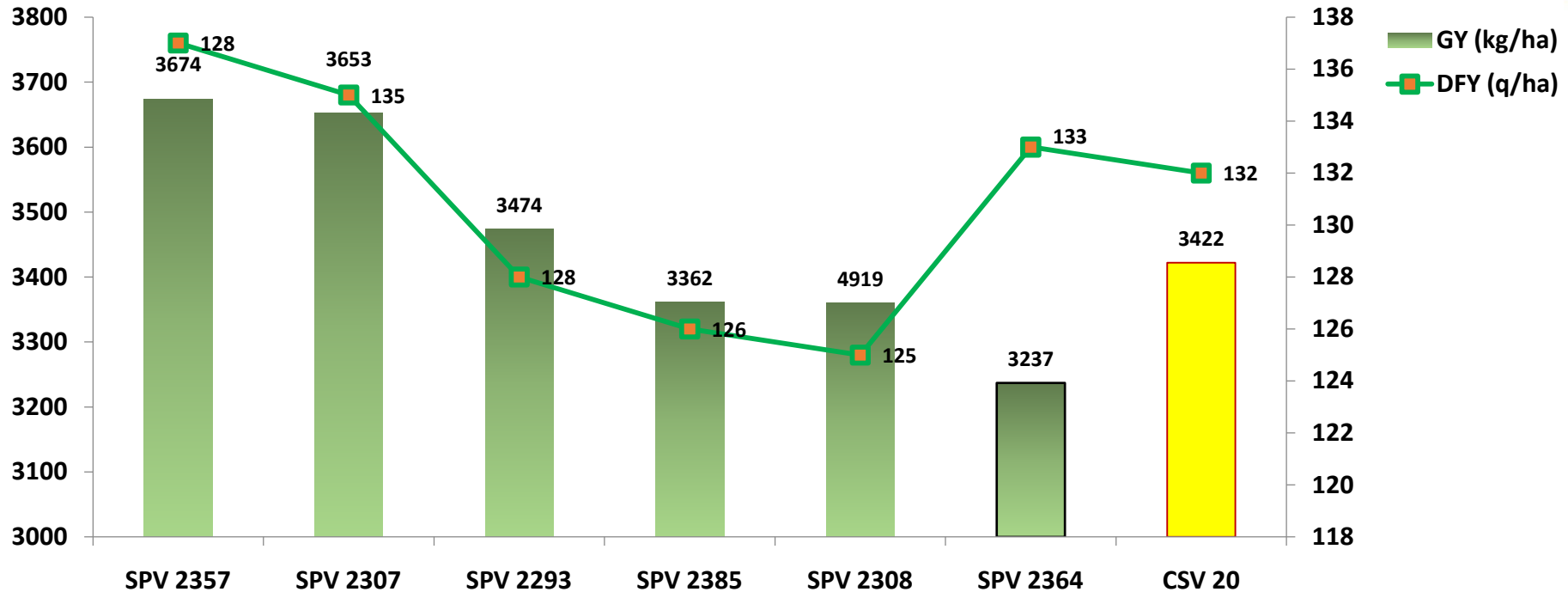


Performance of varieties in AVT- Zone I



- SPV 2301 had significant improvement for GY over the check, CSV 17
- SPV 2358, SPV 2362, SPV 2363, SPV 2296, SPV 2366, SPV 2364 recorded >10% increase in GY over CSV 17
- SPV 2358 and SPV 2366 are early
- SPV 2366, SPV 2372, SPV 2373, SPV 2307 had bold seed (>3g/100 seed)

Performance of varieties in AVT Zone II



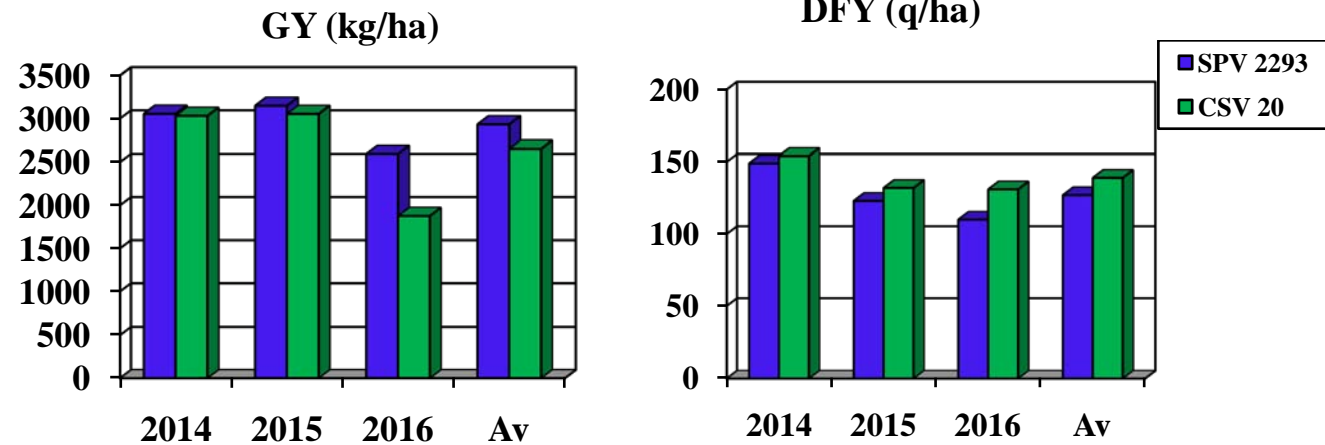
Entries- 14(4+10)
Checks- 5
Locations-9

- SPV 2357 and SPV 2307 recorded 7% increase in grain yield over the check
- SPV 2307 and SPV 2366 had bold seed (>3.0 g/100 seeds)
- SPV 2307 had better level of resistance to GM and SF

Varieties evaluated over 3 years- Zone I

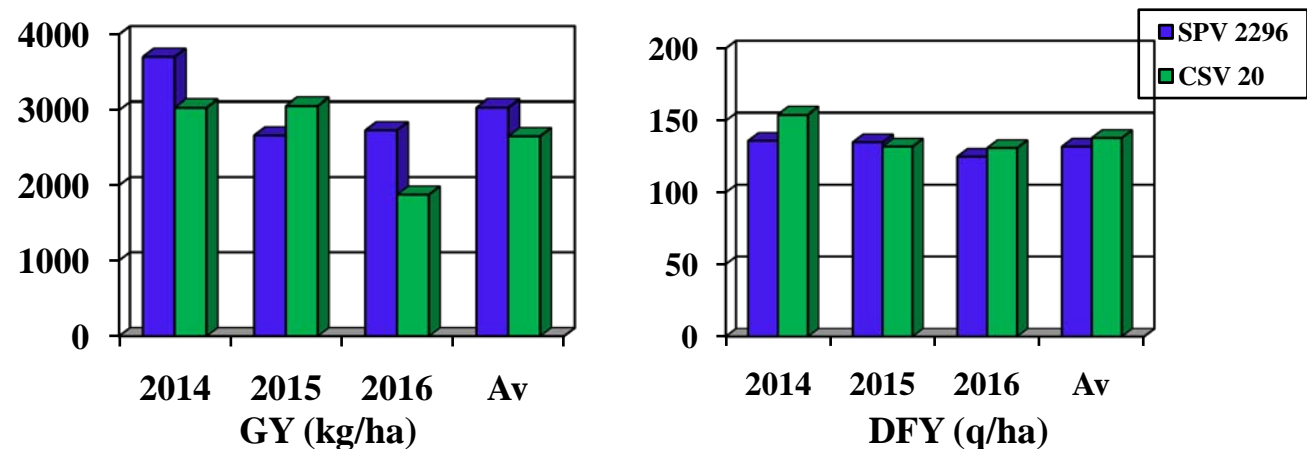
- SPV 2293 and SPV 2296 were promising over 3 years
- SPV 2293- **11% increase** in grain yield and **on par for** dry fodder yield over CSV 20

Performance of SPV 2293



- SPV 2296- **10% increase** in grain yield and **on par for** dry fodder yield over CSV 20

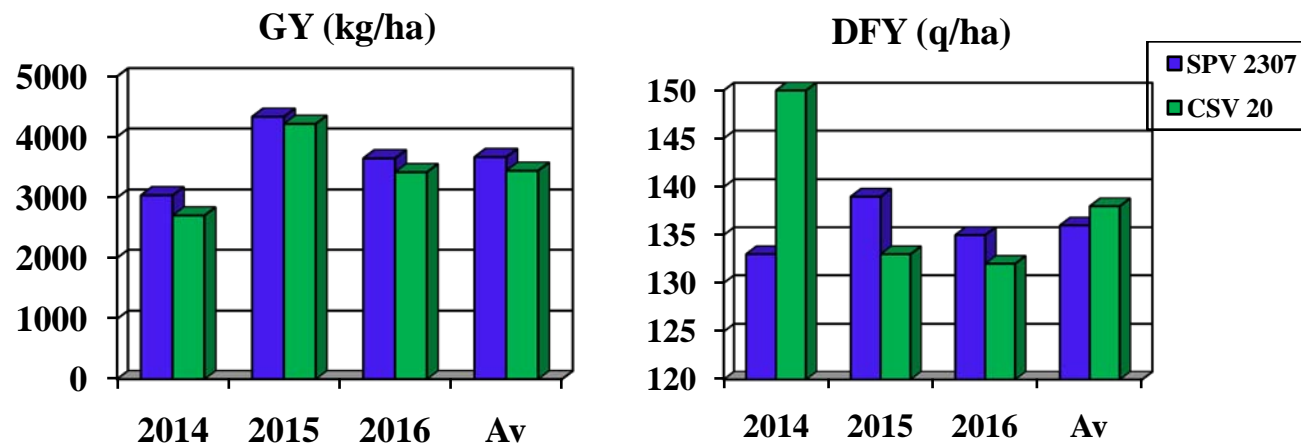
Performance of SPV 2296



Varieties evaluated over 3 years- Zone II

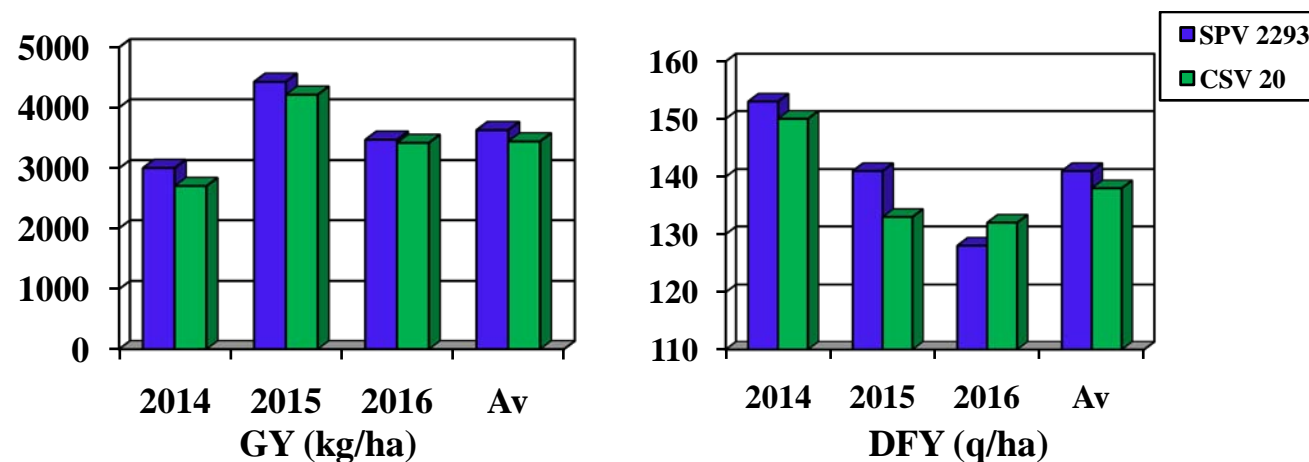
Performance of SPV 2307

- SPV 2307 and SPV 2293 were promising over 3 years
- SPV 2307- **7% increase** in grain yield and **on par for** dry fodder yield over CSV 20

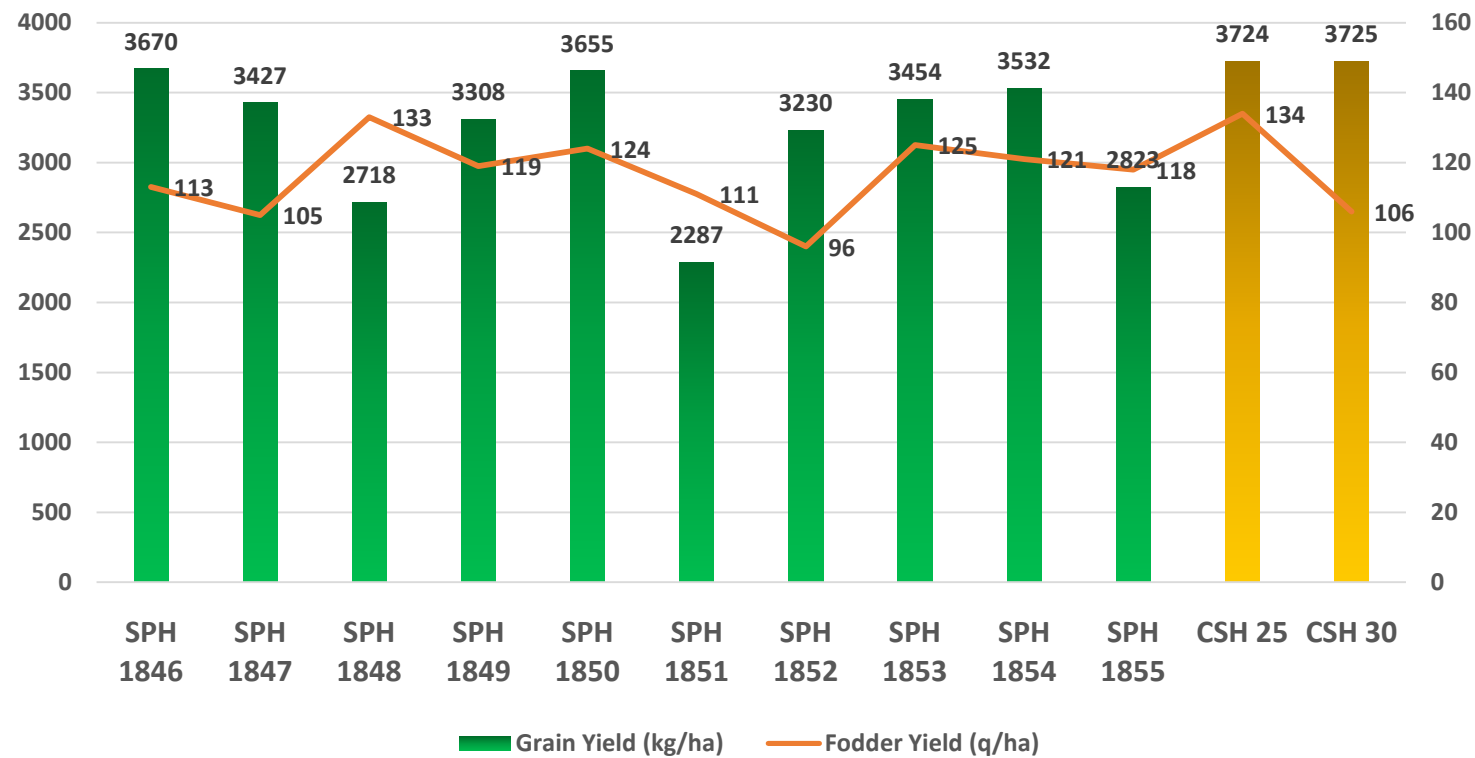


Performance of SPV 2293

- SPV 2293- **6% increase** in grain yield and **on par for** dry fodder yield over CSV 20



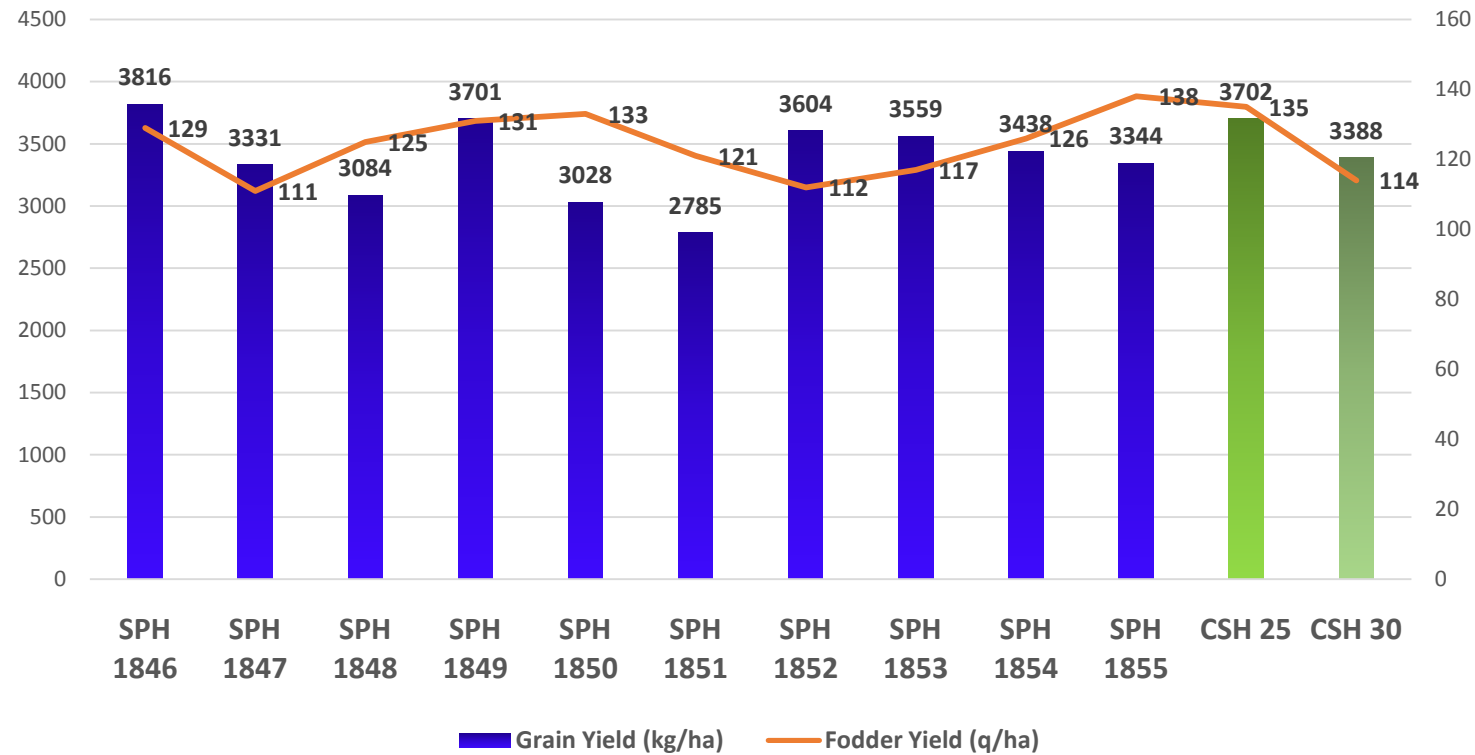
Performance of Hybrids in IHT- Zone I



Entries- 10
Checks- 4
Locations-4

- The check, CSH 30 is ranking first
- SPH 1846 and SPH 1850 were early and yielding on par with CSH 30

Performance of Hybrids in IHT- Zone II



Entries- 10
Checks- 4
Locations-6

- SPH 1846 recorded more GY over the check, CSH 25
- For fodder yield, SPH 1855 was slightly better than CSH 25

Performance of varieties in IVT

Zone I

Genotype	GY (kg/ha)	% > over check	DFY (q/ha)	% > over check
SPV 2438	3368	7.4	164	3.65
SPV 2424	3298	5.2	159	0.66
SPV 2437	3289	4.9	160	1.35
CSV 20	3136	-	158	-
Cd 5%	1295		39.0	

Entries- 21
Checks- 5
Locations-4&6

Zone II

Genotype	GFY (q/ha)	% > over check	DFY (q/ha)	% > over check
SPV 2423	4027	14.4	138	-
SPV 2433	3717	5.7	144	2.4
SPV 2438	3680	4.6	142	0.6
SPV 2436	3652	3.8	150	6.9
CSV 20	3519	-	141	-
Cd 5%	1741	-	44.0	-



Inter-institutional hybrid program



Sl. No.	Hybrid	GY	FY	DTF	DTM	PH	GW
1	CMS 15-4 A x AKR 529	4206	127.6	71	111	218	2.88
2	IMS34A x 841	4028	128.2	77	117	218	2.86
3	CMS15-1A x AKR530	3983	124.2	75	115	197	2.41
4	IMS15A x I26	3969	121.2	76	117	202	2.62
5	IMS34A x I26	3852	128.3	76	116	206	2.66
6	IMS15A x KR125	3837	124.0	74	114	222	2.72
7	IIMR3003A x AKR456	3877	119.5	72	107	151	2.78
8	CSH 25	4398	120.8	74	114	202	2.81
9	CSH 30	3432	108.5	65	105	179	2.65
10	General Mean	3666	120.0	73	113	203	2.81
	CD(5%)	647	16.6	2.5	2.58	20.6	0.24
	CV (%)	16.8	14.3	3.26	2.36	7.92	11.3

GY: grain yield (kg/ha), FY: Fodder yield (q/ha), DTM: days to maturity; PH: plant height (cm), GW: 100 grain weight (g)

New MS lines shared : 9 from 4 centers
New test hybrids developed : 21 hybrids developed



Inter-institutional breeding program- contd..



Centre	No. of F ₂ populations	No. of selections made	Main selection criteria
Udaipur	8	163	Compact panicle with bold grain
Akola	15	220	Higher Grain yield, better grain qualities including grain shape, grain luster, grain boldness, earliness, with higher no. of primaries and secondaries
Diggitonk	15	186	Earliness, compact panicle
Indore	8	156	Yield and grain quality
Deesa	8	34	Dual purpose types with compact panicle

Publications from the group

- Journal publications- 40
- Conference papers- 21
- Popular articles- 11



Future plans

- **Utilization of unused germplasm for creating genetic diversity**
- **Population breeding derivatives will be evaluated for grain mold resistance and related traits to identify stable lines**
- **Inter-institutional hybrid trial with early hybrids**
- **The segregating lines from the shared F₂s will be advanced a generation at different centres**
- **Multi-location trials**



Thank you

