

Identification of Promising Three-Way Hybrids of Pearl Millet for Drought-Prone Environments of North-Western India

Supplementary Materials

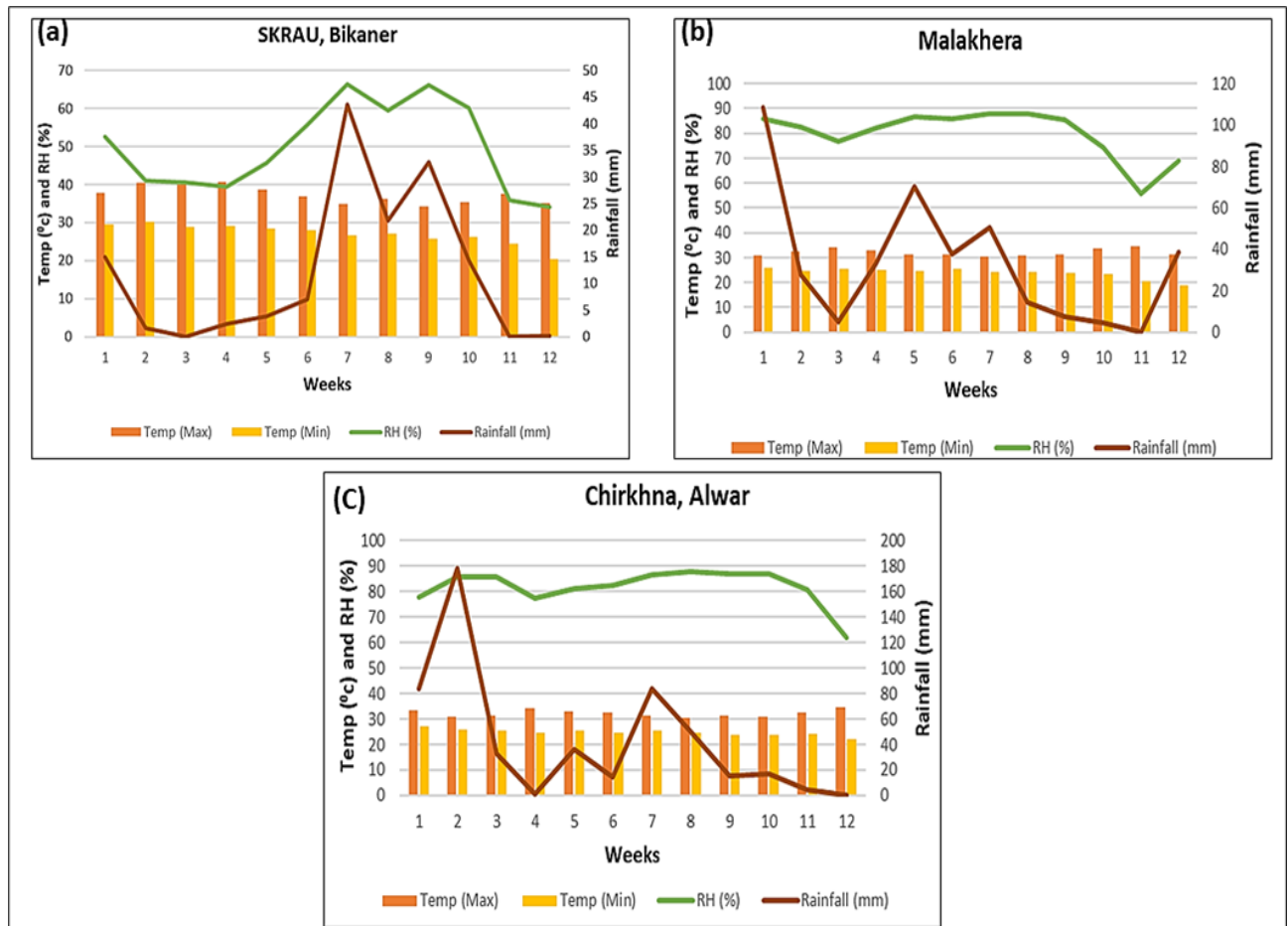


Figure S1: Metrological characteristics of the experimental sites (a) SKRAU, Bikaner, (b) Hytech Seeds, Malkhera-Alwar and (c) JK seeds, Chirkhna-Alwar.

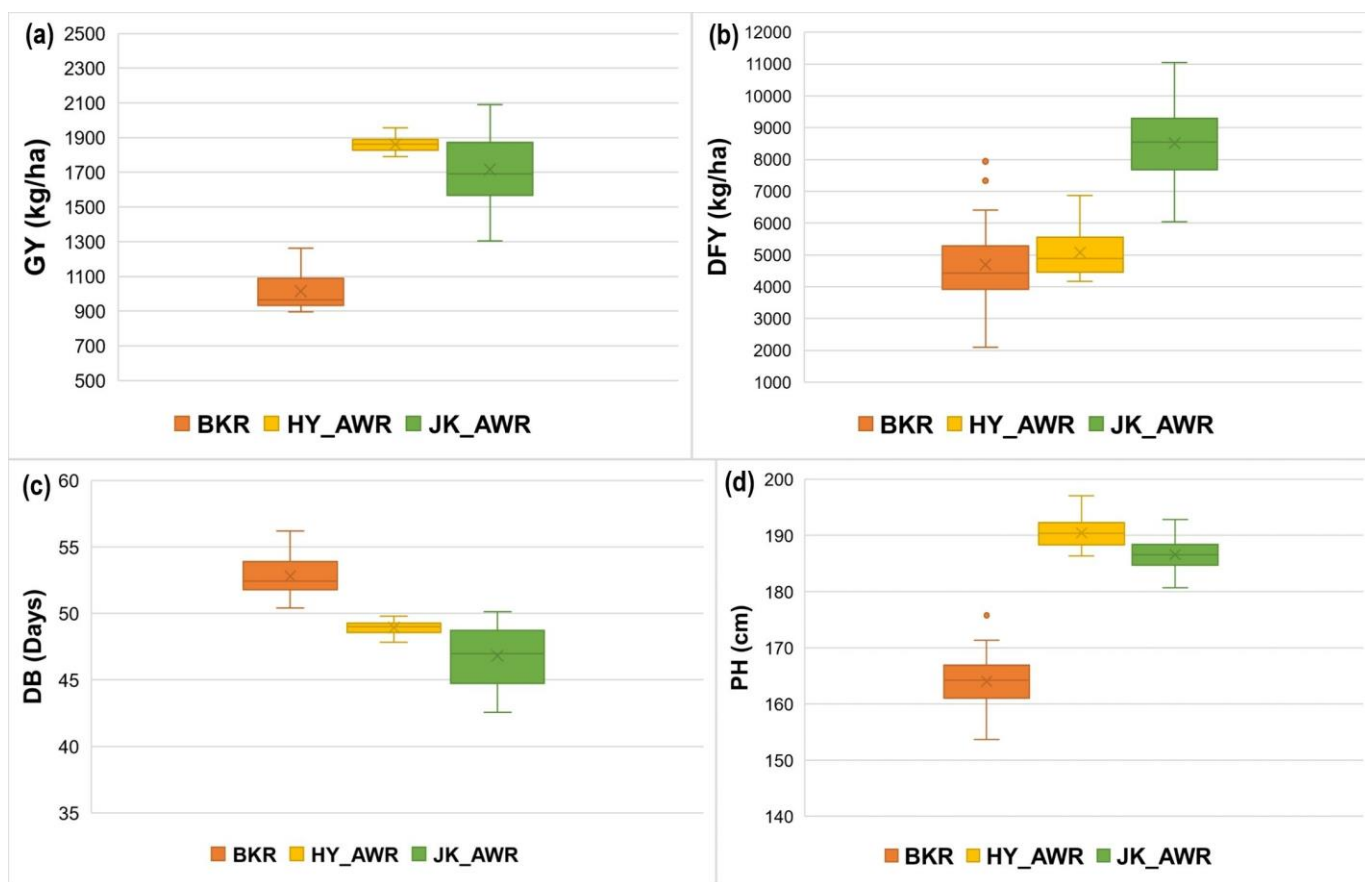


Figure S2: Box plot for agro-morphological traits of 36 genotypes across the locations. BKR= SKRAU, Bikaner, Hy_AWR = Hytech Seeds, Malkhera-Alwar and JK_AWR = JK seeds, Chirikhna-Alwar. (a) GY = Grain yield (kg/ha), (b) DFY = Dry Fodder Yield (kg/ha), (c) DB= Days to 50% flowering (days), (d) PH = Plant Height (cm). In case of box plot the horizontal line positioned at mid-point within box indicates median value for particular at respective location, while 'x' within box-plot indicates mean value for that particular trait.

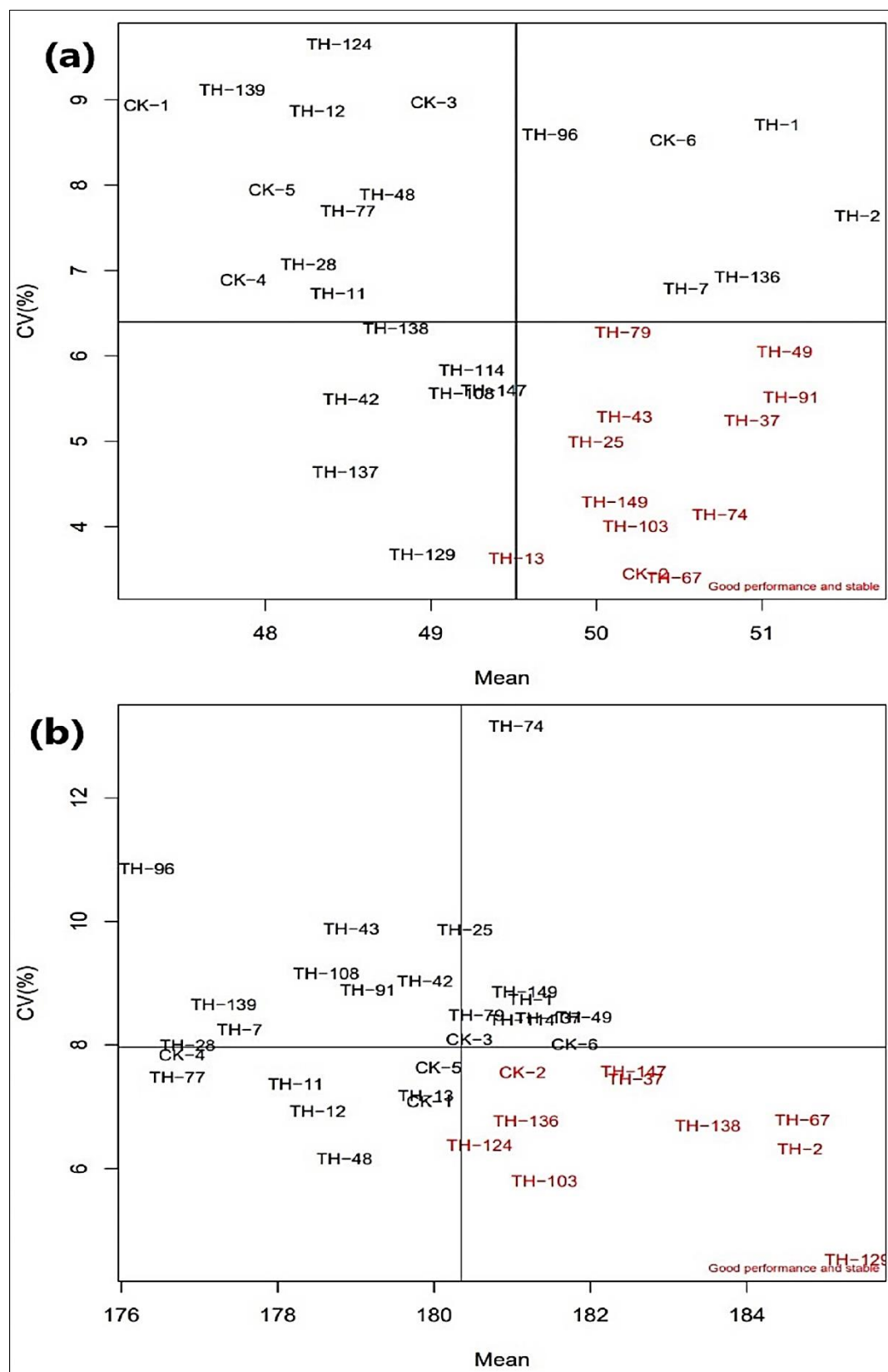


Figure S3. Stability (mean yield plotted against CV) parameter for 36 genotypes across the three different locations. (a) DB: days to 50% flowering (days), (b) PH: plant height (cm).

Table S1. List of Genotypes and parental details used in experimentation.

Sr No.	Genotype	Class	Hybrid parental Code
1	TH-1	TWH	(A1 × B2) × R1
2	TH-2	TWH	(A1 × B2) × R7
3	TH-7	TWH	(A1 × B3) × R1
4	TH-11	TWH	(A1 × B3) × R11
5	TH-12	TWH	(A1 × B3) × R13
6	TH-13	TWH	(A1 × B4) × R1
7	TH-25	TWH	(A1 × B6) × R1
8	TH-28	TWH	(A1 × B6) × R10
9	TH-37	TWH	(A1 × B8) × R1
10	TH-43	TWH	(A2 × B3) × R1
11	TH-48	TWH	(A2 × B3) × R13
12	TH-49	TWH	(A2 × B4) × R1
13	TH-67	TWH	(A2 × B7) × R7
14	TH-74	TWH	(A2 × B8) × R7
15	TH-79	TWH	(A3 × B4) × R1
16	TH-91	TWH	(A3 × B6) × R1
17	TH-96	TWH	(A3 × B6) × R13
18	TH-108	TWH	(A4 × B6) × R13
19	TH-124	TWH	(A1 × B3) × R60
20	TH-129	TWH	(A1 × B4) × R3
21	TH-138	TWH	(A1 × B4) × R12
22	TH-136	TWH	(A2 × B3) × R60
23	TH-139	TWH	(A2 × B4) × R59
24	TH-147	TWH	(A9 × B10) × R59
25	TH-149	TWH	(A11 × B1) × R3
26	TH-42	TWH	(A1 × B8) × R13
27	TH-114	TWH	(A9 × B10) × R13
28	TH-103	TWH	(A4 × B6) × R1
29	TH-77	TWH	(A2 × B8) × R11
30	TH-137	TWH	(A2 × B4) × R3
31	HHB-67 imp	SCH	CK-1
32	MPMH 17	SCH	CK-2
33	RHB 177	SCH	CK-3
34	Dhanashakti	OPV	CK-4
35	GHB-538	SCH	CK-5
36	Raj 171	OPV	CK-6

TWH= Three-way Hybrids, SCH= Single cross hybrids, OPV= Open-pollinated variety, CK= check

Table S2. Adjusted mean values of 36 genotypes (34 hybrids and 2 OPVs) for grain yield and component traits across environments.

Genotype	DB	GY	DFY	PH	PL	PD	PY	PNHI	HI
TH-1	51	1563.44	7175.61	180.90	21.80	27.33	2570.20	60.83	16.04
TH-2	51	1668.16	7264.64	184.41	22.30	27.42	2571.01	64.88	16.96
TH-7	51	1622.81	6820.91	177.04	21.67	28.59	2540.92	63.87	17.33
TH-11	49	1528.86	6666.82	178.03	21.52	26.68	2470.60	61.88	16.73
TH-12	48	1467.25	6348.15	178.10	21.56	28.86	2524.73	58.12	16.54
TH-13	49	1458.82	6538.07	180.02	21.93	27.96	2494.83	58.47	16.15
TH-25	50	1511.48	6979.70	180.60	21.09	27.19	2507.39	60.28	15.93
TH-28	48	1547.76	7106.76	176.45	22.07	26.37	2577.97	60.04	15.98
TH-37	51	1563.21	6543.91	182.81	21.38	28.42	2513.77	62.19	17.26
TH-43	50	1543.04	7575.64	178.86	21.45	26.30	2507.99	61.53	15.30
TH-48	49	1489.62	6947.52	179.07	22.12	26.62	2621.52	56.82	15.57
TH-49	50	1739.92	7119.07	182.49	22.26	27.69	2601.33	66.89	17.90
TH-67	50	1713.36	7466.55	185.08	22.34	27.92	2610.89	65.62	17.00
TH-74	51	1689.85	8002.87	181.38	22.14	27.11	2639.76	64.02	15.88
TH-79	50	1663.21	7014.66	180.62	21.52	28.00	2575.12	64.59	17.34
TH-91	51	1613.22	7152.14	179.09	22.40	28.11	2638.64	61.14	16.48
TH-96	50	1400.21	6531.19	175.97	22.24	26.52	2532.91	55.28	15.45
TH-108	49	1458.48	6026.56	178.87	22.23	27.98	2516.67	57.95	17.07
TH-124	49	1605.09	6637.25	180.69	21.56	26.89	2516.84	63.77	17.53
TH-129	49	1434.70	7289.04	185.02	21.86	27.33	2540.88	56.46	14.60
TH-138	49	1645.60	7173.85	184.28	21.09	28.05	2551.30	64.50	16.92
TH-136	51	1588.95	6383.32	181.44	22.10	26.93	2551.86	62.27	17.78
TH-139	48	1432.55	6245.58	177.16	21.63	26.53	2501.07	57.28	16.38
TH-147	49	1388.20	8101.65	182.57	21.39	25.50	2544.01	54.57	13.04
TH-149	50	1485.82	7223.42	181.02	21.57	26.64	2481.32	59.88	15.31
TH-42	49	1386.48	6344.79	179.63	21.91	28.45	2531.06	54.78	15.62
TH-114	49	1688.16	6814.68	181.17	22.01	26.98	2736.12	61.70	17.68
TH-103	50	1446.34	7143.95	181.04	22.58	28.27	2587.24	55.90	14.86
TH-77	49	1372.74	6333.28	176.28	21.95	26.75	2387.63	57.49	15.74
TH-137	49	1387.73	6962.63	181.64	21.69	27.74	2431.72	57.07	14.77
HHB-67-Imp	48	1272.11	6633.42	179.53	21.02	25.50	2487.22	51.15	13.95
MPMH 17	51	1494.99	6405.22	181.40	22.62	27.69	2640.73	57.75	16.86
RHB 177	49	1433.30	5728.74	180.53	21.94	28.23	2504.51	57.23	17.41
Dhanashakti	48	1433.12	6158.99	176.59	21.07	27.20	2525.76	56.74	16.50
GHB-538	48	1475.56	5721.21	180.19	21.75	25.77	2566.62	57.49	17.80
Raj 171	51	1414.39	6125.68	181.47	21.56	25.95	2564.98	55.14	16.27
Mean	50	1517.46	6797.43	180.32	21.82	27.26	2546.31	59.60	16.28
Std Dev	1	113.27	560.29	2.42	0.42	0.89	64.57	3.73	1.14

DB= Days to 50% flowering (days), GY = Grain yield (kg/ha), DFY = Dry Fodder Yield (kg/ha), PH = Plant Height (cm), PL = Panicle Length (cm), PD= Panicle Diameter (mm), PY= Panicle yield (kg/ha), PNHI = Panicle Harvest Index (%), HI = Harvest Index (%).

Table S3. The relative contribution of important traits in genotype clustering pattern

Trait	Eta2	P-value
Grain yield	0.698518	2.56×10^{-9}
Harvest Index	0.625399	9.20×10^{-8}
Panicle Harvest Index	0.59255	3.68×10^{-7}
Dry Fodder Yield	0.454496	4.54×10^{-5}
Days to 50% flowering	0.43237	8.75×10^{-5}
Plant Height	0.389567	2.90×10^{-4}
Panicle yield	0.303201	2.58×10^{-3}

Table S4. Genotype by yield×trait (GYT) data for 36 Pearl millet cultivars.

Sr No	GEN	Y*PNHI	Y*PL	Y*PD	Y*HI	Y*DFY	Y*PH	Y*PY	Y/DB
1	TH-1	95,103	34,089	42,734	25,081	1,12,18,618	2,82,828	40,18,350	31
2	TH-2	1,08,236	37,197	45,746	28,292	1,21,18,558	3,07,622	42,88,840	33
3	TH-7	1,03,644	35,170	46,391	28,130	1,10,69,007	2,87,308	41,23,414	32
4	TH-11	94,610	32,906	40,797	25,581	1,01,92,659	2,72,190	37,77,209	32
5	TH-12	85,269	31,641	42,338	24,263	93,14,324	2,61,316	37,04,413	30
6	TH-13	85,302	31,993	40,789	23,560	95,37,833	2,62,620	36,39,498	30
7	TH-25	91,114	31,877	41,094	24,081	1,05,49,675	2,72,978	37,89,864	30
8	TH-28	92,924	34,152	40,809	24,736	1,09,99,571	2,73,096	39,90,089	32
9	TH-37	97,210	33,416	44,425	26,979	1,02,29,505	2,85,768	39,29,548	31
10	TH-43	94,936	33,098	40,588	23,612	1,16,89,547	2,75,994	38,69,941	31
11	TH-48	84,644	32,956	39,649	23,189	1,03,49,136	2,66,748	39,05,051	31
12	TH-49	1,16,376	38,723	48,181	31,144	1,23,86,614	3,17,520	45,26,105	34
13	TH-67	1,12,437	38,277	47,829	29,130	1,27,92,885	3,17,109	44,73,385	34
14	TH-74	1,08,176	37,405	45,811	26,832	1,35,23,636	3,06,505	44,60,803	33
15	TH-79	1,07,423	35,794	46,578	28,846	1,16,66,864	3,00,408	42,82,973	33
16	TH-91	98,630	36,136	45,354	26,581	1,15,37,985	2,88,905	42,56,708	32
17	TH-96	77,405	31,147	37,127	21,630	91,45,039	2,46,391	35,46,601	28
18	TH-108	84,523	32,425	40,810	24,899	87,89,595	2,60,881	36,70,506	30
19	TH-124	1,02,363	34,610	43,154	28,144	1,06,53,358	2,90,019	40,39,749	33
20	TH-129	81,010	31,367	39,215	20,940	1,04,57,606	2,65,450	36,45,410	29
21	TH-138	1,06,142	34,711	46,158	27,845	1,18,05,285	3,03,249	41,98,409	34
22	TH-136	98,938	35,123	42,791	28,256	1,01,42,771	2,88,297	40,54,780	31
23	TH-139	82,053	30,985	38,002	23,463	89,47,075	2,53,789	35,82,897	30
24	TH-147	75,750	29,699	35,397	18,102	1,12,46,706	2,53,443	35,31,592	28
25	TH-149	88,971	32,049	39,582	22,748	1,07,32,668	2,68,956	36,86,788	30
26	TH-42	75,950	30,382	39,449	21,658	87,96,931	2,49,053	35,09,269	29
27	TH-114	1,04,158	37,154	45,539	29,839	1,15,04,308	3,05,841	46,19,028	34
28	TH-103	80,855	32,654	40,893	21,497	1,03,32,599	2,61,849	37,42,039	29
29	TH-77	78,924	30,130	36,723	21,608	86,93,921	2,41,987	32,77,584	28
30	TH-137	79,195	30,094	38,491	20,500	96,62,285	2,52,070	33,74,588	29
31	HNB-67 imp	65,064	26,745	32,437	17,743	84,38,449	2,28,387	31,64,017	27
32	MPMH 17	88,066	34,492	42,229	25,709	97,67,886	2,76,636	40,27,082	30
33	RHB 177	82,026	31,449	40,460	24,952	82,10,990	2,58,760	35,89,716	29
34	Dhanashakti	81,315	30,201	38,979	23,649	88,26,547	2,53,070	36,19,711	30
35	GHB-538	84,831	32,091	38,020	26,271	84,42,002	2,65,887	37,87,212	31
36	Raj 171	77,993	30,494	36,698	23,019	86,64,132	2,56,665	36,27,891	28
	Mean	90,877	33,134	41,424	24,792	1,03,45,460	2,73,878	38,70,307	31
	St Dev	12,124	2,641	3,619	3,111	13,27,069	21,560	3,47,577	2

GEN = Genotype, Y = Grain yield, DFY = Dry Fodder Yield, PNHI = Panicle Harvest Index, DB= Days to 50% flowering, PH = Plant Height, PL = Panicle Length, PD= Panicle Diameter, PY= Panicle yield, HI = Harvest Index and SI = Superiority Index.