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High Yielding Millets for Dry Farming Areas in Southern Districts of Tamil Nadu

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Released and pre-release varieties/hybrids of sorghum, bajra, tenai, panivaragu and kudiraivali were evaluated under rainfed conditions in the black soil area at Kovilpatti in replicated yield trials. Among them Sorghum hybrids, K, Tall and CSH.6, and varieties, IS. 3541 and CO 21, bajra hybrids, X 4 and 5141 A X PT 1713, and variety, CO 6, tenai variety CO 5, panivaragu varieties MS 4926 and CO 1 and Kudiraivali varieties EF 7 and CO 1 were identified as suitable for cultivation in the rainfed black soil areas of the southern districts of Tamil Nadu.

The black soil tract with an extent of 10.5 lakh hectares, spread over the three southern districts of Madurai, Ramanathapuram and Tirunelveli represents 39 per cent of the total black soil area of Tamil Nadu. The tract is semi-arid having mean annual rainfall of 730 mm, of which 62 per cent is received during the cropping season from mid-October to mid-December, 20 per cent is received during summer months of April and May and the remaining 18 per cent in the remaining months. The soil is deep black clay, and moderately permeable. Usually a single crop is raised during the North East monsoon period (October-December) in this tract. Besides cotton, the major cultivated crops are sorghum and bajra. While sorghum is grown for fodder and grain, bajra is grown for grain. Minor millets, tenai, panivaragu and kudiraivali, are also cultivated in marginal areas receiving low rainfall. The traditional varieties of these crops are of long duration and are poor yielders. In order to identify crop varieties which are shorter in duration, photo-insensitive and capable of tolerating drought, released and pre-release varieties of sorghum, bajra and tenai were evaluated during the years 1976-77 to 1978-79 and panivaragu and kudiraivali during 1977-78 and 1978-79 in the North East monsoon season and the results are presented in this paper.

MATERIAL AND METHODS

Released and pre-release varieties/hybrids of sorghum, bajra, tenai, panivaragu and kudiraivali obtained from within and outside the State were evaluated under rainfed conditions in the black soil area of the Millets and Cotton Experiment Station, Kovilpatti, during October-January months. The experiments were laid out in randomised block design replicated thrice, having a plot size of 7.5 m x 3.6 m and inter-row spacing of 45 cm and intra-row spacing of 15 cm for sorghum

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TABLE I Yield data of sorghum varieties/hybrids in the rainfed black soil area of Kovilpatti.

Variety/ hybrid	Origin	Duration (days)	1976—77 Yield (q/ha)		1977—78 Yield (q/ha)		1978—79 Yield (q/ha)		Mean Yield (q/ha)	
			Grain	Straw	Grain	Straw	Grain	Straw	Grain	Straw
Kovilpatti Tall	Kovilpatti	95	17.6	54.0	29.1	40.0	14.7	41.1	20.5	45.0
CSH 6	AICSIP	105	17.7	22.8	28.4	18.0	13.2	55.6	19.8	32.1
IS 3541	AICSIP	100	13.5	42.4	12.4	25.4	17.4	58.8	14.4	42.2
CO 21	Coimbatore	95	14.5	57.9	16.9	24.7	8.3	61.7	13.2	48.1
CO 22	Coimbatore	105	7.6	36.7	20.3	30.2	8.2	32.6	12.0	33.2
USV 3	Coimbatore	105	9.8	48.2	16.4	21.4	9.6	44.2	12.0	37.9
K 3	Kovilpatti	115	8.0	22.7	15.7	23.4	—	—	11.9	23.1
CSH 5	AICSIP	110	5.5	50.8	16.0	43.2	—	—	10.8	47.0
USV 5	Coimbatore	100	10.1	53.7	12.3	26.4	7.4	50.6	9.9	43.6
CSH 8R	AICSIP	105	3.1	36.4	3.2	33.3	8.8	56.5	5.0	24.1
SPV 86	AICSIP	105	1.1	60.0	8.7	60.0	1.8	102.8	2.9	74.3
	SE		1.5	4.4	4.3	6.8	1.8	6.8	—	
	CD (5%)		4.3	13.2	N.S.	N.S.	5.4	20.1	—	

TABLE II Rainfall data of Kovilpatti

Particulars	Rainfall (mm) 1976—77	1977—78	1978—79	70 years' mean
Cropping season	407.9	743.5	412.4	470.3
No. of rainy days during Cropping season	18	31	22	—
Annual rainfall (January to December)	675.8	1060.1	704.5	730.0

TABLE III. Yield of bajra varieties/hybrids in the rainfed black soil area of Kovilpatti.

Variety/hybrid	Origin	Duration (days)	Grain yield (q/ha)			Mean yield (q/ha)
			1976–77	1977–78	1978–79	
UCH 4 (x4)						
(5141 A × PT 1921)	Coimbatore	75	7.2	33.2	14.0	18.1
5141 A × PT 1713	Coimbatore	77	—	16.8	15.9	16.4
CO 6	Coimbatore	80	7.7	21.3	16.3	15.1
5141 A × PT 1610	Coimbatore	78	—	13.6	16.4	15.0
MS 7625/9	Coimbatore	68	—	15.2	14.5	14.9
KM 2	Pudukkottai	75	9.0	20.5	14.6	14.7
Composite II	AICMIP	72	9.4	10.6	12.8	11.0
K 1	Kovilpatti	85	5.5	9.0	11.1	8.5
LBC 1	AICMIP	80	6.6	8.1	10.5	8.4
KM 1	Pudukkottai	80	5.2	11.4	—	8.3
	SE		0.8	4.0	1.7	—
	CD (5%)		2.5	11.8	N. S.	—

TABLE IV. Yield of tenai varieties in the black soil area of Kovilpatti.

Variety	Origin	Duration (days)	Grain yield (q/ha)			Mean yield (q/ha)
			1976—77	1977—78	1978—79	
Si 76/4 (CO 5)	Coimbatore	78	—	6.7	15.8	11.3
CO 4	Coimbatore	72	6.4	—	—	6.4
Local	Kovilpatti	85	6.2	5.6	14.5	8.8

TABLE V Yield of panivaragu varieties in the black soil area of Kovilpatti.

Variety	Origin	Duration (days)	Grain yield (q/ha)		Mean yield (q/ha)
			1977–78	1978–79	
MS 4926	Coimbatore	70	4.2	9.0	6.6
CO 1	Coimbatore	70	5.5	5.8	5.7
MS 5212	Coimbatore	72	6.0	5.3	5.7
MS 1316	Coimbatore	71	5.6	5.6	5.6
MS 5218	Coimbatore	67	6.6	3.8	5.2
PV 196	Coimbatore	69	4.3	5.7	5.0
MS 5204	Coimbatore	71	5.6	3.2	4.4
MS 9218	Coimbatore	73	5.1	2.7	3.9
MS 5039	Coimbatore	63	1.7	3.2	2.5
PV 346	Coimbatore	64	1.4	2.3	1.7
	SE		2.6	2.1	1.1
	CD (5%)		N. S.	N. S.	N. S

and bajra and 10 cm for the minor millets. Basal application of 40:20:0 kg of N:P:K/ha was done. The grain and straw yield data gathered for three years from 1976-77 to 1978-79 were subjected to statistical scrutiny.

RESULTS AND DISCUSSION

Among the four hybrids of sorghum viz., K.Tall, CSH 5, CSH 6 and CSH8R, K. Tall recorded the highest averageyield of 20.5 q of grain and 45.0 q of dry straw/ha, followed by CSH 6 (19.8 q of grain and 32.1 q of straw/ha) (Table I). The maximum grain yield recorded was 29.1 q by K. Tall during 1977–78 season when the rainfall received during the crop period was 675 8 mm which was 43.7 per cent above the 70 years mean rainfall of 470.3 mm (Table II). Among the varieties of sorghum, IS 3541 and CO 21. ware outstanding with 14.4 q and 13.2 q of grain and 42.2 q and 48.1 q of straw/ha, respectively. The ruling strain K3 recorded 11.9 q of grain and 23.1 q of straw/ha.

TABLE VI Yield of kudiraivali varieties in the rainfed black soil area of Kovilpatti.

Variety	Origin	Duration (days)	Grain yield (q/ha)		Mean yield (q/ha)
			1977—78	1971—79	
EF 7	Coimbatore	90	2.0	14.7	8.4
PC 49 (CO 1)	Coimbatore	88	4 3	8.7	6.5
MS 2465	Coimbatore	93	2.7	10.0	6.3
EF 2	Coimbatore	82	4.0	8.5	6.3
EF 10	Coimbatore	88	3.0	9.5	6.3
KV 22	Coimbatore	90	3.0	9.5	6.3
EF 5	Goimbatore	84	2.0	10.4	6.2
EF 14	Coimbatore	86	2.6	9.6	6.1
K 1	Kovilpatti	89	1.9	8.9	5.4
	SE		2.3	2.7	1.2
	CD (5 %)		N. S.	N. S.	N. S.

Among the bajra hybrids tested, UCH 4 (X4) recorded the highest average grain yield of 18.1 q/ha followed by 5141 A X PT 1713 (16.4 q/ha) (Table III). The maximum grain yield of 33.2 q/ha was recorded by UCH 4 during 1977-78. Among the varieties of bajra, CO 6 proved superior with an average yield of 15.1 q/ha. The ruling hybrids viz., KM 1 and KM 2. recorded 8 3 q and 14.7 q/ha, respectively In the rainfed black soil area of southern districts of Tamil Nadu, bajra hybrid X 4 and variety CO 6 can replace KM1 and KM2.

Three varieties in tenai, ten in panivaragu and nine in kudiraivali were evaluated. Tenai Si 76/4 (released as CO 5 by Tamil Nadu Agricultural University during January, 1980) was outstanding with an average grain yield of 11.3 q/ha, accounting for an increase of 30.0 per cent over the local variety (Table IV). In the case of panivaragu, though the mean yield differences between varieties were not significant, MS 4926, CO 1, MS 5212 and MS 1316 were found quite promising with 6.6 q, 5.7 q, 5.7 q and 5.6 q/ha (Table V). Kudiraivali varieties, EF 7 and PC 49 (CO 1), were found promising with grain yields of 8.4 q and 6.5 q/ha, respectively (Table VI). The yield potential of the minor millets is far low compared to that of sorghum and bajra. However, the high yielding minor millet varieties can be profitably grown, especially when the monsoon rains are received late.