

SEED QUALITY STUDIES IN COTTON

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Studies of individual bolls for number of matured seed, seed index, germination and vigour in cotton CV MCU 7 indicated that those formed from the first eight sympodia in the winter season and from fifth to tenth sympodia in the summer season contained good quality seed.

In cotton the sequence and pattern of flowering varies significantly with season, variety and cultivation practices and consequently the quality of seeds from individual bolls is likely to vary among each other. To estimate the variation, if any, in seed quality due to the position of bolls in a plant, studies were undertaken with MCU7, a variety cultivated as a summer crop in the rice fallows of Tamil Nadu.

MATERIALS AND METHODS

Field trials were conducted with CV. MCU 7 during winter, 1975 and summer, 1976 seasons. The trials were laid out in completely randomised design with three replications. Recommended package of practices were followed. Eighty plants were marked in each replication, so as to get at least 25 bolls per node sufficient enough to carry out the observations. The bolls were picked immediately after bursting from the first three nodes (N) designated as N₁, N₂ and N₃ per sympodium for a total of 13 sympodia designated as S₁, S₂, S₃, S₄, S₅, S₆, S₇, S₈, S₉, S₁₀, S₁₁, S₁₂ and S₁₃ per plant.

Number of matured seeds was counted in each boll for 10 bolls in each replication in all treatments and the mean number of seeds per boll was calculated. The bolls picked per sympodium and nodewise were pooled replication wise and the kapas were ginned and the seeds obtained were dried to a constant moisture content and weighed. Then the matured seeds were separated and their weight determined. The percentage of matured seeds on weight basis to the total was calculated. The weight of 100 seeds was arrived at from the mean weight of three 100 seed samples. The germination and vigour tests were conducted following the methods detailed by the International Seed Testing Association (1966).

RESULTS AND DISCUSSION

The percentage of seed recovery varied significantly between seasons, sympodia and nodes. The interaction between sympodia and nodes and between season, sympodia and node was also significant (Table-1).

The mean seed recovery was 49.3 per cent in winter and 59.4 per cent

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Table 1. Influence of season on the mean percentage of seed recovery from individual sympodium (S) and node (N) in MCU 7 cotton variety.

	Winter			Mean	Summer			Mean
	N ₁	N ₂	N ₃		N ₁	N ₂	N ₃	
S ₁	64.2	65.0	40.0	56.4	56.0	55.1	53.2	54.7
S ₂	60.3	64.3	45.2	56.6	57.1	56.5	55.1	56.2
S ₃	60.8	61.0	53.7	58.5	57.5	54.1	54.0	55.2
S ₄	61.7	60.4	51.2	60.4	60.2	54.5	53.1	55.9
S ₅	63.6	58.7	47.7	56.7	53.1	57.6	57.3	59.3
S ₆	59.2	48.6	45.9	51.2	65.2	59.9	59.1	61.4
S ₇	57.9	48.1	45.6	50.8	66.1	62.1	60.1	62.7
S ₈	57.4	44.1	41.3	47.6	68.2	65.5	52.2	65.3
S ₉	52.6	42.7	39.2	44.8	71.3	68.0	54.9	68.0
S ₁₀	50.9	40.9	37.2	43.0	65.7	62.2	56.0	61.3
S ₁₁	48.1	38.5	36.1	40.6	63.2	60.1	54.1	59.1
S ₁₂	47.2	35.5	33.1	38.6	61.7	58.1	53.1	57.6
S ₁₃	56.3	49.5	42.0	49.3	49.3	59.1	56.4	59.4
	SEd		CD (P=0.05)		SEd		CD (P=0.05)	
Sympodia	0.39		0.77		Season x Node		0.52	
Node	0.19		0.37		Season		0.42	
Sympodia x Node	0.68		1.35		Season x Sympodia			
Season x Sympodia	0.55		1.08		Node		1.88	

in summer. It was maximum in S₄ and minimum in S₁₃ in winter and at S₃ and S₁₃ respectively in summer. The seed recovery decreased from S₁ to S₁₃ in winter but it increased from S₁ to S₉ and decreased thereafter in summer. The mean seed recovery was the highest in N₁ followed by N₂ and N₃ in both winter and summer. Almost all sympodia in summer and only the first node (N₂) of S₁ to S₅ recorded more than 50 per cent seed recovery in winter. N₃ in all more than the sympodia recorded less than 53

per cent seed recovery in winter. The percentage of matured seeds varied among sympodia from 89.9 (S₄) to 56.2 (S₁₃) in winter and from 99.1 (S₁₀) to 82.1 (S₁) in summer with a mean of 76.70 and 89.65 respectively. The percentage of matured seed was increasing from S₁ to S₄ in winter and from S₁ to S₁₀ in summer. In both the seasons, the maximum percentage of good seeds was recorded in N₁. In winter, the percentage of matured seeds among the sympodia was widely varying in N₁ while in the other two

Table 2. Influence of seasons on the mean percentage of matured seed from individual sympodium (S) and Node (N) in MCU 7.

	Winter			Mean	Summer			Mean
	N ₁	N ₂	N ₃		N ₁	N ₂	N ₃	
S ₁	97.7	96.4	62.5	85.5	85.5	84.2	82.1	83.9
S ₂	95.2	95.4	68.5	86.3	86.1	84.9	83.8	84.9
S ₃	94.2	93.6	75.8	87.9	87.2	85.2	84.8	85.7
S ₄	96.3	93.1	80.2	89.9	89.1	87.5	85.2	87.3
S ₅	95.6	93.1	79.7	89.8	91.0	88.7	87.6	89.1
S ₆	93.2	84.8	77.2	82.1	95.3	90.2	88.9	91.5
S ₇	92.2	77.9	76.6	82.2	95.1	92.9	90.1	92.4
S ₈	89.1	69.6	70.0	76.2	96.5	84.3	92.2	94.3
S ₉	81.3	65.3	65.2	70.6	98.2	95.9	97.8	98.6
S ₁₀	76.3	61.2	60.8	65.2	70.6	98.9	97.8	98.6
S ₁₁	72.2	59.2	56.3	62.6	93.5	89.6	84.3	89.2
S ₁₂	68.1	56.3	53.9	59.4	90.7	87.7	82.1	86.8
S ₁₃	64.2	54.3	50.2	56.2	87.1	84.2	80.2	83.8
Mean	85.9	76.9	67.4	76.7	81.5	89.6	87.2	89.5
		SEd	C.D				SEd	C.D
Sympodia		0.48	0.90	Season x Sympodia			0.65	1.27
Node	0.22	0.43		Season x Node			0.32	0.61
Sympodia x Node	0.79	1.56		Season x Sympodia x Node				
Season	0.18	0.35					1.12	2.20

nodes it was gradually decreasing from S₁ onwards. In summer, the behaviour in all the three nodes among sympodia was almost uniform. The percentage of matured seeds in each sympodia and node was more in winter than in summer. The seasonal influence was more in N₃ than in N₁ and N₂.

The mean number of seeds per boll was 25.5 in winter and 29.4 in summer. In the winter crop, the number of seeds per boll increased from S₁ to S₅ and then decreased

whereas in summer it increased from S₁ to S₁₁ and then decreased. In winter, the number was the highest in N₁ followed by N₂ and N₃, while in summer, it was maximum in N₃ followed by N₂ and N₁. The nodal variation among the sympodia was more in summer than in winter. In winter N₁ recorded the lowest number of seeds upto S₅ but from S₇ onwards it recorded more than N₂ to N₃. In summer, except a few cases, an increasing trend was evi-

Table 3. Influence of season on the mean number of seeds per boll and 100 seed weight from individual sympodium (S) and Node (N) in MCU 7.

		Number of Seed/Boll.			100 seed weight (g)				
		N ₁	N ₂	N ₃	Mean	N ₁	N ₂	N ₃	Mean.
W	S	22.7	24.6	25.1	24.1	10.2	9.8	9.7	9.9
S	"1	21.1	19.7	22.4	21.3	8.3	7.6	7.3	7.7
W	S	24.6	27.3	28.4	26.8	10.3	9.2	9.1	9.5
S	"2	18.7	23.1	24.9	22.4	8.4	7.8	7.6	7.9
W	S	26.3	28.8	29.7	28.2	9.7	9.0	8.1	8.9
S	"3	22.9	26.8	24.8	25.4	5.5	8.9	7.9	8.1
W	S	27.6	30.1	30.2	29.3	10.3	8.8	7.9	9.0
S	"4	29.9	25.7	20.9	26.8	8.7	8.2	8.2	8.4
W	S	29.3	29.3	30.4	29.7	10.2	8.9	7.8	8.9
S	"5	25.8	29.8	29.3	28.4	9.0	8.5	8.3	8.7
W	S	29.5	29.9	26.0	28.5	10.1	8.2	7.0	8.3
S	"6	29.3	28.2	30.0	29.3	9.2	8.8	8.5	8.8
W	S	29.6	26.2	21.0	25.6	10.0	7.9	7.0	8.3
S	"7	27.0	30.7	32.3	30.1	9.3	9.0	8.2	8.8
W	S	31.0	26.2	22.5	28.6	9.1	8.6	6.7	8.1
S	"8	29.8	32.1	31.1	31.2	8.1	8.5	7.6	8.0
W	S	29.9	25.0	21.2	25.4	8.4	7.8	6.5	7.5
S	"9	30.0	32.8	35.7	33.2	9.1	8.2	7.4	8.6
W	S	28.1	24.7	20.0	24.3	8.2	7.7	6.1	7.3
S	"10	34.4	26.1	34.9	35.1	9.3	8.0	7.1	8.1
W	S	27.1	22.2	19.2	22.8	7.9	6.9	6.0	6.9
S	"11	35.8	34.2	37.9	36.0	9.8	7.6	5.9	7.8
W	S	25.9	20.2	18.1	21.4	7.4	6.5	5.8	6.5
S	"12	29.7	31.2	35.3	32.6	9.4	6.9	5.5	7.3
W	S	22.2	18.0	18.0	19.4	7.0	6.0	5.5	6.2
S	"13	28.9	31.7	30.0	30.1	5.1	6.0	5.0	6.7
W	Mean	27.2	25.6	23.8	25.5	9.1	8.1	7.1	8.1
S	"	27.9	29.7	30.5	29.4	8.6	7.3	7.3	7.1

	SEd	C. D. (P=0.05)		SEd	C. D. (P=0.05)
Sympodia	0.288	0.109	Sympodia	0.228	0.447
Node	0.109	0.214	Node	0.109	0.214
Sympodia x Node	0.396	0.776	Sympodia x node	0.396	0.776
Season	0.089	0.175	Season	0.089	0.175
Season x Sympodia	0.323	0.633	Season x Sympodia	0.525	0.633

Table 4. Influence of season (S) on the mean percentage of germination from individual sympodium (S) and node (N) in MCU 7.

S ₁	75	96	96	89	56	56	54	55
S ₂	84	92	82	86	58	71	72	67
S ₃	86	84	78	83	62	70	72	68
S ₄	88	84	78	83	62	70	72	68
S ₅	92	80	74	82	70	76	76	74
S ₆	88	76	70	78	70	72	79	73
S ₇	94	71	62	76	72	76	76	75
S ₈	82	68	60	70	78	76	71	75
S ₉	70	66	58	65	81	66	60	69
S ₁₀	68	65	57	63	84	65	60	69
S ₁₁	68	64	56	63	84	61	58	68
S ₁₂	64	62	56	61	74	60	56	63
S ₁₃	60	58	56	58	69	58	55	61
Mean	78.4	74.5	68.5	73.8	70.6	56.5	66.2	66.1
			SEd	C. D.			SEd	C. D.
			(P=0-05)				(P.0.05)	
	Sympodia		0.42	0.20	Season		0.07	0.32
	Node		0.20	0.40	Season x			
					Sympodia		0.60	1.17
	Sympodia x Node		0.73	1.45	Season x		0.20	0.56
					Node			
	Sympodia x							
	Node		1.04	2.03	Season x			
					Sympodia		1.04	2.03
					Node			

dent for individual nodes. The sympodial behaviour in both the seasons was similar. In winter, the number of seeds per boll decreased from N₁ to N₃ almost in all sympodia and vice versa in summer.

The seed weight varied significantly between seasons. The mean seed index was more (8.1 g) in winter than in summer (7.9). In

winter, the seed index was highest in S₁ which decreased gradually and reached the minimum in S₁₃ whereas in summer it was maximum in S₆ and minimum in S₁₃. The seed index was the highest in N₁ followed by N₂ and N₃ in both the seasons.

A mean germination of 73.8 per cent in winter and 68.1 per cent in summer was recorded. The germina-

tion was maximum in S₁ and S₄ and minimum in S₁₃ and S₁ in winter and summer respectively. In general, the seeds from N₁ recorded the highest germination in both the seasons. Among the nodes in each sympodium though it was not uniform in the first three sympodia, in the subsequent sympodia, N₁ recorded the maximum germination in winter, whereas in summer N₃ from S₂ to S₇ and N₂ thereafter recorded the highest germination. The percentage of germination decreased from S₁ to S₁₃ in winter; while in summer, it increased from S₁ to S₇ and then decreased. The pattern of germination for individual nodes was more or less similar in both the seasons.

The mean vigour index was 2139 in winter and 1943 in summer. The vigour indices generally decreased from S₁ in winter whereas in summer the trend was not uniform. In both the seasons the vigour index was the highest in N₁. But among the nodes in each sympodium, N₁ in winter and N₃ in summer recorded the highest values upto S₅ to S₆ respectively. Significant and positive correlations were obtained between seed germination and 100 seed weight in summer ($r=0.7087$) (ii) seed index and number of seeds in winter ($r=0.6846$), (iii) seed index and percentage of matured seed both in winter ($r=0.7715$) and summer ($r=0.6830$) and (iv) number of seeds per boll and percentage of matured seed in winter ($r=0.4991$).

Studies conducted with the variety MCU 7 have brought out the variations in seed quality between sympodia as well as between nodes in each sympodium. Joshi *et al.*, as early as 1956 have brought out the variations due to varieties, season and cultivation practices on the flowering pattern and consequently on the number of bolls. Bozhkova (1973) has reported that bolls are likely to vary in quality and quantity within a plant. According to McClelland (1916) a flower in the second node of second sympodium and a flower in the first node of tenth sympodium might have been initiated on the same date. But these two bolls may develop and reach the bursting stage on the same date or may not, since the period of boll maturation varies widely from boll to boll (Balls, 1912). Therefore, the seeds obtained from each picking may be varying in their maturity period and consequently in their quality.

Similarly, flowers initiated late in the early formed sympodia may come to harvest along with those formed in the later formed sympodia. In such cases also seeds from early formed sympodia are likely to get rejected since the produce from later pickings are usually rejected for seed purposes (Marappan *et al.*, 1966). Therefore picking wise seed collection as recommended by Marappan *et al.*, (1966) and other workers may not be

a well defined solution to harvest good quality seeds (Christidis, 1951). Harvesting the produce sympodium wise can ensure good quality seed. Since the seed decreases from S₁ to S₁₃ it should be possible to fix the number of sympodia upto which the produce should be harvested for seed. Bozhkova (1973) has stated that 1000 seed weight and germination were strongly influenced by position of boll and has recommended first six sympodia for rainfed and first four sympodia for irrigated crops to be used for seed purposes. Kamalova and Polyantseva (1967) observed variations in seed size among seeds obtained from different portions of a plant. According to the Khasanox (1976), seeds of higher germination and vigour were produced in bolls on the first and second phases on the first six sympodia branches in Taskent-3 cultivar in the Northern Region of Uzbek Soviet Socialist Republic and on the first 8 to 9 branches in the Southern Region. The differences in sowing quality of seeds were attributed to differences in nutritional conditions between different branches of a plant and to differences in climatic conditions between the regions. Ndegwee and Millourn (1974) observed that the seeds from the middle portion of the plant recorded higher germination than that from either the bottom or top ones of the plant. Cardozier (1957) also suggested to avoid seeds from top bolls for sowing. Therefore, it becomes clear that the produce from the first eight sympodia in the winter season and from S₅ to S₁₀ in the summer season can be used for seed purposes in MCU 7.

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