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SEED QUALITY STUDIES IN COTTON

C.P. THIAGARAJAN[1] and K.R. RAMASWAMY[2]

In Cotton variety MCU 7, Studies of individual bolls for number of matured seed, seed index, germination and vigour 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 seeds.

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 MCU 7, 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 atleast 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 N_1, N_2 and N per sympodium for a total of 13 sympodia designated as S_1, S_2, S_3, S_4, S_5, S_6, S_7, S_8, S_9, S_{10}, S_{11}, S_{12}, & S_{13}, 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 seed per boll was calculated. The bolls picked sympodium and node wise were pooled replication wise and the kapas were ginned and 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 Seeds Testing Association.

RESULTS AND DISCUSSION

The percentage of seed recovery varied significantly beetween 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 49.39 per cent in winter and 59.41 per cent in summer. It was maximum in S_4 and minimum in S_{13} in winter and at S_2 and S_1 respectively in summer. The seed recovery decreased from S_1 to S_{13} in winter but it increased from S_1 to S_2 and decreased thereafter in summer. The

1 Associate Professor (Seed Tech). TRRI, Aduthurai

2 Dean (Agri.), Agri, College & Res. Instt. TNAU, Coimbatore-3

mean seed recovery was the highest in N_1 followed by N_2 and N_3, in both winter and summer. Almost all sympodia in summer and only the first node (N_3) of S_1 to S_6 recorded more than 50 per cent seed recovery in winter. N_3 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 (S_4) to 56.2 (S_{13}) in winter and from 99.1 S_{10} to 82.1 (S_1) in summer with a mean of 76.70 and 89.65 respectively. The percentage of matured seed was increasing from S_1 to S_4 in winter and from S_1 to S_{10} in summer. In both the seasons, the maximum percentage of good seeds was recorded in N_1. In winter the percentage of matured seeds among the sympodia was widely varying in N_3 while in the other two nodes it was gradually decreasing from S_1 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 N_3 than in N_1 and N_2.

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 S_1 to S_6 and then decreased whereas in summer it increased from S_1 to S_{11} and than decreased. In winter, the number was the highest in N_1 followed by N_2 and N_3, while in summer, it was maximum in N_3 followed by and N_2, and N_1. The nodal variation among the sympodia was more in summer than in winter. In winter N_1 recorded the lowest number of seeds upto S_8 but from S_7 onwards it recorded more than N_2 or N_3. In summer, except a few cases, an increasing trend was evident for individual nodes. The sympodial behaviour in both the seasons was similar. In winter, the number of seeds per boll decreased from N_1 to N_3 almost in all sympodia and vice versa in summer.

The seed weight varied significantly between seasons. The mean seed index was more (8.169) in winter than in summer (7.977). In winter, the seed index was maximum in S_1 which decreased gradually and reached the minimum in S_{13}, whereas in summer it was maximum in S_6 and minimum in S_{13}. The seed index was the highest in N_1 followed by N_2 and N_3 in both the seasons

A mean germination of 73.8 per cent in winter and 68.1 per cent in summer was recorded. The germination was maximum in S_1 and S_4 and minimum in S_{13} and S_1 in winter and summer respectively. In general the seeds from N_1 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. N_1 recorded the maximum germination in winter, whereas in summer N_3 from S_3 to S_7 and N_2 there after recorded the highest germination. The percentage of germination decreased from S_1 to S_{13} in winter whereas in summer, it increased from S_1 to S_7 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 S_1 in winter whereas in summer the trend was not uniform. In both the seasons the vigour index was the highest in N_1. But among the nodes in each sympodium, N_1 in winter and N_2 in

summer recorded the maximum values upto S_8 to S_{11} 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 per centage 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* (1956) have brought out the variations due to varieties, season, and cultivation practicies on the flowering pattern and consequently on the number of bolls. Bazhkova (1975) 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 purpose (*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 S_1 to S_{15} it should be possible to fix the number of sympodia upto which the produce should be harvested for seed. Bazhkova (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 (1967) observed variations in seed size among seeds obtained from different portions of a plant. According to Khasanox (1976), seeds of higher germination and vigour were produced in bolls on the first and second places on the first six sympodial branches in Taskent-3 cultivar in the Northern Region of Uzbeck Soviet Soeialist Republic and on the first 8 to 9 branches in the Southern Region. The diffferences 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. 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 S_8 to S_{16} in the summer season can be used for seed purposes in MCU. 7.

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

	Winter.				Summer			
	N_1	N_2	N_3	Mean	N_1	N_2	N_3	Mean
S_1	64.2	65.0	40.0	56.4	56.0	55.1	53.2	54.7
S_2	60.3	64.8	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	62.1
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	40.6	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)
Sympodio		0.39	0.77		Season X		0 27	0.52
Node		0.19	0.37		Node			
Sympodia × Node		0.68	1.35		Season X Season		0.23	0.42
Season X Sympodia		0.55	1.08		Sympodia X Node		0.96	1 88

(Values in percentages denote angular values).

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

	Winter				Summer			
	N_1	N_2	N_3	Mean	N_1	N_2	N_3	Mean
S_1	97.7	96.4	62.5	85.5	85.5	84.2	82.1	83.1
S_2	95.2	95.4	86.3	86.1	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	89.8	89.1	87.5	85.2	87.3
S_5	96.6	93.1	79.1	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	90.5
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	94 3	92.2	94.3
S_9	81.3	65.3	65 2	70 6	98.2	96.9	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 6	89.6	84.3	39.2
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	88.3
Mean.	85.9	76.9	67.4	76 7	81.5	89.6	87.2	89.5

	SEd	CD		SEd	CD
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	0.18	0 35		Season X Sympodia X Node.	1.12	2.20

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_1	22.7	24.6	25.1	24.1	10 2	9 8	3.7	9.9
S	S_1	21.1	19.7	22.4	21.3	8.3	7.6	.3	7.7
W	S_2	24.6	27.3	28.4	26 8	10 3	9.2	1.1	9 5
S	S_2	18.7	23.1	24.9	22 4	8.4	7.8	7.6	7 9
W	S_3	26.3	28.8	29.7	28.2	9.7	9 0	3.1	8.9
S	S_3	22.9	26.8	24,8	25.4	5.5	8.9	7.9	8.1
W	S_4	27.6	30.1	30.2	29.3	10 3	8.8	7.9	9.0
S	S_4	29 9	25.7	20.5	26.8	8.7	8.2	3 2	8.4
W	S_5	29.3	29.3	30.4	29.7	10.2	8.9	7.8	8.6
S	S_5	25.8	29.8	29.3	28.4	9.0	8.5	3.3	8.7
W	S_6	29.5	59 9	26.0	28.5	10 1	8.2	7.0	8.3
S	S_6	29.3	28.2	80 0	29.3	9.2	8.8	8.5	8.8
W	S_7	29.6	26.2	21.0	25 6	10.0	7.9	7.0	8.3
S	S_7	27.0	30.7	32.3	30.1	9.3	9.0	8.2	8.8
W	S_8	31.0	26.2	22.5	28.6	9.1	8.6	6.7	8.1
S	S_8	29.8	32 8	31.1	31.2	8.1	8.5	7.6	8 0
W	S_9	29.9	25,0	21 2	25.4	8.4	7.8	6.5	7,5
S	S_9	30.0	32.8	35.7	33.2	9.1	8.2	7.4	8 6
S	S_{10}	28.1	24.7	20.0	24.3	8.2	7.7	6.1	7.3
S	S_{10}	34.4	36.1	34.9	35.1	9 3	8.0	7.1	11.1
W	S_{11}	27.1	22.2	19.2	22.8	7.9	6.9	6.0	6.9
S	S_{11}	35.8	34.2	37.9	36.0	9.8	7.6	5.9	7.8
W	S_{12}	25.9	20 2	18.1	21.4	7.4	6.5	5.8	6.5
S	S_{12}	29 7	31.2	35.3	32.6	9.4	6.9	5 5	7.3
W	S_{13}	22 2	18 0	18.0	19 4	7.0	6.0	5.5	6.2
S	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	Mean	27.9	29.7	30 5	29.4	8.6	7.3	7.3	7.9

	SEd	CD (P=0.05)		SEd	CD (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	0.325	0.633

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

	Winter.				Summer.			
	N_1	N_2	N_3	Mean.	N_1	N_2	N_3	Mean
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	CD (P=0 05)		SEd	CD (P=0.05)
Sympodia	0.42	0.20	Season	0.17	0.32
Node	0.20	0 40	Season x Sympodia	0.60	1.17
Sympodia x Node	0.73	1.45	Season x Node	0.20	0.56
Sympodia x Node	1.04	2.03	Season x Sympodia x Node	1.04	2.03

(Value in parantheses denote angular values)

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