REFERENCES

ABDUL-BAKI, A.A. and ANDERSON,J.D. 1973. Vigour determination in soybean seed by multiple criteria. Crop Sci. 13: 630-633.

HARDING, H.A. 1904. Vitality of the cabbage black rot germ on cabbage seed. N.Y. State Agr. Expt. Sta. Bul. 251.

ISTA. 1985. International Rules of Seed Testing. Seed Sci. Technol. 13 : 299-355.

NAYAK, M.L. SINGH, R.P. and VERMA., J.P. 1976. Effective chemical sprays to control bacterial blight of cotton. Z. Pflkrankh. pflpath. pflschutz. 83 : 407-415.

RANGARAJAN, M. and CHAKRAVATI., B.P. 1970. Bacterial stalk rot of maize in Rajasthan, effect on seed germination and varietal susceptibility. Indian Phytopath. 23 : 470-477.

SHAH, A., SRIVASTAVA, K.K ROY,A.J. and BORA, S.S. 1985. Control of black rot disease of cauliflower by seed treatment. Prog. Hort. 17 : 72-74.

SHEKHAWAI, G.S., SRIVASTAVA, D.N. and RAO, Y.P. 1969. Seed infection and transmission of bacterial leaf streak of rice. Pl. Disc. Reptr. 43: 111-116

SIVAN; A.A., ELAND, Y. and CHET,I.. 1984. Biological control effects of a new isolate of *Trichoderma harzianum on Pythium aphanidermatum. Phytopathology 74* : 498-501.

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DETERMINING OPTIMUM SEASON FOR THE PRODUCTION OF QUALITY SEEDS IN MUNGBEAN

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ABSTRACT

The monthly sowing studies carried out with mungbean cultivar CO 3 for one year (January to December) under coimbatore conditions had brought out the need for sowing the seed crops during the summer months namely, from February to April for getting higher seed yield associated with larger recovery of quality seeds. The hard seed percentage however was more in the produce of the resulting crop. On the other hand, seed crops raised during May to December resulted in low seed yield combined with larger percentage of off-colour seeds which on the seed quality point of view needs to be eliminated.

Basically, seed production technology differs from that of grain production in several respects. The factors affecting seed quality, weather, environmental, biotic, physical or phsiological, need to be considered duly in any seed production venture, one such example will be the occurrence of large percentage of hard seeds or off-colour seeds in seed lots of black gram (Dharmalingam and Ramakrishnan, 1978) and mungbeen raised during certain seasonal conditions. The use of hard seeds for immediate planting (Dharmalingam *et al.*, 1976) and of discoloured and carry over seeds would adversely affect the field stand and growth of the subsequent crop. In order to enquire into certain of the causes that would influence the quality of seeds during production, an attempt has been made in the present study with the mungbean seeds of the cultivar Co 3.

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Table 1. Monthly sowing of seeds to determine optimum season for seed production.

Month of sowing	Plant height (cm)	No.of pods/plant	Pod yield		Seed yield	
			g/plant	kg/plot	g/plant	kg/plot
January	40.0	16.4	6.30	1.35	4.65	0.94
February	42.4	16.4	7.40	1.71	5.38	1.12
March	47.7	10.4	5.82	1.18	4.27	0.88
April	53.6	29.5	13.31	2.09	8.41	1.36
May	39.6	10.1	4.46	0.51	2.93	0.40
June	36.4	10.1	3.03	0.64	1.76	0.44
July	37.9	8.7	2.90	0.69	1.91	0.44
August	35.3	12.1	4.42	0.44	2.79	0.31
September	40.5	11.4	5.23	1.16	3.84	0.84
October	41.6	12.1	5.70	0.97	3.72	0.67
November	39.5	10.1	3.90	0.88	2.75	0.61
December	35.5	13.1	3.97	0.81	2.95	0.63
C.D. (P=0.05)	6.6	2.89	1.47	0.43	1.48	0.32

MATERIALS AND METHODS

Monthly sowing of mungbean seeds of cv co.3 was taken up on 10th day of every month commencing from January to December, under irrigated conditions. The crop was raised in sandy loam soil in 5 m x 3 m plots and six such plots were sown every month. The crop was fertilized with a recommended schedule of 25 kg of N and 60 kg of P_2O_5/ha applied basaly prior to sowing of seeds. Uniform sized seeds were sown in lines adopting a spacing of 25 x 10 cm after pre-treating the seeds with a fungicide (Captan) at 2 g/kg of seed. Suitable plant protection measures were taken to control the incidence of pests and diseases during the crop period. Soil drenching with systemic fungicide (Bavistin 0.1% solution) was given when ever there was an incidence of **Rhizoctoni** wilt either in the early or late stage of maturity. The crop was harvested when more than 75 per cent of the pods turned black. Observations were recorded at harvest and post-harvest periods.

Ten plants were taken at random from each replication for growth measurements

Table 2. Monthly sowing of seeds to determine optimum season for seed production.

Month of sowing	shelling (%)	Pod/seed ratio	Hard seed (%)	Off-colour seed (%)	Seed recovery (%)	100-seed weight (g)
January	74.7 (59.92)	1.34	16.3 (23.81)	-	94.8	2.939
February	73.2 (58.85)	1.37	36.5 (37.15)	-	91.8	2.904
March	73.0 (58.83)	1.36	39.8 (39.11)	-	94.3	2.934
April	65.1 (53.92)	1.58	22.3 (28.18)	-	90.7	3.008
May	67.3 (55.13)	1.49	13.8 (21.74)	6.8 (14.84)	97.6	3.003
June	67.7 (55.40)	1.72	17.3 (24.58)	7.0 (14.75)	95.0	2.995
July	65.7 (54.12)	1.52	17.5 (24.73)	2.5 (8.85)	90.2	2.926
August	63.0 (52.54)	1.58	12.3 (20.45)	14.5 (22.27)	94.8	2.993
September	73.7 (59.28)	1.36	7.0 (15.34)	20.5 (26.83)	98.5	3.047
October	65.2 (53.88)	1.53	5.0 (12.92)	39.5 (38.79)	95.4	2.980
November	70.5 (57.09)	1.42	5.0 (12.92)	24.8 (29.65)	95.9	2.923
December	74.0 (59.39)	1.35	16.5 (23.97)	9.0 (17.33)	92.8	2.930
C.D. (P=.05)	(3.86)		(3.25)	(5.02)	-	0.764

Table 3. Quality of seeds obtained from different months of sowing (Seeds tested immediately after harvest)

Month of sowing	Germination (%)	Root length (cm)	Shoot length (cm)	Dry matter production (mg/10 seedling)
January	94	10.6	12.4	364
February	96	11.0	13.0	402
March	94	11.2	12.6	384
April	96	11.4	12.8	362
May	90	10.4	13.2	400
June	92	11.0	12.6	410
July	94	11.2	12.8	392
August	90	10.8	13.0	380
September	94	10.6	13.4	396
October	92	11.0	12.6	378
November	90	10.4	12.4	380

such as plant height, number of pods as well as pod and seed yield per plant. Net plot yield was recorded from all the plants. The off-colour seeds were separated manually from the produce obtained from each plot and expressed as percentage. The hard seeds were determined in three replicates of 1000 seeds each after soaking them in water for 24 h at room temperature; the seeds which did not imbibe water and remained hard were counted as hard seeds and expressed as percentage.

Germination test was conducted on harvest fresh seeds adopting the modified roo-towel method (Dharmalingam 1983) using 25 x 4 seeds at room temperature (25°±3°C). The test was evaluated on seventh day. The normal seedlings were counted and expressed as germination percentage. For growth measurements, 10 normal seedlings were taken at random and the root and shoot length were measured individually and the mean values expressed as cm. The same seedlings were dried in a hot-air oven at 85°C for 24 h and the dry matter content was recorded and expressed as mg/10 seedlings. The data were analysed statistically following the technique of analysis of variance (Panse and Sukhatme, 1959). Before analysis, the percentage data were transformed to respective angles.

RESULTS AND DISCUSSION

The results revealed that the seeds sown during different months of the year produced plants of different height to a significant level. The seeds sown in the months of April, March, February and october had produced taller plants (53.6 cm to 41.6 cm) than those of other sowings. The plant height recorded ranged between 40.5 and 35.3 cm. (Table 1). The number of pods produced per plant was significantly more in the crops sown in April, January and February followed by the sowings done in December, August, October and September. The mean number of pods ranged from 29.5 to 16.4 per plant in the former sowings and 13.1 to 11.4 per plant in the later ones. The results obtained for the remaining months were however, significantly low.

The pod and seed yield per plant (mean of 10 plants) and per plot (from 15 sq.m. area) showed significant and almost similar results with months of sowing. The sowings done in April, February, January, March, September and October recorded significantly higher pod and seed yields as compared to the remaining months of the year. The pod yield was from 13.31 g to 5.23 g per plant

and 2.07 kg to 0.97 kg per plot; the seed yield ranged from 8.4 g to 3.72 g per plant and 1.36 kg to 0.67 kg per plant. (Table 1). The shelling percentage revealed that the pods obtained from January, December, September, February, March and November sowings had a higher out turn of seeds than those from other months of sowing. The overall increase in shelling percentage was 11 per cent. The pod/seed ratio depicted parallel results as that of the shelling percentage (Table 2). The percentage of hard seeds in the harvest-fresh material differed significantly between months of sowing. It ranged from 5 per cent to 39.8 per cent. March and February produced higher percentage of hard seeds viz., 39.8 and 36.8, followed by the sowings done in April, July and June, which were of 22.3, 17.5 and 17.3 per cent. respectively, (Table 2).

On the other hand, the occurrence of off-colour seeds were noticed in the harvest-fresh produce in the sowings done from March to December. The percentage occurrence varied significantly registering a minimum of 2.5 in July sowing and a maximum of 39.3 in October sowing. The sowings done in October, November and September had the highest percentage of off-colour seeds as against the sowings in other months. Interestingly, the sowings done during January to April did not produce any off-colour seeds at all (Table 2). The differences in the recovery of seeds in 7/64" round perforated metal sieve accounted for 7.8 per cent in various months of sowings. The maximum and minimum were 98.5 and 9.7 per cent, respectively. The seeds that passed through 7/64" sieve consisted of small and immature seeds that are to be eliminated from the seed lot as per the seed certification standards prescribed for this crop. The sowings of September, May, November, October, June, and March have higher percentage recovery of seeds combined with higher 100-seed weight (Table 2). Mungbean crops sown during certain months of the year produced a large percentage of hard seed and in certain other months it contained appreciable quantity of off-colour seeds. The causes for the development of such variable seeds cannot be one and the same. A perusal of the macro environmental conditions that prevailed during the crop period would probably explain these phenomena as the effect of environment on the development of seed in the mother plant. It has been shown in certain monocotyledon that the seeds exposed to unfavourable conditions especially during dough stage, affect the developmental process especially the embryonic growth to a larger extent. (Ovcharov and Kizilova, 1966), suggesting that the maturation phase of the seed was more susceptible to adverse environmental conditions.

Higher percentage of hard seeds obtained in crops sown in the months of March and February would be reaching the maturation phase (60-65 days after sowing) during the months of May and April, respectively when the maximum and mean temperature was at its highest with a low relative humidity. Higher temperature around the developing seed would create a sub-optimal condition for the developing seed as a result the seed coats develop impermeability (Sidhu and Cavers, 1977) presumbly to prevent rapid desiccation, as a result of suberisation. Thus the outer epidermal layer develop waxy coating and become strongly dormant. The reduction in hard seed percentage corresponding to the reduction in temperature is also evident from the study.

On the other hand, the seeds maturing during the cooler part of the year with high relative humidity, as prevailed during the months of October to January, lead to the development of off-colour seeds. Evidently, low temperature and high humidity would favour the growth and development of field pathogens (Christenson, 1967) which would harbour on the seeds, probably as a prefer-

ential host on account of high protein content in the seed and parasitation of the fungus would have resulted in the development of off-colour seeds. (Dharmalingam and Ramakrishnan, 1978). An altered metabolic pathway in such seeds (Kozlowski, 1972) can not also be over ruled as one of the causes for the development of such offcolour seeds. Higher seed yield with better seed quality was noticed in the summer months (March and April) than in the sowings in monsoon, months namely, July to August. Therefore, for seed crops, summer sowing is preferable under Coimbatore conditions. However in view of the greater percentage of hard seeds in late summer, an early summer sowing would possibly strike a reasonable compromise between seed quality. The germination and vigour potential of the harvest-fresh seeds did not reveal significant differences between months of sowing. Since the seed quality evaluations are made immediately after harvest and drying, the differences have not been manifested as is the case with any seed. The differences in seed quality would be more pronounced during storage rather than in the harvest-fresh seed.

REFERENCES

CHRISTENSON,C.M., (1967). Increase in invasion by storage fungi and in fat acidity values of commercial lots of soybean stored at moisture content of 13-14 per cent. Phytopathology 57: 622-624.

DHARMALINGAM,C., 1983. Studies on quality seed production and control of seed deterioration in mungbean and sunflower. Ph.D Thesis Calcutta University, Calcutta.

DHARMALINGAM,C., RAMAKRISHNAN.V.,and RAMASAMY. K.R., (1976). Viability and vigour of stored seeds of blackgram in India (Vigna mungo (L) Hepper). Seed Res. 4: 40-50.

DHARMALINGAM,C. and RAMAKRISHNAN.V.(1978). Seed quality in relation to seed size and seed coat colour variation in blackgram (Vigna mungo (L) Hepper) Seed Res. 6: 101-109

KOZLOWSKI,T.T. (1972). Seed Biology I. Academic Press, New York and London.

OVCHAROV,K.E. and KIZILOVA,K.G., (1966). Differences in seed quality and plant productivity. In Physiologial Basis of Seed Germination. 54-140. Amerind Publishing, New Delhi.

PHANSE, V.G. and SUKHATME, P.V. (1959) Statistical methods for a agricultural workers, ICAR Publication, New Delhi.

SIDHU, S.S and CAVERS, P.B. (1977) Maturity, dormancy relationships on attached and detached seeds of Medicago lupilina L. Bot.Gaz. 138: 174-182.

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RESEARCH NOTES

TCHB.213 - A NEW HYBRID COTTON FOR TAMIL NADU

In Tamil Nadu, the first interspecific hybrid CBS 156 was released in 1973. In Tamil Nadu, the area under cotton is 2.5 to 3.0 lakh ha and the annual production is 5 to 7 lakh bales but the demand is around 20 lakh bales for 439 textile mills in the State. Therefore, with the main objective of increasing the cotton production, development of high yielding hybrid cotton through heterosis breeding was aimed at. A high yielding tetraploid interspecific hybrid cotton viz. TCHB. 213 involving the G.hirsutum female parent TCH. 1218 and the G.barbadense male parent TCB, 209 was developed at Cotton Breeding Station, Tamil Nadu Agricultural University, Coimbatore.