generation was significant for all the characters in majority of the combined treatments and some of the individual treatments (Table 1-3). Khan (1985) also found that combined treatments were most effective.

Induced variation comprises both genetic components and non-genetic variation. The heritable and fixable portion would be of practical significance. The genotypic and phenotypic variances, estimates G.G.V., heritability and genetic advance increased for pod length (Table 1), grains per pod (Table 2) and 100 seed weight (Table 3) considerably in many of the combined as well as single treatments. These parameters showed low to high range for pod length and grains per pod but low to moderate in case of 100 seed weight. Sheriff and Veeraswamy (1977) observed high estimates of GCV and genetic advance for 100 seed weight. The above genetic parameters were not mutagen and dose specific and also varied from trait to trait which are in accordance with the results of Khan (1981).

REFERENCES

ALLARD, R.W. (1960). **Principles of Plant Breeding.** John Wiley and Sons, Inc., New York, PP. 85-89.

BURTON, G.W. (1952). Quantitative inheritance in grasses. Proc. 6th Int. Grassld. Cong., 1 : 277-283.

GREGORY, W.C. (1965). Mutation frequency, magnitude of change and the probability of improvement in adaptation. **Rad. Bot (Suppli.), 5** : 429-41.

JOHNSON, H.W.; ROBINSON, H.F. and COMSTOCK, P.F. (1955). Estimation of genetic and environmental variability in sorghum. **Agron. J., 47** : 314-318.

KHAN, I.A. (1981). Induced mutations in mungbean (**Phaseolus aureus Roxb**). **J. agric. Sci. 15** : 225-31.

KHAN, I.A. (1985). Studies on hydrazine hydrate (HZ) and gamma rays induced mutations affecting quantitative characters. **Genetica Iberica, 37** (1/2): 47-57.

MURRAY, S.A. and NEWCOMBE, C.L. (1970). Synergistic inhibition of growth of mung bean seedling after combination of low level of irridation and low level shock treatments. **Rad. Bot., 10** : 563-67.

SANTOS, T.S. (1965). Reduction of sensitivity to Co^{60} gamma rays in **Phaseolus aureus** Roxb. through pre or post irradiation heat treatments of the seeds. **Rad. Bot., 5** : 263-71.

SCOSSIROLY, R.E. ; PALENZONA, P.L. and SCOSSIROLIY, P.; POLLENGRIVLI, S. (1966). Studies on the induction of new genetic variability for quantitative traits by seed irradiation and its use for wheat improvement. Mutations in Pl. Breeding **Proc. Panel FAO IAEA**, Vienna : 179-229.

SHERIFF, N.M and VEERASWAMY, R. (1977). Genotypic and phenotypic variability of mutants in redgram (**Cajanus cajan** (L.) Millsp.). **Madras agric. J., 64** (1) : 45- 47.

SWARUP, V and GILL, N.S. (1968). X-ray induced mutations in french bean. **Indian J. Genet. and Pl. Breed. 28** : 44-58.

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STUDIES ON CERTAIN ASPECTS OF SEED PROCESSING OF BAJRA HYBRID SEED

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ABSTRACT

Threshing the earheads of KM 2 bajra hybrid at 10, 15, 20 and 25 + 0.5 per cent seed moisture levels in a mechanical thresher resulted in significant differences in the extent of mechanical damage to the seeds. Seeds extracted at 15 or 20 + 0.5 per cent moisture recorded the least damage, higher germination and more seedling vigour than those at 10 or 25 + 0.5 per cent.

INTRODUCTION

Separating the seed from the mother plant is the primary operation carried out following harvesting of a seed crop. The methods and conditions of threshing of the earheads largely determine the extent of mechanical damage to the seed (Kantor and

[Seed Technol] 2. Dean A riculture) (Retd) TNAU, Coimbatore - 3

Table 1. Influence of threshing the earheads at varying seed moisture levels on the extent of mechanical damage, germination, vigour index and electrical conductivity in KM 2 hybrid seeds

	Seed moisture levels				CD (P = 0.05)
	10	15	20	25	
Extent of mechanical damage (%)	18.3	2.9	4.1	18.7	2.1
Germination (%)	80.0	94.0	95.3	80.7	2.8
Vigour index	2608	3225	3257	2791	482
Accelerated ageing test					
Germination (%)	57.3	80.7	81.3	58.7	4.9
Vigour index	1538	2457	2471	1552	176
Electrical conductivity					
(michromos/cm)	64.8	56.2	57.8	65.0	-

Webster, 1967). Of all the factors, the moisture content of seed at threshing assumes considerable importance (Dexter, 1966). Information available on the safe method of threshing the earheads in bajra is meager and there is need to standardise the seed processing in this crop.

MATERIALS AND METHODS

With a hybrid seed crop of KM 2 bajra, the following aspects were studied (A) sufficient quantity of earheads from the primary tillers of the seed parent, harvested at 25 = 0.5, 20 + 0.5, 15 = 0.5 and 10 = 0.5 per cent seed moisture levels were threshed using single head thresher. The seed samples were collected at fixed intervals from the outlet of the thresher and evaluated for (i) the extent of mechanical damage by visual observation (ii) laboratory germination (iii) vigour index; (iv) germination after accelerated ageing and (v) electrical conductivity of seed leachate. (B) At maturity, sufficient quantity of earheads from the seed parent, were harvested at 15-20 per cent seed moisture content and the seeds were extracted by (a) hand threshing (control); (b) threshing by beating the earhead with a plible bamboo stick; (c) threshing by tractor treading; (d) threshing by mechanical thresher; and (e) threshing by bullock treading.

With the seed samples obtained from the above methods of threshing, estimations were done for (i) extent of machanical damage; (ii) germination; (iii) vigour index; (iv) germination and seeding vigour after accelerated ageing and (v) electrical conductivity of the seed leachate.

RESULTS AND DISCUSSION

Threshing the earheads at 10, 15, 20 and 25 + 0.5 per cent seed moisture resulted insignificant differences in the extent of mechanical injury. Threshing at 25 or 10 + 0.5 per cent seed moisture inflicted significantly higher percentage of damage than either at 15 or 20 + 0.5 per cent (Table 1). With higher seed moisture, the seed became more soft and plastic (Penesar and Pathak, 1974) leading to increased damage as reported by Kantor and Webster (1967) in sorghum, Singh (1977) in maize, Brahmanand and Biswas (1974) in wheat, Chhabra and Singh (1975) in paddy.

Kantor and Webstor (1967) and Brahmanand and Biswas (1974) also observed that threshing the seed either at high or at low moisture levels reduced the

Table 2. Influence of different threshing methods on the extent of mechanical damage, germination, vigour index and electrical conductivity in KM 2 hybrid seed

	Threshing					CD (P = 0.05)
	By hand	By beating with stick	By tractor treading	By mechanical thresher	By bullock treading	
Extent of mechanical damage (%)	0	0.3	1.3	3.4	12.2	1.81
Germination (%)	98.0	98.0	94.0	90.0	82.0	5.6
Vigour index	3427	3260	3083	3028	2707	218
Accelerated ageing test						
Germination (%)	86.7	86.0	82.0	80.7	62.0	2.9
Vigour index	2691	2605	2411	2262	1695	223
Electrical conductivity (michromos/cm)	55.0	55.0	57.2	61.6	64.9	

germination and vigour potential of seed. In the present study, the seed threshed at 15 or 20 + 0.5 per cent moisture levels recorded significantly higher germination and seedling vigour than at other moisture levels. The reduction in viability and vigour of mechanically damaged seed could be due to loss of storage and meristematic tissues and retardation of life process (Strona, 1966) and the suppression of synthesis of new compounds that are essential for the the life as well as the disruption of nucleic acid metabolism (Ovcharov, 1969). The fungal invasion at the injured portions of seed leading to rapid decomposition of endosperm (Moore, 1956) can not also be excluded. In the mechanically injured seed, the rate of respiration increases sharply depleting the reserve food materials and thereby leading to reduced viability and vigour (Strona and Shevchenko, 1965). The in jured seed aged rapidly and recorded lower germination and vigour than others (Baskin and Delouche, 1971). On the other hand high germination and vigour recorded in the aged seed extracted at 15 and 20 + 0.5 per cent moisture levels confirmed the importance of threshing the seed at the optimum seed moisture range.

Seeds obtained from bullock treading sustained the maximum damage followed by machine threshing (Table 2). The variation on the extent of mechancial injury may be due to the varying impact forces in the different methods of threshing. Green *et al.* (1966) reported that hand threshed seed samples had no or little injury; whereas, machine threshed seed recorded a high percentage of damage.

According to wortmen and Rinke (1951), as the total damage increased, germination decreased. The germination and seedling vigour was maximum and minimum in seeds obtained by hand threshing and bullock treading, respectively. Green *et al.* (1966) reported that hand threshed seed recorded very high germination compared to machine threshed seed. Baskin and Delouche (1971) reported that the viability of machine threshed seed declined more rapidly than hand threshed ones under accelerated ageing conditions. In the present study, hand threshed seed recorded the highest values.

The electrical conductivity of seed leachate increased with the extent of damage to the seed as has been demonstrated in many crops seeds (Matthews and Bradnock, 1968).

The electrical conductivity values in these studies ranged from 55.0 to 65.0 micro mhos/cm for the seed threshed by different methods (Table 1 and 2).

REFERENCES

BASKIN, C.C. and J.C. DELOUCHE. 1971. Effect of mechanical shelling on storability of peanut (Arachis hypogaea L.) seed Proc. Assi. Off. Seed Anal., 61 : 73-78.

BRAHMANAND and D.K. BISWAS. 1974. Studies on impact damage to wheat seeds. J. Agril. Engg., 11 : 9-13.

CHHABRA, S.D. and K.N. SINGH. 1975. Paddy properties related to threshing. J.Agril.Engg., 17 : 17-20.

DEXTER, S.T. 1966. Conditioning dry bean seed (Phaselolus vulgaris L.) for better processing quality and seed germination. Agron.J., 58 : 629.

GREEN, D.E., L.E. CAVANAH and E.H. PINNELL. 1966. Effect of seed moisture content, field weathering and combine cylinder speed on soybean seed quality. Crop Sci., 6 : 7.

KANTOR, D.J. and O.J. WEBSTER. 1967. Effects of freezing and mechanical injury on viability of sorghum seed. Crop Sci., 7 : 196.

MATTHEWS, S. and W.T. BRADNOCK. 1968. Relationship between seed exudation and field emergence in peas and french beans Hort. Res.., 8 : 89-93.

MOORE, R.P. 1986. Mechanically damaged seed seriously reduce crop stands. Sth. Seedman., 19 : 73.

OVCHAROV, K.E. 1969. The physiology of different quality of seeds. Proc.Int.Seed Test.Ass.,34 : 305-313.

PANESAR, B.S. and B.S. PATHAK. 1974. Investigations into mecahnics of rub threshing-I. J. Agril.Engg., 11 : 1-8.

SINGH, B. 1977. Reducing kernel damage in maize shelling. J.Agril. Engg., 14 : 58-61.

STRONA, I.G. 1966. General seed testing of field crops. As quoted by Ovcharov, K.E. 1977. Physiological basis of seed germination. Amerind Publishing Co. Pvt.Ltd., New Delhi.

STRONA, I.G. and V.M. SHEVCHENKO. 1965. Increasing the yield of ensured seeds of mazie. As quoted by Ovcharov, K.E. 1977. Physiological basis of seed germination. American Publishing Co.Pvt.Ltd., New Delhi.

WORTMAN, L.S. and E.H. RINKE. 1951. Seed corn injury at various stages of processing and its effect upon cold test performance. Agron J., 43 : 299-305.

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CORRECTION OF CHLOROSIS IN SUGARCANE

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ABSTRACT

The field experiments conducted in calcareous soils of Coimbatore district to alleviate Fe and Zn deficiencies in sugarcane crop and to maximise the cane yield, showed that calcareous soils with low Fe availability, 100 kg/ha alone as soil application or 50 kg $FeSO_4$ plus FYM at 20 t/ha can be resorted to maximise cane yield of Mandya sugarcane crop. For correcting Fe deficiency in standing crop, one per cent $FeSO_4$ foliar spray can be given on 45th and 90th day after planting. From another field experiment, the results showed that application of $ZnSO_4$ 50 kg/ha along with 100 kg $FeSO_4$/ha significantly increased yield of ratoon crop of Co.419 sugarcane over NPK treated control Increase in sucrose content was obtained in the above crop through foliar spray of 0.5% $ZnSO_4$ four times at 30, 50, 70 and 90 days after planting.

Of the various soil properties, soils rich in $CaCO_3$ causes lime induced chlorosis in crop plants, such as sugarcane, sorghum, grass species, jasmine, crossandra, etc. Nearly 15% of the cultivable soils in Coimbatore and Periyar districts are calcareous soils. Hence, an attempt was made to investigate on the causes and correction of chlorosis in sugarcane in calacareous soils of Coimbatore district.

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