

## RELATIONSHIP BETWEEN SEED WEIGHT AND GERMINATION AND SEEDLING VIGOUR\*

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Investigations were carried out to study the relationship between seed weight and germination and seedling vigour. The co-efficient of variation in seed weight and vigour parameters like root, shoot and coleoptile lengths of the seedling varied significantly within and between size grade of seed. The correlation between seed weight on one hand and root, shoot and coleoptile lengths on the other was positive and significant

Seeds are easily separated by diameter, weight or density. Often larger seeds, with more 'initial capital' do have at least an initial advantage over smaller ones. Davis (1967) summarised his results with commonly used British grasses stating that "under normal field condition, the size of the endosperm is an important factor in determining the potential ability of a species to establish itself". According to Whally *et al.* (1966), considerable variation in seed size exists in seed produced from the same plant. Seed weight is of great importance to seedling vigour within species (McKell 1972). Therefore, studies were initiated with the seeds of KM 2 hybrid bajra to find out the relationship between seed weight and germination and seedling vigour.

### MATERIALS AND METHODS

Precleaned seeds of KM 2 bajra hybrid were graded with a sieve having 5/64" diameter round perforations. Those

retained by the sieve were designated as G<sub>1</sub> and passed as G<sub>2</sub>. Thirty five seeds from the G<sub>1</sub> and G<sub>2</sub> grades of seeds were selected randomly and numbered serially and their respective weights were recorded in a monopan balance. Then they were allowed to germinate in between roll towel medium and on the day of final count the seedlings were measured for the length of root, shoot and coleoptile and recorded in cm. Correlations were worked out between seed weight on one hand and root, shoot and coleoptile lengths on the other. The variability in seed weight within a size grade was also calculated.

### RESULTS AND DISCUSSION (Table 1).

The weight of G<sub>1</sub> seed was higher than G<sub>2</sub>. Suriyakumar (1980) reported similar results in South Indian millets. Muchena and Grogan (1977) in corn observed significant differences on seed weight between and among the seed sizes. In the present study, seed weight

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variation was significant within each size grade. The co-efficient of variations for seed weight, root length, shoot length and coleoptile length were 15.76, 12.19, 16.04, and 15.60 per cent in G<sub>1</sub>; and 22.90, 16.40, 18.79 and 16.87 per cent in G<sub>2</sub>, respectively. The variation may be partly due to variation among tillers of a plant and also between plants brought out by genetic differences and interplant competition for light water and nutrients.

A positive and close association between seed weight and seedling length was reported by Whalley *et al.* (1966) in *Oryzopsis miliacea*, Dutta (1979) in rice and Suriyakumar (1980) in South Indian millets, whereas Hunter and Kannenberg (1972), observed no such relationship. In the present investigation, a close association between seed weight and seedling length was apparent. Shoot, root and coleoptile lengths of the seedling increased with increase in seed weight. In both G<sub>1</sub> and G<sub>2</sub> seed, a positive and highly significant correlation was observed between seed weight and shoot, root and coleoptile lengths of the seedlings. This may be due to the presence of greater amount of food reserves within the seed and the greater embryo size or both (McKell, 1972;). In general, larger seed produced vigorous seedling, while small seed produced weaker seedling. (Krishnasamy and Ramaswamy, 1979). Positive correlations between seed weight and

vigour have been reported in cereals (Suriyakumar, 1980). Therefore, it becomes apparent that separation of seed lots based on both size and weight can improve the seed quality to a large extent.

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Table 1. Range, mean, SD and CV for seed weight and length of root, shoot and coleoptile of seedlings, and correlation co-efficient (r) between seed weight and length of root, shoot and coleoptile of the seedling in two grades of KM 2 hybrid bajra seeds

	Weight of seed (mg)			Length (mm)				
				Root		Shoot		Coleoptile
	G <sub>1</sub>	G <sub>2</sub>	G <sub>1</sub>	G <sub>1</sub>	G <sub>1</sub>	G <sub>2</sub>	G <sub>1</sub>	G <sub>2</sub>
Range	4.70	3.80	115	89	76	60	26	18
Mean	8.40	4.80	218	153	114	93	42	33
Standard deviation	1.32	1.10	26.57	25.09	18.29	17.47	6.55	5.57
Co-efficient of variation (%)	15.76	22.90	12.19	16.40	16.04	18.79	15.60	16.87
Correlation co-efficient	—	—	0.5048**	0.7836**	0.4973**	0.4896**	0.6775*	0.6216*