Grain Weight in Cultivated Strains of Paddy

by

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Introdutcion : Yield in rice being a complex character is influenced very much by certain contributory factors and these yield components individually and in combination affect the yield. Enumerating the selective factors of the yielding ability in cereals, Panse and Khargonkar (1949) included grain weight as one of the important indices among others. Simolete (1947) found with the help of discriminant function technique that tiller number and grain weight were highly correlated with genetic yield in wheat. Eikichi (1954) recorded high correlations of yield with weight of ear. The association of weight of hundred grain with the yield was found to be very feable by Chandramohan (1961). Parnell *et al.* (1922) have reported that coarse grains were heavier, and weight was associated with grain colour. In this paper besides assessing the variability of 1000 grain weight in 30 cultivated varieties of paddy, the association between duration, grain size and shape are reported.

Material and Method : Thirty strains, ten each from three duration groups *viz.,* short, medium and long were selected for study.

Single seedlings were planted with a spacing of 4″ × 10″ and normal manurial schedule was adopted. The 1000 grain weight was recorded correct to milligram. Husks were removed with hand, taking care to keep the kernel intact. The husk was also weighed and the ratio of husk to grain was worked out. Since the grain weight is greatly influenced by the size of the grain, length, breadth and thickness of grain were measured from six grains for each variety as suggested by Ramaiah and Parthasarathy (1933) and average reading was taken to work out correlation. Besides, the varieties were grouped into two categories based on the shape of grain using the ratio of length/breadth as index as suggested by Graham (1913), and were statistically analysed to find out the difference in grain weight between the categories.

Results and Discussion : The thousand grain weight vary widely in the thirty strains studied. The data are given in Table 1.

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Received on 2—9—'67.

TABLE 1. *Thousand grain weight (g.)*

S. No.	Particulars	Mean	Range
1.	Short duration	22.36	15.76 – 25.21
2.	Medium duration	20.80	17.36 – 29.24
3.	Long duration	21.77	17.70 – 26.79
4.	All the 30 varieties	21.64	15.76 – 29.24
	Confidence limit at 5% limit		20.46<21.64<22.81

The grain weight ranged from 15.76 to 29.24 g with the mean weight of 21.64 g and there was no difference in the extent of the range between the three groups. The data were formed into three duration groups and analysed to find out any difference in grain weight due to duration (*Vide* Table 2).

TABLE 2. *Grain weight (in g.)*

Short		Medium		Long	
Varieties	Weight	Varieties	Weight	Varieties	Weight
ADT. 3	23.82	BCP. 1	17.78	ADT. 17	26.79
ADT. 20	15.76	ADT. 8	17.31	ADT. 15	17.70
Co. 29	23.20	ASD. 11	20.57	ADT. 7	22.83
ASD. 8	24.46	GEB. 24	17.94	ADT. 6	20.65
Co. 18	22.44	Co. 30	18.46	Co. 19	20.00
TKM. 6	20.32	Co. 27	22.80	Co. 4	24.53
PLR. 2	25.21	Co. 7	21.36	PLR. 1	20.47
ADT. 26	22.40	ASD. 12	19.65	ASD. 10	26.72
Co. 13	23.81	Black puttu	23.92	Co. 25	19.74
Co. 10	22.20	White puttu	29.24	Co. 26	18.32
		S.E. = 0.94			

The differences between the three duration groups and between varieties within the group were found to be non-significant. It can be inferred that the grain weight was little affected by duration. This is further confirmed by the *r* values shown below:

Particulars	Duration	Length	Breadth	Thickness	Kernel weight
Grain weight (1000 grains)	0.1857[NS]	0.5386**	0.1385[NS]	−0.0601[NS]	0.8938**

**=Significant at 1% level   NS=Non-significant.

The correlation between duration and grain weight was non-significant and negligible. It was generally believed that the grain weight varies in accordance with the size of the grain. The correlations between grain weight and the length, breadth and thickness show that only the length of grain was moderately correlated with grain weight. The association with breadth and thickness of grain were non-significant. The correlation between grain weight and kernel weight was high and significant.

Besides, an attempt has been also made to find out the relationship between grain weight and fineness of grain. As Parnell *et al.*, (1922) had pointed out that coarse grains are heavier than the finer grain, the data were classified into four groups based on the shape of the grain. The particulars are given in Table 3.

TABLE 3. *Relationship between grain weight and size.*

S. No.	Coarse L/B=2		Fine L/B=3	
	Varieties	Grain Weight	Varieties	Grain weight
1.	ADT. 17	26.79	ASD. 12	19.65
2.	ADT. 8	17.31	Co. 7	21.36
3.	Co. 10	22.20	Co. 29	23.20
4.	PLR. 1	20.47	Co. 27	22.80
5.	Co. 19	20.00	Co. 30	17.46
6.	Co. 26	18.32	GEB. 24	17.94
7.	Co. 18	22.44	ASD. 11	20.57
8.	PLR. 2	25.21	ASD. 6	24.32
9.	Co. 13	23.81	BCP. 1	17.98
10.	ASD. 10	26.72	ADT. 26	22.40
		S.E.=0.29[NS]		

N.S.=Non-significant

The grain weight does not vary significantly between coarse and fine grains. However, to confirm these results further study with larger samples would be necessary.

The out-turn of paddy to rice in most of the varieties was found to be approximately 3:1 except in a few cases. The correlation between the weight of grain and rice though fairly high was not absolute. This explains the individual variations exhibited by the varieties in their proportion of out-turn of paddy to rice.

Summary: The thousand grain weight in cultivated varieties did not vary significantly with duration. The correlation between duration and grain weight was feable and non-significant. Moderate correlation was established between the length of grain and grain weight while its correlation between breadth and thickness of grain was non-significant and negligible. The grain weight did not vary in accordance with the shape of grain. The out-turn of rice to paddy was approximately 3:1 and correlation between weight of grain and kernel though very high was not absolute.

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