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LOCALIZATION OF QUALITY GRAIN IN THE PANICLE

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SUMMARY

The quality grain distribution was examined in the panicles of Jaya, Mahsuri, and Phalguna. The distribution was two times more in primaries than in secondaries in Jaya, two times more in secondaries than in primary branches in Mahsuri and equal in both primaries and secondaries in Phalguna. The number was mostly localized in the top portion of the panicle followed by the middle and the lower regions.

INTRODUCTION

Identification of genotypes with quality grain is desirable in plant improvement programme. Efforts are being made in utilizing the magnitude of grain filling as the major factor for determining the productive plants with quality grain under field conditions (Padmaja Rao *et al.*, 1985). The grain grade index was suggested to determine the proportion of quality grain produced in a variety which serves as an effective screening tool for identifying plants (Padmaja Rao *et al.*, 1985). However, the information on the distribution of quality grain in a panicle of mother shoot and other tillers is not available. Therefore, in the present studies, the localization of quality grain is examined.

MATERIALS AND METHODS

The varieties Jaya, Mahsuri and Phalguna were grown in the experimental farm of the Directorate of rice research, Rajendranagar, Hyderabad during kharif 1982 by adopting the standard cultural practices. The crop was fertilized with 60 kg N, 30 kg P_2O_5 and 30 kg K_2O/ha and with a spacing of 20×10 cm.

The panicles of Jaya were collected after harvest and the panicle branches viz., primaries and secondaries were carefully numbered. The grains collected from each primary axis and the secondaries were studied for their quality in terms of its magnitude of filling by placing them in 1.18 specific gravity solution. The grains that submerged were considered heavier and belonged to very good quality (Padmaja Rao *et al.*, 1985). In this manner, all the grains from the panicles

were assessed separately for primaries and secondaries. A mean of 50 panicles was used in drawing conclusions.

Further, the panicle was divided into 3 regions viz., top, middle and lower, and the very good quality grains in each region were determined as per the above method. For this again, 50 panicles were considered while drawing conclusions.

The panicles of Mahsuri and Phalguna were also collected besides Jaya and similar analysis was carried out for localizing the very good grains.

RESULTS AND DISCUSSION

Localization of quality grain was considered important for understanding and characterization of filled spikelet distribution in the panicle. It was found that invariably, the distribution of quality grain was located on the primary axis of the branches. In general, the occurrence of quality grain increased from the base of the panicle towards the top, rather decreased from top to bottom (Fig-1). Obviously the quality grain in all the varieties studied were mostly localized in the top portion of the panicle followed by the middle and the lower regions (Table 1). This pattern is very much similar to the nature of grain filling in

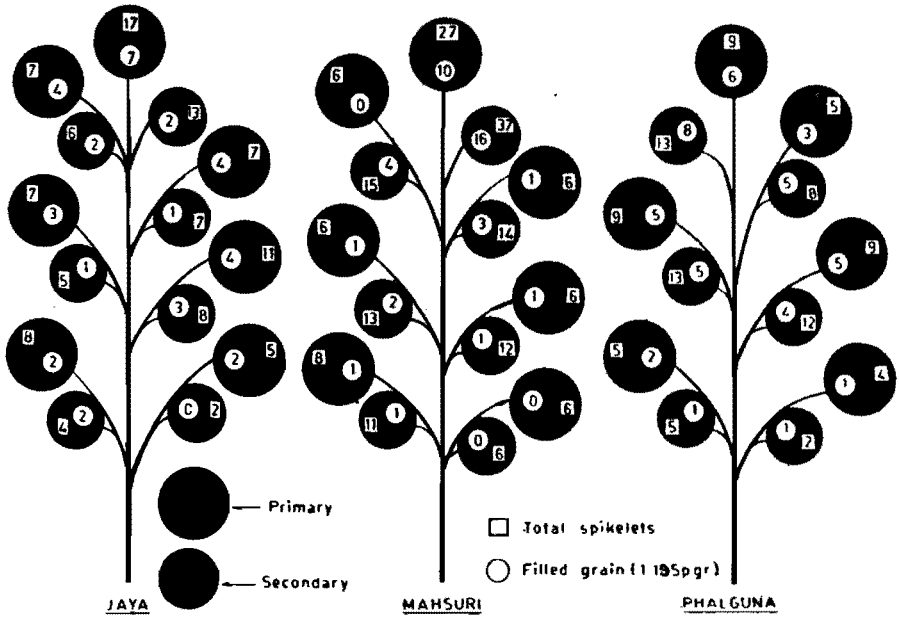

Fig. 1 : Localization of quality grain in the panicles.

Table 1 : Distribution of quality grain among different portion of the panicles in different varieties

Portion of the panicle	Jaya			Mahsuri			Phalguna		
	Primaries	Secondaries	Total no. of filled spikelets	Primaries	Secondaries	Total no. of filled spikelets	Primaries	Secondaries	Total no. of filled spikelets
Top	15 (25)*	5 (11)*	20	11 (17)*	23 (21)*	34	9 (23)*	13 (24)*	22
Middle	7 (11)*	4 (9)*	11	2 (3)*	3 (3)*	5	10 (24)*	9 (17)*	19
Bottom	4 (7)*	2 (4)*	6	1 (2)*	1 (1)*	2	3 (8)*	2 (4)*	5
Filled spikelets per panicle	26 (43)*	11 (24)*	37	14 (22)*	27 (25)*	41	22 (55)*	24 (45)*	46
Total spikelets per panicle	61	45	106	64	109	173	40	53	93

*Data in parenthesis indicates the percentage of filled spikelets over the total number of spikelets in each portion of the panicle.

rice (Vergara, 1970). This is mainly because the anthesis within a panicle starts from the top moving downwards (Vergara, 1970) and thus the top flowers get access for immediate fertilization and grain filling. The rest of the spikelets located at middle and bottom portion of the panicle will be filled accordingly in succession along with the panicle exertion. Thus, anthesis of all the spikelets on a panicle may take even 7 days to be completed (Vergara. 1970).

Localization of quality grain in the panicles of Jaya, Mahsuri and Phalguna (Fig-1) have indicated that in Jaya, the distribution of quality grain was two times more in primaries than in secondaries (Table-2). In Mahsuri, it was two times more in secondaries than in primaries and in phalguna it was equal in both primaries and secondaries. This situation infers that large varietal variation is possible in the occurrence of quality grain in different positions of the panicle. This is ascribed mainly due to the structural variation in panicle type existing among the varieties possessing different number of primary and secondary branches in a particular variety. This situation further focusses the need for identification of varieties possessing ideal panicle types viz, panicles having more primary branches rather than the secondaries.

Table II : Distribution of quality grain among the branches in different varieties

	Jaya		Mahsuri		Phalguna	
	Spike-lets	Quality grains	Spike-lets	Quality grains	Spike-lets	Quality grains
Primaries	61	26	64	14	40	22
Secondaries	45	11	109	27	53	24
Total	106	37	173	41	93	46
Quality grain (%)		35		24		49

In varietal improvement programmes, increasing yield potential is manipulated through several approaches. As per this approach, varieties with high proportion of quality grain are to be used as donors. Here. the nature of distribution of quality grain serves as rich sources of information for precisely aiming at the transfer of the character into the new plant. For instance, if the variety under question possess more quality grain in secondaries as in Mahsuri it would be preferable to enrich the primaries from a donor possessing the character of bearing more quality grains in primaries and in a case like Phalguna it

would be advantageous to improve the both or one of them. Therefore, varietal improvement programmes should be aimed for precision and specificity for furthering yield potential rather than basing on simple visual and empirical considerations.

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