

## STUDIES ON PLANTING TIME ON PRODUCTIVITY OF BPH RESISTANT RICE VARIETIES

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Field studies were made with three BPH resistant varieties i. e. IET 7573, IET 7574 and IET 7575 during 1984-85 (kharif and rabi seasons) at the Directorate of Rice Research, Rajendranagar farm, to assess the suitability of these varieties under normal and late plantings. The grain yields were assessed with young (25 days) and aged (55 days) seedlings cultivated under two types of planting. It was observed that young seedlings though contributed to more number of tillers and panicles, the spikelet and grain number were low in comparison to old seedlings observed under normal planting. In late planting, there was severe reduction in tillers panicles, spikelets and grains among the two age groups. The study therefore indicates that among the two seasons, use of old seedlings (50-55 days) was beneficial under normal planting for realising good yield and exploiting productivity with BPH resistant varieties.

Rice is the most important food crop of India, yet the yield per hectare is low (2.1 t/ha). Lack of suitable varieties and heavy losses caused by pests are the major factors for low yields. In view of the increased pest problems, especially with brown plant hopper (BPH), intensive resistance screening programme was taken up in a massive scale leading to the development of highly resistant donors (Kalode, Mangal Sain and Bentur *et al.* 1983). Of the several leaf hoppers available, BPH is reported to cause extensive yield losses to the extent of 10 to 70 per cent in Kerala (Viswanathan, 1976) amounting to rupees 10 crores during 1973 to 1976 (Dyck and Thomas, 1979). This pest was observed to be widely

prevalent in Andhra Pradesh, Orissa, Tamil Nadu and west Bengal. There is need to develop resistant varieties, which will be economical, safe, prevent environment at pollution and forms an important component of integrated pest management system (Veronica, 1985). Consequently several donors were identified possessing multiple resistance (Kalode *et al.* 1977). Further as the information available on the cultivation practices are inadequate in raising these varieties, the present study was taken up to assess the suitability of using these varieties under normal and late planting during kharif and rabi seasons for exploiting potential yields in BPH endemic areas.

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Table 1. Effect of normal and late plantings on rice productivity in BPH resistant varieties (kharif, 1984)

Varieties	Tiller Number/ m <sup>2</sup>	Panicle number/ m <sup>2</sup>	Spikelet number/ m <sup>2</sup>	1000 gr. wt. (g)	Grain number/ (g/m <sup>2</sup> )	Grain yield (g/m <sup>2</sup> )	Total dry matter (g/m <sup>2</sup> )	Leaf area Index	Days to flowering	Days to maturity
<b>NORMAL PLANTING</b>										
<b>IET 7573</b>										
(a) Young seedlings	505	500	57,937	23.3	42,103	949	1918	3.6	111	144
(b) Old seedlings	485	470	69,166	22.7	46,593	983	2044	3.0	117	149
<b>IET 7574</b>										
(a) Young seedlings	546	535	56,288	21.9	38,266	811	1779	4.7	116	148
(b) Old seedlings	530	510	71,991	21.5	52,710	1077	1884	3.7	119	150
<b>IET 7575</b>										
(a) Young seedlings	523	511	53,940	23.6	35,346	738	1730	4.5	114	148
(b) Old seedlings	508	496	55,600	23.5	41,016	924	1913	3.2	117	150
<b>LATE PLANTING</b>										
<b>IET 7573</b>										
(a) Young seedlings	565	474	57,630	19.3	18,174	288	1189	4.4	140	167
(b) Old seedlings	413	381	27,310	19.1	10,534	185	675	2.7	145	178
<b>IET 7574</b>										
(a) Young seedlings	465	453	51,049	18.6	18,267	305	1066	3.7	140	167
(b) Old seedlings	349	320	25,866	18.5	10,779	185	624	2.9	144	178
<b>IET 7575</b>										
(a) Young seedlings	490	478	61,812	19.4	12,603	246	1088	4.9	142	168
(b) Old seedlings	361	326	25,560	20.4	11,052	201	732	2.7	149	182

## MATERIALS AND METHODS

The experiment was laid out at the Directorate of Rice Research farm, Rajendranagar, Hyderabad, for two consecutive seasons (kharif and rabi) during 1984 - 85 with three medium duration varieties i. e., IET 7573, IET 7574 and IET 7575 by adopting standard cultural practices. The varieties were planted in two sets, one set planted in normal time while the other was delayed nearly by two months. Seedlings were raised as young (25 days) and old (55 days) by adopting staggered sowing. The yield and yield components were assessed following the observations recorded in the field. Standard and accepted procedures were adopted for determining the quantitative aspects by using replicated samples. The crop was harvested at 30 days after 50 per cent flowering and the information on days to flowering and maturity, 1000 grain weight and biometric characters like leaf area index and total dry matter were recorded.

## RESULTS AND DISCUSSION

Results pertaining to the two types of planting are discussed especially with young and old seedlings with regard to their potential sink capacities.

### *Kharif season :*

In normal planting taken up during kharif 1984, young seedlings produced more number of tillers and

panicles (Table 1). But reduction in spikelet and grain number was observed in young seedlings (25 days) in comparison to old seedlings (55 days). Increased production of spikelet and grain number contributed to higher production of yield among aged seedlings. However, all the varieties yielded similar results. Further, the results indicated that higher total dry matter production influenced the net photosynthetic efficiency by mobilising the stored carbohydrates towards the development of panicle which influenced higher production in spikelets and grains and thereby enhanced grain yields in aged seedlings. While the data on leaf area index showed slightly higher values in young seedlings than in aged seedlings indicating its influence only on vegetative phase.

In late planting, aged seedlings flowered and matured earlier (20 - 24 days) than young seedlings. However, in comparison to normal planting, observations on tillers, panicles, spikelets and grains showed drastic reduction in the two age groups. Among the two, young seedlings performed better than the older group in all the plant components. The older seedlings matured earlier than the younger seedlings by 15 - 20 days. However, the total reduction in grain yield among young and old seedlings was 60 to 70 per cent, when compared to normal planting. Besides, there was significant reduction in 1000 grain weight in late planting suggesting the limitation of its practice.

Table 2. Effect of normal and late plantings on rice productivity in BPH resistant varieties - (rabi, 1985)

Varieties	Tiller number/m <sup>2</sup>	Panicle number/m <sup>2</sup>	Spikelet number/m <sup>2</sup>	1000 gr wt. (g)	Grain number/m <sup>2</sup>	Grain yield (g/m <sup>2</sup> )	Total dry matter (g/m <sup>2</sup> )	Leaf area index	Days to flowering	Days to maturity
<i>NORMAL PLANTING</i>										
<i>IET 7573</i>										
(a) Young seedlings	535	523	68,988	19.0	54,412	943	1864	6.6	138	169
(b) Old seedlings	508	469	64,238	19.8	56,124	992	1850	8.1	139	172
<i>IET 7574</i>										
(a) Young seedlings	541	530	66,195	19.6	54,015	868	1949	11.7	136	167
(b) Old seedlings	553	528	61,575	19.0	51,661	852	1865	8.9	131	164
<i>IET 7575</i>										
(a) Young seedlings	508	494	56,554	19.9	44,584	715	1500	8.6	136	167
(b) Old seedlings	606	569	75,729	18.9	64,798	908	1917	9.2	139	172
<i>LATE PLANTING</i>										
<i>IET 7573</i>										
(a) Young seedlings	490	476	63,892	18.3	44,639	695	1952	5.4	121	148
(b) Old seedlings	515	505	63,904	19.9	47,028	859	2445	3.7	134	159
<i>IET 7574</i>										
(a) Young seedlings	373	366	46,412	17.6	42,042	681	1753	6.1	121	148
(b) Old seedlings	473	451	57,823	18.8	37,692	656	2314	3.0	134	159
<i>IET 7575</i>										
(a) Young seedlings	405	395	43,919	18.2	37,128	688	1756	3.4	123	150
(b) Old seedlings	493	471	60,681	20.1	44,765	847	2308	3.1	134	159

*Rabi season* : The study was continued during rabi 1985 with 3 BPH resistant varieties under normal and late planting. The grain yields were assessed with the two age groups cultivated under two types of planting (Table 2).

Among the two plantings, the yields were significantly more in normal planting uniformly for all the 3 varieties. In late planting, the yields were reduced as the varieties suffered with less production of tillers, panicles, spikelets and grains along with severe reduction in leaf index. Days to flowering and maturity was however, reduced by 5 to 10 days in late planting.

These studies would suggest that the performance of old seedlings (50-55 days) was good in getting better yields with increased spikelet and grain number. These results were in conformation of the data presented by Chandra and Manna (1983) and Gill and Sahi (1986). Therefore, use of aged seedlings (50-55 days) under normal planting may be recommended in both kharif and rabi seasons while using these varieties for cultivation in BPH endemic areas.

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