

Studies on Genotypes, Age and Productivity in Rice

S. R. SREE RANGASAMY¹ and P. NARAYANASAMY²

Eight improved genotypes of rice of early, short and medium duration were assessed for the tolerance of delayed planting of the seedlings in two different seasons. Planting aged seedlings resulted in increase in field duration and reduction in grain yields. The field duration was increased in all the varieties by 5 to 10 days for every 10 days of delayed planting. The decrease in yield ranged from 2 to 50 per cent in short duration and from 4 to 41 per cent in medium duration varieties as compared to the performance of 20 days old seedlings. An evaluation of the yield components brought out decrease in the mean expression of yield components.

There was a marked difference between the genotypes as a whole as also between genotypes of different duration groups. Among the genotypes studied, ADT 31 and IR 20 exhibited considerably less differences between seedlings of different ages in their performance and showed tolerance for delayed plantings. The studies indicate possibilities of screening and developing genotypes that could be tolerant for delayed planting especially in certain agroclimatic regions where constraints prevail over planting in proper age of nursery.

In rice culture, nursery period facilitates effective management and nurture. Depending upon environment in which rice is cultivated and also the time of planting, the duration of nursery has to be so adjusted to get maximum returns from the crop. Earlier reports indicate that seedlings can be retained in the nursery for a week for every 30 days of duration of the variety. Narayanasamy *et al.* (1966) reported that for medium duration rice varieties of tall *indicas*, transplanting 35 days old seedlings is generally advantageous. Recent reports, national and international specify to transplant the seedlings at fifth leaf stage. (Pillai *et al.*, 1977). It is therefore of

importance to study how long seedlings of modern dwarf rice varieties can be retained in the nursery beds under the environment that prevails at the coastal region of Pondicherry without reduction in yield when planted in the main field. Experiments were conducted to study this objective at the Krishi Vigyan Kendra, Pondicherry and the results are reported in this paper.

MATERIALS AND METHODS

Trials were conducted in *Navarai (Rabi)* and *Sornavari (Khariff)* 1976 with five short and medium duration genotypes in split plot design keeping genotypes as main treatments and

1 - Principal and 2 - Assistant Professor (Plant Breeding), Krishi Vigyan Kendra, Pondicherry-10.

age of seedlings as subtreatments. Transplanting of seedlings of the age 20, 30 and 40 days for short duration and upto 50 days for mid duration genotypes constituted sub treatments. All the varieties were sown in nursery on the same day. The crop was manured at 120 kg N + 60 kg P₂O₅ + 60 Kg K₂O/ha. Besides collecting grain yield data from individual plots, data on dry matter production, number of productive tillers per hill, panicle length, number of grains and weight per panicle were also collected. Drymatter production was computed from the weight of 10 up-rooted plants from each treatment. Before weighing, the root portion was thoroughly washed to remove the soil particles that were clinging to the roots and dried. The data on yield components namely productive tillers per clump, number of grains and weight per panicle and length of panicle are based on actual counts, weighing and measuring respectively from the sample of 10 clumps collected at random from each plot.

RESULTS AND DISCUSSION

The yield data were analysed statistically and found to be significant in both the seasons. In rabi (Navarai) 1976, the data indicated that the growth parameters such as height, and tillers were lowered with the plantings of 40 and 50 days old seedlings than with 20 and 30 days old seedlings. Transplanting younger seedlings of 20 days recorded higher yield in all the varieties than seedlings of 30 days age and more (Table I). The yield was reduced significantly by 9 and 23 per cent in IR 20 and 31 and 46 per cent in *Bhavani*. Agewise comparison in general showed significant reductions in yield between seedlings of different age groups. In respect of long duration varieties reduction in yield was from 9 to 23 per cent in IR 20 and from 31 to 46 per cent in *Bhavani*. In short duration varieties, the differences in yield between seedlings of different age groups were significant. Yields in the age group of 20 and 30 days were on par

TABLE I. Age of seedlings and grain yield (Kg/ha) (Mean of two seasons)

Genotypes	Age of seedlings in days				Mean
	20	30	40	50	
Short Duration					
Amaravathi (Co. 39)	5096	4694	3903	—	4566
TNAU 6484	4375	4175	2300	—	3617
ADT 31	5585	5475	5104	—	5388
Thiruvani	5250	3425	2650	—	3775
Vaigai (Co. 37)	5225	4225	3250	—	4333
Medium Duration					
TNAU 4611	5375	4925	4025	3150	4368
IR 20	5080	4895	4640	4193	4702
Bhavani	6048	5607	4533	3859	5011
Mean	5292	4677	3801	3734	4470
C. D. For (1) Varieties 322 (2) Age of seedlings 376 (3) Interaction 569					

in *Amaravathi*, TNAU 6484 and ADT 31. In the other two short duration varieties *Thiruvani* and *Vaigai*, 20 days old seedlings recorded significantly higher yield over seedlings of 30 days age and above. In respect of long duration, 20 days old seedlings was significantly superior over the other age groups in *Bhavani* while in TNAU 4611, 20 and 30 days were on

par but superior to 40 and 50 days old seedlings in respect of yield. In IR 20, 20, 30 and 40 were on par and they were significantly higher yielding than 50 days old seedlings. However, 20 days old seedlings always was higher yielding over other age group of seedlings in all the varieties (Table I).

In both *Amaravathi* and ADT 31 field duration was increased by five

TABLE II. Rice genotypes, their yield components and total drymatter production in relation to age of seedlings

Age of seedlings (days)	Amaravathi (Co.39)	TNAU 6484	ADT 31	Thiruvani	Vaigai (Co.37)	TNAU 4611	IR 20	Bhavani
1. Dry matter production in kg/ha								
20	13725	11575	14125	13500	12675	18900	18375	17025
30	10125	8575	15365	14450	14300	22625	16475	15600
40	6225	8000	14350	12300	15575	16200	10225	13325
50	—	—	—	—	—	16550	8950	13000
2. Number of panicles/Clump								
20	8.4	8.2	7.6	9.5	8.2	7.7	5.4	5.4
30	7.3	6.5	6.5	7.0	7.4	7.7	6.3	6.4
40	7.3	6.5	7.1	6.9	7.4	6.7	6.3	5.8
50	—	—	—	—	—	6.0	5.5	5.4
3. Panicle length/cm								
20	18.6	18.8	21.3	24.6	19.4	22.6	23.4	24.6
30	18.6	16.6	21.8	20.8	19.5	24.1	23.2	23.3
40	16.8	16.6	20.8	17.9	19.4	27.2	22.7	20.8
50	—	—	—	—	—	22.9	22.5	20.3
4. Number of grains panicle								
20	97	73	107	106	83	100	108	92
30	69	71	100	82	76	120	105	90
40	55	65	94	80	75	110	103	90
50	—	—	—	—	—	95	90	90
5. Weight of panicle (g)								
20	1.7	1.7	2.2	1.7	2.2	2.3	2.0	2.0
30	1.7	1.5	1.8	1.6	1.9	2.3	2.0	1.7
40	1.2	1.2	1.8	1.5	1.8	1.9	1.5	1.5
50	—	—	—	—	—	1.6	1.6	1.4

days for every 10 days delayed planting over 20 days old seedling and the yield reduction was 2 to 5 per cent in ADT 31 and 10 to 20 per cent in Amravathi.

In Kharif (Sornavari) 1976, also yield level attained the level of statistical significance. The trend in yield was in accordance with the result of rabi 1976 and younger seedlings of 20 days old recorded always higher yield than the older seedling of 30, 40 and 50 days old. The reduction in short duration group was 24 to 50 per cent in case of *Thiruvani* and *Vaigai* in 30 and 40 days and 57 per cent in the case of TNAU 6484 in 40 days compared to 20 days old seedlings. Genotypes, ADT 31 and IR 20 appear to be fairly tolerant towards planting of aged seedlings since the reduction in yield in these varieties was only 2 to 17.5 per cent in aged seedling of 30, 40 and 50 days old compared to 5 to 41 per cent in the other genotypes evaluated at present. The scrutiny on over all performance of the varieties over the two seasons indicates that in varieties of recent origin, irrespective of their duration, transplanting older seedlings not only decreases the yield but also increases the field duration in general but their magnitude of variation depends upon the genotypes (Table I).

The data on yield components are presented in Table II. In early and

short duration genotypes the yield components were distinctly reduced in transplanting aged seedlings 30 and 40 days compared to 20 days old seedlings. Similar trend was observed in medium duration genotypes only from 50 days old seedlings. Total dry matter production (grain and straw including root portion) was also the highest from the crop transplanted with 20 days old seedlings in all the varieties excepting in ADT 31, *Thiruvani*, *Vaigai* and TNAU 4611 and it was reduced towards aged seedlings. The reduction in panicle length and grain number per ear was significant towards aged seedlings of 30, 40 and 50 days in all the varieties except in TNAU 4611 and *Bhavani*. The TNAU 4611 the panicle length increased upto transplanting 40 days old seedlings and the grain number upto 30 days. In *Bhavani*, the panicle length and panicle weight were reduced by transplanting aged seedlings beyond 20 days while the grain number per ear was maintained.

REFERENCES

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