SHORT COMMUNICATION

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Double transplanting of late transplanted *sali* rice under lowland situation

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ABSTRACT

A field experiment was conducted during wet season 2007, to study the effect of planting time, spacing and type of seedling on late transplanted sali rice variety, 'Gitesh' under lowland situation. The results revealed that planting on 10 September produced the highest grain and straw yields. Reduction in grain and straw yields with delaying the planting date from 10 September to 30 September caused 28.9 and 27.9 per cent respectively. Closer spacing of 15 x 10 cm and 60 days (30+30 days) double transplanted seedling recorded the highest yields and all the yield attributes. The per cent increase in grain and straw yield due to double transplanted seedling over 60 days old normal nursery seedling was 31.2 and 11.2 per cent, respectively.

Key words : sali rice, double transplanting, lowland

Rice is the staple food crop of Assam and occupies an area of 25.4 lakh hectares with a production of 38.8 lakh tonnes. The normal time of planting of tall and season bound *sali* rice in Assam is from middle of July to middle of August with 30-45 days old seedling. In practice, farmers could not stick to the optimum planting time due to late onset of monsoon or shortage of agricultural labourers during the peak period of transplanting or due to some other reasons. Further, flood is a recurrent phenomenon in the plain districts and low lying areas of Assam. It is also not possible to take any other crop except rice in such low lying areas due to high level of water accumulation. Under such conditions farmers are compelled to go for transplanting of rice in late even up to the end of September.

The need of double transplanting of rice arise in situation where main field is not conducive for planting due to early flood or delayed onset of monsoon. This practice avoids ill effects of over-aged seedlings in the nursery and it is also useful in seedling scarcity situations and can cover 8-10 times more area as compared to normal planting. Adoption of closer spacing in late transplanted rice is a general rule for accommodating more number of plants per unit area and to compensate the yield loss due to low tiller development. Considering these facts, the experiment was undertaken to study the effect of planting time, spacing and type of seedling on growth and yield of late transplanted *sali* rice.

A field experiment was conducted at the Instructional cum Research farm of Assam Agricultural University, Jorhat during wet season of 2007 on late transplanted *sali* rice variety Gitesh under lowland situation. The treatments consisting of three planting times (10, 20 and 30 September) allocated in main plot and combinations of two spacing (15x10 cm and 20x10 cm) and two types of seedlings *viz*. 60 days old nursery seedling and 60 days (30+30 days) old double planted seedlings in sub-plot of a split-plot design with three replications. The soil of the experimental site was sandy loam in texture with acidic in reaction (pH 5.4), medium in organic carbon (0.64%) and low in available N (269.69 kg ha^{-1}), available P (8.83 kg ha^{-1}) and available K (78.08 kg ha^{-1}). A uniform dose of fertilizers @ 40-20-20 kg N, P_2O_5 and K_2O ha^{-1} was applied. The rainfall received during the period of experimentation was 937.2 mm distributed in 68 days.

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Table 1. Yield attributing characters, yield and economics as influenced by planting time, spacing and type of seedling

Treatment	Plant height (cm)	Panicles/ m^2	Panicle length (cm)	Panicle weight (g)	Filled grain panicle^{-1}	Unfilled grains panicle^{-1}	1000grain weight(g)	Days to 50% flowering	Grain yield (t ha^{-1})	Straw yield (t ha^{-1})	Harvest Index (%)	Net return (Rs/ha)	Benefit-cost ratio
Planting time													
10 September	884	245.9	21.1	3.26	132	15	24.52	124	2.91	6.62	30.16	18003	1.89
20 September	81.2	228.7	20.6	3.03	116	16	24.13	116	2.83	5.71	32.48	17109	1.80
30 September	73.0	167.1	19.1	2.48	87	22	23.87	113	2.06	4.77	29.88	10224	1.07
CD(P=0.05)	3.0	9.0	0.7	0.25	7	4	0.25	-	0.12	0.07	0.63	-	-
Spacing (cm)													
15x10	80.2	219.7	20.4	2.87	111	16	24.19	117	2.83	5.93	31.96	16846	1.71
20x10	81.6	208.1	20.1	2.97	112	20	24.16	118	2.38	5.47	29.72	13256	1.43
CD(P=0.05)	NS	2.2	NS	NS	NS	1	NS	-	0.16	0.13	1.43	-	-
Type of seedling													
60 days nursery seedling	75.1	197.3	18.7	2.46	86	20	24.13	118	2.12	5.36	28.15	11000	1.20
60 days (30+30 days) double planted seedling	86.6	230.5	21.8	3.39	138	15	24.22	117	3.08	6.04	33.53	19102	1.93
CD(P=0.05)	1.2	2.2	0.4	0.11	5	1	NS	-	0.16	0.13	1.43	-	-

Grain and straw yields were significantly influenced by planting time, spacing and type of seedling (Table-1). Among different planting times, 10 September planting produced the highest grain and straw yields. Delaying the planting date from 10 September to 30 September caused 28.9 per cent reduction in grain and 27.9 per cent in straw yield. However, 10 and 20 September planting could not produce any significant difference in grain yield. All the yield attributing characters were also decreased drastically as the planting was delayed. A reduction in yield components, more particularly increase in grain sterility, low panicle density and number of filled grains per panicle remarkably reflected on the ultimate yield of grain. Reduction in yield due to delayed planting was also reported by Joseph (1991), Saikia *et al.* (1989) and Ghosh (2006).

Planting density also affected the grain and straw yields significantly. Higher yields were recorded under closer spacing of 15 x 10 cm, might be due to more number of productive tillers per unit area. Enhancement of grain and straw yields as a result of closer plant spacing was reported by Balasubramanian and Palaniappan (1991) and Shah *et al* (1991).

The grain and straw yields increased significantly with the use of 60 days (30+30 days) old double planted seedling over 60 days old conventional nursery seedling. Double planted seedlings had thicker culm, taller height and better shoot and root growth and thereby more food reserves in comparison to conventional seedlings (Table-2). This might probably led to quick establishment of seedlings in main field

Table 2. Quality of two types of seedling at different dates of planting in the main field

Seedling quality	60 days nursery seedling			60 days (30+30 days) double planted seedling		
	10 Sept.	20 Sept.	30 Sept.	10 Sept.	20 Sept.	30 Sept.
Length (cm)						
Shoot	70.00	62.30	56.00	76.00	73.20	69.00
Root	17.33	10.50	9.30	22.13	14.66	14.33
Dry matter (g eedling^{-1})						
Shoot	1.35	1.03	0.73	2.20	1.71	1.23
Root	0.27	0.24	0.22	0.71	0.69	0.57
Tillers hill^{-1}	-	-	-	9.66	8.66	7.33

and production of effective nodal and basal tillers which ultimately contributed towards higher grain and straw yields. This was in full agreement with the findings of Singh and Thakur (1991) and Ghosh (2006). The highest values in terms of net return and benefit-cost ratio were recorded when rice variety, 'Gitesh' was planted on 10 September with 60 days old double planted seedlings at a spacing of 15x10 cm.

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