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EFFECT OF SEEDLING AGE ON GROWTH & YIELD OF BINA DHAN 6

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Abstract

An experiment was conducted at Rangpur, Bangladesh during November 2015 to July 2016 to study the effect of seedling ages on the growth & yield of BINA dhan 6. Seedlings of different ages, viz 25, 35, 45, 55 & 65 days old were transplanted on the same day. Result revealed that plant height, number of leaves hill^{-1}, total dry matter (TDM) hill^{-1}, leaf area index (LAI), number of total tillers, number fertile tillers hill^{-1}, number of grains panicle^{-1}, 1000 grain weight, grain & straw yield was affected significantly due to different ages of seedlings. The result also showed that number of tillers hill^{-1}, number of leaves hill^{-1}, & leaf area index increased for all seedling ages up to 75 days after transplanting (DAT) and decreased gradually thereafter. The highest number of tillers hill^{-1}, leaves hill^{-1} and leaf area index, the highest amount of stem, leaf, root and total dry matter and CGR were obtained from 35days old seedlings at all sampling dates. The highest number of effective tillers hill^{-1}, panicle length, number of grains panicle^{-1}, grain yield (6.96 t ha^{-1}) and straw yield (7.75 t ha^{-1}) were also achieved by 35 days old seedlings at harvest. Thirty-five days old seedlings were found to be superior to other ages of seedlings in term of growth and grain yield.
Keywords: *Date of transplanting, leaf area index, biological yield and rice cultivar.*

Introduction

The age of seedlings has a tremendous influence on the tiller production, grain formation and yield contributing characters (Islam and Ahmed, 1981. The farmers are less experienced regarding the effects of seedling age on the yield and yield contributing characters for HYV. The use of over aged seedlings was reported to influence the growth of rice plant reduces the yield drastically. Recently BINA has released a· high yielding. variety of Boro rice named as BtNAdhan6.Therefore, a critical study is necessary to determine the optimum age of seedlings of this new variety, Which can maximize the yieldunder the condition mentioned above more investigations are, therefore, needed regarding optimum seedlings are for BINAdhan6. Hence the present research trial was conducted with objectives: (i) to investigate the optimum seedlings age of BINAdhan6; (ii) to indicate the growth behavior of BINAdhan6 with different seedling ages, and (iii) to find out that how yield contributing character are affected by different seedling ages.

Materials And Methods

The experiment was conducted at the experiment field of BINA, Mymensingh during the period from November 2015 to July 2016. Different ages of seedlings was studied in the present experiment as i) 25days old seedlings ii) 35 days old seedlings, iii) 45 days old seedl4ngs, iv) 55 days old seedlings and, V) 65 days old seedlings, The experimentwas laid outin a Randomized complete Block Design(RCBD). Each treatment. was replicated four times. The seed collection, seed sprouting, preparation of seedbed an seed sowing. Land preparation for transplanting, fertilizer application, uprooting of seedlings, transplanting of seedlings, intercultural operations, gap filling and other intercultural operations has been done routinely routinely. From transplantation to harvest

143. 138, 132, 125 and 119 days were life span for 25, 35, 45, 55 and 65 days seedling age, respectively. Data for yield and yield contributing characters were recorded. Analysis of variance was done following RCBD design with the help of computer package MSTAT and the significance of mean differences was adjudged by Duncan's Multiple Range Test.

Results And Discussion

Plant height was distinctly influenced by the age of seedling (Table 1). At 30 days after transplanting (DAT) the tallest plant (42.16cm) was recorded from 65 days old seedlings, which was significantly differed from other treatment. The shortest plant (24.57 cm) was recorded from25 days old seedlings and it was significantly different from other treatment. The tallest plant (50.15cm and 69.71cm) observed from 65days old seedlings at 45 and 60DAT which was significantly differed from other treatment and the shortest plant (41.13cm and 58.39cm) observed from 45days old seedlings at 45 and 60DAT respectively, which showed significant increment over seedlings recovered the shocking effect and started vigorous growth than those of older seedlings.

At 90 DAT tallest plant (106.8cm) was recorded from 35days old seedlings which were significantly differed from other treatments and the shortest plant (94.17cm) was recorded from 65days old seedlings which where were identically followed by 45 and 55 days old seedlings, respectively. The results showed that higher plant height of the old aged seedlings in the seed bed cause earlier higher plant height in the main field. But young seedlings grow faster than older once (35to 55days old seedling). Similar result has also been reported by Singh et al (1999)

Table 1. Effect of seedling age on the plant height of BINAdhan6 at different growth stage.

Seedlings Age (Days)	Plant Height (cm)				
	30 DAT	45 DAT	60 DAT	75 DAT	90 DAT
25	24.57 e	43.06 c	60.93 c	81.96 b	100.17 b
35	26.30 d	48.21 b	66.94 b	87.63 a	106.82 a
45	29.19 c	41.13 d	58.30 d	80.73 b	98.39 be
55	35.13 b	44.29c	67.23 b	87.73 a	95.56 be
65	42.16 a	50.15 a	69.71 a	88.41 a	64.17 c
CV%	2.49	2.19	1.55	2.37	3.42

Table 2. Effect of seedling age on the yield & yield contributing characters of BINAdhan6

Seedlings ages (days)	Plant height (cm)	No. of total tillers hill^{-1}	No. of fertile tillers hill^{-1}	No. of grains penicle^{-1}	Weight of 1000 grain (g)	Grain yield (t ha^{-1})	Straw yield (t ha^{-1})	HI (%)
25	109.9 ab	9.42 b	7.92 b	118.9 ab	23.50	5.66 b	6.88 b	45.13 b
35	113.3 a	13.25 a	11.46 a	124.57 a	23.50	6.96 a	7.75 a	47.31 a
45	103.8 be	9.46 b	8.00 b	116.1 be	23.25	5.24 b	6.53 b	44.55be
55	97.69 cd	7.25 c	5.88 c	110.1 cd	23.00	3.62 c	4.79 c	43.00 c
65	94.03 d	6.18 c	5.67 c	103.8 d	22.98	3.43 c	4.61 c	42.66 c
CV%	4.55	7.79	6.49	3.83	6.84	6.04	7.15	2.86

Number of leaves hill^{-1}

The number of leaves hill^{-1} was affected significantly by the age of seedlings (Fig. 2). Maximum number of leaves hill^{-1} was observed at 75 DAT and declined thereafter. At 30 DAT the highest number of leaves hill^{-1} (15.92) was obtained from 35 days old seedlings which were statistically identical with those of 25 and 45 days old seedlings. The lowest number of leaves hill^{-1} (9.75) was obtained from 65 days old seedlings and it was significantly differed from other treatments. The highest number of leaves hill^{-1} was obtained from 35 days old seedlings at 45 DAT (29.30), 60 DAT (46.54), 75 DAT (63.67) and 90 DAT (49.82) which was statistically differed from the other treatment. The lowest number of leaves hill^{-1} was obtained from 65 days old seedlings on 45 DAT (17.19), 60 DAT (24.29), 75 DAT (29.88) and 90 DAT (26.50) which was identically followed by 55 days old seedlings at 75 DAT but significantly differed from other treatments. The result indicated that the younger seedlings produced more number of leaves hill^{-1} in the younger seedlings than other ones similar result also reported by Roy and Sailer (1992).

Number of fertile tillers hill^{-1}

Number of fertile tillers hill^{-1} was influenced significantly due to age (Table-2). The highest number of fertile tillers hill^{-1} (11.46) was recorded from 35 days old seedlings and it was significantly differed among the treatments. Transplanting of 45 days old seedlings produced 8 numbers of fertile tillers hill^{-1} and it was statistically similar to 25 days old seedlings but differed from other treatments. The lowest number of fertile tillers hill^{-1} (5.67) was found when 65 days old seedlings were transplanted and it was identical with that of 25 days old seedlings but significantly differed from other treatments due to more number of tillers hill^{-1} and more number of leaves hill^{-1} of younger seedlings than older ones. This result indicated that younger seedlings produced more number of fertile tillers hill^{-1} than older ones. Similar result was also reported by Aragones and Wada (1989)

Number of grains panicle^{-1}

Number of grains panicle^{-1} was influenced significantly due to age of seedlings (Table-2). Maximum number of grains panicle^{-1} (124.5) was produced with 35 days old seedlings which were statistically similar to 25 days old seedlings but statistically

dissimilar from other treatments/ transplanting 55 days old seedlings produced 110 grains panicle^{-1} which was identical with that of 45 days old seedlings but significantly differed from other treatments. The lowest number of grains panicle^{-1} (103.8) was obtained from 65 days old seedlings and it was statistically similar to 55 days old seedling. A trend was observed that grains panicle^{-1} gradually decreased as the seedling age increased from 35 to 65 days. It might be due to more assimilate production from the higher LAI, leaf area at 35 days old seedlings and efficient translocation towards the grain during grain filling period and comparatively higher panicle length of younger seedlings than older ones. Similar results were also reported by Roy et al. (1992).

Weight of 1000-grain

Results show that seedling age had no significant effect on 1000-grains weight (Table 2). However, 25 days and 35 days old seedlings produced the maximum weight (23.50 g) of 1000 grains which was very close to other seedling ages.

Grain yield

Age of seedling showed a significant influence on grain yield. 35 days old seedling gave the highest grain yield (6.96 t ha^{-1}) and it was significantly differed from other treatments. Twenty five days old seedling produced 5.66 (t ha^{-1}) of grain which was statistically identical with that of 45 days old seedlings but significantly differed from other treatments. The lowest grain yield (3.43 t ha^{-1}) was obtained from 65 days old seedlings and it was identically followed by 55 days old seedlings but significantly different from other treatments (Table 2). The result showed that grain yield decreased with the increasing seedling age. The growth of younger seedlings was vigorous and higher number of filled grains panicle^{-1} than older ones. As result the highest grain yield was obtained from younger seedlings. Similar result was also reported by Roy et al. (1992).

Straw yield

Straw yield was significantly influenced by age of seedlings (Table 2). The highest straw yield (7.75 t ha^{-1}) was obtained from 35 days old seedlings and it was statistically different among the treatments. Transplanting of 25 days old seedling produced 6.88 (t ha^{-1}) of straw yield which was identical with that of 45 days old seedlings but significantly different from other treatments. The lowest straw yield (4.61 t ha^{-1}) was obtained from 65 days old seedlings which was identical with that of 55 days old seedlings but significantly differed from other treatments. The result indicated that straw yield was decreased with increasing seedling age from 35 to 65 days. This decreased might be due to less number of total tillers hill^{-1}

Harvest index

Harvest index was found to be significantly influenced by the age of seedlings (Table 2). The highest index (47.31%) was obtained from 35 days old seedlings which were significantly different from other treatments. Transplanting of 25 days old seedlings produced 45.13% harvest index which was identically followed by 45 days harvest index which was identically followed by 45 days old seedlings. The lowest harvest index obtained from 65 days old seedlings and it was identically followed by 25 and 65 days old seedlings but significantly differed from other treatments.

Conclusion

From the result of the present study it may be concluded that 35 days old seedlings may be practiced to obtained the highest grain and straw yield from BINAdhan6.

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