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Original Article

Effect of number of seedlings hill^{-1} and weeding on the yield of aus rice cv.BR16

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ABSTRACT

An experiment was conducted to ascertain the impact of weeding and the number of seedlings per hill^{-1} on the performance of aus rice (cv. BR16). The treatments consisted of three weeding methods and four levels of seedlings hill^{-1} in a randomized complete block design with three replications. The number of weeding had an impact on weed dry weight, according to the results. Compared to not weeding, one and two-hand weeding decreased the dry weight of weeds. The degree of shrinkage was greater while weeding with two hands. The number of seedlings hill^{-1} had a substantial impact on yield and all plant morphological parameters, according to data on yield and yield-contributing characteristics of aus rice. With criteria like total tillers hill^{-1}, effective tillers hill^{-1}, grains panicle^{-1}, the weight of 1000 grains, grain yield (5.02 t ha^{-1}), biological yield, and harvest index, four seedlings hill^{-1} achieved the maximum yield. In 8 seedling hill^{-1}, the lowest grain yield (2.58 t ha^{-1}) was discovered. Except for non-effective tillers hill^{-1} and panicle length, all yield-contributing features were strongly impacted by the amount of weeding. Two-hand weeding resulted in the best grain production (5.04 t ha^{-1}) and one weeding produced the lowest yield (3.46 t ha^{-1}). Except for plant height, ineffective tillers hill^{-1}, unfilled grains panicle^{-1}, and weight of 1000 grains, the interaction impact of the number of seedlings hill^{-1} and weeding was found to be significant for the yield-contributing features. With two hands weeding at 20 and 40 DAS, the maximum grain production (5.79 t ha^{-1}) was recorded from 4 seedling hills^{-1}.

Introduction

Over 100 countries cultivate rice, the primary food source for more than half of the world's population, with Asia accounting for 90% of the world's total output. Rice also takes up over one-fifth of the world's cereal-growing land. It is the most significant food crop in Asia, and the continent as a whole produces around 92% of the world's rice (Fukagawa and Ziska, 2019). Bangladesh is the third-largest producer of rice in the world, and the nation maintains autarky to provide its 169.04 million population's needs from its 11.55 million cultivated gross hectares. In comparison to other prominent rice-producing nations like Japan, the yield of rice in Bangladesh is fairly low (2.76 t ha^{-1}) China, Korea and United States of America (Al Mamun *et al*., 2021). The three seasons of rice cultivation in Bangladesh are known as aus, aman, and born rice (Al Mamun *et al*., 2021). Aus rice has a relatively short lifespan and has many issues that often greatly diminish its productivity. The introduction of high-yielding cultivars and improved weeding techniques rank highly among the several elements that affect rice output. The issue of weeds appears to have gotten worse with the advent of modern rice varieties in the current season (Ahmed *et al*, 1986). Due to the hot, humid weather that prevails throughout this season, weed growth is inherently more rapid. Weeds grow quickly compared to current rice seedlings, which mean that they almost always outgrow their rice counterparts. Modern kinds also have shorter statures and upright leaves than tall traditional types; as a result,

more light may enter the crop canopy, which promotes the growth of more weeds. The problem of weeds is made worse by the use of larger fertilizer doses in contemporary rice types. To realize the enhanced production potentials of modern rice, effective weed management is a need. In Bangladesh, Mamun (1981) calculated that weeds cause an annual output loss of around 1.72 million tons of rice. Rahman *et al.* (2017) revealed that the yield of aus rice in Asian nations is less than 1000 kg per hectare was mostly due to weed competition. Losses due to weeds in aus rice vary from 58% to full failure of the crop. The development of plants is negatively impacted by a heavy weed infestation following seed germination, which lowers rice grain output. According to BRRI (2018), doubling the frequency of manual weeding on the 21 and 42 DAT decreased weed infestation and increased grain output. Therefore, weed management has a significant impact on crop performance. The number of seedlings on hill^{-1} has a significant qualitative and quantitative impact on the number of tillers and their development. Maximum radiant energy, nutrients, space, and water may be used by the rice plant to develop properly in both its aerial and subsurface portions. It may also lower the cost of seedlings for farmers (Bozorgi *et al.*, 2011). As a result of reciprocal shade and lodging caused by an excessive number of seedlings and tillers, it is more advantageous to produce straw rather than grain. According to Sarker and Nahar (2017), the number of rice seedlings per hill was a significant factor because it affected the plant population unit's area, sunlight availability, competition for nutrients, photosynthesis, and respiration, all of which had an impact on the yield and yield-contributing traits of the rice. Given the foregoing information, a study was conducted to see how aus rice (cv. BR16) performed in response to seedling hill^{-1}, weeding regime, and their interactions.

Materials and Methods

Location of the study

The experiment was conducted at the Agronomy Field Laboratory of Bangladesh Agricultural University (BAU), Mymensingh during the period from March to August 2011 (aus season). The experimental field is located at 24.75°N latitude and 90.50°E longitude at an average height of 16 m above the mean sea level.

Experimental design and treatments

Three replications of the randomized complete block design were used to set up the experimental treatments. There were 12 different treatment assemblages. Consequently, there were 36 unit plots in all. Blocks and unit plots were separated by 1.0 m and 0.75 m, respectively. The unit plot measured 2.0 by 2.5 meters. The combinations of treatments were assigned at random to the plots inside each block. The experiment included two sets of treatments: (A) weeding and (B) the number of seedlings. A. Number of seedlings hill^{-1}: i. 2 seedlings hill^{-1}, ii. 4 seedlings hill^{-1}, iii. 6 seedlings hill^{-1}, iv. 8 seedlings hill^{-1}; B. Weeding: i. No weeding (Wo), ii. One-hand weeding (WI), iii. Two-hand weeding (W2). The kind of aus rice utilized in the study was known as BR16. More seeds than necessary were placed in lines at a distance of 25 cm, and after germination, the extra seedlings were uprooted to maintain the number of seedlings according to the treatment (SI, S2, S3, S4). On March 31, 2011, the seeds were planted at a rate of 60 kg per hectare, spaced 25 cm apart in straight lines, at a depth of roughly 6 cm.

Data collection and Data analysis

The weeds were first dried in the sun, then for 24 hours at a constant temperature of 80°C in an oven. Five hills were randomly selected from each plot's 1 m^2 area at maturity to collect information on the following crop characteristics: Plant height (cm), Total tillers hill^{-1}, Effective tillers hill^{-1}, Non-effective tillers hill^{-1}, Length of panicle (cm), Filled grains panicle^{-1}, Unfilled grains panicle^{-1}, 1000-grain weight, Grain yield (t ha^{-1}), Straw yield (t ha^{-1}), Biological yield (t ha^{-1}), Harvest index (%), Thousand seed weight was taken from each plot after drying of seeds. Grain and straw yields were recorded separately for each plot in kg which was then converted into t ha^{-1}. The harvest index and grain yield plot^{-1} were determined using the following formula.

Harvest index = Grain yield / Biological yield × 100.

Biological yield = Grain yield + straw yield

The acquired data were analyzed using the ANOVA approach, and the Dui 1 can's Multiple Range Test was used to determine the significance of the mean differences (Gomez and Gomez, 1976).

Results and Discussion

Results of the present study regarding the influence of the number of seedlings hill^{-1} and weeding and their interaction on different plant characters of aus rice cv.BR16 have been studied.

Effect of the number of seedlings hill^{-1} on yield and yield contributing characteristics of *aus* rice cv.BR16

The height of the plants was significantly impacted by the number of seedlings hill^{-1} (Table 1). Six seedlings from hill^{-1} produced the tallest plant, which measured 87.10 cm and was similar to that of hill-1's two seedlings. The 8 seedling hill^{-1} plant that was the shortest (75.36 cm) was measured. The number of active tillers hill-1 has a substantial impact on the number of seedlings hill^{-1} (Table 1). The lowest number of effective tillers hill^{-1} (11.49) was discovered with 8 seedlings hill^{-1} at a 1% level of probability, while the largest number of effective tillers hill^{-1} (19.32) was discovered with 4 seedlings hill^{-1}, which was identical with 6 seedlings hill^{-1} In addition, it was discovered that the tiller number hill^{-1} increased with increasing number of seedlings hill^{-1} up to 3 seedlings hill^{-1} by Islam *et al.* (1980) and Pananiswamy and Gomez (1976). The number of non-effective tillers hill^{-1} was not significantly influenced by the number of seedlings hill^{-1} (Table 1). The highest number of non-effective tillers hill^{-1} (2.44) was found from 8 seedlings hill^{-1} and the lowest number of non-effective tillers hill^{-1} (1.59) was found from 6 seedlings hill^{-1}. The length of the panicle was significantly influenced by the number of seedlings hill^{-1} (Table 1). The longest panicle (20.88 cm) was obtained from 2 seedlings hill^{-1} (SI) and the shortest panicle (19.57 cm) was obtained from 4 seedlings hill^{-1} (S2) at a 1 % level of probability. The number of filled grains panicle^{-1} was significantly affected by the number of seedlings hill^{-1} (Table 1). Four number of the seedlings hill^{-1} showed the (126.82) highest number of filled grains panicle^{-1} which was identical with SI and S3 and the lowest (95.14) from 8 seedlings hill^{-1} at a 1 % level of probability. The number of unfilled grains panicle^{-1} was significantly affected by the number of seedlings hill^{-1} at a 1% level of significance (Table 1). Eight number of seedlings hill^{-1} showed the (22.64) highest number of unfilled grains panicle^{-1} and the lowest (12.13) from 4 seedlings hill^{-1} which was identical with six number of

seedlings hill^{-1}. The weight of 1000 grains was significantly affected by the number of seedlings hill^{-1} (Table 1). The maximum weight of 1000 grain (22.51g) was observed from 2 seedlings hill^{-1} which was identical with 4 number of seedlings hill^{-1} and 6 number of seedlings hill^{-1} and the minimum weight of 1000-grain (21.35g) was observed from 8 number of seedlings hill^{-1} (S4). Grain yield was significantly influenced by different numbers of seedlings hill^{-1} (Table 1). It was found that the highest grain yield (5.02 t ha^{-1}) was obtained from 4 seedlings hill^{-1} which was identical with 6 seedlings hill^{-1} and the lowest grain yield (2.58 t ha^{-1}) was obtained from 8 seedlings hill^{-1}. The straw yield was significantly affected by seedlings number hill^{-1}. From Table 1 it was observed that the highest straw yield (6.29 t ha^{-1}) was found in 6 seedlings hill^{-1} and the lowest straw yield (4.71 t ha^{-1}) was found in 8 seedlings hill^{-1}. The biological yield was significantly affected by the number of seedlings hill^{-1} (Table 1). The highest biological yield (11.29 t ha^{-1}) was produced by 6 seedlings hill^{-1} which was identical with 4 seedlings hill^{-1}. The lowest biological yield (7.30 t ha^{-1}) was produced by 8 seedlings hill^{-1}. The number of seedlings hill^{-1} significantly affected the harvest index at a 1% level of significance (Table 1). The highest harvest index (45.02%) was produced by 4 seedlings hill^{-1} which was identical with 2 seedlings hill^{-1} and also 6 seedlings hill^{-1}. The lowest harvest index (35.31%) was found in 8 seedlings hill^{-1}

Table 1. Effect of the number of seedlings hill^{-1} on yield and yield contributing characteristics of *aus* rice cv.BR16.

Number of seedlings hill^{-1}	Plant Height (cm)	Total tillers hill^{-1}	Effective tillers hill^{-1}	Non-effective tillers hill^{-1}	Length of Panicle (cm)	Filled grains panicle^{-1}	Unfilled grains panicle^{-1}	1000-grain wt. (g)	Grain Yield (t ha^{-1})	Straw Yield (t ha^{-1})	Biological yield (t ha^{-1})	Harvest index (%)
S_1	84.75ab	18.53b	16.40b	2.13	20.88a	124.57a	17.88b	22.51a	4.55b	5.68c	10.24b	44.08a
S2	83.19b	21.01a	19.32a	1.69	19.57c	126.82a	12.13c	22.28a	5.02a	6.10b	11.11a	45.02a
S3	87.10a	20.85a	19.26a	1.59	19.98b	123.97a	14.04c	22.23a	5.00a	6.29a	11.29a	44.23a
S4	75.36c	13.93c	11.49c	2.44	20.10b	95.14b	22.64a	21.35b	2.58c	4.71d	7.30c	35.3 lb
CV(%)	3.73	3.94	3.13	22.44	1.56	2.77	20.03	3.48	2.49	3.04	2.12	2.28
Level of Sig.				NS								

In a column figures with the common letter(s) or without letters do not differ significantly as par DMRT
S1 =2 seedlings hill-', S2 =4 seedlings hill-', S3 =6 seedlings hill-', S4 =8 seedlings hill-' Significant at 5% level of probability

Effect of the number of weeding on yield and yield contributing characteristics of *aus* rice cv. BR16

Plant height was significantly affected by the effect of weeding (Table 2). The tallest plant height (83.75 cm) was obtained from two hand weeding's (W2) which were identical to the plant height in W1. The shortest plant height (80.91 cm) was obtained from no weeding (Wo). Here it is observed that the increasing number of weeding was found to produce a positive effect on plant height. Total tillers hill^{-1} was significantly affected by the weeding regime (Table 2). The lowest number of total tillers hill^{-1} (16.05) was obtained from no weeding (Wo) and the highest number of total tillers hill^{-1} (20.98) was obtained from two hand weeding's (W2). The number of effective tillers hill^{-1} was significantly influenced by the weeding at 1% level (Table 2). The highest number of effective tillers hill^{-1} (18.82) was obtained from two hand weeding's (W2) and the lowest number of effective tillers hill^{-1} (14.34) was obtained from no weeding (Wo) at a 1% level. The number of non-effective tillers hill^{-1} was not significantly influenced by the weeding at 1% level (Table 2). The highest number of non-effective tillers hill^{-1} (2.16) was obtained from two hand weeding's (W2) and the lowest number of non-effective tillers hill^{-1} (1.71) was obtained from no weeding (Wo) at a 1% level. The effect of the weeding regime on the panicle length was not significant (Table 2). The longest panicle (20.23 cm) was obtained from 2 hand weeding's (W2). The shortest panicle (20.01 cm) was obtained from no weeding (Wo). The effect of weeding on the filled grains panicle^{-1} was significantly affected with a 1 % level of probability (Table 2). The highest number of filled grains panicle^{-1} (127.31) was obtained from 2 hand weedings (W2) and the lowest number of filled grains panicle^{-1} (101.85) was obtained from no weeding (Wo). The effect of weeding on the unfilled grains panicle^{-1} was significantly affected with a 1% level of probability (Table 2). The highest number of unfilled grains panicle^{-1} (20.89) was obtained from one-hand weeding (W1) which was identical to W2 and the lowest number of unfilled grains panicle^{-1} (14.43) was obtained from no weeding (Wo) which was identical to W2. The effect of weeding on the 1000-grain weight was significant (Table 2). The maximum weight of 1000-grain (22.62) was obtained from 2 hand weeding's (W2) and the minimum weight of 1000-grain (21.78) was obtained from no weeding (Wo) which was identical to W1. The effect of weeding on the grain yield was significant (Table 2). The maximum grain yield (5.04) was found in W2 at a 1% level of probability and the minimum grain yield (3.46 t ha^{-1}) was obtained from no weeding (Wo). The straw yield was significantly affected by weeding (Table 2). The highest straw yield (6.34 t ha^{-1}) was obtained from 2 hand weeding's (W2) and the lowest straw yield (5.06 t ha^{-1}) was obtained from no weeding (Wo). From the result, it was observed that straw yield decreased with the decrease in weeding intensity, which in other words means that with the increase in weed infestation. This result is supported by Mamun *et al.* (1986). The biological yield was significantly affected by the weeding regime (Table 2). The highest biological yield (11.38 t ha^{-1}) was obtained from 2 hand weeding's (W2) and the lowest biological yield (8.52 t ha^{-1}) was obtained from no weeding (Wo). The effect of weeding regime on harvest index was significant (Table 2). From the result it was observed that the highest harvest index (43.68%) was obtained from 2 hand weedings (W2) and the lowest harvest index (40.09%) was obtained from no weeding (Wo).

Table 2. Effect of weeding on yield and yield contributing characteristics of aus rice cv.BR16.

Number of weeding	Plant Height (cm)	Total tillers hill^{-1}	Effective tillers hill^{-1}	Non-effective tillers hill^{-1}	Panicle length (cm)	Filled grains panicle^{-1}	Unfilled grains panicle^{-1}	1000-GW(g)	Grain yield (t ha^{-1})	Straw yield (t ha^{-1})	Biological yield (t ha^{-1})	Harvest index (%)
Wo	80.91b	16.05c	14.34c	1.71	20.01	101.85c	14.43b	21.78b	3.46c	5.06b	8.52c	40.09c
W1	83.14ab	18.71b	16.69b	2.02	20.16	123.72b	20.89a	21.88b	4.36b	5.69ab	10.06b	42.72b
W2	83.75a	20.98a	18.82a	2.16	20.23	127.31a	14.70ab	22.62a	5.04a	6.34a	11.38a	43.68a
CV(%)	3.73	3.94	3.13	22.44	1.56	2.77	20.03	3.48	2.49	3.04	2.12	2.28
Level of Sig.				NS	NS							

In a column figures with common letter(s) or without letters do not differ significantly as par DMRT; Wo= No weeding, W1= One hand weeding, W2= Two hand weeding's; Significant at 5% level of probability; **= Significant at 1% level of probability NS= Non significant

Interaction between the number of seedlings hill^{-1} and weeding on yield and yield contributing characteristics of *aus* rice cv.BR16

The interaction effect of seedlings hill^{-1} and weeding on plant height was not significant (Table 3). Numerically the tallest plant (89.52 cm) was obtained from 6 seedlings hill^{-1} (S3W2) and the shortest plant (72.54 cm) was obtained from 8 seedlings hill^{-1} with no weeding (W0). The effect of interaction between the number of seeding hill^{-1} and weeding has been shown in Table 3. It was found that the interaction of the number of seedlings hill-' and weeding had a significant effect on the total number of tillers hill^{-1}. The highest number of total tillers hill^{-1} (24.03) was obtained from 4 seedlings hill^{-1} (S2W2) which was identical with S3W2 and the lowest number of total tillers hill^{-1} (13.20) was obtained from 8 seedlings hill"' with no weeding (S4W0) which was identical with S4W1. The effect of interaction between the number of seedlings hill^{-1} and weeding was found to be significant in respect of the number of effective tillers hill^{-1} at a 1% level of probability (Table 3). It was observed that the highest number of effective tillers hill-' was found with (22.38) at 1% level of probability with S2W2 which was identical with S3W2. The lowest number of effective tillers hill^{-1} was found (11.20) at 1% level of probability with S4W0 which was identical with S4W1, and S4W2. The effect of interaction between the number of seedlings hill^{-1} and weeding was found to be non-significant (Table 3). It was found that the highest number of non-effective tillers hill^{-1} (2.72) was obtained from 8 seedlings hill^{-1} with 2 hand weeding's (S4W2) and the lowest number of non-effective tillers hill^{-1} (1.35) was obtained from 6 seedlings hill^{-1} with no weeding (S3W0). The interaction effect of the number of seedlings hill^{-1} and the weeding regime on the panicle length was significant at a 5% level (Table 3). The longest panicle (21.20 cm) was obtained from 2 seedlings hill^{-1} with 2 hand weeding's (S1W2) which were identical with S1W1. The shortest panicle (19.60 cm) was obtained from 8 seedlings hill^{-1} with 2 hand weeding's (S4W2) which were identical with S2Wo, S2W1, S2W2, S3Wo and S3W1. The effect of interaction between the number of seedlings hill-' and weeding was significant at 1% level of probability (Table 3). It was observed that the highest number of filled grains panicle^{-1} (140.10) was obtained from 2 seedlings hill^{-1} with 2 hand weeding's (SIW2) which were identical with S2W1 and the lowest number of filled grains panicle^{-1} (80.84) was obtained from 8 seedlings hill^{-1} with no weeding (S4W0). The effect of interaction between the number of seedlings hill^{-1} and weeding was not significant (Table 3). It was observed that the highest number of unfilled grains panicle^{-1} (29.48) was obtained from 8 seedlings hill^{-1} with 1 hand weeding (S4W1) and the lowest number of unfilled grains panicle^{-1} (9.28) was obtained from 4 seedlings hill-' with no weeding (S2Wo). The effect of interaction between the number of seedlings hill^{-1} and weeding had no significance in respect of the weight of 1000-grain (Table 3). The maximum weight of 1000-grain observed (23.05) was obtained from 2 seedlings hill^{-1} with 2 hand weeding's (S1W2) and the minimum weight (20.63) of 1000-grain was obtained from 8 seedlings hill^{-1} with one hand weeding (S4W1). The effect of interaction between the number of seedlings hill^{-1} and weeding was found to be significant concerning grain yield (Table 3). It was observed that the highest grain yield (5.79 t ha^{-1}) was obtained from 4 seedlings hill^{-1} with 2 hand weedings (S2W2) which was identical to S1W2 and S3W2 and the lowest grain yield (2.16 t ha^{-1}) which was obtained from 8 seedlings hill^{-1} with no weeding (S4W0). The straw yield was significantly affected by the interaction between the number of seedlings hill-' and weeding at 5% level of probability (Table 3). The highest straw yield (7.19 t ha^{-1}) was obtained from 6 seedlings hill^{-1} with 2 hand weeding's (S3W2) and the lowest (4.11 t ha^{-1}) was obtained from 8 seedlings hill^{-1}with no weeding (S4WO) (Fig 3). The biological yield was significantly affected by the interaction between the number of seedlings hill^{-1} and weeding (Table 3). The highest biological yield (12.97 t ha^{-1}) was obtained from 6 seedlings hill^{-1} with 2 hand weeding's (S3W2) and the lowest biological yield (6.27 t ha^{-1}) was obtained from 8 seedlings hill^{-1} with no weeding (Wo) at 1% level of probability. The harvest index was significantly affected by the interaction between the numbers of seedlings hill^{-1}and weeding (Table 3). The highest harvest index (47.26%) was obtained from 2 seedlings hill^{-1}with 2 hand weeding's (S1W2) which were identical with S2W2 and S3W2. The lowest harvest index (34.40%) was obtained from 8 seedlings hill^{-1} (S4WO) which was identical to S4W1.

Table 3. Interaction effect of number of seedlings hill-' and weeding on yield and yield contributing characteristics of aus rice cv.BR16.

Treatment	Plant Height (cm)	Total tillers hill^{-1}	Effective tillers hill^{-1}	Non-effectie tillers hill^{-1}	Panicle length (cm)	Filled grains panicle^{-1}	Unfilled grains panicle^{-1}	1000-GW(g)	Grain yield (t ha^{-1})	Straw yield (t ha^{-1})	Biological yield (t ha^{-1})	Harvest index (%)
S1W0	84.08	160	14.11d	1.92	20.63bc	105.97de	17.03	21.92	3.4le	5.07fg	8.48g	40.21e
S1W1	84.97	180	16.03c	2.03	20.80ab	127.57c	19.15	22.58	4.62c	5.70d	10.33e	44.77bc
S1W2	85.20	214	19.06b	2.42	21.20a	140.18a	17.44	23.05	5.63a	6.28c	11.91c	47.26a
S2W0	81.24	175	16.00c	1.58	19.33g	110.38d	9.28	22.07	4.13d	5.40de	9.53f	43.33cd
S2W1	85.35	214	19.58b	1.84	19.48g	135.86ab	17.44	22.33	5.14b	6.18c	11.31d	45.41b

In a column figures with common letter(s) or without letters do not differ significantly as par DMRT; S1= 2 seedlings hill^{-1}, S2= 4 seedlings hill^{-1}, S3= 6 seedlings hill^{-1}, S4= 8 seedlings hill^{-1}; Wo= No weeding; W1= One hand weeding, W2= Two hand weeding's; *Significant at 5% level of probability; **= Significant at 1% level of probability; NS= Non significant

Conclusion

Number of seedling hill^{-1} had significant effect on yield and all yield contributing characters such as plant height, number of total tillers, effective tillers, length of panicle, filled grains panicle^{-1}, unfilled grains panicle^{-1}, weight of 1000 grains, grain yield, straw yield, biological yield, harvest index except non-effective tillers hill^{-1}. Four seedling hill^{-1} produced the highest yield contributing characteristics whereas the lowest grain yield was found in 8 seedlings hill^{-1}. On the other hand, weeding had significant effect on all crop characters except non effective tillers hill^{-1} and panicle length. Interaction effects of number of seedlings hill^{-1} and weeding had significant effect on total number of tillers hill-', effective tillers hill-', panicle length, filled grains panicle^{-1}, grain yield, straw yield, biological yield and harvest index. But it had no significant effect on plant height, non-effective tillers hill^{-1}, unfilled grains panicle^{-1} and 1000-grain weight. From the result of the study, it appears that number of seedlings hill^{-1} and weeding had profound effect on the performance of aus rice (cv.BR16). Weeding on 20 and 40 DAS was the most effective for controlling weeds. The best performance of aus rice could be obtained in 4 seedlings hill^{-1} with weeding's on 20 and 40 DAS.

Conflict of Interest

The authors declare that there is no conflict of interests regarding the publication of this paper.

References

Ahmed IU, Rahman S, Hossain AKMA and Bhuiyan NI (1986). Growth and yield of rice (BR4 and BR3) as affected by nitrogen and sulphur fertilization. In: Proc. Intl. Symp. on Sulphur in Agricultural Soils, *Bangladesh Agricultural Research Council*, Dhaka, Bangladesh :435-452.

Ahmed S, Mamun AA, Islam MN and Hossain SMA (1983). Critical period of weed competition in transplant aus rice. *Bangladesh J. Agric.* 11(2): 1-9.

Ahmed Z, Khan DR, Alim SD, Tahir M and Marwat KB (1998). Effect of economics of time and weed removal on the yield and yield components of rice. *Sarhad J. Agril*. 14(4): 335-338.

Al Mamun MA, Nihad SA, Sarkar MA, Aziz MA, Qayum MA, Ahmed R, Rahman NM, Hossain MI and Kabir MS (2021). Growth and trend analysis of area, production and yield of rice: A scenario of rice security in Bangladesh. *PloS one*, 16(12):e0261128.

Alam MS, Biswas BK, Gaffer MA and Hossain MK (1995). Efficiency of weeding at different stages of seedling emergence in direct-seeded aus rice. *Bangladesh J. Sci. Ind. Res*. 30(4): 155-167.

Ali H (2008). Effect of spacing and number of seedling hill^{-1} on the performance of BRRI dhan4l. Department of Agronomy, *Bangladesh Agricultural University*, *Mymensingh.* Pp. 47.

Bozorgi HR, Faraji A, Danesh RK, Keshavarz A, Azarpour E and Tarighi F (2011). Effect of plant density on yield and yield components of rice. *World Applied Sciences Journal* 12(11):2053-7.

BRRI (2018). Annual Report for 1978- 79. Bangladesh Rice Res. Inst. Joydebpur, Gazipur. pp. 21-22.

Fukagawa NK and Ziska LH (2019). Rice: Importance for global nutrition. *Journal of nutritional science and vitaminology*.65 (Supplement):S2-3.

Islam MA, Khan MN and Rahman MM (1980). Effects of cultural weed control practices on Aus (summer) rice [in Bangladesh]. Bangladesh Journal of Agricultural Sciences (Bangladesh) 7(1): 43-46.

Mamun AA (1981). Weeds of Bangladesh and their control. Paper presented in the Training Planning Workshop for Agropesticides Distributors. February 5 -17, Dhaka. p.13.

Mamun AA, Ahmed S and Sarker AU (1986). Critical period of crop weed competition in direct seeded aus rice. Bangladesh J. Agril. Sci 13(1):61-66.

Pataniswamy KM and Gomez A (1976). Number of seedlings hill^{-1} and its effect on the variability of plant and tiller number hill^{-1} in transplant rice. *Oryza* 13(1): 65-67.

Rahman AA, Islam AM, Arefin MA, Rahman MR and Anwar MP. Competitiveness of winter rice varieties against weed under dry direct seeded conditions. Agricultural Sciences 8(12):1415-38.

Sarker BC and Nahar (2017). Effect of number of seedlings per hill and spacing on growth and yield of transplanted aman rice. Khulna University Studies 29:27-38.