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COMPETITIVENESS OF AUS RICE VARIETIES AGAINST WEED INFESTATION

SD Shawon*, MN Islam, M Biswas and S Sarker

Department of Agronomy and Haor Agriculture, Faculty of Agriculture, Sylhet Agricultural University, Sylhet-3100, Bangladesh

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Abstract

Experiments on Aus rice were conducted at the Agronomy Research Field of Sylhet Agricultural University, Sylhet and in the farmer's field of Jaintapur and Gowainghat Upazila, Sylhet to find out the competitiveness of Aus rice varieties against weed infestation. The experiments were carried out within the period of April to August 2014. Five commercial rice varieties viz. BR3, BRRI dhan48, hybrid variety Aloron, BRRI dhan43, Iratom-24 along with three (3) local cultivars Aina Miah, Doom and Kanihati were included in the research field trial. On the other hand, survey of thirty farmer's field along with researcher's managed trial were conducted to know the weed situation. In farmer's field, 5 (five) variety namely BR3, hybrid variety Aloron, BRRI dhan55, BRRI dhan48 and cultivar Aina Miah were included. Here each variety or cultivar considered as treatment. The experiment was laid out in randomized complete block (RCBD) design with three replications. Weed Competitive Index (CI) was calculated on the basis of average yield of all varieties and weed biomass. Result indicated that eight weed species were recorded in the research field trial, whereas 28 weed species were recorded in the farmer's field trial. The most prominent weeds in the experiment were *Monochoria vaginalis, Digitaria sangunalis, Leersia hexandra, Cynodon dactylon* etc. The highest weed competitive index was recorded in Aloron (2.27) and the lowest was recorded in Doom (0.42) in the research field. On the other hand, in farmer's field trial the highest weed competitive index (2.05) was recorded in BRRI dhan48 which was followed by variety Aloron (1.71). The highest grain yield (4.04 t ha^{-1}) was produced by the hybrid variety Aloron which was statistically identical with the variety BRRI dhan48 (3.19 t ha^{-1}) and Iratom-24 (3.06 t ha^{-1}). The hybrid variety Aloron produced the maximum panicle length (24.53 cm) and highest (103.53) grains $panicle^{-1}$ and lowest (41.87) panicle length was in variety BRRI dhan43. The lowest yield (1.07 t ha^{-1}) was recorded in local cultivar Doom which was at par with BRRI dhan43 (1.32 t ha^{-1}) and local cultivar *Kanihati* (1.53 t ha^{-1}).

***Keywords*:** Aus rice, varieties/cultivars, growth, yield, hybrid variety Aloron.

Introduction

Rice is one of the most important staple foods for more than half of the world's population (IRRI, 2013) and influences the livelihoods and economies of several billion people. In Bangladesh, rice is grown in three distinct seasons namely Aus, Aman, and Boro. The total area of rice in Bangladesh is about 11.35 million hectares with a production of 31.97 million tons. Boro rice or irrigated rice is grown after harvesting of T. Aman rice or after harvesting a non-rice crop like early potato, mustard or quick growing vegetables. Rice requires use of a high level of inputs like irrigation, fertilizer and plant protection measures. Besides, T. Aus rice (during April to July) and upland broadcast Aus rice (during March to July) are grown under the rain-fed ecosystem in the wet season crop is grown when sufficient rainfall occurs during April to July. But such a climate is very much conducive to higher vegetative growth of the crop but with the higher incidence of pests and diseases. Among the pest weeds are one of the most important biological constraints in *Oryza sativa* (rice) production. Weeds are at present the major biotic constraint to increase rice production worldwide (Zhang, 1996). The yield losses due to uncontrolled weed growth in lowland and upland rice ranged from 12 to 81% (Chopra and Chopra, 2003; Mukherjee and Singh, 2005). In Bangladesh, it is reported that weed infestation reduces the grain yield by 70-80% in Aus rice (early summer), 30-40% for T. Aman rice (late summer) and 22-36% for modern Boro rice cultivars (winter rice) (BRRI, 2006; Mamun, 1990). This loss is therefore, a serious threat for the food deficit countries like Bangladesh.

Weed can be managed by physical, mechanical, chemical and biological ways but all these methods are more or less expensive and time consuming. Recently, researchers have paid more attention to the utilization of the competitive cultivars for weed management in *O. sativa* because it is a cost-effective, safe measure that can reduce weeding inputs. Garrity*et al.* (1992). It is reported that a competitive cultivar might provide the practical equivalent of one or two hand

***Corresponding author: SD Shawon,** *Department of Agronomy and Haor Agriculture, Faculty of Agriculture, Sylhet Agricultural University, Sylhet-3100, Bangladesh, Email: Shuvrashawon45@gmail.com*

weeding in upland *O. sativa*. On the other hand, determination of plant characters that contribute to competitiveness is difficult. Increased competitive ability of cultivars has been attributed to early emergence, seedling vigor and increased rate of leaf expansion, rapid creation of a dense canopy, increased plant height, early root growth and increased root size (Berkowitz, 1988). There are many research papers (Amarante *et al*., 1995; Garrity*et al*., 1992; Jennings and Aquino, 1968) dealing with *O. sativa* cultivar competitiveness, but there is no consensus as to what *O. sativa* plant traits confer competitive ability to cultivars.The choice of a cultivar plays an important role in crop-weed competition due to the cultivar's morphological characters and the competitive ability of rice is usually associated with light interception traits. The main aim of using weed-competitive cultivars should be to achieve rapid canopy closure so that shade under the canopy would suppress the growth of weeds. Hybrids usually have better vigor than inbreeds; therefore, when possible, hybrids can also be used in direct-seeded systems. Bangladesh Rice Research Institute (BRRI) released a weed competitive variety namely BRRI dhan69. One commercial hybrid variety "Aloron" is also has some potential against weed (Islam *et al*., 2015). It is assumed that there should be some cultivars for Sylhet region which have competitive ability against weed. So collection and evaluation of such cultivars is essential.

Therefore, the study has been taken to find out the suitable rice cultivar/varieties against weed infestation, to know the competitiveness of rice varieties against weed infestation and to know the yield loss by weed infestation.

Materials and Methods

The field experiment was conducted at the Agronomy Research Field of Sylhet Agricultural University, under Agro-Ecological Zone of Eastern Surma-Kushiyara Floodplain (AEZ 20) as well as the farmer's field of Jaintapur and Gowainghat Upazila during Kharif-1 season of 2014. The soil of the experimental field was sandy loam in texture having fertility level low to medium and belongs to the "Khadimnagar" soil series with organic matter content was moderate (1.45%), N 0.80%, K 0.07 mmol100g^{-1} of soil, P was 25 µgg^{-1} of soil and S was 10 µgg^{-1} of soil and having pH value 5.2. Eight varieties/cultivars (Aina Miah, BR3, BRRI dhan48, Aloron, BRRI dhan43, Iratom-24, Doom and Kanihati) of Aus rice were tested in the experiment of research field trial and five varieties/cultivars e.g. BR3, hybrid variety Aloron, BRRI dhan55, BRRI dhan48 and a LYV (Aina Miah) of Aus rice were tested in the experiment of farmer's field trial which was collected from Bangladesh Rice Research Institute (BRRI) and local farmers. The experiment was laid out in a RCB (Randomized Completely Block) design with three replications. The total number of plots was 18 with the area of 8.82 m^2 (4.2 m × 2.1 m) in each plot and distance between replication was 1.0 m and the adjacent unit plot was 0.5 m. The experimental plots were fertilized at the rate of 80, 30, 40, 10 and 2.5 kg ha^{-1} as N, P, K, S and Zn respectively. The whole amount of TSP (triple super phosphate), MoP (muriate of potash), gypsum and zinc sulphate were applied as basal dose in the unit plot at the time of final land preparation and thoroughly incorporated into the soil. Remaining urea was top dressed in three equal splits at 10, 25 and 45 days after transplanting (DAT).Seeds of the Aus rice were sown on 10 April 2014 to make seedling and then seedlings were transplanted on 11 May 2014 in the main field maintaining spacing of line 25 cm × 6 cm. Crop was harvested at maturity on plots wise at 4 installments depending of the varietal maturity. BRRI dhan48 and BRRI dhan43 were harvested on 6 August 2014; Iratom-24, Doom and Kanihati were harvested on8 August 2014; Aina Miah and Aloron were harvested on 17 August 2014; and BR3 was harvested on 27 August 2014, respectively. Threshing was done with pedal thresher. After threshing the grains were cleaned and sundried. After sun drying, the grains were adjusted at 14% moisture level. The crop growth parameters like plant height, number of effective tiller hill^{-1}, panicle length, filled grains panicle^{-1}, 1000 grain weight and grain yield data were taken from 10 randomly selected hills from each plot excluding the crop cut area. The yield was converted in terms of t ha^{-1} from the yield of harvesting area. The recorded all data were compiled and analyzed statistically. Analysis of variance was done following randomized complete block design with the help of computer package MSTAT-C. The mean differences among the treatments were adjusted by Duncan's Multiple Range Test (Gomez and Gomez, 1984).

The data on weed vegetation were taken from unit plots. The weed infestation in each plot was identified species-wise and their density m^{-2} was counted. The density of weeds was determined by using an iron made quadrate of 0.5 m × 0.5 m in three places at random in each plot at 25 and 50 DAT. Weed population was then counted which were collected from each plot. Then fresh weight was recorded on all weeds of the research plot. Weed dry weight was recorded on all weeds of the plots after proper sun drying. Weed competitive index was counted also to find out the most suitable weed competitive variety. Weed Competitive Index (CI) was calculated on the basis of average yield of all varieties and weed biomass using the following formula (Rezakhanlou, 2012).

$$CI = \frac{\left[\frac{Vinfest}{Vmean}\right]}{\left[\frac{Wi}{Wmean}\right]}$$

Where, *V*infest is the yield of variety in terms of weed infestation. *V*mean: is the average yield of all varieties in the presence of weed. *Wi*: is weed biomass varieties of i. *W*mean: is average weed biomass is mixed with all varieties.

Results and Discussion

Weed infestation and their composition in experimental field

Eight weed species were observed in the experimental field trial viz. Panilong (*Ludwigia octavalvis*), Arail or Swamp rice grass (*Leersia hexandra*), Kanduli (*Murdannia nudiflora*), Anguli or Crab grass (*Digitaria sangunalis*), Panikachu (*Monochoria vaginalis*), Panimorich (*Sphenoclea zeylanica*), Water prime rose (*Ludwigia octavalvis*) and others (Table 1). Among the weeds, grasses were the dominant in number,broad-leaf weeds were few and the sedges were almost absent in the field. Significant variation was observed in different kinds of weeds among different cultivars (Table 2). The highest number of grasses (35m-2) were recorded in BR3 cultivars field, on the other hand, the lowest number of grasses (24m^{-2}) was found from BRRI dhan43. The highest weed density was recorded in the rice variety BR3 plots and the lowest was in hybrid rice variety Aloron among all the tested cultivars (Table 2). The number of weeds was lower in the hybrid cultivated plots might be due to vigorous growth of the cultivar helped to reduce the weed population and hence lower in number. Similar trend was noticed in cultivars Kanihati and BRRI dhan43. Mercado (1979) found that competition of *Echinochola crusgalli* was found to be greatest when present at a density of 20 plants m^{-2} within the critical period of crop-weed competition. This difference may be due to climatic change, varietal change and other cultural management. Sultana *et al.* (2000) found that the principal weeds were *Monochoria vaginalis*, *Scirpus mucrontus* and *Cyperusiria* in case of BR3 cultivation in Aus season. In another study in case of direct seeded upland rice cultivation *Cyperus iria* and *E. crusgalli* were the principal weeds (Mamun *et al.,* 1986).

Table 1. Weed density in different varieties of rice at 28 DAS at the Agronomy Research Field, SAU

Common Name	Scientific Name	Groups of weed		
		Number of grasses (m^{-2})	Number of broad leaf (m^{-2})	Number of sedge (m^{-2})
Panilong	*Ludwigiaoctavalvi*s	-	12	-
Arail	*Leersiahexandra*	35	-	-
Kanduli	*Murdannianudiflora*	-	7	-
Anguli or Crab grass	*Digitariasangunalis*	28	-	-
Panikachu	*Monochoriavaginalis*	-	18	-
Panimorich	*Sphenocleazeylanica*	-	9	-
Durba	*Cynodondactylon*	31	-	-
Joyna	*Fimbristylismiliaceae*	-	-	8
Others	Others	5	-	-

Weed competitive index of rice cultivar in research field trial

The highest weed competitive index (1.72) was found in the hybrid rice variety Aloron that was followed by Aina Miah (1.42). Hybrid rice varieties grow faster than other variety like local cultivars that's why their competitive index was higher. The lowest weed competitive index was recorded in cultivar Doom (0.42) which was similar to BRRI dhan43 (0.58), Kanihati (0.68), BR3 (0.96) and Iratom-24 (1.29). On the other hand, Aina Miah and BRRI dhan48 had better weed competitive index than Doom (Table 3). Here the weed competitive ability of the hybrid variety Aloron is higher due to its morphological characters and well developed canopy structure, it can easily suppress the weeds. Less weed biomass was found in Aloron and Aina Miah reflected their higher weed competitive index. Chauhan (2011) reported that the high weed competitive index could be attributed to less weed biomass observed due to their ability to suppress weeds.

Weeds can be suppressed by allelopathic effects of rice genotypes in addition to genotypic smothering effect on weeds; however, the genotypes used in this study have not been reported for their allelopathic effect.

Table 2. Weed density in different varieties of rice at 28 DAS at the Agronomy Research Field, SAU

	Weed density (number m^{-2})				
Cultivar	Grass	Broad-leaf	Sedge	Total no. of weed	Fresh weight (g)
Aina Miah	29 ab	4 a	0	33 ab	25.9 e
BR3	35 a	0 c	0	35 a	41.9 cd
BRRI dhan48	31 ab	2 b	0	33 ab	56.9 b
Aloron	28 ab	0 c	0	28bc	38.4 d
BRRI dhan43	24 b	2 b	0	26 c	48.9 c
Iratom-24	29 ab	2 b	0	31abc	68.0 a
Doom	31 ab	0 c	0	31abc	55.8 b
Kanihati	28 ab	0 c	0	28bc	48.7 c
LSD at (0.05)	9.60	1.42	-	6.0	6.90
CV (%)	18.66	65.03	-	11.20	8.23

Same letters on columns do not differ significantly

Table 3. Competitiveness measured as weed competitive index (CI) in the Agronomy Research Field, SAU

Cultivars	Vinfest	Vmean	Wi	Wmean	Competitive Index
Aina Miah	1.70 c		25.9 e		1.42
BR3	1.86 c		41.9 cd		0.96
BRRI dhan48	3.19 b		56.9 b		1.21
Aloron	3.06 a	2.22	38.4 d	48.1	1.72
BRRI dhan43	1.32 c		48.9 c		0.58
Iratom-24	4.04 b		68.0 a		1.29
Doom	1.07 c		55.8 b		0.42
Kanihati	1.53 c		48.7 c		0.68
LSD at (0.05)	1.03		6.90		-
CV (%)	27.42	-	8.23	-	-

Same letters on columns do not differ significantly

Yield and yield attributes of different rice cultivars in the experimental field

Plant and yield contributing characters like plant height, number of effective tillers hill^{-1}, panicle length and number of filled grain panicle^{-1}, 1000-grain weight and grain yield differed significantly among the rice varieties or cultivars which are presented in Table 4.

Among the varieties or cultivars, Aina Miah produced the tallest plant (105.4 cm), which was at par with the hybrid variety Aloron (99.77 cm). The shortest plant height was recorded in variety Iratom-24 which produced the height of 68.63 cm. On the other hand, rest of the cultivar or variety showed intermediate type of plant height. Though plant height is a genetically developed character but soil fertility and other factors may have induced it. Weed is one of the other factor due to which crop growth reduced as a result the plants were shorter. Garrity*et al.* (1992) reported significant correlation between plant height and competitive ability. Perera *et al.* (1992) and Sultana (2000) also found similar reduction on rice plant height due to competition of *E. crusgalli*. The highest number of effective tillers hill^{-1} was recorded

in the variety BRRI dhan43 (12.53) which was at par with variety BRRI dhan48 and Iratom-24 with corresponding values of 12.13 and 10.7 in number, respectively (Table 4). Minimum number of effective tillers (8.2) hill^{-1} was observed in cultivar Doom which has less weed competitive index and hence lower rice yield also. Mamun*et al.* (1986) also found the similar result.

Table 4. Yield and yield attributes of Aus rice cultivars/varieties in the research field

Variety/Cultivar	Plant height (cm)	Effective tillers panicle^{-1} (No.)	Panicle length (cm)	Grains Panicle^{-1} (No.)	1000 grain weight (g)	Grain yield (t ha^{-1})
BR3	85.13 cd	8.90 bc	19.33 c	61.87 cd	34.00 b	1.85 c
BRRI dhan48	87.40 cd	12.13 a	20.53 c	74.00 bc	27.33 bc	3.19 b
Aloron	99.77 ab	8.37 bc	24.53 a	103.5 a	43.33 a	4.04 a
BRRI dhan43	87.53 cd	12.53 a	19.80 c	41.87 d	24.67 c	1.32 c
Iratom-24	68.63 e	10.70 ab	22.07 b	86.27 ab	25.00 c	3.06 b
Aina Miah	105.4 a	8.50 c	19.97 c	90.20 ab	16.67 d	1.70 c
Doom	82.00 d	8.20 c	17.27 d	74.00 bc	24.33 cd	1.07 c
Kanihati	92.53 bc	9.97 bc	19.47 c	86.67 ab	30.67 bc	1.53 c
LSD at (0.05)	7.47	1.87	1.48	20.54	7.92	1.03
CV (%)	4.99	11.14	4.29	15.73	6.09	27.42

Same letters on columns do not differ significantly

Table 5. Weed density (number m^{-2}), fresh weight and yield in different varieties of rice at 28 DAS at farmer's field

	Weed density (number m^{-2})					
Cultivar	Grass	Broad-leaf	Sedge	Totalno.of weed	Fresh weight (g)	Yield (t ha^{-1})
BR3	3 a	20 b	14 a	37 b	84.32 a	2.78 b
Hybrid (Aloron)	3 a	19 b	5 c	27 c	28.15bc	3.71 a
BRRI dhan55	2 a	32 a	7bc	41 b	32.15 b	1.98bc
BRRI dhan48	1 a	21 b	3 c	25 c	18.83 c	2.60 b
Aina Miah (LYV)	2 a	36 a	11 ab	49 a	26.37bc	1.72 c
LSD at (0.05)	NS	7.12	4.67	5.05	9.99	0.62
CV (%)	18.19	14.77	30.99	7.49	14.0	8.66

Same letters on columns do not differ significantly

The highest panicle length (24.53 cm) was observed in the rice variety Aloron resulting the highest grain yield. The lowest panicle length (17.27 cm) was recorded in cultivar Doom reflecting lower yield and weed competitive index. All other varieties or cultivars produced intermediate type of panicle length except the rice variety Iratom-24. Increasing the duration of *Cyperus* iria interference beyond 30 DAT decreased plant height, tiller m^{-2}, crop dry weight, panicle length, number of grains panicle^{-1} and grain weight as compared to weed free (Harmohinder and Kulwant, 2002).

The highest number of grains panicle^{-1} was recorded in the hybrid variety Aloron (103.5) which was statistically identical with cultivar Aina Miah, Kanihati and variety Iratom-24. The lowest weed growth and higher weed competitive ability boost up the higher number of filled grains panicle^{-1}. The lowest filled grains panicle^{-1} was observed in the variety BRRI dhan43 (41.87). Higher weed infestation in this plot suppressed the plant growth and hence number of chappy/empty grain was higher and filled grain was lower. Increasing the duration of *Cyperus iria* interference beyond 30 DAT decreased number of grains panicle^{-1} and grain weight as compared to weed free (Harmohinder and Kulwant, 2002).

The 1000-grain weight of Ausrice varieties/cultivars differed significantly among the variety or cultivar. The highest 1000-grain weight (43.3 g) was recorded in the hybrid variety Aloron which was the highest among the cultivars. The lowest weed growth and higher weed competitive index induced and control boost up the highest 1000-grain weight, hence produced higher grain yield. On the other hand, 1000-grain weight (16.67 g) was lowest in cultivar Aina Miah. Higher weed infestation in this plot suppressed the plant growth and hence number of 1000-grain weight was lowest. It might be due to the higher number of chappy grain in this cultivar. However, Islam *et al.* (1980) found significant effect of weed competition on 1000-grain weight. Rao and Moody (1992) found non-significant effect of weed competition on 1000-grain weight.

The highest grain yield (4.04 t ha^{-1}) was recorded in the hybrid variety Aloron which was statistically similar with the variety BRRI dhan48 (3.19 t ha^{-1})and Iratom-24 (3.06 t ha^{-1}) which was presented in Table 4. It might be the resultant effects of the highest tillers hill^{-1} and grains panicle^{-1} of those cultivars. The lowest grain yield (1.07 t ha^{-1}) was recorded in cultivar Doom which was at par with the variety BRRI dhan43 (1.32 t ha^{-1}).

Considering the yield and yield attributes and weeds infestation, it could be said that hybrid variety Aloron was a competitive variety as shown by its high yield attributing characteristics as well as higher weed competitive index value. Though some other varieties as well as cultivars showed better performance regarding yield attributes and weed competitive index. However, it is understood that hybrid variety Aloron has good potential against weed.

Table 6. Competitiveness measured as weed competitive index (CI) in the farmer's field

Cultivars	Vinfest	Vmean	Wi	Wmean	Competitive Index
BR3	2.78 b		84.32 a		0.49
BRRI dhan55	1.98bc		28.15bc		1.05
Hybrid (Aloron)	3.71 a	2.56	32.15 b	37.96	1.71
BRRI dhan48	2.60 b		18.83 c		2.05
LYV (Aina Miah)	1.72 c		26.37bc		0.97
LSD at (0.05)	0.62	-	9.99	-	-
CV (%)	8.66	-	14.03	-	-

Same letters on columns do not differ significantly

Weed infestation and their composition in farmer's field of Jaintapur and Gowainghat Upazila

Twenty-eight weed species were frequently observed in the weedy plots at farmer's field of Darbast. The most dominant weed species encountered in the weedy plots were *Monochoriavaginalis, Croton bonplandianun, Cyperus iria* (L)., *Digitaria sanguinalis and Dactyloctenium aegyptium*. Low yielding cultivar (LYV) Aina Miah had the highest weed density among all the cultivars (Table 5). The weed density was 49 m^{-2} in these cultivated plots,which composed of, grasses were 2m^{-2}, broad-leaf 36m^{-2}and sedges were 11m^{-2}. Weed density was more or less similar for cultivars hybrid (Aloron), BRRI dhan55 and BR3, however lower than LYV (Aina Miah). The lowest (25) sedges, grasses and broad-leaf weeds were found in BRRI dhan48 (Table 5). From the data of farmer's field, the highest grain yield (3.71 t ha^{-1}) was recorded in hybrid rice variety Aloron (Table 5). For that reason, its weed competitive ability was good. Due to these plants morphological characteristics, total no. of weeds was very less and was similar to BR3 and BRRI dhan48. But the lowest average yield was recorded in LYV (Aina Miah) rice variety (1.72 t ha^{-1}), whereas the total no. of weeds was highest. Mercado (1979) found that competition of *Echinochola crusgalli* was found to be greatest when present at a density of 20 plants m^{-2} within the critical period of crop-weed competition. This difference may be due to climatic

change, varietal change and other cultural management. Sultana *et al.* (2000) found that the principal weeds were *Monochoria vaginalis, Scirpus mucrontus and Cyperus iriain* case of BR3 cultivation in Aus season. In another study in case of direct seeded upland rice cultivation *Cyperus rotundus*and *E. crusgalli* were the principal weeds (Mamun*et al.*, 1986).

Weed competitive index among the rice cultivars in the farmer's field

Higher weed competitive index (2.05) was found in the rice variety BRRI dhan48 that was followed by hybrid rice variety with respective weed competitive index (1.71), other cultivars showed lower weed competitive index (Table 6). The rice varietyBR3 showed the lowest weed competitive index (0.49), which was similar to that of LYV (Aina Miah). However, BRRI dhan55 and hybrid variety Aloron had better weed competitive index than BR3. Similar result also reported by Chauhan (2011), the high competitive cultivars would be rapid canopy closure so that shade under the canopy would suppress the growth of weeds. Hybrids usually have better vigor than inbreeds; therefore, when possible, hybrids can also be used. He also reported that weed competitive index could be attributed to less weed biomass observed due to their ability to suppress weeds.

From the research field, the hybrid variety Aloron has very good weed competitive ability. Its yield was 4.04 t ha^{-1}, which was much more than othersand from the farmer's field, the hybrid variety Aloron had very good weed competitive ability and its yield was also satisfactory (3.71 t ha^{-1}). By comparing weed competitive index of both the research field and farmer's field trials, the hybrid variety Aloron showed the better result which was almost similar to the variety BRRI dhan48. So these varieties have very good weed competitive ability. These varieties have very good morphological characters also. Due to its canopy structure and plant height characters, these can suppress weeds easily that's why produced the higher yield.

Conclusion

From the research field experiment, it was revealed that the weed competitive index and yield of the hybrid variety Aloron and BRRI dhan48 performed well in Aus season against weed.

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