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VARIATIONS OF GROWTH PARAMETERS IN SOME AROMATIC RICE VERITIES UNDER SALT STRESS

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Abstract

A pot experiment with six aman rice varieties *viz.* BRRI dhan34, BRRI dhan38, Binadhan-9, Binadhan-13, Kalijira and Rajbhogh was conducted at the experimental shed of the Department of Agronomy, Sher-e Bangla Agricultural University, Dhaka during the period of June- December, 2014 to investigate the effect of salinity on the growth, physiology and yield of some aromatic rice under different salt stress conditions. The experiment was carried out with five salt stress treatments viz. control (without salt), S25 (25 mM NaCl), S50 (50 mM NaCl), S75 (75 mM NaCl) and S100 (100 mM NaCl). Salt stress significantly reduced the plant height, tiller $hill^{-1}$ and leaves $hill^{-1}$ of these varieties at all growth duration. Among the varieties Binadhan-9 and BRRI dhan38 performed better under saline condition. On the other hand, local variety Kalijira did not perform well under saline condition.

Introduction

Soil salinity is a widespread environmental problem that has been found to affect over 77 million hectares or about 5% of the arable land worldwide (Wang *et al.,* 2001; Athar and Ashraf, 2009). Due to climate change this salt affected areas are increasing day by day and assumed to affect 50% of cultivable land by the midth of 21st century (Mahajan and Tuteja, 2005). Salinity is a major threat to crop productivity in the southern and south-western parts of Bangladesh, where it is developed due to frequent flood by sea water of the Bay of Bengal. In Bangladesh out of 2.85 million hectares of the coastal and off-shore areas about 0.833 million hectares are arable lands, which constitute about 52.8 percent of the net cultivable area in 13 districts (Karim *et al.*, 1990). Introduction of irrigation with saline waters in those areas is another possible reason of the increasing content of salinity. Salinity has adverse effects on plant growth and productivity. According to Bray *et al.* (2000) salt stress can account for up to 50% yield reduction of the major crops. The nature of damage by salt stress is very complex as it causes both osmotic stress and ionic toxicity (Hasanuzzaman *et al.,* 2013). Plants can respond and adapt to salt stress by altering their cellular metabolism and invoking various defense mechanisms (Ghosh *et al.,* 2011). The survival of plants under this stress condition depends on their abilities to perceive the stimulus, generate and transmit a signal, and initiate various physiological and biochemical changes (Tanou *et al.,* 2009; El-Shabrawi *et al.,* 2010). Irrigated rice is well suited to control and even mitigate soil salinity (Wopereis *et al.*, 1998). But rice is a salt-sensitive crop and yield losses due to salinity can be substantial (Asch *et al.*, 1997).

Aromatic rice varieties have gained significant market shares in the global rice trade. As a result, efforts are being undertaken in many countries to increase the production of this type of rice. There are evidences showing that the aromatic quality of these rice varieties varies depending upon the areas and locality of the rice cultivation (Bradbury et al. 2008; Hossain et al. 2008; Nagarajan et al. 2010).

Considering the above mentioned perspectives, the present study was undertaken to investigate the effect of salinity on the growth performance of some aromatic rice varieties in relation to HYV ones.

Materials and Methods

The experiment was conducted at the experimental shed of the Department of Agronomy, Sher-e-Bangla Agricultural University, Dhaka (23.770155° N, 90.374358° E) during the period June-December, 2014. The soil of the experimental area belongs to the Modhupur tract (AEZ No. 28). It was a medium high land with non-calcarious dark grey soil. The pH value of the soil was 5.6.

Six aromatic rice varieties including four HYVs and two lacal varieties were used in this experiment. The HYVs are: BRRI dhan34, BRRI dhan38, Binadhan-9 and Binadhan-13; and the local variities are: Kalijira and Rajbhogh. The experiment was laid out in a Factorial Randomized Completely Block Design (RCBD) with three replications. There were 90 pots all together replication with the given factors. The salinity treatments were applied on 30 days after transplanting (DAT), 45 DAT, 60 DAT and 75 DAT. There were five salinity levels including control. Salinity was induced by adding respected amount commercial NaCl salt to the soil/pot as water dissolved solution. The salinity levels were C (fresh water), S25 (25 mM NaCl), S50 (50 mM NaCl), S75 (75 mM NaCl) and S100 (100 mM NaCl). Seeds were soaked for 48 h and then washed thoroughly in fresh water and incubated for sprouting. The sprouted seeds were sown in the wet seedbed. The experimental pots were fertilized with 250, 110, 140, and 50 kg ha^{-1} N, P_2O_5, K_2O, and S applied in the form of urea, triple super phosphate, murate of potash, and gypsum respectively. One-third of urea and the whole amount of other fertilizers were incorporated with soil at final pot preparation before sowing. Rest of the nitrogen were applied in two equal splits one at 30 DAT and second at 45 DAT. Thirty-day-old seedlings were uprooted carefully from the seedbed and transplanted in the respective pots at the rate of single seedling $hill^{-1}$. All intercultural operations were done as per recommendation. The data obtained for different parameters was statistically analyzed following computer based software XLSTAT 2014 (AddinSoft, 2016) and mean separation was done by least significant difference test (LSD) at 5% level of significance.

Results and Discussion

Plant height

Plant height of different varieties was measured at different growing period (Table 1). The highest plant height was found in BRRI dhan38 at all growth duration except 90 DAT (97.98 cm at 30 DAT, 108.41 cm at 45 DAT, 110.51 cm at 60 DAT and 113.71 cm). However, highest plant height also observed in BRRI dhan34 at 75 DAT (112.33 cm) and at 90 DAT (119.05 cm); in Rajbhog at 30 DAT (97.98 cm). The plant height of BRRI dhan34 at 90 DAT and Rajbhog at 60, 75, and 90 DAT were statistically similar. This result was supported by Hossain and Sikdar (2009).

Plant height differed significantly at different salinity treatments (Table 1). It was significantly greater at control than the other salinity levels. At 30 DAT, plant height

was the maximum at control (93.10 cm) which was statistically similar to that of 25 mM salinity (90.53 cm). The mimimum plant height (82.42 cm) was recorded at 100 mM salinity which was statistically similar to that of 75 mM (86.16 cm) salinity. The decreasing trends of the plant height were found with increasing salinity at 45 D and 90 DAT. Gradual decrease in plant height might be due to the nutrient unavailability caused by increased salinity or the inhibition of cell division or cell enlargement. Salinity has direct effect in plant height. Choi *et al.* (2003) observed that the plant height decreased in the 0.5% saline water in the soil.

Table 1. Effect of variety and salinity level on plant height of rice at different days after transplanting

Variety	Plant Height (cm)				
	30 DAT	45 DAT	60 DAT	75 DAT	90 DAT
BRRI dhan34	87.59bc	98.95bc	104.82bc	112.33a	119.05a
BRRI dhan38	97.98a	108.41a	110.51a	113.71a	118.31ab
Binadhan-9	88.79bc	98.77bc	104.19bc	111.00a	113.91bc
Binadhan-13	85.56 c	95.90 c	100.32c	105.69b	110.27c
Kalijira	77.84d	87.20d	92.55d	99.41c	103.16 d
Rajbhogh	97.98a	101.88 b	108.77ab	109.34ab	117.85ab
LSD $_{(0.05)}$	4.18	4.90	5.11	5.06	5.01
	Salinity level				
C	93.10a	103.11a	108.85a	114.49a	119.38a
S_{25}	90.53ab	100.94a	105.6a	111.24a	116.28ab
S_{50}	89.02bc	98.73ab	104.27ab	110.35a	113.97bc
S_{75}	86.16cd	96.41bc	100.93bc	103.66 b	111.46cd
S_{100}	82.42d	93.41c	97.96c	103.16b	107.70d
LSD $_{(0.05)}$	3.82	4.48	4.68	4.63	4.58
CV (%)	6.49	6.81	6.77	6.39	6.04

Values in a column with different letters are significantly different at $p \leq 0.05$ applying LSD.

The combined effect of salinity and varieties on plant height was significant at $p \leq 0.05$ (Table 2). Plant height generally decreased with the increasing level of salinity. In interaction effects plant height was highest at control plants of BRRI dhan38 and lowest at 100 mM salinity levels of Kalijira variety. Similar results were recorded by Khandakar and Alim (2004). Chen *et al.* (1989) reported that plant height seriously decreased by salinity.

Tillers hill^{-1}

There was a significant variation found in number of tillers hill^{-1} due to varietal variation (Table 3). The highest number of tillers hill^{-1} was found at 30 DAT (4.76), at 75 DAT (25.27) and at harvest (20.51) in case of Binadhan-9; at 45 DAT (10.13) and at 60 DAT (16.03) in case of BRRI dhan38 and at 45 DAT (10.03) in case of Binadhan-13. However, the lowest number of tillers hill^{-1} observed at 30 DAT (3.61) in BRRI dhan34; at 45 DAT (7.14), 60 DAT (12.59), 90 DAT (13.47) and harvest (12.02) in Kalijira; at 75 DAT (18.66) in Binadhan-13.

Table 2. The combined effects of salinty and Aman rice varieties on plant height at different days after trasplanting

Variety	Salinity treatment	Plant height (cm)				
		30 DAT	45 DAT	60 DAT	75 DAT	90 DAT
BRRI dhan34	C	93.07a-g	103.07abc	109.83a-f	114.43a-e	122.73abc
	S_{25}	89.90c-h	100.63bc	106.50a-f	112.67a-f	122.07abc
	S_{50}	89.13 c-h	99.13bcd	106.13a-f	112.43a-f	119.73a-e
	S_{75}	83.80g-k	96.40cde	101.87d-i	111.60a-f	118.30a-e
	S_{100}	82.07 h-l	95.53c-f	99.77 f-j	110.50a-g	112.40c-i
BRRI dhan38	C	101.90a	112.00a	116.73a	118.10a	124.50a
	S_{25}	101.00ab	112.30a	113.70ab	118.10a	120.60a-d
	S_{50}	97.60abc	107.63ab	111.27a-e	116.53abc	117.30a-f
	S_{75}	96.63a-d	105.77abc	106.53a-f	109.50a-h	115.30a-g
	S_{100}	92.80a-g	104.33abc	104.30 b-g	106.23b-i	113.83a-h
Binadhan-9	C	91.80b-g	101.90abc	107.03a-f	114.73a-d	118.40a-e
	S_{25}	89.17c-h	99.37bcd	104.37b-g	114.93a-d	118.20a-e
	S_{50}	88.83c-h	98.40bcd	104.60 b-g	114.34a-e	116.53a-f
	S_{75}	88.43c-h	98.47bcd	103.90b-h	106.53b-i	109.50d-j
	S_{100}	85.73f-j	95.73c-f	101.07d-i	104.47d-i	106.90f-k
Binadhan-13	C	90.43c-h	100.40bc	106.07a-f	116.97ab	116.03a-g
	S_{25}	89.67c-h	99.63bc	103.70c-h	103.20e-i	113.83a-h
	S_{50}	86.8e-i	97.33b-e	100.40e-j	110.23a-g	110.00d-j
	S_{75}	85.47f-j	95.33c-g	98.90f-k	98.53hij	108.97e-j
	S_{100}	75.43kl	86.80e-h	92.53h-k	99.53g-j	102.53ijk
Kalijira	C	85.70f-j	95.43c-g	100.83e-j	108.50a-h	105.27g-k
	S_{25}	78.10 i-l	88.50d-h	93.17h-k	105.23c-i	102.97h-k
	S_{50}	77.30j-l	85.03fgh	91.80ijk	95.87ij	99.60jk
	S_{75}	74.77kl	84.53gh	89.4jk	90.97j	102.97h-k
	S_{100}	73.27l	82.50 h	87.50k	96.47ij	97.47 k
Rajbhogh	C	95.73a-e	105.83abc	112.60abc	114.23a-e	124.13ab
	S_{25}	95.37a-e	105.23abc	112.30a-d	113.20a-e	117.70a-f
	S_{50}	94.40a-f	104.83abc	111.40 a-e	112.67a-f	117.27 a-f
	S_{75}	87.87d-h	97.93bcd	104.97b-f	104.83 d-i	117.07a-f
	S_{100}	85.23f-j	95.5c-f	102.57b-i	101.77f-j	113.07b-i
LSD $_{(0.05)}$		9.36	10.96	11.44	11.33	11.22
CV (%)		6.49	6.81	6.77	6.39	6.04

Values in a column with different letters are significantly different at $p \leq 0.05$ applying LSD.

Table 3. Effect of variety and salinity level on number of tillers hill^{-1} of rice at different days after transplanting

Variety	Number of tillers hill^{-1}					
	30 DAT	45 DAT	60 DAT	75 DAT	90 DAT	At Harvest
BRRI dhan34	3.61e	7.52c	14.22c	20.02d	16.28d	15.36d
BRRI dhan38	4.76c	10.13a	16.03a	21.78c	17.56c	17.38c
Binadhan-9	5.52a	9.51b	15.11b	25.27a	20.69a	20.51a
Binadhan-13	5.14b	10.03a	13.68c	18.66e	14.91e	14.07e
Kalijira	3.98d	7.14d	12.59d	23.54b	13.47f	12.02f
Rajbhogh	4.70c	9.57b	13.96c	20.02d	18.37b	19.31b
LSD $_{(0.05)}$	0.20	0.41	0.65	0.77	0.73	0.67
			Salinity level			
C	7.34a	14.52a	20.21a	26.64a	21.45a	19.54a
S_{25}	6.32b	11.98b	18.37b	24.76b	19.53b	18.29b
S_{50}	4.61c	8.96c	13.98c	20.58c	17.03c	16.41c
S_{75}	2.98d	5.66d	10.50d	17.52d	14.21d	14.78d
S_{100}	1.83e	3.79e	8.27e	14.60e	12.17e	13.20e
LSD $_{(0.05)}$	0.19	0.38	0.59	0.71	0.66	0.61
CV (%)	6.21	6.38	6.25	5.11	5.92	5.62

Values in a column with different letters are significantly different at $p \leq 0.05$ applying LSD.

Application of salt decreased the number of tillers hill^{-1} of rice varieties (Table 3). It was significantly greater at the control than in other salinity levels. The highest number of tillers hill^{-1} was recorded in control at all growing period (7.34 at 30 DAT, 14.52 at 45 DAT, 20.21 at 60 DAT, 26.64 at 75 DAT, 21.45 at 90 DAT and 19.54 at harvest. With the increasing salinity levels the number of tillers hill^{-1} drastically reduced. So, the lowest number of tillers hill^{-1} found in 100 mM salinity level at all growth periods. It was observed that number of productive tillers hill^{-1} decreased with increase in salinity levels (Heenan and Lewin, 1998 and Hasamuzzaman *et al.,* 2009).

The interaction effect of salinity levels and cultivars in relation to the number of tillers hill^{-1} was found significant ($p \leq 0.05$) (Table 4) at all growing periods. The highest number of tillers hill^{-1} was obtained from Binadhan-9 at control condition with the increase of growing period (8.33 at 30 DAT, 17.30 at 45 DAT, 22.43 at 60 DAT, 31.55 at 75 DAT, 25.17 at 90 DAT and 23.02 at harvest. But sometimes BRRI dhan38 at 30 DAT and Binadhan-13 at 30 DAT obtained highest tillers hill^{-1}. The lowest number of tillers hill^{-1} was obtained from Kalijira at 100 mM salt treatment with the increase of growing period (1.17 at 30 DAT, 3.11 at 45 DAT, 7.51 at 60 DAT, 10.43 at 75 DAT, 8.45 at 90 DAT and 8.29 at harvest). Islam *et al.* (2007) also reported that increasing salinity levels negatively affects the number of tillers hill^{-1}.

Table 4. The combined effects of salinty and Aman rice varieties on no. of tillers hill^{-1} at different days after trasplanting

Variety	Salinity treatment	Number of tillers hill^{-1}					
		30 DAT	45 DAT	60 DAT	75 DAT	90 DAT	At Harvest
BRRI dhan34	C	6.16c	13.30c	20.63b	25.85de	20.52de	18.97cd
	S_{25}	5.28d	10.37efg	18.64cd	23.13f	18.98ef	16.33gh
	S_{50}	3.15f	6.57j	13.45fg	19.8hi	17.183ghi	15.22hi
	S_{75}	2.30g	4.04lm	11.40hi	17.50 j	13.43lm	13.43jkl
	S_{100}	1.16h	3.25lmn	7.00k	13.70k	11.30no	12.88jkl
BRRI dhan38	C	8.00a	14.70b	20.54b	27.92bc	22.40bc	20.32bc
	S_{25}	7.08b	13.40c	19.50bc	25.63e	19.66ef	18.46def
	S_{50}	5.11d	10.39ef	17.26de	21.80fg	18.46fg	17.52defg
	S_{75}	2.26g	7.02j	12.28gh	18.61ij	14.56kl	16.22gh
	S_{100}	1.33h	5.16k	10.59ij	14.95k	12.73mn	14.37ij
Binadhan-9	C	8.33a	17.30a	22.43a	31.55a	25.517a	23.02a
	S_{25}	7.01b	11.54d	19.72bc	29.32b	23.63b	22.53a
	S_{50}	5.18d	9.45ghi	13.57fg	25.51e	19.51ef	20.85b
	S_{75}	4.05e	5.18k	10.37ij	22.53f	18.22f-i	18.88cde
	S_{100}	3.04f	4.08l	9.46j	17.44j	16.60ij	17.29fg
Binadhan-13	C	8.29a	14.69b	20.23b	23.37f	18.55fg	17.21fg
	S_{25}	7.17b	13.39c	17.52de	22.40f	16.82hij	16.66gh
	S_{50}	5.12d	9.44hi	13.55fg	19.47hi	15.41jk	13.76ijk
	S_{75}	3.10f	8.54i	9.56j	14.72k	13.31lm	12.37kl
	S_{100}	2.05g	4.08l	7.53k	13.35k	10.50o	10.34m
Kalijira	C	6.13c	11.58d	17.71de	22.40f	18.67g	15.22hi
	S_{25}	5.27d	9.57fgh	16.53e	20.54gh	16.65ij	14.13ij
	S_{50}	5.10d	7.45j	11.47hi	13.49k	13.22lm	12.07l
	S_{75}	2.28g	4.03lm	9.72j	11.40l	10.36o	10.33m
	S_{100}	1.17h	3.11mn	7.51k	10.43l	8.45p	8.29n
Rajbhogh	C	7.17b	15.40b	19.73bc	28.73bc	23.08bc	22.49a
	S_{25}	6.21c	13.67c	18.28cd	27.55cd	21.46cd	21.60ab
	S_{50}	4.00e	10.50e	14.60f	23.33f	18.43fgh	19.01cd
	S_{75}	3.90e	5.18k	9.66j	20.40gh	15.41jk	17.45efg
	S_{100}	2.25g	3.06n	7.54k	17.72j	13.48lm	16.02gh
LSD $_{(0.05)}$		0.46	0.93	1.45	1.73	1.63	1.51
CV (%)		6.21	6.38	6.25	5.11	5.92	5.62

Values in a column with different letters are significantly different at $p \leq 0.05$ applying LSD

Number of Leaves hill^{-1}

Number of leaves of different rice varieties differed significantly due to salinity (Table 5). BRRI dhan34 produced the highest number of leaves at all growth duration except

30 DAT (155.03 at 45 DAT, 163.62 at 60 DAT, 145.18 at 75 DAT and 122.65 at 90 DAT). However, the lowest number of leaves was recorded in Binadhan-9 at 30 DAT (77.09), at 45 DAT (91.83) and in Binadhan-13 at 75 DAT (94.57), at 90 DAT (94.32).

Table 5. Effect of variety and salinity level on number of leaves hill^{-1} of rice at different days after transplanting

Variety	Number of Leaves hill^{-1}				
	30 DAT	45 DAT	60 DAT	75 DAT	90 DAT
BRRI dhan34	111.84b	155.03a	163.62a	145.18a	143.08a
BRRI dhan38	116.95a	133.65b	147.66b	122.47c	122.65b
Binadhan-9	77.09 e	91.83e	118.63d	107.97d	116.92b
Binadhan-13	85.15d	116.05d	126.76c	94.57e	94.32c
Kalijira	92.35c	122.55c	113.62d	94.46e	99.31c
Rajbhogh	92.15c	112.97d	153.95b	136.30b	137.46a
LSD $_{(0.05)}$	4.88	6.04	7.04	6.19	6.22
	Salinity level				
C	114.64a	156.40a	183.22a	159.84a	156.92a
S_{25}	105.30b	136.75b	158.83b	135.33b	135.80b
S_{50}	95.24 c	120.29c	138.96c	116.96c	118.26c
S_{75}	86.86d	89.17d	114.37d	92.68d	100.67d
S_{100}	77.56 e	107.46e	91.47e	79.33e	83.14e
LSD $_{(0.05)}$	4.45	5.52	6.43	5.65	5.68
CV (%)	6.97	6.78	7.02	7.26	7.16

Values in a column with different letters are significantly different at $p \leq 0.05$ applying LSD.

Different salinity treatments affected the number of leaves hill^{-1} significantly throughout the growing period. Salinity treatment reduced the number of leaves hill^{-1} compared to control (Table 5). The highest number of leaves recorded at control from the beginning to end (114.64 at 30 DAT, 156.40 at 45 DAT, 183.22 at 60 DAT, 159.84 at 75 DAT and 156.92 at 90 DAT). With the increase of salinity level the number of leaves hill^{-1} reduced. The lowest number of leaves hill^{-1} observed in 100 mM saline condition at all growing period. This result showed that number of leaves hill^{-1} decreased gradually with the increasing salinity levels. Similar results were reported by Dabnath (2003).

Sharp decreases in number of leaves hill^{-1} was observed in response to salt stress, compared to the control at 30, 45, 60, 75 and 90 DAT for six aman rice varieties (Table 6). The highest number of leaves hill^{-1} was recorded in BRRI dhan34 at all DAT(127.81 at 30 DAT, 194.74 at 45 DAT, 205.01 at 60 DAT, 183.06 at 75 DAT and 184.08 at 90 DAT) during control condition. But after the application of salt at different concentrations, the number of leaves hill^{-1} was reduced. Kalijira showed lowest number of leaves hill^{-1} at 100 mM saline condition (70.85 at 45 DAT, 68.57 at 60 DAT, 55.02 at 75 DAT and 62.28 at 90 DAT) which were similar in case of Binadhan-13 at 100 mM saline codition during 45 DAT and in case of Binadhan-9 at 100mM saline during 75 DAT. This results are supported by Alamgir and Ali (2006).

Table 6. The combined effects of salinty and Aman rice varieties on number of leaves hill^{-1} at different days after trasplanting

Variety	Salinity treatment	Number of leaves hill^{-1}				
		30 DAT	45 DAT	60 DAT	75 DAT	90 DAT
BRRI dhan34	C	127.81a	194.74a	205.01a	183.06a	184.08a
	S_{25}	125.59a	147.57cd	172.60bc	161.33bc	163.94b
	S_{50}	108.12cd	147.23cd	166.36bc	148.25cd	137.36de
	S_{75}	104.72c-f	144.06cd	163.71cd	121.34e	130.63efg
	S_{100}	92.95g-k	141.54de	110.41jk	111.94e	99.41j
BRRI dhan38	C	131.79a	175.87b	178.91bc	165.23b	156.25bc
	S_{25}	127.44a	140.44de	178.00bc	145.44d	153.54bc
	S_{50}	121.58ab	128.66ef	173.28bc	142.17d	147.13cd
	S_{75}	114.21bc	122.83ef	113.68ijk	86.90fg	84.24k
	S_{100}	89.72h-l	100.44i-l	94.43lm	72.61h	72.09klm
Binadhan-9	C	86.59i-m	128.45ef	164.19cd	162.42b	161.72b
	S_{25}	83.74j-n	108.15hij	145.84ef	117.16e	122.36fgh
	S_{50}	83.32k-n	95.92jkl	124.43g-j	109.52e	117.68f-i
	S_{75}	66.15pq	64.25m	87.89mn	78.92gh	113.73lm
	S_{100}	65.64pq	62.36m	70.79o	71.80h	69.10ef
Binadhan-13	C	122.87ab	145.69cd	181.34b	142.39d	131.23ij
	S_{25}	94.27f-j	140.18de	150.44de	115.55e	106.08kl
	S_{50}	78.23mno	115.75fgh	119.65h-k	87.46fg	79.50k
	S_{75}	67.67opq	109.53ghi	104.40kl	78.93gh	79.71l
	S_{100}	62.72q	69.10m	77.95no	48.50i	75.11klm
Kalijira	C	105.72cde	157.06c	170.20bc	139.30d	146.71cd
	S_{25}	99.96defgh	145.42cd	134.74e-h	112.86e	117.07ghi
	S_{50}	96.20efghi	128.21ef	111.17ijk	93.07f	99.28j
	S_{75}	85.03j-n	111.23ghi	83.43mno	72.07h	71.20kl
	S_{100}	74.83nop	70.85m	68.57o	55.02i	62.28m
Rajbhogh	C	113.05bc	136.57de	199.69a	166.61b	161.52m
	S_{25}	100.83d-g	138.71de	171.36bc	159.62bc	151.81b
	S_{50}	83.97j-n	105.97h-k	138.89efg	121.27e	128.63bc
	S_{75}	83.38j-n	92.88l	133.14fgh	117.92e	124.51efg
	S_{100}	79.52lmn	90.72k	126.67ghi	116.09e	120.83e-h
LSD $_{(0.05)}$		10.92	13.53	15.76	13.86	13.93
CV (%)		6.97	6.78	7.02	7.26	7.16

Values in a column with different letters are significantly different at $p \leq 0.05$ applying LSD

Conclusion

Despite rice var. BRRI dhan38 produced the tallest plant under control conditions where Binadhan-9 showed the maximum number of tillers hill^{-1} and BRRI dhan34 highest number of leaves hill^{-1} at all the treatments. The overall growth performance of Binadhan-9 and BRRI dhan38 was better under saline conditions than the other varieties. Moreover, HYVs showed better growth performance than local varieties under salt stress conditions.

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