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Effect of Farmyard manure, Seedling age and Spacing on the growth and yield of rice (*Oryza sativa* L.) under System of Rice Intensification in Sudan savanna ecological zone, Nigeria

[1]Ibrahim, D. A., [2]Mukthar, A. A., [2]Muhammad, A. A., [3]Abu, S. T. and [2]Mahadi, M. A.

[1]Niger State College of Agriculture, PMB 109, Mokwa, Nigeria
[2]Department of Agronomy/Institute for Agricultural Research, Ahmadu Bello University, Zaria
[3]Department of Soil Science/ Institute for Agricultural Research, Ahmadu Bello University, Zaria
Corresponding author's email: ibrahimadamud@gmail.com

Abstract
Field trials were conducted at Irrigation Research Station, Kadawa, Institute for Agricultural Research, Ahmadu Bello University, Zaria and Bakalori Irrigation Project, Birnin Tudu, Talata Mafara, both in the Sudan savanna ecological zone of Nigeria during 2018 and 2019 dry seasons, to investigate the effect of farmyard manure, seedling age and spacing on the performance of FARO 44 (Sipi 692033), under system of rice intensification (SRI). Treatments consisted of four levels each of farmyard manure (FYM) (0, 7.5, 10.0 and 12.5 t ha^{-1}); seedling age (A); (9, 15, 21 and 27 days old) and three spacing (S) (15 x 15cm, 25cm x 25cm and 35cm x 35cm). The experiment was laid out in a split plot design and replicated three times. Data were collected on shoot dry weight, number of tillers per plant, panicle weight per plant and paddy yield. Data were subjected to analysis of variance and means partitioned using Duncan's Multiple Range test (1955) at 5% level of probability. The results revealed that application of 12.5 t ha^{-1} FYM, transplanting of younger seedlings at 9-15 days old and plants spaced wider at at 25 x 25cm, significantly produced heaviest shoot dry weight, with the highest number of tillers per plant and highest paddy yield per hectare in 2018 and 2019 at Kadawa and Talata Mafara. It was concluded that the SRI practice enhances rice performance and productivity. It is therefore recommended that rice farmers in the study areas imbibe the practice towards increasing rice yield.
Keywords: System of rice intensification, farmyard manure, tillers, transplanting

Introduction

Rice (*Oryza sativa* L.) belongs to the family *Graminae (Poaceae)*. It is the most important cereal food crop of the developing world and the staple food of more than 3.5 billion people or more than half of the world's population, depends on it for more than 20% of their daily calories and 13% of per capita protein (Rajput, 2016). It is grown on approximately on a total land area of 162.71 million hectares worldwide, with a resultant paddy output of 757 million metric tons and milled rice production at 497.7 million metric tons in 2019/2020 (Ademola, 2020). In Nigeria, the land area for rice production measures between 4.6 million and 4.9 million hectares, but only 1.7 million hectares, or 35 per cent of the total land mass, is being cultivated to rice (FMARD, 2017; FAO, 2019). This covers six major ecologies: Upland, Hydromorphic, Rain-fed Lowland, Irrigated Lowland, Deep Inland Water and Mangrove Swamp (Longtau, 2003).

Productivity of rice in Nigeria is very low (1.7 tons hectare) compared to the 13.2 t ha^{-1} in Japan, 11.0 tha^{-1} in Philippines, 17.8 t ha^{-1} in India and the world average of 4.2 tons per hectare (USDA, 2017; Yoshida, 1983). This low yield cannot be dissociated with unimproved agronomic farmers' practices, such as delay in the transplanting of seedlings, inappropriate spacing, poor fertilization of crop among other factors, thus creating an unfavorable environment for rice crop to thrive well, resulting to poor growth performance and yield reduction.

To attend to the rising food demand, reduction in productivity and environmental degradation, the development of more productive, environmentally-sound crop and soil management practices necessary (Ahmed *et al.,*2013). Hence a technology that improves rice productivity to meet up with the local demand and surplus for export is required for remarkable increase in rice production. To this effect, the System of Rice Intensification (SRI) greatly improves the growing environment for rice plants and can significantly enhance the utilization of land, water, seed, capital and labour for higher productivity of irrigated rice (Kassam *et al.,* 2011; Sathia and Sathya, 2009). The potential of this technology for rice cultivation have led to realization of about 15 to 20 metric tons per hectare (Uphoff, 2002).

One of the principles of SRI is wider plant spacing, leading to greater root growth and better tillering potential. The transplanting of seedling at younger age, incorporation of organic based fertilizer and alternate wetting and drying among others practices. The plant geometry (square pattern) and special configuration exploit the initial vigour of the genotypes, enhances soil aeration and provide good condition for better establishment (Mohammed, 2016). This brings about sustainability in rice production. Therefore, this study attempted to investigate the influence of farmyard manure, seedling age and spacing affect the growth and yield of lowland rice.

Materials and Methods

Field trials were conducted at Irrigation Research Station, Kadawa, Institute for Agricultural Research, Ahmadu Bello University, Zaria and Bakalori Irrigation Project, Birnin Tudu, Talata Mafara. The former is located between latitude 11^0 39'N and longitude 08^0 02'E and 500 m above sea level, while the latter is located between latitude 12^0 34' N and longitude 06^0 04' E and 488 m above sea level, both in the Sudan ecological zone of Nigeria. The experiment was conducted during 2018 and 2019 dry seasons. Soil samples were randomly collected at five points within the experimental areas in each site at a depth of 0 to 30 cm prior to land preparation each year using auger. The soil samples were thereafter bulked, air-dried, sieved (2 mm mesh) and subjected to physical and chemical analysis using standard procedure as described by Black (1968). Well decomposed farmyard manure was sourced from National Animal Production Research Institute, Shika, Ahmadu Bello University, Zaria. It was analyzed for nitrogen, phosphorus and potassium. The seed, FARO 44 (Sipi 692033) seed variety was sourced from National Cereals Research Institute, Badeggi, Niger State, Nigeria, (NCRI, 2003). It has a yield potential of 7 to 10 t ha^{-1}. Nursery beds measuring 4m x 5m were prepared based on the age of the seedlings. An alternating layers of soil-farmyard manure (2.5cm thick each) was formed and thoroughly mixed and used for nursery bed preparation. Seeds were soaked for 24 hours and incubated in moist jute sack for 1-2 days. Pre-germinated seeds were broadcasted uniformly on nursery beds. After broadcasting the seeds, the mixed soil-farmyard manure was spread in thin layer of one centimeter. Sowings were done at different dates to get the respective aged seedlings (9, 15, 21 and 27 days old). These were transplanted at the same day. The beds were irrigated using watering can in the morning and evening. Before lifting the seedlings, nursery beds were thoroughly irrigated. After lifting, seedlings were immediately transplanted in the main field with gentle placement but not with harsh pushing, which may revert root direction to cause transplanting shock. The main field was prepared and puddled. Treatments consisted of four levels of farmyard manure (0, 7.5, 10.0 and 12.5 t ha^{-1} FYM), seedling age (9, 15, 21 and 27 days old) and three spacings (15 x 15 cm, 25 x 25 cm and 35 x 35 cm). These were laid out in a split plot design with farmyard manure and seedling age assigned to the main plot, while spacing was in the sub-plot. This was replicated three times. The farmyard manure was applied into the two plots weeks before transplanting the seedlings. Graduated wooden marker was used in achieving the various plant spacings. Seedlings were transplanted specifically, on the point where the two lines intersect, so as to achieve square pattern arrangement. The transplanted seedlings were irrigated immediately to field capacity, and the next irrigation followed when water in basins dried up and soils forms fine cracks, but with moisture within the rhizosphere. This alternate wetting and drying method was maintained throughout the vegetative growth stages. From flowering to 10-12 days before harvesting, a thin film of water was maintained continuously by frequent irrigation. The plots were weeded four times using hoe, but where plants were closely spaced, weeds were hand pulled.

Results and Discussion

The physical and chemical characteristics of the soil before and after the application of farmyard manure on the same piece of lands during the experimental periods, shows that at Kadawa; texture of the soil, sandy loam in 2018 and 2019., pH 4.7 in 2018 and 4.78 in 2019., total nitrogen g/kg; 1.23 in 2018 and 1.58 g/kg in 2019., available phosphorus 7.92 mg/kg in 2018 and 12.71 mg/kg In 2019., potassium 0.33 cmol/kg in 2018 and 0.39 cmol/kg., cation exchange capacity 5.74 in 2018 and 5.86 in 2019, while at Talata Mafara;the soil was clay loamy in texture in 2018 and 2019., pH 5.43 in 2018 and 6.10 in 2019., total nitrogen 1.62 g/kg in 2018 and 2.06 g/kg in 2019., available phosphorus 8.06mg/kg in 2018 and 16.22 mg/kg., potassium 0.59 cmol/kg in 2018 and 0.64 cmol/kg in 2019and cation exchange capacity 5.84 in 2018 and 6.37 in 2019 respectively. The result shows the nitrogen, phosphorus and potassium contents of the farmyard manure as; nitrogen 1.05% in 2018 and 1.12% in 2019., phosphorus 0.19% in 2018 and 0.20 in 2019., and potassium 1.15% in 2018 and 1.17% in 2019 respectively. Table 1 presents the effect of farmyard manure, seedling age and spacing on shoot dry weight and number of tillers $plant^{-1}$ at 12 WAT of lowland rice at Kadawa and Talata Mafara during 2018 and 2019 dry seasons. There was significant response of shoot dry weight to farmyard manure. Plots incorporated with 12.5 t ha^{-1} FYM, led significantly to plants with heaviest shoot dry weight with a decreasing trend, where the control plots (0 t ha^{-1} FYM), recorded the least shoot dry weight in 2018 and 2019 at Kadawa and Talata Mafara. Younger seedlings transplanted at 9 days old, produced significantly the heaviest shoot dry weight than those transplanted at 15 days old, 21 days old, with seedlings transplanted at 27 days old, having plants with the lowest shoot dry weight in 2018 and 2019 at Kadawa and Talata Mafara, respectively. Plants spaced at 25 x 25cm, accumulated significantly the heaviest shoot dry weight, compared to plants that were spaced at 35 x 35cm, although, the narrower spaced plant at 15 x 15cm attained the least shoot dry weight in 2018 and 2019 at

Kadawa and Talata Mafara.

The effect of farmyard manure, seedling age and spacing on number of tillers of lowland rice at Kadawa and Talata Mafara during 2018 and 2019 dry season is shown in Table 1. Plots incorporated with 12.5 t ha^{-1} FYM, boosted significantly, plants to produce the highest number of tillers, while the control plots (0 t ha^{-1} FYM), had least number of tillers per plant in 2018 and 2019 at Kadawa and Talata Mafara. The number of tillers per plant of lowland rice responded significantly to seedling age. There was a consistent decrease in the number of tillers per plant as the seedlings get older at transplanting. Transplanted seedlings at 9 days old, led significantly to plants with the highest number of tillers per plant whereas, the oldest seedlings transplanted at 27 days old, recorded the lowest number of tillers per plant at in 2018 and 2019 at both locations. Plants that were spaced at 35 x 35cm. resulted significantly to maximum number of tillers per plant, compared to number of tiller from plants spaced at 25 x 25cm, while, those plants spaced at 15 x 15cm recorded the least number of tillers per plant in 2018 and 2019 at Kadawa and Talata Mafara. Table 2 shows the interaction of seedling age and spacing on number of tillers of lowland rice at 12 WAT at Kadawa during 2019 dry season. A decreasing trend in the number of tillers per plant was apparent as the seedlings get older at transplanting across the different planting geometry. Plots imposed with treatment combination of 9 days old seedlings and plant spacing at 35 x 35cm had produced plants with statistically at par with the number of tillers per plant from combinations of 9 days old seedling and 25 x 25cm, 15 days old seedlings and 35 x 35cm, and 15 days old seedling with 25 x 25cm spaced plants, while treatment combination of 27 days old seedlings and narrower spacing at 15 x 15cm led to least number of tillers per plant.

Table 3 shows the interaction of seedling age and spacing on number of tillers of lowland rice 12WAT at Talata Mafara during 2018 dry season. The results revealed a decreasing trend in the number of tillers per plant as the seedling gets older at transplanting and spacing gets narrower. Transplanting of younger seedlings at 9 days old and spaced at 35 x 35cm, led significantly to plants with highest number of tillers than those from 9 days old seedlings and spaced at 25 x 25cm. This was statistically similar in the number of tillers to plots treated with 15 days old seedlings and 35 x 35cm plant spacing, whereas, the least number of tillers $plant^{-1}$ was obtained from 27 days old seedling and at 15 x 15cm that was also statistically similar to 21 days old seedling at 15 x 15cm spacing. The effect of farmyard manure, seedling age and spacing on the panicle weight and paddy yield of lowland rice at Kadawa and Talata Mafara are presented in Table 4.The results shows that the response of lowland rice panicle weights to the treatments were significant. Rice plots incorporated with 12.5 t ha^{-1} FYM, produced significantly heaviest panicle weight with a decreasing trend as the quantity of FYM application decreased. Thus, the control (0 t ha^{-1} FYM) had the lightest panicle weight per plant in 2018 and 2019 at Kadawa and Talata Mafara. Except in 2018 at Kadawa, where seedlings transplanted at 15 days old recorded significantly the heaviest panicle weight per plant than 9 days old seedling, otherwise, the younger seedlings transplanted at 9 days old had significantly the heaviest panicle weight per plant than seedlings transplanted at 15 days, although, 27 days old transplanted seedlings had produced the panicles with the lowest weight in both years and locations. Seedlings transplanted at a spacing of 25 x 25cm produced significantly heavier panicle per plant compared to seedlings spaced at 35 x 35cm, whereas, seedlings transplanted at a narrower spacing of 15 x 15cm yielded the lightest panicle weight per plant in 2018 and 2019 at both locations.

The effect of farmyard manure, seedling age and spacing on paddy yield of lowland rice during 2018 and 2019 dry season at Kadawa and Talata Mafara is presented in Table 4. The results revealed significant influence of the imposed treatments on the paddy yield at Kadawa and Talata Mafara. Rice plots applied with 12.5 t ha^{-1} FYM, yielded significantly higher paddy compared with plots incorporated with 10 t ha^{-1}, 7.5 t ha^{-1} FYM, while the control (0 t ha^{-1} FYM) had yielded the lowest paddy, in 2018 and 2019 at Kadawa and Talata Mafara. Similarly, a decreasing trend in the paddy yield was observed as the seedlings get older at transplanting, where the younger seedlings transplanted at 9 days old had significantly produced the highest quantity of paddy, than those transplanted at 15, 21 days old, and the older seedlings transplanted at 27 days old had the lowest paddy yield in both years and locations. Seedlings spaced at 25 x 25cm at transplanting yielded significantly highest paddy compared to seedlings spaced at 35 x 35cm at Kadawa, but statistically similar at Talata Mafara in 2018 and 2019, although, seedlings spaced at 15 x 15cm yielded the lowest paddy in both years and locations.

Table 5, present the interaction of seedling age and spacing on paddy yield of lowland rice at Kadawa in 2019. The effect of the interaction of seedling age and spacing on paddy yield was significant. Treatment combination of 9 days old seedlings and spaced at 25 x 25 cm, significantly yielded higher quantity of paddy than the combination of 9 days old seedlings and spaced at 35 x 35 cm, while the treatment combination of 27 days old seedlings and spaced at 15 x 15 cm, recorded the least quantity of paddy yield in 2018 and 2019 at Kadawa. Significant interaction of seedling age and spacing on paddy yield of lowland rice in 2018 at Talata Mafara is presented in Table 6. The results indicated a decreasing trend in the quantity of paddy as the seedlings gets older at transplanting across different planting geometry. A combination of seedlings transplanted at 9 days old and plant spaced at 25 x 25cm, had significantly yielded highest quantity of paddy, but statistically at par with 9 days transplanted seedlings and spaced at 35 x 35cm, while seedlings transplanted at 27 days old at a spacing of 15cm x 15cm had produced the lowest quantity of paddy yield.

The superior performance of the measured parameters; shoot dry weight, number of tillers plant^{-1} at harvest, panicle weight and paddy yield at 12.5 t ha^{-1} FYM application, transplanting younger seedlings at 9-15 days old and plant spacing at 25 x 25cm, probably indicated that FYM might have improve the soil physical properties such as; amelioration of the soil, soil structure, soil aggregation and water holding capacity. Also, the FYM could have provided energy forto soil fauna and flora, which enhanced their ability in manure mineralization and subsequent release of nutrients for plant use. Ibrahim *et al.* (2010) corroborates the present findings. He reported a significant increase in rice root length and volume with FYM application which indicates that the better root development would allow the plant to exploit more water under water stress condition. This preserves plants' potential for tillering and root growth that is reduced by later transplanting. Elhefnawy, (2012) submission supported the current findings. He reported tallest plant height, shoot dry weight, heaviest panicle weight, highest number of grains panicle$^{-1,}$ highest number of tillers/m² (427.0and 425.7) and paddy yield, were produced when using the youngest seedling at 15 day old. The better performance of the measured parameters could be attributed to the reduction in the inter-specific competition among plants for both the beneath and above the soil available resources (e.g water, mineral nutrients, sunlight, carbohydrate). There was also better advantage of light penetration down to the older leaves and interception without shading by the upper leaves. This enable the older leaves to produce assimilate which is translocated to the sink. Thakur (2014a) observed that open canopy structure (to cover more ground area) with erect leaves (minimizing shading of lower leaves) coupled with higher leaf area index, resulted in greater light interception at later phase of vegetative growth. Thus, this could probably led to the production of longer panicles with more grains and better filling, ultimately results to more highly productive plants.

Better performance in the measured parameters at a combination of 9 days old transplanted seedlings and 25 x 25cm, suggest that the young seedlings had advantage of fast recovery from transplanting shock than older seedling and develop the photosynthesis apparatus faster due to wider square spacing arrangement that permit adequate penetration of sunlight down the canopy. Elhefnawy, (2012) report is in consonance with the current findings. He reported the highest number of tillers m^{-2} (433.2) when using youngest seedling ages (15 day old) and widest spacing between hills (30×30cm). On the other hand, while the lowest number of tillers m^{-2} (388.0) were obtained when using oldest seedling ages (25 day old) and closest spacing between hills (20 × 20cm).

Conclusion

Based on the findings from this research, it was concluded, that, SRI practice of applying farmyard at rate of 12.5 t ha^{-1} planting of young seedlings of 9 to 15 days old and plants spaced at 25 x 25cm improved significantly lowland rice growth and yield performances. Also a combination of 9 days old seedling and 25 x 25cm or 35 x 35cm had produced significantly the maximum number of tillers per plant and paddy yield in the study areas.

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Table1: Effect of farmyard manure, seedling age and spacing on shoot dry weight and number of tillers plant-1 at 12 WAT of lowland rice during 2018 and 2019 dry seasons at Kadawa and Talata Mafara

Treatment	Shoot dry weight (g)				Tillers plant^{-1} at 12 WAT			
	Kadawa		Talata Mafara		Kadawa		Talata Mafara	
Farmyard manure (t ha^{-1})	2018	2019	2018	2019	2018	2019	2018	2019
0	61.2d	70.9d	66.7d	76.3d	13.5d	12.7d	11.9d	13.9d
7.5	74.0c	84.8c	80.2c	91.5c	20.2c	21.9c	22.4c	27.0c
10	90.2b	101.2b	94.2b	107.3b	23.8b	25.7b	26.8b	31.5b
12.5	100.7a	112.1a	107.1a	118.9a	27.1a	28.5a	30.6a	34.8a
SE±	0.876	0.959	0.976	1.198	0.434	0.609	0.394	0.808
Seedling age (Days)								
9	99.1a	107.5a	102.2a	112.7a	25.9a	29.7a	27.0a	33.9a
15	86.9b	98.2b	92.5b	103.3b	23.4b	27.1b	23.9b	31.3b
21	76.4c	87.0c	82.4c	94.3c	19.8c	17.9c	21.0c	23.0c
27	63.7d	76.2d	71.1d	83.6d	15.5d	14.2d	19.6d	19.1d
SE±	0.876	0.959	0.976	1.198	0.434	0.609	0.394	0.808
Spacing (cm^2)								
15 x 15	66.8c	75.0c	70.7c	79.6c	17.1c	16.0c	16.4c	20.8c
25 x 25	91.9a	103.8a	99.2a	112.9a	22.2b	24.2b	25.0b	28.9b
35 x 35	85.8b	97.9b	91.1b	103.0b	24.1a	26.4a	27.3a	30.8a
SE±	0.758	0.831	0.845	1.037	0.376	0.527	0.342	0.700
Interaction								
F x A	NS	NS	NS	NS	NS	NS	NS	NS
F x S	NS	NS	NS	NS	NS	NS	NS	NS
A x S	NS	NS	NS	NS	NS	*	*	NS
Fx A x S	NS	NS	NS	NS	NS	NS	NS	NS

Means followed by the same letter(s) within the same column are not different statistically at *P=0.05* using DMRT
NS= Not significant; * = Significant at ($P \leq 0.05$)

Table 2: Interaction of seedling age and spacing on number of tillers of lowland rice 12WAT at Kadawa during 2019 dry season

Treatment	Seedling age (days)			
	9	15	21	27
Spacing (cm)				
15 x 15	21.5c	17.9de	13.8fg	10.9g
25 x 25	32.8ab	30.5b	19.1cde	14.3f
35 x 35	34.8a	32.9ab	20.8cd	17.3e
SE±	1.055			

Means followed by same letter(s) in the same column and row are not different statistically at *P=0.05* level of probability using DMRT

Table 3: Interaction of seedling age and spacing on number of tillers of lowland rice 12WAT at Talata mafara during 2018 dry season

Treatment	Seedling age (days)			
	9	15	21	27
Spacing (cm)				
15 x 15	19.0f	17.0g	15.4gh	14.1h
25 x 25	29.4b	26.4c	23.6de	20.5f
35 x 35	32.6a	28.4b	25.4cd	22.9e
SE±	0.683			

Means followed by same letter(s) in the same column and row are not different statistically at *P=0.05* level of probability using DMRT

Table 4: Effect of farmyard manure, seedling age and spacing on panicle weight plant^{-1} and paddy yield at harvest of lowland rice during 2018 and 2019 dry seasons at Kadawa and Talata Mafara

Treatments	Panicle weight plant^{-1} (g)				Paddy yield (kg ha^{-1})			
	Kadawa		Talata Mafara		Kadawa		Talata Mafara	
Farmyard manure (t ha^{-1})	2018	2019	2018	2019	2018	2019	2018	2019
0	1.9d	2.3d	2.3d	2.7d	2812.7d	3149.5d	2297.4d	2725.1d
7.5	2.4c	3.2c	3.0c	3.3c	5663.2c	6173.1c	5952.6c	6936.0c
10	2.6b	3.6b	3.7b	4.1b	6757.9b	6977.7b	7460.0b	8500.8b
12.5	3.2a	3.9a	4.4a	4.9a	7561.2a	7977.5a	8959.4a	9699.3a
SE±	0.075	0.089	0.070	0.052	133.393	121.708	126.501	160.349
Seedling age (Days)								
9	2.8b	4.0a	4.1a	4.9a	7402.0a	8283.2a	7234.4a	9099.1a
15	3.2a	3.4b	3.6b	4.3b	6285.4b	7317.4b	6658.0b	8395.3b
21	2.1c	3.0c	3.0c	3.2c	5213.3c	4697.6c	5642.2c	5858.9c
27	2.0c	2.6d	2.7d	2.6d	3894.3d	3979.6d	5134.8d	4507.9d
SE±	0.075	0.089	0.070	0.052	133.393	121.708	126.501	160.349
Spacing (cm^2)								
15 x 15	2.3c	2.3c	2.6c	3.0c	4068.2c	4253.5c	3938.7b	5132.6b
25 x 25	2.9a	3.9a	4.0a	4.4a	6682.2a	7216.7a	7393.1a	8066.3a
35 x 35	2.5b	3.5b	3.5b	3.8b	6345.8b	6738.0b	7171.1a	7697.0a
SE±	0.065	0.077	0.061	0.045	115.522	105.403	109.553	138.867
Interaction								
F x A	NS	NS	NS	NS	NS	NS	NS	NS
F x S	NS	NS	NS	NS	NS	NS	NS	NS
A x S	NS	NS	NS	NS	NS	*	*	NS
F x A x S	NS	NS	NS	NS	NS	NS	NS	NS

Means followed by the same letter(s) within the same column are not different statistically at *P=0.05* using DMRT
NS= Not significant *= Significant at ($P \leq 0.05$)

Table 5: Interaction of seedling age and spacing on paddy yield of lowland rice in 2019 at Kadawa

	Seedling age (days)			
Treatment	**9**	**15**	**21**	**27**
Spacing (cm)				
15x15	5766.2d	4751.8ef	3603.0g	2522.6h
25x25	9130.8a	7947.3c	5786.1d	4933.7e
35x35	8630.8b	7705.0c	5477.2d	4354.5f
SE±	159.124			

Means followed by same letter(s) in the same column and row are not different statistically at *P=0.05* level of probability using DMRT

Table 6: Interaction of seedling age and spacing on paddy yield of lowland rice in 2018 at Talata Mafara

	Seedling age (days)			
Treatment	**9**	**15**	**21**	**27**
Spacing (cm)				
15x15	6059.3de	5015.3g	3651.7h	3414.4h
25x25	9329.4a	8860.5ab	7103.3c	5625.7ef
35x35	9111.5ab	8704.1b	6496.7d	5424.0fg
SE±	178.032			

Means followed by same letter(s) in the same column and row are not different statistically at *P=0.05* level of probability using DMRT