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YIELD AND PROFITABILITY OF POTATO AS INFLUENCED BY INTRA-ROW SPACING AND NUMBER OF EYE IN CUT TUBER IN NORTHERN REGION OF BANGLADESH

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Abstract

The effects of four different intra-row spacing viz. S_1=10 cm, S_2=15 cm, S_3=20 cm, and S_4= 25 cm along with two types of tuber viz. C_1 = cut tuber with one eye and C_2 = cut tuber with two eye on yield and profitability of potato were studied in farmer's field of Bogra district during 2007-08 and 2008-09 growing seasons. It was found that closer spacing reduced tuber number per hill, average tuber weight and tuber yield per hill but increase overall production. However, the optimum stem density for maximum tuber yield per hectare markedly differed depending on planting of cut tubers. From two years of trial, highest tuber yield was obtained from closer spacing than wider spacing in both planting. For single eye planting C_1S1theyielded highest (36.2 t ha-1) and double eye planting C_2S_2 yielded highest (37.2 t ha-1). Hence it was concluded that using cut tubers having two eyes had an advantage for obtaining higher tuber yield than cut tubers having single eye in potato production in the northern regions of Bangladesh. Regarding benefit cost ratio (BCR), it was found that highest BCR (1.50) was calculated from the C_2S_2 treatment where cut tubers were used having at least two eyes with an intra-row spacing of 15 cm.

Key words: Cut tuber, intra-row spacing, stem density and potato yield.

Introduction

Among the important food crops of Bangladesh, potato (*Solanum-tuberosum*) rankssecond next to rice. The area, production and average yield of potato in Bangladesh are 4.72 lac hectare,8.50 million tons and 15.0 tons per hectare, respectively (Anon, 2009). Potato is grown during winter (from Mid-November - Mid February) as cash crop in all over the Bangladesh. The length of growing period of potato is relatively short (around 90 days). During crop growth period, low temperatures after planting and early growth stages and high temperatures

during the tuber bulking stage significantly constrain growth and yield of potato because the winter duration (End-November to end-January) is very short in Bangladesh. Winter duration in northern part is quite more and gets more advantages in producing potatoes. So, a proper management practice to enhance vigorous early growth is very important to achieve higher tuber yield from potato under these types of environments. The optimum of plant density is one of the most important factors in potato production, because it affectson seed cost, plant development, yield and quality of the crop (Bussan *et al.*, 2007). In practice, plant density in potato crop is manipulated through the number and size of seed tubers planted (Allen and Wurr, 1992). Therefore, many studies have been conducted to establish the optimal combination of seed size and planting distance for a certain environment (Hoque, 2001, Sultana and Siddque, 1991, Creamer *et al.*, 1999; Negi *et al.*, 1995; Bussan *et al.*, 2007). In general, total yields increased in closer plant density while yield per plant decreased (Hoque, 2001).

However, the optimum planting density differs depending on the environmental conditions and cultivars. Farmers of Bangladesh generally practice planting of cut tuber with one or two eyes at closer densities, and the plant density varied from location to location. But, Tuber Crops Research Centre (TCRC) of Bangladesh Agricultural Research Institute (BARI) has a recommendation of 60 cm x 25 cm for whole tuber planting (Hussain *et al*, 2006).

On the other hand, planting of large seed tubers get more advantages under certain circumstances; such as unfavorable soil and weather conditions during planting, if the growing season is short (Beukema and Zaag, 1990). So, the experiment was designed to evaluate the effects of cut tuber planting with different intra-row spacing on yield and profitability of potato with a view to recommend the plant density by means of arranging cut tuber (one or two eye) and intra-row spacing in commercial potato production in Northern districts of Bangladesh.

Materials and Method

The experiment was conducted in the farmer's field during 2007-08 and 2008-09 at Bogra Sadar Sadar Upazilla, Bogra under Tista flood plain (AEZ-4) soil having sandy loam in texture. The properties of soils are given in table 1.

The experiment was laid out in factorial RCBD with three replications. The inter-row spacing was 40 cm. The

Table 1. Soil analysis values of experimental plot at Bogra Sadar Upazilla, Bogra

Analysis Results and fertility status									
Site	pH	OM%	Total N (%)	(meq/100g soil)			(μg/g soil		
				Ca	Mg	K	P	S	B
Bogra Sadar	6.1	1.22	0.08	3.6	0.8	0.16	15.0	12.6	0.15
Status	Slightly acedic	Low	Very low	Medium	Low	Medium	Medium	Medium	Low

treatments were four different intra-row spacing viz. S_1 = 10cm i.e. 2,50,000 plants/ha, S_2 = 15cm i.e. 1,66,667 plants/ha, S_3 =20cm i.e. 1,25,000 plants/ha, S_4 = 25cm i.e. 1,00,000 plants/ha along with two types of cut tuber viz. C_1 = Cut tuber with single eye and C_2 = Cut tuber with two eyes. Variety Asterix was used as planting material. The seed tubers were kept in a ventilated room and allowed to sprout in diffused light for obtaining healthy sprouts prior to planting. Well sprouted tubers were separated and then cut them according to number of eye. The unit plot size was 2.4m X 3.0m. Fertilizers were applied as per recommendation of TCRC (Hussain *et al.*, 2006) which consisted of Urea (350 kg/ha), TSP (220kg/ha), MOP (250kg/ha), Gypsum (120kg/ha), Magnesium sulfate (120 kg/ha) and Boric acid (6 kg/ha). Half doses of Urea and full amount of other fertilizers were applied during final land preparation. Rest half of the urea was applied as top dressing at 35 days after planting (DAP). The seed tubers were planted on 22nd November 2007 and 20th November 2008 maintaining assigned design. Experimental plot was covered with dry water hyacinth mulch for keeping moisture and to ensure germination. The crop was irrigated twice at 31 and 46 DAP. Furadan 5G was applied @10 kg/ha as basal during land preparation and Malathion (0. 2%) was sprayed in two installments at 45 and 60 DAP to control insects. The crops were also sprayed with Dithane-M 45 (0.2%) and Secure (0.1%)) alternately for four times (at 30, 45, 60 and 75 DAP) to prevent and/or control late blight infection of potato (Dey *et al.*, 2007). Haulm pulling was done at 80 DAP for hardening the tubers. Other intercultural operation viz, weeding, earthing up were done properly as and when necessary. Potato was harvested on 20th February 2008 and 18th February 2009. Data on yield and

related parameters were taken and analyzed statistically by using Crop Stat 7.0 program and relationships between stem density and yield traits were evaluated with regression analysis by using Excel program. Finally, partial budget analysis was done for calculating benefit cost ratio (BCR). Purchase of seed tuber, fertilizer, pesticide were considered as material cost and cost of land preparation, seed cutting, planting of seed tubers, fertilizer application, land rent, spraying of fungicides and insecticides, irrigation, weeding etc. were considered as non-material cost in calculating BCR.

Results and Discussion

Numbers of stemplant^{-1} significantly differed by cut tuber. Comparatively larger tuber i.e. cut tuber with two eyes produced more numbers of stem plant^{-1} (Table 2) than smaller tuber i.e. cut tuber with single eye. The number of stem plant^{-1} ranged from 1.5-2.9. Although, the number of stems per plant was not significantly differed by intra-row spacing, but number of stems per unit area was decreased significantly with wider intra-row spacing (Table 2).

Number of stems m^{-2} significantly varied by planting of cut seed tubers at various intra-row spacing. Number of

Table 2. Interaction effect of intra-row planting and eye number on stem plant^{-1}

Treatment	No of stem plant^{-1}						Main Effect of intra-row spacing
	C_1 (Cut tuber with single eye)			C_2 (Cut tuber with double eye)			
	2007-08 (Mean±SD)	2008-09 (Mean±SD)	Mean±SD	2007-08 (Mean±SD)	2008-09 (Mean±SD)	Mean±SD	
S_1 (40 x 10 cm)	1.5±0.1	1.5±0.2	1.5±0.1	2.3±0.2	2.6±0.3	2.5±0.2	2.0±0.7
S_2 (40 x 15 cm)	1.3±0.1	1.7±0.2	1.5±0.1	2.6±0.1	2.7±0.2	2.7±0.1	2.1±0.8
S_3 (40 x 20 cm)	1.5±0.1	1.7±0.2	1.6±0.1	2.3±0.4	2.8±0.2	2.6±0.4	2.1±0.7
S_4 (40 x 25 cm)	1.8±0.2	1.8±0.2	1.8±0.2	2.7±0.2	3.0±0.3	2.9±0.2	2.3±0.8
Main effect of eye no.	-	-	1.6±0.1	-	-	2.6±0.2	
$LSD_{0.05}$							
For no of eye				0.8			
For intra-row spacing				ns			
For interaction				0.7			

stem m^{-2} ranged from 14.4-55.3. Closerintra-row spacing (10 cm) produced maximum number of stem m^{-2} for cuttuber with single eye (30.1) and as well as two eyes (42.6), while wider intra-row spacing (25 cm) produced minimum number of stem m^{-2} for cuttuber with single eye (14.5) and two eyes (25.7) (Table 3). The present findings were in agreement with Sultana and Siddique (1991) and Hossain (1995).

number was found from S_4C_1 (3.6) and S_4C_2 (4.2) planting.

Similarly, the number of tubers m^{-2} increased with closer planting in both cut tubers with single and double eyes planting. A similar trend was found from the presented data that tuber number m^{-2} decreases when cut tubers were planted in wider intra-row spacing than closer intra-row spacing. A common observation was cut tuber with double eye (58.0) planting produced

Table 3. Interaction effect of intra-row planting and eye number on stem m^{-2}

Treatment	No of stem plant^{-2}						Main Effect of intra-row spacing
	C_1 (Cut tuber with single eye)			C_2 (Cut tuber with double eye)			
	2007-08 (Mean±SD)	2008-09 (Mean±SD)	Mean±SD	2007-08 (Mean±SD)	2008-09 (Mean±SD)	Mean±SD	
S_1 (40 x 10 cm)	28.6±2.6	31.5±2.5	30.1±2.1	55.2±6.4	55.3±5.3	55.3±4.1	42.6±13.8
S_2 (40 x 15 cm)	18.2±2.1	22.1±2.9	20.2±2.8	39.0±4.2	37.8±3.9	38.4±4.8	29.3±10.1
S_3 (40 x 20 cm)	16.5±1.8	17.0±2.1	16.8±1.5	25.3±4.1	30.8±3.6	28.1±3.9	22.4±6.4
S_4 (40 x 25 cm)	14.4±1.4	14.5±1.0	14.5±1.1	24.3±3.8	27.1±3.9	25.7±2.0	20.0±6.3
Main effect of eye no.	-	-	20.3±6.9	-	-	36.8±13.5	-
$LSD_{0.05}$							
For no of eye				6.1			
For intra-row spacing				10.2			
For interaction				9.9			

Intra-row spacing and cut tuber significantly affected on the number of tubers per plant (Table 4). The number of tubers plant^{-1} increased with wider spacing for both single eye and double eye cut tuber planting. Highest tuber

more number of tubers m^{-2} than cut tuber with single eye (42.9) planting.

Mean tuber weight was varied significantly and ranged from 47.9-85.0 g (Table 6). The lowest mean tuber weight was obtained from the closest

Table 4. Interaction effect of intra-row planting and eye number on tuber plant^{-1}

Treatment	No of stem plant^{-2}						
	C_1 (Cut tuber with single eye)			C_2 (Cut tuber with double eye)			Main Effect of intra-row spacing
	2007-08 (Mean±SD)	2008-09 (Mean±SD)	Mean±SD	2007-08 (Mean±SD)	2008-09 (Mean±SD)	Mean±SD	
S_1 (40 x 10 cm)	2.9±0.3	3.0±0.3	3.0±0.1	3.5±0.3	3.6±0.3	3.5±0.1	3.2±0.3
S_2 (40 x 15 cm)	3.3±0.2	3.4±0.3	3.4±0.1	3.6±0.3	4.1±0.4	3.9±0.3	3.6±0.3
S_3 (40 x 20 cm)	3.3±0.3	3.6±0.2	3.5±0.2	4.1±0.4	4.4±0.3	4.2±0.2	3.8±0.4
S_4 (40 x 25 cm)	3.4±0.3	3.8±0.4	3.6±0.2	4.5±0.4	3.9±0.3	4.2±0.3	3.9±0.4
Main effect of eye no.	-	-	3.3±0.2	-	-	4.0±0.2	
$LSD_{0.05}$							
For no of eye				0.6			
For intra-row spacing				0.4			
For interaction				0.3			

intra-row spacing (10 cm) in both cut tuber with single eye (S_1C_1) and double eye (S_1C_2) planting and mean tuber weight values tended to increase with widening intra-row spacing. Compare to cut tuber with single and double eye planting, single eye planting (75.0g) produced larger tuber than double eye planting (66.9g).

The reason in producing heavier tuber in single eye planting than double eye planting that double eye planting produces more number of tuber plant^{-1} as well as more number of tuber m^{-2} than single eye. The inter plant competition for nutrition were more in double eye planting than single eye, because double eye produces more stem m^{-2} than single eye. The regression curves related stem density per square meter and mean tuber weight demonstrated distinct differences among seed size effects (Figure 2a and 2.b). Hossain (1995) reported that weight of tubers per plant increased significantly at wider spacing which corroborates the present findings.

Tuber production per plant are directly correlated with number of main stems per plant and significantly affected by inter-plant and intra-plant competition (Svensson, 1962; Moorby, 1967; Bussan *et al.*, 2007). Our results revealed that major yield components such as number of tuber per plant, mean tuber weight and tuber yield per plant significantly decreased as planting distance get closer due to increasing

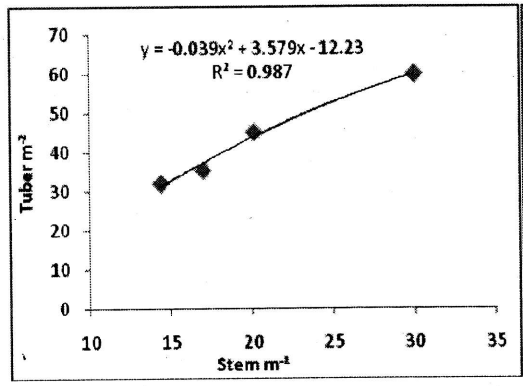

Figure: 1.a

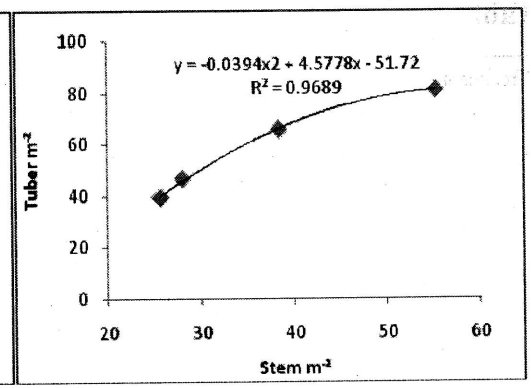

Figure: 1.b

Figure 1.a and 1.b Relationship between stem m^{-2} and tuber m^{-2} for single eye and double eye planting.

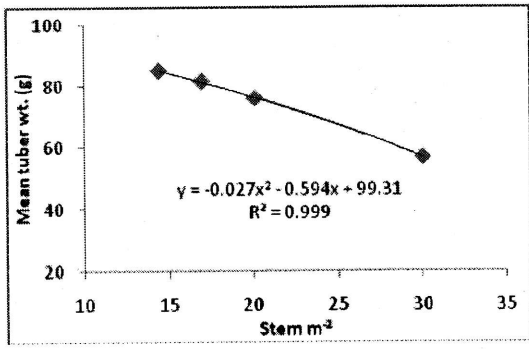

Figure: 2.a

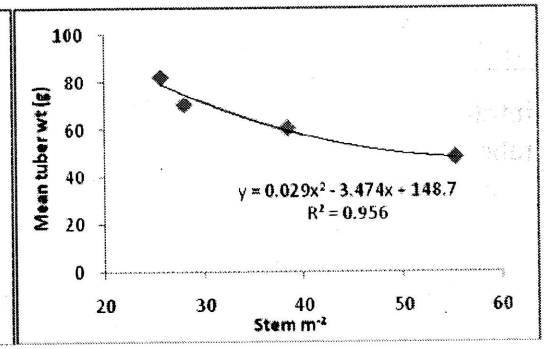

Figure: 2.b

Figure 2.a and 2.b Relationship between stem m-2 and mean tuber weight for single eye and double eye planting.

inter-plants competition.

Planting distance (row or in-row spacing) determines the number of plant (hill) per unit area. Several stems develop from individual seed tubers depending on size and physiological age of seed tubers. Each stem behaves as separate potato plant since each has own root and shoot system (Struik, 2007). Therefore, number of main stems per unit area (stem density) is generally considered as more realistic indicator of plant density than number of planted tubers in potato field (Bussan *et al.*, 2007; Firman and Allen, 2007). Both planting distance and size of seed tubers significantly affect stem density. Tuber yields (plant^{-1} and hectare^{-1}) were

Table 5. Interaction effect of intra-row planting and eye number on number of tuber m^{-2}

Treatment	No of tuber m^{-2}						
	C_1 (Cut tuber with single eye)			C_2 (Cut tuber with double eye)			Main Effect of intra-row spacing
	2007-08 (Mean±SD)	2008-09 (Mean±SD)	Mean±SD	2007-08 (Mean±SD)	2008-09 (Mean±SD)	Mean±SD	
S_1 (40 x 10 cm)	58.0±4.8	61.5±4.4	59.8±4.8	83.0±5.6	78.9±5.1	80.9±5.5	70.3±10.7
S_2 (40 x 15 cm)	46.2±3.3	44.2±3.7	45.2±3.4	64.0±4.3	67.0±4.5	65.5±4.5	55.4±10.2
S_3 (40 x 20 cm)	34.0±2.2	36.0±2.4	35.0±2.2	45.1±4.5	47.9±4.1	46.5±4.3	40.8±5.8
S_4 (40 x 25 cm)	29.2±2.1	34.4±3.1	31.8±2.4	40.1±4.8	38.1±3.9	39.1±4.2	35.5±4.0
Main effect of eye no.	-	-	42.9±12.6	-	-	58.0±18.8	
$LSD_{0.05}$							
For no of eye				9.6			
For intra-row spacing				11.96			
For interaction				15.21			

varied significantly by either the main effects of intra-row spacing and cut seed planting. Interaction effect of intra-row spacing and cut seed planting also affects significantly (Table 4 and 5).

Both tuber yields plant^{-1} and hectare^{-1} increased in cut tuber with double eye planting than single eye planting. However, the effects of intra-row spacing on both yield traits were opposite. The wider planting distance intra-rows resulted in significantly higher tuber yields per plant, whereas the widest intra-row spacing produced the highest tuber yield per plant in both years. The highest tuber yield plant^{-1} was obtained S_4C_1 and S_4C_2 planting (Table7).Mauromicale *et al.*, 2003 stated that planting of potato at very closer spacing resulted in lower tuber yield plant^{-1} due to increasing both inter-and intra-plant competition. Similar findings of higher yield in whole tuber with wider spacing have been reported by Khurana *et al.* (1994) and Siddique *et al.* (1987).

Response of cut tubers to differentintra-row spacing in respect to yield plant^{-1} showed strong relationship (r^2= 0.99 and 0.97) (Figure: 3.a and 3.b). Tuber yield plant^{-1} consistently decreased with the increasing of intra-row spacing in both cut tuber with single eye and double eye planting i.e. stem density negatively correlated with tuber yield plant^{-1}.

Tuber yield hectare^{-1} was decreased

Table 6. Interaction effect of intra-row planting and eye number on mean tuber weight plant^{-1}

Treatment	Mean tuber weight (g)						Main Effect of intra-row spacing
	C_1 (Cut tuber with single eye)			C_2 (Cut tuber with double eye)			
	2007-08 (Mean±SD)	2008-09 (Mean±SD)	Mean±SD	2007-08 (Mean±SD)	2008-09 (Mean±SD)	Mean±SD	
S_1 (40 x 10 cm)	56.0±5.1	58.3±5.2	57.1±1.2	47.3±3.2	48.5±5.2	47.9±0.6	52.5±4.7
S_2 (40 x 15 cm)	64.3±6.2	88.0±7.2	76.2±11.9	67.7±5.2	65.7±5.6	66.7±1.0	71.4±8.3
S_3 (40 x 20 cm)	76.8±5.8	86.8±6.4	81.8±5.0	68.2±5.4	73.2±7.8	70.7±2.5	76.2±6.4
S_4 (40 x 25 cm)	81.1±6.4	89.0±8.1	85.0±4.0	68.9±6.3	95.9±8.6	82.4±13.5	83.7±8.2
Main effect of eye no.	-	-	75.0±12.5	-	-	66.9±14.3	
$LSD_{0.05}$							
For no of eye				6.3			
For intra-row spacing				7.3			
For interaction				8.5			

with increasingintra-row spacingfor both cut tuber with single eye and double eye planting. Tuber yield hectare^{-1} varied from 22.1-39.7 ton ha^{-1}. Highest tuber yield was obtained from closer spacing than wider spacing in

Table 7. Interaction effect of intra-row planting and eye number on tuber yield plant^{-1}

Treatment	Tuber yield (g plant^{-1})						Main Effect of intra-row spacing
	C_1 (Cut tuber with single eye)			C_2 (Cut tuber with double eye)			
	2007-08 (Mean±SD)	2008-09 (Mean±SD)	Mean±SD	2007-08 (Mean±SD)	2008-09 (Mean±SD)	Mean±SD	
S_1 (40 x 10 cm)	162.3±1.8	165.0±2.1	163.6±1.8	168.0±6.2	185.3±8.3	176.7±7.2	170.1±7.5
S_2 (40 x 15 cm)	212.3±18.6	299.2±22.3	255.8±25.3	243.8±8.6	269.2±12.3	256.5±10.6	256.1±12.4
S_3 (40 x 20 cm)	253.4±21.1	312.4±26.6	282.9±24.6	279.6±12.3	319.3±18.4	299.4±16.6	291.2±13.5
S_4 (40 x 25 cm)	275.7±25.7	353.3±36.5	314.5±32.4	310.0±23.3	374.1±29.1	342.1±26.8	328.3±15.9
Main effect of eye no.	-	-	254.2±56.2	-	-	268.7±70.7	-
LSD0.05							
For no of eye					12.3		
For intra-row spacing					23.3		
For interaction					21.8		

Table 8. Interaction effect of intra-row planting and eye number on tuber yield (ton) ha^{-1}

Treatment	Tuber yield (t ha^{-1})						
	C_1 (Cut tuber with single eye)			C_2 (Cut tuber with double eye)			Main Effect of intra-row spacing
	2007-08 (Mean±SD)	2008-09 (Mean±SD)	Mean±SD	2007-08 (Mean±SD)	2008-09 (Mean±SD)	Mean±SD	
S_1 (40 x 10 cm)	35.7±2.2	36.7±2.8	36.2±2.6	35.8±3.4	36.7±3.5	36.3±0.6	35.8±0.6
S_2 (40 x 15 cm)	29.7±2.0	38.9±3.1	34.3±6.5	36.6±3.2	37.7±2.6	37.2±0.7	36.6±4.1
S_3 (40 x 20 cm)	27.9±2.3	31.2±2.7	29.6±2.3	30.8±2.8	35.1±2.8	33.0±3.0	30.8±3.0
S_4 (40 x 25 cm)	22.1±1.8	28.3±2.4	25.2±4.4	27.9±2.7	33.7±2.9	30.8±4.1	27.9±4.7
Main effect of cut tuber			31.3±4.9			34.3±2.9	
$LSD_{0.05}$							
For no of eye			2.5				
For intra-row spacing			2.7				
For interaction			3.3				

both planting. For single eye plant C_1S_1 yielded highest (36.2 t ha^{-1}) and double eye planting C_2S_2 yielded highest (37.2 t ha^{-1}). Similarly single eye and double eye planting markedly differ with each other. From interaction effect it was clear that double eye planting with closer spacing performed better than

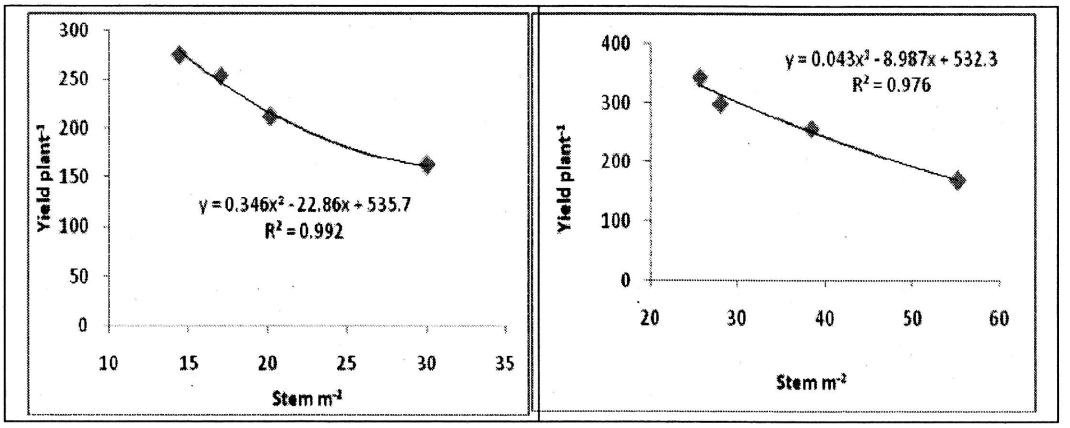

Figure: 3.a Figure: 3.b

Figure 3.a and 3.b Relationship between stem m^{-2} and yield (g) $plant^{-1}$ for single eye and double eye planting.

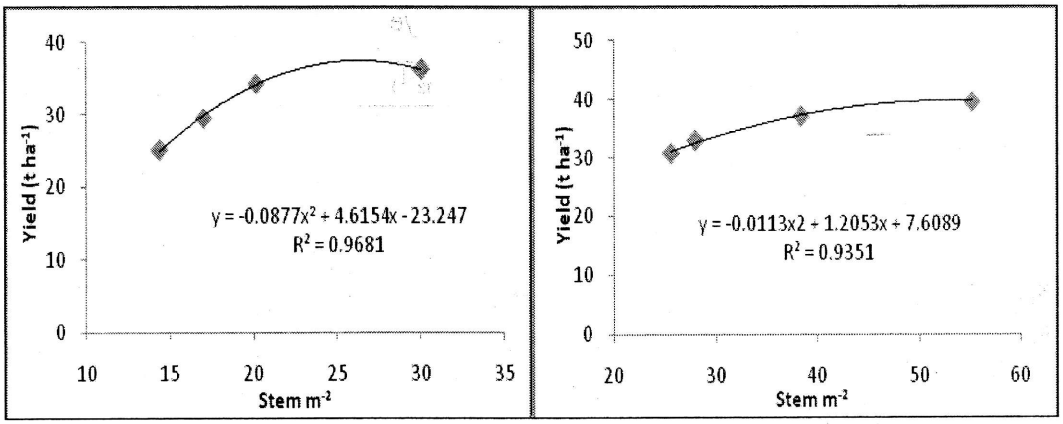

Figure: 4.a Figure: 4.b

Figure 4.a and 4.b Relationship between stem m^{-2} and yield (ton) ha^{-1} for single eye and double eye planting.

single eye with closer planting. Many authors previously reported similar effects of seed size and intra-row spacing on yield components and tuber yield of potato under different production systems (Hoque, 2001; Malik *et al.* 2002; Strange and Blackmore, 1990; Vander Zaag *et al.*, 1990 and Bussan *et al.*, 2007).

From regression analysis, it was concluded that stem m^{-2} has strong positive relationship with yield (t ha-1). In relation to stem m^{-2} i.e. intra-row spacing for single eye and double eye planting yield (t ha^{-1}) of potato can be expressed with the equation, y = 0.3469x2 - 22.865x + 535.79 ($r^2 = 0.96$) and y = -0.0113x2 + 1.2053x + 7.6089 ($r^2 = 0.93$), respectively (Fig 4.a and 4.b). In conclusion, use of cut tuber (one or two eye) with different intra-row spacing significantly influenced on stem $plant^{-1}$, stem m^{-2}, tuber $plant^{-1}$, tuber m^{-2}, mean tuber weight, yield $plant^{-1}$ and yield ha^{-1} which ultimately affect the yield of potato.

Economic analysis

Marked variation in partial budget analysis was observed due to different combination of planting density and cut tuber (Table 9). The total variable cost for potato production was the highest (Tk. 189549.7 ha^{-1}) in S_1C_2 and the lowest (Tk.127413.6ha^{-1}) in the treatment combination S_4C_1. It might be due to that closer spacing required higher seed tuber as well as more labour

Table 9. Partial budget analysis in potato production at different intra-row planting and eye number

Treatment combination	Tuber yield (t ha^{-1})	Gross Return (Tk ha^{-1})	Non material cost (Tk ha^{-1})	Material cost (Tk ha^{-1})	Total variable cost (Tk)	Net benefit (Tk ha^{-1})	BCR
S_1C_1	36.2	362000	30712.5	128170.6	158883.1	203116.94	1.28
S_1C_2	36.3	363000	30712.5	158837.2	189549.7	173450.3	0.92
S_2C_1	34.3	343000	30150.0	115642.8	145792.8	197207.22	1.35
S_2C_2	37.2	372000	30037.5	119031.7	149069.2	222930.83	1.50
S_3C_1	29.6	296000	29587.5	113476.1	143063.6	152936.39	1.07
S_3C_2	33.0	330000	29025	116059.4	145084.4	184915.6	1.27
S_4C_1	25.2	252000	28687.5	98726.1	127413.6	124586.39	0.98
S_4C_2	30.8	308000	28462.5	107281.7	135744.2	172255.83	1.27

Labour = 180 Tk day-1, Seed=Tk 25/ kg, Urea= Tk. 6.5 /kg, TSP= Tk 20.0 /kg, MoP= Tk. 18.5/kg, Zypsum=Tk. 6.0/kg, Mg SO4=Tk. 25.0/kg, Boric acid= Tk. 120/kg

S_1=40cm x 10cm, S_2=40cm x 15cm, S_3=40cm x 20cm, S_4=40cm x 25cm; C_1 =cut tuber with one eye, C_2 = cut tuber with two eyes

which ultimately increased the cost of production. The highest gross return (Tk. 363000.0 ha^{-1}) was recorded in S_1C_2 butits BCR (0.92) is very low compared to other treatment combinations. The lowest gross return (Tk. 252000 ha^{-1}) was observed in S_4C_1, which indicates larger spacing with cut tuber having one eye is not beneficial for potato production. However, the highest net benefit (Tk. 221930.8 ha^{-1})and the benefit cost ratio (1.49) were obtained from S_2C_2 and the lowest benefit-cost ratio (0.92) from S_1C_2. So, benefit-cost analysis indicated that cut tuber containing two eyes with spacing 40cm x 15cm was higher beneficial than other treatment combinations. The result was in agreement with the findings of Hoque (2001).

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