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Response of type of tubers used with different sowing dates on growth and yield of potato (*Solanum tuberosum* L.)

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ABSTRACT
A field experiment was conducted during 2002-2003 on clayey textured soil, alkaline in reaction at Post Graduate Institute Research Farm, Mahatma Phule Krishi Vidyapeeth Rahuri (MS.) India. To study the triplicate experiment was laid out in Factorial Randomized Block Design with sixteen treatment combinations with four different dates of planting and four types of tubers used for planting. It was revealed that early planting (42-met week) recorded maximum tuber yield (143.39qt/ha) than potato planted later. It was also recorded maximum plant height, plant spread number of tubers per plant. Among the type of tubers used the whole tubers recorded significantly higher tuber yield than any other type of tubers used for planting.

Key words: Potato, Sowing dates, Type of tubers, Bio-fertilizers.

INTRODUCTION
Potato (*Solanum tuberosum* L.) is one of the most important nutritious vegetable plant source of food for human consumption. It is nutritionally and agronomically important commercial crop of the world. According to last five years average India ranks fourth in area and third in production but tenth in productivity. Maharashtra share in area, production and productivity is only 15000 ha, 72.60 mT and 44 q/ ha respectively.(Annon.1998)

Growing potato in developing countries and specially over populated countries like India it might have minimize the nutritional requirement of the increasing population and it will reduce the hunger. Being a cool season crop optimum sowing time and use of bio fertilizers is most important agronomic practice for increasing production per unit area. Another important -factor is type of tubers used for planting either whole or cut is special check for cultivator.

Keeping in view the present investigation was undertaken to study the optimum time of sowing and type of tubers to be used for planting.

MATERIALS AND METHODS
A field experiment was conducted during rabbi season at Post Graduate Institute Research Farmof Mahatma Phule Krishi Vidyapeeth, Rahuri (MS) India. The experimental soil was clayey in texture and alkaline in reaction with 8.1pH, available nitrogen 182.1Kg/ ha,available P_2O_5 17.3Kg/ha available K_2O 453 kg/ha. The treatment consists of 4 planting dates viz.42nd met week 44th met wee, 46th met week and 48th met week and four type of tubers with biofertilizers ,viz, whole tubers with fertilizers, cut tubers with biofertilizers, whole tubers without fertilizers, cut tubers without biofertilizers.All the sixteen treatment combinations replicated thrice in Factorial Randomized Block Design.

Potato cultivar Kufri Jyoti was planted at a distance of 60x20 cm with seed rate 15 q/ha. Before sowing field was manured with FYM 10 t/ha. Potato seed tubers were treated with slurry made up of biofertilizers. Both whole and cut tubers treated separately. Cut tubers are prepared by giving slide cut with the help of knife. Recommended fertilizers dose of 120: 60: 120 kg N,P,K/ha was applied respectively. Nitrogen splitted in two doses 50 % at planting and remaining at the time of earthing-up and whole quantity of P_2O_5 and K_2O were applied at the time of planting. De-haulming was carried out before 5 days of harvesting. Harvesting of potato was carried out manually at their maturity.

RESULTS AND DISCUSSION
Date of planting caused significant variation in growth and yield of potato. Higher mean plant height (52.21cm/ plant), plant spread (46.27cm/plant),leaf area (8.20dm^2), number of potato tubers (7.39), dry matter (55.07g/plant), dry haulum yield(9.93 q/ha)and tuber yield (148.34 q/ha) was recorded by 42nd met week.(Table 1). This might be due to the favorable climatic conditions during the crop growth. The cumulative effect of all these growth parameters might have made the maximum tuber yield at early planting. The early planting provide ideal climatic conditions to the potato crop and delayed planting reduces the tuber yield and dry haulm yield of potato (Table1). The finding of Ghosh and Gupta (1973) reported the

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Table 1: Effect of sowing dates and type of tubers on growth and yield attributes of potato.

Treatments	Plant height at harvest cm	Plant spread at harvest cm	Leaf area at harvest dm^2	No. of tubers per plant	Dry matter at harvest g/plant	Dry haulm yield q/ha	Tuber yield q/ha
Planting time (met. week)							
D_1 - 42	52.21	46.27	8.20	7.33	55.07	9.93	148.34
D_2 – 44	46.97	42.53	8.01	6.45	50.73	9.28	140.93
D_3 – 46	43.41	40.83	7.85	5.45	41.00	8.73	114.38
D_4 – 48	4.46	38.34	7.64	5.04	37.37	7.99	95.32
F test	Sig.	Sig.	Sig.	Sig.	Sig.	Sig.	Sig.
CD at 5%	0.55	0.29	0.20	1.03	1.46	5.93	1.37
Types of tuber							
C_1- whole tubers with biofertilizers	47.31	42.98	7.97	6.27	49.00	9.22	130.86
C_2- Cut tubers with biofertilizers	46.27	42.00	7.98	6.21	46.78	9.07	127.22
C_3- Whole tubers without biofertilizers	45.41	41.80	7.91	6.03	44.63	8.89	124.82
C_4- Cut tubers without biofertilizers	44.46	41.23	7.85	5.83	43.76	8.75	116.06
F test	Sig.	Sig.	NS	NS	Sig.	NS	Sig.
CD at 5%	0.55	0.24	-	-	1.46	-	1.37

beneficial effect of early sowing is associated to the climatic conditions. Norwal *et.al.*(1993) reported that the potato planted on 16th October produced maximum potato yield. Nandekar and Sharma (1998) aiso reported that higher yield was obtained with 20th October planting and decreased yield was noted in delayed planting.

The early planted (42 met week) crop get warmer temperature during its vegetative growth and cooler temperature during its tuber development stage. This climatic suitability increases the tuber yield of potato. Subsequently late planted potato caught under unfavorable climatic conditions hence the tuber yield decreases.

Effect of type of tubers :

The effect of type of tubers was significantly influenced on plant height, spread, dry matter production and total tuber yield and was non significant in respect of number of tubers leaf area, dry haulm yield.

Whole tubers with biofertilizers produced maximum mean plant height (47.31cm/plant) spread (42.98cm/plant),dry matter (49.00 cm/plant) and tuber yield (130.86 q/ha) than other type of tubersused for planting. While cut tubers with biofertilizers produced more (7.98 dm^2) leaf area per plant (Table 1).

The whole tubers with biofertilizers recorded maximum tuber yield than any other type of tubers used for planting. This might be due to whole tubers would have more stored food material which might be used by the plant for early emergence ,rapid growth subsequent branching and biofertilizers would have help for more uptake of nutrients from soil for growth and development of tubers which finally led to increased potato production. The findings confirms the findings of Mahendran and Chandramani (1998), Kamala Singh (1999) and Shanmugasundaram and Savitri (2000).

Effect of Interaction :

Early planting (42 met week) and whole tubers with bofertilizers recorded highest total tuber yield (155.75 q/ha) amongst all other treatment combination (Table 2) .Significantly lowest were recorded by delayed planting (48 met week) and cut tubers without biofertilizers (86.50 q/ha)

Thus the result from the present agronomic investigations, it can be concluded that 42nd met. Week is optimum for planting with whole tubers treated with biofertilizers for maximum production & profitability.

Table 2: Interaction effect of sowing dates and type of tubers on tuber yield of Potato

Planting time (Met. week)	Type of tubers			
	Whole tubers with biofertilizers	Cut tubers with biofertilizers	Whole tubers without biofertilizers	Cut tubers without biofertilizers
D_1-42	155.75	151.21	149.52	136.88
D_2- 44	147.74	143.77	139.12	133.10
D_3- 46	120.86	115.78	113.11	107.78
D_4- 48	99.12	98.14	97.53	97.53
F test				Sig.
CD at 5%				2.74

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