

Original Research Article

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Effect of Time of Planting on Growth and Yield Parameters of Potato Crop

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ABSTRACT

To view the effect of different time of planting on growth and yield parameters of potato (*Solanum tuberosum* L.) crop the experiments were conducted at Students Research Farm, Khalsa College Amritsar. The experiments were conducted at four different dates of planting as treatment viz., T₁ (25 September), T₂ (10 October) and T₃ (25 October) and T₄ (10 November) each treatment replicated three times. The data had been recorded at their respective stages of growth and total yield were measured at the end of the season of the potato crop. It was found that maximum no. of stems per hill was 6.9 recorded in T₂ treatment along with maximum plant height T₂ 43.6 cm and maximum leaf area index 3.2 as compared to other treatments. The maximum tuber yield was 218.9 q/ha and highest number of tubers per plant 7.2 found in T₂ treatment. The maximum tuber yield in 10 October sown crop due to optimum moisture and temperature condition along with good growth of plants. Thus, 10th October date of planting is found to be optimum for cultivation of potato crop in Amritsar district of Punjab.

Keywords

Time of planting,
Growth and yield
parameters, Potato
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Introduction

Potato (*Solanum tuberosum* L.) is the fourth most important food crop in the world after rice, wheat and maize in terms of production (Razdan and Mattoo, 2005). Nutritionally potato is rich in complex carbohydrates (61.5-91.5%) which is essential for energy, protein (1.6 g), dietary fiber, vitamin C (25 mg), starch (16.3 g) and minerals like phosphorus, calcium and chlorine (Bose and Som, 1986). The optimum growth and production is largely depend upon prevailing weather

conditions and use of improved inputs like use of improved varieties, time of planting, good seed quality, time of planting and other cultural practices till harvesting. Among them, the optimum time of planting is major limiting factor in maximum production of potato. As the optimum time of planting result in maximum germination, good crops stand and better utilization of light and temperature would enhance the yield. For best yields, potato crop required long day conditions for good growth and short day conditions for tuberization (Chadha, 2009). Thus, the day

length is another important factor for potato (Cutter, 1992). Thus to find the optimum time of planting the present study was conducted during in main season in Amritsar (Punjab).

Materials and Methods

Location and climate

Amritsar is located at 31°-38' North latitude and 74°-52' East longitude and altitude of 236 meters above sea level. The climate is generally semi humid with extreme winters and summers. The maximum temperature of about 45-48°C is not uncommon during summer, while freezing temperature accompanied by frost occurrence may be witnessed in the months of December and January annual rainfall 75 cm.

Treatment and design

The treatments were done on variety (Lady Rosetta) at four different dates T₁(25 September), T₂ (10 October), T₃ (25 October) and T₄ (10 November). The plot size was (3 x 3) m². Plants in the central rows were used for determination of agronomic performance, leaving aside those in the two border rows as well as those at both ends of each row to avoid edge effects.

Measured parameters

The following growth parameters viz., days taken to tuber emergence, number of stem stems per hill at 60DAP, plant height 60 DAP, leaf area index and yield characteristic had been recorded.

Results and Discussion

Growth parameters

Days taken to tuber emergence

From table 1, it is shown that the different time of planting have little effect on tuber

emergence as all treatment has statically different value. Maximum number days taken to emergence in treatment T₄ (17.4 days) as compare to T₃ (16.2 days), T₂ (15.0 days) and T₁ (14.2 days), respectively. But the T₂ (10 October) gave maximum yield thus the 15 days period is optimum for good tuber emergence. Similar findings were in agreement with the earlier reported by Lal and Sahota (1983) and Gopalakrishna (2007).

Number of stems per hill

The data recorded for the number of stems per hill at 60 days after sowing showed that time of planting had significant effect on the number of stems per hill. The maximum number of stems per hill (6.9) was recorded in treatment T₂ followed by T₃ (5.4), T₁ (4.9) and T₄ (3.5). All the treatments varied significantly with each other. Maximum number of stems per hill due to favorable environmental conditions for potato crop. Similar results were observed by Nandekaar and Sharma, (1998). It is found that too early and delay in planting time would reduce the number of stem per plant. Arab *et al.*, (2013)found maximum number of stem per hill (2.7) for 8 October sowing crop, with the early dates of sowing the number of stem per hill significantly reduced.

Plant height

Maximum plant height was observed in T₂ (43.6) followed by T₃ (41.7), T₁ (39.3) and T₄ (37.4). The treatment T₂ being at par with T₃ had significantly taller plants than T₁ and T₄. However, T₁ with T₄ and T₁ with T₃ were at par with each other. The minimum plant height in T₄(10November) due to low temperature conditions which hinder the growth of plants thus the delay in planting with will result in for crop growth and reduce the yield . Similar finding have also been reported by Ezekiel and Bhargava (1992) and Singh and Khurana, (1997). Thongam *et al.*,

(2017) record the maximum height 52.9 and 70.2 cm at 45 and 75 days after planting in 10 October planting time. The delay in planting after 10 October significantly lowered the plant height. The more height due to the favorable temperature (15.6 to 27.9 °C) prevailing during vegetative growth period (Modisane, 2007).

Leaf area index

The plants having maximum leaf area were observed in T₂ (3.2) followed by T₃ (2.7), T₁ (2.2) and least in T₄ (2.1) respectively. Treatment T₄ gave less leaf area because of late emergence, less plant height and low temperature conditions. Similarly, Jahan *et al.*, (2014) also reported highest leaf area index with early planting of potato.

Yield parameters

Number of tubers per plant

Among the different planting date, the plants sown on 10 October (T₂) produced highest number of tubers (7.2). The plants sown on 25 October (T₂), 25 September (T₁) and 10 November (T₄) produced 6.5, 5.7 and 4.9 tubers per plant respectively. The more number of tubers per plant is attributed by more leaf area which directly related to more photosynthesis products. Thongam *et al.*, (2017) also recorded highest number of tubers per plant 8.20 in treatment during in crop planted during 10 October. Similar results was obtained by Khan *et al.*, (2011) and Sharma and Verma (1987) (Table 2).

Table.1 Effect of depth of planting on growth parameters of potato crop

Planting depth (inch)	Days taken to tuber emergence	No. of stems per hill	Plant Height (cm)	Leaf area index
T1 (25 September)	14.2	4.9	39.3	2.2
T2 (10 October)	15.0	6.9	43.6	3.2
T3 (25 October)	16.2	5.4	41.7	2.7
T4 (10 November)	17.4	3.5	37.4	2.1
CD (0.05%)	1.1	0.5	3.0	0.2

Table.2 Effect of depth of planting on yield parameters of potato crop

Planting depth	No. of tubers per plant	Total tuber yield (q/ha)
T1 (25 September)	5.7	177.3
T2 (10 October)	7.2	218.9
T3 (25 October)	6.5	204.3
T4 (10 November)	4.9	149.3
CD (0.05%)	0.6	14.3

Total tuber yield

The total tuber yield is significantly different among all the treatments. The results showed maximum tuber yield 218.9 q/ha in crop planted during 10 October followed by 204.3 q/ha in crop sown during 25 October. The minimum tuber yield was 149.3 q/ha in 10 November sown crop. The maximum tuber yield in 10 October sown crop due to optimum moisture and temperature condition along with good growth of plant which were not prevailing during late sown crop (Haile *et al.*, 2015). Thongam *et al.*, (2017) also observed maximum tuber yield 27.74 t/ha in 10 October sown crop.

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