Potato growth as influenced by planting date, spacing and NPK levels under Godavari conditions

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Abstract
The field experiment was carried out during rabi season of 2018-19 and 2019-20 at College farm, COH, VR Gudem, West Godavari District of Andhra Pradesh. The data revealed that the highest germination and plant height, No. of branches plant⁻¹, No. of leaves plant⁻¹ and leaf area plant⁻¹ (at 30, 60 and 80 DAP) and total tuber yield were recorded in November 1st planting. Respect to spacings, significantly higher growth values were noticed at 75x20 cm except tuber yield. Among NPK levels, application of 160N:80P:200K kg ha⁻¹ was found to be superior in growth parameters as well as total tuber yield. In three way interaction of D₂S₁F₂ and D₂S₁F₂ were recorded the highest growth parameters and total tuber yield respectively. Plant spacing, NPK levels, their all the interaction effects were found to be non-significant on germination. Based on results, it may be concluded that D₂S₁F₂ combination may be considered as the best treatment in terms of tuber yield.

Keywords: Germination, planting date, plant spacing, NPK levels, potato, growth and tuber yield

Introduction
Potato (Solanum tuberosum L.) is the fourth most important staple food crop in the world after rice, wheat and maize. It is belongs to Solanaceae family and native to South America. In the world, China ranks first in area, followed by Russian Federation, Ukraine and Poland. India ranks fifth in area in the world In India, potato is cultivated in an area of 21.42 lakh hectares with an annual production of 513.10 lakh tones and productivity of 24.00 tones per hectare [1], Nutritionally potato rich in starch, protein, sugars and minerals [2]. Potato is a weather sensitive crop. Its growth and production is influenced by climate and several other factors like use of improved varieties, good quality seed, planting time, spacing, nutrition, irrigation, weeds, incidence of pest and diseases. For best yields, potato crop needs long day conditions during growth and short day conditions during tuberization [3]. Earlier planting is not possible due to unfavorable weather conditions, particularly late rains. Plant spacing also influences potato growth and yields, since it determines plant density. In general, closer spacing to certain extent will increase the yield of potato tubers. Under the wider spacing, the plant was more vigorous in terms of leaf size, which might be due to less competition for light, nutrients and moisture [4]. Fertilizer requirement of potato crop will vary with place, soil, variety and climatic conditions of the region. Low NPK fertilization leads to reduction in growth and yield in potato and also plants show nutrient deficiency symptoms. The balanced fertilizer application was increasing yield per unit area [5]. In view of importance of this crop, to develop suitable planting date, plant spacing and NPK levels, this present experiment was planned.

Material and Methods
A field experiment was conducted at College of Horticulture, VR Gudem, Dr. YSR Horticultural University, West Godavari District of Andhra Pradesh during winter season of 2018-19 and 2019-20 on “Growth of potato as influenced by planting date, spacing and NPK levels under Godavari conditions”. There are 18 treatment combinations consisting of three factors viz., planting dates (3 levels viz., D₁: October 15th, D₂: November 1st and November 16th), plant spacings (2 levels viz., S₁: 60 cm x 20 cm, S₂: 75 cm x 20 cm) with F₁: 120:60:150.
kg ha\(^{-1}\), F\(_2\): 160:80:200 kg ha\(^{-1}\) and F\(_3\): 200:100:250 kg ha\(^{-1}\)). The treatments were laid in a factorial randomized block design (FRBD) replicated thrice under open field conditions with Kufri Surya variety. FYM @ 25 and full dose of SSP, 1/3\(^{rd}\) dose of urea and MOP were applied in the last ploughing as basal dose. The remaining dose of Urea and MOP were applied in two equal split doses, first dose at 30 DAP and final dose at 50 DAP. Following observations were recorded during course of study viz., Germination, plant height, no. of branches per plant, no. of leaves per plant, leaf area per plant and total tuber yield.

![Weekly meteorological data during the crop growth period of October 15\(^{th}\) to February 28 during 2018-19 and 2019-20.](image)

**Fig 1:** Weekly meteorological data during the crop growth period of October 15\(^{th}\) to February 28 during 2018-19 and 2019-20.

### Results and Discussion

**Germination (%)**

Germination was significantly highest in November 1\(^{st}\) planting (D\(_2\)) and the lowest in October 15\(^{th}\) planting (D\(_1\)). With respect to spacing and NPK levels both the effects were found non-significant (Table 1), however the superior germination was observed at a wider spacing of 75 x 20 cm with low NPK level F\(_1\) (120:60:150 kg ha\(^{-1}\)) and minimum in closer spacing with high NPK level F\(_3\) (160:80:200 kg ha\(^{-1}\)). The highest germination in D\(_2\) and D\(_3\) plantings might be due to comparatively favourable temperatures (21-33 °C) and optimum moisture at the planting date with November 1\(^{st}\) as these factors basically influence germination. Similar results were reported by Jamro et al. \[6\] in potato.

#### Table 1: Germination as influenced by planting dates, spacing and NPK levels in potato (two years pooled data).

| Spacing (S) | NPK levels (F) | Planting dates (D) |
|------------|----------------|--------------------|
|            |                | D\(_1\) (October 15\(^{th}\)) | D\(_2\) (November 1\(^{st}\)) | D\(_3\) (November 16\(^{th}\)) |
| S\(_1\) (60 x 20 cm) | F\(_1\) (120:60:150 kg ha\(^{-1}\)) | 75.59 | 84.07 | 81.07 | 80.24 |
|            | F\(_2\) (160:80:200 kg ha\(^{-1}\)) | 74.53 | 83.52 | 80.56 | 79.53 |
|            | F\(_3\) (200:100:250 kg ha\(^{-1}\)) | 74.53 | 83.35 | 80.19 | 79.35 |
|            | Mean           | 74.88 | 83.65 | 80.60 | 79.71 |
| S\(_2\) (75 x 20 cm) | F\(_1\) (120:60:150 kg ha\(^{-1}\)) | 75.80 | 84.50 | 81.92 | 80.74 |
|            | F\(_2\) (160:80:200 kg ha\(^{-1}\)) | 75.02 | 84.02 | 81.25 | 80.10 |
|            | F\(_3\) (200:100:250 kg ha\(^{-1}\)) | 74.80 | 83.77 | 81.12 | 79.90 |
|            | Mean           | 75.21 | 84.10 | 81.43 | 80.24 |

#### For Comparing planting dates (D) and fertilizer levels (F)

| Factor                  | D\(_1\) (120:60:150 kg ha\(^{-1}\)) | D\(_2\) (160:80:200 kg ha\(^{-1}\)) | D\(_3\) (200:100:250 kg ha\(^{-1}\)) |
|-------------------------|----------------------------------|-----------------------------------|-----------------------------------|
| Planting dates (D)      | 0.87                             | 2.50                              |                                   |
| Spacing (S)             | --                               | NS                                |                                   |
| Fertilizer levels (F)   | --                               | NS                                |                                   |
| D x S                   | --                               | NS                                |                                   |
| D x F                   | --                               | NS                                |                                   |
| S x F                   | --                               | NS                                |                                   |
| D x S x F               | --                               | NS                                |                                   |

NS: Non-significant

### 2. Plant height (cm)

November 1\(^{st}\) and October 15\(^{th}\) plantings were noticed the highest and lowest plant height respectively at all growth stages (30, 60 and 80 DAP). Similarly, higher plant height was observed at a wider spacing of 75 x 20 cm as compared to closer spacing of 60 x 20 cm (Table 2). Among NPK levels, F\(_2\) level (160:80:200 kg ha\(^{-1}\)) recorded the maximum plant height (at 80 DAP) while minimum plant height was noticed with F\(_1\) level (120:60:150 kg ha\(^{-1}\)). In two way interaction of D x S, D x F and S x F were found to be non-significant on plant height at all growth stages. Regarding to three way interaction of D x S x F, the highest plant height
values were found in the combination D₂ S₂ F₂: November 1st planting + 75 x 20 cm spacing + NPK @ 200:100:250 kg ha⁻¹ whereas the lowest plant height was noticed in D₁ S₁ F₁: October 15th planting + 60 x 20 cm spacing + NPK @ 120:60:150 kg ha⁻¹.

### Table 2: Plant height at 30, 60 and 80 DAP as influenced by planting dates, spacing and NPK levels in potato (two years pooled data).

| Spacing (S) | NPK levels (F) | At 30 DAP | 60 DAP | 80 DAP |
|-------------|----------------|-----------|--------|--------|
|             |                | D₁ | D₂ | D₃ | Mean | D₁ | D₂ | D₃ | Mean | D₁ | D₂ | D₃ | Mean | D₁ | D₂ | D₃ | Mean |
| S₁ (60 x 20 cm) | F₁ (120:60:150) | 13.38 | 16.83 | 16.93 | 16.31 | 23.19 | 28.04 | 26.24 | 25.82 | 29.20 | 24.37 | 32.70 | 32.06 |
|              | F₁ (160:80:200) | 15.15 | 20.75 | 19.35 | 18.42 | 26.29 | 31.13 | 28.74 | 28.72 | 31.73 | 37.41 | 35.00 | 34.71 |
|              | F₂ (200:100:250) | 14.84 | 19.57 | 18.26 | 17.56 | 25.09 | 29.31 | 29.30 | 27.90 | 30.40 | 36.33 | 33.45 | 33.39 |
| S₂ (75 x 20 cm) | F₁ (120:60:150) | 16.03 | 19.66 | 17.75 | 17.81 | 24.09 | 28.17 | 26.65 | 26.31 | 29.62 | 35.15 | 33.26 | 32.68 |
|              | F₁ (160:80:200) | 17.67 | 22.34 | 20.76 | 20.26 | 26.93 | 31.78 | 29.79 | 29.50 | 33.70 | 40.17 | 36.02 | 36.63 |
|              | F₂ (200:100:250) | 16.81 | 20.53 | 19.47 | 18.94 | 25.93 | 30.43 | 27.99 | 28.12 | 32.19 | 38.10 | 34.93 | 35.07 |
| Mean         | 16.84 | 20.84 | 19.33 | 20.09 | 25.65 | 30.13 | 28.15 | 27.98 | 31.84 | 37.81 | 34.74 | 34.79 |

For Comparing planting dates (D) and fertilizer levels (F):

| F₁ (NPK @ 120:60:150 kg ha⁻¹) | D₁ | 14.70 | 19.15 | 17.34 | 17.06 | 23.64 | 28.11 | 26.44 | 26.06 | 29.41 | 34.71 | 32.98 | 32.37 |
| F₁ (NPK @ 160:80:200 kg ha⁻¹) | D₁ | 16.41 | 21.54 | 20.06 | 19.34 | 26.61 | 31.46 | 29.27 | 29.11 | 32.37 | 38.79 | 35.51 | 35.67 |
| F₁ (NPK @ 200:100:250 kg ha⁻¹) | D₁ | 15.82 | 20.05 | 18.87 | 18.25 | 25.51 | 29.87 | 28.85 | 28.01 | 31.37 | 37.21 | 34.19 | 34.23 |
| Mean          | 15.65 | 20.25 | 18.75 | 18.21 | 25.25 | 29.81 | 28.12 | 27.73 | 31.14 | 36.90 | 34.23 | 34.09 |

### 3. Number branches (haulms) per plant

The number of branches or haulms per plant was maximum in November 1st planting followed by November 16th planting and minimum in October 16th planting at all growth stages (Table 3). Non-significant difference was observed on number branches per plant due to spacings, however, higher number of branches noticed at a spacing of 60 x 20 cm compared to spacing of 75 x 20 cm. Among NPK levels, application of NPK @ 160:80:20 kg ha⁻¹ took more number of branches per plant while, NPK applied @ 120:60:150 kg ha⁻¹ took less number of haulms per plant. With regard to interactions, all the two interactions were found to be non-significant but three way interaction was found to be significant and Number of branches per plant was highest in D₁ S₁ F₁ and the lowest in D₁ S₂ F₁ combination at all growth stages (30, 60 and 80 DAP).

### Table 3: Number of branches (haulms) plant⁻¹ at 30, 60 and 80 DAP as influenced by planting dates, spacing and NPK levels in potato (two years pooled data).

| Spacing (S) | NPK levels (F) | At 30 DAP | 60 DAP | 80 DAP |
|-------------|----------------|-----------|--------|--------|
|             |                | D₁ | D₂ | D₃ | Mean | D₁ | D₂ | D₃ | Mean | D₁ | D₂ | D₃ | Mean | D₁ | D₂ | D₃ | Mean |
| S₁ (60 x 20 cm) | F₁ (120:60:150) | 2.52 | 3.59 | 2.83 | 2.98 | 3.12 | 4.27 | 3.85 | 3.74 | 3.99 | 4.90 | 4.49 | 4.46 |
|              | F₁ (160:80:200) | 3.00 | 4.05 | 3.75 | 3.60 | 3.99 | 5.00 | 4.44 | 4.48 | 4.55 | 6.07 | 5.07 | 5.23 |
|              | F₁ (200:100:250) | 2.77 | 3.88 | 3.49 | 3.38 | 3.62 | 4.65 | 4.09 | 4.12 | 4.41 | 5.64 | 4.83 | 4.96 |
| Mean         | 2.76 | 3.84 | 3.36 | 3.32 | 3.58 | 4.64 | 4.13 | 4.11 | 4.32 | 5.54 | 4.80 | 4.88 |

For Comparing planting dates (D) and fertilizer levels (F):

| F₁ (NPK @ 120:60:150 kg ha⁻¹) | D₁ | 2.59 | 3.57 | 2.89 | 3.02 | 3.14 | 4.31 | 3.81 | 3.75 | 4.06 | 4.91 | 4.48 | 4.48 |
| F₁ (NPK @ 160:80:200 kg ha⁻¹) | D₁ | 3.10 | 4.13 | 3.81 | 3.68 | 4.06 | 5.13 | 4.57 | 4.59 | 4.61 | 6.12 | 5.15 | 5.29 |
| F₁ (NPK @ 200:100:250 kg ha⁻¹) | D₁ | 2.82 | 3.94 | 3.60 | 3.45 | 3.68 | 4.74 | 4.24 | 4.22 | 4.41 | 5.69 | 4.90 | 5.00 |
| Mean          | 2.83 | 3.88 | 3.42 | 3.38 | 3.62 | 4.72 | 4.21 | 4.19 | 4.35 | 5.57 | 4.84 | 4.92 |

For Comparing planting dates (D) and fertilizer levels (F):

| F₁ (NPK @ 120:60:150 kg ha⁻¹) | S Em+ CD at 5% |
| F₁ (NPK @ 160:80:200 kg ha⁻¹) | S Em+ CD at 5% |
| F₁ (NPK @ 200:100:250 kg ha⁻¹) | S Em+ CD at 5% |

| Planting dates (D) | 0.07 | 0.21 | 0.08 | 0.22 | 0.06 | 0.18 |
| Spacing (S) | -- | NS | -- | NS | -- | NS |
| Fertilizer levels (F) | 0.07 | 0.21 | 0.08 | 0.22 | 0.06 | 0.18 |
| D x S | -- | NS | -- | NS | -- | NS |
| D x F | -- | NS | -- | NS | -- | NS |
| S x F | -- | NS | -- | NS | -- | NS |
| D x S x F | 0.18 | 0.52 | 0.19 | 0.55 | 0.16 | 0.44 |

Planting dates (D): D₁ - October 15th, D₂ - November 1st, D₃ - November 16th; NS: Non-significant; DAP: Days after planting.
4. Number of leaves per plant

Pooled results revealed that the highest number of leaves per plant was recorded with November 1st planting which was significantly superior to the rest of planting dates at all growth stages (Table 4). The lowest number of leaves per plant was recorded with October 16th planting. Among spacings, the higher leaf number per plant was observed at a spacing of 75 x 20 cm when compared to 60 x 20 cm spacing. Significant effect of NPK levels was observed on number of leaves per plant at all the growth stages and maximum and minimum number of leaves per plant were registered with application of NPK @ 160:80:200 kg ha⁻¹ and NPK @ 120:60:150 kg ha⁻¹, respectively. Regarding to two way interactions, D3 x S2, F2 x S2 and S2 x F2 combinations recorded the highest number leaves per plant and same were lowest in D1 x S1, D1 x F1 and S1 x F1 combinations at 80 DAP. Similarly in three way interaction of D2 x S2 x F2 recorded the highest leaf number per plant and the same was lowest in D1 x S1 x F1 combination.

Table 4: Number of leaves plant⁻¹ at 30, 60 and 80 DAP as influenced by planting dates, spacing and NPK levels in potato (two years pooled data).

| Spacing (S) | NPK levels (F) | Number leaves plant⁻¹ | \[ At 30 DAP \] | \[ 60 DAP \] | \[ 80 DAP \] |
|-------------|-----------------|------------------------|-------------|-----------|-----------|
| \[ 60 x 20 cm \] | | | | | |
| S1 | F1 (120:60:150) | 29.04 | 41.20 | 36.63 | 35.62 | 66.47 | 87.88 | 82.21 | 78.85 | 80.69 | 113.30 | 97.79 | 97.26 |
| | F2 (160:80:200) | 32.44 | 46.92 | 40.43 | 39.93 | 74.21 | 101.12 | 94.38 | 85.16 | 89.56 | 129.54 | 109.47 | 109.52 |
| | F3 (200:100:250) | 30.86 | 43.82 | 38.88 | 37.85 | 67.69 | 96.60 | 87.42 | 83.90 | 85.57 | 123.12 | 103.12 | 103.93 |
| | Mean | 30.78 | 43.98 | 38.65 | 37.80 | 69.46 | 95.23 | 87.94 | 84.21 | 85.27 | 121.99 | 103.46 | 103.57 |
| S2 | F1 (120:60:150) | 31.02 | 44.67 | 41.08 | 38.92 | 70.54 | 91.19 | 88.69 | 83.47 | 84.92 | 116.27 | 100.29 | 100.49 |
| | F2 (160:80:200) | 35.61 | 53.67 | 45.50 | 44.93 | 81.00 | 105.77 | 98.86 | 95.21 | 98.17 | 144.62 | 122.42 | 121.74 |
| | F3 (200:100:250) | 34.17 | 51.23 | 43.97 | 43.13 | 75.67 | 99.59 | 96.02 | 90.43 | 91.05 | 135.18 | 119.09 | 115.10 |
| | Mean | 33.60 | 49.86 | 43.52 | 42.33 | 75.74 | 98.84 | 95.24 | 89.70 | 91.38 | 132.02 | 113.93 | 112.44 |

5. Leaf area per plant (cm²)

Among planting dates, D2 planting recorded maximum leaf area per plant followed by D3 planting and same was minimum in D1 planting at all growth stages (30, 60 and 80 DAP). Similarly, the higher and lower leaf area per plant was observed at S2 and S1 spacings respectively (Table 5). Among the levels of NPK, medium level F2 recorded the maximum leaf area per plant and the same was in low level in F1.

Table 5: Leaf area plant⁻¹ at 30, 60 and 80 DAP as influenced by planting dates, spacing and NPK levels in potato (two years pooled data).

| Spacing (S) | NPK levels (F) | Leaf area plant⁻¹ (cm²) | \[ At 30 DAP \] | \[ 60 DAP \] | \[ 80 DAP \] |
|-------------|-----------------|-------------------------|-------------|-----------|-----------|
| \[ 60 x 20 cm \] | | | | | |
| S1 | F1 (120:60:150) | 268.17 | 652.72 | 512.49 | 477.79 | 884.46 | 1518.54 | 1313.38 | 1238.79 | 1530.90 | 2227.35 | 1977.21 | 1911.85 |
| | F2 (160:80:200) | 351.95 | 867.97 | 687.49 | 635.80 | 1138.08 | 1951.93 | 1576.48 | 1555.49 | 1906.40 | 2537.85 | 2371.42 | 2271.89 |
| | F3 (200:100:250) | 358.59 | 806.07 | 651.48 | 605.38 | 1049.43 | 1846.19 | 1543.65 | 1479.76 | 1864.00 | 2403.16 | 2284.83 | 2184.00 |
| | Mean | 326.23 | 775.59 | 617.15 | 572.99 | 1023.99 | 1772.22 | 1477.84 | 1424.68 | 1767.13 | 2389.45 | 2211.15 | 2122.58 |
| S2 | F1 (120:60:150) | 368.24 | 737.64 | 601.36 | 569.08 | 963.09 | 1713.94 | 1408.76 | 1361.93 | 1725.30 | 2368.19 | 2152.75 | 2082.15 |
| | F2 (160:80:200) | 548.29 | 967.71 | 822.15 | 779.38 | 1227.00 | 2120.56 | 1834.54 | 1727.37 | 2047.17 | 2890.45 | 2623.75 | 2520.46 |
| | F3 (200:100:250) | 470.29 | 901.36 | 738.57 | 703.41 | 1175.63 | 2044.89 | 1790.90 | 1670.47 | 1869.75 | 2718.37 | 2486.32 | 2358.15 |
| | Mean | 462.27 | 689.70 | 720.69 | 683.96 | 1121.91 | 1959.80 | 1678.07 | 1586.59 | 1880.81 | 2659.01 | 2420.94 | 2320.25 |

In two way interaction of D2xS2 found superior in leaf area per plant at 80 DAP whereas D2xF2 combination recorded the highest leaf area at 30 and 60 DAP while, S2xF2 combination noticed maximum leaf area at 30 DAP. With respect to three way interaction, the treatment combination of D2 x S2 x F2 and D1 x S1 x F1 was recorded the maximum and minimum leaf area per plant, respectively at all growth stages.
6. Total tuber yield (t ha⁻¹)

The plants of November 1st planting produced maximum total tuber yield ha⁻¹ followed by November 16th planting (Table 6). Among spacings, the higher yield ha⁻¹ observed at 60 x 20 cm spacing followed by 75 x 20 cm. Application of NPK @ 160:80:200 kg ha⁻¹ gave the highest yield ha⁻¹, whereas, the lowest yield was from NPK @ 120:60:150 kg ha⁻¹. Among interaction means, all the two way interactions were found to be non-significant but three way interactions was found significant. D₁S₁F₂ combination was found to record the superior total tuber yield whereas the least yield was recorded under D₁S₁F₁ combination. All the growth parameters and tuber yield were significantly maximum in November 1st planting followed by November 16th planting may be due to congenial temperatures (21-32 °C) that prevailed during vegetative growth period resulting in greater photosynthetic activity and higher mobilization of assimilates. While, higher temperatures (> 32 °C) during the vegetative phase of potato from October 15th planting might have resulted in reduction in growth and yield of potato plant. Mamun et al. [7], Thongam et al. [13], Dash et al. [9] and Patel et al. [10] also reported similar findings in potato. Wider spacing (75 x 20 cm) showed maximum growth characters which might be due to better availability of nutrients water and sun light since plants at wider spacing. These results are in conformity with the findings of Almeida et al. [11] and Lehar et al. [12] in potato. Medium NPK level (F₂: 160:80:200 kg ha⁻¹) recorded higher growth and yield might be due to the enhanced availability of nutrients to the crop, which may have resulted in increased photosynthetic efficiency of the plant and increased metabolic activities of the plant with increase in NPK dose up to certain level (F₂). Similar results were also reported by Sandhu et al. [13] and Banjare et al. [14] in potato.

### Table 6: Total tuber yield as influenced by planting dates, spacing and NPK levels in potato (two years pooled data).

| Spacing (S) | NPK levels (F) | Planting dates (D) | D₁ (October 15th) | D₂ (November 1st) | D₃ (November 16th) | Mean |
|-------------|----------------|--------------------|-------------------|------------------|-------------------|------|
| S₁ (60 x 20 cm) | F₁ (120:60:150 kg ha⁻¹) | 14.80 | 17.96 | 16.03 | 16.26 |
|             | F₂ (160:80:200 kg ha⁻¹) | 17.11 | 21.33 | 19.69 | 19.38 |
|             | F₃ (200:100:250 kg ha⁻¹) | 15.88 | 19.37 | 18.07 | 17.77 |
|             | Mean | 15.93 | 19.55 | 17.93 | 17.80 |
| S₂ (75 x 20 cm) | F₁ (120:60:150 kg ha⁻¹) | 13.71 | 16.70 | 15.03 | 15.14 |
|             | F₂ (160:80:200 kg ha⁻¹) | 16.24 | 19.56 | 18.48 | 18.09 |
|             | F₃ (200:100:250 kg ha⁻¹) | 14.81 | 17.81 | 16.81 | 16.48 |
|             | Mean | 14.92 | 18.02 | 16.77 | 16.57 |

**For Comparing planting dates (D) and fertilizer levels (F)**

| Factor | D₁ (October 15th) | D₂ (November 1st) | D₃ (November 16th) | Mean |
|--------|-------------------|-------------------|-------------------|------|
| Planting dates (D) | 0.12 | 0.35 |
| Spacing (S) | 0.10 | 0.29 |
| Fertilizer levels (F) | 0.12 | 0.35 |
| D x S | -- | NS |
| D x F | -- | NS |
| S x F | -- | NS |
| D x S x F | 0.30 | 0.85 |

NS: Non-significant

### Conclusions

1. On the basis of the results emerged out from the present investigation, it may be concluded that planting of potato from November 1st (D₂) to 16th (D₃) at a spacing of 60 cm x 20 cm (S₁) with NPK dose @ 160:80:200 kg ha⁻¹ (F₂) may be considered as the best treatment in terms of growth and tuber yield (21.33 t ha⁻¹).
2. The next best treatment combination D₂S₁F₂ (November 1st planting at a spacing of 75 x 20 cm with NPK @ 160:80:200 kg ha⁻¹) was recorded the maximum tuber yield (19.56 t ha⁻¹).
3. It is worth to mention that yield per hectare was at the highest with 60 x 20 cm spacing due to more number of plants per unit area and thus the combination of D₂S₁F₂ was excelling over D₁S₁F₂.

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