

## Effect of Different Levels of Nitrogen, Phosphorus and Potassium with Mulching on Fruit Growth and Yield of Strawberry (*Fragaria x ananassa*) cv. Sweet charley

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### Abstract:

*The experiment was carried out in fruit Research Farm, during Mid-November to 30- March with following combination of which was T<sub>0</sub> (control), T<sub>1</sub> (N.P.K120:50:50), T<sub>2</sub> (N.P.K120:40:40), T<sub>3</sub> (N.P.K120:30:30), T<sub>4</sub> (N.P.K100:50:50), T<sub>5</sub> (N.P.K100:40:40), T<sub>6</sub> (N.P.K100:30:30), T<sub>7</sub> (N.P.K80:50:50), T<sub>8</sub> (N.P.K80:40:40), T<sub>9</sub> (N.P.K80:30:30), T<sub>10</sub> (N.P.K60:60:60), T<sub>11</sub> (N.P.K50:50:50), T<sub>12</sub> (N.P.K40:40:40). The cultivar of strawberry was "sweet charley". The highest high plant (9.17 cm) was recorded in T<sub>12</sub> and the highest plant spread (26.03) and the maximum fruit yield per plot (1.20) kg was recorded with T<sub>2</sub>. NPK 120:40:40, was obtained in treatment and the aimed of this research was to see the effect of treatment combination on growth and economic of strawberry plant.*

**Key words:** strawberry (*Fragaria x ananassa*, plant height, leaves number, plant spread, and "sweet charley"

## **Introduction**

The modern cultivated strawberry (*Fragaria x ananassa* Duchene) is one of the most delicious and refreshing soft fruit of the world. Worldwide, it is the most widely distributed fruit crop due to its genotypic diversity, highly heterozygous nature and broad range of environment adaptations, (Childers et al., 1995). Its plants are cherished in gardens and in commercial fields for its beautiful red soft fruit with a tantalizing aroma (Sharma and Yamdagni 1999) Strawberry is a profitable fruit crop in the shortest possible time as compared to the other fruits. The fruits are delicious and attractive, having pleasant aroma and a delicate flavour. It is also nutritious and beneficial to anemic patients. Rich in Vitamin C, strawberry also provided iron and mineral. Strawberry can reduce the risk of developing cancer 5% -50% due to the high levels of vitamin C as well as foliate and phytochemical compound such as the elegiac acid present in this fruit. Being a rich source of vitamins and mineral coupled with delicate flavours strawberry has now become an important table fruit of million of people around the globe (Sharma and Singh 1999). Beside vitamin C, strawberry is also fairly a good source of vitamin A (60 IU/100 g of edible portion). Strawberry also has high pectin (0.55%), available in the form of calcium pectate, which serves as an excellent ingredient for jelly making Fresh fruits are the major source for the vitamin C required in the human diet. For example, depending on the age group, the daily requirement for vitamin C is about 60 – 90 mg (Johnson M.S. and Fennimore S.A. 2005) . The size, the shape, the color, the firmness, the acidity, the sweetness and the overall fruit flavor make strawberry, one of the most popular spring and summer fruits (U.S. Department of Agriculture, Agricultural Research Service. (2006) It is therefore important to know when ripe vitamin C concentration is higher. Complex interplay between temperature and day length directly influence the content of vitamin C and total

acidity of strawberry fruits (Lester G.E. 2006) Mulching of soil is an old practice aimed primarily to conserve moisture in soil and reduce the intensity of emergence of weed flora, thus increasing yield and quality of fruit in cultivated plants. In addition, mulching changes temperature conditions of the soil and of the air lying immediately above soil, facilitates the movement in the field, and reduces the level of soil erosion. Applying organic mulch (straw, leaves, compost, or similar), further benefits achieved are the increase of organic matter in soil and the stimulation of development of soil micro- and macro-flora. In addition to natural materials, plastic foil is used for mulching more and more often, because of their simple application, ease of manipulation and removal from the field. The application of plastic foil in viticulture becomes more common since the 1960s, primarily to prevent drying of soil and emergence of weeds in the grapevine nurseries and young vineyards (Branas, 1969).

## Material and Methods

The present investigation on growth and yield of strawberry was conducted at research farm, Department of Horticulture, SHIATS, Allahabad during the winter (Rabi) season of 2013-2014. The objective was to find put the best combination of NPK with mulching on growth and yield of strawberry for this region and the method of the plant runner manner.

### Treatments Detail:

- T<sub>0</sub> - Control
- T<sub>1</sub> - 120kg N + 50 kg P O + 50 kg K O  
2 5 2
- T<sub>2</sub> - 120kg N + 40 kg P O + 40 kg K O  
2 5 2
- T<sub>3</sub> - 120kg N + 30 kg P O + 30 kg K O  
2 5 2
- T<sub>4</sub> - 100kg N + 50 kg P O + 50 kg K O  
2 5 2

T <sub>5</sub>	-	100kg N + 40 kg P <sub>2</sub> O <sub>5</sub> +40 kg K <sub>2</sub> O
T <sub>6</sub>	-	100kg N + 30 kg P <sub>2</sub> O <sub>5</sub> + 30 kg K <sub>2</sub> O
T <sub>7</sub>	-	80kg N + 50 kg P <sub>2</sub> O <sub>5</sub> + 50 kg K <sub>2</sub> O
T <sub>8</sub>	-	80kg N + 40 kg P <sub>2</sub> O <sub>5</sub> +40 kg K <sub>2</sub> O
T <sub>9</sub>	-	80kg N + 30 kg P <sub>2</sub> O <sub>5</sub> +30 kg K <sub>2</sub> O

A normal sized flat bed (1.0 m × 1.0 m) was prepared in the departmental nursery on 15 November 2013. After arriving seedling to second true leaves, uniform size and healthy seedlings were selected for the transplanting into the sack to planting seedling separately. after arriving to the forth true leaves transplanting was done into the main field . The fertilizer was applied @ recommended dose viz., NPK with mulching applied as a basal dose After transplanting and well mixed with the soil and adding 1.5 kg and 2.5 kg farm yard manure (FYM) per m<sup>2</sup> according to the treatments. Remaining dose of nitrogen was applied at 15 days after first add fertilazer one three time

## Results and Discussion

### Plant height

The data presented in table 1 clearly showed that the NPK with mulching played significant role in affecting plant height. The maximum plant high was recorded statistically significant NPK 40:40:40 with mulching was recorded (9.17 cm) which was superior over control (5.97 m). There was significant difference at 5% level with other treatments also. The minimum plant height was T<sub>0</sub> control (5.9 cm). Similar result found by Umar , Pandey and Mishra, Kirk D. Larson and A. Abou El-Yazied

### Plant spread (cm)

showed a remarkable difference with different treatments. The maximum plant spread 26.03cm was found with T10 - NPK 60:60:60 with mulching followed by 25.27cm with T12 - NPK 40:40:40 with mulching and minimum 19.67 cm was found with T0 (control).

The increase in plant spread may be due to the fact that between different level of NPK with mulching findings These results are in close conformity with the findings of many research workers, Singh et al (2008) and Nazir et al (2006)

### **Fruit yield per plot (kg)**

The data on the fruit yield as influenced by different NPK level It is evident from the table that maximum yield / plot (1.20) kg was recorded with T2. NPK 120:40:40, followed by (1.08) kg per plot with T1 – NPK120:50:50 The minimum yield per plot was noticed in T0 control (0.30 kg). Similar result found by Radiyala and Bhutani (1990) and Ahmed et al.

### **Conclusion**

Based on the result of experiment it was aimed to identify suitable treatment for strawberry with respect to growth and economic of strawberry during November to May .it may be concluded that the treatment T12 NPK 40:40:40 was recorded the best among treatment combinations on growth . The treatment T12 was obtained The highest High plant (9.17 m) and the highest ,and T8 NPK 80:40:40 plant spread (26.03cm) and T2. NPK 120:40:40 was recorded on yield / plot (1.20) kg.

### **Discussion**

Despite its economic importance, growers are not in a position to produce high productivity due to various biotic (pest and diseases), abiotic (rainfall, temperature, relative humidity and light intensity) and crop factors (flower and fruit drop). Due to

erratic behavior of weather, the crops grown in open field are often exposed to fluctuating levels of temperature, humidity, wind flow etc. Besides this, limited availability of land for cultivation hampers the vegetable production. Hence, to obtain a good production during off season, there is a need to The plant growth in terms of height and spread increased with application of NPK at all successive stage of growth. The treatment combination T12 NPK40:40:40 showed the maximum plant height (9.17 cm) and plant spread (26.03 cm). Minimum plant height (5.97 cm) and plant spread (19.67 cm) was observed with treatment T0(control) and Maximum number of leaves (9.53 cm ) per plant and minimum number of leaves (5.87 ) per plant was noticed in treatment T0 (control) and So far the economics of different treatments concerned the high cost benefit ratio (29.35) was observed with T8 NPK 80:40:40 and least (7.14) was recorded with treatment T0 (control).

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**Table 1: Effect of different levels of N P K on plant height, no of leaves and plant spread of strawberry**

Treatments	Plant height	Fruit yield per plot (kg)	Plant spread
T <sub>0</sub> Control with mulching	5.97	5.87	19.67
T <sub>1</sub> NPK 120:50:50 with mulching	7.17	7.20	22.53
T <sub>2</sub> NPK 120:40:40 with mulching	6.97	7.40	23.37
T <sub>3</sub> NPK 120:30:30 with mulching	7.53	0.30	22.47
T <sub>4</sub> NPK 100:50:50 with mulching	6.93	1.08	23.13
T <sub>5</sub> NPK 100:40:40 with mulching	6.87	1.20	24.17
T <sub>6</sub> NPK 100:30:30 with mulching	7.63	0.60	22.07
T <sub>7</sub> NPK 80:50:50 with mulching	7.10	0.66	23.20
T <sub>8</sub> NPK 80:40:40 with mulching	8.17	0.90	24.63
T <sub>9</sub> NPK 80:30:30 with mulching	7.30	0.38	22.70
T <sub>10</sub> NPK 60:60:60 with mulching	8.43	0.69	26.03
T <sub>11</sub> NPK50:50:50 with mulching	8.40	0.45	24.93
T <sub>12</sub> NPK40:40:40 with mulching	9.17	0.63	25.27
<b>F- test</b>	S	S	S
<b>SEd (±)</b>	0.743	0.118	1.383
<b>C.D (P = 0.05)</b>	1.534	0.244	2.854