

Effect of Different Levels of Foliar Spray of Water-soluble Fertilizer NPK on Growth, Yield and Quality of Prickly Lettuce (*Lactucaserriola*).

Comment [U1]: Obvious words

Comment [U2]: It is preferable to remove the scientific name from the title and include it only in keywords

ABSTRACT

A trial was conducted to evaluate the foliar application of fertilizer on growth, yield & quality of prickly lettuce at Vegetable Research farm, Department of Horticulture, SHUATS. Results revealed that treatment T4 performed best in terms of growth parameters viz; plant height, leaf area, number of leaves per plant, plant spread, leaf area, yield parameters viz; yield per plant, yield per hectare and quality parameters viz; TSS (°Brix) and ascorbic acid (mg/100g).

Keywords: Prickly Lettuce; *Lactucaserriola*; NPK; vegetable foliar spray

Comment [U3]: Include general objective at the beginning, Experimental design used, treatments (quantity and its repetitions), parameters evaluated, analyzes used and the most important results.

1. INTRODUCTION

Prickly Lettuce, a native to the Mediterranean region is. The plant is sometimes called wild lettuce, China lettuce or compass plant because the leaves on the main stem are held vertically in a north-south plane, perpendicular to direct sunlight.

It is an annual or biennial plant in the family Asteraceae. It has a slightly fetid odor and is commonly considered a weed of orchards, roadsides and field crops. It is the closest wild relative of cultivated lettuce (*Lactuca sativa* L.) and is the wild progenitor of cultivated lettuce (*Lactuca sativa*).

It can be eaten as a salad, although it has something of a bitter taste. Young leaves can be eaten raw or cooked. Older leaves can be steamed. While unsubstantial, its roots have been used as a coffee substitute.

Prickly lettuce is highly drought tolerant. Its taproot extends 3 feet or more, and it can therefore tolerate drying of the low layer. Prickly lettuce has greater taproot length per unit plant weight, number of lateral roots per unit taproot and lateral number near the bottom of the taproot compared to cultivated lettuce. The leaves orient vertically in a north-south plane, which allows maximum photosynthesis early and late in the day while reducing overheating and water stress at mid-day. The objectives of this study was to find out suitable combination of water soluble fertilizer of nitrogen, potassium and phosphorus for growth, yield and quality of prickly lettuce and to estimate the economics of the various treatments.

Comment [U4]: Use citations not older than 10 years. Include results of other previous studies, in addition the general objective is not observed at the end of the introduction

2. MATERIALS AND METHOD

Comment [U5]: Include geographic coordinates

More procedurally describe the experiment setup process so that readers can replicate the experiment

parameters evaluated?
used statistical analysis and software?

list the formulas used

The experiment was conducted at Vegetable Research Field, Department of Horticulture, Naini Agricultural Institute, Sam Higginbottom University of Agriculture, Technology & Sciences (SHUATS), Prayagraj (UP) during 2023. This experiment was conducted in the experimental field .

Table no 1 shows the details of the various material used and methods adopted in carrying out experiment :-

| TREATMENT NOTATION | SOLUTION | TIMES OF APPLICATION |
|---------------------------|---|---|
| T ₀ | Control (no Fertilizer) | |
| T ₁ | Full NPK | N-Two split doses P and K –once at the time of transplanting |
| T ₂ | 30mg/L N through liquid fertilizer 19:19:19 + basal dose 25:15:15g | 25 times |
| T ₃ | 60mg/L N through liquid fertilizer 19:19:19 + basal dose 25:15:15g | 12 times |
| T ₄ | 90mg/L N through liquid fertilizer 19:19:19 + basal dose 25:15:15g | 8 times |
| T ₅ | 120mg/L N through liquid fertilizer 19:19:19 + basal dose 25:15:15g | 7 times |
| T ₆ | 1500mg/L N through liquid fertilizer 19:19:19 + basal dose 25:15:15g | 6 times |
| T ₇ | 1800mg/L N through liquid fertilizer 19:19:19 + basal dose 25:15:15g | 5 Times |

Table no 2. Performance of different treatment combination of different level of foliar spray of water soluble fertilizer N.P.K on growth , yield , and quality of Prickly Lettuce.

| TREATMENT NO | TREATMENT DETAIL | PLANT HEIGHT (cm) (30DAT) | NUMBER OF LEAVES (30DAT) | PLANT SPREAD (cm) (30DAT) | LEAF AREA (cm ²) | YIELD PER PLANT (kg) | TOTAL YIELD (q/ha ⁻¹) |
|----------------|--|---------------------------|--------------------------|---------------------------|------------------------------|----------------------|-----------------------------------|
| T ₀ | Control | 14.66 | 10.3 | 14.5 | 35.16 | 10.82 | 21.60 |
| T ₁ | 0 mg/L N through liquid fertilizer 19:19:19 + 50% basal dose 25:15:15g | 20.83 | 10.6 | 19.83 | 38 | 11.55 | 23.1 |
| T ₂ | 30 mg/L N through liquid fertilizer 19:19:19 + 50% basal dose 25:15:15g | 23.66 | 13 | 15.16 | 36.66 | 11.48 | 22.96 |
| T ₃ | 60 mg/L N through liquid fertilizer 19:19:19 + 50% basal dose 25:15:15g | 20 | 11 | 14.83 | 41.16 | 11.82 | 23.64 |
| T ₄ | 90 mg/L N through liquid fertilizer 19:19:19 + 50% basal dose 25:15:15g | 23.66 | 14 | 21.67 | 41.16 | 13.06 | 26.12 |
| T ₅ | 120 mg/L N through liquid fertilizer 19:19:19 + 50% basal dose 25:15:15g | 19.83 | 11.6 | 20 | 37.08 | 11.7 | 22.78 |
| T ₆ | 150 mg/L N through liquid fertilizer 19:19:19 + 50% basal dose 25:15:15g | 19 | 12.6 | 14.16 | 35.66 | 11.07 | 22 |
| T ₇ | 180 mg/L N through liquid fertilizer 19:19:19 + 50% basal dose 25:15:15g | 17 | 11.3 | 15.16 | 36.14 | 11.5 | 23.00 |
| | F- Test | S | S | S | S | S | S |
| | S.Ed(±) | 1.86 | 1.54 | 0.94 | 1.13 | 0.26 | 0.43 |
| | C.D@5% | 3.98 | 3.31 | 2.02 | 2.42 | 0.56 | 0.91 |
| | C.V | 12.10 | 15.97 | 6.54 | 3.74 | 14.49 | 4.42 |

Table no 3. Effect of different level of foliar spray of water soluble fertilizer N.P.K on various treatment combinations of Prickly Lettuce .

| TREATMENTS | COST OF CULTIVATION (Rs/ha ⁻¹) | TOTAL YIELD (q/ha ⁻¹) | SELLING RATE (Rs/kg) | GROSS RETURN (Rs/ha ⁻¹) | NET RETURN (Rs/ha ⁻¹) | BENEFIT COST RATIO |
|------------|--|-----------------------------------|----------------------|-------------------------------------|-----------------------------------|--------------------|
| T0 | 18640 | 21.60 | 30 | 64800 | 46160 | 2.47 |
| T1 | 18940 | 23.1 | 30 | 69300 | 50360 | 2.66 |
| T2 | 19000 | 22.96 | 30 | 68880 | 49880 | 2.63 |
| T3 | 19060 | 23.64 | 30 | 70920 | 51860 | 2.72 |
| T4 | 19120 | 26.12 | 30 | 78360 | 59240 | 3.10 |
| T5 | 19180 | 22.78 | 30 | 68340 | 49160 | 2.56 |
| T6 | 19240 | 22 | 30 | 66420 | 47180 | 2.45 |
| T7 | 19300 | 23.00 | 30 | 69000 | 49700 | 2.57 |

3. RESULTS AND DISCUSSION

Comment [U6]: Update references used.
Improve reference format

3.1 Plant Height at 15 DAS

Data reveals that there was a significant effect of various treatment on plant height at 15 days after transplanting. Among different levels of NPK fertilizers T4(90 mg/L N through liquid fertilizer 19:19:19 + 50% basal dose 25:15:15g) recorded maximum height of 15.83 cm whereas minimum plant height of 10 cm was recorded in T0 (Control).

3.2 Plant Height at 30 DAT

Data reveals that there was a significant effect of various treatment on plant height at 30 days after transplanting. Among different levels of NPK fertilizers T4(90 mg/L N through liquid fertilizer 19:19:19 + 50% basal dose 25:15:15g) recorded maximum height of 23.66 cm whereas minimum plant height of 14.66 cm was recorded in T0 (Control).

3.3 Number of Leaves per Plant

Data reveals that there was a significant effect of various treatment on number of leaves per plant. Among different levels of NPK fertilizers T4(90 mg/L N through liquid fertilizer 19:19:19 + 50% basal dose 25:15:15g) recorded maximum number of leaves per plant of 11.6 whereas minimum number of leaves per plant of 10.3 was recorded in T0 (Control).

3.4 Plant Spread

Data reveals that there was a significant effect of various treatment on number of leaves per plant. Among different levels of NPK fertilizers T4(90 mg/L N through liquid fertilizer 19:19:19 + 50% basal dose 25:15:15g) recorded maximum number of leaves per plant of 21.67 whereas minimum number of leaves per plant of 14.5 was recorded in T0 (Control).

3.5 Leaf Area

Data reveals that there was a significant effect of various treatment on leaves area. Among different levels of NPK fertilizers T4(90 mg/L N through liquid fertilizer 19:19:19 + 50% basal dose 25:15:15g) recorded maximum leaf area of 41.16cm² whereas minimum leaf area of 35.16cm² was recorded in T0 (Control).

3.6 Leaves Yield per plot

Data reveals that there was a significant effect of various treatment on leaves yield. Among different levels of NPK fertilizers T4(90 mg/L N through liquid fertilizer 19:19:19 + 50% basal dose 25:15:15g) recorded maximum leaves yield per plot of 13.06 kg whereas minimum leaves yield per plot of 10.82 kg was recorded in T0 (Control)

It showed that combined application of nitrogen, phosphorus, and potassium resulted in significantly higher plant height, leaf number, as compared to individual nutrient treatments. Its application maintained a balanced ratio of nitrogen, phosphorus, and potassium is important for maximizing the vegetative growth and yield of prickly lettuce. And also resulted in improved leaf quality, enhanced water-use efficiency, and increased resistance to pests and diseases.

4. CONCLUSION

From the above experimental finding, it is concluded that the treatment T4 was found to be best in terms of growth, yield and quality. The highest B:C ratio was found in the same treatment with 3.10.

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