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

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(^{o}Brix) and ascorbic acid(mg/100g).

Keywords: Prickly Lettuce;*Lactuca serriola*; NPK; vegetable foliar spray

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 objectivesof 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.

2.MATERIALS AND METHOD

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

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).

3.3Number 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 fertilizersT4(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 fertilizersT4(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 fertilizersT4(90 mg/L N through liquid fertilizer 19:19:19 + 50% basal dose 25:15:15g) recorded maximum leaf area of 41.16cm^2 whereas minimum leaf area of 35.16cm^2 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.

REFERENCES

1. Rahul Mishra , Samir E. Toppno , Anita Kerketta and Suhel Eraqui (2023) Effect of Different Levels of Foliar Spray of Water-soluble Fertilizer NPK on Growth, Yield and Quality of Curly Kale (Brassica oleracea var. Acephala) Department of Horticulture, Sam Higginbottom University of Agriculture Technology and Science, Prayagraj-211007, (U.P), India Volume 13, Issue 9, Page 3250-3254

2. M.A, Hasan, A.K.M.MJahsin,M.N. Islam, M.A.Ali and J. Uddain (2014).The present study was conducted to determine the optimum level of nitrogen fertilizer and proper plant spacing for better growth and yield of lettuce.Sher-e-Bangla Agriculture University, Dhaka. 304-312

3. Sharma,-D-K., Chaudhary,-D-R., Pandey,-D-P. 2001. Growth and yield of lettuce cv. Alamo-1 as influenced by dates of planting and plant density. Varanasi, India: Indian Society of Vegetable Science. Vegetable-Science, 28(1): 38-39.

4. Sodkowski, P. and Rekowska, E. 2003. The effect of covering and cultivation methods on crisp lettuce yields. Folia Horticulturae, 15(1): 19-23

5.Steingrobe,T.and Schenk,D.(1994).Effect of transplanting and plant spacing on seed yield and yield characters in lettuce.Karnataka Journal of Agricultural Science,5(4):357-361

6.Martin R Broadley, Ido seginer, Amanda Burns, Abraham J Escobar –Gutierrez,Lan G Burns, Philips J white (2003).Quantifying and stimulating the relationships between crop growth, total nitrogen and nitrate concentration can improve crop nutritional husbandary.

7.Moniruzzaman,M(2006).Effects of plant spacing and mulching on yield and profitability of lettuce.Journal of Agriculture and Rural Development,4(1/2):107-111