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Nilesh Sharma
Ph.D Scholar, Department of Horticulture (Vegetable Science), RVSKVV, Gwalior (MP), India

Dr. Rajesh Lekhi
Professor and Head, Department of Horticulture, RVSKVV, Gwalior (MP), India

Corresponding Author:
Nilesh Sharma
Ph.D Scholar, Department of Horticulture (Vegetable Science), RVSKVV, Gwalior (MP), India

Effect of different nitrogen level on growth of potato cv. Kufri Chipsona-1

Nilesh Sharma and Dr. Rajesh Lekhi

Abstract
The experiment was laid out in Factorial Randomized Block Design with three replications consisting of thirteen treatment combinations of nitrogen levels. The observations of morphological parameters on different aspects such as days to emergence, days to 50% emergence, plant height, number of shoots per plant and number of compound leaves were calculated. Result revealed that minimum and maximum days to emergence, days to 50% emergence, plant height, number of shoots per plant and number of compound leaves per plant in first year, second year and in pooled were found the significantly superior nitrogen level among all levels of nitrogen.

Keywords: Morphological parameters, significantly superior, Nitrogen level

Introduction
Potato (*Solanum tuberosum* L.) belonging to family solanaceae, is one of the most important vegetable crop which is originated in South America and is an auto tetraploid with 2n=48. This crop is unique and different from other crops as it stores food material in underground stem parts called tubers. This tuber crop is one of the major crops contributing in the world's food security and is widely grown crop ranking fourth after rice, wheat and maize (Rana, 2008) [8]. It is an economical food which provides a source of low cost energy to the human diet and is a rich source of starch, vitamins, especially B and C and minerals (Kumar *et al*. 2013) [3]. Nitrogen application plays a key role in crop growth and development resulting in increased size and number of both processing and non-processing grade tubers ultimately enhancing total yield, while excessive application leads to delayed maturity, poor tuber quality and occasional reduction in tuber yield. Nitrogen uptake in potato on per day basis is sometimes even more than 1.5 kg / ha during active growth period. Excessive N fertilizer at or before the tuberisation can extend the vegetative growth period and delay the tuber development, resulting in a lower tuber yield. However, N applied later in the season can delay the maturity of the tubers, reducing yield and adversely affecting the tuber quality and skin set. Conversely low application of N at any point of the season can result lower tuber yield and can reduce profit. Nitrogen is a mobile nutrient in the soil and can lead to loses via leaching and surface runoff. These factors make the appropriate N rate critical for successful white potato production (Phillips *et al*. 2004) [7]. The deficiency of N is manifested in the detrimental effect on the growth and development of plant. Nitrogen plays a vital role in potato production and many scientists have studied the effect of N fertilizer rate on yield of potato cultivars.

Method and Materials
The present experiment was conducted at the experimental field, Department of Horticulture, College of Agriculture, Gwalior. The soil of the experimental field was sandy loam with good drainage and uniform texture with very low, medium and medium NPK status, respectively. The experiment was laid out in the Factorial Randomized Completely Block Design with three replications. Each replication was comprised of thirteen treatment combinations involving three levels of nitrogen (100, 120 and 140 kg/ha) after planting of potato variety Kufri chipsona-1. Kufri Chipsona-1 was develop with the crossing of MEX. 750826 and MS/78-79, and released in 1998 by CPRI. It is a medium maturing (90-100 days), high yielding (40 t ha^{-1}) variety and resistant to late blight disease.

The observations of morphological parameters on different aspects such as days to emergence, days to 50% emergence, plant height, number of shoots per plant and number of compound leaves were recorded during research work. Pre-planting seed treatment was done with Mancozeb 0.2% solution for 10 minutes and spread at a cool and moist place so that the check fungal infection.

Result and Discussions

Days to emergence

Result revealed that the minimum days to emergence (7.71, 7.72 and 7.72) in first year, second year and in pooled were recorded in treatment N_3 and it was found the significantly superior nitrogen level among all levels of nitrogen, whereas the maximum days to emergence (8.38, 8.38 and 8.38) in first year, second year and in pooled were observed in treatment N_1, among in nitrogen levels.

Days to 50% emergence

Result showed that the minimum days to 50% emergence (9.56, 9.57 and 9.56) in first year, second year and in pooled were recorded in treatment N_3 and it was found the significantly superior nitrogen level among all levels of nitrogen, whereas the maximum days to 50% emergence (11.64, 11.65 and 11.64) in first year, second year and in pooled were observed in treatment N_1, among in nitrogen levels.

Plant height

Among in nitrogen levels, the maximum plant height (25.96, 26.13 and 26.04 cm) at 30 DAP, (40.54, 40.56 and 40.55 cm) at 45 DAP and (44.12, 44.20 and 44.16 cm) at 60 DAP in first year, second year and in pooled were found in treatment N_3 and it was found the best nitrogen level among all levels of nitrogen, whereas the minimum plant height (23.31, 23.43 and 23.37 cm) at 30 DAP, (37.56, 37.38 and 37.47 cm) at 45 DAP and (42.18, 42.19 and 42.19 cm) at 60 DAP in first year, second year and in pooled were recorded in treatment N_1.

Number of shoots per plant

It was evident from the above that the treatment N_3 was found the best treatment for influencing the number of shoots per plant and it gave the maximum number of shoots per plant (4.00, 4.01 and 4.00) at 30 DAP, (4.59, 4.60 and 4.60) at 45 DAP and (5.20, 5.18 and 5.19) at 60 DAP in first year, second year and in pooled, while the minimum number of shoots per plant (3.30, 3.31 and 3.31) at 30 DAP, (3.90, 3.91 and 3.90) at 45 DAP and (4.49, 4.52 and 4.52) at 60 DAP in first year, second year and in pooled were observed in treatment N_1, among in nitrogen levels. Similarly, the rate of leaf appearance increased drastically due to more branching by high nitrogen level (Carlos Arberto Da Silva Oliveria, 1999) [1].

Number of compound leaves

It was evident from the above that the treatment N_3 was found the best treatment for influencing the number of compound leaves in potato and it gave the maximum number of compound leaves per plant (12.92, 12.93 and 12.92) at 30 DAP, (19.28, 19.30 and 19.29) at 45 DAP and (27.11, 27.14 and 27.12) at 60 DAP in first year, second year and in pooled, while the minimum number of compound leaves per plant (10.82, 10.84 and 10.83) at 30 DAP, (17.31, 17.31 and 17.31) at 45 DAP and (25.01, 25.01 and 25.01) at 60 DAP in first year, second year and in pooled were observed in treatment N_1, among in nitrogen levels. Similarly, nitrogen content in potato foliage was twice as high as that in tubers and continuously increased with the N amount applied, and particularly with higher nitrogen fertilizer rates of N150–210 (Anoton Ruza *et al*. 2013) [10].

Table 1: Show the days of emergence

	Days to emergence			Days to 50% emergence		
Treatment	**Ist Year**	**IInd Year**	**Pooled**	**Ist Year**	**IInd Year**	**Pooled**
N_1	8.38	8.38	8.38	11.64	11.65	11.64
N_2	8.00	8.01	8.01	10.55	10.57	10.56
N_3	7.71	7.72	7.72	9.56	9.57	9.56
S.Em (d)	0.052	0.115	0.063	0.164	0.218	0.136
CD (AT 5%)	0.108	0.238	0.128	0.339	0.450	0.275

Table 2: Plant height (cm)

Treatment	**30 DAP**			**45 DAP**			**60 DAP**		
	Ist Year	**IInd Year**	**Pooled**	**Ist Year**	**IInd Year**	**Pooled**	**Ist Year**	**IInd Year**	**Pooled**
N_1	23.31	23.43	23.37	37.56	37.38	37.47	42.18	42.19	42.19
N_2	24.32	24.70	24.51	39.06	39.11	39.08	43.23	43.22	43.22
N_3	25.96	26.13	26.04	40.54	40.56	40.55	44.12	44.20	44.16
S.Em (d)	0.029	0.016	0.017	0.011	0.020	0.011	0.174	0.154	0.116
CD (AT 5%)	0.060	0.034	0.034	0.023	0.040	0.023	0.358	0.318	0.234

Table 3: Number of shoots per plant

Treatment	**30 DAP**			**45 DAP**			**60 DAP**		
	Ist Year	**IInd Year**	**Pooled**	**Ist Year**	**IInd Year**	**Pooled**	**Ist Year**	**IInd Year**	**Pooled**
N_1	3.30	3.31	3.31	3.90	3.91	3.90	4.49	4.52	4.50
N_2	3.67	3.67	3.67	4.28	4.27	4.27	4.89	4.87	4.88
N_3	4.00	4.01	4.00	4.59	4.60	4.60	5.20	5.18	5.19
S.Em (d)	0.109	0.026	0.056	0.107	0.029	0.056	0.116	0.027	0.060
CD (AT 5%)	0.226	0.053	0.113	0.221	0.060	0.112	0.239	0.055	0.120
N_1	3.30	3.31	3.31	3.90	3.91	3.90	4.49	4.52	4.50

Table 4: Number of compound leaves per plant

Treatment	30 DAP			45 DAP			60 DAP		
	Ist Year	IInd Year	Pooled	Ist Year	IInd Year	Pooled	Ist Year	IInd Year	Pooled
N_1	10.82	10.84	10.83	17.31	17.31	17.31	25.01	25.01	25.01
N_2	11.84	11.83	11.83	18.60	18.61	18.61	26.30	26.31	26.31
N_3	12.92	12.93	12.92	19.28	19.30	19.29	27.11	27.14	27.12
S.Em (d)	0.205	0.198	0.142	0.169	0.203	0.132	0.186	0.204	0.138
CD (AT 5%)	0.422	0.408	0.287	0.348	0.420	0.266	0.384	0.422	0.279

Reference

1. Carlos Arberto Da Silva Oliveria. Potato crop growth affected by nitrogen and plant density. Pesq. Agropee. Bras, Brassilia. 1999;35(5):939-950.
2. Kumar P, Pandey SK, Singh SV, Singh BP, Singh K, Kumar D, *et al*. Effect of growth duration, N application and row spacing on productivity, profitability and processing quality of potato Potato Journal. 2011;38(2):137-142.
3. Kumar M, Baishaya LK, Ghosh DC, Gupta VK, Verma MR. Effects of organic manures, chemical fertilizers and biofertilizers on growth and productivity of rainfed potato in the eastern Himalayas. Journal of Plant Nutrition. 2013;36:1065-1082.
4. Maiti S, Banerjee H, Patra T, Pal S. Effect of nitrogen and phosphorus on the growth and tuber yield of potato in Gangetic plains of West Bengal. Journal of Interacademicia. 2004;8(4):555-558.
5. Najm AA, Haj Seyed Hadi MR, Fazeli F, Taghi Darzi M, Shamorady R. Effect of utilization of organic and inorganic nitrogen source on the potato shoots dry matter, leaf area index and plant height, during middle stage of growth. World Academy of Science, Engineering and Technology. 2010, 71.
6. Najm AA, Hadi MRHS, Darzi MT, Fazeli F. Influence of nitrogen fertilizer and cattle manure on the vegetative growth and tuber production of potato. International Journal of Agriculture and Crop Sciences. 2013;5(2):147-154.
7. Phillips SB, Warren JG, Keahey DA, Mullins GL. The effect of nitrate: ammonium ratios on nitrate reductase activity, nitrogen content, and yield of strawberry (fragaria × ananassa cv.selva). Crop Soil and Env. Sci. Publication. 2004, 438-442.
8. Rana MK. Olericulture in India. Kalyani Publishers, Ludhiana, 2008.
9. Reiter MS, Rideout SL, Freeman JH. Nitrogen fertilizer and growth regulator impacts on tuber deformity, rot, and yield for Russet potatoes. (Special Issue: N mineralization in production agriculture.) International Journal of Agronomy. 2012, Article ID 348754.
10. Ruza A, Skrabule I, Vaivode A. Influence of nitrogen on potato productivity and nutrient use efficiency. Processing of the Latvian academy of science. 2013;67(3):247-253.