The Pharma Innovation Journal 2022; 11(6): 2555-2557

www.ThePharmaJournal.com

The Pharma Innovation

ISSN (E): 2277-7695
ISSN (P): 2349-8242
NAAS Rating: 5.23
TPI 2022; 11(6): 2555-2557

www.thepharmajournal.com
Received: 15-03-2022
Accepted: 10-04-2022

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Effect of varieties and integrated nutrient management on growth and yield of potato (*Solanum tuberosum* L.)

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Abstract
The experiment was layout in split plot design with 3 replication. The main plot treatment was 3 varieties *viz.*, Kufri Sinduri (V_1), Kufri Chipsona (V_2) and Kufri Khyati (V_3) and 6 level of integrated nutrient management supply *viz*., 100% RDF through inorganic fertilizer (N_1), 100% RDF + $ZnSO_4$ (N_2), 75% RDF + @ 2 tonnes ha^{-1} Vermicompost (N_3), 75% RDF + @ 2 tonnes ha^{-1} Vermicompost + $ZnSO_4$ (N_4), 50% RDF + @ 4 tonnes ha^{-1} Vermicompost (N_5), 50% RDF + @ 4 tonnes ha^{-1} Vermicompost + $ZnSO_4$ (N_6) kept in sub plot. The crop was sown on 10 November, 2020-21. Seed rate of 20 q ha^{-1} was taken for sowing having a spacing of 60 cm x 20 cm. The results revealed that Kufri Khyati produced significantly taller plants of potato having maximum number of compound leaves $plant^{-1}$, shoots count $plant^{-1}$, dry weight of shoots $plant^{-1}$ and crop growth rate, fresh weight of tuber $plant^{-1}$, number of tuber $plant^{-1}$, which finally resulted in to highest yield and economic returns. Next superior variety was Kufri Sinduri. Amongst the integrated nutrient management the application of 100% RDF + $ZnSO_4$, caused significantly taller plant height, and higher number of compound leaves $plant^{-1}$, shoots count $plant^{-1}$, dry weight of shoots $plant^{-1}$ and crop growth rate, fresh weight of tuber $plant^{-1}$, number of tuber $plant^{-1}$, which finally gave the highest yield and economic return followed by 100% RDF (through inorganic fertilizer).

Keywords: Potato varieties, integrated nutrient management, vermicompost

Introduction
Potato (*Solanum tuberosum* L.) is one of the most important vegetables comes under family Solanaceae and ranks 4th in terms of production in the world after rice and maize. It is a distinctive and essential food crop of the world. Potato being exceedingly exhaustive and amenable to fertilizers, due to its increase rate of bulking per unit area and time, it also plays important role in solving hunger problem by expanding the productivity and efficiency of the resource in the production system. Potato is highly nutritious food crop it having 20% carbohydrates, 2.1% protein, 0.3% fat, 1.1% crude fiber and 0.9% ash present in potato. Potato also contains a good sum of Vitamin B, C and beneficial amino acids like leucine, tryptophan and isoleucine (Paul and Naik, 2003). Potato contains about 80% water and 20% dry matter. Starch is a substantial component of dry matter, accounting for over 70% of total solid. In comparison to maize, rice and wheat, the potato tuber generates more edible energy per unit area (Dutt 2008). The standard raw material composition of a potato dry matter 20% starch 13-16%, protein 2%, total sugar 0-2%, fiber 0.5% vitamin C 31mg/100g fresh weight, vitamin A trace/100 g fresh weight and ash 1-.1.5%. In the world, about 50% of potato produced is utilized as human food in the world (Shekhawat, 2001).

Materials and Method
The potato was grown on effect of varieties and integrated nutrient management treatments adopting the split-plot design which contains three replications. An experiment was carried out at Krishi Vigyan Kendra Ambikapur Surguja, Chhattisgarh during *rabi* season 2020-21. The experimental field consisted sandy clay loam (*Inceptisols*) in texture, and acidic in reaction (pH 6.5) the soil have low level of nitrogen and medium of phosphorus and potassium. The experiment was layout in split plot design with 3 replication. The main plot treatment was 3 varieties *viz.*, Kufri Sinduri (V_1), Kufri Chipsona (V_2) and Kufri Khyati (V_3) and 6 level of integrated nutrient management supply *viz*., 100% RDF through inorganic fertilizer (N_1), 100% RDF + $ZnSO_4$ (N_2), 75% RDF + @ 2 tonnes ha^{-1} Vermicompost (N_3), 75% RDF + @ 2 tonnes ha^{-1} Vermicompost + $ZnSO_4$ (N_4), 50% RDF + @ 4 tonnes ha^{-1} Vermicompost (N_5), 50% RDF + @ 4 tonnes ha^{-1} Vermicompost + $ZnSO_4$ (N_6) kept in sub plot. The crop was sown

on 10 November, 2020-21. Seed rate of 20 q ha^{-1} was taken for sowing having a spacing of 60 cm x 20 cm.

Result and discussion

Growth attributes

Kufri Khyati produced significantly taller plants of potato having maximum plant height (61.52 cm), number of compound leaves $plant^{-1}$ (49.63), shoots count $plant^{-1}$ (5.40), dry weight of shoots $plant^{-1}$ (39.77) and crop growth rate, (0.34) g day^{-1} $plant^{-1}$ as compared to Kufri sinduri and Kufri Chipsona. Among various nutrient management 100% RDF + $ZnSO_4$ produced significantly taller plants of potato having maximum plant height (65.16 cm), number of compound leaves $plant^{-1}$ (53.21), shoots count $plant^{-1}$ (6.73), dry weight of shoots $plant^{-1}$ (44.48) g $plant^{-1}$ and crop growth rate, (0.47) g day^{-1} as compared to other treatments.

Yield attributing characters of potato

Kufri Khyati (V_3) produced significantly higher no. of yield attributing characters *viz*.- number of tubers 11.84 $plant^{-1}$, fresh weight of tubers 234.62 g $plant^{-1}$, higher tuber yield 14.86 tonnes ha^{-1} as well as benefit cost ratio 1.69 over other varieties, and respect to Nutrient management Maximum fresh weight of tubers 235.44 g $plant^{-1}$, number of tubers 14.08 $plant^{-1}$, tuber yield 17.84 tonnes ha^{-1} also highest benefit cost ratio 2.36 was recorded with application of 100% RDF + $ZnSO_4$ (N_2) as compare to other treatments. This might be due to sufficient supply of nutrients which promoted larger, thick, dark green and succulent leaves production, and meristematic activities in plant cell. This also improves the efficient utilization of sunlight and other growth factors, which ultimately resulted the maximum production of photosynthesis and translocation from leaf to tubers. Findings by Kate *et al*. (2005), Banerjee *et al*. (2016) and Islam *et al*. (2013) [3, 1, 2]. Variation among the integrated nutrient responsible for increasing the number of tuber $plant^{-1}$ and fresh weight of tubers g $plant^{-1}$, that ultimately resulted in high potato tuber yield. The result corroborates the finding of Patel *et al*. (2010) [4]. Singh and Kuswaha (2006).

Table 1: Growth attributes

Treatment	Plant height (cm)	Compound leaves $plant^{-1}$	No. Shoot $plant^{-1}$	Dry weight of shoots (g $plant^{-1}$)	CGR
Variety					
V_1- Kufri Sinduri	61.03	48.73	4.83	38.30	0.31
V_2- Kufri Chipsona	59.92	48.04	4.63	37.28	0.27
V_3- Kufri Khyati	61.52	49.63	5.40	39.77	0.34
SEm±	0.26	0.27	0.14	0.46	0.02
CD (*P=0.05*)	1.05	1.08	0.55	1.83	0.06
Integrated nutrient management					
N_1- 100% RDF through inorganic Fertilizer	64.29	52.18	6.18	43.22	0.38
N_2 - 100% RDF + $ZnSO_4$	65.16	53.21	6.73	44.48	0.47
N_3 - 75% RDF + Vermicompost @ 2 tonnes ha^{-1}	60.07	49.73	5.06	39.87	0.30
N_4 - 75% RDF + Vermicompost @ 2 tonnes ha^{-1} + $ZnSO_4$	62.02	51.21	5.49	42.00	0.34
N_5 - 50% RDF + Vermicompost @ 4 tonnes ha^{-1}	55.50	41.59	2.74	28.11	0.11
N_6 - 50% RDF + Vermicompost @ 4 tonnes ha^{-1} + $ZnSO_4$	57.89	44.87	3.52	33.00	0.26
SEm±	1.74	2.05	0.44	2.81	0.05
CD (*P=0.05*)	5.04	5.94	1.27	8.12	0.15

Table 2: Yield attributing characters

Treatment	Fresh weight of tuber (g) $plant^{-1}$	Number of tuber $plant^{-1}$	Tuber yield Tonnes ha^{-1}	B:C
Variety				
V_1 - Kufri Sinduri	226.01	11.51	14.43	1.65
V_2 - Kufri Chipsonaa	156.14	10.41	13.31	1.46
V_3 - Kufri Khyati	234.62	11.84	14.86	1.69
SEm±	3.73	0.25	0.26	0.03
CD (*P=0.05*)	14.67	0.99	1.03	0.15
Integrated nutrient management				
N_1- 100% RDF through inorganic fertilizer	225.13	13.62	16.28	2.31
N_2 - 100% RDF + $ZnSO_4$	235.44	14.08	17.84	2.36
N_3 - 75% RDF + Vermicompost @ 2 tonnes ha^{-1}	204.38	11.37	14.17	1.66
N_4 - 75% RDF + Vermicompost @ 2 tonnes ha^{-1} + $ZnSO_4$	212.58	12.60	15.54	1.72
N_5 - 50%RDF + Vermicompost @ 4 tonnes ha^{-1}	175.67	6.66	9.58	0.65
N_6 - 50% RDF + Vermicompost @ 4 tonnes ha^{-1} + $ZnSO_4$	180.33	9.19	11.78	0.91
SEm±	6.97	0.40	0.53	0.07
CD (*P=0.05*)	20.14	1.17	1.57	0.21

References

1. Banerjee Hirak, Sarkar Sukamal, Prahlad Deb, Chakraborty Ivi, Sau Sayan, Ray Krishnendu. Zinc Fertilization in Potato: A Physiological and Bio-chemical Study International Journal of Plant & Soil Science, 2017.
2. Islam MM, Akhter S, Majid NM, Ferdous J, Alam MS. Integrated nutrient management for potato (*Solanum tuberosum*) in grey terrace soil. Australian Journal of Crop Science. 2013;7(9):1235-1241.
3. Kate DM, Solanke AV, Tiwari TK, Namade SM. Growth and yield of potato cultivars as affected by integrated nutrient management system. Journal of Maharashtra Agricultural Universities. 2005;30(2):236-237.
4. Patel CK, Chaudhari PP, Patel RN, Patel NH. Integrated nutrients management in potato-based cropping system in North Gujarat. Potato J. 2010;37(1-2):68-70.
5. Singh SP, Kushwah VS. Effect of integrated use of organic and inorganic sources of nutrients on potato (Solanum tuberosum) production. Indian Journal of Agronomy. 2006;51(3):236-238.