



ISSN (E): 2277-7695
ISSN (P): 2349-8242
NAAS Rating: 5.23
TPI 2022; SP-11(9): 3206-3209
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www.thepharmajournal.com
Received: 27-07-2022
Accepted: 30-08-2022

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Evaluation of potato varieties/genotypes in Kanker district of Chhattisgarh

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Abstract

A field experiment was conducted in the North Bastar Kanker District of Chhattisgarh to evaluate the performance of potato varieties for tuber growth, tuber yield and grades. The experiment was laid out in a randomized block design with three replication and ten treatments at College of Agriculture & Research Station, Kanker during the *rabi* 2021-22. Highest emergence percentage was observed in Kufri Pukhraj (80.18%). Kufri Lalit reported higher plant height (21.53 cm) at 30 DAP and Kufri Bahar reported higher plant height at 60 and 90 DAP (36.63 and 38.13 cm respectively). Kufri Lalit was observed maximum number of branches per plant at 60 & 90 DAP. Kufri Lalit reported higher number of compound leaves at 30, 60 & 90 DAP (17.00, 32.33 & 38.33 respectively). Kufri Lalit reported significantly maximum tuber yield per plot (63.30 kg) and tuber yield (70.33 t/ha). Highest percentage of Grade-C tuber was produced by Kufri Arun. The result of the study indicates that Kufri Lalit and Kufri Himalini have potential to grow successfully in North Baster Kanker Region it could be considered suitable for this region. If it suits into their cropping pattern, the variety may be a good option for farmers by increasing cropping intensity, benefit financially and meet their nutritional demands.

Keywords: Growth, potato, variety, yields performance, tuber yield

Introduction

Potato (*Solanum tuberosum* L.) known as Alu is an edible tuber yielding plant of the family *Solanaceae*. The potato plant is an annual herbaceous plant, typically propagated by planting tuber pieces that contain two or three eyes. Potato is popularly known as “The King of Vegetables” (Johora, 2017) [3]. Potato in India is grown under diverse agro-climatic conditions where planting and harvesting periods are different. In certain states, like Karnataka, Maharastra, Jharkand and hills of Chhattisgarh it is grown during *Kharif* season from June-July to September-October. In Chhattisgarh plains it is being cultivated from mid of October to mid of November and during *Kharif* in Mainpath hills of Surguja district. The sufficient information regarding use of suitable variety under Chhattisgarh condition is not available (Bhuwneshwari *et al.*, 2013) [1]. As per Directorate Horticulture and Farm Forestry, Chhattisgarh, the potato production in Chhattisgarh during 2020-21 was 614.05 thousand MT from 42.75 thousand ha area with a productivity of 14.36 t/ha.

A potato varietal trial, testing program was conducted in 2021 at the College of Agriculture & Research Station, Singarbhat, North Bastar Kanker (Chhattisgarh). The test consisted of ten varieties. This study measured the yielding capacity potato varieties and selections during one growing season at one location in Kanker. Yields were compared with other accepted varieties grown in the state and used as control or standard varieties in the varietal trial. This study provided valuable information for growers in determining the suitability of these varieties for production in Kanker district.

One of the most important factors in potato production is to obtain satisfactory yields of good quality potatoes. The efficient production of marketable potatoes per acre will determine to a large degree the success of the individual grower. Several factors contribute to successful potato production. One of the most important considerations is the selection of varieties. The present study reports the results of yield trials with ten varieties.

Materials and Methods

In this study, ten cultivars of potato (Kufri Khyati, Kufri Pukhraj, Kufri Chipsona-I, Kufri Lalit, Kufri Sinduri, Kufri Arun, Kufri Jyoti, Kufri Himalini, Kufri Mohan) representing different maturity groups that were planted in 2 December 2021. A randomized complete

block design with three replications was used. Total plot size was 10 m. × 3 m. Each replication consisted of 3 rows spaced 1 m. apart and comprising 0.75 m. plots per row. Each plot contained 5 row of the potatoes were planted on December 02 and harvested on 25 March 2022.

Ten hills from each plot were randomly selected for data collection of plant height, number of branches per plant, number of compound leaves per plant, number of tubers per plant, fresh weight of tubers per plant. Plant height was measured from the base of the plant to the terminal bud at 30, 60 and 90 DAP. Tuber collect from each plot were weighed in kg for yield determination. Tuber collected from each plot were sorted and classified into three grades: Grade-C potatoes with a diameter less than 28 mm, Grade-B potatoes with a diameter between 28 to 55 mm and Grade-A potatoes with diameter greater than 55 mm. To determine the percentage of potatoes of each grade within a plot the following formula was used:

$$\text{Percentage of Potatoes of Grade M} = (\text{Wg M} / \text{Wt}) \times 100$$

Where,

M = Grade A, B, and C

Wg = Potatoes from each grade and plot were weighed

Wt = Weight of all tubers from the same plot

The data recorded under the study were subjected to statistical

analysis as per standard procedure as suggested by Panse and Sukhatme (1985)^[5].

Results and Discussion

In the growth parameter highest emergence percentage was observed in Kufri Pukhraj i.e. 80.18% whereas, the lowest plant emergence was found in Kufri Mohan i.e. 26.32%. Kufri Lalit reported significantly higher plant height (21.53 cm) over other varieties but was at par with Kufri Bahar at 30 DAP reported significant higher plant. Kufri Bahar reported significant higher plant height (36.63 cm) at 60 DAP & reported maximum plant height (38.13 cm) at 90 DAP but it was at par with Kufri Pukhraj.

The variation in plant height among the different potato cultivars may be due to genetic and inherent character of cultivars of potato which is in accordance with the finding of Kumar *et al.*, (2008)^[4].

Kufri Lalit was observed maximum number of branches per plant at 60 & 90 DAP but it was at par with Kufri Sinduri. Kufri Lalit reported higher number of compound leaves (17.00, 32.33 & 38.33) at 30, 60 & 90 DAP but was at par with Kufri Sinduri (Table 1).

In the Yield attributes Kufri Lalit and Kufri Himalini reported significantly maximum number of tubers per plants (26.76 and 24.77).

Table 1: Performance of potato varieties on different growth parameters during *rabi* season

Variety	Germination %	Plant height (cm)			No. of branches/plant		No. of compound leaves/plant		
		30 DAP	60 DAP	90 DAP	60 DAP	90 DAP	30 DAP	60 DAP	90 DAP
Kufri Khyati	65.16	12.17	29.37	31.67	4.33	7.00	11.33	21.33	27.33
Kufri Pukhraj	80.18	18.07	35.87	37.17	4.00	6.66	13.33	22.33	30.33
Kufri Bahar	54.75	20.03	36.63	38.13	4.33	7.33	14.33	25.00	33.33
Kufri Chipsona-I	53.05	16.27	34.23	34.73	3.67	7.66	13.66	25.33	31.00
Kufri Lalit	60.96	21.53	34.17	34.47	5.00	10.33	17.00	32.33	38.33
Kufri Sinduri	62.76	16.40	33.07	34.37	4.67	9.00	16.33	28.67	33.67
Kufri Arun	61.56	12.00	22.63	24.73	3.67	7.00	12.33	12.33	20.33
Kufri Jyoti	53.95	14.77	26.27	27.37	3.33	7.33	10.00	17.00	23.00
Kufri Himalini	62.76	18.13	29.73	32.13	3.67	8.00	14.33	25.67	31.33
Kufri Mohan	26.32	15.97	30.97	32.17	3.67	5.66	14.33	20.67	26.67
SE (m)	11.22	1.57	2.38	2.36	0.67	1.18	2.33	4.02	2.20
CD	33.59	4.70	7.14	7.12	NS	NS	NS	NS	NS

Significant variations were observed in tuber weight per plant among the varieties. The average weight of tuber per plant ranged from 110 to 422 g. Kufri Sinduri reported maximum weight of tubers per plant (0.422 kg) which was at par with Kufri Lalit and Kufri Himalini.

Variation among different varieties with respect to number of tuber per plant and fresh weight of tuber per plant may be due to genetic differences or agro ecological condition which is in accordance with the findings of Kumar *et al.*, 2008^[4], Bhuvneshwari *et al.*, 2013^[1] and Preetham *et al.*, 2018^[6].

Kufri Lalit reported significantly maximum tuber yield per plot (63.30 kg) and tuber yield per hectare (70.33 tonne) which was at par with Kufri Himalini. Kufri Bahar reported minimum tuber yield per plot (10.66 kg) and tuber yield per hectare (11.84 t/ha) (Table 2).

The highest percentage of tuber Grade-A tubers was produced by Kufri Khyati. (Table 3 and Fig. 1) The highest percentage of Grade-B tuber was produced by Kufri Pukhraj followed by Kufri Bahar (Table 3 and Fig. 2).

The percentage of Grade-C potato was higher in all the varieties than the percentage of grade 'A' or grade 'B' potatoes. The range of weight of grade 'C' tuber was between 85.01 to 97.30 of total weight of all grades of same varieties. Highest percentage of Grade-C tuber was produced by Kufri Arun followed by Kufri Sinduri and lowest percentage of tuber was produced by Kufri Pukhraj (Table 3 and Fig. 3). These differences in the percentage of different grade among the varieties might be due to genetic variation or adoptability of the variety to the climatic conditions of the experimental site.

Table 2: Performance of potato varieties on yield attributes and yield during *rabi* season

Variety	No. of tubers/plant	Weight of tubers/plant (kg)	Tuber yield/plot (kg)	Tuber yield(q/ha)
Kufri Khyati	14.11	0.353	33.6	37.33
Kufri Pukhraj	13.52	0.338	32.10	35.66
Kufri Bahar	4.40	0.110	10.66	11.84
Kufri Chipsona-I	4.92	0.123	11.33	12.58
Kufri Lalit	26.76	0.406	63.30	70.33
Kufri Sinduri	18.23	0.422	43.30	48.11
Kufri Arun	14.31	0.358	34.02	37.80
Kufri Jyoti	10.53	0.263	25.03	27.81
Kufri Himalini	24.77	0.386	59.00	65.55
Kufri Mohan	11.95	0.299	28.30	31.44
SE (m)	0.99	0.032	2.61	2.04
CD	2.99	0.096	7.07	6.12

Table 3: Variety percentage by weight of different grades of tuber

Variety	Percentage by Weight of Tubers (%)		
	Grade-A	Grade-B	Grade-C
Kufri Khyati	1.23	6.14	92.63
Kufri Pukhraj	0.99	14.00	85.01
Kufri Bahar	0.30	13.03	86.67
Kufri Chipsona-I	0.54	8.13	91.33
Kufri Lalit	0.65	12.52	86.83
Kufri Sinduri	0.59	3.07	96.34
Kufri Arun	0.65	2.05	97.30
Kufri Jyoti	0.76	12.28	86.96
Kufri Himalini	0.59	9.35	90.06
Kufri Mohan	1.12	9.04	89.84

Summery and Conclusion

Among ten varieties tested, Kufri Lalit produced the maximum no. of tubers per plant, tuber yield per plot and tuber yield per ha followed by Kufri Himalini. The highest percentage of Grade-A, Grade-B and Grade-C tubers was produced by Kufri Khyati, Kufri Pukhraj and Kufri Arun respectively. Grade-C potatoes was higher in all the varieties then the percentage of Grade-A and Grade-B potatoes. The result of the study indicates that Kufri Lalit and Kufri Himalini have potential to grow successfully in North Baster Kanker Region of Chhattisgarh.

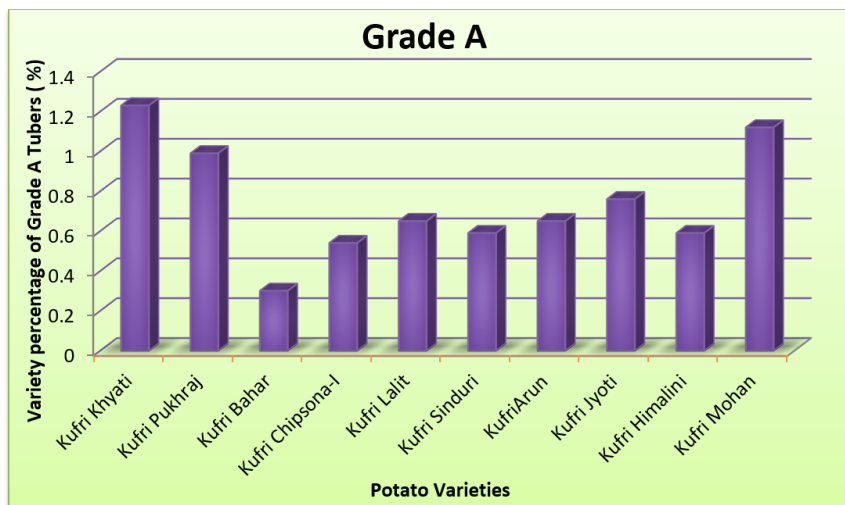


Fig 1: Variations among varieties in the percentage of Grade A

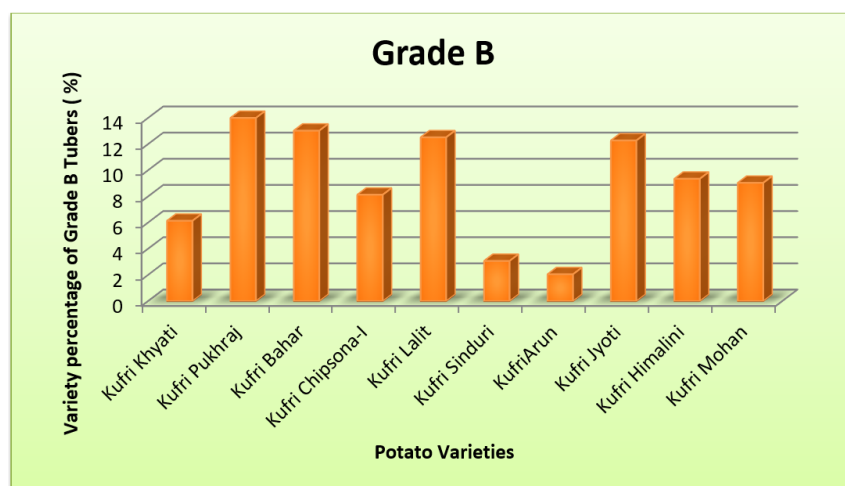


Fig 2: Variations among varieties in the percentage of Grade B

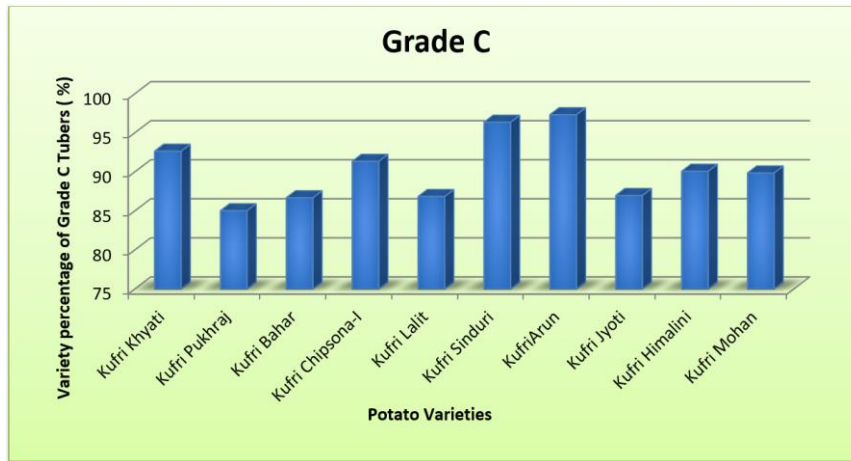


Fig 3: Variations among varieties in the percentage of Grade C

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