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Evaluation of table potato hybrids under southern dry zone of Karnataka

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Abstract

A field study was conducted on evaluation of table potato hybrids for three consecutive years during *Kharif* 2015 to 2017 at HREC, Hassan, Karnataka under AICRP-Potato. An experiment was conducted by using RCBD with four replications. The tubers were planted at 60 cm X 20 cm spacing with soil application of recommended dose of fertilizers (75:75:100 kg NPK/ha) and FYM (25 t/ha) as per the package of practices of UHS, Bagalkot. The genotypes such as AICRP-P-15, AICRP-P-22, AICRP-P-30, AICRP-P-31, Kufri Jyoti, Kufri Himalini, Kufri Pukhraj and Kufri Surya were evaluated for marketable, total tuber yield and rotting tubers during harvest at 75 and 90 days after planting. The pooled data of three years revealed that, Kufri Himalini recorded highest marketable tuber yield of 15.97 and 17.49 t/ha, total tuber yield of 18.23 and 19.97 t/ha at 75 and 90 DAP, respectively. Similarly, Kufri Himalini was noticed least rotting tubers of 0.64 and 0.72 t/ha at 75 and 90 DAP, respectively compared to other genotypes. It was concluded that hybrid Kufri Himalini was found best suitable table potato hybrid for production in Southern Dry Zone of Karnataka during *Kharif* season.

Keywords: Genotypes, tuber, yield and *Kharif*

Introduction

Potato (*Solanum tuberosum* L.) popularly known as 'The king of vegetables', is the fourth most important food crop in the world after rice, wheat and maize. It occupies the top most position among tuber crops followed by cassava, sweet potato and yams. Potato is an ideal crop grown very well in multiple cropping system in prevalent countries having tropical and sub-tropical agro-climatic conditions. Indian vegetable basket is incomplete without potato, because the dry matter, edible energy and protein content of potato makes it nutritionally superior vegetable as well as staple food not only in the country, but also throughout the world. Potatoes highly nutritious food being in itself close to a well balanced diet. Potato contains substantial quantity of energy, edible protein-2.8 g, starch-16.3 g, total sugar-0.6 g, crude fibre-0.5 g, carbohydrate-22.6 g and vitamin-C 25 mg per 100 g fresh weight of tubers (Bhuwneshwari *et al.*, 2013) [2].

It is grown over an area of 1.97 lakh hectares with the production of 344 lakh tones and average national yield per hectare is 21.10 tones in India and it is cultivated in an area of 41,000 hectares with the production of 3,61,000 tones in Karnataka (Anon, 2015) [1].

A variety development is an important process to replace old degenerated varieties with new varieties resistant to abiotic and biotic stress with better nutritional qualities. Besides, potato varieties shows wide variation in their yielding ability, when grown over a varied agro-climatic conditions. The yield and quality of potato depends upon soil, climatic conditions and variety or hybrid used. Moreover, different varieties have different soil and climatic requirements for their optimum performances. India in being a vast country with varied agro-climatic regions, a single variety or hybrid may not be suitable for all the agro-climatic conditions. Hence, new varieties are need to be introduced or evaluated for specific regions. Thus, keeping in above point, a study was conducted to evaluate best table potato hybrids for Southern Dry Zone of Karnataka.

Materials and Methods

A field study was conducted to evaluate table potato hybrids for three consecutive years during *Kharif* 2015 to 2017 at HREC, Hassan, Karnataka. An experiment was laid out in Randomized Complete Block Design (RCBD) with four replications. Eight genotypes *viz.* AICRP-P-15, AICRP-P-22, AICRP-P-30, AICRP-P-31, Kufri Jyoti, Kufri Himalini, Kufri Pukhraj and Kufri Surya were evaluated in the study. The land was prepared for the research before planting and FYM @ 25 t/ha was incorporated into soil.

The tuber planting was taken up during the first week of June in all three years by adopting scientific spacing of 60 cm x 20cm. The recommended dosage of NPK @ 75:75:100 kg/ha was incorporated. From the recommended quantity of nitrogen, 50 per cent of nitrogen applied at planting and remaining 50 per cent of nitrogen after 30 days of planting at earthing-up operation. The package of practices of UHS, Bagalkot was followed during different stages of crop growth and harvesting was done at 75 and 90 days after planting. An observations related to vegetative growth and yield attributes were recorded as follows.

Vegetative growth parameters

Plant emergence (%) at 30 days after planting

$$\text{Plant emergence (\%)} = \frac{\text{Total number of tubers germinated}}{\text{Total number of tubers sown}} \times 100$$

Plant height (cm)

The maximum plant height was measured from the ground to the tip of longest leaf documented at 45 days after planting. The mean of five plants in each treatment was worked out.

Plant width (cm)

The plant width was measured in north to south and east to west from five randomly selected plants at 45 days after planting.

Yield attributes

Marketable tuber yield (t/ha)

Out of total tubers obtained in each plant, all tubers were sorted in to four different grades based on their weight as small (<25g), medium (26-50g), large (51-75g) and extra-large (>76g). Out of these, excluding small tubers all other grades were considered as marketable and weight was recorded. Further using this data marketable tuber yield per hectare was calculated.

Total tuber yield (t/ha)

$$\text{Total tuber yield (t/ha)} = \text{Marketable tuber yield (t/ha)} + \text{Small tuber yield (<25 g)}$$

Rottage (t/ha)

The weight of rotten tubers were recorded and using the data rottage tubers per hectare was calculated.

Results and Discussion

Growth parameters

Three years experimentation revealed that plant emergence was significantly higher in AICRP-P-15 (86.89%) at 75 DAP and 88.70 per cent in Kufri Himalini at 90 DAP (Table.1). The variation in the plant emergence is due to genetic structure of variety and sprouting ability of tubers (Murlidhar *et al.*, 2018) [6]. The highest plant height was reported in AICRP-P-30 of 57.92 and 61.13 cm at 75 and 90 DAP, respectively (Table.1). The variation in plant height was reported by Sandhu *et al.* (2014) [8] and Sadawarti *et al.* (2016) [7] who stated that differences in plant height can be attributed to the differences in the prevailing weather conditions. Whereas, lower plant height is due to the lower temperature experienced by the plants leading to reduced allocation of assimilates. Besides, the variation in plant height among different potato cultivars may be due to genetic and inherent character of cultivars/hybrids of potato, which is in accordance with the findings of Kumar *et al.*, 2007, Bhuneshari *et al.*, 2013 and Enujeka, 2013 [5, 2, 3]. The highest plant width in East-West direction was noticed in AICRP-P-30 of 53.38 and 53.50 cm at 75 and 90 DAP, respectively (Table.2). Whereas, plant width in North South was significantly higher in AICRP-P-30 (52.63 cm) at 75 DAP and 54.25 cm in AICRP-P-22 at 90 DAP. The better performance of these varieties might be due to its genetic make-up and its better adoptability to prevailing environmental conditions (Gobana, 2002) [4].

Table 1: Growth performance of table potato hybrids harvested at 75 and 90 days after planting

Sl. No.	Hybrids	Plant emergence (%) at 75 DAP				Plant emergence (%) at 90 DAP				Plant height (cm) at 75 DAP				Plant height (cm) at 90 DAP			
		2015	2016	2017	Pooled	2015	2016	2017	Pooled	2015	2016	2017	Pooled	2015	2016	2017	Pooled
1	AICRP-P-15	90.00	87.92	82.74	86.89	86.67	84.00	84.06	84.91	46.00	51.00	56.17	51.06	59.00	53.25	62.33	58.19
2	AICRP-P-22	72.50	71.25	70.46	71.40	76.67	78.92	71.42	75.67	41.50	46.00	52.17	46.56	37.50	47.25	55.33	46.69
3	AICRP-P-30	-	72.42	74.38	73.40	-	74.09	76.42	75.25	-	57.50	58.33	57.92	-	59.25	63.00	61.13
4	AICRP-P-31	-	75.17	73.35	74.26	-	80.09	76.25	78.17	-	43.75	44.50	44.13	-	42.25	52.67	47.46
5	Kufri Jyoti	80.84	76.75	75.21	77.60	89.84	77.08	79.75	82.22	43.00	44.50	49.00	45.50	41.00	40.75	51.67	44.47
6	Kufri Phukraj	77.50	82.25	77.63	79.13	83.34	81.17	80.67	81.73	40.00	50.75	53.50	48.08	37.50	51.75	62.33	50.53
7	Kufri Surya	86.67	88.67	79.20	84.85	85.00	95.00	84.24	88.08	45.50	52.00	52.50	50.00	44.00	51.50	60.67	52.06
8	Kufri Himalini	85.00	86.92	78.47	83.46	90.00	90.08	86.01	88.70	54.50	55.50	57.00	55.67	55.00	56.75	61.33	57.69
	S. Em+	5.27	2.83	1.90	1.40	3.74	4.24	1.48	2.03	2.88	2.95	2.43	1.57	2.83	2.94	NS	2.66
	CD(p=0.05)	16.25	8.09	5.57	4.25	11.53	12.14	4.35	6.16	8.85	8.43	7.36	4.77	8.71	8.42	-	8.06
	CV (%)	14.62	7.18	4.96	3.08	12.10	10.45	3.70	4.30	8.80	11.24	7.95	5.46	8.92	11.29	-	8.81

DAP: Days After Planting

NS-Non Significant

Yield parameters

The pooled data of marketable and total tuber yield (t/ha) at 75 and 90 DAP of different potato hybrids are presented in Table. 3, Fig. 1 to 4. At 75 days after planting, a significantly higher marketable and total tuber yields (t/ha) were recorded in Kufri Himalini (15.97 and 18.23 t/ha), respectively. Similarly at 90 days after planting, a significantly higher marketable and total tuber yields (t/ha) were registered in Kufri Himalini (17.49 and 19.97 t/ha), respectively. However,

there was no significant differences in rottage tuber yield at 75 and 90 days after planting. But observed a significant variations among the genotypes across growing environments for tuber size distribution, number and weight may be attributed to inherent potential of such genotypes, which were highly influenced by growing conditions interaction of genotype and environment. Both genetic and environmental factors might played a vital role in stolon development and tuberization process (Subarta and Upadhyya, 1997) [9].

Table 2: Growth performance of table potato hybrids harvested at 75 and 90 days after planting

Sl. No.	Hybrids	Plant width (E to W) (cm) at 75 DAP				Plant width (E to W) (cm) at 90 DAP				Plant width (N to S) (cm) at 75 DAP				Plant width (N to S) (cm) at 90 DAP			
		2015	2016	2017	Pooled	2015	2016	2017	Pooled	2015	2016	2017	Pooled	2015	2016	2017	Pooled
		1	AICRP-P-15	41.00	40.25	46.75	42.67	43.00	38.50	48.25	43.25	54.00	44.75	51.00	49.92	54.50	44.25
2	AICRP-P-22	57.50	43.50	52.25	51.08	51.50	42.75	50.25	48.17	50.50	51.25	52.50	51.42	58.50	52.25	52.00	54.25
3	AICRP-P-30	-	57.00	49.75	53.38	-	54.50	52.50	53.50	-	51.75	53.50	52.63	53.25	52.50	54.00	53.25
4	AICRP-P-31	-	35.25	42.75	39.00	-	37.00	43.00	40.00	-	43.50	43.25	43.38	41.50	39.00	44.00	41.50
5	Kufri Jyoti	42.00	42.00	46.25	43.42	41.50	41.50	45.38	42.79	43.00	44.75	45.50	44.42	48.50	46.75	48.50	47.92
6	Kufri Phukraj	57.50	38.50	49.00	48.33	50.50	45.50	50.00	48.67	51.50	44.00	52.00	49.17	48.00	43.50	52.25	47.92
7	Kufri Surya	41.00	48.75	47.75	45.83	46.00	45.50	47.25	46.25	39.00	48.75	47.25	45.00	56.00	48.88	50.25	51.71
8	Kufri Himalini	51.50	51.00	48.75	50.42	50.00	52.00	50.88	50.96	50.00	55.00	51.25	52.08	54.00	55.63	53.00	54.21
	S. Em+	6.80	3.73	1.77	2.90	3.26	3.28	1.60	1.41	4.88	3.39	1.72	1.87	3.81	3.45	1.86	1.57
	CD(p=0.05)	14.82	10.68	5.20	8.79	10.04	9.39	4.70	4.26	10.65	9.69	5.07	5.68	11.74	9.87	5.48	4.75
	CV (%)	13.94	16.26	7.38	10.74	9.95	14.58	6.60	5.21	10.14	13.96	6.95	6.69	11.05	14.37	7.34	5.41

DAP: Days after Planting

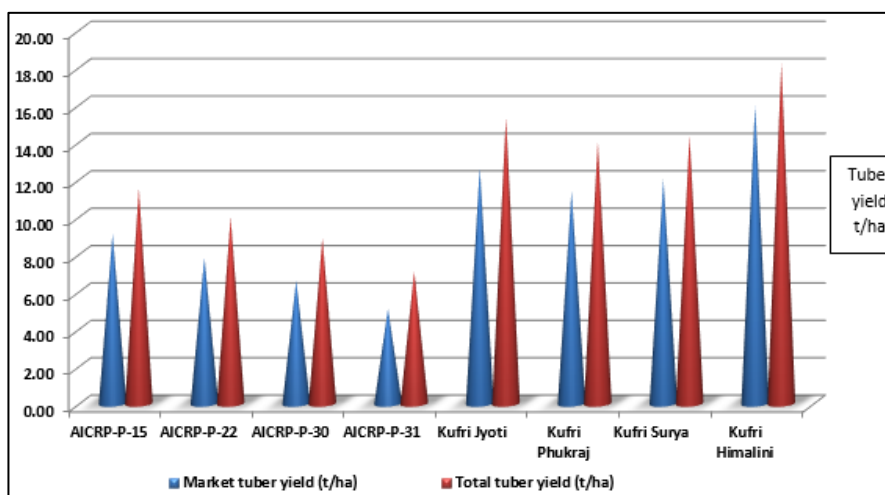
Table 3: Tuber yield performance of table potato hybrids harvested at 75 and 90 days after planting

Sl. No.	Hybrids	Marketable tuber yield (t/ha) at 75 DAP				Marketable tuber yield (t/ha) at 90 DAP				Total tuber yield (t/ha) at 75 DAP				Total tuber yield (t/ha) at 90 DAP			
		2015	2016	2017	Pooled	2015	2016	2017	Pooled	2015	2016	2017	Pooled	2015	2016	2017	Pooled
		1	AICRP-P-15	10.10	10.09	7.11	9.10	13.62	13.26	9.02	11.97	11.81	13.03	9.72	11.52	15.32	15.25
2	AICRP-P-22	8.03	7.32	8.09	7.81	6.65	10.47	10.95	9.36	10.22	9.80	9.89	9.97	10.80	13.27	12.54	12.20
3	AICRP-P-30	-	7.53	5.64	6.58	-	10.36	7.27	8.81	-	9.89	7.85	8.87	-	12.27	10.95	11.61
4	AICRP-P-31	-	5.76	4.39	5.07	-	7.06	5.58	6.32	-	6.89	7.27	7.08	-	7.71	8.47	8.09
5	Kufri Jyoti	11.75	14.97	11.18	12.63	16.81	18.09	14.66	16.52	15.07	16.95	14.01	15.34	18.00	21.16	17.61	18.92
6	Kufri Phukraj	8.47	15.30	10.39	11.38	8.72	18.20	12.15	13.02	12.00	17.09	13.02	14.04	12.40	20.74	15.68	16.27
7	Kufri Surya	9.41	16.96	9.62	12.00	12.99	18.79	12.02	14.60	11.77	18.14	13.11	14.34	16.10	21.46	15.04	17.53
8	Kufri Himalini	16.96	17.63	13.31	15.97	17.16	20.08	15.23	17.49	18.88	19.30	16.51	18.23	19.30	22.64	17.97	19.97
	S. Em+	0.85	0.96	0.63	1.04	1.02	1.02	0.87	1.17	1.06	0.84	0.68	0.80	0.73	1.33	1.09	0.99
	CD(p=0.05)	2.63	2.76	1.84	3.14	3.30	2.91	2.55	3.55	3.26	2.40	2.00	2.43	2.26	3.81	3.22	3.01
	CV (%)	14.60	18.65	14.40	17.81	15.06	15.70	16.00	16.53	13.57	13.69	11.90	11.19	8.32	17.45	15.60	11.50

Table 4: Tuber rotting (t/ha) of tuber potato hybrids harvested at 75 and 90 days after planting

Sl. No.	Hybrids	Rottage (t/ha) at 75 DAP				Rottage (t/ha) at 90DAP			
		2015	2016	2017	Pooled	2015	2016	2017	Pooled
1	AICRP-P-15	0.78	0.60	1.30	0.89	0.76	0.86	2.16	1.26
2	AICRP-P-22	0.50	0.86	0.68	0.68	0.69	1.01	1.05	0.92
3	AICRP-P-30	-	0.47	1.58	0.95	1.33	0.7	2.72	1.58
4	AICRP-P-31	-	0.38	1.40	0.82	0.88	0.43	1.86	1.06
5	Kufri Jyoti	0.54	0.64	1.01	0.73	0.88	0.69	1.42	1.00
6	Kufri Phukraj	1.18	1.07	1.68	1.31	0.57	1.04	2.34	1.32
7	Kufri Surya	0.59	0.89	0.90	0.79	0.49	0.94	1.59	1.01
8	Kufri Himalini	0.65	0.88	0.38	0.64	0.40	0.7	1.06	0.72
	S.Em+	0.08	0.07	0.07	NS	0.04	0.09	0.12	NS
	CD(p=0.05)	0.17	0.19	0.22	-	0.12	0.25	0.34	-
	CV (%)	15.32	16.15	18.67	-	9.98	19.06	18.25	-

DAP: Days After Planting, NS-Non Significant

**Fig 1:** Marketable and total tuber yield (t/ha) at 75 days after planting

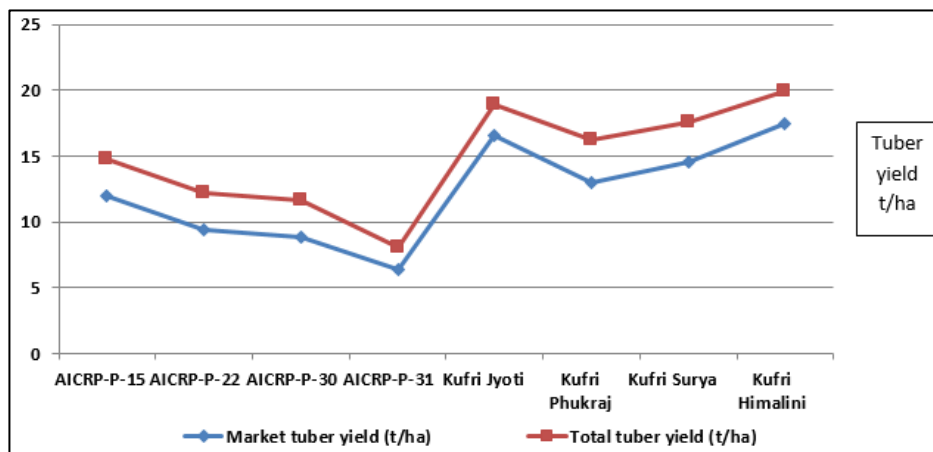


Fig 2: Marketable and total tuber yield (t/ha) at 90 days after planting



Fig 3: Kufri Himalini plot view



Fig 4: Kufri Himalini tubers

Conclusion

From the study, it was concluded that hybrid Kufri Himalini was found best suitable potato hybrid for production during *Kharif* season in Southern Dry Zone of Karnataka.

References

- Anonymous. Horticulture Database, National Horticulture Board, Bengaluru, Karnataka, 2015.
- Bhuwneshwari, Satish, Verma, K, Kamal Narayan, Paikra, MS. Evaluation of processing potato genotypes for growth, yield and yield attributes under Chhattisgarh condition. *The Asian Journal of Horticulture*. 2013; 8(1):241-245.
- Enujeke EC. Effects of variety and spacing on growth characters of hybrid maize. *Asian Journal of Agriculture and Rural Development*. 2013; 3:296-310.
- Gobana DR. Genetic variability, heritability and path coefficient studies in potato (*Solanum tuberosum* L.). M.Sc. (Hort.) Thesis, University of Agricultural Sciences, Dharwad, Karnataka, India, 2002, 166.
- Kumar P, Pandey SK, Singh SV, Kumar D. Irrigation requirements of chipping potato cultivars under west-central Indian plains. *Potato Journal*. 2007; 34(3-4):193-98.
- Murlidhar Sadawarti, Kamlesh Patel, Samadhiya RK, Gupta PK, Singh SP, Gupta VK *et al*. Evaluation of table and processing varieties of potato (*Solanum tuberosum* L) for North-Central India. *International Journal of Chemical Studies*. 2008; 6(4):823-833.
- Sadawarti MJ, Bhatnagar A, Singh SP, Pandey KK. Prospect of early planting of potato seed crop in Central India. *Indian Journal of Hill Farming*. 2016; 27(1):12-16.
- Sandhu AS, Sharma SP, Bhutani RD, Khurana SC. Effects of planting date and fertilizer dose on plant growth attributes and nutrient uptake of potato (*Solanum tuberosum* L.). *International Journal of Agricultural Sciences*. 2014; 4(5):196-202.
- Subarta M, Upadhyya MO. Potato production in western Bengal. *Envirn. Ecol. J*. 1997; 15:646-900.