

Original Research Article

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Kufri Khyati: An Early Maturing Potato Variety for North Gujarat

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ABSTRACT

Keywords

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Six potato cultivars and three advance stage hybrids were evaluated for tuber yield were harvested at 75 and 90 days after planting at Potato Research Station, SDAU, Deesa. In field trials conducted during four years from 2014-15 to 2017-18, cv. Kufri Khyati produced the highest total and marketable tuber yield followed by popular varieties Kufri Pukhraj and Kufri Badshah under both maturity groups. Storage of these genotypes for 75 days at ambient temperature revealed minimum total weight loss in cv. Kufri Laukar followed by Kufri Badshah, Kufri Pushkar and Kufri Pukhraj. The highest yielder Kufri Khyati having medium shelf life. The cultivation of high yielding variety Kufri Khyati as early and main crop is likely to enhance the present productivity of potato in Gujarat and bringing about higher remuneration to the farmers. Due to medium shelf life of Kufri Khyati not advised for heap storage.

Introduction

Potato cultivation is becoming popular in Gujarat. The area under this crop has greatly increased in recent years from a near 12,300 ha (1980-81) to 1,20,400 ha (2018-19). The state falls under sub-tropical agro-climatic zone and has a very short cool growing period during winter. This period again becoming shorter due to global warming. However, available period is good enough to satisfy the crop system requirement of potato. The crop is traditionally grown in *rabi* season and planted in 2nd week of November. It is normally harvested by mid-February to 1st week of March with start of rise in temperature. Due

increase in area and by adoption of high density planting, micro irrigation system and production technology, the production and the productivity of state increase many fold. Due to high state production, potato growers of the state often face the problem of lower market prices mainly due to bulk arrival of potato in the market during this peak arrival period.

To circumvent this situation, some farmers are growing an early crop of potato (75 days crop duration) and selling it before normal harvesting season to fetch premium prices. The practices are becoming popular year after year. At present the potato variety Kufri Pukhraj is popular among the potato growers

due to its early maturity and higher yield. The farmers of north Gujarat growing three crops in a year on same piece of land so they required early bulking potato varieties. The present study was therefore undertaken to identify suitable cultivar which can be grown in the north Gujarat as an early crop and also as main crop to give higher remuneration to the farmers and breaking monocropping of potato variety Kufri Pukhraj in north Gujarat.

Materials and Methods

The six potato varieties released by Central Potato Research Institute (CPRI), Shimla and three advanced stage hybrids developed at Potato Research Station, Sardarkrushinagar Dantiwada Agricultural University (SDAU), Deesa which consisting of early, medium early and medium maturing duration were evaluated in randomized block design with 3 replications at Potato Research Station, SDAU, Deesa, Banaskantha (Gujarat) in twosets *i.e.* 75 and 90 days harvest. The field trials were conducted for four years during *rabi* seasons of 2014-15 to 2017-18, keeping the plot size of 2 m x 3 m and spacing of 50 cm between rows and 20 cm between plants within row. The fertilizers were applied at rate of 275-138-275 NPK kg/ha. The crop was planted in second week of November and harvested after 75 days and 90 days and recorded the total and marketable tuber yield (> 20 gm.). The data was pooled over the years and analyzed with standard statistical procedure.

For storage behavior at ambient temperature, 5 kg healthy and uniform size of each genotype was kept in hessian cloth bags under room temperature in three replications from 90 days harvested crop. The data on rottage both by number and weight and sprouting percentage were recorded. The percentage physiological weight loss and total weight loss after 75 days of storage were calculated and are presented in

Table 2. The tuber dry matter was estimated by oven drying of 100 g composite samples properly chopped at 80° C till complete drying. The dried material was weighted and dry matter was converted into per cent of fresh weight.

Results and Discussion

The potato variety Kufri Khyati gave the highest total (44.22 t/ha) and marketable tuber yield (40.79 t/ha) which was followed by Kufri Pukhraj (40.53 and 35.85 t/ha), Kufri Badshah (37.24 t/ha and 34.14 t/ha) and Kufri Pushkar (35.74 t/ha and 30.51 t/ha) at 75 days of harvest. For 90 days harvest crop also the potato variety Kufri Khyati recorded the highest total (50.27 t/ha) and marketable (47.81 t/ha) tuber yield which was followed by Kufri Pukhraj (49.07 and 46.11 t/ha), Kufri Badshah (44.97 and 43.61 t/ha) and Kufri Pushkar (41.52 and 37.32 t/ha). Higher tuber yield in Kufri Pukhraj and Kufri Badshah in 75 and 90 days harvest was also reported by Patel *et al.*, (2002). Kumar *et al.*, (2009) also reported Kufri Khyati as a high yielding early maturing variety.

In comparison with released potato varieties, the advance stage hybrids gave lower total and marketable tuber yield in both the harvesting periods *i.e.* 75 and 90 days harvest. The cultivar Kufri Pukhraj released in 1997 is popular variety and occupies approximately 65 per cent of area under potato cultivation in the north Gujarat. However, it is apparent from the results that the newly released variety Kufri Khyati (released in 2008) having a increment of 9.10 per cent total and 13.78 per cent marketable tuber yield over Kufri Pukhraj for 75 days harvest. For 90 day harvest also Kufri Khyati showed superior performance with increment of 2.45 percent and 3.69 percent total and marketable tuber yield over popular variety Kufri Pukhraj, respectively (Table 1 and 2).

Table.1 Total and marketable tuber yield (t/ha) of potato genotypes in 75 & 90 days harvest crop

Cultivars/ hybrids	75 Days		90 Days	
	Total yield (t/ha)	Marketable yield (t/ha)	Total yield (t/ha)	Marketable yield (t/ha)
Kufri Khyati	44.22	40.79	50.27	47.81
Kufri Sadabahar	31.91	30.07	39.37	37.60
Kufri Badshah	37.24	34.14	44.97	43.61
Kufri Pukhraj	40.53	35.85	49.07	46.11
Kufri Pushkar	35.74	30.51	41.52	37.32
Kufri Laukar	26.20	23.88	32.31	29.69
DSP-287	17.69	16.07	24.42	22.92
DSP-186	21.87	18.94	26.13	23.63
DSP-245	20.16	18.15	23.42	21.21
S.Em.±	2.81	2.45	2.60	2.62
CD (0.05)	8.20	7.15	7.59	7.64
CV (%)	10.32	10.93	10.27	11.06

Table.2 Dry matter (%) and storage behaviour of potato genotypes at room temperature (75 days)

Cultivars/ hybrids	Dry matter (%)	% Sprouting	% Rottage (by No.)	% Rottage (by wt.)	% Physiological Wt. loss	% Total wt. loss
Kufri Khyati	16.40	2.57	17.26	17.63	9.04	31.84
Kufri Sadabahar	19.34	1.81	18.20	14.51	8.80	27.16
Kufri Badshah	17.79	0.56	6.79	6.39	8.72	15.70
Kufri Pukhraj	16.74	4.21	6.74	6.85	8.26	17.78
Kufri Pushkar	16.27	1.37	8.05	7.30	6.49	15.72
Kufri Laukar	18.03	11.86	6.59	5.82	6.55	13.57
DSP-287	17.90	0.00	14.80	13.35	6.51	21.00
DSP-186	17.27	0.00	14.74	14.73	6.60	22.32
DSP-245	18.24	3.39	16.82	16.62	7.67	25.71

Per cent sprouting in the varieties and advanced hybrids after storage of 75 days under room temperature varied from 0.00 in DSP-287 and DSP-186 to maximum of 11.86 in Kufri Laukar (Table 2). The variety Kufri Badshah also showed lower sprouting (0.56 %) over 75 days of storage while Kufri Khyati and Kufri Pukhraj shows sprouting of 2.57 and 4.21 percent, respectively. The per cent rottage by numbers and by weight also varied in the varieties and advanced hybrids. The per cent rottage by number was lowest in Kufri Laukar (6.59 %) which was nearly followed by Kufri Pukhraj (6.74 %) and Kufri Badshah (6.79 %) while higher per cent rottage by number was recorded in Kufri Khyati (17.26%). The similar trend was also observed in per cent rottage by weight. The per cent physiological weight loss due to dryness was least in Kufri Pushkar (6.49 %) which was nearly followed by DSP-287 (6.51 %), Kufri Laukar (6.55 %) and DSP-186 (6.60%) while the highest physiological weight loss was recorded in Kufri Khyati (9.04 %). The total weight loss due to combined effects of rottage and dryness was minimum in Kufri Laukar (13.57%) which was followed by Kufri Badshah (15.70%) and Kufri Pushkar (15.72) while, variety Kufri Khyati (31.84) was recorded the highest per cent total weight loss. Similar variation in the storage behavior of indigenous varieties and advanced hybrids has been reported by several workers under ambient temperature (Patel *et al.*, 2002 and Kang *et al.*, 2001). Good keeping quality of Kufri Pushkar also reported by Kumar *et al.*, (2005) and Gupta *et al.*, (2015) while higher rottage in Kufri Sadabahr reported by Das *et al.*, (2015). The storage study revealed that the % rottage, % physiological weight loss and % total weight loss was higher in Kufri Khyati hence it is suitable for quick disposal in the market after harvest or store in cold storage. It is not recommended for heap storage.

The early crop of potato is mostly used for table purposes hence quickly disposed off following the harvest to get maximum remunerative returns. Considering the total and marketable tuber yield at 75 days of harvest and poor storage behavior following 90 days harvest, the variety Kufri Khyati appears to be suitable only for introduction as an early culture in north Gujarat and for quick disposal for consumption or cold store following 90 days harvest. Due to early bulking, it is suitable in multiple cropping sequences of north Gujarat *i.e.* Groundnut-Potato-Bajara, Cotton-Potato, Groundnut-Potato- Vegetables/Muskmelon/ Watermelon/ Groundnut. Due to early bulking, it is also suitable for early planting and harvested at 75-80 days before bulk potato arrival in the market for getting higher market price. Kufri Khyati having a comparative tuber dry matter with popular table potato variety Kufri Pukhraj which occupies nearly 65% potato cultivated area in the Gujarat (Table 2).

From the above study, it is clearly evident that cultivation of cv. Kufri Khyati as an early crop culture as well as in the main season in the north Gujarat would not only be remunerative to the farmers but would also enhance the productivity of the state. Due to medium shelf life, this variety recommended for quick disposal after harvest or storage only in cold storage not in heap under shed.

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