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SHORT NOTE

EVALUATION OF HEAT TOLERANT POTATO HYBRIDS UNDER TROPICAL CONDITIONS IN KERALA

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Potato has long been considered a crop of temperate climates. Bushnell (1) defined 17°C as the optimum mean temperature for tuberization in potatoes. Night temperatures above 20°C severely depress both tuber initiation and bulking, and temperatures above 25°C effectively stop tuber production (6). Potato tuberization is also reported to depend largely on the night temperature and not on the average daily temperature (5). In lowland tropics, including peninsular India, high day and night temperature are the major considerations resulting in loss of tuber yield (2) due to reduced partitioning of assimilates to tubers. In India potato crop is grown mainly when the day temperature is below 30°C and night temperature is below 20°C. In order to develop heat tolerant potato varieties crosses were made amongst known heat tolerant and local high yielding genotypes, and the progeny was screened by their ability to form tubers within one month after shifting to high temperature (5).

In southern India, the high elevation region in Kerala occupies about 28.6% of total geographical area of the state and offers ample scope for raising cool season vegetable crops including potato. So far, no research efforts have been initiated for studying the feasibility of growing potatoes in the high ranges of Kerala, especially in Wayanad and Iddukki districts. In the present study three heat tolerant hybrids and cultivar Kufri Lauvkar were evaluated at the Kerala Agricultural University (KAU) Regional Agricultural Research Station, Ambalavayal and KAU Cardamom Research Station, Pampadumpara to see the feasibility of growing potatoes in the hilly tracts of Kerala.

The trials were conducted at Kerala Agricultural University Research Stations located at Pampadumpara (9° 45′ 77° 10′ E, 1100 masl) in Iddukki district and Ambalavayal, (11° 26′ N, 76° 26′ E, 974 masl) in Wayanad district, respectively in Kerala during 2001 and 2002. The crop was planted during last week of November at Pampadumpara and 2nd week of December at Ambalavayal. The average maximum-minimum temperatures during the crop duration were 32-18°C at Pampadumpara and 32-21°C at Ambalavayal.

The tubers of three selected heat tolerant genotypes *viz.*, HT/92-621, HT/92-731, HT/

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Table 1. Analysis of variance

Source of variation	*df*	*Mean squares*		
		Tuber number	*Tuber weight*	*Total tuber yield*
Year	1	11.79**	2097.48**	904.22
Location	1	6.09*	1183.26**	3559.26**
Year x Location	1	0.38	1477.19**	29916.70**
Variety	3	17.90**	1011.92**	39897.30**
Year x Variety	3	4.63**	47.27**	1953.72**
Location x Variety	3	4.04*	235.83**	957.10*
Year x Location x Variety	3	2.21	27.81**	7181.58**
Error	32	1.01	7.61	271.28

92-829 and cultivar Kufri Lauvkar were obtained from Central Potato Research Institute Campus, Modipuram. The experiment was laid out using randomized complete block design with three replications, each with a single row of ten tubers. The spacing was 60 x 20 cm and fertilizer was applied @ 90: 135: 90 kg/ha in the form of ammonium sulphate, single super phosphate and muriate of potash. The crop was raised under rainfed conditions following recommended cultural practices. The trials were harvested at 100 days after planting. The data on yield per plot, tuber number/ plant and average tuber weight were recorded and analyzed as per standard procedure (3).

The ANOVA revealed significant differences among genotypes for all the three characters studied **(Table 1).** The results of pooled analysis over locations and years showed that the hybrid HT/92-621 was superior in comparison to other genotypes for tuber yield (156.7 q/h) **(Table 2).** The trend was similar in individual year's analysis also. Tuber yield is a function of tuber number and average tuber weight. The performance of hybrid HT/92-621 was better due to its high tuber number (6.45) and tuber weight (37.78 g), whereas in other genotypes the tuber number (3.49-5.26) and tuber weight (15.29-26.47 g) were lower hence these had poor yield. The study indicated that the heat tolerant hybrid HT/92-621 is suitable for high ranges of Kerala represented by Pampadumpara and Ambalavayal. The results were in agreement with that of Kumar and Minhas (4) indicating superiority of hybrid HT/92-621 when grown

Table 2. Mean performance of different potato hybrids at two locations and seasons (individual and pooled)

	Pampadumpra			*Ambalayal*			*Mean over locations and years*
	2001	*2002*	*Mean*	*2001*	*2002*	*Mean*	
Tuber number							
HT/92-621	5.80	7.70	6.75	6.53	5.76	6.15	6.45
HT/92-731	4.86	3.26	4.06	6.56	4.63	5.60	4.83
HT/92-829	4.56	2.33	3.45	4.60	2.46	3.53	3.49
Kufri Lauvkar	5.00	3.70	4.35	6.10	6.26	6.18	5.26
CD (P ≤ 0.05)	1.67	1.81	1.67	1.18	0.83		
Tuber weight (g)							
HT/92-621	51.20	27.22	39.21	39.13	33.59	36.36	37.78
HT/92-731	47.01	22.02	34.51	16.19	20.65	18.42	26.47
HT/92-829	27.27	5.12	16.19	13.05	15.73	14.39	15.29
Kufri Lauvkar	49.30	23.15	36.23	22.31	12.21	17.26	16.74
CD (P ≤ 0.05)	4.58	3.24	4.58	3.05	2.29		
Total tuber yield (q/ha)							
HT/92-621	197.22	108.33	152.77	112.50	208.88	160.69	156.70
HT/92-731	86.94	50.00	68.47	39.72	61.11	50.41	59.44
HT/92-829	21.11	44.44	32.77	5.00	9.44	7.22	20.00
Kufri Lauvkar	170.83	38.88	104.86	20.27	93.05	71.66	88.26
CD (P ≤ 0.05)	27.39	19.36	27.39	19.30	13.69		

under high temperature conditions. 'HT/92-621' has been released as variety "Kufri Surya".

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