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EVALUATION OF POTATO VARIETIES FOR EXPORT POTENTIAL IN EARLY SEASON

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ABSTRACT: Uttar Pradesh, particularly its western region, has better export potential for the premium early potato segment as leading Indian exporters demand export-grade tubers (>55mm) during January to tap the deficit period of fresh potatoes in the global market. With this background, a field experiment was conducted during 2020-22 in the early crop season with five promising varieties/ advanced hybrid *viz.*, Kufri Sangam, Kufri Kiran, Kufri Neelkanth, Kufri Chipsona-4 and WS/07-113. The crop was planted in September end and harvested in mid-January. Advanced hybrid WS/07-113 recorded the highest export-grade tuber yield (4.95 t/ha), followed by Kufri Kiran (4.63 t/ha). Maximum tuber dry matter content was attained by cv. Kufri Chipsona-4 (21.3%) followed by Kufri Kiran (20.1%) and Kufri Sangam (19.3%). As a specialty segment, exporters showed keen interest in cv. Kufri Neelkanth which has 4.32 t/ha export-grade tuber yield and 18.6% specific gravity. As exporters require potatoes in January, crop duration may easily be increased to 85-90 days to achieve higher yields. Performance of varieties and exporters' feedback indicates that western UP can lead to export-grade potato production during the early-season.

KEYWORDS: Potato, export, early season, fresh potato, GlobalGAP

INTRODUCTION

The impact of extensive potato research and development in India during the last seven decades has been phenomenal. Area, yield and production of the country were 0.23 mha, 6.59 t/ha and 1.54 mt, respectively, in 1949-50, whereas the third advance estimate for the year 2020-21 by the Ministry of Agriculture and Farmers' Welfare has projected potato production of 54.23 mt from 2.25 mha area with a productivity level of 24.12 t/ha. Today, India is the world's second-largest potato-producing country, contributing around 14.3% of global production (Anonymous, 2022). However, the importance of the Indian potato has not been felt in the international market as the quantum of potato export is less than 1% of total production. Around 90% of fresh potatoes are harvested in March-April in the Indo-Gangetic plains, where frequent glut has been observed during the peak harvesting time, leading to price crashes and monetary loss to potato growers. Lack of proper marketing avenues, insufficient/expensive cold storage facilities, poor condition of the supply chain and lower domestic utilization than production are some factors that precipitate a glut situation. As a result, potato export is neither steady in quantum nor governed by any concrete commitment (Luthra *et al.*, 2004, Khurana, 2013). Rigorous policy intervention has long been felt for a semi-perishable and bulky agri-commodity like potato.

Action by the Government of India in launching Agri-export Policy 2018 for a stable trade regime has come at the right point of time with a mission of doubling agricultural exports to around US$ 60b by 2022 and reaching US$ 100b in the next few years. In this, potato has been identified as

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a potential exportable crop and districts of Agra and Farrukabad in Uttar Pradesh, Indore and Gwalior in Madhya Pradesh, Jalandhar, Hoshiarpur, Kapurthala and Navashehar in Punjab and Banaskantha and Sabarkantha in Gujarat have been selected initially for potato export promotion (Anonymous, 2018). These districts have been identified based on their production, contribution to export, exporters' operation, the potential for upscaling operations, awareness about certification requirements and capacity to achieve export targets in the short term. Such export-oriented cluster development will ensure potato production compliance with standard physical and quality parameters for establishing a brand in the export market (Pandey *et al.*, 2000, CPRI, 2019). In addition, efforts are on at the institute level to identify potential varieties suitable for specific international market destinations and develop agro-technologies complying with the GlobalGAP (Chakrabarti *et al.*, 2019 and; Anonymous, 2019).

Uttar Pradesh produces around 28% of total potatoes within the country, and its western region has latent export potential, particularly early-season potatoes. January harvest can tap the deficit period of the international market with better remuneration. The exporters demand suitable varieties producing export-grade quality tubers of more than 55 mm in size, oval-oblong shape and lower losses during transport. Tuber qualities like flesh color, skin color, taste, flavor and dry matter content (>17-18%) *etc.*, are also crucial for export. With this motivation, a field experiment was conducted to screen promising cultivars, including one water stress tolerant hybrid suitable for early potato export from the western region of Uttar Pradesh (Luthra *et al.*, 2020 and Gupta *et al.*, 2021).

MATERIALS AND METHODS

Experimental site: Field trials were conducted during 2020-22 at ICAR-Central Potato Research Institute Regional Station Modipuram, Meerut, UP, India (29° 05′19″ N, 77° 41′50″ E, 237 m asl). The soil of the experimental site was sandy loam in texture with neutral pH, low in soil organic carbon content and available nitrogen, while medium in available phosphorous and available potassium (**Table 1**). The research station is located under semi-arid and sub-tropical agroecology, where mean maximum weekly temperatures ranged between 19.4-32.5°C and 13.3-34.8°C during the crop season of 2020-21 and 2021-22, respectively. While mean minimum weekly temperatures during the crop period ranged between 3.7-21.6°C in 2020-21 and 6.1-27.3°C in 2021-22, respectively. Cumulative rainfall was negligible in the crop season of 2020-21, but 16 mm rainfall was recorded during the season of 2021-22 (**Fig. 1 & 2**).

Experimental details: The study was conducted in a randomized block design with

Table 1: Soil status of the experimental site

Soil physico-chemical properties	Values
Mechanical analysis	
Sand (%)	57.9
Silt (%)	25.8
Clay (%)	16.3
Texture	Sandy loam
Physical analysis	
Bulk density (g cm^{-3})	1.54
Chemical analysis	
Soil pH	7.19
Electrical conductivity (dS m^{-1} at 25°C)	0.12
Organic carbon (%)	0.32
Available N (kg ha^{-1})	160.4
Available P (kg ha^{-1})	39.1
Available K (kg ha^{-1})	183.2

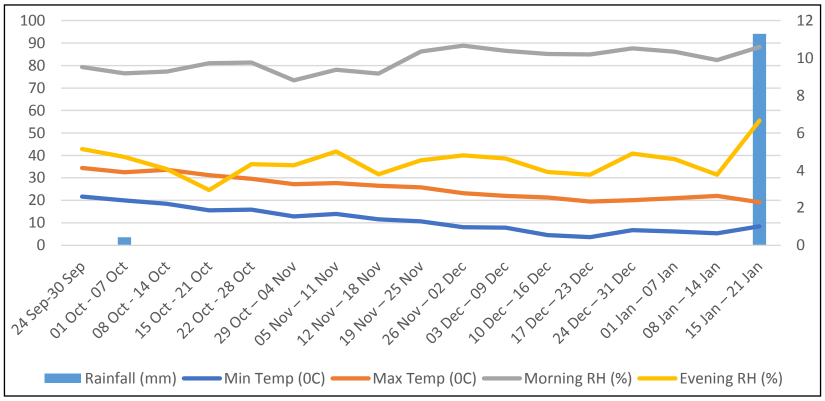

Fig. 1. Weekly weather during potato crop season of 2020-21

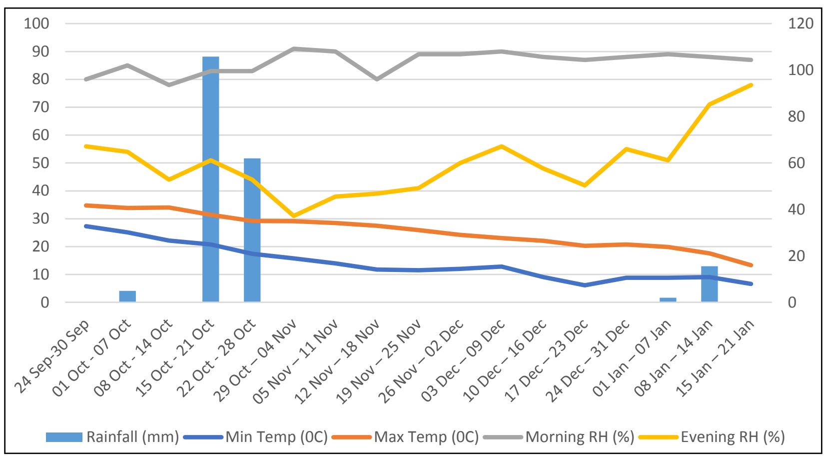

Fig. 2. Weekly weather during potato crop season of 2021-22

three replications. Five advanced hybrid or varieties, *viz*., Kufri (K) Sangam, Kufri Kiran, Kufri Neelkanth, Kufri Chipsona-4, and WS/07-113, were selected for field evaluation due to their tuber quality, storage behavior and specialty attributes **(Table 2)**. Green manuring (*Sesbania aculeata*) was followed in preceding crop season and approximately 25-30 t/ha of it was *in situ* incorporated. Further, FYM (10 t/ha) and gypsum (500 kg/ha) was incorporated into the soil 15 days before seedbed preparation. Sprouted seed tubers of 40-45 mm size were planted in the last week of September at a 66 cm 20 cm distance in a plot size of 26.4 m^2. Uniform fertilizer doses of 110, 34.4 and 104 kg/ha of Nitrogen, Phosphorous and Potassium respectively, were applied at planting, and 110 kg/ha of nitrogen was applied 20-25 days after planting (DAP) at the time of inter-cultivation and earthing. Approximately 50 mm of water (50 l/m^3) was applied during each irrigation through the conventional ridge and furrow method. Water application started 10-12 DAP and continued at the same interval up to 10 days before haulm cutting. The recommended schedule of herbicide, fungicide and insecticide application for potato crop was followed to maintain proper crop growth. The crop was dehaulmed at 60 and 75 DAP to understand tuber bulking and harvested 15 days after tuber skin maturity.

Table 2: Tuber quality of selected potato varieties and advanced hybrid

Varieties/ Advanced hybrid	Tuber characters	Storability	Special feature
Kufri Chipsona-4	White-cream, round-ovoid, shallow, white, 20-21% tuber dry matter, floury texture	Very good	Suitable for chips, field resistant to late blight
Kufri Sangam	White-cream, ovoid, shallow, cream, 18-20% tuber dry matter, mealy texture	Very good	Dual purpose, table (northern plains) and processing (central plains), field resistant to late blight
Kufri Neelkanth	Purple, ovoid, shallow, yellow, 18% tuber dry matter, mealy texture	Very good	Antioxidant (anthocyanin & carotenoids) rich potato variety, field resistant to late blight
Kufri Kiran	White-cream, ovoid, shallow, white, 18% tuber dry matter, mealy texture	Excellent	Tolerant to heat, hopper and mite, suitable for growing early-season crop
WS/07-113	White-cream, ovoid, shallow, white, dry matter >19%, floury texture	Good	Water stress tolerant, moderately resistant to late blight

Observations and analysis: Growth parameters were recorded at scheduled intervals, while grading of tubers at harvest time was done in conformity with export requirements (>55mm), while the rest of the tubers were graded as marketable (55-30mm) and non-marketable (<30mm) for recording tuber number and yield. Tuber dry matter content (TDMC) was estimated by drying a representative sample (50g) of chopped tuber pieces drawn from three export grade tubers from each treatment at 80°C until a constant weight was achieved in a forced hot air draft oven. Specific gravity was also measured by the method described by Kumar *et al*. (2005). Haulms were also dried similarly, where the sample size was 100g. Data from two years of field trials were pooled, and statistical analysis was done using the statistical software IRRISTAT (IRRI, 1999).

RESULTS AND DISCUSSION

Plant population and growth

The ANOVA of the pooled analysis revealed that plant emergence was normal and uniform (>95%) for all five varieties/ hybrid under study without showing any statistical significance (**Table 3**). However, parameters of plant growth *viz*., plant height (cm), number of shoots per plant and number of compound leaves per plant varied significantly among the genotypes. Maximum plant height (49.5) was observed in cv. Kufri Chipsona-4 remains comparable to advanced hybrid WS/07-113 (48.7) and Kufri Neelkanth (47.2), while Kufri Sangam (38.4) recorded the lowest of it, followed by Kufri Kiran (39.7). Shoot number per plant was highest in cv. Kufri Neelkanth (4.09) and these were comparable to Kufri Chipsona-4 (4.08) and Kufri Sangam (3.91). Kufri Kiran had a

Table 3: Plant emergence and growth parameters of potato genotypes (pooled mean)

Genotypes	Emergence (%)	Plant height (cm)	Shoot no./ plant	Leaf no./ plant
Kufri Chipsona-4	97.0	49.5	4.08	55.2
WS/07-113	96.8	48.7	3.22	40.9
Kufri Sangam	97.0	38.4	3.91	48.4
Kufri Neelkanth	97.8	47.2	4.09	54.2
Kufri Kiran	97.5	39.7	2.53	32.5
$CD_{0.05}$	NS	2.68	0.64	3.47
SEM±	0.41	0.87	0.21	1.12

minimum shoot number (2.53), while 3.22 shoots per plant were observed in advanced hybrid WS/07-113. Variety Kufri Chipsona-4 attained highest compound leaf number per plant (55.2), followed by statistically similar leaf number in cv. Kufri Neelkanth (54.2). The minimum of this parameter was found in cv. Kufri Kiran (32.5). Kufri Sangam and advanced hybrid WS/07-113 had 48.4 and 40.9 compound leaf numbers. Overall, Kufri Chipsona-4, Kufri Neelkanth, Kufri Sangam and advanced hybrid WS/07-113 recorded better plant growth. Plant growth depends upon the genetic response of a genotype to the provided environmental conditions (Kumar and Minhas, 2013).

Performance of genotypes at 60 days

Tuber number and yield

Graded and total tuber number (000/ha) varied significantly among different genotypes except for the export grade tubers of more than 55mm. However, differences in graded and total tuber yield (t/ha) were statistically distinct **(Table 4)**. Variety Kufri Neelkanth (34) recorded maximum export-grade tuber number closely followed by advanced hybrid WS/07-113 (33). Minimum export-grade tuber was observed in cv. Kufri Chipsona-4 (27) equivalent to cv. Kufri Sangam (29) and Kufri Kiran (29). Conversion of tuber number into a greater proportion of export grade at 60 days was pertinent to assess the earliness of the genotypes; however, percent of export grade tuber number at this stage was found to be similar among them the genotypes evaluated. Varieties Kufri Chipsona-4, Kufri Sangam, Kufri Neelkanth, Kufri Kiran and hybrid WS/07-113 attained 5.0, 7.1, 7.2, 6.7 and 5.9% of export grade tubers out of total tuber number in the respective varieties (**Fig 3**). The highest marketable size tuber number ('000/ha) was observed in cv. Kufri Chipsona-4 (209) at par with hybrid WS/07-113 (208), while Kufri Kiran had the lowest marketable tubers (169). The maximum and minimum small-sized tuber numbers were observed in hybrid WS/07-113 (319) and cv. Kufri Sangam (208), respectively. In the case of total tuber number, the highest tubers were found in hybrid WS/07-113 (560), closely followed by Kufri Chipsona-4 (544), while the lowest total tuber number was observed in cv. Kufri Sangam (409) which were at par with Kufri Kiran (435) and cv. Kufri Neelkanth had 473 thousand total tuber numbers at 60 days. Variation in tuber number among different genotypes in potato crop is a genetic trait and has also been reported by Philipp *et al*. (2019) under *in vitro* and *in vivo* crop growth environments.

Regarding graded and total tuber yield (t/ha), marked variations were observed at

Table 4: Graded tuber number and yield of potato genotypes at 60 days (pooled mean)

Genotypes	Graded tuber number (000/ha)				Graded tuber yield (t/ha)			
	>55mm	30-55mm	<30mm	Total	>55mm	30-55mm	<30mm	Total
Kufri Chipsona-4	27	209	308	544	2.79	7.36	3.65	13.8
WS/07-113	33	208	319	560	3.36	6.42	5.22	15.0
Kufri Sangam	29	172	208	409	3.33	5.37	2.30	11.0
Kufri Neelkanth	34	181	258	473	3.98	5.47	4.85	14.3
Kufri Kiran	29	169	237	435	4.32	8.47	2.71	15.5
$CD_{0.05}$	NS	14.9	18.4	32.8	0.64	0.85	0.58	1.11
SEM±	4.12	4.86	5.97	10.6	0.21	0.27	0.19	0.36

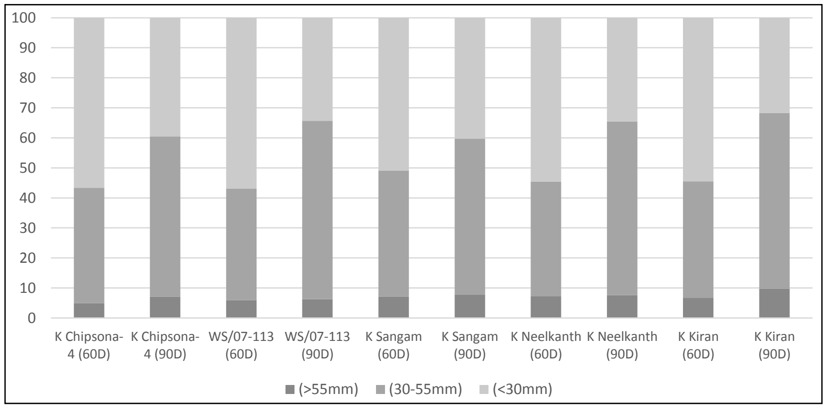

Fig. 3. Percent distribution of graded tubers in total tuber number at 60 and 90 days

60 days. Variety Kufri Kiran significantly achieved the highest export-grade tuber yield (4.32 t/ha) among all genotypes which shows their earliness in tuberisation under heat stress. Hybrid WS/07-113 and Kufri Sangam were comparable in performance as both recorded similar export-grade tuber yields of 3.36 and 3.33 t/ha, respectively. The proportion of export-grade tuber yield in total yield was 27.9, 30.3, 27.8, 22.4 and 20.2%, respectively, in cvs. Kufri Kiran, Kufri Sangam, Kufri Neelkanth, hybrid WS/07-113 and Kufri Chipsona-4 (**Fig 4**). Highest and statistically superior marketable tuber yield (8.47 t/ha) was recorded in cv. Kufri Kiran. Other potential genotypes for marketable tuber yield were Kufri Chipsona-4 (7.36) and hybrid WS/07-113 (6.42). The lowest marketable tuber yield was observed in cv. Kufri Sangam (5.37). Small size tuber yield also varied distinctly where maximum (5.22) and minimum (2.30) yield was reported in hybrid WS/07-113 and Kufri Sangam, respectively. Overall, for total tuber yield Kufri Kiran (15.5) was the best performer variety and it remained statistically comparable to hybrid WS/07-113 (15.0) and Kufri Neelkanth (14.3). Variety Kufri Sangam attained the lowest total tuber yield (11.0). Genotypic variations in yield level and their performance for this trait under different kinds of stress is governed by several factors like the ability of the crop to maintain growth and canopy cover, and finally, efficient translocation of photosynthates from source to sink (Schafleitner *et al.*, 2007).

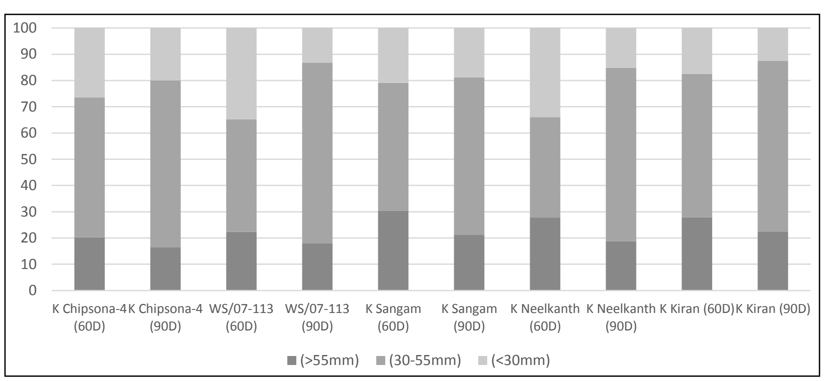

Fig. 4. Percent distribution of graded tubers in total tuber yield at 60 and 90 days

Tuber dry matter content and yield

Tuber dry matter content (%) and yield (t/ha) showed significant differences among the varieties and advance hybrid evaluated under this field study **(Table 5)**. The highest tuber dry matter content was accumulated by cv. Kufri Chipsona-4 (20.1) which remained statistically superior over all the genotypes evaluated. Variety Kufri Sangam (18.4) and Kufri Kiran (18.0) had comparable tuber dry matter content. Alike, Kufri Neelkanth (17.5) and hybrid WS/07-113 (17.3) were also statistically at par. Tuber dry matter content is an essential parameter for considering the suitability of potatoes for export purposes. Further, it affects tuber dry matter yield and fresh tuber yield (Philipp *et al*., (2019). There is also a relationship between tuber dry matter content and the storage behaviour of tubers. Better storability is important in export as tubers pass through different phases and modes of transit. Tuber dry matter yield varied markedly and was found highest in Kufri Kiran (2.78), remaining at par with Kufri Chipsona-4 (2.77) and hybrid WS/07-113 (2.58). Variety Kufri Neelkanth (2.50) and Kufri Sangam (2.03) attained lower tuber dry matter yield at 60 days.

Biomass yield and harvest index

Biomass yield and harvest index (HI) was calculated based upon tuber and haulms dry matter yield. Like tuber dry matter yield, another component of biomass yield, haulms fresh and dry weight, varied significantly **(Table 5)**. The highest biomass yield recorded by cv. Kufri Chipsona-4 (5.36) was statistically better among all the genotypes evaluated. The next best performer was Kufri Kiran (4.75) which also remained significantly higher over hybrid WS/07-113 (4.44), Kufri Neelkanth (4.24) and Kufri Sangam (3.95). HI, an efficiency in converting more photosynthates into economic yield also differed statistically and heat tolerant cv. Kufri Kiran (0.61) exhibited its trait while remaining comparable to Kufri Neelkanth (0.58) and hybrid WS/07-113 (0.58). Medium duration varieties Kufri Sangam (0.54) and Kufri Chipsona-4 (0.51) attained lower HI at 60 days.

Performance of genotypes at 90 days

Tuber number and yield

Significant variations were found in graded as well as total tuber number (000/ha) and yield (t/ha) at 90 days among the evaluated genotypes (**Table 6**). The highest export grade tubers were observed in cv. Kufri Kiran (43) which were comparable to Chipsona-4 (39). Kufri Neelkanth (37) and hybrid WS/07-113 (36) also had at par tubers of this grade, while Kufri Sangam (32) recorded the lowest export grade tubers. Percent of export grade tuber number varied

Table 5: Biomass yield and harvest index at 60 days (pooled mean)

Genotypes	Tuber dry matter content (%)	Tuber dry matter yield (t/ha)	Haulms fresh yield (t/ha)	Haulms dry yield (t/ha)	Biomass yield (t/ha)	Harvest index
Kufri Chipsona-4	20.1	2.77	20.1	2.59	5.36	0.51
WS/07-113	17.3	2.58	18.4	1.86	4.44	0.58
Kufri Sangam	18.4	2.03	14.1	1.92	3.95	0.54
Kufri Neelkanth	17.5	2.50	15.0	1.74	4.24	0.58
Kufri Kiran	18.0	2.78	14.3	1.97	4.75	0.61
$CD_{0.05}$	0.52	0.25	1.60	0.22	0.25	0.04
SEM±	0.17	0.08	0.52	0.07	0.08	0.01

Table 6: Graded tuber number and yield of potato genotypes at 90 days (pooled mean)

Genotypes	Graded tuber number (000/ha)				Graded tuber yield (t/ha)			
	>55mm	30-55mm	<30mm	Total	>55mm	30-55mm	<30mm	Total
Kufri Chipsona-4	39	292	216	547	3.62	13.9	4.38	21.9
WS/07-113	36	341	197	574	4.95	19.1	3.66	27.7
Kufri Sangam	32	217	168	417	3.55	10.1	3.18	16.8
Kufri Neelkanth	37	280	167	484	4.32	15.2	3.47	23.0
Kufri Kiran	43	256	139	438	4.63	13.4	2.62	20.6
$CD_{0.05}$	4.73	23.9	16.8	33.4	1.10	1.29	0.52	2.20
SEM±	1.53	7.75	5.47	10.8	0.35	0.42	0.17	0.72

between 6.3% in hybrid WS/07-113 to 9.8% in Kufri Kiran and rest of three cultivars had 7.1-7.7% of export grade tubers at 90 DAP (**Fig 3**). Advanced hybrid WS/07-113 (341) attained maximum marketable tuber number which were statistically distinct from other genotypes. Kufri Chipsona-4 (292) and Kufri Neelkanth (280) had comparable marketable grade tubers, followed by Kufri Kiran (256) and Kufri Sangam (217). Variety Kufri Kiran recorded lowest (139) under-size tubers, while the highest small tubers were found in Kufri Chipsona-4 (216). Total tuber numbers were maximum in hybrid WS/07-113 (574), which were at par with Kufri Chipsona-4 (547), and the lowest total tubers were recorded in Kufri Sangam (417).

Alike tuber number, significant variations were observed in graded and total tube yield (t/ha) at 90 days, and the highest export grade tuber yield was observed in hybrid WS/07-113 (4.95), which was statistically comparable to Kufri Kiran (4.63) and Kufri Neelkanth (4.32). Variety Kufri Chipsona-4 (3.62) and Kufri Sangam (3.55) attained lower export grade tuber yield. The proportion of export-grade tuber yield to total yield was 22.5, 21.1, 18.8, 17.9 and 16.5%, respectively, in cvs. Kufri Kiran, Kufri Sangam, Kufri Neelkanth, hybrid WS/07-113 and Kufri Chipsona-4 (**Fig 4**). Marketable tuber yield was also maximum in hybrid WS/07-113 (19.1) which was significantly better than other genotypes. The second best performer w.r.t. marketable yield was Kufri Neelkanth (15.2) which was at par with Kufri Chipsona-4 (13.9). Variety Kufri Kiran and Kufri Sangam recorded 13.4 and 10.1 t/ha marketable tuber yields, respectively. Non-marketable tuber yield was significantly higher in cv. Kufri Chipsona-4 (4.38) than other genotypes *viz*., hybrid WS/07-113 (3.66), Kufri Neelkanth (3.47), Kufri Sangam (3.18) and Kufri Kiran (2.62). Overall, hybrid WS/07-113 (27.7) recorded maximum and statistically superior total tuber yield among all genotypes, followed by Kufri Neelkanth (23.0), Kufri Chipsona-4 (21.9) Kufri Kiran (20.6) and Kufri Sangam (16.8). Luthra *et al*. (2020) reported the yield performance of Kufri Neelkanth on similar lines to this study. Tuber yield and its stability under any stress are crucial in screening genetic material. As far as the performance of a genotype under varied stress like soil moisture or temperature is concerned, it may differ due to variation in metabolic activities and rate of transfer of metabolites to tubers during tuberisation, which is ultimately governed by some genes (Schafleitner *et al*., 2007).

Tuber dry matter content, specific gravity and yield

Tuber dry matter content (%), specific gravity and yield (t/ha) differed statistically for the varieties and advanced hybrid evaluated under this trial **(Table 7)**. The highest tuber dry matter content (21.3) and specific gravity (1.087) found in cv. Kufri Chipsona-4 was significantly better than all other genotypes. Variety Kufri Kiran also accumulated statistically higher tuber dry matter content (20.1) and specific gravity (1.083) over the rest of the genotypes. Similar was the case of Kufri Sangam as it attained 19.3% tuber dry matter and had 1.078 specific gravity. Hybrid WS/07-113 (18.7) and Kufri Neelkanth (18.6) had comparable tuber dry matter content and specific gravity. Hybrid WS/07-113 had maximum and significantly marked (5.15) tuber dry matter yield over the varieties evaluated at 90 days. Kufri Chipsona-4, Kufri Neelkanth, Kufri Kiran and Kufri Sangam recorded 4.68, 4.26, 4.13 and 3.24 t/ha tuber dry matter yield, respectively.

Biomass yield and harvest index

Biomass yield and HI were calculated based upon tuber and haulms dry matter yield. Components of biomass yield *viz*., tuber dry matter yield, haulms fresh and dry weight varied significantly **(Table 7)** among the genotypes evaluated. The highest biomass yield was obtained in hybrid WS/07-113 (6.12), which was at par with cv. Kufri Chipsona-4 (5.66). Variety Kufri Kiran, Kufri Neelkanth and Kufri Sangam recorded 4.75, 4.59 and 3.70 t/ha of dry matter yield, respectively. Harvest index improved considerably at 90 days among all the genotypes compared to 60 days crop duration. Better and comparable HI was observed in heat tolerant cv. Kufri Kiran (0.89), Kufri Neelkanth (0.89) and Kufri Sangam (0.87). In comparison, HI was lower in hybrid WS/07-113 (0.84) and Kufri Chipsona-4 (0.82).

Feedback of exporters

Representatives of two leading potato exporters from Gujarat and progressive potato growers from the western zone of Uttar Pradesh observed produce at harvest time after ninety days. In addition, tuber samples of all varieties and the hybrid were provided to the exporters for further taking initial feedback from associates of importing destinations. In the second year, exporters positively responded to promoting the export of indigenous potato varieties, particularly Kufri Neelkanth in the specialty segment and Kufri Kiran and Kufri Sangam as table potato due to their overall performance for different parameters, including better storability.

CONCLUSION

Potato export is a demand and quality-driven segment as it is crucial to cater to the specific demand of an importing nation in

Table 7: Biomass yield and harvest index at 90 days (pooled mean)

Genotypes	Tuber dry matter content (%)	Specific gravity	Tuber dry matter yield (t/ha)	Haulms fresh yield (t/ha)	Haulms dry yield (t/ha)	Biomass yield (t/ha)	Harvest index
Kufri Chipsona-4	21.3	1.087	4.68	6.64	0.98	5.66	0.82
WS/07-113	18.7	1.078	5.15	8.89	0.97	6.12	0.84
Kufri Sangam	19.3	1.078	3.24	3.73	0.46	3.70	0.87
Kufri Neelkanth	18.6	1.077	4.26	4.18	0.49	4.75	0.89
Kufri Kiran	20.1	1.083	4.13	4.04	0.46	4.59	0.89
$CD_{0.05}$	0.49	0.001	0.45	0.66	0.09	0.48	0.02
SEM±	0.16	0.0003	0.14	0.21	0.03	0.15	0.001

a particular period. It is essential to match the standards and preferences of destination countries along with better storability for lower losses in transit. As there is a deficit in the supply of fresh potatoes in the early season and the western region of Uttar Pradesh has the potential to tap this opportunity. Variety Kufri Kiran and Kufri Neelkanth and advanced hybrid WS/07-113 can potentially maintain the supply chain for early season export.

CONFLICT OF INTEREST

The authors confirm that this manuscript has no conflict of interest

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