INTRODUCTION

Although area under potato in the hills is less than 10% of the total area under potato in the country, yet it is an important part of potato supply chain providing fresh potatoes at a time when they are not available in the plains. Amongst all the biotic and abiotic factors that limit potato production in the hills, late blight disease caused by *Phytophthora infestans* is the most important limiting factor restricting potato productivity to below national average (6).

The late blight resistance breeding programme in India has led to the development and release of several resistant varieties during 1963-1971 (2, 7). These varieties including popular cv. Kufri Jyoti, possessing major R-genes derived from *S. demissum*, became susceptible to late blight in due course of time owing to the development of matching virulences in the pathogen. Thus varieties namely, Kufri Giriraj (2) and Kufri Shailja (5) with horizontal resistance derived from *S. andigena* were developed and released for cultivation in the hills in 1998 and 2005, respectively.

The continued efforts to develop late blight resistant varieties led to selection of clone “SM/91-1515” that was released for commercial cultivation under the name Kufri Himalini in 2005. This paper describes the salient features of this variety.

PEDIGREE

Kufri Himalini (SM/91-1515) is a selection (Fig. 1) from progeny of the cross ‘I-1062’ (CP 2000) x bulk pollen (CP 2132, CP 2183, CP 2175 and Kufri Pukhraj). The female parent ‘I-1062’ received from Mexico has white, oblong tubers with shallow eyes and medium maturity. It also possesses late blight resistance both in foliage as well as in the tubers, immunity to wart and moderate resistance to PLRV (3). Although bulk pollen was used for attempting this cross but the clone “SM/91-1515” could have originated from fertilization with one male parent only. Microsatellite analysis with multicopy markers namely, STIIKA, STINHW1, STU6SNRN and STM007

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showed that CP 2132 (Tollocan) was the most likely paternal parent of this hybrid (unpublished). ‘Tollocan’ was received from Peru and possesses white, oblong tubers with medium deep eyes and creamy flesh. It is an early maturing genotype having moderate resistance to late blight. This genotype is also one of the parents of variety ‘Jacqueline Lee’ known to have strong foliar resistance to the US-8 genotype of \textit{P. infestans} which is highly pathogenic and its isolates are reported to overcome all known R-genes resistance (1).

**SELECTION PROCEDURE**

The cross was made in 1991 at the Central Potato Research Station, Kufri (32°N 77°E, 2501 m amsl). The seedling generation was grown in 1992 and screened under controlled environment at Shimla against the complex races of \textit{P. infestans} as per standard procedure (8). The selected clones were subjected to early generation selections (F\textsubscript{1}C\textsubscript{1}-F\textsubscript{1}C\textsubscript{4}) and seed multiplication at CPRS, Kufri. In the following years, “SM/91-1515” was tested in replicated yield trials (F\textsubscript{1}C\textsubscript{5}-F\textsubscript{1}C\textsubscript{7}) and under natural late blight epiphytotic conditions at Kufri using Kufri Jyoti and Kufri Giriraj as controls. In 2000, the hybrid was introduced in All India Coordinated Research Project (Potato) for multilocation trials at hill centres. The hybrid was also evaluated in the north-western plains at the Central Potato Research Institute Campus, Modipuram (29°N, 76°E, 222 m amsl) during 2003 and 2004 for testing its adaptability under short days of autumn crop and irrigated conditions. The hybrid was recommended for release in the 25\textsuperscript{th} group meeting of potato workers of AICRP (Potato) held at the Maharana Partap University of Agriculture and Technology, Udaipur (Rajasthan) during 8-10 September 2005 for cultivation in north-western and north-eastern hills of the country. It was finally released and notified as variety ‘Kufri Himalini’ in 2006 by the Central Sub-Committee on Crop Standards, Notification and Release of Varieties of Horticultural Crops, Department of Agriculture and Co-operation, Ministry of Agriculture, Government of India, New Delhi.

**VARIETAL DESCRIPTION (Fig. 2)**

**Morphology**

- **Habit**: Medium-tall, semi-erect, semi-compact, vigorous.
- **Stem**: Many, green with purple colour at base, wings feebly developed.
- **Leaf**: Intermediate, dark green, leaflet width medium, coalescence absent, glossy, folioles many, rachis green.
- **Flower**: Flowering profuse, floral stalk green, floral stalk-pedicel articulation clearly visible and located above the middle, calyx green, corolla light purple and semi-stellate, anthers yellow and normally developed, pollen fertility high, style longer than stamen and stigma round.
- **Tuber**: Size medium, oval-oblong, white, smooth, eyes shallow, normal eyebrows, flesh pale yellow.
- **Sprout**: Predominantly purple, white-green at apex, shape conical, pubescence of base high and tip closed.

\begin{figure}[ht]
\centering
\includegraphics[width=0.5\textwidth]{fig1.png}
\caption{Pedigree of Kufri Himalini}
\end{figure}
Other attributes

**Maturity**  Medium (110-120 days)

**Specific gravity**  1.066

**Tuber dry matter**  18.5 percent.

**Keeping quality**  Good, better than Kufri Giriraj.

**Cooking quality**  Good, like Kufri Jyoti, cooks well in 30 min, floury texture, mild flavour, free from after-cooking discolouration.

YIELD PERFORMANCE

In the field trials conducted at Kufri during 1997-1999 (Table 1), Kufri Himalini yielded on an average 395 q/ha compared to 267 and 319 q/ha by the control varieties Kufri Jyoti and Kufri Giriraj, respectively. Its yield was higher than that of Kufri Jyoti by nearly 48%.

The yield performance of Kufri Himalini at different locations in the AICRP (Potato) hill centres (120 days crop duration, rainfed crop) is presented in Tables 2 and 3. Kufri Himalini yielded significantly higher than the respective best controls (Table 2) at different

![Flower](Image)

![Leaf](Image)

![Sprout](Image)

![Crop](Image)

![Tubers](Image)

*Fig. 2. Morphological features of Kufri Himalini*
locations over the years. However, percent increase over the controls varied from location to location. The average of four years showed that Kufri Himalini yielded about 56% higher than Kufri Jyoti, about 15% higher than Kufri Giriraj and about 16% higher than Kufri Shailja at various locations (Table 3). On an average, Kufri Himalini could yield 270-290 q/ha under normal conditions of crop growth in the hills. In sub-tropical plains at Modipuram, Kufri Himalini produced about 10% higher yield than the controls Kufri Jyoti and Kufri Giriraj (Table 4) and about 28% higher yield than the late blight susceptible variety Kufri Bahar during 2004-05.

**DRY MATTER PRODUCTION**

Kufri Himalini produced higher dry matter (18.5%) than the control Kufri Jyoti (17.0%)
and was at par with Kufri Giriraj (18.4%). The recently released cultivar Kufri Shailja produced the highest dry matter (19.1%) in these multi-location trials.

**LATE BLIGHT RESISTANCE**

Kufri Himalini showed higher level of resistance to late blight compared to Kufri Jyoti, Kufri Giriraj and Kufri Shailja (Table 3). The latter varieties had derived resistance from *S. andigena*. In Kufri Himalini, cv. ‘Tollocan’ was used as one of the male parents of bulked pollen. ‘Tollocan’ was found to have durable resistance to late blight between 1960 and 1999 (4). The authors also reported that the field resistance in this cultivar is possibly introgressed from Mexican varieties, such as ‘Amarilla de Puebla’ and ‘Leona’ in addition to *S. demissum*. In the laboratory, Kufri Himalini was found to have significantly high resistance to late blight (lesion area 1.27 cm²) than Kufri Jyoti (lesion area 5.85 cm²) by detached leaf method.

The results of whole tuber method revealed that the fungus was not able to penetrate and cause infection in tubers of Kufri Himalini, whereas tubers of Kufri Jyoti showed susceptible reaction (lesion area 6.15 cm²). However, in tuber slice method, Kufri Himalini showed moderate resistance (lesion area 5.33 cm² compared to 9.50 cm² in Kufri Jyoti).

**KEEPING QUALITY**

The storage behaviour of Kufri Himalini was studied at room temperature immediately after harvest upto 120 days duration at Modipuram. Kufri Himalini had dormancy duration equal to that of Kufri Jyoti (83 days) but longer than those of Kufri Giriraj (68 days) and Kufri Shailja (75 days). The total weight loss in Kufri Himalini after 120 days of storage was lower (15.17%) than all the three controls, Kufri Jyoti (16.68%), Kufri Giriraj (24.01%) and Kufri Shailja (19.50%).

It is evident from these results that Kufri Himalini is a high yielding, late blight resistant variety having acceptable tuber characters with good tuber dry matter and better keeping quality than cultivars Kufri Jyoti, Kufri Giriraj and Kufri Shailja. It can be grown both in the hills and plains. The cultivation of this variety will supplement the other varieties in combating late blight disease more effectively as these carry resistance genes from different sources thereby limiting single or few races to attack the crop in one season.

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**LITERATURE CITED**


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