

## Screening of potato cultivars against common scab disease (*Streptomyces scabies*) in naturally infested field

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A field experiment was conducted to study the level of resistance and susceptibility of common scab of potato. Out of ten varieties tested highest per cent incidence of scab was observed in the variety Kufri Anand (23.19%) followed by Kufri Giriraj (16.16%), Kufri Pukhraj (14.94%), Kufri Jyoti (10.51%) and lowest incidence in the variety Kufri Ashoka (0.24%). No symptom was observed in the variety Kufri Chipsona – 1. Considering the total healthy tuber yield and total scab disease scenario in each variety, Kufri Surya (31.25 t/ha) can be considered as the best variety which showed comparatively poor scab infection (0.99%).

**Keywords:** Screening, Potato cultivars, Common scab disease.

### INTRODUCTION

Potato (*Solanum tuberosum* Linn), belonging to the family Solanaceae is the most popular crop in West Bengal next to cereals. As the crop can be stored for longer periods its usefulness has increased day by day. It occupies the largest area under any single vegetable crop and it produces more food per unit area than cereals and that too in a short period of time. The potato is widely grown crop on a world scale and ranks fourth in food production.

Commercially potatoes are propagated through seed tubers. Due to vegetative propagation, various fungal, bacterial and viral diseases are transmitted down for generations. In West Bengal it has been observed critically that the incidence of several fungal, bacterial and viral diseases (aerial and tuber) affect the crop in every year. Among them one of the important bacterial tuber diseases is scab which causes heavy losses due to poor marketability. The disease is of worldwide occurrence and in India, the disease was introduced from Myanmar in 1958 and in the plains it was first seen in Patna in 1958 with as high as 61.7% incidence in some fields. Otherwise it remained restricted to hilly regions. By 1965 it was found throughout Bihar. Later, Potato scab was reported from Uttar Pradesh (1979), Punjab (1962), Maharashtra (1976),

Gujarat (1979) and Madhya Pradesh (1984). It is present throughout Himachal Pradesh where it is more severe in Lahaul Valley. Based on the symptoms Scab disease has been classified into six types. (Paharia and Pushkarnath, 1963; Nagaich and Dutt, 1972; Jeswani *et al.*, 1987).

The present investigation was carried out to find out the reaction of different potato cultivars against scab disease and the objective of the investigation was to sort out the varieties which are less susceptible to the disease and better adapted to West Bengal climatic condition.

### MATERIALS AND METHODS

The experiment was conducted at Adisaptagram Block Seed Farm, Hooghly during 2009-2010 crop seasons. The soil of Adisaptagram Block Seed Farm is moist having pH of 6.5 - 7.0

Ten cultivars, namely, Kufri Chandramukhi (KCM), Kufri Pukhraj, Kufri Jyoti, Kufri Chipsona – 1, Kufri Jawahar, Kufri Anand, Kufri Giriraj, Kufri Ashoka, Kufri Surya and Kufri Bahar were selected for this investigation. Of these cultivars, Kufri Anand is susceptible and the rest are resistant. All the varieties were planted during middle of November. The per cent disease incidence of potato scab disease was

recorded at the time of harvesting on the basis of tuber symptoms and then compared with their yield data.

The disease incidence per cent was calculated using the formula:

$$\text{Disease incidence (\%)} = \frac{\text{No of Tubers Infected}}{\text{No. of Tubers Observed}} \times 100$$

## RESULTS AND DISCUSSION

### *Per cent incidence of scab disease of potato in different varieties*

Table 1 represents the total number of tubers obtained, number of tubers infected by scab in each

the variety K. Anand (4.56%) followed by K. Jyoti (3.41%), K. Pukhraj (2.60%), K. Chandramukhi (2.51%), K. Giriraj (1.62%), K. Jawahar (0.78%), K. Bahar (0.26%), K. Surya (0.20%) and K. Ashoka (0.12%) respectively. In respect of total scab disease scenario of potato (including pitted and russet) highest incidence per cent was observed in the variety K. Anand (23.19%) followed by K. Giriraj (16.16%), K. Pukhraj (14.94%), K. Jyoti (10.51%), K. Chandramukhi (9.53%), K. Bahar (2.37%), K. Jawahar (1.09%), K. Surya (0.99%) and K. Ashoka (0.24%) respectively. In one variety such as K. Chipsona - 1, incidence of scab (pitted and russet) was not observed. Almost same observation was also found by Basu (2007).

**Table 1:** Per cent incidence of scab disease of potato in different varieties.

Name of Varieties	Total no. of Tubers	Pitted Scab		Russet Scab		Total Scab	
		Infected Tubers	Incidence (%)	Infected Tubers	Incidence (%)	Infected Tubers	Incidence (%)
K. Chandramukhi	598	42	7.02	15	2.51	57	9.53
K. Pukhraj	770	95	12.34	20	2.60	115	14.94
K. Jyoti	704	50	7.10	24	3.41	74	10.51
K. Chipsona-1	633	0	0.00	0	0.00	0	0.00
K. Jawahar	645	2	0.31	5	0.78	7	1.09
K. Anand	789	147	18.63	36	4.56	183	23.19
K. Giriraj	495	72	14.55	8	1.62	80	16.16
K. Ashoka	837	1	0.12	1	0.12	2	0.24
K. Surya	507	4	0.79	1	0.20	5	0.99
K. Bahar	758	16	2.11	2	0.26	18	2.37

variety of potato. The disease incidence per cent of pitted, russet and total scab was calculated in each variety and tabulated in the same table.

Highest incidence per cent of pitted scab was observed in the variety K. Anand (18.63%) followed by K. Giriraj (14.55%), K. Pukhraj (12.34%), K. Jyoti (7.10%), K. Chandramukhi (7.02%), K. Bahar (2.11%), K. Surya (0.79%), K. Jawahar (0.31%) and K. Ashoka (0.12%) respectively, whereas highest incidence per cent of russet scab was observed in

### ***Relationship of total tuber yield (t/ha) with per cent disease incidence in different varieties of potato***

The total healthy tuber yield and scab disease scenario in each variety are presented in Table 2. It is observed from the results that the highest tuber yield was obtained in the variety K. Surya (31.25 t/ha). Next highest tuber yield was obtained in the variety K. Chandramukhi (26.17 t/ha).

This was followed by K. Jyoti (24.61 t/ha), K. Pukhraj

**Table 2:** Per cent disease incidence of potato scab and total tuber yield in different varieties of potato.

Name of the Varieties	Disease incidence (%) of potato scab during harvesting	Tuber yield (t/ha)
Kufri Chandramukhi	9.53	26.17
Kufri Pukhraj	14.94	23.44
Kufri Jyoti	10.51	24.61
Kufri Chipsona – 1	—	19.53
Kufri Jawahar	1.09	23.44
Kufri Anand	23.19	18.36
Kufri Giriraj	16.16	12.50
Kufri Ashoka	0.24	10.16
Kufri Surya	0.99	31.25
Kufri Bahar	2.37	20.31

(23.44 t/ha), K. Jawahar (23.44 t/ha) and K. Bahar (20.31 t/ha). But the varieties K. Chipsona – 1, K. Anand, K. Giriraj and K. Ashoka yielded 19.53 t/ha, 18.36 t/ha, 12.50 t/ha and 10.16 t/ha respectively.

Here, the potato variety K. Chipsona – 1 showed completely free from scab disease but the tuber yield was very poor (19.53 t/ha) compared with other potato varieties. On the other hand, the variety K. Surya gave highest yield (31.25 t/ha) and

showed comparatively poor scab infection (0.99%). Therefore considering the common scab disease reaction and yield, K. Surya can be considered as the best variety.

Considering the per cent incidence of scab disease of potato in West Bengal the whole experiment was summarized as follows:

Highest Incidence of common scab was observed in the variety K. Anand (23.19%). This was followed by K. Giriraj (16.16%), K. Pukhraj (14.94%), K. Jyoti (10.51%) and K. Chandramukhi (9.53%). Negligible per cent of common scab was observed in the varieties K. Ashoka (0.24%), K. Surya (0.99%), K. Jawahar (1.09%) and K. Bahar (2.37%). No common scab symptom was observed in the variety K. Chipsona – 1.

Considering the overall scab disease scenario and healthy tuber production it can be concluded that K. Surya was the best variety which gave the highest tuber yield (31.25 t/ha).

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