

Degeneration of potato cultivars due to viral diseases in the plains of West Bengal

A. CHAKRABORTY

AICRP on Potato, Directorate of Research, Bidhan Chandra Krishi Viswavidyalaya, Kalyani, 741235, Nadia, West Bengal.

Received : 11.08.2011

Accepted : 18.04.2012

Published : 29.10.2012

The three cultivars viz. Kufri Jyoti, Kufri Surya and Kufri Chipsona-1 showed gradual degeneration in successive years in case of ware crops and the crop maintained through seed plot technique when the seed from the produce of same crop was used in each year. The actual yield potential was maintained when fresh breeders seed was used in each year in all the three varieties tested.

Key words: Degeneration, potato cultivar, viral diseases

INTRODUCTION

The mild mosaic (PVX), severe mosaic (PVY) and leaf roll (PLRV) are the major virus diseases of potato in West Bengal. These diseases are carried through seed potatoes and are mainly responsible for degeneration of seed stocks in subsequent years, if necessary management strategies are not adopted (Singh *et al*, 2008). It has been observed that crop maintained through seed plot technique only exhibited actual potential of the cultivar Kufri Jawhar, Kufri Sutlej and Kufri Pukhraj (Basu *et al*, 2003). Therefore, an experiment has been undertaken during 2007-08, 2008-09 and 2009-10, at Adisaptagram Block Seed Farm, Hooghly with three varieties namely Kufri Jyoti, Kufri Surja and Kufri Chipsona-1 to find out the rate of degeneration in subsequent years.

MATERIALS AND METHODS

This experiment was conducted at Adisaptagram Block Seed Farm, Hooghly. The varieties used in this experiment were Kufri Jyoti, Kufri Surya and Kufri Chipsona-1. All these varieties were received from C.P.R.I., Shimla. The experiment was conducted in randomized block design with six replications. The individual plot size was 3 m×2.4 m. The planting was done during 2nd week of November each year giving a spacing of 60 cm × 20 cm. Three treat-

ments used in this trial were T₁ i.e crop planted as ware crop with no aphid control and harvested at maturity, T₂ i.e crop planted with seed plot technique i.e. application of systemic insecticide (thimet 10G @ 10 kg/ha) at first earthing up + two sprays of insecticide dimethoate (rogor 30 EC) @ 1 ml/lit at 15 days interval starting at 45-50 days after planting + haulm cutting when aphid population reaches critical level of 20 aphids per 100 compound leaves and T₃ i.e crop planted from fresh breeders seed and harvested at maturity. The produce from T₁ and T₂ treatments were kept as seed for planting in each successive years and treatment T₃ was used afresh each year. The per cent incidence of viral diseases i.e mosaic and leaf roll were recorded at every 10 days interval.

RESULTS AND DISCUSSION

The results are presented in Table 1. It is observed from the table that the highest incidence of viral diseases i.e mosaic and leaf roll were observed in treatment T₁ in all the varieties tested i.e in Kufri Jyoti it was 4.53 and 7.20%, in Kufri Surya it was 3.42 and 4.23% and in Kufri Chipsona-1 it was 3.28 and 8.22% respectively. In T₂ treatment the incidence of viral diseases were less as compared to T₁ treatment in all the varieties tested i.e in Kufri Jyoti it was 3.80 and 6.00%, in Kufri Surya it was 2.90 and 3.64% and in Kufri Chipsona-1 it was 2.58 and 5.91% and

this was due to adoption of control measures against the insect vectors which are the carrier of potato leaf roll viruses. (Singh *et al.*, 2008). In treatment T₃ the incidence of viral diseases were less as compare to T₁ and T₂ treatments in all the three varieties i.e in Kufri Jyoti it was 2.76 and 2.60%, in Kufri Surya

Table. 1: Incidence of viral diseases and yield (t/ha) in the varieties of Kufri Jyoti, Kufri Surya and Kufri Chipsona-1.

Variety	Treatment	% of viral diseases			% of viral diseases			% of viral diseases		
		2007 -2008			2008 -2009			2009 -2010		
		Mosaic	Leaf roll	Yield (t/ha)	Mosaic	Leaf roll	Yield (t/ha)	Mosaic	Leaf roll	Yield (t/ha)
Kufri Jyoti	T ₁	4.53	7.20	18.75	5.24	10.34	16.50	6.25	14.50	15.90
	T ₂	3.80	6.00	21.65	4.32	9.40	19.90	5.00	11.00	18.40
	T ₃	2.76	2.60	23.68	1.47	1.89	24.52	0.00	2.25	29.30
Kufri Surya	T ₁	3.42	4.23	20.48	3.70	5.09	19.50	4.65	10.50	16.50
	T ₂	2.90	3.64	22.35	3.63	4.82	20.48	4.50	9.35	18.50
	T ₃	0.64	1.63	23.50	0.00	2.65	24.75	0.00	3.00	24.00
Kufri Chipsona-1	T ₁	3.28	8.22	18.02	3.82	9.34	15.90	4.50	10.33	15.20
	T ₂	2.58	5.91	21.73	3.31	7.47	16.08	4.84	9.00	15.60
	T ₃	1.42	2.51	22.36	2.23	2.29	22.95	0.00	3.50	25.00

it was 2.90 and 3.64% and in Kufri Chipsona-1 it was 1.42 and 2.51% respectively. Among the varieties highest virus infection was observed in Kufri Jyoti followed by Kufri Surya and Kufri Chipsona-1. In case of T₁ and T₂ treatments in all the three varieties tested the viral diseases gradually increased in each successive years.

The yield recorded in T₃ treatment was more than T₁ and T₂ treatment in all the varieties tested i.e in case of Kufri Jyoti in treatment T₃ it was 23.68 t/ha as compared to T₁ (18.75 t/ha) and T₂ (21.68 t/ha) treatments. In case of Kufri Surya in T₃ treatment the yield was 23.5 t/ha as compared to T₁ (20.48 t/ha) and T₂ (22.35 t/ha) and in Kufri Chipsona-1 in T₃ treatment the yield was 22.36 t/ha as compared to T₁ (18.02 t/ha) and T₂ (21.73 t/ha) treatments. Not only that in T₁ and T₂ treatments in all the varieties the yield gradually decreased in each year i.e. 2008-09 and 2009-10.

It was also observed from the result that there was a gradual reduction in yield in treatment T₁ and T₂ in

all the varieties tested i.e. In Kufri Jyoti in treatment T₁ the gradual reduction in yield was 18.75 t/ha → 16.50 t/ha → 15.90 t/ha and in treatment T₂ it was 21.65 t/ha → 19.90 t/ha → 18.40 t/ha in each successive years i.e., 2007-08, 2008-09 and 2009-10 respectively. The same trend was observed in Kufri Surya and Kufri Chipsona-1 also.

Therefore, a gradual degeneration in yield was observed in treatment T₁ and T₂ in all the varieties tested and such degeneration will occur if the produce of each year is used as seed in next year and it continues in each successive years. But no such degeneration was occurred in case of fresh breeders seed.

REFERENCES

- Basu, A, Chettri M and Konar, A. 2003. Degeneration of potato varieties in the plains of West Bengal. *Potato Journal*. 30 : 125-126.
- Singh, Narendra, Patel, N.H., Chaudhuri, S.M., Patel, R.L. and Patel P.J. 2008. Degeneration of potato cultivar in North Gujarat Abstract, Global Potato Conference, 158