

Production of disease free seed potatoes in plains of West Bengal

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Presently, West Bengal is holding second position in potato production among different potato growing states of the country. In terms of productivity the state ranks second next to Gujarat. Each year there is a gradual increase in production of potato in the state but till date the major problem in potato cultivation is the non availability of quality seed at the time of planting. Therefore, efforts had been made to produce potato seed tubers in the state. Seed production programme was carried out in the districts of Bankura and Birbhum. The biotic stresses like diseases and pests were kept under check by adjustment of date of planting and application of pest control strategies and the performance of this programme was very promising.

Key words: Potato seed, disease free , West Bengal

INTRODUCTION

In West Bengal potato is the most popular crop next to cereals. The crop is cultivated in *rabi* season (November to March) in the state. At present West Bengal ranks second both in terms of production and productivity. The average production of the state is approximately 90-100 lakh tonnes from 3.5 to 4 lakh hectares of land annually. But the production does not remain constant in each year and this is mainly due to lack of quality seed tubers. In potato cultivation seed tuber is the single most important factor which accounts for nearly 40-50% of the total cost of cultivation due to higher seed rate per unit area (Kushwa and Lal, 1988; Singh, 2003). Approximately 30-40% of the seed potato is procured from outside the state like Punjab , U.P etc. the quality of which is not always good enough resulting in rapid degeneration of tubers due to viral

diseases. Not only that, cost of such seed tubers is also very high resulting in huge monetary loss . The rapid degeneration of tubers and also huge cost of seed material aggravates the situation because the farmers do not get the profitable price after harvest of their produce . Therefore, to save the farmers from such losses and to make the potato cultivation profitable an effort has been made to produce potato seed in the state so that the farmers in the state can produce the seed and avoid the dependence on other state for supply of quality seed. Not only that the potato seed production in West Bengal should be made to such an extent that the state can export the seed to other state instead of procuring from outside.

MATERIALS AND METHODS

Potato seed production programme was carried

out in the districts of Birbhum and Bankura during 2009-10 to 2011-12 crop seasons following seed plot technique (Pushkarnath, 1967) with some modifications. One hectare of land was selected in each district involving some farmers in individual district .The details of which is given below.

RESULTS AND DISCUSSION

The result on management of diseases is presented in Table 1. It is evident from Table 1 that upto 60 days of crop growth no late blight appeared in both the locations i.e. Birbhum and bankura .

District	Name of the farmers	Village	Block	Amount of cultivated land (ha)
Birbhum	Manik Mondal	Tarulia	Labpur	0.53
	Manik Dhibar	Do	Do	0.20
	Nidhiram Dhibar	Do	Do	0.27
Bankura	Abani Kundu	Barobendya	Barjora	0.40
	Ajoy Kundu	Do	Do	0.33
	Ashoke Roy	Do	Do	0.27

Basic agronomic practices for seed production

Planting Time: 1st week of November, Fertilizer dose: N: P: K :: 150:100:100 kg/ha, Spacing : 50 cm × 20 cm, Rouging of Diseased/off type plants : 40, 50, 60 days after planting; Dehauling : 2nd week of January, Harvesting: 4th week of January.

Measurement of disease severity of potato Late Blight

The crop was regularly observed for the first appearance of the disease . Disease severity was recorded following 0-9 scale as described by Malcolinson (1976) where 0=no visible symptom ; 1=1-9%; 2=10%; 3=11-25%; 4=26-40%;5=41-60%;6=61-70%;7=71-80%;8=81-90%and 9=91-100% area of leaf infected.

The per cent disease severity (PDI) of individual Plant was calculated by using the following formula developed by Wheeler (1969)

$$\text{Per cent Disease Severity (PDI)} = \frac{\text{Sum of numerical rating} \times 100}{\text{Total no of leaves examined} \times \text{Maximum rating}}$$

Methodology for aphid population count

For recording aphid population 5 spots were selected in each field ; 4 spots at 4 corner of the field and rest one spot at the middle of the field .In each spot 10 plants were selected randomly taking 2 compound leaves from each plant .In each compound leaf population of aphids were recorded at 7 days interval.

The disease appeared during 60 days of crop growth but the intensity per cent was only 1.82 and 1.53 at Birbhum and Bankura districts respectively. This low intensity was due to management of this disease through chemical means and dehauling of the crop during 2nd week of January. It is also observed from table 1 that upto 60 days of crop growth only 0.75% of viral disease (mild mosaic ,severe mosaic and potato leaf roll were collectively denoted as only viral disease) was observed in the districts of Birbhum and Bankura respectively. This lower incidence of viral disease was mainly due to application of systemic insecticides at 30,45 and 60 days after planting . No black scurf and brown rot were observed in both the locations but only negligible per cent of common scab (1.14 and 1.00 %) was recorded both in the districts of Birbhum and Bankura respectively.

The production of seed potatoes are presented in Table 2 .It is evident from the result that the production of seed tubers was very high i.e. in Birbhum it was 17t/ha and in Bankura it was 15.4t/ha.Not only that maximum yield was recorded in 25-50gm tuber size which is most suited for seed potatoes .In Birbhum 10.20 t/ha and in Bankura 9.25 t/ha yield was obtained within this size. Moreover, multiplication rate of tuber was also very promising i.e. in Birbhum it was 1:7.5 and in Bankura it was 1:6.8.

Population dynamics of aphid in unsprayed potato crop has been depicted in Fig. 1. Monitoring of aphid was carried out for 3 years (2009-10 to 2011-12) in both the locations . It was observed that the critical level of aphid (20/100 compound leaves) reached during second week of January in the unsprayed crop. Thus 8-9 weeks of low aphid pres-

Table 1 : Severity of important diseases of potato during 2009-10 to 2011-12 crop seasons (Pooled Data)

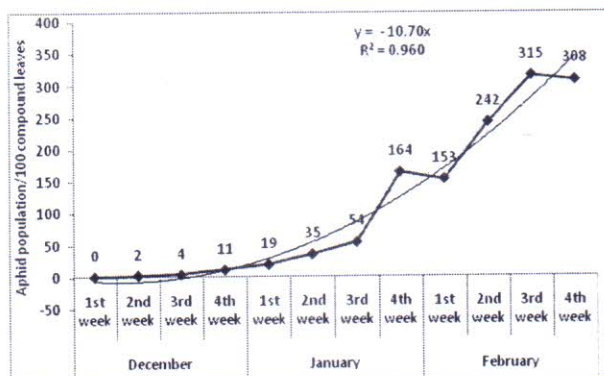
Locations	Per cent disease Intensity of late blight at days interval		Per cent Incidence of viral* diseases at days interval			Per cent Incidence of soil and tuber borne diseases		
	40	60	40	50	60	Black Scurf	Brown Rot	Common Scab
Birbhum	0.00	1.82	0.35	0.60	0.75	0.00	0.00	1.14
Bankura	0.00	1.53	0.60	0.65	0.75	0.00	0.00	1.00

*Mild Mosaic, Severe Mosaic and Potato Leaf Roll

Table 2: Yield attributes (pooled data) of seed potatoes produced during 2009-10 to 2011-12 crop seasons

Locations	Grade wise tuber yield (t/ha)			Total tuber yield (t/ha)	Multiplication rate
	≤ 25g	25-50g	51-75g		
Birbhum	2.04	10.20	4.75	17.00	1:7.5
Bankura	1.84	9.25	4.31	15.40	1:6.8

sure period was observed even in unsprayed conditions (Fig. 1). As the crop was dehaulmed during second week of January, therefore, there was least chance of appearance of viral diseases in seed crop. Moreover, the seed crop was sprayed with systemic insecticide immediately after germi-

**Fig. 1** : Mean aphid population/100 compound leaves during 2009-10 to 2011-12 crop season

nation thereby resulting no chance of insect infestation.

Therefore, from the present study it may be concluded that following the seed plot technique disease free potato seeds can be produced not only

in Birbhum and Bankura districts but in other potato growing districts of West Bengal also. Therefore, if the farmers and the different public sector organizations come forward then the day will come when the state of West Bengal will not only produce its own required quantity of seed but will be able to supply the seed to other part of the country.

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