Session II

CHEMICAL CONTROL OF SCAB DISEASES OF POTATO

by B. L. DUTT *and* D. S. SRIVASTAVA, *Central Potato Research Institute, Simla*

Powdery scab (*Spongospora subterranea* (Wall.) Lagerheim) and common scab (*Streptomyces scabies* (Thaxt.) Waksman and Henrici) are common diseases of the potato tubers in the hills. The former is rather serious in the higher hills but is never observed in the plains. The common scab on the other hand sometimes also appears in the plains. Treatment of the seed tubers with mercury compounds along with the soil treatment with PCNB helped in reducing the incidence of the scabs. In the case of powdery scab, treatment of tubers with mercuric chloride (1 : 1200) for 1½ hour besides treating the soil with PCNB (30 kg/ha) gave the best results. In the case of common scab, treatment of tubers with Agallol-6 (0·25 per cent) along with soil treatment with PCNB (75 kg/ha) provide a good control of the disease. The tuber treatment alone, though a little less effective, was found to be more economic for the control of the scabs.

Powdery scab of potato caused by *Spongospora subterranea* (Wall.) Lagerheim has been observed to occur annually in all the potato growing areas in the higher hills of Himachal Pradesh. The disease has also been found to occur fairly commonly at Bhowali, Mukteshwar, Ranikhet and Droonagiri (Kumaon hills), Shillong (Assam), Darjeeling (W. Bengal) and Ootacamund (Nilgiri hills). Powdery scab was also observed in tubers from Sikkim. The disease is more common in the higher hills (above 8,000 ft height) in Himachal Pradesh and is particularly serious in the grey soils and in freshly reclaimed forest areas. In severe attacks most of the surface area of the tubers may be covered by pustules of the disease. The affected tubers are the source of infection and are, therefore, not to be used as seed in the hills. However, powdery scab does not develop in the plains and lightly affected tubers could be safely planted there. Field trials were conducted in the Simla hills to develop a chemical control of the disease and the results are presented in Table I.

It was observed that the incidence of powdery scab could be effectively reduced by the treatment of the tubers with mercuric chloride (0·1 per cent) for 1½ hour coupled with soil treatment with PCNB (30 lb/acre). Continuous use of treated seed tubers alone helped in providing a good control of the disease. At our Kufri farm the entire seed stocks are annually treated with mercuric chloride. The incidence of the powdery scab affected tubers came down from 25 per cent to less than one per cent within four years.

TABLE I

Effect of chemical treatment on the incidence of powdery scab in variety Kufri Safed at Kufri

Treatment	1961				1962			
	No. of tubers harvested	No. of diseased tubers	Percentage of disease infection	Yield/plot in gms	No. of tubers harvested	No. of diseased tubers	Percentage of disease infection	Yield/plot in gms
Agallol (1 lb in 20 gall. water) tuber treatment alone ..	680	115	16·9	1950·0	365	100	27·4	1197·5
Agallol (1 lb in 20 gall. water) tuber treatment + 20 lb PCNB/acre soil treatment ..	692	100	14·5	1930·0	321	69	21·5	1102·5
Agallol (1 lb in 20 gall. water) tuber treatment + 30 lb PCNB/acre soil treatment ..	–	–	–	–	362	68	18·8	1032·5
Aretan (½ lb in 20 gall. water) tuber treatment alone ..	667	96	14·4	2025·0	495	122	24·6	1481·5
Aretan (½ lb in 20 gall. water) 768 tuber treatment + 20 lb PCNB/acre soil treatment	768	97	12·6	1980·0	315	60	19·0	1152·5
Aretan (½ lb in 20 gall. water) tuber treatment + 30 lb PCNB/acre soil treatment	653	60	9·2	1570·0	385	66	17·1	1022·5
Mercuric chloride (¼ oz) + carbolic acid (¼ pint) (in 25 gall. of water) tuber treatment alone ..	697	107	15·8	1995·0	–	–	–	–
Mercuric chloride (4 oz in 30 gall. water) tuber treatment alone	653	49	7·5	2175·0	347	54	15·5	1215·0
Mercuric chloride (4 oz in 30 gall. water) tuber treatment + 20 lb PCNB/acre ..	671	40	6·0	1855·0	276	27	9·7	817·5
Mercuric chloride (4 oz in 30 gall. water) tuber treatment + 30 lb PCNB/acre treatment ..	562	15	2·7	1830·0	258	20	7·7	731·2
Tillex (1½ lb in 20 gall. water) tuber treatment alone ..	–	–	–	–	421	108	25·6	1430·0
Tillex (1½ lb in 20 gall. water) tuber treatment + 20 lb PCNB/acre	–	–	–	–	360	66	18·3	1082·5
Tillex (1½ lb in 20 gall. water) tuber treatment + 30 lb PCNB/acre ..	–	–	–	–	335	55	16·4	980·0
Control (No treatment)	745	187	251	1912·5	314	114	36·3	1002·5

Potato suffers from the attacks of another scab named common scab caused by *Streptomyces scabies* (Thaxt.) Waksman and Henrici. Common scab is commonly observed in the Kumaon, Assam and West Bengal hills. It has not

TABLE II

Effect of seed and soil treatments on the incidence of common scab in variety up-to-date at Patna

Tuber treatment	Percentage of common scab affected tubers		
		Soil treated with PCNB	
	No soil treatment	@ 50 kg/ha	75 kg/ha
Control (No treatment)	37·7	8·5	6·6
Mercuric chloride (0·05%) 15 min	16·0	4·4	3·1
Mercuric chloride (0·1%) 15 min	15·7	3·2	3·0
Agallol (0·25%) 5 min	10·4	3·2	2·7
Agallol (0·25%) 15 min	9·2	3·4	2·1
Agallol (0·5%) 5 min	6·4	4·0	1·4
Agallol (0·5%) 15 min	6·4	3·2	1·4
Aretan (0·25%) 5 min	11·6	3·7	5·3
Aretan (0·25%) 15 min	10·5	3·6	3·2
Aretan (0·5%) 5 min	9·8	2·8	4·2
Aretan (0·5%) 15 min	7·2	2·2	4·5
PCNB 75W (20 gms applied to 30 tubers) ..	33·8	7·8	3·0

TABLE III

Effect of treatment of soil with Brassicol on the incidence of Sclerotium wilt. and common scab at Rajgurunagar during 1969–70

Treatment and rate per ha	Average percentage infection	Sclerotium wilt yield (Q/ha)	Average percentage of diseased tubers	Common scab yield (Q/ha)
Brassicol 20W 10 kg + NPK ..	7·10	48·1	55·2	132·1
Brassicol 20W 20 kg + NPK ..	6·33	43·8	42·4	138·7
Brassicol 20W 30 kg + NPK ..	5·44	42·5	41·1	120·0
Brassicol 75W 10 kg + NPK ..	0·44	40·2	48·2	131·9
Brassicol 75W 20 kg + NPK ..	4·72	38·4	39·7	73·2
Brassicol 75W 30 kg + NPK ..	3·36	38·0	28·2	99·7
Control (No soil treatment + NPK) ..	25·89	45·5	38·9	158·8
Control (No soil treatment + No NPK)	38·53	19·1	40·9	67·3
LSD 0·05	9·6	15·7	13·9	32·9

Basal dose of 100 : 80 : 60 kg NPK

been observed so far in the Simla hills. The disease has been observed annually at Rajgurunagar (Maharashtra) and is particularly serious in the Rabi crop. The disease has also been occasionally observed at Patna.

The experiments at Patna showed that treating the tubers with Agallol along with treatment of soil with PCNB (75 kg/ha) provided a good control of the disease (Table II).

In another experiment planted during Rabi 1969 at Rajgurunagar, observations were recorded on the incidence of common scab (Table III). Treatment of soil with Brassicol was not found to effectively reduce the incidence of common scab. However, application of Brassicol 75W at the rate of 30 kg/ha helped in reducing the disease incidence. It is probably a higher dose that may provide a better control but it may cause a further depression in the yield.