

Potato Improvement by Multiplication of Virus-free Seed

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Potato is an important food crop that deserves both large-scale and quick multiplication of quality seed material and widespread extension to regions in which it can be profitably cropped. At present, its cultivation is chiefly confined to about 20,000 acres on the higher plateau of the Nilgiris, where it is a major food and money crop.

Unfortunately, no single commercial variety offers a high resistance to the several virus diseases, four of which have been recorded on the Nilgiris. *Great Scot* may be said to show the greatest resistance among the popular cultivated varieties. The absence of a good variety, totally immune to virus, has been responsible for the deterioration in the yield values of the potato throughout the world.

In view of the serious havoc caused by virus diseases, active investigations on their prevention and control are in progress in America and the Irish Free State and to the greatest extent at Wageningen in Holland.

Coming nearer home, an idea of the huge loss in potato production in the Madras State is necessary to appreciate the critical situation confronting the grower. The over-all yields from the seed material produced and supplied from the Agricultural Research Station, Nanjanad, have been steadily declining with the passage of years. This gradual fall has been found as being mainly due to the incidence of virus diseases, which have been spreading in the seed material imported years ago. For example, it is found that the range of acre-yields in the main crop had declined from 16,800 lb. in 1939 - '40 to about 8,500 lb. as at present. The high yields of 1939 - '40 were never attained in any of the succeeding years. In the case of the second crop, the fall was still more marked. The high figure of 14,600 lb. of 1939 - '40 has come down to the region of about 5,000 lb. The same is the story for the irrigated crop, the corresponding respective figures being 14,800 lb. and 6,000 lb.

In between the years above mentioned, small consignments of certified virus-free 'Class A' *Great Scot* seeds were obtained from Scotland and tried against the seed of the same variety grown year after year at the Station. The amazingly high yields secured through the freshly imported material proved a pointer, viz., that any measures taken

to make similar disease-free seed available in abundance to our growers can and must bring about a marked improvement in production in the shortest possible time.

Before taking up the question of virus-free seed multiplication, it would be useful to see how the infection spreads from year to year and 'runs out' established good yielders. The infection is said to occur, jointly and severally, by the following ways:

- (a) Sucking insects, aphids among the more important of them, conveying the disease from the diseased to the healthy plants. But, if centres of seed production are isolated at a distance of about 300 yards away from the infected areas, a partial protection is conferred on the material multiplied. But this is not strictly safe for it is recorded that infection has occurred over a distance of more than a mile from such safety-belts by migrating aphids acting as carriers.
- (b) Infected left-over tubers on the field after lifting the crop transmit the disease to the incoming potato crop. Active propaganda in favour of search and removal of such tubers will prove of use in minimising the spread of virus.
- (c) The use of small sized tubers or 'chats' is another factor responsible for spreading the disease. Infected plants usually produce such chats and if these are utilised for seed, the virus naturally multiplies and overpowers the resulting crop.
- (d) A number of plants like *Datura*, *Petunia* and other *Solanum* species have been found to be infected with virus. These are usually found growing as weeds near potato holdings. Insects transmit the disease from these to the potato crop. Destruction of these weeds may help to check the spread of virus.

It may be concluded that all the above methods can, at the best, only afford partial prevention. The only effective solution lies in the rapid multiplication of certified virus-free foundation seed stock under the control of the State Department of Agriculture.