Trials to grow certified seed potatoes in the Golan Heights

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Summary

A trial to grow seed potatoes in summer 1968 in the Golan Heights indicated that hardly any aphid transmission of potato virus Y (PVY) could be noticed. Normal plant growth and tuber formation were observed. The incidence of seed borne virus diseases in fields grown from local seed produced in the Golan Heights in 1970 was: PVY 0.1-0.3% in 2 out of 33 inspected fields, potato leaf roll virus (PLRV) 0.3-2% in 19 fields. In 1972 30 fields were inspected. PVY was observed in 3 fields at a level of 0.1-0.2% PLRV at a level of 1-4% in 28 fields. Alfalfa mosaic virus (AMV) and Stolbur were not observed.

The result of post-harvest control in field plots planted with seed potatoes produced in the Golan Heights in 1969, 1970 and 1971 were: PVY very low infection, 0.2-0.7%, for the three years; PLRV, low percentage, 0.3-0.7%, in 1970 and 1971, while it increased in 1972 to 1.3-6%. AMV and Stolbur were not observed.

Introduction

In the past, attempts to grow foundation-stock seed potatoes in Israel failed because of spread of virus diseases beyond an acceptable limit.

The main virus diseases are caused by potato virus Y (PVY) and potato leaf roll virus (PLRV). Other viruses identified on potatoes in Israel are: potato virus X (PVX), potato aucuba mosaic virus, alfalfa mosaic virus (AMV) and Stolbur (Zimmerman-Gries and Swirski, 1955; Alper and Loebenstein, 1966; Zimmerman-Gries and Nitza-ny, 1969; Zimmerman-Gries and Harpaz, 1970; Zimmerman-Gries, 1970).

The green peach aphid, *Myzus persicae* (Sulzer) plays a major role in the natural spread of PVY and PLRV.

Trials were conducted in the Upper Galilee mountains (850 m above sea level) virus free potatoes being planted in May and harvested by the end of September. The mean temperatures in these months are, in this area, 19.2, 22.2, 23.5, 24.1 and 21.8 °C, respectively, somewhat cooler than in other lower lying areas in the country in which potatoes planted in May, when there is a low ebb of aphids, cease to produce tubers.

1 Part of this paper was read at a session of the Virology Section at the 5th Triennial Conference of the EAPR (Norwich, September 1972).
but develop excessive above-ground growth. These plants in the mountains produced normal tubers (Zimmerman-Gries and Harpaz, 1970).

Golan Heights upper zone area is about 900 m above sea level; the temperature is a little lower than in the East Galilee Mountains during the summer. The mean temperatures in these months in this area are 17.5, 21.8, 22.8, 23.4, 22 and 18.5 °C. The maximum and minimum temperatures in these months are, respectively: May: 22.7 and 11.1; June: 27.8 and 14.7; July: 28.4 and 17.1; August: 29.5 and 17.5; September: 27.5 and 15.6; October: 24.2 and 12.8 °C. The annual rainfall is about 900–1000 mm. During the potato growing period the average distribution of rainfall is: April 5.2 days, 28.9 mm; May 4 days, 19.1 mm; June-August no rain at all; September 0.5 days, 1.2 mm; October 4.8 days, 14.5 mm.

During the growing period strong winds blow, mostly West and North-West which are prevalent between 11 a.m. and 5 p.m. (Gat and Lomas, 1969).

A survey of aphid spread during 1968–1970: the population was high till mid May, very low during June till the end of August, while the population of *Myzus persicae alata* was very small from May to the beginning of September (Alper and Loebenstein, 1971).

**Materials and methods**

On 20 May 1969 in Merom Golan, a settlement in the Golan Heights, about 4 ha of *Up-to-Date* certified seed potatoes were planted. After obtaining fairly good results from this field it was decided to continue trials for seed potato production. In summer 1970 two settlements, Merom Golan and Ein Zivan, started to grow *Up-to-Date* from certified seed Class A. The trial fields were irrigated by sprinklers throughout the growing season. The total application was 8000–10000 m³ water per hectare, 200–300 m³ being applied during each period of irrigation. The precise amount, and the number of days between periods of irrigation (4–7 days) varied according to the daily temperature. Before harvest, the fields were treated with vine killers.

These field plots were under the control of the Seed Inspection Service and were inspected 2–3 times in June, July, August 1970–1971. The yield of the plots was released as local certified seed potatoes.

Samples of Golan Heights seed (from the above mentioned settlements) were grown in experimental plots during 1970–72 in Kalia, Bet-Shean Experimental Station and Kfar Shalem ‘Hazera’ Farm.

From the yields of summer 1970 and 1971, samples of 800–1000 tubers were collected at different harvest dates at Merom-Golan and Ein-Zivan. These tubers were sorted into two different classes by weight: 40–80 g medium-size seed, 80–100 g largeseed.

Virus infection on these tubers was diagnosed upon breaking their dormancy by the aid of ethylene chlorhydrin as described by Zimmerman-Gries and Harpaz (1967).

The tubers were sown in an insect-proof screen house for virus tests; observations were made every 10–14 days. Presence of PVY was established by observation of visible symptoms on the suspected plants, followed by indexing on a series of indicator