RESISTANCE TO POTATO VIRUS Y IN SOLANUM TUBEROSUM SSP. ANDIGENA

A Thesis

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by

Francisco J. Muñoz

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SUMMARY

This study consists of five parts. The first part involved the isolation, identification and maintenance of a strain of potato virus Y. Results indicated that the strain involved belongs to the common group of strains or Yo.

The second part deals with the screening for resistance to virus Y of three progenies - P64, P66 and P69 - by means of field exposures. The results confirm the unsuitability of field exposures, especially for genetical studies. The segregations of P64 and P69 after the second exposure show a tremendous increase in the number of susceptible seedlings. The difficulty of assessing symptoms with accuracy on USDA seedling 41956 probably obscured the final results. However, the segregations of the P66 progeny after the second exposure suggests the possibility of having a single dominant gene in L504-18 which controls resistance to virus Y. This segregation also suggests a tetrasomic type of inheritance in which the Andigena male parent (L504-18) is in the simplex condition and the Tuberosum type female parent (J246-1) is in the nulliplex condition.

The third part of this thesis tested six progenies for resistance to potato virus Y by means of mechanical inoculation in the greenhouse. The Tuberosum type progenies - Q73, Q144 and Q147 - which had a common male parent (J246-1),

apparently possessed no resistance to the virus. The results of the segregation of these progenies confirm the idea of having J246-1 in the nulliplex condition in crosses with L360-4, L504-18 and L504-30.

On the contrary, the segregations of P64, P66 and P67 fit adequately into a tetrasomic type of inheritance in which the Andigena male parents were in the simplex condition. A better fit is always obtained by assuming random chromatid segregation. The hypothesis of one dominant gene controlling resistance to potato virus Y is strongly suggested based on these results.

The fourth part of this work was aimed at testing whether the apparently resistant lines which originated from the mechanical inoculation test were also resistant after aphid inoculation. The results confirm this idea thus showing that mechanical inoculation at the seedling stage is a very reliable method for use in screening for resistance to potato virus Y.

The fifth and final part of this thesis was directed at determining what type of resistance to this virus was available. The results show that immunity was the type of resistance.