

Tobacco Mosaic Virus (TMV)

Introduction

This is the best known of all virus diseases of plants and worldwide distribution. This affects more than 150 genera of primarily herbaceous, all dicotyledonous plants including many vegetables (potato, tomato, and cucurbits), flowers and weeds. There are serious losses in yield as well as quality of tobacco and some other crop plants. TMV affects plants by damage of leaf, flower and fruit and causes stunting of plant.

The tobacco mosaic virus affects photosynthetic tissue of the host leading to distortion, blistering and necrosis. It also causes dwarfing of affected plants. It is one of the most damaging viruses of plants, causes enormous loss of tobacco crop by reducing yield and quality.

Symptoms

- i. The first symptoms are light discoloration along the view of the youngest leaves.
- ii. Further chlorosis occurs and as the leaves enlarges and of dark green spots appears.
- iii. The spots further develop into blister like patches while other part remains chlorotic.
- iv. These light and dark green color patterns give the leaves an appearance of mosaic.
- v. Plants becomes infected early in the season and very much dwarf/shunted.
- vi. Yellow patches develop on the leaves due to the presence of more than one strain produced by mutation.
- vii. The disease may cause partial sterility of pollen.

Causal organism: The causal organism is known as *Nicotiana virus* by Smith.

Etiology:

- i. It was first extracted by W.M. Stanley from disease plant.
- ii. The virus is rod shaped measuring about 280 μ in length and 15-18 μ breath with a hollow tube about 20A^o
- iii. It consists ribonucleic acid covered with protein coat and molecular weight of 40 million.
- iv. The protein coat of virus contains 2130 protein subunits and each subunit composed of 158 amino acid residues.
- v. RNA is single stranded and molecular weight is 24 million.

Disease Cycle

The virus perennates in infected tobacco plant debris, tobacco refuse from warehouses, cigarettes, cigars, pipe and chewing tobacco and in perennating hosts which form the source of primary inoculum. This is one of the most infectious of the plant viruses. The virus is disseminated from plant to plant by mechanical transmission, by handling tobacco plants during transplanting; through other field operations; and contact by man and cultivation implements. The virus enters in the host tissue; it multiplies very rapidly producing disease symptoms.

Control:

- i. Seed beds should be located at a great distance from the tobacco warehouses.
- ii. Seed beds should be free from any tobacco refuse.
- iii. Seed bed soil should be sterilized by steam.
- iv. Care should be taken to avoid contamination through hands and cultivation implements.
- v. Since pipe tobacco, cigarettes and chewing tobacco are all sources of primary inoculum, smoking or chewing of any kind of tobacco should be avoided.
- vi. Susceptible hosts, weed or otherwise in which virus may harbour, should be destroyed.
- vii. Previous year's plant debris should be destroyed by burning.
- viii. Diseased plants should be removed and burnt to stop further spread of the disease.
- ix. Growing resistant varieties produces good results.



Fig. 392. Tobacco Mosaic Virus. Disease symptoms on tobacco leaves induced by ordinary or field strain.

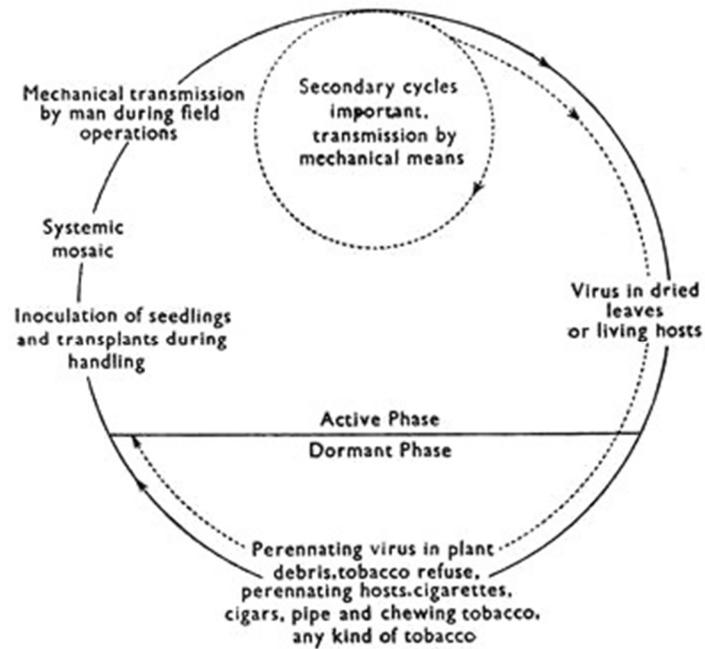


Fig. 394. Disease cycle of Tobacco Mosaic Virus.

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