Indian Phytopath. 56 (3) : 300-301 (2003)

Association of Carla- and Poty-viruses with mosaic disease of elephant foot yam

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Key words: Elephant foot yam, mosaic disease, *Carlavirus, Potyvirus,* ISEM

The genus *Amorphophallus* (family Araceae) consists of 90 species but widely cultivated species in the tropics is *A. companulatus.* It is cultivated throughout the Indian subcontinent for vegetable purposes. The major cultivation of *A. companulatus* is done in the North-eastern and southern states. *Dasheen mosaic virus* (DsMV) a member of potyvirus group infecting yam has been reported from several countries[1]. During survey in Assam, virus disease like symptoms were observed in *A. companulatus.* The variety Kovur showed 80% incidence. The symptoms include mottling, rolling and crinkling of leaves. The leaves show cup-like structure due to inward and upward rolling of leaf margins. Brownish chlorotic spots of 0.1 to 0.2 cm in diameter appear on the leaf lamina. The diseased leaves become leathery, brittle and severely reduced (Fig. 1). Infected plants become stunted. The size and weight of corm reduced to 70%.

Fig.1. Leaves of elephant foot yam showing mottling and crinkling of leaves

Infected leaf and bulb samples were collected from field of Assam Agricultural University, Jorhat and studied at Plant Virology Unit. About 2.0 mm of infected leaf tissue were cut from symptomatic leaf and ground in phosphate buffer (0.07 M, pH-6.5). 10ml of the extract was placed on parafilm in a moist Petri plate and carbon coated grids (400 mesh) were placed over it. The grids were then washed with 8-10 drops of distilled water and stained with 2% uranyl acetate, (pH-4.5). Excess of stain was immediately removed by Whatman's filter paper. The grids were examined under JEOL-100-CX II transmission electron microscope (TEM). Immuno sorbent (ISEM) was performed as described by Milne and Lesemann[2]. The antisera (1:50 dilution) in this experiment were *Papaya ring spot virus* PRSV), *Potato virus Y* (PVY) and *Carnation latent virus* (CLV).

Electron microscopy of leaf dip preparation showed filamentous particles in large numbers and in aggregated form (Fig. 2). In decoration test of ISEM both decorated and undecorated particles were observed when treated with away of the antisera of PRSV, PVY and CLV (Fig. 3). These results suggested the presence of a mixed infection in elephant foot yam. Further tests were therefore, conducted with mixed antibodies of PVY and CLV. The particle size of *Poty and carla poty-viruses* were 725 nm and 610 nm respectively. It was interesting to note that all the virus particles were decorated with mixed antisera confirming the presence of a potyvirus and a carla virus with mosaic disease of elephant foot yam in Assam (Fig. 4). All the 10 samples collected from Jorhat

showed the presence of both carla and potyvirus in ISEM suggesting that the plants of elephant foot yam had a common mixed infection. In India, there is only one report of a viral infection of *A. companulatus*[3]. Serologically related to Dasheen mosaic virus, which is also a member of potyvirus group. However, in our studies, infection of *A. companulatus* by two viruses, one carnation latent virus and another potyvirus has been confirmed.

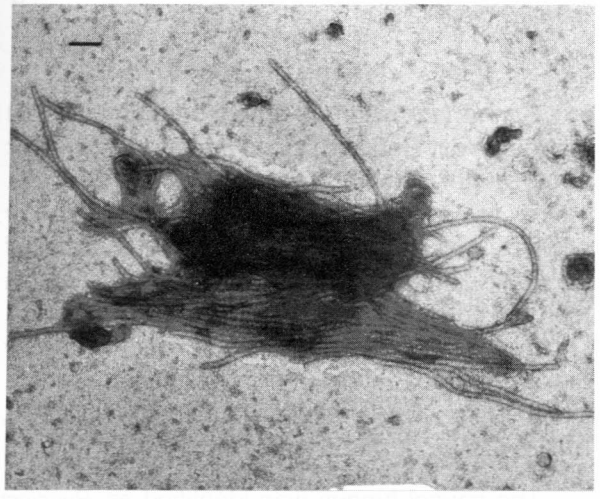

Fig.2. Electron micrograph showing filamentous particles in aggregated form; Bar = 100 nm

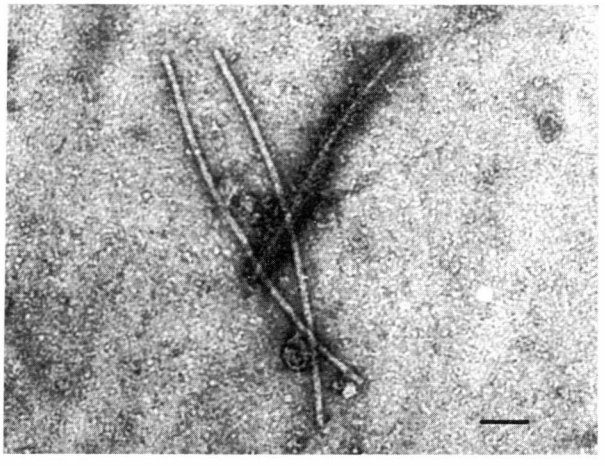

Fig.3. Electron micrograph showing decorated and undecorated virus particles is ISEM test Bar = 100 nm

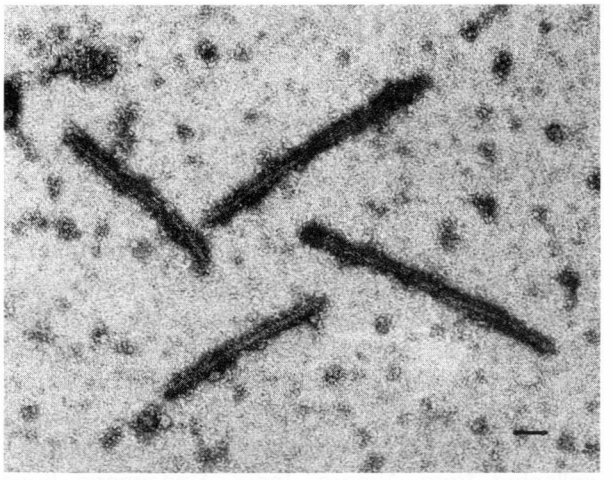

Fig.4. Electron micrograph showing all decorated particles with mixed antisera of PVY and CLV in ISEM Bar = 100 nm

The etiology of a mosaic disease of *A.companulatus* has been experimentally established for the first time in India.

A. companulatus is a vegetatively propagated plant and mixed infection in such plants are quite common. The viruses may spread through vegetative propagation inadvertently and therefore to manage these viruses selection of healthy planting material is essential.

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Received for publication October 18, 2002