

Fig Mosaic Virus (Fmav) Elimination and Commercial Micropropagation in *Ficus carica* 'Sierra'[®]

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Fig (*Ficus carica* L.) ranks as one of the earliest domesticated plants by man. Fig mosaic disease is found wherever figs are grown. The symptoms appear as yellow, chlorotic patches or spots on leaves that can become deformed with various vein banding patterns and shapes resulting in defoliation, stunted growth, and fruit drop. While several viruses belonging to Closterovirus, Mosaic, Luteovirus, and Umbravirus groups were found in infected trees, the causal agent for fig mosaic still remains unknown. One most common sequence detected resembled in homology to European mountain ash ringspot associated virus (EMARAV) (Walia, 2009) and a name, fig mosaic associated virus (FMaV) was suggested for the disorder.

The University of California recently released a promising, dual purpose, hybrid fig cultivar, 'Sierra' in 2005 from their breeding program. However, it is also susceptible to FMaV. As part of our efforts to provide "clean" fruit tree and vine nursery stock to growers, studies were undertaken to eliminate viruses by combining conventional plant tissue culture procedures like shoot apical meristem culture and heat therapy.

The stem cuttings of 'Sierra' were procured from Kearney Agricultural Experiment Station of the University of California. They were grown under mist in the greenhouse.

Actively growing shoots were excised, surface sterilized, and explanted in vitro on a proprietary medium. Apical meristems from actively growing shoots were aseptically isolated under a microscope and transferred to the growth medium in test tubes. They were grown under normal culture room conditions (25±2 °C; 30 μmol·m⁻² s⁻¹ fluorescent light; 16 h day/8 h dark). When established, the actively multiplying cultures were subjected to high temperatures of 37 °C for 6 weeks. The surviving, disease-free shoots were mass multiplied, rooted, and acclimatized in the fog house and finished in pots in the greenhouse on benches.

The plant material was tested and selected for freedom from viruses after meristem culture and heat therapy, and before mass micropropagation. Thermotherapy alone did not kill all the viruses and there were a few "escapes" that tested positive for FMaV and later showed visible symptoms of the disease. However, when it was preceded by apical meristem culture, we could get "clean," healthy nursery stock that tested negative and showed no visible symptoms even after 9 months of growth in our facility.

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LITERATURE CITED

Walia, J.J., N.M. Salem, and B.W. Falk. 2009. Partial sequence and survey analysis identify a multipartite, negative-sense RNA virus associated with fig mosaic. *Plant Dis.* 93(1):4–10.