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Long-lasting Systematic Roguing for Effective Management of CABMV in Passionflower Orchards through Maintenance of Individualized Plants

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Description

Brazil is the world's largest producer of passion fruit, with an estimated production of 703,489 tonnes in a cultivated area of 49,889 ha in 2016. Passion fruit woodiness, caused by the cowpea aphid-borne mosaic virus (CABMV), is the predominant disease in passionflower crops. It reduces the yield and the useful life of the orchards from 36 months to approximately 18 months. The virus is spread mainly by several species of aphids in a non-persistent manner. The virus can also be transmitted mechanically by shears and fingernails during cultural pruning and trimming practices, but not through seeds. Control of passion fruit woodiness is difficult because commercially planted Passiflora species are not virus-resistant or disease-tolerant.

Chemical control of the aphid vectors is not efficient mainly because the virus is transmitted during short probing of the insects. Besides, the species of aphid vectors do not colonize passionflower. Management alternatives include the use of healthy seedlings produced in certified nurseries, the use of seedlings of at least 100–120 cm in height to establish new orchards, the elimination of old and/or infected passion fruit plants before a new planting, disinfection of pruning tools to prevent mechanical transmission of the virus and to plant in isolated locations away from known virus sources of inoculum, whenever possible. However, these recommendations are not entirely useful.

Therefore, passionflower orchards are renewed annually because of the high rates of infection of plants with CABMV. In this work, we first evaluated the latent and incubation periods of three isolates of CABMV in passionflower vines to optimize rouging diseased plants' efficiency. Passion fruit plants mechanically inoculated with CABMV started to act as sources of inoculum from the third day after inoculation, and the symptoms were expressed, on average, eight days after inoculation. Following that, five field experiments, conducted in São Paulo and Bahia's states, were conducted to demonstrate that diseased plants' systematic roguing was efficient for managing passion fruit woodiness disease.

To facilitate the identification and subsequent removal of the

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infected plants, they need to be individualized, as passion fruit vines attach to its support through tendrils and intertwine with neighboring vines. The plants were trained separately on arbors and wire trellises. They were inspected weekly, and those with symptoms of CABMV-infection were immediately eradicated. The results indicated that systematic roguing of diseased plants could be recommended for managing passion fruit woodiness, provided it is applied on a regional scale by all passionfruit growers. It is necessary that the technicians responsible for identifying and eradicating infected plants be professionally trained to recognize the initial symptoms of the disease promptly.

The reduction of external sources of inoculum is also a necessary measure that must be adopted by the growers so that management of passionfruit woodiness through roguing of diseased plants attains the desired efficiency. Pilot plantings for the application of roguing in a passionflower producing region of the state of São Paulo are underway to validate the use of this technique for managing passion fruit woodiness disease. Three fields with 1000 plants each, approximately 10 km apart, are being inspected weekly. In two fields, CABMV-infected plants will be immediately eliminated and replanted with healthy plants to maintain the stand. The third field will be the control, without eradicating diseased plants. The fruits of the plants of the three fields will be harvested and the production compared.