Report to the National Watermelon Association for Project on

Combining insecticides and systemic acquired resistance induced by Actigard to manage watermelon vine decline and other viruses

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Fig 1. Watermelon vine decline in FL caused by whitefly transmitted SqVYV

Brief summary of experimental results: Experiments were conducted to determine if combining insecticide sprays to manage whiteflies with Actigard to induce systemic acquired resistance will help manage watermelon vine decline caused by the whitefly-transmitted Squash vein yellowing virus. No statistically significant differences among the three treatments and the untreated check with respect to watermelon vine decline was observed. This was most likely due to high disease pressure during the season which may have obscured potential differences. In previous studies we have observed that routine application of insecticides resulted in slowing down watermelon vine decline development compared to untreated check despite high disease pressure. However, in the trials in 2018 such differences were not observed.

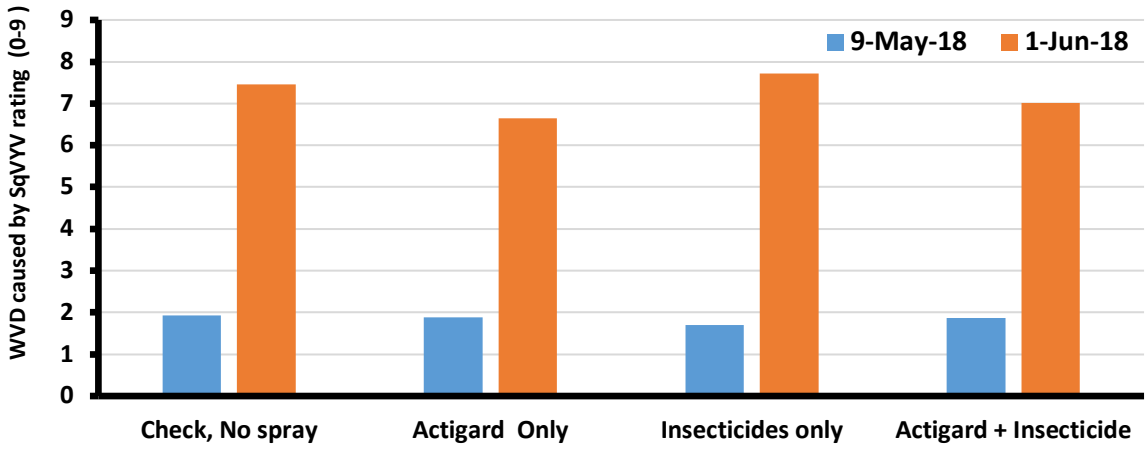

Figure 1. Effect of four insecticide sprays and Actigard on development of watermelon vine decline (WVD) caused by the whitefly transmitted virus SqVYV in Immokalee, FL in spring 2018. WVD was rated on a 0-9 scale on May 9th and June 1st, 2018.

Introduction

Watermelon vine decline (WVD) caused by *Squash vein yellowing virus* (SqVYV) was first identified in 2005 (Figure 1) in FL has caused severe losses to watermelon growers to the tune of $60-70 million. SqVYV causes a rapid vine decline in watermelon as the crop approaches harvest and is distributed widely in southwest and west-central FL. Fortunately, it has caused only intermittent losses since about 2012 although it was a significant economic problem in southwest FL in spring 2016 and 2017 seasons. More recently, WVD caused by SqVYV has been detected in California, Puerto Rico, Guatemala and Israel where the growers have suffered monetary losses as well. In 2016, the whitefly populations were very high in FL and GA and other whitefly-transmitted viruses including *Cucurbit leaf crumple virus* (CuLCrV) and *Cucurbit yellow stunting disorder virus* (CYSDV) also caused significant losses. High whitefly populations are again present in 2017 in FL, GA and SC. Both CuLCrV and CYSDV are at high incidence in FL and GA, and CuLCrV has recently been detected in SC. Actigard is labelled for application on watermelon on a weekly basis for managing many fungal diseases and some viral diseases. Actigard turns on the plant's defense response and thus helps prevent disease. Actigard has been shown to help reduce diseases caused by other insect-transmitted viruses such as *Tomato spotted wilt virus*. A combination of Actigard to turn on plant defenses and insecticides to reduce the whitefly populations seems to be a promising approach to manage WVD and potentially other viruses like CuLCrV and CYSDV in watermelon.

Experiments conducted:

The experiments was conducted at the SWFREC farm in Immokalee, FL. Experiments were conducted during spring of 2018. Four week old plants of a commercial seeded watermelon variety 'Crimson Sweet' was transplanted onto raised plastic mulched beds on XXX. For data collection the plots were divided into units of 5 plants each for a average of 10 sections per treated plot. Each plot was 100-feet long with an average of 50 plants per plot. Each treatment was replicated 4 times. One SqVYV infected squash plant was planted at the end of each treated plot or the untreated check to serve as the source of inoculum. A 10 foot spacing between each plot was provided to separate the plots. The following treatments were evaluated:

1. Untreated control (No spray)
2. Actigard (sprayed every other week)
3. Insecticide (4 sprays: 1. Admire at transplanting, 2. Oberon, 3. stylet oil, 4. Knack)
4. Actigard + Insecticide (Actigard tank mixed with insecticide at each spray date)

The plots were sprayed every other week. Plots were also sprayed with fungicides every week to manage gummy stem blight and other diseases. Data on watermelon vine decline development in the plots was recorded on a 1-9 scale that we have used previously.

Results and discussion: No statistically significant differences among the three treatments and the untreated check with respect to watermelon vine decline was observed. This was most likely due to high disease pressure during the later part of the season which may have obscured potential differences. In previous studies we have observed that routine application of insecticides resulted in slowing down disease development compared to untreated check despite high disease pressure. However, in the trials in 2018 such differences were not observed. It is not clear why there was no control. Further studies will be undertaken in near future.