Organic Screenhouse Trial of TYLC Resistant Tomatoes

Preliminary Results, July-October 2018

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Introduction

Tomato production in Hawaii poses numerous challenges to growers due to the heavy pest and disease pressures in our unique growing environment. Tomato yellow leaf curl virus *(TYLCV)* has been identified as one of the most devastating causes of crop loss in tomato production and was first observed on Oahu and Maui in 2009 (*Meltzer et al., 2009).* Viral symptoms present with interveinal discoloration, shortened internodes in the apical growth, cupping at the leaf margins, and premature flower drop (*Sugano et al. 2011).* Transmission by two species of whitefly, the sweet potato whitefly (*Bemisia tabaci*) and the silverleaf whitefly (*Bemisia argentifolii*), are the only modes of virus acquisition (*Meltzer et al 2009).*

Shining Star, photo by Giselle Bryant

Ongoing research by CTAHR extension staff and specialists have identified screen systems as an effective management option for minimizing certain pests. While screenhouses greatly reduce many of Hawaii's larger pests (fruit fly, *Lepidoptera* species, etc.) whitefly and other smaller insect intrusion is still a production concern (*Sugano et al. 2011).* TYLC resistant tomato varieties offer screen house production systems a preventative measure to potential virus transmission. This variety trial seeks to continue previous research on identifying TYLC resistant tomato varieties and measure their performance in a certified organic screen house setting.

Methodology

Due to initial propagation issues, only five varieties were chosen for comparison in this trial. Among the cultivars four are listed as resistant to TYLC ('Pamela', 'Shining Star', 'Red Eclipse', and 'Sacramento') while 'Brandywine' was used as an indicator of TYLC presence. Previous trials have identified 'Pamela' as an acceptable variety. The purpose of this trial is to investigate other possible cultivars that compete or potentially outperform 'Pamela'. Tomato starts were transplanted to the certified organic screen house located at the Waimanalo Research Station on July 11, 2018. Four replications of each variety, 20 plants of each variety in total, were arranged in a random complete block design. Tomatoes were harvested from August 29-October 31st. Total fruit weight (Kg) per plant was calculated for each variety and compared.

Results

'Brandywine' exhibited TYLC symptom two weeks after transplanting, indicating the presence of the virus in the screen unit. All varieties labeled for TYLC resistance remained asymptomatic throughout the trial. 'Pamela's' performance was consistent with previous trials. While there was no statistically significant difference between the yields of 'Pamela', 'Shining Star', or 'Red Eclipse', 'Red Eclipse' yield was numerically (25%) lower than 'Pamela' and 'Shining Star' and statistically similar to the inferior yielding

varieties. Shining Star has a unique globular shape that is reminiscent of heirloom varieties. It's larger fruit size, comparable yield, and overall performance potentially make Shining Star an attractive alternative to 'Pamela' for tomato organic screenhouse production.

Table 1. Seed sources of varieties used in this trial.

Variety	Seed Source	Contact
Pamela	NE Seed	https://www.neseed.com/shop/vegetable-seeds/tomato/pamella-f1-hybrid/
Red Eclipse	NE Seed	https://www.neseed.com/shop/vegetable-seeds/tomato/red-eclipse-f1-hybrid/
Shining Star	NE Seed	https://www.neseed.com/shop/vegetable-seeds/tomato/shining-star-f1-hybrid-tomato-seeds/
Sacramento	NE Seed	https://www.neseed.com/shop/vegetable-seeds/tomato/sacramento-f1-hybrid/
Brandywine	Totally Tomato	https://www.totallytomato.com/P/00112/Brandywine+Tomato

Figure 1. Total yield per plant of certified organic, screenhouse-grown tomatoes harvested 8/29/18-10/31/18.

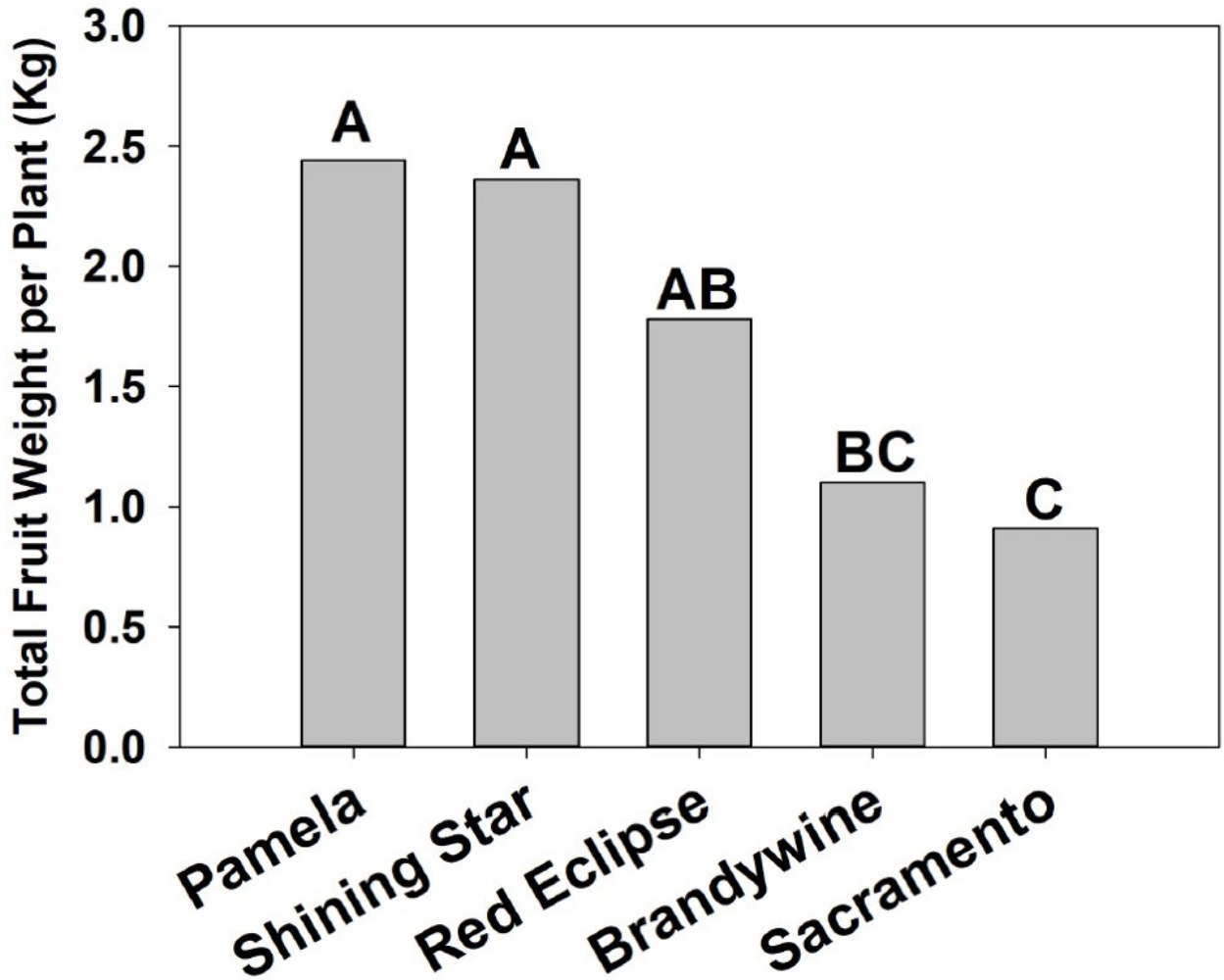

Figure 2. Representative fruit of varieties used in this trial.

References

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