Evaluation Of Specialty Pumpkin Cultivars For Disease Resistance

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INTRODUCTION

- Calabaza (*Cucurbita moschata*), also called the "tropical pumpkin," holds a $30 million market value in the USA.
- Thriving in temperate and tropical climates, its thick rind encases a dense, orange pulp distinguished by a sweet, nutty profile.
- Potyviruses, such as the Zucchini yellow mosaic virus (ZYMV) and Papaya Ringspot Virus (PRSV), and damping off diseases such as crown rot caused by *Phytophthora capsici* are some of the major challenges that affect Calabaza production.

OBJECTIVES

To determine the resistance/susceptibility profile of 19 specialty pumpkin cultivars and 2 controls when:
i) Inoculated with ZYMV and PRSV viral inoculum
ii) challenged with a virulent isolate of *P. capsici*

MATERIALS AND METHODS

For each disease, ten seeds per cultivar were germinated for disease evaluation.

a) ZYMV and PRSV

- At the 2-3 true-leaf stage the plants were inoculated with ZYMV and PRSV inoculum.

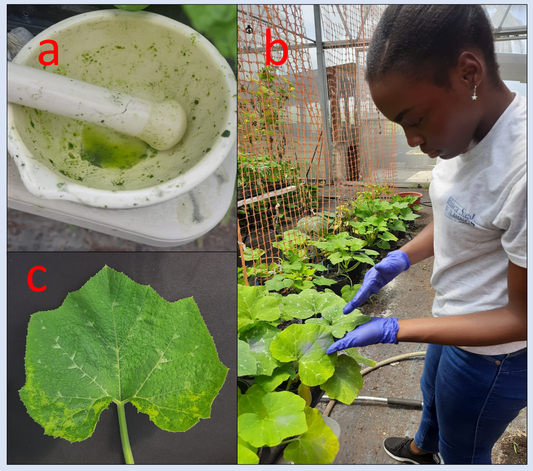


Figure 1: a) 1 gram of frozen ZYMV/PRSV-infected leaves grounded in 5ml of phosphate buffer. b) Gentle application of the inoculum of silicon carbide-dusted leaves. c) ZYMV symptoms visible on the leaf

b) *Phytophthora capsici*

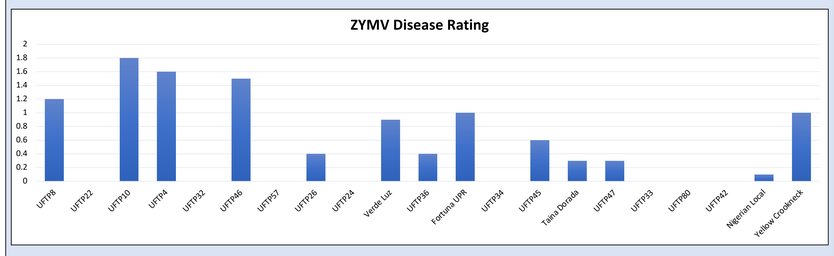
- At the 2-4 true-leaf stage the plants were inoculated with 1x 10^5 *P. capsici* zoospores concentration.

Figure 2: a) Petri plates with *P. capsici* zoospores. b) Flooding *P. capsici* petri plates with cold distilled water and incubating them at 4°C for 30 minutes. c) Collecting water containing the zoospores in a beaker. d) Spraying the zoospores near the crown of the plant at 2-4 true leaf stage.

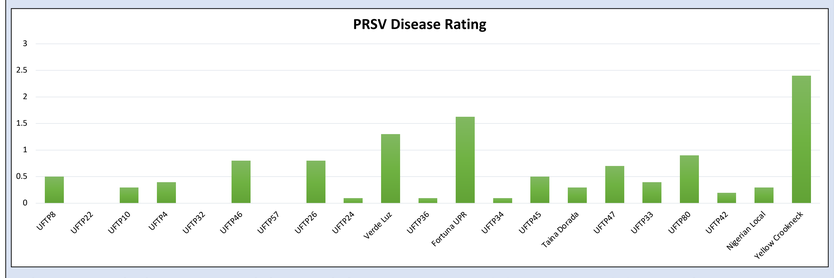
c) DNA extraction and KASP assay

DNA was extracted from the 19 specialty pumpkin cultivars and two controls using a commercial DNA Extraction Kit. End-point genotyping (SNP KASP assay) on a fluorescent machine (Roche Light Cycler 480 II) was done to determine the presence and absence of resistance genes.

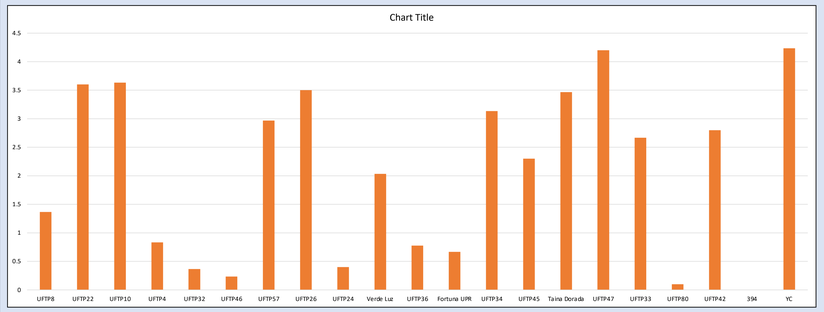
RESULTS AND CONCLUSION



The specialty pumpkin cultivars UFTP22, UFTP32, UFTP57, UFTP24, UFTP34, UFTP8, UFTP80 and UFTP42 showed highest resistance to ZYMV disease with an average rating of 0. UFTP10, UFTP4, and UFTP46 were highly susceptible to ZYMV disease.



The specialty pumpkin cultivars UFTP22, UFTP32, and UFTP57, showed the highest resistance to PRSV disease. The susceptible control Yellow Crookneck, Verde Luz, and Fortuna UPR showed susceptibility to PRSV disease.



The resistant control 394-1-27-12-4U-1 showed the highest resistance to *P. capsici* followed by UFTP80, UFTP46, and UFTP32. The susceptible control Yellow Crookneck showed the highest susceptibility followed by UFTP47, UFTP10, UFTP22, UFTP26, and Taina Dorada.

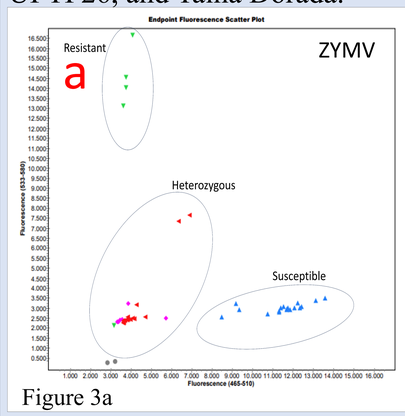
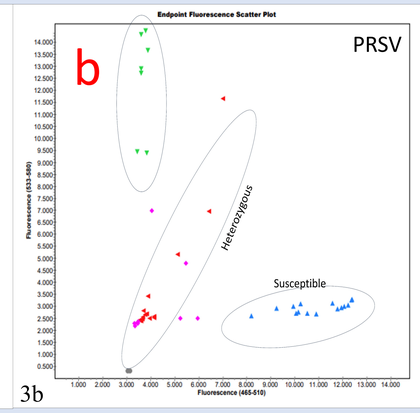


Figure 3a



3b

One KASP marker for ZYMV (Figure 3a) and one KASP marker for PRSV (Figure 3b) developed from the QTL regions and significantly associated with resistance ($p<0.05$) were used to determine the presence and absence of resistant genes in the specialty pumpkin cultivars.

ACKNOWLEDGEMENTS

This material is based upon work that is supported by the National Institute of Food and Agriculture, U.S. Department of Agriculture, under award number 2020-38640-31521 through the Southern Sustainable Agriculture Research and Education program, under sub-award number LS21-360 and SUB00002596. USDA is an equal-opportunity employer and service provider. Any opinions, findings, conclusions, or recommendations expressed in this publication are those of the author(s) and do not necessarily reflect the view of the U.S. Department of Agriculture.