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CUCUMBER CULTIVAR STUDY IN THE U.S. VIRGIN ISLANDS

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Abstract: Cucumbers are a valuable commodity throughout most of the Caribbean, including the U.S. Virgin Islands. Downy mildew, a foliar disease caused by the oomycete *Pseudoperonospora cubensis* (Berk. and Curt.) Rostow, is one of the most destructive pathogens of cucurbits. Cucumber growers in U.S. Virgin Islands observed disease in their crops. Nine cultivars of cucumber (slicing type) "Dasher II", "Fanfare", "Indio", "Intimidator", "Speedway", "Stonewall", "Thunder", "SVR 3462", and "SVR 4719" evaluated for disease resistance and yields in the summer of 2013 at the University of the Virgin Islands Agricultural Experiment Station. All marketable fruits were weighed to determine total yields for each cultivar. Three fruits of each cultivar were randomly selected at each harvest and measured to determine individual weight, length, and diameter. Once downy mildew infestation was significant, 50 leaves of each cultivar were randomly picked and analysed using a disease severity assessment key. "Indio" had the highest marketable yield (166.3 kg), followed by "Stonewall" (159.8 kg) and "SVR 4179" (148.7 kg). "Indio" had the significantly lowest rating of downy mildew (2.69), followed by "Speedway" (3.29) and "SVR 4179" (3.31). Matching fruit qualities to downy mildew resistance, study shows the "Indio", "Intimidator", and "SVR 4719" cultivars were found more suitable for U.S. Virgin Islands conditions.

INTRODUCTION

Cucumber (*Cucumis sativus*) is a valuable commodity throughout most of the Caribbean, including the U.S. Virgin Islands. Cucurbit downy mildew, caused by the pathogen *Pseudoperonospora cubensis*, is a disease of worldwide importance (Call et.al, 2012). Recently, growers in U.S. Virgin Islands observed downy mildew in cucumber fields and concerned about the methods of control for this disease. Historically, downy mildew was the most important disease on cucumber in the southeastern United States (Gusmini et.al, 2008). U.S. Virgin Islands warm and humid climate is favorable for the disease. There are many cultivars available with claims of improved fruit qualities, higher yield, and increased disease resistance (Wehner and Shetty, 1997). However, testing of cultivars is limited in the region. The objective of current study was to evaluate the cucumber cultivars in the local soil and climatic conditions and evaluate for the resistance to downy mildew and yields.

MATERIALS AND METHODS

Seeds of cucumber cultivars were obtained from Stokes Seeds, NY. Field plots were established at the University of the Virgin Islands Agricultural Experiment Station, using randomized complete block design with three replicates, in the summer 2013 season. Nine cultivars of cucumber were evaluated in this study: "Dasher II", "Fanfare", "Indio", "Intimidator", "Speedway", "Stonewall", "Thunder", "SVR 3462", and "SVR 4719". Standard management

practices were applied for the cucumber crop throughout the season. Plots consisted of three rows spaced 4' apart, with 12 plants per row spaced 2' between the plants within a row in drip system. Fungicides were intentionally omitted during the study. Marketable fruits were harvested and measured for overall yield, as well as average fruit weight, length, and diameter for each individual fruit. Harvesting took place three times weekly. Once downy mildew infestation was significant, 50 randomly selected leaves were picked from each plot and analyzed using a disease severity assessment key (DSAK), with ratings from 1 to 8 for 0% to 100% infected leaf tissue, respectively.

Fruit quality data was averaged with standard error values. Downy mildew ratings were analyzed with analysis of variance and multiple regression using statistical procedures from SAS software. Leaves were randomly picked, photographed and sent to disease diagnostic laboratory in NC State University (Todd Wehner) to process with a disease severity assessment key and statistical analysis (Thompson and Jenkins, 1985).

RESULTS AND DISCUSSION

Results of disease rating and marketable yield are presented in Table 1**.** The "Indio", "Stonewall", and "Intimidator" cultivars were the most preferable for overall marketable yields, respectively, and the "Indio", "Speedway", and "SVR 4179" cultivars were the most preferable for downy mildew resistance, respectively. Results for individual fruit weight, length, and diameter were variable and desirable for all cultivars. Visual analysis suggested the "Indio", "Intimidator", and "SVR 4179" cultivars to be most favorable, respectively, with all characteristics weighed evenly.

The results are valuable for growers in the region. Drier and more windy summer than usual occurred during the study. Results may vary with increased humidity in a more typical summer, the wetter seasons, or in other regions with greater humidity. If undertaking a similar study in the near future, overhead irrigation and inoculation of seedlings for a better test of downy mildew resistance is recommended.

Matching fruit qualities to downy mildew resistance, our study shows the "Indio", "Intimidator", and "SVR 4719" observed superior cultivars for U.S. Virgin Islands conditions. Ironically, the "Indio" cultivar was removed from the market many years ago. Hopefully, results from this and other similar studies will convince the breeders to bring this cultivar back. Regardless, our growers have proven results from our region to aid them in selecting the best slicing cucumber cultivars for profits and improved IPM for downy mildew.

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Todd C. Wehner, North Carolina State University, for disease severity assessment key ratings and statistical analysis; Liam Marin, Antioch College, for statistical analysis of yield and fruit quality data; funding for this research is supported from Hatch project funds.

REFERENCES

Call, A. D., A. D. Criswell, T. C. Wehner, K. Ando and R. Grumet. 2012. Resistance of cucumber cultivars to a new strain of cucurbit downy mildew. HortScience 47: 171-178

Gusmini, G. and T.C Wehner**.** 2008. Fifty five years of yield improvement for cucumber, melon, and watermelon in the United States. HortTechnology 18 (1): 9-12

Thompson, D.C. and S.F. Jenkins. 1985. Pictorial assessment key to determine fungicide concentrations that control anthracnose development on cucumber cultivars with varying resistance levels. Plant Disease 69 (10): 833-836

Wehner, T.C. and N.V. Shetty. 1997. Downy mildew resistance of the cucumber germplasm collection in North Carolina field tests. Crop Science 37(4): 1331-1340

Table 1. Characteristics for each of nine selected cultivars: Dasher II, Fanfare, Indio, Intimidator, Speedway, Stonewll, Thunder, SVR 3462, and SVR 4179. Characteristic values are for overall marketable yield (kg), individual fruit weight (mean, kg), individual fruit length (mean cm), individual fruit diameter (mean, cm), and resistance rating for downy mildew. Superscript values indicate significant differences for rating of downy mildew resistance.

Cultivar	Marketable yield (kg)	Mean fruit weight (kg)	Mean fruit length (cm)	Mean fruit diameter (cm)	Downy mildew resistance rating
Dasher II	131.8	0.41 ± 0.10	21.39 ± 2.89	5.46 ± 0.50	4.50^{b}
Fanfare	108.9	0.43 ± 0.08	23.23 ± 2.22	5.35 ± 0.33	5.04^{a}
Indio	166.3	0.46 ± 0.08	22.56 ± 2.14	5.53 ± 0.42	2.69^{e}
Intimidator	151.5	0.44 ± 0.08	23.00 ± 2.30	5.49 ± 0.35	3.63^{cd}
Speedway	135.0	0.44 ± 0.10	21.45 ± 2.30	5.57 ± 0.47	3.29^{d}
Stonewall	159.8	0.50 ± 0.10	24.01 ± 2.15	5.41 ± 0.63	3.93^{c}
Thunder	144.0	0.47 ± 0.10	23.47 ± 2.41	5.51 ± 0.46	4.89^{ab}
SVR 3462	136.0	0.50 ± 0.10	23.93 ± 1.01	5.63 ± 0.43	3.71^{cd}
SVR 4179	148.7	0.47 ± 0.10	21.86 ± 2.88	5.63 ± 0.55	3.31^{d}

Fig.1. Nine cultivars of cucumber were planted using randomized complete block design with three replicates. UVI-AES horticultural experiment field on St. Croix, Kingshill Campus

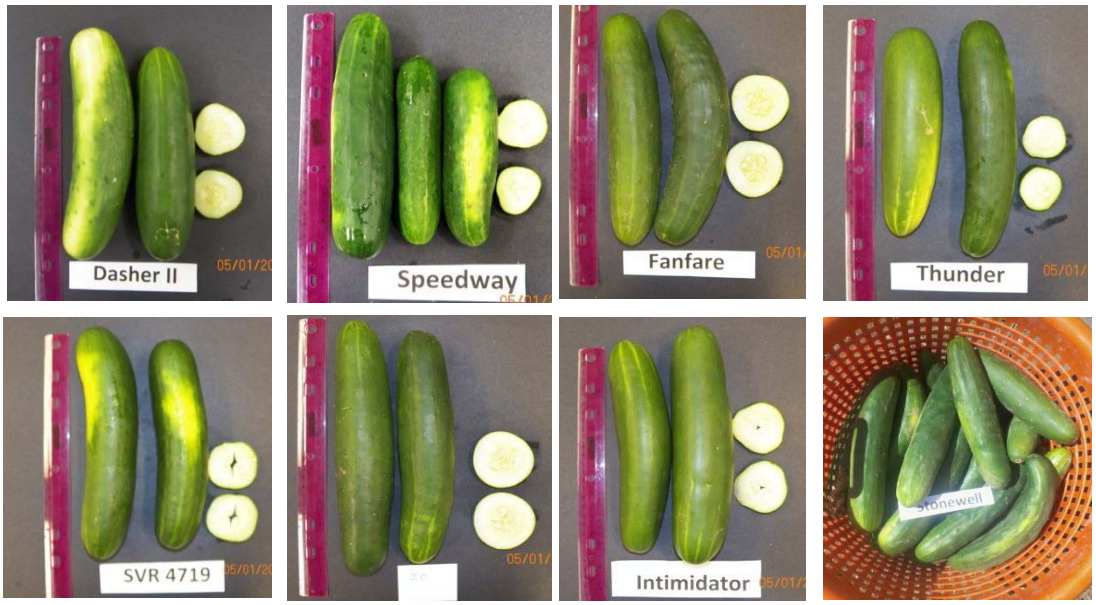

Fig.2. Fruits of cucumber cultivars screened

Fig.3. Leaves were randomly picked, photographed, and then sent to NC State Plant Disease Diagnostic laboratory (Todd Wehner) to process with a disease severity assessment key and statistical analysis