# Management of cucurbit diseases in the panhandle: Notes for 2016

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## Gummy stem blight (GSB)

Most destructive on watermelon (30-50% yield losses in ideal conditions for spread of GSB. Can infect muskmelon, cucumber, pumpkin, and squash

### Santa Rosa County, 2011

- **GSB**-resistant varieties not available in cucurbits
- One of the primary sources of **GSB** inoculum is the seed
- Seeds/transplants can be infested without expressing symptoms



 GSB at the seedling stage (a sure case of infected seed/unclean trays): necrotic areas on the margin of the leaves • **GSB** at the seedling stage: water-soaked regions on the stem, gummy ooze from the stem.



 Second source of GSB inoculum is the organic debris from previous cucurbit crops with a history of GSB incidence

## **GSB: Symptoms**







GSB

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#### GSB/inadequate soil liming/ other reasons

GSB

## Fungicide resistance evaluation of *Didymella bryoniae*, the fungus that causes gummy stem blight in Florida

| UPI  | GROUP 1 PUNCACIDE  |
|--|--|
| TTOPSIN<br>THIOPHANATE-ME<br>70% Wettal<br>20% Wettal<br>Management<br>20% Management<br>20%<br>20%<br>20%<br>20%  | THYL FUNGICIDE<br>the Powder   |
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|  | perty kwolving this product.   |
| In case of an emergency endangering life or pro-<br>cell day or night 1-800-800-HELP (4057).   |  |
| in case of an energency andergeting life or pro-<br>cell day or right 1-800-800-HELP (H057).<br>Net Contents:  |  |





| BOSCALID                                    | ISOLATES |
|---|----------|
| Resistant (>40% Inhibition)                 | 22       |
| Reduced Sensitivity (10.1-39.9% inhibition) | 8        |
| Sensitive (<10% inhibition)                 | 18       |



| AZOXYSTROBIN        | ISOLATES |  |
|---------------------|----------|--|
| Resistant           | 13       |  |
| Reduced Sensitivity | 22       |  |
| Sensitive           | 13       |  |



| THIOPHANATE<br>METHYL | ISOLATES |  |
|-----------------------|----------|--|
| Resistant             | 33       |  |
| Reduced Sensitivity   | 4        |  |
| Sensitive             | 11       |  |

#### THIOPHANATE METHYL (TOPSIN)









| TREATMENT   | NUMBER | AUDPC |     | YIELD<br>(KG/HA) |    |
|---|--------|-------|-----|------------------|----|
| Control   | 1      | 1,497 | а   | 63,776           | ab |
| Actinovate AG (6 oz)  | 2      | 773   | c-d | 78,710           | ab |
| Actinovate AG (6 oz) + Actigard (0.5 oz)  | 3      | 783   | c-d | 61,991           | ab |
| Topguard EQ (5 fl oz) (1-6 wk)  | 4      | 568   | d   | 82,074           | ab |
| Topguard EQ (8 fl oz) (1-6 wk)  | 5      | 727   | cd  | 72,332           | ab |
| Topguard EQ (16 fl oz) (1-6 wk)   | 6      | 681   | cd  | 62,796           | ab |
| Equation (11 fl oz) (1-6 wk)  | 7      | 979   | bc  | 60,293           | ab |
| Equation (15.5 fl oz) (1-6 wk)  | 8      | 1,198 | ab  | 44,531           | b  |
| Quadris Top (12 fl oz) (1-6 wk)   | 9      | 598   | cd  | 74,977           | ab |
| Bravo WeatherStik (2 pt) (1-3 wk) alt Oso (6.5 fl oz) (4-6 wk)                                      | 10     | 842   | b-d | 86,014           | а  |
| Bravo WeatherStik (2 pt) (1-3 wk) alt Oso (6.5 fl oz) (4-6wk) alt Tebustar 3.6L (8 fl oz) (7-8 wk)  | 11     | 844   | b-d | 71,624           | ab |
| Bravo WeatherStik (2 pt) (1-3wk) alt Tebustar 3.6L (8 fl oz) (4-5wk) alt Inspire (20 floz) (6-7 wk) | 12     | 666   | cd  | 75,227           | ab |

#### Gummy stem blight disease severity and yield of watermelons - Spring 2015



| Gummy stem | blight disease | severity - | Spring 2015 |
|------------|----------------|------------|-------------|
|------------|----------------|------------|-------------|

| TREATMENT (PLANTS INOCULATED WITH 1:1 RATIO OF BOSCALID INSENSITIVE:<br>SENSITIVE ISOLATE) | NUMBER | AUDPC |    |
|--|--------|-------|----|
| Control  | 1      | 1568  | ab |
| Bravo WeatherStik (2pt)  | 2      | 1259  | ab |
| Endura (6.5oz)   | 3      | 1691  | а  |
| Bravo WeatherStik (2pt) alt Tebustar 3.6L (8fl oz) alt Endura (6.5oz)                      | 4      | 1163  | b  |
| Abound (15.5fl oz)   | 5      | 1522  | ab |
| Bravo WeatherStik (2pt) alt Tebustar 3.6L (8fl oz) alt Abound (15.5fl oz)                  | 6      | 1210  | ab |
| Topsin M (0.5lb)   | 7      | 1218  | ab |
| Bravo WeatherStik (2pt) alt Tebustar 3.6L (8fl oz) alt Topsin M (0.5lb)                    | 8      | 1372  | ab |
| Tebustar 3.6L (Bfloz)  | 9      | 1408  | ab |



- Rotation of non-cucurbit crops (bahiagrass pastures excellent)
- Duration of rotation: >2 years after a single cucurbit crop with an outbreak of Gummy stem blight
- High level of isolate resistance to Quadris (azoxystrobin), Endura (Boscalid) and Topsin (T-methyl) in growers fields in FL and GA **and is risky to use**.
- Rotate, Rotate, available modes of action
- Preventative sprays important
- Chlorothalonil: Follow label instructions on watermelon after fruit set. Do not apply on mature watermelons under dry and hot conditions.
- Evolution of new isolates with unique fungicide resistance profiles from other geographical regions is a concern.

# Powdery mildew – Can be a severe issue on cantaloupe; a minor problem in watermelon



#### Powdery mildew disease severity - Spring 2015

| TREATMENTS   | NUMBER | AUDPC |   |
|--|--------|-------|---|
| Control  | 1      | 761   | а |
| Quintec (6oz) (1,3,5) alternated with Torino (3.4oz) (2,4) | 2      | 179   | с |
| MON 105014 (100g a.i./a) + Activator 90 (1.25 ml/L)        | 3      | 94    | с |
| MON 105014 (25g a.i./a) + Activator 90 (1.25 ml/L)         | 4      | 422   | b |
| MON 105015 (100g a.i./a) + Activator 90 (1.25 ml/L)        | 5      | 108   | с |
| MON 105015 (25g a.i./a) + Activator 90 (1.25 ml/L)         | 6      | 108   | с |
| MON 105018 (25g a.i./a) + Activator 90 (1.25 ml/L)         | 7      | 139   | с |
| MON 105019 (25g a.i./a) + Activator 90 (1.25 ml/L)         | 8      | 63    | с |



## Fusarium wilt; Gilchrist county, 2015



Sanchez et al. 2016, UF-IFAS

- Re-emerging disease in Florida, and other southern states
- Races & resistance

# Races in Florida: 0-2 (This could change in the near future!)

# Races 2 & 3 - **Most** aggressive; Resistance **not** available for race 3.

Limited control with current management practices



*Fusarium oxysporum* f.sp. *niveum* 

Chlamydospore **Most** important source of inoculum

Survives 10+ years

Sanchez et al. 2016, UF-IFAS

## **Fusarium wilt - Cultural management**

**Management options** 

• Crop rotation



- Challenges
- Land availability
- Presence of the pathogen in "new land"
- Pathogen brought into the field
- Clean plant material (seeds / transplants)

## Early symptoms





Under high disease pressure in Quincy, none of the fungicides reduced disease severity. **However, at moderate-low disease severity in Citra, there were effective fungicides** 





Sanchez et al. 2016, UF-IFAS

Novel *Pseudomonas syringae* strains affecting watermelon and other cucurbits in Florida, Georgia, California, Tennessee







### Butternut squash, Steve Bost, University of Tennessee



### Cucumber, Steve Bost, University of Tennessee



### Squash, Steve Bost, University of Tennessee

- If cold + wet weather is expected in early spring, or through the season, there is risk of *Pseudomonas syringae* infections on watermelon and other cucurbits.
- Copper + Ethylene Bis Dithiocabamate (e.g: Mancozeb) or Mankocide (pre-mix) can effectively manage the disease if applied early in the season
- Based on weather conditions, 2/3 applications may be needed early in the season.
- **Do not use high rate of copper** (Phytotoxicity issues on watermelon and other cucurbits)
- Actigard (SAR inducer is also useful in reducing the disease severity if applied early in the season

Anthracnose becoming widespread in the region; we had cases of >80% yield losses due to first attack of gummy stem blight followed by Anthracnose.





United States Department of Agriculture National Institute of Food and Agriculture







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