

Watermelon Spray Guide 2015

- 1.) Crop rotation** is an important step when managing watermelon diseases. Typically, a 3 to 5 year rotation is recommended for reducing disease problems, however in fields with *Fusarium* wilt it is important to rotate for 5 to 7 years. Avoid double cropping the same plastic with cucurbits, as this can lead to significant disease pressure in the right conditions.
- 2.) Monitor transplants:** The diseases gummy stem blight and bacterial fruit blotch can spread by seed. Thus, inspecting transplants and removing the diseased seedlings, and those around it, will reduce the risk for epidemics.
- 3.) Spray early and consistently** to prevent the disease. Fungicides are more effective when applied in a preventative manner rather than a curative one. Normally spray programs begin 1 week after planting and continue on a 7 to 10 days schedule.
- 4.) Rotate fungicides chemistries** to minimize the risk that the fungus becomes resistant to a fungicide. The Fungicide Resistance Action Committee (FRAC) developed a code of numbers and letters that can be used to distinguish fungicides mode of actions. Rotating to a different mode of action is an important step in prolonging the life and effectiveness of a fungicide. There are two main types of fungicides: protectant (e.g. chlorothalonil and mancozeb) and systemic (e.g. Cabrio, tebuconazole, boscalid). Systemic fungicides are absorbed by the plant and will move either across the leaf or up the plant.
- 5.) Fungicides should be selected based on the target pest.** Many fungicides can control multiple diseases, but in general they are more effective for specific pests. Some common diseases to watch for are:

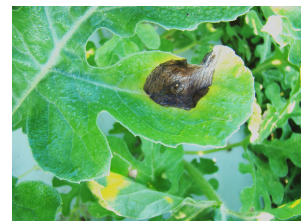
Powdery mildew (PM) typically produces white, powder-like signs on the upper and lower surface of watermelon leaves. This disease will start as small, faint yellowish spots on the leaves. The spread of PM is facilitated by dry conditions, however moisture is required for infection. Symptoms first appear in the lower canopy on older leaves and can quickly spread throughout a field in the right environment. Yields can be reduced by 30% or more in crops not sprayed for this disease. PM has developed resistance to fungicides in FRAC groups 1 (e.g., Topsin M), 3 (e.g., tebuconazole) and 11 (e.g. Cabrio). Currently, some of the recommended fungicides for PM are Torino, Quintec, Switch and Luna Experience.



Downy mildew (DM) is a problem on cucurbits in the southern Florida peninsula, however its incidence varies from year to year in the northern half of the state. Lesions start out as yellow angular leaf spots that will later turn brown to black in color. Often leaf curling and water soaking are associated with DM. A white to grayish fungal growth will appear in the undersides of these lesions when the leaves are wet from heavy dews, rainfall and high humidity (> 90%). Protectant fungicides (chlorothalonil and mancozeb) provide excellent control early in the season, but their effectiveness is limited once DM develops. DM has been reported to have resistance to Ridomil Gold and FRAC group 11 (e.g., Cabrio, Quadris) fungicides. Revus, Ranman, Presidio and Previcur Flex are the suggested fungicides for DM control once it is present. These fungicides should be mixed with a protectant fungicide to provide optimal control of DM.



Gummy stem blight (GSB) primary symptom is dark circular leaf spots at the margin of the leaves where moisture holds for long durations. When severely infected, complete leaf necrosis and leaf drop can be noticed. Yield losses can be as high as 30-40% if the disease is not managed using an appropriate fungicide management strategy under high moisture and warmer weather conditions. If a severe outbreak happens early in the season leading to heavy leaf drop yield losses can be higher as exposed fruits can have sun scalding. The GSB pathogen is known to be resistant to a wide range of FRAC groups. Hence a carefully planned fungicide rotation program is necessary to reduce the risk of fungicide resistance. Based on previous findings in the U.S, fungicides in FRAC groups 11 (e.g., Quadris), 1 (e.g., Topsin-M), and 7 (e.g. boscalid) have a high risk of failure if fungicide resistant GSB isolates are present in the field. The recommended fungicides for GSB management include rotation programs with FRAC group M5 (e.g. fungicides with Chlorothalonil active) with a group 3 (e.g. tebuconazole) or group 9 + 3 (e.g. Inspire Super) or group 7 + 3 (Luna experience) fungicides.



Bacterial fruit blotch (BFB) and Pseudomonas syringae leaf spot (PSLS): BFB symptom appears as dark greasy spots on the fruit and irregular spots on the leaves, and PSLS appears as circular leaf spots with white to tan centers. These diseases can be managed by foliar application of FRAC group M1 (copper based compounds) or group P (Actigard) fungicides. For BFB, copper

compounds should be applied 2 weeks before female flowers open, at bloom, and 2 weeks after bloom. For PSLS copper compounds should be applied starting one week after transplanting under cool wet conditions. These practices will help in suppression of BFB and PSLS. Actigard should also be applied early in the season and before the start of the infection to be effective in suppressing BFB and PSLS. These management strategies coupled with healthy transplants and field sanitation are important for limiting early season infections of the bacterial pathogens that causes BFB and PSLS.

6.) A typical spray schedule in north Florida should start 1 week after transplanting and then use a 7 to 10 day schedule. These schedules should be tightened to 5 to 7 days during periods of heavy rainfall, and should only be greater than 10 days if it is very dry and no disease is present. If disease is present, sprays may also be adjusted based on the resistant traits of the watermelon variety. Pay attention to pre-harvest intervals (PHI) for late season sprays as they may be as high as 14 days. Chlorothalonil is a quality product for early season disease control, but should **not** be sprayed within 21 days of harvest as it can cause watermelon rind burn.

Consult the Vegetable Production Handbook for Florida for more detailed information about watermelon management and fungicides listed for specific disease control (<http://www.thegrower.com/vegetable-production-handbook-for-florida>).

Suggested Seasonal Fungicide* Spray Rotations for Watermelons Based on Research Data from 2012 to 2014 with a Focus on the Disease:				
Spray Number	Gummy Stem Blight	Powdery Mildew	Downy Mildew	Fruit Blotch/Pseudomonas syringae leaf spot
1**	chlorothalonil	chlorothalonil	chlorothalonil	Actigard and/or copper***+mancozeb
2	chlorothalonil	chlorothalonil	chlorothalonil	Actigard and/or copper+mancozeb
3	tebuconazole or chlorothalonil	tebuconazole or chlorothalonil	tebuconazole or chlorothalonil	copper+mancozeb
4	chlorothalonil	chlorothalonil	chlorothalonil	copper+mancozeb
5	Inspire Super or Luna Experience	Inspire Super or Luna Experience	Inspire Super or Luna Experience	Inspire Super or Luna Experience + copper
6	mancozeb	Quintec or Torino or Rally + mancozeb	Presidio or Revus	copper+mancozeb
7	Switch	tebuconazole or Switch	mancozeb	tebuconazole or Switch
8	mancozeb****	Quintec or Torino or Rally + mancozeb	Presidio or Revus	copper + mancozeb
9	tebuconazole or Inspire Super	tebuconazole or Inspire Super	mancozeb	tebuconazole or Inspire Super
<p>* A detailed list of fungicides and the diseases they control can be found in the Vegetable Production Handbook for Florida.</p> <p>** Fungicide spray programs typically begin 1 week after transplanting, and can vary in number of sprays as well as product choices.</p> <p>***Copper indicates copper hydroxide products. Do not mix copper products with chlorothalonil.</p> <p>****Avoid spraying chlorothalonil products within 21 days of harvest as this fungicide can cause rind burn on watermelons.</p>				

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This guide is a reference for possible programs that may help manage watermelon diseases and is not an endorsement for any particular product or brand. The materials are in part or in full for educational purposes and proper credit should be given when this information is used in other resources and settings.

The authors would like to acknowledge other watermelon and vegetable spray guides resources for their content and formats, especially Drs. Keinath and Miller from Clemson University. More specific information about these spray guides can be found at the following web resources (accessed 11/25/2014):

<http://www.clemson.edu/psapublishing/PAGES/PLNTPATH/IL86.pdf>
<http://gfva.org/wp-content/uploads/2012/03/Binder1.pdf>; <https://utextension.tennessee.edu/publications/documents/W141.pdf>;
<http://www.thegrower.com/south-east-vegetable-guide/>