WEEKLY CROP UPDATE
UNIVERSITY OF DELAWARE COOPERATIVE EXTENSION

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Vegetable Crops

Pollenizer Systems and Spacing for Seedless Watermelons

– *Gordon Johnson, Extension Vegetable & Fruit Specialist;* gcjohn@udel.edu

There are a number of pollinizer systems that have been successful for seedless watermelons. The original research with seedless production showed that for standard size seedless watermelons a 1:3 ratio of pollenizers to seedless maximized yields and field space. A 1:2 ratio did not increase yield. A 1:4 ratio gave similar results often to a 1:3 ratio. However, if there were any pollinizer losses, the reduction in pollen production had a much greater yield effect. For example a 20% pollinizer loss in a 1:3 ratio results in a final ratio of about 1:3.8; in contrast, a 20% pollinizer loss in a 1:4 ratio results in a final ratio of 1:5 which can be pollen limiting.

Pollenizers can be planted in several configurations (Figure 1):

1. In separate rows in between seedless rows

2. Every fourth plant in the seedless row at even spacings

3. Evenly spaced seedless plants with the pollinizer placed between every third and fourth seedless plant.

Research has shown that this third in-row pollinizer planting method has the highest yield potential per area planted.

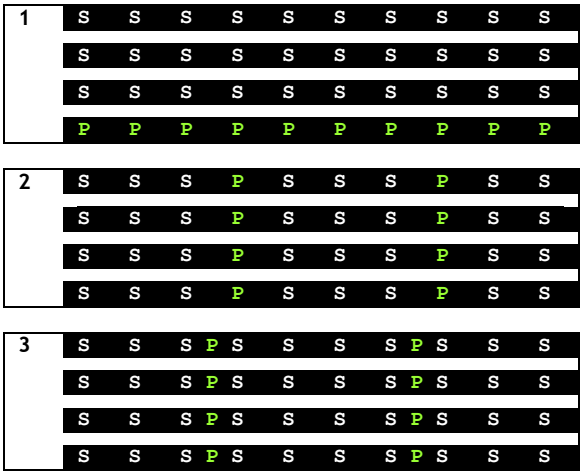

Figure 1. Pollenizer configurations for seedless watermelon plantings. S represents seedless plant placement in the row and P represents pollenizer plants.

One issue with in-row pollenizer planting is the need to have a separate pollinizer planting operation at the same time the seedless is being planted. This has led to problems with mixing up pollenizers and seedless plants by planting crews. One way that this can be avoided is by spraying a white particle film clay product on the pollenizers to "color code" them so that crews can tell them apart from the seedless. Research at UD has shown that this coating has no effect on pollinizer performance as new leaves that are produced are normal green in color.

Another way that this issue has been addressed is by a unique program being offered by one seed company. In this program, the trays come preplanted with every third plant double planted with a seedless and a pollinizer plant. The

planting crew then pulls plants in order from the tray and the correct ratio (1:3) of pollinizer to seedless is planted without needing a separate planting operation. This eliminates the need for separate planting trays of pollenizers to keep track of and also reduces by ¼ the amount of trays to be carried in the field.

With seedless spacing, research has shown that with standard seedless types (36-60 count seedless), a 3 foot spacing between plants give the best yield and economy (plants used). Closer spacing did not improve yield while wider spacing (4 ft. between plants or greater) reduced yield.

Improving Early Fruit Set in Seedless Watermelons

– *Gordon Johnson, Extension Vegetable & Fruit Specialist;* gcjohn@udel.edu

Early watermelons are being planted at this time. These early plantings often have variable crown sets and more hollow heart in the fruit. In early watermelons, the first flowers develop during colder weather conditions. Cold and other adverse weather conditions such as rainy weather and heavy winds during pollination can reduce fruit set or cause fruit development irregularities.

One issue is reduced pollen production. This is can happen when flowering is delayed in pollinizers, when pollenizers have to be replanted because of plant loss, when there are low male flowers numbers, or male flowers are damaged thus reducing the amount of pollen produced. To avoid these problems and improve early fruit set select earlier flowering pollenizers, select pollenizers with higher pollen production, or plant extra pollenizers to increase the pollen available in the field. Only plant well hardened-off pollenizers and use practices that insure good pollinizer survival during transplanting such as windbreaks, proper plant handling to maintain pollinizer vigor and proper planting to minimize plant damage to pollenizers.

Another issue is reduced pollen transfer. This happens when honey bee flights are reduced in the field due to adverse weather. Other factors related to bees such as reduced bee numbers, poor hive strength, delayed hive placement, and pesticide effects can reduce pollen transfer. To manage bee related pollen transfer issues set extra hives in early fields, work with bee keepers to have the strongest hives in for the earliest plantings, place hives at multiple locations (cold, windy, rainy weather keeps bees closer to the hive), and time placement at first flower opening.

Bumblebees may be an option for earlier plantings because they are more active in cold weather. However, mixing honey bees and bumblebees can be problematic, especially if placed too close to each other. Bumble bees should be placed as far from honey bee hives as possible. Honey bees are very resourceful and a bumble bee colony is a great source of pollen and nectar which honey bees are constantly seeking. Bumble bees are susceptible to honey bee robbing causing a weakened colony and overall loss in productivity from both pollinator species.

A final issue in early fruit set is reduce pollen viability or pollen germination and pollen tube development due to cold weather and high winds causing desiccating conditions. Managing for these conditions is best addressed by high, thick windbreaks (rye) between every row. Extra bee hives and extra pollenizers can also help by increasing pollen production and transfer.

Potato Late Blight Notices

– *Nathan Kleczewski, Extension Specialist – Plant Pathology*; nkleczew@udel.edu

This year I will once again be providing late blight monitoring updates. If you are interested in receiving updates, please contact me at nkleczew@udel.edu and indicate how you would like to receive the notices. Green row is perhaps 2 weeks away, so please let me know soon.

If you recall I mentioned a couple of weeks ago that the DEOS weather systems will be tied into the Cornell DSS late blight prediction system. We expect this will be finalized within the next week or so, which means that when you set up fields you will be able to select the DEOS station that is most appropriate for a given field or set of fields. This should greatly improve the

accuracy of the model across the state. I encourage scouts and producers to check out the DSS. It can be found at the link located at http://www.usablight.org/dss. There also is a brief tutorial on how to use the system, although honestly, it's very intuitive. **What does the DSS allow you to do?**

1. Standard Blitecast readings (what we have used in the past).

2. Predicted Blitecast readings based on future weather.

3. Another disease forecast system (Simcast) that includes fungicide weathering and varietal susceptibility in determining the need for fungicide.

4. The ability experiment (virtually) with different fungicide strategies before actually making an application.

All of this information can be sent to an email or your phone, or you can log in and check it as you want. You can use it on multiple fields, so when you receive a report everything is available as a list, for your reading pleasure. It's also free, another bonus.

Seedling Diseases in Greenhouse Transplants

– *Kate Everts, Vegetable Pathologist, University of Delaware and University of Maryland*; keverts@umd.edu and *Nathan Kleczewski, Extension Specialist – Plant Pathology*; nkleczew@udel.edu

Transplant production is in high gear on Delmarva and some problems, mostly abiotic, have been observed. Although these current problems are primarily abiotic, a refresher on common diseases is always good. In addition, because of our delayed spring, the weather may cause some transplants to be held longer than usual before planting, which isn't optimal and will further stress the seedlings. If any seedlings appear diseased, identification of the problem is critical.

The most common fungal disease of **tomato** transplants in the greenhouse is **gray mold**, caused by *Botrytis cinerea*. However, **leaf mold** caused by *Fulvia fulva* and even **late blight** caused by *Phytopthora infestans* can occasionally be problems. All these diseases can be reduced by changing watering practices (by watering the base of the plants and early in the day to reduce moisture on the foliage). Also improving ventilation, venting, and heating (if outdoor temperatures are cool enough) to reduce humidity in the greenhouse will minimize disease.

Bacterial diseases of tomatoes include **bacterial spot** and **speck**. To reduce these diseases use certified and hot-water treated seed. Maintaining a good environment is critical to managing diseases. Additionally, there are organic and conventional fungicides that are labelled to use in the greenhouse. See the Delaware Commercial Vegetable Recommendation Guide for more information.

Transplants of **squash, cucumber, watermelon** and **cantaloupe** also may contract fungal and bacterial diseases. Reoccurring diseases here on Delmarva include **Bacterial Fruit Blotch (BFB)**, which is caused by the bacterium *Acidovorax avenae* subsp. *citrulli*. Symptoms of BFB on seedlings begin with water-soaked areas on the lower surface of the cotyledons and inconspicuous lesions on leaves. BFB lesions will become necrotic often with yellow halos. Lesions are frequently delimited by veins. Infected seedlings collapse and die.

If the bacterium is present, conditions in greenhouse transplant houses are highly favorable for the development of BFB symptoms and the spread of disease. Good practices for greenhouse transplant production are to disinfect surfaces before planting (benches, walls, walkways, etc.). The seed source should have tested negative for the pathogen with a minimum assay number of 10,000 seeds. Clean transplant trays must be used (disinfect trays if they will be reused) and new soil. Destroy any volunteer seedlings and keep the area in and around the greenhouse weed free. Avoid overhead watering if at all possible, or water in the middle of the day so that the plants dry thoroughly before evening. The bacterium can spread on mist and aerosols, so keep relative humidity as low as possible through proper

watering and good air circulation in the greenhouse. Separate different seedlots, to reduce lot-to-lot spread. If BFB is suspected, collect a sample and submit it to your Extension educator, or specialist. Destroy all trays with symptomatic plants. Remove adjoining trays to a separate, isolated area for observation. Monitor these isolated seedlings daily and destroy trays where symptoms develop. The remaining trays should be sprayed with a labeled bactericide and the applications continued until the plants are transplanted to the field.

When receiving shipments of transplants, inspect them carefully for symptoms and get a diagnosis if symptoms are observed.

Figure 1. Water soaked appearance of the lower surface of the watermelon cotyledon infected with bacterial fruit blotch.

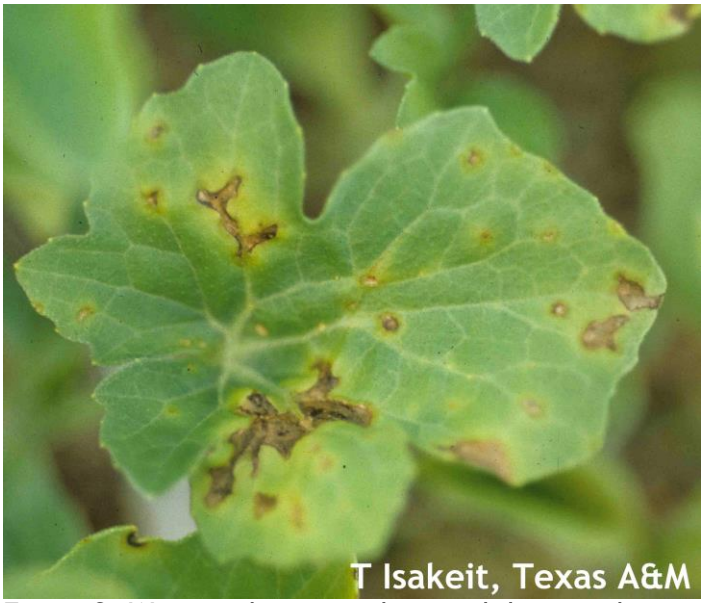

Figure 2. Watermelon transplant with bacterial fruit blotch. Note the yellow halos around the necrotic lesions.

Other bacterial diseases of cucurbits in the greenhouse:

Angular leaf spot (ALB), which also is a bacterial disease, looks similar to BFB. This "look-alike" disease occurred in Delmarva's greenhouses several years ago. Symptoms of angular leaf spot are a chlorotic halo and may appear "shiny" (due to bacteria on the lesion surface). Small irregular lesions expand and become angular. On watermelons the borders are chlorotic. Older lesions may turn brown, dry and tear to produce a tattered appearance.

ALB also may be seedborne. There are several bacteria (*Pseudomonas viridiflava*, *P. syringae* pv. *lachrymans*, and possibly others) that cause similar symptoms and vary in their ability to cause damage. Therefore, it is important to have the disease identified. The symptoms look similar to anthracnose.

Figure 3. Upper and lower surface of leaf with symptoms of angular leaf spot.

The fungal diseases **gummy stem blight**, **Alternaria leaf blight**, **anthracnose,** and **Fusarium wilt** can also be introduced into the greenhouse on watermelon seed or through inoculum from a previous crop. Diseases that are transmitted on seed often are randomly located throughout the greenhouse. Initial infections will occur as clusters of diseased plants.

Although we have not seen Fusarium wilt infected transplants in local commercial greenhouses, it has occurred in other states. Symptoms are wilted seedlings that may remain green or become chlorotic (yellow).

An additional reason to be concerned about diseases that occur in a greenhouse on transplants is that, if planted, these transplants can introduce new strains of the pathogen into your field. For example, new strains or races of the Fusarium wilt pathogen can be introduced into an area on seedlings grown from infested seed. Recently, scientists in Florida have detected fungicide resistant isolates of *Didymella bryoniae* (the gummy stem blight pathogen) in transplant greenhouses. If planted to the field, fungicides used for managing gummy stem blight may be ineffective on the crop.

Agronomic Crops

Herbicide Choices for Palmer Amaranth

– *Mark VanGessel, Extension Weed Specialist*; mjv@udel.edu

"What is the best herbicide for use in fields infested with Palmer amaranth" has been a common question this spring. There are a number of products that could be used, the key is maximizing their effectiveness. Most of our Palmer amaranth plants are resistant to glyphosate and many are resistant to Group 2 herbicides, so we cannot rely on these products to provide control.

1. Use the appropriate rate (full rate for the soil type)
For pre-packaged mixtures, examine what products are included and what rate of each product is being applied. There are a number of soybean herbicides that contain more than one active ingredient, but one or more of those active ingredients may be at a low rate. Sources for this information are the Corn or Soybean Weed Management Guide http://extension.udel.edu/ag/weed-science/weed-management-guides/. See table 3 page 8 in the Corn Guide or table 3 page 9 in the Soybean Guide as well as table 7 for typical use rates when used alone).

Soybean Herbicide Active Ingredients with Good Preemergence Control for Palmer Amaranth

Active Ingredient	Trade Name*
dimethenamid	Outlook
s-metolachlor	Dual Magnum
metolachlor	several
pendimethalin	Prowl
pyroxasulfone	Zidua/Anthem
flumioxazin	Valor
fomesafen	Reflex
linuron	Linex/Lorox
metribuzin	Tricor/Glory
sulfentrazone	Authority/Spartan

*Trade names given are only an example and others trade names may be available

Note many of the Palmer amaranth are Group 2 resistant so this group of herbicides was not included

Corn Herbicide Active Ingredients with Good Preemergence Control for Palmer Amaranth

Active Ingredient	Trade Name*
acetochlor	Harness/Surpass
alachlor	Intrro
dimethenamid	Outlook
s-metolachlor	Dual Magnum
metolachlor	several
pendimethalin	Prowl
pyroxasulfone	Zidua/Anthem
atrazine	several
isoxaflutole	Balance
mesotrione	Callisto
simazine	Princep

*Trade names given are only an example and others trade names may be available

Note many of the Palmer amaranth are Group 2 resistant so this group of herbicides was not included

2. Apply the herbicides in a timely fashion. Herbicides applied more than 7 days before planting means the postemergence herbicides must be applied earlier than normal. Be sure to use your residual herbicides close to planting so when the postemergence sprays are made about 4 weeks later, the crop is approaching canopy closure.

3. Postemergence sprays will need to include a product that is highly effective on Palmer amaranth since most of our plants are

glyphosate resistant. Applications need to be made to Palmer amaranth plants before they reach 4 inches; in most situations this is three to four weeks after the preemergence herbicide application has been made.

UD Weed Science has had consistent postemergence control in soybeans with PPO herbicides (Reflex, Blazer Ultra, or Goal); of these products Reflex will provide good residual control as well. Liberty (used with Liberty Link soybeans) has been very effective for Palmer amaranth, but does not provide any residual control.

In corn, HPPD herbicides such as Callisto, Impact/Armezon, or Laudis (all combined with 1 pt to 1 qt/A of atrazine) have provided very good control of Palmer amaranth. While all of these products will provide residual control, Callisto provides the longest residual control. If an HPPD herbicide (Group 27) will be used postemergence, refer to the herbicide labels to determine if there are limits on use of an HPPD herbicide at planting. In most situations, if a HPPD-inhibiting herbicide will be use postemergence, there is seldom benefit for using one at planting. Dicamba is also effective for postemergnece control of Palmer amaranth, but it does not provide effective residual control.

4. Finally, we have not seen any triazine-resistant Palmer amaranth in the region. But as we use more triazines (atrazine, metribuzin, and simazine) for Palmer amaranth control, we need to be sure we also incorporate other effective herbicide groups for our soil-applied treatments.

Announcements

Job Posting: Agronomy Program Manager

University of Maryland, Wye Research and Education Center, Queenstown, MD. Duties: Working with scientists, coordinate and implement research, demonstration and educational projects for agronomic crops.

Min. Qual.: BS in Agronomy or related field, 5 years of farm-related experience including research plot design and staff supervision. Salary commensurate w/experience, with base salary $55,200.

Details/Apply: https://ejobs.umd.edu/ Position #103087. Best consideration /closing date: May 8, 2015. Contact: Barbara South (410) 827-6202. EEO/AA.

Season Extension Workshop & Field-Day: Extend your Season with High Tunnels

Friday, May, 15, 2015 10:00 a.m.-3:30 p.m.
Delaware State University
Smyrna Outreach & Research Center (SORC)
884 Smyrna-Leipsic Road, Smyrna, DE

Topics Include:
- High Tunnel Options
- IPM in high tunnels
- Small fruits in high tunnels
- EQIP program and High Tunnels
- Farmer Perspectives
- Do not miss an opportunity to experience the building of a high tunnel!

Speakers:
Judson Reid of Cornell University Extension will share his experiences on IPM in high tunnels

Michael Newell of University of Maryland will share his experiences with small fruits production in high tunnels.

Attendees will be able to receive the following credits:
1.5 DE Nutrient Management Credits
2.0 DE Pesticide credits

To register for the free workshop or for more information, call Rose Ogutu at 302-387- 6397 or by emailing rogutu@desu.edu. RSVP by Monday May 11, 2015.

Presented by DSU Cooperative Extension, Small Farms Program

POULTRY GROWER'S FIELD DAY:
Hot Weather Broiler Management
Wednesday, May 20, 2015 10:00 a.m.-3:00 p.m.
Woodpecker Farm
3557 Woodpecker Rd., Seaford, DE 19973

*********CANCELLED*********

The Poultry Grower's Field Day has been cancelled due to the ongoing issues and concerns associated with infection, eradication and control of High Path Avian Influenza in the Upper Midwest.

While these infections don't have a direct threat to the Delmarva Broiler Industry, the association with wildlife can threaten our region. The source of infection is primarily linked to migratory waterfowl and HPAI breaks have occurred along 3 of the 4 primary flyways in the U.S.

For more information about HPAI see the website links below. There will also be an educational series of off-farm meetings planned to help you keep your farm disease free. These are planned for late May, early June. You are encouraged to attend one of these seminars.

http://www.usda.gov/avianinfluenza

http://extension.umd.edu/sites/default/files/_docs/newsletters/Commercial%20Poultry%20Newsletter%20April%202015.pdf

Thank you!

Bill Brown, University of Delaware Cooperative Extension

Jon Moyle, University of Maryland Cooperative Extension

Jenny Rhodes, University of Maryland Cooperative Extension

Weather Summary

Carvel Research and Education Center Georgetown, DE

Week of April 23 to April 29, 2015

Readings Taken from Midnight to Midnight

Rainfall:

0.27 inch: April 25
0.02 inch: April 26

Air Temperature:

Highs ranged from 74°F on April 29 to 51°F on April 25.

Lows ranged from 46°F on April 28 to 34°F on April 25.

Soil Temperature:

55.5°F average

Additional Delaware weather data is available at http://www.deos.udel.edu/monthly_retrieval.html and http://www.rec.udel.edu/TopLevel/Weather.htm

Weekly Crop Update is compiled and edited by Emmalea Ernest, Associate Scientist – Vegetable Crops