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University of Kentucky
College of Agriculture, Food and Environment
Cooperative Extension Service

AGMatters

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Researchers attack emerging threat to watermelon, cucumber

Jordan Powers, Univ. of Georgia - printed in Vegetable Growers News, 12.19.23

Growers of cucurbits — which include melons, pumpkin, squash and cucumbers — face numerous challenges in production, leading to decreased profitability and less produce on grocery shelves.

Seven East Coast states harvested nearly 102,000 acres of watermelon and cucumber in 2019 and 2020, representing more than 62% ($410 million) and 45% ($180 million) of the U.S. production of the two crops, respectively.

Among the plant diseases, one fungus — Colletotrichum spp., which causes anthracnose — is an emerging threat to watermelon and cucumber production in the east coast.

Anthracnose infects all above-ground plant parts and can cause irregular brown spots on leaves and sunken black spots on fruit. While annual yield losses of watermelon and cucumber across the U.S. are difficult to estimate, conservative numbers range from several hundred thousand to millions of dollars.

Figure 1. Cracking of lesion is characteristic of anthracnose. Gerald Holmes, Strawberry Center, Cal Poly San Luis Obispo, Bugwood.org

"There is a huge threat from this particular disease," said Bhabesh Dutta, associate professor in the Department of Plant Pathology at the University of Georgia College of Agricultural and Environmental Sciences (CAES) and a UGA Cooperative Extension vegetable disease specialist. "Growers traditionally have been using Fungicide Resistance Action Committee (FRAC) 11 group of fungicides to manage this disease, but due to fungal populations insensitive to this fungicide, management has been difficult."

Occurrences of fungicide insensitivity put the long-term viability and profitability of the cucurbit industry at risk, Dutta added.

The U.S. Department of Agriculture (USDA) National Institute of Food and Agriculture recently announced that a CAES-led effort is among 21 research and Extension projects included in a $70.2 million Specialty Crop Research Initiative.

The selected research projects address key challenges of national, regional and multistate importance in sustaining all components of food and agriculture, including conventional and organic food production systems. *continued on pg. 8*

Upcoming Events

February 1
Winter Wheat Meeting
Bruce Convention Center
Hopkinsville, KY

February 1
Private Applicator Training
Christian County Office, 8AM
Hopkinsville, KY

February 8
KY Crop Health Conference
National Corvette Museum
Bowling Green, KY

February 12
Pennyrile Beekeepers
Christian County Office
Hopkinsville, KY

February 28
KY Dairy Partners Conference
Sloan Convention Center
Bowling Green, KY

March 7
Private Applicator Training
Christian County Office, 8AM
Hopkinsville, KY

April 4
Private Applicator Training
Christian County Office, 8AM
Hopkinsville, KY

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Biochar Boost Soils

AgriLife, 12.18.23

An ancient soil amendment – biochar – could be a promising tool for future soil health enhancement and maintenance, according to a study by the Texas A&M Department of Horticultural Sciences.

Amit Dhingra, Ph.D., head of the department in the Texas A&M College of Agriculture and Life Sciences, led the study titled "Metatranscriptomic analysis of tomato rhizospheres reveals insight into plant-microbiome molecular response to biochar-amended organic soil" published in Frontiers in Analytical Science. The research showed biochar improved the soil microbiome and plant root interactions with a spectrum of beneficial microorganisms found there.

"This is very relevant to horticulture production here in Texas because we have 1,300 soil types," Dhingra says. "It is proof-of-principle that shows biochar could be a valuable amendment when it comes to enhancing and managing soil health."

Biochar's role in soil health enhancement

Variations of biochar have been used throughout history, Dhingra says. Ancient civilizations in Brazil used pyrolyzed organic biomass to enhance soil fertility in the Amazon.

Biochar used in this study looks like fine-grained charcoal. Its highly porous, carbon-rich characteristics facilitate enhanced water and nutrient exchange and may result in decreased soil acidification when amended to the soil. It can be made from any sort of biomass, from manure to crop residue like corn stalks. In this case, Dhingra's team used biochar derived from wheat crop residue.

Research has shown that organic soil amendments improve microbiome health, and the addition of biochar is a promising strategy for enhancing soil fertility, beneficial microbe diversity, and long-term sequestration of carbon, he adds.

The team characterized the effects of biochar-derived crop residue on tomato growth, soil microbial diversity, and rhizosphere-level gene expression responses in the organically grown fruit.

"Biochar is useful for reclamation and further evolution of a millennia-old strategy to improve soil fertility," Dhingra says. "This study provides an effective methodology for further examination of the impact of biochar and any other soil amendments on soil and plant health, and potential uses across horticultural systems."

Study shows enhanced beneficial microbial activity, numbers

Organic-certified wheat-based biochar amendments were applied and incorporated into sandy loam trial beds alongside control beds at a rate of 2 tons per acre. All trial beds were in certified organic soil.

Tomato transplants were placed in the biochar-amended and control beds and received organic 5-1-1 Alaska fish fertilizer once per week throughout the experiment. Rhizosphere samples were then taken at 25 days, or juvenile stage; 40 days, or vegetative growth stage; 55 days, or pre-flowering stage; and 70 days, with 75% of fruit at red ripe stage.

Dhingra says researchers concluded the soil microbiome displayed heightened functional activity in several beneficial microbes while reducing the activity of pathogenic fungi throughout the study.

The conclusions were based on the responses of plant roots and the soil microbial community profiles. Active transcripts within the communities were quantified at four plant developmental stages between emergence and mature fruit being harvested.

Winter Manure Application

Christine Brown,Fruit and Vegetable News, 1.10.24

Protecting watersources from manure would be a lot easier if the weather would cooperate. After a relatively good growing season, the conditions since September have been wetter than normal with only short windows between rain events to complete harvest and field work. A challenging corn harvest, combined with wet soils and early snow events has resulted in fieldwork that is behind schedule and manure storages that are full and need to be emptied before the calendar gets to "winter".

Water contamination from field drainage tiles, soil erosion and surface runoff must be considered when applying manure during a wet and/or wintry October, November or December. Field damage from soil compaction, especially on heavier soils is another consideration in balancing field operations and healthy soils.

For some farms, manure application will need to occur in "winter" conditions. ("Winter", for the purposes of this article, is defined as frozen or snow covered soils, not the calendar date). For others, manure application will be the contingency plan to avoid an overflowing storage. In some fields, frozen soils may be required before tankers or spreaders can manoeuvre them.

For application that must occur in wet conditions, the ideal option is still to surface apply manure onto crop residue followed by incorporation of the manure as soon as possible after application. Where this is not possible a common sense approach to minimize water or soil contamination is required. This includes identifying and managing high risk areas. Options for manure application during a wet harvest season or in "winter" conditions are as follows:

1. Custom Application

Is this the year where custom application makes the most sense? It is important to consider place and method of application. Consider hiring a custom applicator if harvest and workload dictates that manure application cannot be done to meet environmental or farm needs. A custom applicator with site specific or GPS capabilities is able to map the location and rate of manure application so that commercial fertilizer supplementation becomes easier next spring.

2. Assessing Sites for Application

Some fields on the farm have higher risk for nutrient contamination; more topography, surface runs, infiltration; poor soil structure that makes them a poor choice for late-season manure application. Choose fields, or parts of fields furthest from water courses, fields that have less slope and fields with buffers (fence lines) as the first choice for application. Choose fields with relatively high amounts of crop residue when possible.

3. Records

Keep records of where manure has and hasn't been spread for crop nutrient and liability purposes.

4. Avoid Injection Into Wet Soils

Injection of liquid manure isn't a good option in wet soils. Wet soils smear more easily, especially when combined with additional and concentrated liquids at each injection point. Surface application onto crop residue (ideally corn) followed by tillage at the earliest opportunity will result in the least amount of compaction damage in wet soils.

5. Avoid Contaminating Surface Water

Spread on fields or parts of fields with the least slope. Start with fields where there is no access to surface water. Water flow patterns are obvious in most fields during a storm. Take note of these areas and avoid manure application to them as well as other areas where there is evidence of ponded water or eroded rills through the field.

6. Separation Distances From Watercourses

Maintain separation distances from watercourses. Under good spreading conditions, the recommended separation distance from any watercourse normally ranges between 40 and 100 feet, depending on runoff risk. In winter application, the separation distance should be at least 100 feet. (In the Nutrient Management regulations, the minimum setback increases to 330 feet with winter application where slope to the watercourse is greater than 3% for liquid manure, or 6% slope where solid manure is applied).

7. Separation Distances From Surface Inlets

Surface inlets or hickenbottoms act as direct chan- *continued on pg. 7*

New Weakness in Sweet Corn Herbicide Armor

Vegetable Grower News, 1.10.24

A team of USDA-agricultural Research Service (ARS), university and industry scientists has spotted a genetic vulnerability to tolpyralate herbicide in 49 varieties of corn, marking the first report of the weed control posing a danger to the staple crop.

The finding, reported in the December issue of Pest Management Science, will enable farmers to avoid crop losses, such as by choosing a tolpyralate-tolerant variety or by using a different herbicide product.

According to Marty Williams, an ecologist with the ARS Global Change and Photosynthesis Research Unit in Urbana, Illinois, tolpyralate was registered in 2017 and labeled for use in fallow fields and on all types of field corn, popcorn and sweet corn. It belongs to a class of herbicides known as HPPD (4-Hydroxyphenylpyruvate dioxygenase) inhibitors.

When applied as a post-emergent herbicide, tolpyralate triggers a biochemical chain of events in targeted weeds that initially causes bleached-appearing leaves and then ultimately plant death. Normally, corn plants can quickly metabolize (break down) HPPD inhibitor herbicides before they inflict the same kind of harm. The process depends on the presence or absence of certain types of alleles (alternate gene copies) in a region of their genome known as NSF1.

One way that corn breeders check for the alleles during evaluations of new candidate varieties is to spray them with nicosulfuron. It is an ALS (acetolactate synthase enzyme)-inhibiting herbicide that can also serve as a reliable indicator of a variety's sensitivity to several types of post-emergence herbicides, including most ALS and HPPD inhibitors. As it turns out, however, spraying nicosulfuron isn't a reliable indicator of corn tolerance to tolpyralate.

That's what Williams and his collaborators from the University of Wisconsin-Madison and Illinois Foundation Seed Inc. learned after conducting a series of greenhouse, field and laboratory tests using genetic mapping techniques. They began their investigation in late summer 2021, after a corn breeder's report that spraying tolpyralate onto a sweet corn inbred line called XSEN187 had severely damaged all plants.

But instead of the alleles they expected to see, the team traced the sweet corn inbred line's tolpyralate sensitivity to a cluster of genes residing on a unique region of chromosome 5. This was confirmed by the alleles' association with visible tolpyralate damage in two populations of offspring plants that were derived from crosses between the sweet corn inbred and two tolerant corn lines, according to a news release.

The researchers expanded the scope of their investigation, ultimately identifying tolpyralate sensitivity in a total of six types of field corn and 43 types of sweet corn. Additional screening is likely to detect the trait in other varieties as well. Consider the case of the inbred line IL677a, which was used to introduce the widely popular sugary enhancer gene to sweet corn. In tests, the line proved severely sensitive to tolpyralate, raising the possibility that this sensitivity was also widely introduced into sweet corn along with the sugar enhancer trait.

Importantly, the researchers also showed that tolpyralate sensitivity in the corn lines they evaluated is contingent upon exposure to oil-based adjuvants, additives that are mixed into herbicide tanks before application. However, removing them isn't an option, Williams noted. The adjuvants are key to ensuring the herbicide is absorbed into the leaves of targeted weeds, killing them more effectively.

How exactly the newly identified gene or genes on chromosome 5 make these varieties vulnerable to harm from tolpyralate hasn't been figured out yet.

"We need a greater understanding of the physiological mechanism so that the manufacturer and seed companies can reduce the risk of crop injury, such as by improving crop tolerance to the herbicide," Williams said in the release. "Moreover, the research may have application beyond tolpyralate, because several new HPPD-inhibiting herbicides are being developed from the same pyrazole ring scaffold as tolpyralate."

Tips To Stretch Hay Supplies

Jeff Lehmkuhler, Univ. of KY, 2.14.23

Below are a few tips to consider stretching limited hay supplies. For additional information contact your local Extension agent. It is recommended to consult with your feed nutritionist or County ANR Agent before making drastic changes in your feeding program.

1. **Inventory hay** – know how much hay you available; weigh a few bales to get an average weight or estimate the weights based on available information from Extension publications.
2. **Minimize storage losses** – keep hay off the ground on a surface that will allow water to drain away; keep bales covered or stored inside a barn; if bale grazing limit the number of bales placed in the field to provide 2-4 weeks of feeding to reduce weathering losses.
3. **Reduce feeding loss** – consider minimizing feeding losses; using hay rings with skirts / metal on the bottom, tapered ring designs, chains to suspend bales, or cone inserts to keep hay inside the feeder has been proven to reduce hay feeding losses compared to hay rings with openings at the bottom; using an electrified temporary poly-wire placed down the center of unrolled hay will reduce losses from cows laying on the hay, trampling it into the mud, and defecating on the hay; feeding processed hay into a bunk or large industrial tire reduces waste compared to feeding processed hay on the ground.
4. **Cull** – consider selling less productive females, open cows, and cows with structural/functional issues to reduce the number you must over winter; consider selling the bull as the market may provide the opportunity to sell a mature bull and replace him with a younger bull next spring.
5. **Limit time access to hay** – research has shown dry cows in mid-gestation can be maintained on good quality hay when they have restricted access time to only 6-8 hours a day; the hay savings comes from less waste as feeding behavior is altered; all cows must be able to access hay at any given time; this is not recommended young or thin cows, lactating cows or growing animals.
6. **Substitute hay with grain** – calories and protein can be provided from supplements; grain/commodity mixes can be used to replace hay; cows can be maintained on a low hay diet by using grain supplementation that balances the nutrient supply and animal requirements; consult a nutritionist before making extreme feeding changes.
7. **Deworm young animals** – animals with an internal parasite burden will have reduced efficiency.
8. **Feed an ionophore** – if grain supplementation will be used, consider adding an ionophore to increase the energy efficiency of the feed consumed. Consult your nutritionist to discuss inclusion rates and developing a supplement program. Previous work has shown that feeding 200 mg of monensin allowed cows to maintain body condition on 10-15% less hay.

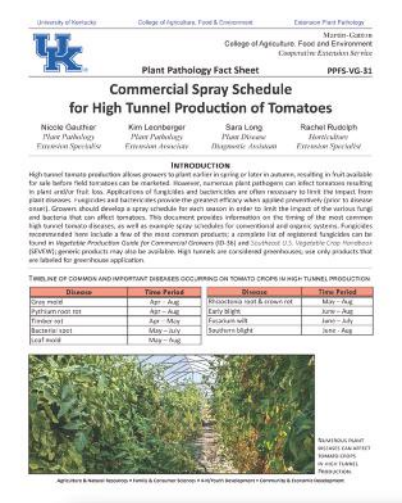
Publication Spotlight

Commercial Spray Schedule for High Tunnel Production of Tomatoes (PPFS-VG-31)

High tunnel tomato production allows growers to plant earlier in spring or later in autumn, enabling growers to market fruit when field tomatoes are not available. However, numerous plant pathogens can infect high tunnel crops resulting in plant and/or fruit loss. Applications of fungicides and bactericides are often necessary to limit the impact of plant diseases.

This newly developed fact sheet provides information on when the most common tomato diseases are likely to occur in the high tunnels, disease management information for conventional and organic production, and an example spray schedule for each production method.

Contact the Christian County Extension office to request a free copy - (270) 886-6328


Plant Pathology Fact Sheet PPFS-VG-31

Commercial Spray Schedule for High Tunnel Production of Tomatoes

Reviewing 2023 - Looking Forward to 2024

Kenny Burdine, Univ of Kentucky and James Mitchell, Univ of Arkansas

The U.S. cowherd reached a 60-year low in 2023. Some of this decline is driven by efficiency in the beef industry. We produce more with less. As such, it would be misleading to compare today to 60 years ago. It still does speak to how significant the recent declines in beef cow numbers have been.

For a more recent comparison, the 2023 cowherd is slightly smaller than in 2014, a year fondly remembered by most in the cattle business. Expansion resulting from those 2014 / 2015 price levels continued until 2019, and the cowherd has been getting smaller since then. Figure 1 below shows beef cow inventories from 1940 to 2023.

2020 was set to be the high-water mark for U.S. beef production. While production increased slightly in 2020, COVID backlogs pushed some of that production into 2021. Then, widespread drought led to significant increases in female slaughter in 2022, which resulted in another year-over-year increase. That brought us to 2023, which ended up being the first year-over-year decrease in beef production in eight years.

Data on cow slaughter and the share of heifers on feed both imply another year of declining inventories. Nationally, there is no doubt this cowherd got even smaller during 2023. Weather and hay supply has been an issue in some areas, but we also think we have to consider the impact that input costs and high interest rates have on the cost of expanding one's cowherd. At some point, expansion will occur, but farmers are not at that point yet. All this is to say that the 2024 calf crop will be smaller than the 2023 calf crop, and the feeder cattle supply will continue to shrink. Certainly, numerous things impact markets, but we expect calf prices to be stronger in the spring of 2024 than in the summer of 2023.

It is hard to see beef cow numbers increasing until 2025 at the earliest. So, cow-calf operators should get relatively strong calf prices for a few years. Some may choose to expand during this time, but we always like to point out that there are other ways to capitalize on a solid calf market. Investing in facilities, genetics, grazing systems, etc. has the potential to lower costs and/or increase efficiency. At the same time, paying down debt and/or building up working capital can put a farm in a better financial position for the future. The point is that each cow-calf operation should take a long-term view when they make decisions and know that what makes sense for one operation may not make sense for another.

Figure 1: January 1 US Beef Cow Inventory - 1940 to 2023

USDA-NASS (1,000 cows)

Struvite- A Promising Fertilizer

Jennifer Duffield White, Green Talks, 1.12.24

There's some interesting new research out of the University of Illinois Urbana-Champaign. A new form of recycled fertilizer, struvite, provided promising results for both sustainability and yield. Struvite is a chemical compound that contains not only phosphorus, but also magnesium and other elements like nitrogen.

They looked at struvite during in-ground soybean production. This particular product recycles nutrients from wastewater streams, reduces leaching of phosphorus and nitrogen in agricultural soils, and (big bonus) maintains or improves soybean yield compared to conventional phosphorus fertilizers.

"There have been some lab and greenhouse projects showing the potential of struvite, but this is the first field-scale assessment of nutrient loss and yield benefits together," said principal investigator Andrew Margenot in a news release.

The study, "Field-scale evaluation of struvite phosphorus and nitrogen leaching relative to monoammonium phosphate," is published in the Journal of Environmental Quality.

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nel to surface water. In a wet year, the risk of water contaminated with manure moving through surface inlets increases. As a result, separation distances from hickenbottoms or inlets should be the same as for watercourses.

8. Keep Application Rates Low

A rate of 5,600 Imperial gallons per acre (6,800 US gal/ac) is the equivalent to ¼ inch (6 mm) evenly applied across spread width. Consider the soil conditions at the time of application. If a ¼ inch of rain fell in one minute, would it runoff or move?

9. Monitor & Be Prepared to Implement The Contingency Plan

For all manure application options, monitoring is essential to ensure that contamination of water sources does not occur. If a spill or discharge to a watercourse does occur, it is required by law for the producer or operator of the application equipment to immediately contact the Spills Action Centre at 1-800-268-6060, followed by implementation of the farm's contingency plan.

10. Alternate Manure Storage?

Consider alternative storage if available. Some neighbours may have sold their livestock, but still have manure storage space that could be "rented".

11. Temporary Solid Storages

Where temporary field storages will be used for solid manure, make sure that the location is flat, and away from water sources and tiles locations. Location with respect to neighbours should also be considered due to potential odour complaints.

12. Application to Frozen or Snow-covered Soils

Spreading manure on frozen, or snow covered soils is never a recommended practice. The risks can be reduced to some extent, if manure can be incorporated on the day of application or the manure is applied earlier in the winter as opposed to later (e.g. in February) when there is a deeper layer of frost and higher risk for runoff. (Farms implicated under the regulation must incorporate liquid manure within 6 hours after application to frozen or snow-covered soil)

13. Consider Snowmelt Runoff

If manure is being applied to snow covered fields, consider the soil under the snow. Risk of contaminated runoff is highest where rainfall is combined with melting snow over frozen soils. Where will the runoff move? Snow covered fields with unfrozen soils, still have some capacity for infiltration. However, compaction could be an issue and there is still risk of contaminated runoff depending on conditions at snow melt. Target manure application considering snowmelt runoff patterns and avoid application in high risk areas.

10-Minute Bean Soup

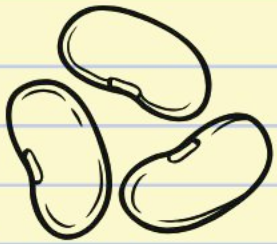
Cooperative Extension Service

INGREDIENTS

- 1 tablespoon olive oil
- 1 teaspoon minced garlic
- ¼ cup onion, finely chopped
- 2 (15.8 ounce) cans of great northern beans, rinsed and drained
- 1 (14.5 ounce) can diced tomatoes with basil, garlic and oregano
- 1 (14 ounce) can low-sodium vegetable or chicken broth
- 4 cups kale, torn into small pieces
- 1 tablespoon lemon juice
- ½ cup grated Parmesan cheese

DIRECTIONS

1. In a medium saucepan, heat oil over medium heat and sauté garlic and onion for 3 minutes or until onion is tender.
2. Add beans, tomatoes and broth to saucepan. Stir and simmer for 5 minutes. Add kale and cook until tender, for about 2 minutes.
3. Mix in lemon juice and Parmesan cheese just before serving. Optional, garnish with finely chopped fresh basil or dried basil.



NOTES

Cooked, dried beans may be substituted for canned beans. Using prepared dry beans in place of canned will reduce sodium in this dish. If you can't find diced tomatoes with basil, garlic and oregano, use regular diced tomatoes and add dried versions of these seasonings.

Source: Caroline Durr, Area Nutrition Agent for Kentucky Nutrition Education Program, University of Kentucky Cooperative Extension Service

Nutrition facts per serving: 400 calories; 8g total fat; 2.5g saturated fat; 0g trans fat; 10mg cholesterol; 500mg sodium; 62g carbohydrate; 15g fiber; 4g sugar; 24g protein; 140% Daily Value of vitamin A; 160% Daily Value of vitamin C; 40% Daily Value of calcium; 30% Daily Value of iron

continued from page 1

In the project "SAM: Sustainable Anthracnose Management for Watermelon and Cucumber Growers in the Eastern U.S.," project director Dutta and co-project director Marin Brewer, William Terrell Distinguished Professor in the CAES Department of Plant Pathology, will lead a team that will undertake a coordinated, multistate effort to improve the understanding of recent anthracnose outbreaks. The team will work to determine pathogen biology, population structure, host specificity and fungicide resistance profiles of the pathogen causing severe anthracnose outbreaks in cucurbit crops, including watermelon and cucumber.

Florida, South Carolina, North Carolina, Virginia, Delaware, New York and the USDA Vegetable Laboratory in Charles, South Carolina, are also included in the four-year, $4.8 million project. Of that amount, $2.2 million will fund research at UGA.

"We have 18 scientists across multiple disciplines and seven Eastern states, along with one USDA-ARS station, participating in the project," Dutta said. The project will be guided by the stakeholder advisory panel that includes panels of scientists, seed and chemical industry representatives, cucurbit growers and state vegetable commissions.

Anthracnose infects all aboveground plant parts and can cause irregular brown spots on leaves and sunken black spots on fruit. While annual yield losses of watermelon and cucumber across the U.S. are difficult to estimate, conservative numbers range from several hundred thousand to millions of dollars, according to a statement to project stakeholders.

The research team will tackle sustainable anthracnose management with two broader goals for the end of the research process: addressing the pathogens by leveraging genomics and plant pathology and developing management practices and breeding efforts to provide a holistic solution for growers.

"One component is fundamental fungal biology and population genetics, and the other is more applied greenhouse and field-based research. At the end of four years, we hope to provide a complete package to our growers that will help them and the cucurbit industry to succeed," Dutta said.

That arsenal will include practices to reduce disease severity as well as varieties that have resistance to the pathogen. Researchers also aim to discover how the pathogen is introduced and how it survives in diverse geographical locations on the East Coast. They will explore the diversity of the pathogen species complex, whether they are sensitive or resistant to diverse groups of fungicides, and ultimately design tests to detect them.

Beyond tailoring management programs for different conditions from state to state, researchers will be able to help growers detect fungal resistance within a population.

"Knowledge of fungicide sensitivity or resistance status of Colletotrichum spp. in different geographical areas will help growers to make informed decisions on their choice of fungicide program," Dutta said.

Each component of the SAM research project will impact the general and sustainable production of watermelon and cucumber in the region. Management strategies resulting from the project will reduce losses to anthracnose across the production chain, maximizing productivity and profitability. This is especially critical in rural agricultural communities where cucurbit crops are an essential aspect of the local economy.

Beyond economic benefits, optimized production practices and precise fungicide use will minimize the overuse of fungicides and losses to anthracnose and increase the efficient use of land, water, fuel, pesticides and other resources for cucurbit production. Ultimately, the integration of host resistance in integrated pest management for anthracnose will reduce the cost of production for growers and foster improved environmental stewardship.

While cucurbit growers will collaborate with researchers, Extension and private industry professionals to manage this pressing issue, the project will train future agricultural scientists, including graduate students and postdoctoral researchers.

"I'm excited by the challenge. It's a challenging project with a challenging organism and you may have to rely on a multifaceted approach to manage it," Dutta said. "In any scientific project, if you answer one question, it will open many new questions. The answers we learn from this particular project will also help in devising strategies against similar organisms in different systems."

Fig. 2. Watermelon anthracnose symptoms. Jason Brock, University of Georgia, Bugwood.org