

Fruit & Vegetable News

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Tomato Pollination and Bumblebee Visits

Jerry Brust, IPM Vegetable Specialist, UMD

While visiting a tomato field this week I saw the tell-tale signs on the flowers that this field was being visited by bumble bees that were pollinating the tomato flowers. In the field wind movement is usually enough to cause pollination in a tomato flower, but at times there are very calm days and nights with very 'heavy' air and little wind movement. However, even with wind action it is always beneficial to have bumble bees perform buzz pollination, which can greatly increase fruit set. Bumble bees perform buzz pollination by firmly biting the flower cone, then rapidly vibrating their wing muscles which dislodge the pollen from within the flower. The bumble bee leaves visible bite bruises on the flower cone, which can be used to verify that pollination has occurred (fig. 1). Good pollination of the tomato flower is important because the final size and weight of fruit is largely determined by



Fig. 1 Bumble bee bruising of tomato flower showing buzz pollination has occurred. Photo by G.Brust, UMD

the number of seeds set, which is ultimately due to the quality of pollination and fertilization. In figure 2, flower 1 has been visited by a bumble bee approximately 4-6 times, while flower 2 has been visited just 2-3 times and flower 3 has not been visited. In the field the more visits the better. Not surprisingly this particular field of tomatoes I was in had a very heavy fruit set (fig. 3). Growers should try and look for this flower bruising from time to time to see if they are having sufficient bumble bee visits ($\geq 3-4$ is good) in their tomato field which will increase fruit numbers, fruit size and fruit quality. Little or no visits may indicate a poor pollinator environment which could mean poor pollination and therefore poor fruit quality.



Fig. 2 Tomato flowers showing various levels of bumble bee bruising. (visits: 1= many; 2= a few; 3= none). Photo by G.Brust, UMD



Fig. 3 Heavy fruit set in tomato field with high bumblebee activity. Photo by G.Brust, UMD

Water Core in Apples: What is it, What Causes it and How Can it Be Controlled?

By Macarena Faruh, Ph.D. Assistant Professor and Extension Specialist, UMD

What is it?

Water core is one of the many physiological disorders affecting apples (Fig. 1). Physiological disorders are abnormalities in the various apple tissues that result in loss of quality, loss of marketability and increased loss of fruit that is discarded and not consumed. These disorders are caused neither by fungi, insects or viruses, nor by mechanical damage. The incidence of water core can vary from year to year. Not all apple varieties are affected equally, some of the most susceptible being Cox's Orange Pippin, Delicious, Fuji, Braeburn, Jonathan, Stayman, Starkrimson, although it can also be detected in Golden Delicious, Granny Smith and McIntosh, among others.



Fig 1. Apple exhibiting the physiological disorder of water core. Photo: M. Faruh, UMD.

Water core has only internal symptoms, not external, making it difficult to predict without destroying the fruit. Water core is recognized by the presence of translucent, glassy-looking areas in the flesh of apples. When the problem is mild, it usually appears around the vascular bundles and the core of the fruit. In more severe cases, it may extend to the pulp cells underneath the apple skin (Fig. 2).

The degree of severity of the disorder is determined at the time of harvest, as the disorder does not continue to develop once the fruit has been harvested and is in storage or transport. Furthermore, symptoms of water core, when the damage is mild to moderate, may disappear in storage. However, when the level of damage is very severe, the affected tissue may develop browning that can subsequently trigger decay and fermentation of the dam-



Fig 2. Severity scale of water core in apples (left: mild, right: severe). Photo: M. Faruh, UMD.

aged tissue, developing unpleasant aromas and flavors (Fig. 3).

What causes water core?

Water core is caused by an increase and accumulation of a sorbitol-rich liquid. Sorbitol is a sugar alcohol that is one of the main carbohydrates transported from the leaves to the fruit in apples. Sorbitol is also widely used in the food industry to produce sugar-free products. Sorbitol, once in the fruit, is rapidly converted to other carbohydrates, so its content represents a very low percentage of total sugars (less than 10%); however, some studies have indicated that the sorbitol content in water-cored fruit can be almost double compared to fruit that do not develop the disorder. This excessive increase in sorbitol causes an attraction of water to the cells (given the difference in concentration) producing this accumulation of liquid that gives rise to the glassy appearance of the water core. This liquid in the intercellular space decreases the oxygen level or gas exchange of the cells causing browning and fermentation due to the presence of sugars.

To date, the direct causes of why sorbitol transport is altered and water core is produced are not entirely clear. What is known with certainty is that the disorder originates directly in the orchard and that it occurs mainly associated with fruit harvested at an overripe stage. In addition, it has been found to be more frequent in large, light-exposed and/or calcium-deficient fruit. The calcium effect would be associated with delayed maturity and with effects on



Fig 3. Water core symptom with development of internal breakdown in Red Delicious apple Photo: INTA, Argentina

the modification and alteration of cell membrane integrity, which could affect sorbitol accumulation. In addition, vigorous trees and excessive nitrogen fertilization increase the incidence of the disorder.

Environmental factors such as temperature have also been associated with the development of water core. Low temperatures (below 50 degrees Fahrenheit) around 4 to 5 weeks prior to harvest have a direct effect on water core expression in susceptible cultivars. It is speculated that, at low temperatures, leaves senesce rapidly and thus sorbitol stored in the leaves can be translocated to the fruit quickly. Water stress during fruit ripening in the

orchard is also considered as a factor that may aggravate the development of this disorder. The damage is also more frequent in apple varieties that must be left on the tree for a longer period of time to develop the skin color necessary for marketing. This practice results in the harvest of overripe fruit with obvious internal symptoms of the disorder.

How can water core be controlled?

The best way to control the incidence of this disorder is to harvest fruit at optimum maturity, avoiding harvesting overripe fruit or keeping fruit hanging on the tree for excessive time. In addition, balanced and uniform tree growth should be maintained. Pre-harvest management such as pruning and thinning should avoid increasing tree vigor. In addition, the fertilization program should be adequate to avoid calcium deficiencies or excessive nitrogen increase. It should be remembered that if the level of water core at harvest is mild or moderate, the damage will be reabsorbed during fruit storage, and thus disappear.

Harlequin Bugs are Especially Bad this Season

Jerry Brust, IPM Vegetable Specialist, UMD

Harlequin bugs (*Murgantia histrionica*), are being seen in especially high numbers this season. They are a pest of many vegetables, but preferentially feed on and damage brassica plants, which includes mustards, crucifers, greens and radish. They also are secondary pests of various fruit and vegetable crops such as beans, cantaloupe, onion, raspberry and even tomato.

Females will lay about 12-barrel shaped eggs in a cluster (Fig. 1). The eggs are easily recognizable by their black and white pattern. Eggs laid now will hatch in 4-5 days. Nymphs feed for a moderately long period of time of 5-8 weeks going through 5 to 6 instars. The whole process from egg to adult can take 45-75 days.



Fig 1. Harlequin eggs and immatures. Harlequin bugs suck. They insert their needle-like mouthpart into plant tissue and suck out fluids, which destroys plant tissue and potentially kills plants, particularly young plants. Damage appears as stippling or light-colored cloudy spots in leaves (Fig. 2). Young plants will have larger areas of plant tissue with dead patches, wilting and deformed growth.

Physical removal of eggs, and the bug itself can reduce the pest population without the need for insecticides, although this method works best in smaller operations or organic systems. Harlequin bugs can be controlled chemically by using neonicotinoids or pyrethroids or in organic systems using Spinosad's. Keep in mind that insecticides are more effective against nymphs than adults. Read and follow the label for proper use.

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Fig 2. Harlequin bug nymph and their associated feeding damage. Photo: Whitney Cranshaw, Colorado State University, Bugwood.org

Southern Bacterial Wilt of Tomato

Jerry Brust, IPM Vegetable Specialist, UMD

Southern bacterial wilt of tomato, which is caused by the soil-borne bacterium *Ralstonia solanacearum* Race 1, has been found in a couple of tomato fields in the past week. This pathogen affects many solanaceous crops and is found throughout the southern United States.



Fig. 1 Tomato stem infected with *R. solanacearum*, split in half, showing discolored vascular tissue and pith. Photo by K. Rane, UMD.

The pathogen enters plant roots through small wounds such as those caused by insects, nematodes, cultivation, or transplanting. The bacteria then multiply in the vascular system, eventually clogging the water conducting vessels with bacterial cells and slime which prevents water and nutrients from moving throughout the plant. Initially, infected plants develop wilt symptoms in the afternoon, and recover in the evening. Symptoms can develop quickly, especially when fruit is rapidly expanding, or when temperatures are 85-95° F and moisture levels are high. As the disease progresses, the base of the plant may show brown cankers, root rot, and a section of

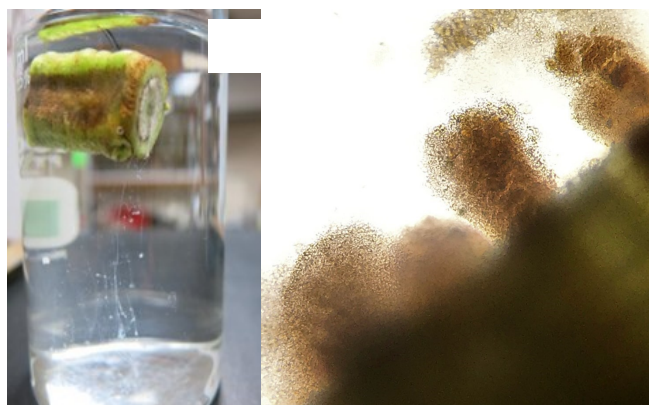


Fig. 2 Bacterial slime streaming out of a cut stem in glass of water (A) and bacteria streaming out of infected xylem tissue-viewed under a microscope at 100X (B). Photo by NC State Plant Pathology and K. Rane, UMD

an infected stem may show a brown discoloration of the vascular tissue (fig. 1). The plant eventually becomes permanently wilted and death occurs. A freshly cut stem at the base of the plant placed in water can show a stream of a white slimy substance (fig. 2A) that is a strong indicator of the bacterium present in the vascular tissue (fig. 2B). The interior of the stem also can be a dark or light brown in the pith area (fig. 3).



Fig. 3 Discolored pith at the base of an infected tomato stem. Photo by G. Brust, UMD.

Bacterial wilt is difficult to manage once present in the field. There are no chemical controls that provide effective management. This disease can be introduced into fields through infected transplants, water runoff from adjacent contaminated fields, or movement of tools and equipment containing infested soil. Weeds can serve as alternative hosts for this pathogen, so weed control is important in disease management. Crop rotation (for at least 4 years) and planting cover crops of non-susceptible plants (i.e., corn, beans, cabbage) may help reduce populations of the pathogen in the soil. Growers can use tomato plants grafted with bacterial wilt resistant rootstocks in fields where bacterial wilt is present. A list of resistant rootstocks is available on the USDA [tomato rootstock page](https://www.ams.usda.gov/vegetable-research-and-extension/tomato-research-and-extension/tomato-rootstock) and includes such examples as Armada, Bowman and RST-05-113-TE rootstocks.

**The 2022-2023 Mid-Atlantic Commercial
Vegetable Production Recommendations Guide**

is available for free at

<https://go.umd.edu/MidVegGuide>

Maryland Department of Agriculture seeks input on Priorities for Resilient Food Systems Infrastructure Program

The Maryland Department of Agriculture (MDA) has received \$3.8 million through the United States Department of Agriculture's [Resilient Food Systems Infrastructure](#) program to assist in strengthening Maryland's food supply chain between farmers and consumers by investing in infrastructure. The Maryland initiative will begin distributing funds in 2024. MDA will work in partnership with the USDA to distribute these funds as competitive grants to invest in the aggregation, processing, manufacturing, storage, transportation, wholesaling, and distribution of locally and regionally produced food products. Eligible food products include fruits and vegetables, dairy, grains for human consumption, aquaculture, and other food products (excluding meat and poultry). The project will also fund business development services for new and established food companies.

To participate in a public survey to help MDA develop priorities for this program, please visit <https://bit.ly/44nUyvP>. The department will host a virtual listening session on July 21, 2023 for the industry and stakeholders to provide input on priorities. The event is open to the public but registration is required. For more information please visit <https://bit.ly/3pTqSHQ> or contact the department's Agriculture and Seafood Marketing Program at (410) 841-5770, or email Mark Powell at mark.powell@maryland.gov.

Irregular Ripening in Watermelon

Gordon Johnson, UD, Retired Extension Specialist

Irregular ripening is a common problem that occurs in some watermelon fields each year. This is where varieties planted at the same time do not ripen evenly in a field. Fruits that look mature on the outside are not fully ripe inside, often with significant amounts of white flesh (fig 1.).



Fig 1.) Watermelon that did not fully ripen. Note excess white rind. Photo by G Johnson, UD

Watermelons are classified as non-climacteric, that is, they do not continue to ripen significantly after harvest. Other fruits, particularly those that soften, such as peaches, release ethylene gas during the ripening process and will continue to ripen after harvest. It was once thought that ethylene was not involved in watermelon ripening, however, in 2009, USDA researchers found that watermelons released a burst of ethylene at the white fruit stage.

Watermelon fruit development and ripening also is dependent on the accumulation of sugars. Sugars are produced by photosynthesis in the foliage of the watermelon plant and are translocated to the fruit. So, what is the cause of irregular ripening? One possible explanation is deteriorating vine health. Loss of foliage or stem tissue due to diseases such as gummy stem blight or insect or mite feeding on leaves and stems can reduce the amount of sugars available to translocate into the fruit. In a field, variability in vine health therefore would lead to variability in fruit ripening. Certain viruses can also affect watermelon ripening.

The burst of ethylene that researchers found could also be an issue. In plants where ethylene production is compromised, this could lead to later ripening or incomplete ripening. Potassium may also be an issue. Potassium is important in fruit ripening and low or variable potassium levels may lead to irregular ripening. In fields with pre-plant potassium applications only, heavy irrigation could leach potassium out of the root zone creating lower than normal levels in the soil and potential deficiencies leading to irregular ripening.

Hot weather (temperatures in the 90s) can also lead to fruit disorders. In general, watermelons tolerate high temperatures; however, some varieties are less tolerant of extended hot weather, leading to irregular ripening. Long season varieties often take longer to ripen, even when outwardly they appear to be mature.

July Insect Scouting Tips

Emily Zobel, UME, Dorchester County

Check > 50 plants throughout the whole field when making treatment decisions. Localized infestations can be spot treated to save time and money. For up-to-date chemical recommendations, check the Mid-Atlantic Commercial Vegetable Production Guide. Read all labels carefully for rates and restrictions.

All crops: Continue to scout for aphids and spider mites. Early detection is critical since these pest populations can quickly explode during hot, dry weather. Pyrethroid and Carbaryl applications will worsen, so avoid unnecessary pyrethroid applications.

Eggplant: Scout eggplants for defoliation, such as Japanese beetles and Colorado potato beetle (CPB), which can cause heavy defoliation. The threshold for CPB is if you have an average of 4 small larvae or 2 large larvae per plant for plants above 6 inches.

Lima Beans and Snap Beans: Scout fields for leafhoppers and Mexican bean beetles+. The leafhopper threshold is based on the age of the plant. Pre-bloom, the threshold is an average of 5 per sweep; during bloom, it is 12 adults/nymphs per sweep, and during pod set, it's 25 per adults/nymphs per sweep. Continue to scout for bean leaf beetles and Mexican bean beetles—Control when there is an average of 20% defoliation or 1 beetle per plant.

Potatoes: Scout fields for Colorado potato beetle, leafhoppers, and aphids. Controls will be needed for aphids if you find 2 aphids per leaf during bloom and 4 aphids per leaf post-bloom. This threshold increases to 10 per leaf at 2 weeks from vine death/kill.

Cucurbits: The first generation of striped cucumber beetles are active. When scouting, make sure to check inside the flowers. Kaolin clay can repel beetles but is most effective before beetle populations become high. It should not be used as a rescue treatment. Still, it can be paired with an insecticide application for crops that are susceptible to bacterial wilt. Thresholds are an average of 1 beetle per plant on cantaloupe, cucumber, and watermelon and 5 beetles per plant on squash and pumpkins. Squash bugs are active right now. Thresholds are 1 egg mass per plant. You may need to spray twice to clean them up, about 10 days apart. Eggs are hard to kill with insecticides, so target the nymph stage. Check for rind-feeding pests on melons, such as beet armyworm, yellow-striped armyworm, cabbage looppers, and cucumber beetle.

Sweet Corn: Sample pre-tassel stage for whorl feeders (corn borer, corn earworm, and fall armyworm). Treatment should be applied when 15% early and late whorl infestation and 30% mid-whorl stage. The key is to treat early infestations. When large holes are noticeable, the worms may have left or are too deep in the whorl to reach with an insecticide. David Owens from UD Extension recommends using pyrethroids (only if caught early enough) or Rimon, Intrepid, Intrepid Edge, Avaunt, and the spinosyn class and saving chlorantraniliprole for silk protection later in the season.

Berries: Japanese beetles and June beetles are active. Japanese beetles can cause defoliation and may need to be spot treated in some plantings. Control measures for spider mites are not taken until 25% of leaves sampled show the presence of spider mites, but no predator mites are found, OR 30% of leaves sampled show the presence of spider mites, and some predator mites are found.

Cucurbit Downy Mildew Alert

By Emmalea Ernest, Delaware Extension
Fruit & Vegetable Specialist

Cucurbit downy mildew (CDM) was recently reported in southern New Castle County Delaware (Fig 1.). CDM has been reported in Atlantic, Salem, and Gloucester counties in southern New Jersey. There are also three counties in North Carolina reporting CDM (<https://cdm.ipmpipe.org/>). All the reports in Delaware, New Jersey and North Carolina are on cucumber or cantaloupe, indicating that it is probably Clade II isolates that are circulating in the region and cucumber and cantaloupe crops are most at risk. Continue to scout all cucurbit crops for CDM symptoms, particularly cantaloupe and cucumber. Preventative fungicides should be considered for these two crops, especially more recent plantings that will be harvested later in the season.



Fig 1. Cucurbit leaves without (left) and with (right) symptoms (yellow, irregularly shaped lesions) of downy mildew. Photo by Rebecca A. Melanson, Mississippi State University Extension, Bugwood.org

Black Root Rot Found in Strawberry Plantings

Jerry Brust, IPM Vegetable Specialist, UMD

Strawberries have had a tough time of it in the Mid-Atlantic this season. Some strawberry fields have been found with black root rot disease mostly triggered, I think, by environmental stresses. Black root rot is one of those strange 'conglomerate' diseases that is both a serious and common problem in most strawberry producing areas. The disease gets its name because it turns the normally whitish roots of strawberry black. The disease is actually several different root disorders that produce comparable symptoms. However even these disorders are not clearly understood and are commonly known as 'root-rot'. Not only have several different fungi been implicated as causes of black root rot, an interaction between some of the soilborne fungi and the lesion nematode has also been associated with exacerbating the disease in certain situations.



Fig. 1 Strawberry plant with many dead leaves because of black root rot infection. Photo G.Brust UMD.

Black root rot is most common in fields that have a long history of strawberry production. In matted row systems, black root rot is generally worse in older plantings that have had limited rotations, especially during dry weather due to poor root development and when close to harvest. Infection usually begins in the first fruiting year and worsens the following years. Any type of environmental stress such as poor soil drainage, drought, flooding and soil compaction will increase the likelihood of black root rot problems.

Symptoms begin with some plants in the field showing reduced vigor and plant stunting which often occurs in low or wet spots or in portions of the field where the soil is compacted. This decline in vigor usually begins during the first fruiting year. Stunted plants often produce small



Fig. 2 . Some strawberry cultivars (2 rows to right) appear to be less susceptible at times to black root rot infection than other cultivars (4 rows to left). Photo G.Brust UMD.

fruit, few runners, and numerous dead older leaves (fig. 1). Infected plants do not respond to fertilization or improved growing conditions, and yields may be reduced by 25-40%. The symptoms are most apparent the few weeks before harvest. The percentage of plants affected in a field usually increases considerably the year after symptoms first appear. Some cultivars appear to be more susceptible to infection than others (fig. 2).

A good time to check plants for black root rot is when fruit begin to color. Poor looking plants should be carefully dug up and their root systems examined. If black root rot is the cause, there usually is a loss of lateral roots, and irregular black patches along the length of the roots. In severely affected plants, these black patches grow together so that only a few white roots are visible (fig. 3). The interior of infected older woody roots turns black. Diagnosis of black root rot is difficult because of the many different organ-



Fig. 3 Strawberry roots with dark (BRR infected, red circle) and light (non-infected, blue circle) roots. Photo G.Brust UMD.

isms that may be involved.

Because several factors appear to be involved in the black root-rot complex, no general control method is entirely effective. While preplant fumigation of the soil before planting new strawberry plants is helpful, it is not a guarantee of success. Some horticultural methods that may help reduce black root rot's occurrence are: Always

use new plantings with healthy white-rooted plants. Rotate out of strawberries for at least 2-3 years before replanting. Minimize soil compaction and incorporate organic matter. Avoid heavy, wet soils and improve drainage in marginal soils.

Maryland Department of Agriculture Announces New Strategy at Nutrient Management Summit

ANNAPOLIS, MD (July 17, 2023) – The Maryland Department of Agriculture (MDA) held a much anticipated Nutrient Management plan writing summit on Monday, July 17 at Anne Arundel Community College to present the overview of the re-imagined and improved nutrient management program. Following a June 1st announcement by MDA of changes to the way plans are written as well as listening sessions held throughout the State in the weeks following, MDA and the University of Maryland (UMD) have made the joint decision to reevaluate and reframe how the program is managed. Farmer and industry input contributed greatly to this decision.

During the July 17 Summit, MDA shared goals and objectives including:

- Evolving the nutrient management plan model through industry input to adapt to modern farming practices and operations;
- Improving the plan writing process through cost-free plans available to farmers;
- Grow and support plan writers by increasing the emphasis on Farmer Training Certification (FTC) Program;
- Incentivize individuals and organizations to offer plan writing services throughout the state;
- UME will remain engaged in this program by continuing to offer free nutrient management plan support as in the past.

"Throughout this process tough decisions and conversations had to occur to get us to this point of creating a solid plan going forward," said Maryland Department of Agriculture Secretary Kevin Atticks. "I thank our industry and their representatives for

providing critical input throughout the listening sessions. In addition, I want to thank the University for stepping up and addressing our concerns. We look forward to further partnership as this process moves forward with renewed and enhanced engagement through University of Maryland Extension."

Maryland law requires all farmers grossing \$2,500 a year or more or livestock producers with 8,000 pounds or more of live animal weight to follow nutrient management plans when fertilizing crops and managing animal manure. Nutrient management plans specify how much fertilizer, manure or other nutrient sources may be safely applied to crops to achieve yields and prevent excess nutrients from impacting waterways.

Because of their complexity, these plans must be prepared by a certified University of Maryland specialist, certified private consultant, or farmer who is trained and certified by the department to prepare his or her own plan.

"I want to thank the Maryland Department of Agriculture for working with us on priority changes to the statewide nutrient management program," said University of Maryland's College of Agriculture and Natural Resources Dean Craig Beyrouty. "We are very encouraged by the progress that has been made to re-introduce University of Maryland plan writers so that we may continue to offer the support our Agricultural community has come to trust and rely upon. I'm thrilled that the University of Maryland Extension (UME) will administer this new program. They provide research-based education with a deep understanding of farmers' operations and environmental needs and will be excellent stewards for this important work."

Lastly, the Department announced a new 30-member Farmer Taskforce, convening in August to

provide guidance to MDA and UMD regarding ways to improve the nutrient management plan to be more practical for farmers to implement. The Task Force's recommendations will be considered by the Nutrient Management Advisory Committee.

For more information and full details about the changes, please visit www.mda.maryland.gov and click on Nutrient Management Plan Writing updates.

The following details were also presented at the Summit:

Framework of Tentative New Agreement:

- MDA and UMD will enter into a 3 year MOU to continue funding UMD Nutrient Management plan writers to be renewed annually, contingent upon funding;
- The new program will be administered day-to-day by UMD Extension.

Funding & Staffing:

- Both MDA and UMD will seek more permanent funding to sustain the program. Currently the program is funded primarily by the EPA;
- The UMD will seek ways to increase salaries and offer benefits for plan writers. Currently, UMD plan writers are hired on a contractual basis because of the uncertainty of continued annual funding by EPA.

Nutrient Management (NuMan) Software improvement:

- Build a more modern software program that helps our industry meet its environmental stewardship roles by ensuring better inclusion of today's modern agricultural production systems, incorporation of the latest research and incorporating web-based accessibility on a variety of devices.

New Nutrient Management Oversight Committee:

- MDA and UMD, chaired by the Secretary of Agriculture and the Dean of UMD College of Agriculture and Natural Resources will be created to:
 - Oversee the plan writers
 - Draft annual reports on the program that includes data such as number of engaged farms/farmers, number of plans developed, acres represented by plans, and reduction of pounds of nitrogen and phosphorus entering waterways as a result of the plans;
 - Set goals for increasing the percentage of plans written through UMD.

Expanded Training Opportunities:

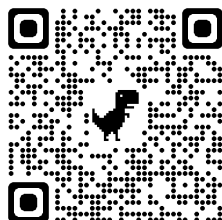
- MDA will hire a NM Training Coordinator;
 - More training opportunities will be available for both Farmer Training Certification (FTC) and developing and delivering classes for consultants;
 - Develop online training modules.
- Education:

UMD will work with MDA to develop educational programs directed to producers to encourage greater participation in the nutrient management program.

Two NEW Weed Publications From UME

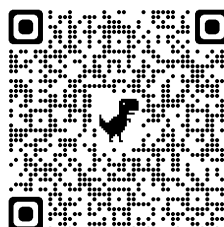
Know Your Foxtails, by Dwayne D. Joseph, and Leo Kerner

<https://extension.umd.edu/resource/know-your-foxtails-fs-2023-0658>



Keys to Identifying Palmer Amaranth and Waterhemp, by Kurt Vollmer, and Ben Beale

<https://extension.umd.edu/resource/keys-identifying-palmer-amaranth-and-waterhemp-fs-2023-0653>



University of Maryland Extension Upcoming Events

Additional events, information and registration link can be found on the University of Maryland Extension Agriculture & Food Systems website. <https://extension.umd.edu/programs/agriculture-food-systems/meetings-and-events>

- **Wednesday Webinars: Smart Actions for Mental Health.** Aug 9, 2023. 12:00 PM - 1:00 PM. Online (<https://www.eventbrite.com/e/2023-wednesday-webinars-tickets-466528528387>)
- **Central Maryland Research & Education Center Twilight Tour.** Aug 2, 2023 4- 9 pm. 2005 Largo Road, Upper Marlboro, MD. This event is free. However, a reserved meal ticket is required. Register online at bit.ly/CMRESTT2023 or call 410 222-3906. If you need special assistance to participate, please get in touch with the Anne Arundel County Extension office at 410-222-3906 by July 26, 2023.
- **Western Maryland Research & Education Center Horticultural Twilight.** Aug 10, 2023. 5-8 p.m. 18330 Keedysville Road, Keedysville, MD. This event is free. Register online at bit.ly/WMRECHorTour2023 or by calling the Carroll County Extension office (410-386-2760) If you need a reasonable accommodation to participate in this event please contact the UME-Carroll Extension Office by July 26, 2023 at 410-386-2760.
- **UMES Ag Showcase.** Aug 16, 2023, 9:00 am - 3:00pm at the UMES Research, Extension and Teaching Farm 10789 Stewart Neck Road Princess Anne, MD. (<https://wwwcp.umes.edu/extension/small-farms-program/ag-showcase/>)
- *** Save the Date* UMES Small Farm Conference.** Nov 3-4, 2023 at the UMES Campus.
- **Maryland Agritourist Conference.** Dec 10-12, 2023 at the Hyatt Resort, in Cambridge, Md. \$90. <https://www.eventbrite.com/e/maryland-agritourism-conference-2023-hosted-by-umes-extension-tickets-668382408777>

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Header photo By E. Remberg

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