April 24, 2019

Peaches are at shuck-split/fall...begin sprays for scab (Cladosporium carpophilum) control. Apples are Full-bloom...keeping an eye on weather conditions for Fire blight (Erwinia amylovora) problems. Several disease models and forecast recommend products to help with this disease. Blueberries have nearly completed bloom. Grape buds have broken...better get that detailed pruning finished!

Strawberry Plasticulture

We really do not need a repeat of the 2018 strawberry harvest season. Extended heavy rains during last year’s harvest season, reduced marketable yields considerably. Low tunnels can be a valuable tool to reduce this type of damage.

I hope we can safely put the floating row covers away for the 2019 frost season, but we have had frost in May before!

We have a 2nd year carry-over plot and a new fall 2018 planted plot with some similar varieties as in 2017. It’s interesting in how much more advanced the carry-over plot is!

The only accurate method of applying the appropriate amount of spring fertilizer through the drip is through tissue sampling and nutrient analysis. It Pays!

Standard spray recommendations are to apply fungicides at 10% bloom and then at full-bloom to reduce gray mold (Botrytis cinerea) and anthracnose (Colletotrichum acutatum) fruit diseases. For our site, the Strawberry Advisory System (SAS), did not forecast a need to apply fungicides at the 10% bloom stage.

For more information about the SAS program and other strawberry topics, make plans to attend the 2019 Annual WyeREC Strawberry Twilight Meeting on Wednesday May 22nd. The announcement can be found in this newsletter. Good Luck!

Figs. 1 and 2 Dark spots on strawberry leaves often mistaken for the start of foliar diseases.
These damaged areas of strawberry foliage can be very disconcerting when they appear as dark spots on the stems (fig. 3). No bacteria or fungi have ever been found associated with these dark spots. I have seen this type of discoloration in strawberry foliage early in the season many times over the years and have never seen the spots turn into any disease problem or any other type of problem. The best that we can come up with is that the plant has ‘bruised’ foliage. And as you look at the spots this is exactly what the damage looks like (kudos to Karen Rane for coming up with this description of the damage).

**Fig. 3 Strawberry stem with dark spot.**

This damage usually appears within a short time span after high winds occur. Figure 4 shows a good example of this as you can see the bruised areas of the leaves that appeared a few days after a very windy period on April 15.

**Fig. 4 Strawberry leaf with bruises and tattered margins.**

Also notice the tattered appearance of the leaf edges demonstrating that these leaves were knocked around a great deal. It is possible that disease organisms might enter the plant through this damaged tissue, but I have never seen this occur to any extent in the field—even during the wettest spring. Nothing needs to be done about this bruising, growers just need to be aware of the possibility occurring after wind events.

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**Disease Update:**

**Fire Blight, Apple Scab, and Bitter Rot Management are Necessary**

By Kari Peter

Tree Fruit Pathologist

Penn State University Fruit Research and Extension Center

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Bloom is a critical time for a lot of diseases: keep trees protected from fire blight and fungal diseases. Photo: Kari Peter, Penn State

Bloom is occurring for a large portion of the apple growing region. This is a critical period for fire blight, apple scab, and bitter rot management.

Vigilance is needed, and protection is most optimal when applied before rain events. The following update includes a healthy refresher of what to know and keep in mind for disease management during the next few weeks. Especially management strategies for those critical diseases that can keep folks up at night: fire blight, apple scab, and bitter rot.

**Minimum requirements for fire blight blossom infection**

For blossom infection to occur, the following criteria must be met in the following order:

1. Flowers must be open with petals intact (flowers in petal fall are resistant)
2. An accumulation of at least 198 degree hours above 65ºF
3. A wetting event as dew or rain
4. An average daily temperature of 60ºF

**Streptomycin**

How does streptomycin protect open flowers from fire blight disease? Insects are attracted to the ooze from active overwintering fire blight cankers. They unwittingly pick up the bacteria on their bodies and move it to flowers as they are busy pollinating. The bacteria on the insect bodies are deposited on the flower stigmas. Here, the bacteria replicate and reach high numbers. A wetting event, such as dew or rain, will then wash the bacteria from the stigmas into the open nectaries. When streptomycin is applied to open blossoms, it kills the bacteria on the stigmas.
Streptomycin has partial systemic properties, such that any bacteria that may have moved into the nectaries will also be killed. In addition, there is about a 48-hour window of activity for streptomycin. Applying streptomycin resets the clock, you’re cleaning up the flower. If you apply streptomycin today and it rains tomorrow, there is no need to worry about streptomycin being washed off; you had already killed the bacteria in the flower when you made your streptomycin spray. Streptomycin has done its job.

Therefore, it is critical to apply streptomycin before the wetting event. It’s a lot easier to kill the bacteria before it has moved into the plant via the nectaries. Don’t apply what you know about fungicides and controlling fungal diseases with controlling fire blight. You want fungicides to persist through and after a rain event because that is when control is most critical; this isn’t the case when applying streptomycin controlling for fire blight. In short, streptomycin packs its biggest punch at the moment and shortly after application.

**Plant Defense Elicitors**

How does applying plant defense elicitors, such as Actigard, help with fire blight management? When you tank mix streptomycin and Actigard and apply the mix to your open blossoms, Actigard will be absorbed by the plant tissues. After it’s absorbed, the plant defenses will be turned on in approximately 48 hours. This signal can persist for a period, depending on the size and age of the tree. Actigard enhances the efficacy of your blossom blight protection program. The streptomycin will kill the bacteria in the flower, and the activated plant defenses will further protect the tree from infection from any wayward bacteria that escape the streptomycin application.

Actigard is not a substitute for streptomycin—Actigard does not kill the bacteria. Depending on the season, streptomycin may not be 100% effective. We observe this in our research trials. Actigard can be viewed as extra insurance to help you get through the bloom season, especially if there is rattail bloom or a protracted bloom. If bloom hangs around a while, you want to be sure to apply streptomycin if five to seven days have elapsed since the last streptomycin spray. Remember: streptomycin kills the bacteria. Regalia is another option as a plant defense elicitor; however, please note that Regalia at 2 qt/A will cause damage to the flower petals when applied during bloom; however, this does not affect fruit finish.

**Fire Blight**

How long do I need to worry about fire blight this season? Growers need their fire blight management vigilance on high alert from bloom through approximately early June. The period post bloom is very critical for the establishment of fire blight. As a result, a proactive shoot blight program is warranted.

We applied this combination three times, every ten days starting at petal fall. When using Apogee/Kudos, growers will need to monitor growth to determine the number of extra applications that are needed. It takes 10-14 days for the effect of Apogee/Kudos to kick in. Depending on when you begin your treatments, monitor your trees closely. If disease conditions are favorable (especially when very warm, wet temperatures occur), a Cueva application may be necessary to keep trees protected before the Apogee/Kudos takes effect.

**Apple Scab**

What are the best options for managing apple scab from bloom through petal fall?

We are in a period where disease pressure will be peaking if warm, wet conditions occur. We are recording exceptionally high mature scab spores being available, and this will continue for about the next week or two. If rain is in the forecast, growers are encouraged to use the FRAC Group 7 fungicides tank mixed with a rainfast mancozeb for the next 2-3 weeks. Complete sprays are recommended; however, if half sprays are used, shorten the interval between sprays. If disease conditions persist, no more than 3.5 days in between half sprays should occur. FRAC Group 7 fungicides include Aprovia, Fontelis, Sercadis, Luna Sensation, Luna Tranquility, Merivon, and Pristine. Use fungicides in FRAC group 3 and 9 (e.g., Inspire Super, Indar) as rotation partners during this period.

**Bitter Rot**

When should bitter rot management begin?

Bitter rot was a problem last season. Our research to date has shown bitter rot spores being available as early as bloom. Consequently, a good fungicide program during bloom will be necessary, especially if conditions are frequently warm and wet. We have also observed the number of leaf wetness hours is also very important for disease establishment. If bitter rot was a problem last season, the best fungicide to use during bloom through petal fall is Merivon (two – three applications, depending on weather conditions). Omega (6.9 fl oz/A) is also another option; this can be rotated with Merivon during this early season period. Tank mix with a rainfast mancozeb.

For commercial fruit growers, please note: When controlling for disease, weather and tree growth conditions need to be monitored at a local level.
within one’s own orchard. Before chemical products are applied, be sure to comply by obtaining the current usage regulations and examining the product label. Product information can be easily obtained from CDMS.

CDMS

Pesticide Labels and MSDS On-Line at:
http://www.cdms.net/

Applied Research Results on Vegetable Crop Disease Management 2018 Season

Some of the applied research results of trials on management of vegetable diseases that were conducted in Maryland and Delaware, are now available online. These results include evaluations of 1) foliar fungicides for gummy stem blight and anthracnose on watermelon, 2) cultivars and foliar fungicides for downy mildew of processing cucumber, 3) impact of cultivar selection on Phytophthora blight on watermelon, and 4) drip vs. foliar application of fungicide for managing Phytophthora blight on watermelon. The compiled research reports are available at:
https://extension.umd.edu/mdvegetables/vegetable-plant-pathology/disease-management
Click on 2018 Season - Applied Research Results on Vegetable Crop Disease Management.

Early Transplanting

By Gordon Johnson
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Early warm season vegetables such as tomatoes and watermelons require protection when transplanted in April. The following are some consideration for these early plantings:

- Plant in your highest elevation fields with the lightest soils first and avoid low areas and frost pockets.
- Start planting only when a warming trend is in the forecast. This is when daytime temperatures are expected to increase during the week and nighttime temperatures do not drop below 40°F. Bed temperatures should be above 60°F. Do not plant on a cooling trend and avoid planting when cold, clear nights and high winds are in the forecast.
- Also avoid planting if extended cold, cloudy weather is in the forecast. It is critical to have warm soil conditions after transplanting to allow roots to grow out into the bed quickly. In cold, cloudy conditions, plants shut down physiologically, little root growth occurs, and the existing roots on the transplant do not function well, thus increasing the risk for transplant stunting or transplant losses.
- Target fields with well advanced (the tallest) rye windbreaks between each row for early plantings. Windbreaks reduce wind injury and desiccation of transplants and also reduce the loss of heat from black plastic mulched beds, thus allowing more heat to be accumulated during the day (to be released at night).
- In areas without windbreaks, consider using floating row covers for cold sensitive crops for the first 2-3 weeks. Use wire hoops supports over the top of plants to avoid mechanical injury. Clear perforated plastic row covers also can be used to increase daytime temperatures and heat the plastic beds. However, clear row covers do not have the same insulating effect of floating row covers. Row covers may be required in addition to windbreaks in the earliest plantings.
- Only use well hardened-off plants for early plantings. Plants should be acclimated to outside conditions for 5 or more days before transplanting.
- With the potential for more severe weather events, wind protection for young vegetable plants should be considered.
- Windbreaks are a very useful tool for producing early vegetables. Most commonly, rye is used because it grows taller than other small grains and elongates in April. Using rye windbreaks requires planning because they are planted the previous fall (September-October).
- Windbreaks can be planted between every vegetable bed, every 2-3 beds, or in drive row areas only. For early protection, every-bed windbreaks are recommended. Most commonly a drill is used and 2-4, 7” drill rows of rye are planted and the other drill
spouts are blocked off to leave the area where the vegetable crop will grow (bed areas) unplanted. As an alternative, the field can be solid planted and areas between windbreaks can be tilled in early spring to terminate the rye in bed areas. Windbreaks can be used in bare ground systems but are most effective when combined with Plasticulture.

Windbreaks serve several functions:

1) Windbreaks block high winds, thus protecting transplants and seedlings from direct wind damage (whipping, tearing, shredding, and breaking stems and leaves).

2) Windbreaks reduce or eliminate “sandblasting” in sandy soils where fine sand particles are picked up by the wind. Sandblasting can severely damage young plants by shredding leaves and cutting stems.

3) Windbreaks reduce transpiration losses in young transplants thus reducing losses to wilting and desiccation.

4) Windbreaks reduce convectiveal heat losses from the soil, thus providing a warmer environment for early growth.

5) Windbreaks can serve as a mulch between plastic beds, reducing soil contact for vining crops such as melons, thus producing cleaner fruit and reducing the potential for soil borne diseases infecting fruits. Rye is the most common crop used for windbreaks because of its early growth and height. Triticale (wheat/rye cross) matures 1-2 weeks later and also can be used as a windbreak. Barley is also early; however, modern varieties are shorter in stature and less effective as a windbreak. Wheat is later still and not as effective as rye for early plantings.

If rye windbreaks have not been fall-planted, then early spring planted mustard crops can be used as windbreaks; however, they are less dense than rye. March planted spring oats is lower growing and much later in stem extension than rye thus limiting its use as a windbreak to late plantings.

If high winds are an issue for late spring and summer plantings or for fall crops then May-June planted sudangrass or sorghum/sudangrass crosses would be recommended as the preferred windbreak.

In no-till or strip till systems using rye cover crops or mixtures with rye, windbreaks can be left in the field by rolling some areas and leaving others unrolled as a windbreak.

Windbreak growth termination is also important. All rye (or other small grain) windbreaks should be killed using a non-selective herbicide before viable seed is produced, otherwise volunteer grain will come up in later crops. This is not a big problem for farms that only produce vegetables, but can be a major issue on farms that rotate with other crops (volunteer rye in a wheat field for grain is a problem).

Another caution on using windbreaks is that they can build up other pests such as mites, and when killed may serve as a reservoir to infest vegetable plantings (a common problem is mites moving out of windbreaks into watermelons). Therefore, fields with windbreaks should be monitored closely for these pests and treated accordingly.

**Other Wind Protection Methods**

Low tunnels with row covers (clear or spun) also are effective at protecting young plants. Covers must be well secured. Covers most often are removed once plants have significant growth.

Another method for protecting seeded vegetable from windblown sand that can cut off new seedlings is interplanting or co-planting with grass family crops such as small grains and ryegrass. These nurse crops are then killed with grass selective herbicides before they become competitive with the vegetable seedlings. (this system is not appropriate for sweet corn). No-till and strip-till plantings into killed cover crops can also serve this purpose.
Sanitation is Important in Transplant Production Houses

By Jerry Brust
Extension IPM Vegetable Specialist
University of Maryland
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With all of the important things that go into transplant production one of the sanitation factors that is somewhat neglected is weed control. Figure 1 shows the outside edge of a high tunnel production house in February.

Figure 1. Chickweed present inside and outside a high tunnel being prepared for transplant production.

The grower was getting ready to drop seed in just a few days after they cleaned up the house from the fall growing season. This particular grower had been having intermittent problems with thrips (and consequently tomato spotted wilt virus) and two spotted spider mites in their production house. The chickweed you see on the outside and more on the inside at the base of the high tunnel was harboring a few thrips and a few mites. All the thrips and mite holdovers from the fall were female and would be ready to feed and lay eggs in the next week. The grower was cleaning up the weeds and debris from last fall five days before they were to start their seedling trays. This is not enough time to eliminate the pest problems that were on the overwintering weeds. Three and probably four weeks would have been much better to greatly reduce the mite and thrips populations.

Not only can chickweed harbor these two major insect and mite pests, but the weed also can act as a host for tomato spotted wilt virus along with other weeds such as Canada thistle, ragweed, redroot pigweed, nightshade, chicory, yellow sweet and white clovers, phlox and many others. This makes it imperative that growers control their weeds weeks, if not months, before they drop seed for their vegetable or flower transplants. This includes controlling the weeds throughout the production period. Often growers become very busy this time of season and neglect managing new weed problems as they arise (Fig. 2). I know we are always asking you to control your weeds in your vegetable fields, which is a difficult thing to do, but it is much more manageable to control weeds in a high tunnel or greenhouse over a period of a few months.

Besides insects and viruses weeds also can harbor fungal and bacterial diseases. One of the worst diseases and one that is becoming much more of a consistent problem in our tomato fields is bacterial spot caused by four species of Xanthomonas (Fig. 3). I think part of the reason bacterial spot has become such a problem is that it establishes itself in the field early in the season. This may be due to several factors such as weeds in the field harboring bacterial spot disease, Xanthomonas strains with copper resistance and by transplants being infected. Transplants can become non symptomatic carriers of bacterial spot. Studies have found that a tray with one seedling that is infected can result in several plants in that tray and surrounding trays having a Xanthomonas spp. bacteria on them but with no infection. It would be impossible to know which plants were carriers and which were not. Bacterial spot is so prolific a disease that one infected seed in 10,000 can start an epidemic in the field. To help reduce any chance of bacterial spot in your transplants, good sanitation practices need to be used in the production area and seeds should be hot-water treated, which will eliminate the bacteria from the surface of the seed and more importantly from within the seed.

Figure 2. Weeds growing alongside transplants.

Figure 3. Bacterial spot on a tomato leaf.
Nutrient Management Plans for Fruit Growers
By Kayla Griffith
Nutrient Management Advisor
University of Maryland
Anne Arundel County

As summer arrives don’t forget to plan for tissue sampling! If your operation has tree fruits, grapes, brambles, or blueberries you won’t want to miss out on the small window of time to take plant tissue samples in preparation for your 2020 nutrient management plan:

<table>
<thead>
<tr>
<th>CROP</th>
<th>SAMPLE TYPE</th>
<th>TIME TO SAMPLE</th>
<th>LOCATION ON PLANT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blueberries</td>
<td>40 leaves</td>
<td>1st week of harvest</td>
<td>Current season’s growth</td>
</tr>
<tr>
<td></td>
<td>(no petals)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Brambles</td>
<td>60 leaves</td>
<td>August 1st – August 20th</td>
<td>Select the most recently fully expanded leaf blade of each</td>
</tr>
<tr>
<td></td>
<td>(no petals)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grapes</td>
<td>Small = 75 petals</td>
<td>Full bloom</td>
<td>Opposite 1st blossom cluster</td>
</tr>
<tr>
<td></td>
<td>Large = 50 petals</td>
<td>70-100 days post-bloom</td>
<td>Across from last fully expanded leaf</td>
</tr>
<tr>
<td>Fruit Trees</td>
<td>50 leaves</td>
<td>July 15th – Sept. 1st</td>
<td>One or two leaves from mid portion of current season’s growth. Select shoots making an upward angle of 45-60 degrees to the ground at eye level from outside of tree.</td>
</tr>
<tr>
<td></td>
<td>(no petals)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Strawberries</td>
<td>At least 50 leaves</td>
<td>Late July or early August</td>
<td>Newly expanded leaves</td>
</tr>
<tr>
<td></td>
<td>(no petals)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

For more information click ‘Sample Collection and Preparation for Perennial Fruit Crops Instruction Card’ at [https://extension.umd.edu/learn/5-tissue-sampling-and-testing](https://extension.umd.edu/learn/5-tissue-sampling-and-testing)

Welcome to the Grapes and Fruit website. Statewide Extension and research programs for viticulture (grape growing), tree & small fruits, and enology (winemaking), are being created and implemented at Western Maryland Research and Education Center by Dr. Joseph A. Fiola, Extension Specialist in Viticulture and Small Fruit. Dr. Fiola works with existing vineyard and winery owners to increase production and improve quality. He is working to expand the industry in Maryland by educating new vineyard owners.

**Pre-Bloom (March–May)**
- Avoiding Injury to Grapes from Off Target Herbicide Exposure (pdf)
- Canopy Management - Shoot Thinning and Positioning (html) (pdf)
- Early-Season Disease Management (html) (pdf)
- Phomopsis (pdf)
- Pre-Bloom to Post-Bloom Disease Management (pdf)
- Managing Frost Damage: Background, Compensation, and Potential Options (pdf)
- Nitrogen Fertilization in the Vineyard (html) (pdf)
- Red Leaves in the Vineyard—Diagnosis and Management (html) (pdf)
- Season Insect Management: Climbing Cutworms (html) (pdf)
- Season Insect Management: Flea Beetles (html) (pdf)
- Using Difenoconazole Fungicides for Effective Disease Management (pdf)

**Bloom (May)**
- Disease Management - Botrytis (html) (pdf)
- Red Leaves in the Vineyard—Diagnosis and Management (html) (pdf)
- Tissue Sampling (html) (pdf)

**Spotted Lanternfly Basics for Hops, Berry, and Vegetable Growers – Webinar Recording**
Recorded February 26, 2019

Tim Weigle, Grape and Hops IPM Specialist, NYS IPM Program
Juliet Carroll, Fruit IPM Coordinator, NYS IPM Program
Ethan Angell, NYS Dept. of Agriculture and Markets

Download presentation slides (PDF)
UMD Food Safety Labs Offering FREE Water Testing
By Carol Allen
Extension Associate in Food Safety
PSLA, University of Maryland

Whether you are GAP certified, wanting to become GAP certified or are anticipating the Food Safety Modernization Act Produce Safety Rule requirements, microbial water testing is a hot topic. The University of Maryland Plant Science Department is offering two different water testing programs this summer. The cost is free. Did I mention the cost? It is nothing to the producer! Does your farm fall into either or both of these two categories?

- The Walsh lab is looking for growers of lettuce and strawberries who might be using surface water (ponds, streams, etc.) for cooling, frost protection, spraying or simply overhead irrigation. Farmers who volunteer would be visited about once per month through the growing season for water sampling. We will be measuring the presence of generic E. coli, an indicator of possible fecal contamination in a body of water. The values will be sent to the farmer (only) and will be correlated to local rain events. I will also be available to go over existing or new GAP or FSMA SOPs and help answer any other questions you might have while I am on the farm.

- The Micallef lab is doing a study comparing the presence of Salmonella and E. coli in pond water. Salmonella has not been well studied and the lab is interested in tracking seasonal and geographic variation as well as the impact from rainfall. The sampling team will visit the pond 3 to 4 times during the growing season. The results will be available to the farmer only and the farm identity is never revealed.

Even though the FDA has held off implementing the rule on water testing, I know a lot of folks are nervous about FSMA microbial water quality procedures and calculations. We will be happy to explain calculating the GM (geometric mean), the STV (statistical threshold), and how the cumulative and yearly averages are to be maintained. We will also demonstrate water sampling technique and can help with writing a water testing SOP specific to an individual farm.

Looking for a Lawyer or Insurance Agent? Here are Two Lists that can Help You Find One Who Understands Farms
By Neith Little
Urban Agriculture Extension Agent
University of Maryland
Baltimore City Office

First, read enough to know what questions to ask. The UMD Agriculture Law Education Initiative is a great place to start learning about legal issues that might affect your farm: http://umaglaw.org/

In particular, I’ve found helpful their articles on farm business structures, labor laws, and liability. The Maryland Insurance Agency also has a helpful guide to farm insurance, including the difference between crop insurance and liability insurance.

But once you know enough to know you need a lawyer or insurance policy, how do you find professional help that has experience with farms? Referrals from another farmer are great, but if you need to widen your search here are two lists that can help.

Lawyers who practice agricultural law:
The Maryland State Bar Association is the professional association for lawyers in Maryland. They keep a list of their members who practice agricultural law.

Insurance companies who work with farms:
The Maryland Insurance Agency is the consumer protection agency that regulates insurance companies in Maryland. As mentioned above, they have some helpful educational articles and guides. They also publish a list of companies who offer farm-related insurance in Maryland.

Please consider helping these labs gather more information about microbial ecology of surface waters. The Micallef study will begin later this spring and the Walsh study has just started. Please contact Carol Allen (callen12@umd.edu, 301-405-4372 for the Walsh lab study and Shirley Micallef (smicall@umd.edu, 301-405-4369) for the Micallef lab study.
AG MARKETING ALERT!

23 Million Available: A Grants Program to Support the Development and Expansion of Local and Regional Food Systems

Eligible applicants include agricultural businesses or cooperatives, producer networks or associations, community supported agriculture networks or associations, food councils, local governments, nonprofit corporations, public benefit corporations, economic development corporations, regional farmers market authorities, and tribal governments. Both FMPP and LFPP require matching funds equal to 25 percent of the total Federal portion of the grant. Additionally, both FMPP and LFPP applicants may use up to $6,500 of the amount requested in their application for upgrades to equipment to improve food safety. In addition to FMLFPP, LAMP encompasses the Regional Food System Partnership grants and the Value-Added Producer Grants (VAPG) Program. LAMP aims to:

- Connect and cultivate regional food economies through public-private partnerships.
- Support the development of business plans, feasibility studies, and strategies for value-added agricultural production and local and regional food system infrastructure.
- Strengthen capacity and regional food system development through community collaboration and expansion of mid-tier value chains.
- Improve income and economic opportunities for producers and food businesses through job creation.
- Simplify the application and the reporting processes for the grants administered under the Program.

For more information about grant eligibility, previously funded projects and upcoming informational webinars, visit the AMS Grants website. -USDA AMS

For more articles concerning marketing, click here.

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The U.S. Department of Agriculture (USDA) has announced $23 million in competitive grant funding to support the development and expansion of local and regional food markets, enterprises and producer-to-consumer marketing.

The Farmers Market and Local Food Promotion Program (FMLFPP), authorized by the 2018 Farm Bill under the Local Agriculture Marketing Program (LAMP), covers both the Farmers Market Promotion Program (FMPP) and Local Food Promotion Program (LFPP). Applications for both FMPP and LFPP must be submitted electronically through www.grants.gov by 11:59 p.m. Eastern Time on June 18, 2019.

FMPP funds projects that develop, coordinate and expand direct producer-to-consumer markets to help increase access to and availability of locally and regionally produced agricultural products. FMPP offers two types of projects: Capacity Building and Community Development Training and Technical Assistance. Both have a three-year performance period. Funding ranges from $50,000 to $500,000.

LFPP funds projects that develop, coordinate and expand local and regional food business enterprises that serve as intermediaries and help increase access to and availability of locally and regionally produced agricultural products. LFPP offers 18-month Planning Grants and 3-year Implementation Grants. Funding ranges from $25,000 to $500,000.

Gardening questions? Pest Problems? The Home and Garden Information Center can help!

Visit the HGIC website at: www.extension.umd.edu.hgic
2019 Empty Pesticide Container Recycling Program & FieldWatch Info

Attached is a copy of our 2019 container recycling schedule. It can also be accessed at the following link:

MDA Implements New Pesticide Sensitive Crop and Beehive Locator

Beekeepers, Specialty Crop Growers, and Pesticide Applicators Encouraged to Sign Up for FieldWatch Registries

The Maryland Department of Agriculture’s Pesticide Regulation Section has announced the implementation of FieldWatch, an online registry that connects beekeepers, specialty crop growers, and pesticide applicators around the state. This registry uses precision mapping tools to help commercial applicators know where beehives and specialty crops are located, thus showing which areas are more sensitive to pesticides.

“We are thrilled to have this new system in place so we can promote better communication between beekeepers, specialty crop growers, and pesticide applicators,” said the department’s Pesticide Regulation Section Program Manager Dennis Howard. “This streamlined system will help create awareness among these groups and improve stewardship in Maryland. Since switching over to FieldWatch early this year, the department has received excellent feedback from registrants on the user-friendly interface and the timeliness of the data.”

The department has maintained a sensitive crop registry for several years. In January of this year, the department entered into an agreement with FieldWatch to start providing registry services. The FieldWatch mapping tools allow users to update their own information in real-time, so pesticide applicators can make the most informed decision before spraying.

FieldWatch offers three free voluntary mapping tools called DriftWatch, BeeCheck, and FieldCheck. All Maryland beekeepers, specialty crop growers, and pesticide applicators are encouraged to sign up.

To register, go to FieldWatch.com and choose the type of account you would like to create. Beekeepers should register for BeeCheck, specialty crop growers should register for DriftWatch, and applicators should register for FieldCheck.

For more information about FieldWatch, read this helpful resource or call the department’s Pesticide Regulation Section at 410-841-5710.

USDA Study Shows Significant Greenhouse Gas Benefits of Ethanol Compared with Gasoline

A new study released by the U.S. Department of Agriculture (USDA) finds greenhouse gas emissions from corn-based ethanol are about 39 percent lower than gasoline. The study also states that when ethanol is refined at natural gas-powered refineries, the greenhouse gas emissions are even lower, around 43 percent below gasoline.

“These new findings provide further evidence that biofuels from America’s heartland reduce greenhouse gases even more than we thought, and that our farmers and ethanol plants continue to become more efficient and effective,” said Secretary Sonny Perdue. “President Trump has made it abundantly clear he is unleashing the full potential of American energy production as we retake our rightful place as the world’s leader. Expanding the sale of E15 year-round will provide consumers with more choices when they fill up at the pump, including environmentally friendly fuel with decreased emissions. I appreciate EPA Administrator Andrew Wheeler moving expeditiously to finalize the E-15 rule before the start of summer driving season.”
Background:
The study, led by Dr. Jan Lewandrowski of USDA’s Office of the Chief Economist, and published in the journal Biofuels, supports findings of other research that ethanol has a significantly better greenhouse gas profile than previously estimated.

The study, titled “The greenhouse gas benefits of corn ethanol—assessing recent evidence,” attributes much of these additional benefits to revised estimates of the impacts of land-use change as a result of demand for ethanol. Where previous estimates anticipated farmers bringing additional land into production as a result of increased corn prices, recent analysis finds only modest increases in crop acreage. Additional improvements at ethanol refineries, combined with on-farm conservation practices that reduce greenhouse gas emissions, such as reduced tillage and cover crops, have further decreased emissions associated with corn ethanol. The study projects that with added improvements in refineries and on farms, a reduction of over 70 percent in lifecycle emissions is possible by 2022.

The study is available for download. More information on the greenhouse gas profile of biofuels is available at https://www.usda.gov/oce/oeep.

Paraquat Certified Applicator Training to Prevent Poisonings Now Available

A new certified applicator training module for paraquat dichloride (also known as paraquat) is now available. The training was developed by paraquat manufacturers as part of EPA’s 2016 risk mitigation requirements and approved by EPA.

Paraquat is one of the most widely used herbicides in the U.S. for the control of weeds in many agricultural and non-agricultural settings and is also used as a defoliant on crops such as cotton prior to harvest. Paraquat is a restricted use pesticide for use only by a certified applicator. The restriction applies to mixing, loading, and applying paraquat, as well as other pesticide handling activities.

Since 2000, 17 deaths have been caused by accidental ingestion of paraquat. Many of these deaths resulted from people illegally transferring the pesticide to beverage containers and the victim later mistaking it for a drink. A single sip can be fatal. In addition to the deaths by accidental ingestion, since 2000, three more deaths and many severe injuries have been caused by the pesticide getting onto the skin or into the eyes of those working with it.

To help prevent these tragedies, certified applicators must now take paraquat-specific training before use, to emphasize that the chemical must not be transferred to or stored in improper containers. The training also covers paraquat toxicity, new label requirements and restrictions, consequences of misuse, and other important information.

The requirement for training is only one of several actions EPA has taken to prevent poisonings, including making label changes, restricting the use of all paraquat products to certified applicators only, and requiring closed-system packaging for all non-bulk (less than 120 gallon) end use product containers of paraquat. View the paraquat:

- **Training module and list of FAQs**,  
- **Summary of mitigation measures**, and  
- **Mitigation decision and other supporting documents** at www.regulations.gov under docket # EPA-HQ-OPP-2011-0855.
1. Why are there additional training requirements to use paraquat?
Since 2000, there have been 17 deaths – three involving children – caused by accidental ingestion of paraquat. These cases have resulted from the pesticide being illegally transferred to beverage containers and later mistaken for a drink and consumed. A single sip can be fatal. In addition to the deaths by accidental ingestion, since 2000 there have been three deaths and many severe injuries caused by the pesticide getting onto the skin or into the eyes of those working with the herbicide. To prevent these tragedies, EPA is requiring this special training for certified applicators who use paraquat. One of the purposes of the paraquat training is to reinforce that paraquat must not be transferred to or stored in improper containers.

2. Who is required to take this training?
Any person who intends to use paraquat must be a certified applicator and is required to take the training. “Use” includes pre-application activities involving mixing and loading the pesticide; applying the pesticide; and other pesticide-related activities, including, but not limited to, transporting or storing opened pesticide containers, cleaning equipment, and disposing of excess pesticides, spray mix, equipment wash waters, pesticide containers, and other paraquat-containing materials.

3. Who is permitted to use paraquat?
The use of paraquat, which is a restricted use pesticide, is restricted to certified pesticide applicators only; noncertified persons working under the supervision of a certified applicator are prohibited from using paraquat, including mixing, loading, applying the pesticide, and other pesticide-related activities.

4. What are the training requirements for paraquat products?
To use paraquat products, you must be a certified applicator. In addition, paraquat-specific training is required by new paraquat labels and must be completed prior to using products with the new labeling. All paraquat labels are expected to include a link to the training by Fall 2019. The training provides important information about paraquat’s toxicity, new label requirements and restrictions, and the consequences of misuse. The training must be retaken every three years. Although this training is a paraquat label requirement, a state may choose to approve it for continuing education. For state-specific requirements, contact your state lead pesticide agency. To find the contact information for your state lead pesticide agency, see the National Pesticide Information Center’s webpage on state pesticide regulatory agencies.

5. How does the paraquat training module differ from the certified applicator training requirements?
Pesticide applicators become certified by proving they are competent to apply or supervise the use of restricted use pesticides (RUPs), generally by examination. Many states approve courses that certified applicators can take to maintain their certification. The examinations and training courses pertain to a category or type of pesticide application (e.g., agricultural plant pest control, seed treatment, structural pest control). Conversely, the paraquat training module emphasizes the importance of handling paraquat safely because of its extreme toxicity. The training highlights product-specific restrictions, including that paraquat products bearing the new labeling can be handled by certified applicators only (i.e., paraquat can no longer be handled by those working under the supervision of a certified applicator). For more information related to the pesticide applicator certification, visit: How to Get Certified as a Pesticide Applicator.

6. One of the label requirements is to maintain a record of the completed training. How will certified applicators show proof that they completed the required training?
Once the certified applicator successfully completes the training, a certificate will be automatically generated. Per the new labeling, applicators are required to retain certificates of training completion. In addition, paraquat registrants have arranged for the National Pesticide Safety Education Center (NPSEC) to retain certification records should the user, state regulators, or enforcement personnel need access.

7. Who is responsible if a certified applicator overlooks a label requirement, even if the paraquat-specific training covered that point?
The intent of the training is to provide the user with the best possible understanding of paraquat product safety issues. Ultimately, it is the user’s responsibility to handle the product in strict accordance with the product labeling.

8. Are state personnel required to conduct the paraquat-specific training?
No, state employees are not required to conduct this training. The training is available online for paraquat users to take at their convenience at: www.usparaquattraining.com.

9. Are states or other entities permitted to develop alternate paraquat training materials?
States or other entities may develop alternate training materials that comply with the 2016 mitigation decision. All paraquat handler training materials must be approved by EPA. For a discussion of the requirements for the training materials, refer to the 2016 Paraquat Dichloride Human Health Mitigation Decision.

The U.S. Department of Agriculture’s (USDA) Under Secretary for Marketing and Regulatory Programs, Greg Ibach, alerts international travelers of a deadly swine disease that they could unknowingly bring back into the United States on their clothes, shoes, or hands.
African swine fever (ASF) is a highly contagious and deadly disease affecting both domestic and feral (wild) pigs. It does not affect human health and cannot be transmitted from pigs to humans. Recent spread of the disease to new countries in Asia and Europe has triggered a series of actions by USDA, State Agriculture Departments, and the pork industry to bolster protections against ASF in the United States and keep ASF out of North America.

“ASF has never been detected in the United States,” said Ibach, “but an outbreak here would not only affect the pork industry, but would have major impacts on trade and raise food prices for consumers. We are asking international travelers to help prevent the spread of ASF to the United States by understanding what products can be brought back into the United States, and declaring any agricultural items in their baggage.” Click here to view Ibach’s video commentary.

The USDA’s Animal Plant and Health Inspection Service’s (APHIS) new traveler website provides updated information about potentially harmful pests and diseases that can hitchhike on food or other agricultural products. When returning to the United States, travelers are reminded to declare food items and animal products in their luggage. Failure to declare items may result in serious penalties.

“USDA and U.S. Customs and Border Protection (CBP) recognize the crucial work of detector dog teams at U.S. ports of entry.” said Ibach, “While travelers’ declarations of any food products brought with them to the United States is a critical step to protecting U.S. agriculture, the dogs and secondary agricultural inspections provide another line of defense to keep ASF out of the country.”

Travelers will also see some changes at airports as USDA works with CBP to increase screenings of passenger baggage. This includes training and adding 60 additional beagle teams for a total of 179 teams working at key U.S. commercial, sea, and air ports and ensuring travelers who pose an ASF risk receive secondary agricultural inspection. USDA is also coordinating with CBP to expand arrival screenings, including checking cargo for illegal pork and pork products.

Anyone who visits a farm in an ASF-affected country should take specific precautions before returning to the United States. Follow the farm’s biosecurity protocols and wear site specific footwear and coveralls or clothing. Thoroughly clean and disinfect or dispose of clothes and footwear worn on the farm before returning, and declare the farm visit to CBP when re-entering the United States. Travelers should not visit farms or any other locations with pigs—including livestock markets, zoos, circuses, and pet stores with pot-bellied pigs for at least 5 days after returning.

More information on ASF, partner resources, and additional resources for travelers are available on the APHIS ASF webpage and in this infographic.

**PERC Announces a NEW Suite of WPS Training Resources in Spanish**

**Printed copies** are available for purchase here, with a portion of proceeds benefiting pesticide safety education programs.

**Cómo Cumplir con la Ley de Protección al Trabajador para Pesticidas Agrícolas, Revisada en 2015**

**Lo que los Propietarios y Empleadores Necesitan Saber**

**How to Comply** with the 2015 Revised Worker Protection Standard for Agricultural Pesticides – What Owners and Employers Need To Know

http://pesticideresources.org/wps/htc/index.es.html

**Guía de Protección Respiratoria** de la Ley de Protección al Trabajador (WPS) Requisitos para Empleadores de Manipuladores de Pesticidas

Worker Protection Standard (WPS) **Respiratory Protection Guide**: Requirements for Employers of Pesticide Handlers

http://pesticideresources.org/wps/hosted/respirators.es.pdf


**Worker Protection Standard Handbook for Agricultural Employers**: This is a 17-page handbook in Spanish for agricultural employers. The small booklet answers frequently-asked questions, serving as a summary of WPS requirements on farms, nurseries, orchards, vineyards, and other agricultural settings http://pesticideresources.org/wps/hosted/wps-agemp-handbook.es.pdf

**Bilingual Dictionary of Terms** – English and Spanish http://pesticideresources.org/wps/dictionary.html

Our **Quick Reference Guide** (2-pages) is also available in English and Spanish, freshly updated.

We also have **Spanish videos, flipcharts, posters, and presentations**.

**Materiales de capacitación en español sobre la seguridad de los pesticidas**

**Spanish-Language Training Materials About Pesticide Safety**

For more information, please contact percsupport@ucdavis.edu.

PERC is led by University of California of Davis Extension and Oregon State University, and is funded by cooperative agreement #XB-83616301 from the U.S. EPA.
Small Fruit Farm Tour & Field Day
Wednesday, May 22, 2019

Following on our successful Ready to Take Root beginner series in 2018, SMADC and University of Maryland Extension are excited to offer a Small Fruit Farm Tour + Field Day workshop covering blueberries, strawberries, and bramble production designed for both beginning and experienced growers.

This is a unique opportunity to get a closer look at berry production and hear from experienced small fruit growers in Southern Maryland and then head over to the Wye Research and Education Center in Queenstown for the Annual Strawberry Twilight Tour!

Itinerary:
11:30 Optional pick up at Loveville Produce Auction followed by Charlotte Hall library
12:15 Bus pick-up at Waldorf Park and Ride (Mattawoman Beantown Road)
12:30 Arrive at Shlagel Farms- tour strawberries, bramble plantings
2:00 Depart Shlagel Farms
2:40 Arrive at Swan's Farm
4:00 Depart for Wye Research and Education Center
5:30 Arrive at Wye, Dinner served
6:00 Wye Strawberry Twilight Tour
7:30 Eat Strawberries and Ice Cream
8:00 Depart Wye
10:00 Arrive at Waldorf Park and Ride

Information and registration at:
Eventbrite: https://2019smallfruittour.eventbrite.com
Facebook: https://www.facebook.com/events/1082262065299423/

2019 Annual Strawberry Twilight
Wednesday, May 22, 2019
6:00PM – 8:00PM
University of Maryland
Wye Research and Education Center
211 Farm Ln, Queenstown, MD 21658

Come and listen to University and USDA Specialist discuss current conditions and issues with Maryland strawberry production, including fungicide resistance, scheduling fungicide sprays using the Strawberry Advisory System (SAS), and weather monitoring systems to aid in spray decisions.

See and taste some of the 15 varieties in our 2018/19 annual plasticulture variety trial, which includes a few of the standard varieties, as well as a few newer available selections. As always, a sweet treat will be served at the conclusion of the program.

Register at:
https://2019strawberrytwilight.eventbrite.com

This program is free, but we ask that you please RSVP for planning purposes. For more program information, contact Mike Newell 410-827-7388, mnewell@umd.edu

See the Attachments!

1) UMD Food Safety Lab Water Testing Program
2) IPM Threshold Guide for Vegetable Crops
3) 2019 Multi-Fruit Spray Guides for Small Fruit and Tree fruit.
4) 2019 Pesticide Container Recycling Program

Vegetable & Fruit News
A timely publication for the commercial vegetable and fruit industry available electronically in 2019 from April through October on the following dates: April 25, May 23, June 13, July 18, August 15, September 19 and October 24 (Special Research & Meeting Edition).

Published by the University of Maryland Extension Focus Teams 1) Agriculture and Food Systems; and 2) Environment and Natural Resources.

Submit Articles to:
Editor,
R. David Myers, Extension Educator
Agriculture and Natural Resources
97 Dairy Lane
Gambrills, MD 21054
410 222-3906
myersrd@umd.edu

Article submission deadlines for 2019 at 4:30 p.m.
On: April 24, May 22, June 12, July 17, August 14, September 18 and October 23 (Special Research Edition).

Note: Registered Trade Mark® Products, Manufacturers, or Companies mentioned within this newsletter are not to be considered as sole endorsements. The information has been provided for educational purposes only.

The University of Maryland Extension programs are open to any person and will not discriminate against anyone because of race, age, sex, color, sexual orientation, physical or mental disability, religion, ancestry, national origin, marital status, genetic information, political affiliation, and gender identity or expression.
What?
This University of Maryland project funded by the Department of Agriculture aims to study *Salmonella* dynamics in pond water to be used in farm risk assessment and decision-making.

How?
The project will evaluate surface irrigation pond water sources in Maryland to determine levels of *E. coli* and *Salmonella* during the growing season. The data will be used to determine how well levels of these two microbes correlate, and reveal *Salmonella* distribution in ponds.

What's new?
Prevalence of *Salmonella* in ponds is not well studied. Variations from pond to pond, or due to seasonally-related factors are not known. The study will determine whether differences in timing of water testing affect water quality profiles. Specifically, the project will compare profiles generated from testing based on the calendar versus testing based on when irrigation is actually necessary i.e. during periods of low precipitation.

When?
Sampling will start in late spring 2019.

How can you help?
If you have an irrigation pond, consider participating in this study. A sampling team from the University of Maryland will come to your farm 3-4 times during the growing season to filter up to 35 L of pond water for bacterial analysis. Your farm identity will never be revealed in our data sharing. We will share your farm data with you only.

More info? Ask Dr. Shirley Micallef, University of Maryland
smicall@umd.edu; 301-405-4369

Mitigating *Salmonella* risk on Maryland farms through knowledge-based practices and farmer education

Get free water testing and help shape future testing requirements

Specialty Crops Block Grant Program

CFS³
DEPARTMENT OF PLANT SCIENCE & LANDSCAPE ARCHITECTURE
IPM Threshold Guide

Vegetable Crops

ECONOMIC THRESHOLD –
Level of pest activity when control action is suggested to prevent economic injury

COLE CROP INSECTS

Plant Emergence (or Transplanting) to Beginning of Heading or Reproductive Development

CABBAGE ROOT MAGGOT
Control when planting

FLEA BEETLES
> 50% of newly emerged plants infested and "shothole injury" is present.
Treatment thresholds for leafy cultivars not available

CABBAGE APHIDS AND OTHER APHID SPECIES
Broccoli and Cauliflower - infestations of all species combined reach nearly 100%
Brussel Sprouts > 15% of plants are aphid infested from transplanting till 3 weeks before harvest
Cabbage 2% of plants are infested with 5 or more aphids on leaves

THRIPS
Fresh market cabbage > 20% of plants infested

IMPORTED CABBAGEWORM, CABBAGE LOOPERS & DIAMONDBACK MOTH CATERPILLARS
Sample 50 plants - treat when count is > 0.5 larval units per plant

Weighting factor for larval unit determination:
Cabbage Looper: large=1.0 small=0.7
Imported Cabbageworm: large=0.07 small=0.1
Diamondback Caterpillar: any size=0.1

Heading or Sprout Development

CABBAGE APHIDS AND OTHER APHID SPECIES
Treat when 2% of plants are infested with > 5 aphids

IMPORTED CABBAGEWORM, CABBAGE LOOPERS & DIAMONDBACK MOTH CATERPILLARS
Cabbage – treat when count is > 0.5 larval units per plant
Broccoli, Cauliflower and Brussel Sprouts – treat when > 1 caterpillar per 25 plants

CUCURBIT INSECTS

Plant Emergence to Three Leaf Stage

SPOTTED AND STRIPED CUCUMBER BEETLES
For wilt susceptible cucumbers and muskmelons – use systemic insecticide treatment at planting time
Provisional threshold for pickling cucumbers – foliar insecticide when 20% of plants are infested with cucumber beetles

Three Leaf Stage to Harvest Maturity

MELON APHID
Provisional threshold > 20% of runners have > 5 aphids on leaves

THRIPS
Heavy infestation, leaf injury, plants not actively growing

SPIDER MITES
> 50% of runners show early leaf injury on crown leaves and live mites present

Three Leaf Stage to Harvest Maturity

SPOTTED AND STRIPED CUCUMBER BEETLES
Cabbage – treat when count is > 0.5 larval units per plant
Broccoli, Cauliflower and Brussel Sprouts – treat when > 1 caterpillar per 25 plants

LEAFHOPPERS
Severe leaf injury expected to retard fruit maturity and affect yield

SQUASH VINE BORER
As soon as moths are trapped

LIMA BEAN INSECTS

Bloom to Harvest

PLANT BUGS (LYGUS) –
Early bloom to harvest > 6-10 adult/nymphs per 20 sweeps
After mature bud set > 20-40 adults/nymphs per 20 sweeps

CORN EARWORM
> 50% of larvae are > 1/2"

Fordhook Lima Beans:
Up to 4 weeks from harvest > 1 larvae per 6' of row
Less than 4 weeks from harvest 3 larvae per 6' of row

Baby Lima Beans:
> 1 larvae per 6' of row, from late flat pod stage to harvest
PEA INSECTS
PEA APHID - 50 aphids per sweep or 5-10 per plant

PEPPER INSECTS
*Early Fruit Set to Harvest*
GREEN PEACH APHID
Before fruit formation > 2 aphids per leaf
Once fruit is present 4 aphids per leaf
PEPPER MAGGOT
As soon as flies are caught on sticky traps
EUROPEAN CORN BORER
When fruits are forming on plants > 25 moths trapped per 5 days, average
Shorten treatment schedules if > 100 moths trapped per 5 days
CORN EARWORM
When fruits are forming on plants, > 100 moths trapped per 5 days (see sweet corn section for MDA Pest Survey website link)

POTATO INSECTS
*Plant Emergence to 12" Shoots*
POTATO FLEA BEETLE
> 20% leaf loss
COLORADO POTATO BEETLE
Overwintered > 5 adults per 10 plant clusters and > 10% shoots chewed off at ground level
All stages
Chemical treatments:
  Defoliation 20% and density per 10 plant clusters > 5 adults or > 40 small larvae or 15 large larvae or combination of any 2 stages, at 1/2 above levels
Bt treatment:
  10% plant infestation, > 30% eggs hatched (trigger date)
Greater Than 12" Shoots to Bloom
GREEN PEACH APHID, POTATO APHID
Prior to bloom - 2 per leaf
During bloom - 4 per leaf
Within 2 weeks of vine kill - 10 per leaf
Greater Than 12" Shoots to Bloom
MELON APHID -
Prior to bloom > 1 per leaf
During bloom > 2 per leaf
Within 2 weeks of vine kill > 5 per leaf
POTATO LEAFHOPPER
> 3 adults per sweep or > 1 nymph per 10 leaves

EUROPEAN CORN BORER
100 moths trapped per 5 days (reduce if host plants unavailable) or 5% of leaves are infested with egg masses
*Bloom to 50% Leaf Yellowing or Vine Kill*
COLORADO POTATO BEETLE
Defoliation > 30% and potential for further damage

SNAP BEAN INSECTS
*Plant Emergence to 3rd Trifoliate Stage*
SEEDCORN MAGGOT
5 to 10 maggots per seed
THRIPS
> 6 per leaflet with leaf injury
SPIDER MITES
> 20 live mites per leaflet
BEAN LEAF BEETLE AND MEXICAN BEAN BEETLE
Pre trifoliate stage 6 or more per row foot
Post-trifoliate stage 20% defoliation, > 2 per plant
Prebloom Stage (3rd Trifoliate to Bud)
POTATO LEAF HOPPER
> 5 adults + nymphs per sweep
MEXICAN BEAN BEETLE
> 20% defoliation
BEAN APHID
50% or more have 5 or more aphids per terminal, distributed throughout
GREEN CLOVERWORM
> 20% defoliation and > 15 larvae < 1" per sweep
*Bloom to Harvest*
LEAFHOPPERS
During podset > 25 per adults/nymphs per sweep
During bloom > 12 adults/nymphs per sweep
MEXICAN BEAN BEETLE
Defoliation > 10% during podding and population present
EUROPEAN CORN BORER
> 25 moths trapped per 5 days
CORN EARWORM
> 100 moths per 5 days

SWEET CORN INSECTS
CUTWORM
1-2 leaf - 10% damaged plants
3-4 leaf - 5% damaged & 4 larvae per 100 plants
WHITE GRUB
Heavy soils - 2 per sq. ft.
Sandy soils - 1 per sq. ft.
WIREWORM
1 per bait station
SLUG
Spike to 3 leaf - 5 per plant
STALKBORER
4%, 6% or 10% damaged at the 2, 3 or 4 leaf stage

ARMYWORM
35% of plants > 50% defoliated & larvae < 3/4”

EUROPEAN CORN BORER
Not irrigated - 80% infested with live larvae
Irrigated - 50% infested with live larvae

CORN ROOTWORM
1 Western or 2 Northern per plant

FLEA BEETLE
For Stewart’s wilt susceptible varieties from spike stage to silking >5% of plants infested

CORN EARWORM
At tassel emergence >15% tassel infestation
From tasseling to harvest - 1st spray at 30% silk and apply subsequent sprays according to 5-day trap catch

TOMATO INSECTS
*Plant Emergence or Transplant to 10'' Plants*

COLORADO POTATO BEETLE
Overwintered CPB:
At plant emergence - adults reducing plant densities below recommended levels for maximum yield
Actively growing > 15 adults per 10 plants

10'' Plants to Early Fruit Set

COLORADO POTATO BEETLE
All stages
Chemical Treatments:
Defoliation 20% throughout and > 20 adults and/or larvae per 10 plants
Bt Treatment:
10% plant infestation with egg masses and > 30% eggs hatched (trigger date)

10'' Plants to Early Fruit Set

POTATO APHID, GREEN PEACH APHID
Natural controls not present and > 20% of terminals are infested

SPIDER MITES
No specific threshold - treat during hot dry weather when damage is noticed due to heavy infestations

HORNWORMS
20% defoliation and further damage potential

Early Fruit Set to Fruit Maturity or Vine Kill

COLORADO POTATO BEETLE
Defoliation potential > 10% or > 2% of plants have at least 1 freshly-injured fruit

TOMATO PINWORM
Active leaf mines > 0.7 per trifoliate leaf

TOMATO FRUITWORM
> 5 damaged fruit in sample of 200 (2.5% damage)

WEEDS OF FIELD CROPS

ANNUAL WEEDS

# per 25 sq. ft. to cause 10% loss:
Cocklebur --------------------------------- 3
Jimsonweed or Velvetleaf ---------------- 3
Pigweed, Lambsquarters
or Morningglory ----------------------- 5
Annual grasses -------------------------- 20

PERENNIAL WEEDS
% of field infested:
Light <5%  Heavy <30%
Moderate <10%  Severe >30%

NOXIOUS WEEDS -- no threshold, eliminate all

IPM DEFINITIONS

Economic Injury Level - EIL
“The lowest pest population density that will cause economic damage. At the EIL the Cost of Control equals the Benefit of Control.”

Economic Threshold (Action or Treatment Threshold) - ET
“The density of a pest at which control measures should be implemented to prevent an increasing pest population from reaching the EIL - ET is generally 80% of the EIL.”

\[
\text{EIL} = \frac{\text{Pest Density (P)}}{\text{ET}} \\
\text{P} = \frac{\text{C}}{\text{V X D}} \\
\text{C} = \text{Cost of Control} \\
\text{V} = \text{Value of Crop} \\
\text{D} = \text{Damage} \\
\]

Note: At EIL Benefit = Cost; B=C

Compiled R. D. Myers 2000; Updated 2018
Compilation and layout assistance by Carol Jelich, Master Gardener, Anne Arundel County
This reference was adapted from the University of Maryland and Delaware Cooperative Extension Field Crop and Vegetable IPM Pest Management Manuals
Reviewed by Galen Dively, Terrance Patton, and Sandra Sardenelli
The University of Maryland Cooperative Extension's programs are open to all regardless of race, color, religion, age, national origin, sex, or disability.
Spray Program for Multi-Tree Fruit Orchards

Many local orchards are composed of multi-fruit combinations producing for fresh market apples, peaches, pears, plums, nectarines, and cherries.Aggressive fruit tree spray programs are required to achieve high quality fruit. These multi-fruit orchards create many spray management challenges for the achievement of good pest control in accordance to labeled guidelines. Therefore, the following multi-fruit orchard spray program for the control of major tree fruit pests and diseases may offer some assistance: **Labeled as noted in 2019 for All Tree Fruit – Pomes: Apples & Pears Stones: Peaches, Plums, Nectarines, and Cherries.**

### Fungicides: [FRAC] *RATE* NOTES

<table>
<thead>
<tr>
<th>Product</th>
<th>Rate</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Captan® 80WDG [M4]</td>
<td>3-5.0 lbs</td>
<td>General Protectant (Not Labeled for Pears; Reduce Rates for Cherries)</td>
</tr>
<tr>
<td>Dormant Oil [NC]</td>
<td>4.0 gal</td>
<td>Apply Temp 35-85°F</td>
</tr>
<tr>
<td>Kocide® DF [M1]</td>
<td>6.0 lbs</td>
<td>Other Fixed Coppers (Stones: Dormant Spray Only)</td>
</tr>
<tr>
<td><strong>Rally</strong> 40W [3]</td>
<td>4.0 ozs</td>
<td>Powdery Mildew</td>
</tr>
<tr>
<td><strong>Sulfur 95W [M2]</strong></td>
<td>3.0 lbs</td>
<td>General Protectant</td>
</tr>
<tr>
<td><strong>Gem</strong> 500 SC [11]</td>
<td>3.0 ozs</td>
<td>Brown Rot &amp; Peach Scab (Stones Only)</td>
</tr>
<tr>
<td><strong>Adamant</strong> 50WG [3/11]</td>
<td>6.0 ozs</td>
<td>Brown Rot, Peach Scab &amp; Powdery Mildew (Stones Except Plums)</td>
</tr>
<tr>
<td><strong>Pristine</strong> 7/11</td>
<td>14.5 ozs</td>
<td>Brown Rot, Powdery Mildew (Limited to 4 Sprays/Season with Only 2 Consecutively)</td>
</tr>
<tr>
<td>Indar® 2F [3]</td>
<td>6.0 ozs</td>
<td>Powdery Mildew &amp; Rusts (With Only 2 Consecutively)</td>
</tr>
<tr>
<td><strong>Topsin-M® 70W [1]</strong></td>
<td>8.0 ozs</td>
<td>General Protectant</td>
</tr>
<tr>
<td><strong>Ziram 76DF [M3]</strong></td>
<td>5.0 lbs</td>
<td>Dormant Peach Leaf Curl (Captan Substitute for Pears)</td>
</tr>
<tr>
<td><strong>Agrimycin® 17 W</strong></td>
<td>24.0 ozs</td>
<td>Fireblight Control (Apples &amp; Pears Only)</td>
</tr>
<tr>
<td><strong>Ph-D WDG [19]</strong></td>
<td>6.2 ozs</td>
<td>Powdery Mildew &amp; Scab (Not labeled for stones)</td>
</tr>
</tbody>
</table>

### Insecticides: [IRAC] *RATE* NOTES

<table>
<thead>
<tr>
<th>Product</th>
<th>Rate</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Imidan® 70W [1A]</strong></td>
<td>2.0 lbs</td>
<td>Curculio, SWD, Scale &amp; Fruit Moths</td>
</tr>
<tr>
<td><strong>Warrior</strong> [3]</td>
<td>4.0 ozs</td>
<td>Borers, Curculio, SWD, BSMB or Tombstone [3]</td>
</tr>
<tr>
<td><strong>Actara</strong> [4A]</td>
<td>4.5 ozs</td>
<td>Aphids &amp; Curculio</td>
</tr>
<tr>
<td><strong>Lorsban® Advanced [18]</strong></td>
<td>1.5 qts</td>
<td>Dormant &amp; Trunk Borer</td>
</tr>
<tr>
<td><strong>Acratome® 50WS [25]</strong></td>
<td>1.0 lbs</td>
<td>Mites Only as Required</td>
</tr>
<tr>
<td><strong>Sevin® 50W [1A]</strong></td>
<td>4.0 lbs</td>
<td>SWD, Japanese Beetles, Hornets &amp; Sap Beetles (Apple Thinning Agent)</td>
</tr>
</tbody>
</table>

*Rate for 50-100gal Acre Concentrate Spray
**Be sure to follow all labels closely for PHI and REI!

### Multi-Fruit Spray Calendar*

#### March 15 - Dormant Spray
- Dormant Oil 4.0 gal (Scales & Mites)
- Kocide® DF 6.0 lbs
- Lorsban® 4E 1.5 qts (Mites)

#### April 5 - Peach Bloom
- Apple Tight Cluster
- Captain® 80WDG 3.0 lbs

#### April 15 - Peach Petal Fall
- Apple Bloom
- Captain® 50W 3.0 lbs
- Indar® 2F 6.0 ozs
- Agrimycin® 17 W 14.0 ozs (Fireblight Control Add for Apples & Pears Only)

#### April 25 - Peach Shuck Split
- Apple Petal Fall
- Pristine® 14.5 ozs
- Warrior® 4.0 ozs (Curculio)
- Agrimycin® 17 W 24.0 ozs (Fireblight Control Add for Apples & Pears Only)

#### May 5 - 1st Cover Spray
- Captain® 80WDG 4.0 lbs (Cedar Apple Rust - Higher Rates for Wetter Conditions)
- Indar® 2F 6.0 ozs (Powdery Mildew & Rusts)
- Actara® 4.5 ozs (Curculio & Aphids; PHI: 35-Days Pomes, 14-Days Stones)

#### May 15 - 2nd Cover Spray
- Captain® 80WDG 3-4.0 lbs
- Rally® 40W 4.0 ozs (Peach Rusty Spot Only)
- Warrior® 4.0 ozs (Curculio; PHI 21-Days Pomes, 14-Days Stones)

### Organic Approach Substitutions:

#### Conventional Product
- Captain® & Toppin-M®
- Devrinol® 50 DF [15]
- Princep® 4L [5]
- Solicum® [12]
- Goal® or Galigan® [14]
- Chateau® [14]
- Matrix® [2]
- Prowl® [3] or Surfani® [3]
- Poast® [1]

#### Organic Certified Product (OMRI)
- Surround® or Sulfur or Lime Sulfur
- Kaligreen® (Powdery Mildew Eradicant)
- Neem® or Pyganic® or Entrust® (Stone Fruits Only)
- Agrimycin®
- Avenger® or Burnout® or AXE®/BioSafe® or (Scythe® no OMRI label)

*Important Note: The calendar spray dates given are an average estimate for Anne Arundel and Prince George’s County Orchards, and may vary by location in Southern Maryland. Be sure to adjust your spray schedule application dates accordingly. The above recommendations very closely reflect the current spray program utilized at the University of Maryland Research and Education Center, Upper Marlboro Facility for its research orchards. Remember to always *Read the Label*
Spray Program for Multi-Small Fruit Plantings

Many local farms are composed of multi-small fruit combinations producing for fresh market blackberries, raspberries, blueberries, strawberries and grapes. Aggressive fruit spray programs are required to achieve high quality fruit. These multi-small fruit plantations create many spray management challenges for the achievement of good pest control in accordance to label guidelines. Therefore, the following multi-small fruit spray program for the control of major small fruit pests and diseases may offer some assistance:

Labeled as noted in 2019 for All Small Fruit – Strawberries, Brambles: Blackberries, Raspberries, Blueberries, and Grapes.

**FUNGICIDES: [FRAC]  **RATE **NOTES**
- Lime Sulfur [M2] 10.0 gals Dormant Fall Sanitizer
- JMS® Stylet Oil [NC] 1.0 gal Apply Temp 35-85°F
- Kocide® DF [M1] 2.0 lbs Other Fixed COPpers
- Captain® 50W [M4] 2.0 lbs General Protectant
- Ziram® 76DF [M3] 5.0 lbs General Protectant
- Sulfur 95W [M2] 3.0 lbs General Protectant
- Rally® 40W [3] 4.0 ozs Powdery Mildew & Black Rot
- Pristine® [7/11] 14.5 ozs Fruit Rot, Spot, Powdery & Downy Mildew & Cane Blight
- Elevate® 50WG [17] 1.5 lbs Botrytis & Powdery Mildew
- Switch® 62.5W [9/12] 11.0 ozs Anthracnose, Mummy Berry, Phomopsis, Sour Rot & Botrytis
- Phostrol® [33] 4.0 pts Botrytis & D. Red Stelle
- Ph-D® WDG [19] 6.2 ozs Botrytis & Powdery Mildew
- (Strawberries and grapes only)
- Provado® Admire® [4A] 4.0 ozs SWD, Grubs, Aphids, Hoppers, Curculio & Whitefly
- Brigade® WSB [3] 12.0 ozs BMSD, SWD, Clipper Beetle, Plant Bug, Mites & Root Weevil
- Malathion [18] 2.0pts SWD, Scale, Fruit Moths & Whitefly
- Sevin® 50W [1A] 4.0 lbs SWD, Japanese Beetles, Hornets & Sap Beets

*Rate for 50-100 gAcre Concentrate Spray

** Be sure to follow all labels closely for PHI and REI!

** Multi-Small Fruit Spray Calendar**

<table>
<thead>
<tr>
<th>Month</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>March 5</td>
<td>Spring Dormant Spray: JMS® Stylet Oil 1.0 gal (Scales &amp; Mites)</td>
</tr>
<tr>
<td>April 10</td>
<td>Early Strawberry Bloom: Captain® 50W 2.0 lbs (0-3 Day PHI &amp; 2-Day REI) Thiram® 75W DG 5.0 lbs (Strawberry Only)</td>
</tr>
<tr>
<td>April 15</td>
<td>Strawberry Bloom/ Blueberry Early Bloom: Captain® 50W 2.0 lbs (0-3 Day PHI &amp; 2-Day REI) Ziram 76DF 5.0 lbs (Except Strawberry) Brigade® WSB 12.0 ozs (Clipper Beetle, 0-3-Day PHI)</td>
</tr>
<tr>
<td>April 25</td>
<td>Strawberry Full Bloom/ Blueberry Mid-Bloom/ Grape Bud Break: Captain® 50W 2.0 lbs (0-3 Day PHI &amp; 2-Day REI) Pristine® 14.5 ozs Brigade® WSB 12.0 ozs (Clipper Beetle, 0-3-Day PHI)</td>
</tr>
<tr>
<td>May 5</td>
<td>Strawberry 1st Cover &amp; Early Harvest Spray/ Blueberry Full Bloom/ Grape &amp; Bramble Shoot Growth: Captain® 50W 2.0 lbs (0-3 Day PHI &amp; 2-Day REI) Elevate® 1.5 lbs (0-Day PHI) Provado® 4.5 ozs (Curculio &amp; Aphids; 7-Day PHI)</td>
</tr>
<tr>
<td>May 15</td>
<td>Strawberry 2nd Cover &amp; Harvest Spray/ Blueberry 1st Cover/ Grape Bloom Spray: Captain® 50W 2.0 lbs (0-3 Day PHI &amp; 2-Day REI) Pristine® 14.5 ozs (0-Day PHI) Malathion® 2.0 pts (Curculio, Scale &amp; Fruit Moths; 0-3 Day PHI)</td>
</tr>
<tr>
<td>June 1</td>
<td>Strawberry 3rd Cover &amp; Harvest Spray/ Blueberry 2nd Cover/ Grape 1st Cover/ Bramble Bloom: Captain® 50W 2.0 lbs (0-3 Day PHI &amp; 2-Day REI) Pristine® 14.5 ozs (0-Day PHI) Malathion® 2.0 pts (Curculio, Scale &amp; Fruit Moths; 0-3 Day PHI)</td>
</tr>
</tbody>
</table>

**HERBICIDES: [HRAC]  **RATE **NOTES**

<table>
<thead>
<tr>
<th>Herbicide</th>
<th>Rate</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gramoxone® [22]</td>
<td>1.0 qts</td>
<td>Burndown, Directed Spray</td>
</tr>
<tr>
<td>Roundup® [9]</td>
<td>1.0 qts</td>
<td>Burndown, Shielded &amp; Directed Spray</td>
</tr>
<tr>
<td>Devrinol® 50 DF [15]</td>
<td>4.0 lbs</td>
<td>Spring/Summer 35-Day PHI</td>
</tr>
<tr>
<td>Princep® 4L [5]</td>
<td>1.0 qts</td>
<td>Spring Dormant, Avoid High pH Soils</td>
</tr>
<tr>
<td>Solica® [12]</td>
<td>2.5 lbs</td>
<td>Spring/Fall Dormant, 1-yr Established</td>
</tr>
<tr>
<td>Aim® [14] or Shark® [14]</td>
<td>2.0 ozs</td>
<td>Directed Spray to Weeds, 3-day PHI</td>
</tr>
<tr>
<td>Venue® [14] (Grapes only)</td>
<td>2.0 ozs</td>
<td>Directed Spray, 0-day PHI</td>
</tr>
<tr>
<td>Chateau® [14] (Except Brambles)</td>
<td>12.0 ozs</td>
<td>After Harvest to Spring Bud Swell</td>
</tr>
<tr>
<td>Surfan® [3]</td>
<td>2.0 qts</td>
<td>Spring, Summer, Prowl 60-day PHI</td>
</tr>
<tr>
<td>Poast® [1]</td>
<td>1.5 pts</td>
<td>Summer Grasses, Variable PHI</td>
</tr>
<tr>
<td>Sinbar® [5]</td>
<td>4.0 ozs</td>
<td>Fall Dormant, 1-yr Established</td>
</tr>
</tbody>
</table>

*Lowest Use Rate Recommended Initially

** Organic Approach Substitutions: **

<table>
<thead>
<tr>
<th>Conventional Product</th>
<th>Organic Certified Product (OMRI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Captain®</td>
<td>Surround® or Sulfur or Lime Sulfur</td>
</tr>
<tr>
<td>Rally®</td>
<td>Kaligreen® (Powdery Mildew Eradicant)</td>
</tr>
<tr>
<td>List Insecticides</td>
<td>Neem® or Pyganic® or Entrust® or Dipel®</td>
</tr>
<tr>
<td>Gramoxone® or Roundup®</td>
<td>Avenger® or Burnout® or AXXE®/BioSafe® or (Scythe® no OMRI label)</td>
</tr>
</tbody>
</table>

* Important Note: The calendar spray dates given are an average estimate for Anne Arundel and Prince George’s County small fruit production, and may vary by location in Southern Maryland. Be sure to adjust your spray schedule application dates accordingly. The above recommendations closely reflect the current spray program utilized at the University of Maryland Research and Education Center, Upper Marlboro Facility for its research fruit plots. Remember to always “Read the Label”.

R. David Myers
Principal Agent, Agriculture
myersrd@umd.edu
The Maryland Department of Agriculture (MDA) is offering the empty plastic pesticide container recycling program in 2019. Maryland’s pesticide container recycling program is a combined effort of state, county, and federal agencies and private industry working together to protect the environment. Rinsing and recycling empty pesticide containers will help to reduce the potential for contamination of ground water and the Chesapeake Bay while saving valuable landfill space.

A schedule of collection sites and dates is enclosed. **Triple-rinsed** (or equivalent), clean, plastic, *pesticide* containers will be collected on the scheduled days and times at these sites. Containers acceptable for recycling will be chipped and transported by the contractor, under contract with the Ag Container Recycling Council (ACRC), for processing at an approved recycling facility.

To ensure a successful program, each individual container will be inspected by MDA personnel and only **triple-rinsed** (or equivalent), clean, *pesticide* containers will be accepted. Any container that is not clean will be returned to the owner, who will be responsible for disposing of the container in a legal manner.

Additional information on the rinsing of empty pesticide containers and recycling program can be obtained from the following MDA publications: *Rinsing & Recycling Empty Pesticide Containers*, and *Pesticide Information Sheet No.7 - Pesticide Container Recycling Program*. For further information, contact the Maryland Department of Agriculture, Pesticide Regulation Section at 410-841-5710 or visit our website at www.mda.maryland.gov.
MARYLAND DEPARTMENT OF AGRICULTURE’S  
2019 PESTICIDE CONTAINER RECYCLING COLLECTION DATES

**EASTERN SHORE**

<table>
<thead>
<tr>
<th>LOCATION</th>
<th>DATES</th>
<th>TIME</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kent County - Chestertown</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nicholson</td>
<td>June 14</td>
<td>9:00 - 3:00</td>
</tr>
<tr>
<td>Transfer</td>
<td>July 12</td>
<td>9:00 - 3:00</td>
</tr>
<tr>
<td>Facility on</td>
<td>August 9</td>
<td>9:00 - 3:00</td>
</tr>
<tr>
<td>Earl Nicholson Road</td>
<td>September 13</td>
<td>9:00 - 3:00</td>
</tr>
<tr>
<td><strong>Talbot County - Easton</strong>*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MidShore Regional Solid</td>
<td>June 21</td>
<td>8:00 - 12:00</td>
</tr>
<tr>
<td>Waste Facility on Barker's</td>
<td>July 19</td>
<td>8:00 - 12:00</td>
</tr>
<tr>
<td>Landing Road</td>
<td>August 16</td>
<td>8:00 - 12:00</td>
</tr>
<tr>
<td></td>
<td>September 20</td>
<td>8:00 - 12:00</td>
</tr>
<tr>
<td><strong>Wicomico County - Salisbury</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Newland</td>
<td>June 28</td>
<td>9:00 - 3:00</td>
</tr>
<tr>
<td>Park Landfill</td>
<td>July 26</td>
<td>9:00 - 3:00</td>
</tr>
<tr>
<td>on Brick Kil</td>
<td>August 23</td>
<td>9:00 - 3:00</td>
</tr>
<tr>
<td>Road</td>
<td>September 27</td>
<td>9:00 - 3:00</td>
</tr>
</tbody>
</table>

*Note - Because of legal restraints, only residents from Caroline, Kent, Queen Anne’s and Talbot counties are able to use the collection site in Easton. Lower Shore residents must use the collection site in Salisbury.*

**CENTRAL MARYLAND**

<table>
<thead>
<tr>
<th>LOCATION</th>
<th>DATES</th>
<th>TIME</th>
</tr>
</thead>
<tbody>
<tr>
<td>Harford County - Street</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Scarboro</td>
<td>June 7</td>
<td>9:00 - 3:00</td>
</tr>
<tr>
<td>Landfill, 3241 Scarboro Road</td>
<td>July 5</td>
<td>9:00 - 3:00</td>
</tr>
<tr>
<td><strong>Harford County - White Hall</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The Mill of Black Horse</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4551 Norrisville Road</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Facility will be accepting clean, empty containers from June 1 through September 30, during normal business hours. Containers will be collected from their current customers, only. Call 410-329-6010 or 410-692-2200 for hours of operation and drop-off instructions.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**WESTERN MARYLAND**

<table>
<thead>
<tr>
<th>LOCATION</th>
<th>DATES</th>
<th>TIME</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frederick County - Frederick **</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Frederick</td>
<td>June 18</td>
<td>9:00 - 3:00</td>
</tr>
<tr>
<td>County</td>
<td>July 23</td>
<td>9:00 - 3:00</td>
</tr>
<tr>
<td>Landfill, 9031 Reich’s Ford Road</td>
<td>August 20</td>
<td>9:00 - 3:00</td>
</tr>
<tr>
<td><strong>Washington County - Hagerstown</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Martin’s</td>
<td>June 4</td>
<td>9:00 - 3:00</td>
</tr>
<tr>
<td>Elevator</td>
<td>July 9</td>
<td>9:00 - 3:00</td>
</tr>
<tr>
<td>13219 Mau-gansville Road</td>
<td>August 6</td>
<td>9:00 - 3:00</td>
</tr>
<tr>
<td><strong>Montgomery County - Gaithersburg</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>M-NCPCC</td>
<td>June 11</td>
<td>9:00 - 3:00</td>
</tr>
<tr>
<td>8301 Turkey</td>
<td>July 16</td>
<td>9:00 - 3:00</td>
</tr>
<tr>
<td>Thicket Drive</td>
<td>August 13</td>
<td>9:00 - 3:00</td>
</tr>
<tr>
<td></td>
<td>September 10</td>
<td>9:00 - 3:00</td>
</tr>
</tbody>
</table>

*Note - Frederick County has agreed to allow residents from outside Frederick County to submit empty pesticide containers for recycling, but NO TRASH from outside of the county will be accepted at the landfill under any terms.*

**INSPECTION CHECKLIST**

- All containers must be made from high density polyethylene (HDPE).
- The container must have held an EPA-registered pesticide or adjuvant, crop oil, etc.
- Pesticide containers must be properly rinsed (pressure-rinsed or triple-rinsed).
- Caps and other non-HDPE parts, such as rubber linings and foil seals cannot be recycled.
- Stained containers are acceptable provided no material can be smeared or removed when touched by a rubber glove.
- Please remove lids and label booklets prior to recycling.
- Any container up to 55 gallons will be accepted, if requirements above are met. All containers 30 gallons and over must be cut prior to recycling. IBC’s will also be accepted (contact MDA for instructions).
- For any container over 55 gallons (except IBC’s), contact MDA prior to recycling.