Partridge Pea: Your Local Community Buffet for Natural Enemies in Organic Corn
By Lauren G. Hunt and Cerruti R.R. Hooks
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In last year’s issue of Special Research & Program Edition of Vegetable & Fruit Headline News, in the article “Using Flowering Plants to Help Parasitic Wasps Attack Stink Bug Eggs”, we introduced our current project investigating partridge pea as an insectary plant and trap crop. In case you missed it, here’s a RECAP: Agricultural fields with only one type of plant (monoculture) generate favorable conditions for pest outbreaks. Once an insect pest locates its host plant within a field and colonizes the crop, it settles in to enjoy the feast and raise a family. However, this field may not be a favorable habitat for the pest’s natural enemies. Under such conditions, applying synthetic pesticides may only further exacerbate the problem. By eliminating natural enemies, secondary pest outbreaks or stronger pest resurgences may follow. Growers can use crop rotation and other ecologically based practices to help prevent pest outbreaks, but the more tools available, the better equipped growers are to manage unwanted pests.

Here’s where partridge peas come in!
Last season, we proposed that the presence of alternative vegetation in the form of insectary plants might increase the number of natural enemies in nearby cropping systems. In our study system, stink bugs and European corn borers (ECB) are key economic pests.

We want to make sure that their natural enemies (parasitic wasps) live long, produce many offspring and are in prime striking distance of stink bug and ECB eggs. First, we need to make sure they are properly fed. Parasitic wasps’ favorite food is... you guessed it! Nectar! Partridge pea plants produce a plethora of nectar from extrafloral nectaries at the base of their petioles. If partridge pea is planted alongside cornfields as shown above, we can provide these parasitic wasps their favorite food in close proximity to their insect hosts. To summarize, we hypothesize that planting a nectar source (partridge pea) next to corn will attract parasitic wasps that will subsequently suppress stink bug and ECB populations. How far will these wasps travel from the nectar source? Our data from this season and our future trials will hopefully provide answers to this question. We plan to continue evaluating collected data and further investigate our hypothesis and questions over the next season.
Although we targeted these two notorious pests, if you have other insect pests, planting a stand of partridge pea around your cash crop could still be a good idea. A multitude of beneficial insects use plant nectar as a food source. Thus, maintaining insectary plants nearby your fields can enrich the community of beneficial arthropods within. In addition to aiding parasitoids, insectary plants can provide a habitat for generalist predators, as well as shelter and sustain alternative prey for predators such as spiders, ladybugs and mantids. Additionally, partridge pea is known to attract pollinators. From casual observations during the study, we were able to verify that various species of bees, flies, and wasps also visit partridge pea.

For six weeks during the growing season, data on insect pests, predators, and other arthropods found within the corn and partridge pea were collected by visual counts, sticky card traps, and vacuum samples at research plots in Keedysville, Maryland. We also searched each corn plant to locate, identify, and tag egg masses of stink bugs and European corn borers. By doing so, we could monitor and quantify rates of egg parasitism. At the end of the season, we harvested, weighed and rated corn ears to identify and quantify pest damage and estimate yield.

Partridge pea plants established and grew well over the summer months indicating their suitability to western MD growing conditions. Initial results suggest that corn plots bordered by partridge pea had higher rates of stink bug egg parasitism compared with monoculture corn plots. However, further data analysis is needed to substantiate these findings. Stink bugs have been shown to colonize partridge pea; for this reason, we will investigate the potential of partridge pea to serve as an insectary plant and function as a stink bug trap concurrently. Next summer, studies will be conducted at field sites in central and western MD.

Be sure to follow the Vegetable & Fruit Headline News for updates and come see us next season at the various research farm field days in your area to hear more about our research activities. We hope to see you there!

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Cover Cropping Termination Timing and Method in No-Till Soybeans and How it Impacts Insects, Weed Pests and Soil Moisture

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Cover cropping helps protect our bay and its tributaries, and locks in nutrients that producers worked hard to incorporate into their soils. Further, cover cropping may help farmers by reducing future input cost which in turn increases their bottom line. To encourage farmers to plant cover crops, the Maryland Agricultural Water Quality Cost-Share or MACS program will put money into their pocket to plant cover crops during the off season. They even get a $10-$20 an acre planting bonus for planting a cover crop before October 1.

But once you have your cover crop in the ground, what should you do to get the best plant health and yield, and lowest number of insect pests in subsequent crops? Everyone will have their own method and some will swear by it. We called or emailed local extension agents to determine which methods MD no-till soybean growers were using to terminate their cover crops and then tested some of these methods using barley as the cover crop. We learned that many farmers burned down (spray with an herbicide) their cover crop in April which we abbreviated EK for early kill. Others would kill off their cover crop on or closer to the soybean planting date (May), which we abbreviated LK for late kill. However, we were interested in what would happen if cover crops are flail mowed as opposed to killed with a post-emergent herbicide and we named this method FM for short. Our final interest was to test what would happen if one chose not to plant a cover crop and simply planted their soybean in fallow fields which was called the bare-ground (BG) method. Thus, we tested these four cover crop termination methods in field experiments conducted during the 2013 and 2014 growing seasons.

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These techniques were replicated and tested on a small scale using field plots planted at the Central Maryland Research and Education Center in Upper Marlboro and Beltsville, MD. The soybean was planted at 7 and 30 inch row spacing in Upper Marlboro and Beltsville, respectively. We counted and recorded the number and species name of weeds in each treatment plot and noted whether they were grasses or broadleaves. The percentage of ground area cover by weeds, cover crop or corn residue was measured. Beneficial insects and other arthropods in each treatment plot were censORED with a sweep net. After locking many exhausted student interns in the laboratory to sort and identify insects for months, we noted a few interesting findings. Yield did not vary much between treatments according to the 2013 study but we still have yet to analyze the data from the 2014 growing season. Other 2013 findings indicate that weeds can go through a “terrestrial algal bloom” (get out of hand) in EK treatment plots. Even with a rescue herbicide treatment, higher weed counts and coverage was found in EK vs BG, FM and LK plots. LK plots were relatively clean of weeds and only had a low number of weeds to establish prior to soybean canopy closure. FM treatment plots had lower number of weeds than EK but had problems mainly with grass weeds although still relatively lower than the weeds in EK.
These thick barley residues persisted from May to August in LK and FM plots and may have been the mechanism for treatment differences.

In terms of insects, the 2013 results suggest that the high level of weeds in EK contributed to higher populations of plant sucking insects compared to other treatment plots. These included plant hoppers, treehoppers and other sucking insects whose mouth parts are essentially a needle-like probe that they insert into plants during feeding. The parasitic wasp *Telenomus podisi* was found in higher numbers in FM and EK plots than in the LK treatment. However, spiders were more numerous in LK than in EK plots for the 2013 growing season.

So what does this mean for you? Like many other studies, this data reinforces the idea that agricultural practices contrary to the belief of some is more than spraying but there should be a production strategy in place. Data obtained from these field studies clearly suggests that a cover crop burn down in May has some advantages over burning it down in April especially with respect to weed suppression. But do benefits associated with burning down your cover crop late outweigh the possible soil moisture loss? In the 2013 growing season, we saw a trend of soils being drier in the EK and BG treatments compared to the high residue LK and FM treatments. If potential soil moisture loss is a real concern then you may think terminating the cover crop in April is best. However, according to our yield data, there was no difference in yield between EK and LK treatment plots. Further, what if we told you that soil moisture levels may be higher in soybean fields where the cover crop is terminated late. This is because if cover crops are terminated late and thus allowed to build up more biomass, the high residue left on the soil surface may contain moisture longer after a rain compared to those soil surfaces with no or little cover crop residue remaining. Thus, the decision to terminate a cover crop in April should not be solely based on the fear that if it is terminated later, it will suck all the moisture out of the soil resulting in lower soybean yield.

This project was jointly funded by the generous contributions of the Maryland Soybean Board and USDA NIFA EIPM grant: (2013-41534-21512)
Vegetable growers who want to reduce their chemical inputs and field disturbance may turn to cover crops to help manage crop pests and improve soil quality. Winter cover crops are seeded in the fall and killed off in the spring prior to planting the main crop. There are several advantages to using winter cover crops as living plants or as surface mulch. Cover crops compete with weeds for space and resources and prevent weed seed germination. Some types of cover crops fix nitrogen, increasing available soil nutrients for the main crop and reducing the need for fertilizer application. Cover crops also give structure above and below the soil, reducing soil erosion and providing shelter or food sources for natural enemies of arthropod pests and for weed seed predators.

The type of cover crop used can have a big influence on potential benefits. Legumes are a popular cover because they can produce large amounts of aboveground biomass, creating a dense habitat for beneficial arthropods and suppressing weed growth, while at the same time fixing nitrogen in the soil. Grasses can provide a dense cover, but their higher carbon content means the plants break down more slowly, providing longer-lasting surface mulch after the cover crop is killed off. Growing cover crop mixtures, like legumes and grasses together, may provide complementary benefits beyond what each type of cover can provide alone. In a four-year research project, we addressed how cover crops grown in monocultures or as a mixture influenced soil fertility and health, weed germination and growth, abundance of beneficial and pest arthropods, and crop yield. We grew organic vegetable crops planted into one of four treatments: no cover crop (bare ground, BG), barley (*Hordeum vulgare*, B), crimson clover (*Trifolium incarnatum*, CC), or a barley and crimson clover mixture (B + CC). Winter cover crops were seeded each fall at approximately 25 lbs/acre (CC), 100 lbs/acre (B), and 60 + 40 lbs/acre (B + CC). All plots were flail mowed and then strip tilled 4 weeks prior to planting the main crop. Early tilling can allow weed seeds to germinate; killing weed seedlings with herbicide or a second till before planting can reduce weed pressure (stale seedbed technique). Crookneck squash were direct-seeded into the tilled strips at 4’ plant spacing, 3’ row spacing. Each treatment was replicated four times, in 36’ x 39’ plots, at the Central Maryland Research and Education Center in Upper Marlboro, MD.
Cover crop treatments remained the same through all four years of the study. In 2011 and 2012 the main crops were organic broccoli-snap bean double crop. In 2013 and 2014, the main crop was organic crookneck squash. We collected and analyzed soil samples for nutrients, nematodes, and microbes. We measured beneficial and pest arthropods by recording plant damage and arthropod numbers on crop plants, and by sampling ground-dwelling arthropods with pitfall traps. We assessed weed abundance by counting and identifying individual weeds, and collected weed samples to measure biomass. To assess amount of weed seeds present in the soil, we collected soil from each of the plots, placed the soil in plastic flats within the greenhouse and allowed seeds to germinate. Weed seedlings that germinated were counted and identified. For an economic assessment of weed suppression, we recorded time spent weeding each plot. We measured crop quality through plant size measurements, plant tissue nutrient analysis, and crop yield.
Here we report preliminary results based on the 2013 season. Aboveground cover crop biomass was highest in the cover crop mixture (B + CC), but both crimson clover and barley grown alone produced enough biomass to reduce weed biomass relative to the no-cover crop treatment. Soil nitrate levels were highest in treatment plots containing crimson clover, and aboveground plant material in the barley plots had the greatest carbon content.

Initial conditions of the cover crop treatments prior to planting the main crop show high biomass in mixture plots and more soil nitrate in plots with crimson clover.

Weed surveys showed that weed presence was greatest in bare ground plots throughout the growing season, but cover crop type had no effect on the number of weed seeds present in the soil. Treatments also influenced weeding effort. It took longer to hand weed bare ground plots than any other treatments. None of the treatments influenced abundances of the most common insect pests (squash bugs (*Anasa tristis*) and cucumber beetles (*Diabrotica undecimpunctata*) and (*Acalymma vittatum*)) found on squash plants. Squash plants were largest in the cover crop mixture plots, and yield was highest in plots containing crimson clover.
Results from the 2013 season show that cover crops were effective for weed suppression. Greater aboveground biomass especially in the cover crop mixture led to fewer weeds and reduced weeding effort. Plots with crimson clover in particular had the highest soil nitrate levels, the largest plants, and the greatest yield. In this study season, cover crops did not influence beneficial or pest arthropod abundances. Further analysis of all four years of this study will give a more complete picture of which cover crops can be most effectively used to influence crop pests and soil quality.

Acknowledgements:
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Economic Optimization of Cover Crops and Sterile Seedbed Techniques for Eggplant Production

By P. L. Coffey¹, G. Chen², and C. R. R. Hooks³

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Winter cover crops are planted in the fall and terminated in the spring, leaving residues in the field until they break down. Cover crops are versatile tools for farmers because the remaining residue may have a variety of effects on soil health and quality, arthropod and weed abundance, and crop quality, fertility, and ultimately performance. We have started a three year project to investigate the effects of winter cover crops and stale seed bed techniques on soil quality, insect and weed communities, and crop production in eggplant fields, and to conduct an economic analysis comparing their effectiveness and cost.

Previous work by our group has shown that eggplant yields poorly when planted in no-till fields. Thus, experimental fields were strip tilled prior to planting the eggplant. Strip tillage provides a narrow tilled area for crop growth while leaving most of the surface undisturbed. We compared crimson clover (23 lbs/acre) and a rye-crimson clover mix (65 and 13 lbs/acre) to a no-cover crop control treatment. Each treatment was replicated four times and arranged in a randomized block design at the University of Maryland Research and Education Center, Upper Marlboro Facility (CMREC).

Cover crops were terminated with a flail mower and the field was tilled in 10" wide strips with 4' spacing between tilled strips. Weeds grew in the strips for three weeks and then we killed them (the stale seed bed technique) either by "shallow tilling" with a garden tiller, or with Avenger herbicide. We transplanted eggplant seedlings (Solanum melongena 'Nubia') at 3' intrarow spacing into the weed-free strips the following day. We recorded labor and cost associated with the three whole plot (cover crop) treatments and two sub-plot (stale seedbed technique) treatments for economic comparison.

The Colorado potato beetle, Leptinotarsa decemlineata (CPB) and the flea beetle complex, Alticina, can cause severe defoliation resulting in yield loss, and at high densities can kill plants. Cover crop residue can slow pest movement into a field, and support more predators than bare-ground soil surfaces. We recorded eggplant defoliation, numbers of CPB egg masses, larvae, and adults, and numbers of adult flea beetles weekly. To estimate treatment effects on CPB egg predation, we deployed sentinel (field collected) CPB egg masses on three occasions and then monitored their fate.
Primary predators of the CPB are the two-spotted stink bug (*Perillus bioculatus* – pictured), and the spined soldier bug (*Podisus maculiventris*). We counted egg masses, nymphs, and adults of these species, and monitored their egg masses for parasitism and predation. Any potentially parasitized eggs we collected and reared in the laboratory to identify any parasitoid wasps that emerged.

One of the biggest concerns of organic vegetable farmers is weed control. Using organic herbicides and manually removing weeds can be costly. To assess weed suppression and estimate labor cost associated with weed management among treatments, we measured weed density and biomass, and time needed for weed removal. To measure weed density, we estimated ground area covered by weeds, live cover crops or residue, and bare soil. We also counted, identified, and dried each weed encountered during sampling events to obtain biomass. To measure the effect of cover crop on weeding effort and compare the two stale seedbed techniques, we recorded the time to hand weed between each row. In addition, we measured the time to weed in each row in order to compare the benefits of each stale seedbed technique.

We measured eggplant growth weekly by recording plant height, canopy width, and leaf size and number. Once harvesting was initiated, we recorded yield by weight and number of fruits harvested. We sorted fruits by marketability, and recorded damaged fruits as either physiologically damaged or damaged by insects. Harvesting lasted for two months, after which we collected four eggplant plants from each subplot to measure final plant biomass. Samples and data collected during this study are currently being processed and some of the results will be presented at the next Upper Marlboro Twilight Tour event in August of 2015.

As part of the economic assessment, an ag-economist (Stephan Tubene) will help us compare the profitability associated with adopting each treatment. Production expense including seed, chemicals, and labor (e.g., planting and weeding time) costs, and data on marketable yield will be used as part of the cost analysis. This assessment along with weed and insect data will allow us to make better recommendations to growers on how to optimize winter cover crop use for maximum benefit.

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Heat-Tolerant Romaine Lettuce Varieties for Summer Production
By Anna Wallis, Elizabeth Prinkey, Mike Newell, and Chris Walsh
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Lettuce is a currently a top vegetable crop in the U.S. However, it is a cool weather crop with an upper temperature limit of ~80°F. Therefore over 90% of U.S. production is grown in the consistently mild climates of CA and AZ. Producing lettuce locally in the Mid-Atlantic region during the hot summer conditions may be possible using heat-tolerant cultivars and cultivation techniques. Local production has the potential to provide local growers with novel summer crop and increase sustainability through the reduction of food miles.

We evaluated five cultivars of heat-tolerant romaine (Cos) lettuce in 2013 and 2014 across three growing times: spring, summer, and fall. Seed was germinated in the University of Maryland greenhouses in College Park and transplanted to the Wye Research and Education Center in Queenstown, MD. Performance of the cultivars was evaluated on yield and quality, including a taste test at the USDA facility in Beltsville, MD compared to commercially available varieties purchased from a local supermarket. Lettuce was grown following recommendations in the 2014 Maryland Commercial Vegetable Growers Guide.

Preliminary data indicates that several of the cultivars may be suitable for growing in the hot summer conditions of the Mid-Atlantic. In both seasons, Dov was consistently less affected by the summer conditions and is most suggested for summer planting. Solid King tended to yield the highest during all planting times as compared to other cultivars, but all cultivars produced smaller heads in the summer planting. Cultivars Solid King, Sunbelt, and Stryker are moderately suggested for summer planting in the Mid-Atlantic area. Green Forest was most affected by the summer conditions and is not suggested for summer planting in the Mid-Atlantic. It had a higher tendency to bolt and tasted more bitter to a sensory evaluation panel. It showed a lower tendency to bolt and was preferred by sensory panelists for its flavor and its appearance.

Future work will include evaluation of cultivation techniques that may improve performance of these cultivars in summer conditions. Germination conditions, direct seeding, and plastic mulch color have all been observed to have some influence on heat tolerance. A combination of these factors will be tested in the 2015 growing season.
How Plant Available Nitrogen Is Affected By Cover Crops and Tillage Systems?
By Guihua Chen and Cerruti R² Hooks
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Introduction
To maintain and improve the sustainability of agricultural production systems, the goal of nutrient management is to achieve maximum nutrient uptake while minimizing nutrient losses from the soil and harm to the environment. Nitrogen (N) is usually the most difficult nutrient to manage in organic vegetable systems. Prior to plant uptake, N fertilizer in organic form has to be converted to an inorganic form (ammonium and nitrate), a process called N mineralization. Nitrogen mineralization rates are affected by soil temperature and moisture and the accessibility and nature of organic N sources. These conditions are important factors that helps determine plant N availability.

In areas with mild climate such as Maryland, most vegetable producers grow cover crops during the off season to prevent soil erosion, catch post-harvest residual N, and improve soil fertility. Though legume cover crops which add atmospheric N₂ to the soil are more often used by growers, research has discovered that a mixture of legume and non-legume species usually accumulates greater biomass and total N at time of cover crop termination. This is because grasses (non-legume species) usually grow more vigorously at the outset and thus compete better with weeds. Grasses also take up leftover N in the soil, which helps reduce N from leaching to the groundwater and enhance N fixation by the legume. However, because the rate of N availability from cover crops is affected by the carbon to nitrogen (C:N) ratio of the cover crop residue, balancing cover crop C:N composition is very important when managing plant N availability.

Tillage is commonly used by vegetable growers to control weeds, make beds and incorporate residue and fertilizers. Tillage usually speeds up mineralization rate of organic N because it changes soil physical conditions (moisture, temperature and aeration) and makes organic fertilizers more accessible to soil microbes. If the period of crop N demand matches the time when high mineral N is released into the soil, this will improve plant N availability. Therefore, management of cover crop and tillage for N fertilizer is important yet challenging.

Field Trials
Field experiments were conducted at the University of Maryland Research and Education Center in Upper Marlboro, MD from fall 2011 to fall 2013 to study effects of different tillage practices and cover crop mixture on N mineralization rate. A mixture of forage radish (FR, *Raphanus sativus*) and crimson clover (CC, *Trifolium incarnatum* L.) cover crops were no-till drilled at seeding rates of 4 and 11 lbs/A, respectively on September 19, 2011. Volunteer rye (*Secale cereal*) was also present in the field. On September 5, 2012, a mixture of three cover crop species was planted at seeding rates of 4, 11, and 60 lbs/A for FR, CC and rye, respectively.

The four tillage treatments were conventional tillage without surface mulch [bare-ground (BG)], conventional tillage with black plastic mulch (BP), strip-till (ST) and no-till (NT). Forage radish was frost killed in January and the remaining cover crop mixture was flail-mowed in early May in BG and BP treatment plots, one week prior to tillage (rototill in 2012 and chisel-
plow in 2013), and in mid-May in NT and ST plots both years. Surface disk was performed in BG and BP plots and black plastic was laid in BP plots one week after tillage and just prior to planting (sweet corn) or transplanting (eggplant) the crop. Plots consisted of 12 rows with 3 ft between rows in the BG, NT and ST plots, and six rows (double row) with 6 ft between rows in the BP plots. This allowed a similar number of plants to exist in all treatment plots.

In 2012, eggplant (Solanum melongena) seedlings were transplanted on May 24 at 16″ plant spacing; and in 2013, sweet corn (Zea mays, cv. Luscious) was direct seeded at 9″ plant spacing on May 20 and reseeded on June 11 and 19 because of geese and other problems impacting stand establishment. Target fertilization rate was 120 N lb/A for both crops. With an expectation that cover crops provided about 45 N lb/A each year, organic fertilizers (chicken manure -3:2:3, feather meal-7:2:2, or blood meal-12:0:0) were applied to provide 75 N lb/A. Fertilizers were applied at 40 N lb/A at pre-planting and 35 N lb/A as side-dress in BG, NT and ST plots, and at 75 N lb/A at pre-planting in BP plots. Pre-plant fertilizer applications were incorporated in BG, BP and ST plots. All fertilizers were applied by hand along crop rows. The BG and BP plots were cultivated and ST and NT plots hand weeded on June 7 and 19, 2012, respectively to manage weeds. In 2013, hand-weeding was done in all plots on June 20 and July 15. Surface drip irrigation was used to mitigate periods of low precipitation.

**Cover Crop Biomass Composition and C:N Ratio**

<table>
<thead>
<tr>
<th>Cover crop components</th>
<th>2011-2012</th>
<th>2012-2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dec. 05</td>
<td>Apr. 30</td>
<td>Nov. 26</td>
</tr>
<tr>
<td>% crimson clover (CC)</td>
<td>17.9</td>
<td>80.7</td>
</tr>
<tr>
<td>% forage radish (FR)</td>
<td>50.0</td>
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<tr>
<td>% rye</td>
<td>25.8</td>
<td>19.3</td>
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<tr>
<td>Total DM (Mg ha⁻¹)</td>
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<tr>
<td>Total N (lb/A)</td>
<td>-</td>
<td>50.8</td>
</tr>
<tr>
<td>C/N ratio</td>
<td>-</td>
<td>21.4</td>
</tr>
</tbody>
</table>

Table 1 presents dry matter components (% biomass) of the cover crop mixture (CC+ Rye+ FR) in late fall and at cover crop termination and the C:N ratio of total cover crops at termination. The total dry matter at termination did not differ in 2012 and 2013. Total N fixed was slightly higher in 2012 than 2013 (51 vs. 44 lb/A). However, the composition of dry matter for legume and non-legume species was quite different. Dry matter of crimson clover was about 4 times as much as rye dry matter in 2012 (81 vs. 19%) but about 40% less than rye dry matter in 2013 (40 vs. 59%). This led to greater C:N of the total cover crop residue in 2013, which impacts N mineralization rate because when the C:N ratio is high, more N will be immobilized (tied up) by the soil microbes rather than converted to mineral N.

**Soil Temperature and Moisture Conditions**

Figure 1 represents soil temperature and water potential at 4-6″ depth in plant rows in 2013. Soil temperature was highest in BP plots and lowest in NT and ST plots during most of the growing season. This might be due to the cover crop residue that remained on the soil surface kept the soil cooler.

Soils were slightly moister in BP than other treatment plots during the early growing season and soils in all plots were moist from May to July because of great precipitation. Soils were slightly drier in BP than other treatment plots in early and mid-July when no irrigation was applied.
Soil Mineral Nitrogen Content and Plant N Uptake

Figure 2 represents total mineral N content at 0-6” depth within the plant row areas (one foot wide) during 2012 and 2013 crop growing seasons. Mineral N content was greatest in BP plots and lowest in NT plots. The greater mineral N content in BP plots was probably due to warmer soil temperature, greater initial fertilizer input, and the presence of the plastic mulch that reduced N loss during rainfall events. Lower mineral N content in NT plots was attributed to lower soil temperature and no fertilizer incorporation. Regardless of tillage treatments, the overall lower N mineralization rate in 2013 than in 2012 was associated with higher C:N ratio in the cover crop biomass of 2013.

Data of eggplant and sweet corn growth indicated that plants grew rapidly during early to late June in 2012 and from early June to early July in 2013. Thus, greater N mineralization rate occurred simultaneously with higher crop N demand in 2012 but too early to match crop N demand in 2013. Though soil mineral N content differed among the four treatments, symptoms of plant N deficiency were not observed in NT plots, and plant leaf chlorophyll content, an indicator of plant N levels, were similar in all treatment plots during both years.

Where Did the Excessive Mineral N Go – Lost or Stored?

Results from mineral N content indicated that more organic N was converted to the mineral forms in BP than other treatment plots in both years. Because crops in each treatment plot did not display N deficiency, this suggests that there was excessive mineral N in BP treatment plots. There are three possible paths for the excessive mineral N: (1) loss to the atmosphere through denitrification, a process of nitrate reduction (performed by anaerobic bacteria) that may ultimately produce nitrogen gas (N\(_2\)) through a series of intermediate gaseous nitrogen oxide products (among which nitrous oxide (N\(_2\)O) is a major greenhouse gas), (2) loss to the watershed through leaching and/or erosion, (3) stored in the soil until it is taken up by winter cover crops or immobilized by soil microbes (called immobilization, a reverse process of mineralization). In both years, we observed that N\(_2\)O – N emission during the growing season was in the order of BP > BG > ST > NT. While in the off season (winter cover crop growth season), N\(_2\)O – N emission was much lower than in the summer and less different among treatments. It suggests that conventional tillage, especially with black plastic mulch, creates a favorable soil condition (warmer and moister) for rapid N mineralization which also favors denitrification. This results in rapid depletion of soil fertility and adversely impacts the environment through increased greenhouse gas emissions and water pollution. Therefore, conservational tillage such as strip tillage and no-till can be alternative options that improve soil fertility and productivity and are less harmful to the environment. Using grass and legume cover crop mixture at the optimal seeding rates can help retain soil residual N, improve growth of legume species, and maintain a healthy soil.

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Grafting Heirloom Tomatoes for Increased Yield and Quality

By Jerry Brust, IPM Vegetable Specialist
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Tomatoes are grafted by joining the top of one plant (the scion) to the root system of another (the rootstock). The subsequent plant is more vigorous and productive. Several studies have been done over the last 10 years that show the benefits of using grafting for soil disease control in tomato production, but there is not much research that examines the influence of rootstocks when there is no disease in a tomato high tunnel production system. In general, grafting has been shown to enhance yield and improve crop tolerance. We looked at what would be the benefit, if any, of grafting an heirloom tomato variety, Cherokee Purple, (fig. 1) onto a more vigorous rootstock (Maxifort) in a high tunnel production system. The data from this first year of study are still being worked on so this will act as a general summary as to what was done and what was found.

Methods:
Grafting treatments consisted of three combinations: a scion/rootstock graft, a non-grafted control, and a self-grafted control (the scion and root stock were from different plants but the same variety (Cherokee Purple) to test for any ‘grafting effects’. Six weeks after grafting, all grafted and non-grafted plants were transplanted into the HT on March 15th. Black plastic mulch and drip irrigation were used. There were six rows that were 40ft long. Each row (plot) was divided into 20 ft sections, 10 tomatoes spaced 2 ft apart per plot. There were 4 replications.

Leaf tissue samples were taken at first flower bud and every two weeks throughout the study. Fruit harvests were conducted two-three times per week and sorted into marketable and non-marketable components. Non-marketable fruit categories consisted of: yellow shoulders, uneven ripening, cat-facing, blossom end rot, fruit cracking and ‘other’. Fruit number and weight were recorded.

Results:
Overall grafted plants (mean of 18.3 lbs/plant) had significantly greater yields of marketable fruit compared with non-grafted (14.5 lbs/plant) and self-grafted plants (13.8 lbs/plant). Grafted plants had on average 18% greater leaf tissue nutrient concentrations for N and P. The all-important nutrient K was 23% greater in grafted plants vs. self-grafted and non-grafted plants. Grafted plants had 25% greater overall yields, with ~30% greater marketable fruit yield compared with the non-grafted and self-grafted plants. Early, middle and later harvests were all about equal among the grafted and non-grafted plants, although there was a trend for grafted plants to have lower early yields compared with non-grafted plants. It does look possible, at least from this 1st year of study to increase yields and quality in heirloom tomatoes just by grafting the heirloom plant onto more vigorous root stock. But more data from different sites and in multiple years will be needed before we can say it is consistently cost-effective to graft heirloom plants in the absence of any disease problems.

Fig. 1 An example of a Cherokee Purple tomato (found at: http://www.tsflowers.com/seeds2/tomato_cherokee_purple_tomato_seeds.html
Evaluating Microbial Water Quality in Vegetable Operations in Maryland

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Introduction
Microbial water quality is a major component of on-farm food safety and the proposed federal Food Safety Modernization Act (FSMA). Water is used in almost every phase of vegetable production, from transplanting, irrigation, chemical applications, and postharvest washing. Since water is a known carrier of pathogenic microbes, varying uses of water can carry different food safety risks. Under FSMA, the proposed regulations will require farmers to periodically test their water sources for *Escherichia coli*, an indicator of fecal contamination. Historically the levels of *E. coli* and total coliforms in surface water sources (such as ponds and springs) tend to be higher and more variable than well sources, as surface water is subject to environmental variables and contamination. In this study we monitored chemical and physical factors (pH, turbidity, electrical conductivity, and nitrates) in addition to the biological factors (total coliforms and *E. coli*) because these can influence bacterial growth.

This study was conducted to develop baseline information by analyzing the water quality of major water sources used in Maryland vegetable operations. The information gathered in this project will help evaluate the impact of proposed food safety regulations on agricultural water sources, determine the appropriate timing of water sample collection, and will be used to train growers how to interpret water tests.

Methodology
Five geographic regions in Maryland (Western, Central West, Central East, Southern, and Eastern Shore) were identified as sampling regions, each with one University of Maryland Extension (UME) collaborator. Each UME collaborator identified fruit and/or vegetable farms with diverse agricultural water sources to sample. In total, 28 water sources (12 ponds, 3 springs, 1 spring cistern, and 12 wells) were sampled monthly during 2013 and 30 water sources (12 ponds, 3 springs, 1 spring cistern and 14 wells) were sampled in 2014. Samples were taken from April through September. Each sample was sent to the Pennsylvania State University Agricultural Analytical Services Laboratory (AASL) and was tested for *E. coli*, total coliforms, pH, turbidity, electrical conductivity (in 2013) and nitrates (in 2014). The Colilert Quanti-tray system was used to enumerate total coliform and *E. coli* counts.

Since bacterial counts show high variability, the total coliform and *E. coli* count data were log transformed to obtain a normal distribution and more easily compare differences in population numbers. A constant of 0.1 was added to all bacterial counts, in order to log transform the zero counts.

Results and Conclusions
In both 2013 and 2014, the highest *E. coli* counts were found in the warmer summer months: June, July, and August. In 2014, *E. coli* counts remained high through September (Figures 1 and 2). Surface sources had the greatest amount of variability in bacterial counts (*E. coli* and total coliforms). In 2013, water source and month had a significant impact on *E. coli* counts (p<0.001) – statistics are still being tabulated for 2014 results to determine yearly trends.

The proposed FSMA regulations recommend that water samples used for irrigation fall under 126 MPN (colonies) of *E. coli* per 100mL sample, which equates to 2.1 log *E. coli* (MPN/100mL). When comparing the 2013 and 2014 results from each source to the recommendation for irrigation water, 50% (6/12) of the ponds and 8.3% (1/12) of the wells exceeded the 126 MPN *E. coli*/100mL recommendation during at least one point in the season. In 2013, 75% (3/4) of the springs exceeded the recommendation for irrigation water, and in 2014, 50% (2/4) of the springs exceeded the recommendation. These data show that although bacterial counts are variable in water sources, growers may need to consider mitigating their irrigation water quality during at least one point in the growing season.

These data are being distributed to the individual collaborating farmers, to be used for personal use. With our findings, we are developing factsheets and recommendations for Maryland growers on interpreting their water tests and methods for mitigating water sources with high *E. coli* counts. These anonymous findings will also be communicated at regional grower meetings, and will be added into Cornell University’s national agricultural water database.
Our monitoring efforts began in early June and I attempted to cover as many types of soft fruit as I could, so I selected 2 orchards with the most crop diversity I could logistically handle. Traps were deployed and monitored on a weekly basis until the fruit was gone, and a fruit sample of each crop was taken at peak harvest time. This year we used the new Trece lure plus apple cider vinegar (ACV) and with it we caught more SWD than the usual assortment of fruit flies and we caught African Fruit Flies (AFF) in Aug for the first time, rather than the end of September. AFF has not proven to be a pest because of its short ovipositor and we now think they don’t overwinter in our area, but fly in from the South each season. The reason is that they are mostly tropical in range and can’t tolerate the cold winters. As for SWD, it appears that the females are the colonizers since we see more of them in new crops than males, as we would pick up females first as the crop ripened, and then more males later, and mostly males when the crop was done. These samples were taken to the fruit lab in Biglerville where any larva in the fruit were given a chance to develop and were then identified and counted.
The good news from 2011, 12, 13 and 14 was that it appeared well managed crops like tart cherries, sweet cherries, strawberries (both plasticulture and matted row) and black raspberries made it through with little to no damage in Central and Western Maryland. Having said that, I would like to address the term “well managed.” In plantings that were not harvested in a timely fashion or received little or no insecticide applications, problems have arisen. Another important point here is to be sure there is positive identification of this pest. In all of the early cases where SWD was first detected it could be associated with a management issue. Although SWD was identified in the samples, there were significant numbers of other types of fruit flies that were found in the fruit when the larva were reared in a laboratory.

Now as for blackberries, later blueberry varieties and primocane bearing raspberries, even well managed plantings, began to run into trouble, particularly as the season progressed. What was not expected in 2014 was that the numbers in MD grapes were very high. This was my first year monitoring grapes and I feel grape growers will need to keep an eye on SWD in the future. Our first trap detection was June 14th in 2012 and June 21st in 2013 and July 1st in 2014 in Central Maryland, and there were already larva in the fruit in blackberries. The traps are a tool that help, but in the end I found myself simply breaking up a lot of fruit and looking closely for the larva in the fruit if I really wanted to know what was going on in a planting. Populations generally increased all summer and into the fall with what appeared to be drops during extended very hot periods.

The take home message is that SWD is going to pose a serious challenge to small fruit producers but is not the end of the world. The intensity of management in small fruit will certainly increase in order to produce fruit without “worms”. It appears to be critical from my personal experiences and those shared with me from other states that this pest must be addressed early and not allowed to get a good foothold in your planting. Through trapping, scouting, timely harvest, sanitation and consistent insecticide applications that provide thorough coverage, including the lower part of the plant once the infestations are identified, production and quality can be maintained. In the long run, hopefully sooner than later, research will identify beneficials and predators that will create a more natural balance with this pest that will help reduce pesticide application. However, for now it is important to remember to be on the lookout in small fruit as soon as fruit begins to show color because it appears this is a pest that is more readily held to acceptable levels if caught early. If it becomes very established in a planting, control can become almost impossible.

Thorough coverage with both pressure and water volume is critical; a seven day schedule seemed to work best. Below are some products that have efficacy against SWD. Please read and understand the label on all the products and make sure they fit for your crop and your harvest schedule. This is not an all-inclusive listing; please check the label before applying. To avoid resistance, consider using the same product twice in a row then switching to a different material in a different group and using that twice in a row and following that pattern to avoid resistance development.

**Good, shorter residual-about 3 days:**
Delegate 25WG- Caneberries, Blueberries, Cherries
Malathion 8F- Caneberries, Cherries, Blueberries
Pyganic EC- Blueberries, Caneberries, Cherries

**Good, use for rotations 3-7 days:**
Entrust SC- Blueberries, Caneberries, Cherries
Sevin- Blueberries, Caneberries, Cherries
Assail- Blueberries, Cherries, Caneberries

**Good, longer residuals 7-14 days depending on conditions:**
Danitol- Blueberries, Cherries, Caneberries
Mustang Max- Caneberries, Cherries
Bifenture- Caneberries,
Imidan 70WP- Blueberries, Cherries
Lannate 90SP- Blueberries

*Exira*- New blueberry product for 2014

*Be sure to read the label and make sure the crop is on the label and be aware of REI and PHI, as well as other limits on the label as far as number of applications and amounts allowed on a crop per season.*

*These scouting efforts were made possible substantially partly through funding by the Maryland State Horticulture Society (MSHS). MSHS provided the bulk of the money required to cover the travel needed to these sites each week and to take samples for positive identification to the Penn State Fruit Lab in Biglerville, Pa.*
High-Density Orchard Systems for Maryland: Field-Testing Advanced Selections
From the Geneva Apple Rootstock Breeding Program
Bryan Butler, University of Maryland Extension
Anna Wallis, Christopher S. Walsh, Emily Snyder, and Tim von Thun
Department of Plant Science and Landscape Architecture,
University of Maryland-College Park
Julia Harshman, Washington State University
Douglas Price, Maryland Agricultural Experiment Station
Gennaro Fazio, USDA-ARS, Cornell-Geneva

This planting is part of the first evaluation of the G-202 rootstock on a large scale. This study serves to examine and compare the growth habits of apple trees on tissue culture (TC) and stool bed G-202, as well as G-935 and G-41. The plot is split with half of the trees having Cripps Pink for a scion and the other half having Brookfield Gala for the scion. Growers/nurseries buy liners directly out of TC for peaches and cherries but not for apples. By observing the growth rate and structure, overall size and yield, we want to begin to determine if the TC process is detrimental to apple production or cultural practices in the orchard. Much of the work that has been done with these rootstocks and the Tall Spindle system has been done in other parts of the country. Maryland growers have had to extrapolate from that information; given the variation in climates, we are not certain how closely recommendations from states like New York or Michigan can be followed here. We plan to: evaluate High Density systems for western/central MD; collect data on new dwarfing disease tolerant rootstocks; help to determine the appropriateness of this High Density system for hot humid conditions of the mid-Atlantic region; and gain a better understanding of the growth habit of TC trees in comparison to those produced in traditional stool beds.

Data has been collected on height, trunk diameter, survivability, fruit quality (which includes color, soluble solids, firmness, and starch), fruit size, yield per tree, and tree efficiency (fresh weight of fruit/cross sectional area) for four seasons. To this point as we finish the 5th leaf on this planting there has been very little difference between the trees. The 202TC trees certainly broke out of the blocks fast and initially made a larger more robust tree in comparison to stool bed 202 trees but, over the last two years, it is difficult to see a great difference between any of the trees and statistically there are no differences between the treatments.

As far as survivability, we have lost a number of trees. All tree losses were due to breaking at the graft union. Most of the losses were early on but G-935 continues to break and has been the rootstock that has lost the most trees.

Although this will be the final season for collection of all the data, the planting will remain and be managed so further observations can be made regarding this rootstock and the planting will be expanded in 2015 to include G-214, G-11, G-22, Bud 9, M-9, and G-42, planted at both 6’x12’ and 3’x12’ on our four wire 9’ trellis system.
Characteristics of G-935
Vigor intermediate between M-9 and M-26
Very cold hardy
Resistant to Fire Blight and Crown Rot
Tolerant to Replant Disease Complex
Susceptible to Wooly Apple Aphid

Characteristics of G-41
M-9 vigor
Highly yield efficient
Highly productive (most U.S. trials yields 100-125% of M-9 check)
Very precocious
Very cold hardy
Does well in warmer climates
Immune to Fire Blight and Crown Rot and Wooly Apple Aphid
Replant tolerant

Characteristics of G-202
It is similar in size to M-26
Precocious, productive
It is resistant to woolly apple aphid, fire blight, and crown rot
In New Zealand it has been a top performer
Good choice for weak growing cultivars like Honeycrisp
Tolerance to apple replant disease
Moderate rooting in stool bed.
Geneva® 202 was released in May of 2002 in New Zealand and in the USA in 2004.

Trellis Budget for ½ acre planting

<table>
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<th>Quantity</th>
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I was very excited this season to have actually accomplished renovation pruning. Below you can see it does really work and we are now finishing our fifth leaf and will begin doing a lot more of this type of pruning as we work on our Maryland Modified Tall Spindle System.
I have continued my work with Surround® and “soft insecticides” for the 2014 season on apple and peaches. Although that data is not in yet, I wanted to share some of the information as we go into the final weeks of the 2014 season. BMSB pressure appears to have been relatively light this season with the big migration to homes occurring the third and fourth weeks of September in Central Maryland. Even though we are almost out of the woods, it is important that you stay vigilant even if you haven't had damage to this point. It is possible for BMSB to move in late and do a lot of damage on your late season fruit.

Following the 2010 growing season with its devastating losses in peaches and apples caused by Brown Marmorated Stink Bug (BMSB), many growers in Maryland were ready to use any chemistry required to produce a crop in 2011. The 2011 season proved to be frustrating for growers that experienced BMSB infestations with regard to: pick your own spray schedules, days to harvest, IPM programs being damaged by broad spectrum pesticide application leading to loss of beneficial insects, increased exposure to high toxicity products, cost, increased number of applications, fuel, time, loss of some of these products, and public perception. Thus growers have been forced to spend significantly more on production costs such as labor, fuel, materials, and maintenance.

This project examines the potential to return to pre-2009 timing, interval, and material selection by incorporating Surround® as a tool to combat our newest and most insidious pest Brown Marmorated Stink Bug (BMSB).

Current recommendations for the control of BMSB in apples include the use of Synthetic Pyrethroids, Organochlorines and Organophosphates. These chemical families have been replaced in orchard spray programs in recent years by products with more specific modes of action that are generally less harmful to beneficial organisms. The use of the more general insecticides that appear to reduce the level of BMSB damage may potentially lead to the destruction of Integrated Pest Management (IPM) programs that have been in place for nearly thirty years as beneficial populations are decimated. The purpose of this experiment is to determine if the addition of Surround® (an organically certified kaolin clay product) to insecticide materials used to control traditional orchard pests can reduce the level of damage to fruit caused by BMSB.

The Surround® was used at a rate of 12.5 pounds per 100 gallons as a tank mix that may be acting as a repellent or tactile deterrent and could offer greater protection of the fruit, particularly if used as a bridge treatment between or a replacement for insecticide applications, or as part of a push-pull management strategy. Thus, the addition of the clay to the surface of the fruit and foliage may result in behavioral modification of BMSB. It is well documented that BMSB is very mobile and moves into the orchard causing the most severe damage on the perimeter rows. The clay barrier from Surround® could be deterring BMSB from moving into the orchard, or possibly reduce the time spent in the trees, leading to a reduction in feeding damage. In order to examine this, samples evaluated were paired with samples from trees in similar positions in the orchard, i.e. exterior bordering to corn, exterior bordering woods, and interior. This was done to compare fruit that should be receiving comparable pressure from BMSB based on the environment.

The insecticide applications were made based on an IPM program using traditional monitoring tools for lepidopteron pests with visual observations for BMSB being added to the program and material selection being based on need for control of the pests present. Pheromone traps for Coddling Moth, Tufted Apple Bud Moth and Oriental Fruit Moth were placed in the block and monitored weekly to determine need for application. BMSB were monitored using three minute surveys of five trees weekly to determine presence and damage to fruit.
Half of the trees received the program without Surround® added and half received the program with Surround® added. Fifty fruit per tree were destructively sampled at harvest and, although damage was still above what would be considered acceptable economic threshold, severity of damage was very low, yielding a high percentage of salable fruit.

Although we are in the process of evaluating the data, initially it appears that there was nearly 30% less damage by BMSB on the fruit that received the program with Surround® and larger differences when like replicates are paired for comparison.

In our Red Haven peach block we had no BMSB pressure at all this season. Weekly counts and end of season evaluation of the fruit showed extremely low levels of injury with brown stink bugs being the stink bug we did find in the block just before harvest time but no BMSB.

Our apple data for 2014 on our Goldrush block is not in but for 2013 pressure was overall light from BMSB. We did find BMSB in the block later in the season and did have damage to fruit. Unfortunately, the Surround® treatments did not all hold up well and what I found interesting was that a late Brigade without application on our Pink Lady provided much cleaner fruit (<2%) damage compared to up to 80% in some of the treated Goldrush replications.

After three years working on this project I am forming an opinion that using Surround® early may be very helpful as we work our way through the initial incursion from BMSB but later in the season when pressure gets heavy with that fresh population the use of Brigade or Venom or similarly effective products is the way to go to ensure clean fruit at harvest.

This work will continue as we try to provide adequate control with the softest possible program.

### 2014 APPLE WMREC SPRAY TIMELINE

By Bryan Butler, University of Maryland Extension

4/3/14 – Late dormant – Lorsban Advanced + Damoil + Copper
4/14/14 – Tight cluster – Manzate Pro-Stick + Inspire Super
4/24/14 – Pink – Manzate Pro-Stick + Scala + Imidan 70W
5/1/14 – Bloom – Manzate Pro-Stick + Procure 480 SC + Agri-Mycin 17
5/8/14 – Petal fall – Manzate Pro-Stick + Syllit FL + Agri-Mycin 17 + Imidan 70W
5/16/14 – Thinning spray – Sevin XLR Plus (Pink Lady only)

Maxcel (Gala and Fuji only)
5/19/14 – 1st cover – Manzate Pro-Stick + Rally 40WSP + Agri-Mycin 17 + Assail 30 SG + Surround® WP
5/30/14 – 2nd cover – Manzate Pro-Stick + Vangard WG + Imidan 70W + MicroFine Sulfur + Surround® WP
6/9/14 – 3rd cover – Captan 50W + Vangard WG + Actara + Surround® WP
6/20/14 – 4th cover – Flint + Imidan 70W + Surround® WP
7/1/14 – 5th cover – Flint + Assail 30 SG + Surround® WP
7/10/14 – 6th cover – Captan 50W + Rally 40WSP + Imidan 70W + Surround® WP
7/22/14 – 7th cover – Captan 50W + Topsin M WSB + Ziram 76 DF + Assail 30 SG + Surround® WP
7/31/14 – 8th cover – Pristine +Imidan 70W + Surround® WP
8/11/14 – 9th cover – Captan 50W + Topsin M WSB +Ziram 76 DF+ Surround® WP
8/21/14 – 10th cover – Pristine + Belay
9/2/14 – 11th cover – Captan 50W + Topsin M WSB + Ziram 76 DF + Actara
9/10/14 – 12th cover Pristine + Brigade WSB (Fuji and Pink Lady only) Pristine + Belay (Goldrush and Enterprise)

Sprayer calibrated for 100 gpa
Raspberry Fertility Trial at WMREC, Keedysville, MD
By Bryan Butler, University of Maryland Extension

Over the past several years there has been an increased interest from growers on the finer production points of black raspberries *Rubus occidentalis*. Although this is a native plant found wild in almost every farm fence line with a wide tolerance to soil type and pH and crop and that has been produced in the mid-Atlantic for many years, new varieties and increased interest from consumers for the improved flavor and health benefits of black raspberries has caused increased production across the mid-Atlantic.

Variety evaluation, new primocane types, trellising, disease management, fertility, and new invasive pest issues are several of the areas of interest of producers establishing or expanding their plantings of black raspberries. These are topics that are all of great importance because, although black raspberries are fairly easy to grow, maximizing product and quality can be challenging, and this is certainly a crop that responds quite favorably to refined management practices.

Over the last two seasons a number of bramble producers have approached me regarding concerns over the Nitrogen rate recommendations for both primocane and floricanes producing raspberries. Many growers have been applying about 30 pounds of actual N per acre per year and do not feel they are getting an adequate response. The nutrient management guidelines are a little vague but they do make recommendations on altering your application rate based on tissue testing but they do not provide clear guidelines for rates. I have been told by growers that they are concerned with the lack of vigor in black raspberries and concerns over the longevity of the stand. With primocane bearing varieties, growers have expressed concerns that the plants seem to weaken prematurely in the late summer and early fall and that possible additional application of Nitrogen during the season may help to develop a plant that can produce further into the fall.

**Nitrogen**

Four rates, 0, 30, 75, 150 lbs. per acre, source: calcium nitrate. The 75 and 150 pound applications are split. Fertilizer was applied the third week of April with the second application for the second half of the 75 and 150 pounds rate put on the second week of July.

**Two varieties:**

**Jaclyn** a Primocane producer-fruit is a distinct dark red when ripe, quite vigorous and erect, growing to 4 to 5 feet tall. Ripening time is late summer early fall

**Jewel** a Florican black raspberry-fruit is firm and glossy with good flavor, vigorous, erect plants. Mid-season (mid-June) ripening

Collect data on **growth (height and # canes), overwintering/winter damage, marketable yield, tissue samples**

**Time line:** planting was established in spring 2013. This year the first treatments were made and data collection has begun and will continue for 15 and 16. This year’s data is not showing very much difference in yield but we cannot seem to turn off the Jaclyns as harvest continues as we go to press.

4 Treatments x 4 replications = 16 x 2 Varieties = 32 reps

Plants are planted 18 inches between plants. 36 inches between reps. 5 plants per rep. Row spacing is 12 feet. Plants were established in the first year with 30 lbs. of N per acre rate and the site had been tested so pH, Phosphorus and Potassium were adjusted to recommended levels prior to planting.
2014 Pumpkin Trial Highlights & Timeline
WMREC, Keedysville, MD
By Bryan Butler, University of Maryland Extension

Highlights
This was the third year for this project looking at spray programs for pumpkins at WMREC and at the Wye. Dr. Kate Everts is the Principle Investigator on this project, and Mike Newell at the Wye and Doug Price at Keedysville have done a great job keeping this project afloat. For this season, although the data has not been analyzed yet, what really stood out to me was stem quality. The field had No spray blocks, IPM blocks and Premium spray program blocks. Although it appears yields were not that different, the quality of the stems in the premium blocks was vastly superior to the other blocks. They not only looked better but they were significantly stronger.

Timeline

6/3/14 - planted pumpkins
6/4/14 – sprayed Strategy + Roundup PowerMax
6/24/14 – applied Macho 2.0 drench
7/10/14 – All Treatments – Bravo Weather Stik + Thionex 3EC
7/22/14 – IPM Treatments – Bravo Weather Stik + Kocide 4.5 LF
  Premium Treatments - Bravo Weather Stik + Rally 40 WSP
7/31/14 – IPM Treatments – Bravo Weather + Kocide 4.5 LF + Quintec
  Premium Treatments - Bravo Weather Stik + Rally 40 WSP
8/8/14 – IPM Treatments – Bravo Weather Stik
  Premium Treatments - Bravo Weather Stik + Quintec + Presidio
8/18/14 – IPM Treatments – Bravo Weather Stik + Kocide 4.5LF
  Premium Treatments – Bravo Weather Stik + Rally 40 WSP + Ranman
8/30/14 – IPM Treatments – Bravo Weather Stik + Quintec + Asana XL
  Premium Treatments – Bravo Weather Stik + Quintec + Presidio + Asana XL
9/8/14 – IPM Treatments – Bravo Weather Stik + Asana XL
  Premium Treatments – Bravo Weather Stik + Rally 40 WSP + Ranman + Asana XL
10/1/14 – Harvest

2014 PEACH WMREC SPRAY TIMELINE

By Bryan Butler, University of Maryland Extension

4/3/14 – Late dormant – Damoil + Lime Sulfur Solution
4/14/14 – Pink – Micro Fine Sulfur
4/25/14 – Bloom – Bravo Weather Stik
5/1/14 – Late Bloom – Vangard WG
5/8/14 – Petal fall – Bravo Weather Stik + Imidan 70W + Surround® WP
5/19/14 – Shuck split – Indar 2F + Captan 50W + Assail SG + Surround® WP
5/30/14 – 1st cover – Tospin M WSB + Imidan 70W + MicroFine Sulfur + Surround® WP
6/9/14 – 2nd cover – Indar 2F + Alticor + Surround® WP
6/20/14 – 3rd cover – Captan 50W + Tospin M WSB + Imidan 70W + Surround® WP
7/1/14 – 4th cover – Indar 2F + Sevin XLR Plus + Surround® WP
7/10/14 – 5th cover – Elevate 50 WDG + Sevin XLR Plus + Surround® WP
7/22/14 – 6th cover - Captan 50W + Tospin M WSB + Sevin XLR Plus + Assail 30 SG + Surround® WP
7/30/14 – First harvest and data collected
7/31/14 – 7th cover – Indar 2F
8/4/14 – Final harvest
Sprayer calibrated for 100 gpa
In Maryland and the mid-Atlantic region, wine grape growers rely upon crop protectants to manage fungal diseases in the vineyard. The selection of a fungicide program is based upon several factors, including product efficacy, disease presence and pressure, product safety, mode of action and product/program price. This publication is provided as a reference tool for wine growers to estimate fungicide costs and options when planning a fungicide program.

How to Use the Excel Spreadsheet
Growers are encouraged to solicit pricing data for their operation and input that data into the spreadsheet. Prices will need to be converted to a “per unit” basis. The unit is defined by the measure used for the application rate. For example, if a product cost $250 per gallon and the desired unit is ounces, the per-ounce unit cost would be $1.95 per ounce ($250 per gallon/128 ounces gallon). Once prices are updated for the operation, input the number of applications for each product per growing season and the application rate per acre to calculate the per-acre and per-season total cost.

Assumptions:
Prices are based upon information from multiple sources and will vary depending upon availability, market conditions, area and other factors. The lowest available pricing was used in this example. Always check with your supplier for current pricing.

Product trade or brand names were used based upon availability in a specific area and to provide real pricing data. The use of brand names does not imply any endorsement by the University of Maryland and no discrimination is intended.

Typical container sizes are given for the smallest known available quantity with the exception of Captan, Mancozeb, and Sulfur. Container size availability may change over time and vary by supplier. Cost per container is provided to indicate the initial cost of a particular product.

Unit defines the typical unit used for recommended application rates, such as pounds, ounces, pints or quarts.

Rate per acre will vary for many products. In this example, the higher recommended per acre rate was used. Adjust the rate based upon your specific need.

The number of applications per year and total cost per acre are provided for an individual grower to estimate the per-season cost per acre for different fungicide schedules.

Always read and follow the pesticide label. The use of any pesticide inconsistent with label direction is a violation of federal law.
## Sample Costs of Commonly Used Wine Grape Fungicides*

<table>
<thead>
<tr>
<th>Product</th>
<th>Cost per Container</th>
<th>Typical Container Size</th>
<th>Cost per Unit</th>
<th>Unit</th>
<th>Rate per Acre</th>
<th>Cost Per Application</th>
<th># of Applications per year</th>
<th>Total Cost per Acre</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abound</td>
<td>$235.75</td>
<td>1 gal</td>
<td>$1.84</td>
<td>oz</td>
<td>15.5</td>
<td>$28.55</td>
<td></td>
<td>$-</td>
</tr>
<tr>
<td>Armicarb</td>
<td>$50.60</td>
<td>5 lb</td>
<td>$10.12</td>
<td>lb</td>
<td>5</td>
<td>$50.60</td>
<td></td>
<td>$-</td>
</tr>
<tr>
<td>Captan 50</td>
<td>$93.30</td>
<td>30 lb</td>
<td>$3.11</td>
<td>lb</td>
<td>4</td>
<td>$12.44</td>
<td>5</td>
<td>$62.20</td>
</tr>
<tr>
<td>Elevate</td>
<td>$72.46</td>
<td>2 lb</td>
<td>$36.23</td>
<td>lb</td>
<td>1</td>
<td>$36.23</td>
<td></td>
<td>$-</td>
</tr>
<tr>
<td>Endura</td>
<td>$506.80</td>
<td>6.5 lb</td>
<td>$4.87</td>
<td>oz</td>
<td>4.5</td>
<td>$21.93</td>
<td></td>
<td>$-</td>
</tr>
<tr>
<td>Flint</td>
<td>$202.40</td>
<td>20 oz</td>
<td>$10.12</td>
<td>oz</td>
<td>2</td>
<td>$20.24</td>
<td></td>
<td>$-</td>
</tr>
<tr>
<td>Forum</td>
<td>$274.85</td>
<td>1 gal</td>
<td>$2.15</td>
<td>oz</td>
<td>6</td>
<td>$12.88</td>
<td></td>
<td>$-</td>
</tr>
<tr>
<td>Gavel</td>
<td>$264.00</td>
<td>30 lb</td>
<td>$8.80</td>
<td>lb</td>
<td>2.5</td>
<td>$22.00</td>
<td></td>
<td>$-</td>
</tr>
<tr>
<td>Inspire Super</td>
<td>$198.95</td>
<td>1 gal</td>
<td>$1.55</td>
<td>oz</td>
<td>20</td>
<td>$31.09</td>
<td></td>
<td>$-</td>
</tr>
<tr>
<td>JMS Stylet Oil</td>
<td>$30.00</td>
<td>1 gal</td>
<td>$30.00</td>
<td>gal</td>
<td>2</td>
<td>$60.00</td>
<td></td>
<td>$-</td>
</tr>
<tr>
<td>Luna Tranquility</td>
<td>$974.62</td>
<td>2.5 gal</td>
<td>$3.05</td>
<td>oz</td>
<td>24</td>
<td>$73.10</td>
<td></td>
<td>$-</td>
</tr>
<tr>
<td>Luna Experience</td>
<td>$138.00</td>
<td>1 qt</td>
<td>$4.31</td>
<td>oz</td>
<td>8</td>
<td>$34.50</td>
<td>1</td>
<td>$34.50</td>
</tr>
<tr>
<td>Manzate Prostic</td>
<td>$109.80</td>
<td>30 lb</td>
<td>$3.66</td>
<td>lb</td>
<td>4</td>
<td>$14.64</td>
<td>5</td>
<td>$73.20</td>
</tr>
<tr>
<td>Oxidate</td>
<td>$104.95</td>
<td>2.5 gal</td>
<td>$0.33</td>
<td>oz</td>
<td>128</td>
<td>$41.98</td>
<td></td>
<td>$-</td>
</tr>
<tr>
<td>Phostrol</td>
<td>$51.47</td>
<td>2.5 gal</td>
<td>$2.57</td>
<td>pt</td>
<td>5</td>
<td>$12.87</td>
<td>10</td>
<td>$128.68</td>
</tr>
<tr>
<td>Presidio</td>
<td>$257.60</td>
<td>1 qt</td>
<td>$8.05</td>
<td>oz</td>
<td>4</td>
<td>$32.20</td>
<td></td>
<td>$-</td>
</tr>
<tr>
<td>Pristine</td>
<td>$382.95</td>
<td>7.5 lb</td>
<td>$3.19</td>
<td>oz</td>
<td>12.5</td>
<td>$39.89</td>
<td></td>
<td>$-</td>
</tr>
<tr>
<td>Procure</td>
<td>$104.88</td>
<td>1 qt</td>
<td>$3.28</td>
<td>oz</td>
<td>8</td>
<td>$26.22</td>
<td></td>
<td>$-</td>
</tr>
<tr>
<td>Quadris Top</td>
<td>$692.87</td>
<td>2.5 gal</td>
<td>$2.17</td>
<td>oz</td>
<td>14</td>
<td>$30.31</td>
<td></td>
<td>$-</td>
</tr>
<tr>
<td>Quintec</td>
<td>$92.40</td>
<td>30 oz</td>
<td>$3.08</td>
<td>oz</td>
<td>4</td>
<td>$12.32</td>
<td>4</td>
<td>$49.28</td>
</tr>
<tr>
<td>Rally</td>
<td>$55.20</td>
<td>20 oz</td>
<td>$2.76</td>
<td>oz</td>
<td>5</td>
<td>$13.80</td>
<td>3</td>
<td>$41.40</td>
</tr>
<tr>
<td>Ranman</td>
<td>$229.43</td>
<td>1 qt</td>
<td>$7.17</td>
<td>oz</td>
<td>2.75</td>
<td>$19.72</td>
<td></td>
<td>$-</td>
</tr>
<tr>
<td>Reason</td>
<td>$457.00</td>
<td>1 gal</td>
<td>$3.57</td>
<td>oz</td>
<td>2.7</td>
<td>$9.64</td>
<td></td>
<td>$-</td>
</tr>
<tr>
<td>Revus</td>
<td>$467.00</td>
<td>1 gal</td>
<td>$3.65</td>
<td>oz</td>
<td>8</td>
<td>$29.19</td>
<td></td>
<td>$-</td>
</tr>
<tr>
<td>Revus Top</td>
<td>$941.55</td>
<td>2.5 gal</td>
<td>$2.94</td>
<td>oz</td>
<td>7</td>
<td>$20.60</td>
<td></td>
<td>$-</td>
</tr>
<tr>
<td>Ridomil MZ</td>
<td>$70.15</td>
<td>5 lb</td>
<td>$14.03</td>
<td>lb</td>
<td>2.5</td>
<td>$35.08</td>
<td>1</td>
<td>$35.08</td>
</tr>
<tr>
<td>Rovral</td>
<td>$185.00</td>
<td>1 gal</td>
<td>$23.13</td>
<td>pt</td>
<td>2</td>
<td>$46.25</td>
<td></td>
<td>$-</td>
</tr>
<tr>
<td>Scala</td>
<td>$110.97</td>
<td>.5 gal</td>
<td>$1.73</td>
<td>oz</td>
<td>18</td>
<td>$31.21</td>
<td></td>
<td>$-</td>
</tr>
<tr>
<td>Sovran</td>
<td>$76.91</td>
<td>1.25 lb</td>
<td>$3.85</td>
<td>oz</td>
<td>5.6</td>
<td>$21.53</td>
<td></td>
<td>$-</td>
</tr>
<tr>
<td>Sulfur</td>
<td>$18.60</td>
<td>30 lb</td>
<td>$0.62</td>
<td>lb</td>
<td>4</td>
<td>$2.48</td>
<td>11</td>
<td>$27.28</td>
</tr>
<tr>
<td>Switch</td>
<td>$127.40</td>
<td>28 oz</td>
<td>$4.55</td>
<td>oz</td>
<td>12</td>
<td>$54.60</td>
<td>1</td>
<td>$54.60</td>
</tr>
<tr>
<td>Tanos</td>
<td>$292.42</td>
<td>7.5 lbs.</td>
<td>$2.44</td>
<td>oz</td>
<td>8</td>
<td>$19.49</td>
<td></td>
<td>$-</td>
</tr>
<tr>
<td>Torino</td>
<td>$269.96</td>
<td>34 oz</td>
<td>$7.94</td>
<td>oz</td>
<td>3.4</td>
<td>$27.00</td>
<td></td>
<td>$-</td>
</tr>
<tr>
<td>Vangard</td>
<td>$171.00</td>
<td>50 oz</td>
<td>$3.42</td>
<td>oz</td>
<td>10</td>
<td>$34.20</td>
<td></td>
<td>$-</td>
</tr>
<tr>
<td>Vivando</td>
<td>$295.33</td>
<td>1 gal</td>
<td>$2.31</td>
<td>oz</td>
<td>15.4</td>
<td>$35.53</td>
<td></td>
<td>$-</td>
</tr>
<tr>
<td>Ziram</td>
<td>$42.00</td>
<td>10 lb</td>
<td>$4.20</td>
<td>lb</td>
<td>4</td>
<td>$16.80</td>
<td></td>
<td>$-</td>
</tr>
<tr>
<td>Additional product</td>
<td>$-</td>
<td></td>
<td>$-</td>
<td></td>
<td></td>
<td>$-</td>
<td></td>
<td>$-</td>
</tr>
<tr>
<td>Additional product</td>
<td>$-</td>
<td></td>
<td>$-</td>
<td></td>
<td></td>
<td>$-</td>
<td></td>
<td>$-</td>
</tr>
<tr>
<td><strong>Total Per Acre:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>$506.21</td>
</tr>
</tbody>
</table>

*In this example, there are 5 Captan, 1 Luna Experience, 5 Mancozeb, 10 Phostrol, 4 Quintec, 3 Rally, 1 Ridomil MZ, 11 Sulfur and 1 Switch applications with a total estimated per acre cost of $506.21
The FDA has released an update to the proposed regulations for the Produce Safety Rule within the Food Safety Modernization Act (FSMA; docket # FDA-2011-N-0921). After receiving thousands of comments on the original proposed regulations and reviewing new research, the FDA has adapted several of their standards to make them more flexible. Most notably, the two sections that Maryland growers have been most concerned about (agricultural water testing and manure standards) have been adapted. After these proposed regulations are finalized, many farmers in Maryland growing fruits and vegetables for raw consumption will be required to follow them.

The summary of the key revisions to the Produce Safety Rule can be found here: http://www.fda.gov/Food/GuidanceRegulation/FSMA/ucm334114.htm. The full text of the revisions can also be found on this website, or by searching “Food Safety Modernization Act” online. In these revisions the FDA suggests allowing for a tiered, risk-based approach to agricultural water sampling and mitigation, in contrast to a one-size-fits-all approach that was originally proposed. In addition, the previously proposed nine-month interval between applying manure and harvesting high-risk crops has been removed, and will be decided on at a later time. Until then, the FDA “will not take exception” to farmers complying with the National Organic Program (NOP) standards of waiting a 120-day interval between applying raw manure and harvesting produce in contact with the soil. The FDA has also clarified definitions on covered farms and qualified exemptions.

The FDA has asked growers, extension officials, and anyone interested to write in their comments on these revised proposed rules -- the official comment period of 75 days ends on December 15, 2014. For anyone affected by or dissatisfied with these proposed regulations, please write in a comment. Additionally, if you are pleased with the way FDA has responded to previous comments, please write in to express your satisfaction. The FDA must investigate and respond to the contents of every comment before passing the final regulations.

Comments on the revisions to the produce safety rule can be sent electronically via: http://www.fda.gov/Food/GuidanceRegulation/FSMA/ucm334114.htm. There is a “comment now” link in the right sidebar.

Alternatively, each comment can be mailed in to:
Division of Dockets Management (HFA-305), Food and Drug Administration
5630 Fishers Lane, Rm. 1601. Rockville, MD 20852.
If writing and mailing in a comment, please specify Docket # FDA-2011-0921 and Regulatory Information Number (RIN) 0910-AG35.

TPM/IPM Weekly Report
for Arborists, Landscape Managers & Nursery Managers
Stanton Gill, UME Extension Specialist,
IPM for Nursery, Greenhouse and Managed Landscapes,
sgill@umd.edu

Thousand Canker Disease confirmed in Maryland – Karen Rane and David Clement and Stanton Gill

Last week MDA confirmed that a walnut tree was found in Maryland near the Delaware border (Cecil County?). Last fall the walnut twig borer was found in a trap by MDA but the disease associate with the beetle was not found. Now, it has been confirmed that the first case of thousand canker disease has been found in Maryland. It is late in the season at this point and many of the walnut trees have dropped their foliage and it will be difficult to detect foliar symptoms of the disease. We would like to request that in the 2015 season if you see a walnut with wilting branches or dieback to get a sample to us or MDA. This is not a quarantine disease/insect complex but MDA and we would like to track where it is being found in Maryland.

UME Fruit Team News
By Dave Myers, Extension Educator & Acting Ag Program Leader University of Maryland

It has been a long time in coming and is still an ongoing effort but UME has recently added important faculty members to support Maryland tree and small fruit producers.

Administrators have worked diligently to develop the Mid-Atlantic Fruit Consortium and so far Dr. Kari Peter from Penn State supporting tree fruit pathology and Dr. Cass Sweet for UMD supporting small fruit and grape pathology have been developing strategies to support growers in both Pennsylvania and Maryland and recently the UMD Entomology Department has hired Dr. Kelly
Hamby who comes from California where she was awarded her Ph.D. from UC Davis; she worked on Spotted Wing Drosophila. Added to these great new hires we have Dr. Chris Walsh and Dr. Joe Fiola who continue to support growers with their research and outreach efforts. The fruit program is certainly on the move and we can thank Dr. Angus Murphy for his tireless efforts to nurture the consortium and pursue new positions.

With the increase in specialist support and recent retirements in Extension, Bryan Butler will be returning to Carroll County to resume a more general Agricultural support role serving a wide array of producers in the Carroll county as well as the Northern Cluster Counties. Bryan had worked to support the fruit industry during the height of the BMSB outbreak and continued as SWD moved into the Mid-Atlantic but with a void in his home county of agricultural support he will now return.

Focus Group and Farm Tour, West African Ethnic Crops
Wednesday, October 29, 2014 from 11:30 AM to 2:30 PM
Muirkirk Research Farm, Beltsville, MD

Farmers and community garden organizers are invited to a focus group and farm tour in Beltsville on Wednesday, October 29 at 11:30 AM. Please register at: http://www.eventbrite.com/e/focus-group-and-farm-tour-west-african-ethnic-crops-tickets-13501765143

The Muirkirk Research Farm, located on Old Baltimore Pike one mile south of Muirkirk Road is operated by the University of the District of Columbia and has been growing the traditional crops of West Africa. This event will provide a tour of the facilities, lunch created from the harvest as prepared by University chefs and an opportunity to share information in a focus group. We are interested in talking to farmers and learning more about crop introduction decision making as well as learning about familiarity with these crops and the African diaspora market. This is an academic project and there will no attempt to sell any product or service. As the African-born population is one of the fastest growing in the region, there has been considerable discussion about how this market may be a growth opportunity for farmers. If you cannot attend the focus group, feel free to share your opinions at: https://www.surveymonkey.com/s/5HPRBOQZ. For more information, contact Michael Segal at farmersmma@gmail.com

Southern Maryland Buyer and Grower Workshop
November 5, 2014

The Southern Maryland Agricultural Development Commission (SMADC) will host a Buyer and Grower Workshop for Southern Maryland region producers and buyers of meats, fruits, vegetables and seafood on November 5, 2014 from 8:30 a.m. to 3 p.m. Farmers, restaurant owners, chefs, store owners and retail and wholesale buyers are encouraged to attend.

The workshop, Take Your Product to the Next Level – Production and Sales to Retail/Wholesale Markets, will provide a forum for farm businesses and buyers to explore the marketing opportunities and challenges of selling and buying locally produced products to small and large retail and wholesale venues.

Join in lively morning sessions, kicking-off with an informal panel discussion on what it takes to buy and sell to stores, restaurants, grocery chains and institutions for all producers and hear from buyers and farms representing Cabin Creek Heritage Farm, Chesapeake’s Bounty, Even’ Star Organic Farm, Farming 4 Hunger, Wegmans and Woodberry Kitchen. Late morning and afternoon sessions are focused on meat/livestock production, featuring a keynote presentation by Jessica Moore, founder of Philadelphia Cowshares who will showcase the tools and technology she has used to start and grow Philly CowShare, an aggregate farm retail brand dedicated to simplifying the logistics of connecting “communities of responsible farmers and processors with urban communities who simply want to eat well.” Other workshop topics include improved genetics for meat animal selection presented by John W. Comerford, a specialist in the economics of meat production, traceability and bio-security regulations, farm liability and business insurance for producers, plus information on transitioning farm enterprises from one generation to the next.

The workshop will be held at the Southern Maryland Electric Cooperative (SMECO) auditorium at: 15035 Burnt Store Rd, Hughesville, MD 20637. A registration fee of $15 includes lunch. To register contact SMADC staff, Susan McQuilkin at (301) 274-1922, Ex. 1, or email info@smadc.com. For the agenda, information on featured speakers and to register on-line visit the ‘news and announcements’ page at www.smadc.com.

LINK TO WORKSHOP DETAILS HERE

To learn more about additional programs and resources, contact SMADC, P. O. Box 745, Hughesville, MD 20637; phone: 301-274-1922, Ex. 1, fax: 301-274-1924; email cbergmark@smadc.com or visit www.smadc.com.
Beginner Farmer Training Program
Now Accepting Applications

A unique, year-long training program for beginning farmers is now accepting applications for farmer trainees in the Chesapeake region. The program’s goal is to equip the region’s brightest new farmers with the knowledge and hands-on experience necessary to start a successful farm.

The average age of farmers in the region is close to 60-years-old, according to the latest USDA census. At the same time, demand for fresh, local produce is also on the rise. A wave of aspiring farmers, young and older, are ready to take up the mantle, but obstacles are many: access to workable, affordable land; finding resources; and connecting with other new farmers, to name a few.

Enter the Beginner Farmer Training Program (BFTP), now in its sixth year, which provides a comprehensive, year-long experience designed for new farmers ready to farm.

Background:

The BFTP is unique among farmer training programs across the nation in that it allows participants to work part- or full-time at their existing farms or jobs while completing training. Participants are encouraged to transition into farming with a detailed crop and business plan in place.

BFTP pairs trainees with experienced farmers who have already established profitable, sustainable farms in the region. In addition to this hands-on training, BFTP also provides classes, workshops, and field days. Speaking about his experience in the program, graduate Devin Barto said: “I believe that I could assume the responsibilities of a farm following this training experience because of the skills that I gained.” Barto now manages a large CSA at Pennypack Farm in Horsham, PA.

BFTP accepts applications from new farmers located throughout the Chesapeake, including MD, DC, VA, WV, DE and PA. To find out more about the program qualifications and to complete an online application, go to: http://www.futureharvestcasa.org/field-school/beginner-farmer-training-program

Maryland Farm Bureau
PMT Economic Analysis Released

The Phosphorus Management Tool (PMT) Economic Analysis Study will be released on Thursday, October 23, 2014 at 10:00 AM. You will be able to access the report from MDA’s website at http://mda.maryland.gov.

This study was required by the Maryland General Assembly after farmers voiced concern over the impact of the regulatory proposal on their businesses. The mandate from the General Assembly prohibited MDA from moving forward with the regulation until after the study was complete and 2 committees of the General Assembly received the report for review.

The study’s author, Memo Diriker, Director of BEACON at Salisbury University, will brief interested members of the community on Thursday, October 23 from 3:00 to 4:30 PM at the Talbot County Community Center. The address is 10028 Ocean Gateway, Easton, MD 21601. Dr. Diriker will present the study findings and answer questions related to the report.

Maryland Farm Bureau members with concern and questions about the PMT and its impact on farm businesses and local communities should plan to attend this important briefing. Click here to view Maryland Farm Bureau's official 2013 comments on the Phosphorus Management Tool.

Vegetable & Fruit Headline News

Published by the University of Maryland Extension Agriculture and Natural Resources Profitability Impact Team

Submit Articles to:
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Gambrills, MD 21054
410 222-3906
myersrd@umd.edu

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Do you receive questions from clientele wanting to start or expand a new farm enterprise? Need resources to help future farmers find land, capital or make that decision to start a farm? Have you ever thought of offering a Beginning Farmer Workshop in your county? If you answered yes to any of these questions, plan to attend the first annual “Supporting Beginning Farmer’s in Maryland” workshop scheduled for October 28th at Washington County Extension office and October 30th at the WYE Research Center. There is no cost to attend. The goal of this workshop is to provide agriculture service providers the tools and resources needed to help farmers start and maintain an agricultural operation in Maryland.

**What:** Train the Trainer Workshops

**When:** October 28th and October 30th

**How to Register:** Register by October 24th, seats are limited. To register please contact Hannah Shear via email (hshear@umd.edu) or by phone (301-600-3580). Please indicate which session you wish to attend.

**Where:**

- **October 28th:** Washington County Extension Office, 7303 Sharpsburg Pike, 7303 Sharpsburg Pike  Click Here for Directions
- **October 30th:** Wye Research and Education Center 124 Wye Narrows Drive Queenstown, MD 21658  Click Here for Directions
Supporting Beginning Farmer’s in Maryland
Train the Trainer Workshop

9:00-9:30am  Welcome and Overview of the Beginning Farmer Success Project
             Beginning Farmer Team

9:30-10:15am Tools for Finding and Evaluating Farmland
             Greg Bowen, MD FarmLink
             Paul Goeringer, UMD Dept. of Agricultural and Resource Economics
             Ben Beale, Extension Educator: AGNR Educator- St. Mary’s County

10:15-10:30am Break

10:30-11:15am Financing Options for Beginning Farmers
             Speaker TBD, Mid- Atlantic Farm Credit
             Steve McHenry, Executive Director, MARBIDCO

11:15-12:00pm Business Planning How to and Resources
             Shannon Dill: AGNR Educator-Talbot County

12:00-12:45pm Lunch

12:45-1:30pm Review of Beginning Farmer Success Website and Resources
             Hannah Shear, Beginning Farmer Success Coordinator
             Ben Beale, AGNR Educator- St. Mary’s County
             Shannon Dill: AGNR Educator-Talbot County

1:30-2:15pm Farmer Training, Coaching, Mentoring and Apprenticeship Programs in Maryland.
             Farm Business Coaching: Ginger Myers, UME Marketing Specialist
             On Farm Training (Apprenticeship): Cathy Tipper, Future Harvest
             Mentoring Program: Greg Bowen, FarmLink
             UMES Small Farm Programs: Candy Walter, UMES- Southern Maryland

2:15-3:00 pm Panel Discussion: Conducting Beginning Farmer Workshops: Sample curriculum,
             course content, venues, lessons learned.
             University of MD Educators

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