WyeREC Plasticulture
Strawberry Update
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It’s planting time! Most strawberry plugs will be planted between now and the end of the month. If you fumigated this year, be sure to follow the label for plant-back times. After planting your plugs, do not let them dry out! Until the roots leave the plug media and begin growth in the native soil, they are very susceptible to drying out. Be sure your beds are well watered and that the roots in the plug stay moist. Delays in plant establishment can affect spring yields. At WyeREC we are planting this week.

The extended 90 day weather forecast (if you have any faith in the forecasting system) for the mid-Atlantic is for above average temperatures. This will be good for fall planted plasticulture strawberry growth. Some growers opt to plant later in the month to decrease the number of runners produced (and eventually will need to be removed) and will sometimes apply a light weight floating row cover (FRC) to gain a few more heat units for increased plant growth. This method has been successful for experienced growers.

If FRC’s are used for fall growth enhancement, late season heat waves with daily high temperatures in the upper 70's (f) can push temperatures under the FRC’s close to 90 degrees or above. These high temperatures can have a negative effect on flower bud initiation (spring yield), so be sure to monitor weather conditions during fall FRC deployment.

Be sure to join us next spring at our annual strawberry twilight meeting to view the plasticulture variety trial.

Vegetable Crop Insects
By Joanne Whalen
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Cabbage
Continue to scout all fields for harlequin bugs, beet armyworm, fall armyworm, diamondback and cabbage looper larvae.

Lima Beans
Continue to scout all fields for lygus bugs, stinkbugs, corn earworm, soybean loopers and beet armyworm.

Peppers
Be sure to maintain a 7-day spray schedule for corn borer, corn earworm, beet armyworm and fall armyworm control. You should also watch for flares in aphid populations.

Snap Beans
All fresh market and processing snap beans will need to be sprayed from the bud stage through harvest for corn borer and corn earworm control.

Spinach
Continue to sample for webworm and beet armyworm larvae. Controls should be applied when worms are small and before webbing occurs.

IPM Threshold Guide
Vegetable Crops
ECONOMIC THRESHOLD
Level of pest activity when control action is suggested to prevent economic injury

Available at:
Maryland SWD & BMSB Update
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2014 SWD Season Monitoring in Review

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 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 male 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 helps, 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.

These scouting efforts were made possible in substantial 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.
BMSB Update
Pressure has been light for most of the season but in the last couple of weeks there appears to be movement into both orchards and toward buildings. Monitoring at WMREC has picked up very few bugs and little to no damage except for in unprotected apples (no sprays applied that were effective on BMSB) along the borders of woods. BMSB numbers jumped significantly last week and there appears to be fairly heavy feeding damage on that fruit.

Do not let your guard down on later fruit. Be sure to keep an eye on those last blocks with fruit remaining and especially around borders. Be sure to be using products that are effective on BMSB for the remainder of the season. This is especially important as the corn and beans senesce and are removed and as there are fewer blocks that still have fruit for BMSB to feed on.

Pumpkin Bacterial Leaf Spot
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This week I received the pumpkin fruit shown below. The fruit has bacterial leaf spot, which is a disease that causes lesions on both leaves and the fruit. The disease is often seed borne and can be spread from plant to plant in the field by irrigation or splashing rain. It is favored by warm wet weather. Leaf symptoms are small, less than ½ inch, angular, water soaked lesions. These lesions often occur near a vein and may not be very noticeable. Fruit lesions are initially very small, sunken tan spots like those in the image. These spots often have a small dark border. When they enlarge they can crack and the lesions will penetrate the fruit. Control measures are sanitation, bacterial seed treatment, avoidance of overhead irrigation, and crop rotation.

Copper sprays may be effective if applied early in the season to reduce plant to plant spread, however once the lesions are present on the fruit, it is too late.

Fungicide Applications for Watermelons
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As the season winds down, it is a good time to reflect on how well your fungicide program worked in 2014. Both Nathan and I have received numerous questions about best practices for fungicide application this year, so it is also a good time to review these best practices. Fungicide applications should begin on watermelons when the vines are about 18 inches long or about when the first flowers open (these will be male flowers). This early spray is very important to prevent disease in becoming established. Following the first spray, fungicides should be applied weekly. The first fungicide application should include a copper product to manage bacterial fruit blotch (BFB). Additional applications for BFB should be applied in two weeks as the female flowers open and again two weeks later. Protect additional fruit set from BFB with additional copper applications.

Apply the best fungicides for the diseases that are present in your field. Correct identification of the problem is critical. There are many "look-alike" diseases and other diseases that mimic abiotic problems. In addition to identifying what diseases are present in the field, assess what the most prevalent problems are in selecting what fungicide to use. In selecting fungicides, be sure to stay informed about fungicide resistance (insensitivity) that has developed to watermelon disease pathogens. For example, the gummy stem blight pathogen is resistant to strobilurins, Topsin M and Pristine. Recently resistance to
tebuconazole was reported in Georgia. Choose other fungicides such as Fontelis, Luna Experience, Switch, or Inspire Super. Likewise the powdery mildew pathogen is resistant to strobilurins, and Topsin M. Group 4 fungicides such as Procure are still useful for a limited number of your powdery mildew applications, but should be used with excellent resistance management practices. Timing of the fungicide applications is very important. All fungicides are more effective if they are applied before disease development. This is true even for protectants, which have some “kick-back” activity. Therefore apply fungicides BEFORE rain. Don’t worry about the fungicides being removed during a typical rain, because modern fungicides are formulated to persist on leaves and fruit following rain. In the case of aerial applications, light rainfall may improve coverage by improving distribution of the fungicide within the plant canopy.

Several very effective fungicides have long pre-harvest intervals (7 days). These fungicides should not be used during the harvest period. That brings me to one additional important point. Always read and follow the label. Be aware of pre-harvest intervals, re-entry intervals, correct personal protective equipment. In addition, formulations of fungicides may be improved and the rates and allowed application methods may change from year to year.

Fall Control of Perennial Weeds
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Fall is the best time to treat most perennial weeds because it is the time that plants are best able to move the herbicide to the roots where it will do the most good. When considering fall weed control the emphasis should be on what the patch of weeds will look like next spring or summer not the amount of dead stems this fall. Also, it is important to consider that a fall application will not eradicate a stand of perennial weeds; the fall application will reduce the stand size or the stand vigor. Fall application of glyphosate is the most flexible treatment for most perennial weeds such as bermudagrass, Canada thistle, common milkweed, common pokeweed, dock, hemp dogbane, horsenettle and johnsongrass. Rates of 1 to 1.25 lb acid per acre are consistently the most economical (or about 1.5X the normal use rate for annual weeds). Dicamba (Banvel) at 2 to 4 pints is also labeled for artichoke, bindweeds, dock, hemp dogbane, horsenettle, milkweeds, pokeweed or Canada thistle. Planting small grains must be delayed after dicamba application 20 days per pint of dicamba applied. Fall herbicide applications should be made to actively growing plants. It is best to spray prior to mowing the corn stalks and allow plants to recover after harvest. Allow 10 to 14 days after treatment before disturbing the treated plants. If fall applications are delayed, remember weed species differ in their sensitivity to frost; some are easily killed by frost (i.e. horsenettle) others can withstand relatively heavy frosts. Check the weeds prior to application to be sure they are actively growing.

Commercial 2014 Vegetable Production Recommendations Maryland EB 236

Offing Cover Crops for Weed Suppression: Featuring the Roller-Crimper and Other Mechanical Contraptions
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No-Till (NT) Cover Crop Termination
Cover crops are an integral component of conservation practices. As part of a vegetable or field crop’s rotation system, cover crops are typically planted from late summer to early fall and terminated in the spring. The killed residue then acts as a dying mulch on the soil surface. Cover crops used as part of a money (cash) crop rotation system can provide a variety of ecosystem services, including enhanced soil quality and health, reduced nutrient losses via leaching, and pest suppression. In no-till cropping systems, producers generally use a “burn down” herbicide to off (terminate) their cover crops prior to planting their money crop. No-till and other conservation tillage practices may provide beneficial services that cannot be obtained from conventional tillage. No-till farming can reduce soil erosion, labor and fuel inputs, allow the build-up of soil organic matter and improve other soil features. In addition, NT cover crop rotation system may be a
valuable tool for managing weeds. Research has shown that NT cover crop-soybean systems achieve greater weed suppression than intensively tilled soybean habitats.

While burn-down herbicides are common, there are non-chemical alternatives for offing cover crops that are compatible with no-till production. Mechanically offing cover crops limits soil disturbance and can help reduce synthetic chemical use. Mowing (e.g., bush hog rotary, flail mowing) is probably the most popular method for mechanically terminating cover crops. Another gadget, which is not as well known, is the under-cutter-roller. This is a specialized implement, designed to slice shallowly through the soil and cut cover crop roots underground. It consists of a V-pow sweep blade mounted on a toolbar, followed by a rolling harrow to crimp and roll the cover crop as it falls to the ground, creating a thick and uniform mat of residue. Weed suppression was shown to be greater when an under-cutter was used to off a cover crop versus a mower.

**Enter the Cover-Crop Roller Crimper**

One of the latest thingamajigs available for offing cover crops in no-till operations is the cover-crop roller-crimper (RC). The RC has made using cover crop residue to suppress weeds in NT operations more practical for organic farmers. While the act of terminating a cover crop with a roller-crimper, or what we refer to as “Big Crimpin”, has not yet gone viral, it is steadily picking up steam. Though, the RC is sold at a limited number of establishments, its rapidly rising stardom should result in it being more widely accessible in the future. Roller crimpers are reported to have been adapted from equipment used in southern Brazil and Paraguay that lays cover crops down while crimping. A roller crimper is essentially a cylinder with protruding fins that rotates on a lengthwise axis as it moves over the soil. It consists of a hollow drum (with the option of being filled with water for increased weight) and blunted blades meant to maximize force against cover crops without cutting their stems. The implement crimps the vascular tissue which leaves plants intact and attached to their roots. This results in a flattened uniform layer of mulch that persists on the soil surface since decomposition is slowed. Subsequently, weed suppression lasts longer than in mowed mulch habitats. In a study comparing rolled and flail-mowed rye, rolled rye had significantly fewer weeds during year 1, but were similar among the two tactics the following year. Still, RCs do not require an energy intensive power take-off (PTO) drive and thus require less fuel and energy than mowers; Additionally, RCs operate at much faster tractor speeds than flail mowers in effectively terminating cover crops. In addition, if a crimper is mounted on the front of the tractor, there is the potential to terminate the cover crop and plant the money crop in the same pass. Partially for these reasons, RCs are thought to be a more sustainable investment for offing cover crops.

**Integrating ‘Big Crimpin’ with other tactics**

To make the practice of cover cropping economically viable and more effective, additional management tactics may need to be added. Weed suppression through the use of cover crops should be used as part of an integrated weed management (IWM) program that includes numerous methods to help suppress weeds including ecological approaches. Timing of cover crop planting and termination can be used as an important tool to predict quantity and quality of cover crop biomass. Additional tactics could include adjusting crop row spacing and plant density, selecting competitive crop cultivars, adapting a high-residue cultivation system, and decreasing weed seed bank through intensive weed management in other crop sequence phases. Combining an effective herbicide with a roller crimper could offer the benefits of earlier and excellent cover crop control along with weed suppression. However, this may quicken residue breakdown. Multi-tactical weed management programs including rotational tillage (tilling soils every two years or less often), diverse crop rotations, and enhancement of money crop competitiveness can play a role in IWM programs involving RCs and will be most effective if such acts concomitantly help deplete the weed seed bank. Further, any management tactic that limits weed seed return to the soil is a vital component of IWM because it helps deplete weed seed banks and ultimately reduces weed pressure and management cost in the long run.

**What cover crop should be used with the RC?**

Most research conducted in the Northeast with respect to RCs has used cereal rye as the test cover crop. Many humans think of rye as a cover crop super hero. Rye doesn’t wear a cape on the outside of its seed coat; however, rye is extremely cold tolerant so a cape is not practical. Other super natural powers of rye include: flexible establishment date, rapid emergence, ability to develop a fibrous root system, tolerance to low fertility soils, easy uptake of available nitrogen, weed suppression, and soil erosion prevention all in a single growing season. Grass cover crops such as rye, barley, spelt and triticale have a higher C:N compared to...
legumes (crimson clover, Austria winter pea, red clover, etc.). As such, residue mulches persist a considerably longer period of time after termination. The persistence of the grass residue results in longer-lasting soil coverage, which protects soils from erosion while preventing weed emergence. Further, grass cover crops are more capable of retrieving soil-applied nitrogen. The ability of grass cover crops to grow in winter/spring and sequester nutrients makes them an ideal RC partner, particularly in watersheds that suffer from excess nutrient runoffs such as the Chesapeake Bay Region of the United States. However, we tend to believe that the greatest amount of ecosystem services can be obtained by using cover crop mixtures and specifically mixing grass and legume species. Many legumes can be readily terminated with a RC at the flowering stage. Unfortunately, such mixtures especially those that include a legume may not be in compliance with state cover crop cost share programs.

Limitations of Physical Termination Methods

Each physical method used for offing cover crops has rewards and shortcomings. For example, mowing (e.g., rotary, flail, stalk chopper) may result in cover crop regrowth and unequal displacement of residue on the soil surface. Uniform ground cover is important if cover crop residue is to aid in weed suppression because weeds capitalize in niche spaces and germinate in areas without residue. In the past, producers wanting to suppress weeds mostly used a herbicide to off their cover crops. Mechanical methods were not cost effective and resulting cover crop residues were less persistent and uniform. Uniform ground cover can be obtained by using a flail mower with the appropriate cutting blades, but similar to other mowing instruments that macerate plant tissue, cover crop breakdown is hastened. Studies have shown that mowed mulch decomposition rate is accelerated compared to rolled mulches. Further, flail mowing requires a low tractor speed (2 to 5 mph) to effectively mow cover crop stands unless there is little biomass. Still mowers are versatile, easily available and more commonly owned.

Other potential disadvantages of using mechanical termination methods include cover crop “pop ups” (RC) and regrowth (mower) which may affect crop establishment. This generally occurs if the cover crop is mechanically terminated at an early development stage and/or in the case of the crimper there is not enough "crimper weight". These problems can be remedied by adding water inside the RC drum and offing the cover crop at the appropriate stage of development. For example, research has shown that it is important to delay mechanical termination of cereal rye until 50% of plants have reached anthesis (flowering) to prevent regrowth and ensure successful termination. In Pennsylvania, rye was consistently controlled at anthesis with a RC, but using a RC prior to this stage was less effective. Unfortunately, waiting for cover crops to flower can delay money crop planting. If the delay is significant, for example in the case of soybeans, yield reductions can occur. Further, soybean stands may be reduced if planted into a thick cover crop residue which decreases the seed-to-soil contact. This may be avoided by planting the soybean directly into standing cover crop and offing the cover crop while soybean seedlings are small enough to avoid being killed during cover crop termination. This tactic should reduce soybean seed-soil contact problems and subsequently improve weed management.

Recent advancements in crimper design has improved their efficiency and comfort. Tractor operators using older RC models felt they were riding an excessively vibrating dryer as opposed to big crimper. Further, older RCs were less efficient in offing cover crops and planting into the cover crop mulch was not always easy. Despite improvements and the promise RC shows for cover crop termination, it is still not very effective in killing cover crops at earlier growth stages and is not useful for directly offing weeds; the sweep plow under-cutter is likely a better bet for terminating young cover crops. Moreover, the RC is not as easily obtainable compared to other farming implements. Because a RC only crimps, it may not provide direct farm services beyond offing a cover crop and thus may not be a good investment for producers not cover cropping or using conservation tillage practices. Unlike mowers, RCs can’t moonlight with landscapers.

How does the crimper compare to the burndown system

Successful weed management in no-till farming systems depends upon the use of reliable tactics that are not second-rate to synthetic herbicides. A study was conducted in Illinois to investigate the potential of the roller-crimper to inhibit weed development in a no-till soybean system with minimal or no reliance upon herbicides. As part of the investigation, they compared “Big Crimpin” with the “Burndown” tactic. Following vetch or rye cover crop, crimping reduced weed biomass 26 and 56% more, respectively, than burndown. In contrast, burndown reduced weed biomass more in the no-cover crop control habitats, suggesting that the RC did not effectively kill weeds. Yield reduction caused by weed interference was unaffected by cover-crop termination method (RC or burndown) in soybean plots following rye, but yield lost was higher in RC than burndown treatment in both hairy vetch and control treatments. This study showed that using a RC to off a rye cover crop can reduce weeds and maintain high yields in no-till soybean. In production systems where herbicide use is an option, chemically offing the cover crop allows for termination at younger stages relative to mechanical termination and this reduces the risk of losing yield potential in some crops. However, using a RC to off a cover crop could be an important option for growers seeking a non-chemical method for managing weeds that minimizes labor, fuel costs and soil disturbances. This study found also that agronomic benefits of offing cover crops with a RC are contingent on cover crop species.
How do cover crops aid in weed management

Cover crops can aid in weed management as a living mulch by competing for resources such as sunlight, space and nutrients, and as a dead mulch on the soil surface that suppresses weed emergence. Surface mulch can inhibit weed growth by providing a physical barrier to weeds, intercepting light before it reaches weeds (reducing light availability), lowering soil surface temperature, physically blocking weed growth, and increasing weed seed predator populations. Cover crop mulches that reduce light levels at the soil surface slows photosynthesis and warming of soils in the spring. These conditions reduce weed seed germination and act as a physical barrier to their emergence. If weed management is mainly achieved by the cover crop physically blocking weed growth, cover crop biomass is critical. The level of weed suppression depends on the amount of cover crop biomass that accumulates prior to termination, with an exponential relationship between biomass and weed emergence. Depending on the amount of residue and termination method, sufficient weed control has been shown to last from 4 to 16 weeks into the season following cover crop termination. Though biomass is critical for weed suppression, large amounts of cover crop residue at money crop planting time may be challenging to producers that direct seed. However, improvements in planter and drill technology have alleviated some of these NT planting pitfalls; and though excessive cover crop residue can be potentially challenging, more weeds may emerge in low levels of residue than in bare-ground plots. How is this possible? Low cover crop residue is not sufficient to inhibit weeds from emerging but can create environments more conducive for weed germination and emergence. Low residue can impede evaporation of soil moisture and thus provide more uniform moisture conditions for weed germination and emergence than would exist on the surface of bare-soil. Also, nitrogenous compounds released into the germination zone, particularly from legume cover crops, can stimulate certain weed species to germinate.

Some cover crops aid in weed suppression by releasing allelochemicals or allelopathic phytotoxins that are toxic to weed seeds. When residues of allelopathic cover crops decompose into the soil, phytotoxins may be released that inhibit the emergence and growth of many weed species. While allelopathic mechanisms of weed suppression have been well studied and are soundly understood for some cover crop species, there is little known about potential interactions between cover crop mixtures and weed seed germination and growth.

How to Better Manage Cover Crops for Weed Suppression

Termination technique. Cover crop choice is important, but cover crop termination technique and residue management are considered by some to be the most critical factors in successfully using cover crops for weed suppression. Cover crops can be terminated climatically (e.g., winterkill), naturally (e.g., senescent), chemically or via physical or mechanical tactics (e.g., plowing, disking, mowing, big-crimpin or undercutting). The most appropriate termination method will depend on the production objective and equipment fleet. For example, incorporation of cover crop (e.g., green manures) into the soil is most common when the goal is to increase soil nutrients. Weed suppression can be enhanced by incorporating cover crop residues that release greater amounts of allelochemicals within the soil. Tilling in the top growth of an allelopathic green manure causes an intense but relatively brief burst of allelopathic activity throughout the till depth but leaving the residue on the surface as an in situ mulch creates a shallow (less than one inch) but more persistent allelopathic zone that can last for 3 to 10 weeks depending on weather and soil conditions. Thus, no-till cover crop management offers a potential for selective suppression of small-seeded annual weeds in transplanted and large-seeded crops, whose roots grow mostly below the allelopathic zone. Thus, when weed management is a priority and allelopathy is needed to suppress shallow small-seeded weeds, termination of allelopathic cover crops resulting in maximum and extended surface residue and minimal soil disturbance has the greatest potential to inhibit weed seed germination, establishment and growth. Cover crop biomass will vary widely depending on its growth stage at termination. The growth stage is partially influenced by timing of fall planting and spring termination. Most winter cover crops are not grown to full maturity, so achieving optimum biomass and soil coverage is difficult. Winter cover-crop biomass accumulates in spring, with low accrual early on and growth at break neck speed later in the spring. A study showed that termination date in the spring had a greater influence on final cover crop biomass than planting date in the fall. For example, a delay in rye termination in the spring resulted in an increase in cover crop biomass and an associated decrease in summer annual weed populations. Rye termination delayed from May 01 to 30 resulted in an increase in cover crop biomass from 400 g m$^{-2}$ to 1000 g m$^{-2}$ and an associated reduction in weed density from 36 to 24 plants m$^{-2}$. In another study, delaying rye termination by 10 to 20 days nearly doubled its biomass, but did not consistently improve weed control. It was suggested that the earlier termination dates (April 24 to May 17) followed by soybean planting along with competitive rye contributed to these results. However, even at early termination, weed density and biomass were reduced compared with treatments without rye cover crop. In an effort to delay cover crop termination, the money crop could be sown into the living cover crop which is suppressed at a later date, or a shorter season money crop cultivar could be chosen which will allow it to be planted later in the season. If a cover crop has to be terminated early in the spring, another approach is to plant it early the previous fall and choose a cover crop that provides additional mechanisms of weed suppression such as allelopathic...
activity. Enhancing the synchrony between high cover-crop biomass and soil coverage, and weed emergence can improve weed management drastically.

**Cover crop cultivar.** Choosing the appropriate cover crop cultivar is critical. For instance, the problem associated with having to terminate a cover crop prior to it reaching maturity in spring may be overcome by using an early-maturing cultivar. This may allow greater flexibility of cover crop termination. Some cultivars may produce greater biomass compared to others. A study found that the rye cultivar ‘Aroostook’ consistently produced greater biomass than ‘Wheeler’. Increasing cover crop seeding and fertilization rates are two additional tactics to increase cover crop biomass. However, applying fertilizer may be counter intuitive since cover crops are often planted to scavenge nitrogen from the soil profile. Further, it was shown that increasing rye biomass by applying poultry litter did not lower weed biomass. Weeds are known to disproportionately benefit from over fertilization, so that crop competitiveness can be increased by temporarily and spatially managing soil nutrient availability. Soybeans and other legumes that fix atmospheric nitrogen have a competitive edge over weeds when soil nitrogen levels are low.

**Seeding rate.** Increasing cover crop seeding rate can reduce weed biomass without an associated increase in cover crop biomass. An increase in rye seeding rate was shown to reduce weed biomass without an increase in rye biomass by time of termination. In the study, rye was planted at 90, 150 and 210 Kg seed ha⁻¹ which is equivalent to 80, 135 and 185 lbs seed/a⁻¹, respectively. It is likely that the greater seeding rate increased cover crop residue coverage. It has been suggested that it is necessary to achieve 97% soil coverage with cover crop residue to reduce weed density by 75% with respect to light interception. Thus, tactics that increase the amount of soil surface coverage by cover crop residue could lead to greater and lengthy weed suppression.

**Diversity.** Increasing cover crop diversity may impact weeds differently as a mixture of cover crop species may more readily suppress a broader range of weed species. Using a single cover crop species is popular due to the simplicity of planting, uniform development, predictable growth stage and termination efficacy. However, mixed cover crop habitats may provide greater weed control by increasing the number of mechanisms that contribute to weed suppression. A mixture of cover crop species with complementary growth features could increase weed control by way of greater overall cover crop shoot biomass accumulation, appropriately timed degradation of residue, and a broader spectrum of allelopathic activity. Multi-species mixtures may enhance productivity, stability, resilience, and provide greater on-farm services than single species. In a study evaluating cover crop mixtures, it was found that increasing cover crop diversity increased biomass productivity in 2 of 3 study years and that diverse cover crop mixtures were more resilient following management error and severe weather disturbance.

**Finishing statement**

Whether conventional or organic, producers should rely on multiple weed suppression tactics. Various methods include crop rotation, flaming, weed seed predation, smother crops, competitive crop cultivars, cultivation, cover cropping and etc. Frequent cultivation is the core of many organic weed control programs. However, continuous cultivation has negative consequences on soil quality and health and increases input costs. Weed management tactics that integrates no-till practices with mechanically terminated cover crops should maximize ground coverage, minimize soil disturbances and avoid causing stand reductions of the money crop. In addition to manipulating cover crops for weed suppression, there is the potential to directly manipulate the money crop. For instance, planting soybean in narrower rows or increasing the seeding rate places greater emphasis on their competitive ability for weed suppression. This suggests that cover crops don’t have to be a standalone approach and can be integrated with other tactics to formulate a successful IWM program that is less dependent on herbicide intervention.

**FARM BILL PAGE**

A webpage has been developed to house information that is related to the implementation of the 2014 farm bill. Currently it just has the presentations from the farm bill meetings posted but new resources will be added as they become available. Producers and anyone else interested can view it at:

http://www.arec.umd.edu/extension/crop-insurance/2014-farm-bill

**Updated Estate Planning for Farm Families**

The *Estate Planning for Farm Families* publication has been revised to reflect some changes the MD General Assembly made on estate tax exemptions last session. The publication is available at:

Update of Human Health Benchmarks for Pesticides in Water

The EPA has updated its list of human health benchmarks for pesticides. The EPA develops these benchmarks as screening levels for use by states and water systems in determining whether the detection of a pesticide in drinking water or a drinking water source may indicate a potential health risk. This year, the EPA added 11 new benchmarks to the list, revised 10 of the benchmarks published in 2012 to reflect new scientific information and added cancer effects benchmarks for 40 of the pesticides. To view the revised list of human health benchmarks for pesticides, visit www.epa.gov/pesticides/hhbp

New Website on Soil Fumigants

As part of the EPA’s effort to build a more user-friendly website, we have compiled all of our information on soil fumigants into a microsite so that visitors can find the information they need more quickly and easily. The Soil Fumigant Toolbox contains material on

- training,
- fumigant management plans,
- buffer zones and
- other safety measures for the protection of agricultural workers and bystanders.

You will find background information on soil fumigants and links to fact sheets and the National Association of State Departments of Agriculture Research Foundation’s Soil Fumigation Manual, a national pesticide applicator study guide. This toolbox will be useful to fumigant handlers and certified applicators, state and tribal agencies, and communities that may be affected by the fumigation of soil. It can be accessed at http://www2.epa.gov/soil-fumigants

EPA Site Quick Finder

About EPA’s Pesticides Program
Overview of EPA’s program evaluating potential new pesticides and uses, providing for special local needs and emergency situations, reviewing safety of older pesticides, registering pesticide producing establishments, enforcing pesticide requirements, pesticide issues in the works, overview of risk assessment in the pesticide program

Types of Pesticides

Pesticides are often grouped according to the type of pest they control or by chemical or source. type of pest, chemically-related

Frequently Asked Questions
Answers to questions from the public.

Fact Sheets
Search general interest and technical fact sheets. health and safety, regulatory actions, specific chemicals

Information Sources
Additional information of general interest. General information, hotlines, information centers, databases

Pesticide Program Reports
Reports produced by the Office of Pesticide Programs Annual Reports, Performance Management & Accountability, Pesticide Industry Sales and Usage, Progress Reports, Restricted Use Products Reports

Pesticide News Stories
Pesticide related articles appearing in news media

Publications | Glossary | A-Z Index |
IPM Alert: Cherry Trees Defoliated
By Stanton Gill Extension Specialist in IPM and Entomology for Nursery and Greenhouse
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On Monday, upon the request of a nursery, I visited a site they had installed with ornamental cherries lining a driveway. It looked like nuclear winter with two or three leaves on each of the trees. It was not that the trees that had been installed were of inferior quality. The problem was this was one related to the continually wet summers and foliar leafspot diseases on cherry trees were prevalent through June, July and August, causing spotting of leaves, yellowing of foliage and pre-mature leaf drop. It would have taken quite a few foliar applications of protectant fungicides this season to prevent this defoliation. There is not much that can be done at this point in the season. We have had several arborist and landscapers call and email in describing similar situations in their customer’s landscapes. At least, you are not alone.

www.Extension.umd.edu/ipm - IPM Alerts

Mid-Atlantic Crop Management School
Expanded Facility Supports Larger Audience
Mid-Atlantic Crop Management School November 18-20, 2014

The annual Mid-Atlantic Crop Management School will be held November 18-20 at the Princess Royale Hotel in Ocean City, MD. This highly acclaimed event has for many years been the “one-stop” location for Certified Crop Advisors to obtain Continuing Education Units (CEUs) in the categories of Crop Management, Pest Management, Nutrient Management, and Soil and Water Management. This year, a remodeled conference center at the Princess Royale will provide larger rooms for the concurrent educational sessions offered at this school. The expanded facility allows the planning committee to accept a higher number of students than could be supported in previous years.

Over the three days of the school, there will be 45 different topics presented in the four subject areas previously mentioned in addition to an open fifth category. I encourage farmers and farm managers, agronomists, crop consultants, extension educators, farm service providers, soil conservationists, state department of agriculture personnel, and extension educators located in the Mid-Atlantic to register and attend this school. This year’s program can be seen and registration can be accomplished by visiting http://psla.umd.edu/extension/md-crops

http://extension.umd.edu/agmarketing

A new “Ag Marketing News Update – August 2014: “Ignite Your Sales with Sensory Branding” has been posted to the web: http://extension.umd.edu/learn/ignite-your-sales-sensory-branding

Vegetable & Fruit Headline News
A timely publication for the commercial vegetable and fruit industry available electronically in 2014 from April through October on the following dates: April 17; May 15; June 19; July 17; August 14; September 18; and October 23.

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