

PLANT & PEST ADVISORY

VEGETABLE CROPS EDITION \$1.50

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How Organic Mulches Suppress Weeds

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I recently read the article "Compost as an Alternative Weed Control Method" by Monica Ozores-Hampton from the University of Florida (1998: HortScience 33:938-944). The article reviewed literature on organic mulches and compost for managing weeds.

Weeds are suppressed by organic mulches and compost by two methods: they physically prevent weeds from growing; and as they decompose, chemicals that are toxic to plants are produced as part of the breakdown process which can prevent weed seed germination.

Physically Preventing Weeds

Organic mulches (sawdust, straw, bark, etc) can be as effective as herbicides based on some research trials. They also can improve soil health by minimizing soil erosion and compaction. Their use has also resulted in increased yields (compared to not mulching or not using herbicides). Depending on crop, fruit quality can also been improved by preventing direct contact between the fruit and soil.

The effectiveness of organic mulches for suppressing weeds is dependent on the thickness of the mulch layer, with thicker layers resulting in fewer weeds. A four to six inch mulch layer has been found generally effective. Germination of weed seeds is lesser with thicker layers and has been linked to changes in light levels, temperature and moisture. The effectiveness of organic mulches for suppressing weeds is also dependent on the type of organic mulch, weeds species present and environmental conditions.

Phytotoxic Effects during Composting

During the composting process, organic materials (animal manures, leaves, paper, wood chips, straw, textiles, etc.) are decomposed by microbes which over time convert the organic material into compost. Decomposition results in the release of nutrients in plant-available form from compost. However, chemicals toxic to

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plants are also released including acetic acid, acetaldehyde, ethanol, acetone, ethylene and allelopathic compounds. These chemicals are typically not present in mature or finished compost. Some research has shown that phytotoxic compounds tend to disappear more quickly when a static pile system is used compared to a windrow system.

Immature compost should not be applied to soils because phytotoxic chemicals are present. The most phytotoxic chemical in decomposing compost is acetic acid which can inhibit seed germination of crops and weeds. In one trial immature (4-week-old) sewage sludge-based compost (strict regulations exist for applying sewage sludge to agricultural lands) was applied to the alleys between raised beds and successfully suppressed weeds for 8 months due to physical restriction and the phytotoxic chemicals in the compost. Immature compost can also decrease oxygen levels and increase temperatures in the soil which can negatively affect plant root growth.

The Bottom Line

Organic mulches (newspaper, broiler litter mulch, oak bark, etc.) have been used very successfully for managing weeds in many crops. Studies have concluded that organic mulches suppress weeds by inhibiting germination physically and chemically. However, since they are not applied until after crop seedling emergence has occurred, the negative effects of toxic compounds have not been observed. In the last issue of the Gazette I reported on a trial where newspaper mulches were evaluated for weed management in a cucumber crop. In that trial, all of our mulch treatments suppressed weeds to below yield-depressing levels. However, there are also some issues to be aware of before using them. Organic mulches can create a habitat for small animals (voles, mice) that can damage crops. This doesn't happen every year or in every field, but it can be an issue. A few years back we had a strawberry trial and used straw mulch covered with a row cover for winter protection. In the spring about 1/3 of the plants had been damaged by voles who had taken up residence in the straw. Organic mulches can maintain soil moisture, limiting the amount of irrigation crops may need. However, they can create moist environments that can favor root rots, especially in a wet year. Organic mulches may provide less weed suppression and can be more expensive than herbicides. They also need to be replenished to maintain their depth as they break down.

Finally, if buying compost, consider storing it if it is immature until it matures. When mature compost is incorporated into soil can result in increased crop yields and improve soil health. □

Plastic Mulch and Fertilization

Adapted from Steve Reiners, Cornell University and reprinted from Vermont Vegetable and Berry News – May 23, 2007, University of Vermont Extension

If you need to broadcast fertilizer prior to planting, it is relatively easy to figure out how much to apply. If you are using plastic mulch, however, you may be applying more fertilizer than you need. In a typical mulched field, the width of the soil surface covered with mulch is usually three feet. The uncovered area is usually 2 to 3 feet depending on the row spacing. For our example, let's use two feet. Prior to laying plastic you need to add 50 pounds of N and 100 pounds of P and K. Using a 10-20-20 fertilizer you could spread 500 pounds evenly across the acre. But you will be fertilizing the area that is between the rows, an area where crop roots will likely not be feeding but weeds will.

If you have the equipment, it is much better to apply the fertilizer only to the area that will be covered with mulch. Since that will be only three feet of every five feet, that means that only 60% of an acre will be used by the crop. You can cut your fertilizer rate to 300 pounds per acre from 500 and still get the same effect. Once this is applied and the plastic is laid, you can use the same calculation to apply fertilizer through the drip system. If you need 20 pounds per acre of N, P, and K and are using a 20-20-20 soluble fertilizer, you will need only 60 pounds of fertilizer rather than 100 pounds. It all comes down to the fertilized-mulched acre. This is the percentage of an acre that is covered by plastic mulch where most of the crop roots will be found. Applying fertilizer based on this will save you money and maintain your crop's quality. □

Vegetable Disease Update

Andy Wyenandt, Ph.D., Specialist in Vegetable Pathology and Wesley Kline, Ph.D., Cumberland County Agricultural Agent

✓ **Cucumber/Pickles – Angular leaf spot** - Symptoms are distinct and easily diagnosed. Small water-soaked **lesions** develop on leaves and expand until they are **delimited by larger secondary veins** in leaves resulting in angular lesions. After time these lesions turn brown and infected tissue drops-off resulting in ‘shotholes’. Angular leaf spot can be spread by splashing rain, insects, on the hands of workers and on farm machinery. Working in the field when the foliage is wet favors the spread of the disease. The disease can also be spread by blowing wind and in irrigation water. Best management of Angular leaf spot begins with clean-seed and planting in fields that has been out of cucurbit production for at least 2 years. Cultivating when foliage and soil are wet and irrigating with pond water should be avoided. There are cucurbit varieties with resistance. Add label rate of fixed copper + mancozeb to fungicide maintenance program and repeat applications every 7 days.

✓ **Lettuce – Bottom Rot/Drop** – Growers should take precautions to help control Bottom rot (*Rhizoctonia*) and Lettuce drop (*Sclerotinia*) which may cause potential problems. For Bottom Rot, Endura 70W (boscalid, Group 7) at 8 to 11 oz/A, or Rovral 50WP (iprodione, 2) at 1.5 to 2 lb/A or OLF should be applied one week after transplanting or thinning and 10 and 20 days later. For Lettuce drop, the biological Contans 5.3WG at 2 to 4 lbs/A pre-plant can be incorporated at a depth of 1 to 2 inches; or apply Rovral (iprodione, 2) at 1.5 to 2 lb/A 50WP or Endura (boscalid, 7) at 8 to 11 oz 70W/A beginning one week after transplanting or thinning and again at 10 and 20 days later. For more information on control of Bottom rot and Lettuce drop and other important diseases of lettuce please see the 2007 *New Jersey Commercial Vegetable Production Recommendations Guide*.

✓ **Parsley – Septoria Blight/Bacterial blight** – Leaf spots caused by **Septoria blight** are easily distinguished by small, angular to round leaf spots with grayish-brown centers with a definitive dark brown margin. Numerous black fruiting bodies develop and are visible in the center of lesions. Spread of Septoria blight is by wind-driven rain, heavy dews and overhead irrigation. Workers and equipment may also spread the disease during wet conditions. Best management practices include i) proper crop rotations of at least 2 years and by using clean or treated seed; ii) scout fields early for symptom development; iii) keeping workers and equipment out of fields with wet foliage; and iv) plowing under residue of harvested crop and avoid planting in fields

adjacent or near previously infected fields. Applications of azoxystrobin (Amistar or Quadris) and fixed copper can be alternated every 7 days for control. Bacterial leaf spot (*Pseudomonas syringae*) of parsley shows up at the same time as Septoria blight. Leaf spots caused by Bacterial blight appear as small brown to black spots on the leaves. It does not have the grayish brown centers or brown margins like Septoria. The pathogen can be soil or seed borne and develops during cool, moist weather. The disease spreads during cool rainy periods or under sprinkler irrigation; and a high plant density. The same control measures listed for Septoria will assist in preventing the spread of Bacterial leaf spot as long as fixed copper is included with azoxystrobin. If Oxidate is used, follow the label carefully.

✓ **Pepper – Phytophthora blight**

For control of the crown rot phase of blight:

Apply 1 pt Ridomil Gold 4E/A or 1 qt Ultra Flourish 2E/A (mefenoxam, 4). Apply broadcast prior to planting or in a 12- to 16-inch band over the row before or after transplanting. **Make two additional post planting** directed applications with 1 pint Ridomil Gold 4E or 1 qt Ultra Flourish 2E per acre to 6 to 10 inches of soil on either side of the plants at 30-day intervals. Use formula in the “Calibration for Changing from Broadcast to Band Application” section of Calibrating Granular Application Equipment to determine amount of Ridomil Gold needed per acre when band applications are made.

When using polyethylene mulch, apply Ridomil Gold 4E at the above rates and timing by injection through the trickle irrigation system. Dilute Ridomil Gold 4E prior to injecting to prevent damage to injector pump.

✓ **Potato – Black Leg** – The aerial phase of Black leg, also known as aerial stem rot, has shown up over the past week. Black leg is caused by *Erwinia* spp., which also cause ‘soft rot’. The bacteria which lead to the aerial phase of Blackleg are soil-borne (originate from old crop debris) and are spread by rainfall, overhead irrigation and wind. The aerial phase of Blackleg does not originate from decaying seed pieces. The bacterium can enter the plant through wounds created by cultivation or through stems damaged by blowing wind, sand or hail. Dense canopies, warm weather and prolonged periods of leaf wetness favor the spread of aerial Blackleg. Fortunately, the disease rarely extends below ground and causes dieback of stems over time. Symptoms of the aerial phase of Blackleg first appear as an irregular, water-soaked ‘green’ decay on stems that turns light-brown to black over time. Hot, dry weather will cause infected areas to dry out and become brittle. To help suppress aerial Blackleg, avoid excessive overhead irrigation if possible. Do any cultivating when plants are dry. Cultivating in the presence of dew or wet plants may help to spread the bacterium around.

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✓ **Tomato – Bacterial spot, speck and canker** – Bacterial diseases can cause serious problems in the field if infections are allowed to spread. Apply Actigard (P) at 0.33 oz 50 WG/A, or fixed copper (M1) at 1 lb a.i./A plus a mancozeb (Dithane, Manex II, Manzate, Penncozeb, M3) at 1.5 lb 75DF or OLF, or ManKocide (M1 + M3) at 2.5 to 5.0 lb 61WP/A, or Cuprofix MZ (M1 + M3) at 1.75 to 7.25 lb 52.5DF/A on a 7 day schedule.

✓ **Tomato - Stem Rot/Pith Necrosis**
– Symptoms begin to develop as green fruit begins to mature. Bacteria are most likely ubiquitous to tomato fields and develop when weather conditions and cultural practices lead to favorable conditions for disease development. Symptoms include the development of irregular brown lesions on main stems and branches. Late pruning (suckering) can provide entry points for both bacterial diseases, especially during wet conditions. Internally, stems will become brown and mushy. High humidity is necessary for disease development in both cases. High nitrogen and low night temperatures are associated with Pith Necrosis development. Control of both begins with cultural practices such as avoiding working in fields with wet foliage, avoiding late pruning and watching the amount of N applied to plantings. □

Vegetable Diseases of the Week

Andy Wyenandt, Ph.D., Specialist in Vegetable Pathology



Symptoms of Stem/Pith Necrosis of tomato.



Symptoms of Angular leaf spot on top and bottom side of cucumber leaf.

Pest Notes

Gerald M. Ghidui, Ph.D., Specialist in Vegetable Entomology

✓ **Flea beetles:** Closely monitor for **flea beetle** activity or damage. The current warm weather this week will bring out the flea beetles on most vegetable crops, but damage will be readily noticeable on eggplant, cabbages and corn. Damage appears as small holes in the leaves or notches in leaf edges at first. Multiple holes appear as the population increases then the holes dry out and tear in the wind. For cole crops, treatment is recommended if there is one beetle per plant in the larger plants, or if there is one beetle per plant in seedling stage plants. Pyrethroids are very effective, and include Asana, Baythroid, bifenthrin, Mustang MAX, Proaxis, and lambda-cyhalothrin. Also, Provado (or generics), Sevin and Thionex are effective against flea beetles.

In sweet corn, treat if there are 6 beetles per plant. With varieties susceptible to Stewart's Wilt disease, treat at the spike stage when 5% of the plants are infested. For a discussion of materials to select for flea beetle control (post-planting), and effect of cool weather on flea beetle management, refer to pages F110 of the *2007 Commercial Vegetable Recommendations for New Jersey*.

✓ **Asparagus beetles** are still active and depositing eggs on asparagus spears. These pests will be even more active with the current warm weather (>70 degrees). Treat spears during harvest if infestations exceed 5-10 adults per 100 crowns or if eggs are present on more than 2% of the spears. If you have asparagus beetle problems now, remember to treat ferns later in the season if infestations exceed 5-10 adult beetles per 10 crowns. This will reduce the population that will overwinter to cause problems next year. Sevin, Lorsban, Pounce/Ambush, malathion, methoxychlor, and Lannate are labeled for asparagus beetle control. Spintor (Entrust) is labeled for asparagus beetle control in the fern stage only.

✓ **Cucumber beetles** transmit bacterial wilt, and most varieties of melons are susceptible to this disease. Also, adult beetles can cause serious feeding damage to young plants. Control of beetles should be made before they feed extensively on the cotyledons and the first true leaves. Many at-plant insecticides are registered, such as Admire Pro or other imidacloprid-type material, Furadan (a Special Local Needs label is in effect for NJ), and Platinum. If only foliar insecticides are used, treatments may be necessary from the time plants emerge until vines begin to run. □

IPM Update

Kristian Holmstrom, Research Project Coordinator II, Vegetable IPM Program

Note – No maps will be produced in the May 30th edition. Higher catches will be posted by location. ECB maps will resume in the June 6 edition. As yet, no corn earworm (CEW) have been captured. When CEW adult catches occur, maps for that pest will begin.

Sweet Corn

Cooler evening temperatures during the first half of the week depressed **European corn borer (ECB)** adult numbers in general, although a few steady catches were made in Burlington, Gloucester and Salem Counties (see ECB map). Had the nights been warmer, we would likely have seen greater numbers throughout the southern half of the state. The first flight is just getting underway, and overall catches should be fairly light for the next week. In the central counties, the earliest sweet corn plants (those started on plastic) are just large enough to be targets for ECB larval injury. In the southern counties, egg laying and larval injury will likely occur within the next 1-2 weeks as adult activity increases.

The highest nightly ECB catches for the previous week are as follows:

Beckett	2	Dayton	1	New Egypt	1
Crosswicks	2	Georgetown	1	Phillipsburg	1
Mannington	2	Little York	1	Sergeantsville	1
Burlington	1	Long Valley	1	Shirley	1

For sweet corn in the whorl stage, check 5 consecutive plants each in 10 random locations throughout the planting. Look for the presence of "shot-hole" type feeding that is characteristic of ECB larvae. Consider treating if fresh damage is found on 12% or more plants. Do not count plants with larger holes that appear in straight lines across leaves. This feeding is caused by the **billbug**, and occurred when the plants were very small. It is not economically important.

For newly emerged plantings, check 10 consecutive seedlings each in 10 random locations in the field for the presence of corn **flea beetle**. This pest is capable of transmitting **Stewart's wilt** to small sweet corn plants. If the variety has been purchased with a seed treatment (Gaucho or other systemic insecticide), or a systemic insecticide was used at planting, it is unlikely that flea beetles will be present on the plants. If no systemic insecticide was used and the variety is susceptible to Stewart's wilt, a foliar insecticide treatment should be applied when >6 flea beetles are found per 100 seedlings.

Cole Crops

Imported cabbage worm (ICW) infestations are increasing, and adults (the white cabbage butterfly) are visibly active in fields on warm days. In heading type cole crops like cabbage and broccoli, check 5 consecu-

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tive plants each in 10 random locations. Look on the undersides of leaves and on the youngest leaves at the center of the plant. Consider treating if 10% or more plants are infested while in the 0-9 true leaf stage. The threshold may increase to 20% from 9 true leaves to the early head stage. Once heads form, the threshold becomes a more conservative 5%, in order to protect the marketable portion of the plant.

While scouting for caterpillar pests, note the presence of **crucifer flea beetle**, especially on new transplants or recently emerged plants. This pest can be very destructive, particularly to newly emerged seedlings. Consider treating if 50% or more plants have flea beetles on them, and damage is visible. It is important to check these young fields at least weekly, as reinfestation can occur quickly after a foliar insecticide application.

Tomatoes

In general, recently transplanted tomatoes have been unaffected by insect pests in the northern and central counties as yet. However, it is time to begin looking for several common pests including **aphids**, **mites** and **Colorado potato beetles (CPB)**.

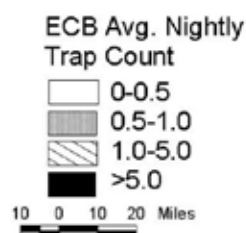
Tomatoes are subject to infestation by aphids, even early in the season. Check 5 consecutive plants each in 10 random locations in the planting. Look at two complete leaves per plant. Aphid colonies may be tolerated on plants for a time as long as they are not numerous and heavy enough to result in honey dew (sticky droppings) on the surface of fruit. In most cases, there are no fruit present on plants yet. Aphids may be controlled by natural predators and parasites if broad spectrum insecticides are not used. Note whether colonies are increasing in number and note the presence of predators such as ladybird beetles/larvae, lacewing larvae, syrphid maggots and the presence of bloated, gold colored aphid mummies (indicating parasitism by aphidiid wasps). If aphid colonies are still present when fruit begin to size, and are heavy enough to result in honey dew deposition in several samples, consider a foliar insecticide application to control them.

When scouting for aphids, note the presence of whitish "pin-spots" on the surface of lower leaves. Upon closer inspection, **two-spotted spider mites** may be found on the lower surface of leaves with the pin-spots. This pest is best dealt with before it becomes widespread in the field. Spot treatments with miticides may be sufficient to prevent larger infestations. Be sure to take several samples from field edges to account for potential mite migration into the field from grassy edges or other near by host crops.

Colorado potato beetle (CPB) adults are active at this time, and are a threat to new transplants that have not been treated with a neo-nicotinoid material like Admire Pro (see the 2007 NJ Commercial Vegetable

Recommendations for materials). When scouting for pests, take some samples from areas closest to where CPB host crops (potatoes, tomatoes, eggplant) were the previous season. These may be areas of early infestation. If populations are localized, a spot treatment may be sufficient to prevent a greater infestation. Otherwise, consider treating if CPB adults average 15 per 10 plants throughout the field. Note also the presence of bright yellow CPB egg masses. If eggs are evident in numerous samples, it may be better to delay treatment until greater than 50% of the eggs hatch. Treating at that time will control emerging larvae.

Distribution of Adult European Corn Borer for the Week Ending May 23, 2007



Data collected and processed by: Kris Holmstrom, Marilyn Hughes
Rutgers Cooperative Extension & Center for Remote Sensing

Weekly Weather Summary

Keith Arnesen, Ph.D., Agricultural Meteorologist

Temperatures averaged near normal, averaging 60 degrees north, 62 degrees central and 62 degrees south. Extremes were 88 degrees at Freehold and Toms River on the 17th, and 36 degrees at Newton on the 15th. Weekly rainfall averaged 0.71 inches north, 0.69 inches central, and 0.78 inches south. The heaviest 24 hour total reported was 1.14 inches at Seabrook on the 16th to 17th. Estimated soil moisture, in percent of field capacity, this past week averaged 87 percent north, 87 percent central and 84 percent south. Four inch soil temperatures averaged 61 degrees north, 62 degrees central and 63 degrees south.

Weather Summary for the Week Ending 8 am Monday 5/21/ 7										
WEATHER STATIONS	RAINFALL			TEMPERATURE				GDD BASE50		MON %FC
	WEEK	TOTAL	DEP	MX	MN	AVG	DEP	TOT	DEP	
CANOE BROOK	.92	19.68	8.39	87	42	61.	0	336	152	94
CHARLOTTEBURG	.83	14.98	3.86	84	46	60.	2	288	174	85
FLEMINGTON	.66	18.62	7.91	85	43	60.	-1	316	119	87
NEWTON	.43	10.95	1.06	84	36	58.	-1	261	117	82
FREEHOLD	.47	14.07	3.40	88	46	63.	1	448	201	78
LONG BRANCH	.85	14.56	3.54	86	43	61.	0	300	90	94
NEW BRUNSWICK	.90	18.80	8.35	85	48	63.	0	365	91	89
TOMS RIVER	.60	11.68	1.00	88	40	60.	-2	347	115	74
TRENTON	.64	15.83	6.17	84	42	61.	-3	392	85	85
CAPE MAY COURT HOUSE	.48	7.80	-1.56	82	42	60.	-2	337	66	77
DOWNTOWN	.77	13.01	3.39	86	39	61.	-3	407	88	82
GLASSBORO	1.12	12.30	2.09	85	49	63.	-1	479	174	85
HAMMONTON	.56	11.94	2.00	87	41	62.	-1	420	123	71
POMONA	.63	10.11	.80	85	40	61.	-1	385	136	80
SEABROOK	1.14	13.29	4.52	85	46	64.	0	500	176	84
SOUTH HARRISON	.85	14.58	5.13	84	46	63	NA	459	NA	NA
WES KLINE -- GDD BASE 40 PINEY HOLLOW										
LAST WEEK 163 (Ending 5/14/07)										
THIS WEEK 149 (Ending 5/21/07)										

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