

PLANT & PEST ADVISORY

VEGETABLE CROPS EDITION \$1.50

AUGUST 15, 2007



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Food Safety Series: Water Testing and Third-Party Audits

Wesley Kline, Ph.D., Cumberland County Agricultural Agent

Q – What water sources need to be tested?

A – All water sources used in production, spraying or post harvest operations must be tested. This includes municipal, well and surface water.

Q - How often do I test?

A - Municipal water test results can be obtained from the local water authority on an annual basis. Well water should be tested twice each year and treated if fecal coliforms are present. Surface water should be tested three times during the growing season – first at planting, second at peak use, and third near harvest.

Q – What do I test for?

A – Test for fecal coliform not total coliform. The results should be reported in numbers not just presence or absence. Testing for E. coli is also recommended.

Q – What if the test comes back positive for fecal coliform or E. coli?

A – Well water can be shock treated for the bacteria prior to use. Information is available through your county extension office or contact the health department. Surface water is harder to treat.

Q – What levels are acceptable?

A. – For potable water, it is the same as drinking water standards. For irrigation water the acceptable levels are still being discussed. For this year, New Jersey will use 200 Fecal Coliform units/100 ml. There will be continued research in this area to refine the levels.

Q – What do I do with the results?

A – When you request an audit, the auditor will request to see the results to verify that water testing is a standard practice. These test results should be kept to compare one sampling date to the next.

Q – Do I need to use potable water for all applications?

A – No, potable water must be used for drinking, hand washing, cooling produce and ice making. Surface water is not considered potable so it cannot be used for post harvest activities.

SEE WATER TESTING ON PAGE 2

Q - Do all crops need to be audited?

A – No, for a vegetable farm that grows spring, summer and fall crops the grower and the buyer can decide which crops they would like audited. Only the crops audited will be listed on the USDA website. USDA auditors will work with the operation to group crops together.

For example, if greens are grown in the spring and fall the spring audit can also apply for the fall crops. However, if summer crops are grown (i.e. tomatoes, peppers, eggplant, etc.) and the operation/buyer would like those audited, then two audits would be required. With the second audit, generally it only would be the packing and field operations related to those crops. The general question section would not be revisited unless the auditors see a health and safety issue. This also will help reduce the cost of the second audit.

Q – Why are we being asked to have more than one audit by buyers?

A – It depends on who is purchasing the produce. Most buyers will accept the USDA audit, but there are exceptions. If two different buyers ask a grower to use different auditing firms talk to the buyers to see which auditing firm would be acceptable to both.

Q – Do packing sheds need to be enclosed?

A – No, but there must be some way to exclude birds and rodents from the open shed. This can be done by covering the eaves with mesh screens, using distress signals, bird guards, etc. Remember the presence of birds or rodents or signs of either can result in an automatic failure of the audit. If a new packing shed is being built, I would recommend it be enclosed. There is no question that enclosed packing sheds are much better than open sheds. If the packing shed is enclosed, make sure the doors are closed at night. This will help reduce the bird problem.

Q – Do all water sources need to be tested?

A – Yes, the wells that are used for drinking and the packing shed must be potable water. This means the normal test for house wells (drinking water standards) will be carried out. That includes testing for total Coliform.

For irrigation sources, the water does not need to be potable. Those sources must be tested for at least fecal coliform and preferably E. coli. **A total coliform count will not tell the grower whether it is fecal or not.** If surface water is tested, there will be coliform present. Do not waste time and money testing for total coliform and then have to re-test for fecal coliform. □

Vegetable Diseases of the Week

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



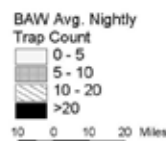
Symptoms of Bacterial wilt on pumpkin leaf.



Discolored vascular tissue of pumpkin stem with Bacterial wilt.

BAW MAP FROM PAGE 6

Distribution of Adult Beet Armyworm for the Week Ending August 15, 2007



Data collected by Joe Mahar and processed by Kils Holmstrom Rutgers Cooperative Research and Extension

Vegetable Disease Update

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

✓ **Carrot – Leaf blight caused by *Alternaria* or *Cercospora*** - Apply Amistar 80WDG (azoxystrobin, FRAC code 11) at 3 to 5 oz/A or Quadris (azoxystrobin, 11) at 9.2 to 15.4 fl. oz 2.08F/A, or Cabrio 20EG (pyraclostrobin, 11) at 8 to 12 oz/A, or Pristine (pyraclostrobin + boscalid, 11 +7) tank-mixed or alternated with Bravo, Echo, Equus (chlorothalonil, M5) at 1.5 to 2 pt/A or OLF, or Endura 70W at 4.5 oz/A. Apply Rovral 50WP (iprodione, 2) at 1 to 2 lb/A or Switch (cypridonil, 9) at 11 to 14 oz/A for *Alternaria* only. Do not make more than one sequential application of Amistar, Pristine or Cabrio (FRAC code 11). For more information on tolerant varieties and control please see the *2007 New Jersey Commercial Vegetable Production Recommendations*.

✓ **Cucurbits – Powdery mildew** - Powdery mildew typically occurs from mid-July until the end of the season. Symptoms typically begin on older, lower leaves and can develop and spread rapidly under dry, humid conditions. **Control of Powdery mildew begins with regular scouting for symptoms and weekly fungicide applications.** Fungicide resistance management of the fungus which causes Powdery mildew is critical. Fungicides with a high risk for resistance development such as the strobilurin (Pristine, FRAC code 11) should be tank mixed with a protectant fungicide such as chlorothalonil (M5) or sulfur (M2) and rotated with fungicides of a different chemistry such as chlorothalonil + Nova or Procure (FRAC code 3). FRAC code 3 fungicides are also high-risk and should never be applied alone. Growers need to read and follow restrictions on labels carefully. For more information on control of Powdery mildew and other important diseases of cucurbits please see the *2007 New Jersey Commercial Vegetable Production Recommendations Guide*.

✓ **Cucurbits – Downy mildew** - Tank mix one of the products listed below with a protectant fungicide such as chlorothalonil (M5), or maneb (M3), or mancozeb (M3) (see label for rates and specific crop uses):
Ranman (cyazofamid, 21) at 2.1 to 2.75 fl. oz. 400SC/A, or
Previcur Flex (propamocarb HCL, 28) at 1.2 pt 6F/A, or
Gavel (zoxamide + mancozeb, 22 + M3) at 1.5 to 2.0 lb 75DF/A (some muskmelon may be sensitive)
Curzate (cymoxanil, 27) at 3.2 oz 60DF/A, or
Tanos (famoxodone + cymoxanil, 11 + 27) at 8 oz 50WDG/A

Downy mildew materials should always be tank mixed with a protectant fungicide and rotated weekly with fungicides from a different FRAC code to reduce the chances for fungicide resistance development.

Cucurbit growers who suspect downy mildew should contact their county agricultural agent. To track the progress of Downy mildew in the eastern US and to keep up with reports of Downy mildew from other states please visit North Carolina State University's Cucurbit Downy Mildew Forecasting Center at <http://www.ces.ncsu.edu/depts/pp/cucurbit/>. For more information on Downy mildew control for specific cucurbit crops please see the *2007 New Jersey Commercial Vegetable Production Recommendations Guide*.

✓ **Cucurbits – 'White speck' of Pumpkin** – also known as *Microdochium* or *Plectosporium* blight causes small, distinct lesions on infected vines, petioles, leaves, handles and fruit (see VDOW). Symptoms include light tan to pure white 'spindle-shaped' lesions that have a dry, scabby appearance. These small 'white specks' often coalesce to form large, dry scabby whitish-tan areas on infected plant parts. Heavy vine infection can lead to complete defoliation and handle and fruit infection can ruin aesthetic fruit quality. Control of White speck begins with proper rotations with crops other than cucurbits. Maximum coverage with fungicide applications are necessary for control of White speck. For more information on control please see the *2007 New Jersey Commercial Vegetable Production Recommendations*.

✓ **Cucurbits – Bacterial Wilt** – Symptoms of Bacterial wilt are beginning to show up in Cucurbit crops. Symptoms of Bacterial wilt will vary depending on crop. In general, plants may wilt during the day in hot weather and 'recover' during cooler parts of the evening and morning. Margins and interveinal areas of leaves become necrotic which cause leaves to appear 'scorched'. Healthy green plants turn chlorotic with time and infected plants eventually collapse and die exposing fruit to sunscald injury. Cutting through stem tissue at the base of infected plants often reveals a coppery-tan color where the bacterium causes the vascular tissue to 'plug up' (see VDOW). Control of Bacterial wilt begins with controlling **striped and spotted cucumber beetles** which vector the pathogen early in the growing season as plants emerge. Late-season beetle control will remain important as fruit begins to mature. Late-season beetle feeding may cause injury to stems ruining aesthetic quality. For more information on cucumber beetle and Bacterial wilt control please see the *2007 New Jersey Commercial Vegetable Production Recommendations Guide*.

✓ **Lettuce – Bottom Rot/Drop** – For Bottom Rot, Endura 70W (boscalid, 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 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 Rovral 50WP (iprodione, 2) at 1.5 to 2 lb/A beginning one week after transplanting or thinning and again at 10 and 20 days later. For more information

SEE DISEASES ON PAGE 4

on control of Bottom Rot and Drop and other important diseases of lettuce please see the *2007 New Jersey Commercial Vegetable Production Recommendations Guide*.

Pepper - Bacterial leaf spot – Symptoms of Bacterial spot on pepper leaves include small, brown water-soaked lesions that turn brown and necrotic in the centers. Spots may coalesce and form large blighted areas on leaves and premature defoliation can occur. On fruit, brown lesions can form which have a roughened, cracked wart-like appearance. High temperatures, high relative humidity and rainfall favor Bacterial spot development. Loss from Bacterial spot can be reduced somewhat by maintaining high levels of fertility, which will stimulate new growth. Applying a fixed copper (M1) at labeled rates plus maneb (M3) at 1.5 lbs 75DF/A or 8 to 10 oz Tanos (famoxadone + cymoxanil, 11 + 27) may help suppress spread. For more information on control of Bacterial spot of pepper please see the *2007 New Jersey Commercial Vegetable Production Recommendations*.

✓ **Pepper – Anthracnose** - Symptoms of fruit infection include sunken, circular spots which develop blackish-tan to orange concentric rings as lesions develop. Lesions on stems and leaves appear as grayish-brown spots with dark margins and can easily be overlooked. Control of Anthracnose begins with using clean-free seed and/or transplants. A three-year crop rotation with non-solanaceous crops is recommended. After the harvest season, pepper fields should be disced and plowed under thoroughly to bury crop debris. Beginning at flowering, alternate one of the following FRAC code 11 fungicides: azoxystrobin (Amistar 80WDG at 2 to 5 oz/A or Quadris at 6.2 to 15.4 fl oz 2.08F/A), or Flint (trifloxystrobin) 50WDG at 2 to 4 oz/A, or Cabrio (pyraclostrobin) 20EG at 8 to 12 oz/A with maneb (M3) 75DF at 1.5 to 3 lb/A or OLF.

✓ **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. □

IPM Update

Kristian Holmstrom, Research Project Coordinator II, Vegetable IPM Program

Sweet Corn

European corn borer (ECB) adult numbers have remained fairly stable in the southern counties and have declined slightly in the central and northern counties over the past week. (see ECB map). This trend may be in part due to cooler night temperatures since the weekend. Larval feeding is present in whorl stage-plantings in many areas now. 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. On pre-tassel stage plants, look for discoloration or actual caterpillars in the emerging tassels. Consider treating if fresh damage is found on 12% or more plants. Be sure to treat again at the full tassel to first silk stage to protect the forming ears from ECB larvae that are leaving the tassel and traveling down the stalk.

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

Indian Mills	4	Hammonton	3	Burlington	2
Shirley	4	RAREC	3	Cinnaminson	2
Tabernacle	4	Seeley Lake	3	Flagtown	2
Elm	3	Beckett	2	Little York	2

Fall armyworm (FAW) feeding in whorl-stage plantings is now occurring all over the state. In some fields (particularly along the coast) FAW feeding has reached threshold levels. FAW feeding initially is found on small groups of plants in the field. This is due to limited numbers of adult females laying eggs on consecutive plants. As the adult population increases, feeding will become more consistent throughout the field. FAW is capable of causing significant injury to sweet corn plants and will feed on all stages, including seedlings. For this reason it is necessary to check all pre-silking fields for signs of FAW feeding. Look for large, ragged holes and lots of caterpillar droppings in the whorl. Consider treating if 12% or more FAW injury is found alone, or in combination with ECB injury in a planting.

Corn earworm (CEW) catches have increased in all areas over the past week. There are scattered areas of very high activity throughout the southern counties (see CEW population map), but damaging moth levels are occurring in the north as well. CEW adults pose a significant threat to silking sweet corn. The shaded area on the map (blue on the web version, found at: www.pest-management.rutgers.edu/IPM/Vegetable/Pest%20Maps/maparchive.htm) corresponds to a 5-day silk spray schedule. The cross-hatched area (green on the web) corresponds to a 3-4 day silk spray schedule.

SEE IPM ON PAGE 5

Silking Spray Schedules*:

- North – 3-5 days
- Central – 3 days
- South – 3 days

* Note: These are general recommendations. Local trap catches may indicate some variation in the frequency of insecticide applications to silking corn.

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

Indian Mills	18	Elmer	5	Centerton	4
East Vineland	11	Hammonton	5	Eldora	4
Mannington	7	New Egypt	5	Elm	4
RAREC	7	Seeley Lake	5	Lawrenceville	3

Tomatoes

A few plantings in the northern and central counties have developed **bacterial infections** recently. All infections are characterized by very dark, often wet looking lesions on leaves of any age. In the case of bacterial canker, lesions often start at leaf margins but may also be found on petioles. Bacterial speck results in a dark blister-like lesion on infected fruit, while bacterial spot causes a more severe dark fruit lesion. Bacterial canker causes a whitish blister referred to as “bird’s-eye spot” on fruit. If these symptoms appear in a planting, consider regular applications of copper if this is not already part of the program. Avoid fields when wet. Always work in younger plantings first if activity is planned in multiple plantings. This will prevent the distribution of bacteria from older infected plants to younger ones. The younger the plants are when they are infected, the more likely economic injury is to occur. Consider placing buckets with a 5-10% bleach solution in water at the end of rows when tying or pruning. This will enable workers to dip wands or pruning tools in the solution between rows to limit spread among plants.

Peppers

With the second generation **ECB** adults now active, it is important to check peppers weekly for the presence of ECB eggmasses, as well as aphids and **TSSM**. ECB eggmasses are flat and waxy looking, having the appearance of fish scales on the underside of the pepper leaf. As the larvae emerge, they will bore into the fruit where the cap meets the shoulder of the pepper. Uncontrolled infestations will result in many fruit developing soft rot. Check 5 consecutive plants each in 10 random field locations. Look at the underside of 2 leaves per plant. If 2 or more ECB eggmasses are found in the total sample, consider an insecticide application to minimize plant injury. Additionally, a weekly spray schedule is warranted on fruiting plants when ECB adult numbers reach 1 or more per night in local blacklight traps. At present, adult ECB activity at this level exists in all southern and central counties. All shaded and cross-hatched areas on the ECB map (blue and green on the web ver-

sion) correspond to a weekly spray schedule on fruiting peppers.

Beet armyworm (BAW) adult catches have increased slightly in the pheromone network in the southern counties. Numbers are averaging well below 5 per night in most areas, but a few spots now have catches averaging in the 5-10 moth/night range in Cumberland and Salem counties. Even in these areas however, numbers are below those considered potentially damaging. While checking for other insect pests, look for leaves exhibiting heavy feeding near the upper portion of the plant. Often, small BAW larvae will be found near the buds where this feeding occurs. Later, as they enlarge, BAW will begin feeding on fruit.

Pumpkins and Winter Squash

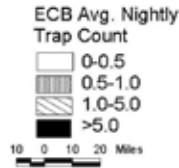
It is very important to scout fields weekly, for the presence of pests including **aphids** and **TSSM**. Check 10 mature leaves per site in 10 random sites throughout the field. Consider treating if leaves with an average of approximately 25 aphids are found in each of 10 sample sites. Populations this high can result in deposition of droppings onto the surface of maturing fruit, as well as overall stress to the plants. **Melon aphids** have been found on some northern pumpkin plantings this week. TSSM occasionally becomes an economic pest on smaller plantings under hot, dry conditions. If TSSM is found in more than one site in the field, and the overall trend is increasing, consider treating.

Powdery mildew (PM) infections are now common in most plantings. This fungal pathogen first appears as a dime-sized lesion that looks like white powder. They can develop on either leaf surface as well as the petioles. While scouting, look on mature leaves, particularly those within the canopy for PM lesions. When the threshold of 1 lesion per 50 older leaves is reached, begin the regular, weekly protectant fungicide program.

Be alert for the possibility of **downy mildew (DM) infections**. As of July 8, DM has been detected in Cumberland County, as well as in states to our north, west and south. DM first appears as sharp yellow lesions on the upper surface of leaves. Veins are yellow and constricted on the lower leaf surface. Shortly after this, dark sporulation occurs along veins on the lower surface beneath the lesion. This sporulation will be present when conditions are wet or very humid. In a matter of several days, significant defoliation can occur. Fungicides specific to DM and related fungi are required for good control of this pathogen. For recommended fungicide rotations for DM and PM, consult the *2007 Commercial Vegetable Production Recommendations*.

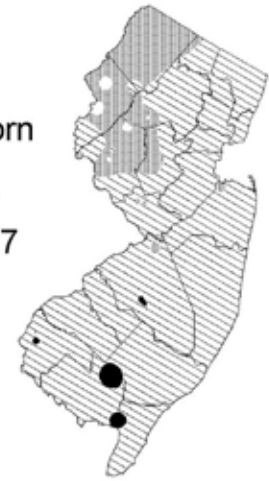
SEE ECB AND CEW MAPS ON PAGE 6 AND BAW MAP ON PAGE 2

Distribution of Adult European Corn Borer for the Week Ending August 15, 2007



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

Distribution of Adult Corn Earworm for the Week Ending August 15, 2007



Data collected and processed by: Kris Holmstrom,
Rutgers Cooperative Extension Pest Management Office

SEE BAW MAP ON PAGE 2

Weekly Weather Summary

Keith Arnesen, Ph.D., Agricultural Meteorologist

Temperatures averaged much above normal, averaging 74 degrees north 77 degrees central and 80 degrees south. Extremes were 101 degrees at Pomona on the 9th, and 52 degrees at Charlotteburg on the 12th. Weekly rainfall averaged 3.52 inches north, 0.74 inches central, and 0.56 inches south. The heaviest 24 hour total reported was 3.28 inches at Newton on the 8th to 9th. Estimated soil moisture, in percent of field capacity, this past week averaged 92 percent north, 57 percent central and 58 percent south. Four inch soil temperatures averaged 76 degrees north, 77 degrees central and 80 degrees south.

Weather Summary for the Week Ending 8 am Monday 8/13/ 7

WEATHER STATIONS	RAINFALL			TEMPERATURE				GDD BASE50		MON %FC
	WEEK	TOTAL	DEP	MX	MN	AVG	DEP	TOT	DEP	
CANOE BROOK	4.83	39.52	16.81	93	56	75.	3	2285	437	94
CHARLOTTEBURG	3.31	29.16	6.25	89	52	72.	3	1983	524	93
FLEMINGTON	1.59	28.75	6.81	94	56	75.	3	2164	268	86
NEWTON	4.35	25.77	4.68	89	55	72.	2	1955	272	94
FREEHOLD	1.17	28.69	7.36	95	55	77.	4	2358	334	75
LONG BRANCH	.68	28.19	6.79	95	57	76.	3	2130	185	53
NEW BRUNSWICK	1.43	32.18	10.77	95	58	77.	4	2285	177	80
TOMS RIVER	.17	22.50	.51	95	59	77.	5	2191	255	32
TRENTON	.26	24.51	4.09	97	59	78.	3	2386	182	38
CAPE MAY COURT HOUSE	.66	14.46	-4.50	96	61	78.	3	2269	191	59
DOWNSTOWN	.43	17.79	-2.26	96	60	79.	4	2399	184	46
GLASSBORO	.50	21.94	.92	96	61	80.	5	2648	460	57
HAMMONTON	.53	18.13	-2.93	97	60	79.	4	2463	273	53
POMONA	.39	17.84	-1.38	101	60	80.	7	2403	360	40
SEABROOK	.88	18.67	-.62	98	61	82.	7	2658	435	62
SOUTH HARRISON	1.00	21.73	.72	96	60	79	NA	2545	NA	NA
WES KLINE -- GDD BASE 40 PINEY HOLLOW										
LAST WEEK 279 (Ending 8/6/07)										
THIS WEEK 272 (Ending 8/13/07)										

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