

PLANT & PEST ADVISORY

VEGETABLE CROPS EDITION \$1.50

AUGUST 17, 2005



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Vegetable Disease Update

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

✓ **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 inter-veinal 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’. 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 *2005 New Jersey Commercial Vegetable Production Recommendations Guide*.

✓ **Cucurbits – Powdery mildew – Powdery mildew starting in on cucurbits in south Jersey.** Powdery mildew typically occurs from mid-July until the end of the season. Unlike Downy mildew, the diagnostic characteristics of Powdery mildew are *pure white ‘fuzzy’ growth on both the upper and lower leaf surface, petioles and stems*. 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 strobilurins (Cabrio, Pristine, Flint, Amistar, Tanos, Group 11) should be tank mixed with a protectant fungicide such as Bravo (M4) or Sulfur (M1) and rotated with fungicides of a different chemistry such as Bravo (chlorothalonil, M4 + Nova or Procure (Group 3). Group 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 *2005 New Jersey Commercial Vegetable Production Recommendations Guide*.

SEE DISEASES ON PAGE 2

✓ **Cucurbits – Downy Mildew** – Downy mildew continues in all cucurbit plantings. In some fields Downy mildew has caused 100% loss. Growers should take great precautions to keep Downy mildew under control. If Downy mildew has been a problem in fields, growers should scout and continue on a weekly fungicide maintenance program. There are a number of fungicides labeled for control of Downy mildew and many will help control other important diseases in cucurbits. For information on control of Downy mildew and other important diseases of cucurbits please see the *2005 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 Ronilan 50DF (vinclozolin, 2) at 1 to 2 lbs/A or OLF, 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 on control of Bottom Rot and Drop and other important diseases of lettuce please see the *2005 New Jersey Commercial Vegetable Production Recommendations Guide*.

✓ **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 disked and plowed under thoroughly to bury crop debris. At flowering, Maneb 75DF (M2) at 1.5 to 3.0 lbs/A should be alternated every 7 to 10 days with Amistar (azoxystrobin, 11) 80 WDG at 2 to 5 oz/A, or Cabrio (pyraclostrobin, 11) 20 EG at 8 to 12 oz/A, or Flint (trifloxystrobin, 11) 50 WDG at 3 to 4 oz/A. For more information on control please see the *2005 New Jersey Commercial Vegetable Production Recommendations*.

✓ **Peppers - Bacterial 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. For more information on control of Bacterial spot of pepper please see the *2005 New Jersey Commercial Vegetable Production Recommendations*.

✓ **Tomato – Anthracnose** – Symptoms of Anthracnose are easily diagnosed. Symptoms on ripe fruit appear as water-soaked circular lesions that often have a lighter colored tan center. Black fruiting bodies are often visible in the center of Anthracnose lesions. Control of Anthracnose begins with preventative fungicide applications. Fungicides labeled for other important foliar and fruit diseases of tomato will help control Anthracnose. If fruit-ripening agent has been used, additional fungicide applications may be necessary to help control Anthracnose. For more information on control please see the *2005 New Jersey Commercial Vegetable Production Recommendations*.

✓ **Tomato – Buckeye Rot – Wet weather and wet soils** favor the development of Buckeye rot. Symptoms of Buckeye Rot on green fruit include brownish-tan lesions that have a *definitive concentric appearance*. As lesions form the fruit will begin to soften up, this is quite different than Late blight which will cause a dark brownish/black lesion with the fruit remaining somewhat firm. Unlike Late blight, Buckeye rot won't attack the foliage. For more information on control please see the *2005 New Jersey Commercial Vegetable Production Recommendations*. □

Fungal Leaf Blights of Carrot

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

Alternaria and Cercospora are two soil-borne fungal pathogens that may cause early defoliation in carrots reducing yields and making harvest difficult. Both pathogens produce distinct symptoms on carrots. Symptoms of Alternaria include *irregular, dark brown to black spots which typically show up on older leaves first*. Cercospora leaf spots are *round, grayish-brown and are more prevalent on younger foliage*. Both leaf blights typically start at the margins of leaflets and as more spots develop leaflets begin to wither and die. Symptoms similar to leaf infections can develop on stems and petioles.

Control of both diseases begins with regular scouting and preventative fungicide applications on susceptible varieties. Apply Amistar 80WDG (azoxystrobin, 11) at 3 to 5 oz/A or OLF, 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, M4) 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 (Group 11) before alternating with another fungicide chemistry. Several carrot varieties exhibit leaf blight tolerance and should be grown where adapted. For more information on tolerant varieties and control please see the *2005 New Jersey Commercial Vegetable Production Recommendations*. □

Pest Notes

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

Corn Earworm Insecticide Resistance 2005

Recently there has been some concern about **corn earworm** insecticide resistance to pyrethroids, and reports from Ohio indicate that control of the corn earworm has been less than expected when using pyrethroids.

There has as of yet been no confirmed cases of pyrethroid resistance by the corn earworm in Ohio or other Midwestern states. Several researchers are looking into this question, including scientists at Virginia, Michigan, and Maryland. Based on various reports from other states that pyrethroids were not as effective against corn earworm as expected, it is certainly possible that some resistance is starting to appear with these pests.

The bottom line is use great management techniques. These include the use of both pyrethroid and non-pyrethroid insecticides for corn earworm control (rotation of the class of insecticides is important to reduce or prevent the development of insecticide resistance); timing of applications is critical (if populations are high, a 2-3 day schedule is necessary, and if populations are low, a 3-5 day schedule might work); good application equipment – as temperatures increase, the population pressure increases, you will need ground-applied, ear-directed sprays for precise placement of the material on the corn ear silks.

Remember that many 'failures' of pesticide materials against corn earworms can be directly attributed to either poor application techniques or poor timing of applications, or both.

As for the future, it is most likely that very few corn earworm moths survive the winter in our area, and we will deal with a 'new' population next year. Thus if resistance has started in this area, it most likely will not be a problem next year because those moths will not be able to overwinter successfully (unless resistant moths enter New Jersey in the beginning).

✓ **Cucurbits:** Several agricultural agents report that **cucumber beetles** are still a problem in various cucurbits. Materials used 'at-plant' are probably no longer effective, and foliar sprays are the only alternative at this time. Pyrethroids such as Asana, bifenthrin, Danitol, and permethrin are labeled on most cucurbits, and are effective against cucumber beetles. Thionex is one of the safer materials to use if bees are actively foraging. Carbaryl is also effective, but is very toxic to bees.

For best results, apply your pesticide of choice early in the morning, or late in the evening, after bee activity has stopped. With most of the pesticides, once the spray is dry, toxicity to bees is significantly reduced.

✓ **Greens, Spinach, etc.:** **Grasshopper** populations may be building up in soybean and corn fields. If your greens or spinach fields are near these crops, the grass-

Vegetable Disease of the Week

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



Mosaic virus causing uneven ripening (green islands or netting) on pumpkin fruit.

hoppers frequently migrate into your crops to continue feeding as the field crops dry down. Be aware of the crops that surround your area, and watch for migrating **stink bugs** and grasshoppers into your vegetable crops. Look for damage along your field edges first, and spot-treat the field borders if the population of these pests is increasing.

✓ **Peppers:** **European corn borers** activity is still high, and have currently infested about 20-30% of the peppers in trials at the RAREC at Upper Deerfield, NJ. Many materials are available for this pest, and it is best to rotate different classes of insecticides for best management practices. Use a rotation schedule of a pyrethroid (Asana, Baythroid, bifenthrin, Mustang MAX, permethrin, or Warrior) with either Avaunt, Confirm, Intrepid, Lannate, or SpinTor. If **aphids** are present, rotate with Lannate. If **beet armyworms** are present, rotate with either SpinTor, Confirm, Intrepid, or Avaunt.

✓ **Tomato:** Tomatoes damaged by **stink bugs** have been increasing in several areas throughout southern New Jersey. These pests are just now leaving many field/forage crops as they dry down and are seeking more succulent food sources (such as tomatoes). If the number of bugs is increasing (adults or nymphs), or damage is increasing, use either Actara, Baythroid, Danitol, Monitor, Mustang MAX, Thionex, or Warrior. The most effective of these materials would likely be Monitor, followed by Warrior and the other pyrethroids, Actara, and Thionex. Remember that Thionex and Actara will also control **aphids** and **Colorado potato beetles** as well, while the pyrethroids will also control the **tomato fruitworm (corn earworm)**. □

IPM Update

Kristian Holmstrom, Research Project Coordinator II, Vegetable IPM Program

Sweet Corn

Adult **European corn borer (ECB)** activity has declined somewhat throughout the state, although pockets of very high activity remain, especially in northern counties and parts of Cumberland and Salem Counties (see ECB map). Larval injury in whorl and pretassel stage sweet corn plantings is also increasing at this time. Be sure to check all whorl and pretassel stage sweet corn plantings for signs of ECB damage. Check 5 consecutive plants each in 10 random locations. Look for the "shot-hole" type injury on leaves and discolored sections in the emerging tassels. Consider treating when 12% or more of sample plants show fresh feeding signs. Additionally, be sure to treat these early sweet corn plantings as they go to full tassel and first silk. This application will help eliminate remaining ECB larvae before they can re-enter the plant near the developing ear. If local light traps continue to catch ECB adults and silking stage corn is present, consider treating weekly to prevent infestations by larvae that have been deposited on or near the ears themselves. The highest average nightly ECB blacklight catches are:

Seeley Lake	22	Woodstown	13	Burlington	7
Allamuchy	20	Chester	8	Phillipsburg	6
Hackettstown	13	Tabernacle	8	Belvidere	4
Little York	13	Bayside	7	Califon	4

CEW moth catches are increasing steadily throughout the state, although there has been no large, widespread increase that would be associated with a particular weather event. There are a few areas of higher activity, most notably near the Atlantic and Camden County borders, but the main difference between this week and last is a greater area of the state experiencing moderate populations (see CEW map). Delaware and Maryland are reporting increasing CEW catches that are not very different from ours. Without the help of a southerly weather system or prolonged southerly breeze we could experience a gradual increase in CEW adults over the next 1-2 weeks. Should we get favorable weather for CEW migration, there could be a large statewide increase. On the map, shaded areas (blue on the web version) indicate a 5-6 day silking spray schedule, while crosshatched areas (green on the web version) warrant a 3-4 day silk spray schedule. The highest average nightly CEW blacklight catches are:

Elm	11	Burlington	3	Allentown	2
Beckett	7	Cinnaminson	3	Chapel Heights	2
Medford	7	Fishing Creek	3	Georgetown	2
Seeley Lake	4	Springdale	3	Tabernacle	2

Fall Armyworm (FAW) is active throughout the state, with infestations increasing in severity. Infestations approaching 100% have been reported in the Gloucester/Salem County area. This pest will lay eggs on all stages of sweet corn, including large seedlings. As a result, it now becomes critical to include seedling stage corn in scouting activities. Initial injury to sweet corn appears as "window-pane" type feeding on leaves, with damaged areas progressing down toward the whorl. As the larvae increase in size, they begin to chew large, ragged holes in the leaves, and their brown droppings are quite obvious. Initial FAW injury is often confused with the feeding caused by the **western corn rootworm beetle**. These small yellow and black beetles are numerous in many sweet corn plantings now, and although their feeding is largely cosmetic, it makes treatment decisions difficult. Rootworm beetles do not produce the heavy droppings associated with FAW, and their feeding often is not concentrated strictly in the inner whorl. Consider treating when 12% or more plants are infested with FAW alone, or in combination with ECB.

General Silking Spray Schedules*:

- North - 3-4 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 sweet corn.

Pumpkins

Cucurbit downy mildew (DM) should be considered present on vine crops in all areas of the state. DM symptoms often begin as sharp yellow spots on the upper surface of leaves. Observation of the lower leaf surface will typically show that the lesion is associated with veins. As the infection progresses, dark spores will be apparent on the lower leaf surface during periods of high humidity. Under warm, wet conditions, rapid defoliation of leaves can occur if regular control is not undertaken. Most pumpkin and winter squash fields have reached the action threshold of 1 **powdery mildew (PM)** lesion per 50 older leaves. Regarding PM, look for small, powdery spots on either surface of older leaves. Be sure to check leaves within the canopy as well. In order to protect fields against both pathogens, it is necessary to be on a weekly fungicide program that includes both protectant materials and a product that targets fungi similar to DM. For labeled fungicides, consult the *2005 Commercial Vegetable Production Recommendations*. Any field that has not been scouted recently should be checked for PM and DM.

Over the past few weeks, a number of pumpkin fields in northern counties have lost plants to a crown rot disease that has been diagnosed as **Fusarium** at the Rutgers Plant Diagnostic Lab. The plants begin to yellow, and ultimately collapse with none of the obvious

SEE IPM ON PAGE 5

white yeast-like growth often present when *Phytophthora* is involved. There may, however, be an amber colored ooze coming from the tissue near the crown. Adequate field rotation (4-5 years) should be observed to avoid future loss to this type of organism. For the present, maintain the necessary foliar program to minimize losses to the mildews on plants that are not affected by any crown rot.

Tomatoes

The period from late June through the first half of July is typically the time when adult **brown stinkbugs** (*Euschistus spp.*) are active and laying eggs on host crops like tomatoes. Increasingly, brown stinkbugs have been observed feeding in sweet corn tassels, so they are active in the fields. These insects will feed directly on tomato fruit, causing a pale, diffuse blotch on green fruit that turns bright yellow as the fruit matures. More damaging is the injury caused by the nymphs as they begin to hatch and slowly disperse in the planting. In general, damage is worse during dry periods, because stinkbugs seek more succulent irrigated hosts as non-crop hosts dry up. Adult stinkbugs are difficult to detect in tomatoes because they hide or drop to the ground when approached. The nymphs may be easier to spot, as they remain in a group for some time after egg hatch. Check 5 consecutive plants each in 10 random locations in the planting. Look at two complete leaves and two fruit per plant. If adult stinkbugs or nymphs are found in more than one sample, or if fruit injury is increasing in field samples or in picked baskets, consider applying a labeled insecticide.

Bacterial infections are present, and increasing after recent powerful storms. **Bacterial speck and spot** often first appear as small, very dark spots on the interior of leaves of any age growth. As the infection progresses, fruit lesions may develop. These are dark scabby pits in the case of spot, and dark blister like lesions in the case of speck. Another infection is **bacterial canker**. This often begins as dark margins on older leaves. The lesion progresses inward, and under proper conditions (following pruning, tying, hail or hard rain events) can infect whole stems, causing death in the affected part of the plant. Fruit lesions are whitish blisters known as "bird's eye spot". When working in multiple fields, be sure to work in order from youngest to oldest. This will minimize the chance of transmitting an infection to younger, more vulnerable plants. Avoid fields when foliage is wet. Consult the *2005 Commercial Vegetable Production Recommendations* for materials that may be helpful in limiting the spread of bacterial infections.

Peppers

Aphids, **TSSM**, and **thrips** are all potential pests of peppers at this time. Monitor fields weekly for the presence of these organisms. Check 2 leaves and 2 fruit per plant on 5 consecutive plants in 10 random locations in the field. Observe the under sides of leaves for aphids

and mites. Consider treating if aphid numbers exceed 100 per 100 leaf sample or there are fruit on the plants that are being disfigured by the sticky droppings of the aphids. Consider treating for TSSM if more than 10% of sampled leaves are infested. (Spot treatments may be useful if the infestation is localized). Observe fruit and leaves for the light or silver-colored streaks caused by thrips feeding. Consider treating if thrips are found on 10% or more fruit, or 10% or more plants or fruit are showing signs of fresh feeding.

With recent increases in **ECB** activity throughout the state, it is important for all pepper plantings to be protected against fruit infestation by this pest. Larval ECB will penetrate fruit just under the cap, resulting in increased incidence of soft rot. Plantings should be treated weekly to minimize injury. Consult the *2005 Commercial Vegetable Production Recommendations* for labeled materials. On the ECB map, peppers in any black, shaded or cross-hatched area are at risk for infestation.

Rutgers Cooperative Research & Extension Vegetable IPM personnel have deployed **beet armyworm (BAW)** pheromone traps in the southern counties where this pest causes injury to peppers in some years. Many times, low levels of BAW adults are captured without economically significant infestations ever occurring. However, higher adult activity (greater than 20 per night on average) is considered to be a potential threat to peppers. On the BAW map, the shaded area indicates a light population that is not likely to be injurious at present levels. The crosshatched area represents a moderate population, and scouting of peppers for injury should be undertaken in that area. The black region on the map indicates a potentially damaging population. Fields in this area should be scouted frequently for the first signs of BAW feeding. BAW catches have leveled off in some of the traps, and increased dramatically in the "hot-spots" in lower Cumberland County over the past week. High catches over the past week include 260 adult BAW per night near Jones Island and 72 per night near Shirley in Cumberland County. Initial BAW feeding occurs on leaves near the growing terminals. Foliage has numerous ragged holes, and the small green larvae may be found curled up near the buds. As the larvae enlarge, they begin to damage fruit, and become much harder to control. Scouting is critical to optimizing control of BAW.

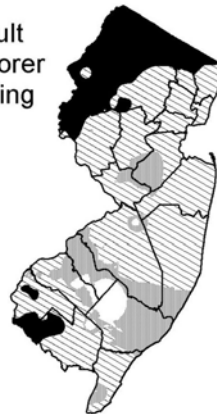
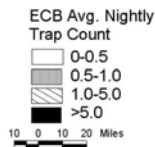
SEE DISTRIBUTION MAPS ON PAGE 6

**Distribution of Adult
Beet Armyworm for
the Week Ending
August 17, 2005**



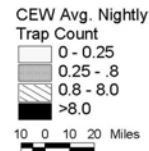
Data collected by Joe Mahar and processed by Kris Holmstrom
Rutgers Cooperative Research and Extension

**Distribution of Adult
European Corn Borer
for the Week Ending
August 17, 2005**



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 17, 2005**



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 much above normal, averaging 79 degrees north, 80 degrees central and 81 degrees south. Extremes were 98 degrees at Canoe Brook and New Brunswick on the 12th and 14th, and 61 degrees at Charlotteburg on the 11th. Weekly rainfall averaged 0.87 inches north, 1.13 inches central, and 1.22 inches south. The heaviest 24 hour total reported was 2.80 inches at Seabrook on the 8th to 9th. Estimated soil moisture, in percent of field capacity, this past week averaged 60 percent north, 59 percent central and 57 percent south. Four inch soil temperatures averaged 77 degrees north, 79 degrees central and 80 degrees south.

Weather Summary for the Week Ending 8 am Monday 8/15/ 5

WEATHER STATIONS	RAINFALL			TEMPERATURE				GDD BASE50		MON
	WEEK	TOTAL	DEP	MX	MN	AVG	DEP	TOT	DEP	%FC
BELVIDERE BRIDGE MISSING										
CANOE BROOK	.51	18.49	-4.54	98	67	82.	10	2410	518	60
CHARLOTTEBURG	.60	21.07	-2.16	95	61	77.	8	1993	506	60
FLEMINGTON	1.43	24.15	1.91	98	66	79.	7	2265	325	76
NEWTON	.95	18.24	-3.16	93	63	77.	8	2125	403	66
FREEHOLD	.66	23.12	1.49	96	67	80.	7	2277	207	57
LONG BRANCH*	.66	22.27	.54	96	69	80.	7	2239	248	45
NEW BRUNSWICK	.49	22.99	1.26	98	67	81.	8	2377	223	62
TOMS RIVER	.82	23.48	1.17	96	68	80.	8	2212	232	42
TRENTON	3.02	23.64	2.93	96	70	80.	5	2412	158	100
CAPE MAY COURT HOUSE	.31	21.59	2.35	93	69	80.	5	2028	-100	30
DOWNSTOWN	.52	17.88	-2.47	95	69	81.	7	2292	29	36
GLASSBORO	2.35	20.40	-.92	94	70	82.	8	2555	318	61
HAMMONTON	.88	20.76	-.59	96	69	81.	6	2354	114	43
POMONA	.32	20.19	.67	96	69	81.	8	2262	173	30
SEABROOK	2.92	21.74	2.18	93	67	81.	7	2572	300	62
SOUTH HARRISON	.18	22.95	1.68	94	69	81	NA	2430	NA	NA
*SOME CUMULATIVE VALUES ESTIMATED DUE TO MISSING PAST DATA										
WES KLINE — GDD BASE 40 PINEY HOLLOW Last Week* 282 (Ending 8/8/05) This Week 286 (Ending 8/15/05)										
* February total base 40 equals 32 units										

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