

PLANT & PEST ADVISORY

VEGETABLE CROPS EDITION \$1.50

SEPTEMBER 28, 2005



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Pest Notes

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

Fall Worm Pests

The 'worm' pests of vegetables this fall are unusually high. Part of the reason is because of the many storm fronts, hurricanes, and wind currents that come from either the southern areas of Florida or the southern areas of Texas, Louisiana, Mississippi, etc. These wind currents carry many of the moths that migrate into New Jersey, such as **beet armyworms, corn earworms, fall armyworms, diamondback moths**, etc. There are many commercially-available insecticide products that are effective against these worms, but many of them depend on proper application, correct application of the timing, and even the right selection of pest control material because many of these products are pest-specific.

✓ **Beet Armyworms:** This pest has been a problem for New Jersey vegetable growers for several weeks. High populations of beetle armyworms can readily be found in bell and non-bell peppers, tomatoes, various cole crops (especially broccoli), snap beans, and potatoes. Larvae also survive well on soybeans, pigweed, and lambsquarter. This pest can survive on crops such as lettuce, cucurbits, and other vegetables, although these crops are not the favorite food host.

Beet armyworms are very difficult to control, perhaps the toughest 'worm' pest to control in vegetables (at least as difficult as **diamondback moth** larvae). The most effective (best) materials available to control it are Proclaim, Avaunt, and Intrepid. Virginia currently has high populations of this pest, and reports that Lorsban has been effective in some crops. Good control has been obtained with SpinTor and Confirm. Poor control has been obtained with Lannate, and No Control has been obtained with the pyrethroids (Warrior, Mustang MAX, etc).

✓ **Fall Armyworms, Yellow Striped Armyworms:** These pests are similar to beetle armyworms in habits and crops attacked. However, they are not as difficult to control as beetle armyworms, and as a consequence, more materials are available that will effectively manage these pests. Avaunt, Confirm, Intrepid, Lannate, Proclaim, SpinTor, and the pyrethroids (Asana, Mustang MAX, Warrior, etc) are effective for both fall armyworms and yellow-striped armyworms.

✓ **Corn Earworms:** Corn earworm populations are still high in some areas, and will readily attack sweet corn, snap and pole beans, tomatoes, peppers, lettuce, and other vegetable crops. The pyrethroid

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insecticides, such as Asana, Baythroid, Capture, Mustang MAX, and Warrior have been very effective against this pest in New Jersey. Several states (Virginia, Ohio) have reported that resistance to pyrethroids may be increasing, as the control obtained with these materials was not as good as expected in some areas. Alternative, and still effective, materials include Sevin, Thionex, SpinTor (Entrust), Intrepid, and Proclaim.

✓ **European Corn Borers:** Corn borers attack nearly every vegetable crop in New Jersey, but they definitely favor sweet corn, peppers, and snap and lima beans. There has been no resistance to insecticides reported for corn borers, and everything labeled for corn borer is effective. All of the materials for the armyworms are very effective, along with all of the Bt insecticides (biological insecticides), the pyrethroids, Lannate, Lorsban, and Orthene. The current fall weather conditions, such as some moisture, warm days, and cool nights, are ideal for the use of biological insecticides (the Bt's) for corn borer management.

✓ **Cabbage Loopers:** Loopers attack primarily cole crops, but can be found in lettuce, tomatoes, beans, and other crops. These pests migrate from southern areas, and appear in New Jersey in late summer. For effective control of cabbage loopers, use any of the biological insecticides (the Bt's), any of the pyrethroids (Asana, Baythroid, Capture, Danitol, Mustang MAX, Warrior, etc) or any of the 'worm' materials such as Avaunt, Confirm, Intrepid, or Proclaim. Other materials that are highly effective include Lannate, Larvin, Orthene, Proclaim, and SpinTor/Entrust. In the cole crops, consider adding a spreader-sticker and use high pressure, high gallonage to obtain thorough penetration of the spray material.

✓ **Diamondback Moth Larvae:** Another migrant insect pest that usually arrives in New Jersey in late summer is diamondback moths. Diamondback moths attack the cole crops, and can quickly cause significant damage. Like beet armyworms, diamondback moth larvae are difficult to control, and very few available insecticides are effective against this pest. For best results, consider Avaunt, any of the labeled biological insecticides (Bt's), Orthene, Proclaim, or SpinTor/Entrust. The pyrethroid insecticides *do not* effectively control this pest. Obtain thorough coverage of the foliage, including leaf undersides and within developing heads, for best control.

✓ **General:** As always, check each pesticide label to make sure the pest and crop are on the label before using any pesticide. Obtain thorough coverage of the foliage for best results. Apply treatments before the population increases to high levels, as control is much more difficult when the pest population is at high levels. This won't occur if you target the smaller life stages of the worm pests (the early instars), as it is more difficult to control large worms than it is small worms for most of these pests, especially when a Bt is used. □

Vegetable Disease Update

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

✓ **Cole Crops – Downy mildew** can be a problem in fall cole crops (cabbage, collards, broccoli, cauliflower and kale). Infection begins as irregular yellow spots on leaves which later turn brown. A white fluffy growth develops on the underside of leaves during cool moist weather. When the disease first appears apply a fungicide every 7 to 10 days. Bravo, maneb, Ridomil Gold Bravo and Aliette are labeled. For more information on control please see the *2005 New Jersey Commercial Vegetable Production Recommendations*.

✓ **Cucurbits – Powdery mildew** – *Powdery mildew is widespread 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*.

✓ **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*.

✓ **Leeks – Purple Blotch** – Symptoms of Purple blotch include tannish-brown, elongated, concentric, circular lesions with chlorotic margins. Lesions run

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parallel with the leaf veins. Development of Purple blotch is favored by warm night temperatures. Fungicide applications should begin in the fall as soon as transplants are set out on 10-day intervals as long as night temperatures remain warm. There are a number of fungicides labeled for the control on Purple blotch. . For more information on control please see the *2005 New Jersey Commercial Vegetable Production Recommendations*.

✓ **Parsley – Septoria Blight /Bacterial (blight) leaf spot** –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 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. 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 spread of Bacterial leaf spot as long as fixed copper is included with the azoxystrobin. If Oxidate is used, follow the label carefully.

✓ **Spinach – White Rust** – Symptoms of White rust include *irregular, chlorotic areas on the upper leaf surface with white, blister-like pustules developing on lower leaf surface*. Development of White rust is favored by cool nights and mild day temperatures with *prolonged periods of dew or fog which favor wet leaf surfaces*. Control of White rust begins with crop rotations of 2 or more years. Some varieties have partial resistance and should be used if possible. A preventative fungicide schedule should begin 2 to 3 weeks after planting, and/or *if weather conditions favor disease development*. There are a number of fungicides labeled for the control of White rust on spinach. For more information on the control of White rust on spinach 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*. □

Disease Briefs

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

Late blight reappears in fresh-market tomato.

An isolated case of **Late blight** was found in fresh-market tomatoes grown near Cedarville late last week. This is the first report of Late blight on tomato this fall. Early this season, Late blight was found in isolated incidences on both tomato and potato. Tomato growers should continue to scout for symptoms and, if necessary apply the appropriate fungicide(s), depending on how long they continue to harvest. For more information on Late blight control please see the *2005 New Jersey Commercial Vegetable Production Recommendations*.

2005 cucurbit virus survey update.

The Vegetable Pathology lab in coordination with county agricultural agents and the Rutgers Plant Diagnostic Laboratory in New Brunswick are conducting a survey of virus-infected cucurbit crops this fall. To date, 100% of the samples sent in for screening have tested positive for WMV (watermelon mosaic virus) and 35% have been positive for both WMV and ZYMV (zucchini yellow mosaic virus). Four viruses can typically be found in cucurbit crops. These include CMV (cucumber mosaic virus), WMV (watermelon mosaic virus), ZYMV (zucchini yellow mosaic virus) and PRSV (Papaya Ringspot Virus, formerly known as WMV-I). Although diagnosing the problem can be easy (these viruses all produce similar and recognizable symptoms on infected hosts) determining which virus(es) are infecting cucurbit crops (in any given year) requires a special test. Growers who have had virus problems in their cucurbit fields and/or who are beginning to see virus symptoms develop should contact their county agent for more information on how to participate. □

IPM Update

Kristian Holmstrom, Research Project Coordinator II, Vegetable IPM Program

Sweet Corn

Adult **European corn borer (ECB)** activity has declined to low levels over the past week. It is not likely that we will see further adult moth activity of any great significance for the remainder of the season. The highest trap catches are still from western Warren County at this time (see ECB map). Scouting is not necessary at this time since it's not likely there are any non-silking sweet corn plantings left. Current **corn earworm (CEW)** adult numbers require silk spray schedules that will be sufficient to prevent ECB damage to developing ears by larvae that have been deposited on or near the ears themselves.

The highest average nightly ECB blacklight catches are:

Belvidere	7	Beckett	1	Green Creek	1
Chester	2	Croton	1	Long Valley	1
Little York	2	Eldora	1	Mullica Hill	1
Phillipsburg	2	Hopewell	1	Tabernacle	1

Over the past week, CEW activity increased further with some of the warmer evenings prior to, and over the weekend. Now, with cooler temperatures, activity should be reduced. However, the higher numbers here are representative of the trap catches prior to the night of 9/25. Highest activity is currently Atlantic and Salem Counties (see CEW map). In general, the current population is one that requires a 3-day silk spray schedule to manage effectively. On the map, crosshatched areas (green on the web version):

<http://www.pestmanagement.rutgers.edu/IPM/Vegetable/Pest%20Maps/maparchive.htm> warrant a 3 day silk spray schedule. Black areas on the map (red on the web version) indicate a 2-3 day spray schedule. The highest average nightly CEW blacklight catches are:

Hammonton	13	Hackettstown	7	Belvidere	5
Mannington	13	Tabernacle	7	Denville	5
Chester	10	Allamuchy	6	Eldora	5
East Vineland	7	Elmer	6	Hopewell	5

Fall armyworm (FAW) is still active throughout the state, with infestations common. Damage is quite high in some cases. The silking stage spray schedule necessary for CEW management should also control FAW.

General Silking Spray Schedules*:

North - 3 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

As fields mature, it is important to determine when to discontinue fungicide applications. Fields still having adequate foliage should be treated to limit **powdery mildew**

(**PM**) and **downy mildew (DM)** damage as long as fruit must remain in the field for several more weeks. If foliage is largely gone, or fruit are to be removed promptly, it is not necessary to continue the foliar program. Prompt fruit removal may also help limit the occurrence other fruit rots.

Peppers

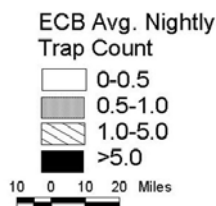
Aphids and **TSSM** are all appearing in peppers at this time. Monitor fields weekly for the presence of these organisms. Check 2 leaves and 2 fruit per plant on 5 consecutive plants in 10 random locations in the field. Observe the under sides of leaves for aphids and mites. Consider treating if aphid 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.

Beet armyworm (BAW) activity has increased both in area and numbers caught over the past week. 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 remained high in Cumberland, Salem and Atlantic Counties over the past week. High catches over the past week include 234 adult BAW per night near East Vineland and 158 per night near Shirley in Cumberland County. BAW larval feeding has been reported on tomatoes near the Camden-Atlantic County border. 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.

Cole Crops

Cabbage looper (CL), imported cabbageworm (ICW), and diamondback moth larvae (DBM) infestations are high in many cabbage, broccoli and other cole crop plantings at this time. These caterpillars do considerable damage to the larger leaves before moving onto developing heads as the plants mature. They are capable of causing significant loss on all crops, but especially on collards and kale, where the mature leaf is the saleable portion. Check 5 consecutive plants each in 10 random locations in the field. Consider treating if greater than 20% of heading type cole crops are infested prior to head formation and if greater than 5% are infested when heads are present. For leafy greens, consider treating if 10% or more plants are infested at any time.

Distribution of Adult European Corn Borer for the Week Ending September 28, 2005



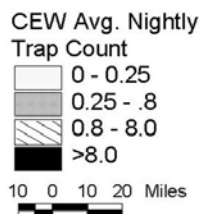
Data collected and processed by: Kris Holmstrom, Marilyn Hughes
Rutgers Cooperative Extension & Center for Remote Sensing

Distribution of Adult Beet Armyworm for the Week Ending September 28, 2005



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

Distribution of Adult Corn Earworm for the Week Ending September 28, 2005



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

Onions: Harvest and Curing Tips for Best Quality

Reprinted from Vegetable Notes, Sept. 9, 2005, UMass Extension. Note from UMass Editor: the following article from Cornell Cooperative Extension talks about the technology used by large-scale onion growers, but the crop needs are the same on small farms – except that growers often have to improvise to achieve the best conditions. A relative humidity sensor and maximum-minimum thermometer would be useful tools for growers aiming for good curing and long term storage of onions or other root crops.

Harvest Tips for Best Quality

- 1) Be sure onions are well dried and necks tight (i.e. the tissue does not slide when you roll your neck between your fingers) before harvesting/topping. **Bacterial diseases** and **Botrytis Neck rot** can move through green tissue into the bulbs. These diseases do not move in dry tissue.
- 2) Leave 2-3 inches of neck on the bulb. This increases the distance from the cut surface to the bulb for these pathogens to travel.
- 3) Minimize mechanical injury during harvesting by adjusting the chain speed to make sure the chain is always full. This will help reduce rolling and bumping of the bulbs.
Reduce drops to 6" and pad sharp surfaces. Bruises provide direct entry points for diseases to get started.
- 4) Grade out damaged onions before putting them into storage. Damaged bulbs give off moisture, which is favorable for development of diseases in storage.

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Curing Onions for Maximum Quality

Temperature - Quick curing can be done with outside air, which is heated to approximately 77°F. Higher temperatures, up to 90°F can be used if onions are of high quality with several layers of good skins. Higher temperatures are favorable for development of bacterial diseases. **Black mold** is more likely to develop when temperatures exceed 82°F. A lower temperature, down to 68°F should be used if onions are poorly skinned or if they have been touched by frost. Best skin color develops at 75-90°F.

Relative humidity – should not fall below 65% or exceed 80%. RH going into the boxes should ideally be 50%.

Airflow - should be no less than 3 cubic feet per minute per cubic foot of product. Be aware that when

bulb size is down, air circulation through the boxes is reduced (onions pack tighter with smaller air spaces in between). An empty bushel crate can be placed into the onion boxes while filling to increase air circulation.

Dryer Volume - the wetter/greener the onions going into a dryer, the fewer should be put into it. Stack no more than 3 boxes away from the plenum. Check Conditions – RH and temperature of the air going into and out of the boxes should be monitored and adjustments made accordingly. Check air flow. Air will take the path of least resistance. Use a smoke test to show you where and how the air is moving.

September 7, 2005 PestMinder 12.19 1, A publication of the Cornell Cooperative Extension Vegetable Program. □

Weekly Weather Summary

Keith Arnesen, Ph.D., Agricultural Meteorologist

Temperatures averaged much much above normal, averaging 68 degrees north, 71 degrees central and 72 degrees south. Extremes were 92 degrees at Pomona on the 24th, and 48 degrees at Freehold on the 25th. Weekly rainfall averaged 0.00 inches north, 0.09 inches central, and 0.11 inches south. The heaviest 24 hour total reported was 0.56 inches at Cape May Courthouse on the 20th to 21st. Estimated soil moisture, in percent of field capacity, this past week averaged 75 percent north, 58 percent central and 43 percent south. Four inch soil temperatures averaged 69 degrees north, 71 degrees central and 73 degrees south.

Weather Summary for the Week Ending 8 am Monday 9/26/ 5

WEATHER STATIONS	RAINFALL			TEMPERATURE				GDD BASE50		MON %FC
	WEEK	TOTAL	DEP	MX	MN	AVG	DEP	TOT	DEP	
BELVIDERE BRIDGE	missing									
CANOE BROOK	missing									
CHARLOTTEBURG	.00	23.64	-5.98	84	49	66.	9	2813	766	74
FLEMINGTON	.01	25.19	-2.83	88	51	69.	8	3187	539	65
NEWTON	missing									
FREEHOLD	.10	24.22	-2.98	90	48	70.	8	3222	405	63
LONG BRANCH	.20	22.72	-4.81	90	56	71.	8	3213	452	40
NEW BRUNSWICK	.12	25.24	-2.43	89	51	71.	9	3375	428	76
TOMS RIVER	.00	23.94	-4.22	89	50	69.	7	3158	392	31
TRENTON	.01	26.81	.63	87	56	72.	9	3420	353	51
CAPE MAY COURT HOUSE	.57	25.68	1.25	88	56	72.	6	3021	214	46
DOWNSTOWN	.00	20.20	-5.41	89	51	71.	7	3260	176	37
HAMMONTON	.00	21.82	-5.10	91	52	71.	8	3355	299	19
POMONA	.00	20.80	-3.50	92	53	72.	9	3276	438	30
SEABROOK	.00	23.59	-1.10	90	58	74.	10	3625	521	51
SOUTH HARRISON	.00	24.98	-1.29	90	56	73	NA	3354	NA	NA
*SOME CUMULATIVE VALUES ESTIMATED DUE TO MISSING PAST DATA										
WES KLINE — GDD BASE 40 PINEY HOLLOW Last Week 251 (Ending 9/19/05) This Week 219 (Ending 9/26/05)										

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