

PLANT & PEST ADVISORY

VEGETABLE CROPS EDITION \$1.50

JUNE 28, 2000



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Vegetable Crops Diseases

Stephen A. Johnston, Ph.D., Plant Pathology

✓ **Arugula: Bacterial leaf spot** is present in some fields at this time. Infected leaves contain numerous, irregular-shaped tan lesions with dark borders. Avoid working in fields while the foliage is wet to reduce spread.

✓ **Bean (snap): Pythium root rot** continues to appear in young fields at this time. Infected plants wilt, and black lesion is present at the base of the plant extending up the stem. The hypocotyl or portion of the stem below the ground is hollow within the necrotic area. Fields where the disease is most severe were not treated with Ridomil Gold 4E at seeding. The Ridomil Gold application in a band over the row following seeding is important in protecting the stand.

✓ **Beet:** Maintain applications of a copper fungicide every 7-10 days for control of **leaf spots**.

✓ **Cole crops: Downy mildew** is present on Chinese cabbage at this time. Older leaves contain numerous, angular lesions that are covered with white sporulation on the underside of the leaf. Maintain applications of maneb every 7-10 days for control of **Alternaria leaf spot & downy mildew**.

✓ **Carrot:** Now is the time to initiate fungicide applications for control of **leaf blights**. In 1999, **leaf blight** incidence was high early in the season; therefore, it is important to start a fungicide program prior to the onset of disease. Fields in South Jersey are at the prime time for treatment. Repeat applications every 10 days.

✓ **Eggplant: Verticillium wilt** is present in fields in all parts of the state at this time. Infected plants have a few leaves with a lighter color green present. Eventually the entire plant wilts. No control available at this time. Crop rotation away from eggplants and preplant soil fumigation are the recommended controls.

✓ **Lettuce: Alternaria leaf spot** is present in some fields of Romaine lettuce at this time. Infected leaves contain numerous brown, circular lesions. Maintain applications of maneb every 7-10 days.

✓ **Muskmelon: Fusarium wilt** is present in some fields at this time. Infected plants contain a brown lesion at the base of the stem, and are wilted. Use resistant varieties such as 'Saticoy' in future years.

✓ **Pea: Ascochyta blight** is present in some fields at this time. Infected plants have numerous black flecks present over the leaves and pods. There are no control measures available at this time. Immediately after harvest, disc field and plow under crop debris in

SEE DISEASES ON PAGE 2

order to promote destruction of the pathogen. In the future, rotate away from fields where peas have been produced. **Gray mold** is present also at this time. Infected plants have wilted terminal growth that is gray in color. Occasionally, old blossoms are infected and attach to various locations on pods. Frequent rains and high humidity are providing favorable conditions for infection. No control measures are available.

✓ **Pepper: Phytophthora blight** continues to appear in many fields at this time. Infected plants completely wilt, and a black, girdling lesion is present at the base of the plant near the soil line. Remove infected plants as they appear, and improve drainage within the field to allow water to leave the field rapidly following a rain. Maintain applications of mefenoxam (Ridomil Gold; Ultraflourish) every 21 days for control.

✓ **Pumpkin & winter squash:** Once vines begin to run, apply Bravo or mancozeb and alternate with Quadris (11 – 15.4 fl oz/A) every 7-10 days for control of **foliar diseases**. **Bacterial leaf spot** is present in some fields of spaghetti squash. Infected leaves contained numerous, angular-shaped dark lesions that are clustered together. Avoid working in fields while the foliage is wet, and apply a copper fungicide + mancozeb every 7 days for control.

✓ **Squash, summer: Phytophthora blight** is severe in several fields at this time. Both the crown rot and fruit phases of the disease are present. Plants infected with crown rot completely collapse. A dark lesion is present at the base of the petiole near the main stem. Fruit rot symptoms are difficult to observe initially. Within a couple of days, a cream colored, appressed sporulation appears on the surface and the fruit collapses. Apply Ridomil Gold Copper, Ridomil Gold Bravo or Flouronil as a foliar spray every 14 days for control.

✓ **Sweet corn: Rust** is present in some fields in North Jersey at this time. Infected leaves are close to the ground, and are covered with small, reddish pustules. If corn is in the whorl stage or younger, apply a fungicide for control. Older corn will not benefit from fungicide application. **Smut** is present on leaves and stems at this time. Raised bumps are scattered over leaves and typical enlarged gray galls are present on stems. No control is available; use resistant varieties whenever possible.

✓ **Tomato: Late blight** has been reported on tomatoes in Albany County, New York. Therefore, all tomatoes should be protected with a fungicide at this time to prevent infection. **Phytophthora blight** is present in some fields. Infected plants have a girdling lesion at the base of the stem. **Pythium blight** is also present. Symptoms include a black, girdling lesion at

What Does the Atmosphere Feed Your Crops?

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Our atmosphere is changing. Industrialized society has produced rising levels of carbon dioxide, ozone, and nitrogen oxides. Sulfur dioxide emissions may have stabilized, but considerable amounts are still transferred in the air, particularly in the northeast states.

What do these substances do to your crops? Do they help, or do they harm?

Carbon dioxide, worrisome for its role as a greenhouse gas, is the biggest source of nutrients for all plants. More than 90 percent of plant dry matter is made up of the carbon and oxygen it supplies. Numerous studies indicate that the elevated levels expected in the future are likely to stimulate plant productivity.

Ground level ozone, on the other hand, can hurt your crop. Near urban areas, crops frequently show symptoms of ozone injury. Increasing levels of carbon dioxide may not do much more than counterbalance the increasing levels of ozone.

Across the eastern Corn Belt, sulfur dioxide in the air can supply substantial amounts of the plant nutrient sulfur. Plant leaves can absorb it through their stomates as a gas or through their roots after rain washes it into the soil as sulfate. The soil does not hold sulfur well, though, and crops like alfalfa, which remove a lot of it, can still show deficiencies.

In some areas, sulfur dioxide may be concentrated enough to cause stress to plants. Recent

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the base of the stem and the lesion is hollow. **Bacterial canker** is present in some fields. Infected plants have a marginal necrosis on the majority of the leaves. Avoid working in the fields while the foliage is wet to prevent spread. Apply a copper fungicide + mancozeb every 7 days for control. With the pressure for fungal and bacterial diseases at this time, a good fungicide program to follow would be to apply a copper fungicide (1 pound active ingredient) + mancozeb (1 pound active ingredient) + Bravo alternated with Quadris every week.

✓ **Watermelon: Phytophthora blight** is present in some fields at this time. Infected vines have numerous tan, girdling lesions present and are wilted. Improve drainage in the field, and maintain applications of a copper fungicide plus a sticker every 7 days to assist in control. □

Pest Notes

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

✓ **General:** Many different **beetles** that are the adults of the various "**grubs**" that attack vegetables in New Jersey are present in both the field and the light traps. Some of the **beetles** trapped include **Japanese beetles, oriental beetles, rose chafers**, and others. These pests *may* attack the root crops such as white and sweet potatoes, radish, etc., although the damage is not always related to adult activity in the light traps. Some of the more effective materials for **grub** control include Aztec, Counter, Force, Fortress, Lorsban and Thimet. Consult label for crop registrations to determine for which vegetable crops these materials have registrations.

Also, several different species of **cutworm moths** are now being caught in the IPM blacklight traps (S. Walker). Some of these pests include the **black cutworm, the spotted cutworm, and the large yellow underwing cutworm**. All of these have potential to cause significant damage to a number of vegetables, including root crops, cole crops, sweet corn, etc. For white and sweet potatoes, watch the foliage closely for large holes or defoliated tissue and no signs of the pest, or for plants cut off at the base. If damage or larvae are found, dig around at the base of the plant and try to find the larva (usually a dark brown or dark grey "**worm**" pest) to confirm **cutworm**. Select an insecticide, and direct the spray at the base of the plants, using high gallonage (greater than 30-40 gal/acre). Spray between dark and 5 A.M. when the **worms** are active, and cultivate after the insecticide application to improve pest/pesticide contact.

✓ **Cabbage:** **Imported cabbageworms** are found in high numbers on cabbage throughout the state. **Imported cabbageworms** are the larvae of the common white butterfly, and have no resistance to pesticides but are usually found in high numbers because growers tend to forget about this pest until the damage appears. Many different insecticides are labeled and effective for this pest, including any of the biological insecticides (*B.t.'s*) currently on the market. Thorough coverage of the application is important for proper management of **imported cabbageworms**.

✓ **Corn:** **Corn earworms** are still active, and adults are being trapped in higher numbers than normal for this time of the year. It is likely that the early warm (hot) weather in March and April, and more hot weather in May and June accelerated the appearance and buildup of **corn earworm** in New Jersey. Monitor this pest in both the light traps (or pheromone traps) and in the whorls of the sweet corn. If silks are present, and moths are active, it is likely that the larvae will cause damage to the ears. Most

effective sprays include Asana XL, Baythroid 2E, Lannate L, permethrin (Ambush/Pounce), and Warrior 1T. For more information concerning spray timing and tips, refer to pages 146-147 of the *2000 Commercial Vegetable Production Recommendations for New Jersey*.

✓ **Pepper (bell):** Small fruit are on the plants, and will likely be targets for **European corn borer** larvae. Adult **moth** activity is currently low, although it can rapidly increase in the hot humid weather that is present throughout New Jersey. Watch for increases in the **moth** counts in the pest newsletters, or county agent newsletters, and begin spraying if the **moth** counts increase. Although the first generation is over, the summer generation (single generation **moth**) should commence within the next week or so, and the second generation **moths** of the 2-generation variety should appear within the next 3-4 weeks (we expect that **moth** activity will be observed earlier than normal this summer because of the hot weather). Orthene is still one of the best materials for protection from **European corn borer**, but at this time growers are only allowed 2 applications if they use new material (read the label to determine if you have the new or old label). Growers with the old label can use Orthene as instructed on that label (multiple applications are allowed). A Special Local Needs label (24-C) for the use of 4 applications was requested from the NJ DEP, although final approval has not yet been made.

✓ **Potato:** Second generation **Colorado potato beetle** larvae are present on potato plants. If Admire 2F was applied, do *not* use Provado 1.6F. Regardless of previously applied materials, it would be best to use a non-imidacloprid material such as AgriMek, SpinTor, Kryocide (cryolite), Thiodan, or Vydate L. By rotating these materials in place of imidacloprid, it is less likely that the **potato beetle** will develop resistance to imidacloprid. Also, some materials such as Vydate L and Thiodan will effectively control the **potato leafhopper**, another serious pest that is present in potato fields. Monitor closely for **potato leafhoppers** by watching for both adults and larvae of the **leafhopper**, and the damage caused by **leafhoppers** ("hopper burn" to the leaf tips). Dimethoate, Guthion, Imidan, Thiodan and Vydate all effectively control the **leafhopper**.

✓ **Tomato:** EPA is going to revoke the tolerance for chlorpyrifos (Lorsban) on tomatoes this year. The use of Lorsban on tomatoes will be prohibited after December 31, 2000. Although Lorsban was not generally used on tomatoes in New Jersey, it was an effective material for control of garden **symphyliids, wireworms, and maggots**. □

Vegetable IPM Update

Kristian Holmstrom and Sarah Walker, Program Associates in Vegetable IPM

Cole Crops

All three worm pests, **imported cabbage worms (ICW)**, **diamondback moth larvae (DBM)**, and **cabbage loopers (CL)** can be found in leafy greens and cabbage. However, **ICW** appears to be the primary pest in many fields. Adult **ICW** butterflies (white with a black spot on the wing) are easily found flying in fields during the day, and eggs can be found in high numbers in some plantings. **ICW** eggs are laid singly, are off-white to yellow, and protrude in a bullet-shape from the leaf. They can be found without the use of a hand lens, and generally are more easily noticeable than **CL** and **DBM** eggs. Fields should be checked at least one week following a treatment for egg hatch and new infestations. Check 5 plants in 10 locations and consider treatment when 20% of the plants are infested.

Snap Beans

The first generation moth flight of **European corn borer (ECB)** is over in most areas of the state. Moth activity should be increasing again in the next 1-2 weeks. Treatment for **ECB** should occur when plantings are in the bud-early bloom stage followed with a second application during the late bloom-early pin stages when adult blacklight trap counts increase to 2-5 moths per night in your area.

Peppers

The first generation moth flight of **ECB** is over in all but the northern areas of the state. Moth activity should be increasing again in the next 1-2 weeks. As moth levels increase most nights in your area to 1 per night, small fruit (one half inch or greater size fruit) need to be protected from **ECB** infestation.

Two spotted spider mites are starting to show up in low numbers in one field. Make sure to check fields along edges where grass is being mowed or next to crops such as eggplant that are susceptible to **mite** infestations. Early infestations can be spot treated if **mites** are localized in a planting.

Pumpkins

Monitor pumpkin fields from seedling emergence through bloom for the presence of **striped** and **spotted cucumber beetles**. Sample 5 plants in 10 locations in the field, examining the entire plant for **beetles**. On hot windy days, **beetles** may hide in cracks in the soil surface or under plastic mulch. A suggested threshold guideline is 2 **beetles** at 6 of the scouted sites.

Sweet Corn

The first generation moth flight of **ECB** is over in the central and southern areas of the state and is on the decline in the northern counties. (see **ECB** map) However, larval feeding in whorl and pretassel stage corn continues to be found. Make sure to scout fields prior to silk and to treat plantings with greater than 12% plants infested.

The highest average nightly **ECB** blacklight trap catches are:

| | | | | | |
|----------------|---|--------------|---|-----------|---|
| Little York | 5 | Chester | 2 | Milltown | 2 |
| Sergeantsville | 4 | Drakestown | 2 | New Egypt | 2 |
| Phillipsburg | 3 | Hackettstown | 2 | Oldwick | 2 |
| Califon | 2 | Hopewell | 2 | Medford | 1 |

First generation adult **corn earworm (CEW)** adult blacklight trap captures have decreased significantly throughout the southern and central counties. (see **CEW** map) Older **CEW** larvae can still be found feeding in some older whorl and pretassel plantings, although new infestations are not occurring now. Silking spray schedules should be followed as closely as the weather permits, especially on newly silking plantings.

The highest average nightly **CEW** blacklight trap catches are:

| | | | | | |
|---------------|---|--------------|---|------------|---|
| Pemberton | 5 | Hammonton | 2 | Egg Harbor | 1 |
| Crosswicks | 2 | Morristown | 2 | Manville | 1 |
| East Vineland | 2 | Pedricktown | 2 | Matawan | 1 |
| Folsom | 2 | Phillipsburg | 2 | Woodstown | 1 |

General Sweet Corn Spray Schedule

| | |
|---------------------|----------|
| Silking corn: North | 4-5 days |
| Central | 3-4 days |
| South | 3-4 days |

* These are general spray recommendations for large areas of the state. Growers can increase or decrease the intervals based on their own local situations.

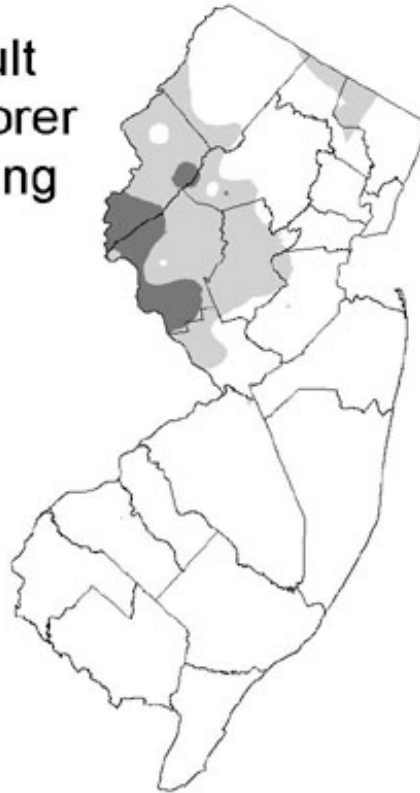
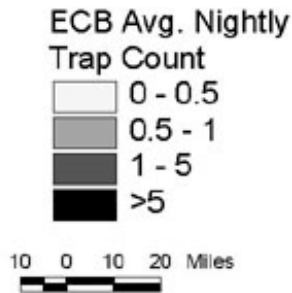
Tomatoes

Blacklight trap captures of several species of **stinkbugs** have been increasing, however the large population of the brown **Euschistus stinkbugs** that we have seen the past two years has not yet materialized. We expect these **stinkbugs** to appear in greater numbers in the next 1-2 weeks. In the past two years we have noticed that **stinkbug** damaged fruit increased significantly approximately one week following the influx of the **Euschistus** species of **stinkbugs** in the blacklight traps.

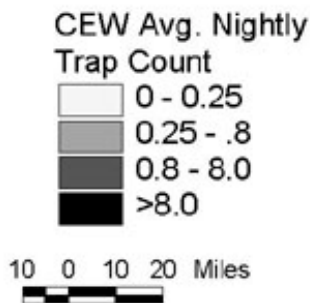
CEW blacklight trap captures have declined significantly throughout the state except in some areas in the northern counties. Continue to monitor plantings that had fruit during the first generation

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Distribution of Adult European Corn Borer for the Week Ending June 28, 2000



Distribution of Adult Corn Earworm for the Week Ending June 28, 2000



flight for the presence of **CEW** larvae. Also check plants for the presence of **tomato hornworms (THW)**, as larvae and eggs have been observed in some plantings. **THW** eggs are laid singly, and are light green spheres about the size of the head of a map pin. **THW** larvae can be very difficult to spot on a plant as they blend in with the foliage. Look for signs of leaf feeding or missing leaves and dark green or brown droppings on lower leaves or on the plastic.

White Potatoes

Monitor all fields at least once a week for the presence of **potato leafhopper (PLH)** adults and nymphs and **Colorado potato beetle (CPB)** adults and larvae. Threshold levels of both of these pests have been observed in some fields in the southern counties. The threshold for **PLH** control is 25-50 adults or nymphs per 50 sweeps (0.5-1 **PLH** per sweep). The guideline for **CPB** is to treat if more than 50 adults or 75 large larvae or 200 small larvae are counted per 50 stems.

For resistance management purposes, foliar applications of Provado are not recommended at this time, especially on fields that were treated with Admire. Many other control options are available for **CPB**. Consult the *2000 Commercial Vegetable Production Recommendations* book for materials to control both **CPB** and **PLH**. □

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

Weekly Weather Summary

Keith Arnesen, Ph.D., Agricultural Meteorologist

Temperatures averaged slightly above normal. Extremes were 96 at Pemberton on the 23rd and 47 degrees at Charlotteburg on the 20th. Weekly rainfall averaged 0.85 inches north, 0.32 inches central, and 0.42 inches south. The heaviest 24 hour total was 1.35 inches at Belvidere on the 21st to the 22nd. Estimated soil moisture, in percent of field capacity, this past week averaged 83 percent north, 75 percent central and 70 percent south. Four inch soil temperatures averaged 68 degrees north, 72 degrees central and 73 degrees south.

Weather Summary for the Week Ending 8 am Monday 6/26/00

| WEATHER STATIONS | RAINFALL | | | TEMPERATURE | | | | GDD BASE50 | | MON %FC |
|----------------------|----------|-------|-------|-------------|----|-----|-----|------------|-----|---------|
| | WEEK | TOTAL | DEP | MX | MN | AVG | DEP | TOT | DEP | |
| BELVIDERE BRIDGE | 1.56 | 19.54 | 4.81 | 92 | 53 | 71. | 1 | 874 | 84 | 87 |
| CANOE BROOK | .39 | 13.48 | -2.38 | 92 | 53 | 71. | 1 | 970 | 212 | 70 |
| CHARLOTTEBURG | .80 | 17.23 | 1.21 | 90 | 47 | 68. | 1 | 674 | 86 | 75 |
| FLEMINGTON | .77 | 15.74 | .59 | 91 | 53 | 72. | 2 | 1005 | 219 | 77 |
| LONG VALLEY | .75 | 16.48 | .26 | 86 | 53 | 68. | 0 | 756 | 109 | 83 |
| FREEHOLD | .28 | 11.27 | -3.62 | 92 | 54 | 73. | 2 | 1064 | 188 | 64 |
| LONG BRANCH | .13 | 14.32 | -.64 | 85 | 56 | 72. | 1 | 899 | 91 | 56 |
| NEW BRUNSWICK | .23 | 14.78 | .24 | 91 | 55 | 73. | 0 | 1031 | 102 | 77 |
| PEMBERTON | .30 | 13.49 | -.89 | 96 | 56 | 78. | 7 | 1465 | 556 | 51 |
| TOMS RIVER | .23 | 14.26 | -.54 | 88 | 54 | 73. | 2 | 1019 | 216 | 59 |
| TRENTON | .76 | 13.08 | -.45 | 89 | 56 | 73. | 0 | 1094 | 114 | 62 |
| CAPE MAY COURT HOUSE | .04 | 13.99 | .86 | 85 | 58 | 73. | 2 | 1058 | 176 | 36 |
| DOWNTOWN | .28 | 13.29 | -.11 | 89 | 58 | 73. | 0 | 1139 | 140 | 55 |
| GLASSBORO | 1.06 | 14.70 | .21 | 90 | 58 | 75. | 2 | 1228 | 250 | 76 |
| HAMMONTON | .59 | 12.51 | -1.59 | 89 | 56 | 73. | 0 | 1091 | 120 | 61 |
| POMONA | .33 | 11.84 | -.97 | 86 | 55 | 72. | 1 | 1041 | 153 | 63 |
| SEABROOK | .47 | 14.78 | 1.95 | 89 | 57 | 75. | 2 | 1223 | 217 | 55 |
| ATLANTIC CITY MARINA | .18 | 13.12 | .88 | 86 | 61 | 73. | 3 | 1047 | 225 | 58 |
| SOUTH HARRISON | .72 | 18.39 | 3.93 | 88 | 56 | 73 | NA | 1235 | NA | NA |

As of June 26th, South Harrison will replace Woodstown, but the values will be compared to the normals for Woodstown because no normals exist for South Harrison.

WES KLINE — GDD BASE 40 PINEY HOLLOW

Last Week 233 (Ending 6/19/00)

This Week 236 (Ending 6/26/00)

ATMOSPHERE FROM PAGE 2

research in India showed that nutrient-deficient soybeans were particularly susceptible, while those grown with balanced levels of nitrogen, phosphorous and potassium tolerated stress better. Potassium protects against ozone as well by increasing leaf levels of antioxidants such as ascorbic acid.

Nitrogen can be delivered through the air just like sulfur. Across most of the Corn Belt, 5 to 8 pounds per acre fall with the rain each year. Ammonia that volatilizes from livestock operations, manure storages, and fields can be absorbed as a gas by plant leaves. Leaves also rapidly take up oxides of nitrogen that are emitted from the soil. In fact, a recent study in Ontario found that turf fertilized with nitrogen took up nitrogen oxides faster than unfertilized turf.

In some areas near the ocean coasts, the rain

delivers as much as 28 pounds of chloride per acre each year. Away from those areas, however, chloride deposition is negligible. Rainfall delivers only very small amounts of calcium, magnesium, potassium, and phosphorus – not enough to be significant to the nutrition of most crops.

Deposition varies greatly from one place to another and from year to year. The National Atmospheric Deposition Program, through its nationwide network of precipitation monitoring sites, provides useful maps showing the distribution of nutrients delivered by rain each year. Their website, <http://nadp.sws.uiuc.edu/>, gives full public access to the data.

Your nutrient management plan is not complete if it doesn't consider what comes from the air.

Submitted by Joseph Heckman, Ph.D., Soil Fertility. □

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