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a newsletter for commercial growers of fruit and vegetable crops



"We are what we repeatedly do. Excellence, then, is not an act, but a habit." Aristotle

Address any questions or comments regarding this newsletter to the individual authors listed after each article or to its editor, Rick Weinzierl, 217-333-6651, weinzier@uiuc.edu. The ***Illinois Fruit and Vegetable News*** is available on the web at: http://www.ipm.uiuc.edu/ifvn/index.html . To receive email notification of new postings of this newsletter, call or write Rick Weinzierl at the number or address above.

This issue's words of wisdom ... which usually means the jokes ... are at the end of newsletter ... check the last page.

In this issue ...

Crop and Regional Reports

In northern Illinois, average highs have ranged from the upper 70s to lower 80s, and night-time lows have been in in the 50s to 60s. Soil moisture is still adequate in most counties due to the abundant rainfall received during the first two weeks of June and about 1 inch recorded between June 17 and 29. The counties bordering Wisconsin received more rainfall than counties in the Chicago Metropolitan area and central part of the state.

Orchardists are still completing fruit thinning and continuing cover spray programs. Codling moth monitoring is ongoing. Some grape varieties are in full bloom, and berries are sizing well in the earlier varieties. Sour cherry harvest is underway, and strawberry picking is over.

Cucumber beetles are a problem in most cucurbit fields, and Colorado potato beetle is present in fields where potatoes, eggplants, and tomatoes are growing. Bean leaf beetles have been observed feeding on bean leaves, and diamondback moth and imported cabbageworm adults are flying in fields where cabbage, broccoli and other cole crops are grown. Early plantings of cabbage, beets, and other greens are being harvested. Pumpkin planting is done on most farms, and watermelons and muskmelons in black plastic mulch systems are vining well. Bacterial spot and speck problem have been reported in some tomato fields, and tomato plant death on isolated spots in the fields observed. Sweet corn planted early in the season is now silking.

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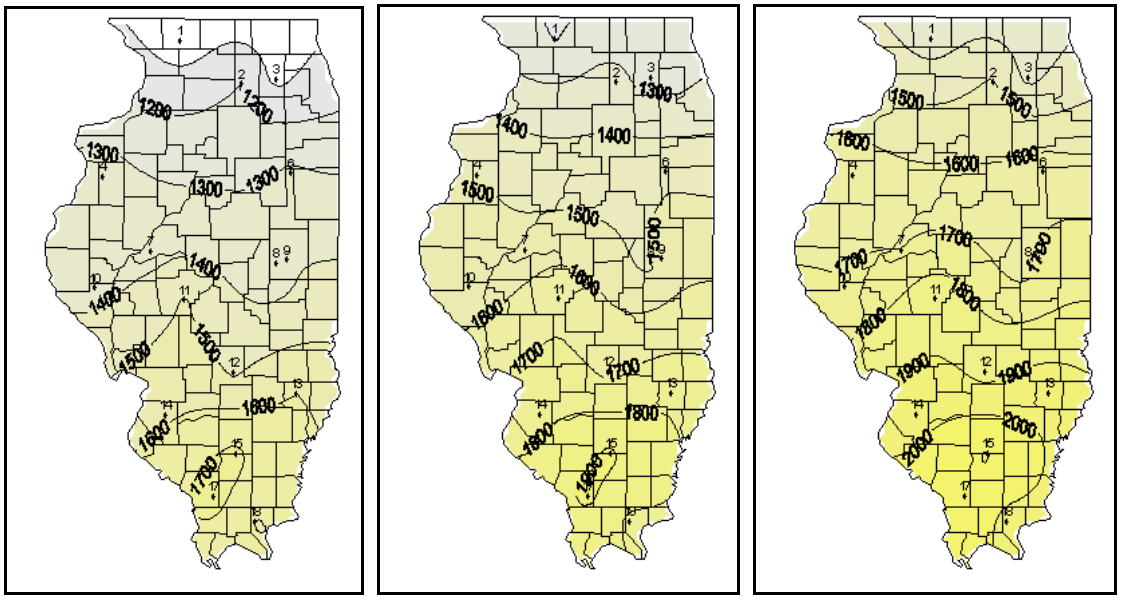
Degree-Day Accumulations and Projections

To view an up-to-date contour map of accumulated degree-days in Illinois, go to http://www.sws.uiuc.edu/warm/pestdata/choosemap.asp?plc=#, and select a base temperature of 50˚F. To reach the degree-day calculator, go to: http://www.ipm.uiuc.edu/degreedays or http://www.sws.uiuc.edu/warm/agdata.asp.



DD accumulations, base 50 F, for January 1 through June 30 (left) and projected through July 6 (center) and July 13 (right).

No.	Station	County	Base 50 Degree-Days January 1- June
1	Freeport	Stephenson	1041
2	Dekalb	Dekalb	1200
3	St. Charles	Kane	1076
4	Monmouth	Warren	1348
5	Peoria	Tazewell	missing
6	Stelle	Ford	1317
7	Kilbourne	Mason	1358
8	Bondville	Champaign	1299
9	Champaign	Champaign	1383
10	Perry	Pike	1366
11	Springfield	Sangamon	1506
12	Brownstown	Fayette	1487
13	Olney	Richland	1601
14	Belleville	St. Clair	1585
15	Rend Lake	Jefferson	1719
16	Fairfield	Wayne	missing
17	Carbondale	Jackson	1914
18	Dixon Springs	Pope	1781

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Notes from Chris Doll

Back-40 Happenings on June 30: DD50 numbers are 1664 for the year and 1349 for Codling Moth biofix. A few entries and emergence holes have been found with an Imidan sprays schedule. No moths have been trapped for 28 days. The first apple, peach and nectarine harvest was on June 26, which is 7 days earlier than last year. Raspberry harvest is complete and the expired fruiting canes have been pruned out to allow air and light into the row. A few blackberries have been picked but the majority are showing the early reddening of immature fruits. Strawberry renovation is completed. If it wasn't for Japanese beetle spraying, life would be better. Tops of cherry and plum trees (too tall for good spray coverage) and some Honeycrisp shoots have been severely chewed already. And the raccoons have harvested the first plum and sweet corn corp.

Field Observations: Codling moth trap counts have diminished to low single digit numbers in both an Illinois and Missouri orchard. Most of the live larvae found this spring have been calyx entries, and numbers are way down from the past three years. Mites have required control on Reds in some orchards, and all varieties in others. Pyramite performed well where used, and so did Acramite.

Brown rot on early nectarines was reported by one good grower (and also was found on my first nectarine) and might be an indicator of problems in heavy rain areas. Peach bacterial spot can be found on some leaves, but no fruit spots have been seen yet. Peach scab is visible in poorly sprayed trees. My daughter's tart cherry tree in Batavia was 90 percent infested with oriental fruit moth, and her apples were 100 percent damaged by curculio. An orchard in NE Illinois had moderate infestation of white apple leafhopper and spotted tentiform leafminer. Apple scab was moderate in a couple of orchards in the same area.

Harvest of early peaches in this area has been ongoing for 10 days. Red Haven are coloring and sizing just ahead of first pick. Some leaf drop (yellow leaves) is happening on peach in this area, which I attribute to physiological reasons, due to warm, dry conditions following excess soil moisture earlier in the growing season. Jonathans sprayed three times with Apogee (32 ounces per acre total) are showing renewed shoot growth, while Fuji and spur Reds continue to be checked.

IDFTA Honeycrisp Tour: Three bus loads of growers toured Minnesota and Wisconsin orchards last week to view rootstocks and training methods, as well as to discuss the problems and potentials of the variety. The majority of new plantings are on Bud 9, but we saw older plantings on M9 which were good, and some on G18 and G30 which had more vigor. Tree stakes were either angle iron or one-inch conduit, both of which have nearly doubled in price, making growers think more of trellising. Honeycrisp is not scab resistant, but does have tolerance to infections. However, it is susceptible to powdery mildew. The fruit set in the area was fairly light this year, so that thinning results were hard to assess. Sevin seems to be the thinner of choice, and some growers said go easy and others said go hard. 2003 prices received were quoted from $42 to $64 and higher per bushel, with lots of optimism for the near future. No trees with the abnormal leaf coloring (yellow to bronze) was seen on tour, but is beginning to show in local orchards.

Chris Doll
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Fruit Production and Pest Management

More on Nutrient Deficiency in Fruit Trees

Magnesium deficiency. Symptoms of low magnesium include yellowing and scorching of the leaf blades, especially between the veins, that can extend to the outer edges. The symptoms usually occur in the lower leaves on the shoot and extend to the upper leaves. Magnesium deficiency occurs rapidly during the summer moths, especially in heavily limed soils. Soils high in potassium also show some magnesium deficiency. Older leaves tend to fall, while younger leaves hang on in deficient trees, leaving lower areas of shoots bare. Fruit quality and yield are not affected by magnesium. Some orchards in Illinois, especially those in the central and northern part of the state, may be considered moderately deficient in magnesium.

Zinc deficiency. Zinc deficiency causes young leaves to bunch together, forming a rosette. The leaves tend to be narrow with irregular yellow stripes between the veins. Shoot dieback and high flower bud mortality may also result from severe zinc deficiency. Leaves vary significantly in their zinc level, therefore it is difficult to predict if they are deficient based on nutrient analysis. Visible symptoms are a better indicator of zinc deficiency.

Manganese deficiency. Manganese deficiency results in yellow mottled leaves. The yellowing, however, is not as intense as with iron deficiency. The deficiency is more severe in alkaline soils. Manganese deficiency is not a problem in Illinois.

Molybdenum deficiency. Molybdenum deficiency is a problem in some Illinois orchards that have very acidic soils. Molybdenum deficient leaves tend to be pale yellow and distorted.

Boron deficiency. Boron is one of the most important micro-element for fruit trees, especially apples, pears and plums. Boron deficiency causes poor fruit set due to shortening of the life of the stigma. It causes cork spots, which can be very severe, especially on plums and apples. It causes growing tip-die back, shortened stems and distortion of the leaves. Boron deficiency is a serious problem in many orchards in Illinois. Soils deficient in boron are not restricted to one region in the state, but seem to depend on the site and size of the crop. Boron deficiency tends to be serious in years when the crop is heavy or when we have heavy rainfall, as we usually do especially in early spring.

Calcium deficiency. Calcium is the most important element for fruit trees. Calcium deficiency can cause poor fruit quality, restrict root growth, and cause die-back of growing points. Calcium deficiency is common in acid soils, in seasons of heavy rain, in soils with very high magnesium and potassium levels, and under very dry conditions.

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Fruit Diseases

Rust Diseases of Apples

Rust diseases occur commonly in Illinois. They are an important economic problem in southern Illinois, but considered less important in northern Illinois. The diseases and the fungi that cause them are cedar-apple rust (*Gymnosporangium juniperi-virginianae*), quince rust (*G. clavipes*), and hawthorn rust (*G. globosum*). All three fungi spend part of their life cycle on red cedar and are problems only when red cedar is found close to an orchard. The life cycles and control of these diseases are similar. Cedar-apple rust is the most important.

Symptoms: The bright color of the lesions produced by cedar-apple rust makes it easy to identify. Small, pale yellow spots develop on upper leaf surfaces shortly after bloom. These spots gradually enlarge and turn orange. Orange-colored drops of liquid may be observed in the spots when they are about 1/8 inch in diameter. Later, black dots (pycnia) appear in the spots on the upper surface.. In late summer, cylindrical tubes or protuberances (aecia) become evident on the leaf under-surfaces. The ends of the tubes split open and curl back.

Severe infection results in extensive defoliation and weakens the tree. Fruit infection is most common near the calyx end, and lesions are similar in color to those on leaves except the borders are darker green. Lesions are shallow, not over 1/16 inch deep, and with no internal chlorosis or necrosis.

Hawthorn rust produces lesions on apple leaves but rarely on apple fruit. Lesions resemble those of cedar-apple rust but are usually not over 1/6 inch in diameter.

Quince rust usually does not cause leaf lesions. Lesions on fruit are dark green, about 3/4 to 1 1/2 inches in diameter, and they usually distort the fruit. Lesions are deep, with necrotic tissues extending to the core. Affected fruit usually drop before harvest. Quince rust also occurs on pear fruit.

Disease Cycle. The disease cycle of cedar-apple rust is complex. Two plants (apple and cedar) and three fruiting structures (telia, aecia and pycnia) are involved. The pathogen requires two years to complete its life cycle.

The fungus overwinters in reddish brown galls or “cedar apples” in the cedar tree. When wet in spring, the galls extrude gelatinous tendrils or “horns” consisting of two-celled teliospores. Each spore produces four basidiospores from each of the two cells. Air currents carry the basidiospores to the apple leaf and fruit. Temperature and wetting conditions favoring infection are very similar to those of apple scab except no infection occurs below 43 ˚F because such temperatures are too cool for basidiospore production. Fruit are most susceptible for a 2- 3-week period beginning at bloom; foliar infections can occur as long as basidiospores are produced and new leaves emerge. Leaves are most susceptible when 4 to 8 days old. In July and August, windborne aeciospores from apple infect cedar leaves. Rust lesions develop in 1 to 3 weeks. These galls mature the following summer and produce telia the next spring, approximately 18 months after infection, completing the life cycle of the fungus.

Top: Cedar apple rust galls on cedar. Middle: Cedar apple rust on apple leaves.
Bottom: Cedar apple rust and hawthorn rust on apple fruit.

Control. Removing cedars located within a 2-mile radius of the orchard interrupts the life cycle and makes fungicidal control easier. For complete control, remove all cedars within 4 to 5 miles of the orchard.

Fungicides effective against the rust diseases should be applied periodically from the pink stage of bud development to third cover to protect the emerging leaves and developing fruit. Several fungicides (including Bayleton, Nova, Procure, Rubigan, and Sovran) are effective against apple rusts. For more information on rust diseases of apple, check the following website: http://www.ag.uiuc.edu/%7Evista/abstracts/a802.html. For updates on fungicide application for control of rust diseases of apple, consult the "2004 Commercial Tree Fruit Spray Guide, University of Illinois Extension, ICSG4-03."

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Vegetable Production and Pest Management

Vegetable Insects

Greenhouse Pest Management – Leafminers

Leafminers are a major concern in vegetable and floriculture greenhouse production systems because they have developed resistance to many commercially available insecticides and there are very few effective insecticides currently available. The over-use of abamectin (Avid) has resulted in several leafminer species that are now totally resistant to this insecticide/miticide. The common leafminers that attack greenhouse-grown vegetables and floricultural crops are in the family Agromyzidae (Order: Diptera), and they include the chrysanthemum leafminer, *Phytomyza* (=*Chromatomyia*) *syngenesiae*; columbine leafminer, *Phytomyza minuscula*; pea leafminer, *Liriomyza huidobrensis*; and serpentine leafminer, *Liriomyza trifolii*. Leafminers cause plant damage primarily when in the larval stage. They may only feed on specific crops or they may feed on a wide-range of greenhouse-grown crops, depending on the species.

Leafminer larvae feed between the leaf surfaces in the mesophyll layer of cells, creating either blotches or winding, serpentine mines or trials. Based on the species, leafminers may feed in different sections of the mesophyll layer. Furthermore, the mine pattern and location may vary depending on the leafminer species, stage of leaf development, and host plant.

The damage caused by leafminers is primarily aesthetic or visual, as plants are rarely killed from a leafminer infestation. However, a heavy infestation may impact plant sale-ability. Under certain conditions, leafminer larvae may tunnel into leaf stalks or into plant stems. Adult female leafminers may also cause damage by puncturing leaves as they insert their ovipositor (egg-laying device) to lay eggs. This creates white specks on the surface of leaves. Females may puncture both the upper and lower surface of leaves; however, this depends on the species. Leaf puncturing can reduce photosynthesis and kill young plants. In addition, these punctures may provide entry sites for diseases such as bacterial leaf spots. Leafminers are generally host specific and this can be used to aid in identification.

Leafminer adults are 2 to 3.5 mm (1/8 inch) long, shiny, black flies with yellow markings on the abdomen. They resemble fruit flies in appearance. Adult females lay single translucent, white oval eggs into leaf punctures created by the ovipositor during probing. Both the female and male feed on the sap that exudes from these wounds. Each female can lay an average of 60 eggs in a two to three week life span. The number of eggs laid depends on the food source and temperature. Eggs hatch into bright yellow to white larvae or maggots that feed on the mesophyll layer of cells creating mines within the leaf. The larvae may either mine the top of the leaf, bottom of the leaf, or both depending on the species. Temperature, host plant, leaf position, and age can all influence larval development.

Mines enlarge in size as the larva grows or molts to the next instar. The mine pattern, location, and plants attacked depend on the species. There are three to four larval instars that take approximately five to eight days to develop prior to pupation. The last larval instar cuts a semicircular slit in the leaf and typically drops to the soil to pupate. Pupae are oblong, and brown to gold in color. Leafminers require darkness in order to pupate so they are typically located deep within the soil. Adults emerge from the pupae stage in nine to ten days. A generation may be completed in 16 to 24 days, depending on temperature.

Insecticides may be used to manage leafminer populations; however, because a number of leafminer species have developed resistance to several commonly used insecticides, this has complicated leafminer control. Additionally, larvae are well-protected within the leaf tissues thus escaping contact with insecticides. The insecticides that are used for controlling leafminers are primarily either insect growth regulators such as cyromazine (Citation), which target the larval stage, or chemicals with translaminar activity, including abamectin (Avid), spinosad (Conserve), and acetamiprid (Tristar). Products with translaminar properties are effective against the larvae, as these materials are capable of entering the leaf and killing the larvae. Pyrethroid-based insecticides that are useful against adults include permethrin (Astro / Pounce), bifenthrin (Talstar / Capture), cyfluthrin (Decathlon / Baythroid), fenpropathrin (Tame / Danitol), and esfenvalerate (Asana); however, these materials are generally not effective on the larvae. The number of leafminers present and the occurrence of overlapping generations influence the frequency of insecticide applications needed. Sprays should be applied in the morning when females are laying eggs; this may disrupt this behavior. The problem of insecticide resistance has led to leafminers emerging as a major pest – once again.

*** Be sure to read the label thoroughly to determine if a pesticide can be used legally on greenhouse-grown vegetables**

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This issue's words of wisdom ...

You might be a college student if ...

- ... you have ever price-shopped for Top Ramen
- ... you consider Mac and Cheese a balanced meal.
- ... you have ever written a check for 45 cents.
- ... your underwear supply dictates the time between laundry loads.
- ... you eat at the cafeteria because it's "free", even though it tastes terrible.
- ... you wear the same jeans 13 days in a row -- without washing them.
- ... your idea of "doing your hair" is putting on a baseball cap.
- ... your breakfast consists of a coke on the way to class.
- ... you get more sleep in class than in your room.

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