Purdue Cooperative Extension Service

July 22, 2005 - Issue 18

In This Issue

Insects, Mites, And Nematodes

Soybean Aphid Numbers Continue to Rise - *(John Obermeyer, Christian Krupke, and Larry Bledsoe)*

- Scout soybean fields now!
- Hot temperatures and/or rains haven't stopped aphids.
- Predators cannot keep up with surging aphids.
- Treatment threshold and application guidelines given below.

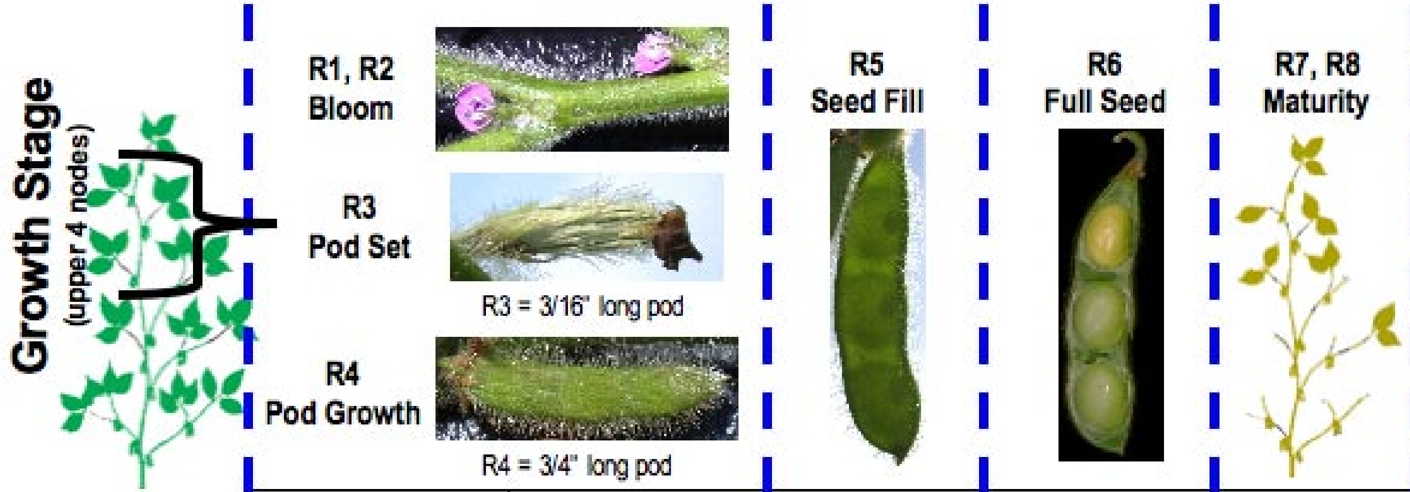
For the past several weeks, we have given soybean aphid updates. The news is much the same, in that aphid numbers continue to increase. However, now this increase is occurring during the critical pod set/development growth stages. Because of the variability in aphid numbers from field to field, diligent scouting NOW can pay big dividends. The following is a quick scouting review.

Sampling: Count aphids, primarily on the undersides of leaves, on at least 20 plants in various areas of the field. When aphids are just beginning to colonize soybean plants, they will be concentrated on the newest unrolled leaves. Generally these are the leaves lighter in color and located just below the top of the canopy.

Aphid Number: Should you find an average of 250 or more aphids/plant during the early soybean reproductive stages (R1-R4), a treatment is justified. During the seed-fill stages (R5-R6), treatment is not as clear-cut. If aphid numbers are increasing and plants are under stress, however, a treatment is justified. Do NOT treat soybean beyond the R6 stage of growth. See soybean aphid treatment threshold guide on next page.

Weather: High temperatures (90's) are less than optimal for soybean aphid growth and reproduction, but does not stop them. It is quite possible that the heat has kept populations from exploding throughout the Midwest, but they are still reaching economic levels in many fields. Rainfall, including some hard downpours, has had little effect on aphid populations. Extended high humidity may favor the development of fungal pathogens that inhibit aphid population growth. Unfortunately, these epizootics usually occur well after threshold numbers have been surpassed.

Predators: Most pest managers calling to report aphid numbers are also aware of predator populations. We appreciate their desire to preserve natural enemies and prevent unwarranted pesticide treatments. However, once aphid levels reach over 100 per plant, predators may not be able to keep ahead of the aphid's reproductive capability.



Aphid #/plant	< 250	≥ 250	> 250	> 250	Not Necessary
Action	Resample Later	Treatment is advised	Treat if aphids are increasing	Treat only if plants under drought stress	Do Not Treat

Soybean aphid treatment guide

Treatment: Should control be necessary, complete coverage on the foliage seems to be the key. Ground driven rigs applying at least 20 gallons per acre with 40 PSI at fine to medium droplet size will help penetrate the canopy. Aerial application success is dependent on finished spray volume (we recommend 5 gallon/acre) and air movement into the canopy. Products labeled for soybean aphid control include Asana, Lorsban 4E, Mustang Max, Penncap-M, and Warrior. All of these insecticides are restricted use products. Please follow all label rate, application, and use directions.

Extension publication "Soybean Aphid," E-217 has just been revised and is available in PDF format for download at <www.entm.purdue.edu/entomology/ext/targets/e-series/fieldcro.htm>.

Chewing Insects and Soybean Yield - *(John Obermeyer, Christian Krupke, and Larry Bledsoe)*

- Insect damage varies widely from field to field.
- Pod fill is the critical time for soybean defoliation.
- Identify insect defoliators, crop growth stage, and determine the level of defoliation.

According to the Indiana Agricultural Statistics Service, as of July 17, 12% of the state soybean crop is setting pods (13% is the 5-year average). Pod development and fill are critical stages for the soybean crop, and certainly a time when stress, such as leaf removal, is undesirable. Bean leaf beetle, Japanese beetle, grasshoppers, and green cloverworm all feed upon soybean leaves. Although soybeans have a remarkable capacity to withstand damage from defoliation, yield losses can occur.

The best management guidelines for soybean defoliators involve identifying the insect pests and then characterizing the level of defoliation and growth stage of the beans. Then management decisions will depend on the anticipated market price of the soybeans, cost of treatment, the level of damage, the growth stage of the soybean, and potential yield. At mid pod fill, consider treatment when defoliation exceeds approximately 15 to 20% and the defoliator(s) is still present and actively feeding. Refer to the following table on the next page for treatment thresholds for insect defoliated soybeans.

Indiana's defoliator

Treatment Thresholds for Insect Defoliated Soybeans

Soybean Growth Stage	Percentage Defoliation* Market Price - $5/bu Cost of Treatment					Market price - $6/bu Cost of Treatment				
	$6/A	$8/A	$10/A	$12/A	$14/A	$6/A	$8/A	$10/A	$12/A	$14/A
V1-2	40-50	45-55	50-60	45-55	55-65	35-45	40-50	45-55	45-55	50-60
V3-4	40-50	45-55	50-60	55-65	55-65	40-50	45-55	45-55	50-60	50-60
V5-6	45-55	45-55	50-60	55-65	55-65	40-50	45-55	50-60	50-60	50-60
V7+	40-50	40-50	45055	50-60	55-65	35-45	40-50	40-50	45-55	50-60
R1	25-35	30-40	35-45	40-50	40-50	25-35	25-35	30-40	30-40	35-45
R2	20-30	25-35	30-40	35-45	35-45	20-30	25-35	25-35	25-35	30-40
R3	15-25	20-30	20-30	25-35	25-35	10-20	15-25	20-30	20-30	20-30
R4	10-20	15-25	15-25	20-30	20-30	10-20	10-20	15-25	15-25	20-30
R5	15-25	15-25	20-30	20-30	25-35	10-20	15-25	15-25	15-25	20-30
R6	15-25	20-30	25-35	25-35	30-40	10-20	20-30	25-35	25-35	30-40

Soybean Growth Stage	Percentage Defoliation* Market Price - $7/bu Cost of Treatment					Market Price - $8/bu Cost of Treatment				
	$6/A	$8/A	$10/A	$12/A	$14/A	$6/A	$8/A	$10/A	$12/A	$14/A
V1-2	35-45	40-50	40-50	40-50	45-55	30-40	35-45	40-50	40-50	45-55
V3-4	35-45	40-50	45-55	45-55	45-55	35-45	40-50	40-50	40-50	45-55
V5-6	40-50	45-55	45-55	45-55	50-60	40-50	40-50	45-55	45-55	45-55
V7+	35-45	35-45	40-50	40-50	45-55	35-45	35-45	40-50	40-50	45-55
R1	20-30	25-35	30-40	30-40	30-40	20-30	25-35	25-35	30-40	30-40
R2	15-25	20-30	25-35	25-35	25-35	15-25	20-30	20-30	25-35	25-35
R3	10-20	15-25	15-25	15-25	20-30	10-20	15-25	15-25	15-25	20-30
R4	10-20	10-20	10-20	15-25	15-25	5-15	10-20	10-20	15-25	15-25
R5	10-20	10-20	15-25	15-25	20-30	10-20	10-20	15-25	15-25	15-25
R6	15-25	15-25	20-30	20-30	25-35	10-20	15-25	20-30	20-30	20-30

* The defoliation level needed before a control is applied will vary somewhat depending on insect numbers and stage of development, growing conditions, variety grown, expected yeild, economic factors, and plant population counts. All of these factors must be taken into consideration when making control decisions. The defoliation figures are shown as a range in each category. This range is included so that limiting factors can be considered. When a few limiting factors are present, the control decision value will normally be at the higher end of the scale. Under some circumstances or conditions management guidelines given above may need to be adjusted from what is given. Based on 50 bushel per acre yield.


Bean leaf beetle defoliation


Japanese beetle defoliation

Nematode Update – (*Jamal Faghihi and Virginia Ferris*)

- Corn nematode damage is done for the season.
- SCN damage is quite evident in many fields, even where claimed resistant lines have been planted.
- CystX® is becoming more available in soybean cultivars, providing superior SCN resistance.
- Two-different tests are available for SCN and soybean seed, details below.

It is safe to assume that the season to find corn nematodes has passed. The dry conditions along with high temperature are too lethal for this nematode. Now that needle or dagger nematodes have disappeared, plants in infested fields should be on their way to recovery and re-establishing themselves. Even though corn might catch up, yield damage most likely was done. However, as we said before this was not a "good" year for corn nematodes in Indiana and we have not found them to be a problem in the samples submitted to our laboratory.

The story for soybean cyst nematode (SCN) is completely the opposite. We have observed severe symptoms from many infested fields throughout Indiana already. What is alarming to us is that several of these fields are planted with "resistant" soybean but no sign of resistance can be found. The source of resistance for most of the current SCN resistant cultivars is the same (PI 88788), but different cultivars possessing this source of resistance do not necessarily behave the same way toward the same field population. We have collected a field population that has overcome three resistant cultivars, all with PI 88788 as their source of resistance. We are in the process of determining if the failure is due to their common source of resistance (PI 88788) or whether these particular "resistant" cultivars happened to be susceptible. Regardless of the outcome of these experiments, it is a sound SCN management practice to use different cultivars with different sources of resistance.

As most of you might know, we introduced a broad base source of resistance known as CystX® several years ago. Cultivars with this novel and new source of resistance are now available in wide range of maturity groups. No doubt more cultivars with CystX® resistance will become available in the near future. You might want to explore the possibility of obtaining cultivars with CystX® resistance as part of your SCN management. The CystX® resistance is non-race specific and now has been incorporated into elite germplasm. This is a superior resistance with no yield drag associated with it. Be advised that two types of CystX® cultivars are being marketed at the present time (Gold and Silver). These cultivars might not contain all of the CystX® resistance; thus the presence of cysts on their roots should not be alarming.

To help growers fight against SCN, and as an alternative to the race test, we are now offering to expose the growers' field populations of SCN against prospective soybean cultivars that they are planning to use. Growers can send us a gallon of SCN infested soil and about 100 seeds from each soybean cultivar that they are planning to plant. We will plant your seeds in your soil, replicated 5 times, and provide you with the results so you can make a more informed decision as to which resistant cultivar is more suitable to your particular field population. The cost for this service is a minimum of $50 for up to five cultivars and $10 for each additional cultivar. This test will take about 2 months to complete. If the population of SCN is not high enough to extract needed inoculum, an additional $20 cost and 1.5 months time is required.

We again urge you to start monitoring your fields for presence of soybean cyst nematode. If you have not sampled for SCN in the past, or have used resistant soybean seeds for several years, you need to sample for this nematode. As in previous years, Indiana Soybean Board is paying the processing fees for Indiana growers, up to 10 samples/grower/year. Soil samples taken from a depth of 4-6 inches can be sent to our laboratory for analysis.

If you have any question about these or any other kinds of nematode, you can contact Jamal Faghihi at 765-494-5901 or send an email to jamal@purdue.edu. Soil samples for nematode analysis can be sent to: Nematology Laboratory, Purdue University, Department of Entomology, Smith Hall, 901 W. State Street, West Lafayette, IN 47907-2089.

SCN damage in "resistant" cultivar

Black Light Trap Catch Report - (*John Obermeyer*)

County/Cooperator	7/05/05 - 7/11/05							7/12/05 - 7/18/05						
	VC	BCW	ECB	SWCB	CEW	FAW	AW	VC	BCW	ECB	SWCB	CEW	FAW	AW
Dubois/SIPAC Ag Center	0	0	2	0	3	0	2	0	0	2	0	0	0	2
Jennings/SEPAC Ag Center	0	5	1	0	0	0	10	3	1	1	0	0	0	5
Knox/SWPAC Ag Center	0	1	2	0	1	0	1	0	2	2	0	1	0	2
LaPorte/Pinney Ag Center	0	8	1	0	0	0	3	0	1	0	0	0	0	0
Lawrence/Feldun Ag Center	1	3	2	0	0	0	8	0	3	5	0	0	0	0
Randolph/Davis Ag Center	0	4	2	0	0	0	11	0	1	0	0	0	0	2
Tippecanoe/TPAC Ag Center	1	2	0	0	0	0	4	1	4	0	0	0	0	8
Vermillion/Hutson								0	0	0	0	3	0	7
Whitley/NEPAC Ag Center	0	0	4	0	0	0	14	1	7	0	0	0	0	6

VC = Variegated Cutworm, BCW = Black Cutworm, ECB = European Corn Borer, SWCB = Southwestern Corn Borer, CEW = Corn Earworm, FAW = Fall Armyworm, AW = Armyworm

Plant Diseases

Soybean Sudden Death Syndrome – (*Andreas Westphal, Scott Abney, and Gregory Shaner*)

- Heavy rains favor early infection by the SDS pathogen.

The spring and early summer has been quite dry in many areas of Indiana. Typically, this will reduce the risk for soil-borne diseases caused by fungi. However, recent severe weather with ample soil moisture may have changed the situation. The fungal pathogen that causes SDS occurs in most soybean fields in nearly all areas of the state, and can cause root rot and top symptoms when conditions are favorable.

Sudden death syndrome is caused by the soil-borne fungus *Fusarium solani* f. sp. *glycines* with the newly proposed name *Fusarium virguliforme.* The SDS-pathogen can be isolated from roots of soybean seedlings as early as one week after crop emergence. The fungus colonizes the root systems of susceptible plants. While the fungus can colonize soybean root tissue early on, it is only at mid-season when soybean is in the reproductive growth stage that aboveground symptoms of SDS occur. Leaf symptoms usually do not appear until pods development, any time from mid July through mid August. Heavy rains during reproductive stages seem to be a critical predisposing factor for SDS. Under these conditions the fungus starts producing toxins in the root system that are translocated within the plant and lead to foliar symptoms.

In affected plants, leaf tissue between the major veins turns yellow, then brown. Soon, the leaflets die and shrivel. In severe cases they drop off, leaving the petioles (leaf stalks) attached. Brown stem rot may cause similar foliar symptoms, but the leaflets tend to remain attached to the petioles. Brown stem rot can be distinguished from SDS by symptoms in the plant stem. When split, the lower stem and taproot of a plant with SDS will exhibit a dark cortex, but white pith. Brown stem rot darkens the pith, but the cortex is not much discolored. If a plant with symptoms of SDS is dug up when soil is moist, there may be small, light-blue patches on the surface of the taproot. These are spore masses of the SDS fungus. As the plant dries, this color will fade, but when it is seen, in conjunction with the other symptoms mentioned above, a diagnosis of SDS is strongly indicated.

Early planting into cool soils favors SDS. Soybean planting this spring progressed ahead of average. Many of these early-planted fields have been very wet in recent weeks. Wet soils, particularly as plants begin flowering, are conducive for SDS. It is not possible yet to predict how severe or widespread SDS will be this year. If conditions remain wet we may expect to see a lot more SDS. If it returns to being dry SDS may not be a problem. The strong environmental impact on symptom expression makes prediction difficult.

Certain cultural practices can reduce the risk of SDS. For example, a grower can choose a soybean cultivar that is less susceptible to SDS. Late planting is thought to reduce the risk for SDS. It is always good practice to keep field records of soil-borne diseases. Fields severely impacted with SDS in 2005 should be earmarked for later planting when they are scheduled for soybean planting in the future. Resistance cultivars should be planted in these fields.

Agronomy Tips

Yield Loss Potential During Grain Fill – (*Bob Nielsen*)

Yield potential in corn is influenced at several stages of growth and development. Ear size potential (number of potential kernels) is determined quite early, from about knee-high to about shoulder-high, or from about leaf stage V6 to V15. The next influential period for the corn crop is pollination. The period following successful pollination and finishing at kernel black layer is defined as the grain filling period in corn and represents the final important yield determining time frame. Grain fill stages in corn are described in an accompanying article. Perfect conditions for ear size determination and pollinations can still be negated if severe stress occurs during the grain fill period.

Yield loss during grain fill can occur from 1) stand loss, 2) incomplete kernel set, 3) lightweight kernels, and 4) premature plant death.

Stand Loss During Grain Fill

Yield loss due to stand loss during grain fill is usually greater than that due to stand loss that occurs during the vegetative phase. When stand loss occurs prior to pollination, ear size (number of kernels) on surviving plants may compensate in response to the lesser competition of a thinner stand. Additional compensation may occur during grain fill in terms of greater kernel weight. When stand loss occurs during grain fill, ear size has already been set. Only kernel weight can compensate in response to the lesser competition of a thinner stand.

Incomplete Kernel Set in Corn

Kernel set refers to the degree to which kernels have developed up and down the cob. Incomplete kernel set is not always apparent from "windshield" surveys of a corn field. Husks and cob will continue to lengthen even if kernel set is incomplete. A wonderfully long, robust-looking, healthy green ear shoot can completely mask even a 100 percent failure of pollination or severe kernel abortion.

One of the causes of incomplete kernel set is **unsuccessful pollination**. Unsuccessful pollination results in ovules that are never fertilized and, subsequently, ears with varying degrees and patterns of incomplete kernel set. Many factors can cause incomplete pollination and distinguishing between them can be very difficult.

Certain insects like corn rootworm beetles and Japanese beetles can interfere with pollination and fertilization by their silk clipping action. These insects feed on pollen and subsequently clip silks as they feed on the pollen that has been captured by the silks. Unusually early or late pollinating fields are often particularly attractive to these insects.

Drought stress may delay silk emergence until pollen shed is nearly or completely finished. During periods of high temperatures, low relative humidities, and inadequate soil moisture levels, exposed silks may also dessicate and become non-receptive to pollen germination.

Unusually favorable conditions prior to pollination that favor ear size determination can result in ears with an unusually high number of potential kernels per row. Remember that silk elongation begins near the butt of the ear and progresses up toward the tip. The tip silks are typically the last to emerge from the husk leaves. If ears are unusually long (many kernels per row), the final silks from the tip of the ear may emerge after all the pollen has been shed.

Another cause of incomplete kernel set is **abortion of fertilized ovules**. Aborted kernels are distinguished from unfertilized ovules in that aborted kernels had actually begun development. Aborted kernels will be shrunken, mostly white, often with the yellow embryo visible; compared to normal plump yellow kernels.

Kernels are most susceptible to abortion during the first 2 weeks following pollination, particularly kernels near the tip of the ear. Tip kernels are generally last to be fertilized, less vigorous than the rest, and are most susceptible to abortion. Once kernels have reached the dough stage of development, further yield losses will occur mainly from reductions in kernel dry weight accumulation.

Severe drought stress that continues into the early stages of kernel development (blister and milk stages) can easily abort developing kernels. Severe nutrient deficiencies (especially nitrogen) can also abort kernels if enough of the photosynthetic "factory" is damaged. Extensive loss of green

Examples of kernel abortion at tip of ears

Closer view of aborted kernels

leaf tissue by certain leaf diseases, such as common rust or gray leaf spot, by the time pollination occurs may limit photosynthate production enough to cause kernel abortion. Consecutive days of heavily overcast, cloudy conditions may also reduce photosynthesis enough to cause abortion in recently fertilized ovules.

Decreased Kernel Weight

Severe stress during dough and dent stages of grain fill decreases grain yield primarily due to decreased kernel weights and is often caused by premature black layer formation in the kernels. Decreased kernel weight can result from severe drought and heat stress during grain fill; extensive European corn borer tunneling (especially in the ear shanks); loss of photosynthetic leaf area by hail, insects, or disease early in grain fill; and killing fall frosts prior to normal black layer development.

Once grain has reached physiological maturity, stress will have no further physiological effect on final yield, because final yield is already achieved. Stalk and ear rots, however, can continue to develop after corn has reached physiological maturity and indirectly reduce grain yield.

Premature Plant Death

A killing fall frost prior to physiological maturity can cause premature leaf death or whole plant death. Premature death of leaves results in yield losses because the photosynthetic "factory" output is greatly reduced. The plant may remobilize stored carbohydrates from the leaves or stalk tissue to the developing ears, but yield potential will still be lost.

Premature death of whole plants results in greater yield losses than if only leaves are killed. Death of all plant tissue prevents any further remobilization of stored carbohydrates to the developing ear. Whole plant death that occurs before normal black layer formation will cause *premature* black layer development, resulting in incomplete grain fill and lightweight, chaffy grain. Grain moisture will be greater than 35%, requiring substantial field drydown before harvest.

Related References

Nielsen, R.L. (Bob). 2002. **Some Droughty Fields Experiencing Silk Emergence Delay.** Corny News Network, Purdue Univ. Online at <www.kingcorn.org/news/articles.02/SilkDelay-0726.html>. (URL verified 7/15/05)

Nielsen, R.L. (Bob). 2004. **Grain Fill Stages in Corn.** Corny News Network, Purdue Univ. Online at <www.kingcorn.org/news/articles.04/GrainFill-0705.html>. (URL verified 7/15/05)

Nielsen, R.L. (Bob). 2005a. **Ear Initiation & Size Determination in Corn.** Corny News Network, Purdue Univ. Online at <www.agry.purdue.edu/ext/corn/news/articles.05/EarSize-0523.html>. (URL verified 7/15/05)

Nielsen, R.L. (Bob). 2005b. **Silk Emergence.** Corny News Network, Purdue Univ. Online at <www.kingcorn.org/news/articles.05/Silks-0704.html>. (URL verified 7/15/05)

Nielsen, R.L. (Bob). 2005c. **Tassel Emergence & Pollen Shed.** Corny News Network, Purdue Univ. Online at <www.kingcorn.org/news/articles.05/Tassels-0704.html>. (URL verified 7/15/05)

Behind the Proverbial Eight Ball – (*Bob Nielsen*)

"Behind the Eight Ball": A term, referring to the game of pool, meaning in an unfavorable or uncomfortable position.

The New Dictionary of Cultural Literacy, Third Edition. Edited by E.D. Hirsch, Jr., Joseph F. Kett, and James Trefil.

This year's corn crop in Indiana is certainly "behind the eight ball" relative to the potential for high grain yield. This year's struggles are particularly frustrating for growers who harvested record high yields last year following a growing season where the crop was "ahead of the curve" almost the entire game. In contrast to last year's almost perfect growing season, the 2005 season has misfired to date in a number of ways. As is usually the case, perfect weather from here to the finish line would help mitigate some of the damage, but certainly not all.

The corn crop condition ratings by USDA – National Agricultural Statistics Service reflect the accumulated effects of these stresses. The percent of the state's corn crop currently (7/17/05) estimated to be good to excellent is only 39% (USDA-NASS, 2005). Based on the historical relationship between July crop condition ratings and yield, the potential statewide yield could be as much as 10% less than the historical trend yield of 146 bu/ac. Contrast this potentially low yield estimate with the record yields achieved in 2004 (16% above trend) and it's no surprise why the outlook in many local coffee shops is gloomy.

Major Stresses in 2005.

Germination, Emergence, and Stand Establishment. Fields throughout eastern and southern Indiana planted in mid-April suffered the consequences of a significant cold snap and crusting rains that occurred prior to emergence of the crop. Toss in some seedling blight and bird damage for good measure and stand establishment was pathetic in a number of fields.

The number of replanted acres consequently reported by many seed companies was cited as being the highest in recent years. A further complicating factor for some fields was a shallow compacted soil layer resulting from spring tillage that eventually restricted rooting depth of the corn crop and increased its eventual vulnerability to drought stress.

Increasing Drought Stress. Though not as serious as reported in Illinois, soil moisture deficits began to develop early in some areas of Indiana and continue today to varying degrees, resulting in a dramatic "rags to riches" contrast from one field to another. Fields of corn also suffering from the root limiting effects of severe soil compaction or feeding damage from western corn rootworm (WCRW) larvae (Obermeyer et. al., 2005b) are obviously even more vulnerable to the effects of drought stress.

Some of the drought-stressed fields I've walked in recent weeks are as bad as I've seen since the "Great Drought of 1988". Yet, I've seen other fields and talked with some growers who feel that 200 bu/ac is a realistic yield potential simply because they have received more rainfall at critical junctures of the season.

The effects of severe drought stress to date include a likely reduced ear size potential heading into pollination, possible delays in silk emergence during pollination, and smaller size and poorer health of the effective "photosynthetic factory". Continued drought stress early in the grain filling period can easily cause significant kernel abortion, especially in the tips of the ears. Temperatures in the lower 90's are not terribly stressful to the corn crop in and of themselves, but clearly aggravate the effects of soil moisture deficits on the health of the crop.

Warm Night Temperatures. The two main physiological processes that work in concert to "build" the "factory" and eventually produce grain are photosynthesis and respiration. The former captures solar energy and converts it to chemical energy; which is then used to convert absorbed carbon dioxide to simple sugars in the leaves.

In contrast to photosynthesis, respiration catabolizes (breaks down) some of the simple sugars produced by photosynthesis to create the chemical energy it requires to then convert the remainder of the simple sugars to more complex carbohydrates. This catabolism also produces carbon dioxide, some of which is lost through the leaf stomata.

Excessively warm nights greatly increase the rate of respiration and are sometimes thought to be detrimental to overall dry matter accumulation in the corn crop because of a possible reduction in net carbohydrate accumulation. While often talked about, there is surprisingly little published research to support the importance of this stress factor in corn.

Recent Spate of Cloudy Days. I've often thought that one of the most frequent limiting factors to high yields in the eastern Corn Belt is the typically high number of excessively cloudy or simply hazy days during mid- to late summer. The remnants of Hurricane Dennis brought welcome wet relief to some Indiana cornfields, but also blanketed the Hoosier State with nearly a week of excessively cloudy days.

Relative to the solar radiation measured on 19 July (a day with few clouds and moderate humidity) at the Purdue Agronomy Research Center near W. Lafayette, the average solar "load" received from 11 – 16 July was only about half and ranged from 35% to 61% on a daily basis (PAAWS, 2005). Such decreased levels of available solar radiation significantly reduce the rate of photosynthesis. The question is whether the reduction in photosynthesis was great enough to influence the success of pollination or the survival of newly fertilized kernel embryos in fields that were at these stages of development during the cloudy weather.

Lesser or Yet To Be Determined Stresses.

Severe Drought Stress. Corn fields in drought-stricken areas that have not received significant rainfall from recent storm systems will continue to struggle, especially if the high temperatures forecast for the next week indeed occur. Fields yet to pollinate will continue to be vulnerable to severe drought stress effects. Assuming that pollination was moderately successful in earlier planted fields, the risk of significant kernel abortion is high during first two weeks after end of pollination. Soil moisture deficits that continue to linger well into the grain filling period increase the risk of overall lower kernel dry weight and lower yield.

Silk Clipping by WCRW Beetles. Scattered reports of aggressive silk clipping in some fields can obviously interfere significantly with the success of pollination. Early planted fields by and large are finished with pollination, so are not at risk any longer. Later planted fields, including those replanted at late dates, should continue to be monitored for severity and timing of silk clipping insects (Obermeyer et. al., 2005a).

Leaf Diseases. The remnants of Hurricane Dennis not only brought welcome precipitation to some areas of the state, but also foggy, misty, and otherwise high humidity weather that can be conducive for the development of a number of corn leaf diseases. For some growers, memories of last year's incidence of northern corn leaf blight are still painfully fresh. Few reports have yet been received on this yet, but the "time is ripe".

Related References

Nielsen, R.L. (Bob). 2005a. Stress Continues for Corn Growing Under Refrigerated Conditions. Corny News Network. Purdue Univ. Available online at <www.kingcorn.org/news/articles.05/RefrigCorn-0429.html> [URL verified 7/20/05].

Nielsen, R.L. (Bob). 2005b. I've Got The Corny Stand Establishment Blues… Corny News Network. Purdue Univ. Available online at <www.kingcorn.org/news/articles.05/StandEstablishmt-0503.html> [URL verified 7/20/05].

Nielsen, R.L. (Bob). 2005c. Some Mid-April Planted Corn in Trouble. Corny News Network. Purdue Univ. Available online at <www.kingcorn.org/news/articles.05/StandLossDisease-0508.html> [URL verified 7/20/05].

Nielsen, R.L. (Bob). 2004 (rev. 2005). Yield Loss Potential During Grain Fill. Corny News Network. Purdue Univ. Available online at <www.kingcorn.org/news/articles.04/GrainFillStress-0705.html> [URL verified 7/20/05].

Obermeyer, John, Christian Krupke, and Larry Bledsoe. 2005a. Stressed Corn, Pollination, and Rootworm Beetles. Pest & Crop Newsletter. Purdue Univ. Available online at <http://128.210.99.160/entomology/ext/targets/p&c/p&c2005/p&c16_2005.pdf> [URL verified 7/20/05].

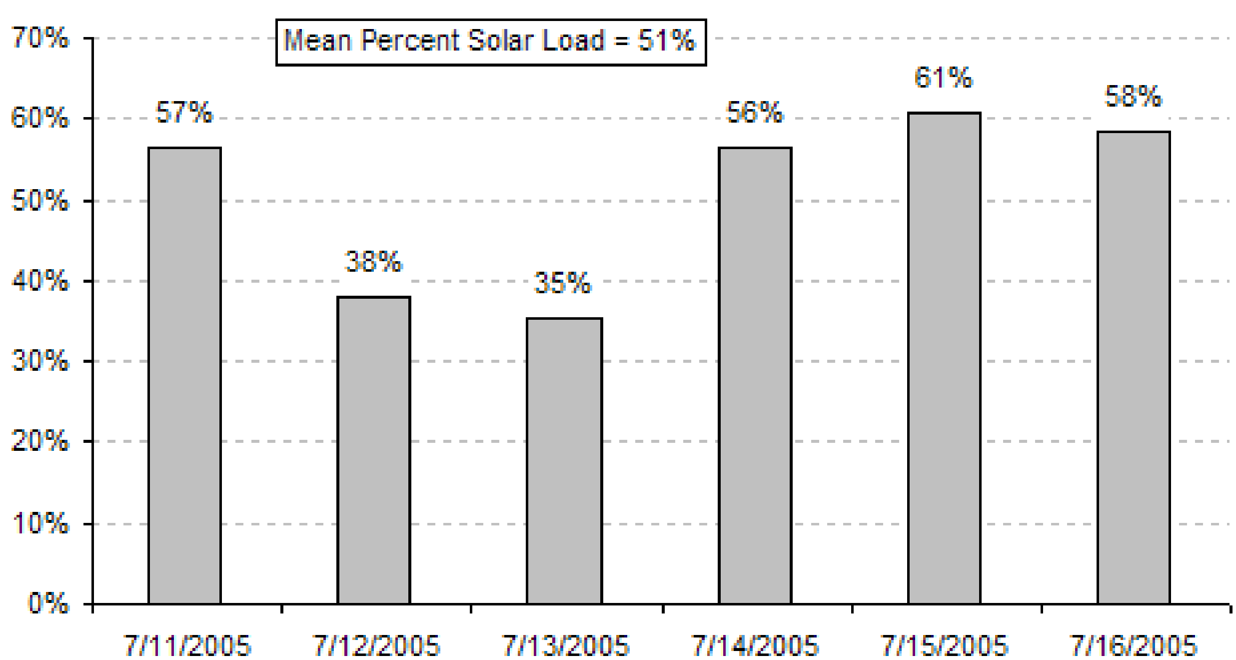
Obermeyer, John, Christian Krupke, and Larry Bledsoe. 2005b. Root Damage Ratings Can Now be Conducted. Pest & Crop Newsletter. Purdue Univ. Available online at <http://128.210.99.160/entomology/ext/targets/p&c/p&c2005/p&c17_2005.pdf> [URL verified 7/20/05].

PAAWS. 2005. Purdue Automated Agricultural Weather Stations (PAAWS) Network. Available online at <http://shadow.agry.purdue.edu/sc.zen-geog.html> [URL verified 7/20/05].

USDA-NASS. 2005. Weekly Crop & Weather Report (7/18/05). Available online at <www.nass.usda.gov/in/cropweat/2005/we2905.pdf> [URL verified 7/20/05].

For other Corny News Network articles, browse through the CNN Archives at <www.kingcorn.org/news/archive.html>. For other information about corn, take a look at the Corn Growers' Guidebook at <www.kingcorn.org>.

Mean Solar Radiation Load Relative to 19 July 2005
For Six Consecutive Days, 15-Hrs from 6am to 8pm



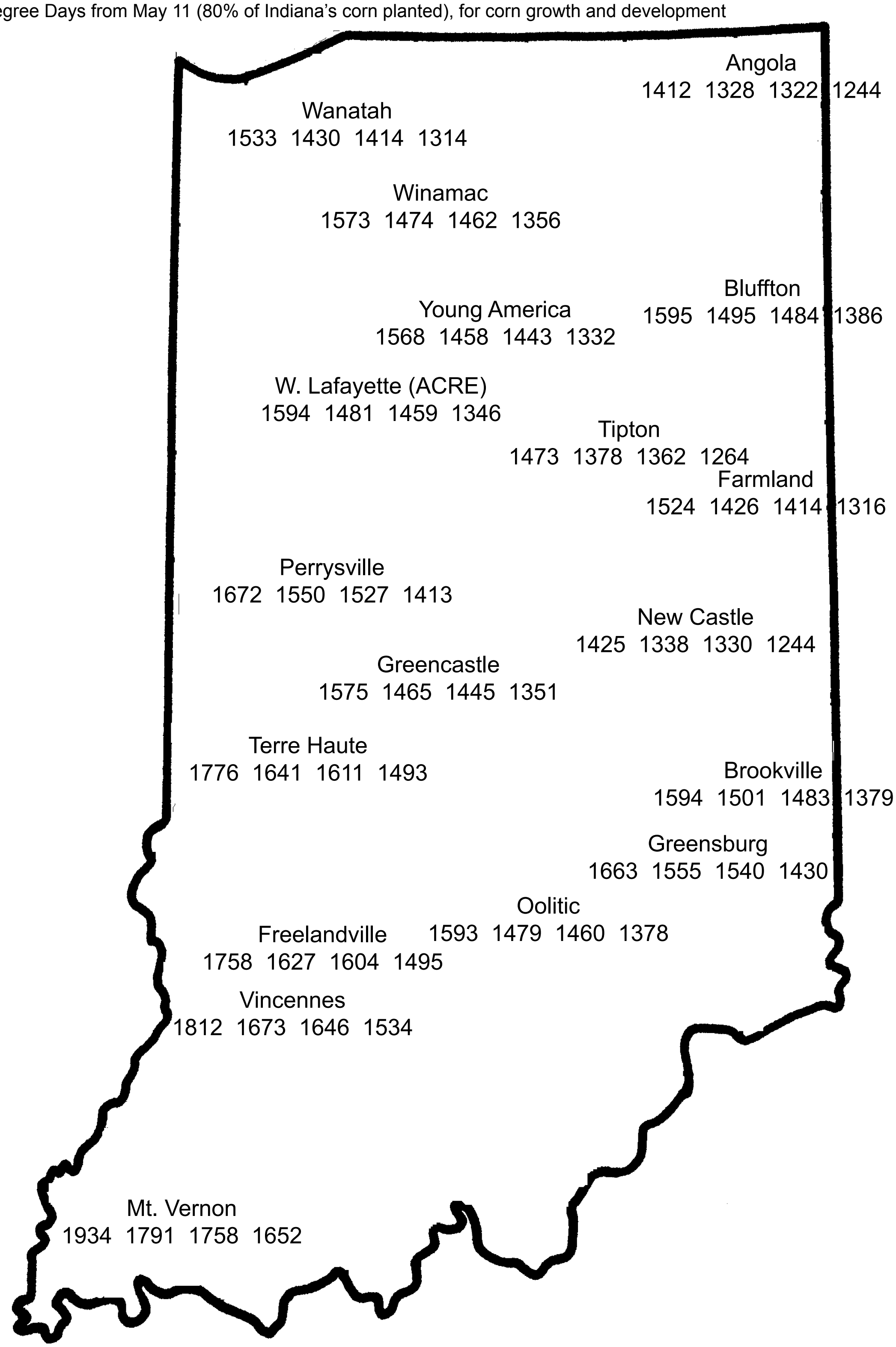
Data Source: http://shadow.agry.purdue.edu/sc.zen-geog.html
Solar radiation load for July 19 near maximum.

Weather Update

Temperatures as of July 20, 2005

MAP KEY
Location GDD(10) GDD(35) GDD(55) GDD(80)

GDD(10) = Growing Degree Days from April 15 (10% of Indiana's corn planted), for corn growth and development
GDD(35) = Growing Degree Days from April 27 (35% of Indiana's corn planted), for corn growth and development
GDD(55) = Growing Degree Days from May 4 (55% of Indiana's corn planted), for corn growth and development
GDD(80) = Growing Degree Days from May 11 (80% of Indiana's corn planted), for corn growth and development



4" Bare Soil Temperatures 7/20/05

Location	Max.	Min.
Wanatah	92	71
Columbia City	87	69
W. Lafayette	95	73
Farmland	84	72
Butlerville	89	76
Vincennes	99	78