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SW Minnesota IPM STUFF 2004-1

4/30/04

This is the first issue of the season. My hope is that we have no problems and this is the only issue for 2004. But then, I've hoped that for the past few seasons.

Outlook for a SW MN 2004 crop

Planting progress for 2004 has been good and by May 1, most corn and a lot of soybeans will be in. The only delays have been from much needed rain. We have the potential for a good crop with good weather and adequate rainfall. As usual, the Southwest Research and Outreach Center (SWROC) temperature, rainfall and soil moisture data are available at: http://swroc.coafes.umn.edu/Weather/weather.htm

Is early planting conducive to good yields?

In simple terms, early planted and emerging corn and soybeans have adequate time to grow and take advantage of long days. A closed canopy takes maximum advantage of the solar energy that peaks June 21. The earlier in the season this vegetative growth and canopy closure happens, the more efficient use of solar radiation is possible. Early emerging soybeans have the opportunity to put on more vegetative growth (nodes and leaf area) before longer nights trigger the shift to reproductive stages. Nodes translate into potential pod sites and leaf area translates into photosynthetic efficiency. Additionally, root systems are developing before emergence. Our April 6th planting date of corn began to emerge on April 28th. Our April 15th planted soybeans have not yet emerged but seem to be relatively happy (anthropomorphism intended). ***This is in a date of planting trial so don't try this at home.***

Figures 1 and 2 show the results of a long term planting date study at the SWROC. The data points represent planting dates where 100% indicates the highest yielding plot (date) for the year. If nothing else, it is an interesting comparison of the corn and soybean yield response to planting date. Plantings on either side of the long term optimum can yield well but yields are more variable; with corn being more variable at late planting and soybeans being more variable at very early planting. Of course, very late planting dates of both corn and soybeans are consistently poor yielding. One disclaimer - these results are based on one location and the environmental conditions that occurred over these 15 years. This spring's planting dates are setting us up for good yields but there is certainly no cause to panic if you don't have all your corn and beans planted yet. After all, the walleye opener is not until May 15th.

Is there a downside? Yield variability in these studies is related to planting date but also to environmental conditions such as poor planting conditions and perhaps weed control in some of these years. There can also be somewhat of a risk with early season insects and

damping off fungi (*Pythium* in particular). Wireworm, white grubs, seed corn maggots tend to be more problematic in early plantings when conditions remain cool. The reason for this is twofold: Firstly, wireworm and white grub prefer cooler soil temperatures. Secondly, slower growth leaves plants vulnerable to insect injury for a longer period of time.

2004 Bean leaf beetle

Will bean leaf beetles be a problem this spring? It is a bit early to determine the size of bean leaf beetle (BLB) populations available to colonize 2004 soybeans. Some did make it through the winter in good shape. Kathleen Bennett, U of M Entomology graduate student and Bill Hutchison have been tracking survival of bean leaf beetles in cages at Rosemount. A significant percentage of BLB appeared to have survived on April 30. Therefore, we have some potential for bean leaf beetle populations high enough to cause concerns for bean pod mottle virus transmission. Whether we have a BLB problem in 2004 also depends on the number of beetles going into the winter. I do not know how 2003 insecticide treatments for soybean aphid affected the BLB populations going into the winter.

Peter Anthony, St. Peter, sent an email that he found BLB while checking corn depth (yes it can be done) April 14 and more evidence that multitasking pays. Volunteer soybeans are starting to emerge so bean leaf beetle activity should start to be apparent soon. Feeding on volunteers might provide a gauge of how beetle numbers compare to last year. Keep in mind however, that the degree of feeding is in part dependant on the number of plants available.

Severe defoliation (50% or more) by overwintering bean leaf beetles can cause yield loss but this amount of injury appears relatively uncommon in SW MN. Historically treatment of bean leaf beetle is directed toward beetles during pod fill to prevent seed injury and pod clipping. A greater concern to seed bean and food grade soybean production is bean pod mottle virus (BPMV), due to discolored seed. Unfortunately, preventing virus transmission requires BLB control before beetle populations can be adequately determined and well before the virus transmission capabilities of the BLB cohort can be assessed.

Late season BLB populations were fairly low in a 2003 study funded by the Minnesota Soybean Research and Promotion Council. However, Figure 3 shows the relationship between the timing of bean leaf beetle control and soybean injury. Treating BLB (apparently a mix of 1st and 2nd generation adults in 2003) in August prevented pod feeding. However, it does little to reduce seeds with virus symptoms. Controlling overwintering beetles reduced the percentage of seeds with virus symptoms and an advantage for treating both overwintering and first generation beetles may exist. This study agrees with information generated by ISU and observed in other trials in southern MN. Unfortunately, the number of generations of bean leaf beetle in Minnesota appears to be less clear-cut than for our southern neighbors.

2004 Soybean aphid watch

Will soybean aphids wreak havoc on SW MN soybean fields and my fly fishing plans again in 2004? It is too early to observe any trends in population. Rob Vennette, University of Minnesota Department of Entomology, is evaluating two models for predicting soybean aphid winter survival.. A preliminary estimate is that aphids should have wintered well south of the Twin Cities and perhaps as far north as Alexandria. The 2003 growing season, however, should have illustrated the point that you do not need local overwintering to have an aphid problem. We will look be looking at buckthorn, volunteer soybean and early emerging fields to try to get a feel for over wintering success.

More important than aphid winter survival is weather during the growing season. University of Minnesota Entomologists will be testing a treatment decision aid that incorporates weather forecasts this summer. Preliminary information can be found at http://www.soybeans.umn.edu/crop/insects/aphid/aphid_sagemodel.htm.

Soybean Rust

Soybean rust (SBR) could become an economically important soybean pathogen in the U.S. However, it has to get here first. SW Minnesota may be at an advantage with respect to SBR because we are at a distance from the area where rust is expected be able to winter and our propensity for desert-like conditions. This does not mean that we can't have a problem with this disease.

I would encourage people involved in soybean production not to forget the yield limiting factors we already have. Soybean Cyst nematode, a complex of root rot pathogens and soybean aphid quickly come to mind. Unlike most pathogens, this disease has already cost a significant amount of time and money without yet being present. Being forewarned is important. As the growing season progresses, I'll try to post some pictures of common soybean foliar pathogens that ***are not rust***. However, I am still hoping that everything goes well and there will not any disease symptoms to photograph.

Fortunately, there appears to be a larger strategy in place than just trying to talk soybean rust into extinction. The Minnesota Soybean Growers and Minnesota Soybean Research and Promotion Council, Federal and state agencies, the University of Minnesota and others Universities, seed companies and the Crop Protection industry are actively working on planning for the arrival of soybean rust and a significant amount of research and educational efforts are in progress.

If or when soybean rust does arrive, fungicide options for control will be available. Clorothalonil(Bravo®, Syngenta Crop Protection) and Azoxystrobin (Quadris®, Syngenta Crop Protection) are currently labeled for use in soybeans. A section 18 exemption has been granted for Mycobutanil (Laredo®, Dow Agrosciences) and most recently Propiconazole (Tilt®, Syngenta Crop Protection). Other fungicides are currently being evaluated for section 18 exemptions. **Fungicides with section 18 labels are not to be used on soybeans until rust occurs in the US.**

In the meantime, if you are curious, and you have some spare time, you can check out some of the links for soybean rust information at: http://swroc.coafes.umn.edu/SWMNPEST/swmnpest.htm.

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Figure 1.

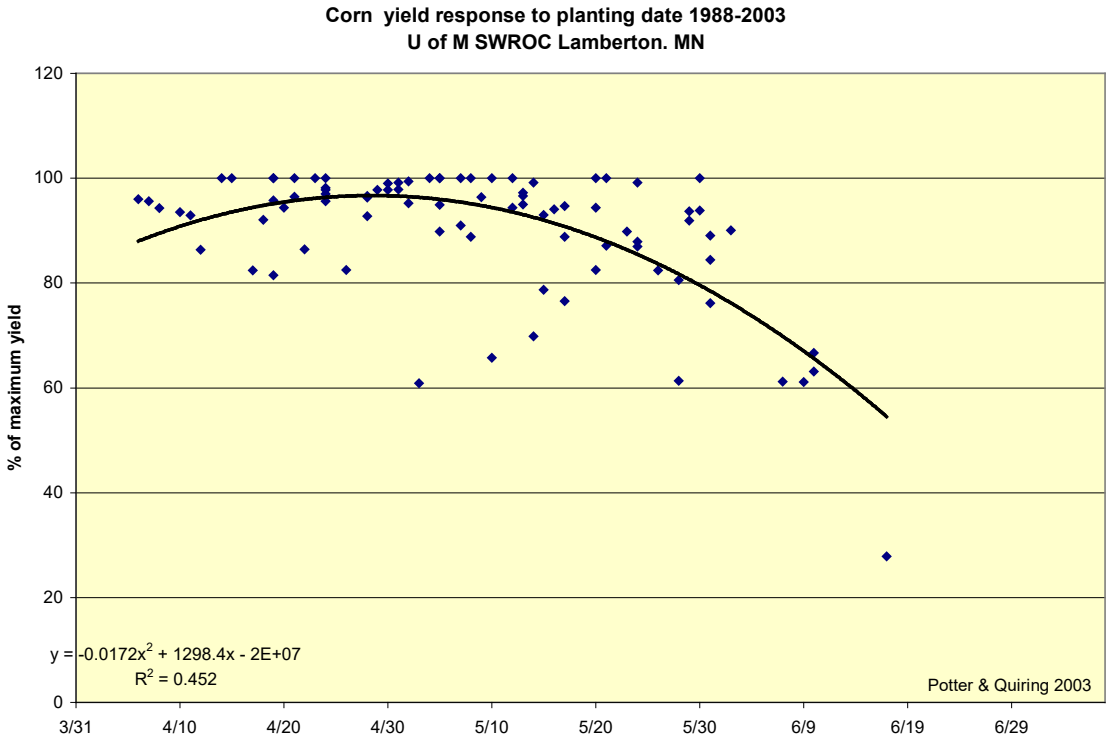


Figure 2.

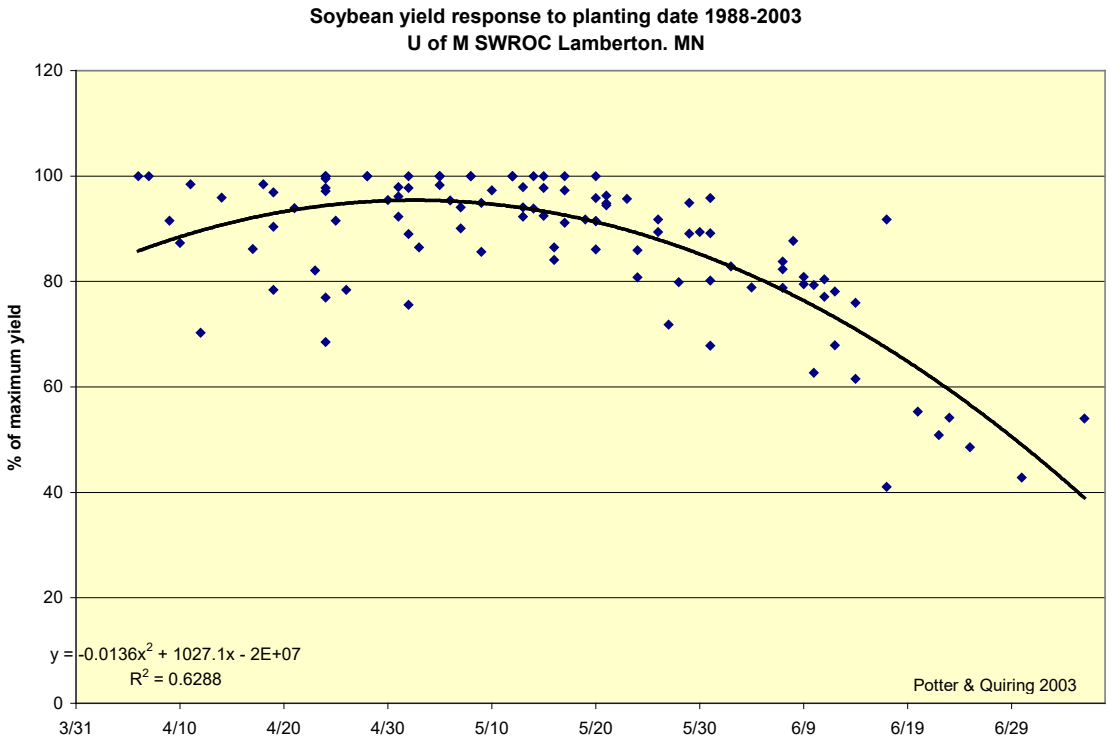
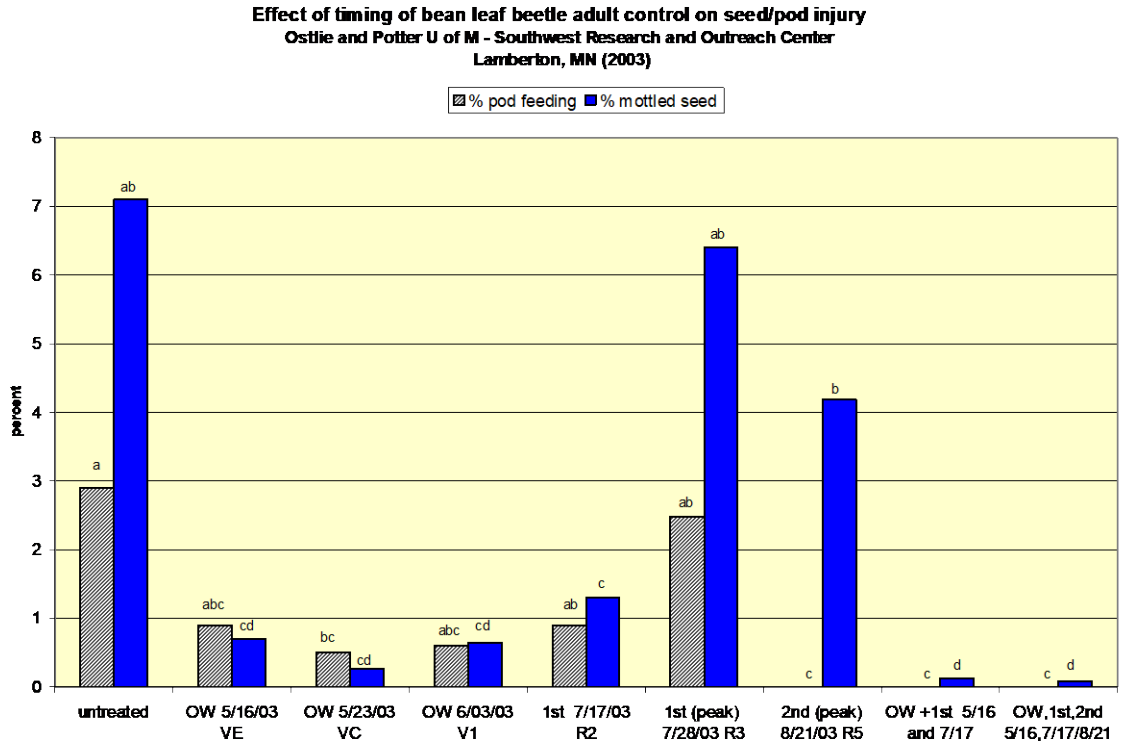


Figure 3.



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SW Minnesota IPM STUFF 2004-2

5/7/2004

Rain needed

Rainfall continues to be sparse in this part of the world. Low humidity and high winds have been the rule for the past week. I thought I'd have to move to get Wyoming weather. The only thing missing is mountains on the horizon. Maybe the Buffalo Ridge counts.

The dry spring has helped speed planting. Corn and soybean planting progress is rapidly nearing completion in SW MN. Winter wheat and other small grains look a little wind tattered but otherwise very good. We are a little behind most producers at the SWROC. We are doing ok in the number of fields planted (we've already planted a few thousand corn and soybean fields) but it's hard to cover acres when your fields are 10 wide and 65 long.

Over the past week, considerable early-planted corn started emerging and soybeans planted April 19th and earlier in research plots at the SW MN started cracking May 5th. Begin scouting fields beginning soon after emergence to identify stand problems.

Jodie Getting reminded me that a continued lack of rainfall may hinder the performance of pre-emerge herbicides. Pessimism must be contagious. Keep an eye on things. Rotary hoes, although not glamorous, still work.

Bean leaf beetles?

Compared to the past couple of springs, Bean leaf beetles (BLB) appear scarce. To our south, Corey Sinn and Steve Sodeman reported seeing few BLB yet this spring. I suppose that the cool temperatures and high winds may have forced the beetles to keep their heads down. Perhaps the timing of last year's aphid control coincided with first generation beetles in enough cases to minimize populations going into the winter.

In any case, I am not yet ready to rule out any BLB problems for 2004 but I would urge some caution in treating overwintering beetles for virus control. I would definitely not apply insecticides to control bean leaf beetle and subsequently bean pod mottle virus without scouting fields to confirm that BLB are abundant. Seed production fields, especially those seed fields planted to emerge later than neighboring soybeans, may be at less risk this year compared to 2001-2003.

The difficulty of predicting pest populations from year to year makes the economics for widespread prophylactic insecticide and fungicide applications less than certain. The use of preventative pesticide applications (e.g. trangenics, rootworm control, seed applied

pesticides) can however, fit well into and integrated pest management strategy when their use is well planned and ***selective***. Preventative treatment is the only option for some pest problems like corn rootworm or SCN, preferably with some knowledge of the pest risk for the field.

Black cutworm

The same weather systems preventing rain seem to have, for the most part, blocked black cutworm migrations into the state. One location in Rock County reported significant captures last week. The Lamberton and Fulda traps have not yet captured any moths this spring. As soybean field most soybean residue has been tilled, late arriving cutworm flights will find fewer corn fields suitable for egg laying. Ridge/strip tilled fields with undisturbed residue or fields with heavy weed flushes. For additional black cutworm information, see Ken Ostlie's articles at http://swroc.coafes.umn.edu/SWMNPEST/04news/04_newsletters.htm.

How many pests are too many?

An unidentified informant sent me an article that indicates some have taken the concept of threshold relationship to cost of treatment a bit too far. The higher corn and soybean prices have some growers in a "don't take any chances" or risk adverse mood. This is understandable but may limit profitability.

One definition of an economic threshold or treatment threshold is the "pest infestation level where the predicted loss caused by a pest is greater than cost of control". While it is true that the cost of controlling an insect, weed or disease factors into the determination of economic thresholds, it is not necessarily true that a few insects, leaf spots or weeds will cause yield loss. In other words, if pesticides were very low price (or free) it does not mean that there will be a benefit to treat very low infestations.

Will you find insects in a corn, soybean, or alfalfa field? Most definitely, and probably a lot more than in a parking lot. However, not all insects you find are harmful. In fact, some, like lady beetles, are doing us a favor. Low levels of pest insects may not affect yield and by treating insects at very low pest levels, things might be made worse. By eliminating beneficial predators and parasites it is possible to flare the populations of their prey and require another treatment later.

Low pest populations do not always increase. Insects like corn rootworm, cutworms and weeds are limited to one generation a year that can cause damage. Populations may increase from year to year but not during the same year. Some pests that can undergo rapid increases and many generations in a growing season such as soybean aphid, potato leafhopper, many foliar pathogens including rusts. However, they are subject to environmental conditions and depending on weather and predators. Three aphids/plant may become thousands/plant or none. On the other hand 250 aphids/plant is an indication that things could get out of hand quickly.

Treating pests “early and often” can lead to pesticide resistance. This has been documented many, many times with insects, pathogens and weeds. The pipeline is not as full as it once was with new products to replace those we have burned out.

Finally, your field has some ability to compensate for some weed competition, insect defoliation, diseased tissue, and even stand loss.

Yield loss is related to stand loss for insects and diseases that kill plants. Soybeans, in general, are less sensitive to stand reductions than corn. Related factors include when stand loss occurs and whether there are any long term or chronic effects. Reduced, diseased root systems are perhaps the best example of the latter.

Yield loss is related to the intensity of the pest population, for example, the number of defoliating pests, plant parasitic insects, disease infection sites, and weeds. It is also related to the timing and duration of the pest population. Jeff Gunsolus, Extension weed scientist, University of Minnesota Department of Agronomy and Plant Genetics provided Figure 1 to illustrate this concept. Crop yield loss due to weeds results from competition for the same resources (water, nutrients and light as the crop). The graph illustrates that the generic crop can compete with a generic weed for a period of time without suffering loss. The crop also suffers no loss or out competes the weeds when weeds emerge late enough in the season. How long the crop can tolerate weeds depends upon the sensitivity of the crop to competition, weed density, weed species, and the growing season environment. A study conducted at Lamberton, Morris and Waseca showed that soybeans could tolerate competition from 12 inch tall weeds at low weed populations and good moisture while competition past 4 inch tall weeds reduced yield with low soil moisture and high weed density. Within a given year, very low weed densities can be usually tolerated until combining with no measurable loss of yield.

Although it is difficult to generalize across pathogen, nematode and insect species; yield loss from many pathogens and insects can be viewed similarly. However, yield loss from disease and insects most typically results from reducing the crops ability to photosynthesize, transport or to use nutrients. In basic terms, the crop plant can less efficiently gather resources and/or the crops resources are redirected to the pest. Yield loss is still related to intensity, timing and duration of the pest. Pathologists quantify this loss relationship by calculating the AREA UNDER THE DISEASE PROGRESS CURVE (AUDPC). An entomological example would be APHID DAYS. Figure 2 represents a loss curve for a generic obligate insect or foliar fungal parasite (soybean aphid and a foliar soybean pathogen can be used interchangeably here). At low pest intensity and duration (low AUDPC or Insect-days) the crop can cope. The pest pressure can become great enough that yield loss begins. Finally, at some point (usually less than 100 % yield loss) no further loss occurs. Total losses less than 100 percent are due to yield already accumulated, crop maturity, limited sites for the pest to colonize, and reduced nutrient suitability of the host crop. This is where spraying for revenge comes in. Pest species, crop tolerance, crop growth stage, and environmental influences on the crop and pest influence the magnitude and shape of the generalized curve illustrated just like weed competition.

Figure 1. The critical period of weed control.
Time of removal = time period weeds and crop can coexist without yield loss
Weed free period = time period needed before weeds that emerge after crop emergence no longer effect crop yield

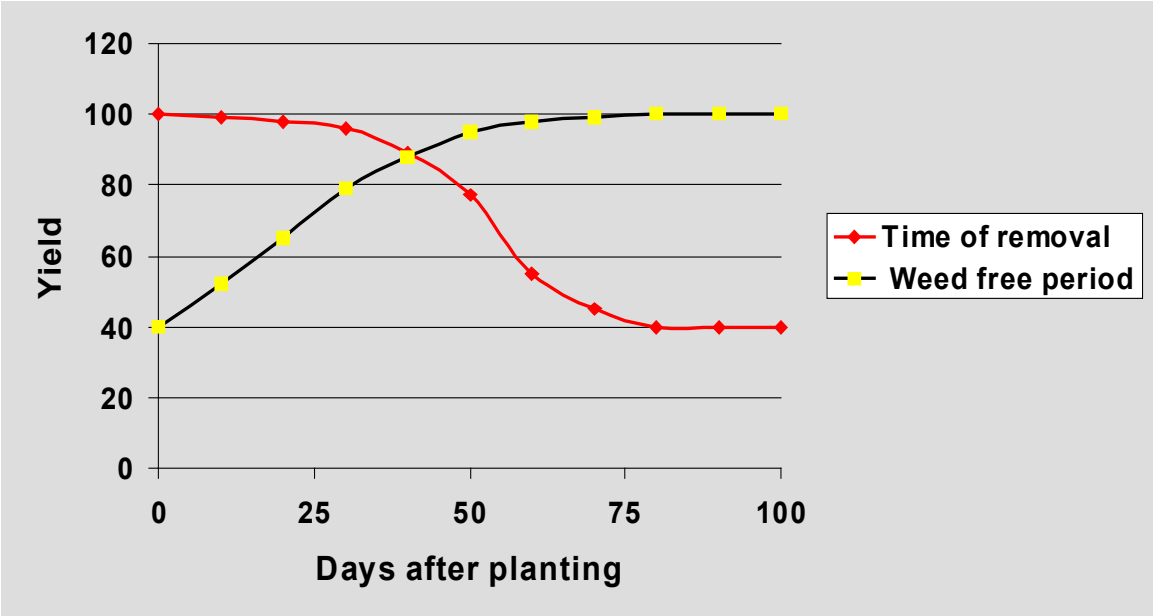
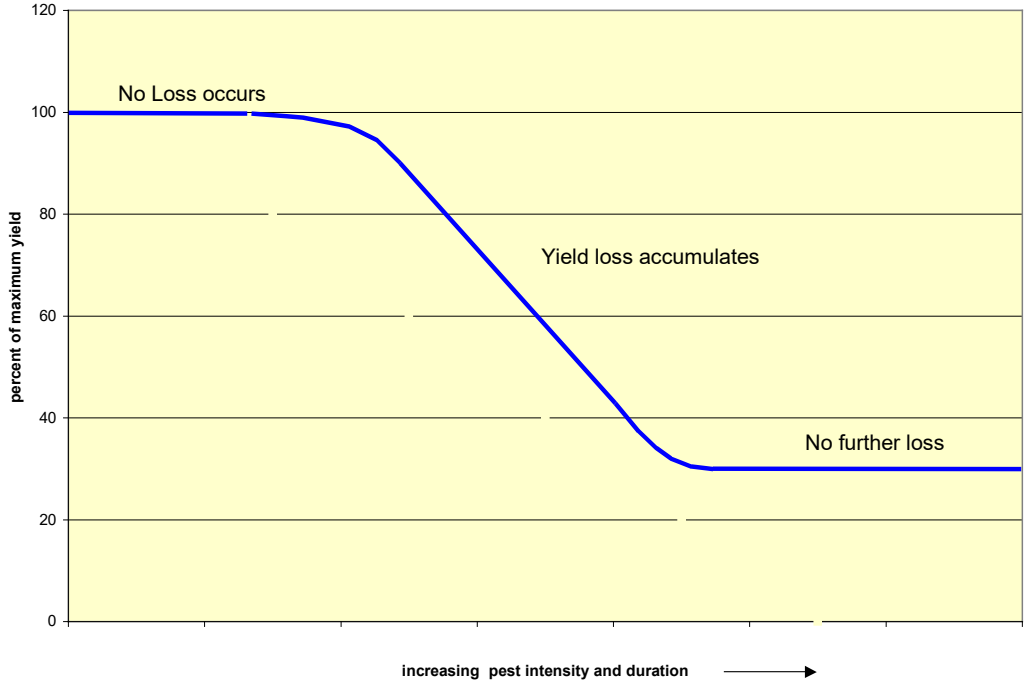


Figure 2. Generalized effect of intensity and duration (AUDPC, insect –days) of a pest on crop yield



Economic thresholds are not often used for weeds because of seed production and uncertainties in emerge time. They may need to be very proactive in the case of pathogens where controls need to be applied before infection occurs. In the case of insects, they are not perfect but work well in most cases and conservative enough to prevent economic loss.

Just something to consider when feeling the "just in case" urge to tank mix an insecticide with a glyphosate application or adopt a "by the calendar" pest management plan.

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SW Minnesota IPM STUFF 2004-3

5/19/2004

Crop update

A most welcome rain fell the past weekend.
Frost the nights of May 14th and 15th was severe enough to require some soybean replants occurred in some areas notably Martin and Faribault counties. At the Southwest Research and Outreach Center (SWROC), corn and soybeans, even larger plants, in early-planted plots came through okay in spite of freezing temperatures for two consecutive nights. Small grains look good with the cool dry spring. Rye is starting to head and winter wheat is in the boot and looking simply marvelous. Spring wheat is 4-5 leaves and tillering.

Planting date – Part Deaux

In our first issue, the historical relationship between planting date and corn and soybean yield at the SWROC was shown. In this and subsequent issues, I'll use ongoing experiments at the SWROC to go into detail on how planting date affects yield potential and crop pests. We still have additional corn and soybean dates to be planted in 2004 but here are the results so far. Again the disclaimer, *we do not advocate planting corn the 9th of April or soybeans the 15th of April.* We often experiment with "high risk' treatments and try to screw up on purpose so you don't have to. On May 12, there was a definite difference in physiological age for corn and soybean by planting date. We will be following these plots through the growing season to look at the potential impact of growing season stresses (we usually have a few at Lamberton) on soybean and corn stages and ultimately yield. You will be looking at one year and one location so your mileage may vary.

2004 corn and soybean development by planting date on May 12. U of M SWROC.

Corn (2 hybrids)		Soybean (2 varieties)	
Planted	Stage	Planted	Stage
4/9	2 collar	4/15	unifoliate (VC)
4/20	1 collar	4/26	cotyledon
4/30	emerging	5/4	Emerging

Frost injury

What if the recent frost had been colder or longer?

Until approximately the 5-leaf stage, the growing point of corn remains below ground where soil protects it from cold air temperatures. Sensitive corn tissue above ground freezes relatively. However, corn can with rare exceptions, easily continue to shoot new leaves from the protected growing point. No time lost and minimal stress to the plant.

Soybeans, on the other hand, cannot recover if growing points are killed. Although below 29F for an hour is a good starting point, when a seedling soybean plant will freeze is really not that simple. Seth Naeve, University of Minnesota Department of Agronomy and Plant Genetics, has the uncanny ability to rapidly access relatively obscure facts about soybean. It may be why he's the Extension soybean agronomist. He forwarded a couple of 2001 papers by NDSU researchers Meyer and Badaruddin that looked at frost injury to legume seedlings under laboratory conditions. Of the legumes tested, soybean, and field pea were intermediate in cold tolerance, tolerating colder temperatures than dry bean and less cold than alfalfa and clovers. One hour at 24 F was calculated to be the temperature that kill 50 % of soybean plants in this study. However, the early emergence stage (arch/crook) was more tolerant to cold. Other research has also shown that when it comes to soybean seedlings freezing, size matters. Mortality, especially among small seedlings, was not significant at 28.4 F for one hour. Significant stand loss of 37 to 56% stand loss began at 25 F for all fully emerged stages. How long the minimum temperature occurs also influences mortality. In another North Dakota Study survival at 25 F dropped from approximately 80 % to 20% by increasing the duration of minimum temperature from ½ hour to 4 hours. Intensity and duration are just as important in losses from frost as they are for pest populations.

Exposure to cold temperatures before freezing hardened the plants in these experiments. Hardening has been shown to increase cold tolerance. Additional factors that influence frost mortality in soybean are soil type and soil moisture. Dry soils and wet soils tend to freeze easiest. And of course low-lying areas in a field tend to be colder. Predicting soybean stand loss by frost based solely on air temperature is not easy for these reasons. Checking plant health at least 2-3 days from the frost is still the most accurate.

At cotyledon stage soybean there is a main growing point plus 2 axillary buds at the base of the cotyledons. The latter usually do not develop if the main growing point is healthy but are available as plan B for the plant. When tissue below the cotyledons is destroyed by frost (hail and insect damage work too) below the cotyledons all is lost. Fortunately, soybeans have a tremendous ability to compensate for reduced stand when scattered plants are removed. They cannot compensate for larger areas of stand loss.

The early season growing point location is why dingy cutworms, which feed primarily at or above the soil surface, are not a serious corn best while the black cutworm, which often feeds below ground, can cause serious stand loss. Both species can kill soybeans equally well.

As mentioned in the last issue, yield variability in plots at Lamberton is greater with early planting for soybeans and later planting for corn. Frost injury is one of the reasons.

References:

Meyer, D.W., and M. Badarruddin.2001. Frost tolerance for ten seedling legume species at four growth stages. Crop Sci. 41:1838-1842

Badaruddin, M.; and D.W. Meyer. 2001. Factors modifying frost tolerance of legume species. Crop Sci. 41:1911-1916.

Does tillage matter?

Planting date is not the only factor that can influence crop growth. Tillage can also influence growth by modifying soil temperatures. Earlier this spring, Lee Klossner ,Research Fellow at the SWROC, placed temperature sensors in a few of the tillage systems in an ongoing tillage experiment at the SWROC. Lee does not seem to have the same propensity for electrocution as I do and so far has survived the experience.

The average pre-plant soil temperatures for conventional tillage (Fall chisel, spring field cultivator), No till, and strip till soybean residue prior to planting are shown along with air temperature in figure 1. The soil temperature at 2 inches (proper corn seed depth) was coldest under no till and the low residue tillage system actually averaged a higher temperature than the air. Wow, how can this be possible? Figure 2 shows hourly air and soil temperatures over the same period. Firstly, the variation of air temperatures over the period is dramatic. Secondly, soil temperatures lag behind air temperatures and tillage influenced the magnitude of soil temperature change. Low residue followed air temperature closely, but was still buffered from rapid cooling. The high residue no till plot was the most buffered from air temperature swings and as might be expected, the strip till system was intermediate in mean temperature and temperature fluctuation. Do you think crop and weed, disease and insect growth or frost injury might respond differently to soil temperatures?

Before you convince yourself to moldboard plow every acre, soil temperature is only one of the variables influenced by residue. Soil moisture, shows the opposite relationship to tillage as soil temperature. Finally, residue can stabilize soil against water and wind erosion. The photo in figure 3 was taken by the SWROC's Steve Iverson, south of Lamberton, and shows the reason to pay attention to more than just soil temperature.

Figure 1.

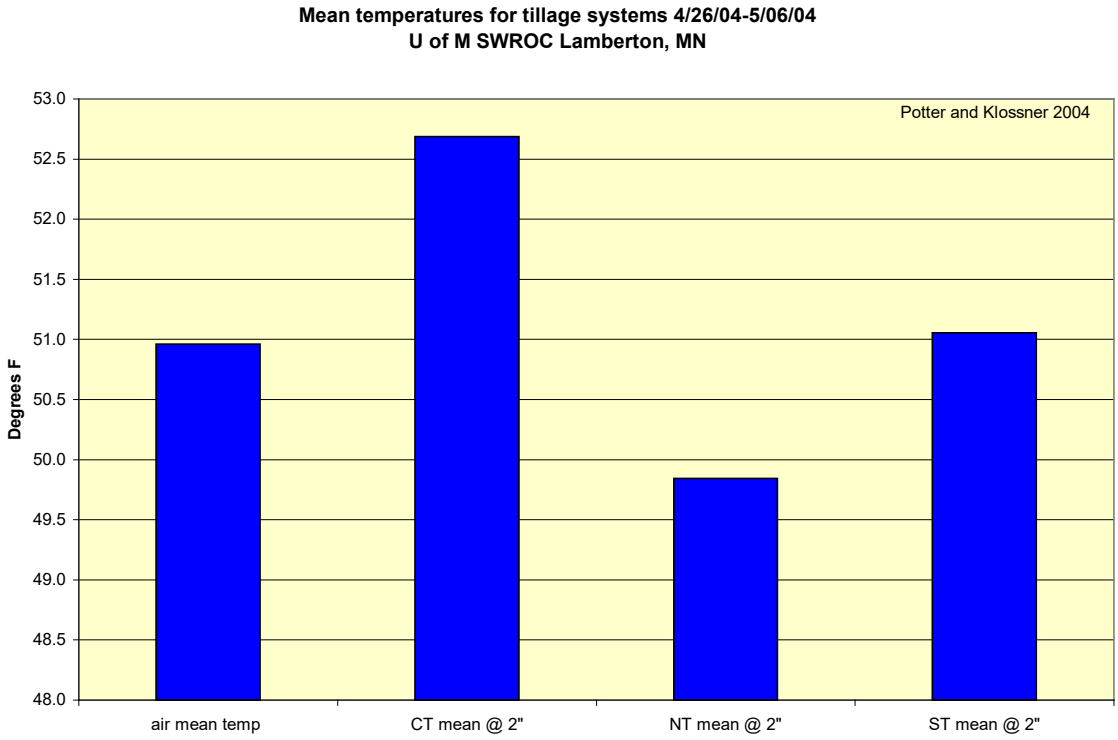


Figure 2.

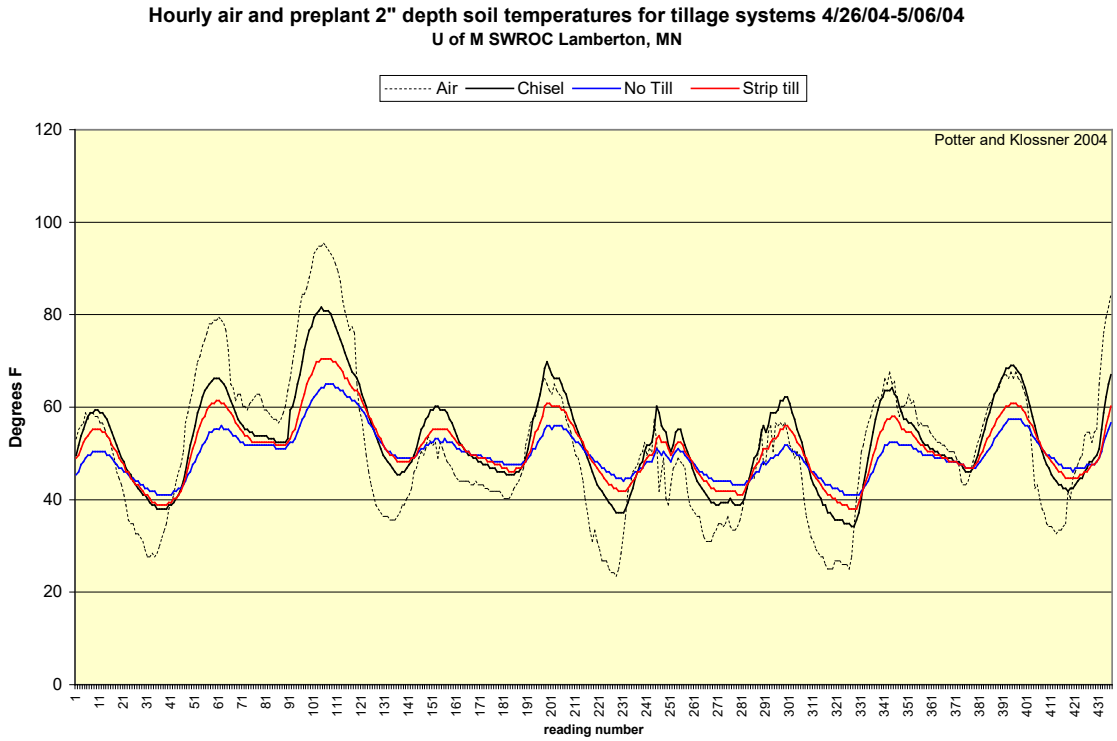


Figure 3.

Bean leaf beetles? Is maybe really the most underutilized word in the English language?

As the spring progresses, it is looking less likely that bean leaf beetles will be a significant threat this spring. Many ag professionals have been looking for bean leaf beetle this spring and the general consensus is that beetles seem much scarcer in southern Minnesota this spring. Thanks you all for your perceptions. In bean leaf beetle experiments at Lamberton, we are seeing few beetles and a very low percentage of plants with feeding (0.4 percent) on unifoliate beans. What happened? Perhaps, after the 2002 and 2003 seasons, they are afraid of the prowess of Jeff Irlbeck and Steve Quiring (SWROC plot technician and plot coordinator respectively) in bean leaf beetle control and have opted to infest less closely watched soybean fields. Populations going into the winter may have been low due to things that happened during the 2003 growing season.

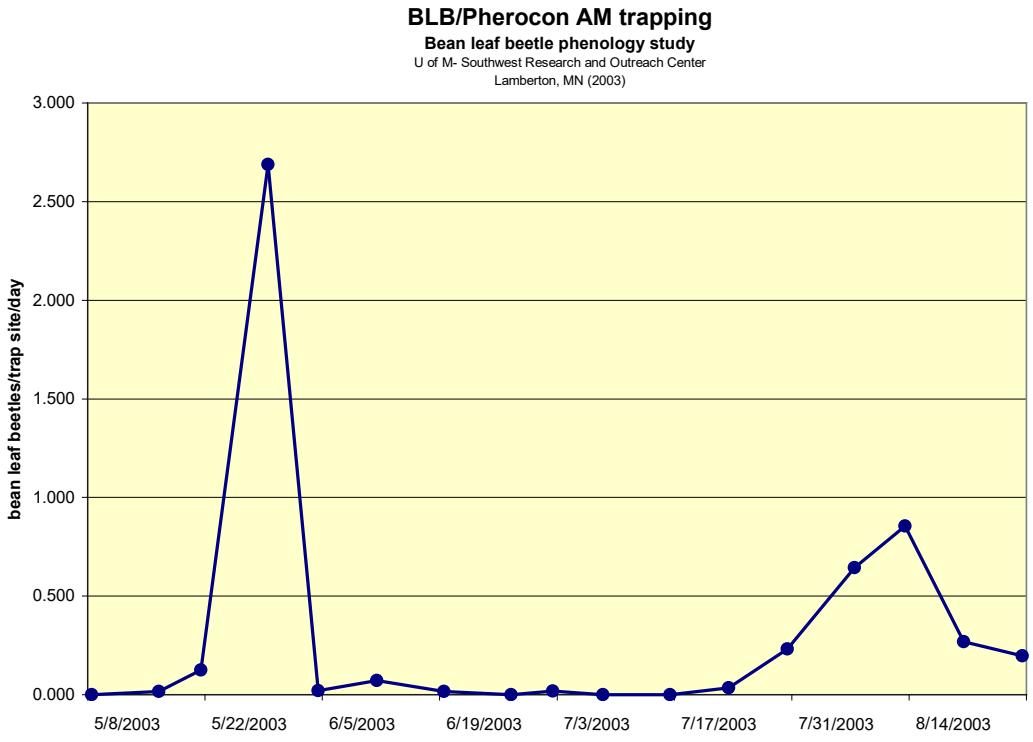
It may just be that the beetles are slow moving out of wintering areas. During 2003, beetle movement into soybean fields began on or near May 16th although beans were emerging by May 8. Peak over-wintered beetle activity in this experiment, occurred after the 20th (Figure 4). In this 2003 trial, it appears that only one generation occurred or part of the population stopped at one generation and part completed two generations. Late season populations were low in this trial even where aphids were not sprayed.

Lady beetle movement into soybeans seems a bit delayed this spring and the bean leaf beetles may also be off to a slow start with respect to soybean emergence this year. They should not be ignored for the next week. Check edges, especially those bordering last year's soybean fields or alfalfa.

My initial impression is that bean leaf beetles will be less troublesome this year, including seed production and food grade soybeans. Before we get too carried away deciding if bean leaf beetles are bad in your field, we should examine what it takes to make a recommendation. Unfortunately, one size doesn't fit all in the world of crop production. There are things that work more often than not and others that usually fail. However, what is the best hybrid, tillage system, crop rotation, weed insect or disease control program timing really does depend on the individual field and often on the grower's economics and perception of risk. It also depends on the crop and pests' perception of the individual field.

I can discuss general concept of pest and crop dynamics and often have data that tells us which control tactics work for a pest. Remember, however, although showing examples from specific trials, I can only give general impressions of BLB populations based on talking with others and my own observations. I can describe what is happening in plots and fields I look at. I can discuss what I know about thresholds, how to scout and guesses on whether things will get better or worse. I am usually eager to discuss what- if scenarios. However, I would hesitate; and often refuse, to make a specific recommendation for an insect, disease or weed problem in a field I haven't seen. Typically, the most effective and economical crop production recommendations are only possible after actually seeing the field.

Figure 4. 2003 bean leaf beetle populations



A 17-year event or flirting with taxonomy
We don't have problems with 17- year locusts at Lamberton, although we do hear the screeching hum of cicadas during the heat of summer.

The orders Homoptera (aphids, plant lice, leafhoppers and cicadas) and Hemiptera (plant bugs, water boatmen, etc.) were combined into the order Hemiptera by a zealous group of taxonomists a while back.The true bugs are now members of the suborder Heteroptera, aphids and scale insects were placed in the suborder Sternorryhncha and cicadas and plant hoppers placed in the suborder Auchnorryhncha. Whew! In recent years, whenever attempting to explain how insects with piercing-sucking mouthparts are related, I have assumed that this massive taxonomic lumping was engineered as an attempt to traumatize me and negate six-years of entomology courses. In a desperate attempt to regain my entomological equilibrium, I talked with Phil Clausen and Ralph Holzenthal at the University Of Minnesota Department Of Entomology. Phil assured me that taxonomists were bound to change things in short order while Ralph re-explained the new nomenclature and made the point that he was in no way responsible for this portion of the the Class Insecta. In reality, you don't need to be a taxonomist to learn to identify a soybean aphid, boxelder bug or know that a small yellow mayfly most closely resembles a # 16 light Cahill pattern. In any event, until the taxonomy changes again, maybe in 17 years, we have a good population of at least one member of the order Hemiptera.The lowly but entertaining Box elder bug seems to have had a good winter. In Figure 5, you can see a moderately high population of nymphs outside the SWROC office front door. The bright red nymphs are the result of eggs laid by over-wintered adults. Box elder bugs feed on the sap of the box elder and a few other trees. Feeding does not seriously

Figure 5. Box elder bug nymphs

harm trees. Box elders may not qualify as trees in some circles but we can't be too choosey out here in the prairie. The abundance of box elder seedlings along the sunny south side of the building and in the nearby sidewalk no doubt attracted the females this spring.

These insects will produce another generation this summer and it could be a colorful late summer and fall if these insects have good survival and reproduction. Box elder bugs were the main fall insect annoyance in those simpler times before Multi-colored Asian lady beetles. The SWROC accountant, Jean Price, has proven to be an effective biocontrol for these insects. Countless box elder bug nymphs have met an untimely demise under her iron heel.

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SW Minnesota IPM STUFF 2004-4

5/29/2004

Crop update

Send warm weather. Small grains are enjoying the cool weather and many fields look exceptional. Growth is dense enough that alfalfa underseedings may be at even more risk than usual if small gains are taken to grain. Phil Berg, Extension technical advisor reported a pocket of hail in Pipestone County. Although we now have adequate moisture, corn and soybean crop growth has been slowed by cool weather. Dry soils early and cool conditions lately have kept alfalfa fairly short but otherwise healthy this season. Weed control may get a bit dicey if the wet weather continues and it would warm up. On May 26, early-planted corn at the University of Minnesota Southwest Research and Outreach Center (SWROC) was at a strong 3 collars. Read herbicide labels for weed and crop size restrictions. With the cool weather, corn at a given growth stage may be shorter than typical.

How cold is it? As she does with all the weather tables and charts presented in these newsletters, Molly Werner, web guru and benevolent dictator of the SWROC weather database, put together the degree-day accumulations for 2004 compared to other years. These data are shown at http://swroc.coafes.umn.edu/Weather/Charts/GDD/00_04gdd.htm. We'll try to keep this graph updated through the growing season since crops and insects develop based on accumulated temperatures.

Pest problems to this point have been relatively minor. Although typically favored by cool soils, only scattered pockets of wireworm have been reported. White grub damage, if it occurs, should be showing up soon. We have observed only minor bean leaf beetle feeding (well less than 50% of the plants with feeding on earliest emerging soybean) at the SWROC but Bill Hutchison and Eric Burkness, U of M Entomology have reported higher populations in snap beans at Rosemount. No soybean aphids have been observed on SWROC soybean as of yet and we've looked at thousands of plants. However, it is early to scout for this insect in soybean.

Perhaps 2004 will be a relatively easy year for crop weeds, diseases and insects. If this turns out to be the case, remind yourself that it is still important to keep a crop-scouting schedule. It may be less than exciting to find low numbers of pests but on the other hand it's easy to count to zero and decisions are easy. Remember soybean aphids in the thousands? Three student workers at the SWROC, Derek Erickson, Missy Olsem, and Mark Anderson do and are quite pleased with the current low insect numbers.

You don't need to be a taxonomist but…

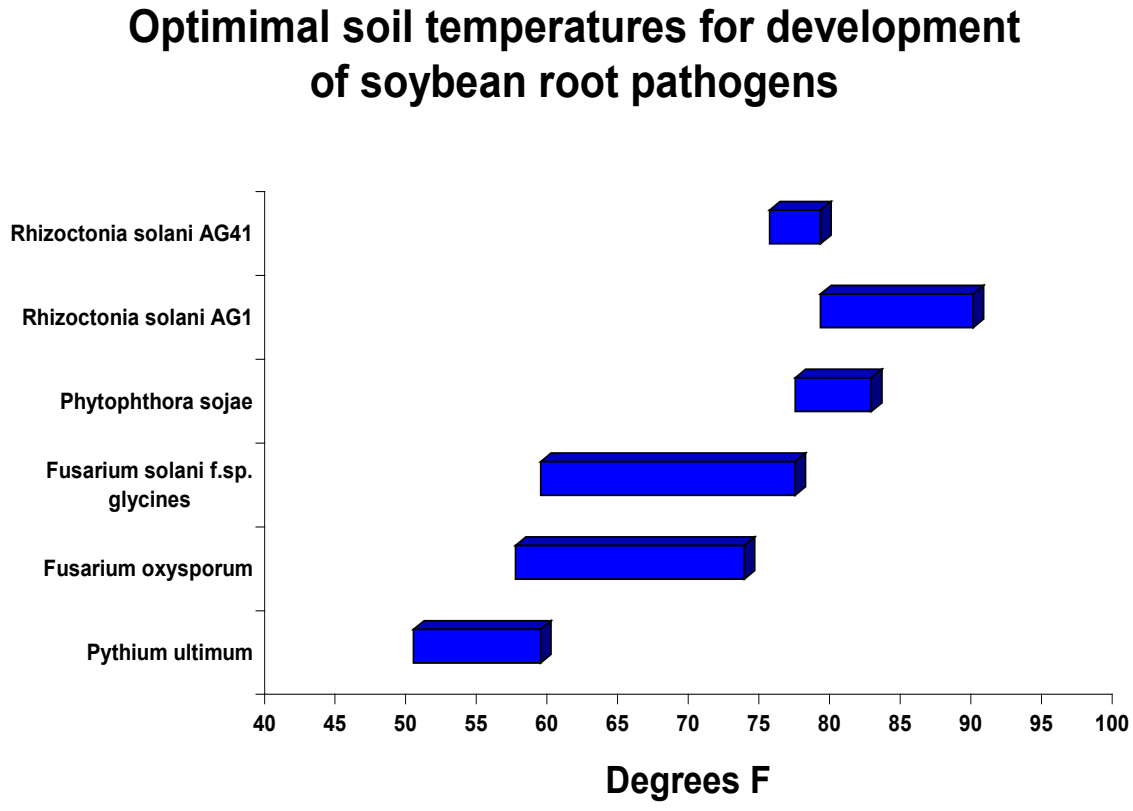
Alfalfa cutting will begin soon and growers may have already begun on first cutting. Timely detection of economically damaging populations of alfalfa insects is important and scouting alfalfa can often be profitable. Last year we had widespread problems with Potato leafhopper and some localized problems with Alfalfa weevil. Proper pest identification is important. *Don't mistake the aster leafhopper, which is harmless to alfalfa fields unless they are under seeded to carrots, for potato leafhopper.* These species are fairly easy to tell apart. Bill Hutchison has a comparison of the two species available at: http://www.vegedge.umn.edu/mnvegnew/vol4/524pot.htm

As of 5/26/04, neither leafhopper species had been found in sweeps of Southwest Research and Outreach Center alfalfa. We are seeing a few early instar alfalfa weevil larvae now. Seven-spotted and multi-colored Asian lady beetles are common in fields now. Unlike 2003, Pea aphid populations are very low. One can only hope that this bodes well for lower soybean aphid populations as well.

Where have all the soybeans gone?

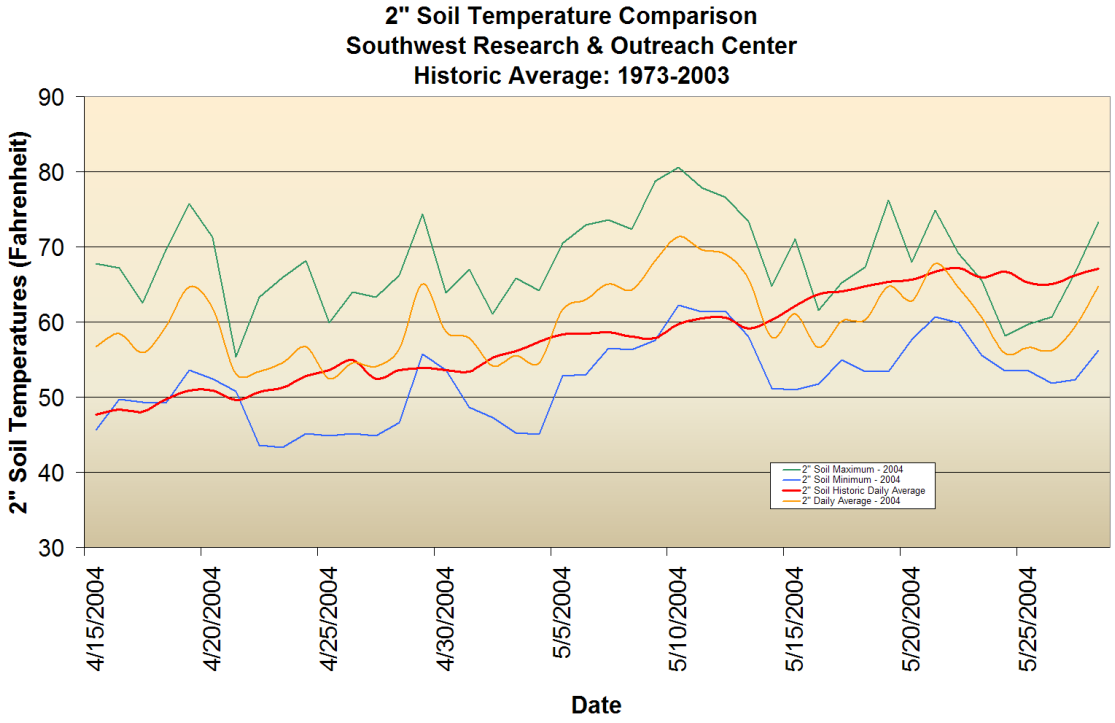
The early season dry period is still making its presence known in spite of the recent rainfall. Emergence in some fields is uneven, with fields planted in early May perhaps more affected more than those planted earlier or just before the rainy spell. It appears that two, usually unrelated factors are to blame. Soybean germination is variable in some fields because of lack of moisture. Some seeds germinated before and some seeds after the recent rains. Waiting for a rain to improve soil moisture before planting also has risks associated with it, primarily the possibility of a very prolonged waiting period In spite of my nauseatingly consistent advocacy for checking planting depth often, I have this situation in one of my soybean trials. Oh well, even Shaq can miss a free throw. .

The second problem is seedling damping off. Wayne Schoper, Extension technical advisor, and I looked at May 8th seeded field in Brown County with a relatively high



percentage of damping off occurring during and shortly after emergence. The most likely culprit was presumably *Pythium*. Stand loss was not severe enough to need replanting but another reminder to check stands early. It appears that dry topsoils delayed germination until the recent rains when conditions ideal for fungal infection occurred. *Pythium* likes cool (50-60 F) and wet soil conditions. See figure 1 for the optimal temperatures for infection by some soybean seedling pathogens and figure 2 for this springs soil temperatures.

Figure 2.



At this point damping, off does not seem to be too widespread. However, the general rule of thumb is that wet soil = soybean root rots and soil temperature helps determine the fungal species causing the problem.

Tables 1 –4 show the impact of reduced stands and delayed planting on soybean and corn yield and date for corn and beans.

Sometimes delayed planting or a replant situation is unavoidable. Don't compound the problem by planting an earlier maturity soybean than you need. The following article by guest lecturer Seth Naeve, offers some advice when planting soybeans late.

Delayed soybean planting – Do not make drastic management changes.
Seth Naeve, Extension Soybean Agronomist
Few of us expected the current rainy weather pattern two weeks ago, when things were so very dry. A large number of soybean fields went unplanted, while awaiting the much

needed rain. Now that the tap has been turned on, the handle must have broken. It just keeps dripping.

Producers planting soybeans in the first week or two of June should not make significant changes in their management strategies. Most producers should not make changes in variety, seeding rate, or seeding machinery. Strategies that traditionally work best for producers when planting in May, will continue to work well when planting in early June.

Soybean varieties that are well adapted to a producer's latitude will be delayed in maturity by only one or two days when planted through early June. Cool, short nights in September hasten maturity of late planted soybeans. This reduces the effect of late planting on soybean maturity. Prematurely shifting to early maturity soybean varieties will greatly reduce the yield potential. CAUTION, producers who have purchased seed that is only marginally adapted to their area (eg. a variety that is ½ maturity group longer than adapted) should now be exchanging seed for varieties that are better adapted.

The best source of information regarding variety adaptation can be found in the Minnesota Varietal Trials bulletin. The soybean section is available at www.soybeans.umn.edu. Actual 2003 maturity dates are listed for many new commercial and public varieties. Use the maturity date of older/familiar varieties as an index to evaluate the actual maturities of newly released varieties.

Soybeans that will not be planted until after June 10, should be planted to a variety that is about ½ maturity group shorter than adapted (eg switch to a group 1.5 from a group 2.0).

Soybean date of planting studies conducted at the Southern Research and Outreach Center, Lamberton, have shown no additional benefit to narrower rows or higher populations with later planting dates. Although narrow row spacings out-yield wider row spacings, this affect is no greater when planting later. Therefore, producers should not switch planting equipment (e.g. from a row-planter to a drill) when planting soybeans in June. Systems that work well for producers when planting in May, will work well when planting in June.

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Table 1. *From*: Naeve, S.L., D.R. Hicks, and J.M. Bennet. 1999. The soybean grower's field guide for evaluating crop damage and replant options. University of Minnesota Extension Service # MI-7444-S

Effect of population reduction on soybean yield		
Plants per acre	**Percent of optimum stand**	**Percent of optimum yield produced**
157,000	100	100
118,000	75	98
78,000	50	90
39,000	25	75

Table 2. *From*: Naeve, S.L., D.R. Hicks, and J.M. Bennet. 1999. The soybean growers field guide for evaluating crop damage and replant options. University of Minnesota Extension Service # MI-7444-S

Soybean yield losses and yield potential due to planting after May 1		
Planting Date	**Yield loss (%)**	**Yield Potential**
May 1	0	100
May 5	1	99
May 10	2	98
May 15	3	97
May 20	6	94
May 25	9	91
May 30	13	87
June 4	18	82
June 9	24	76
June 14	30	70
June 19	36	64
June 24	43	57

Table 3. *From*: Hicks, D.R., S.L. Naeve, and J.M. Bennet. 1999. The corn grower's field guide for evaluating crop damage and replant options. University of Minnesota Extension Service # MI-7290-S

Relationship between corn plant population and grain yield for corn planted prior to May 1	
Plant Population (Plants/Acre)	Grain Yield Potential (%)
30,000	100
28,000	98
26,000	94
24,000	92
22,000	88
20,000	84
18,000	79
16,000	74
14,000	67

Table 4. *From*: Hicks, D.R., S.L. Naeve, and J.M. Bennet. 1999. The corn grower's field guide for evaluating crop damage and replant options. University of Minnesota Extension Service # MI-7290-S

Grain yield loss and expected yield potential for various corn planting date		
Planting Date	**Yield loss (%)**	**Yield Potential**
April 25	0	100
April 30	1	99
May 5	3	97
May 10	6	94
May 15	9	91
May 20	12	88
May 25	14	86
May 30	17	83
June 4	23	77
June 9	29	71
June 14	35	65
June 19	41	59

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SW Minnesota IPM STUFF 2004-5

6/04/2004

Crop update

For most of Southwest MN the drought is over. Flooding of field low areas occurred with the worst possibly being the Morgan, Wabasso, Redwood Falls area. The photo shows some of the land at the University of MN Parker Sanders farm south of Redwood falls. In the areas where the water receded early the crop seems to have survived well. We did not have a great amount of ponding at the Center. The ability to handle 6 inches or more of rain in a week as well as we did illustrate how low soil moistures was. On June 4th, early-planted corn at the University of Minnesota Southwest Research and Outreach Center (SWROC) was at five collars and primed for rapid growth. Earliest planted soybeans are at V1 or 1st trifoliate opened. Soybean root quality has deteriorated in areas with saturated soils but these may recover with drier soil conditions. Winter wheat has started to head and small rains are jointing.

Forage loopers are quite common in alfalfa and roadsides and in spite of their much greater size are often confused with European corn borer (ECB). A corn borer look alike, the smartweed borer, is starting to show in the SWROC black light trap. This indicates that the ECB first generation flight is not far off. We have not captured any ECB at Lamberton yet but the peony bloom is a bit behind also.

At the SWROC, we have checked many thousands of soybeans in the course of evaluating experiments and not found any soybean aphids yet. Hundreds of buckthorn plants have also yielded no soybean aphids. As of today, Dave Ragsdale, U of M Entomology, and his crew are having a similar lack of success in finding soybean aphid in southern MN. Lady beetle populations are very high in alfalfa and other areas but seem much lower in soybean this spring. Maybe they know something. Keep your fingers crossed but remember that it is early in the season and “It ain’t over till it’s over”.

PEST ALERTS

Bean leaf beetle

Movement of Bean leaf beetle (BLB) into 2004 soybeans has occurred over the past week. Populations in alfalfa have also increased. At this point, most, if not all of the fields I have looked at seem to have much lower bean leaf beetle populations than 2002 or 2003. However, bean leaf beetle movement to and activity in soybeans may continue. There may be pockets where BLB and virus transmission could cause problems for seed and food grade soybean production fields. These should be watched for the next week or so. George Simkins and Steve Commerford have reported seeing "somewhat higher" populations near LeSueur. Most soybeans had emerged before beetle activity increased and early-planted fields may not be as attractive to BLB this year. The good news is that we may not see many BLB problem fields in 2004. The bad news is that problems that occur only in isolated fields often get missed.

Alfalfa insects - watch the re-growth

Alfalfa is being cut or will be cut soon. A couple of insects should be scouted after harvest.

Potato leafhopper

These little pests have made it to SW MN. Corey Sinn, reported a single potato leafhoppers (PLH) on soybean and alfalfa on 6/02/04. Adult potato leafhoppers were running 0-0.3 /sweep in bud stage alfalfa at the SWROC the same day. Potato leafhoppers over winter near the Gulf of Mexico and migrate into MN each spring. They can be serious pests of alfalfa, snap beans and, of course, potato. Heavy PLH populations cause a characteristic injury to the leaves of alfalfa. Occasionally, they can cause "hopperburn" on seedling soybeans as shown in the picture. No treatment threshold for soybean is available other than injury symptoms, abundant leafhoppers and slowed soybean growth. However, in a 2003 SWROC study, PLH injured soybeans seedlings recovered at the same rate whether or not potato leafhoppers were controlled with insecticide.

PLH populations do not always develop to economic levels but this insect should be monitored closely during 2nd and 3rd alfalfa crops. Seedling alfalfa is particularly prone to PLH. Under very high PLH populations, seedling PLH tolerant varieties may need treatment. Unfortunately, because of variability in alfalfa genetics, thresholds for leafhopper tolerant alfalfa are not as clear-cut and newer varieties are increasingly tolerant to PLH. The following University of MN potato leafhopper guidelines for alfalfa were lifted from a Bill Hutchison's 2003 MN Crop News article.

Because of crop variability, local or cash sale purposes for the alfalfa, and variation in PLH infestations, PLH treatment decisions will continue to be needed on a field-by-field basis.

The following economic thresholds are based on Adult PLH counts, and primarily for established stands:

Alfalfa Height (inches)	PLH Economic Threshold (per sweep)*
<3	**0.2**
6	**0.5**
8-10	**1.0**
12-14	**2.0**

*Notes/Questions:

1- Sweep Net/Sampling Reminders:

- Where possible use a 15" diameter sweep net; all threshold research was based on this standard,
- **Use the Pendulum sweep method**; i.e., swing the net in front of you, as you walk through the field (think of the pendulum clock motion).
- **What is a Sweep?** Each time the net comes down through the crop canopy = ONE sweep.
- **How many Sweeps to take?** Our research, and that of Cornell Univ., has shown that a 10-sweep sample unit is much more efficient (accurate and faster) than a 25-sweep unit. Also, for a "typical" 40-ac field, only 4-5 sets of 10 sweeps will be necessary to confirm the infestation.
- The net should go about 13-14" into the canopy on each sweep (for 15" net); use a medium-strength sweep motion; IF you are getting over a bale of hay after 10 sweeps, you are sweeping too hard!
- **When to Sweep?** Ideally, you should only sweep when wind-speed is <10 mph; at high wind speeds, we know that sampling efficiency with a net drops off significantly (sampling will underestimate true density).. Experienced consultants can often scale their counts accordingly. Also, must avoid early-morning dew, to keep the net dry. Thus, usually after 10 am, works well.

2- Threshold/Control Caveats:

In addition to the following, final spray decisions, will depend on local economics and needs and uses for the alfalfa (cash crop vs. local dairy use, etc.). However, keep in mind that PLH and water-stress are

additive yield reducers (UofM research). If projections for continued dry weather continue (and you can't irrigate) , control of PLH may become more critical.

- In addition to the standard guidelines, a few notes apply. In general, the treatment decision should be made before the alfalfa is 10-12" tall. However, if you have YELLOW alfalfa that is in the 12" range (and/or possibly stunted by PLH), my recommendation is to spray it now, let it recover, then cut it (vs. cutting now). The alfalfa should quickly respond and green up.
- **For spring-seeded fields,** the above thresholds apply; however, for both new and established fields, if nymphs (immature stages) are present, you have confirmation of an actively/local breeding infestation (use this information to confirm that insecticidal control is needed).
- **For "PLH-resistant" varieties**, under high PLH pressure (such as >4/sweep), insecticide treatment may still be needed (cannot say for sure, because there is such high variability among varieties and their tolerance to PLH); again, decisions must be made on a field-to-field basis. NOTE: some of the more recent PLH varieties will still provide high RFV's, even without insecticide control, due to high leaf-stem ratios on "moderately stunted" alfalfa.

3- Insecticides:

All insecticides currently labeled will provide good to excellent PLH control (including 10-14 days of residual control of adults, and nymphs as they hatch); if you spray, you will only need to spray once for a typical 30-40 day crop interval. The only exceptions, that I do not recommend, are Sevin (carbaryl) and Malathion; these materials do not provide adequate residual control. Also are recent change is that Penncap-M is NO longer labeled for alfalfa. . Dimethoate is still one of the more inexpensive products, and provides systemic action within the plant. Also check pre-harvest intervals for each.

Alfalfa weevils

Alfalfa weevil is more abundant in SWROC alfalfa than usual. In fact, alfalfa weevil larva populations are the highest I've seen since I've started at Lamberton in 1997. They Alfalfa weevil larvae are light green with a black head and a white stripe in the center of the back. Since alfalfa is well into the bud stage cutting is the method to control alfalfa weevil now. Additionally, treating blooming alfalfa with alfalfa is not recommended because of hazards to honeybees. Cool moist conditions favor larval survival in alfalfa stubble and larvae often congregate under windrows. Scout the stubble. An insecticide may be needed with 8 or more larvae / ft^2 . Under stressful growing conditions, drought or sandy soils, fewer larvae can prevent re-growth. Depending on hay price, alfalfa can tolerate about 4 days of delayed re-growth without economic loss. Cutworms and other defoliators can occasionally factor into delayed re-growth. Bill Hutchison recommended the following downloadable Kansas State University alfalfa insect fact sheet for more information on alfalfa weevil thresholds:

http://www.oznet.ksu.edu/library/ENTML2/samplers/MF809.asp.

Sweep sample of alfalfa weevil larvae, potato leafhopper and pea aphids
Right alfalfa weevil damage (2004 U of M SWROC)

The only good bug …

When I have a few spare moments I'll sweep a grassy area or some alfalfa just to see if I can find anything new or different. An alfalfa crop, on close inspection, might reveal itself as a fascinating and complex zoological garden. We tend to focus on the insects that might cause us economic harm. Fortunately, we have many insect allies in the struggle. These ***beneficials*** or "good guys" are often more interesting in appearance and behavior than the pests they feed on.

Last Wednesday, several species of the bee and wasp look-alikes; the Syrphid flies, whose slug like larvae also feed on aphids, could be seen sunning themselves in the afternoon sun. A parasitic wasp or two could occasionally be found in the bottom of the net.

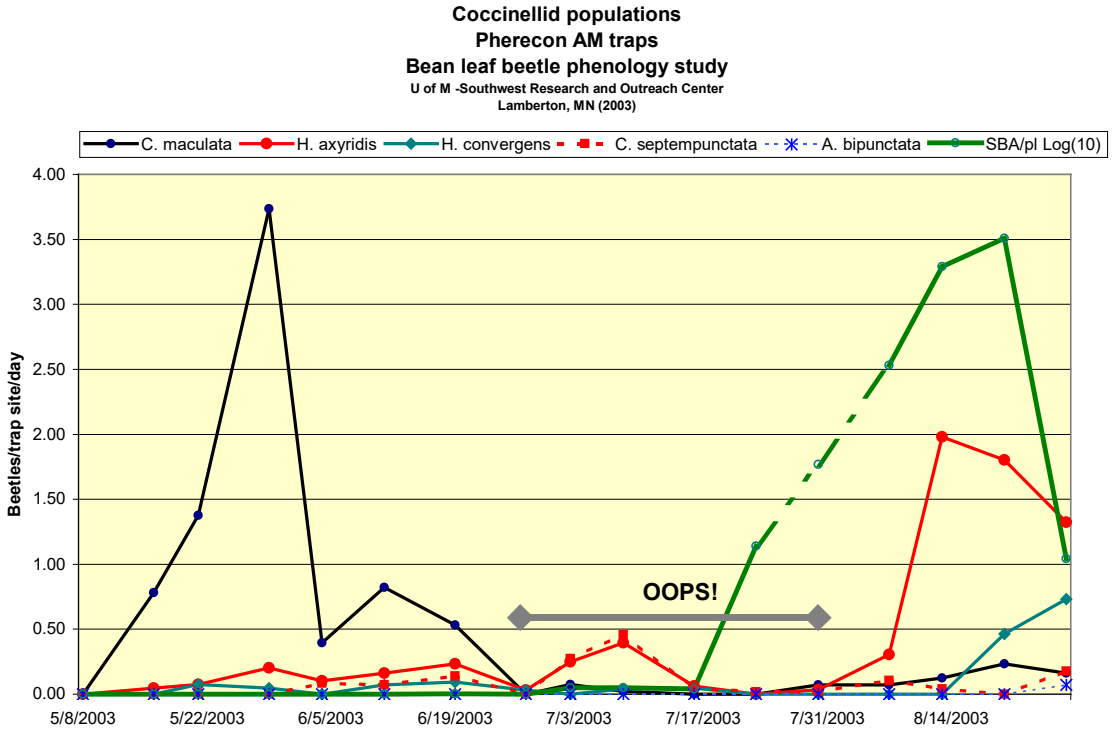
Lady beetles are perhaps the most widely recognized of a complex of aphid predators. Lady beetles, of several species, were especially abundant the past week. Perhaps, the high populations were, in part, a result of an ample food supply in soybeans last August. *Coccinella septempunctata* was the most commonly observed lady beetle. For those of you who prefer English, the common name of this insect is the Seven-spotted lady beetle. This lady beetle is also known as by its acronym (C-7). It is quite obviously named for the pattern of seven black spots on the elytra (wing covers). Unlike one of its prey

species, the soybean aphid, C-7 undergoes sexual reproduction with at least two generations per year.This European species was introduced to the United States for biological control and first recovered in Minnesota in 1986. This lady beetle is about the same size as the multi-colored Asian lady beetle and is likewise a very effective aphid predator. In addition to aphids, some researchers have observed C-7 feeding on alfalfa weevil larvae. Some lady beetle species can consume hundreds of aphids in their lifetime and the adults of some species, including C-7, can persist for a period of time on pollen if prey is scarce.

C-7 is shown with along with a few of the other lady beetle species (we've seen seven species so far this spring) currently present in alfalfa and other crops in the figures below. How many can you identify? Hint: the scale is in millimeters and none of the beetles shown are bean leaf beetle. The answers and tips to identify these species and more will be posted next week. If you can't wait until next week or want to show off your lady beetle identification skills you can email me with your guesses.

We are developing a section on the SWROC web site "INSECTS of SW MN". Lady beetles will be some of the first insects posted since they're so darn neat and the adults are relatively easy to identify by pictures. O.K., we'll have weeds and pathogens also. If you have any *good* digital images you would like to share for this effort let me know.

Can lady beetles control soybean aphid populations? When lady beetles are present in soybeans early enough and in great enough numbers, they can help prevent establishment. They may not, however, be able to play catch up with rapidly increasing soybean aphid populations. The graph below shows the populations of several lady beetle species with the population of soybean aphid in a 2003 study at the SWROC funded by the MSRPC. Circumstantially, in this case study, it looks like early season lady beetle populations (primarily 12-spotted lady beetle, *Colleomagilla maculata*, primarily) may



have had a role in suppressing soybean aphid early. However, a major influx of aphids in mid-July coincided with a lack of adult lady beetles. Multi-colored Asian lady beetles, *Harmonia axyridis*, colonized the field after a large aphid population developed. In this case they were too late. Ken Ostlie, U of M, Extension entomologist and I are continuing this study at Lamberton and Rosemount in 2004 to determine which species are foraging in soybeans and when.

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SW Minnesota IPM STUFF 2004-6

6/11/2004

Crop update - it's wet enough for now

In research plots at the University of Minnesota Southwest Research and Outreach Center (SWROC), Lamberton, early planted corn is at 6 collars and about 16" extended leaf height where exposed to the wind. Early planted soybeans are at V3 (3 trifoliates open). Winter wheat is flowering. Early spring wheat, barley and oat varieties are heading.

My early optimism for SWROC spring planted small grains is waning. After jointing and now at heading plots are very short in stature with only average size heads. I thought it might just be a distorted perspective induced by years of looking at seven-foot tall corn. Jochum Wiersma, U of M small grains agronomist made the long trip down from small grains country at the Northwest Research and Outreach Center in Crookston to look at these plots. He also thought they were short, blaming this short stature primarily on the dry conditions earlier and then launched into a discussion of how photoperiod makes wheat and everything else is bigger in Texas, er um… Crookston. Winter wheat, rye and many commercial spring wheat and oat fields near Lamberton still look pretty good.

If you don't like the weather in SW MN just wait a few minutes. Unseasonably hot (97 F) and windy (***average*** wind spread of 17 mph) weather on the 7th has been followed by a cool wet period. The SWROC and some areas south and west have fared ok with less than an inch of rain and little standing water; at least for now. Areas east, north and south were hit with significant rainfall and standing water is common. Some areas that were replanted are again under water. In addition to the obvious problem of crop death due to drowning, the past few days of wet soils and foliage can lead to problems that show up later. Expect to see symptoms of crazy top disease in corn that flooded and root rots including SDS in soybeans later this summer. Stock up on mosquito repellant.

Is there a fungus among us? As a general rule, insect populations are favored by dry weather and the fungi and bacteria are favored by wet weather (soils and foliage). Insect transmitted plant diseases, viruses in particular, are typically worse when weather favors their insect vectors. Fungal and protozoan disease outbreaks in insect population are often triggered by wet weather. You may have seen grasshopper, spider mite or aphid populations disappear with wet weather. A fungus outbreak in a crop needs three things to happen: 1) the presence of the pathogen, 2) Susceptible genetics in the crop, 3) Time with the proper environment for infection and spread (moisture and temperature requirements vary by pathogen). Soybean roots at the SWROC, even those from areas that had short-term standing water last week still look remarkably white and healthy (see point 3 above) but 2004 is starting to look like a disease year.

Soybean aphid watch
Soybean aphid infestations *have been* reported in EC and SE Iowa with some fields being treated. As far as I know, soybeans aphids ***have not*** been observed in Minnesota, Wisconsin, North and South Dakota. Remember that aphids were found earlier in 2003 than other years. This is still a week or so early for aphids to be showing up with the early ober2003 in eastern MN being early. Soybean aphid cornicles are excretory organs and not known to function as snorkels so perhaps they are waiting for a shipment of SCUBA gear before invading southern MN soybeans.

We are not out of the out of the woods yet with respect to soybean aphid.

Bean leaf beetle
At the SWROC populations remain n much lower than last year. Rich Kvols, MDA and Bryan Smith, Centrol, reported seeing more beetle activity over the past week. Why the movement into soybean is so much later than previous years is a bit of a puzzle. I have not heard of any heavy populations yet.

European corn borer
The Lamberton and Fulda black light traps caught their first European corn borer (ECB) moths (1st generation multivoltine strain) on 6/08/04. It is still too early to gauge the magnitude of this flight. Warm > 50 F nights are needed for moth flight and mating. Follow the progress of the 2004 ECB at**:** **http://www.vegedge.umn.edu/2004/moth.htm**

Other moths that are quite common now are the forage looper and army cutworm, the latter species being blown off course from a planned migration north along the east slope of the Rocky Mountains. The army cutworms still haven't found fly fishing attractive.

I've received several calls about the moths and since insect timing is similar to 2002, I pulled the following ECB and misc. moth information from IPM Stuff 2002-6 (6-12-02).

1st generation ECB Scouting guidelines from IPM stuff 2002-6-6/12/02

First egg hatch will occur about 212 DD $_{50}$ after first flight or the **8th**th**.** Tunneling into corn stalks and associated loss of insecticide control ability (3rd to 4th instar) begins between 435 and 567 DD $_{50}$ after first moth flight or approximately 2 – 3 weeks after hatch). Warm, humid nights during moth flight favor mating and egg lay. Cold nights during moth flight, or hot, dry weather during hatch reduce corn borer reproduction and survival. Heavy rains can drown early instar larvae in the whorl.

To be safe, start scouting for shotholing about 170 DD $_{50}$ days after first moth capture or 7-10 days from the 8th depending on temperature.

Scout tallest fields first. Corn borer larvae do not survive well on corn less than 6 leaf stage due to DIMBOA, a naturally occurring compound in corn. Emerging moths move from last year's corn to grassy areas in corn or field edges to rest and mate. Sampling in and along these areas may give an artificially high estimate of larval populations.

Scouting for first generation should focus on leaf shotholing in the whorl. Scout 20 plants at five locations in the field for leaf feeding. Dissect a couple plants at each location for larvae***. Borers/plant = (% of plants shotholed) x (average number of borers/shotholed plant)***

Treatment thresholds should take into account potential damage, treatment cost and crop value. Fields close to threshold may need to be scouted more than once.

The following economic threshold table is from Ken Ostlie's 1996 publication, FS-5969-A Quick Guide to European corn borer management: Scouting and Decision-Making for First Generation.

Economic Thresholds [1] (Borers/plant) for First-Generation European Corn Borer

Crop Value [2] ($/Acre)

CONTROL COSTS[3] ($/ACRE)		200	250	300	350	400	450	500	550	600
	6	0.75	0.60	0.50	0.43	0.38	0.34	0.30	0.27	0.25
	7	0.88	0.70	0.58	0.50	0.44	0.39	0.35	0.32	0.29
	8	1.00	0.80	0.67	0.57	0.50	0.45	0.40	0.37	0.34
	9	1.12	0.90	0.75	0.64	0.56	0.50	0.45	0.41	0.38
	10	1.25	1.00	0.83	0.71	0.63	0.56	0.50	0.46	0.42
	11	1.38	1.10	0.92	0.79	0.69	0.61	0.55	0.50	0.46
	12	1.50	1.20	1.00	0.86	0.75	0.67	0.60	0.55	0.50
	13	1.63	1.30	1.08	0.93	0.81	0.72	0.65	0.59	0.54
	14	1.75	1.40	1.17	1.00	0.88	0.78	0.70	0.64	0.59
	15	1.88	1.50	1.25	1.07	0.94	0.84	0.75	0.68	0.63
	16	2.00	1.60	1.33	1.14	1.00	0.89	0.80	0.73	0.68
	17	2.13	1.70	1.42	1.21	1.06	0.95	0.85	0.78	0.71
	18	2.25	1.80	1.50	1.29	1.13	1.00	0.90	0.82	0.75

[1] Calculation makes four assumptions:

1) scouting is 100% efficient,
2) each scouted larva will produce one tunnel (=100% survival),
3) each tunnel will cause 5% yield loss, and
4) an insecticide application will control 80% of the larvae.

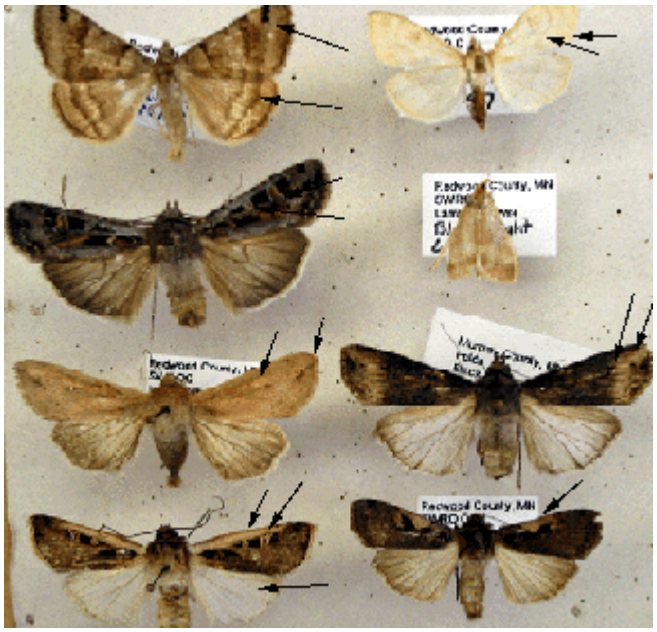
[2]Crop value = expected yield (bu/acre) X projected price ($/bu)

[3]Control costs = insecticide price ($/acre) + application costs ($/acre)

Miscellaneous moths from IPM stuff 2002-6-6/12/02

An additional species was observed the same night as the armyworm flight. A large number of Noctuid moths tentatively identified as ***army cutworm*** were present at the Fulda location**.** In late spring, these moths migrate from the Great Plains to summer in

the Rocky Mountains. These individuals, as sometimes happens, were blown off course by the weather system in which they were traveling. They should not pose a crop threat. Summering in the mountains? Sounds like a good idea. Under magnification, however, it did not appear that these moths were packing fly rods.



Calls about large numbers of moths in corn, around lights and in houses could be one of several species. The figure shows several moths that are present now. Most are reasonably harmless. These include from top to bottom, left row: Forage looper (a common contaminant in canning peas), army cutworm, armyworm and western bean cutworm. Western bean cutworm moths are not yet present but may appear in SW MN corn in early July. Western bean cutworm larvae feed in the ear. Right row: European corn borer, corn borer with wings in folded, (both forms are observed in radiators), black cutworm and spotted cutworm. Notice the small size and light color of European corn borer moths. I tried to point out diagnostic characters for each species but identification of Noctuid moths can be difficult. If several of these moths look similar, take comfort that us agriculturalists probably all look alike to the cutworms too**.**

Alfalfa weevil and Potato leafhopper

Ken Fransky, Garst, reported significant alfalfa weevil populations in and around Pipestone County. The problem is not in every field but could be worth your time to check standing 1st crop alfalfa and re-growth. This insect is not a problem in every field and Phil Berg, University of Minnesota, has also checked a few fields in that area with little weevil pressure.

From alfalfa plots I have swept and the reports of others it appears that SW Minnesota potato leafhopper populations are relatively low at this point. Continue to scout for this insect during the 2nd and 3rd crop.

Small grain diseases

Small grains are not the dominant crop in the SW MN landscape. However, some farmers do have wheat and oats acres. At the SWROC, we do have variety trials for small grains. Small grains can have disease problems and we are starting to see several of these now including Septoria, wheat leaf rust, and bacterial leaf spots. Thanks to Mark Anderson, student intern for his help in photographing and editing some of these photos.

Wheat stem maggot

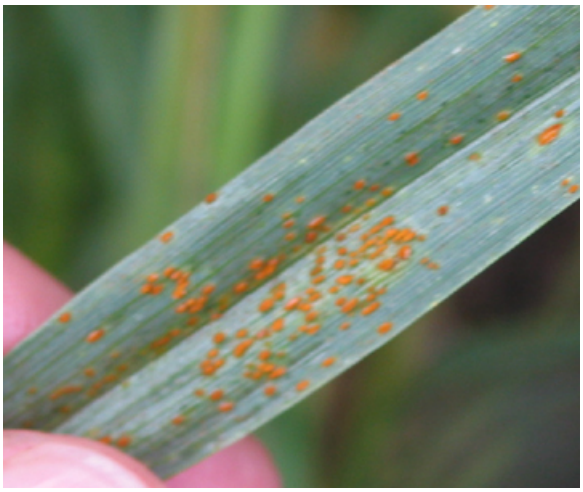
The scattered white heads you may see in wheat and barley are not a disease but rather the result of feeding by the larvae of an insect. In spring the adult fly lays single eggs near the stem. The larvae feed inside the stem near the upper joint. After head emergence dead white heads result from this feeding severing the stem (below right). Wheat stem maggot injury can be distinguished from other problems (some root rots) because the bleached heads can be easily pulled free from the plant and the affected heads tend to be scattered in the field.

Barley yellow dwarf virus.

This disease is transmitted by several species of small grain aphids. It affects barley, oats and wheat. Based on the abundance of lady beetles, aphids were present at one time this spring in the small grains at the SWROC. Symptoms of barley yellow dwarf include stunting and a yellow (wheat and barley) or reddish (oats) discoloration of leaves progressing from the tip. Wheat tends to show less dramatic symptoms than barley and oats. Symptoms are shown on winter wheat below left and spring oats below right. Another name for this disease is “oat red leaf”. Related to where virus-carrying aphids fed, the symptomatic plants can be scattered or more typically congregated in small circular areas in the field. The symptom expression depends on time of infection with earlier infections tending to have greater symptoms, the species infected and growing conditions. However, yield loss can still occur with otherwise symptom-less plants.

Wheat leaf rust

During the early 90's, in a futile attempt to become a plant pathologist, the cereal rusts and powdery mildew were of particular interest to me due to their complicated life cycle. They haven't gone away and I am reminded we already should understand a lot about how a soybean rust outbreak could react.



In winter wheat plots at the SWROC, some varieties were at 100 % of the plants infected in the lower canopy. Some spring wheat varieties were starting to rust as well.

The fungus *Pucinnia triticina (recondita* until taxonomists got involved*)* causes wheat leaf rust. Wheat leaf can overwinter where mild winters allow infested green leaf tissue to persist through the winter. This rarely happens in Minnesota. However, large amounts of additional inoculum (rust spores) are being produced to our south along the "Puccinia pathway" and leaf rust could be a problem this year if weather favorable for the fungus continues. Wheat varieties vary in resistance to leaf rust and a long-term running firefight between wheat breeders and race shifts of the fungus showing no signs of a let up. The rust pustules in the winter wheat leaf above show susceptibility to the genetics of this particular rust. Resistance to leaf rust often shows as yellow borders around the rust pustule and reduced pustule size. Several fungicides can provide good leaf rust control when well timed.

Oats are affected by a related species, oat crown rust, *Puccinia coronata*. Buckthorn is the alternate host for oat crown rust and allows this fungus to overwinter in Minnesota. Those of you trying to find soybean aphids on buckthorn this spring probably noticed the bright orange Aecia of crown rust on the leaves which produce spores that can infect oats.

The USDA-ARS Cereal Disease Laboratory, St. Paul, MN puts out a bulletin on cereal rust severities through the growing season. The most current issue can be found at: http://www.cdl.umn.edu/crb/2004crb/04crb6.html.

Fusarium head blight (Scab)

It is too early for symptoms of this disease to show, in fact for infection to have occurred, but this disease may cause a problem this year. Spores are produced on crop residue and infect barley and wheat at flowering. Wet conditions at flowering with moderate temperatures favor infection. *Fusarium graminiarum*, one of the fungi that cause scab, is the same fungus that causes a stalk rot of corn. Life could get interesting for anyone that planted wheat on corn stalks. At flowering, fungicides provide only limited control of scab especially on spring wheat (50% reduction with the best compound).

A new scab-forecasting model has been developed. To assess your risk of scab in a particular field you can check the predictive model at:
http://mawg.cropdisease.com/index.pl?model=1086865200&M_runmode=scab_model.

Lady beetles

The answers to last week's lady beetle question are:

1) Thirteen-spotted *Hippodamia tredecimpunctata* , 2)Seven-spotted *Coccinella septempunctata*, 3) 12-spotted *Coleomegilla maculata*, 4) Multicolored Asian Lady beetle *Harmonia axyridis*, 5) Polished lady beetle *Cycloneda munda*.

Upcoming Events

Soybean rust issues and facts teleconference
June 29th 8:30 –12:00 pm.
For details see the announcement at:
This program is geared to ag professionals. There will be a charge for this event. The SWROC will be one of the locations. Depending on the weather and audience interest we may hold an impromptu clinic for small grain disease id and alfalfa insects after the soybean rust conference.

The American Soybean Association is also presenting an educational event for growers. There will be an event on July 30, 2004 in Mankato.

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SW Minnesota IPM STUFF 2004-7

6/18/2004
SW MN Crop weather, degree-days etc.: *http://swroc.coafes.umn.edu/*.
WCROC Crop weather: *http://wcroc.coafes.umn.edu/Weather/weather.htm* .

Crop update - *it's still wet*
The crop looks good in areas that have received only moderate amounts of rainfall. We do need a period of dry weather. Wet soils and windy conditions have hindered spraying with aerial weed control being used in some areas. Check the label before you do this. Remember to check crop height/leaf restrictions and herbicide plans may need to change with taller corn.

The incessant whine of mosquitoes reminds me that it's an election year. Although it looks like the student's hand is under attack from a 1950's B horror film mosquito, she's in no real danger. The insect, although also a member of the Diptera or fly order the insect in question is not in the same family as mosquitoes and is actually a crane fly (Tipulidae) adult. The larvae are aquatic or semi-aquatic and most feed on decaying vegetation. The long-legged adults do not bite. This is the largest SW MN species that I know of and most species, although larger than mosquitoes, are much less intimidating to motorcyclists.

In research plots at the University of Minnesota Southwest Research and Outreach Center (SWROC), early planted corn is at 7 collars and about 30-inch extended leaf height where exposed to the wind. Taller corn can be found in sheltered areas and canopies are approaching canopy closure in some fields. Other fields are not fairing as well. Stress will have an increasing impact on yield from now until pollination. I visited with Dale Hicks, University of Minnesota Extension corn Agronomist and perpetual optimist. Ear size (rows) will be determined before 12-leaf (collar) stage. A bigger factor in determining maximum potential ear size is kernels/row or ear length. This will be determined before silk emergence. Although some corn looks ragged now, we are fortunate that it is still

relatively early and excluding drowned-out areas, might still end up with a respectable yield.

Early planted soybeans are at V4 (4 trifoliates open) and an occasional bloom can be observed. The imitation of branches has also started. Night length will soon induce soybeans to begin flowering. Early planted narrow rows may close canopy next week.

Yellow beans - During the past week, soybeans in fields in some of the wetter portions of SW Minnesota started to develop a yellow cast. Several factors are probably involved and all relate to poor root systems.

The first female soybean cyst nematodes (SCN) of the season were observed on 5/15/03. SCN resistant varieties can reduce SCN reproduction but feeding by high larval populations can still cause root injury. Although water is not an issue now, roots are still needed to obtain nutrients. SCN injury can also lead to infection by root pathogens.

Lower parts of root systems in wetter soils have been killed as evidenced by decayed outer roots and nodulation confined to the upper inch or less of the root. There may not be a lot of nitrogen in the top inch or so of soil right now.

Iron deficiency is just beginning to appear now on 3 to 4 trifoliate soybeans that are starting to increasingly rely on root systems.

Root pathogens are starting to make their presence know. *Fusarium* mycelia (pink to purple colonies) are appearing on some root systems. *Rhizoctonia* can be seen on some plants (brick red sunken lesions below soil surface) as well.

Dead plants can also be seen in some fields as in the 2 dead plants in the photo on the right. This could be *Phytopthtora.* However, it is hard to isolate the causal pathogen from dead plants (I can almost guarantee *Fusarium* spp. will be isolated from dead soybean roots). When submitting samples for disease culturing or diagnosis; include some live plants adjacent to the affected area.

Can you have phytopthora root and stem rot (PRR) on soybeans with resistance to this disease? Unfortunately, yes. *Phytophthora* root rot resistance genes (Rps1a, Rps1c, and Rps1k) work against specific races of the fungus. *Phytophthora* races can be selected for after prolonged use of a particular Rps gene in a field.

Can soybean fields planted with fungicide treated seed have root rot problems? Yes, they can. Under the right conditions, fungicide treated seed may help with emergence but do not last very long. It has been a month or more since planting.

Are fields with poor root systems doomed? Not necessarily. With drier soils and conditions otherwise unfavorable for disease increase, root regeneration can occur and good yields may still be possible. Unfortunately, sometimes when soybean plants seem to have recovered, chronic fungal infections can result in premature soybean death later in the season. On the corn side, early season fungal root and crown infections in corn resulting in stalk rot if corn plants undergo stress later in the season.

Soybean root rots tend to look alike, so how do you tell them apart? The only sure way to know which pathogen(s) you are dealing with is to have a plant pathology lab culture the fungus. I would suggest the University of Minnesota Plant Disease Clinic.

Plant Disease Clinic
495 Borlaug Hall
1991 Upper Buford Circle
University of Minnesota
St. Paul, MN 55108-6030
(612) 625-1275

Sample submission guidelines, clinic services offered and pricing are available at: *http://www.extension.umn.edu/distribution/cropsystems/DC3170.html* .

Bacterial blight can be seen on lower leaves in some fields.

Small grains are headed except for late varieties. Winter wheat is in very early dough stage. Pustules of crown rust were first observed on oats the past week. Leaf rust is increasing in severity on winter wheat.

Potato leafhopper – Populations have been generally low. Do not take this insect for granted and some fields may have treatable infestations. Scout your alfalfa during second and third cutting.

Alfalfa weevil larvae preventing re-growth were reported by Paul Bruns, Lyon County Farm Service. Larvae should be at or approaching pupation.

ECB – The flight has been low and uneventful at Lamberton and Fulda with 5 moths/night being the high capture so far. I would still scout some of the taller fields.

Bean leaf beetle – Based on several conversations, it appears that areas with little soybean aphid treatment last summer have somewhat higher bean leaf beetle populations. Is spraying soybean aphid a good management strategy for bean leaf beetle control? No.

Need to know degree-days other than base 50 or you don't farm near a Research and Outreach Center? A handy degree-day calculator for any base temperature and location can be found at *http://climate.umn.edu/ddgen/ddgen.asp*. *Note: Some insect development models (e.g. alfalfa weevil) use a sine model to calculate degree-days and the above sight will underestimate these especially at near base temperatures.*

Soybean aphid watch
Its late spring and agriculturalists thoughts turn to soybean aphid (SBA). I am not aware of any being found yet this spring in Minnesota. We've had some dandy false alarms at the SWROC though. The slow appearance (compared to last year) of SBA is a good thing but it is still very early. During previous years, the 19th of June (2002) is about the earliest we have found them on SWROC soybeans. Assuming SBA survived the winter, the cool spring may have been favorable but the wet weather and high winds have probably not. There is still a lot we don't know about this insect.

It is still early to devote a lot of effort to soybean aphid scouting. However, if you want to be the first one on your block to find SBA this spring, or just want to get in practice, start now and concentrate on smaller sized fields with buckthorn close by. From past experience some of you may know of areas that tend to have aphids first. I would focus on healthy soybeans. Scouting field borders, or around any obstructions within a field, a windbreak for example, may be most productive for detection. Early in the season, SBA should be concentrated on newer soybean leaves at the top of the plant. The threshold **is still** 250 aphids/plant average through the field.

Lady Beetle Update
The search is on for Lady beetles here in Lamberton. This year we have already found and identified seven different species of lady beetles. However, we do have a way to go considering there are over 4,000 species of lady beetles worldwide and 350 alone found in North America. Lady beetles are commonly thought of as an insect that is a nuisance; however, most species of lady beetle are among the most beneficial insects. The reason why they are so beneficial is that they consume huge number of insects that feed on plants, mostly aphids.

Lady beetles are members of the order Coleoptera (sheath-wing for the elytra or hardened forewings) and the family Coccinellidae ("little sphere' for their round shape)

Like other beetles, the lady beetle goes through a complete life cycle that includes an egg, larval, pupil, and adult stage during their lives. When springtime comes most of us are very thankful because the lady beetles (especially Asian lady beetles) leave our homes and fly to yards and fields where mating takes place. Lady beetles are also hungry little insects. For example an adult Convergent Lady Beetle can consume up to 75 aphids per day. The larvae of lady beetles also feed on small insects and are scary looking creatures. They resemble alligators except on a much smaller scale of course. Lady beetles live in many different habitats, including trees, shrubs, houses, and of course fields.

Hopefully you have enjoyed diving into the world of the Lady Beetle. I know that I have enjoyed the experience. If anyone is wondering why this does not sound like Bruce Potter's writing, there is a simple explanation. Bruce didn't write this article, someone else did. My name is Missy Olsem and I am the author of this article. I am one of Bruce's summer interns. This article is part of my internship at the SWROC for one of my classes at SDSU.

Lady beetle pictures and descriptions can be found at: *http://swroc.coafes.umn.edu/SWMNPEST/pests/insects/beetles/ladybeetles/ladybeetles.htm*. We used lady beetles for the tentative design for insect, weeds and diseases of SW Minnesota. Let us know what you think. Any suggestions are appreciated and good ones might even be incorporated.

UPCOMING EVENTS

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SW Minnesota IPM STUFF 2004-8

6/30/2004
SW MN Crop weather, degree-days etc.: *http://swroc.coafes.umn.edu/*.
WCROC Crop weather: *http://wcroc.coafes.umn.edu/Weather/weather.htm* .

Crop update - In research plots at the University of Minnesota Southwest Research and Outreach Center (SWROC), early planted corn is at 8-9 collars and about 45 inch extended leaf height where exposed to the wind on 6/30. Early planted soybeans are at V6/R2 stage.

Corn and soybeans are looking much better after drier weather and a little heat. I have been in a few spectacular looking corn fields the past week. We are now behind last year in accumulation of degree-days and about 1 week behind long term average. The yellowing from the iron deficiency chlorosis, root rot, soybean cyst nematode (SCN) complex is visible now. SCN females are becoming obvious on soybean root systems.

Soybean aphid watch – *Soybean aphids appear in SW Minnesota*. The longer we go without seeing significant aphid populations, the less likely a widespread outbreak like 2003. Soybean aphid appearance is late in the season compared to previous years (2 weeks later than 2004 in Southwest MN). This is good news but the season has a long way to go.

On 6/30 Mark Hockel observed small colonies of aphids tended by ants in Cottonwood County. Earlier in the week, Steve Commerford found a couple of aphids in an incidental observation in Brown County. Both of these observations were from small fields, bordered by wooded areas with buckthorn. Ken Ostlie's crew found very low aphid populations in Dakota County. This counters the hypothesis proposed by Derek Erickson, student intern, that an invisibility gene had been selected for in the SWROC soybean aphid population. I have heard of no aphids from or WI to date but there are aphids reported from IA, IN, IL, PA, and NY and just recently NE based on reports compiled by Drs. Dave Ragsdale and Rob Venette, U of M entomology. *This does not mean economically treatable levels.*

Enjoy the holiday weekend but I would start scouting aphids more intensely after the 4th of July weekend. I would appreciate hearing from you on locations where aphids have been found this year.

Small grains – Leaf rust continues to be a concern. More susceptible stage winter wheat varieties are severely rusted (see photo) in the soft dough stage and some spring wheat varieties (e.g. Marshall) are also starting to rust heavily. Dependent on variety, crown rust is starting to rapidly increase on oats. Rye leaf rust is also much more common than usual.

Plant pathologists refer to development of plant disease based on "the disease triangle" which composed of 1) a susceptible host, 2) the presence of disease (inoculum) and 3) an environment favorable for infection and disease development.

In the case of small grain rusts in 2004, we have at least one portion of the disease triangle in place, namely large amounts of rust spores (urediniospores). Varieties susceptible to the races of rust present are present in some fields. We can only hope that the environment is not favorable (wet leaves) for these diseases during the remainder of the growing season.

Some of you may have attended one of the soybean rust teleconference training sessions on the 29th or otherwise learned about the environmental requirements of soybean rust, how it is not likely to winter in the northern U.S., and how rust movement across the center of the continent on wind might occur. Unlike soybean rust, crown rust of oats can overwinter and an epidemic can be locally produced with buckthorn serving an alternate host in the spring. This means buckthorn is important for the sex life of both crown rust and soybean aphid with soybean aphids cavorting in the fall and crown rust in the spring.

Soybean rust epidemics are expected to behave more like wheat leaf rust where urediniospores move from the south where green leaf tissue allows the fungus to overwinter. In this case, the sexual stage of these fungi is not of major importance and epidemics are usually driven by inoculum (spore) production in wintering areas to the south.

If or when soybean rust gets to the United States, it will probably not cause devastation in this part of the world every year. However, given the right combination of circumstances thing could get very bad indeed. This is probably the worst leaf and crown rust I have seen at Lamberton since I started here in 1997. Will you see clouds of orange spores while combining oats? Maybe, maybe not, but Jodie Getting, SWROC scientist was quick to point out the benefits of a cab on the swather after looking at some of the oats here.

We'll soon know how far the current leaf and crown rust epidemic develops and to quote Neil Young out of context, "Rust never sleeps".

Potato leafhopper– Populations have been slowly increasing in alfalfa and soybean fields.

European corn borer– In general the first generation multi-flight has been low. The exception has been a light trap near St. James. Peak flight should have occurred with univolitine flight starting soon in Southwest MN.

Corn rootworm – feeding injury is present on root systems now and will continue to increase for the next few weeks.

Bean leaf beetle – Overwintering beetle populations are dropping. They didn't have far to fall in most fields. Round 2 or first generation bean leaf beetle emergence should begin in mid-July.

Grasshoppers – Early instar nymphs of red-legged grasshopper are relatively common in some fields. I have not seen anything approaching economic levels but it is worth keeping a watch on these.

SCN – SCN/root rot interactions are pronounced in many fields. Some fields with SCN resistant beans are affected as well. I have heard reports and seen several soybean fields with root rot problems, most likely *Fusarium*. Do not discount SCN in this mix. Seeing severe damage and cysts on a SCN resistant variety means that 1) SCN pressure is very high, 2) The resistance is incomplete in the variety or 3) resistance is not working because of nematode genetics in the field. Keep track of these fields because they will need to be managed differently.

Wild Buckwheat – It seems that the self-propagated rumors of their demise may have been exaggerated and there may still be a future for weed scientists. Wild buckwheat is one of the weeds on the North Central Pest Management "Weeds to Watch" poster (http://www.extension.iastate.edu/Publications/IPM72A.pdf). Wild buckwheat, *Polygonum convolvulus,* is an annual in the Polygonaceae or buckwheat family. Smartweeds, knotweeds and docks are also members of the family. We have a bit of this weed on the SWROC and based on herbicide trials, it does not succumb easily to glyphosate applications. When larger plants were treated, weed mortality occurs slowly and half-rate applications appear to result in good wild buckwheat survival. The photo on the right is from a check plot and shows size and density of the uncontrolled weed.

Quickly responding to this new threat, Dr. Jeffrey Gunsolus, U of M Extension weed scientist, offered "Wild Buckwheat should be treated with glyphosate when it is less than 2 inches tall. In corn, atrazine, Callisto, dicamba, and Liberty have activity; in soybean two-applications of glyphosate or Harmony GT provide control. "

Similar to common lambsquarters, another weed on the list, wild buckwheat tends to emerge early in the season. Other increasingly common southwest Minnesota weeds to watch include wild four-o-clock, biennial wormwood, waterhemp and kochia.

I was worried about a waterhemp or lambsquarters monoculture developing after prolonged and intensive use of glyphosate but perhaps we may end up with some weed biodiversity after all.

UPCOMING EVENTS
I hope to see some of you at:

SWROC field days Wednesday, July 7, Lamberton

SROC Insect and Disease Pest Tour, July 15, Waseca

WCROC Summer Center day, July 16, Morris

For a good crop production training opportunity I would recommend the U of M field schools being held at Crookston and Waseca. For more information on field school check http://www.iap.umn.edu/.

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SW Minnesota IPM STUFF 2004-9

7/08/2004
SW MN Crop weather, degree-days etc.: *http://swroc.coafes.umn.edu/*.
WCROC Crop weather: *http://wcroc.coafes.umn.edu/Weather/weather.htm* .

Crop update - In research plots at the University of Minnesota Southwest Research and Outreach Center (SWROC), early planted corn (4/09) is at 12 collars and over 60 inch extended leaf height where exposed to the wind on 7/08/04. At this point, kernels/row are being determined. Latest planted corn (5/27) is 8 collar. Early planted soybeans are at V7/R2 stage.

Soybean aphid watch – Additional low-level infestations have been reported since June 30th. Additional counties with soybean aphids (SBA) observed include Nicollet (Steve Commerford), Redwood (Al Van Grouw), and Waseca (Tom Hoverstead, U of M SROC). I have the SBA population in one Nicollet County field under surveillance and they have increased slightly between 7/1 and 7/8 with areas in the field now with 100% of the plants with 1-10 aphids. In addition to a Minnesota Department of Agriculture find in that county, Mark Bernard observed isolated plants with approx. 150 aphids/plant in one Blue Earth County field. High SBA populations on individual plants with aphids lined up on soybean stems of young plants occur, even at relatively low overall field populations, as ants tend aphids. Unfortunately, these SBA colonies are under pressure from crowding and winged stragglers are capable of infesting other plants and fields. Yippee ki yi yay!

People that look at a large number of soybean fields have reported most of the 2004 aphid infestations that I know of. I am not aware of any treatable infestations yet this year. In most fields, aphids are absent or at very low levels that elude easy detection. For example, we have not yet been able to find any SBA on the normally early-infested SWROC this spring. During 2003, fields in the Minnesota River Valley and SE Minnesota were already being treated at this time. At this point we are not faced with the unpleasant situation of early and widespread large populations of aphids available to infest new fields.

Fields with aphids below threshold population now should be checked periodically and will serve as indicators of population increases or collapse. Due to their tremendous reproductive capabilities, don't rule out soybean aphids yet.

European corn borer-

In addition to looking for soybean aphid, Mark Bernard has apparently spent some time naming the few corn borer larvae he has been able to find in SC Minnesota. Populations, in general, are low.

Corn rootworm – Pupae are present in corn fields now.

Yellow beans appear on schedule
I spotted suspicious characters in a yellow portion of a Lac Qui Parle soybean field. Upon closer investigation I discovered George Rehm and Paul Bloom, University of Minnesota Department of Soil, Water and Climate, trying to unravel the mysteries of yellow soybeans. Yellow soybeans are especially pronounced this season. Why have George or others not been able to solve this problem yet? A complex set of soil chemistry (pH, salts, carbonates, moisture, and oxygen), soybean physiology and genetics, nematological and mycological factors are involved and often interact. Although symptoms are the same, soybeans can be yellow for different reasons or combination of factors in different fields or areas.

Here are some factors to consider in trying to determine the cause of yellow soybeans.

1) Does the field have a long history of iron deficiency chlorosis? The problem may be more of a biological problem rather than soil chemistry in nature when chlorosis shows up in new areas of the field. If the field has a history of chlorosis, was a ***good*** iron chlorosis tolerant variety planted?

2) Does this field have Soybean Cyst Nematode (SCN)? Was an SCN resistant bean planted and ***how resistant*** (S, MS, MR, R) was the variety. No varieties are immune and even good SCN varieties will struggle with high populations or SCN in combination with soil chemistry and pathogen problems. SCN impaired root systems will have a harder time with nutrient uptake. Finally, there is evidence that SCN populations, or at least symptoms, can be higher in high pH areas of a field.

3) Are roots decayed? Root rots may also reduce the plants ability to obtain iron or other nutrients. SCN feeding or root injury from a temporary lack of oxygen can provide an easy avenue for pathogens, including less aggressive species, to colonize root systems. Sandy Gould, U of M Plant Disease Clinic, has cultured many samples of both *Rhizoctonia* and *Fusarium* from soybean roots this spring.

The unfortunate truth is that many of the fields of areas of fields that look tough now have all three of the above factors occurring and need a combination of iron chlorosis tolerance and SCN resistance. On the bright side, stunted chlorotic beans will be less attractive to soybean aphids.

SCN – How and why do we need to manage soybean cyst nematode? First, with a few exceptions, soybean fields in southwest Minnesota have soybean cyst nematode from non-detectable to levels to populations virtually ensuring soybean yield loss regardless of

soybean genetics or other management practices. Given the current state of soybean genetics and other technologies, the only two management options available for soybean cyst nematode are increasing the rotation interval between host crops and resistant varieties.

Figure 1 illustrates the real problem with SCN infestations. Under no (little) SCN pressure susceptible (S) varieties can out-yield SCN resistant (R) beans. Obviously, the SCN resistant varieties yield better under SCN pressure. The issue lies in the yield performance under moderate to heavy SCN pressure. Yield of susceptible varieties was reduced by 35%. However, the yield of resistant varieties was still reduced by 19%. In other words, ***heavy SCN pressure in a field ensures a low yield environment for soybeans including resistant varieties***.

Deal with SCN infestations early by using resistant varieties (other traits are important also) or rotation changes. High yielding environments with good drainage and fertility can delay the appearance of noticeable yield loss. The potential for a couple more bushels with susceptible varieties is attractive and often delays the use of resistant varieties. Sometimes this strategy works but it may be costly in a year like 2004.

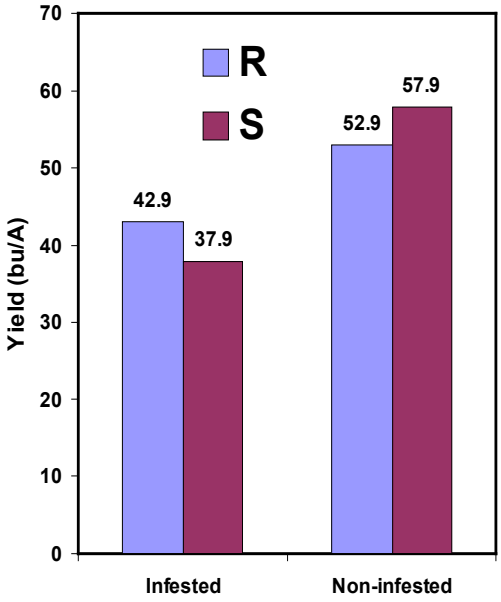
Aggressive SCN management in a field might cost a couple bushels in the short run but will preserve the option of maintaining your rotation and allow the use of susceptible varieties every few soybean crops. Once a field is infested and requires SCN management the problem might be minimized but not eliminated. Populations will increase with the planting of each susceptible variety.

Extending the interval between soybean host crops is recommended at soil test levels over 10,000 eggs/100 cc soil. The reason for this is twofold. First, the yield of the resistant varieties may be unacceptably low due to root injury as juveniles attempt to feed and the previously mentioned interactions. Secondly, SCN genetics vary within a field and exposing SCN resistance to high SCN populations is placing a lot of selection pressure on the resistance. The loss of resistance within a field in as few as four soybean crops has been documented in southern Minnesota.

Where symptoms and cysts are easily observed on highly resistant varieties in a field, the only option left is an increased interval between soybean crops. Two years between soybean crops will usually not be enough to allow successful use of susceptible variety. Soybeans following peas still count as soybeans for that crop year.

Prioritize your SCN problems on a field-by-field basis to get the most benefit from rotation changes and resistant varieties.

Figure 1. Yield of top ten resistant varieties and top ten susceptible varieties in SCN-infested and non-infested fields in 1999-2002. S. Chen, University of Minnesota.



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SW Minnesota IPM STUFF 2004-10

7/18/2004
SW MN Crop weather, degree-days etc.: *http://swroc.coafes.umn.edu/*.
WCROC Crop weather: *http://wcroc.coafes.umn.edu/Weather/weather.htm* .

Crop update - In research plots at the University of Minnesota Southwest Research and Outreach Center (SWROC), corn planted before 5/10 is starting to tassel with earlier planting dates further along in the process. Of course, tassseling will be uneven in those fields with excess water problems earlier. These pockets in the field that are out of synch in development may be attractive to rootworm beetles later. Most root development has been completed at silk and plants with shallow or injured root systems may be at risk from dry hot weather.

We are slightly behind last year in degree-days and about 200-degree -days (base 50F) behind long-term average.

Soybean aphid watch – The first soybean aphids were observed at the SWROC on 7/14. A small two-plant infestation of 6 aphids, including one alate (winged), has since expanded to several plants and 116 aphids. Additional small aphid population centers have recently been found on the station and based the number of cast skins some of these may have been the original source for the infestations here. ***However, these SWROC soybean aphid populations are***

not near economically treatable levels (average of 250 aphids/plant on 80% or more of the plants) nor am I aware of SW MN aphid populations that are.

Additional counties where soybeans have been reported over the past week include soybean aphids include Martin (Corey Sinn) and Yellow Medicine (Alain Bellicot). The Minnesota Department of Agriculture also found an infestation near Crookston. Last week, most observations included at least a few alates indicating that aphids are on the move. Most southern MN soybean fields probably have a few aphids at this point but populations are below easily detectable levels in many.

Aphid populations in my indicator field near New Ulm have slowly increased over the past week and are currently over 40% of the plants with aphids and averaging 5 aphids /plant. This aphid infestation remains predominantly on the field edges. Apparently, it's not the heat; it's the humidity in this Minnesota River valley field.

Following the recent SWROC aphid finds, the frantic activity of vehicles and student interns rushing about the station flagging aphid colonies reminded me of the searching behavior of the bee-like hover flies (Diptera: Syrphidae) searching for aphid prey for their offspring. Other predators also seem to be finding aphids as any larger colonies have a compliment of lady beetles (C-7 and *Harmonia)* and their larvae. Lacewing eggs and larvae are common and small, metallic long-legged flies (Diptera: Dolichopodidae) can also be seen around most colonies.

The next three weeks will probably determine the impact of soybean aphids in 2004. As branches develop and as pods start to form, aphids will be found with increasing frequency in the lower part of the canopy. Pull and examine the entire plant when scouting.

Erin Hodson, U of M Entomology, has developed a binomial sampling program to help speed scouting. This method, which may save some time, depending on how you were scouting, is in a testing phase for Minnesota and the 250 aphids/plant threshold is still valid. This sampling method is in part based on the biological relationship between incidence (% plants colonized) and severity (population/plant) seen for many biological organisms and obligate parasites and predators in particular. Give this method a shot and supply some feedback. The guidelines are located at: http://www.soybeans.umn.edu/crop/insects/aphid/aphid_sampling.htm. You can also report your aphid observations at http://www.soybeans.umn.edu/crop/insects/aphid/aphid_comments.htm.

How does this year compare? At this point, populations are reminiscent of 2002, with increasing numbers of localized colonies appearing as the growing season progresses. In localized SW MN hotspots, aphid populations had built to treatment threshold by 7/26/2002 and shortly after July 4th in 2003. To further put things into perspective, the SWROC had very few aphids until July 16 in 2003 and things still got ugly. On the brighter side, during 2003, we had many heavily infested fields to provide a continuous supply of immigrant aphids. On darker side, we are in the middle of a period of relatively good aphid weather.

Pea aphids- Randy Vancura (Centrol) reported a flaring pea aphid population in an insecticide treated alfalfa field. Pea aphid populations are also very high in untreated alfalfa at the SWROC. This indicates good weather conditions for aphids and makes me more nervous about the potential for soybean aphid problems and my vacation next week.

European corn borer – The univoltine flight at Lamberton, while bigger than 1st generation, is less than spectacular. The largest nightly capture has been 32 moths.

Potato leafhoppers - Pay close attention to increasing leafhopper populations in alfalfa. Hopperburn was visible on some late cut alfalfa at the SWROC.

Bean leaf beetles - 1st generation adults are emerging now. Defoliation of upper leaves now is either from bean leaf beetle or grasshoppers.

Corn rootworm - The first northern corn rootworm adult of the season was observed at the SWROC on 7/18/04. For the rest of the story - see the following section.

Root rots. They're not just for soybeans anymore.
The cold wet soils have caused many root rot problems in soybeans this season. To clarify my comments from last week, the U of M Plant Disease Clinic has isolated both *Fusarium* and *Rhizoctonia* form the same root system in some cases. *Phytopththora* is now starting to be more apparent. Secondly, soybean cyst nematodes (SCN) do not have to turn soybeans yellow to cause yield loss.

Unfortunately, this year, corn may be suffering a similar fate as its rotational partner.

Some corn fields in SW Minnesota have been showing stunting, lodging and potassium deficiency symptoms. There appears to be a varietal relationship and reduced tillage, especially corn on corn, often shows greater symptoms.

The cause of the problem is diseased root systems. The corn photos were taken from a field in Martin County that had stunted and potassium deficient areas. Decayed roots and deteriorating crowns can be observed. In the lower photo, the disease has progressed to several nodes above the crown, based on the discolored nodes. Potassium deficiency

symptoms can be seen on leaves in the background. These roots are obviously unable to efficiently utilize nutrients and water.

Rootworm injury can be observed in addition to decay in some cases while in others significant rootworm feeding is absent or has been obliterated by decay. Corn rootworm damage has been related to potassium deficiency and root disease in the past. Feeding reduces root function and allows an avenue for disease just like SCN. The wet soils and temporary anaerobic conditions were favorable for fungal infections of root systems. Minor insect injury can be greatly magnified by diseases entering the wounds. This also applies to fields with corn rootworm insecticides, as they do not provide complete protection under the best circumstances.

Rootworms were probably required for root rots. The residue and variety differences make me tend to believe that root infecting fungi are key players here. *Fusarium/Gibberella* can be seen on some roots and other fungi and bacteria are probably involved as well.

Root decay will make root rating for corn rootworms a nightmare in some trials and we are now well set up for stalk rot problems this fall.

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SW Minnesota IPM STUFF 2004-11

7/23/2004
SW MN Crop weather, degree-days etc.: *http://swroc.coafes.umn.edu/*.
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Crop update - More and more aphid infestations are found but still at low levels. All aphid trials at the Southwest Research and Outreach Center (SWROC) currently have aphids at low levels (<< 1 aphids /plant). The field near New Ulm remains relatively stable. Mark Bernard reports similar slow increases of aphids near Mankato. The lack of hot spots continues to bode well for sub-economic near term aphid populations. Most early planted soybeans are late R2 to R3 now.

It could be soybean rust but it's not. Soybean foliar diseases increase in SW MN.
One of the rules of plant pathology is the either everything or nothing looks like the pictures. As mentioned in a previous article, many plant disease symptoms are quite similar, often difficult to identify in the field and in spite pontifications to the contrary, often require culturing and microscopic examinations for confirmation of the causal organism.

Heavy rainfall, high humidity and prolonged periods of wet soybean leaves have provided a good environment for development of some soybean leaf diseases. These are severe enough to defoliate lower soybean leaves in some cases. The most common foliar pathogens now are Bacterial blight, *Septoria* brown spot, and Downy mildew. I suppose that the latter disease could be confused for soybean rust. There may be a bit of bacterial pustule mixed in as well but I am not as confident on my diagnosis of the latter. There are probably other many other similar appearing foliar pathogens out there as well.

All three diseases typically persist from season to season on soybean residue but can also be seed borne. Additional all can cause leaf loss. Younger leaves are more susceptible to bacterial blight and downy mildew. Older leaves are more susceptible to Brown spot. All three diseases are favored by high humidity and cool to moderate temperatures.

Bacterial blight
Bacteria are spread by wind and rain. Bacterial blight can be spread by cultivation if foliage is wet. This disease is favored by cool wet conditions. Lesions start as small yellow spots. Reddish to dark brown irregular shaped dead areas are surrounded by a yellow halo. Lesions can merge and dead leaf area often drops out. Infections lower in the canopy can move upward in the plant with subsequent rains.

Brown spot (*Septoria glycines*)
Plants are infected by rain splashing the fungus from the soil on to the plant.

Dark brown to black lesions do not have a yellow border. Yellowing of the leaves may occur and the disease will appear as brown lesions in the midst of a general yellowing. This disease is favored by heavy rainfall. Increased brown spot severities have also been associated with SCN and *Fusarium*.

Downy mildew
This fungus starts as light green spots on the upper side of leaves.
Fungicides for soybeans are being promoted for disease control this season. There is little MN data to quantify the economics of fungicide applications in soybeans but we do have trials out this year. Fungicides will not provide control of bacterial diseases so disease identification becomes important. Fruiting structures of fungi can sometimes be observed by placing the affected leaves in a plastic bag room temperature with a bit of moist cotton or paper towel to provide humidity overnight.Using a good hand lens, look for dark fruiting structures in the lesions. Bacterial infections will not sporulate, but may become more waters-soaked.

I would like to once again encourage you to send plant diseases that you are uncertain of to the **University of Minnesota Plant Disease Clinic**. They actually know what they are looking at.

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SW Minnesota IPM STUFF 2004-12

8/04/2004
SW MN Crop weather, degree-days etc.: *http://swroc.coafes.umn.edu/*.
WCROC Crop weather: *http://wcroc.coafes.umn.edu/Weather/weather.htm* .

Crop conditions- Degree-days continue to lag well behind normal and this week will not help. Soybeans planted at typical dates are at R4 (3/4" pod on one of upper four nodes) at this point. Node and pod counts are low in many SW Minnesota fields and trials. This may in part be due to the abundance of cool nights this growing season. Fully seeded pods and large seed size can still compensate for low pod numbers in these fields. Corn stage ranges from early silking to blister, unfortunately often in the same field. This could cause harvesting/drying/storage problems. Fortunately, both crops are amazingly resilient.

Extremely high winds have caused lodged corn in some SW Minnesota counties. For a discussion of the impacts of lodging at this date see Dale Hicks' Crop News article at: http://www.extension.umn.edu/cropenews/2004/04MNCN16.htm.

Soybean aphid watch - Soybean aphid populations have dramatically increased the past week in some fields. The field I have been watching near New Ulm has gone over threshold during the past three days. Unfortunately, it produced enough alates to cause at least one neighboring field to be pushing treatment threshold levels as well.

The 2004 aphid infestation is very spotty and by no means are many fields, even within small geographic areas, heavily infested. Many people have reported seeing their first soybean during the past week. One of my informants, we'll call him "deep throat", has found one field of several hundred scouted that is close to threshold. We are placing an insecticide trial there even though populations are currently below threshold (~ 70 aphids/plant)

Although a few aphids can still usually be found near the tops of plants, aphids move increasingly lower in the canopy and onto stems and pods as soybean fields complete vegetative growth. *These populations will probably see their greatest expansion during the next week or so.* A spreadsheet to estimate time to threshold and scouting frequency can be found at http://www.soybeans.umn.edu/crop/insects/aphid/aphid_sagemodel.htm. Refresh your screen to view this page.

Do not treat borders or pockets of high aphid populations in a field. The threshold we are using is an average of 250 aphids/plant on 80% or more of the plants with aphids and through R5 (1/8" to full seed) in pods at one of the top four nodes of the plant. The speed

scouting method given in a previous issue seems to work well from the limited amount I have been able to test it. If you have time please give some feedback on this method.

250 aphids/plant should not cause yield loss. Rather, the 250 aphid/plant economic or treatment threshold should allow adequate lead-time to schedule and apply an insecticide before economic yield loss occurs.

We are very confident in this threshold through R3 but feel it is prudent to follow it until R5. We may be less certain on this threshold during later development stages R4 and R5 but have seen relatively common yield reductions at R4 and have also seen yield reduction in heavy R5 infestations. Acknowledging this potential to treat a few more fields than are necessary, it is probably best to err on the side of treating. Fortunately, early maturing beans will rapidly be moving towards a point where aphids will have minimal impact on yield.

As the month progresses, fuller season varieties and late-planted fields will be at greater risk compared to early planted early maturing fields.

Bean leaf beetle – 1st generation appears to be at or near peak in soybeans at the SWROC. Interestingly, Greg LaPlant reported populations only slightly behind in SE North Dakota. In some fields he is observing higher populations than we are seeing here…so much for cold winters hurting bean leaf beetles. We are seeing a few gravid (egg bearing) females now but with the cool year and late first generation beetle emergence, I anticipate the majority of the bean leaf beetle population in SW Minnesota to stop at one generation. Grasshopper populations are relatively high in some soybeans. Do not attempt to distinguish between grasshopper and bean leaf beetle in assessing defoliation thresholds (25% of photosynthetic leaves during pod fill). The soybean plant probably doesn't care. Watch for pod injury as pods fill and 10% of the pods with feeding or any pod clipping are also a valid threshold. We have not been able to confirm this threshold for Minnesota but 4-6 beetles /sweep may also be appropriate.

White mold is becoming apparent in some fields. Conditions were very favorable for white mold infection about three weeks ago. Fields with high plant populations and lush growth will be most susceptible provided that the fungus (*Sclerotinia sclerotiorum*) was present as well. Fields that are still flowering and remain wet during this cool spell are still susceptible to late season infections. I take full responsibility for white mold problems since I did not put out any white mold related trials this year choosing instead to stock up on soybean aphid, bean leaf beetle and corn rootworm studies.

Corn rootworm- Although captures in emergence cages at the SWROC are similar to last year, beetles populations in corn I have checked are low at this time. Northern corn rootworm will continue through the month but the next two weeks should be optimum for scouting beetles and assessing risk to 2005 corn on corn and 2006 rotated corn. Pay close attention to late silking fields or portions of fields in an area.

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SW Minnesota IPM STUFF 2004-13

8/12/2004
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Crop conditions- Degree-days continue to lag well behind normal and this week will not help. Sound familiar?

Soybean aphid watch (*Aphis* has left the building?)
Soybean aphid populations, in the fields I am familiar with, are static or declining rather than increasing. Several people have called to report static and lower numbers. This includes the site where we had planned to put an insecticide efficacy trial. Some have reported an orange hue to some of the aphids. Initially suspecting disease or the development of orange sweaters to ward off the chill, upon closer inspection, the specimens with this orange coloration from Lamberton and near St. James had wing pads.

Do not rush to treat fields near threshold at this point. This potential for population crashes is the reason that last week I mentioned that treating fields that had only borders or isolated hotspots with high aphid populations was unwise. This is especially true later in the growing season and in years with low aphid populations. Pay attention to large numbers of predators and nymphs with wing pads.

At this point I am unsure of the entire reason for these drops in populations, but movement of winged individuals appears to be at least part of it. In a 2004 trial near New Ulm, we observed a temporary depression in aphid populations at the R 4.5 (end of terminal leaf development) stage due to the development of large numbers of alate adults. Soybean development is a bit behind normal and coincidentally; many fields are at R 4.5 to early R5 now. Whether winged aphids have begun to move to buckthorn, are attempting to colonize new soybean plants, or both is unclear. Yes Andy, strange things seem to happen to soybean aphid populations around Sturgis week and a big event may be starting on buckthorn. However, we have still not been able to observe any helmets or Harley Davidson merchandise on aphids. However, some do refer to the cornicles of aphids as tail pipes.

Most soybean yield still has not been made at this point. There is still some potential for a yield reducing aphid population recovery yet this year but I think I can hear the large lady warming up her vocal chords.

Bean leaf beetle – The 1st generation of bean leaf beetle appears to have had good success this spring. 1st generation beetles remain high (relative to the overwintering

generation and may end up higher than 2003) and may have actually increased a bit the past week in soybeans at the SWROC.

Bean leaf beetle population dynamics are probably going to be more confusing than usual as cool weather delays and extends beetle development and emergence. Beetles should remain active in soybeans for the next few weeks. ***Watch pods for feeding damage in more heavily infested fields.*** I am also starting to see some pod feeding by grasshoppers.

Odds for a distinct and noticeable 2004 2nd generation in SW MN continue to diminish or be extremely late, as continued cold weather will delay development. Beans are usually safe from bean leaf beetle damage at yellow pod and beyond.

Corn rootworm- Based on root ratings, northern corn rootworm root damage, although present, is less than the previous several years, at least at Lamberton.

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SW Minnesota IPM STUFF 2004-14

8/25/2004
SW MN Crop weather, degree-days etc.: *http://swroc.coafes.umn.edu/*.
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Crop conditions- Degree-days continue to lag well behind normal and this week will not help. As of August 23, we are behind normal. Bean development is slightly behind normal although some 1.5 maturity and earlier fields have started to turn. Corn is the big concern now. 96 day corn planted April 9 is just beginning to dent. Early May planting dates and areas suffering from excessive water in June are considerably behind. We will need a lot of warm weather and a late frost to avoid freezing corn before physiological maturity.

The most common aboveground disease at this point seems to be downy mildew. White mold is also more common this year than recently and infected plants are increasingly visible. Brown stem rot symptoms are also starting to show up.

Soybean aphid watch
On 8/20/04 winged aphids were easily observed on buckthorn at Lamberton. We will check over the next week or so to see if colonies form. It appears that some things remain constant in spite of a rather unusual growing season.

Some later maturing beans still have 50-200 aphids per plant but in general, numbers are much lower. My season high is slightly over 3000 aphids/plant, which is a far cry from my 2003, all-time, record of 14.400, give or take a few thousand.

Unfortunately, all (insert expletive of your choice here) soybean aphids did not leave soybeans and those that remained are forming new colonies. I expect the new colonies forming on undersides of leaves in the mid to lower canopy to persist for some time unless a drastic change in weather, parasitism or predation occurs. Emigration and predation appears to be holding populations constant or most often declining in the fields I have looked at. I have seen no evidence of exploding populations in these fields.

The aphid-day accumulations for these late populations should remain low. Depending on soybean maturity, most normal planting dates and typical maturities are at or past the R5 stage and becoming less susceptible to yield loss as they mature. I have heard that some spraying has been occurring this week on and west of the South Dakota border and also some in southwest Minnesota the past week. Odds for an economic yield response at this late date is not highly likely under moderate aphid populations (200-300 aphids/plant and

probably much higher) unless other insects such as bean leaf beetle are also causing pod damage. Soybeans which have developed canopies with no or very low aphid populations until R5 and have good growing conditions can likely tolerate a population of a few hundred aphids for quite some time.

We have little or no data to indicate the cost effectiveness of spraying aphids past R5 stage. I regret we do not have better guidelines for late season aphid treatment but good data is hard to come by. Our insecticide efficacy trial was treated late (R 4.5) and may be able to supply some data by this fall. Additionally, aphid populations tend to decline at R6. Be very cautious in treating late season aphids and I certainly would not treat aphids if yellow pods can be found in the field.

The speed scouting method for soybean aphid that is under development does not replace the 250 aphid /plant threshold. Some of you have been evaluating this method. Based on 2004 field observations, in many cases the method overestimates soybean aphid populations. In other words, it would indicate that spraying is necessary well below a 250 aphid/plant field average. However, it does seem to work well on the do not spray side. Based on the data from which it was derived, it is probably very inappropriate this late in the season. The method may still hold some merit after has some tweaking.

I doubt any widespread aphid problems yet this year. If you are still scouting soybean aphids, focus on 1) Later maturing fields, 2) Pay close attention to smaller fields, near wooded areas, especially those with coarser textured soils that have tended to be on the drier side this season.

I don't see that many fields and there may be some problems out there but from what I have seen and heard, going fishing may be a good option as well.

Bean leaf beetle- Most of the problems reported have been north and west of Lamberton and correspond to areas where relatively little aphid spraying occurred in July and August of 2003.

Yellow pods are a cutoff for this insect.

Corn rootworm- Beetle emergence was still occurring at a good rate in SWROC research plots last week. This is considerably later than normal but it has been cold and beetle emergence is relatively normal when compared to corn stage. We should have enough beetles to cause problems in some corn fields next year.

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