SOYBEAN APHIDS INCREASING!

Soybean aphids need to be scouted for increasing soybean aphid populations. This time of year soybean aphids are found on the underside of leaves in the upper trifoliate. Look for the small <1/8" inch light green aphid with two black cornicles (tailpipes) on rear of abdomen. In some cases, fields are near or have already reached the economic threshold near Grand Forks and other areas in the Red River Valley. Minnesota also is reporting increasing populations of soybean aphids near threshold in Fergus Falls area (Source: I. MacRae, UMN).

The economic threshold for soybean aphids in the upper Midwest is 250 aphids per plant on 80 percent of more of the plants, and an increasing aphid population. Most fields are in the late vegetative to R1 (beginning of flowering) growth stages. The 250-aphids-per-plant threshold is valid from late vegetative through the R5 (early seed development) growth stages. Research indicates that insecticide applications at R6 (full seed) and beyond do not give a positive yield benefit. Therefore, insecticide applications for soybean aphids are not recommended after the R5 growth stage.
Research on the economic threshold for soybean aphid was conducted over a three-year period at 19 locations in the northern U.S., which included North Dakota. The economic threshold was established to give growers a five to seven day lead time for insecticide application before aphid populations reach a level where economic losses actually begin. Even though soybean market prices are high, the 250 aphids per plant threshold is still valid. This is because 250 aphids per plant are lower than the population at which yield loss can be measured and attributed to aphid injury. What this means, in practical terms, is that the lead time for insecticide application is reduced from seven days to three or four days with higher crop prices. Therefore, it is critical that growers monitor their fields closely.

NDSU Extension Entomology has received a few calls from growers asking whether they should tank mix an insecticide with their last glyphosate application, even though soybean aphid numbers are not at the threshold. We do not recommend this practice, nor do we recommend any insecticide application when the economic threshold has not been reached. Beside the incompatibilities or phytotoxicity issue with tank-mixing insecticides and herbicides, the optimal application is different for herbicides versus insecticides. For example, glyphosate herbicide spraying is conducted with low-pressure and large droplet-size nozzles to reduce spray drift. In contrast, insecticides are normally sprayed using high pressure and small droplet-size nozzles.

Applying insecticides too early to control soybean aphids very well may result in a re-invasion of aphids, which would require a second insecticide application. Insecticides also kill natural enemies of soybean aphids, such as lady beetles and damsel bugs, so re-invading aphid populations can increase very rapidly in the absence of natural enemies. Conservation of natural enemies is important in controlling soybean aphids, so don’t spray unless and until you have to.

Some vendors are offering guarantees on second insecticide applications. While the guarantee covers the chemical, it may not cover application costs. There also is the risk of spider mite flare-ups in fields that have been treated twice with pyrethroid insecticides because beneficial predaceous mites also have been killed and pyrethroids trigger the spider mite’s reproductive ability. This may require a third application using an organophosphate insecticide to control the spider mites.

Pyrethroid and organophosphate insecticides offer good control of soybean aphids. A listing of insecticides registered for soybean aphid control is available from the ND Field Crop Insect Management Guide 2011, E-1143, NDSU Extension Service: http://www.ag.ndsu.edu/pubs/plantsci/pests/e1143w1.htm

BLISTER BEETLES IN CANOLA

*Lytta nuttalli*, a large purplish green blister beetle was found feeding on flowers of canola in Hettinger and Bowman Counties in SW ND this past week. Most blister beetle species have one generation per year and *Lytta* species are predaceous on bee nests as immatures. Adult blister beetles are attracted to blooming canola fields, where they are ravenous feeders devouring leaves, stems, flowers, and pods. Blister beetles are mobile and gregarious, and often congregate in certain spots in a field. In some instances, blister beetles feed for a short period of time and then migrate to other plants or fields. Alfalfa is an alternative host of blister beetles and they often move into canola fields when the alfalfa is cut. Blister beetles produce a toxin (cantharidin) which extremely poisonous is if ingested by horses, and to a lesser degree by other livestock (sheep and beef cattle).

The presence of large numbers of blister beetles in spots of a canola field can be alarming for producers. However, adult feeding is generally not significant enough to warrant an insecticide treatment. The “High Plains Integrated Pest Management Guide” recommends treatment when there are 10 adult blister beetles per plant feeding on the flowers or pods. Spot treatment with foliar insecticides registered in canola is often all that is needed for control of blister beetles.
WHEAT MIDGE SCOUTING CRITICAL

With the localized hot spots for the wheat midge increasing this year, field scouting will be important. Please see the past issue No. 2 of the Crop & Pest Report for the Wheat Midge Larval Soil Survey risk map for 2011. The current DD map indicates that wheat midge emergence is well underway (1,300 – 1,600 growing degree days) in the northern tier of counties.

Scouting should be conducted at night when temperatures are greater than 59 degrees and winds are calm (less than 6 miles per hour) during the heading to early flowering crop stages. The critical spray timing is from late heading to early flowering when wheat is most susceptible to wheat midge infestation. Most insecticides labeled for wheat midge control can be tank-mixed with a fungicide if scab is also a potential problem.

With the high price of wheat this year, the action threshold for durum is recommended for wheat - one midge per seven to eight heads. Organophosphate (OP) insecticides, such as chlorpyrifos, are recommended over pyrethroids since OPs can kill the eggs, larvae and adults. A late insecticide application should be avoided to minimize negative impacts on the parasitoids that naturally control wheat midge. A listing of insecticides registered for wheat midge control is available from the ND Field Crop Insect Management Guide 2011, E-1143, NDSU Extension Service: For more information, consult wheat midge extension publication: http://www.ag.ndsu.edu/pubs/plantsci/pests/e1330.pdf

CONTINUE TO SCOUT FOR CEREAL APHIDS AND BYDV

Cereal aphids will continue to be a threat to cereal crops, especially late planted fields, until crops is flowering. IPM scouts have picked up increasing numbers of aphids in the SW, central and NE regions of ND. Continue to scout for cereal aphids and any symptoms of barley yellow dwarf virus (yellowing of flag leaf from tip). Remember most of our late planted wheat is at ‘high’ risk for aphid infestation and BYDV transmission, so we recommend that producers/crop consultants be more preventative against aphid infestations and treat as soon as aphids are detected or BYDV is observed in their field.
BANDED SUNFLOWER MOTH EMERGING

Adult banded sunflower moths are emerging in Fargo and Mapleton in Cass County, SE ND, based on recent pheromone trap catches. Moth emergence will probably be delayed for a week in the more northern counties. Banded sunflower moth is a small (¼ inch long) tan-colored moth with a wingspan of about ½ inch. Its forewings have a triangular dark brown band crossing through the middle of the wing. Adults emerge about mid-July, and are present in the field until mid-August. Scout for resting adult moths in along field ditches during the day. This is an important insect pest of sunflower since larvae damage florets (may prevent pollination) and reduce the total number of seeds produced by the sunflower head.

OPTIMAL TIME FOR COLLECTING LEAFY SPURGE FLEA BEETLES

Several areas have reached the optimal time to collect leafy spurge flea beetles (Aphthona species) in southeastern, central and northeastern North Dakota. Flea beetles should be collected between 1,200 and 1,600 AGDD using the sunflower growing degree day model from NDAWN.

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OPTIONS FOR PREVENTED PLANTING ACRES

The spring of 2011 has been wet and cold in many areas in North Dakota and Minnesota. Because of this, many acres were not planted and growers need options for prevented planting fields. Farmers must be aware that if a cover crop is planted it cannot be harvested, grazed, or hayed before November 1st without reduction in insurance payment. Haying or grazing prior to November 1st will result in a 65 percent reduction in the prevented planting indemnity payment. Haying or grazing of the cover crop after November 1st is permitted. Always contact your insurance agent to consult about your intentions for the prevented planting acres.

One of the choices is leaving the soil fallow, but this is not recommended because of increased soil erosion and potential nutrient leaching. Planting cover crops will protect the soil from erosion, use excess moisture, remobilize nutrients from deeper layers in the soil, and add carbon, organic matter, and nitrogen to the soil (the latter only if legumes are used).

Choosing a crop for prevented planting acres depends on the farming operation. If forage is needed in the fall, forage brassicas such as forage radishes or turnips are a good choice since they are frost tolerant and foliage will remain green well into November, providing excellent quality grazing forage for the late fall.

If the forage is not needed, a cover crop mixture to protect the soil is recommended. The seed mixture should have at least three crops in the mix, one to provide cover and organic matter avoiding soil erosion and using excess moisture, a legume to fix nitrogen, and a deep rooted or tap root crop to reduce compaction in the soil and increase water infiltration.
Choices of cover crops are many, including a warm-season crop such as forage sorghum or millet for dry matter production, radishes to reduce soil compaction and increase water infiltration, a legume (field peas, hairy vetch, or other) to fix nitrogen would be the most useful ones. Legume seed in the mixture should be inoculated with the correct crop specific Rhizobium species. For pea and vetch Rhizobium leguminosarum biovar viceae should be used.

Preliminary data of studies conducted in eastern North Dakota in 2010 indicate cover crops can add 0.5 to 1.5 ton/acre of dry matter when planted the first week of August. Forage pea ‘Arvika’ had the highest yield of all cover crops evaluated (Table 1). The total N uptake (amount of N in the above ground plant tissue) for the peas was 112 lbs/acre. If we subtract the amount of nitrogen absorbed by the non-legume cover crops, which is coming from the nitrogen in the soil, we can estimate the amount of atmospheric nitrogen fixation by the forage pea to be about 60 lbs/acre in only 60 days of growth. The other two legumes evaluated had lower biomass and nitrogen fixation.

The forage turnips, Pasja and Purple Top, had dry matter yields of 1.4 and 1.1 tons/acre, respectively. The nitrogen uptake was about 60 lbs/acre. These deep rooted cover crops help utilize nutrients from deeper layers in the soil and bring them to the soil surface for the next crop.

The forage quality of all cover crops was excellent. Legumes, as expected, had higher protein content and radishes and turnip had very high digestibility of the fiber (Table 2). Radishes and turnips would need supplemental fiber or straw to account for the reduced fiber of this forage. When considering the short growing period of these cover crops and the high forage quality, cover crops can be considered an excellent forage source for late fall grazing in North Dakota.

<table>
<thead>
<tr>
<th>Cover crop</th>
<th>Soil pH</th>
<th>O.M. %</th>
<th>P ppm</th>
<th>K ppm</th>
<th>Plant height cm</th>
<th>Biomass yield tons/acre</th>
<th>Nitrogen uptake lbs/acre</th>
</tr>
</thead>
<tbody>
<tr>
<td>Forage pea (Arvika)</td>
<td>7.3</td>
<td>4.8</td>
<td>16</td>
<td>310</td>
<td>77</td>
<td>1.42</td>
<td>112</td>
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<tr>
<td>Austrian winter pea</td>
<td>7.5</td>
<td>4.6</td>
<td>17</td>
<td>286</td>
<td>30</td>
<td>0.86</td>
<td>80</td>
</tr>
<tr>
<td>Hairy vetch</td>
<td>7.4</td>
<td>4.5</td>
<td>19</td>
<td>303</td>
<td>24</td>
<td>0.85</td>
<td>76</td>
</tr>
<tr>
<td>Forage turnip (Pasja)</td>
<td>7.4</td>
<td>4.8</td>
<td>21</td>
<td>300</td>
<td>31</td>
<td>1.40</td>
<td>59</td>
</tr>
<tr>
<td>Purple top turnips</td>
<td>7.5</td>
<td>4.8</td>
<td>15</td>
<td>345</td>
<td>29</td>
<td>1.14</td>
<td>61</td>
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<tr>
<td>Forage radish (Daikon)</td>
<td>7.5</td>
<td>4.7</td>
<td>14</td>
<td>280</td>
<td>30</td>
<td>0.77</td>
<td>61</td>
</tr>
<tr>
<td>Check (no cover crop)</td>
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<td>4.9</td>
<td>18</td>
<td>294</td>
<td>0</td>
<td>0</td>
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</tr>
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Table 2. Cover crops forage quality averaged over two locations, Fargo and Prosper in 2010.

<table>
<thead>
<tr>
<th>Cover crop</th>
<th>CP</th>
<th>NDF</th>
<th>ADF</th>
<th>ADL</th>
<th>IVDMD</th>
<th>NDFD</th>
<th>TDN</th>
<th>RFV</th>
<th>RFQ</th>
</tr>
</thead>
<tbody>
<tr>
<td>Forage pea (Arvika)</td>
<td>25</td>
<td>32</td>
<td>27</td>
<td>4.4</td>
<td>74</td>
<td>77</td>
<td>68</td>
<td>199</td>
<td>122</td>
</tr>
<tr>
<td>Austrian Winter pea</td>
<td>29</td>
<td>23</td>
<td>17</td>
<td>2.4</td>
<td>82</td>
<td>86</td>
<td>70</td>
<td>308</td>
<td>111</td>
</tr>
<tr>
<td>Hairy vetch</td>
<td>28</td>
<td>27</td>
<td>21</td>
<td>3.9</td>
<td>80</td>
<td>83</td>
<td>68</td>
<td>253</td>
<td>103</td>
</tr>
<tr>
<td>Forage turnip (Pasja)</td>
<td>13</td>
<td>16</td>
<td>12</td>
<td>0.9</td>
<td>91</td>
<td>92</td>
<td>70</td>
<td>471</td>
<td>155</td>
</tr>
<tr>
<td>Purple top turnips</td>
<td>17</td>
<td>16</td>
<td>13</td>
<td>1.0</td>
<td>90</td>
<td>91</td>
<td>68</td>
<td>475</td>
<td>157</td>
</tr>
<tr>
<td>Forage radish (Daikon)</td>
<td>16</td>
<td>18</td>
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<td>1.2</td>
<td>89</td>
<td>91</td>
<td>66</td>
<td>399</td>
<td>150</td>
</tr>
</tbody>
</table>
Web Links for more information:

1. Prevented Planting Fact Sheet, indicates the options of cover crops in flooded land.  
2. 2011 Basic Provisions for prevented planting  
3. Summer annual grasses for cover crops for prevented planting acres  
   and Prevented Planting Row Crop Acres – Which cover crops can help?  

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ESTABLISHING WINTER WHEAT IN LAND NOT PLANTED THIS SPRING

There are literally millions of acres that did not get planted this year due to excessive soil moisture. For many with prevent plant acreage, winter wheat may be an excellent choice this fall. Winter wheat has high yield potential, reduces spring workloads, and can reduce the risk of not planting a crop next spring if conditions are wet as they were this year. Winter injury can be one of the main factors impacting yield of winter wheat. Therefore, management practices that enhance the winter survival of winter wheat can pay big dividends the following year. The following are practices to consider when establishing a winter wheat crop in prevent plant acres.

Greater snow cover moderates temperatures at the soil’s surface

The survival of winter wheat throughout winter is enhanced when it is planted into fields that catch and retain snow that will insulate it during the coldest winter months. Fields that still have standing stubble are ideal for direct seeded winter wheat. For fields that were previously tilled or that have little or no stubble, establishing an effective residue crop can significantly improve the probability that there will be adequate snow cover. To be effective, a residue crop must remain erect during the fall and winter. The most effective residue crop is probably flax. Flax can be established as a lightly seeded solid stand, in wide rows (i.e. 3-4 feet spacing) or as strips. Strips of flax 3 to 5 feet wide and 15 feet apart have been found to effectively trap snow while minimally depleting soil moisture. When seeding flax in strips or in wide row spacings, the drill should be set at a high seeding rate (40 pounds per acre) and drill spouts should be taped shut to obtain the desired spacing. Strips of flax more than 20 feet apart can be risky as they do not catch sufficient snow in most years. Flax should be seeded in mid- to late July or early August, depending on the region of the state. Though some additional weed management will be needed prior to planting, flax planted in late July or early August followed by winter wheat could be a viable and profitable option for dealing with land that was too wet to plant this spring.

Volunteer canola may also serve as a relatively good stubble source if the plant populations are adequate and relatively uniform. Be sure to terminate the canola crop before viable seeds are formed, however, to ensure that canola does not reseed and become a problem plant in your winter wheat crop.

Cereal crops that are planted as a cover crop may also establish a reasonable stubble if planted early enough in the summer. Cereals that do not reach the boot stage before being killed by frost or herbicides, will lay flat on the soil and will not capture much snow. Though I was not able to find any experimental results to confirm the best planting date for cereal-stubble crops, data generated using NDAWN, suggest that small grains should be planted before the last week in July if they are to reach the heading stage before they need to be terminated in time to break the green bridge before winter wheat planting.
Control weeds and volunteers

In fields that are not established to a stubble crop, carefully manage weeds and volunteer crop plants prior to planting. Volunteer wheat plants and other grassy weeds can harbor the wheat curl mite that is the vector of wheat streak mosaic virus. These plants must be controlled well in advance of planting winter wheat in order to “break” the green bridge and reduce the risk of wheat streak mosaic virus infections. Terminating cover crops two weeks prior to planting is recommended to help minimize the risk of an outbreak of wheat streak mosaic virus.

Variety choice and other management practices can improve winter survival

If not planting into a standing residue, make sure that you plant the most winter hardy varieties. Recent data suggests the following winter hardiness ranking (first listed is the most winter hardy) of some of the currently available winter wheat varieties: Peregrine > CDC Buteo > Accipiter > AC Radiant > Jerry > Seward > Roughrider > Ransom > Boomer > CDC Falcon > Lyman > Striker > Yellowstone > Overland > Darrell > Wesley > Hawken > Jagalene > Art. I would suggest if you are not planting into stubble, plant a variety at least as winter hardy as Jerry.

Plant towards the early end of the recommended planting date. Earlier planted winter wheat plants have greater reserves and generally do better than the smaller plants that develop from late plantings. Nevertheless, don’t plant earlier than is recommended, as plants that are too large are less hardy and early plantings are at greater risk of being infested by wheat streak mosaic virus. Recommended seeding dates are: September 1-15 in the northern half of the state and September 15-October 1 for the southern part of the state.

Adding some phosphorous with the seed has been shown to enhance winter hardiness, especially in fields that tend to be towards the lower end of P availability.

Increase the seeding rate when planting in to sub-optimal conditions. Using the higher end of the current recommendation of 900,000 to 1.2 million seeds per acre or slightly exceeding it may be in order if planting into bare ground.

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plant pathology

SMALL GRAIN DISEASE SURVEY: JULY 4 – JULY 8

Wheat: ND IPM scouts surveyed 70 wheat fields during the 4th of July week. The average growth stage of spring wheat in North Dakota for that week was early head emergence. Similar scouting in Minnesota showed a more advanced growth stage of spring wheat, with an average growth stage of early flowering during the week ending July 8. A map of fields scouted from June 27 to July 8 in both ND and MN shows the variation in wheat growth stage across the region (see figure). At the time of this report, July 13, all crops will be much more advanced.

For the week of July 4-8, tan spot symptoms were recorded in 94% of ND surveyed fields, with an average severity of 22%. Cereal grain aphids were observed in 75% of ND surveyed fields, with an average of 23% of the tillers showing one or more grain aphids in each field. Barley yellow
dwarf virus (BYDV) symptoms were observed in 29% of ND surveyed fields. Bacterial leaf streak was observed at low severities in 55% of ND surveyed fields. Examination of some fungicide treated winter wheat plots vs non-treated plots on July 11, showed that fungicide application kept the whole canopy much greener than in non-treated plots. However, bacterial leaf streak was evident in both treated and non-treated plots - a reminder that fungicides have no effect on bacterial leaf streak infections. Wheat leaf rust was observed at trace amounts in one spring wheat field in ND and low levels were observed in non-fungicide treated plots of winter wheat at Prosper. Fusarium head blight (scab) was observed in four ND winter wheat fields, at low incidence and severity levels, at this time. Scab was very common in winter wheat plots at Prosper.

Barley: NDSU IPM field scouts looked at 5 barley fields during the week of July 4th. Barley net blotch was common, but leaf severity averaged below 2%. Grain aphids and BYDV also were reported.

Risk of Fusarium head blight in wheat and barley has diminished throughout the state for July 11-13. Considering the average growth stage of the spring wheat crop in ND, considerable attention will still need to be paid to the forecasting models as the later planted crops approach heading and flowering.

NEW NDSU EXTENSION SMALL GRAIN PATHOLOGY PUBLICATIONS ON-LINE
Several new small grain pathology publications are now available on-line from NDSU.

- Bacterial leaf streak and black chaff information is provided in the two page publication: http://www.ag.ndsu.edu/pubs/plantsci/smgrains/pp1566.pdf
  A cooperative, multi-state effort resulted in two recently published cereal rust publications, available on-line.

The above wheat disease picture handbook was developed by Kansas State University, with input from pathologists in multiple states, including ND. Unfortunately, some of the management recommendations are more suitable for winter wheat, not spring wheat (ie. those for barley yellow dwarf recommend late planting for winter wheat and seed treatment with insecticide, useful recommendations for winter wheat but not for spring wheat), but the pictures available for aid in disease identification are very useful.

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WHITE MOLD CAN'T TAKE THE HEAT
In the last two years we have had very high levels of white mold. This has left our fields infested with high levels of sclerotia that can produce lots of inoculum. Although we have had plenty of rain for sclerotia germination, the heat is going to impair the ability of the pathogen to cause infections.

Crops are susceptible to white mold once they enter bloom. Ascospores will colonize flower petals first, and from there the fungus will penetrate into the rest of the plant, eventually causing the characteristic cream colored and shredded lesion. For this to occur, several environmental factors need to come together. First, enough soil moisture must be present to allow sclerotia to germinate and produce ascospores. Generally the minimum rainfall needed is 1 to 2 inches within 1 to 2 weeks of bloom. Secondly, you need a favorable environment during bloom; namely, wet canopies (heavy dew, rain, etc), and cool to moderate temperatures. According to the weather forecast, we are going to be HOT as soybeans, dry beans, and canola are blooming. According to the National Weather Service, temperatures in North Dakota will reach the high 80's and low to mid 90's by weeks end, and stay there for the remainder of the 10- day forecast. The white mold pathogen is much less of a threat when temperatures are above 85F. If the weather forecast is accurate and your crops are blooming when temperatures are in the 90's I would expect few infections until the temperature drops. This is great, because the infections that occur closest to bloom are the most yield limiting. Those early infections are often lower on the plant and have the most time to develop and subsequently cause yield loss.
When the temperature drops infections can occur, but these late infections are often on lateral branches, and have less time to develop lesions.

Below are some thoughts on the effect of heat and management of white mold.

For soybean growers, particularly those in the southern part of the state, a fungicide application this year may be far less likely to provide a return if your plants are soon entering bloom. Further, data suggests that once soybean reaches R3, fungicides for white mold are unlikely to impact yield under any temperature. This is simply because the infections occurring after that are usually not yield-limiting.

For dry bean growers, it is important to remember that dry beans are very susceptible to white mold, and we have lots of inoculum potential. Even under non-ideal conditions you can get some disease. A fungicide application may still be warranted, particularly in the Northern part of the state where white mold has been terrible in the last two years. However, in beans entering bloom in this heat, I would expect disease severity to be less than in either 2009 or 2010.

For canola, which is already blooming in many areas, white mold may be much less of an issue than in years past. Some infection could have already occurred, but I would expect far fewer new infections once we get hot.

For sunflowers, this heat will reduce the incidence of mid-stalk rot. However, bloom is still weeks away and this week’s temperatures will have no impact on head rot.

For other crops that are naturally less susceptible, namely peas, flax, lentils, chickpeas etc, white mold will likely be a non-issue if your plants are blooming during the heat.

**SUNFLOWER DOWNY MILDEW APPEARING**

Downy mildew is showing up in many sunflower fields throughout North Dakota. NDSU-IPM scouts have reported downy mildew in 10 of 12 fields scouted. In most cases, the incidence has been low, but two fields had incidence in excess of 20%. Frequent rains and wet soils have made conditions very favorable for infection.

Downy mildew causes chlorosis and rigidity of leaves, severe stunting, and stand reduction. Yield loss from downy mildew is most common when the disease occurs in patches in fields. Because sunflowers can compensate well, losses do not usually occur when a few, randomly spaced plants are infected.

There is no management option for downy mildew once planting is complete. However, the downy mildew spores (oospores) will survive many years in the field, so if you have downy mildew now it will be important to manage the disease the next time you plant sunflowers. Downy mildew resistant hybrids (DMR) are available, but the development of a new pathogen race in 2009 that is able to overcome the resistance makes it unclear how effective the resistance is. There are seed treatments available, and it is likely that additional products will be labeled in the future.

DISEASES OF SUGARBEET

Fusarium yellows
Fusarium yellows infected seedlings and older plants were observed and confirmed at research sites in Moorhead and Sabin. Symptoms were first observed in mid-June on susceptible plants with two leaves. Currently, symptoms are also present on older susceptible plants. Symptoms include interveinal yellowing and necrosis of older leaves, sometime distinct death of half the leaf on one side of the midrib, followed by death of the older leaves. When the roots of infected plants are cut in a cross section, there is a distinct darkening of the vascular system. Roots of infected plants that survive the disease will not store well in piles. The best and only way to manage Fusarium yellows is to plant tolerant varieties, several of which are available.

Rhizoctonia damping-off and root rot
Warm and wet soils in early June provided favorable conditions for Rhizoctonia solani to cause damping-off of late planted seedlings and root rot in older susceptible plants that were not protected. Fields with a known history of severe Rhizoctonia should be planted to a Rhizoctonia tolerant variety and the use of a fungicide such as Quadris or Headline applied in-furrow at planting typically provides good early season protection, especially when planting into warm soils. Post application of Quadris or Proline in a 7 inch band before the average daily bare soil temperature at the 4 inch soil depth reaches 65 F also results in good root rot control.

Aphanomyces root rot
Fields are currently very wet and warm, conditions that are very favorable for Aphanomyces cochlioides, the pathogen which causes Aphanomyces root rot. This disease has been reported in several fields. Many high yielding Aphanomyces tolerant varieties are available and should be used in fields with a history of this disease. Tachigaren seed treatment is recommended to provide additional protection, especially during the seedling stage, for fields with high inoculum pressure.

Cercospora leaf spot
The earliest planted sugarbeet fields have closed rows; later planted fields will need another 7 to 14 days to close rows. Fields with closed rows will start to provide conditions favorable for infection by Cercospora beticola, the causal agent of Cercospora leaf spot. Favorable conditions include wet leaves by rain or dew, and warm temperatures (more than 60 F in the night and more than 80 F in the day). Cercospora leaf spot is the most damaging foliar disease of sugarbeet in our area. The fungus kills the leaves that make the sugar, resulting in reduced tonnage and lower sugar concentration caused by higher impurities. Growers have done an excellent job over the past decade in controlling leaf spot by using tolerant varieties, crop rotation, incorporating infected residue by tillage, and timely application of fungicides. As such, the inoculum level of C. beticola is very low in fields. However, in favorable conditions, the fungus can multiply rapidly completing one sporulation cycle in less than two weeks. The best time to reduce the population of the pathogen is early in the disease cycle when its population is still low. Look for heavily infected individual plants that are randomly distributed when scouting fields since this was commonly observed last year in some factory districts.

The best way to control Cercospora leaf spot is to apply fungicides in a timely manner. We have a number of fungicides – namely Inspire, Proline, Headline, SuperTin, and Tupsin that will provide effective disease control when used in alternation or recommended mixtures. The first fungicide application should be made when leaf spot symptoms are first observed or at the disease onset. Subsequent applications, typically at 14 days in high disease pressure, should be made when symptoms are present and two consecutive daily infection values are high (>6). For ground application, apply fungicides in 15-20 gallons of water per acre at 100 psi pressure; aerial applicators should use 5 to 7 gallons of water per acre for best results. Use the recommended rate of the fungicides; cutting rates will result in poor disease control and will quickly lead to the development of resistant isolates. Fields should be scouted regularly to determine the presence of symptoms. Check with your agronomist for the fungicide rotation that is best for your area.

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RECIPE FOR HIGHER WHEAT PROTEIN

Research on enhanced protein for wheat from post-emergence sprays has been conducted since the 1950’s. Based on this early work, and more recent work from the NDSU Carrington REC by Blaine Schatz and Greg Endres, the following is ‘The Recipe’ for post-anthesis UAN application:

1. Wait until the wheat is nearly done flowering (some secondary or tertiary tillers may have some anthers on, but the main stems and first tillers are completely done flowering). If the wheat berries have clear liquid in them, the timing is good. If the wheat berries start to turn milky, it is too late for enough benefit to be economic.
2. 10 gal water + 10 gal UAN (28-0-0)
3. Apply during the cool of the day (early morning or late evening-later if plants are wilted from the heat of the day)
4. Broadcast spray with flat fan nozzles aimed directly over the plants

This application nearly always results in at least a ½ percent protein increase. This is real wheat protein, not some absorbed ammonia that makes the analyzer put out odd results.

Do not apply low rates of slow-release N products to try to achieve similar results. These products are only effective if used at similar N rates to UAN (10 gal/acre UAN contains 30 lb N/acre). Growers will find that if used at similar N rates, the costs for using slow-release N products are prohibitive.

Some leaf burn should be expected after using the recipe. This burn is superficial and has not resulted in yield decreases in recent studies at NDSU.

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SCOUTING FIELDS TO DETERMINE HERBICIDE EFFECTIVENESS

Scouting fields 3 to 14 days after a herbicide application is extremely critical to determining the effectiveness of the herbicide application and the need and timing of any future herbicide applications. Scout a field 3 to 7 days after a herbicide application to determine if a complete herbicide failure occurred. This will allow for timely retreatment. When using contact herbicides scout closer to three days after application and for translocating herbicides scout about 5 days after application. Scouting again 10 to 14 days after application is critical. At this point in time scout to determine the total effectiveness of the herbicide application, looking for herbicide resistant plants and newly emerged plants that will require an additional postemergence application.

If herbicide resistance is present in the field, usually just a single weed species will be remaining. If a high level of resistance is occurring in the field, dead plants will be right next to uninjured or nearly non-injured plants with few intermediate-responding plants. If a low level of resistance is occurring in the field, dead plants will be right next to nearly normal appearing plants with the majority of the plants having an intermediate (between dead and nearly normal) response. Low-level resistance is usually seen with glyphosate (Group 9 – EPSPS inhibiting herbicides), ACCCase-inhibiting herbicides (Group 1 – examples: Select, Puma, Axial), and PPO-inhibiting herbicides (Group 14 herbicides – examples: Flexstar, Cobra, Cadet). A continuum of plant responses to Group 14 herbicides may only be present within
the first 14 to 21 days after application, while Groups 1 and 9 will show a continuum of plant responses for greater than 14 to 21 days.

Low-level herbicide resistance is difficult to identify. A video showing a continuum of plant responses was created to assist individuals in identifying low-level herbicide resistance. The video is available at the following website: http://www.ag.ndsu.edu/weeds/herbicide-resistant-weeds. Once at the website select “Scouting for Glyphosate Resistance”. Two videos are available at the above mentioned website. The long version includes an introduction about glyphosate resistance and shows the continuum of plant responses and the short version shows only the continuum of plant responses. If you suspect herbicide resistance, especially to glyphosate, contact Jeff Stachler at jeff.stachler@ndsu.edu or 701-231-8131.

TIME TO CONTROL VOLUNTEER ROUNDUP READY® CORN

Volunteer Roundup Ready corn is becoming evident in Roundup Ready sugarbeet and soybean. The tendency is to wait to remove volunteer Roundup Ready corn from Roundup Ready sugarbeet and soybean because volunteer corn emerges for a long period of time, especially when the corn kernels are still attached to the cob. However, waiting to remove the volunteer corn is a bad idea for two main reasons. First, volunteer corn will reduce sugarbeet yield sooner and at lower densities than in soybean. Volunteer corn can and will reduce soybean yields as densities increase. Lastly, the longer the volunteer corn remains in the field the shorter the duration of rotating away from corn and the greater the selection for diseases and insects of corn. One example to be concerned about is the reduced level of Bt toxins produced in a volunteer corn plant causing a greater selection for Bt-resistant insects. Another example is that volunteer corn may increase the Rhizoctonia pressure in a sugarbeet field.

The preferred method of removing volunteer Roundup Ready corn from Roundup Ready sugarbeet and soybean is to apply a low rate of Select Max, generic clethodim, Assure II or Targa, or Fusilade(soybean only) early to small corn and apply the same rate in a second application. This is preferred because the volunteer corn will be controlled earlier and will allow for the control of later emerging corn. Consult the Control of Volunteer Roundup Ready Crops Table on page 115 in the 2011 NDSU Weed Control Guide for the effectiveness of herbicides to control volunteer corn and the required rates based upon the size of the volunteer corn. The larger the corn, the more difficult it is to control. A crop oil adjuvant should be mixed with generic clethodim fomulations to maximize control, especially as the corn becomes larger.

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CONTROL FIELD BINDWEED EARLY

The following article is by Steve Sebesta, Deputy Commissioner, ND State Seed Dept.

In some parts of the state, field bindweed is a common problem. Some have even termed it the “state flower”. However, in spite of its showy appearance, it is a prohibited weed in seed fields because it is difficult to separate from seed due to its size, shape and density. Once field bindweed begins to flower it produces viable seed within 14 days.

Controlling field bindweed before it reaches the reproductive stage is imperative.

Field bindweed often encroaches into fields from field margins. When inspectors find bindweed in these areas they’ll often isolate those spots, marking them with flags so the seed producer can spot them easily and avoid those areas at harvest. Field inspection reports will be marked as “conditionally passed” and the conditioner will be required to submit a five-pound sample of seed for analysis.

When found within the seed field, the task of isolating it becomes more difficult. It is likely to be found in more areas of the field, and the likelihood of finding all of it in a lush canopy of wheat is remote. Nonetheless, inspectors try to isolate and mark those trouble spots. However, if patches of field bindweed are found scattered throughout a field, it will be rejected. Each year we receive calls from growers inquiring whether they can salvage a seed field by spraying to kill the bindweed. Unfortunately, by the time we find it in a field it’s often too late for effective chemical control.
Control field bindweed before field inspection –

- Banvel/dicamba/Clarity = apply up to 5-leaf stage
- 2,4-D = should be applied from 4-leaf until prior to boot stage.
- MCPA = very safe on wheat so apply from emergence to boot.
- Paramount = Prior to planting wheat or after wheat harvest. Paramount leaves a chemical residue – follow crop rotation restrictions.

As you can see, these chemicals are not labeled for use after the boot stage. Again, by the time our inspectors find field bindweed in seed fields, the crop is well beyond the boot stage.

Attempts at chemical control after field bindweed has been found in a seed field are ineffective at this time for two reasons. First, late-applied phenoxy herbicides will injure the crop. Damage may appear as lower yields due to sterility and lower test weight. Harvested seed may also exhibit reduced germination. Second, applying herbicides when it is safe for the crop will be too late. Field bindweed seed will have already been produced.

Therefore, chemical control options are essentially noneffective at this stage. The phenoxy herbicides may be applied after physiologic maturity as a harvest aid according to the guidelines listed in the NDSU Weed Guide (p16). 2,4-D can be applied after the dough stage, but Banvel/dicamba must wait until the wheat is in the hard dough stage. However, by that time, the damage will have already been done. The field bindweed will already be producing seed so the seed producer will only be throwing money away in a futile attempt to control a problem that has no remedy.

And, while glyphosate is also labeled for use as a harvest aid, it is not recommended for use in seed fields because it can cause reduced germination. Our seed analysts have noticed an increase in the number of samples with poor germination over the last several years. Some have been positively attributed to improper chemical use.

Research and grower use has shown good season-long control of field bindweed using Express + 2,4-D + Banvel at 0.33 oz/A + 0.75 pt/A + 2 to 4 fl oz/A. Dupont herbicide Affinity Broadspec is used preferentially instead of Express and would produce the same result. Paramount has been shown to be more effective than all others chemicals on field bindweed but is not labeled for in-crop application at this time. It is labeled to use prior to seeding wheat and immediately after harvest. It does leave a residue so crop rotation must be considered. Consult the Weed Control Guide for more information.

The bottom line is this. It is important to control field bindweed before the field inspection. Attempts to control field bindweed after our field inspector has found it in your seed field is not effective. Scout seed fields early so herbicides can be applied at the proper time, when they are most effective. Spot spray bad areas if needed.

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Yellowheaded spruce sawfly (Pikonema alaskensis) has been reported feeding on spruces in shelterbelts in McHenry and Wells Counties this week. It is a primary pest of spruce in shelterbelts and ornamental plantings. Spruce shelterbelts need to be inspected for foliage-feeding sawfly larvae.

Adults are reddish-brown in color and are about 8 mm long. From late May through mid-June, adults emerge from overwintered pupae and mate. Females begin laying eggs, with a single egg deposited at the base of a needle. Eggs hatch in five to ten days. Young larvae are about 5 mm long and mature larvae are almost 2 cm long and are dark glossy green with a light lateral striping pattern along the back. A yellowish head and thorax are characteristic of this species. There is one generation per year and they will overwinter in the egg stage. Eggs hatch in May and mature larvae will pupate in late August to early September.

E. Bradford Walker, VT Dept. of Forests,  
Parks & Rec., Bugwood.org
stripe and reddish-brown head. Larvae feed for 30 to 40 days, consuming new foliage first and then older needles. Mature larvae drop to the ground to pupate. There is one generation per year.

Defoliation is caused by larval feeding. Heavily infested trees appear ragged, especially near the top, and can be completely stripped of foliage. Severe infestations over one to several years can kill trees directly or make trees susceptible to attack by other insects.

Open-grown trees that are five to nine years old are more vulnerable to yellowheaded spruce sawfly damage than are older trees or trees in dense stands. Predators, such as birds and rodents, and parasitic wasps are not always effective in keeping sawfly populations at acceptable levels. If infestations are light, larvae can be removed by hand. Isolated ornamental trees can be effectively treated by spraying off the larvae with a strong jet of water. However, chemical control often becomes necessary as the sawfly population increases. Acephate, carbaryl, imidacloprid, malathion and several pyrethroids are labeled for use against yellowheaded spruce sawfly. Biorational treatments include azadirachtin, horticultural oil, insecticidal soap, pyrethrin and spinosad.

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around the state

North Central ND

Wheat Midge Numbers High in Some Areas:

At our McLean (Roseglen), Renville (Mohall), and Ward (Minot) sites trap catches are at or above the economic threshold. Over 50% of the female wheat midge has emerged in the area. We expect the midge flight to continue for about another 7-10 days. Wheat that will be heading to mid-flowering during this period will be susceptible to wheat midge damage. Insecticide applications on wheat during late flowering or beyond will not be effective for wheat midge control. As an example of how effective a well-timed insecticide can be, a chlorpyrifos application was made at early flowering at the McHenry site. Trap catches at that site were shut down from 7.7 midge/trap/day before the application to 0.05 midge/trap/day after the insecticide was applied.

For more information on wheat midge visit:
http://www.ag.ndsu.nodak.edu/aginfo/entomology/entupdates/Wheat_Midge/owbm.htm

Wheat Midge Trap Catches

<table>
<thead>
<tr>
<th>COUNTY</th>
<th>NEAREST TOWN</th>
<th># Midge/trap/day</th>
<th>Dates of Trapping</th>
</tr>
</thead>
<tbody>
<tr>
<td>McLean</td>
<td>Roseglen</td>
<td>8.3*</td>
<td>7-7 to 7-11</td>
</tr>
<tr>
<td>McLean</td>
<td>Max</td>
<td>0.2</td>
<td>7-5 to 7-11</td>
</tr>
<tr>
<td>Renville</td>
<td>Mohall</td>
<td>3.0*</td>
<td>7-5 to 7-8</td>
</tr>
<tr>
<td>Ward</td>
<td>Minot</td>
<td>30.5*</td>
<td>7-6 to 7-12</td>
</tr>
<tr>
<td>Williams</td>
<td>Ray</td>
<td>2.0</td>
<td>7-5 to 7-9</td>
</tr>
</tbody>
</table>

* = at or above economic threshold of 3 midge/trap/day
Sunflower Downy Mildew:
We have seen some downy mildew presence in sunflower fields in the area. One field in northern McLean county had a severe infection with approximately two-thirds of the plants infected with downy mildew. Severe infections in fields planted with downy mildew resistant varieties may be an indication that a new resistant race is present.

What are all the White Butterflies in my Field?
Numerous white butterflies can be seen flying in crop and prevented plant fields around the area. In most cases these are adults of imported cabbage worm, (=*Pieris rapae*). Larvae feed on brassica crops but are mainly a pest on vegetable crops such as broccoli, cauliflower, cabbage, and Brussels sprouts. In addition to vegetable brassicas, larvae feed on the leaves of canola but are not considered an economically important pest. The closely related *Pieris napi* looks very similar but is pale yellow in color.

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SOUTH-CENTRAL ND
According to NDAWN (North Dakota Ag Weather Network) data, the region received from 0.3 inches (Carrington and Robinson) to 2.2 inches of rain during the past week (July 6 to 12). According to southeast (including Dickey, Ransom and Sargent counties) extension agent reports, last weekend’s storm of high wind, heavy rain and hail caused significant damage to corn and wheat, besides damage to ag buildings, etc. Small grain lodging occurred broadly in the region.

Water use by the region’s corn on July 12 (source: NDAWN) ranged from 0.27 to 0.32 inches, and wheat water use was 0.21 to 0.25 inches.

Seed development is advancing in winter wheat and barley, and beginning in spring wheat seeded during early May. Row crop growth continues to accelerate with favourable air temperatures and abundant soil moisture. Early May planted corn generally is ‘hip-to-shoulder’ height. Growing degree day (GDD) units continue to lag compared to the long-term average. For example, the region’s corn planted on May 1 is currently behind 30 GDD units at Lisbon and 180 GDD units at Jamestown. Timely planted soybean is nearing or in early flower stages (R1). Hay harvest continues to be challenging due to inconsistent curing conditions and wet lowland areas. Pastures are in excellent condition – cattle are eating overtime to keep the grass short!

Scab, leaf rust and tan spot are easily found in winter wheat. Currently, spring wheat generally is green but protection from disease by early flower fungicide application continues to be a good strategy. Use NDSU’s wheat disease forecast tool to help with your decisions with fungicide use (www.ag.ndsu.nodak.edu/cropdisease/wheat-models.html). Remember to monitor for small grain aphids and barley thrips in crop not headed, and aphids in soybean.

Farmer calls are being received regarding the application of foliar nitrogen for protein enhancement in spring wheat. Adequate N (30 lb actual/acre), diluted with water and timely applied should provide at least a one-half percentage point increase in protein. Contact the NDSU Extension Service for details.

Please join us for the Carrington Research Extension Center’s annual field day on Tuesday, July 19.

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