Wisconsin Crop Manager

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Late Summer Cutting Management of Alfalfa

Dan Undersander (Forage Agronomist) and Bill Bland (Climatologist)

Difficult alfalfa harvesting conditions sometimes result in farmers being off schedule for late summer harvesting alfalfa. This raises the question of best management for alfalfa harvest as the end of summer approaches.

Alfalfa must either be cut early enough in the fall to regrow and replenish root carbohydrates and proteins or so late that the alfalfa does not regrow or use any root carbohydrates if we want good winter survival and rapid greenup for good yield next. This has resulted in the recommendation of a 'no-cut' window from Sept 1 to killing frost for Wisconsin. However, research in Quebec has helped define this window by indicating that alfalfa needs 500 growing degree days (GDD, base 41oF accumulated until a killing frost of 25oF) after the last summer cutting to regrow sufficiently for good winter survival and yield the next year. This means we can cut as late as 500 GDD will still accumulate without hurting the winter survival which is usually September 1 or slightly later depending on location.

On the other extreme, we can also cut so late that little regrowth occurs. Calculating the 200 or less GDD level indicates when insufficient regrowth occurred to use up root carbohydrates. These plants would also have good winter survival. It is important to remember that we do not need to wait for a killing frost to take the last cutting. We must only wait until it is so cool that little or no regrowth will occur.

So we either want to take the last cutting early enough that regrowth and root replenishment occurs or so late that little to no growth occurs. Calculating the sum of these two probabilities tells us the risk of winter injury or kill due to harvesting at different dates during September. This data was calculated for eight sites in Wisconsin where we had 30 years of weather history. In each graph, the area with diagonal lines is the probability of accumulating 500 GDD after each week. The purple area with '+'s in it is the probability of accumulating less than 200 GDD. So the top line is the probability of accumulating either 500 GDD or less than 200 GDD after the indicated date and shows the probability no injury or kill to alfalfa stands harvested on that date. We should assume that the graphs are for very winterhardy varieties (winter survival score of 2 or less) and that less winterhardy varieties would be at more risk. Optimum soil test levels of soil pH (6.5 or higher) and potassium can also enhance winter survival.

We can see that, at Lancaster and Beloit, 94 and 100 percent of the time we have accumulated 500 GDD or more after September 08. Waiting one more week reduced the probability to 61 and 87%, respectively. Thus great risk is not incurred until cutting two weeks after September 1.

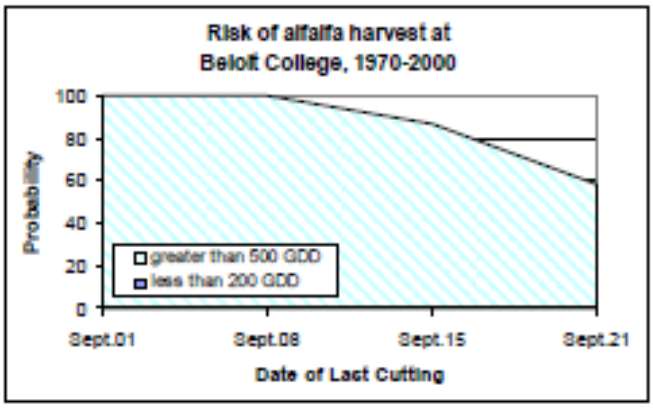
At Eau Claire, Hancock and Marshfield, 94, 94 and 91 % of the time 500 GDD was accumulated after Sept 1, respectively. Probability of 500 GDD accumulation fell to about 70% one week later. Thus, not harvesting after Sept 1 is the safe alternative but oftentimes being a week late was not detrimental. We also see that harvesting at the end of September, 6 to 16% of the time we had less than 200 GDD accumulation. Waiting till mid Oct will often be safe whether or not a frost has occurred.

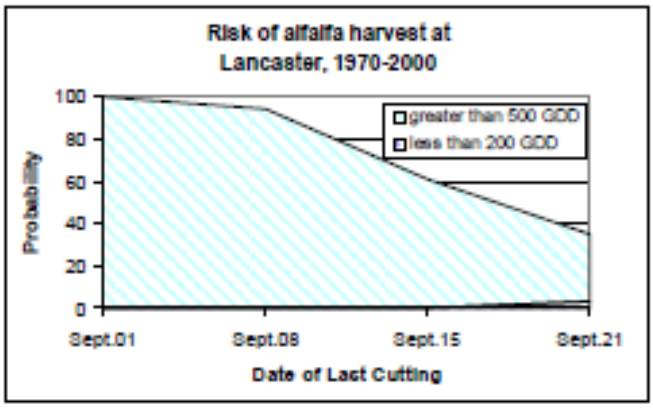
At Plymouth, we had 100% probability of 500 GDD following a Sept 1 harvest and the potential for 500 GDD fell rapidly after that date.

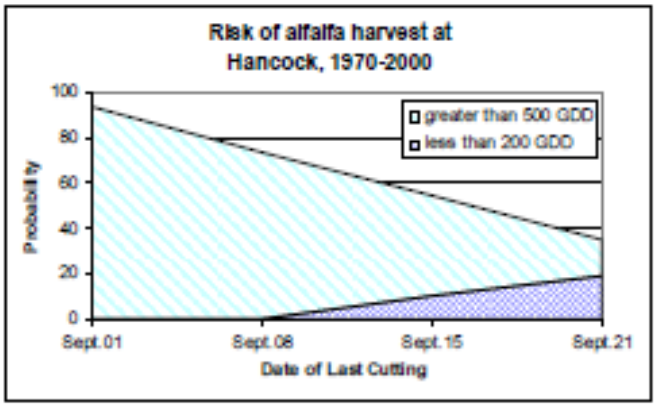
At Antigo and Rhinelander the probability of 500 GDD after Sept 1 was 61 and 84%, respectively. After Sept 21 the likelihood of accumulating less than 200 GDD increased significantly indicating that a cutting could likely be taken at the end of September with good probability of no regrowth and good winter survival.

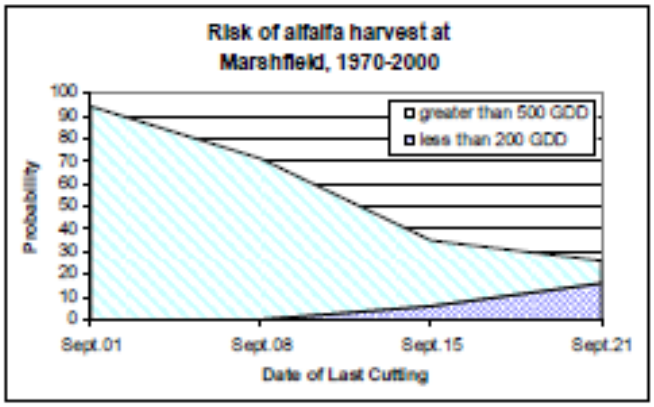
We should remember that forage quality of alfalfa changes little during September, so harvesting versus delaying harvest should be based on likelihood of winter injury or survival if the stand is to be kept. The effect of timing late summer cuttings on winter survival and next year yield depends on the weather

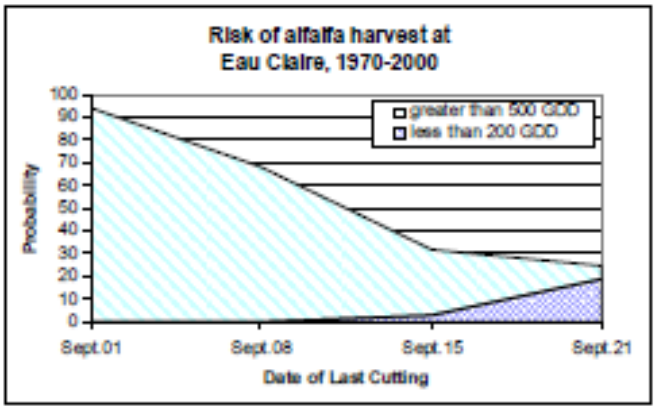
following cutting. These charts give a probability of winter survival at various cutting dates in the fall so that farmers can determine the risk associated with harvesting at various date

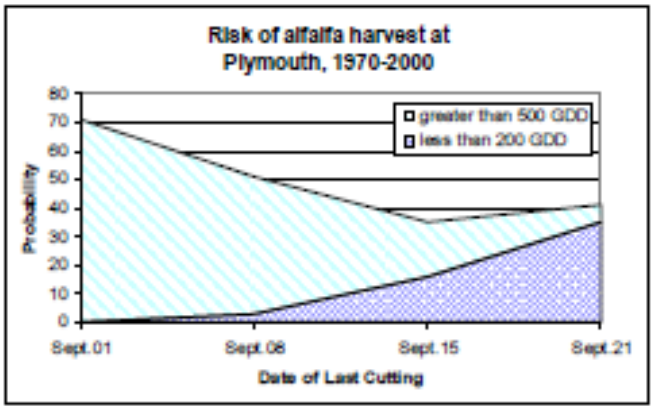


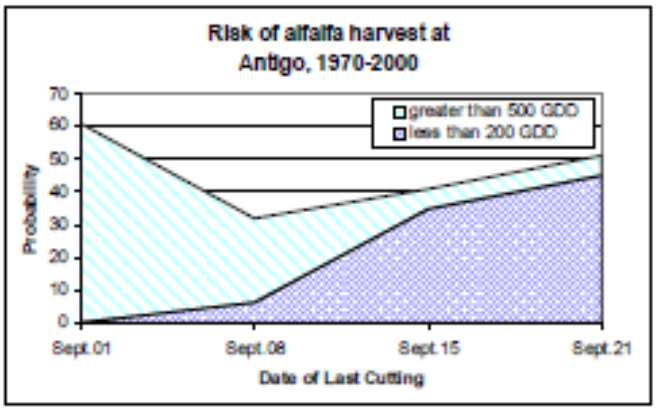


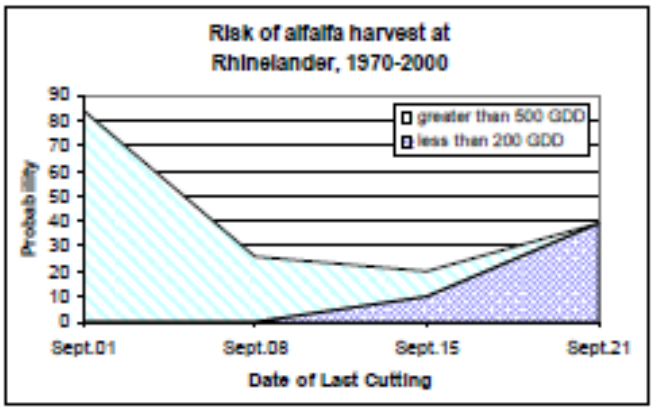












Top 8 Recommendations for Winter Wheat Establishment in 2012

Shawn Conley (State Soybean and Small Grains Specialist), John Gaska (Outreach Specialist)

Top 8 winter wheat establishment recommendations:

1. Variety selection: please see the 2012 WI Winter Wheat Performance Test
2. Plant new seed (don't plant saved seed).
3. A fungicide seed treatment is recommended for winter wheat in WI.
4. Wheat should be planted 1 inch deep.
5. The target seeding rate for wheat planted from September 15th to October 1st is 1,300,000 to 1,500,000 seeds per acre.
6. The optimal seeding rate for wheat planted after October 1st should be incrementally increased as planting date is delayed to compensate for reduced fall tillering.
7. Crop rotation matters.
8. Drought considerations: Check herbicide labels for plant back restrictions and conduct a PPNT for wheat following any corn crop.

Variety Selection

As with any crop, variety selection is the most important factor to consider in maximizing winter wheat yield and profitability. When choosing a winter wheat variety, several factors must be considered. These include winter survival, insect and disease resistance, lodging, test weight, and most importantly, yield. Since no variety is ideal for every location, it is important to understand the crop environment and pest complex that affects your specific region to maximize yield.

Yield is based on the genetic potential and environmental conditions in which the crop is grown. Therefore, by diversifying the genetic pool that is planted, a grower can hedge against crop failure. Select those varieties that perform well not only in your area but across experimental sites and years. This will increase the likelihood that, given next year's environment (which you cannot control), the variety you selected will perform well.

Test weight is also an important factor to consider when selecting a variety. The minimum test weight to be considered a U.S. #2 soft red winter wheat is 58 lb/bu. Wheat at lower test weights will be discounted. Both environment and pests may greatly affect test weight; therefore, selecting a variety that has a high test weight potential in your region is critical to maximizing economic gain.

Select a variety that has the specific **insect and disease resistance** characteristics that fits your needs. By selecting varieties with the appropriate level of resistance, crop yield loss may be either reduced or avoided without the need of pesticides. Careful management of resistant cultivars through crop and variety rotation, are required to ensure that these characteristics are not lost.

Crop height and **lodging potential** are also important varietal characteristics that may be affected by your cropping system. If the wheat crop is intended for grain only, it may be important to select a variety that is short in stature and has a low potential for lodging. This may decrease yield loss due to crop spoilage and harvest loss as well as increase harvesting rate. However, if the wheat crop is to be used as silage or is to be harvested as both grain and straw, then selecting a taller variety may be warranted. For detailed information regarding winter wheat variety performance please visit www.coolbean.info for results of the 2012 WI Winter Wheat Performance Test.

Plant New Seed in 2012

- To maximize wheat yields in 2013, it is imperative that growers plant certified or private (professionally prepared) seed that is true to variety, clean, and has a high germination percentage (>85%).

If growers absolutely need to plant saved seed due to availability or other economic considerations, the following steps should be taken to increase the likelihood of establishing a legal and good wheat crop.

Step One: Determine if you can legally plant the wheat seed you saved. Today, many private wheat varieties now come with statements which buyers sign at the time of purchase, stating that they understand they are not authorized to use the harvested grain for seed. Most current public winter wheat varieties are Plant Variety Protected (PVP) and though you may replant them on your own land, you do not have the right to trade/sell seed of those varieties to others for planting.

Step Two: Once you have determined if you can legally plant the seed you saved, the next step is to clean the wheat seed. It is important that wheat seed be cleaned to remove small and damaged seeds and to eliminate weed seeds. Removing small and damaged seeds will not only aid in crop establishment, but will also provide a more uniform wheat seedling stand. Removing small and damaged seeds will also increase the thousand-kernel weight (TKW), which serves as a measure of seed quality. Wheat seed with TKW values greater than 30 grams tend to have increased fall tiller number and seedling vigor.

Step Three: Perform a germination test. Germination tests can either be completed at home or by sending a sample to the Wisconsin Improvement Association. A home test can be performed by counting out 4 sets of 100 seeds and placing each of them in a damp paper towel. Place the paper towel into a plastic bag to conserve moisture and store in a warm location out of direct sunlight. After five days, count the number of germinated seeds that have both an intact root and shoot. This will give the grower an estimate of % germination. It is important to choose random seeds throughout the entire seed lot and conduct at least 4 – 100 seed counts. If germination is below 85%, it is important to increase the seeding rate to compensate; however, we would caution growers from seeding any wheat with a germination test below 80%.

Step Four: Assess the need for a seed treatment. A number of fungicides and insecticides are labeled for use as seed treatments on winter wheat and are listed in Pest Management for Wisconsin Field Crops 2012 (UW-Extension A3646). Seed treatment fungicides protect germinating seed and young seedlings from seedborne and soilborne pathogens. Seed treatment fungicides will not improve germination of seed that has been injured by environmental factors and will not resurrect dead seed. Remember, seed treatment fungicides applied this fall will not protect against potential FHB infection next summer. If seed with scab must be used for planting, a seed treatment fungicide is a must.

Seeding Depth

Wheat should be planted ~1.0 inch deep depending upon soil moisture conditions. Wheat planted less than 0.5 inches deep may result in uneven germination due to seed exposure or dry soil conditions. Shallow planted wheat is also more susceptible to soil heaving. Wheat planted more than 1.5 inches deep may result in death due to pre-mature leaf opening or poor tiller development and winter survival. Uniform seed placement and seeding depth are important in promoting crop health in the fall.

Seeding rate and planting date

The targeted fall stand for wheat planted from September 15th to October 1st is between 30 and 35 plants per square foot. To achieve this goal, the seeding rate for soft red winter wheat is between 1,300,000 and 1,600,000 viable seeds per acre (Table 1). Depending upon varietal seed size, this equates to a range of between 74 and 119 pounds of seed per acre (Table 2). The optimal seeding rate for wheat planted after October 1st should be incrementally increased as planting date is delayed to compensate for reduced fall tillering (Table 1).

Winter wheat and crop insurance (Information courtesy of Michele Austin, Director -Insurance Services; Badgerland Financial)

The Wisconsin winter wheat final planting date varies by county, ranging from September 30th to October 10th. If the wheat is seeded after the county's final plant date (late planting period) the crop insurance guarantee is reduced by 1% per day for the first 10 days. If wheat is seeded after the late planting period, the crop insurance guarantee is reduced to 60% of the original guarantee.

Special notes regarding the 2013 crop

- The Trend Adjustment option is now available for some Wisconsin counties on Wheat. Talk to your crop insurance agent for more details.
- Winter wheat coverage is not available in all Wisconsin counties.
- Air seeded (flown on by airplane) wheat is not insurable and no premium is charged.
- The final day to turn in a 2012 winter wheat claim is October 31st
- The 2013 wheat price discovery on CBOT (using September '12 contract) will be determined as follows (this price will be used for both yield protection and revenue protection plans of insurance):
  - The Projected Price tracks from August 15, 2012 – September 14, 2012
  - The Harvest price tracks from August 1, 2013 – August 31, 2013
  - There is a 200% maximum difference between the Base and Harvest Prices with no downside limit.

Table 1. Wisconsin seeding rate recommendations based on planting date.

Wisconsin Winter Wheat Seeding Rate Recommendations					
Seeds/acre Million	Seeds/sq ft	Row Width (in)			
		6	7	7.5	
		Seeds per foot row			
0.4	9.2	5	5	6	
0.5	11.5	6	7	7	
0.6	13.8	7	8	9	
0.7	16.1	8	9	10	
0.8	18.4	9	11	11	
0.9	20.7	10	12	13	Seeding Rate for Sept 1 to Sept 15
1.0	23.0	11	13	14	
1.1	25.3	13	15	16	
1.2	27.5	14	16	17	
1.3	29.8	15	17	19	
1.4	32.1	16	19	20	Seeding Rate for Sept 15 to Oct. 1
1.5	34.4	17	20	22	
1.6	36.7	18	21	23	
1.7	39.0	20	23	24	
1.8	41.3	21	24	26	
1.9	43.6	22	25	27	Seeding Rate for Oct. 1 to Oct 10
2.0	45.9	23	27	29	
2.1	48.2	24	28	30	
2.2	50.5	25	29	32	
2.3	52.8	26	31	33	
2.4	55.1	28	32	34	
2.5	57.4	29	33	36	

Table 2. Seed size and seeding rate conversion table.

Seeds/lb	Seeds per acre (x 1 million)						
	1.0	1.2	1.4	1.6	1.8	2.0	2.2
	Pounds of seed/acre						
10000	100	120	140	160	180	200	220
11000	91	109	127	145	164	182	200
12000	83	100	117	133	150	167	183
13000	77	92	108	123	138	154	169
14000	71	86	100	114	129	143	157
15000	67	80	93	107	120	133	147
16000	63	75	88	100	113	125	138
17000	59	71	82	94	106	118	129

**This table is based on 100% germination. Adjust your seeding rate by the % germ printed on your bag tag.*

Crop Rotation:

Yield data from our long term rotation experiment located at Arlington, WI indicated that wheat grain yield was greatest when following soybean (Table 3) (Lauer and Gaska, 2003-2006, unpublished). Yield of second year wheat (2003 column) was similar to wheat yields following corn for grain or silage. Third (2004), fourth (2005), and fifth (2006) year continuous wheat yields were dramatically lower than the other rotational systems. Our data suggests that growers should plant wheat after soybean first, then corn silage, corn for grain, and lastly wheat.

Table 3. Winter wheat grain yield following winter wheat, soybean, corn for grain, and corn silage.

Rotation	2003	2004	2005	2006	Average
	----------Winter wheat grain yield bu a^{-1}----------				
Continuous **Wheat**	56.3[1]	47.0	41.8	45.0	47.5
Corn-Soybean-**Wheat**	66.3	51.0	71.8	74.0	65.8
Soybean-Corn (grain)-**Wheat**	55.7	42.0[2]	51.1	66.0	53.7
Soybean-Corn (silage)-**Wheat**	57.7	51.0	62.0	69.9	60.2

[1] *2003 marked the second year of the continuous wheat rotation treatment*

[2] *Poor stand establishment in the 2004 Soybean-Corn (grain)-Wheat rotation affected wheat yield.*

If growers choose to plant second year wheat, several management factors should be considered to reduce risk. First plant a different wheat variety in the second year that possesses excellent resistance to residue-borne diseases. Under no circumstances should growers consider planting bin-run seed in second year wheat. By planting a different variety with strong disease resistance characteristics you can reduce the likelihood of early disease pressure and significant yield loss. Growers should use a seed treatment in wheat following wheat. Be aware that seed treatments are not a cure all for all common diseases in continuous wheat systems (e.g. take-all). Growers should also consider increasing their seeding rate to 1.8 to 2.0 million seeds per acre in wheat following wheat systems. This will aid in stand establishment and increase the likelihood of a uniform stand going into the winter. Lastly, if using a notill system, planting into a seedbed that is free of living volunteer wheat is important in reducing the incidence of Barley Yellow Dwarf Virus. Growers should consider a herbicide application to any living volunteer wheat prior to planting to prevent a "green bridge" for the aphids that vector this virus.

Drought considerations for wheat following any corn crop

Given the extreme drought across much of the WI winter wheat growing area is it imperative that growers check plant back restrictions for corn applied herbicides. Even if you have "gotten away with it" the last few years the likelihood for injury is substantially greater in 2012. It may also prove beneficial to pull a PPNT (pre-plant nitrogen test; please refer to A2809 for details on PPNT sampling) sample. This would give growers an idea about the residual N so we are not either:

1. Under applying N and limiting yield or
2. Over applying N which may lead to lush spring growth that can increase the incidence of powdery mildew and lodging that may decrease yield, grain quality and slow harvest.

Fertilizer Needs for Wheat Following a Drought

Carrie A.M. Laboski (Extension Soil Fertility/Nutrient Management Specialist)

As preparations are made for planting the 2013 wheat crop, growers should consider how the 2012 drought might impact their fertilizer needs. There is a strong possibility that there will excess (carryover or residual) N in the soil profile after the 2012 corn crop is harvested because the corn was too affected by drought to use all of the applied N. If soybean is the previous crop, there is a low likelihood of excess N remaining in the soil profile. Regardless of previous crop, some of the P and K applied last year will be available for the wheat crop.

In the fall of 1988 following a summer drought, 150 to 450 lb NO_3-N/a were found in the soil profile after corn harvest at five locations around Wisconsin. At seven different locations, spring 1989 soil profile nitrate concentrations ranged from 98 to 406 lb N/a. These data clearly show that there may substantial amounts of excess N in the soil profile that could be used by wheat.

Past research in Wisconsin has shown that wheat needs less N if fall preplant soil profile nitrate concentrations are over 50 lb N/a. This same research demonstrated that there was no good relationship between N response and profile nitrate concentrations in early spring. Based on our current wheat N response database, we have developed N recommendations that take into consideration soil texture, previous crop, preplant soil nitrate concentration and the price of N relative to the price of wheat. These N rate guidelines are shown in Table 1. The most profitable N application rate is the one that maximizes the return to N (MRTN) and is given in bold text. The N rates in gray text give the range of N rates that will produce profitability within $1/a of the MRTN rate. The N rates in Table 1 are based on a N:wheat price ratio of 0.05 (e.g. $0.40/lb N and $8/bu wheat). The revised UWEX publication A2809 (Nutrient application rate guidelines for field, vegetable, and fruit crops in Wisconsin), which will be released later this year, will contain additional N:wheat price ratios.

Table 1. Suggested nitrogen (N) application rates for wheat.

Soil group [a]	Previous crop	PPNT	Nitrogen:Wheat price ratio 0.05		
		soil NO_3-N, lb/a	lb N/acre (total to apply)[b]		
Loamy	Corn	≤ 50[c] or no PPNT	65	**75** ------	85
Loamy	Corn	51 to 100	35	**45** ------	55
Loamy	Corn	> 100	0	**0** ------	0
Loamy	Soybean, small grain	All[d]	45	**55** ------	65
Sandy	All	—[e]	95	**105** ------	115

[a] Sandy soils are generally sands and loamy sands. Loamy soils are all other mineral soils.
[b] On loamy soils with < 2% OM, add 30 lb N/a to all rates. Reduce N rates by 10 lb N/a for spring wheat on all soils. Manure N credits must be subtracted from these values.
[c] If wheat follows a forage legume or leguminous vegetable, use the MRTN rate for wheat following corn with PPNT ≤ 50 and take the legume credit.
[d] Previous crop soybean or small grain: If a PPNT is taken and the PPNT is ≤ 50 lb N/a, use the top end of the profitable range; if the PPNT is 51 to 100 lb N/a, use the bottom end of the profitable range; if the PPNT is > 100 lb/a, no additional N is needed. Do not take a soybean legume credit.
[e] PPNT is not recommended on sandy soils.

With the high potential for excess N in the soil profile following corn, growers are encouraged to take soil samples for the preplant nitrate test (PPNT) and use this information to help select a N rate for wheat. The PPNT is actually two soil samples: 0-1 foot and a 1-2 foot samples collected prior to planting wheat. Fifteen soil cores should be collected randomly from 20 acres. Sampling bad and very bad areas separately may be useful to assess variability within a field. In addition, areas with different soil characteristics and/or past management should be sampled separately. After collection samples should be kept cool becauae the nitrate content is moist soil samples stored under warm conditions can increase quickly and cause erroneous test results. If samples cannot be delivered to a soil testing lab within 1 to 2 days, the samples should be frozen or air-dried to prevent changes in nitrate concentration.

It is likely that not all of the P and K fertilizer applied this past spring was used by the 2012 crop and will be available for the 2013 wheat crop. Thus, recommended P and K applications for wheat may be reduced. Take credit for unused P and K using the following formula.

Nutrient credit =
2012 fertilizer applied – {2012 fertilizer applied x (yield achieved ÷ expected yield)}

Example K_2O credit:

- The expected corn yield used to determine 2012 fertilizer application rates was 200 bu/a
- The actual corn yield was 120 bu/a
- The K fertilizer application rate was 250 lb K_2O/a
- K_2O credit = 250 – {250 x (120 ÷ 200)} = 100 lb K_2O/a

To maximize profitability, growers should strongly consider using the PPNT to select a N rate for wheat if the previous crop was corn in 2012. In addition, growers can improve profitability of their wheat crop by reducing P and K applications by the amount of unused P and K that was applied to any previous crop in 2012.

Vegetable Crop Update 9/5/12

The 24th issue of the Vegetable Crop Update is now available. This issue contains late blight updates as well as cucurbit downy mildew and cucurbit powdery mildew updates. Click here to view this update.

Spider Mites: My Lessons Learned and Varietal Differences Noted

Shawn Conley, Soybean and Wheat Extension Specialist

Like many growers and crop consultants if I don't see spider mites for another 24 years it will be too soon. As we transition into physiological maturity and put this season behind us it is always a good idea to reflect back on what we have experienced and learned so a documented record is present for the next time these infrequent events occur. So here is what I learned battling spider mites in 2012.

1. There are product efficacy differences. I sprayed our Janesville, East Troy, Fond du Lac, and Arlington (twice) sites in 2012 for spider mites. All of the locations were sprayed with Dimethoate except Fond du Lac which received bifenthrin. For the most part I was pleased with control at all locations.
2. I waited too long to spray. I am a strong proponent of IPM guidelines and follow them religiously with excellent success. My mistake was that I did not effectively scout the large border areas surrounding our Arlington research trials. This did not lead to any significant plot loss or impact my research but it did lead to a continuous re-supply of spider mites due to egg numbers that I had to manage.
3. Rain did not help. Rain did knock down populations for a couple days but they quickly rebounded and required chemical control.
4. Varietal differences are evident. Plot to plot variability was noted at our Janesville and Fond du Lac sites so we took plot notes to quantify (0-10, where 0 = no plot damage and 10 = 100 of plot injured. this variability. Analysis of the data indicated significant varietal differences (0 to 8 at Janesville and 0 to 3 at Fond du Lac). It is unclear whether these differences were due to initial selection, preferential feeding, or increased fecundity (more eggs) but they were real. Given the infrequency of spider mites for Midwest growers I would not select varieties based on this criteria, but it may help explain infestation or control variability for 2012.

A video is also available on this topic. Click here or on the image below to view this video.

UW-Extension/Madison Plant Disease Diagnostic Clinic (PDDC) Update

Brian Hudelson, Ann Joy, Amanda Zimmerman, Lindsay Wells, Andrew Pape, Plant Disease Diagnostics Clinic

The PDDC receives samples of many plant samples from around the state. The following diseases/disorders have been identified at the PDDC from August 24 through August 30, 2012

PLANT/SAMPLE TYPE	DISEASE/DISORDER	PATHOGEN	COUNTY
FIELD CROPS			
Corn	Gibberella Stalk Rot	*Fusarium graminearum*	Sauk
	Gray Leaf Spot	*Cercospora zeae-maydis*	Dane
Soybean	Frogeye Leaf Spot	*Cercospora sojina*	Lafayette
	Fusarium Root Rot	*Fusarium graminearum*	Dane
	Stem Canker	*Phomopsis* sp.	Dane
FRUITS			
Raspberry	Anthracnose	*Sphaceloma necator*	Milwaukee
	Cane Blight	*Coniothyrium fuckelii*	Milwaukee
	Root/Crown Rot	*Pythium* sp., *Rhizoctonia* sp., *Fusarium* sp., *Cylindrocarpon* sp.	Lincoln, Milwaukee, Taylor
Strawberry	Root/Crown Rot	*Rhizoctonia* sp.	La Crosse, Wood
	Verticillium Wilt	*Verticillium* sp.	La Crosse
VEGETABLES			
Bean (Kidney)	Bacterial Brown Spot	*Pseudomonas syringae* pv. *syringae*	Cook (MI)
Tomato	Black Shoulder	*Alternaria alternata*	Waukesha
	Late Blight	*Phytophthora infestans*	Sheboygan
Watermelon	Verticillium Wilt	*Verticillium* sp.	Kewaunee

For additional information on plant diseases and their control, visit the PDDC website at pddc.wisc.edu.