AG ALERT

NDSU EXTENSION SERVICE GRIGGS COUNTY

Issue #9

Friday, June 30, 2017

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Rainfall and Growing Degree Days (GDD)

Location	Cooperstown	Finley	McHenry	Pillsbury
Barley/Wheat GDD (Plant date: 4/15/2017)	1692	1714	1721	1776
Compared to 2016	-267	-211	-131	-176
Corn GDD (Plant date: 5/1/2017)	662	658	661	717
Compared to 2016	-164	-116	-52	-100
Rain Since 4/15/2017	8.40	7.82	5.72	5.18

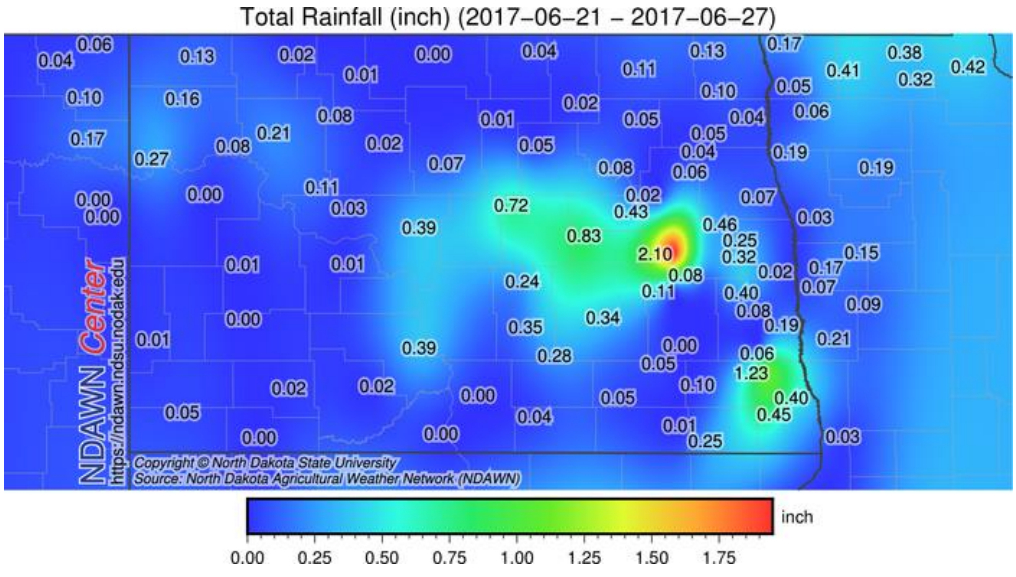
Note: Actual rain amounts may vary.

WEATHER

The June 29 through July 5, 2017 Weather Summary/Outlook

It was both cool and dry across much of the North Dakota Agricultural Weather Network (NDAWN) this past week. Temperatures averaged 5° to 10° below average in eastern North Dakota into northwestern Minnesota with temperatures still below average but noticably warmer in southwestern North Dakota. Those warmer temperatures in southwestern North Dakota were partially attributed to a slightly warmer air mass in that area, but also because of the very dry conditions in that region as dry soils have a noticeable impact on near surface air temperatures.

Very little rain fell during the past week until Tuesday Night and Wednesday. Wednesday rain data was unavailable in map form at publishing time, but one to three inches of rain fell Wednesday in portions of east central North Dakota into northwestern Minnesota. Parts of Grand Forks County recorded over 3.5 inches of rain. Yet, a vast majority of North Dakota recorded very little rain, continuing the trend of dryness that started back in March and April of this year.



Although there will be some showers in the area both today (Thursday) and Friday with even some isolated rains on Saturday, the amounts look generally light, plus locations south and west of the Missouri River, the locations that are the driest, look to be getting very little if any rain from these events.

Plus, after a few cooler than average days now through Sunday, there are indications that a surge of very warm air will be moving into the state early next week around Independence Day, with triple digit heat possible in western North Dakota on July 4 and 5. All areas of the state should expect above average temperatures next week for at least a couple of days and with that will come many more growing degree days (GDDS) than what was recorde during the second half of June. Estimated GDDs for the period June 29 through July 5, 2017 can be found on the graphic below.

Northeastern North Dakota into northwestern Minnesota should see an increase in high relative humidity (RH) hours, especially in the next few days associated with the rain from Tuesday night into Wednesday.

Using May 10, 2017 as an average planting date, the number of corn growing degree days accumulated through June 27 is depicted on our website. The exact numbers based on your actual planting date(s) can be found here: https://ndawn.ndsu.nodak.edu/corn-growing-degree-days.html Other agricultural tools can be found in the applications tab in the menu on the left side of the ndawn.org website. New inversion data (for spray drift concerns) can also be found on the NDAWN website in the table section of the current weather link, with additional stations added earlier this week.

Using a plantiing date of May 1, 2017, the number of wheat growing degree days accumulated through June 27 is presented on our website. The exact numbers based on your actual planting date(s) can be found here: https://ndawn.ndsu.nodak.edu/wheat-growing-degree-days.html

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PLANT PATHOLOGY

Fungicide Efficacy and Timing Questions on Fusarium Head Blight (Scab)

Small grains in western ND have headed with most of the crop past the flowering growth stages. In the northcentral and northeastern parts of the state, the small grain crop is near heading or flowering. This area of the state currently has the most amount of Fusarium head blight (FHB) risk. Several questions have been asked about fungicide use for FHB and here is some information on the three most commonly asked questions.

What to spray?

Fungicides in the FRAC 3 (DMI or triazoles) are the only labeled group of fungicides that provide adequate suppression of FHB and deoxynivalenol (DON). However, efficacy differences are observed among this group. Specifically, prothioconazole + tebuconazole (Prosaro) and metconazole (Caramba) offer the most suppression (~50-60%) of FHB and DON. Tebuconzole (Folicur, generics) provides some suppression (~20-30%), while propiconazole (Tilt, generics) does very little for scab suppression (~10-15%). With regards to fungicide chemistries, **do not apply a product containing a FRAC 11 (QoI or strobilurin) for FHB and DON suppression**. Products containing FRAC 11 chemistries have been shown to increase DON levels.

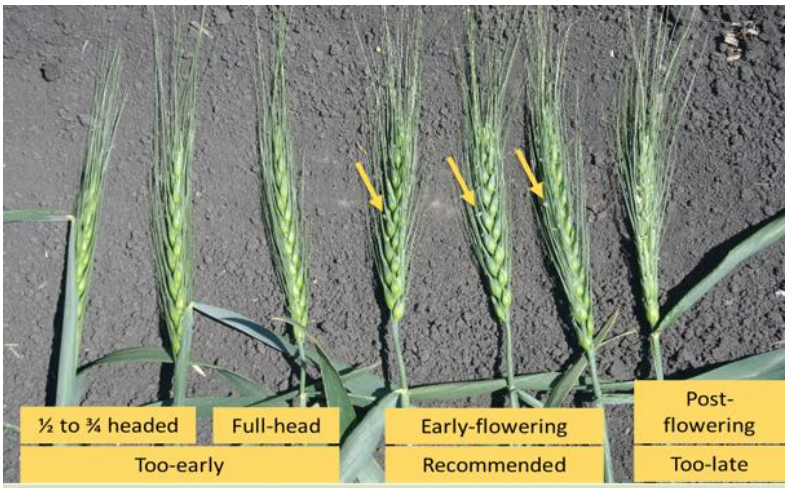

Figure 1. Growth stages of wheat indicating a too-early application, recommended (early-flowering) and a too-late application (post-flowering).

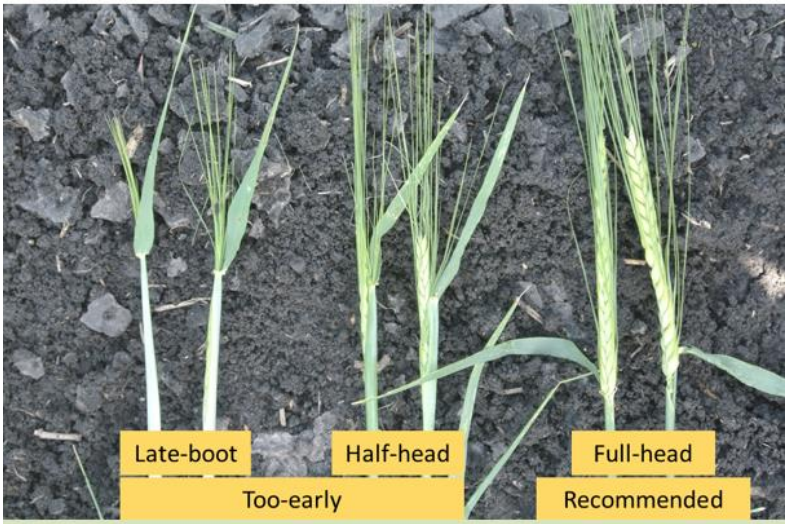

Figure 2. Growth stages of barley indicating a too-early application and the recommended timing of full-head emergence.

When to spray?

The best time to apply a fungicide for FHB management in wheat (and durum) is at early-flowering and for barley at full-head. However, there are several field situations where the optimum timing cannot be completed due to environmental conditions, logistical issues, etc. Therefore, the question arises on whether you should err on the side of being "too-early" or "too-late". Too-early is referred to growth stages that occur before early-flowering (yellow anthers on the wheat head) in wheat (Figure 1) and growth stages prior to full-head in barley (Figure 2). Too-late is referred to applications made after early-flowering in wheat and after full-head in barley. Although FHB suppression occurs with a "too-early application, recent research suggests that "too-late" applications provide greater FHB and DON suppression (Figure 3). Studies conducted by the US Wheat and Barley Scab Initiative across several states have shown that "too-late" applications show just as good or sometimes better management of FHB and DON when compared to recommended timings. Potential explanations on why this occurs could be attributed to a greater FHB risk later in the growing season and/or the fungicide application is protecting more small grain heads (i.e.: tillers, delayed main stems).

What about double/split applications?

The recent epidemics in northcentral and northwestern ND in the past couple years have prompted more trials on the use of double or split fungicide applications. This includes applying a half-rate of a fungicide twice in the flowering process or applying a full-label rate of two fungicides belonging to the FRAC 3 group. Last year, 12 research trials at 5 locations (Carrington, Fargo, Langdon, Prosper and Williston) were conducted using double/split applications for FHB and DON management in barley, winter wheat, spring wheat and durum. Table 1 includes the mean level of DON reduction for treatments included across all locations and small grain market classes. Notice that double applications often had greater DON suppression. However, keep in mind that some of these fungicide treatments are not economical and the cost of an additional application should be weighed before employing this across a farm. These trials also show that sequential fungicide applications using two different manufacturer's triazole chemistries do not provide complete additive control. For example, a single Prosaro application giving 44% DON production, followed by a Caramba application 4-7 days later does not double the DON reduction to 80-90%. These trials are being conducted again this year and results will be analyzed and communicated at several Extension events.

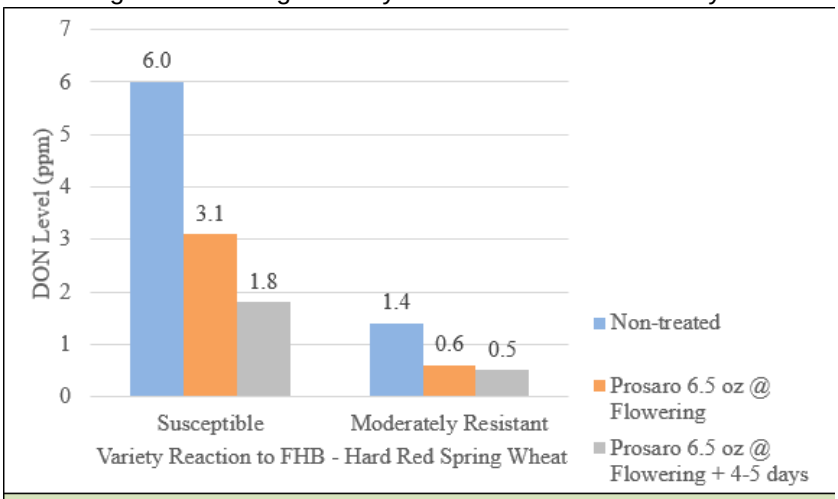

*Figure 3. Mean DON (VOM) levels from integrated Fusarium head blight management trials conducted at Fargo and Langdon in 2014-2015. Notice post-flowering applications resulted in lower or similar DON levels compared to the flowering (recommended) application. (*Trials funded through the United States Wheat and Barley Scab Initiative)*

Table 1. Mean DON reduction for double/split fungicide treatments. Data is from 12 USWBSI fungicide trials on spring wheat, winter wheat, barley and durum conducted in 2016 in North Dakota. Recommended timing refers to early-flowering in wheat and full-head in barley.

#	Fungicide	Timing	DON Reduction (Compared to non-treated control)
1	Prosaro @ 6.5 oz/A	Recommended timing	44%
2	Prosaro @ 6.5 oz/A	Recommended timing	64%
	Caramba @ 14 oz/A	4-7 days later	
3	Caramba @ 14 oz/A	Recommended timing	58%
	Tebuconazole @ 4 oz/A	4-7 days later	
4	Proline @ 5.7 oz/A	Recommended timing	64%
	Tebuconazole @ 4 oz/A	4-7 days later	

Andrew Friskop
Extenstion Plant Pathologist,
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WEEDS

Glyphosate + 2,4-D Compatibility – Part 1

Question: What causes glyphosate + 2,4-D to 'set-up' in the sprayer and plug screens and nozzles? Is it just a freak thing that happensoccasionally? It happened two times this week. One of the guys is just dumping his right in the top of the tank. They are putting the glyphosate first then adding the 2,4-D separately, so they are not touching in the cone. The AMS was added last.

Answer: This is called physical incompatibility. Salts of glyphosate and 2,4-D each can dissociate and bind with each other. For example, the K+ cation from the K salt glyphosate can disassociate from the glyphosate and dimethylamine (DMA) salt can disassociate from the 2,4-D anion. These four ions (glyphosate, K, 2,4-D, and DMA) are able to recombine.

Binding of the K+ cation with 2,4-D results in a very low solubility product which readily precipitates out. This precipitation is worse when very low rates of water are used (low gpa) and when the temperature of the water is cold.
2,4-D-amine is more compatible with glyphosate-IPA (the original formulations of Roundup).

It is preferred to mix 2,4-D esters or 2,4-D acids with K salt glyphosate formulations. Esters do not disassociate, so no precipitate is formed and with the 2,4-D acid, the disassociated ion would be H+ which does not precipitate.

Glyphosate + 2,4-D Compatibility – Part 2

Question: I have been following the delay on Enlist registration from the inference that there is 'synergy' when glyphosate and 2,4-D are mixed together. Is there any truth to this potential antagonism?

Answer: Mixtures of 2,4-D and glyphosate (in other formulations) have been used successfully for weed control in various systems for many years. Glyphosate + 2,4-D is still the standard herbicide mixture for fallow weed control in many dryland areas.

NDSU weed scientists have observed for many years the antagonism between different salts of glyphosate and 2,4-D. This illustrates a principle that many people may not be aware of. When glyphosate-ipa and 2,4-D-dma (dimethyl amine) are mixed, there is often grass antagonism. The different salts induce the reduced grass control similar to when hard water cations bind with glyphosate and weak acid herbicides. It is assumed that Monsanto knew this many years ago and developed LandMaster BW where both the glyphosate and 2,4-D contained the same salt (glyphosate-ipa + 2,4-D-ipa (isopropylamine)) which resolved the grass antagonism because the ipa salts were the same. The only commercial source of 2,4-D-ipa was in LandMaster BW. Many growers thought the activity would be the same if they mixed Roundup and 2,4-D independently to make their own LandMaster BW, but growers did not realize the salt formulation made a difference in control.

Antidotal evidence: In 2016 I attended a meeting where many weed scientists across the country discussed the over-use of PPO herbicides and development of glyphosate + PPO resistant weeds in soybeans. Some academicians across the country reported something very interesting – they have observed grass antagonism from RU Xtend [glyphosate-mea (monoethanol amine) + dicamba-dga (diglycolamine)]! They also observed that these dual salt herbicides coupled with the extremely large droplets from TTI increased the antagonism or reduced weed control. Their use of the term 'antagonism' is partly correct but the recommended TTI nozzles produce large droplets that may miss some small grass plants and result in lower weed control.

An historical example of this is the long-used product Fallow Master which contains glyphosate + dicamba, the same active ingredients as in RU Xtend. The difference was RU Xtend is formulated as glyphosate-ipa + dicamba-acid. The acid form of dicamba does not produce physical incompatibility with the ipa salt from glyphosate, which resolves the salt antagonism problem. However, the dicamba-acid exacerbates the volatility problem and is probably why it was not developed for the dicamba resistant soybean technology. AMS may lower the spray solution pH, forming dicamba acid which has high volatility and is why AMS is restricted. Spray acidifier adjuvants are not allowed with RU Xtend as low pH (below 5.5) will negate the mysterious Vapor-Grip technology and create more volatile dicamba-acid molecules.
I was surprised to hear of the synergism between glyphosate and 2,4-D and was not surprised that there was little published data to support it. The possible antagonism from the differential salts of glyphosate-dma + 2,4-D-choline seem more accurate based on historical data described above and observations.

Grazing Restriction for 2,4-D

Question: I am wondering why there is a 30 day after application haying restriction for 2-4-D when there are no grazing restrictions. I have been getting calls asking about these haying restrictions.

Answer: The short answer is that was the way the residue studies were done for EPA registration.

Another answer might be due to concentration – animals that graze on treated forage would have a diluted concentration of 2,4-D because of the high water content in plant foliage. Foliage processed for hay would be dry (water evaporated) allowing the herbicide to be more concentrated in plant material and which might require the 30 days for degradation to occur.

Rich Zollinger
Extension Weed Specialist

PLANT SCIENCE

Guidelines for Haying Drought Damaged Small Grains

The severe drought that is currently affecting parts of the state is limiting crop and pasture growth. There have been questions about the best practices for haying small grains that have been severely damaged by the drought. Hayed small grains can be a valuable source of feed when handled properly. The following are a few suggestions to consider when haying drought stressed small grains:

- Before haying or grazing small grains make sure you have sorted out the issues regarding crop insurance, and have the adjuster make a yield estimate. Yield can be estimated by measuring out number of spikes in a given area and number of kernels per spike. If you wish to estimate the potential yield of your field prior to deciding to hay it, use the procedures described on the NDSU Crops Website about Estimating Yield under Spring Wheat. This estimate, however, will be valid only if the remainder of the season is favorable for grain filling.
- Drought stressed crops can accumulate nitrates to levels that may be toxic to livestock. Have a sample of your crop tested for nitrate levels. Nitrate levels above 1,000 ppm need special consideration when feeding. Follow published guidelines for feeding high nitrate hay and avoid using these hays for lactating or pregnant cows. Nitrate levels will not change much after it has been dried and bailed. Ensiling high nitrate materials, on the other hand, has the potential for reducing nitrate levels over time through the fermentation process. More information on nitrate poisoning can be found in the NDSU Extension Publication Nitrate Poisoning of Livestock.
- Nitrate levels can be tested at the NDSU Vet Diagnostic lab. Please follow instruction on the web site. Payment needs to be submitted with the sample. A gallon plastic bag full of representative plant material is needed for this test. The plant material can be dried or green.
- The optimum time for haying small grains for both amount and quality is when they reach the milk stage. However, if plants are so severely stressed that they are losing leaves and are no longer growing, haying prior to the milk stage will result in a better outcome than waiting.
- Weeds can also be a source of high nitrates. Some species accumulate nitrates more than others. Weed species such as kochia, lambsquarters, pigweeds, quackgrass, and Russian thistle have the potential to accumulate high nitrate levels. If there is a large patch of weeds, it may be wise to hay around the weed patch.

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APPS for AG

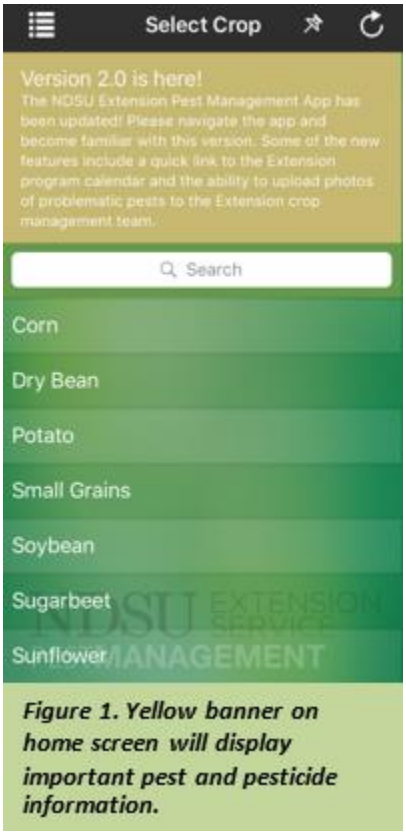

Figure 1. Yellow banner on home screen will display important pest and pesticide information.

New Features for NDSU Extension Pest Management App

The NDSU Extension Pest Management App (which houses information from the Plant Disease Management Guide, Insect Control Guide and Weed Control Guide) has recently been updated with new features. These features include a banner, a pest identification help tool and calendar function. The banner is displayed on the home screen of the app and will highlight important pest and pesticide information throughout the growing season (Figure 1). The pest identification help tool allows for digital diagnosis of pests through photos submitted by app users (Figure 2). This will help with preliminary assessments of pests, but for a more complete diagnosis, individuals may be asked to submit samples to the NDSU Plant Diagnostic Lab. The calendar function provides information on upcoming Extension events (Figure 2).

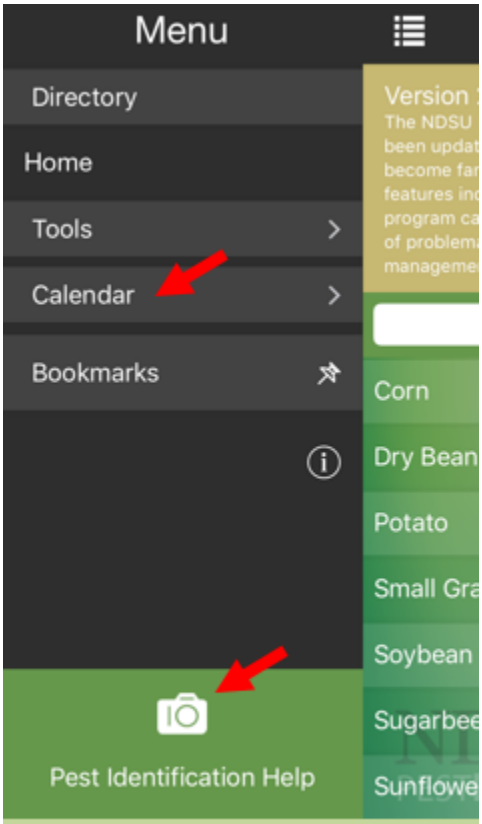

Figure 2. The NDSU Extension calendar and a pest identification tool are now available in the app.