WHEAT PRODUCTION NEWSLETTER

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In this issue

Wheat Crop Update or Where's the Water?

An Oklahoma City weather forecaster indicated last night that November has gone by with only a trace of precipitation, which ties for the driest November on record. One does not have to look far to see the impact of drought on the Oklahoma wheat crop and the sharp contrast in forage production as compared to last year. Our Wheat Pasture Research Unit at Marshall, OK, for example, had close to 3,000 lb/ac of available wheat forage at this time last year but has less than 1,000 lb/ac of wheat forage available this year.

While the impact of drought on forage production is clear, the impact on the grain harvest of 2006 is not as clear cut. Right now my best prognosis would be that as long as sufficient tillers exist, there should be little impact on final grain yield. So, for dual-purpose wheat producers that have been disappointed by their wheat forage production this year, there is still hope for a good grain crop to partially offset reduced returns from beef cattle operations. The key here will be to focus on maximizing profitability of the grain enterprise by maximizing efficiency of inputs such as Nitrogen fertilizer (see article on page 2).

Wheat Disease Update

Dr. Bob Hunger, Extension Wheat Plant Pathologist

Wheat leaf rust:

Oklahoma: Through November, I have continued to see and hear reports of severe leaf rust in Oklahoma. Plots near Stillwater have severe leaf rust in 'Jagalene' (most severe), 'Jagger' (intermediate), and 'Cutter' (intermediate) with very low levels seen in 'Overley'. Dr. Brett Carver (OSU Wheat Breeder) reported seeing such a heavy level of rust pustules on Jagalene in plots near Marshall, OK (about 25 miles west of Stillwater) that orange clouds of spores would raise-up as he walked through plots. Similar reports have come from north central and southern Oklahoma as well. ***HOWEVER – No Stripe Rust has been reported.***

Yellowing of wheat (variety 2137) in Garfield County, OK due to leaf rust on November 8, 2005 (above) and a closer view of foliage (below). Note that the older leaves at the bottom of the plant are more yellow and have abundant sporulating pustules, while younger leaves show only flecks or are mostly green.

Texas: On 8 Nov 2005, Rex Herrington (Research Associate-Small Grains, Dept. of Soil & Crop Sciences, Texas A&M University) reported, "While at our McGregor nursery in Central Texas yesterday, I found several single pustules of wheat leaf rust, and additional flecking on September planted TAM 110 wheat. With the exception of early-planted oats, the small grain fields in the area, have very poor emergence. This is the driest and warmest fall in the Eastern half of Texas in recent memory. There is little, if any fall grazing, and the summer hay crop was very short."

Louisiana: Last week, Dr. Stephen Harrison (Professor/small grains breeder, Louisiana State University) reported that, "The warm weather we had in November is conducive to leaf and stripe rust development, but the lack of moisture probably prevented any significant development. Aphids in early-planted wheat could be a problem."

Root rots:

From the samples I received over the last 10 days with root rot-like symptoms, I isolated *Bipolaris sorokinina* (common root rot) from discolored sub-crown internodes, and (from a different sample), I isolated a fungus that appears to me to be Fusarium (it certainly produces fusiform spores). The spotty, extremely heavy rainfall of several weeks ago combined with the drought and warmth over the last 2 months, it is difficult to separate some of the root rots from other weather/environmental effects.

Other problems:

Dr. Tom Allen (Asst. Research Scientist at Bushland, TX) has reported widespread incidence of both wheat streak mosaic virus and high plains virus in the Texas panhandle.

Pinching pennies this year? Consider an N-Rich strip.

Dr. Jeff Edwards, Extension Small Grains

Farmers across the country are looking for ways to trim the fat from their operations, and justifiably so. The key is knowing how to trim the fat without cutting into muscle, and this cannot be accomplished without a clear distinction of where the fat ends. Determining this optimal point is difficult in agriculture, but luckily we have tools, such as sensor-based nitrogen recommendations, that can help us to determine where the fat ends and muscle begins.

If you have been to a county extension meeting within the past two years, it is likely that you have been introduced to the concept of sensor-based nitrogen recommendations (a.k.a. Greenseeker or N-Rich Strips). Simply put, this system uses a hand-held sensor to compare plant health and plant size between an area where nitrogen is not limiting (i.e. an N-rich strip) and an area that represents normal farmer practice. The first step in this process is to create an N-rich strip. The following are a few frequently asked questions regarding N-rich strips:

How do I create an N-rich strip?

In the simplest terms, an N-rich strip is an area where Nitrogen is not limiting. This can usually be accomplished by applying 2.5 – 3 lbs/ac of nitrogen for every bushel of wheat yield goal. For example, a producer with a 40 bu/ac yield goal would apply around 100 – 120 lb/ac in an N-rich strip.

How big does my N-rich strip have to be?

There is no one-size-fits-all answer to this question. The N-rich strip needs to be in a representative area of the field and large enough to accurately reflect the variability in crop growth in the field. So, a very uniform field would only require a small N-rich strip (maybe 30' wide by 100' long), but for most producers a longer strip will be better.

When to I create my N-rich strip?

In a perfect world, all N-rich strips would be created pre-plant or soon after emergence. However, N-rich strips created as late as the end of December can still be effective. The take-home message is the earlier the better.

Do I need an N-rich strip in every field?
YES!

I graze my wheat, how does that change things?
Yes. Based on some of our experiences last year, we have concluded that N-rich strips in a grazing system may require more nitrogen than in a grain-only system. This is likely because forage production and preferential grazing by cattle removes more N from the soil profile. In this situation, we can wind up with strips that are no longer truly N-rich. We are conducting research to find easier ways of using sensor-based recommendations in a dual-purpose system, but the best recommendation right now is to create your N-rich strip as normal and monitor it throughout the year. If the N-rich strip starts to look N-deficient, then a supplemental N application may be necessary.

Whom do I contact for more information?
As always, your local county extension educator is your best one-stop shop for information on N-rich strips and other agronomic topics of interest.

Hessian Fly: A Potential Concern for Oklahoma Wheat Producers?

Dr. Tom A. Royer, Extension Entomologist

Oklahoma growers are again experiencing Hessian fly infestations in some areas of Oklahoma this year, raising questions regarding their "future" in Oklahoma. I would like to try and answer some of those questions:

Q: Why have we seen increases in Hessian fly infestations these past few years?
A: Hessian flies require a food source (wheat, barley or rye) and adequate conditions for survival. Oklahoma has always had plenty of food for Hessian flies, but we have not always had adequate conditions for survival. It was believed that Hessian fly typically did not survive well under dry conditions, but increased during mild winters with adequate fall and spring precipitation (something we have experienced in the last few years). More recently, Hessian fly has been found farther west in Texas, suggesting that they may be adapting to drier climatic conditions that previously seen.

Oklahoma producers often plant wheat early to take advantage of the forage that wheat produces for grazing by cattle. However, they have also not traditionally had many winter crops to rotate their wheat crop with, so a common rotation is continuous wheat. Hessian fly has not been a persistent or common pest in Oklahoma, so there has been little demand for developing or planting Hessian fly-resistant wheat varieties. Producers have typically not seen an economic advantage to using an insecticide-treated seed, so it is not commonly used. The one factor that has been consistent over the past few decades is that wheat fields have been clean tilled during the summer, which adequately destroys the Hessian fly pupae that are over-summering in wheat stubble or volunteer wheat.

During the past few years, there has been a renewed interest in conservation tillage among producers, due to concerns about sustainable production systems and especially because of increased fuel prices. This provides a strong incentive to try and reduce "trips across the field". In my opinion, the reduction in clean tillage is the most important factor for the apparent increase in Hessian fly infestations that we have been experiencing in Oklahoma. This fall, I collected wheat plants from several fields in northern Oklahoma that illustrate the importance of some of the management strategies that can be used for Hessian fly (See Table).

Tillage	Crop Rotation	Plant Date	Insecticide	plants infested	tillers infested
NT	Wheat/Wheat	E	No	61%	41%
NT	Wheat/Wheat	E	Yes	0%	0%
NT	Wheat/Wheat	E	No	89%	40%
T	Wheat/Wheat	E	No	22%	5%
NT*	Corn/Wheat	E	No	94%	51%
NT**	Corn/Wheat	E	No	33%	10%
NT	Corn/Wheat	L	No	0%	0%

T = Tilled, NT = No-till
E = early planted, L = late planted
*sample taken next to wheat stubble
**sample taken ½ miles away from wheat stubble

Q: What do these flies look like, and when do they attack wheat?
A: The adult Hessian fly is a tiny insect about one-eighth of an inch long that resembles a gnat. The damaging stage is the larva, which starts out as an orange, headless and legless maggot that turns into a shiny, white maggot as it gets older. It measures

up to 3/16 of an inch. When mature, the larvae form dark brown, 1/8 inch long puparia that are commonly referred to as a "flaxseed" and look like a grain of rice.

Hessian flies emerge from their puparia in response to temperature and precipitation. Typically, they emerge about 12 days after a significant rainfall (1 inch or more) if temperatures are favorable. There are 2 main generations that occur coupled with one or more "minor generations that occur in Oklahoma. The two most important are a fall infestation and a spring infestation.


Adult Hessian fly

Photo courtesy of Jimmy Hatchett, Kansas State Universitv

Q: When should I look for them, and what does the damage look like?
A: The fall infestation normally occurs from September 1 through mid October. Young infested plants become dark-green to bluish green in color and are stunted with thickened leaves. Often, secondary tillers fail to develop or simply die. To confirm an infestation, the plant and roots should be removed from the soil and inspected for maggots or flaxseeds by gently pulling the leaf sheath away from the stem and examining the crown area. Pay particular attention to any secondary tillers for flaxseed.

The spring infestation normally occurs when temperatures average 45 to 50 degrees coupled with a rainfall event. In a spring infestation, the stem is often injured, and will lodge at the point of feeding. A heavily infested field looks like it has suffered hail damage. In such fields, the lodged plants will nearly always contain "flaxseeds" that are inserted at the first joint of the stem, just under the leaf sheath. You can estimate damage by counting fallen tillers per foot of row in several locations, and dividing that by the number of heads in a foot of row.

Q: What kind of yield loss might I expect from an infestation?
A: Fall infestations will kill tillers on plants or reduce their potential to contribute much to the yield. Spring infestations cause wheat stems to lodge, making them difficult to pick up with a harvester. According to researchers that evaluated soft red winter wheat, a fall infestation that exceeds 8% infested tillers, and a spring infestation that exceeds 20% infested tillers causes economically significant damage.

Q: What should I do to prevent future Hessian fly outbreaks?
A: Control: Hessian fly can be managed using several methods which work best when done in combinations.

- Plant late (after mid October). Fields planted later, say in mid to late October, are at less risk of a fall infestation. A specific "fly-free planting date" is not well-defined for Oklahoma growers, with the exception of the northern tier of counties in Oklahoma, including the panhandle. Why, because in much of the state, Hessian flies can emerge any time during an extended warm period. A final note: the fly-free planting date only works on the fall generation; it does not affect infestations that occur in the spring. In fact, <u>be careful about planting too late</u> since late-planted fields may be more vulnerable to a spring infestation because adult flies prefer to lay eggs in younger wheat.

- Plant resistant varieties: Resistant varieties represent a very effective tool for managing Hessian fly. Unfortunately, while there are many resistant varieties available for spring or soft red winter wheat, there are far fewer hard red varieties with identified resistance. The most popular variety, "Jagger" is listed as susceptible. I collected Hessian fly pupae from several infested fields in north central Oklahoma and had them tested. Results showed that biotypes A, B, C, and D comprised 90+% of the biotypes that were collected. Thus, any variety that has resistance to one or more of those biotypes will be of value in areas where Hessian fly has been a more consistent problem.

- Bury wheat residue 2-4 inches beneath the soil surface and destroying volunteer wheat by August 15: Burying wheat stubble and eliminating volunteer wheat is effective, but not realistic if the producer is committed to no-till. In such systems, the use of resistant varieties, multi-crop rotations, delayed planting and seed treatments should be considered.

- Rotate wheat with a non-host crop: This can be an effective way of reducing Hessian fly infestations, but remember that Hessian fly adults can move up to 1 mile from their over summering/overwintering site.

- Treat seed with Gaucho or Cruiser: According to Kansas researchers, seed can be treated with Gaucho or Cruiser insecticide to control fall infestations. This should be a strong consideration for growers that use no-till or conservation tillage, and are growing continuous wheat. Dr. Gerald Wilde, a research entomologist at Kansas State, has conducted some studies that evaluated control of Hessian fly with seed treatments. His work showed that Gaucho and Cruiser both reduced Hessian fly compared to untreated seed by about 90%. **REMEMBER**, these seed treatments do not reduce spring infestations.

- Apply insecticide to control spring infestations: Presently I know of no effective insecticide control for spring infestations in Oklahoma, although research from Georgia has looked at timing insecticide applications to the spring egg laying activity of adult flies.

In summary, the future of Hessian fly in Oklahoma is difficult to predict. It is likely to be a more common problem if significant acres of wheat are cultivated in no-till systems. Management using combinations of methods will be necessary to keep this pest from causing significant economic loss to wheat producers.

Wheat yield response to chlorine fertilization in Oklahoma

Recent articles in popular press have touted the benefits of chlorine (Cl) fertilization of winter wheat. It is true that in many areas of the country, wheat yield has shown a positive response to Cl fertilization, but data collected by OSU researchers Hailin Zhang and Bill Raun indicate that this may not necessarily be the case in most Oklahoma soils. They collected 200 soil samples from 17 Oklahoma counties and analyzed them for soil chloride content. They used guidelines established by previous studies to determine the likelihood of a crop response to Cl fertilization. These were:

30 lb/ac soil test Cl or less in the upper 24” of soil = high likelihood of a crop response to Cl fertilization

30-60 lb/ac soil test Cl in the upper 24” of soil = fair chance of crop response to Cl fertilization

60 lb/ac soil test Cl or higher in the upper 24” of soil = low likelihood of crop response to Cl fertilization

To compare sampling methods, they also compared soil test Cl levels when taking a 0-6” sample as compared to a 6-24” sample. Their data indicate that a 6” sampling depth might incorrectly identify a need for Cl fertilization when the need does not exist (Figures 1 and 2). This is because wheat roots generally penetrate much deeper than 6”, and would have ample access to Cl deeper than 6” in the soil profile. When the 6-24” samples were analyzed, 68 % of samples indicated a low likelihood of response to Cl fertilization, 32% of samples indicated a fair likelihood of crop response to Cl fertilization, and 0% of samples indicated a high probability of crop response to Cl fertilization (Figure 2).

Figure 1. Based on 200 samples from 17 Oklahoma counties, a typical 6" deep soil sample has a good probability of showing a Cl deficiency, but a 24" deep sample will likely tell a different story (Fig. 2).

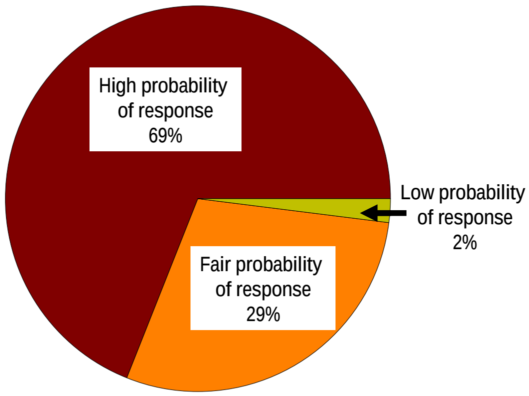
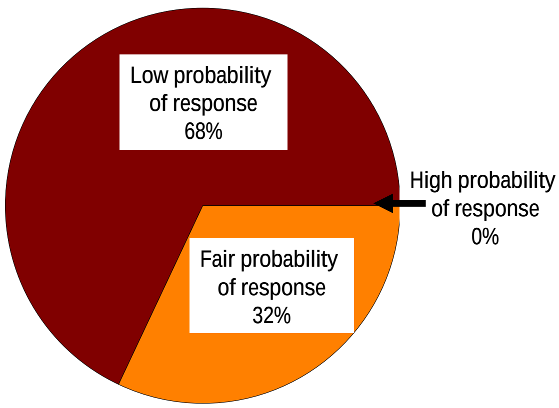


Figure 2. When the same 200 sample sites from Fig. 1 were sampled at 24" depth, the majority showed little likelihood of a crop response to Cl fertilization.



In addition to soil sample analysis field trials were conducted to evaluate the response of wheat yield to Cl fertilization. Two years of data showed no response to Cl fertilization at Carrier or Hennessey, OK. A positive response was observed each year at Perkins, OK. Chlorine is very mobile in soils, especially sandy soils with low organic matter. The soil at the Perkins, OK test location was very sandy soil with low organic matter, which may explain the positive response to Cl fertilization at this location.

The take-home message here is that to apply Cl fertilizer without a soil test is a shot in the dark, at best. Responses are most likely on sandy soils with low organic matter, but a soil test is needed to accurately gauge the likelihood of a crop response. Further, this soil test must be taken at a 6-24" depth to accurately assess Cl availability to the plant.

Contact your local extension agent for more information on soil testing procedures and more information on wheat fertilization.

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