k-state extension Agronomy e-Updates

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1. Kansas farm and agricultural assistance contacts

The Kansas Rural Family Helpline is available to provide confidential information and referral to families affected by the recent winter storms in Kansas. The toll-free number is 1-866-327-6578. The Rural Family Helpline deals with many issues, including financial stress, depression, suicidal thoughts, family conflict, and others.

More information at:
http://www.humec.k-state.edu/fshs/pfws/krfhprogram.htm
or
http://www.k-state.edu/farmksu

Other resources and assistance for agricultural families include:

* K-State's Kansas Agricultural Mediation Service (KAMS) and Farm Analyst Program
800-321-3276
http://www.oznet.ksu.edu/kams

KAMS specialists provide initial information and guidance at no cost through a toll-free hotline**.** A state-wide network of cooperating agencies and programs includes a pool of trained agricultural mediators, K-State Research and Extension financial consultants and Kansas Legal Services (KLS). The program's goal is to help resolve conflicts and disputes using mediation.

-- Providing alternative dispute resolution opportunities for Kansas agricultural borrowers and creditors.

-- Providing dispute resolution for farmers with non-credit issues concerning other USDA agencies (FSA, NRCS, FCI).

-- Helping Kansas farmers facing financial adversity through the mediation process.

* Kansas Legal Services, 800-723-6953. This is a statewide non-profit organization dedicated to helping low-income Kansans meet their basic needs through the provision of essential legal, mediation, and employment training services.
http://www.kansaslegalservices.org/Home/PublicWeb

* K-State's AgrAbility Program, in the Department of Biological and Agricultural Engineering, which helps people with disabilities who are employed in agriculture.
800-526-3648
http://www.oznet.ksu.edu/agrability

-- Steve Watson, Agronomy e-Update Editor
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2. Effect of prolonged ice and snow on wheat

Ice and snow have fallen over parts of Kansas off and on since late December and into January. The effects of this on wheat will vary. On the positive side, the winter storms have provided needed moisture and, in the case of snow, protection from cold temperatures. On the negative side, prolonged ice cover can injure wheat.

Ice

Ice helps provide needed moisture where it melts within a few days. But where a sheet of ice covers the wheat for an extended period, it cuts off oxygen, traps the byproducts of respiration, and generally creates an anaerobic environment that is not healthy for wheat.

If the wheat was dormant when it was first iced over, the wheat can survive anaerobic conditions for a longer period of time. Dormant wheat may not suffer any damage unless it remains under a sheet of ice for 2 to 4 weeks.

The bigger problem is where wheat was actively growing at the time of the icing event. Unfortunately, temperatures had been unusually warm until the first of the winter storms in late December, and most of the wheat was not fully dormant when it was covered by ice. Wheat that is actively growing can only tolerate about 7 to 10 days under ice, in an anaerobic environment, before it starts to suffer some damage. In this situation, the wheat will suffer from oxygen depletion, and a buildup of toxic gases.

According to a Canadian study, prolonged ice cover (40 days) resulted in reduced oxygen consumption and a buildup of carbon dioxide and ethanol in the wheat plants. Wheat survival rate ranged from 20 to 60 percent. See:
http://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=1091982

To find out if wheat under an ice sheet has been damaged, producers can dig up some plants and soil from different parts of the field about two weeks after the ice has melted, bring them inside. If the plants do not begin greening up and showing signs of growth within two weeks, they probably did not survive. Survival rates will also become apparent in the field after the ice clears and the weather starts to warm up into the 60's again in late winter or early spring.

Snow

For the most part, the snow that western Kansas has received recently should be beneficial to the wheat crop. The soils in these areas had been getting dry, and the snow will add needed moisture.

If the wheat remains under snow cover for too long, however, it's possible that wheat could become infected with "snow mold" disease. Snow mold very rarely occurs in Kansas, but it can happen. The following information comes from Washington State University:

Snow molds of wheat consist of several diseases, primarily pink snow mold and speckled snow mold, which generally are severe only in areas with early snowfall and prolonged, deep snow cover on unfrozen ground.

Cause
Pink snow mold is caused by *Microdochium* (synonym *Fusarium*) *nivale*, a fungus with stout, sickle-shaped conidia that are 1- to 3-septate. The sexual stage is *Monographella* (synonym *Calonectria*) *nivalis*. Perithecia of this ascomycete are found in mycelial mats and contain asci with 1- to 3-septate, spindle-shaped ascospores. The fungus attacks plant parts during wet, cool weather, but is not dependent upon snow.
Speckled snow mold is caused by *Typhula idahoensis* and the similar *T. ishikariensis*, two basidiomycete fungi that produce small (0.5-1.5 millimeter), black sclerotia. Both species are restricted to areas with deep snow. Less serious is *T. incarnata*, which has a wider geographical range and is found even in areas without prolonged snow cover. It forms slightly larger sclerotia, similar to radish seeds in size, shape, and color. All three *Typhula* species form clubshaped basidiocarps about 1 centimeter long.

Hosts
Wheat and some turf grasses are the main economic hosts, although these fungi have been reported on a wide range of cereals and grasses.

Symptoms and Signs
Snow molds are most apparent in early spring when the snow first melts. Pink snow mold

produces pinkish mycelium and conidia that cover dry yellow or dead leaves (Photo 12). Dark colored fruiting bodies may be embedded within lower leaf sheaths
In the case of speckled snow mold, leaves appear scalded or bleached-white or tan in color and have a tendency to crumble. Enzyme action of the pathogen on leaves under the snow releases chlorophyll and produces "green snow." Plants dug out of the snow will reveal dissolution of leaf tissue. Numerous scattered dark sclerotia that give diseased plants a speckled appearance are a key diagnostic feature. Plant vigor may be markedly reduced, and in severe cases, the crowns are killed. Surviving plants recover slowly and are sensitive to additional stresses.

Disease Cycle
Fusarium usually survives as conidia or mycelium on living plants, and it can maintain itself as a crown and root rotting fungus. *Typhula* survives as a parasite or as sclerotia in plant debris or soil. The sclerotia germinate to form basidiocarps (Photo 13), which produce basidiospores. When *Typhula* or *Fusarium* spores germinate, they invade plant tissue. Older leaves in contact with soil under snow are attacked first. Crowns may be invaded later. The fungi continue to develop under the snow and eventually produce conidia or sclerotia. The snow mold pathogens are most aggressive at low temperatures, that is, slightly above freezing. Early snowfall and deep (about 1 foot), prolonged (about 100 days) snow cover on unfrozen ground favor the disease. Deep snow maintains the surface of unfrozen soil at about 41F.

See: http://pnw-ag.wsu.edu/smallgrains/Snow%20Mold.html

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3. Corn population recommendations

The Kansas Corn Production Handbook has been revised, and is nearing completion. The handbook includes a new discussion of recommended plant populations.

The recommendations that will be in the revised handbook are:

Suggested Dryland Corn Final Populations and Seeding Rates			
Area	Environment	Final Plant Population (plants per acre)	Seeding Rate*
Northeast	100-150 bu/a potential	22,000-25,000	25,900-29,400
	150+ potential	24,000-28,000	28,200-32,900
Southeast	Short-season, upland, shallow soils	20,000-22,000	23,500-25,900
	Full-season	24,000-26,000	28,200-30,600

	bottomground		
Northcentral	All dryland environments	20,000-22,500	23,500-26,400
Southcentral	All dryland environments	18,000-22,000	21,200-25,900
Northwest	All dryland environments	16,000-20,000	18,800-23,500
Southwest	All dryland environments	14,000-20,000	16,500-23,500

Suggested Irrigate Corn Final Populations and Seeding Rates			
Environment	Hybrid Maturity	Final Plant Population (plants per acre)	Seeding Rate*
Full irrigation	Full-season	28,000-34,000	32,900-40,000
	Shorter-season	30,000-36,000	35,300-42,400
Limited irrigation	All	24,000-28,000	28,200-32,900

* Assumes high germination and that 85 percent of seeds produce plants.

Optimum plant populations depend on the yields a particular environment will permit. This explains the wide range in recommended plant populations across the state. The desired plant population for dryland corn in a wheat-corn-fallow rotation in northwestern Kansas may be only 16,000 to 20,000 plants per acre; whereas dryland corn in northeastern Kansas may require 22,000 to 25,000 plants per acre or more to maximize yield. Most irrigated corn plant populations will range from 28,000 to 34,000 plants per acre, with some as high as 36,000 plants per acre. If irrigation is limited, the desired plant population may range from 24,000 to 28,000 plants per acre, depending primarily on soil type and amount of available water.

The picture is made more complex by the interaction of yield response to plant population with other management practices and environmental conditions. Dramatic changes in temperatures and rainfall resulting in erratic yield levels often are observed from one year to the next in a particular area. This is especially true for dryland corn in central and western Kansas. Populations somewhat lower than those listed in the chart above may, in fact, result in more consistent dryland yields in western Kansas. But with lower populations, yields may be limited if growing conditions are good.

Optimal seeding rates may need to be adjusted for irrigated corn if fertilizer or irrigation rates are sharply increased or decreased. For example, research at the Irrigation Experiment Field near Scandia has shown that if fertilizer rates are increased, seeding rates also have to be increased to realize the maximum yield benefit.

If populations are too low to use the growing conditions, corn can compensate by producing larger ears. An average ear weight is near 0.5 pound, but smaller ears are more likely with high populations or less favorable growing conditions.

Hybrids also respond differently to plant populations. When the population is too high, some hybrids will have barren stalks and produce lower grain yields. Shorter-season hybrids should have final stands that are 10 to 15 percent higher then those suggested for full-season hybrids in the same environment.

In addition to yield differences, the effect of population on root and stalk lodging should be noted. Lodging increases as populations increase, but the problem is more severe with some hybrids. Producers should consult seed company recommendations for desired plant populations of specific hybrids.

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These e-Updates are a regular weekly item from K-State Extension Agronomy. All of the Research and Extension faculty in Agronomy will be involved as sources from time to time. If you have any questions or suggestions for topics you'd like to have us address in this weekly update, contact Jim Shroyer, Research and Extension Crop Production Specialist and State Extension Agronomy Leader
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