k-state extension AGRONOMY e-Updates

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1. Nitrogen management considerations for wheat

Tillage systems affect nitrogen (N) management for wheat in many ways. Nitrogen rates, application methods, and timing can all be affected by tillage considerations. Some of the most important factors include the following.

* Even distribution of previous crop residues is extremely important for no-till wheat. Nitrogen applied on the surface can get tied up, or immobilized, on crop residues and be unavailable to the currently growing crop for several months or longer. Where there are windrows of residue, the N immobilization potential is especially high for surface-applied materials. Also, where wheat is planted into fields with an uneven distribution of crop residue, the wheat may have poor stand establishment and root development in the areas of especially heavy residue.

* No-till wheat may require an extra 20 to 30 lbs of N per acre compared to conventional-till wheat. One reason for this is that no-till soils are generally cooler, and have lower N mineralization rates. Another reason is that organic matter levels tend to build up slowly in no-till soils, and this process uses and stores soil N. For example, every percent organic matter in the top 6-7 inches of soil contains about 1,000 pounds of N per acre. If the soil organic matter level were to increase by a full percentage point over 20 years, an extra 50 lbs N per year per acre would need to be invested just to build up the organic matter level. That's over and above the needs of the crop.

* Topdress N should be in the root zone by jointing. Producers should not wait too long to apply topdress N. Topdress applications should be applied early enough to have a good chance of moving down into the root zone by jointing. By waiting until the last minute, producers run the risk of being prevented by wet weather from applying the N in time. On the other extreme, late-applied topdress N may not receive any precipitation for a time after it is applied, and thus may not get into the root zone when the plant needs it most to maximize yield potential.

* Urea-containing N fertilizer products (such as dry urea or N solutions) should not be placed in direct seed contact as a starter fertilizer.

* On medium- and fine-textures soils with adequate internal drainage, applying N in a subsurface band is generally more efficient and consistent than surface-applied N in no-till. A subsurface band minimizes or eliminates the potential for immobilization, places N in the active root zone where it is needed, and would eliminate any potential for volatilization losses if it exists.

* For surface applications of N, applying it in a dribble band is generally more efficient and consistent that broadcast N, but not as consistent as subsurface applications.

* Although broadcast surface applications of N are often somewhat less efficient and consistent overall than subsurface band applications, there are can be many reasons that broadcast applications better fit many producers operations;

-- Can cover more acres per day
-- Does not require specialized equipment
-- Does not require extra horsepower or fuel use
-- Allowing producers to tank mix with herbicides in a single application

While topdress N applications to wheat may sometimes result in some leaf burn (especially late applications in early spring), it is generally cosmetic only and has not resulted in noticeable yield loss in Kansas trials.

* On well drained, medium- and fine-textured soils, there is generally no agronomic advantage to making multiple split applications of N. For no-till wheat, however, there may be an advantage to applying at least 20 to 30 lbs of N preplant or at planting time in order to supply adequate N for fall growth.

* On poorly drained or claypan soils, topdress applications of N are preferred. Fall applications of N are subject to denitrification losses on these soils.

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2. Oat forage production

With the conditions of the last several years, many producers have had problems getting adequate hay and/or grazing production from pastures. Recent winter precipitation provides an opportunity for producers who need a quick supply of forage from spring pasture, silage, or high-quality hay for next fall/winter. Spring oats may be an option for producers in this situation. While best suited for hay or silage, oats can also provide high-quality pasture in April and May, until other grazing sites are ready. When properly stored, oats also provide a high quality source of hay for next fall and winter.

Considerations for pasture, silage, and hay

Producers should treat oat pasture as they would winter wheat pasture when determining stocking rates and when to place cattle in terms of vegetative growth. Since grain production is not recommended under grazing oats, the length of pasture production will be a function of stocking rate and weather.

Oats should be harvested for silage from late milk through early dough stages. Expect silage with a TDN of approximately 60%, and 9% protein on a dry basis. For hay, late boot to early heading is the optimal timing. Harvested at the soft dough stage, hay should have an approximate TDN of 56% with 10% protein, both on a dry basis. A nitrate test is recommended when oats are harvested for hay.

Cultural practices

Before planting oats, check herbicide applications on the desired field. Oats are especially sensitive to triazine herbicides.

The optimal planting date varies depending on the area of the state. In southeast Kansas, the optimal date ranges from Feb. 20 to March 15. In northwest Kansas, the optimal date is from the first week of March through the end of March. For most of the remainder of the state, the ideal planting date ranges from late February through the mid-March. After the optimal planting range, production will be limited most years.

To maximize pasture production potential, it is necessary to plant toward the early side of the optimal range of planting dates. A seeding rate of two bushels per acre is recommended for pasture production. Under good soil moisture conditions, three bushels may be preferable for grazing. When grown for hay or silage, fertility recommendations are similar to those for grain production -- 75 to 125 lb/acre nitrogen. When planted for grazing, additional 30 lb/acre nitrogen is recommended. As always, a soil test is recommended.

Oats may be successfully planted no-till. However, growth and vigor are typically greater where pre-plant tillage is used. In either case, a fine, firm seedbed is necessary for optimal production. Also to make planting easier and get maximum potential forage production, winter annual weeds should be controlled either with tillage or with a burndown herbicide treatment prior to planting. Weed control is best achieved by having a good stand and rapid growth. Herbicides are available, although many are not permitted under forage production. Before using any herbicides consult the label.

Spring Oat Dry Matter (Hay) Yield: Hutchinson, 2005-2006

Variety	Dry Matter Yield lbs/acre production on a dry weight basis		
Year	**2005**	**2006**	**2-year average**
Bates	7700	7900	7800
Blaze	9700	10800	10250
Chaps	7600	-------	
CHD-2301-SO	5700	9000	7350
Dane	7400	7900	7650
Don	6800	------	
Drumlin	9500	------	
Esker	9200	8800	9000
Forage Plus	8500	8200	8350
Gem	9400	8800	9100
INO9201	8900	------	
Jay	7700	-----	
Jerry	8400	-----	
Jim	8400	-----	
Kame	------	10500	
Leonard	------	9700	
Moraine	8100	9400	8750
Ogle	8000	7700	7850
Reeves	8100	9900	9000
Richard	9200	9200	9200
Spurs	7900	8900	8400
Stallion	-----	9800	
Thunderleaf	-----	8000	
Winona	-----	8900	

Forage yield data

The table above is a summary of oat forage production research at the South Central Experiment Field for the 2005 and 2006 crop years. Both years 75 lbs/acre nitrogen was applied pre-plant, with 50 lbs/acre nitrogen topdressed. The seeding rate was 64 lbs/acre. Hay was cut at the late milk/early dough stage, with an average hay moisture at cutting of 60 percent. Some oat varieties were negatively affected by a late freeze in 2005. Growing conditions were good in 2006.

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3. Spring greenup will reveal whether ice has damaged wheat

Wheat has been covered with ice and snow for several weeks in much of western Kansas, and scattered throughout other regions of the state. For the most part, the snow cover is welcome. Snow provides protection from extremely cold temperatures and will help topsoil moisture conditions when it melts.

Ice cover can also provide moisture and protection from the cold, but it can also be a potential problem for wheat. Whether prolonged ice cover will damage wheat on a given field is hard to predict. Research has shown that damage is possible after 10 to 40 days of ice cover, depending on the physiological status of the wheat and the microclimate at the soil surface.

Ice cover can cut off the oxygen supply to wheat, creating anaerobic respiration. The byproducts of anaerobic respiration, ethanol and carbon dioxide, and eventually kill the plants.

Whether this actually occurs depends on a few key factors, such as the microclimate at the soil surface. If there was a layer of snow or loosely packed sleet, or even loosely packed crop residue, covering the wheat before the ice storm occurred, there may be enough trapped oxygen for the wheat to survive. On the other hand, if the wheat was covered by a solid sheet of ice with very few air pockets, the ice cover poses more of a threat.

If the wheat was dormant when it was covered by ice, it can remain healthy longer than if the wheat was actively growing at the time – possibly as long as 20 days or longer, depending on the microclimate conditions.

There is no way to predict with certainty how any given field of wheat will respond to the ice and snow this winter. Producers should not assume anything at this point, even if their

wheat has been under ice for several weeks. The wheat may be fine, or the stand may be thinned. Some plants may lose part or all of their tillers. In the most severe cases, entire plants may die.

Spring greenup will tell the story. If there are areas within a field that do not green up and start growing when temperatures warm up in late winter or early spring, then producers should think back to what happened during December and January. If the problem area was under ice for several weeks, that could well be the cause of the problem.

If a field that had been under ice does not seem to be greening up normally, producers should proceed cautiously because the field may need to be replanted to a row crop. They should avoid applying any herbicides with a residual period that would prevent them from destroying the stand and planting a row crop this spring, if necessary.

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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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