Issue 604

K-STATE
Research and Extension

Extension Agronomy

eUpdate

12/16/2016

These e-Updates are a regular weekly item from K-State Extension Agronomy and Steve Watson, Agronomy e-Update Editor. 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 Steve Watson, 785-532-7105 swatson@ksu.edu, or Curtis Thompson, Extension Agronomy State Leader and Weed Management Specialist 785-532-3444 cthompso@ksu.edu.

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1. Grazing cover crops: Toxicity considerations

(Note: The following is a slightly edited excerpt from K-State Research and Extension Publication MF3244, Forage Crops Grazing Management: Toxic Plants. – Steve Watson, Agronomy eUpdate Editor)

Annual cover crops grown in place of fallow can provide high-quality forage during key production periods and may help reduce soil erosion, suppress weeds, and increase soil nutrient profiles. Traditionally grown for agronomic or soil benefits but not harvested, cover crops are being considered for grazing, haying, or planting as annual forages. They are appealing because of the potential for additional revenue from improved cattle performance combined with the benefits of soil stabilization. Those contemplating this decision should know that plants that work well as cover crops may not be suitable for forage or grazing. In fact, some species can be toxic or fatal to livestock. This article describes popular cover crops and the dangers they present for grazing livestock.

Poisonous Plants

Hairy vetch

Hairy vetch is a nitrogen-fixing plant that works well as a cover crop but is not recommended as a forage crop because of toxicity to cattle and horses. Hairy vetch prompts an allergic reaction with symptoms such as subcutaneous swelling, photosensitization, hair matting, skin sloughing, oral ulcers, cough, alopecia, weakness, loss of appetite, diarrhea, decreased milk production, sporadic abortions, red-tinged urine, and death. The mortality rate for affected animals ranges from 50 to 100%, usually as a result of kidney failure. Grazing is risky at any stage of plant growth. Animals with black pigmented skin such as Angus, Angus cross, or Holstein cattle and black horses, are the most susceptible, but Hereford cattle also may be affected.

Hairy vetch poisoning has been linked to herd genetics, which may explain why livestock deaths associated with this plant tend to cluster within herds. Unfortunately, there is no genetic test to indicate live- stock sensitivity to hairy vetch. Weigh potential benefits and risks when deciding whether to plant hairy vetch as a forage crop.

Lupin

Lupin is a good source of protein and energy in livestock feeds for both ruminants and monogastrics, but use is limited to four nontoxic species: narrowflower lupine *(Lupinus angustifolius)*, white lupine (*L. albus*), European yellow lupine (*L. luteus*), and tarwi (*L. mutabilis*). The lupin grain can be fed and is relatively low in starch, which reduces the likelihood of acidosis. Even though lupin grain is high in protein, when feeding to monogastrics, bear in mind that lupins are low in methionine and lysine.

Six lupin species that are particularly toxic to cattle and sheep are silky lupine (*L. sericeus*), tailcup lupine (*L. caudatus*), velvet lupine (*L. leucophyllus*), silvery lupine (*L. argenteus*), summer lupine (*L. formosus*), and sulfur lupine (*L. sulphureus*). These poisonous plants can kill sheep and may cause cleft palates, crooked legs, distorted and malformed spines, and other birth defects when consumed by pregnant cows.

Amaranth

Amaranth is a bushy plant related to pigweed. Species used for grain production include love-lies-bleeding (*Amaranthus caudatus),* red amaranth *(A. cruentus),* and Prince-of-Wales feather *(A. hypochondriacus)*. The grain from the amaranth plant is marketed to food processors, breakfast cereal companies, and health food stores. Spiny amaranth or spiny pigweed (*Amaranthus spinosus* L.), redroot pigweed (*Amaranthus retroflexus*), and Palmer amaranth (*Amaranthus palmeri* S. Watson) are examples of amaranth species that are classified as true weeds and hard to control in pastures and crops. Palmer amaranth is consistently high in nitrate and potentially toxic to cattle. Know which amaranth species you are getting before using it as a forage crop for livestock.

Metabolic disorders

Brassicas – Kale, rapeseed, swede, turnip, canola, mustard

Brassicas provide high-quality, high-protein feed for cattle. Aboveground parts provide 20 to 25% crude protein (CP) with 60 to 80% *in vitro* digestible dry matter. Roots are 10 to 14% CP and 80 to 85% digestible. Brassicas are ready for grazing about 75 days after planting. Regrowth is possible if not overgrazed. Palatability increases after a freeze.

Brassicas are high in moisture and low in fiber. Other dry feeds should be offered to maintain a functional ruminal environment. They are low in copper, manganese, and zinc. Plan to supplement with a properly balanced mineral to meet cattle requirements. This is especially important for breeding animals.

Maladies associated with improper grazing include polioencephalomalacia, hemolytic anemia (abnormal breakdown of red blood cells, mainly an issue with kale), pulmonary emphysema (a permanent accumulation of air in lungs), nitrate poisoning, bloat (especially with canola), and metabolic problems associated with glucosinolates. Photosensitivity may be observed in sheep. Polioencephalomalacia (PEM), anemia, and emphysema are normally found when the cattle diet consists solely of brassicas. Brassicas should comprise no more than 75% of the total diet. An iodized mineral pack should be offered to counter negative effects of glucosinolates on iodine uptake.

Nitrate toxicity is possible with brassicas. Test forage before turnout to determine if it is safe based on laboratory results. In general, the more mature the plant, the lower the nitrate concentration. If nitrate value is high early in the season, it may be suitable for grazing at a later date. Introduce animals to the brassica diet over 5 to 7 days. Do not turn out hungry animals. Make sure they are full of hay first.

Canola is high in sulfur, increasing the risk of PEM. Test sulfur levels in the canola plant and water source to minimize toxicity concerns. Sulfur may inhibit absorption of minerals and particularly copper and selenium. Provide a trace mineralized salt and mineral supplement to cattle grazing canola.

Flax

Grazing flax is not recommended because of the potential for prussic acid poisoning. Avoid grazing green flax straw, in particular, and especially right after a freeze when risk is higher. On the other hand, harvested flax seed is a good high-protein feed. In addition to 35% CP, it offers a unique fatty acid profile, making it desirable as a dietary supplement for horses. After seed harvest, flax straw's high cellulose and lignin content makes it a poor-quality forage. Despite desirability as feed, flax is not recommended for grazing or haying.

Small grains – Barley, Oats, Rye, Ryegrass, Wheat, Triticale

Rapidly growing, lush grasses can lead to grass tetany in grazing cattle. Grass tetany is more common in the spring but can occur with the cool-season growth of small grains in the fall and winter. High-protein grasses may contribute to bloat.

To manage grass tetany, provide magnesium to lactating cows, preferably a free-choice mineral containing 8 to 12% magnesium. Begin supplementation before turnout, making sure the mineral is palatable to ensure adequate intake. Increasing legumes to 30% of the pasture may reduce risk of grass tetany.

Nitrate toxicity risk increases with heavy nitrogen fertilization of cool-season grasses. Nitrate can accumulate, reaching dangerous levels on cool, cloudy days, during periods of drought or under environmental conditions that slow grass growth and metabolism.

Legumes

Grazing either yellow or white sweetclover, is not a risk for cattle, however moldy hay puts cattle at risk for sweetclover poisoning. Low-coumarin varieties such as red clover and Banat sweetclover (*Melilotus dentate)* are exceptions. Yellow (*M. officinalis)* and white (*M. albus)* sweetclover varieties contain the most coumarin. Avoid feeding moldy sweetclover hay to cows within 2 weeks of calving to reduce the risk of abortion.

Bloat is another concern when grazing clovers and legumes. Forage with less than 50% clovers is less problematic. Never give hungry animals access to lush clover stands, and provide dry hay to reduce bloat. Clovers are less likely to cause bloat than alfalfa. Annual lespedeza, birdsfoot trefoil, and sainfoin are not known to cause bloat, but certain birdsfoot trefoil species may contain high levels of prussic acid.

Cattle will consume lablab, cowpea, sunhemp, mungbean, and soybean, which are suitable for grazing. Bloat can be an issue as with other legumes, but the risk is fairly low. Sheep are less tolerant of these crops than cattle. A small percentage, usually crossbred sheep, may show photosensitivity around the face and ears while consuming cowpea. This is rare with lablab or soybean. Sheep grazing rain-damaged mature soybean crops may become ill if exposed to the fungus *Phomopsis* and toxins that cause lupinosis-like symptoms. Lupinosis causes acute liver atrophy and may lead to death.

Medics are legumes that are recommended as forage because of their high biomass production. Black medic is not palatable to cattle, but animals may consume other varieties. These plants may cause bloat in cattle and sheep to a lesser extent. Snail medics are not as risky as barrel and naturalized medics.

Sorghum, Sudans, Millets, and Corn

Sorghums and millets are warm-season, drought-tolerant crops that grow in above-average temperatures. Four main categories are grain sorghum, forage sorghum, sudangrass, and sorghum-sudangrass hybrids. Cattle grazing on any of these are at risk for prussic acid HCN poisoning. Sudangrass, with low levels of HCN, is the least toxic and rarely kills animals. Sorghum-sudangrasses pose an intermediate threat, and sorghum, with the highest levels of HCN, is potentially the most toxic to livestock.

Corn does not raise prussic acid concerns, but cattle are at greater risk for prussic acid poisoning than sheep. Sorghums and corn have been associated with nitrate toxicity. Test forage before grazing or haying.

Graze sorghum when the plant is 18 inches or higher. HCN levels are highest when the plant is young and growing, after a drought breaks, during regrowth, and immediately following a freeze. A rotational system should be used if grazing sorghums during summer. Briefly, turn cattle into the paddock when plants exceed 18 inches. To keep cattle from consuming regrowth, do not graze the paddock for more than 5 days. Although appetizing, new shoots may be high in HCN. HCN levels tend to increase following a light frost and peak after a killing frost. Wait 10 days after a killing frost to graze or feed sorghums and delay grazing sorghum stalks until after a killing freeze. Prussic acid is not a concern with baled hay because HCN evaporates as the hay dries.

Nitrates are the biggest threat when harvesting sorghum for hay. Although curing removes prussic acid, which is volatile, nitrates remain in the hay. Test plants for nitrate before harvest and raise cutting height, leaving the bottom one-third of the stalk where nitrate concentrations are highest. If the test is high, delay harvest to allow plants to grow and metabolize more of the nitrates.

With millet (pearl or foxtail), nitrate toxicity may be a problem but not prussic acid. These grasses are recommended for horses. Sorghum is not recommended because it contains lathyrogenic nitriles such as β-cyanoalanine, cyanogenic glycosides, which may cause cystitis. Symptoms include urinary incontinence, posterior ataxia or incoordination, and less frequently death and late-term abortion. Mold is a problem with high-tonnage crops such as millet or sorghum hay. Poorly cured hay can cause respiratory problems in horses, and cattle may refuse to eat it.

In Mississippi, researchers studying the effects of cattle grazing on corn reported steer gains of 1.9 to 2.0 pounds per day. Experiments involved turning cattle onto corn after ears developed as plants dried for winter feed. Cattle graze selectively in corn fields, which can lead to acidosis and founder. The Mississippi steers also grazed selectively, consuming leaves, tops, ears, and then stalks when that was all that was left. In a similar Canadian study, cows grazed ears, leaves, tops, then the stalk, in that order.

Corn grazing may lead to nitrate toxicity in cattle. To prevent this and to maintain an optimal rumen microbial environment, strip graze the corn and allow cattle to graze for 2 to 3 days per paddock. Reduce daily corn consumption to decrease the risk of acidosis and founder. Strip grazing also increases forage utilization, even if cattle are only grazing stalks.

These recommendations are based on current information. Consult your veterinarian before grazing or feeding any of the plants discussed. To select forage crops suitable for your operation, consult your area livestock extension specialist and veterinarian.

Forage Crop Characteristics and Toxicities

Plant	C[1]	G[2]	W[3]	S[4]	TDN[5]	CP[6]	Toxicities	Livestock affected
Amaranth	B	A	L	W	68	13-18	Some species OK, some poisonous	
Beet (bulb)	B	B	H	C	75-79	7-11	Choking	All livestock species
Beet (tops)	B	B	H	C	58-61	15-17		
Brassica hybrid	B			C	67-70	15-16	Nitrate, polioencephalomalacia, anemia, emphysema	All cattle
Buckwheat[7]	B	A	M	W	62-75	3-25	Photosensitive dermatitis	Horses
Canola	B	A/B	M	C	62-65	13-16	Nitrate toxicity, bloat, polioencephalomalacia	All cattle
Carrot (root)	B	A/B	H	C	83	10	Scouring	Cattle
Carrot (top)	B	A/B	H	C	73	13	Nitrate	
Chicory leaves	B	P		W	67	8		
Chicory roots	B	P		W	89	4		
Flax[8]	B	A	M	C			Prussic acid (green flax), seeds SAFE	All cattle
Kale	B	A	M	C	69	22	Nitrate,polioencephalomalacia, anemia, emphysema	All cattle
Mustard[9]	B	A/P	H	C	53	10	Glucosinolate toxicity	All livestock species
Phacelia	B	A	L	C	56	15		
Radish	B	A	H	C	66	20	Nitrate, polioencephalomalacia, anemia, emphysema	All cattle
Rapeseed	B	A/B		C	70	17	Nitrate, polioencephalomalacia, anemia, emphysema	All cattle
Safflower	B	A	H	W	55-58	10-13		
Spinach[10]	B	A	M	C	51	31		
Squash[10]	B	A		W	54	26		
Sunflower[11]	B	A	H	W	55	10-12	Nitrate	All cattle
Turnip	B	B	H	C	67	16	Nitrate, polioencephalomalacia, anemia, emphysema	All cattle
Barley[12]	G	A	L	C	62-66	9-11	Grass tetany, bloat	All cattle, lactating cows
Cereal rye[12]	G	A	H	C	48-52	7-9	Grass tetany, bloat	All cattle, lactating cows
Corn	G	A	H	W	70	8.1	Nitrate, acidosis, founder	All cattle
Crabgrass	G	A		W	60-64	15-21		
Forage sorghum	G			W	58	6	Nitrate, prussic acid	All cattle and sheep
Foxtail millet	G	A	L	W	57	15	Nitrate, prussic acid	
Grain sorghum	G	A	M	W	60	7.5	Nitrate, prussic acid	All cattle and sheep
Oats[12]	G	A	M	C	54-58	8-10	Grass tetany, bloat	All cattle, lactating cows
Pearl millet	G	A	L	W	57	13	Nitrate	
Proso millet	G	A	M	W	56	10	Nitrate, prussic acid	
Ryegrass[12]	G	A/P	M	C	60	16	Grass tetany	All cattle, lactating cows

continued

Forage Crop Characteristics and Toxicities

Plant	C[1]	G[2]	W[3]	S[4]	TDN[5]	CP[6]	Toxicities	Livestock affected
Sorghum-Sudan grass	G			W	56	6-8	Prussic acid	All cattle and sheep
Sudan grass	G	A	M	W	70	17	Minimal chance of prussic acid poisoning	All cattle and sheep
Teff	G	A	M	W	55-64	9-14		
Triticale[12]	G	A	H	C	52-54	8-10	Grass tetany, bloat	All cattle, lactating cows
Wheat[12]	G	A	M	C	55-60	8-10	Grass tetany, bloat	All cattle, lactating cows
Alfalfa	L	P	H	C	51-63	14-22	Bloat	All cattle
Berseem clover	L	A	L	C	56-71	18-23		
Birdsfoot trefoil	L	P	M	C	58-66	15-20		
Chickpea[13]	L	A	L	W				
Cowpea	L	A	L	W	65	18	Minimal chance of bloat, photosensitivity in sheep	Cattle and sheep
Field Pea	L	A	L	C	67	17	Bloat	Cattle
Forage lespedeza	L	A		W	71	18	Milk decrease	Lactating dairy cows after plant blooms
Guar	L	A	L	W	81	19	Bloat	
Hairy vetch[14]	L	A/B	M	C	NG	NG	Poisonous, allergy	Cattle, horses
Lablab	L	A/P		W	56	18	Minimal chance of bloat	Cattle and sheep
Lentil[11]	L	A	L	C	56	15		
Lupin	L	A	L	C	63	32-44	Some species OK, some poisonous	Cattle and sheep
Medic[15]	L	A/P	L	C	54-58	7-8.5	Bloat	
Mung bean	L	A		W	78	15		
Red clover	L	B/P	L	C	70	20	Bloat	All cattle
Sainfoin	L	P	H	C	52	17		
Soybean	L	A		W	58	15	Minimal chance of bloat, potential for lupinosis in sheep	Cattle and sheep
Sweetclover	L	A/B	M	C	54	16	Bloat, "sweet clover poisoning", vitamin K interference	All cattle
White clover	L	P	L	C	80	25	Bloat, "sweet clover poisoning", vitamin K interference	All cattle

NG=data not given
[1] C=Class of plants: G=grass; B=broadleaf; L=legume
[2] G=Growth pattern: A=annual; B=biennial; P=perennial
[3] W=Plant water use: H=high; M=medium; L=low
[4] S=Season: W=warm; C=cool
[5] TDN=total digestible nutrients, measure of energy, % of dry matter
[6] CP=crude protein, % of dry matter
[7] Buckwheat grain TDN=86.6 and CP=13; buckwheat straw TDN=42 and CP=5
[8] Flax seed TDN=110 and CP=23; Flax straw TDN=38 and CP=4
[9] Values for TDN and CP are based on mustard hay values for tame species.
[10] Values adapted as the vegetable from Dairy One Feed Library as reported by Davis et al. (2012). Utilization of cull vegetables as feedstuffs for cattle. Values do not estimate grazing quality (no leaf portion).
[11] Values for TDN and CP are based on silage estimates.
[12] Values at boot stage, change through growth stage.
[13] Chickpea TDN=89 and CP=22; Chickpea straw TDN=45 and CP=6
[14] Values for TDN and CP are not reported because this is not recommended as a livestock feed.
[15] TDN and CP ranges are based on different varieties.

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(This publication is based upon work supported by: U.S. Department of Agriculture, Project Nos. 2013-69002-23146 through the National Institute for Food and Agriculture's Agriculture and Food Research Initiative, Regional Approaches for Adaptation to and Mitigation of Climate Variability and Change. Great Plains Grazing is a group of research scientists, Extension specialists, and consumer experts from Kansas State University, Oklahoma State University, University of Oklahoma, Tarleton

State University, Samuel Roberts Noble Foundation, and the USDA's Agricultural Research Service working together to improve and promote regional beef production while mitigating its environmental footprint.)

2. Nutrient availability in poultry manure

Poultry litter can provide a significant and important supply of nutrients for crop production in areas of Kansas where a supply of litter is available. Although Kansas is not a major producer of poultry, there is an abundant supply of litter from the nearby states of Arkansas, Missouri, and Oklahoma, which rank among the largest producers of poultry in the U.S. The acreage available to receive poultry litter has been declining in Arkansas, Missouri, and Oklahoma in recent years because of environmental concerns. That trend, coupled with high fertilizer prices, has meant the availability of litter to areas such as southeast Kansas has been on the rise.

Poultry litter should serve as an excellent complement to commercial nitrogen (N) fertilizers. Phosphorus content in poultry litter is usually high, and applications rates should be based on P levels to avoid potential surface water contamination.

Types of Poultry Litter				
Source	**Typical moisture content**	**Typical nutrient content (lbs/ton)**		
		N	P	K
Layer	High	35	40	20
Pullet	Low	40	45	40
Breeder	High	40	60	40
Turkey	Low	60	60	55
Broiler	Low	60	60	55

Moisture content and nutrient concentration in poultry litter can be highly variable and depends mainly upon production conditions, storage, and handling methods. Therefore, laboratory analysis is the best way to determine the level of N and P in the material to be applied. The table above presents average values for the different types of poultry manure collected over a period of time. The table below presents the actual laboratory analysis of 67 poultry manure samples from southeast Kansas. There is a large range in nutrient values, likely due to the source of the litter. However, a good sample average to expect would be a 55-55-47.

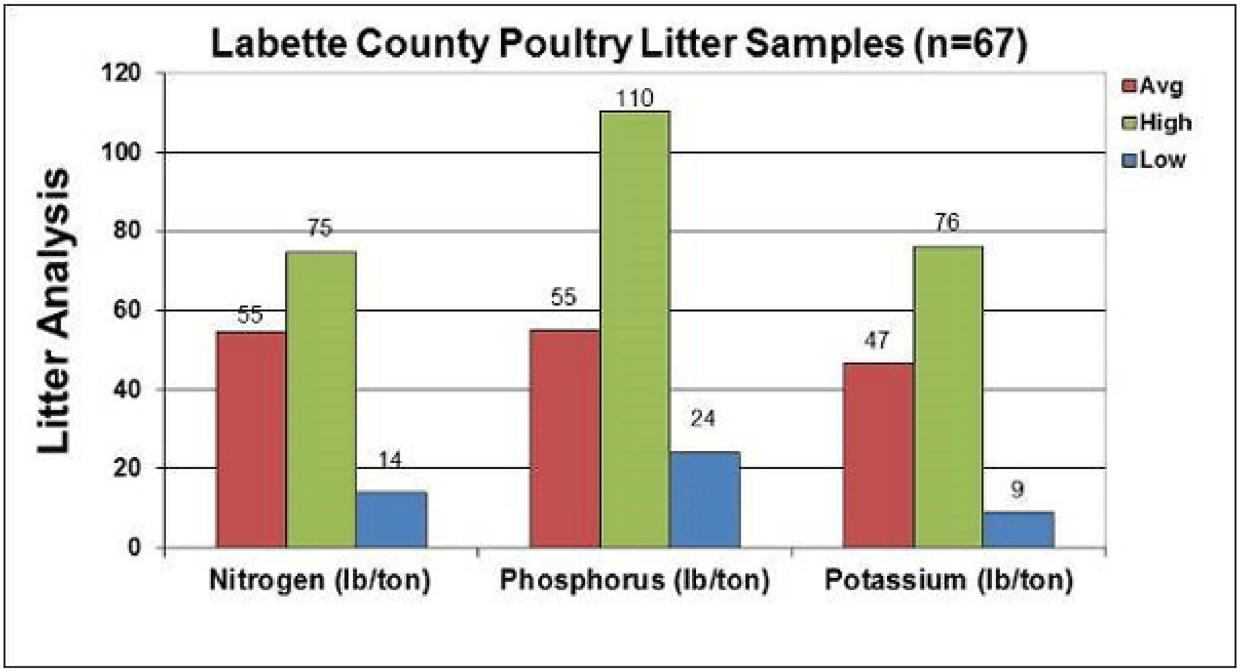

Figure 1. Results of analysis of 67 samples of poultry manure from Labette County. Source: Keith Martin, K-State Research and Extension, Wildcat Extension District.

For maximum efficiency of manure use, it is essential to know the nutrient content of the manure. Using a manure lab analysis will help in determining the actual nutrient rates applied. A laboratory analysis should be done on the poultry litter before applying it to land. A laboratory analyses provides information regarding nutrient levels, as well as the chemical forms of these nutrients. This information is necessary for an adequate estimation of nutrient availability and application rates. For more information, see K State Extension publication MF-2562, "Estimating Manure Nutrient Availability," at: http://www.ksre.ksu.edu/bookstore/pubs/MF2562.pdf

Nitrogen availability

Nitrogen and P crop availability shortly after application is a common question. In the case of N, it is important to consider that this nutrient is primarily in the organic form in poultry litter (up to 75-80% organic). Organic N needs to mineralize before becoming available to crops. A fraction of this organic N may become part of the soil organic matter pool and unavailable to crops in the short term.

Field and laboratory studies suggest the fraction of total nitrogen that becomes plant available the first year of application is approximately 45-55%, which includes both the inorganic N in the manure and a percentage of the organic N. This value varies depending upon components in the litter, and the method of handling and application. For example, poultry litter that contains a large fraction of bedding material will tend to have lower N availability the year of application. Reduction in N availability may also occur when litter is aged, and has undergone some level of composting. Nitrogen lost from the volatile ammonium fraction at the time of application to the soil surface can also reduce plant available N. Ammonium volatilization is typically higher during windy and warm days. Incorporation of litter immediately after application will reduce volatilization and potential nutrient loss by water runoff in case of a rainfall event, in addition to reducing the odor of the litter.

If the manure is applied to pastures, the percentage of nitrogen utilized by the forage the first year will depend on whether the pasture consists of cool-season or warm-season grasses. For cool-season grasses, such as fescue pasture, nitrogen utilization will likely be less than 50% the first year. Most of the growth in cool-season pasture occurs early in the year. Microbes will not mineralize as much N early in the spring as they will later in the summer. Fall applications may utilize more N for fescue than winter or spring applications. For warm-season grasses, such as bermudagrass pasture, nitrogen utilization from manure will likely be close to 50%. In both cases, producers should base application rates on the P and K needs of the grass, and supplement additional N fertilizer to meet the N needs of the grass.

Phosphorus and potassium availability

When manure is applied to the soil, what percentage of this phosphorus and potassium is available to the crop during the first year?

A large fraction of the phosphorus in manure is considered to be plant available immediately after application. The fraction that is not plant available shortly after application will become available over time.

Estimated values of phosphorus availability are from 50 to 100%. This range accounts for variation in sampling and analysis, and for phosphorus requirements with different soil test levels. Use the lower end of the range of phosphorus availability values (50%) for soils testing "Very Low" and "Low" (below 20 ppm) in phosphorus. In these situations, large yield loss could occur if insufficient phosphorus is applied and soil phosphorus buildup is desirable.

On the other hand use 100% availability when manure is applied to maintain soil test phosphorus in the Optimum soil test category, and when the probability of a yield response is small.

Several studies have shown that manure P is a valuable resource, comparable to inorganic fertilizer P for crop production. These two P sources are similarly effective when the manure P concentration is known and the manure is applied properly.

Nevertheless, excessive application of manure phosphorus (for example, applying manure at rates sufficient to meet the crop's nitrogen needs) often results in excessive soil phosphorus buildup over time, resulting in higher risk of surface water contamination. This problem of excessive phosphorus buildup in the long-term can be minimized by:

- Applying manure to meet the phosphorus needs of the crop and using inorganic sources of fertilizer to complement nitrogen needs,
- Constantly monitoring soil test phosphorus levels, and
- Using the P-index to assess potential impact of phosphorus buildup on water quality.

Producers should think in terms of actual phosphorus application rates and not just tons per acre of manure being applied. Uniform application of manure at precise rates can also be difficult. Careful calibration of manure applicators is needed. If these aspects are not considered, the efficiency of manure P compared with inorganic fertilizer P may be reduced. Careful management pays off.

Availability of potassium (K) is usually near 100% with proper application, poultry litter can also provide significant amounts of secondary and micronutrients.

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3. K-State Corn Management Schools scheduled for January 2017

A series of three K-State Corn Production Management Schools will be offered in early January of 2017 to provide in-depth training targeted for corn producers. The schools are primarily sponsored by Kansas Corn Commission and Pioneer.

The one-day schools will cover up-to-date and specific corn topics: on-farm research, high-yielding corn production practices, weed control, soil fertility, and price and market perspectives. The focus of the Corn Production Schools will be in northwest, central, and eastern Kansas. Schools will be followed by a tour.

Jan. 9 – Wichita – Drury Plaza Hotel Broadview Wichita, 400 West Douglas Ave.

Jan. 11 – Oakley – Buffalo Bill Cultural Center, 3083 US 83

Jan. 13 – Olathe – John Deere Ag Marketing Center, 10789 South Ridgeview Rd.

Jan. 9 – Wichita

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Jan. 11 – Oakley

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Jan 13 – Olathe (John Deere facility) – Registration is needed

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Lunch will be provided courtesy of the sponsors. There is no cost to attend, but participants are asked to pre-register before or by January 6.

Online registration is available at K-State Corn Schools: http://bit.ly/KSCORNSchools

You can also preregister by emailing or calling the nearest local Research and Extension office for the location you plan to attend.

For more information, contact:
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Ignacio Ciampitti, K-State Cropping Systems Specialist; ciampitti@ksu.edu

Lucas Haag, Northwest Area Crops and Soils Specialist; lhaag@ksu.edu
AJ Foster, Southwest Area Crops and Soils Specialist; anserdj@ksu.edu
Stu Duncan, Northeast Area Crops and Soils Specialist; sduncan@ksu.edu
Doug Shoup, Southeast Area Crops and Soils Specialist; dshoup@ksu.edu

Primarily supported by:

4. Canola College 2017 in Enid, January 19, 2017

Once again, the Great Plains Canola Association, Oklahoma State University, Kansas State University, USDA-RMA, and partners from the canola industry are teaming up to conduct Canola College.

Canola College 2017 will be held January 19, 2017 at the Chisholm Trail EXPO Center, 111 W. Purdue, Enid, OK.

This will be the premier canola education/training event in the region in 2017. Canola College 2017 is for anyone with an interest in the canola industry including: experienced and first time growers, crop insurance agents, members of agricultural governmental agencies, and canola industry service and product providers. Attendees will hear from canola experts on a variety of key topics and will have the opportunity to visit with industry members who provide the goods and services needed to produce, handle, and market the crop.

Canola College 2017 topics will include:

- **Canola Basics** – Mike Stamm, K-State Canola Breeder and Heath Sanders, OSU SW Area Extension Agronomy Specialist
- **Canola Planting Technology –** Josh Bushong, OSU NW Area Extension Agronomy Specialist and Kraig Roozeboom, K-State Cropping Systems Agronomist
- **Advanced Production Practices** – Bob Schrock, Grower, Kiowa, KS and Jeff Scott, Grower, Pond Creek, OK
- **Risk Management** – Francie Tolle, Director, USDA-RMA, Oklahoma City
- **Canola Economics** – Trent Milacek, OSU Extension Area Economist, NW District
- **Weed Control** – Misha Manuchehri, OSU Extension Weed Scientist
- **Insect Management** – Kris Giles, OSU Regents Prof of Entomology
- **Canola Plant Health Management** - John Damicone, OSU Extension Plant Pathologist and Paul De Laune, Assoc Prof, Texas A&M
- **Canola Learning Lab** – Coordinated by Josh Lofton, OSU Cropping Systems Specialist

The very popular **Canola Learning Laboratory** will be continued in 2017. Attendees will see demonstrations and gain experience with: canola biology, canola production equipment, and the latest in spray technology. Participants will have the opportunity to learn to identify common canola production pests.

Individuals can register for *Canola College 2016* at www.canola.okstate.edu. For more information on Canola College, contact Ron Sholar, Executive Director, GPCA, at Jrsholar@aol.com or Josh Lofton, Extension Cropping Systems Specialist, OSU, at josh.lofton@okstate.edu.

Mike Stamm, Canola Breeder
mjstamm@ksu.edu

5. K-State Soybean Schools scheduled for late January 2017

A series of three K-State Soybean Production Schools will be offered in late January 2017 to provide in-depth training targeted for soybean producers and key stakeholders. The schools will be held at three locations around the state.

The one-day schools will cover a number of issues facing soybean growers: weed control strategies; production practices; nutrient fertility; and insect and disease management.

The dates and locations of the K-State Soybean Production Schools are:

Jan. 24th – Parsons, 25092 Ness Road
Contact information:
Josh Coltrain, Wildcat Extension District, jcoltrain@ksu.edu, 620-724-8233
Jeri Sigle, Wildcat Extension District, jlsigle@ksu.edu, 620-331-2690

Jan. 26th – Hesston, AGCO building, 420 W. Lincoln Blvd
Contact information:
Ryan Flaming, Harvey County Extension, flaming@ksu.edu, 316-284-6930

Jan. 27th – Highland, Highland Community Building, 501 West Av
Contact information:
David Hallauer, Meadowlark Extension District, dhallaue@ksu.edu, 785-863-2212
Matthew Young, Brown County Extension, mayoung@ksu.edu, 785-742-7871

More information on the final program for each Soybean School will be provided in future issues of the Agronomy eUpdate.

Lunch will be provided courtesy of Kansas Soybean Commission. There is no cost to attend, but participants are asked to pre-register by Jan. 19.

Online registration is available at: K-State Soybean Schools

You can also preregister by emailing or calling the nearest local Research and Extension office for the location you plan to attend.

Ignacio Ciampitti, Crop Production and Cropping Systems Specialist
ciampitti@ksu.edu

Doug Shoup, Southeast Area Crops and Soils Specialist
dshoup@ksu.edu

Stu Duncan, Northeast Area Crops and Soils Specialist
duncan@ksu.edu

6. K-State Sorghum Schools scheduled for late January and early February 2017

A series of four K-State Sorghum Production Schools will be offered in late January and early February 2017 to provide in-depth training targeted for sorghum producers and key stakeholders. The schools will be held at four locations around the state. The one-day schools will cover a number of issues facing sorghum growers: weed control strategies; production practices; nutrient fertility; and insect and disease management.

The dates and locations of the K-State Sorghum Production Schools are:

Jan. 31st – Colby: City Limits Convention Center, 2227 S Range Ave
Kurt Sexton, Thomas Co. Extension, kurtsexton@ksu.edu, 785-460-4582

Feb. 1st – Wichita: Sedgwick Co. Extension Center, 7001 W 21st St N
Zach Simon, Sedgwick Co. Extension, zsimon@ksu.edu, 316-660-0100

Feb. 2nd – Concordia: Cloud County Community College, 2221 Campus Drive
Kim Kohls, River Valley Extension District, kclarson@ksu.edu, 785-243-8185

Feb. 3rd – Iola Riverside Park New Community Building, 600 S. State St
Carla Nemecek, Southwind Extension District, cnemecek@ksu.edu, 620-365-2242

More information on the final program for each Sorghum School will be provided in future issues of the Agronomy eUpdate.

Lunch will be provided courtesy of Kansas Grain Sorghum Commission. There is no cost to attend, but participants are asked to pre-register by Jan. 27. Online registration is available at: K-State Sorghum Schools

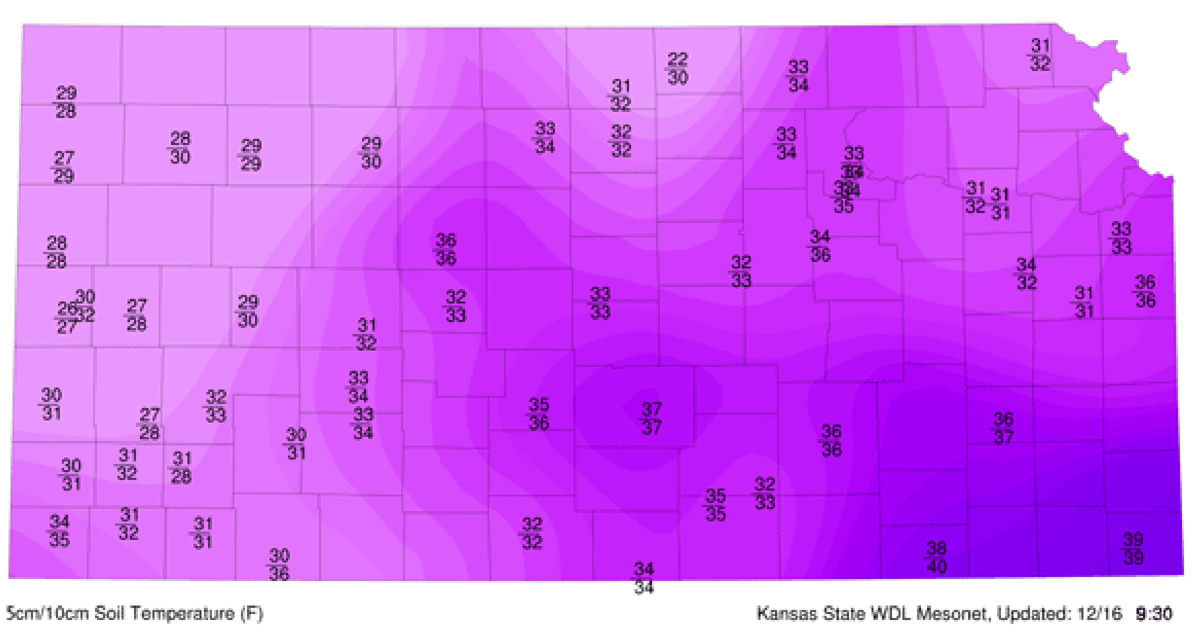
You can also preregister by emailing or calling the nearest local Research and Extension office for the location you plan to attend.

Ignacio Ciampitti, Cropping Systems Specialist
ciampitti@ksu.edu

Pat Damman, Kansas Grain Sorghum Commission
pat@ksgrainsorghum.org

7. Soil temperature update

After another week of cold weather, soil temperatures continue to cool. However, as of the morning of Dec. 16, the lows were still above the mid-20 degrees F range (figure 1). Warmest temperatures continue to be in the southeast, where average air temperatures were also the warmest.



Soil temperatures in individual fields and within fields will vary, depending upon soil type, current soil moisture, and residue levels. Another blast of frigid temperatures is expected over the weekend, before temperatures moderate in the next week. However, normal temperatures at this time of year are low, so soil temperatures are likely to continue to cool.

Mary Knapp, Weather Data Library
mknapp@ksu.edu

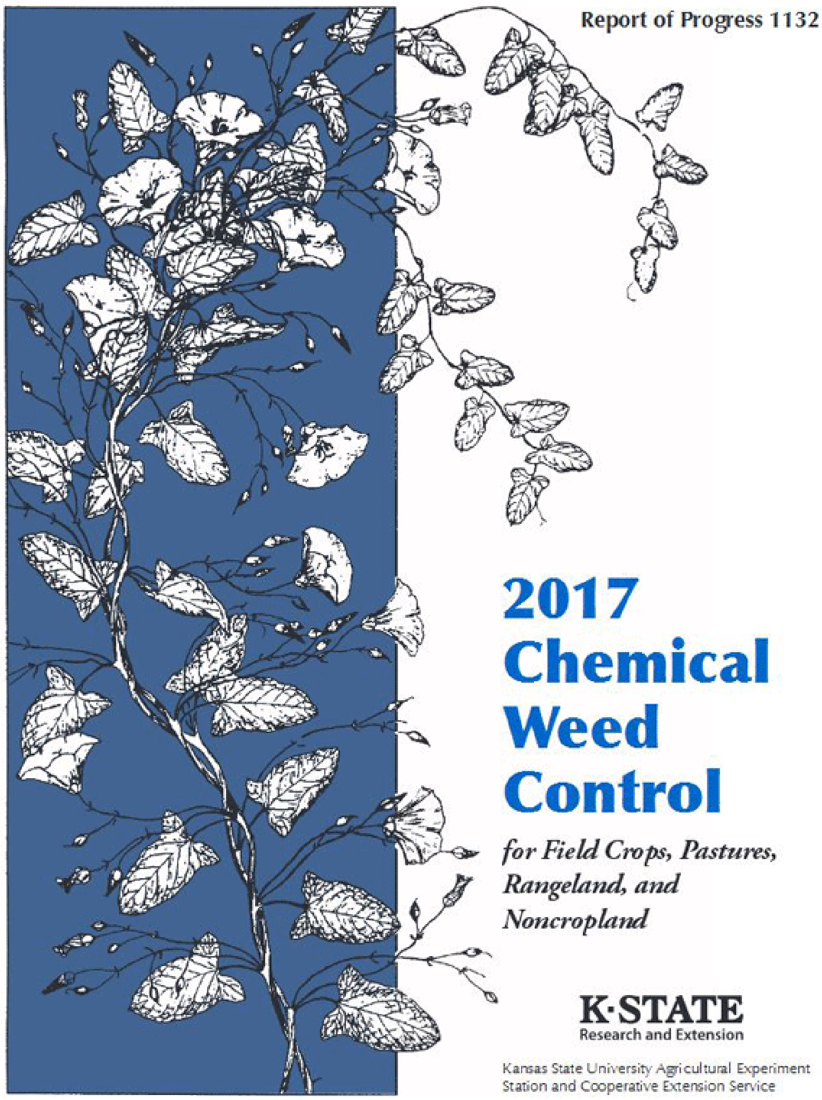
Chip Redmond, Kansas Mesonet Manager
christopherredmond@ksu.edu

8. New K-State 2017 Chemical Weed Control Guide now available online

The new K-State 2017 Chemical Weed Control Guide is now available online at:

http://www.bookstore.ksre.ksu.edu/pubs/SRP1132.pdf

Hard copies of this publication will be available soon.



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