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1. Management options for drought-stressed soybeans

Soybeans typically can withstand drought stress reasonably well in the vegetative stage. But in scattered areas of Kansas this year, the combination of drought and heat stress has been so extreme that soybean leaves have begun to curl or drop. In those cases, it's already time to consider whether to leave the soybeans in the field and hope for the best or cut them for hay. The decision depends on the stage of growth and condition of the plants.

Drought symptoms appear early as leaf wilting and reduced growth. Nodule formation, development and nitrogen fixation are reduced when soil temperatures rise above 90 degrees. In general, soybeans can tolerate short periods of high temperatures if supplied with adequate moisture but the crop cannot tolerate high temperatures indefinitely. The ideal temperature for soybean growth and development is around 86 degrees. Temperatures above 95 degrees can reduce seed set and potential seed vigor.

Prolonged heat and drought stress causes considerable leaf loss and yield reduction in soybeans. If the crop is so drought-stressed that it's losing leaves or dropping too many flowers or pods, it may be time to cut it for hay. The idea might have particular appeal for livestock producers who are facing dry pastures and supplemental feed costs.

Soybeans with 50 to 90 percent leaves and a good number of pods at R6 have a good chance of producing a decent crop if allowed to mature -- especially if timely rains occur. In that case, it would probably best to harvest the crop as normal, even though some of the leaves, flowers, and pods have dropped due to stress. This is still a gamble, and good yields are not guaranteed even if the plants are in good shape at R6. Stress during rapid pod growth reduces the number of beans per pod and reduces bean size. Pod filling is the most susceptible time for drought injury to the soybean crop.

If possible, it's best to hold off on making any decisions about cutting soybeans for hay until the plants are well into seed fill (R5 to R6). This is the optimal time to cut beans for hay in order to retain digestible nutrients. However, holding off until this stage of growth may not be possible. This year, plants in the vegetative stage are dropping half or more of their leaves already. If too many leaves are dropped, the plants have reduced value as a hay crop. As a result, producers may need to make the decision to cut for hay while the plants are still in the vegetative stage, before the R5 to R6 stage, and before the soybeans lose too many leaves.

Soybean plants that still have 30 percent of their leaves can produce 0.75 to 1.25 tons (dry matter) of hay per acre, with about 13 percent protein and 48 percent in-vitro dry matter digestibility. The more leaves a plant has, the more hay tonnage it will produce. Based on Shroyer's research, the quality is roughly comparable to very mature alfalfa. Such plants might be more valuable as a hay crop than leaving them to cut for seed yield, depending on the price of soybeans and hay.

The "gray area" is where there are plants with 30 to 50 percent of leaves still remaining. Those have the capability of filling pods if it rains and of making a soybean harvest that will produce more than the cost of the hay. But that's a pretty big "if" in parts of Kansas this year, given how spotty the rains have been.

The producer's decision this year will depend partly on when the soybeans were planted. Soybeans that were planted late, or after wheat harvest, in late June or early July are probably still young enough to withstand drought stress for several more weeks without dropping leaves. Soybeans planted in May or early June would be more vulnerable to rapid leaf loss at this time of year.

By the early reproductive stage, the effects of prolonged heat and drought are critical. Under drought conditions, soybeans in early reproductive stages will have increased flower and pod abortion. In later reproductive stages, prolonged drought will cause pods to be small, with fewer and smaller (or shriveled) seeds than normal. If the crop has been in the blooming stage for 3 to 4 weeks, has set no or very few pods, and drought conditions persist, it is likely that yields will be very low.

Soybeans can tolerate short periods of heat and drought at this time by aborting flowers or pods and forming more later. But the crop will not bloom indefinitely and under prolonged heat and drought may be unable to recover. Stress during flowering reduces the length of the flowering period. Soybeans will normally bloom for 3 to 4 weeks or so under excellent conditions, but less than that under stress conditions.

If the crop has been blooming for 3 to 4 weeks, it is very near the end of the blooming period. If no pods are set after 3 to 4 weeks, it is possible that the crop will not set any pods or make any seed yield. If fields have no pods set at all by the time they have reached the end of their blooming period, the crop should be hayed.

Because of extremely high July temperatures, irrigated fields are not immune to the effects of drought stress. With numerous days over 100 degrees F, even irrigated plants can abort pods.

Drought stress can be exaggerated by phytophthora root rot and charcoal root rot. Plants affected by those diseases probably are not even salvageable as hay.

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2. Fall can be a good time to plant alfalfa in Kansas

Late summer and early fall are often the best times to plant alfalfa in Kansas -- if we've had enough rainfall. A fall-seeded crop is more productive during the first growing season than a spring-seeded crop. After the first season, however, yield potential is about the same.

Growers in northwest Kansas can plant as early as Aug. 10-15. Those in southeast Kansas can plant in mid- to late September. In other parts of Kansas, planting time is late August or early September.

Producers just need to plant early enough to have three to five trifoliate leaves before the first frost. Alfalfa is a three- to five-year or longer investment. Some producers shy away from alfalfa because of its high establishment cost and risk of stand failure. In the long run, however, it's relatively inexpensive, if amortized over the life of the crop.

If managed properly and if we have a good year in terms of weather, dryland alfalfa can produce four to six tons of forage per acre per year. Irrigated fields can produce eight to 12 tons per acre per year.

A good stand would be 50 to 55 stems (not plants) per square foot. So, if a field has just 25 to 35 stems per square foot, the grower should consider starting over and replanting.

When planting alfalfa, producers should keep the following in mind:

* Test the soil. Alfalfa grows best in well-drained soils with a pH of 6.5 to 7.5. If the land needs lime, add it before planting. Apply the needed phosphorus and potassium, too. Since each cutting removes 10 pounds of phosphorus per acre for each ton of forage harvested, it's an annual input.

* Plant certified, inoculated seed. Inoculation helps alfalfa seedlings fix available soil nitrogen for optimum production.

* Plant in firm, moist soil. If possible, prepare the seedbed and plant after a rain. Tilling after a rain will reduce soil moisture. A firm seedbed ensures good seed-soil contact; therefore, use a press wheel with the drill to firm the soil over the planted seed. Or, consider no-till planting in small-grains stubble – which is a successful alternative and in some areas is the primary mode of planting.

* Don't plant too deeply. Plant one-fourth to one-half-inch deep on medium- and fine-textured soils and three-fourths-inch deep on sandy soils. Don't plant deeper than 10 times the seed diameter.

* Use the right seeding rate. Plant 8 to12 pounds of seed per acre of dryland in western Kansas, 12 to15 pounds per acre in irrigated medium- to fine-textured soils, 15 to 20 pounds per acre on irrigated sandy soils, and 12 to 15 pounds per acre of dryland in central and eastern Kansas.

* Check for herbicide carryover that could damage the new alfalfa crop – especially when planting alfalfa no-till into corn or grain sorghum stubble. In areas where row crops were drought-stressed and removed for silage, that set up a great seedbed for alfalfa, but may still bring a risk of herbicide damage.

* Choose pest-resistant varieties. Resistance to phytophthora root rot, bacterial wilt, fusarium wilt, verticillium wilt, anthracnose, the pea aphid, and the spotted alfalfa aphid is essential. Some varieties are resistant to even more diseases and insects.

More information about growing alfalfa in Kansas can be found in the annual performance bulletins and the "Alfalfa Production Handbook." That information also is available on the web at: http://www.oznet.ksu.edu/agronomy/extension/crops/alfalfa.htm.

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3. Germination quality of this year's wheat seed

This year's wheat crop is averaging about 97 percent germination in laboratory tests so far, which is very good. For the first several weeks after harvest, it's important to make sure the wheat is pre-chilled before taking a germination test. The lab will do that on a routine basis. But producers testing their seed at home should also pre-chill the wheat by putting it in the refrigerator at about 40 degrees for 5 days. Wheat has a physiological characteristic called post-harvest dormancy. If you take a germination test immediately after harvest the germination can be quite low. The pre-chilling treatment breaks the post-harvest dormancy and will allow the seed to germinate normally.

There is some difference among varieties regarding how long their post-harvest dormancy period is. Hard white wheats with poor sprouting tolerance, for example, have almost no post-harvest dormancy. They will germinate almost as soon as the seed is harvested. Other varieties, such as Overley, have a relatively long post-harvest dormancy, and may not germinate well for five or six weeks after harvest unless the seed is pre-chilled. By Labor Day, all varieties will have lost their post-harvest dormancy and should germinate unless the seed is defective in some way.

If there is any question about the viability of the seed, it is well worth the $15 it costs to have the seed tested for germination by a certified seed laboratory. This is especially true in areas where there was freeze damage, severe drought, a rain delay at harvest, or scab on the wheat last year.

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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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