CSU Agronomy Agents Corner #8

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Management Sensitivity of Crops

Crop production management can mean any aspect of farming from the rotation order to the investment level within a year. Corn is often referred to as management sensitive. Implying that corn yields are highly correlated with what you put into the crop. Hybrid grain sorghum is often referred to as management insensitive. This reputation is in some part a result of the challenge of designing experiments that will show sorghum's reaction to different management techniques. Statistically speaking, sorghum tends to have a higher coefficient of variation when given the same experimental design as corn. But we know sorghum requires many of the same conditions as corn. If producers didn't expect a response from soil fertility treatments, changes in density… They wouldn't put any fertilizer out or plant over a few thousand seeds per acre.

Density is the aspect of management that I have spent the most time studying. Much like corn's reputation it reacts in a predictable manner to changes in density. Some have said that corn will not tiller. In every plot I have planted corn with no competition, it has tillered. If you plant corn at three thousand plants per acre or less, it will tiller. There is no commercial reason to do so. It's just fun to show that corn can tiller. If you over plant, corn will produce less grain than if you plant at a rate the growing conditions can support. The seeding rate which produces the maximum yield is slightly more than the seeding rate that produces maximum profit. The last five hundred to a thousand seeds per acre don't make enough grain to justify the seed cost. Sorghum is less predictable regarding tillering. An early heat wave can promote tillering even if all other conditions say it shouldn't. Panicles on tillers will mature later than the primary stalk's panicle. This decreases grain quality. Wheat will tiller no matter how it is treated.

Sorghum's ability to avoid drought is another contributor to its reputation of being management insensitive. While corn will continue to grow during drought stress, sorghum will become dormant for several days until a water supply becomes available. This trait can be beneficial in areas with a long growing season. In areas with a short growing season it can be detrimental. In Baca county the risk of a short season sorghum hybrid not growing to maturity before the first frost is less than the same occurrence in Sedgwick county.

Some recent studies have compared the return on investment of low input corn and sorghum to high input corn and sorghum. Overall sorghum was competitive in either case. The moral of the story is while it is more difficult to measure yield results due incremental changes in sorghum than corn, those changes do pay off in the long run. An extra ten pounds of nitrogen is more noticeable in corn than sorghum. Another 50 pounds of nitrogen is easy to see in either one. Overall management insensitivity is largely a myth perpetrated primarily through challenging measurements.