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Soybean Management

Asian Soybean Rust (ASR):

Soybean rust is an obligate parasite; therefore it requires a living host year round. Like wheat rust, it will have to move into Missouri from the south on prevailing winds. Like any other disease, the environmental conditions will determine disease severity in a given area and/or given year. Utilize the tracking information from USDA's tracking web site, http://www.usda.gov/soybeanrust/index.shtml, to keep current with location of disease in the U.S. Also, follow your local weather conditions. Soybean rust requires prolonged leaf wetness (6-12 hours), high relative humidity and a temperature range of 46-86 F for spore germination. Under these conditions rust will complete a life cycle within 10-20 days. After 5 days, tan to reddish-brown pustules may be observed on leaves. Symptoms begin at bottom of canopy and can rapidly move up the plant. Early detection is critical. Monitoring and protecting plants during reproductive stages of soybean development will be critical for protecting yield potential.

In general, under uniform plant density, yield can be divided into three components: 1) total number of pods, 2) beans per pod, 3) weight per bean. The three basic reproductive stages that coincide with these stages and where stresses can influence yield are: 1) R3 - pod initiation, 3/16 inch long pod at one of 4 uppermost nodes on main stem with a fully developed leaf to R4 – pod development, 2) R5 – seed initiation, 1/8 inch long seed in pod at one of the 4 uppermost nodes on main stem with fully developed leaf to R6 – seed development, 3) R6 – seeds fill pod to early to R7 – one pod has reach mature pod color. Protecting prior to and during these stages of development will help protect yield.

Soybean's reproductive cycle is triggered by a photoperiod (day length) X temperature interaction. In general, early maturing (indeterminate) soybeans (Group IV or less) require fewer growing degree days (number based on temperature) and slightly longer photoperiod compared to late maturing (determinate) soybeans (Group V or greater). Therefore, flowering date can vary based on planting date, maturity group, and temperature. There are some models available which base flowering prediction on historic weather data, planting date, and maturity group. One such guide is available on the web at: http://www.ca.uky.edu/agc/pubs/agr/agr184/agr184.pdf . Due to yearly environmental variability, these models are estimates and should only be used as guides. Nothing can replace visually inspecting individual soybean fields.

When evaluating your soybean fields, remember Group IV's are indeterminate which means they will continue to grow vegetative parts for approximately 2-3 weeks after flowering (R1) begins. Group V's are determinate which means once flowering (R1) begins vegetative growth ceases. This difference could be a factor to consider when determining fungicide application timings.

Fungicide programs are the current method of defending your soybean crop against rust. Researchers are intensely looking for resistance, but estimates are that method is several years into the future. Current fungicides labeled for rust via full Section 3 or Section 18 are: 1) strobilurins: Quadris and Headline; 2) chlorothalonil; 3) triazoles: Tilt, PropiMax, Bumper, Loredo, Domark, and Folicur; 4) premix of strobilurin + triazole: Quilt, Stratego, Headline BSR. Fungicides in general are applied to leaves in order to protect from disease development and spread. This is why early detection is important. Strobilurins and chlorothalonil are protective fungicides, and if applied alone, should be prior to infection in order to protect against disease development or in combination with triazoles at early post infection. Triazoles are a group of fungicides with limited curative properties meaning they are not intended as a rescue treatment. Target applications of triazoles should still be prior to or at early post infection. Premixes of preventative and curative are available and would offer two modes of action for a preventative or early post infection application.

In order to protect soybean leaves from infection or further disease development, canopy penetration and leaf coverage with fungicide applications will be necessary. Some things engineers have found with spraying systems is droplet penetration into the canopy improves with increases in spray volume and reduction in speed. Droplet size recommendation for most fungicides is a 250 micron average.

There are numerous websites that are devoted to soybean rust. Two websites to utilize this season will be the rust tracking web sites out of NC State University and USDA. There are numerous more that have good information including general information about rust (Missouri), fungicide use guidelines (Kentucky), and spray tip guidelines (Kansas). For links to all these websites visit the soybean rust link at Mississippi County Extension's web site: http://outreach.missouri.edu/mississippi/ag.shtml .

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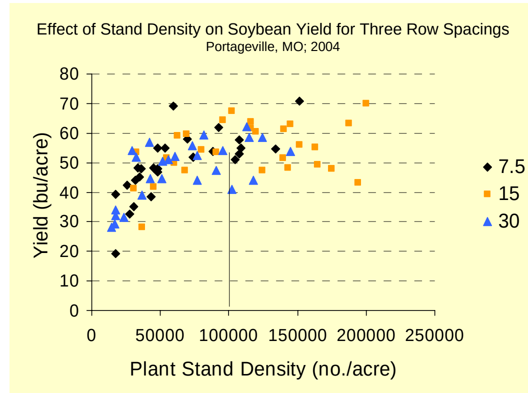
Soybean Seeding Rates



One other question that has been asked is regarding seeding rates. Research at the Delta Center the last 3 years with Group V maturity has indicated that yield begins to level off once plant density goes above 100,000-125,000 **plants/acre.** The graph is 2004 data of three row widths (7.5, 15, 30). Arkansas has available on the web a breakdown of planting rates based on 80% germ, maturity group, row width, and irrigation. This table is linked to the Mississippi county website. Arkansas recommends a higher plant population for Group IV, around 130,000 **plants/acre**.

Notice the number the vertical line is pointing to is **Plant Density**. You will have to plant more **seeds per acre** than this to account for germination percentage and 90% emergence rule for viable seed. One seeding rate recommendation is 160,000 seeds per acre. Assuming 85% germination and 90% emergence the final stand of 122,000 plants would fall in range indicated by plant density studies. If there is some apprehension, consider trying this on a few select fields to compare your seeding rates with potentially lower rates.

Wheat Management

Yellow and green streaks are beginning to appear in some wheat fields around the area. Remember that the highest demand for nitrogen is during stem elongation (Zadoks 30 -50, Feekes 4 -10). If nitrogen is required after flag leaf emergence, take care to avoid or minimize flag leaf injury. During reproduction the plants utilize stored nutrients to develop grain.

If wheat is still not greening up you may want to check for sulfur deficient. The primary symptom is yellow new leaves compared to N deficient yellow old leaves. Most of the Sulfur in soil is contained in soil organic matter. Therefore, low organic matter (usually sandy) soils of Southeast Missouri are also prone to low sulfur conditions and sulfur fertilizers should be part of the nutrient program. Ammonium sulfate and 28-0-0-4 are commonly available Sulfur fertilizers. Most low sulfur soils require 10 to 15 lbs./acre of Sulfur.

Wheat rust has been identified in south Arkansas. It was identified relatively early compared to most years. Other diseases showing up are Septoria leaf blotch and powdery mildew. However, most beneficial use of fungicides is to protect the upper most leaves (flag leaf +). Protecting the flag leaf helps with kernel weight (test weight). Label application timings are typically timed for Feekes growth stages 8 - 10 (booting) to 10.5 (flowering).

Begin monitoring fields for armyworm feeding. Most destructive feeding is flag leaf removal or head clipping. Threshold is 4 or more non-parasitized larvae per square foot and before 2-3% head clipping.

Hessian fly second generation damage was high this year. If you had Hessian fly damage, the first generation (Spring) will bore into 1 to 2 node wheat therefore potentially weakening some of the remaining plants in the field. Timely harvest could help avoid potential lodging problems. Also, make decisions on variety selection for next year to avoid potential problems next season. Refer to MU Guide 7180 for more information.

Resistance Management

The best way to reduce the potential for pesticide resistance (herbicide, fungicide, insecticide) is rotating or incorporating multiple modes of action that target the same species. This reduces the selection pressure put on a species by one mode of action. Traditionally, crop rotation has been a good means of controlling the same weeds in a field with different herbicide modes of action. However, in some situations crop rotation is not an option and even with crop rotation herbicides labeled for different crops can have the same mode of action. The University of Missouri weed scientists put together a weed control guide each year that is a good reference for determining the mode of action of a particular herbicide. This guide can be accessed through the Mississippi County Extension website (http://extension.missouri.edu/mississippi/ag.shtml) by linking to the Delta Center Weed Science page. This is will also be important with the potential use of fungicides for rust. Read and follow all label directions.

One of the more recent cases of herbicide resistance is to glyphosate. Horseweed or marestail was confirmed resistant to glyphosate in Missouri last season. This winter a common ragweed biotype was confirmed resistant to glyphosate as well.

Remember to practice some form of resistance management so these technologies can continue to offer good pest control on your farm. Make a note of any weed escapes or control failures occurring in a field where you know herbicides, insecticides or fungicides have been properly applied. For weeds, monitor the spot the following season for spreading.

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Corn Planting

Due to weather much of the corn planting has been delayed. One concern that might arise is when is the latest corn can be planted. Unfortunately there is no magic cut off date and corn development is a function of not only planting date but weather and geographic location. The reason behind planting windows or dates is trying to maximize growing degree days which leads to maturity. Ideally you want enough growing degree days between planting and the hottest part of the season so tasseling and silking will be synchronized. Any stress including heat just prior to and at VT (vegetative tasseling) will cause delayed silk emergence therefore causing a reduction in kernel fill.

Corn growth and development only occurs during the temperature range of 50-86 F. This is why mild weather and cool nights help with corn yield potential because of more growth and development and more efficient pollination occurs. Therefore planting late in the season will affect yield, but it is uncertain how much because of the temperature/weather factor.

Studies out of the Delta Center have shown that late planted corn has a gradual reduction in yield potential as planting progresses further into May. Based on average weather in Southeast Missouri, corn planted on May 10 has a potential yield decrease of 10-15%. After that date yield potential continues to decline at a more rapid pace. The decision to continue planting is ultimately up to the producer. Corn will continue to grow and produce grain regardless of date, however other factors will greatly influence yield potential.