Soybeans: What to look for to monitor yield potential
July 25, 2012 Webinar

Question: What do the high soil temps mean for soil N release for the beans?
If water remains limited, decomposition of crop residues and organic matter will be very limited. If water is not limiting, bacterial and fungal activities typically are increased with higher temperatures. Many biological reactions occur two times faster for every 10 degree Celsius increase in temperature. However, without adequate water, microbial activities will be at low, reduced rates regardless of soil temperature.

Question: How deep do Soy roots go (effectively) and how long do we have in SW/WC Iowa till N fixation stops?
When soil is without restrictive layers or compacted and water is adequate, soybean roots will penetrate to 6 feet or deeper. These roots are capable of extracting water and nutrients associated with that water.

Question: The nodules on the bean roots are 75 percent less than last year. They are green and white on the inside. Will water help to activate the rhizobia? How much effect will this have on yield? 25 percent, 50 percent, less?
Nodules on soybean or other legumes that are actively fixing nitrogen for the host plant are pink in color. Nodules that are green or white are not fixing nitrogen. If soil water becomes adequate again and soybeans are not too mature, it is possible that they will begin symbiotically fixing nitrogen again, however that is not too likely to occur once soybean has matured beyond R3.5 or R4.

If the green or white nodules in question are on Vegetative or R1-R2 stage soybean plants, then it is more likely N fixation will actively contribute N for better yield IF soil water is adequate. Nitrogen fixation typically will provide about 50 percent of the nitrogen in the seed at harvest; the other 50 percent of the nitrogen comes as nitrate from soil organic matter or manure applications (if manure was applied prior to planting soybean).

The N from soil uptake more likely is taken up earlier in the growth of the plant and stored as proteins in roots and shoot, stems and leaves. This N is remobilized and transferred during seed fill. Much of the stored N is in proteins required for photosynthesis and capturing carbon dioxide to produce energy for the plant. Once remobilization from a leaf starts to occur, photosynthesis in that leaf is rapidly decreased. Soybean plants require active nitrogen fertilization for high yields. Nitrogen storage in tissues will likely be inadequate to produce high yields.

Question: How do the producers tell if N fixation has stopped?
Dig up soybean roots and gently remove them from the soil. Look for nodules on the roots. If the nodules are pink or reddish colored, then they are actively fixing nitrogen. If nodules are white, then nitrogen fixation is not occurring.
**Question: How far ahead is soybean development at this point?**

Photoperiod, the number of hours of day and night lengths, is a primary driver for maturation of soybean. Degree days accrued also are important for plant development, but the main cue for reproduction is photoperiod. So, 2.4 MG soybean varieties should be going reproductive at about the same day length (night length really) as in previous years. Elevated night temperatures can increase the rate at which reproductive stage soybean mature.