



Q: Several of my neighbor's fields appeared to have fairly severe sudden death syndrome but still yielded in the 50 bushel range. Why were soybean yields so high this year even with several diseases present?

A: You're right; Missouri soybean yields were phenomenal in 2004. Missouri farmers harvested a huge soybean crop with an average yield that shattered the previous record. The 2004 soybean season was unusual in that every region of the state produced yields above their 5-year averages. Although good soybean management was important, most of the credit must be given to Mother Nature.

Two weather characteristics are important for determining soybean yield; the amount of rainfall during flowering and pod set and the temperature during seed-filling. Most of Missouri's soybean crop flowers in July and early August. Precipitation should average at least one inch per week for good to high soybean yield potential. The timing of the rainfall is also important. Adequate rainfall timed so that the plants do not experience short term stress is ideal. The ability of soil to store and supply water determines the optimum rainfall frequency. Plants with little or no stress will produce more flowers and set more pods.

Rain during the rest of the soybean life cycle is important, but its importance diminishes as seed-filling continues. Stress during early seed-filling will reduce pod and seed number; whereas, stress during late seed-filling will reduce seed size. Timely rains will increase seed number and allow each seed to fill completely.

Temperature, particularly night temperature, is important because of its effect on respiration. During the daylight hours soybean plants produce sugars that can be used to fill seeds. During the night, some of these sugars are burned or respired. The warmer the temperature at night the greater the rate of respiration and yield loss will be. Cooler temperatures reduce this waste and add to yield potential. In much of Missouri, seed-filling occurs during August so August temperatures are most important.

In many parts of the Missouri we experienced nearly ideal weather patterns. Night temperatures during August were often below average. For most weeks in July and August, rainfall was above normal and timed nearly ideally. Some regions experienced short term stress, but these stresses were much less frequent than in our recent past. Unfortunately, this weather pattern is rare and may not repeat in the near future.

Soybean disease incidence is also related to weather. Many of our worse soybean diseases result from pathogens that live and over winter in the soil. These diseases become apparent when the proper interactions occur between the pathogens and weather in the presence of a susceptible variety. For example, cool and wet weather when soybean plants are seedlings favor sudden death syndrome (SDS), although symptoms will not be expressed for several weeks. We saw higher than normal SDS incidence in 2004 because of the spring weather conditions that occurred in some parts of Missouri. White mold, a rare soybean disease in Missouri, was identified in some northern Missouri soybean

fields. This disease likely occurred because of rain and cooler than normal temperatures during summer, especially during flowering.

In other words, weather can add or subtract from yield potential through a direct effect on the soybean plant or through an indirect effect by influencing pathogens and the diseases they cause. It does not surprise me that fields infested with SDS yielded well because the yield potential for soybean was unusually high in 2004. It is hard to estimate how much greater the yields would have been without disease.

Missouri soybean plants experience few diseases for which the pathogen multiplies in the south and is spread by wind and storms to Missouri. Unfortunately, Asian soybean rust is spread in this way. So, farmers will be watching for weather patterns in 2005 that may not have concerned them in the past. If soybean rust can over winter in south Texas, those host plants may serve as inoculum sources for the spread of rust to Missouri during the summer. Southern winds and storm movement from the south should be watched closely for possible indications of a potential rust problem.