

Have you ever wondered if the row crop before wheat affects the subsequent double-cropped soybean yield after wheat? (Note: This is the second part to the study that was discussed in Agronomy Research Briefs #20.)

An on-going cropping systems study was established in 1996 at the Southeast Research Center near Columbus, KS to address this question. The site was a Parsons silt loam in a 2-year rotation, but with three crops being grown in two years. Three row crops, soybean, corn, and grain sorghum, were planted using either conventionally tilled (disk-chisel-disk-field cultivate) or no-till. Wheat was planted after row crop harvest, then soybean was planted either reduced till (disk) or no-till immediately after wheat harvest. In 2003, soybean was no-till planted into both the reduced-till and no-till treatments.

The six-year average yields for double-cropped soybean when the previous crop before wheat was soybean, corn, and grain sorghum were 28.1, 33.3, and 33.7 bushels per acre, respectively. Interestingly, this was a consistent response for each of the six years and not caused by one year being exceptionally different than the other years. Thus, there was approximately a 16 % reduction in the double-cropped soybean yield when the previous crop was full-season soybean instead of corn or grain sorghum. When comparing no-till and reduced-till within each of the previous row crops, double-cropped soybean yields for no-till were higher than reduced-till yields. This was especially noticeable when full-season soybean was the previous crop— no-till yields were 2.7 bushels per acre higher than reduced-till double-cropped soybean yields. When averaged over the row crops, the double-cropped soybean yield for no-till was 32.7 bushels per acre and 30.7 bushels per acre for reduced-till.

It's not unusual to see wheat yields to be higher when wheat is planted after soybean compared to after corn and grain sorghum, but to think that double-cropped soybeans would have lower yields a whole year after full-season soybeans compared to after corn and grain sorghum might be difficult to understand. There were virtually no differences in nutrient uptake for double-cropped soybean compared among the different previous row crops and even though the wheat yield after soybean was slightly higher than after corn and grain sorghum there was no difference in surface soil moisture available for the double-cropped soybean. So, what's going on here? Probably the best explanation is simply that soybean is too prevalent in the rotation. Even though wheat was planted between the two soybean crops, the wheat didn't break up the continuous soybean effect, which allows pest problems, such as phytophthora root rot, charcoal rot, and cyst nematode to persist and affect yields.

What's the bottom line?

Double-cropped soybean yields are lower a year after full-season soybeans compared to double-cropped soybean after corn or grain sorghum, due to a higher level of pests associated with continuous soybean, which lowers yield. By using no-till plantings instead of reduced-till, double-cropped soybean yields after full-season soybean responded to a greater extent than after corn or grain sorghum (and they responded to no-till plantings, too). Therefore, it is important that producers use no-till plantings when double-cropping soybean regardless of the previous crop.

For more details about this research see:

2003 Agricultural Research, Southeast Agricultural Research Center. Report of Progress 909. P. 32-35. K-State Research and Extension.

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