

Have you ever wondered if tillage systems affect yields and profit within a wheat-sorghum-fallow rotation in western Kansas?

Results from a ten-year, wheat-sorghum-fallow rotation study at the Southwest Research-Extension Center at Tribune help answer this question. There were three different tillage treatments used within the rotation. They were: conventional tillage, in which 4-5 tillage operations were used for weed control during the fallow period; reduced tillage, which used 2-3 tillage operations and 1-2 herbicide applications to control weeds during the fallow period; and no-till, which used only herbicides during the fallow period to control weeds.

The ten-year average wheat yield was greatest for no-till (46 bu/a), while wheat in the reduced tillage system yielded 43 bu/a, and the conventional tillage yielded only 38 bu/a. That represents a 21 % yield advantage for no-till wheat over conventional tillage wheat. But, interestingly, when the economics of the different tillage systems were compared, the reduced tillage system had the highest net return (\$44/a). The conventional tillage system had a slightly better net return (\$31/a) than no-till (\$28/a). Although the no-till system had the highest yield, the increased herbicide costs were greater than the returns from the increased yields.

Sorghum yields followed the same trend as wheat in the different tillage systems. The ten-year no-till sorghum yielded 76 bu/a, reduced tillage sorghum yielded 70 bu/a, and conventional tillage sorghum yielded 45 bu/a. That represents a 68 % yield advantage for no-till sorghum over conventional tillage sorghum. The net returns for the no-till sorghum (\$38/a) and reduced tillage sorghum (\$36/a) were virtually the same, while returns for the conventional tillage sorghum was only \$7/a.

What's the bottom line?

Reduced tillage and no-till systems reduce soil moisture loss, which allows more moisture to be available for grain yields. Grain sorghum responds to no-till and reduced tillage systems more than does wheat. Because no-till wheat in the wheat-sorghum-fallow system was the least profitable due to the increased herbicide costs, a combination of tillage and herbicides (reduced tillage system) should be used during the fallow period prior to wheat.

For details about this study see:

Field Day 2001, Southwest Research-Extension Center. P. 20-21. K-State Research and Extension Report of Progress 877.

For related materials see: Great Plains Dryland Conservation Technologies: Enhancing Agricultural Profitability and Sustainability. 1995. K-State Res.& Ext. S-81.

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