

SOYBEAN AND CORN RESPONSE TO TILLAGE AND ROTATION IN THE MISSISSIPPI BLACKBELT PRAIRIE

G.R.W. Nice¹, N.W. Buehring¹, R.R. Dobbs¹, R.L. Ivy², R.W. Wimbish³, D. Summers⁴,
and S.R. Spurlock⁵

AUTHORS: ¹North Mississippi Research and Extension Center, Mississippi State University, Mississippi State, MS; ²Prairie Research Unit, Mississippi State University, Mississippi State, MS; ³Natural Resources Conservation Service; ⁴Summers Farms, West Point Mississippi; and ⁵Department of Agricultural Economics, Mississippi State University, Mississippi, MS.
Corresponding Author: G.R.W. Nice (gnice@ra.msstate.edu.).

INTERPRETIVE SUMMARY

Conservation tillage and crop rotation are methods for improved productivity and sustainability. These methods may be of use in the Blackbelt Prairie of Mississippi, a large farming area in which many of the sloping soils are classified as highly erodible. A field study (1996-98) was conducted to investigate the effect of tillage method on residue, yield, and financial return in continuous soybean and soybean/corn rotations. Treatments consisted of three tillage systems in continuous soybean or a soybean/corn rotation. Tillage systems in continuous soybean were: no-till (NT); fall applied one-pass chisel equipped with coulters and chain harrow (FC-H); and spring paratill followed by a spring harrow (SprP-H). Soybean/corn rotation tillage treatments were: NT corn followed by NT soybean; fall bed winter wheat followed by NT corn and FC-H soybean the following year; and conventional tillage (CT) corn followed by CT soybean. Duplicate treatments in the rotation were established so soybean and corn treatments were present each year. The NT treatments had at least 40% more ground cover from residue than any treatment with some form of tillage. Compared with CT, FC-H following corn increased ground residue cover and was equal to NT 2 (1996 and 1998) of 3 years.

Corn yield response also varied across years. In 1998, corn yield was reduced due to a dry June and CT corn yield was 15% more than NT. NT corn yield was comparable with CT corn yield in 1996 and 1997 with a 3-year average of 5.6 bu/A more than CT. NT and CT corn had similar total costs, but NT had a higher 3-year average return above total cost than both CT and the fall bed winter wheat cover crop-NT corn.

Soybean rotation and tillage response varied across years. NT treatments had at least 19% lower soybean yield than all other treatments in 1996 within the respective rotation treatment. However, soybean showed no yield response to tillage or rotation in 1997 and 1998. FC-H generally had the most stable high soybean yield across 3 years. FC-H soybean following corn had the highest 3-year average return above total cost at \$69/A, 8 and 44% more than CT and NT, respectively. FC-H soybean following NT corn in a 2-year rotation production system on the Blackbelt Prairie clay soils not only met conservation compliance requirements but also maintains returns higher than NT and equal to CT. The success of this production system is dependent upon performing the tillage operation in the fall and planting NT in the spring. Thereby, spring labor requirements are reduced significantly and allow for timely planting of both crops.