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Conservation Systems Research

Narrow and Wide Strip Tillage Systems for Peanut

CONSERVATION SYSTEMS PROJECT DESCRIPTION NO. 56



Wide-strip tillage equipment includes a coulter and shank, followed by two coulters, rolling basket, and drag chain.



Narrow-strip tillage equipment includes a coulter and shank, followed by rubber press wheels.

Researchers

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The Challenge

Many peanut growers in the southeastern USA are adopting conservation tillage systems that include winter cover crops and minimal soil tillage because of the reduced production costs and benefits from maintaining protective residue on the soil surface during the growing season. A typical system includes planting a winter annual cereal cover crop, terminating it in the spring, and preparing a peanut seedbed strip using an in-row subsoiler followed by coulters and baskets to make a smooth seedbed.

A different tillage system, using rubber pneumatic tires rather than coulters and baskets, closes the subsoiler slit while preserving most of the surface residue cover. This system, which has been used successfully for cotton and other crops grown in single rows, has not been evaluated for peanut production.

Some peanut producers are shifting to twin-row systems, which may require wide strips of disturbed soil. Wide strips reduce amounts of surface residue protecting the soil. Twin-row patterns are especially popular in conventional tillage systems, where damage from thrips is often reduced compared to single-row patterns. In conservation tillage systems, residue cover seems to reduce thrip damage under either row pattern, so the yield advantage may not be as significant.

Results from the first year suggest that narrow-strip systems produce yields comparable to the wide-strip systems, while providing greater protection of the soil.

What We Have Learned

Results from the first year suggest that narrow-strip systems produce yields comparable to the wide-strip systems, while providing greater protection of the soil.

Tillage system effects

The narrow-strip system produced greater amounts of residue cover than the wide-strip system. Both systems produced similar peanut yields and sound mature kernels (SMK).

Row patterns

There were no yield differences between single- and twin-row patterns. This may be because the cover crop residue reduces thrip damage to peanuts, so the thrip damage in single-row patterns, wide-strip tillage systems is not a factor. There were some yield and SMK differences among the three peanut cultivars, but these will be monitored in the following seasons.

Soil moisture

There were no effects on soil moisture from tillage systems or row patterns. Soil moisture was affected by peanut cultivar, suggesting differences in water use efficiency.

The Experiment

Multi-year experiments were established in the autumn of 2003 at the Alabama Agricultural Experiment Station's Gulf Coast Research and Extension Center (Fairhope) and Wiregrass Research and Extension Center (Headland) to:

1. Determine the effects of two strip tillage systems – the wide strip system using coulters and baskets and the narrow strip system using rubber tires – on surface residue cover and peanut yield response.
2. Compare the effect of single- and twin-row patterns on yield of three peanut cultivars.
3. Evaluate soil moisture status for these practices.



Single-row pattern



Twin-row pattern

Related Publications

K.S. Balkcom, F.J. Arriaga, and D.L. Hartzog. 2005. Narrow and wide strip tillage production for peanut. Pages 47–54. In W. Busscher, J. Frederick, and S. Robinson (eds.) Proc. Southern Conservation Tillage Systems Conf., 27, Florence, S. Carolina. June 27–29, 2005, Clemson Univ. Pee Dee Res. Educ. Ctr., Florence, SC. Available at: <http://www.ag.auburn.edu/aux/nsdl/sctcsa/>.