

# **Summary of Long-Term Rotation and Tillage Trials in North Carolina 1999-2022**

David Jordan  
Department of Crop and Soil Sciences  
North Carolina State University

919-810-6611  
[david\\_jordan@ncsu.edu](mailto:david_jordan@ncsu.edu)

## Background

Rotation and tillage trials were initiated at Lewiston-Woodville (1999) and Rocky Mount (2000) and have been maintained through 2022

Soil at Lewiston-Woodville is a combination of Norfolk and Goldsboro soil series

Soil at Rocky Mount is a combination of Goldsboro, Lynchburg, and Raines soil series

Trials were established primarily to compare the effects of rotation and tillage on peanut yield

Sequences of rotation had peanut in all plots around every 5 years

Impacts of rotation on corn and cotton were confounded in some cases based on rotation sequence relative to peanut

## Summary

Rotation and tillage affected crop yield independently in most years

Rotation had a major impact on peanut yield but had only modest effects on corn and cotton yield

Peanut yield was lower in strip tillage compared with conventional tillage on fine-textured soils

Peanut yield was similar on coarse-textured soils for both tillage systems

Corn yield was greater in strip tillage compared with conventional tillage on coarse-textured soils but was similar in both tillage systems on fine-textured soils

Cotton yield was similar in strip tillage and conventional tillage on both soils

## Crop Yield Response to Continuous Conventional and Strip Tillage

The rotation × tillage interaction was often not significant

Peanut yields reflect average of long and short rotations

Data are pooled over rotations and years

<b>Lewiston-Woodville (1999-2022)</b>		
<b>Norfolk and Goldsboro series</b>		
<b>Crop</b>	<b>Conventional till</b>	<b>Strip till</b>
Corn (bu/acre)	119	124 * (n = 12)
Cotton (lbs lint/acre)	823	816 (n = 15)
Peanut (lbs/acre)	3917	3899 (n = 9)

<b>Rocky Mount (2000-2022)</b>		
<b>Lynchburg, Raines, and Goldsboro series</b>		
<b>Crop</b>	<b>Conventional till</b>	<b>Strip till</b>
Corn (bu/acre)	147	150 (n = 6)
Cotton (lbs lint/acre)	904	901 (n = 11)
Peanut (lbs/acre)	3871	3147 * (n = 9)

## Summary

Results from these and other trials were used to develop a risk index to assist growers in making a decision on transitioning from conventional tillage to reduced tillage

The majority of peanuts in North Carolina are planted in conventional tillage

The intensity of tillage in peanut production systems has decreased in conventional tillage systems

Lower peanut yield in strip tillage on fine-textured soils is attributed to greater pod loss during digging relative to conventional tillage









## Tillage Practices in Peanut in North Carolina

Percentage of farmers listing a practice on at least a portion of their acreage

Tillage	1998	2004	2009	2014	2019
Disk	90	78	71	75	79
Chisel	25	23	27	12	21
Moldboard plow	58	17	7	5	6
Field cultivate	75	55	42	44	53
Rip and Bed	49	39	40	55	48
Bed	44	35	32	25	35
Reduced till	10	23	41	20	31



***Table 3-15. Advisory Index for Determining the Risk of Peanut Yield in Reduced-Tillage Systems Being Lower Than Yield in Conventional-Tillage Systems***

Category	Scoring Criteria	Your Score
<p><b>Soil series</b> Pod loss on finer-textured soils, such as those on the Roanoke and Craven series, is often greater than on coarser-textured soils, such as Conetoe and Wanda series, regardless of tillage system. Difficulty in digging can increase when these soils become hard in the fall if rainfall is limited.</p>	<p>Roanoke and Craven — 40 points Goldsboro and Lynchburg — 20 points Norfolk — 10 points Conetoe and Wanda — 0 points</p>	<p><b>Soil series</b> <b>Your score:</b></p>



**Tillage intensity**

Peanut response to reduced-tillage systems is invariably correlated with the degree of tillage. Efficient digging can be difficult when peanuts are planted in flat ground in reduced-tillage systems. Although fields may appear to be flat and uniformly level, often fields are more rugged than they appear, and setting up the digger to match unforeseen contours in the field can be difficult. Strip tillage into flat ground is a better alternative than no tillage into flat ground, although digging peanuts planted on flat ground can be more challenging regardless of the tillage system. Strip tillage into preformed beds often results in yields approaching those of conventional tillage.

No tillage into flat ground — 35 points

Strip tillage into flat ground — 10 points

Strip tillage into stale seedbeds — 0 points

**Tillage intensity****Your score:**

<b>Risk of yield being lower in reduced tillage than in conventional tillage:</b>	35 or less — low risk 40 to 50 — moderate risk 55 or more — high risk	<b>Total index value</b> <b>Your score:</b>
---	---	--

