

# **Performance of Pumpkins With Different Tillage Methods, Plateau Experiment Station, 2000**

Charles A. Mullins

## **Interpretative Summary**

Conventional tillage without modifications was as productive as conventional with additional modifications of black plastic mulch, straw mulch, or subsoiling. Reduced tillage methods were a failure in the trials.

## **Introduction**

Pumpkins are grown in large commercial acreages for the Halloween market in Tennessee. An estimated 3500 acres of pumpkins are produced in Tennessee, with over half on the Cumberland Plateau. Pumpkins have been a profitable crop in recent years, and the acreage grown seems to expand each year. Some producers have grown pumpkins successfully with reduced tillage methods. Weed control is a problem in pumpkins when herbicides are used as the total method of weed control.

No-till production of snap beans and sweet corn has not been fully successful in trials at the Plateau Experiment Station. Different procedures have been evaluated, but results were highly variable among plantings. The sandy loam soil seems to become very hard and does not appear to allow satisfactory root penetration. An experiment was conducted at the Plateau Experiment Station at Crossville, TN in 2000 to evaluate performance of 'Spirit' pumpkins with seven different tillage and mulching treatments.

## **Materials and Methods**

The site was prepared for planting by different tillage methods on June 2. Tillage treatments were 1) conventional tillage, 2) conventional tillage plus black plastic mulch, 3) no-till, where a fluted coulter was used to slice a strip through the soil, 4) Strip-till, where a 4 foot wide tractor mounted rototiller was used to prepare a 4 foot wide strip in the center of the plot, 5) Conventional tillage with straw mulch added after the pumpkin plants were 6 inches tall, 6) conventional tillage with subsoiling where a subsoil shank was used in the center of the plot and 18 inches to each side, and 7) subsoiling only where three passes were made with the subsoil shank as in treatment 6 and the tire of a small tractor was run over the subsoil furrow to fill and pack soil in the furrow before planting pumpkins. Fertilizer was broadcast at 400 lb/A of 15-15-15 before final tillage on June 8. Plots were direct seeded with 'Spirit' hybrid pumpkin on June 8. 'Spirit' is a cultivar that has produced medium sized fruit in previous Tennessee trials. Plot size was 12 by 20 ft. One row, 20 ft long with 5 hills (3 seeds/hill) spaced 4 ft apart in the row was seeded down the middle of each plot. Hills were thinned to two plants/hill after germination. Experimental plot design was a randomized complete block with four

replications. Preemergence herbicides applied for weed control on June 8 were clomazone (Command) at 0.375 lb ai/A and bensulide (Prefar) at 6.0 lb ai/A. Paraquat (Gramoxone) at 0.5 lb ai/A was used as the burndown herbicide.

Insect control was by esfenvalerate (Asana) at 0.05 lb ai/A alternated with carbaryl (Sevin) at 1.0 lb ai/A on a 7 to 10 day frequency. Fungicides were azoxystrobin (Quadris) at 0.25 lb ai/A alternated with a combination of chlorothalonil (Bravo) at 2.0 lb ai/A and myclobutanil (Nova) at 0.125 lb ai/A applied with each insecticide treatment. Pumpkins were harvested on Sept 14 and 15. Harvested pumpkins were sorted according to sizes of over 20 lb, 15 to 20 lb, 10 to 15 lb, and less than 10 lb. Number and weight of pumpkins in each weight range were recorded. All data were analyzed by analysis of variance methods, and means were separated by Duncan’s multiple range tests at the 0.05 level.

### Results and Discussion

‘Spirit’ usually produces pumpkins in the 10 to 12 lb weight range, and which was evident in this trial (Table 1). Few pumpkins weighed over 15 lb. The no-till treatment failed to produce well, and the subsoil treatment was only slightly more productive than the no-till treatment. The conventional treatment produced more tons of pumpkins per acre than all treatments except conventional with black plastic mulch and conventional with straw mulch. Pumpkin fruit size was larger with the conventional treatment plus straw mulch than the no-till and subsoil only tillage treatment.

The conventional treatment produced a larger number of pumpkins per acre than all treatments except conventional with black plastic mulch, conventional with straw mulch, and conventional and subsoil (Table 2). The number of less than 10 lb, 15 to 20 lb, and over 20 lb pumpkins was not affected by tillage. The number of 10 to 15 lb pumpkins produced per acre was higher with conventional tillage than with conventional and black plastic mulch, conventional and straw mulch, and conventional and subsoil.

Weed control was not exceptional with any of the treatments. Redroot pigweed was a major weed problem. Improved herbicides are needed for pumpkins regardless of tillage system.

Table 1. Yield in tons per acre of different size classes of pumpkins with different tillage methods at The University of Tennessee Plateau Experiment Station at Crossville, 2000.

	Total yield -	Pumpkins < 10 lb tons/A	Pumpkins 10-15 lb	Pumpkins 15-20 lb	Pumpkins >20 lb	Pumpkin average

<b>Tillage treatment</b>	tons/A		tons/A	tons/A	tons/A	wt - lb
Conventional	9.7 a <sup>2</sup>	4.2 a	2.8 a	0.22 a	0.05 a	6.82 abc
Conventional + black plastic mulch	7.0 ab	2.9 ab	2.6 a	0.04 a	0.05 a	5.82 abc
No-till	1.7 d	1.7 b	0.0 b	0.00 a	0.00 a	2.92 c
Strip-till	4.0 cd	2.4 ab	0.9 ab	0.08 a	0.00 a	7.13 ab
Conventional + straw mulch	7.4 ab	3.2 ab	2.5 a	0.12 a	0.05 a	8.42 a
Conventional + subsoil	6.0 bc	3.2 ab	1.4 ab	0.07 a	0.04 a	5.42 abc
Subsoil	1.6 b	0.9 ab	0.8 ab	0.00 a	3.91 bc	

<sup>2</sup> Means within a column followed by the same letter are not significantly different at the 0.05 level of probability, Duncan's multiple range tests.

Table 2. Yield in number per acre of different size classes of pumpkins with different tillage methods at The University of Tennessee Plateau Experiment Station at Crossville, 2000.

<b>Tillage treatment</b>	Pumpkins total no./A	Pumpkins < 10 lb no./A	Pumpkins 10-15 lb no./A	Pumpkins 15-20 lb no./A	Pumpkins >20 lb no./A
Conventional	2042 a <sup>2</sup>	1225 a	499 a	94 a	45 a
Conventional + black plastic mulch	1770 ab	1225 a	408 ab	220 a	91 a
No-till	1180 b	1180 a	0 c	0 a	0 a

Strip-till	1134 b	908 a	136 bc	0 a	0 a
Conventional + straw mulch	1652 ab	1225 a	408 ab	100 a	45 a
Conventional + subsoil	1497 ab	1225 a	227 abc	87 a	45 a
Subsoil	1316 b	908 a	136 bc	0 a	0 a

<sup>2</sup> Means within a column followed by the same letter are not significantly different at the 0.05 level of probability, Duncan's multiple range tests.

Copyright © 1999 by [The University of Tennessee](http://www.tennessee.edu). All rights reserved.

This research represents one season's data and does not constitute recommendations. After sufficient data is collected over the appropriate number of seasons, final recommendations will be made through research and extension publications.