

Successes With No-Till Cotton

John F. Bradley¹

Introduction

Eight years of research with no-till cotton at the University of Tennessee Milan Experiment Station have proven that no-till cotton can be produced successfully in previous crop stubble or in killed small grains that have been grown for winter cover. There have also been three to four thousand acres during the 1988 growing season demonstrating success on the farm by West Tennessee farmers.

During the past four seasons yields of no-till cotton have exceeded 2 bales per acre of lint cotton. During the 1987 growing season over 3 bales of lint cotton per acre were produced under the no-till system. This equalled the conventionally planted and cultivated cotton at Milan.

There are several advantages to no-till cotton that should be considered, (1) seedbed preparation is eliminated which can reduce the cost of production, as many as six trips across the field can be saved, (2) cotton can be produced on slopes not normally used for conventional crop, (3) soil erosion is effectively reduced on sloping land (4) all fertilizer and lime can be broadcast on the soil surface, (5) soil is firmer at harvest time with fewer harvesting delays due to weather. Proven steps in producing no-till cotton need to be adhered to in order to achieve high yields. (Table 1)

Table 1. No-tillage vs conventional tillage cotton lint yields across variety trials planted into standing wheat or rye.

Year	No-till Lb/A	Conventional Lb/A
1981	273	382
1982	940	937
1983	508	336
1984	1071	1146
1985	1040	1048
1986	854	853
1987	919	987
1988	767	690
AVERAGE	797	197

Planting

Field selection should be on soils suitable for conventional tillage cotton. Fields with heavy infestations of perennial grasses such as johnsongrass or bermudagrass should either be avoided or the producer should plan to repeat applications of in-season grass herbicides.

¹Superintendent. Milan Exp. Sta.. Univ. of Tennessee. Milan, TN 38358

Soil temperature is more critical for no-till cotton than conventional because the soil can be several degrees cooler depending on the thickness of the mulch. Ideal soil temperature is 68°F, 2 inches below the soil surface at 8:00 a.m. for three consecutive days. Research has shown in limited residue situations such as old crop stubble (cotton stalks in particular) the soil warms up as fast as that of a prepared tilled seedbed, resulting in no delay of planting. Winter cover crops such as wheat, rye or vetch should be killed 10-15 days prior to planting cotton, the soil will warm and dry faster.

Popular recommended cotton varieties usually perform well in no-till culture. Grades, staple length, and micronaire values have not been different than those obtained from the same varieties that have been conventionally tilled.

Good stands can be obtained in no-till cotton production. Six year average plant population has been approximately 75 percent that of conventionally planted seed from the same source. 2.5 to 3.5 stalks per foot of row are sufficient for optimum yields. This requires planting 6-7 seed per foot of row of 80 percent germ seed

Planting Equipment

Use only planters designed for no-till. The Milan Experiment Station uses a John Deer Max-Emerge planter, a Case-IH Early-Riser will work as well, as will an A-C No-Till planter. One ripple coulter from 3/4" to 1" wide leading in front of the double disc openers works best. The coulter should be set to run one inch deeper than the double disc openers. The "rule of thumb" for coulter setting: the dryer the soil the deeper the coulter setting, the wetter the soil the more shallow the setting.

The double disc openers need to be followed by heavy duty press wheels with pressure enough to cover the seed firmly. Planting should be 4-5 MPH. Weight may need to be added to the planter when soil conditions are dry or hard.

A soil treatment of an insecticide (Temik) plus a soil fungicide (Terraclor Super X) is a must in no-till cotton. Use recommended rates of soil treatments such as Ridomil PC

plus Temik, TSX plus Di-Syston, Temik-TSX or TSX in-furrow followed with foliar treatments after cotton emergence for thrip and aphids.

Fertilization

As always a good fertility program is necessary. Soil test and apply lime, phosphate and potash in the fall or early spring. Nitrogen should be applied broadcast just prior to planting at the rate of 60-80 units per acre. Use soil test and common sense to adjust nitrogen rates according to field history, ie. if cotton grows rank in a field, cut back on nitrogen.

Herbicides

A complete kill of all vegetation prior to or at planting is essential. In most cases one quart of Roundup per acre is necessary for good control, especially if tough to kill annuals such as horseweed (marestail) or perennial weeds are present. Gramoxone Super plus surfactant works excellent on cover crops as wheat, vetch, clovers and annual weed.

Dual or Prowl should be used preemergence with Cotoran and/or Zorial. A surfactant can be included when these are applied to enhance foliar activity on emerged weeds. Dual has exhibited more activity than Prowl on sparges and nut-sedges, while late annual grass control has been better with Prowl. Cotoran will be needed in most situations. Tank mixtures of Cotoran and Zorial have performed better where prickly sida, velvetleaf and sparges are present.

It will probably be necessary to post-direct the no-till cotton after the cotton is at least 6" tall and weeds are less than 2" tall for season long control. Johnsongrass can be controlled with over-top applications of Poast or Fusilade. Although it has not been necessary at the Milan Experiment Station, no-till cotton in old cotton, soybean or corn stubble can be cultivated successfully.

Insect and disease control has not been different with no-till compared to the conventional. A good scouting program always pays.