Tennessee No-Tillage Update

George J. Buntley

No-till acreage in Tennessee dropped from 563,200 acres in 1984 to 451,000 acres in 1985 according to the NACD-CTIC 1985 conservation tillage survey data. No-till corn (162,280 acres) and no-till soybeans (214,871 acres) accounted for about 84 percent of the total 1985 no-till acreage. Small grain (32,360 acres), grain sorghum (29,980 acres) and forage crops (10,960 acres) made up the bulk of the remaining no-till acreage in 1985.

The 1985 decrease in no-till acreage was due primarily to conditions resulting from an extremely wet 1984 fall season. Wet soils restricted the amount of wheat sown which resulted in wheat acreage being down 43 percent. This in turn drastically reduced the acreage of no-till soybeans that would have followed wheat in double-crop systems. In addition, fields that normally would have been no-till planted into crop residues of the previous crop were so deeply rutted by 1984 harvesting operations that they could not be planted no-till in the spring of 1985. However, all indications are that no-till acreage again will be on the increase in 1986.

Results of research in grass-legume cover crops for corn and in no-till cotton are reported below.

Nitrogen-fixing legume cover crops have the potential to protect the soil from erosion and to supply nitrogen to a following grain crop. Yields of various cover-tillage treatments for conventional and no-tillage corn are shown in Table 1.

Corn yields did not increase much above the 100 lbs. N/A fertilizer rates when corn was planted into soil incorporated wheat-vetch or chemically-killed wheat-vetch. When corn was planted in a conventional seedbed with no winter cover or planted no-tillage in killed wheat, yields increased up to the 150 lbs. N/A rate. A nitrogen contribution to the corn crop of at least 50 lbs. N/A from the vetch is indicated whether the vetch was incorporated or used as a no-tillage mulch.

Table 1. GRASS-LEGUME COVER CROPS FOR CORN
(6 YR. AVG.) (1980 - 1985)

	N Rate (lbs/A)			
	0	50	100	150
	Corn Yield bu/A			
NO Winter Cover (conv.)	17	59	86	99
Wheat-Vetch (conv.)	48	83	99	103
Wheat-Vetch (no-till)	42	70	93	98
Wheat (no-tiil)	13	44	75	94

Don Tyler and Bob Duck

Vetch as a mulct. for no-tillage cotton has also been compared to other cover-tillage treatments at various nitrogen rates. Yields of cotton at two locations for the various treatments are shown in Tables 2 and 3.

Table 2. NO-TILL COTTON (MES)
(5 YR. AVG.) (1981 - 1985)

	No-till			Conventional		
	Lbs N/A			Cbs N/A		
	0	30	60	0	30	60
	Lint Yield (lbs./A)					
No Cover (Previous Cotton Stubble)	624	747	797	742	797	817
Rye	528	586	762	648	794	804
Rye-Vetch (Vetch 3 yrs. Crimson Clover 2 yrs.)	578	591	724	708	700	762
Vetch	638	601		715	681	

Don Tyler, Phil Hoskinson and Bob Hayes

TABLE 3. NO-TILL COTTON (WTES)
(5 YR. AVG.) (1981 - 1985)

	No-till				Conventional			
	Lbs N/A				Lbs N/A			
	0	30	60	90	0	30	60	90
	Lint Yields (lbs/A)							
No Cover (Previous Cotton Stubble)	752	931	898	921	839	1175	1015	915
Rye	629	807	809	880	864	972	999	915
Rye-Vetch (Vetch 3 yrs. Crimson Clover 2 yrs.)	621	716	678	584	893	973	716	871
Vetch	747	675	652	565	906	884	849	928

Don Tyler, Phil Hoskinson and Bob Hayes

Yields of cotton planted no-tillage into heavy mulches such as rye, rye-vetch (vetch 3 yrs.- Crimson clover 2 yrs.), or vetch were lower when planted no-tillage as compared to conventional tillage. When planted in previous cotton stubble yields were about the same between tillage systems.

Cotton responded to more fertilizer nitrogen when planted no-till into rye as compared to when it was no-till planted into the stubble of the previous cotton crop. Yields were reduced at high fertilizer nitrogen rates where cotton was no-till planted into vetch.

Yields at the Milan Experiment Station location were similar for cotton planted either no-till or conventional in previous cotton stubble. Yields were lower at the West Tennessee Experiment Station location at Jackson when the cotton was planted no-till in previous cotton stubble as compared to conventional tillage.

No-tillage cotton in a limited mulch residue is being recommended to Tennessee growers. Heavy mulches have tended to result in cooler than optimum soil temperatures. Cotton maturity also has been delayed when no-till planted into heavy mulches.

No-till alfalfa was recommended for the first time in Tennessee in 1985. There was considerable interest and a small acreage planted in 1985. The number of no-till drills increased with a much larger acreage seeded in the spring of 1986, probably 1,000 to 1,500. Interest is increasing daily, and with the need to kill fungus infected fescue pastures, no-till alfalfa fits the situation nicely.

The fescue endophyte fungus problem is being discussed statewide. A concerted program for killing the infected fescue will be put into operation in the fall of 1986. The new diagnostic lab will be completed in September and will provide facilities for testing for the endophyte fungus in fescue.

Research indicates that the best methods of killing 100 percent of the infected fescue are:

1. Use a rotation crop such as corn, sorghum X sudangrass, grain sorghum or alfalfa. All of these crops can be seeded no-till.

2. Kill the fescue in late summer or early fall and reseed with fungus free fescue seed. Two spray applications two to three weeks apart are needed for 100 percent kill. Fescue is much easier to kill in fall than in spring.

3. One spray application can be used in late fall with another spray in spring after fescue turns green and is growing, with the fescue seeded in spring after the last spray application. No-till reseeding of the fescue and rotational crops is being stressed.

No-till alfalfa seeding and no-till reseeding of fungus-free fescue demonstrations will be given special emphasis at the Southeastern Forage and Grassland Expo '87 to be held at Greeneville, Tennessee, June 18-19-20, 1987.