

NO-TILLAGE VERSUS CONVENTIONAL TILLAGE CORN IN
BAHIAGRASS SOD WITH SOYBEANS FOLLOWING

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Perennial grasslands occupy several million acres in the southeastern USA and also occur on vast acreages in the tropics. With proper management techniques that are efficient and at the same time conserve the land and other natural resources, much of this area could be used for grain production. Research was initiated at AREC Quincy with 3 objectives: (1) compare conventional methods of soil preparation and cultivation with no-tillage methods for producing corn in Bahiagrass sod, (2) determine the influence of the two practices on soybean production following the corn, and (3) identify limiting factors in no-tillage corn production.

Six early corn hybrids were planted in a bahiagrass sod on 22 March, 1978. Seeding directly into the sod (no-tillage planting) with a Brown-Harden Super Seeder was compared to planting on a prepared seedbed that included turning with a moldboard bottom plow and one disking. The Super Seeder was used to plant both treatments. Rows were 30 inches wide and the subsoiler feet ahead of the planters were set at 14 inches deep. In a single pass over the plots application of an insecticide, herbicide, and fertilizer was made while subsoiling and planting. "Roundup" herbicide was broadcast at 1/2 gallon of commercial products per acre. Furdan was banded over the row at 20 pounds commercial product per acre. Fertilizer applied at planting was 1000 lb/A of 5-10-15 (N-P₂O₅-K₂O) with ammonium nitrate applied at 450 lb/A when the corn was 24 inches tall. Conventional tillage plots were cultivated once. Irrigation water was applied two times, but facilities were not adequate to irrigate for maximum yield potential. Sample rows were hand harvested on 19 July. At this time moisture in the grain was in a range of 26 to 30%.

Grain yields are shown in Table 1 as bushels/A at 15.5% moisture. The highest yielding hybrid for both planting methods was Funk's G-4507. With this hybrid the prepared seedbed resulted in a yield increase of 16 bushels/A over the no-tillage treatment. All hybrids responded in a similar manner with yield differences up to 44 bu/A. The average increase of all varieties was 24 bushels/A in favor of conventional land preparation.

Cobb soybeans were planted behind the corn on 26 July with the Super Seeder. Two quarts Lasso plus 1 pint Lexone and 10 pounds 10G Furdan (not labelled) were applied during the planting operation. Roundup at 1 gallon/A was applied in a second trip over the field. All soybeans were planted without any tillage into the conventional and no-tillage corn residue. Soybean yields were low due to the late planting date, stink bug damage, and shattering losses caused by excessive rainfall at harvest time. Average yield from no-tillage beans behind conventional tillage corn was 15 bushels/A compared to 9 bushels/A behind the no-tillage corn.

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The experiment was repeated in 1979 with 7 corn hybrids planted on 14 March. Aatrex-Lasso-Paraquat (1-2.5-0.5 a.i./A) was broadcast at planting with Furdan banded at 20 pounds per acre. At planting, 800 lb/A of 7-14-21 (N-P₂O₅-K₂O) was applied with 300 lb/A ammonium nitrate applied on 20 April. Conventional tillage plots were cultivated once. On 16 May Paraquat + Lorox (0.5 + 1.0 a.i./A) was applied post directed to all plots. Supplemental irrigation was used to maintain a favorable moisture regime. Corn was harvested on 18-20 July with grain moisture content 24 to 30%.

Corn grain yields for 1979 are shown in Table 2. Funk's 6-4507 was again the highest producer. Whereas in 1978 the conventional method resulted in a 16 bu/A increase over no-till (Table 1), in 1979 the no-till method resulted in a 7 bu/A advantage with this hybrid (Table 2). DeKalb XL-12 also produced a slightly higher yield under no-till. The other hybrids showed a slight yield advantage for the conventional method in 1979. The average yield difference in 1978 (Table 1) was 24 bushels per acre for conventional versus no-till, while in 1979 (Table 2) the average difference was only 6 bushels per acre.

Cobb soybeans were planted following corn harvest on 26 July. Half the area was planted in rows and half was drilled using a grain drill. Lasso-Sencor-Paraquat (1.5-0.5-0.5 a.i./A) was applied to row planted beans with Paraquat omitted from the drilled beans which were planted on a disked seedbed. On 11 September, Paraquat at 0.5 a.i./A was post-directed to soybeans in rows. The drilled beans held the weed competition to a desirable level. Soybeans were irrigated once on 17 December. A plot combine was used to harvest the soybeans. Moisture content was 15 to 18% at harvest.

Soybean yields following conventional corn was 17 bushels per acre, while yields behind no-till corn was 18 bushels per acre. Yields of drilled beans were no different from those in rows.

Results from these 2 years of research show that corn yields of up to 150 bushels per acre can be realized with no-till practices on Bahiagrass sod. Higher yields might be achieved by increasing plant populations. In 1979, plant populations were in the range of 18,000 to 23,000 plants per acre. Current recommendations are for 30,000 plants per acre for irrigated corn. Obtaining a uniform and consistent stand has been a problem, and if this can be solved to give higher populations, yields of up to 200 bu/A might be realized. Research is being continued with this objective in mind.

Soybean yields following corn in these experiments have been low enough that this practice would probably not be profitable.

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Table 1. Grain Yields of 6 Corn Hybrids Seeded in a Bahiagrass Sod. AREC, Quincy - 1978.

Hybrid	Conv. ^{1/}	No-Till ^{2/}	Diff. ^{3/}
Funk's 6-4507	150	134	16
Northrup King PX 20	131	87	44
DeKalb XL 12	124	108	16
Pioneer 3958	124	104	20
DeKalb XL 18	116	91	25
Pioneer 3965	114	88	26
Avg .	126	102	24

^{1/}Conventional Tillage. Turned with bottom plow and disked once before planting with Brown-Harden Super Seeder.

^{2/}No-Till. Planted directly into sod with Brown-Harden Super Seeder.

^{3/}Advantage (+ or -) of conventional over no-till.

Table 2. Grain Yield of 7 Corn Hybrids Seeded in A Bahiagrass Sod. AREC, Quincy - 1979.

Hybrid	Conv. ^{1/}	No-Till ^{2/}	Diff. ^{3/}
		Bu/A Grain	
funk's G-4507	150	157	- 7
DeKalb XL-726	132	129	+ 3
Pioneer 3958	125	111	+14
Northrup King PX 20	118	114	+ 4
DeKalb XL 18	111	96	+15
Pioneer 3965	110	91	+19
DeKalb XL 12	102	107	- 5
Avg .	121	115	6

^{1/}Conventional Tillage. Turned with moldboard plow and disked once. Seeded with Brown-Harden Super Seeder.

^{2/}No-Till. Planted directly into sod with Brown-Harden Super Seeder.

^{3/}Advantage (+ or -) of conventional over no-till.