STATUS OF NO-TILL PLANTING IN KENTUCKY, 1977 AND 1982

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NO-TILL ACREAGE ESTIMATES

Until the Kentucky Crop and Livestock Reporting Service (KCLRS) conducted a survey in 1981, there were few reliable data available on no-till acreages in Kentucky. Reports prior to 1981 were based on estimates made by various organizations, and were not always made on the same basis. One reason for variations in no-till acreage estimates has been due to differences in what is defined as "no-till planting". This particularly affects the size of no-till acreage of forages and small grains since grassland renovation by sowing forage legume seeds directly onto undisturbed soil surfaces and aerial seeding of small grains are sometimes included in "acreage of no-tilled crops". Because of this it is somewhat confusing in trying to determine the status of no-till acreage actually planted with the no-till planting technology developed during the 1960's and 1970's which involves use of specially designed planters to open a small slit in soil, drop a seed into it, and press soil around the seed. No-till planters are now widely available for planting corn, soybeans, grain sorghum, and forage species. Acreages reported here for Kentucky are estimates for notill planting of crops only by use of a no-till planter. Acreages were estimated as follows:

CORN: The 1977 estimate was based on observations and opinions of University of Kentucky agronomists. It was based on increasing the 18.8 percent determined by the KCLRS in 1981 to 20 percent for 1982.

SOYBEANS: The 1977 estimate was based on observations and opinions of University of Kentucky agronomists and the 1982 estimate was based on increasing the 33.5 percent determined by the KCLRS in 1981 to 35 percent €or 1982.

GRAIN SORGHUM: Both 1977 and 1982 estimates are based on observations and opinions of University of Kentucky agronomists that 25 percent of the acreage was no-till planted.

SMALL GRAINS: Both 1977 and 1982 estimates are based on observations and opinions of University of Kentucky Agronomists that none was planted with a no-till drill in 1977 and 5% in 1982.

FORAGES: Both 1977 and 1982 estimates are based on observations and opinions of University of Kentucky Agronomists that there were no more than 60 no-till renovators in Kentucky in 1977 and 100 in 1982, and that each no-till renovator was used on 200 acres.

	Crop (000 acres)					
Year	Corn	Soybeans	Grain Sorghum	<u>Small Grains</u>	Forages	<u>Total</u>
1977	248	338	10	0	12	608
1982	336	595	12	46	20	1009

Table 1. Estimated Acres of Crops Planted in Kentucky with No-Till Planters

TRENDS

By the mid-1970's no-till acreage of corn and soybeans in Kentucky had increased greatly, with an estimated 26 percent of the corn and 30 percent of the beans being no-till planted in 1974. No-till acreage dropped from that point to an estimated low of 10 percent of the corn and 21 percent of the beans in 1978. Agronomists at the University of Kentucky attribute this decline to weed control problems, especially johnsongrass, which had intensified during the previous 6 years of no-till planting. Additionally, the market impetus of the mid-1970's encouraged expansion of corn and beans, most of which was clean cultivated. By 1978 the herbicide Roundup was available and use of it was begun to control johnsongrass. This herbicide was particularly effective in postemergence applications on johnsongrass in beans using wipers or recirculating sprayers. As a result, together with a dramatically increased planting of wheat during the fall of 1980, no-till planting of beans increased to 35 percent of the crop in 1982. No-till corn acreage didn't increase as fast but has more than doubled since 1977, making up 20 percent of the acreage in 1982.

We don't have good statistics for use of no-till planters in seeding other crops. Following introduction of the first commercial model of a no-till pasture drill in the mid-1970's, there has been a slow increase in the number of such planters in Kentucky. We estimate there may have been as many as 60 such planters in 1977 and there may be as many as 100 now. By arbitrarily assuming that each planter would be used on 200 acres per year, we estimate that 12,000 acres of grasslands were renovated by use of no-till planters in 1977, and that 20,000 acres were renovated with no-till planters in 1982.

Since it's doubtful there were any no-till small grain drills in the state in 1977, we concluded no small grains were seeded with a no-till drill then. However, since 1977 there has been considerable interest in no-till grain drills and there are several around now. We've estimated that 5 percent of the small grain acreage was planted with no-till drills in the fall of 1981, but that's probably too high.

We don't have much basis for estimating acres of grain sorghum planted with no-till planters, so we arhitrarily estimated 25 percent for 1977 and 1982, which may be too low.

NO-TILL PRACTICES IN KENIUCKY

CORN: The most obvious change in practice which has taken place with no-till corn is the type of residue into which planting is done. Since much of the grassland acreage suitable for no-till corn has been used, about the only sod available for no-till planting now, is that which is in rotation with red clover and alfalfa. Most no-till corn in Kentucky is now being planted into residues from the previous year's crop... usually corn or soybeans...or into a winter cover crop, mostly wheat with lesser acreages of rye. Use of winter annual legumes for no-till cover currently is minimal, and since planting of corn will usually be delayed in order to get enough legume growth to fix substantial amounts of nitrogen, it's unlikely that this will become a major practice unless it is used on those soils on which delayed planting is a usual occurrence.

Paraquat is still by far the dominant contact herbicide used, although farmers are slowly becoming more sophisticated in deciding on what residual herbicides to use. Even though atrazine is still probably the dominant residual herbicide used, mixtures with other herbicides to provide broader spectrum control is more widespread now than 1977.

Nearly all fertilizer continues to be broadcast onto the soil surface, although high fertilizer prices have prompted some corn growers to go back to banded fertilizer since rates of needed phosphate and potash can be reduced by banding. Delayed application (4-8 weeks after planting) of part or all nitrogen with ground-driven equipment is now a common practice. Row application of insecticides is still a common practice, but probably not to the extent it was 2 or 3 years ago. With the stress prices received for corn during the past few years, soil insecticide use has been one major area where growers have cut back on expenses. With the second generation of commercial no-till corn planters now widely available, it appears in Kentucky that most no-till corn growers have settled on planters with a double-disk furrow opener running behind a coulter which now is more commonly a ripple coulter rather than a fluted coulter. Lack of good seed coverage continues as a problem for many growers. Although there is currently a variety of covering mechanisms in use, it would appear there is a trend toward use of either small covering disks running just in front of wide packer wheels or use of dual small diameter packer wheels which "squeeze" the seed slit closed.

SOYBEANS: No-till soybeans are nearly all double-cropped with wheat and to a lesser extent barley. They are seeded directly into small grain stubble using paraquat as the dominant contact herbicide, mixed with various other residual herbicides chosen for target weeds. Postemergence application of Roundup with a wiper has become a common practice to kill johnsongrass. Planting no-till beans normally involves use of doubledisk openers running behind 1 or 2 coulters. Although there is much interest in the newly developed multi-crop no-till dril **Is** which would make narrow-row planting of no-till beans easier, most no-till beans are still planted in Kentucky with the standard no-till planters, with the units being narrowed down to 20-inch or less spacing. Most fertilizer is applied the previous fall at the time small grains are seeded, although some growers continue to make band applications when planting beans.

FORAGES: Commercial development of no-till planters capable of planting small-seeded forage species into an undisturbed seedbed during the latter half of the 1970's and continuing to the present, has made seeding of forage legumes directly into an undisturbed sod a reality. This is a growing practice in Kentucky at the current time, but represents only a small fraction of total grassland renovation. We estimate that about half the acreage renovated with no-till drills is not treated with a contact herbicide, while about half is treated...either totally or in narrow strips centered over each furrow...with a contact herbicide, dominately paraquat.

NEW PRACTICES IN NO-TILL

Since the original technical components became available in the late 1960's to make no-till planting of corn and beans practically feasible, few changes in that technology have developed which have resulted in new practices for no-till. Most changes which have taken place represent a fine-tuning of the original major technical components designed for the practice rather than changes in components. Several of the "fine-tuning" changes, however, are noteworthy. Much more attention is now given to the surface pH of no-till corn since research during the 1970's showed this to be so important on residual activity of the triazine herbicides. The practice of delayed nitrogen applications has also become commonplace. The labelling of Roundup in the late 1970's was a major breakthrough for johnsongrass control in no-till beans and postemergence applications of Roundup, mostly with wipers, has become a common practice. A wider selection of herbicides for use on target weeds has made use of multicomponent herbicide mixtures a common practice. No-till planting has also made a major contribution to erosion control and has added more flexibility in developing more profitable cropping systems.

NO-TILL RESEARCH IN KENTUCKY

Major research emphasis on no-till at the University of Kentucky is concentrated in the areas of herbicides and weed control programs, insecticides and insect control, seed vigor, soil moisture and temperature relationships, fertilizer efficiency, cover crops, and use of the practice in developing more profitable cropping systems.