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Use No-till in Delayed Planting of Both Corn and Soybean

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In previous articles in Purdue's Pest and Crop Newsletter, we've made the assertion that there is even more reason to plant no-till the longer that planting is delayed by wet weather. That recommendation is consistent for both corn and soybeans, and for rotation or continuous cropping situations, as long as suitable equipment is used and management (including pests) are near optimum. Farmers are (understandably) reluctant to change their time-honored tillage practices in the face of adverse weather, but are more likely to change when there are sound reasons for doing so. What follows is our attempt to explain some of the basis for our recommendation.

Although there have been specific tillage trials conducted with multiple planting dates in other states, the local evidence supporting the recommendation for no-till in delayed planting situations is based on long-term experience. The best circumstantial evidence is our 27-year history of yield responses of corn and soybean to chisel plowing versus no-till planting on poorly drained, silty clay loam soils at the Agronomy Research Center (West Lafayette, IN) (see Tables 1 and 2). This particular study has received careful management throughout that whole period.

The planting date each year was consistently the first available opportunity - based on soil moisture in the seedbed zone - to do satisfactory secondary tillage on plowed plots after the calendar date of April 20 for corn, and after May 1 for soybeans. The planting dates that we achieved represent the practical range

of what area farmers experienced in that 27-year period on similar tile-drained soils. The interpretation of the data might also be aided if the reader is aware that 5 year average yields of both corn and soybeans have remained fairly constant with time (i.e. no general increase in that 27 year period). Rotation corn averaged 176 bushels and rotation soybeans averaged 51 bushels per acre from 1975 to 2001.

It is not fair to compare yield data in either Table 1 or 2 among planting dates because corn hybrids changed 9 times, soybean varieties changes 13 times, and because we don't have either multiple planting dates within a year or an equivalent number of years represented within each 10-day interval. However, the results can be used appropriately to compare relative crop responses to tillage system or rotation within the planting period.

With corn following soybeans or corn, it is quite clear that no-till is more likely to result in similar yields as after chisel plowing when corn is planted in late May versus late April (Table 1). Based on these results, no farmer can afford to do tillage for corn if yield responses are less than 4 bushels per acre. Furthermore, additional planting delays and cloddy seedbeds with tillage involve even more risk of yield loss.

For soybeans following corn, or for soybeans after soybeans, it is also quite clear that there is progressively more yield advantage with the no-till system as planting date is delayed (Table 2). In fact, soybean yields with no-till have averaged higher than those with conventional tillage with planting dates after May 20. So even if farmers decide to shift acreage into soybean from corn and, consequently, plant soybeans after soybeans, both income and time would be lost by doing unnecessary tillage.

Additional Suggestions for Moist Soil Situations:

1. For no-till corn, plant populations may be improved by the use of seed firmers if planting in moist soils.
2. Surface soil drying can be enhanced by residue cleaning with row cleaners from the row area or by residue disturbance with rotary harrows in advance of planting.
3. Chemical weed control is essential for system success. If rains have prevented timely burndown or residual herbicide application and certain problem weeds are beyond the stage for satisfactory chemical control, tillage may be required.
4. Banding of starter fertilizer for corn is less beneficial with progressively later no-till planting.
5. Achievement of a uniform planting depth and good closure of the seed furrow is essential (especially if dry weather follows planting into marginal soil moisture situations).

Summary:

No-till becomes a more and more expedient and practical system with progressively later planting of either corn or soybeans. Long-term success with no-till, fall strip-till and other high residue systems for corn will, of course, require careful attention to drainage, fertility and pest management. But even in this difficult spring, farmers might benefit from no-till or stale seedbed planting systems. In fact, planting

delays makes conservation tillage more imperative.

Table 1. Tillage system effects on **corn** yields in various planting date ranges at the Agronomy Research Center, West Lafayette, IN (1975-2001).

Date†	No. of years	Corn-Soybean			Continuous Corn		
		Chisel	No-till	Loss with No-till	Chisel	No-till	Loss with No-till
		---Yield (bu/ac)---		(%)	---Yield (bu/ac)---		(%)
April 20-30	10	181.3	173.5	4.3	167.9	145.4	13
May 1-10	11	173.7	171.1	1.5	160.9	144.2	10
May 11-20	3	189.8	185.9	2.1	175.8	158.5	10
May 21-31	3	151.2	149.9	0.9	138.7	130.6	6

† May 11 to 20 range is represented by 1993, 1998 and 1999.

Table 2. Tillage system effects on **soybean** yields as influenced by planting date ranges at the Agronomy Research Center, West Lafayette, IN (1975-2001).

Date†	No. of years	Soybean-Corn			Continuous Soybean		
		Chisel	No-till	Loss with No-till	Chisel	No-till	Loss with No-till
		---Yield (bu/ac)---		(%)	---Yield (bu/ac)---		(%)
May 1-10	5	51.9	49.2	5.2	45.1	43.7	3.2
May 11-20	15	52.5	51.2	2.5	47.2	47.4	0.4
May 21-31	5	48.4	49.4	-2.1	43.5	45.5	-4.6

† Note: Data from 25 years only; planting dates in June (1995 and 1996) were excluded.

For other information about corn, take a look at the Corn Growers Guidebook on the World Wide Web at http://www.kingcorn.org

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