



Tillage Options for Corn in a Wet Spring

Tony Vyn
Agronomy Dept., Purdue Univ.
West Lafayette, IN 47907-1150
Email address: tvyn@purdue.edu



If wet soil conditions continue to delay corn planting operations in 2002, farmers may be well advised to reconsider their intended tillage practices. The alternatives to consider first are those that will help facilitate completion of corn planting by May 5, or as soon as possible thereafter. However, in their rush to plant farmers should not compromise on trying to achieve optimum seed and seedling root environments for corn in its early growth stages. The options below present alternatives Indiana farmers should consider this spring based on their present field situations. The recommendations result from our 30-year history in tillage research.

Situation 1: Full-width tillage completed last fall, but fields untouched since then.

A single pass of secondary tillage is required wherever soil surface undulation is too rough to permit optimum planter speeds or accurate planting at a uniform depth. The secondary tillage pass should be shallow (average depth not to exceed 3") and should be performed within 24 or 48 hours of planting to minimize excessive moisture loss from the seed zone. There is rarely a yield benefit associated with a second secondary tillage pass; it is best to concentrate on using the proper equipment and adjustments to achieve satisfactory conditions in the first pass. However, if fall tillage operations (such as those after fall disking, disk-ripper combination tools, and fall mulch-finisher combination tools) resulted in a reasonably level surface with minimum

surface crusting, corn should be planted without secondary tillage. The latter concept is known as "stale seedbed planting"; it has resulted in corn yields similar to those with full primary and secondary tillage on both fine- and medium-textured soil in the last 3 years of Indiana research (and even prior to that in other regions with similar spring conditions).

Situation 2: Strip-tillage completed last fall, but fields untouched since then.

These are the simplest fields to manage from a corn planting perspective in wetter than normal springs. The strip-tilled "berms" in the row are relatively residue free and dry as fast as chisel plowed fields. Furthermore, soil erosion control is not sacrificed (relative to no-till) since fields still have 75% of the residue cover left after no-till. The big advantage with this system is that planting can proceed as soon as the top 2" of soil in the row zone is sufficiently dry. Planting may even occur sooner on these fields than on chisel-plowed fields because the latter requires time for secondary tillage. Farmers with moderately to poorly drained soils should consider expanding the acreage of strip tillage this fall as a hedge against planting delays in a wet spring.

Situation 3: No fall tillage at all, and soybean stubble still undisturbed.

These fields should all be considered as serious candidates for no-till corn this year if suitable planting equipment is available. Many of these fields may already be intended for no-till (since over 20% of Indiana's corn acreage was no-till planted in 2000 and 2001). The traditional urge to cultivate some of these fields prior to corn planting should be avoided where possible because such tillage also involves risks in wet springs of cloddy seedbed formation. In the last 3 years, corn yields have not been any higher after single-pass spring cultivation on soybean stubble versus those after no-till on the same soybean stubble. However, rotary harrows are sometimes beneficial on clay soils in enabling earlier corn planting because they disturb the "matted" crop residue and "scratch" the soil surface to a depth of 1" or less. Spring strip tillage in advance of planting is risky on high clay context soils, and should only be done with tined row cleaners and (or) mole knives (i.e. not with multiple coulters per row), and should be performed at shallow depths if at all.

Situation 4: One pass of secondary tillage already completed, rain delays since.

In most cases, these fields should be planted without any further secondary tillage. The only justification for performing additional secondary tillage is (a) if the field in question has developed a thick surface crust (more likely when soils have high silt contents and are low in organic matter or structural stability) and (b) planting at a uniform depth would otherwise be

difficult. This recommendation to plant directly is somewhat analogous to the "stale seedbed planting" suggested above. Our recent experiences are that corn planting is generally delayed if more secondary tillage is performed, and corn yields are not improved by more tillage (relative to planting as soon as the top 2" of soil are dry).

Situation 5: Soil surface undulating because of prior anhydrous ammonia applications.

In some areas in Indiana, farmers were successful in completing all or a portion of their pre-plant nitrogen application. If ridges persist, these should be leveled with minimum depths of full-width tillage. Shallow cultivation or rotary harrows may be the best options.

Situation 6: Corn intended to follow grain corn, but no tillage performed since harvest.

On sandy soils, no-till would still be a feasible system if properly managed (e.g. suitable planter and if new corn rows are positioned 6" away from prior corn rows). On most other soils, some level of tillage would be beneficial even if it would take more time before planting. However, new combination tillage tools should be considered since disk-cultivator-harrow combination tools in a single-pass system have resulted in yields similar to those after spring chisel plowing plus secondary tillage. There is no need to do primary tillage first if tillage implements are available to handle the residue and create a level seedbed in one pass.

General Comments:

Our results after 27 years indicate that no-till corn yields average within 3% of those with conventional tillage. Even first-year no-till can be successful with proper equipment, nutrient and pest management. Corn yields are often influenced more by the planting operation itself than by the selection of the tillage system. Planting should not be rushed with damp soil conditions in early May if significant in-furrow smearing or poor seed closure results. Such conditions are particularly deleterious when late May weather is hot and dry. In-row seed firmers may improve plant stand in wetter portions of fields but are not substitutes for proper management (i.e. waiting for appropriate soil moisture conditions at planting). Timing of planting relative to seedbed conditions and adjustments of the planter are crucial importance.

Summary:

The spring of 2002 may be a challenging one in terms of soil moisture conditions, but it should also prompt renewed thinking about the merits of soil-conserving, cost-conserving, and time-

conserving tillage systems. New tillage options developed in the last decade also provide new alternatives to reduce late-planting risks on poorly drained soils. The best alternatives will vary with your soil and current field situations.



For other information about corn, take a look at the Corn Growers Guidebook on the World Wide Web at

<http://www.kingcorn.org>

It is the policy of the [Purdue Agronomy Department](#) that all persons shall have equal opportunity and access to its programs and facilities without regard to race, color, sex, religion, national origin, age, or disability. [Purdue University](#) is an Affirmative Action employer. This material may be available in alternative formats.

© 2002, Purdue University

End of document