



No Till Corn: I

Guidelines

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No-till corn production is, basically, planting corn on unplowed soil and using herbicides to control weeds. The practice is also known as zero, chemical or conservation tillage.

In no-till, a narrow slot is made in undisturbed soil so that seed can be properly placed. No further tillage is required. This method became feasible after special no-till corn planters and suitable herbicides were developed.

Over 50,000 acres of no-till corn were grown in Michigan last year. There have been both "successes" and "failures." These experiences suggest that top management is required for success.

An important advantage of no-till is greatly reduced loss of soil by wind and water erosion. The practice offers particular benefits on sloping or rolling land and sandy textured soils. The plant residue left on the surface also helps reduce water runoff and prevents soil crusting.

No-till permits better timing for planting as one does not have to wait for suitable soil moisture conditions needed for plowing and fitting. On the other hand, an exceptionally dry spring can cause poor stands with no-till. The lack of soil moisture can be especially hazardous where rye, alfalfa, quack grass or other plants are growing. No-till often requires slower planter speeds than do conventionally prepared seedbeds.

An important consideration is availability of specialized equipment, herbicides and other pesticides necessary for no-till. They can usually be obtained through local suppliers, but should be ordered early. No-till planters are manufactured by the major farm equipment companies, and the herbicides are generally available.

To determine if no-till is best for you, check the following guidelines.

Soil Adaptation to No-till

- Soil texture, drainage, and slope affect stands with no-till.
- Soil organic matter and existing vegetation affect herbicide effectiveness.
- Soil structure and existing fertility levels and nutrient balance are very important.
- Well-drained loams and sandy loams are best-adapted to no-till because such soils warm up better than fine-textured soils.
- Loamy sands and sands respond well to no-till, but profitable production is difficult without irrigation. Corn on such soil does much better during July and August drought periods than on plowed land.
- Fine-textured (silty clay loams, clay loams and clays) dark colored soils, and soils with poor drainage are not well adapted to no-till. Yields are often low. However, where normal tillage is delayed because of wet weather, no-till can enable planting on time.
- Corn should not be grown, by any method, on steep slopes (10% or more).
- A regular program of soil testing for fertilizer and lime levels is needed with no-till, as with any other tillage system. Anhydrous ammonia can be applied if equipment has a coulter ahead of each shank. Usually, ample phosphate and potash fertilizers are band-placed during the planting operations. Broadcast applications of fertilizer on no-till fields have shown good recovery.

Equipment Requirements

- Fluted coulters with heavy-duty mounting are required to assure adequate penetration in firm soil.
- Basic planter unit must be rugged and heavy to stand up under extreme conditions.
- Plant at 3.0 to 3.5 mph (miles per hour) in contrast to 4.5 to 5.0 mph for conventional tillage. This may require up to 50% more hopper units to maintain same planting rates.

- Tractor size requirements for no-till are roughly a minimum of 5 pto H.P. (power take off horse power) at 3.0 mph; 8.1 pto H.P. at 3.5 mph; 9.3 pto H.P. at 4 mph; 10.4 pto H.P. at 4.5 mph and 11.5 pto H.P. at 5 mph.

- For proper placement of starter fertilizer, use 16-inch, or larger double-disk furrow opener with heavy duty shank. Adjust fertilizer placement unit to place fertilizer 1 to 2 inches to the side, and 2 inches below the seed. If fertilizer can not be placed 2 inches below the seed, place it about 2 inches to the side.

- Use press wheel system designed to adequately firm soil over the seed. A single press wheel approximately 1-inch wide directly over the seed, and ahead of the broad compaction wheel, is usually adequate. Double, 1-inch press wheels at an angle directly above the seed will do a better job. Press wheels that leave a partly opened furrow can be an invitation to bird feeding.

- The no-till planter can also be used to plant in other tillage systems.

- Insects such as wireworms, grubs, slugs and cutworms are likely to be more of a problem. Use planter box seed treatment.

Getting a Good Stand

Equipment Adjustment — The planter frame should be as level as possible when planting. Adjust coulter depth to only twice as deep as seed is planted. Seed must be left in firm contact with the soil.

Planting Date — Delay planting when soils are cool and wet. For most soil conditions, plant between April 25 and May 15. Use a little earlier maturing variety (3 to 5 days) than you would normally consider for plowed fields.

Plant Population — Sow 10 to 15% more seed than with conventional tillage because trash may interfere with proper depth. If seed is found on top of the soil, check coulter adjustments.

Control of Weeds and Vegetation

Herbicide recommendations for various situations: (Rates for herbicides, except Paraquat, are expressed in pounds of active ingredient per acre.)



No-till corn planted in bromegrass sod at MSU.

The field to be planted is in alfalfa or has perennial broadleaved weeds, grasses such as timothy and brome grass and annual weeds.

OR

The field to be planted is mainly bluegrass, timothy, brome grass and annual weeds.

OR

The field to be planted has a stand of quackgrass.

Apply atrazine at 2 pounds per acre plus 1 quart of crop oil-emulsifier concentrate when the quackgrass is 4- to 6-inches tall. Just prior to planting, at planting, or prior to emergence of the corn, apply atrazine at 2 pounds and Paraquat at 1 to 2 pints per acre, plus surfactant. In alfalfa or where perennial broadleaf weeds are present, use 2,4-D low volatile ester at 1¼ lb/acre with first application of atrazine or 7-10 days before planting corn.

The field was in a clean tilled crop the previous year, such as corn or soybeans.

Apply atrazine at 1 to 1½ pounds per acre plus Lasso at 2-3 pounds (2-3 quarts) per acre. This will control annual grasses, such as fall panicum, witchgrass, green foxtail, and crabgrass, as well as annual broadleaved weeds. Where there has been a herbicide residue problem with atrazine, and a sensitive crop such as oats, alfalfa, or sugar beets is to be planted next year, use 1½ pounds of Bladex and 2-3 pounds (2-3 quarts) Lasso. An alternative combination for control of annual grasses and broadleaved weeds is atrazine at 1 pound and simazine at 2 pounds per acre, but corn should be grown the following year because of the carryover of some of the herbicides.

Precautions and General Recommendations

- If any green growth is showing at planting time, use 1 pint of Paraquat, plus surfactant, with the selected herbicide or herbicide combination.
- Thorough wetting of the foliage is necessary—use 40 to 60 gallons of water per acre where there is heavy vegetation.
- Do not use 2,4-D in combination with Paraquat. 2,4-D can be used well ahead—at least 2 weeks—of a Paraquat treatment.
- Herbicide sprays should be full coverage—do not make band applications over the row.
- Use boom sprayers—do not apply spray with flood-type nozzles.
- Use fan-type nozzles rather than cone nozzles.
- Use only clean water with Paraquat—clay particles in the water will reduce the effectiveness of the herbicide.



Proper control of the existing vegetation is essential to a no-till crop management program.

- If a heavy stand of nutsedge is present, do not use no-till. Instead, use conventional tillage and incorporate Sutan at 4 pounds per acre for best control. If nutsedge problem is minor, use Lasso at 3 pounds (3 quarts) per acre.

Control of Mice

When corn is planted in grain stubble or in sod fields where rodent runways are obvious, spread 8 to 10 pounds of poison bait per acre. Use 2% zinc phosphide treated oat groats.

Summary

In no-till corn planting, the very best management practices are a must.

- Start with soil of high fertility and good soil structure.
- Fertilize according to soil test results.
 - a. Use maximum row application of fertilizer.
 - b. Place fertilizer 1-2 inches to the side and 2 inches below seed.
- Use timely and complete weed control.
 - a. On heavy cover crops, use 50 to 60 gallons of water per acre.
 - b. Always use a surfactant.
- Use proper equipment:
 - a. to open adequate furrow
 - b. to insure uniformity (correct planting depth—1 to 1½ inches)
 - c. to insure complete soil seed contact for uniform germination.
- Plant at proper speed—3.0 to 3.5 mph.

- Use proper insect control.
 - a. Check for the presence of cutworms, wireworms and white grubs on established sods. Rootworms are likely to be a serious problem on continuous corn land. Obtain update information on their control.
- Check established sods and small grain stubble for mice and control, if necessary.
- Consider rye cover crops on continuous corn, especially when silage was harvested or fodder removed.
- Adjust plant population to soil type.
- Use a little earlier maturing variety (3 to 5 days).
- Try on trial basis on your farm the first year.
- Think twice before planting no-till on heavy or poorly drained soil.

Everything must be done right and at the correct time. Don't take any short cuts. Mistakes can be disastrous.

- Don't plant when soil is too wet to work.
- Don't skimp, hurry the operation or delay chemical weed control.
- Don't use no-till as a substitute for proper crop rotation.
- Don't try no-till with conventional equipment.
- Don't substitute no-till for proper land use.
- Don't chop or disk stalks (there is no advantage, except possibly to control insects).
- Don't use no-till on strongly acid or low fertility soils.
- Don't worry about what your neighbor says.



Corn planted no-till in sod. When soil in slot fails to make close contact with seed, germination is slow. In extreme conditions germination may be greatly reduced. Note that corn is missing in slot (at left of arrow).