Cultural Practices for No-Till Corn, Sorghum and Soybeans

Cultural practices for no-till crop production differ from conventional tillage since the crop is established into living cover crops, weeds or previous crop residues and tillage operations are eliminated. The important difference most producers will note is the need for more precision and careful management in nearly all operations.

Crop Establishment

Planting dates for corn or sorghum may be delayed slightly since soils under a mulch tend to warm more slowly than clean tilled fields. On the other hand, bedded land left from previous crops tends to warm sooner.

Soil moisture may also be different. Where a cover crop is growing, the soil may dry faster in the spring than a clean tilled field since the cover crop is using water. In contrast, previous crop residues remaining on the soil surface retard evaporation which results in slower drying.

Under either system soil temperature, soil moisture and the weather forecast are still important factors to use in determining when to plant. Begin planting when early morning soil temperature at seeding depth is 50°F for corn and 65°F for grain sorghum, soils are dry enough to be properly tilled, and warm, sunny weather is forecast for the next few days. In some cases, no-till fields can be planted earlier than conventionally tilled fields in extended wet weather since equipment can operate sooner.

Planting Dates

Since no-till soybeans usually follow a small grain crop, they are planted later than ideal and should be seeded as soon as possible after small grain harvest. As soybean planting is delayed, potential yield is reduced. Frequently, the difference in surface soil moisture in no-till fields as compared to clean tilled fields makes the difference between immediate soybean seed germination and having to wait for rain to initiate germination. This can be very critical with double-crop soybeans.

To increase the ease of planting no-till double-crop soybeans, use a straw shredder on the combine to chop the small grain straw and distribute it over the field.

Variety selection for soybeans is quite important. When growing double-crop beans, early maturing varieties frequently do not produce a large enough plant to provide maximum yields. Therefore, medium to late maturing varieties are preferred. Medium maturing varieties include Centennial, Coker 156 and Davis while later maturing varieties are Bragg, Coker 237, GaSoy 17 and Ransom. For corn or grain sorghum the same varieties may be planted no-till as in conventional tillage. However, when planting extremely late, early maturing corn or grain sorghum varieties are preferred.

In no-till corn increase seeding rates 10 percent above that for conventional tillage or 15 to 20 percent above the first stand recommended by the commercial company for the variety planted. It is more difficult to get good uniform soil-seed contact in no-till planting than in conventionally tilled seedbeds. This is also true for grain sorghum and soybeans.

Row Width

Row width for no-till planting is the same as suggested for conventional planting. Plant corn in 30-, 36- or 38- inch rows with a slight preference for 30 inches. Grain sorghum will do best in 14 to 20-inch rows. The later sorghum or soybeans are planted, the more desirable narrow rows become. Furthermore, narrow rows aid in late season weed control by shading out weeds. In soybeans, whatever row width will allow you to get the row middles covered by the soybean foliage before flowering begins is best. For double-crop soybeans in 20-inch rows, plant 5 to 7 seeds per foot of row.

No-Till Planters

Usually in no-tillage, some crop residue, weeds or cover crop have to be cut through with a coulter prior to the actual planter opening a furrow for the seed. The coulter must cut through this residue, not just push it into the ground. Generally the coulter should run just slightly deeper than the desired seeding depth. No-till planters have a fluted, rippled, serrated or notched coulter in front of the seed opener.

It is undesirable for the coulter to move soil. If the coulter throws soil out of the furrow, the soil is too wet, you are driving too fast, or the coulter is inappropriate for the soil moisture and texture. It should only slice through any organic material on the soil surface and allow the planter to penetrate into the soil, cover the seed and establish seed-soil contact.

The other key to no-till planting equipment is the press wheel. As mentioned earlier, getting good soil-seed contact is more difficult in no-till planting than in conventional, so the press wheel must be relied on more heavily to firm the soil back around the seed. The ribbed press wheel is the most frequently used, but units which firm the soil from the side work well as long as they can effectively press the soil against the seed. This is more difficult when you have a heavy residue on the soil surface, moist firm soil or a

living root mass than it is in a freshly prepared conventional seedbed.

Depth Control

Finally, especially in grain sorghum and soybeans, good depth control is necessary to obtain excellent stands. The seed must be placed consistently between one and two inches deep. Seeds too shallow are frequently not properly covered with soil and may not germinate. Those placed too deep may not be able to reach the soil surface as they germinate, especially if weather conditions are not ideal. Depth bands or gauge wheels next to the seed opener appear to work best to control seeding depth in no-tillage.

Farmers in North Carolina have found that no-till planting soybeans, grain sorghum and corn can be just as successful as conventional. They also have found that little mistakes quickly become bigger problems in no-till planted crops and therefore more precision is required.

Fertilization and Liming

Optimum soil pH and fertility are especially important to promote vigorous early growth of any no-till planted crop. If soil tests indicate a low P status or the need for lime, it is recommended that these materials be applied and mixed into the topsoil by plowing and/or discing, since lime and phosphorus move very little in the soil. This can be done prior to any crop but if time and weather permit, a good time is in the fall prior to planting a small grain crop. It is most important to not let a low pH develop in the surface few inches of soil, since this may greatly reduce the effectiveness of triazine herbicides.

When soil tests suggest only a low rate of phosphorus (20 lbs $P_2 0_5$ or less), this may be applied from any phosphorus fertilizer in a band 2 to 4 inches to the side and 3 to 4 inches deep at planting. The application of K_2O and micronutrients is not different from conventional tillage.

Special consideration should be given to nitrogen application for no-till corn or grain sorghum. The need for splitting the application and use of an ample rate may be even greater for no-tillage. Recent research evaluating sources of N for no-till corn suggest that urea-supplied N may be subject to some loss of availability under no-till conditions. The degree of loss is difficult to predict but is most likely to occur with application on moist soil followed by lack of enough rainfall soon afterward to move the fertilizer deeper into the root zone. The greater amount of crop residue on the surface under no-till corn as compared with conventionally tilled corn (or grain sorghum) contributes to volatilization of ammonia from the urea. A nitrogen source containing no urea (ammonium nitrate-33 percent N) is not affected while those with a partial urea component (30 percent solution contains one-half the N as urea and one-half as ammonium nitrate) are less susceptible than pure urea fertilizer (46 percent N). If 30 percent solution is used it would be desirable to dribble it near the plant rather than spray it, over the surface to minimize the amount of residue contacted. Although somewhat difficult to do, optimum response from urea containing N sources would be enhanced if the urea or urea solutions could be shallowly banded below the soil surface. Anhydrous ammonia is not affected by,the surface residue except that it must be injected through the residue and then adequately sealed at the surface to prevent gaseous loss.

In conjunction with N fertilization, if late season weed control is needed, layby N solutions containing 2,4-D, or contact herbicides such as Lorox or Evik, will be convenient and an efficient production practice.

No-till soybeans should be fertilized similarly to corn except there would be no need for N; there may be some benefit from a small amount in the mixed fertilizer although the yield response will probably be small or non-existent.