

A Guide to Conservation Tillage Sweetpotato Production

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FIELD EVALUATION AND SELECTION

Field selection is a very important factor in conservation tillage sweetpotato production. When planting conservation tillage potatoes for the first time many farmers will try it on their poorest land. Their reasoning is that if conservation tilled does not work, the loss will not be too great. When the crop does not meet their expectation, they give up and fail to try it again on their better soils.

Evaluating a field for conservation tillage sweetpotato production is similar to selecting one for conventionally tilled sweetpotatoes. Soil test results should indicate that P and K levels are at least in medium levels. Fall applied lime (if needed) will be dissolved by spring resulting in better utilization of nutrients by the sweetpotato plant. Soil pH problems below 6 inches of the surface will require deep placement of the lime and tillage may be necessary.

Farmers should also check for hardpans. This can be done by using a soil penetrometer or a push rod. Checking should be done when the soil is at field capacity (soil is saturated). Any resistance down to the 10 inch depth could limit yields. If a hardpan does exist, the soil should be subsoiled or paratilled to a depth of 10-12 inches. Using a paratill plow will leave more residue on the surface. Conservation tilled sweetpotatoes should not be planted in fields where perennial weeds are present as the system is designed to be totally dependent upon chemicals for weed control.

EQUIPMENT NEEDS

With the increased popularity of conservation tillage, many equipment companies have manufactured implements especially for conservation tilled systems. The planter is the most important tool that a farmer will buy and the planter should be able to plant on most soil types and moisture conditions, and through heavy residue cover.

Research trials at the Jamie L. Whitten Plant Materials Center have shown that a conventional transplanter can plant slips in conservation tillage fields planted with a cover crop with just a few modifications. To plant through heavy residues, the transplanter may be modified by mounting a shank with a sweep set to run 6 inches deep behind the coulter as shown in Figure 1.

Fig. 1. Shank with 6 inch sweep added for planting in high residue.



Adequate down pressure on press wheels is essential to seal the soil around the transplants. The transplanter may be modified by making planter units non-floating (Figure 2). This can be accomplished by 1) attaching a 2 by 2 inch piece of angle iron across the 4 upright support arms which hold the watering tanks, 2) attach a metal strap (3/16" by 1" wide by 31" long) between the press wheel frame and the angle iron. It may be useful to drill holes along the end of the strap where it attaches to the press wheel frame allowing for adjustment of down pressure.

Fig. 2. Rigid Frame System.



Cultivation increases water infiltration and supplements chemical weed control. This may not be necessary with proper use of herbicides and adequate field selection. Soil loss due to cultivation should not be a concern due to the stirring of cover and possible increase in water

infiltration. Some adjustment in row arrangement should be considered on sloping land if cultivation is planned.

For chemical weed control, equipment used in conventional tillage systems can be used for conservation tilled sweetpotatoes. This reduces extra expenses of purchasing new applicators when converting from one system to another. Lay-by rigs and cultivator-mounted sprayers without sweeps may be used to apply postemergence herbicides.

PLANTING

Coulters should be set to cut 1 inch deeper than the planting depth. Planter speed should be the same as conventionally tilled sweetpotatoes depending upon surface cover conditions, planter performance, and surface roughness. Plant the normally recommended variety of sweetpotato for your area with no changes to row or plant spacing.

COVER CROPS

Cover crops may be recommended in certain situations and conditions where more soil erosion control is warranted. They may also be grown to stabilize newly developed rows on land not prone to erosion. Basically there are two types of cover crops: legumes and nonlegumes. Legumes such as crimson clover fix nitrogen in addition to providing canopy cover. Nonlegumes such as wheat and rye tend to provide more fall canopy cover, are less expensive to plant and are easier to burndown with herbicides.

Soil testing is essential because crimson clover and hairy vetch require adequate amounts of P and K and the soil pH should be at least 5.5 to 6.0 for best performance. Wheat and rye should be fertilized with 20-30 lb N/acre at planting. In dry years when the previous crop may not have removed all of the applied N, this additional N should be omitted.

Seeding rates are 20, 30, 90 and 90 lb/acre for crimson clover, hairy vetch, wheat, and rye, respectively, when broadcast planted. Fields should be tilled and hipped prior to planting with a light harrowing afterwards.

Wheat and rye should not be planted where Command[®] has been applied during the preceding 12 months or stands may be reduced or lost. A legume cover crop should then be considered where applicable.

HERBICIDES

Cover crops should be killed at least 2-3 weeks prior to planting. This will increase soil temperature, conserve soil moisture, and reduce insect damage better than if the chemicals were applied at planting. Always use labeled rate based on the size of the plant and growing conditions. Waiting until clover starts to bloom, vetch reaches its maximum growth stage and wheat and rye begins to joint will require higher herbicide rates and may need additional applications.

If perennial weeds or mares tail (*Conyza* sp.) are present, use Roundup® in 10 gallons of water per acre (gpa). Rates for grasses, legumes, and native cover are 1.0, 2.0, and 1.0 lb ai/acre, respectively. These rates should be adjusted according to the farmer's experience. If Gramoxone® is used, thorough coverage is a necessity and apply 0.6 to 0.9 lb ai/acre in 20 gpa. A second application may be necessary for some species. Add 0.5 percent nonionic surfactant by volume to both chemicals for enhanced activity. Legume response to Roundup® may be slow but plants should be completely killed before planting sweetpotatoes.

Command® or Dacthal® may be applied for preemergence weed control. Postemergence herbicides such as Poast® can be used the same as in conventionally tilled sweetpotato production. During unusually dry periods or when potatoes are planted late, herbicide carryover effects may cause damage to a planted cover crop.

FERTILIZATION

Fertilize conservation tilled sweetpotatoes as you would conventional tilled systems. Sweetpotatoes following a vetch cover crop may require little or no nitrogen. If large amounts of residue are present, split applications are preferred. Surface applied ammonium nitrate is very effective for sweetpotato production. Surface applications of urea-based fertilizers may result in large losses of N due to volatilization unless rain or irrigation occurs within three days of application.

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