

Reduced Tillage in Vegetables (Northeastern United States)

SWEETS, NORTH RIDGEVILLE, OHIO

Location: North Ridgeville, Lorain County, OH

Annual Precipitation: 54 inches

Reduced Tillage Method: Strip tillage

Crops: Sweet Corn

Lorain County



Description: 150 Acres retail sweet corn

BACKGROUND AND PREVIOUS TILLAGE METHODS

GROWER BACKGROUND

Gary took over his family farm that started in the 1880s. Gary took over the farm in 1973 after his father passed away. This farm has always been at the same location over the years. Gary was a first year student at Cornell when he left to take over the farm. Because of the challenges he faced to run the farm profitably, he could not go back to complete his studies at Cornell.

FARM SIZE & CLIMATE

Gary & Terry Sweet farm 150 Acres of sweet corn. Proceeds from 75-80 acres are sold directly to consumers (retail sales). Because of the branded sales, Gary & Terry get good premium for the sweet corn (\$5.50 per dozen of sweet corn).

SOIL TYPE (CHALLENGES)

Gary has different types of soils from sandy soils to heavy clay loam. Strip till works on all his

soils.

PREVIOUS CROP/SOIL MANAGEMENT BEFORE REDUCED TILLAGE

Gary previously used conventional tillage for his sweet corn production. Rye grass are planted in summer or early fall as cover crop and plowed under in spring. Gary previous tillage tools were moldboard plow and disks.

CROPS GROWN AND MARKETS

Gary's entire farm is now under strip tillage except for about 5 acres rocky ground that is in no tillage. Gary plants only sweet corn.

REASON FOR ADOPTING REDUCED TILLAGE & INITIAL EXPERIENCES

Two major reasons that led Gary to adopt reduced tillage are the increasing prices of agricultural inputs and the concern for soil quality. Gary experimented with no-till and observed that the crops and soils were looking healthier in no till plots compared to conventional tilled plots.

Another pressing reason for Gary's adoption of the reduced tillage came up in 2001 when the city water supply for irrigation was cut off from his farm. Gary felt he had to adopt a tillage method that can conserve moisture and make the crops more resilient to adverse weather condition. Strip tillage goes just about 5 inches deep but Gary goes deeper up to 20 inches. He classifies his tillage method as "deep rip strip tillage". Gary sets his strip width between 2 to 5 inches and the deep rip shank can go down up to 20 inches. From Gary's experience, it might be difficult to set up the strips on slopes without triggering soil erosion except you have a good cover crop. According to Gary, if you also have a stony soil, you need to avoid digging up the stones with the tillage implement. This can be achieved by building your strips to have a little ridge on top of the soil. Gary first experimented with reduced tillage on one of his rocky soils several years ago. He planted his crop into this soil with no-till drill. He later met some growers who were practicing zone-till and strip-till. He found out that strip-till with about 5 ins ridges on top were very good for his condition especially with a lot of rainfall occurring at this location. The ridges will help the soil to drain out more quickly for seed establishment.

GENERAL APPROACH TO REDUCED TILLAGE

Gary has a penetrometer to test for soil compaction in the 27 different fields that he farms. He pushes the penetrometer into the soil to know how deep the compacted layers are located. Gary noticed five years ago, that the compacted layers were generally between 8-10 inches but last year they were between 3-4 inches. This shallow compaction may be due to either spraying or harvesting operation in less than optimum condition for the soil. Gary does his strip tillage in the fall after mowing the corn residue down. In the spring he waits for the ridges to dry out and he plants directly on top of the ridges with a planter. The rye grass is killed with chemicals about two weeks before planting. Gary has a single coulter on his planter and no row cleaner. The ridge is high enough to prevent any trash pressure

The ripper stripper has only one coulter as well. The ridges are created by the adjustable shanks. These shanks have wide “foot” with 3 inches wings (1½ inches on either side). This is similar to a winged subsoiler. The bigger the wing, the higher the ridge. The wings loosen compacted soil and pushing it up to form a ridge. Following the shanks are 2 coulters that pack the soils together. Driving speed is about 5 miles an hour, which makes the soil to fly about. However, these two coulters keep the soil within the ridges. Gary runs the deep ripper 1 -2 inches below the pan layer to break the sub-surface compaction. He gets a good ridge no matter how deep he goes with the ripper strip tiller.

EQUIPMENT & OPERATION

Gary uses a Monosem 4-row planter for seeding. A slight modification was made on this planter to make it more adaptable to his system. A single no-till, wavy coulter was installed ahead of the planter to keep trash away and create a 1-inch passage for the planter. Over the years, Gary has changed to liquid fertilizers instead of dry fertilizers. The dry fertilizers burnt some roots during one of the drought years. During conventional days, Gary side-dressed with dry urea but now he uses liquid side-dresser.

SPECIFIC CULTURAL PRACTICES USED

CROPS, COVER CROPS & ROTATION

The rotation is between sweet-corn and rye grass cover crop. No other crops are planted apart from these. Some fields have been planted to sweet corn for up to 70 years using this cover cropping method.

RESIDUE MANAGEMENT

Gary does not have problem with his residue because of the choice of rye grass as his cover crop. Rye grass is easy to manage unlike some other cover crops that demand greater management attention. Gary kills the rye grass in the spring with Paraquat instead of Glyphosate, since Paraquat works better in wetter conditions than Glyphosate. The rye grass lay flat on the ground surface after chemical killing which Gary normally does about 2 weeks ahead of planting. The rye cover crop is allowed to grow up to 4 inches tall before they are killed. They are planted late in the summer or early in the fall before the strip tillage operation.

WEED MANAGEMENT

Once in a while Gary has noticed outbreaks of perennial weeds. However he has not had problem with them over the past 5 years. According to Gary, a combination of 2-4D and roundup in the fall is the best way to control these perennials.

DISEASE AND INSECT MANAGEMENT

Gary has noted rust lately on his farm. It seems to be getting worse each year. Gary will be spraying this year to control rust in his fields. He has seen some Stewart's bacterial wilts largely due to flea beetle activities. Gary together with a partner scouts his fields 3 times a week during the growing season to monitor for any pest, diseases and other damages in the field. This helps in controlling problems before they get out of hand. Other pests found on the farm are corn borer and earworm. Gary has noticed that the healthier you keep the soil, the healthier will be the plants and the less will be incidence of pest and diseases. Apart from killing the cover crops with Paraquat, Gary uses ¼ rates of Princep and Bicep Magnum for general weed control. These chemicals are broadcast all over the field.

Gary has seen some slugs on the field but they have not significantly affected yields in the

different fields. The slug baits have been very effective in controlling them.

CROP SEEDING STRATEGY

No difference between Gary's seeding and conventional systems

BENEFITS FROM REDUCED TILLAGE

POSSIBILITY OF INCREASING PROFIT

Gary's input cost are much less with his strip tillage compared to his costs during the conventional tillage years. He attributes this reduction in costs to reduced herbicide and fuel usage for land preparation. He also has healthier produce which command a better premium.

SOIL QUALITY IMPROVEMENT

Gary has noticed great improvements in soil quality, among which are increased earthworm populations, better infiltration of water, absence of runoff and erosion from his fields. Initial compaction at 8-10 inches which was caused by moldboard plow has been eliminated from the fields.

LESSONS LEARNT

CROP ESTABLISHMENT AND SECURITY

Gary has never experienced any crop failure while practicing reduced tillage.

FALL VS. SPRING ZONE BUILDING

The reason why Gary does his tillage in the fall is to allow the zones to dry out quickly in the spring. Fall strip preparation also allows the aggregates in the narrow strips to break down sufficiently over winter and be ready for planting in spring. Since the spring is wetter for Gary, it becomes better to do the strip preparation in the fall to avoid planting delays in springs.

FALL VS. SPRING WEED CONTROL

Perennial weeds are controlled in the fall while annuals are controlled in spring. Gary feels that you can reduce the amount of herbicides used for weed control if a good cover cropping method is in place.

TOO WET WEATHER

About two years ago, Gary could not strip till in fall due to too wet weather. He then tried to do the land preparation the following spring. He found out that in some fields, the ridges were still intact from previous year and he did not do any preparation there. He just planted straight in the field. He nevertheless got very good yields from these fields.

ADVICE FOR NEW FARMERS WILLING TO ADOPT REDUCED TILLAGE

Start simply. Start with a small portion of your field with zone or strip till and compare with your conventional management. If convinced and satisfied with zone till, increase the acreage gradually. This will enhance your learning process before you convert entirely to reduced tillage. Try to stick with the treatment for about 5 years in small area to be able to compare the practices. This will help you to make a better decision as to which method to follow.

PLANS FOR THE FUTURE AND CONSTRAINTS

Gary would like to see a live cover growing between the rows that would not compete or interfere with the economic crop grown in the row. Gary thinks this would be very good for soil health and reduce disease pressure on cultivated crops.