ORGANIC COVER CROP CASE STUDIES

Tom Cotter

Farm location	Mower County, MN
Certified organic acres	250
Total acres	1000
Year of initial organic certification	2017 (MOSA)
Primary cash crops	Corn, soybean, hemp, grass-fed cattle
Years planting cover crops	20+
Frequently used cover crops	Cereal rye, red clover, buckwheat
Livestock on farm	50 cows
Soil type	Clay silt loam

Brief Farm History

The Cotter farm was first plowed in 1875 and continued to be tilled until 2014. At that time, they began flame strip tilling and started planting no-till soybeans and corn in 2015. The farm has been completely low or no-till, for both corn and beans, since approximately 2017. The farm started organic certification in 2017 with 15 acres of alfalfa. They now have about 250 acres certified organic, which is approximately one quarter of the total acres under their management.

Cover Crop Use & Goals

"We got into cover crops looking for weed control but found that cover crops really boosted yields as well," Cotter recalls. While growing peas and sweet corn for canning, he wanted something to help control fall weeds after the crop had been harvested. Albert Lea Seed House suggested cover crops and he tried about 20 acres of Dwarf Essex rape seed in 1998. It grew well, but when they grazed it, the cattle did not like it as a single species planting. **Cotter then tried more diverse cover crop mixes and learned that they could include some of the less palatable species in a mix with no trouble.** Cover crops provided the fall

weed control they were looking for, as well as cattle forage, while also boosting cash crop yields. After their initial successes, they began planting winter rye regularly, even on fields located a further distance from the home farm where they did not plan to graze cattle. Today the farm primarily plants cover crop mixes. Common species include cereal rye, red clover and buckwheat. In their grazing mixes, they've grown to like Bayou kale, which grows better than radish and is less susceptible to being kicked over by the cattle.

Buckwheat up-close

Cotter's primary goal in using cover crops is weed suppression. Secondary goals include improving water infiltration and recycling nutrients. Cotter sees the nutrient cycling aspect as particularly important in organic management, and strives to create rotations that capture micronutrients and support the long term health of soil biology.

Cotter has found that cover cropping reduces his farming costs once the system was established. He explains, "Initially, there's the added cost of spring tillage and fall planting, but once you get rolling, you don't need spring tillage. Then if you can start interseeding at V6, you can cut out the fall planting pass as well. It costs less to harvest on a no-till cover crop field; the combined fuel consumption for harvest and cover planting is lower than fall tillage. It's easier to drive across a field with structure and requires less fuel."

He continues, "I go up and over what I should on covers, but really the end goal is nutrient cycling. The goal is to not apply fertilizer. That makes up for any cover crop costs. But, you have to recognize transition time and costs. You need to build the soil and earn the right to no-till, to really see healthy soil."

Additionally, Cotter appreciates how growing cover crops has impacted how he farms. "Overall, covers allow me to work with plants. If I only grow corn and soy, I don't really get to work with plants. When you have a cover crop you get to see all of the different actions. Our first year growing covers, we planted 17 species. Now I get to work with all these different plants. I planted organic hemp this year. I probably wouldn't have done that without the experience and confidence gained by growing covers and the comfort that I now have working with a wide variety

of crops. Cover crops teach me how to grow things."

Crop Management

TYPICAL ROTATION

"Every field is different! We don't manage any field exactly the same way but we're always looking for ways to get a cover crop in as fast as possible for the most possible growth." In conventional fields, the typical rotation is peas or sweet corn followed by field corn and then soybeans. Sometimes oats are used as a transition to organic. In organic fields, the most common rotation is corn, soybeans, then oats.

FIELD OPERATIONS

All conventional fields are no-till. If fields are grazed during a muddy period and create compaction, they might strip till for corn or sweet corn planting, but prefer to avoid this tillage and plant directly into rye.

Organic corn is planted into a strip tilled cover crop. A clover mix is preferred for increased species diversity but sometimes a mix of winter rye and winter triticale, or barley and winter rye, is used, which can be grazed and then planted no-till. Cotter is still working to improve their organic reduced-till systems, particularly no-till beans. In general, Cotter tries to minimize capital expenses related to equipment. They have resurrected an 8-row strip-till bar and adapted it for 60" rows. In the summer of 2020, the farm hired a "Soil Warrior" and was very happy with its performance. Overall, Cotter would rather mow than till and recently purchased an 8 row mower. They've also borrowed a weed zapper from a friend and were really impressed, particularly in controlling waterhemp.

Corn with cereal rye cover crop

Cotter prefers to avoid terminating cover crops with tillage. Ahead of corn, he discs the cover crop along with manure that has been spread, in order to incorporate the manure and the cover crop together for less N loss. Otherwise, he mows or uses a corn chopper whenever possible to terminate covers and avoid unnecessary tillage.

The last cutting of a cover crop is often wrapped and bale grazed over the winter, with bales located in areas that need more fertility. Cotter would like to move toward using more bio-

strips to avoid tilling cover crops and is considering attempting a red clover-brassica mix.

NUTRIENT INPUTS AND TIMING

The Cotter Farm raises grass-fed cattle (not certified organic) as part of their system and manure is an important part of the fertility program. Once crop harvest is complete, cattle are let into the fields to graze, usually beginning in December. Cattle have the option to remain in the field through January and usually choose to come in only when it's windy.

Cattle are kept inside in February and March to reduce grazing in muddy conditions that would cause soil compaction. Perennial pasture is rotated throughout the farm, currently encompassing 120 acres divided into twelve 10 acre paddocks. **Cotter is working toward subdividing into smaller paddocks that would be rotated more quickly than the current grazing plan allows. Within their farm economics, the cattle allow Cotter to "double dip" and generate multiple lines of income from each field.**

In addition to grazing cattle, turkey litter is occasionally added for fertility in crop fields. A major goal is to create bio-strips, cover crop strips throughout the field, alternating with row crop strips, and fertilize only in the planting strip rather than broadcasting amendments uniformly over the field. Building the right equipment to apply fertility in this way is a challenge. Cotter is considering retrofitting a Gandy box as one solution.

SEEDING AND ESTABLISHMENT

Though the farm will likely buy a no-till drill at some point in the future, for now they primarily plant cover crops with a pendulum spreader and a floater truck. Broadcast seeding in this way requires that they plant as early as possible to maximize available daylight. They also have used a Gandy box on a rotary hoe following a soybean crop. This seeding method has provided faster and more effective germination than their pendulum spreader.

Cattle grazing

Cotter wants to try different timings and spacings for cover crop and row crop optimization, including interseeding and 60 inch corn. They have tried interseeding into standing corn at V4 with a Gandy box to allow for cover establishment that will be

grazed in the fall following corn harvest. Cotter would like to try planting warm season cover crops too, including a warm season legume to provide habitat for natural insect predators.

Advice to New Cover Croppers

When Cotter started working with cover crops, he didn't know anyone else growing them with whom he could share information. As a result, he learned a lot by trial and error.

He says, **"I tried many things that 'they' said wouldn't work. Just because it doesn't work there, doesn't mean it won't work here. A million things have to happen for a system to work well. I tried a lot of things that weren't 'supposed' to work because I was figuring it out on my own."**

"Network! Network! Network! Webinars from Rick Clark and Ray Archuleta are great, but you need a group close by, within a 20-30 minute drive. You need to be able to call them up and jump in your truck to see what they have in their field. In numbers comes strength and it gives confidence. You can learn more from failures than successes so you want a network where you can see both."

"In your fields, just get started and try something. It can be as simple as a handful of seed in a corner of a field, or throwing some cereal rye and a spreader, just to see what it looks like."

"Also, you need to reboot your brain. Every year when I was growing up, it was tillage, tillage, tillage. Whatever the co-op said. They aren't the ones in the field, though. We need to be our own experts. I'm a farmer, why shouldn't I be the expert on my own ground?"

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OGRAIN

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