

Organic Weed Management at Hurricane Flats – a Case Study

Background. ‘Geo’ Honigford has been farming at Hurricane Flats in S. Royalton, Vermont, since 1994. The farm has a total of 37 acres; 8 acres are in mixed vegetables and cover crops, the rest in hay. He primarily markets at a busy farmers’ market about 20 miles away. There is a small self-serve roadside stand at the farm, and excess produce is wholesaled when necessary. Two high tunnels on the farm are used for early plantings of a variety of crops. The field has a wide array of vegetables, with the largest acreage in popcorn, sweet corn, potatoes, and cantaloupe. Tomatoes, mesclun mix, cole crops and sweet potatoes are also significant crops on the farm.



A view of the fields at Hurricane Flats, S. Royalton VT. The farm is certified organic by Vermont Organic Farmers.

The farm has sandy loam soils, and it sits along a river which provides irrigation. The land was mostly in hay prior to becoming a vegetable farm. Geo started out with just a couple of acres in production and gradually converted hay land until the vegetable growing area reached its current size.

Production practices. First thing in the spring, purchased composted poultry manure is spread on all 8 acres at approximately 5 tons/acre. Geo is looking into alternative sources of fertility to reduce P applications over time, but this has been an affordable source of nutrients and organic matter, with good results in terms of crop health and yields. After spreading the compost is tilled in with a 5 foot wide rotovator, usually within a few hours, to avoid nutrient losses. A 6 foot wide cultipacker is then used to firm the soil to make a good seedbed.

The cultipacker marks the rows; the tractor tires mark the aisles and the area in between, about 5 feet wide, mark the beds. Some crops are grown one row to a bed (melons, winter squash, sweet potatoes on plastic, staked tomatoes) some are two rows to a bed (potatoes, cole crops) and some are 3 rows (onions, carrots) or 5 rows (mesclun mix). A 2-row planter is used for corn seeding, and a Planet Jr. is used for seeding everything else. Transplants that are started in a small germination greenhouse on the farm are set out by hand. “I’m still not big enough to justify the cost of a transplanter” says Geo.

Primary weeds. “When we started, there was a garden and mostly a hay field, and the main weeds were lambsquarter and pigweed and another weed that has since gone away. Over the years large crabgrass came in, it is now our worst weed.”

“We keep a close eye on the hairy galinsoga, pulling maybe 50 plants a year. When we see it, we pull it up and walk it out of the field. I will stop the tractor and get off to pull up galinsoga; we never cultivate it in, and this way we have been able to keep under control. We’re also starting to get some purslane in a couple of areas. It is hard to kill and I am converting one of the areas to asparagus because it does not do well with the heavy layer of hay mulch that we use on that crop.”

“Quackgrass is the initial foe when I break up new sod for vegetable production. To get it under control I’ll plow in the spring, let the quack come up, then disk or rotovate it, let in come up again, then disk or rotovate again. I till it at least twice, about 2 weeks apart, until I see its vigor decline, then I sow buckwheat at 100 pounds to the acre, in mid- to late June. I broadcast the seed and lightly disk harrow it in, and let it go until it’s ready to set seed. Then I rotovate it in, let quack come up again, and see how much there is. If there’s still a lot of quack I’ll rotovate it, wait a couple weeks, and hit it again. Once the quack regrowth is minimal I’ll plant oats right away. That could be anytime from mid-August to early September. The next year the field will be very clean. There are always a few quackgrass plants, but they have no vigor and don’t take over. They usually die on their own in the course of regular field traffic.”

Geo avoids a long crop rotation with hay and vegetables because he feels he’d have to fight the quackgrass all over again. “I don’t want to let it come back in, once the field’s mine, it’s mine.”

Cultivation tools. A 5 foot wide tine weeder is a mainstay of mechanical weed control on the farm. “I bought it used for \$75 and it’s probably 50 years old; I think it’s a Ferguson implement. I look at newer tine weeders out there and ask: are they \$1500 better?”



Geo Honigford describes his tillage and cultivation tools at an on-farm workshop. From left to right: cultipacker, 2-row hilling disk set up, rotovator, and an old Ferguson row crop cultivator with C-shanks and shovels.

The tine weeder is used for stale seedbedding before planting and then blind cultivation shortly after crops are planted. "I want to weed every square inch of the field every two weeks, that's my goal. It only takes about 5 to 10 minutes to do an acre since I use the tines at high speed, probably 7 to 8 mph, or as fast as I can go and stay on the tractor. I run over the fields every couple of weeks, depending on the weather. That will take care of most weeds, although some always survive."

As fields are planted, they may get tine weeded again when the crop is still small, if it's a crop that can tolerate blind cultivation, such as corn. Thus, since the beds are typically made in mid-April, they get stale bedded once or twice before the first plantings in early May. Then blind cultivation begins as soon as the corn is up and there is a small flush of weeds. "The tine weeder rips up some corn but very little. Once the corn is up I go right back in with the tines as soon as weeds emerge; if the weeds are a half inch tall I am all over them; it could be 4 days after planting the corn or it may be a couple of weeks, it depends on the conditions. Sometimes the tines work great and sometimes they don't, especially if it rains and the weeds aren't as easily killed." With this system, late plantings of corn have been stale bedded with the tines repeatedly before the last sowing around the fourth of July. Those fields typically have very little weed pressure.



This old Ferguson tine weeder is used for stale bedding fields prior to planting and for blind cultivation over crops like corn while they are still small.

"I have tried flame weeding for stale seed bedding, but I don't flame anymore since it doesn't work on one of my main weeds - crabgrass. Its growing point is below ground so the flame only burns off the leaves; it does not kill the plant like mechanical cultivation can."

Once the crops are too large for blind cultivation, a row crop cultivator, also an old Ferguson implement, is the main weed control tool. It has sets of C-shanks fitted with shovels; there are 3 offset shanks between each row, which are pretty aggressive.

"The unit used to have guards on it to shield the crop rows but I took them off because they stopped the shanks from throwing some dirt up into the row, which seems to help with weed control. The shields were blocking this without really protecting the plants. Sometimes I go through a crop like sweet corn twice with the row crop cultivator but when the tines have done a great job, like in some late corn plantings, there's not much weed flush left so I won't need the row cultivator at all."

The last mechanical cultivation on large crops is with a 2-row set of hilling disks, they are about a foot in diameter and one disk in on each side of the row, moving soil up into the crop to cover small weeds. I generally don't have to adjust the disks, but sometimes the angle needs to be changed to get the right amount of action to throw up enough soil to kill the weeds by burying them.

"On some smaller crops that are 3 rows to a bed, like carrots, I might also use the row cultivator, and I'll move the shanks to one side or another and take some off to get the coverage I need without damaging the crop. Using the cultivator is not much faster than using wheel hoes given the diversity of crops and spacing that I have on the farm."

"I really like the old wheel hoes like those you find at flea market; the new ones have thin steel and on our sandy loam soil they cut too deep. I like the heavier blades that can ride on the surface, cutting off weeds without going too deep and bring up new weed seeds."

With crops like mesclun mix that are 5 rows to a bed, all the weeding is done with hand hoes. "We only need to hit it once, just after it comes up. That's because we grow these crops in areas that have been stale bedded with the tine weeder. The exception therefore is in the early spring, where there hasn't been time for stale bedding. "In the spring it's sometimes a mess in the small crops."

Hand weeding. "We try to hand weed the entire farm to keep and surviving weeds from getting away from us. Every 3 to 4 weeks we go through each bed with hand hoes to kill crabgrass survivors while they are still small and to hand pull any big weeds that have escaped. It's quick if everything works according to plan; it only takes a few minutes to do an entire acre."

"If an area really gets away from us we do what I call triage, and we leave it for last, so we can keep the rest of the farm under control. Then we'll do whatever it takes. For example, this year I had planted carrots and beets and got a perfect flush of crabgrass—it was a solid stand, a mess. So we left it and then plowed part of that area under and replanted, but I needed to keep some so I could have a steady supply of those crops. Even though it was a money loser I had a worker go though the really weedy area and clean it up by hand."

"After harvest we'll also go thru fields and pull weeds. For example, when the sweet corn harvest is over, before I mow it down, we'll walk through and look for weeds that have viable seeds, pull them into baskets, and remove from the field. It's usually pretty fast work and well worth it. In a crop like cantaloupe, it's hard to get in once the vines run, but later, as we pick, we'll also pull weeds. We don't let weeds go to seed, so we are constantly in weeding situations."

"Basically I have a 4 pronged attack: tractor cultivation first, wheel hoe second, scuffle hoe third, then hand pulling. We always end up there, because we let nothing go to seed that we know of."

Cover crops. "I stopped using winter rye as a winter cover crop; it was hard to kill, and was like a bad weed in the spring. Now I use oats since they are all dead in the spring and easy to work with."



This field of Japanese millet in mid-August was recently mowed to make it easier to incorporate in the fall and to allow Geo to more easily scout it for weeds that may have established in the cover. This field will be turned in and planted to oats in September.

In addition to oats over the winter, Geo sows buckwheat for a short-lived cover in summer, and hairy vetch as a source of nitrogen, often mixed with another cover crop. He has used a lot of Japanese millet to provide a longer summer and fall cover. “If you get a nice stand, it gets very tall, and you can mow and it down and let it come back. But it is a little fussy about growing in cold temperatures; it can’t take the frost so you have to wait to plant it until June in my area. It’s nice that we have a local organic source of seed from a nearby farm.”

Geo is always on the lookout for weeds in his stands of cover crops. “One year we had quite a flush of weeds in a Japanese millet and vetch mix, mostly pigweed and lambsquarter. I decided it was not worth the labor of trying to pull that may weeds out of an acre of cover crops, so I let the cover winter kill and then put potatoes in there the next year so I could easily control the weeds mechanically.”

Labor devoted to weed management. “I record my time on farm tasks. Last year I spent 154 hours weeding, and my main worker did the same, so we had about 300 hours into weed control, divided by 8 is about 37 hours per acre. That number has been pretty steady; it’s gone up some as I’ve added acreage over the years but on a per-acre basis I am actually spending less time weeding every year; that allows me to spend more time harvesting and marketing, both of which have increased as my farm has grown.”

Make weed control a priority. Good weed control has lot of benefits. My farm is highly visible from the road so customers see my fields and they like the fact that they are clean; it makes them want to support me. Clean fields also encourage high employee morale; when the place looks good they are proud of it. And finally, good weed control makes picking a lot easier. When there are no weeds in mesclun, we are just picking, not sorting through weeds.”

“My advice to new farmers is: don’t rush to be mechanized; figure out your system first on a few acres with hand tools. There is no payback on a tractor at that scale. You have to buy equipment and use technology that’s right for your size - avoid equipment envy. If you can’t keep up, either your systems aren’t right or you need more help. Usually I think it’s the former. We have 2 guys that do all the work on 8 acres, and we keep up. Of course, we work hard, and my employee is well compensated; it keeps him thinking about how to do things better and more efficiently.”

Vern Grubinger 2-11-11