

# Putting the Farm to Bed

by Lou Johns

Why would anyone, let alone a young farm couple struggling to make ends meet, want to walk down a blind alley? Compaction, shallow silt and clay loam, poor plant performance, mud, inexperience; compassion for soil life and compunction about causing environmental harm...

Dealing with these issues on our newly acquired farm in the Finger Lakes region of New York while we were trying to establish ourselves as reliable organic vegetable growers became troubling. After 3 or 4 years we could see that the nature of our farming practices, particularly the frequent tractor traffic, full width tillage, constant foot traffic, overhead irrigation, working soils in less than ideal conditions (early season planting, or harvesting in inclement weather), would continue to have detrimental effects on our soils, and ultimately on our crops and our pocketbooks. We needed to make some changes, and trading in the farm for some sandy river bottom wasn't an option. Nor was finding a book, farm magazine, Cornell expert, or experienced farmer who offered a solution. While we knew that deep chisel plowing could remediate compaction, we wanted something more; a long term fix, something that could address the issues at the front end of the process rather than at the tail end. We were looking for a new approach, a routine that would be sustainable, rather than a rescue treatment for an ongoing problem.

We decided to convert our fields to permanent planting beds with grassy strips in between where all tractor, foot and irrigation pipe traffic would be concentrated. This was accomplished with one major modification to our tractors, widening their wheel tracks to allow them to straddle the 70" swath that our Kuhn rotovator makes. Four of our five tractors (David Brown 995 65 HP, Case 1210 4WD 65 HP, Hines cultivating tractor, which is similar to an Allis Chalmers G, and Farmall 350 with belly mounted cultivators) were modified with the help of a local welder, or more simply by utilizing the manufacturer's designs, i.e. sliding wheels on axles or flipping the dish of the wheels. The rotovator was new at the time that we made the conversion, so we gave little thought to trading it in for a different width. In hindsight, a narrower bed would be easier to manage from a hand weeding and hoeing perspective.

In the initial year of the conversion we created the bed system out of fields that had been under full width tillage practices, so it was all bare ground starting out. The large rear tires of the David Brown set the width of the paths. We thought that they should be kept as narrow as possible, but after a few years of struggling to till straight enough to keep the



photo courtesy Lou Johns

Celeriac and red cabbage in the late fall



photo courtesy Lou Johns

Leeks in early fall.

rotovator from encroaching onto the tire tracks, or driving onto the adjoining beds, we started remaking beds with wider paths. After working with this system for 12 years, we are now making 60" wide paths. This change is partly driven by the issue of encroachment, but also by learning what it takes to maintain the vegetation growing in the pathways. Our stony soil hasn't helped. Stones getting onto the paths from tillage operations have wrecked many a mower; cheap hand-pushed, modified cheap hand-pushed, mid level self-propelled, and heavy duty walking tractor mounted BCS types. Today we're making our paths with an International Cub Loboy 154 with a belly mounted 60" Woods mower, and also keeping the self-propelled and BCS type mowers for maintenance. Obviously, it has been a long struggle to find the right tool for this job.

The time involved in mowing has constantly pushed us to upgrade mowing equipment. Now with almost 10 acres under the permanent bed system and 5 acres of fallowed ground to manage, moving to a more powerful riding mower allows us to accomplish this important task quickly and efficiently. This is especially important in the spring when paths are growing lushly and need to be mowed every other week.

Though learning how to maintain these paths has been a headache, the farm has realized many benefits since their establishment. The clippings from mowing add significant organic matter to the beds. The paths also create habitat for beneficial insect and spider populations, and widening them will only increase the habitat. Our sloping, undulating land was prone to erosion under the former tillage practices. With the bed system, which was designed to have the beds running across the predominant slope of the fields, erosion has been eliminated completely, even in the heaviest summer thunderstorms.

Much of the equipment we use for vegetable production is standard, off the shelf stuff with a few modifications to address use in our system. The rotovator has been heavily shielded on both sides to keep all tilled soil in the beds. We also have a Lilliston rolling cultivator mounted on either side, and just behind, to rake the soil that escapes back into the bed. Our sloping fields exacerbated the problem of dirt sloughing out of the rotovator. Not only was simple gravity at work, but we found that the corkscrew pattern of the rotovator's tines have a tendency to move soil under the machine from left to right. The effect is that when you till across the slope with the right hand on the downhill side, soil

gets pushed out around the shielding onto the path. The surface of the bed is also left with a rise on the downhill edge, leaving an unwanted stair step to the beds. Tilling in the other direction actually allows the rotovator to work against the affect of gravity by moving the soil uphill. Little or no dirt gets pushed outside the shielding. The solution has been to till the beds in one direction. Our longest beds are 400', (most are 250') so the added time to drive back to start another bed is minimal. This problem only exists when running the rotovator; all other tractor operations can be done in both directions. Another small point about the rotovator is that all gauge wheels and leveling skids have been removed, and we make the tractor's 3 point hitch carry all of it's weight, which transfers it onto the sod paths through the wheels.

Our direct seeded crops are planted with a belly-mounted gang of 4 Planet Junior seeders on our Hines tractor. The only modification needed for this operation was a radical axle extension both front and rear. This tractor is solely dedicated to seeding, partly because the axle extensions don't allow it to carry heavy cultivators.

The Farmall 350 was much easier to fit into the system. It was originally manufactured to allow the user to create a wide stance by sliding the rear wheels along a long solid shaft rear axle. The front axle was made with telescoping tubes to change the front wheel track. We use beet and bean knives from Bezzerides Brothers on the Farmall's cultivator tool bars. The rear mounted wheel track erasers were replaced with small Lilliston rolling cultivators (2 spider gangs, one on each side), that clean up the outside edge of the bed. They are set to move soil that the outermost cultivating knife pushed out back into the bed. This tractor is used for the first and second cultivations in direct seeded crops, and the first cultivation in transplanted crops.

The third and fourth cultivations in four-row cropping is accomplished with a 6' wide three point hitch mounted Ford/Ferguson field cultivator. This is set up with wide sweeps running between the rows. The outside edges of the bed are worked with a narrow shovel and another set of small Lilliston cultivators that were mated up to a pair of shanks off the cultivator by our local welder. This cultivator also has a pair of gauge wheels for depth control mounted on the outside of the front corners, so the wheels themselves travel on the sod paths.

Some of our cropping is done in a 2-row configuration. The rows are 36" apart, centered on the bed.

Potatoes, winter squash, strawberries, tomatoes and peppers are planted this way. In these crops we use a combination of cultivators to accomplish mechanical weed control. Generally early cultivations are done with a gang of four 16" (5 spider gang) Lillistons. These lend themselves nicely to the bed system because you can control the soil movement so well. Often they are set to stir and move the soil towards the crop rows, so the outside two gangs are working the edge of the bed at the same time they are cultivating next to the crop row. Late cultivation in these crops is done with another 6' field cultivator that has sweep arrangements to match the two crop rows and the same small cleanup spiders and gauge wheels. Potatoes are hilled with a modified gang of three standard style hillers - a deep cutting shovel with broad soil moving wings on either side set in a "V". What's been changed is that the two hillers that work the outside of the two rows have been cut in half, one wing removed, and shielded so they only move dirt towards the row. The middle hiller is left alone and is simply cutting a deep furrow between the two rows. Some sloughing off of soil occurs with this cultivator. I'm working on a better shielding and may incorporate a set of cleanup Lillistons. As always this is a work in progress.

For compost spreading we use an older New Idea manure spreader, a gift from a neighboring dairy farmer. Surprisingly, it fit into our routine perfectly. Its wheel track could be widened just a bit for some wiggle room, but for now it works fine. The box is 5' wide, 12' long and 3' deep, with beaters that push the material straight down rather than picking it up and throwing it. As long as we spread in relatively dry conditions the spreader tracks quite straight behind the David Brown 995, and we're able to drop all the compost in a nice even sheet over the bed.

The sod paths really shine when it comes to irrigation. We use overhead sprinklers on 20 or 30 foot 2" aluminum pipe, set in single runs that water 4 to 6 beds at a time. These pipe sets are always laid out in the sod paths, which in this situation have two advantages. One; the ground under each sprinkler is always firm and relatively level and will stay that way throughout the watering period. Two; when the pump shuts down the set can be moved immediately without having to walk into muddy soil as is common in clean cultivated fields, again avoiding soil compaction.

We do our share of hand weeding here, and most all of the crops are hand harvested. Here, again, the sod paths offer advantages not found in clean cultivated fields. All of our weeding operations can be accomplished without stepping or kneeling on the planting beds, eliminating compaction especially after rainfall or irrigation. The paths also provide a place to put weeds after pulling where they don't have the chance to re-root. For harvesting, in our case lots of bunched greens, cut heads of lettuce and spinach, or pulled root crops, all have a clean grassy strip to be laid down on prior to being boxed in the field. All



photo courtesy Lou Johns

Newly transplanted lettuce.



photo courtesy Lou Johns

### Fields in late summer.

the foot and tractor traffic needed to move the harvested crops out of the field is concentrated on the sod paths. The same is true for tractor assisted harvesting, such as lifting garlic, loosening carrots or parsnips, or digging potatoes. Many of our crops are fall harvested as late as possible for storage, when our fields are often at their muddiest. The permanent bed system makes it possible for us to get these late crops out of the field without making a mess.

The blind alley has lost its shroud of darkness here at Blue Heron Farm. After 12 years of trials and errors we are feeling much more comfortable with this system. It has been quite a learning experience, sometimes more costly than we would have liked, (mostly from having to redo or remake ideas set in steel), but one that's paying off now. We see our soils growing in richness and vitality; our insect and disease pressures reduced to minor, occasional problems, our yields expanding, and our crops being recognized as consistently high quality. One other benefit of the bed system is that it really helps us to keep track of planting rotations. All the beds are numbered, with flags marking every 10 beds, and mapped by field. Well worth the effort, in our minds.

To those who might be considering an endeavor such as I've described, here is my wish list if I were starting anew.

1. Use a 5' rotovator, or a spader. Spaders are slower, so operations of 10 acres or less might get away with it.
2. Use 4 wheel drive tractors. They track much straighter than rear wheel drive and utilize the engine horsepower better.
3. If you plan on using a manure spreader for compost or manure, get two tractors. Use one to pull the spreader and one with a bucket loader for picking up and loading the material.
4. For mowing the sod paths, if you're going to crop 5 acres or less, get a heavy-duty (no less than 6 HP) self propelled lawn mower with side discharge and bagging capabilities. Honda makes a nice machine. Make your paths at least two mower's width wide. For operations over 5 acres bite the bullet and get a reliable riding mower. It will help you keep up with path maintenance easily, along with mowing roadways, headlands, and your lawn, which you probably can't keep up with either.
5. Your seeding and cultivating patterns have to match up exactly. Don't plant anything you can't cultivate.
6. Use 1 or 2 cropping patterns, no more. This keeps

you from having to change cultivators around all the time.

7. If you have a sod or native weed & grass field to start with, simply till open the beds and leave the existing vegetation in place for the paths. Sod paths are very hard to establish in clean tilled soil, annual weeds will plague you for many years. If you're starting with bare ground, use your tiller and mower to lay out the beds and seed the paths to a mix of hard red and creeping fescue grasses and white Dutch and alsike clovers. This is best done in late summer to early fall, or early spring. The idea is to get the vegetation established before they get a lot of foot traffic. Though it takes quite a while, they will eventually fill in.

8. I'm available to answer questions one on one, and glad to help anyone who thinks they might want to take this idea on.

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