Improved Cultivation for Root Crops

Field Tested is a series of reports about farm tools that have been tested by Montana farmers to enhance their specialty crop production. The reports describe these farmers' findings to help others make informed decisions about their specialty crop businesses. Visit FarmLinkMontana.org to read more Field Tested reports. This project is administered by the Community Food & Agriculture Coalition with funding from the Montana Department of Agriculture Specialty Crop Block Grant Program.

SWEET ROOT FARM | HAMILTON

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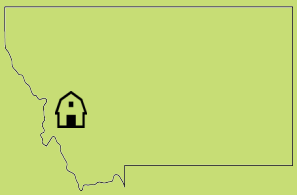
SWEETROOT FARM SNAPSHOT

Location: Hamilton, MT



Acres in Production: 3 acres

Operator(s): Mary Bricker and Noah Jackson

Crops: Mixed vegetables, herbs, cut flowers, and berries

INTRODUCTION

Mary Bricker and Noah Jackson have been farming at SweetRoot for three years. They sell products through a farm membership program, farmer's market, wholesale markets, and an on-site farm store. Mary and Noah wanted to better meet customer demand and increase their farm store's sales through late fall; they decided to increase their production capacity of storage crops by making labor-efficiency improvements. To do so, they purchased an undercutter bar for root harvesting, silage tarps and a double wheel hoe for weed control. They hope their review of this suite of simple, scale-appropriate tools will help others make decisions about using similar equipment on their farms.

Carrot plantings at Sweet Root Farm

IMPROVING ROOT HARVEST AND WEED CONTROL

Mary and Noah's customers indicated that they would buy root crops well into the winter if the farm store was stocked, so they worked on increasing production by improving their labor efficiency in two main areas: weeding and harvesting. Mary and Noah wanted to open new beds to production, butneeded to control weeds on the uncultivated land, particularly perennial weeds, and they needed quicker methods of controlling annual weeds in planted beds. Finally, they needed to improve their efficiency of harvesting root crops.

MATERIALS PURCHASED

- Silage Tarps: $678
- U-bar double wheel hoe cultivator and attachments: $560
- Undercutter bar for 3-point tractor hitch: $639

WEED CONTROL

Silage Tarps

Silage tarps are UV-treated polyethylene tarps that are used to create stale seedbeds. Weed seeds germinate under the tarp and are suffocated. They young plants die and begin to decay, adding organic matter to the seedbed. Mary and Noah used the silage tarps after tilling but before their field is ready to plant.

In the first season of using the silage tarps, Mary and Noah prepped areas of the farm that were too weedy to be planted. These areas were mostly infested with quack grass. Silage tarps were left for 4-5 weeks during the Summer or up to 6 weeks during shoulder seasons (Spring and Fall.) Their process is outlined below:

Mary showing quack grass from under the tarp (right) and outside the tarp

Tarp Timeline

1. Shape beds
2. Lay tarps (4-6 weeks)
3. Remove tarps (1 week before planting)
4. Flame weed (when planting greens in the bed)
5. Direct seed
6. Flame weed prior to germination (for beets and car-

Mary pulls the tarp back, showing field condition after 4 weeks being covered.

Mary and Noah found that for areas with high weed pressure, their weeding of greens beds was cut from three to four hours per bed to just 30-40 minutes per bed when they were able to use the silage tarps and a flame weeding prior to planting.

The silage tarps require a lot of sandbags to keep them on the beds, especially in windy areas. Mary and Noah use five pound bags of sand every five to six feet on the perimeter of the tarps and more on the interior if they are needed.

Silage tarps are heavy! Mary and Noah cut their 120' x 30' tarps in half (60' x 30') so that they could be rolled and then carried using tractor forks. If you don't have access to a tractor, you will need smaller tarps. If they get wet, they are even harder to manage.

TIP

The tarps work best during the hot Summer months. In the Spring, Mary and Noah deployed them in high tunnels for only 3 or 4 weeks, but they needed longer.

TIP

Move the tarps at the end of the day so that you can jump in a river or shower right after, the tarps are heavy and slimy

Mary holding the cultivator attachment for the double wheel hoe.

U-bar Double Wheel Hoe and Cultivator

For crops planted one or two rows to a bed, the double wheel hoe is really useful (e.g. broccoli, cabbage, cauliflower, zucchini, and summer squash.) For these crops, Mary and Noah estimate that the double wheel hoe reduced their cultivating time by one half compared with a hula hoe or a single wheel hoe.

Mary and Noah did not have a chance to determine the double wheel hoe's usefulness on root crops because of their bed design. For beets and carrots, they plant four rows per bed which didn't leave enough room for the double wheel hoe. They have since expanded their production area and will try planting beets and carrots with three rows per bed so that they can use the double wheel hoe. This will allow them to determine whether they can benefit from the double wheel

TIP

Mary and Noah say that the double wheel hoe works well for annual weeds, but for perennial weeds such as quack grass, weeds must be eradicated before planting to obtain good weed control.

Mary with the double wheel hoe. The hoe is pushed along while a U-bar cuts weeds off at or just below ground level.

hoe's efficiency for root crops.

ROOT HARVEST

Undercutter Bar

Prior to using the undercutter bar, Mary and Noah were using broad forks to harvest garlic and carrots. The undercutter bar, on the other hand, runs through the soil below the surface, lifting up root crops. The bar also attaches to the back of their tractor, so this tool has made their harvest efficiency much better.

In order to ensure the undercutter bar harvests crops without damaging them Mary and Noah had to make a few adaptations. For example, they mulch their garlic heavily and the remnants of the mulch can build up on the edges of the undercutter bar and crush the garlic. The same thing happens if beds have too many weeds. To avoid this, Mary and Noah mulched with sainfoin straw which decomposed more than wheat straw they had used previously. Finally, Mary recommends not running the bar too low for garlic, otherwise the garlic will still be stuck in the compact soil/sod layer and be difficult to harvest. Ideally you cut off some portion of the roots, and loosen the soil throughout the root zone to allow the garlic to pull easily.

TIP

Harvest with the undercutter bar is more efficient if pathways and beds have good weed control. For beds or paths with weeds, Mary and Noah weed whack before harvest.

Mary demonstrating how the undercutter bar runs through the soil, lifting up root crops.

TIP

It helps to make sure several feet of bed are soft soil before the carrots or hand-harvest the first few feet of the bed before using the under cutter bar so you have a runway to get the bar to dive down to depth.

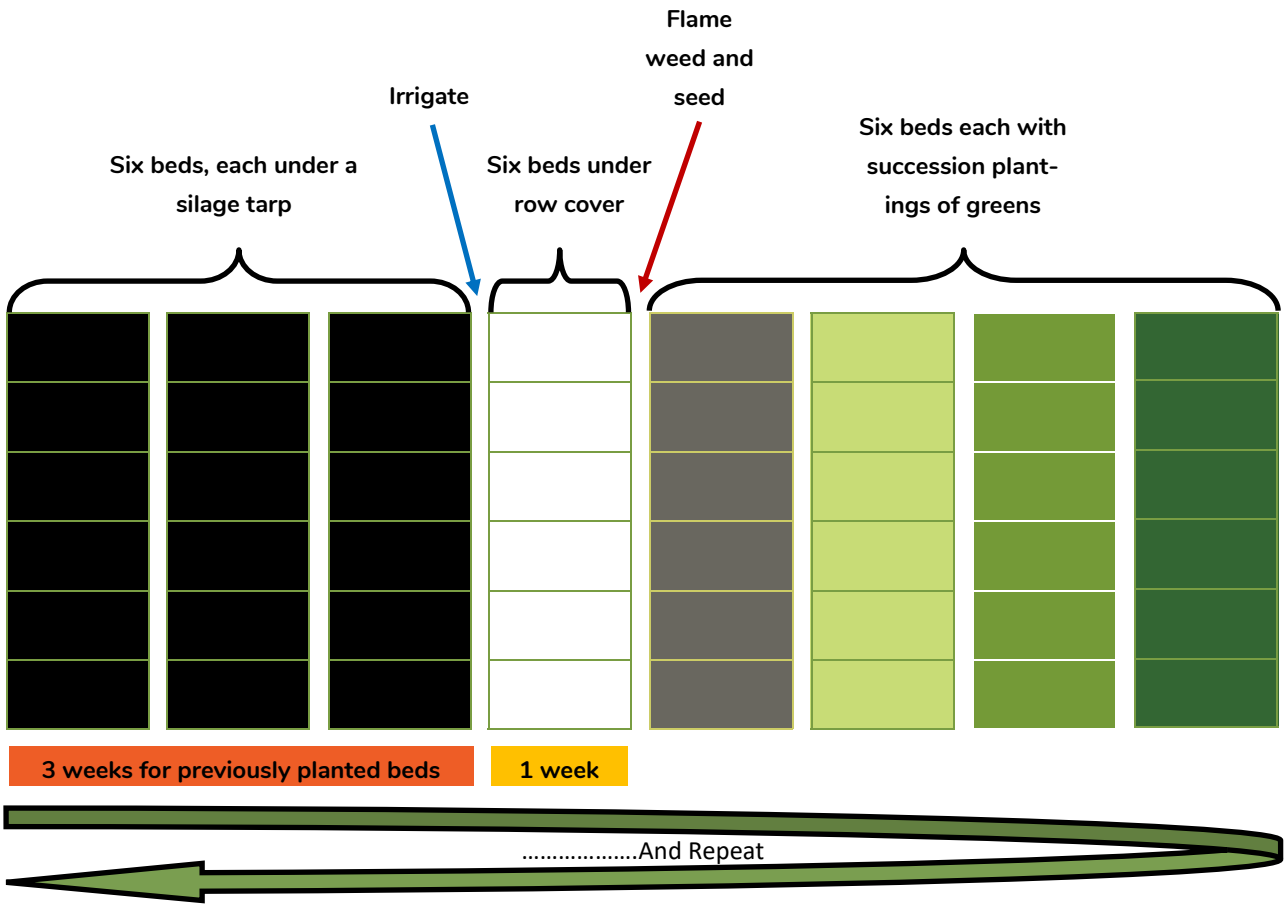
For carrots, Mary and Noah were worried about getting the proper depth to avoid cutting the tips off the longer varieties. They found having one person stand on the bar as it gets started down the bed, achieves a good depth. Mary and Noah also made a mark on the sides of the tool, so they know how deep it's running. One person rides the bar and can call out to the driver of the tractor if it starts to drift up too high.

RESULTS

Mary and Noah have had good success with each of the tools they purchased, which has enabled them to produce more root crops and extend their farm store season. Weed control on their farm is improving. In fact, the silage tarps have proven themselves so useful that they have just ordered more. The double wheel hoe is the least used of the tools, but still is twice as efficient as the hula hoe or single wheel hoe. The undercutter bar has resulted in garlic harvest that takes half as long and carrot harvest

that takes only one third the time of previous harvests.

SWEETROOT FARM'S BLOCK SUCCESSION FOR GREENS USING SILAGE TARPS FOR WEED CONTROL



ADDITIONAL RESOURCES

Montana Department of Agriculture Specialty Crop Block Grant Program: The purpose of this program is solely to enhance the competitiveness of specialty crops in Montana. Visit their website to find funding opportunities and more information. Search Montana SCBG.

Farm Link Montana: A project of the Community Food and Agriculture Coalition to connect Montana's beginning farmers and ranchers with the tools they need to succeed: farmlinkmontana.org

Field Tested Reports and Videos: Find more reports about other projects and see videos of tools in action at the Field Tested webpage, under Resources on FarmLinkMontana.org