

FIELD
TESTED



Garlic Harvesting and Storage Systems



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/fieldtested 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.

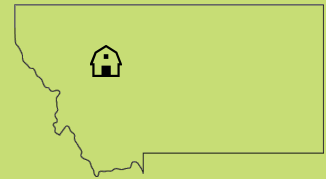
GROUNDWORKS FARM | FORT SHAW



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Groundworks Farm Snapshot

Location: Fort Shaw, MT
Operator: Eric Bergman
Acres: 3 acres
Crops: Garlic



INTRODUCTION

Eric Bergman's farming career has gone through many phases. He has farmed full-time, part-time, with staff and without. The current version of Groundworks Farm is a part-time operation focused on seed garlic production. Garlic is a crop that grows well in Montana. Relatively, it has a very high gross value per acre, especially as a certified Organic crop. This value is balanced by significant labor costs. For this project Eric implemented an undercutter for garlic harvest and repurposed a greenhouse frame to create an ideal curing space for his crop. Eric hopes to demonstrate how certain equipment, infrastructure, and techniques can contribute to significant labor-time savings for other garlic growers.

GROUNDWORKS FARM

Groundworks Farm is a first-generation farm founded in 2010 and located in Cascade County, Montana. From its inception, work on the farm has focused on biological, regenerative practices, and various enterprises have been explored and tested. A vegetable CSA was operated through the 2010-2017 growing seasons, as well as farmers market, and restaurant sales in Great Falls.



Currently, Groundworks Farm is focused on certified Organic garlic as the only crop. The high quality garlic is sold wholesale to several seed companies. This production utilizes approximately three acres of space, with half of that in production and half under cover crop. Eric does not have any employees, nor does he own a tractor. He hires custom tractor work through a neighbor for field prep and harvest.

GARLIC PRODUCTION AT GROUNDWORKS

Eric has been growing seed garlic for over a decade, and has been selecting seed from the same line since the beginning. He has developed seed that grows large and is high grade healthy garlic in his climate. Seed garlic is graded on the number of skin layers that cover the cloves, with 5-7 full layers the target. Bulbs are sorted by diameter size and sold in three categories: 1.5"-2", 2-2.5", and 2.5"+. Any that are smaller than 1.5" or damaged, are sorted out. Eric contracts with several seed companies, so his product is pre-sold before harvest.

Project Supplies

- Undercutter, 46", US Small Farm Equipment Co, WY
- ClearSpan Custom Cover, 10 oz, Grower's Supply
- 1" 4000# Ratchet x2
- 1" 3000# Strap

Planting and Management

At Groundworks, garlic is planted in late October or early November. In 2019, Eric had help from one worker to put in this season's crop. Eric plants at a rate of 1200 pounds of

seed per acre, and planted approximately 1.5 acres. He does not irrigate after planting or over the winter, and the first irrigation applied to the crop is typically in April or May, depending on the weather. His beds are 48" wide with 12" spacing between garlic rows.

Eric manages weeds with hand tools including a wheel hoe and stirrup hoes. As a sole operator with an off-farm job, Eric does not have time to keep his beds weed free. He chooses to spot manage the weeds to give the garlic just enough space to stay competitive. While the weed competition in his fields certainly reduces the size of the garlic heads, the garlic still reaches marketable size with much less time spent weeding. Eric uses a wheel hoe mainly in the pathways and hoes in the beds with the stirrups. Weeding is timed to ensure time for weeds to die (a few days) so that they don't re-root during the next watering. Eric values the biomass produced by the weeds and the organic matter they add to his soil.



One week before harvest, the garlic is barely visible through the weeds, but the bulbs are sized up nicely for harvest.

Harvest and Curing

The garlic is harvested in late July, once the heads have reached the desired size and skin thickness. Eric recommends harvesting a head, cutting it in half and counting the number of skin layers before you reach the cloves. There should be 5-7 layers on top quality seed garlic to ensure good storage life.

The garlic is loosened in the soil by the undercutter bar pulled by a tractor. The tractor straddles the row and pulls the bar through the soil, underneath the garlic bulbs. Due to the weed presence in the fields at Groundworks, a second person follows the tractor and occasionally removes biomass build up that accumulates on the undercutter. After this pass, the garlic can be easily pulled out of the ground by hand. The garlic is loaded into a truck and driven to the curing shed, about 50 yards away.



Undercutter used for garlic harvest.

The garlic is dried on the ground in Eric's drying shed, a repurposed greenhouse frame covered with an opaque cover. Eric emphasizes that moisture and pest damage are two key considerations in deciding whether to hang your garlic, dry it on tables, or dry it on the ground. At Groundworks, conditions are dry and

pest pressure is low, so the garlic does not need to be elevated. Eric's garlic dries down for storage in 10-14 days depending on the weather during this period. If the weather is extremely hot, Eric can turn on a fan to vent the shed, but does not typically need to do this, as curing garlic can handle all but extremely high temperatures. After the harvest, Eric grazes his cattle through the garlic field then grows a cover crop.

IMPACT: TIME SAVINGS

Both the undercutter implement and opaque tunnel covering both facilitated significant time savings in regards to Eric's garlic crop.

Eric compared the time it took to harvest without the undercutter and with it, and saw a significant difference in labor-time. When compared to harvesting using digging forks, the tractor pulled undercutter was over 10 times faster. Two people (one person on the tractor, one on the ground) harvesting one acre of garlic using human labor and digging forks took a little over 64 hours. With the undercutter it took two people 6 hours.

Before his on farm curing facility, Eric would have to move the garlic to his storage facility that was much farther away. He now saves about 15 minutes round trip, since his new storage facility is much closer to his field.

For the garlic grown in 2020, approximately 26 total round trips would have been necessary to deliver garlic to his off-farm curing facility and subsequently haul back to the farm for processing and distribution. On average, each trip would involve two workers. Therefore, having an on-farm curing facility saves Eric 13 hours of labor annually - which is a lot of savings for a small operation.

Overall, Eric has been very pleased with his purchase of equipment and infrastructure improvements. They have been very effective in improving the viability of the garlic enterprise on Groundworks Farm and are both recognized as truly worthwhile investments.



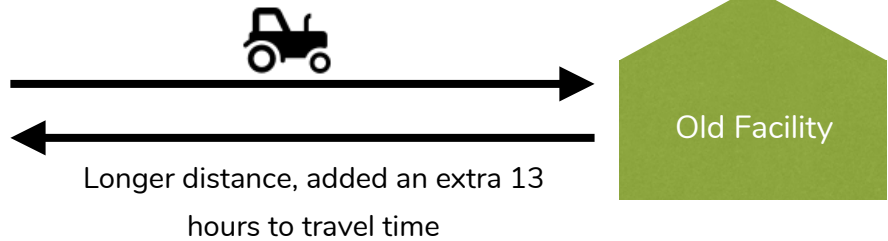
Opaque tunnel covering used to cover the high tunnel Eric uses to cure and store his garlic.

GARLIC HARVEST TIME SAVINGS

OLD Equipment and Curing Facility

Two People +
Digging Forks

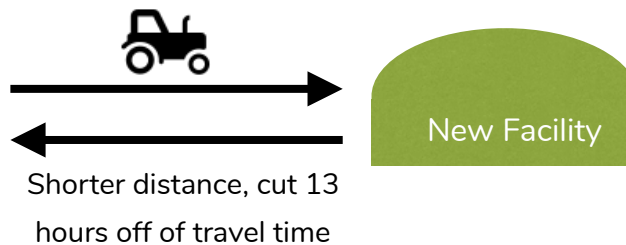
One Acre of Garlic
Harvested
=
~64 HRS



NEW Equipment and Curing Facility

Two People +
Tractor +
Undercutter

One Acre of Garlic
Harvested
=
~6 HRS



Total Time Savings with new
equipment and curing facility **= 71 HRS**

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](#).

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](#)

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: