Weed Suppression Techniques For Growing Saffron in Southern Vermont

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About Hobby Hill Farm

1790-1920s	350 Acres, Sugar & Sheep
1935-1955	Girls Summer Camp
1960-1980s	Lodge, land sell off
1980s-2016	Private home, land sell off
2017	Bought by me (12 acres)

About Hobby Hill Farm Today

- Clearing overgrown land (500 trees and counting)
- Raise hogs (whole and half, butchered)
- Laying hens
- Agritourism (two short-term rentals on farm)
- And Saffron
- And bees (Windham County Beekeepers’ Club Yard)

2019

Read about the UVM saffron work at dentist's office

Thought it seemed like an easy way to make money

"$100,000 annual income on a quarter of an acre"

$$$$$$$$$

2020

Cleared and tilled an overgrown hay field that had saplings, shrubs, raspberry bushes, general weeds and grass and….
Carolina Horse Nettle (aka Satan’s Tomato)

2020 - field before clearing/prep

Carolina Horse Nettle, aka Satan's Tomato in winter

It's a horrible weed. All parts of it are poisonous to livestock and it spreads by seed AND rhizome. Don't till it!

I didn't know. I tilled it.

2020 - field cleared and beds tilled

2020 - 8 ft fence installed, buckwheat planted to prep soil

2020 - planted 5,000 corms

I ran out of time and left some in boxes. Margaret Skinner told me to get them in the ground!

So some were planted shallowly in rows, just to get them in soil.

2020 - First harvest

2020 - Light November snow, saffron kept coming

2020 Harvesting

2020 Drying

Tried:

- On a baking sheet on wood stove (good, but got distracted and burned a gram)
- On a baking sheet on propane heater (ok)
- In a pan on gas cook stove (ok)
- Air drying in sunny location (sub-optimal, but okay)

Measuring by the quarter gram

2020 Yield - 8 sellable grams

- 5,000 plants
- Goal is one gram per 160 plants
- Harvested 9 grams
- This was one gram per 555 plants
- Burned one gram
- Sellable yield was 8 grams
- Sold for $15 per ¼ gram
- Sold out in February ‘21
- Sold at Farmer’s Market & Existing Farm Customers

2021 - So Much Rain, So Little Saffron

- 29 inches of rain in July, including 8 inches that fell July 30-Aug 1
- Our road washed out and was closed for several days
- Power out for a couple of days
- FEMA emergency
- Great for weeds!
- Bad for saffron

2021 - almost no saffron - 1 gram

That’s mostly grass. It felt like all I did was weed and the next day, it was full again with the grass

2022 - SARE Grant Starts

Need: Weeds are out of control! Can't mow due to sloping, rocky soil. Hand weeding is taking a loooong time, and I'm dealing with Satan's Tomato. Help!

Plan: establish new field beds and compare four weed suppression techniques in the established (2020) beds and the new (2022) beds.

Methods:
Low cover crop (red clover)
Tall cover crop (buckwheat)
Silage tarp
Hand/flame weeding

Received a two-year grant to study weed suppression methods in saffron
Thank you SARE!

NORTHEAST SARE
Sustainable Agriculture Research & Education

2022 - SARE Grant Starts

Tried to plant four new beds in an area that had been cleared and tarped since March, but it was too rocky to dig.

Requested change of plans from Margaret Skinner (my Research Advisor) and SARE, they okayed raised beds and store-bought soil.

These beds (1,000 corms) plus whatever was in the field yielded 5.5 grams, 182 plants +/- per gram.

Honeybees loved the new beds

2022 - SARE Grant Starts

Established field yielded about ½ gram of saffron.

2022 Side by Side Comparison

Paper Towel & Dehydrator Method

I put the stigmas on paper towels first (easy to spot dirt and non-saffron things), then use an electric dehydrator for about 10-15 minutes.

The dehydrator I bought only has one setting

2022 Soil Testing

Field Bed with Red Clover

Results VT County: Windham

Nutrient		Very Low	Low	Medium	High	Excessive
Phosphorus (P):	**8.4**					
Potassium (K):	**156**					
Magnesium (Mg):	**65**					

Raised Bed with Red Clover

Results VT County: Windham

Nutrient		Very Low	Low	Medium	High	Excessive
Phosphorus (P):	**17.7**					
Potassium (K):	**18**					
Magnesium (Mg):	**160**					

November 2022 Soil Testing

Field Bed with Buckwheat (didn't really take)

Results VT County: Windham

Nutrient		Very Low	Low	Medium	High	Excessive
Phosphorus (P):	**28.3**					
Potassium (K):	**201**					
Magnesium (Mg):	**134**					

Raised Bed with Buckwheat (didn't take at all)

Results VT County: Windham

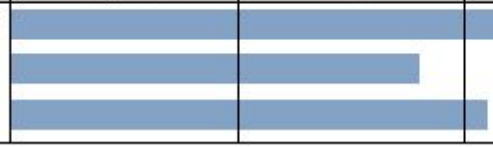
Nutrient		Very Low	Low	Medium	High	Excessive
Phosphorus (P):	**16.6**					
Potassium (K):	**111**					
Magnesium (Mg):	**162**					

November 2022 Soil Testing

Field Bed Tarped til September

Results VT County: Windham

Nutrient		Very Low	Low	Medium	High	Excessive
Phosphorus (P):	**6.6**					
Potassium (K):	**90**					
Magnesium (Mg):	**56**					



Raised Bed Hand Weeded

Results VT County: Windham

Nutrient		Very Low	Low	Medium	High	Excessive
Phosphorus (P):	**16.6**					
Potassium (K):	**111**					
Magnesium (Mg):	**162**					

April 4, 2023

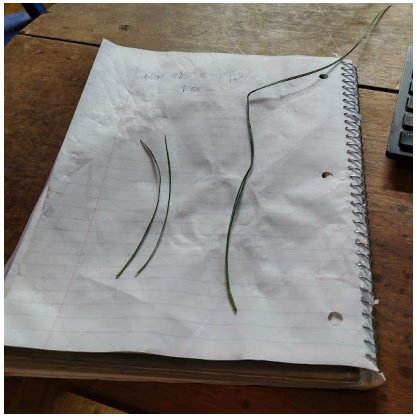
Raised Beds

Looking towards the field

Close up of field beds

April 25, 2023

Weeds are starting to outperform the saffron in the field beds.

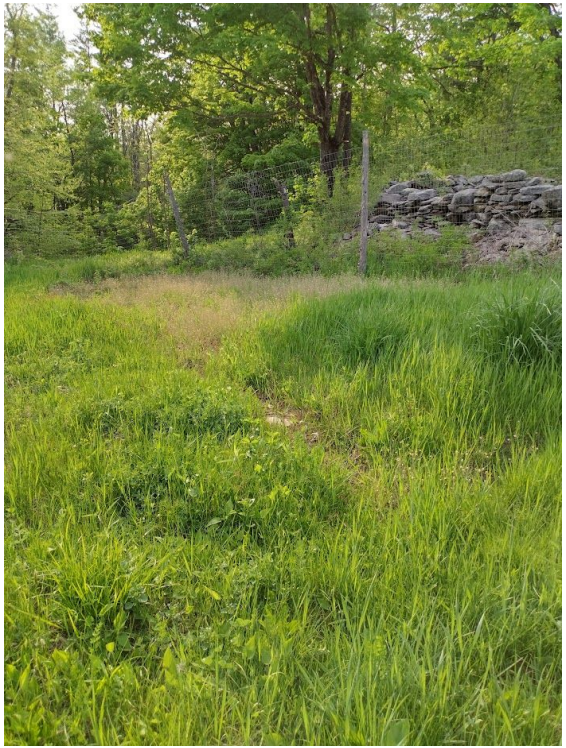


Field (L), raised bed (R)

May 15, 2023
(2 days before the 25 degree temps that killed all the apples around here)

Raised Bed (hand weed)

Raised Bed (with Red Clover)



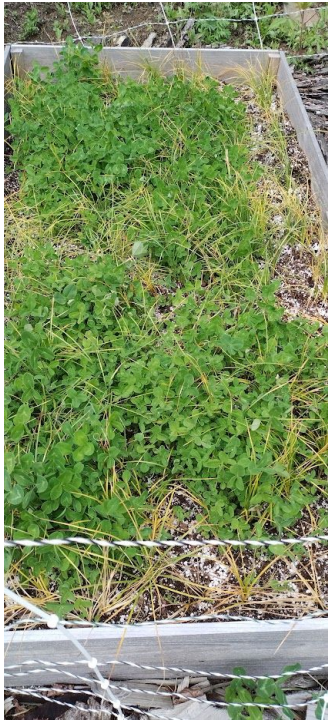
OMG!!! Field beds

May 21, 2023

The bears think the field plots would make a nice home.

June 5, 2023

Raised Bed (hand weed)



Raised Bed (with Red Clover)

OMG!!! Field beds

July 7, 2023 - fully dormant

New buckwheat (left) and same clover (right)

Deer eating clover

Two other raised beds

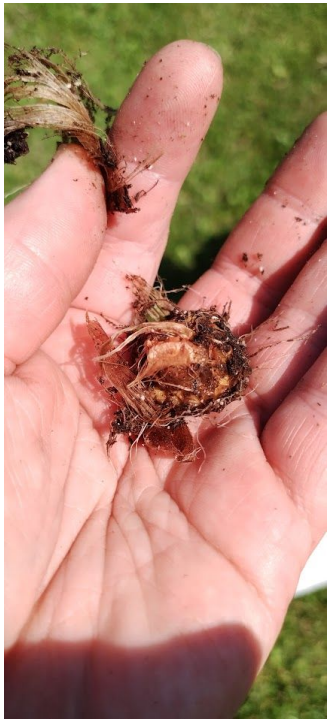
The field has been taken over by bears and weeds

July 2023 - Corm Sampling

Buckwheat bed

Mostly 8 cm,
babies 6-7 cm

Clump of babies



Papery bits

July 2023 - Corm Sampling

Clover bed

Mostly 7 cm,
babies 6-7 cm

Hand weed bed

Hand weed beds 1&2, mostly 7-8 cm,
babies 5-6 cm

July - September 2023 - Research Beds

Buckwheat (high cover crop)

Red Clover (low cover crop)

Silage tarp (half white, half black)

Hand and flame weed (if needed)

July - September 2023 Weather

- July 9 - Major Rainfall and Flooding added to generally wet season
- The amount of rain exceeded the 2021 July 30th flood (which was “only” 8 inches in 24 hours) which devastated the field crop that year.
- The summer of 2023 had fifteen days (only) when there was no rain in Newfane.
- And yet…. The saffron in the raised beds was fine.
- The field beds are now just toast. Wet toast.

2023 September Soil Testing

Raised Bed with Red Clover September 2023 (pre-harvest, year two)

Results VT County: Windham

Nutrient		Very Low	Low	Medium	High	Excessive
Phosphorus (P):	**3.7**					
Potassium (K):	**33**					
Magnesium (Mg):	**179**					

Raised Bed with Red Clover November 2022 (post-harvest, year one)

Results VT County: Windham

Nutrient		Very Low	Low	Medium	High	Excessive
Phosphorus (P):	**17.7**					
Potassium (K):	**18**					
Magnesium (Mg):	**160**					

2023 September Soil Testing

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Raised Bed with Buckwheat November 2022 (post-harvest, year one)

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Phosphorus (P):	**16.6**					
Potassium (K):	**111**					
Magnesium (Mg):	**162**					

2023 September Soil Testing

Raised Bed Hand Weeded September 2023 (pre-harvest, year two)

Results VT County: Windham

Nutrient		Very Low	Low	Medium	High	Excessive
Phosphorus (P):	**2.0**					
Potassium (K):	**20**					
Magnesium (Mg):	**180**					

Raised Bed Hand Weeded November 2022 (post-harvest, year one)

Results VT County: Windham

Nutrient		Very Low	Low	Medium	High	Excessive
Phosphorus (P):	**16.6**					
Potassium (K):	**111**					
Magnesium (Mg):	**162**					

2023 September Soil Testing

Raised Bed Tarped September 2023 (pre-harvest, year two)

Results VT County: Windham

Nutrient		Very Low	Low	Medium	High	Excessive
Phosphorus (P):	**2.3**					
Potassium (K):	**24**					
Magnesium (Mg):	**182**					

I didn’t test this bed in 2022

Soil Amendments in 2023

UVM recommended the following:

Per 40 sq ft
1 lb of 7-7-0
1.5 lb bone char 0-13-0
2 lb sulfate of potash ash 0-0-51

No bone char to be found, so instead, added 7-7-0 and potash plus bone meal

Harvest begins: October 13, 2023 (early)

October 19, 2023

October 19, 2023

Weeds are creeping up around the outside of the raised beds, but the bed interiors are pretty weed-free

Bees loving the saffron

Deep Freeze, Nov. 1-2, 2023

Harvest Dates and Yields

	Buckwheat	Clover	Tarp	Hand Weed	
10/19/23	75	75	7	90	
10/22/23	50	70	100	125	
10/27/23	25	40	90	80	
10/28/23	8	8	15	20	
11/5/23	4	5	5	3	
					TOTAL TOTAL
BED TOTALS	**162**	**198**	**217**	**318**	**895**

Top yield by far from hand-weeded bed.

Yearly comparisons

	Corms Planted	Expected total plants from reproduction and 20% loss of corms	Sellable Saffron Grams	Flowers per gram of sellable saffron	Notable events
2020	5,000	n/a	9 gathered, but I burned one	Not measured	burned one gram
2021	n/a	8,000-15,000	0.75 gram	Not measured	massive flooding, corm rot, resulted in near total loss of crop
2022	1,000	no reproduction, but got a few flowers from the original field beds	5.5 grams	170	a little from old field beds, maybe half a gram
2023	n/a	2,000 - 3,200	5.5 grams	162	lots of rain, but raised beds were fine, then deep freeze in early November froze some flowers and production stopped

Conclusions

Original Plan: study weed suppression methods in field beds

Pivot: compare weed suppression methods in raised beds vs. field beds

Conclusions

Abandon field beds (at least in my rocky, weedy soil)

Plant in raised beds/boxes

Advantages:

- can plant 12 inches deep
- Start with super-clean (store bought) soil
- Manage/suppress weeds around the perimeter of raised beds

Conclusions

Forget about cover/companion plants

The buckwheat and clover compete with saffron and reduce yield

Don’t bother tarping. Tarp provides safe environment for rodents to eat corms undercover

Plant saffron close together (24 per square foot)

Do soil testing and amend as recommended

Keep the weeds down around the raised beds

Next Steps/Goals

Take down fencing, mow the field, add fruit trees and more saffron.

2024: Plant 5,000 new corms in raised beds, hoping for yield of 25 grams in 2024, with an ongoing yield increase of about 10-15% per year.

2025: Separate and replant babies from 2022 beds

Ongoing: separate beds every 3-4 years, replanting in new raised beds.

Continue hand weeding, soil testing, and suppressing weeds around the exterior of raised beds

Next Steps/Goals

I’ve been experimenting with distilling essential oil from the saffron flowers.

It’s not yet perfected.

THE END

Thank you, Northeast SARE for funding my weed suppression research. I didn't find what I was expecting, but I learned valuable info that I think will be helpful for others starting out on small scale saffron growing in Vermont, especially as part of a diversified operation.

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