RESEARCH REPORT 2021
No-till sunflowers in northern Ontario

IN A NUTSHELL
Becky's goal was to see if it was possible to establish land for cut flower production on existing perennial pastures using no-till methods.

- Poor germination across her replicated trial comparing cover crop mulch, deep compost mulch and tillage (control) resulted in no appreciable results to note.

Becky had good luck growing sunflowers in two demonstration plots that she tarped for 12 months and 2 months.

Becky recommends using tarps for 2-12 months ahead of planting into perennial pasture.

MOTIVATION
Sunflowers are a staple late summer, early fall crop that is very popular as a cut flower at local markets (Photo 1). They make up a significant part of The Colour Farm's total crop production and income, as they are very reliable, prolific, easy to grow, and beautiful.

METHODS
The soil type for this trial was a sandy loam on rocky Canadian Shield bedrock.

Researcher Becky with family Guy Porlier, Emeric and Severine in the sunflower patch.

Agrinovation directly onto perennial pasture (Photos 2 & 3). Initially she tried securing the tarps with irrigation pegs, but found they didn't work well, and changed to burying the edges or using sandbags. She left the tarps until spring 2021, when she removed them and direct-seeded sunflowers.

Occultation for 2 months

Demonstration Plot
In April 2021, Becky prepared another section of her garden with tarps and left them on for two months, after which she transplanted sunflowers.

Photo 1. Stunning bouquets with sunflowers, ready for market!
**Cover crop mulch and deep compost mulch in green**

**Attempted replicated trial**

In 2021, Becky also initiated a randomized, replicated trial with three treatments: tillage (control), cover crop (spring tillage before seeding a cover of oats and then mowing at base to terminate for mulch), and deep compost mulch (4”). Each treatment had six replicates, for a total of 18 3’x25’ beds with a 1’ walkway between.

Overall, Becky observed poor germination across all replicate beds and treatments. Even with overseeding, Becky suspects the seeds didn’t have enough moisture, were unable to penetrate the soil to the right depth with her Earthway seeder, and were eaten by birds, rodents, etc. For this reason, we were not able to run statistics on the replicated treatments.

**Seeding**

Becky’s original plan was to start trays of sunflowers in the greenhouse and transplant them to the trial areas (Photo 4). However, due to excessive seed predation in the greenhouse, Becky direct-seeded on May 13, 2021 into the 2020 occultation demonstration plot and the replicated trial area. (Rodents, chipmunks specifically, love sunflower seeds, you know!)

She then successfully seeded and transplanted into the 2021 occultation demonstration plot. Becky notes that seeding 70x72 trays and transplanting the seedlings into the field was very labour intensive and required additional help.
FINDINGS

Observations from occultation for 12 months and direct seeding

- See Photos 5-7
- “A full year of tarping led to bare soil underneath”, and Becky observed “no plant debris at all” under the tarp.
- “Sunflowers germinated beautifully and grew very well. We had a nice crop of medium sized heads until the deer outsmarted the fence and ate all the sunflowers.” (Photos 8 & 9)

Observations from occultation for 2 months and transplanting

- This section had the same level of good weed control as the section tarped for a full year.
- Becky observed they “did the best [and produced] a full crop and nice sized heads a few weeks earlier than other growers.”
- This section was “not weeded at all. It could have been lightly weeded, but the weeds coming in were not as obnoxious as the replicate areas and the sunflowers outgrew them.

Observations from cover crop, mulch and tilled sections

- See Photos 10
- “The tilled sections quickly became overrun with weeds. As did the compost sections. That came from a sheep farm and must have had a lot of dormant weed seed in it.”
- “The tillage + cover crop (oats) section was ok in [the sections that held moisture]. We had a month of drought in the spring that had a big impact on the cover crop. This section also became very weedy.”

CAVEATS

The cover cropped treatment may have done better with a different cool season early cover crop, or different spring growing conditions.

NEXT STEPS

While Becky is happy with how the tarps prepared land for production, the more she learns about and works with tarps, the more she’s not sure a full year of coverage is needed or wanted. Specifically, she would like to know more about whether a full year of tarping negatively impacts soil microbiology.

Moving forward, Becky is going to continue to use tarps for 4-8 weeks to weaken weeds and terminate cover crops for bed preparation. Although transplanting was labour intensive, she plans to transplant sunflowers in the early season and direct seed later in the season.

TAKE HOME MESSAGE

All in all, Becky had great luck using occultation with silage tarps and would recommend tarping to establish beds on pasture. The effectiveness of occultation is independent of precipitation, which makes it a more reliable method.