To be posted to the following summer 2026:

https://www.youtube.com/playlist?list=PLadSWX2eSzRhaz7kpLLnG3iLK4eKjErCD

Video script:

Intro music/montage

***Introduction*:** Montana's organic horticultural producers rate weed management as a top agronomic challenge. Weed management is most effective when many tools are utilized together as part of an integrated system.

Title Card: Interseeding cover crops

Interview/B-roll

Name Graphic Hello, my name is Sophie and I am a graduate student at Montana State University studying ecological weed management.

We are at the Menalled lab to discuss seeding cover crops between rows of vegetables, a method known as interseeding. This technique offers many benefits including earlier establishment of cover crops and reduced weed pressure in fall plantings.

The last two seasons at the MSU horticultural research station in Bozeman, Montana, we interseeded three varieties of cover crops in carrots. We saw successful establishment of cover crops with equivalent yields of carrots! This promising result is motivating further trials in which we will fine tune best timings and varieties for three vegetable crops.

Caption: Fall Establishment

Cover crops are widely known for their soil improvement and weed management properties. They are commonly used in areas with long periods between frosts, where they can be planted before or after cash crops. However, in regions with shorter growing seasons such as Montana, many vegetables require the entire season, leaving no time for cover crops to be established. This means that farmers who utilize them must choose between growing a cash or cover crop each season, prohibiting many farmers from including them their rotation due to high land costs. Interseeding allows earlier fall establishment with no sacrifice of profits or land, and potential soil health and weed management benefits.

Caption: Preliminary Trials

In the summers of 2023 and 24, we ran several trials where we interseeded cover crops in carrots. We trialed bers eem clover, summer alfalfa, annual ryegrass, and a control with no cover crop. In these trials, we cultivated our carrots regularly until a week before canopy closure, at which point we ran a push seeder in a single pass between and beside each row. For harvest, we

used an undercutter to loosen the carrots while leaving cover crop roots intact. Covers were then left to continue growth and we saw successful establishment.

In addition to cover crop growth, we found equivalent yields in interseeded and control beds, so cover crops were not competing with our carrots!

Interseeded cover crops were selected to over the winter, however we saw regrowth the following spring from the summer alfalfa and annual ryegrass. We did not see a difference in weed biomass at harvest, but in beds where the covers overwintered, there were fewer weeds the following June.

Caption: Timing Interseeding

When is it best to interseed cover crops? The earlier cover crops are seeded, the higher the benefits they provide, like nitrogen fixation and organic matter production. But seeding too early in the season could lead to competition with cash crops, limiting yields. This dilemma leads to a need for new research!

In the summers of 2025 and 2026, we are determining the ideal timing of interseeding based on the critical period of weed control for cabbage, onions, and carrots. Check out our timing cultivation video in this series to learn more about how we find this period. Ou r idea is that at the end of the critical period of weed control, when weeds are no longer reducing crop yields, neither will a cover crop. We have found this to be true when cover crops are interseeded about ten days before the end of the critical period of weed control. Here are images of what the cabbage, onions, and carrots looked like at this successful interseeding time. And what the cover crops then looked like in the fall!

With this rotation, we were able to successfully grow a crop and cover crop in the same season in Montana, and prepare the fields to be planted back to production the following spring!

Caption: Cover Crop Variety Selection

Which cover crops are best for interseeding? There’s no one size fits all recommendation for which cover crop to select. Two common goals are improved soil nutrients and structure. Leguminous varieties, such as alfalfa and clover, are recommended for nitrogen fixation, while fast-growing grains such as oat and ryegrass can produce fibrous root structures and introduce high levels of organic matter to be incorporated into the soil.

Another key factor to consider is how a cover crop variety will fit into overall crop rotations. In our trials, we are interested in varieties that demonstrate rapid fall establishment and that are easily terminated either with tillage or our cold Montana winters. This aims to allow an early planting of vegetables the following spring.

For our coming trials we will be looking at berseem clover and winter wheat. These are two varieties which align with our goals and have been tested on site. We have observed some yellowing in onion leaves of plants that were interseeded with winter wheat, we suspect that this

could be due to root competition between the wheat and onions. Berseem clover did not display this effect so may be better suited for interseeding in onions.

Wrap up: Used in combination with other tools, interseeding cover crops can be an effective part of an integrated weed management program. We look forward to sharing our results about best timings and varieties for cover crop interseeding in organic carrots, cabbage, and onions!

Credits