Champlain Valley CROP, SOIL & PASTURE Team

THE UNIVERSITY OF VERMONT EXTENSION

FALL 2024 NEWSLETTER

Focus on Agriculture

Shawn Lucas, Assistant Professor, Extension Agronomy

GREEK PHILOSOPHER HERACLITUS SAID, "the only constant in life is change." Each season brings different challenges — wet, dry, pests, manure management, nutrient management, cropping strategies, regulations, and more! Farmers face evolving landscapes in tools, technologies, crop varieties, management practices, and other options. Similarly, the UVM Extension Champlain Valley Crop, Soil, and Pasture team has changed.

Many people served in the Middlebury Extension office recently. Jeff Carter worked for the Champlain Valley agricultural community for 37 years before retiring from UVM Extension in 2022. He helped found both the UVM No-Till and Cover Crops conference and the Champlain Valley Farmer Coalition. His work overseeing the Crops Exhibit at the Addison County Fair and Field Days was honored and the event renamed the "Jeff Carter Crops Exhibit."

Joshua Faulkner recently led water quality and conservation efforts through VAAFM and USDA-NRCS funded projects. Staff including Kirsten Workman, Cheryl Cesario, Anna Elewski, Abby Augarten, Carly Bass, and Emma Sandman organized outreach and programming. Dr. Becky Maden has been working with the region's fruit and vegetable growers and Karen Gallott has been at the front desk in the Middlebury Extension Office through these changes.

I come to Vermont from Kentucky, and for eight years, I served stakeholders at Kentucky State University (KSU). I'm an agronomist and soil scientist, and I've worked extensively on soil health and understanding nutrient losses. I'm here to help producers make management decisions that benefit their soil resources and farm productivity, while preserving the surrounding ecosystem. At KSU, I focused on agronomy in certified organic operations. I bring an understanding of the National Organic Program, organic transition, diversified production, and challenges faced in complex operations. I've also investigated soil microbiology, cover cropping, and no-till production in "conventional" systems. (I avoid the term "conventional" because every farm, and its needs, are different.)

I'm excited to be part of the Champlain Valley Crop, Soil, and Pasture team. Ben Franklin said, "When you're finished changing, you're finished." Learning is part of change, and I look forward to learning about the challenges faced by Champlain Valley farmers, and finding ways to meet those challenges. Reflecting on Franklin's quote, Vermont farmers are a resilient lot, as is the team here in the Extension office. Some of us are getting started, but none of us are finished.

For crop, soil, and agronomy questions contact me at **Shawn.Lucas@uvm.edu**.

Bales of hay observed during soil sampling at Cutting Hill Beef Farm in Cornwall, Vt. (Photo: Shawn Lucas/UVM Extension)

Plan Your Herd's Feed Needs With the Grazing Plan Template

Carly Bass, UVM Extension Grazing Specialist

This past spring several grazing professionals from UVM Extension, USDA's Natural Resources Conservation Service (NRCS), and the Vermont Agency of Agriculture Food and Markets (VAAFM) collaborated to update the grazing plan template that will be used by farmers enrolled in VAAFM's FAP Rotational Grazing program and NRCS's Prescribed Grazing and others who are interested in general pasture planning. These partners worked together and compared notes on what has been observed in terms of dry matter availability on pastures and the dry matter demands of our animals. As a result, we were able to create one uniform template that is representative of and beneficial to grazing farms in Vermont.

Proper planning is an essential part of successful rotational grazing. It allows the farmer to get a sense of how much land the animals need/how many animals a plot of land can sustainably feed. Overstocking the land will inevitably lead to overgrazing, which has a negative impact on the animals, plants, and soil. It can also be costly for the farmer due to needing extra stored feeds (hay, grain, etc.) to adequately feed the animals during the grazing season. Having the correct stocking rate and a well-managed rotational grazing system will result in healthier animals, sustainable pastures to graze for years to come, and fewer dollars spent — a win-win for everyone.

It is important to note that stocking rates change depending on the time of year because grass grows at different rates. Figure 1 is a table that is part of the new template, and it shows how the recovery times get longer as the season progresses due to grass growth slowing down. Farmers can often make hay from some of their pastureland for first cut before needing it for grazing later in the season, which this table can help calculate. Not listening to these recovery times can result in returning to a pasture that is not fully regrown, damaging the plants, and slowing down their regrowth for future rotations.

Understanding the math behind grazing planning can also be useful when calculating winter feed needs. Once you know the herd's daily dry matter demand (Step 1 on the template) and how much dry matter is in your stored feed (Step 2 of the template and/or a feed analysis), you can use those values to calculate how much feed you will need to get through winter.

This is the key difference between calculating hay versus pasture needs: winter hay feeding should have an added buffer of 20 to 50% to cover the animals potentially eating more and inevitable waste, since animals tend to eat more when they are cold but will not eat every ounce of every bale. Knowing what percentage to add depends on feed quality and the habits of specific livestock. Below is the math from

Pasture Calculator:

	May	June	July	Aug.	Sept.	Oct.
Rest Period (days)	20	25	30	35	45	60
Paddock Size (acres)						
# Paddocks Required						
Acres Required						
Acres Available for Grazing						
Pasture surplus or deficit? (acres)						

Color Key:		
	Green	**Pasture surplus** - enough feed/pasture for animal needs
	Red	**Pasture deficit** - not enough feed/pasture for animal needs
	Purple	**Extended season pasture availability**

NOTES:

An occupied paddock does not rest until livestock exit. Suggested rest periods will work for cattle in a typical year, but sheep and goats need at least 45 days of rest, preferably 60 or more days, to reduce parasite exposure.

Paddock size or supplemental feed may need to increase over the course of the season as pasture productivity drops due to weather or utilization decreases due to manure refusal and mature forage. Consider budgeting for additional acreage or supplemental feed as the end of the season approaches.

Hayland is often added to the grazing system later in the season.

RED - Pasture deficit. As recovery slows, farmers must de-stock, graze additional acreage, or increase supplemental feed to meet their dry matter demands.

GREEN - Pasture surplus. Excess pasture can be hayed, stockpiled or fallowed.

After October, pastures do not recover well. Pasture surplus or deficit in October shows the **extended season pasture availability** and only applies to farms who graze past the end of October. For late season grazing, request information from a grazing specialist about bale grazing and stockpile grazing.

Figure 1. *Table from the new grazing planning template which calculates how many acres are needed for rotational grazing throughout the season.*

the grazing planning template broken down for a better understanding of how feed needs are calculated.

The new template can be found by scanning the QR code or going to the VAAFM Farm Agricultural Practices webpage:

https://agriculture.vermont.gov/fap

This site also includes a factsheet that guides users through the steps to fill out the template.

A special "thank you" to the team who updated the template: Tom Akin, NRCS; Connor Steckel and Sonia Howlett, VAAFM; Carly Bass, Amber Reed, Kelsie Meehan Braam, and Jascha Pick, UVM Extension.

If you have any questions about grazing planning, calculating winter feed requirements, or need help filling out the template, contact Carly at **cbass1@uvm.edu.**

# of cows	×
cow's weight (lbs)	×
dry matter (DM) intake per day %	×
feeding period (# of days)	=
feed (dry matter in lbs) needed	

feed (dry matter in lbs) needed	÷
feed dry matter %	=
feed needed (as fed in lbs)	

feed needed (as fed in lbs)	÷
bale weight (lbs)	+
20–50%	=
bales needed	

Figure 2. *Dry Feed Calculation Charts*

Upcoming Events

February 13, 2025

No-Till Cover Crops Conference

At the DoubleTree by Hilton in Burlington, Vt. Registration is open at **https://go.uvm.edu/2025ntcc.**

UVM Extension and Champlain Valley Farmer Coalition are excited to announce a series of workshops in 2025 designed to provide farmers with valuable insights and practical strategies. From interactive farmer roundtables to hands-on field days, these events are packed with opportunities to connect, learn, and improve farm operations.

February

Farmer Roundtable

A great opportunity to discuss and share experiences! This winter session will focus on strategizing for cover crop termination, providing key insights into making informed decisions for the upcoming growing season.

May

Compaction Pop-Up Field Day

Dig into the science of soil health at this Compaction Pop-Up Field Day, where farmers will learn to identify and alleviate compaction issues in their fields.

Pop-up Top Dressing Manure

This unique event will provide live demonstrations on top dressing manure application techniques, ensuring optimal nutrient use and efficiency for your crops.

Be sure to mark your calendars and stay connected for more details on these exciting workshops!

Are Your Soils Compacted?

Abby Augarten, Agronomy Specialist

We often hear Champlain Valley farmers express concerns about soil structure, compaction, and poor drainage. The combination of clay soils, extreme precipitation, and heavy traffic from field operations can create conditions prone to compaction. Compacted soils can hinder root growth, infiltration, drainage, and soil biology, so preventing and alleviating compaction is key for healthy crops, soils, and waterways.

The first step is identifying if compaction is an issue and, if so, where the compaction layer is located. Measurements like penetrometer readings, bulk density, and aggregate stability can help us quantify physical soil health parameters. However, we can learn a lot from simply observing our soils, aboveground crop growth, and how water moves throughout the landscape and into the soil profile.

Curious about your soils? Grab a shovel and head out to the field!

What to look for in a shovel of soil?

1. Context

What are the inherent soil type(s), current crop(s), residue, slope, landscape, weather, and land use history? Context matters and all these things can shape your soil and its function, limitations, and opportunities for improvement. Keep this in mind when evaluating your soil or making any comparisons.

2. Structure

What are the soil aggregates like: crumbs or large blocks/plates? Are there aggregates of different sizes and adequate pore space to allow for movement of air and water? Do aggregates fall apart easily or are they held together by microbial glues? Healthy soil structure will be crumbly, with aggregates of different sizes that don't fall apart easily. Though clay soils can be more prone to blocky soil structure, we observe a range of soil structures in Champlain Valley's heavy clay soils (figure 1).

3. Root Growth

Where are roots clustered? Does root growth appear to stop at a certain depth? Are roots growing vertically or horizontally? Are there any J-roots that turn and grow horizontally if they hit a compacted area? Shallow roots that are concentrated in the top two inches of

Figure 1: *Clay soil from two different shovel tests in Addison County. In photo a (left) we see crumbly soil structure with a diversity of aggregate sizes and deeper roots. The soil profile in b (right) is dense, lacking poor space and aggregation especially in the top three inches, and has a thicker layer of shallow roots at the soil surface. (Photo: Abigail Augarten/UVM Extension)*

soil may indicate some compaction at deeper depths. If roots break through any massive blocks of soil, this is a good sign that plant and soil biology can begin work to repair soil structure at deeper depths. Keep in mind that plants have different root systems.

4. Biological Activity
Is there any evidence of soil biology like worms and biopores? Alternatively, do you see any old manure or plant residue (like a previous sod crop) that is slow to break down? Earthworms are a great indicator that the soil is not compacted at the depth where they are located. Undecomposed older organic material can indicate that aeration and soil biology are lacking at that point in the soil profile.

5. Color
How does the overall color compare to other areas of the same soil type? Is there any red or discoloration? Darker color can be indicative of greater organic matter. Red or other discoloration may indicate redox conditions like a seasonally high water table.

6. Smell
Take a sniff! What does it smell like? A nice earthy smell is a good sign of good water movement and biological activity!

Alleviating Compaction

Understanding if you have compaction, where it is, and the severity is the first step in determining appropriate alleviation strategies. There is no magic solution to alleviate compaction. Preventing compaction, promoting continuous and diverse living roots, and reducing tillage are commonly promoted practices. However, many farmers are considering how strategic tillage, such as subsoiling or artificial drainage, may fit into Champlain Valley cropping systems to improve soil health and crop production.

To provide better recommendations for local systems and soils, there's a need to evaluate the effectiveness of various strategies to alleviate compaction here, and how best to implement them to maximize economic, water quality and soil health benefits. But in the meantime: if implementing a change, remember that shovel tests can be an effective, low-cost tool to evaluate your soil over time. Questions about compaction or soil health? Reach out to our team at **cvcrops@uvm.edu**!

Does 'Natural' Soil Compaction Exist in Vermont?

Joshua Faulkner, Farming & Climate Change Coordinator, Extension Research Associate Professor, Interim Director: Center for Sustainable Agriculture

There is no question that deep soil compaction due to tractor traffic is common on the heavy clay soils of the Champlain Valley. However, we often visit farms with much lighter soils outside of the Valley that don't experience heavy equipment traffic, but also have a very obvious "compacted" subsurface soil layer.

This layer is actually naturally occurring, usually at a depth of 15 to 30 inches, and is sometimes referred to as a "fragipan" or "densic layer" in soil surveys. This layer forms not as result of downward pressure (e.g., tractors or glaciers(!)), but as a result of very slow (thousands of years) physical and chemical processes that create a very dense and naturally cemented layer.

Typically, the soils above this layer are very permeable and rainfall quickly soaks in. However, as it seeps downward, it stops at this natural compacted layer. This creates drainage challenges for the field. Even if this layer is broken up with a subsoil plow, it will reform back to its original compacted state. Because of this compaction, tile drainage is relatively ineffective in these soils because it is often placed within or below the compacted layer and water cannot move through that layer, even after soil is broken up during installation. These soils are common in sloping landscapes, so the area at the top of the slope is often where the most surface ponding — and runoff — is observed.

The effect that these types of soils have on runoff was first documented by scientists working in the Sleepers River watershed in Danville, Vermont in 1970. Since that discovery, the significance of those soils and their contribution to watershed hydrology has been documented around the world. Despite how difficult these soils are to manage because of their naturally compacted layer, they played a central role in Vermont's place in hydrology history!

Welcome Emma Sandman,

Soil Health and Water Quality Outreach Specialist

Emma Sandman provides agricultural technical assistance and conducts outreach to farmers in the Champlain Valley. She also supports water quality research in the Little Otter Creek and Dead Creek watersheds. Most recently, Emma served as an agricultural outreach specialist for the Lamoille County Conservation District, where she worked with farmers to implement soil sampling, nutrient management plans, and facilitate workshops on sustainable practices.

Emma has prior experience working with the Addison County Regional Planning Commission where she contributed to water quality projects, conducted culvert inventories, and performed water sampling on key tributaries throughout Addison County.

Her current work involves the Conservation Effects Assessment Project (CEAP). By gathering and analyzing data on conservation practices within the Addison County watershed, this project aims to assess the impact of these practices on Lake Champlain and its surrounding tributaries. CEAP will focus on the Dead Creek and Little Otter Creek watersheds, providing valuable insights into how implemented conservation measures influence watershed health.

Emma is excited to collaborate with farmers and partners across the Champlain Valley. If you have any questions or would like to schedule a visit, feel free to contact her at: **Emma.Sandman@uvm.edu**.

Crimson clover in bloom. (Photo: Rebecca Maden/UVM Extension)

Mustard cover crop with visiting bee. (Photo: Rebecca Maden/UVM Extension)

Flowering buckwheat. (Photo: Root 5 Farm)

The Buzz About Cover Crops

Becky Maden, UVM Extension Vegetable Nutrient Management Specialist
Laura Johnson, UVM Extension Pollinator Support Specialist

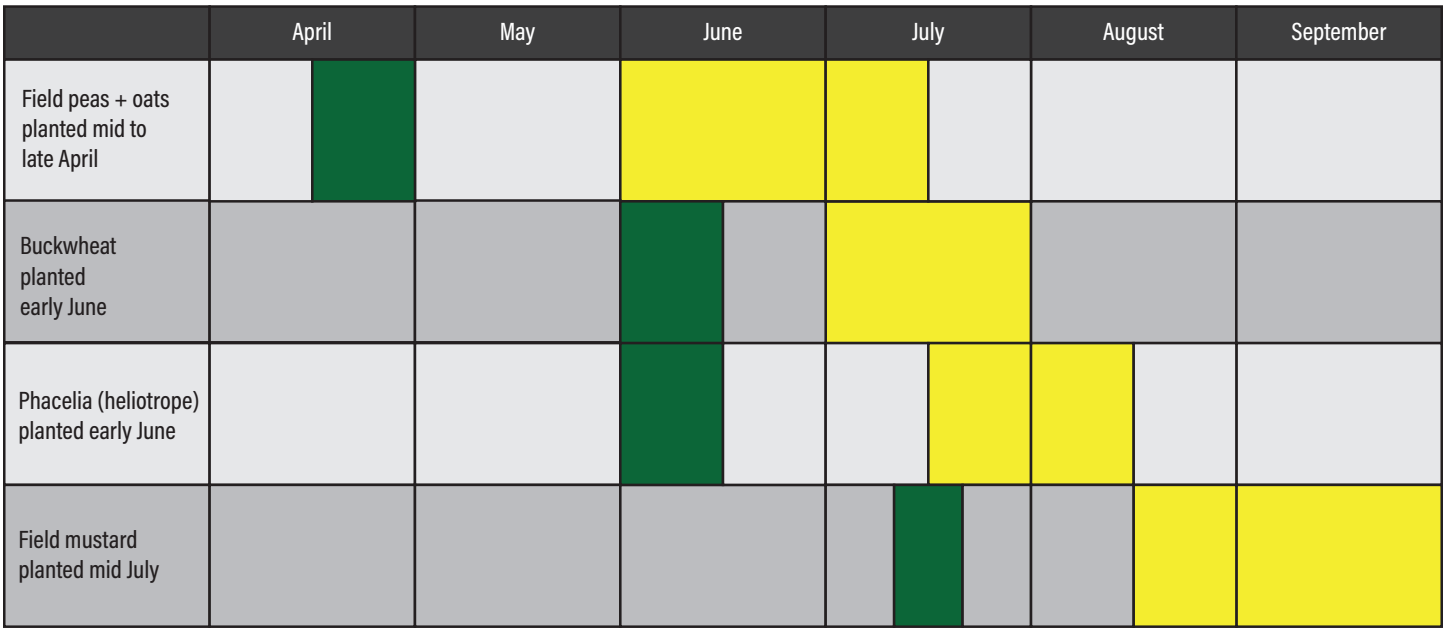
In recent years, we've seen a remarkable increase in the number of cover cropped acres throughout the Champlain Valley on farms of all types—dairy or vegetable, organic or conventional. The rapid adoption of cover cropping reflects the ability of farmers to quickly change practices and become better stewards of the environment by reducing runoff and soil loss into surface water bodies.

Farmers know that cover crops offer benefits far beyond compliance with state regulations or to receive incentive payments. Much of the work cover crops do is below the soil surface: they uptake leftover nutrients, fix atmospheric nitrogen (if legumes are present), promote microbial activity, and increase aggregate stability. Cover crops do amazing things above ground, too. Integrating cover crops that bloom (e.g., peas, buckwheat, or clover) with grass species (e.g., oats or winter rye) can provide habitat and food for many of our most important critters, especially beneficial insects and pollinators.

Although field crops do not require insect pollination, some high-value vegetable and berry cash crops do. Blueberries, strawberries, tomatoes, cucumbers, squash, and pumpkins depend on, or benefit from, insect pollination. Optimizing cover cropping practices to provide floral resources is one way to help maintain beneficial populations and yields of crops that depend on them in the face of multiple challenges including climate change, habitat loss, and exposure to parasites and pesticides.

The charts below illustrate one example of a systematic approach to sequential plantings of annual cover crop species to optimize their potential benefits. These plantings can be small in size, around field boundaries or in small areas. Note that farms are responsible for being in compliance with the "Vermont Rule for Control of Pesticides, Section 5.04 Protection of Bees" (**https://go.uvm.edu/protectbees**) when considering pollinator habitat enhancement activities like blooming cover crops. More information can be found at UVM Extension's Pollinator Support Resources (**https://go.uvm.edu/pollinator**).

April – September, Estimated Cover Crop Seeding, Flowering, and Pollinator Monitoring



Pollinator cover crop planting guide developed by Laura Johnson, UVM Extension

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