

USING TARPING IN COVER CROP MULCH AND CONSERVATION TILLAGE SYSTEMS

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OVERVIEW



Tarpping at the University of Vermont Horticulture Research and Education Center. Photo Credit: Stephanie Hurley

Tarpping is the practice of applying reusable tarps to the soil surface and removing them prior to planting to manage or terminate weeds, crops, and cover crops. Tarpping can facilitate the transition between cash crops with minimal to no soil disturbance. The use of tarps to terminate cover crops in no-till and reduced tillage systems allows farms to achieve the benefits of integrating soil-building practices without specialized equipment or the application of herbicides. Given the logistical challenges of moving, securing, and storing the tarps, they are typically used on small farm operations of less than 5 acres.

Tarpping offers numerous climate change adaptation benefits. When used in conjunction with reduced or no-tillage and cover crops, tarpping can build soil health, improve water holding capacity, increase infiltra-

tion, and reduce erosion and surface runoff. Mulch from cover crop residue can further enhance these effects, while also conserving soil moisture and regulating soil temperatures. Tarps themselves can be used as a moisture management tool during wet periods to prevent soils from becoming saturated and during dry periods to prevent evaporative losses. Additionally, tarps may reduce or eliminate the need to use equipment for tillage, which can be helpful in rainy and wet periods when the soil is too wet to work. This affords farmers more flexibility with respect to the timing of cover crops and plant termination, which is increasingly important in a more variable climate.

GENERAL LOGISTICS OF USING TARPING IN COVER CROP MULCH AND CONSERVATION TILLAGE SYSTEMS

Tarps of varying thickness, material, permeability, durability, and size can be used for this practice, including landscaping fabric, billboard (not currently allowed under USDA organic standards) and silage tarps, with a lifespan ranging from 2-8 years. A commonly available silage tarp is 5mil thick and 32ft wide by 100 ft long. Sandbags and cinder blocks are often used to secure tarps and prevent the tarp from blowing loose and becoming a hazard to equipment, animals, and people. At least two people are generally needed to apply, remove, and store tarps, though this may vary depending on tarp and field size as well as weather conditions.

The use of tarpping in cover crop and conservation tillage systems is a flexible multi-step process. Integrating the use of cover crops with tarps requires an even stand of cover crops with high biomass. The crop should be laid down before applying the tarp. Rolling is the best method for doing this, as it avoids creating stubble that can poke holes in the tarp as would be the case with mowing. An example of this application of tarpping, best suited to transplanted crops, is shown below.

COSTS AND BENEFITS OF USING TARPING IN COVER CROP MULCH AND CONSERVATION TILLAGE SYSTEMS:

POTENTIAL BENEFITS

- Eliminates the need for herbicides and/or specialized equipment like a roller-crimper
- Provides flexibility in the timing of cover crop termination
- Augments the weed suppression provided by cover crop residue
- Increase cover crop biomass which may support long-term soil health goals, like protecting soil organic matter and building soil structure. Supporting soil health can also improve water holding capacity
- Eliminates the need for field passes (especially beneficial when soils are too wet to operate equipment)
- Reduces soil erosion
- Supports use of overwintering cover crops, some of which (i.e., hairy vetch, not pictured here) may add valuable nitrogen and reduce future need for fertilizer

POTENTIAL COSTS

- Logistical challenges associated with handling tarps, including moving, securing, and storing tarps
- Scale-limited due to above challenges
- Ecological footprint of tarp material manufacturing
- Concerns associated with the disposal of plastic once it is no longer fit for use
- Concerns regarding release of microplastics into soil as tarps wear over time
- Loose tarps can become a hazard to farm equipment, animals, and people
- Pooling of water on and around edges of tarp
- May create habitat for rodents, increasing this pest population and predators such as snakes, as well as potentially leading to crop damage
- Reusing tarps may introduce soil-borne diseases into uninfected fields if moving from an infected field
- Labor issues with managing weeds that emerge in mulch
- Potential yield reductions associated with limited nitrogen available for nitrogen demanding vegetable crops

VISUALIZATIONS

These visualizations are designed to help the viewer picture how the implementation of tarping appears in the context of a real New England farm. These images depict the different stages of practice implementation and help the viewer anticipate how tarping will appear over time and what implications it may have for the farm. To use these images, please request permission from Stephanie Hurley (stephanie.hurley@uvm.edu).

TARPING IN COVER CROP MULCH AND CONSERVATION TILLAGE SYSTEMS



Spring growth of winter rye cover crop planted previous September.



In June, roll down cover crop with lawn roller or tractor with roller-crimper to prepare for tarping.



Use black plastic tarps to prepare planting beds and kill weed species. Weigh tarps with sand bags.



Two weeks later: remove black plastic tarps. Then plant vegetable starts in cover crop mulch. Example: Brassica species such as broccoli or kale.



Brassica crop growing within cover crop mulch.

ADDITIONAL RESOURCES

Interested in using tarping in cover crop and conservation tillage systems? Visit our website at nefarmclimate.com for more information and to explore our economic tool to determine potential costs and revenue. Check out these additional resources for more information:

GUIDES, FACTSHEETS, OTHER

- Tarping in the Northeast: A Guide for Small Farms, University of Maine Cooperative Extension, 2022, Natalie Lounsbury, Sonja Birthisel, Jason Lilley, Ryan Maher
- Tarping, Reduced Tillage in Vegetables Project, Small Farms Program, Cornell College of Agriculture and Life Sciences, July 15, 2019, Ryan Maher
- Reusable Black Tarps Suppress Weeds and Make Organic Reduced Tillage More Viable, Reduced Tillage in Vegetables Project, Small

Farms Program, Cornell College of Agriculture and Life Sciences, January 14, 2019, Haley Rylander

- Take Me Out to a Tarp Field, Reduced Tillage in Vegetables Project, Small Farms Program, Cornell College of Agriculture and Life Sciences, April 6, 2018, Ryan Maher
- Small Scale No-Till Vegetables at Seeds of Solidarity Farm, Reduced Tillage in Vegetables Project, Small Farms Program, Cornell College of Agriculture and Life Sciences, October 3, 2016, Brian Caldwell and Ryan Maher
- Cover Cropping on Vegetable Farms in Northern New England, UVM Extension

VIDEOS

- Silage Tarps to Reduce Tillage on Small Farms: Farmer Experiences, Reduced Tillage in Vegetables Project, Small Farms Program, Cornell College of Agriculture and Life Sciences, Dec 20, 2018
- No-till and Cover Crops in Vegetable Systems with Natalie Lounsbury, Recorded Webinar, April 6, 2020
- Reduced Tillage on Permanent Beds, Webinar in “Reduced Tillage Webinar Series” hosted by Cornell RT, Michigan State University, and the University of Maine. Ryan Maher and Brian Caldwell, Cornell University, Mark Hutton, University of Maine, Thursday, March 9, 2017.

RESEARCH

- Lounsbury NP, Warren ND, Wolfe SD, Smith RG (2018). Investigating tarps to facilitate organic no-till cabbage production with high-residue cover crops. Renewable Agriculture and Food Systems 1–7. <https://doi.org/10.1017/S1742170518000509> <https://drive.google.com/file/d/1QBRs64azOPJ8QousMgVRGOsnN5YWIDr1/view?usp=sharing>

BOOKS

- Mays, Daniel. The No-Till Organic Vegetable Farm: How to Start and Run a Profitable Market Garden That Builds Health in Soil, Crops, and Communities. Storey Publishing, LLC. November 10, 2020. ISBN-10: 1635861896.

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