

UNH Researchers Find Forage Radish is the Cream of Cover Crops

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An aerial photo shows a checkerboard pattern of the cover crop project at the experiment station's Woodman Horticultural Research Farm. Credit: Rich Smith/UNH

When it comes to the most beneficial cover crops farmers can use to suppress weeds and increase production values, University of

New Hampshire scientists have found that forage radish is at the top of the list, according to new research from the [NH Agricultural Experiment Station](#).

Cover crops are plants that are grown before or after cash crops are planted and harvested. They are used to protect soil from erosion, improve soil fertility, suppress weeds, and/or provide additional habitat for pollinators and other beneficial organisms. Because they minimize erosion and can help to keep nitrogen and other nutrients from leaching to ground waters or being lost via other pathways, cover crops can be important tools for reducing pollution and other negative environmental impacts associated with agricultural activities.

“Control of weeds and improvement of soil quality and soil health are issues that every farmer struggles to deal with. Cover crops are tools that farmers can use to address these issues simultaneously; however, not all cover crops are equally capable of suppressing weeds or contributing to soil enhancement, particularly under the climatic conditions that are typical of our region. This research is aimed at determining which cover crop species might be most useful for farmers in our region,” said Richard Smith, assistant professor of agroecology.

The research is presented in the article [“In-Season and Carry-Over Effects of Cover Crops on Productivity and Weed Suppression”](#) in the journal *Agronomy Journal*. In addition to Smith, the research was conducted by Elisabeth Hodgdon, doctoral student with the University of Vermont who is a former UNH graduate student in biological sciences; Nicholas Warren, UNH graduate student; and Becky Sideman, a researcher with the NH Agricultural Experiment Station and extension professor of sustainable horticulture production.

Researchers examined the performance of eight different cover crops intended to fill the late summer and fall fallow period that

occurs between crop harvest in the summer and the following springtime planting of a subsequent cash crop. This fallow period would typically follow the harvest of vegetable crops such as snap beans, broccoli, sweet corn, and spinach, or corn silage.

Researchers planted cover crops at the experiment station's Woodman Horticultural Research Farm either as monocultures (one cover crop) or bi-cultures (mixture of two cover crops). Crops planted include annual ryegrass, winter rye, alfalfa, crimson clover, white clover, hairy vetch, soybean, and forage radish. Researchers also included a control in which no cover crop was grown. Some of these species, such as winter rye and hairy vetch, are quite common in our region, while the rest are less commonly used as cover crops.

The two-year study allowed scientists to determine not just the average values for each cover crop but also the consistency of each cover crop's performance. "Based on our research, we found that forage radish was consistently among the highest biomass-producing treatments in the fall, provided excellent fall weed suppression, and resulted in some of the highest production values in the test-crop," Smith said.

"We were particularly surprised with how well the forage radish performed, both in terms of fall growth and fall weed suppression, and how much of an impact it had on the subsequent test-crop despite the fact that it died in the winter," Smith said.

There is growing interest in using cover crops to improve soil health and sequester carbon in the soil. "Here in New England, many farmers are already using some of these cover crops. For example, on some vegetable farms in our region, it is not uncommon for as much as 50 percent of a farm to be in cover crops during the growing season. That said, there is a relative lack of information about how well different cover crops perform in our region, particularly in regard to weed suppression, given our short

growing season and relatively intense winters. This is especially true for cover crop species such as forage radish, crimson clover, and soybean,” Smith said.

This study is part of a larger research effort that aims to provide New England’s farmers with science-based information about agricultural practices that reduce the need for economically and environmentally costly agrichemicals and other external inputs. The goal is to develop biologically based practices that are appropriate for their operations and that improve their bottom line.

“Agriculture continues to be an important component of our regional economy and therefore implementation of practices that benefit agriculture, such as the use of cover crops, should be of interest to not just farmers, but anyone who enjoys eating locally and regionally produced food or who values seeing a vibrant and sustainable agriculture on the landscape,” Smith said.

Future research will assess a wider range of cover crop species and their performance under different types of growing conditions and when planted at different times during the growing season. Scientists also will continue to conduct research on the potential benefits of planting cover crops as mixtures and in inter-cropping systems, and will assess a wider range of services that cover crops provide to agroecosystems.

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Founded in 1887, the [NH Agricultural Experiment Station](#) at the [UNH College of Life Sciences and Agriculture](#) is UNH’s original research center and an elemental component of New Hampshire’s land-grant university heritage and mission. We steward federal and state funding, including support from the [USDA National Institute of Food and Agriculture](#), to provide unbiased and

objective research concerning diverse aspects of sustainable agriculture and foods, aquaculture, forest management, and related wildlife, natural resources and rural community topics. We maintain the Woodman and Kingman agronomy and horticultural farms, the Macfarlane Greenhouses, the Fairchild Dairy Teaching and Research Center, and the Organic Dairy Research Farm. Additional properties also provide forage, forests and woodlands in direct support to research, teaching, and outreach.

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