

# Tobacco Production and Soil Conservation Practices in Connecticut



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**September 2025**

## Overview

Tobacco is a regionally important crop, grown in rich topsoils of the Connecticut River valley. Indigenous peoples grew tobacco in the area long before the European settlers arrived during the early 17th century. Almost four centuries later, farmers in north central Connecticut grow tobacco on these same soils and cultivate the highest quality wrapper leaf tobacco for cigar making. Historically, shade tobacco was the primary tobacco crop in Connecticut, but over the last 30 years the cost of production led to the collapse of shade tobacco production. Remaining farmers have transitioned to field production of broadleaf varieties for cigar wrappers; approximately 2,000 to 3,000 acres are under production in the state.

Farm fields have lost inches of topsoil and tons of organic matter as a result of conventional inversion tillage, erosion, and frequent cultivation. Reduced land availability and increased demand for production have exacerbated challenges with land use. Although the adoption of conservation tillage and cover cropping practices has increased significantly across the Northeast, particularly among dairy farms, it is uncommon in local tobacco production. Across the approximately 2,500 acres in Connecticut currently dedicated to tobacco production, the adoption of conservation tillage and cover crops could protect water quality in the Connecticut River and its tributaries. Improved soil



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aggregate stability and increased soil carbon could improve water infiltration and retention, and reduce erosion, which are all critical strategies that support crop resilience, especially under recent climate patterns of extreme precipitation. However, soil health practices are difficult to incorporate into existing tobacco growing systems, and there are numerous barriers to adoption of soil health practices.

Over the last two years, AFT gathered information about current production practices in Connecticut through interviews with tobacco farmers, farm visits, soil testing, and collaboration with extension professionals. In this brief, we summarize the current methods of tobacco production among this community of farmers, how these methods differ from other types of farming and other types of tobacco production, the key challenges to production experienced by these farmers, the primary barriers to adoption of soil health practices cited by farmers and extension professionals we interacted with, and recommendations for addressing challenges.

## Tobacco Production

The vast majority of Connecticut tobacco production is broadleaf tobacco for cigar wrappers and binders. Unlike burley tobacco grown in other parts of the country, which is shredded and used to fill cigarettes, the broadleaf wrapper tobacco for the cigar market must be of the highest quality, large and unblemished. The largest, most perfect leaves are used for cigar wrappers, and the smaller areas of quality leaves are cut down for the cigar binder. Any blemish, bruise, disease spot, hole, off-flavor, or discoloration reduces the value of the crop. While there are limited varieties of broadleaf tobacco compared to other types of tobacco, newer varieties have been bred in Connecticut, selected for leaf size, nematode and disease resistance, color, flexibility, thinness, and flavor. Tobacco crop yield in Connecticut averages 2,000 lbs. per acre, so maintaining a high proportion of top-grade leaves is critical for profitability - farmers generally expect that only half their crop will be wrapper grade.



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In general, tobacco is a resilient plant. It can grow well under adverse conditions including drought and extreme heat. In fact, the most vulnerable growing conditions for tobacco are very wet or cloudy periods; waterlogged transplants will die easily from lack of oxygen to their root system. Cloudy periods during the peak growing season (mid-July through August) contribute to thinner leaves, leading to increased brittleness and harvest damage. Moisture during harvest and curing promotes mold and fungal pathogens that can destroy the mature crop. For these reasons, tobacco often grows better in well-drained soils with a soil pH around or below 6.0, than in fields with high organic matter and neutral pH. A soil pH above 5.5 makes particle-bound nutrients available in the soil solution; a soil pH below 6.2 reduces the likelihood of some fungal pathogens, which prefer a higher soil pH.

Most tobacco growers in Connecticut use a disk harrow and moldboard plow for primary tillage. Fertilizer is broadcast after spring plowing and incorporated prior to transplant. Transplants are grown in greenhouses (or less commonly in cold frames) and set out in the fields in late May through June, after the last threat of frost. Tobacco plants are sensitive to nitrogen (N) availability during vegetative growth and have significant N requirements. Fertilizer rate recommendations for broadleaf tobacco range widely, from 150 to 275 lbs N/acre. From our interviews with eleven tobacco growers, the average total N applied is 288 lbs./acre, including both pre-plant and side dress. Most Connecticut tobacco growers have adopted the practice of utilizing a mixture of organic fertilizer, such as soybean meal or cottonseed meal, plus granulated fertilizer, because they've found that using too much urea N can contribute to off-flavor in the cured leaves. In addition, these organic fertilizers mineralize more slowly and provide more consistent nitrogen to the plants over the growing season.

Side dress N is crucial to support continued vegetative growth, especially on sandy soils during wet growing seasons when N has been washed down out of the root zone. Most growers apply 50 to 150 lbs. N/acre after cultivation anywhere from one to three times during the growing season, using either calcium nitrate or soybean meal.

Many growers use winter cover crops for soil erosion prevention, with winter rye predominating. Rye can be planted late into the fall and aggressively scavenges residual nitrogen following the tobacco crop, which makes it a good cover crop option for tobacco growers. However, winter rye overwinters and

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produces a huge amount of biomass if allowed to grow to maturity in mid-May or early June. This massive amount of plant material is difficult to plow under, and farmers often terminate it early to prevent nutrient tie up and limit biomass residue that might reduce yields.

Unlike tobacco producers in the southern region of the U.S. who need to rotate crops to control for soil borne diseases and nematodes, in Connecticut, tobacco has performed well despite being grown continuously. Growers reported problems such as over-large plants and leaf breakage when rotating tobacco into rich soil (for example where cover crops or vegetables had recently been grown) compared to growing tobacco year after year on the same field. Several farmers reported preferring a rotation with either corn or grain between tobacco crops.

Tobacco farmers are also limited in crop rotation options because of the tobacco harvest and drying process. Plants must be carefully cut and bunched before being hung to dry for curing, and the field must be located relatively close to drying barns. These post-harvest activities required to get saleable tobacco are both time and labor intensive. This means that farmers have limited time to plant cover crops in the fall or harvest other crops in their rotations. This unique aspect of tobacco production limits farmers' capacity for soil health stewardship and farm diversification.

### **Barriers to Adoption of Soil Health Practices**

A major deterrent to experimenting with soil health management practices is the additional risk to the tobacco crop. Technical assistance, financial assistance, and education can help address some of the perceived risks, but the reality of how soil health practices impact tobacco systems is complicated.

Cover crops can introduce additional risk into these systems. When a spring cover crop produces biomass with high carbon content, incorporating that into the soil can cause nitrogen immobilization as the biomass decomposes. The timing of decomposition and nitrogen mobilization is unpredictable because it depends on many factors: soil moisture, residue particle size, biological activity, and soil and air temperature. This unpredictability is a major concern because tobacco is sensitive to N availability, especially for growth of high-quality wrapper leaves. So instead of being able to rely on cover crops for N contributions, farmers minimize contributions from cover crops and apply full rates of fertilizer.

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Cover crops can also host pests and diseases. For example, most species of clover can host leaf spot virus which can ruin a broadleaf crop. Incorporation of cover crops in tobacco systems requires that species be carefully selected for disease and pest interactions, incorporated at the right time to enhance N retention and availability, and fit into farmers' schedules.

High purchase prices for premium tobacco may deter farmers from implementing soil health management practices, finding the possibility of depressed yield or leaf quality too great to risk. Current conservation practice incentive payment rates are inadequate to offset this risk. Tobacco is often produced on farms that grow one or two additional cash crops, like hay, corn, or pumpkins and winter squash. This means that there is increased financial risk, because a majority of farm income comes from tobacco production.

In other regions of the US, research is being conducted on the benefits of conservation tillage and cover crops on tobacco production and soil health (Pratt, 2015). Tobacco represents a larger part of the agricultural economy in those regions as compared to Connecticut, and there is industry funding for the research. However, the Valley Laboratory of the Connecticut Agricultural Experiment Station (CAES) in Windsor, CT conducted a four-year trial of strip till tobacco from 2019 to 2023. Results and observations were recently written up and will be shared during the winter of 2025 and 2026.

## Promising Ideas

Most farmers and extension professionals interviewed agreed that strip tillage, also referred to as zone tillage, seems to be the most promising strategy for improving soil health in Connecticut tobacco production. Strip tillage equipment utilizes a deep shank to open a furrow, followed by a roller or basket to create a plantable zone. This concentrates and limits damaging tillage to 8 inches of a 40-inch row. This practice can conserve soil carbon, decrease soil compaction, prevent soil erosion, and maximize both water infiltration and retention, especially if utilized in conjunction with a winter cover crop.

While a winter rye cover crop is commonly utilized in tobacco production, it is also often planted late (October or November) and terminated early (April), which limits biomass growth and potential to improve soil organic matter. There is potential to use staggered harvest dates to maximize seeding cover

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crops early, which would expand the days of living cover crop as well as increase options for multi-species cover crops. The fundamental challenge of cover cropping is that the work isn't nearly done when the tobacco crop is harvested. Next comes the intensive process of drying, curing, selecting and processing the crop, which occupies farmers through October. Ideally there would be a service for farmers to contract timely cover crop planting as part of their soil fertility management plan.

Another idea is to select multispecies cover crop mixes that would improve the carbon to nitrogen (C:N) ratio, compared to a monoculture winter rye. Planting a cover crop mix that includes a legume, like hairy vetch or Austrian winter peas, would mitigate N immobilization in spring by improving C:N ratio and making biomass easier for soil bacteria to decompose efficiently. Cover crop species should be selected with consideration of cover crop planting date ranges, and the ideal termination date and subsequent cash crop planting dates to ensure appropriate nitrogen availability.

Farmers' risk aversions and negative perceptions of soil health practices likely limit their willingness to try new practices. While several tobacco farmers expressed concern with water infiltration and soil erosion, they didn't associate those concerns with the concept of improved "soil health." Building an association between soil health practices, essential soil function, and reduced inputs will help growers find value in them. Local research on tillage innovations and demonstrations of cover crops are needed to demonstrate the benefits and risks for Connecticut tobacco farms. There are several farms that plan to experiment with strip till tobacco production in 2026. Additionally, the results of the Valley Lab (CAES) four-year trial of strip till tobacco should also provide important data to help growers see the benefits and approaches to this conservation tillage practice.

### Conclusion

Increased soil health will support Connecticut tobacco farmers who are faced with increasing weather extremes and unexpected precipitation patterns, conserve valuable topsoil, and protect our local water quality.