

Northeast SARE 2005 Farmer/Grower Grant Report

Hunt Country Vineyards

1. Project name and contact information

“Replacing Soil Sterilant Practices with Low, Permanent Ground Covers in Northeast Vineyards” – FNE05-547

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2. Goals

In the first year of our multi-year study, we proposed to investigate two species of ground cover in the vineyard rows, leaving no bare ground and significantly reducing the need for under-the-row herbicide use and between-the-row mowing. Ground ivy (*Glechoma hederacea*) has grown in some of our oldest vineyard rows, yet has defied eradication. It never exceeds four or five inches tall, tends to choke out other weeds, and maintains a relatively shallow root system. We sought to promote the growth of the ground ivy beneath the rows where we have traditionally used pre-emergent herbicides. Tall fescue (*Festuca arundinacea*), a grass species whose blades grow to about eighteen inches, also tends to crowd out other species and turns brown in the fall, allowing its growth to become natural mulch. We looked to sow the fescue between and/or beneath the rows, depending upon the treatment.

We expect an associated cost through a reduction in yield, but we seek to compare this cost to the savings of the proposed practices. Economically, we foresee a significant savings due to a reduction in herbicide costs, labor, and farm machinery use (e.g. fuel, maintenance, etc.). Environmentally, the benefits would include minimizing soil erosion and compaction, limiting herbicide usage, and reducing air and groundwater pollution. Water from our farm, and from the majority of the region’s vineyards, drains directly into the lakes that sustain us. Our proposed research seeks to develop both an economically and environmentally friendly ground cover practice for Finger Lakes region grape growers.

Specifically, we are attempting to answer several questions. Will these species be able to crowd out competing weeds to form an effective cover? Will these species become so invasive that containment will be a problem? What reduction in yield will we incur by promoting vegetative growth beneath the rows? How will our loss in yield be offset by economic gains through reduced herbicide, labor, and fuel costs and the like? Can the promotion of vegetative growth beneath the vines reduce excessive vigor, thus improving grape and wine quality in the varieties it affects? As fuel and labor become ever more expensive and herbicides lose their

effectiveness, how might the results of our research affect the long-term management of Finger Lakes vineyards?

3. Farm profile

The Hunts are a sixth and seventh generation family on a 171-acre farm that has seen grapes cultivated on it for nearly two hundred years. Joyce and Art Hunt have been growing grapes full-time since 1973 and currently have about 50 acres under cultivation. The varieties on the farm include: natives such as Concord, Niagara, and Delaware; French-American hybrids such as Seyval Blanc, Vignoles, Vidal Blanc, Chancellor, and Cayuga White; and Vinifera varieties including Riesling and Cabernet Franc. In 1981, the Hunts established Hunt Country Vineyards, a winery producing world-class wines from the varieties grown. They take pride in their long history on the land and strive to enhance the long-term productivity of the vineyards through sustainable means. Their youngest daughter, Suzanne, earned a Master's in Natural Resources and Sustainable Development and continues to guide the family toward greener practices.

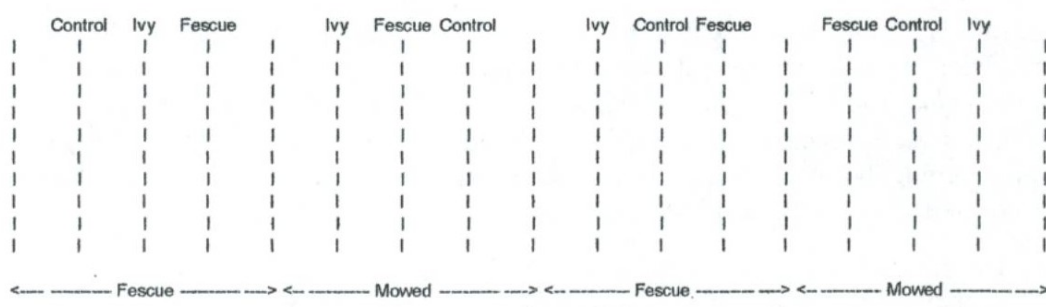
In addition to their sustainable work under the SARE grant, the Hunts have begun a compost program on their farm utilizing the grape pomace from the fall's pressings. Mixed with horse manure and wood chips, the compost will be applied in the vineyards to primarily boost the health of young and weak vines.

4. Participants

Dr. Timothy Martinson, Cornell Cooperative Extension Grape Specialist, acts as technical advisor on this project. He has made multiple site visits to observe project progress, publicized our work through CCE newsletters, reviewed project data and assisted on a Field Day at Hunt Country Vineyards introducing the research to area growers. Dr. Martinson will continue his role as advisor pending continued funding for the research.

5. Project activities

A two-acre plot of seventeen rows of Concord grapes was utilized for the research. The rows were chosen based on their uniformity in length, age, slope, and climatic regimes. The treatment rows are part of a larger block, so the end rows of our research plot experience no bias in relation to sunlight or other factors. Two replicates of each of the following cover crop treatments were established: control (bare earth – our present practice) beneath the vines with fescue between the rows; ivy beneath the vines with fescue between the rows; fescue beneath the vines with fescue between the rows; control beneath the rows with mowing (our present practice) between the rows; ivy beneath the rows with mowing between the rows; and fescue beneath the rows and mowing between the rows. Please see Figure 1 for a diagram of the plot. The treatments beneath the rows were randomly assigned, and buffer rows were placed between fescue and mowed sub-plots.



Row headers (Control, Ivy, and Fescue) relate to what is beneath the row.
 "Fescue" and "Mowed" below the diagram relate to what is between the rows.

Figure 1 - Treatment design for 17-row SARE research plot at Hunt Country Vineyards.

During the winter before the trial was established, ground ivy was taken from surrounding vineyard rows and placed in a landscaper's greenhouse for the purpose of propagating enough plugs to transplant into the ivy treatment rows in the spring. However, space constraints in the greenhouse limited the amount of propagated ivy available to us. Our original plan called for small (1-2" diameter) plugs to be planted at a rate of 1-2 per foot of row length, but difficulty separating the ivy into small plugs led us to instead plant 4-6" diameter plugs every 3.5 feet (2 equally spaced between each vine, approximately 150 per row). The ivy from the greenhouse supplied about a third of the required plugs, and the remainder was "harvested" from rows outside the research plot. Shallow holes were dug, and a small scoop of compost was added to the holes before planting. The ivy was planted during the first week of May.

Twice during the summer (13 June and 12 July) the ivy rows were hand-weeded to remove unwanted species, once (late July), due to especially dry conditions, the ivy was watered, and twice (15 August and 1 November) the rows were measured for percent coverage of the ivy versus other plant species. For the percent cover measurements, ten panels were randomly selected (Panels 4, 7, 9, 11, 12, 16, 17, 19, 20, and 21 in each ivy row), and a one-m² quadrat was placed against the north side of the middle vine of each panel. Estimates of ivy, other vegetation, and bare earth were recorded.

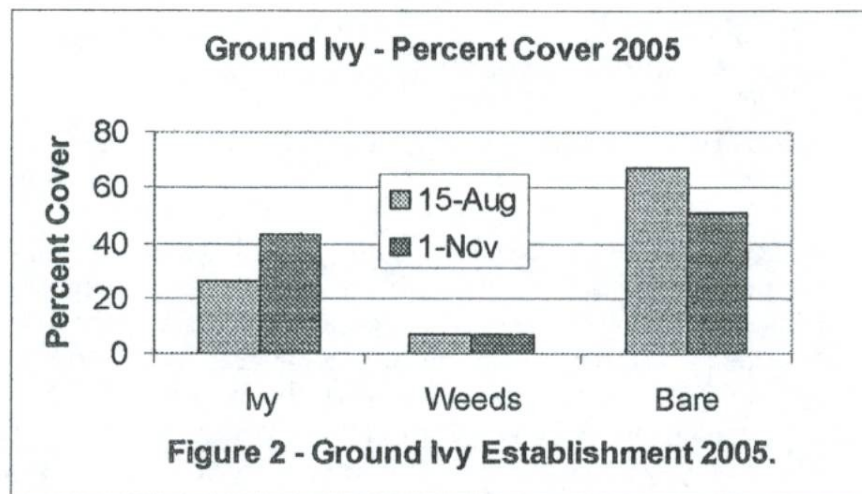
The species of fescue to be used was debated, and the commercially available "Aurora Gold" was selected due to its relatively shallow roots and glyphosate tolerance. As per the manufacturer's recommendation, the fescue seed was planted using a no-till drill in the fall season at a rate of 80 lbs. per acre. For treatments with fescue beneath the rows, seed was spread by hand under the vines.

Grapes were mechanically harvested, each row into its own bin to be weighed. Vines were mechanically hedged, and the vine trimmings were collected from a 5-panel section of each row (Panels 9-13) to calculate pruning weights for the treatments.

6. Results

The ground ivy has begun to establish itself well beneath 3 of the 4 rows. On the whole, percent cover of ivy rose from 26% to 43% between the dates of 15 August and 1 November (Figure 2). One of the rows did not fill-in well, remaining at about 18 percent over the same

period. The reasons for the poor growth in this row aren't known, as historically, all of the rows have been treated equally. In regard to the greenhouse-reared versus the wild-harvested plugs, the ivy that over-wintered in the greenhouse burned in its first couple of weeks after planting but ended up stronger than the plants dug from the vineyard in the spring. The transplanted ivy experienced no burning, but seemed to grow at a slower rate. No growth rate data was collected, so this is purely anecdotal – but potentially significant as well.



The Aurora Gold fescue germinated well after its fall planting. However, at the time of grape harvest (about 3 weeks after planting), the ground was fairly wet, so the young fescue looks to have sustained a setback in its establishment between the rows. The first couple months of spring will be telling as to the extent of the damage.

7. Conditions

The growing season was dominated by especially warm and dry conditions. Though the ivy was watered once during the summer, it was drought-stressed much of the time. This likely limited the growth of the ivy in the treatments. A small percentage of the plugs (<5%) desiccated completely.

8. Economics

As the ivy and fescue are being established, the initial outlay for the added labor and seed outweighed realized economic gains. Transplanting the ivy plugs required 50 hours of labor; watering the ivy took 4 hours to complete; and weeding the ivy treatment rows required 12 hours of work. The fescue seed cost \$295, which included the seed itself, shipping, and use of a no-till drill for planting. Savings during this first establishment year were seen in reduced herbicide spraying, totaling between \$30 and \$40. Economic gains from the notoriety the winery is gaining from this research project are difficult to quantify, but numerous customers in the tasting room have inquired about the work after having heard of the project through the local media.

9. Assessment

The establishment of both the ivy and fescue shows promise, though both will have to be supplemented this spring. Over-wintering the ivy in the greenhouse was unnecessary, though there may be an increase in overall health of these plugs as compared to the ivy transplanted directly from surrounding vineyard areas. One row had disappointing ivy growth and will require some spot replanting this coming season, but overall the establishment was better than expected as residual herbicide levels in the soils below the vines were a concern. The fescue will likely be reseeded at a much lower concentration this spring to enhance the areas damaged during the harvest. The use of the no-till drill to plant the fescue proved problematic, as its width was a bit too much for the vineyard rows. A full assessment of the fescue will be better made this spring after it begins to fill-in between the rows.

In all, ivy and fescue establishment proceeds well, and no major changes to the project are needed. Both should be nearly fully established by the end of the 2006 growing season in preparation for future year's research.

10. Adoption

To continue the establishment of the ivy and fescue, ivy plugs will be spot planted where necessary and fescue will be reseeded in much the same manner as in 2005. Changes during this establishment phase of the project will be minimal. 2005 was the first year of a multi-year project, so insights into the value of adopting the proposed practice for the entire vineyard are still years away.

11. Outreach

On 18 August, Art Hunt and Dr. Tim Martinson led a 2-hour field session to introduce the project and provide preliminary results to a dozen growers. The first percent cover measurements had been completed, so the participants could get a feel for the rate of establishment of the ivy. Cornell Cooperative Extension of Yates County recently received funding for additional sustainable viticulture work, and that future project was also discussed with the growers present.

Hunt Country Vineyards authored a press release regarding the project that was picked up by numerous local news sources, and the Finger Lakes Wine Gazette published an article about the ongoing sustainable research in their Harvest 2005 issue (Vol.12 No. 4, pages 38 & 40). Paper copies of both are included.

12. Report Summary

This project investigates planting two species of ground cover (ground ivy [*Glechoma hederacea*] and a hard fescue commercially known as "Aurora Gold") in the vineyard rows,

leaving no bare ground and significantly reducing the need for beneath-the-row herbicide use and between-the-row mowing. Ivy plugs were transplanted every 3.5 feet along the row length (2 equally spaced between each vine) in the spring, while the fescue was seeded between and beneath the rows (where appropriate) in the fall. Measurements of the percent cover of ivy, vine pruning weights, and grape yield were collected. By the end of the growing season, the ivy had covered over 40% of the bare earth under the vines. The establishment of both the ivy and fescue shows promise, but both will require spot planting this coming spring. This is the first year of a multi-year study, but overall the establishment was better than expected as residual herbicide levels in the soils beneath the vines were a concern. Both ground cover species should be nearly fully established by the end of the 2006 growing season in preparation for future year's research.

Letting the Weeds Grow: Sustainability at Hunt Country

By PAMELA GODDARD

What's so special about two acres of ordinary Concord grapes at the north end of Keuka Lake, and why are they being watched so carefully...for the next five years?

Hunt Country Vineyards has been awarded a multi-year Sustainable Agriculture Research and Education (SARE) Grant to study options for the reduction or elimination of herbicides in vineyards. Instead of maintaining bare earth under the grape vines, Hunt Country has planted English Ground Ivy and Fescue Grasses in a carefully controlled study of 17 rows of Concord grapes.

After choosing an isolated area where the rows are as similar as possible, Hunt Country is using the first year of the study to establish the plants and gather baseline data. "These two species have never really been used for this. There's the chance that they might just go wild, so we want it to be a controlled spot," says vineyard manager Jamie Hawk.

"When we first moved up here the mark of a good vineyardist was to have no weeds. Just bare ground. There was a lot



(Photo: Ted Crane)

Jamie Hawk, vineyard manager at Hunt Country.

of rutting and erosion, with ground water running down the hillsides," says Art Hunt. "We'd been trying to kill the stuff for 30 years."

Decades of herbicide use have left the ground under many grape vines bare and basically sterile. Near Hunt Country's test

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Sustainability at Hunt Country

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plot, an adjacent acre of lawn has long stripes of green where old grape vines were pulled out, and yellow stripes where herbicides were used to kill weeds. "This is at least the fourth season we've had this ripped out," Art says, showing how long it takes the earth to recover. Jamie Hawk adds, "This kind of thing shows how detrimental herbicides are to the soil in the long run."

Conventional wisdom says that ground-covering weeds reduce grape yields by competing with the vines for water. Recent studies in established vineyards have shown that leaving the ground cover doesn't have much of a negative impact. In fact some varieties have too much plant vigor, and weed competition can be good for grape quality.

"We have a long investment in the Finger Lakes with alternative ground covers," according to Dr. Tim Martinson, a viticulture specialist at the Cornell Cooperative Extension. "Three quarters of growers use straw mulch in the vineyard, and we've seen real improvements. The mulch conserves moisture, and we get more tons of grapes. In California, ground crops may be a new thing, but here in the Finger Lakes we have been doing it for many years."

After packing the weeds down for 30 years, growers like the Hunts are wondering what will happen if they just leave them alone. Jamie Hawk started thinking that maybe they should experiment by carpeting the vineyard with English Ivy. Jamie and Art's daughter Suzanne prepared the SARE grant proposal with technical advice from Dr. Martinson. This will

be the first study putting these weedy plants to controlled use in a vineyard.

"Suzanne's always been interested in making things more sustainable and green,

and it's rubbing off on the whole family, I think," says Jamie Hawk. Suzanne Hunt, with a graduate degree in environmental resource management, has worked with California vineyardists to increase the wild habitat around their vineyards. Hawk has done graduate work in Biological Oceanography and gained experience in sustainable development as a Peace Corps volunteer in Zambia.

"They took the initiative and are running with it," says Martinson. "My role is to help with data analysis and field meetings."

"One of the challenges we're facing is that growers are dependent on pre-emergent herbicides which have the most impact on the soils," Martinson says. "The critical time to keep weeds down is from grape bloom in June through grape development in August. There may be a tendency to go overboard earlier and later."

This study will look at two different types of ground cover. English Ground



English Ivy ground cover planted under the vines at Hunt Country.

(Photo: Ted Crane)

Ivy has fairly shallow roots and never grows more than four inches high, but it forms a thick carpet and crowds out other types of weeds.

"Aurora Gold" Fescue, a

type of grass that stays short with a shallow root system, is somewhat dormant during the summer and has some tolerance to more environmentally friendly herbicides such as RoundUp. While the Ivy has been planted in the formerly bare earth under the grape vines, the Fescue will go both under and between the rows.

In spite of the drought conditions during August, the Ivy has begun to establish itself. There is already a 20-60 percent ground cover in the formerly bare rows. A representative sampling of grapes from those rows will be tested for yield and quality.

"Ground covers may compete with some moisture in years like this, but they're shallow rooted," Art Hunt says. "They won't compete for the deep moisture which grape vine roots can reach."

"Ultimately we're trying to reduce the amount of herbicide we're using to keep the earth bare," says Jamie Hawk. "This is especially important in the Finger

Lakes where everything you put in the land runs right into the lakes. That's our main water source for drinking."

Hunt Country hopes that the use of low ground covers will generate environmental gains, economic benefits, and quality improvements. If all goes well, it will result in reduced labor, fuel, and herbicide costs. Increased growth under the vines may act as a control on excessive vigor of the vines and improve grape quality.

"We're starting with Concords because they're pretty durable," says Art. "Vinifera will be our next thing, because that's where we have the most difficulty controlling vigor and keeping them through the winter. The next generation of our experiments will be trying to establish the most successful of treatments in the vinifera vineyards to avoid hilling up those vines."

Jamie adds, "Concords are so widely grown we wanted the study to be applicable to the majority of Northeast growers."

The results may have a short-term impact, producing improved flavors in their wines, but the environmental gains can be long lasting. The Hunts are highly aware of their role as caretakers of the land. Art is the sixth generation on the Hunt farm and Suzanne and Jonathan, the seventh generation, are carrying on the tradition.

"It behooves us to make things more sustainable, because we hope to go on for many more generations," says Art Hunt. "The only way we will is if we take better care of the land than we used to." 🍇