

FARMER/GROWER GRANT REPORT – October 2003

1. Project name and contact information

Legume Interseed in Field Corn-FNE03-494

Birch Meadow Farm-Steve Stocking
143 Birch Meadow Rd.
Fairlee, VT 05045
802.333.4840
arline.c.stocking@valley.net

Grant Researcher: Juanita Lerch
567 Victory Rd.
East Burke, VT 05832
802.626.5347
nell@bluemoo.net

2. Goals

Steve Stocking of Fairlee, VT with the assistance of Juanita Lerch of East Burke, VT applied for a SARE farmer/grower grant for the 2003 year with the following objectives: To pursue an on-the-farm research trial for cover crops, legumes and/or rye grass interseeded into IMI field corn at time of planting for erosion control, nitrogen building and possibly pesticide reduction on a field that has less than optimum soil characteristics and prone to flooding by the Connecticut River.

IMI (IR/IT) or Clearfield (CL) corn was developed by tolerance selection to be resistant/tolerant to imidazolinone herbicides (e.g., Pursuit, Scepter). Although these hybrids were initially introduced to help manage herbicide carryover, Pursuit and Pursuit-containing products such as Lightning can be applied directly to the IMI corn hybrids as part of the weed management program. Some IMI varieties (IR) also are tolerant to some sulfonylurea (e.g., Accent, Exceed) and sulfonamide (Broadstrike products, Python) herbicides and are used to reduce the injury potential of these products when applied alone or in combination with organophosphate (OP) insecticides.

The general idea of this whole project is a simple one in that when the field corn was cut for silage in the fall, the interseed crop would already be in place and established well enough to help hold the topsoil during the winter and spring months.

3. Farm profile

Steve Stocking is the full-time owner/operator of Birch Meadow Farm in Fairlee, VT since 1965. He raised 60 acres corn and 40 acres hay in 2002, 64 acres corn and 26 hay in 2003. His total farm size is 106 acres, which contain his home, several barns, equipment buildings and a new silage storage facility that will hold 1150 tons of corn silage. This was formerly an operating dairy facility and all buildings and equipment are in good condition and working order. He currently is a cash crop farmer with no means of producing his own manure, which he purchases and spreads each spring. Steve is very proactive with regards to environmental friendly projects, and has participated in numerous field trials with organizations such as NRCS and the Big Flats Materials Center in Corning, NY. This spring alone, he restored a buffer along the Connecticut, seeding it with a spring grass blend and planting it with a variety of trees and blueberry bushes. Our particular test field is a known site for Indian artifacts, being located at a ford in the

Connecticut River. Part of his property and is also a state wildlife area, accessible by river only and is open to visitors arriving by canoe or kayak.

4. Participants

Paul Salon- Research Agronomist, USDA/NRCS, Big Flats Materials Center, Corning, NY; Herbicide and interseed consultant.

Willie Gibson- Agricultural Consultant (Formerly of UVM Ext.), Connecticut River Academy- Bradford, VT; Agricultural and soil consultations, including fertilizer recommendations.

Sid Bosworth- Extension Forage Agronomist, Plant & Soil Science Dept., University of Vermont- Burlington, VT; Corn yield tests.

Dan Koloski- Soil Conservationist, USDA/NRCS, Berlin Service Center, Berlin, VT; White River Natural Resources: Conservation Farm Plan and maps.

Juanita Lerch- Agricultural Researcher, East Burke, VT; Project execution including pesticide application, soil and PSNT tests, agricultural research, digital photography and technical writing.

Twin-State Fertilizer- Bradford, VT; Seed supply, fertilizer application and seeding assistance.

UVM Agricultural Testing Lab- Burlington, VT; Soil and PSNT test results.

5. Project activities

Start-up preparations for this project began in March of 2003 with the set-up of a timeline of project objectives. Then, a consultation with Steve Stocking, the owner of Birch Meadow Farm in Fairlee, VT helped to determine specific objectives, field selection, test plot size determination, etc. The field selected for this project was 8A, located on the lower meadow of Steve's farm, right next to the Connecticut River and subject to flooding. The soil in this field is of a challenging variety (it is very light, Hadley), but we considered it a perfect place to have a test. If we can accomplish a test with a measure of success in this sort of field, then it would be even more successful in fields with better conditions.

Calibration information was drawn from Sid Bosworth and Bill Jokela of UVM Extension, Burlington, VT. Consultations were also made with Paul Salon of the Plant Materials Center, USDA/NRCS, Corning, NY. Paul has been researching interseeding in field corn with success in his test plots at the PMC. We also calibrated Steve's manure spreader to determine size and capacity. The Brillion seeder was also calibrated in preparation for seeding. This was done by placing a cardboard collection device under the seeder and making revolutions by hand according to the seeder manual to determine seeding rate per acre. The month of April finished up with soil testing on the entire farm. (See project for fertilizer recommendation made by Willie Gibson, Agricultural Consultant, based on soil test results. Soil Test Result database for entire farm, including Micronutrients, Metals and % Organic Matter available upon request. Also available is a breakdown of the different soil types on Birch Meadow Farm, which highlights: associations, descriptions, classifications, capability class, estimated yields, physical and

chemical properties, limitations, water management, depth to bedrock, frost potential, soil legends with map, soil fact sheets and herbicide description sheets.)

With the help of agricultural consultant Willie Gibson, field diagrams were drawn up that would allow for two test plots and two corresponding control areas. (See project for diagram of field test plot.) The field was cultivated, manure was spread and then the plot was sectioned off using orange wire flags. (Pictures available of entire process, upon request.) We entertained the idea of hand seeding the interseed, as done by Paul Salon in his test plots, but opted to go with Willie Gibson's plan, which allowed for mechanical seeding. It was more in keeping with our idea that this kind of interseeding project should be something practical and usable by the average farmer. Mid-May we planted the IMI corn in the test plot, planted the interseed and sprayed herbicides accordingly. Since both Steve and I (Juanita Lerch) are certified applicators in the State of Vermont, we did the application ourselves following all safety procedures and everything was done and flagged in one morning's time. (See project for pictures of plot preparation.) The legume plot of Medium Red Clover and Alfalfa was sprayed with a combination of Pursuit, 1.44 oz., and Python, 1 oz/acre, with surfactant. The grass plot of Italian Annual Ryegrass and Perennial Ryegrass was sprayed with a combination of Pursuit, 1.44 oz., and Callisto, 6 oz/acre, with surfactant. The day was clear & calm and practically perfect for spraying herbicide. Corn had spiked by the end of the month and we began making preparation for PSNT tests. A field database was also set up to record field information and a file of digital pictures was begun for the project. (A copy of this database available upon request.)

A regular program of field visits was begun during the month of June, typically every two weeks approximately, to record growth progress of the IMI corn and the interseed. Interseed counts were taken of the emerging legumes and rye and then a minor drought took the majority of the rye plot. We noticed a weed control problem in one end of the legume plot, which appears to have been caused by improper application of herbicide. We assumed our sprayer was spraying herbicide, when in fact, it was obviously spraying rinse water out of the lines. So, for about 75 feet or so, we have an intense grass problem, which abruptly comes under control once the herbicide application kicks in. (See pics of this problem upon request.) A PSNT test was taken on this plot alone, not the whole farm, and sent to UVM Extension for analysis. (Refer to project for a copy of this nitrate test.)

A PMC Open House was held at the farm in July, in attendance were John Dickerson from the PMC; Kevin Kaija, NRCS; Dan Koloski, NRCS; and others from both NRCS and Conservation Districts in both VT and NH. (See Conservation Plan Maps provided by Dan Koloski, Berlin Service Center, USDA/NRCS, Berlin, VT available from SARE.) The test plot was reviewed and some of the problems were discussed. Also reviewed was the buffer Steve planted next to the test plot, adjacent to the Connecticut River and other projects Steve has going on the farm. Continuing correspondence took place with Paul Salon, who expressed some concern at the light legume growth, non-existence of the rye and possible herbicide problems that might have partially caused the rye to disappear.

Sid Bosworth, University of Vermont- Burlington took corn yields on September 9th, 2003, which produced wet yields on the spot for Steve. (See copy of project for pictures of this process as well as a database of corn yield results.) Dry matter results

came in a week later, as well as a breakdown of the results of Sid's findings. Digital pictures were taken of the corn yield, and have been taken throughout the growth process so that the progress of the test plot could be followed. Corn was harvested for silage on September 25th.

6. Results

Despite the light legume growth, both Steve and I are determined to discover the proper combination that would allow a farmer to successfully establish an interseed crop at time of corn planting on corn cropland that is prone to flooding. We discussed with Sid Bosworth that perhaps our seeding was too light in the legumes and that taking into account the light, sandy soil, a heavier seeding might be required, as well as a possible herbicide change. Perhaps even a different type of legume should be explored, something more adept in challenging soils.

A follow-up visit on September 29th, complete with pictures, shows the field after corn harvest, with reference to the legume growth. Control areas seem fairly clean. Rye seems to have come back to a small extent. According to Steve, the IMI corn produced an exceptional crop, with ear size being phenomenal. He contends that although the IMI corn was the same height as the conventional planted in the same field, he noticed a significant difference in the harvest. He had to gear his tractor down to contend with the heavy crop as he was cutting the silage and was highly impressed with the ear size, particularly from a field which has proven itself to be iffy when it came to producing a good corn crop.

Another visit on October 21st shows how the legume has re-established itself during the cool, damp fall weather. Concluding consultation also took place with Steve at this time.

7. Conditions

Field 8A used for our test project is Ha-Hadley, very fine sandy loam with 0-5% slope, 8 acres in size, located adjacent to the Connecticut River and prone to flooding. A minor drought in late May could possibly have contributed to an intensification of the herbicides in the rye test plot, eliminating the rye crop for all intensive purposes.

Tillage # and kinds: Plowed winter rye from last fall down as well as experimental interseed legume crop, 3 acres in size, which bordered the field; field cultivator, perfecta.

Planter type: JD Max Emerge Plus-4 row finger pickup 7200.

Row spacing: 30"

Planting Rate, population: 30,000 seeds/ac.

Seedbox treatment-Insecticide/Fungicide: Kick Start: Vitavax-Diazinon-Lindate: 1.5 oz bag per bushel.

Planting Date: 5/16/03

Manure History: 2001: None, 2002: east half of plot had 20 tons, 2003: 20t/ac.

Fertilizer at planting: 50 lbs K, 50 lbs DAP/ac.

Pre-sidedress nitrogen test: June 17th, 2003: Nitrate level: 7 ppm.

Fertilizer topdress: June 18th, 2003: 46% Urea, 217 lbs/ac, (100# actual N).

Herbicide+adjuvant+nitrogen type and rates: In conventional corn in same field: Lumax 2½ qts per/ac. In IMI corn-2 different sprays: Pursuit-1.44 oz, Python-1 oz/ac, in legumes; Pursuit-1.44oz, Callisto-6oz/ac in ryegrass. Surfactant-Hydrate Plus-1 qt/100 gal.

Spray date: 5/16/03

Conventional Corn Variety: 37M81 Pioneer

IMI Corn Variety: Pioneer 35P15 Clearfield

Cover Crop sp.& variety & rate: 6 lbs Perennial Ryegrass-Vibrant, 4 lbs Italian Annual Ryegrass per/ac. (1/4 ac/plot site). 8 lbs Med. Red Clover, 4 lbs Alfalfa per/ac. (1/4 ac/plot size).

Date Cover Crop planted: 5/16/03

Type of seeder/cover crop: Brillion-10 ft.

Date corn harvested: 9/25/03

Soil test results: pH-6.2, availP-11.4, ResP-49, K-54, Mg-55, Al-22, Ca-541, CEC-3.3, Zn-1.7. Micronutrients: Na-12.0, Fe-5.5, B-0.2, Mn-10.4, Cu-0.5. % Organic Matter-1.1.

Corn Yield Test Results: IMI Corn with Alfalfa-Average % DM-38%, Yield (tons/acre) "As Is"-19.1, DM-7.3, Silage Equivalent 35% dry matter-20.9. Plant Population, Plants/acre-27,225. IMI Corn with no cover-Average % DM-39%, Yield (tons/acre) "As Is"-20.7, DM-8.0, Silage Equivalent 35% dry matter-22.8. Plant Population, Plants/acre-31,218.

P Source Potential-33.8, P Transport Potential-0.504, P Index-17.0. This is considered low potential for P movement from site, with N based nutrient management acceptable. (See project for Phosphorus Worksheet, which explains how a P Index is determined in Vermont, via Bill Jokela, University of Vermont.)

8. Economics

Herbicide cost for this type of project is comparable to what we used in the conventional corn in the same plot. Price of the corn seed per acre is comparable as well. There is obviously more expense in starting a legume cover crop than planting an annual rye grass as a cover crop, approximately \$10 per acre more. But the expense would hopefully be offset by the amount of nitrogen fixation that would reduce the amount of fertilizer needed the following year. Also, the advantages of planting an interseed crop at time of corn planting, particularly on troubled fields, could ease up the farmer's rush to get in his late ryegrass plantings on the farm as a whole. This savings in time is difficult to put a price on. (See project for a project supply cost sheet and bar graph, which breaks down the cost of doing such a project per acre.)

9. Assessment

Steve Stocking would like to try this project again next year, with the following changes: hire a local herbicide consultant and work in conjunction with Paul Salon, USDA/NRCS Big Flats Research Center, with hopes of determining a better spray variety and rate that would be more successful in his particular type of soil and weather; seed heavier in both the ryegrass plot and legume plot, in an attempt to overcome early

minor droughts that caused this year's crop to be a little too light; do more research into soils, on the part of the researcher with the assistance of agricultural consultant Willie Gibson, with emphasis on determining the best kind of crops to grow based on soil characteristics of this site.

10. Adoption

The projected project for 2004 would be done in hopes of making this part of a multi-year project, in which the first year, interseed would be established in IMI corn; and the second year, the interseed would possibly be band-sprayed to allow the planting of corn through the established legume. After corn harvest the second year, Steve would like to see if a legume harvest of some sort would be possible. If not, the legume could be incorporated back into the soil as a well-established green manure crop. He would like soil tests done, spring and fall, as well as PSNT; to track the way the interseed is affecting the soil in this field. It would also be advisable to try this on a little larger scale than $\frac{1}{4}$ acre test plots, so that an actual simulation could take place of this project as viable for the typical farmer. In keeping with that theory, Steve would like to try this same project on the same field next year, the entire 8 acres done in IMI corn, with two different seedings, one of legumes, one of grasses with coordinating controls.

In conclusion, we determined that the seeding rates, though typical for our consultant Paul Salon, were too light for our state and soil type. We did not get a thick enough established growth for fall. We also determined that a better herbicide combination, especially in the ryegrass, should to be explored, perhaps one that is not so easily affected by minor droughts early in the growing season. More research into the soil characteristics is needed in this particular field to make a project more successful. This is a very viable project that if given an opportunity to fine-tune the specifics of a field, could work well to help prevent soil erosion and be a nitrogen fixer in what is typically Connecticut River flood plain area. Tests at the Plant Materials Center, USDA/NRCS, Corning, NY, have shown that this type of planting program could work well for Steve who wants to prevent soil erosion due to flooding or run-off and who also seeks to build nitrogen in his soil, in a manner that provides him with ease of planting at the optimum time.

We would like to thank SARE for their continued support of on-the-farm research projects such as this and would like to enlist their support for next year's proposed project as well. It is with your financial assistance that farmers like Steve Stocking of Fairlee can test out some of their theories of particular farming techniques which may prove to be of value to other farmers who have similar problems or conditions to deal with on their farms. Helping one another, through planned on-the-farm research... Making agriculture a successful way of life is what SARE is all about.

11. Outreach

In an effort to accommodate Steve's hectic schedule, our outreach program differed slightly from what we had anticipated.

Our outreach program consisted of the following: the Plant Materials Center (PMC) Open House (USDA/NRCS, Corning, NY), in which a wide variety of

agricultural experts from a host of local service agencies reviewed the plot and offered their advice and input into what they seen on-site. It was a full afternoon of discussions ranging from grasses to herbicides to options for the future.

Willie Gibson, an instructor with the Connecticut River Academy, Bradford, VT has also been out to the farm, conducting extensive classroom instruction with his students on soils and he is utilizing the same test plot acreage we used for our project. Willie is formerly from UVM Extension and brings with him an expertise in the area of agriculture and conservation.

I personally involved a student from Lyndon State College, Lyndonville, VT to assist with our corn yield process. Lucas Clover is a meteorology/math major at the college and enjoyed learning how corn yields were measured and calculated using data gathered from the field. Lucas also assisted me with formulating the Phosphorus Index for the project, which utilizes math computations of field specifics.

I also contacted 'Farming-The Journal of Northeast Agriculture', a magazine published by Moose River Publishing Company, St. Johnsbury, VT with a query concerning this project and upon their acceptance, will submit to them an article on what we accomplished with our trials at Birch Meadow Farm.

Bound portfolios containing an expanded version of this project, which include a host of digital pictures, test results, maps and specific site information are available at: SARE; Farmer Grant Specialist, Dale Riggs, Stephentown, NY; Sid Bosworth-Extension Forage Agronomist, Plant & Soil Science Dept., University of Vermont, Burlington, VT; Dan Koloski-Soil Conservationist, USDA/NRCS, Berlin Service Center, Berlin, VT; Steve Stocking-Birch Meadow Farm, Fairlee, VT; Paul Salon-Big Flats Research Center, Corning, NY; William Gibson-Agricultural Consultant, Connecticut River Academy, Bradford, VT; Juanita Lerch- Agricultural Research, East Burke, VT.

For more information on this project, contact Juanita Lerch at: 802.626.5347 or e-mail: nell@bluemoo.net or Steve Stocking at: 802.333.4840 or e-mail: arline.c.stocking@valley.net.

Juanita Lerch: November 5, 2003

Project Supply Cost Sheet: Birch Meadow Farms - 2003

Supplies	Price	Cost in Project¹	Cost Per Acre
Kickstart-1.5 oz bag	\$3.25/pk	\$ 1.22	\$ 1.22
Lumax	\$55.75/gal		\$ 34.84
Pursuit-DG	\$15.13/oz	\$ 21.79	\$ 21.79
Python-WDG	\$12.80/oz	\$ 6.40	\$ 12.80
Callisto	\$697/gal	\$ 16.34	\$ 32.67
Pioneer 35P15 Clearfield	\$136/bag	\$ 51.00	\$ 51.00
Pioneer 37M81 Corn	\$109/bag		\$ 40.88
Perennial Ryegrass-Vibrant	\$2.05/lb	\$ 3.08	\$ 12.30
Italian Annual Ryegrass	\$0.85/lb	\$ 0.85	\$ 3.40
Med. Red Clover	\$1.28/lb	\$ 2.56	\$ 10.24
Alfalfa	\$3.68/lb	\$ 3.68	\$ 14.72
DAP	\$308/ton	\$ 7.70	\$ 7.70
K	\$231.96/ton	\$ 5.80	\$ 5.80
Urea - 46%	\$8.75/50# bag	\$ 37.98	\$ 37.98
Prices for 2003 growing season courtesy of Twin-State Fertilizer of Bradford, VT and Northeast Agricultural Sales of Lyndonville, VT.			
¹ : 2 - 1/4 acre test plots.			

COST COMPARISON - BIRCH MEADOW FARM

