***Bill Jokela, Soils Extension & Research;*** UVM, Burlington, VT-Corn yield and crop consultation.

**5: Project activities**

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The weather didn't cooperate well for the critical planting phase of this project, and we found ourselves hard-pressed to get this crop in. As it was, we ended up planting almost 2 weeks later than last year and in cold, wet conditions. This proved to be a bad combination for our herbicide regime, particularly the Pursuit. Cold, wet weather can cause Pursuit to repress the growth of corn and/or an interseed. We did get good weed control with this herbicide regime though, better than what Steve typically has on this field, and when sprayed under the proper conditions, Pursuit can be quite a successful weed control agent.

Despite our careful calibration of equipment, precise field preparation, and attention to detail when it came to seeding the legumes, the crop of legumes and grass that finally established itself is not what we would have liked.

**6: Results & 7: Conditions**

The clover came on late considering planting time, about mid-August, which according to our consultants, Paul Salon and Willie Gibson was probably the result of herbicide repression. We did get a stand of clover, light and patchy, the thickest being 10 small plants per square foot. There were a lot of places where it just didn't come on at all, despite the heavy seeding ratio.

The same result happened, light and patchy growth, with the grass combination we planted: a bad selection in the grass regime, the Red Fescue, and we believe an herbicide reaction due to spraying in cold, wet weather was the cause. We discovered that Red Fescue is not something that will take on this type of soil. According to Paul Salon, the soil is obviously too light, and without any real structure to support Red Fescue growth. We found very little evidence of it and feel it is not a good option for this type of sandy soil. We do have some Orchardgrass though, enough we feel to build some valuable biomass for this field. The Orchardgrass is patchy, due to the fact that is was planted in a mix with the Red Fescue. Upon close examination you can, in some areas, actually see where the Red Fescue started then withered and died. This is right next to thick, lush clumps of the Orchardgrass. The seedlings range from no plants per square

This type of interseeding has been successfully tested by Paul Salon, Plant Materials Specialist, USDA/NRCS, and Paul would be a consultant on planting and establishing this interseed project.

**3: Farm profile**

This project was approved by SARE in March of 2004 and according to their guidelines; one half of our operating budget was released in April. Steve Stocking, the owner and operator of Birch Meadow Farm in Fairlee, Vermont designed this project with me in the fall of 2003 with the hopes of finding a viable way to build soil and prevent erosion in a field that has proved to be one of his most troublesome. With SARE's financial help, we had hoped to establish a successful cover crop and silage corn crop at the same time in this field.

Steve Stocking is a full-time farmer in Fairlee, Vermont, since 1965, cash crop hay and corn silage. He owns his own farm, totaling 106 acres. This test field is one of five fields he has that are located on the lower meadow of his farm. This entire lower meadow area is about 35+/- acres of floodplain land with about 32 in field crops, either hay or silage corn. All of these fields have had crop problems in the past and continue do so in part to the frequency of flooding. The area flooded dramatically four years ago with the Connecticut River damage being so extensive to this section of land that a new riparian wall was needed and, henceforth, built by NRCS. According to local USDA specialist, Kevin Kaija, this field was covered with sand from the flooding, anywhere from 2 feet to 5 feet thick in places.

Just last year this field, as well as all the other four, was back-flooded when the Connecticut backed up into a wetland area adjacent to these fields and then found its way back to the river across these fields. Though I did not witness the flood damage, it was easy to see the outline of the flooding in the soil. It was clearly visible in the soil being of a lighter texture and color in the damage area. This area is also heavily compacted due to this flooding. And, when the new crop began to grow, the corn was lighter in color and smaller in size in the flooded area, which was quite remarkable to observe and document.

The following is a breakdown of field info:

## Data Collection Sheet-2004-Test Plot-Field 8A
## SARE Project: FNE04-531

**Farmer name:** Steven Stocking
**Farmer Phone#:** 802.333.4840
**Farmer Address:** 143 Birch Meadow Rd., Fairlee, VT 05045
**Field # and acres:** 8A-8 acre field
**Farmer primary objective:** Erosion control/nitrogen fixation/soil building

**Soil Test:** April 18, 2004 UVM Testing Lab, Burlington, VT
Also tested by cooperating lab for sludge application.
**Soil Type:** 67 A-1 First Section, 68 A-1 Second Section
**Slope:** 0-5% **Corn Year:** 5

**Soil Description:** Ha-Hadley very fine sandy loam
**Tillage # and kinds:** 5/1/2004: Plowed Winter Rye from last Fall down as well as experimental interseed legume crop in 1 ac test plot in center of 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.
**IMI Corn variety:** Golden Harvest H-6809IM (99 day); Garst 8766IT (99 day); Pioneer 34B28 Clearfield (109 day).
**Date IMI Corn planted:** Outside 16 row control-May 27th. Inside test, left side, May 27th, right side, May 28th, 2004.
**Emergence:** Corn-June 6th, 2004.
**Seedbox treatment-Fungicide:** Agrox-Premiere; Captan, Diazinon, Lindane. 1 pkt per bushel.
**Manure history:** 2001-None; 2002:east-half/20 t; 2003-20t/ac; 2004-20t/ac.
**Fertilizer at planting:** 50 lbs Dap/50 lbs K20 w/ mineral pkt.
**Pre-sidedress nitrogen test:** June 23, 2004
**Fertilizer topdress:** 120 lbs/ac.
**Weeds anticipated:** pigweed, lambsquarters, wild mustard.
**Weeds encountered prior to spraying:** Field is clean with little weed pressure.
**Herbicide+adjuvant+nitrogen type and rates:** Pursuit 1.44 oz/ac, Callisto 5.5 oz/ac in grass test plot. Pursuit 1.44 oz/ac, Python 1 oz/ac, in legume test.
**Spray date:** May 27th & May 28th, 2004 with corn seeding, pre-emergence.
**Cover crops sp. & variety & rate:** Grass-Red Fescue & Orchardgrass, 20 lbs/ac. Legume-Red Clover 8 lbs/ac, Dutch White Clover 4 lbs/ac.
**Type of seeder/cover crop:** Brillion-10 ft.
**Date CC Planted:** May 29th, 2004.
**Herbicides normally used:** Bicep II/Callisto
**Date Corn Harvested:** Sept. 17, 2004

## 4: Participants

Consultants on this project were:

***Paul Salon, Plant Materials Specialist, USDA/NRCS;*** Syracuse, NY.-Pesticide & Seeding consultation.
***Willie Gibson, Agriculture Consultant;*** East Ryegate, VT-Growth analysis.
***Kevin Kaija, Conservation Agronomist, USDA/NRCS;*** White River Junction, VT- Tech support.
***Juanita Facteau, Soil Research Consultant;*** Hartland, VT- Project implementation, data collection and analysis, soil quality testing.
***Lucas Clover, Meteorology Major;*** Lyndon State College, Lyndonville, VT-Weather analysis and mapping.
***Twin States Fertilize;,*** Bradford, VT-Herbicide/fertilizer consulting and supplies.
***Sid Bosworth, Agronomist;*** UVM, Burlington, VT-Corn yield and crop consultation.

***Bill Jokela, Soils Extension & Research;*** UVM, Burlington, VT-Corn yield and crop consultation.

**5: Project activities**

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foot to a high of 44 plants per square foot. The Orchardgrass proved to be a good choice for this type of soil and is an option for this farmer for future interseeding plantings.

The IMI corn did phenomenal on this field, particularly a 109 day variety of Pioneer Corn which out yielded the shorter day varieties in this same field. Corn yield tests showed that in the test area, we harvested 27.76 tons/acre and 28.30 tons/acre in the control, of corn silage. Plant population was high and ears averaged 8-10 inches in length with 14-18+ row averages. Steve was highly impressed with the yield results, particularly the Pioneer, regardless of the interseed and has never had this kind of crop results on this field before. Steve feels this is due to the type of corn, the Pioneer later day variety and the amount of manure he added in the spring. A heavy dairy manure application in the spring has not always been an option for Steve, as he is a cash crop farmer with no manure generating capability of his own. He has also tried to work with the earlier maturing varieties of corn on this field, primarily because the field is a lower meadow field which typically matures later. It seems though, according to these results, that a late maturing variety will actually get him a higher yield, should he be able to continue with manure applications in the spring.

PSNT's, taken on June 23rd, revealed a Nitrate-N level of 8 ppm for this field. In order to achieve 25 tons/ acre, the recommendation from UVM was to apply 125 lbs/ N, which according to their report is higher than average considering the manure application in the spring. On consultations with Kevin Kaija from USDA, this field for all intensive purposes is being hypothetically hydroponically farmed. What ever results Steve obtained is a direct result of manure and fertilizer application, because the soil itself is not indicative of either organic matter or tilth.

Tests from the USDA Soil Quality Test Kit show that the soil in this field is: in a somewhat depleted state of organic matter and biological activity (Respiration and Earthworm Tests), it lacks structure and is considered a sand to a loamy sand in structure (Soil Texture Test). It is heavily compacted in some areas (Bulk Density and Compaction Penetrometer Tests), areas of known flooding reading as high as 175 pounds at a 5" depth, infiltration is rapid to very rapid (Infiltration Test), even in the established grass buffer next to this field. EC levels are low, not affecting crop growth (EC Test), but the pH results were running a little high at 8.64 (pH Test). Aggregate Stability Tests showed that the soil is highly erodible, and Slake Tests indicate that the soil is relatively unstable and not strong enough to withstand the stresses of rapid water uptake.

## 8: Economics

Economically speaking, this project was comparable in cost to a conventional corn planting on the same area. Per acre, the cost to plant this project was approximately $140 for the IMI corn & grass planting with our choice of pre-emergent herbicides; and $120 for the IMI corn and legume planting with the required pre-emergent herbicides, typical DAP, N and manure applications not withstanding.

In a conventional planting of corn, with traditional herbicide applications and then a winter rye application in the fall, the cost is slightly less running about $110 per acre, depending on seed sources and type of herbicides used. This does not take into consideration the difference in man-hours with a conventional planting which requires additional field preparation and seeding time.

Initial expense was more for an interseed project of this type, but all in all, the price is comparable if you factor in time saved as opposed to money invested.

**9: Assessment**

We took the difficulties in this project as an opportunity to re-evaluate this entire field and do a full series of soil tests to analyze what may have gone wrong and what could be done to achieve better results. USDA has come out with a new program called The Soil Quality Test Kit. In its text, it walks you though twelve basic soil tests to determine soil quality: Respiration, Infiltration, Bulk Density and Compaction, EC, pH, Nitrate, Aggregate Stability, Slake, Earthworm, Physical Observations and Water Quality.

The manual assists you in building The Soil Quality Test Kit, testing the soil and recording the info on a series of charts. Then, you learn what these tests mean to the soil and how you can improve the soil and make educated choices in field preparations. Whether or not you plant an interseed, just knowing more about the soil in each field will assist the farmer in making more educated choices on how to plant, maintain and build his soil for the future.

On final assessment of this project; the grass portion of this field is approximately 50% covered in grasses, the legumes approximately 30%. This is a lower ratio that what we were hoping for. Even so, what area is now seeded, is well established and will provide better cover for the soil when spring flooding occurs than the ryegrass section of control that was seeded down after harvest. The soil is crusted over and lack of disturbance alone with help combat the effects of erosion and what is now established will also provide valuable biomass in the spring. A re-evaluation in the spring, after the effects of winter, would be ideal to determine visually and perhaps physically with the Soil Quality Test kits series of tests, if the soil did indeed fare better with the interseed trial or without.

**10: Adoption**

Steve Stocking is unsure if he will continue this project on this soil. He does like the results, especially the corn yield, but would have liked a better established interseed crop on this soil. This project was not entirely successful in the aspect of how well we have protected the land for the upcoming winter. It was successful in that we learned some of what will work and not work on this soil and the farmer now has a list of test results and how to interpret them to help him make more educated decisions for next year's crop on this field.

**11: Outreach**

This SARE project was part of a Soil Dynamics study done at Union Institute & University in Montpelier, Vermont. An oral, as well as a written demonstration was done at the college on Saturday, October 30th before faculty mentor, Martha VanderWolk, PhD., and the following students: Mary Elizabeth Sisson, Newport, VT; Robin Peel, NYC, NY; Francis Fischer, Albany, VT; Matt Larson, Moscow, VT; Mariah Keagy, Jerico, VT; Candace Jeffries, Worcester, MA. Based on the efforts put forth in this

project, fifteen college credits was awarded to the researcher, Juanita Facteau, in the area of soil science & science.

Students from Hartland Elementary School in Hartland, Vermont helped with soil testing, small test plot interseeding and soil quality tests. Students from Clonlara HBEP program also assisted in soil work and multiple crop walks.

Final field analysis was performed by Paul Salon, USDA/NRCS, attended by Steve Stocking, Juanita Facteau and Cody Facteau.

Lucas Clover, Meteorology Major from Lyndon State College assisted with corn yield analysis and soil quality test analysis.

A field day was initially proposed for this project, in an effort to give local farmers the option to review an established interseed during the growth process. Ideal time for this would have been mid-June to early July, as the corn would not have been too tall to restrict observation and the interseed would hypothetically be visible and established. Since our interseed was not visible at this optimum time, the field day idea was canceled. Instead, a story based on this project, will be submitted to Farming Magazine and/or others for publication, with digital pictures.

Project summary in its entirety, hard copy binder bound, will be sent out to the following: SARE, Steve Stocking, Willie Gibson, Paul Salon, Kevin Kaija and Union Institute & University. It will contain project analysis, crop info, data collection info, cost sheets, pictures and soil quality test results.

## 12. Conclusion

Interseeding ***is*** a viable crop alternative that ***does*** work. Interseeding was an established field process before the age of tractors and high-tech equipment and it proved successful in not only preventing excessive weed growth but it worked as a soil-builder by building bulk matter in the soil and providing erosion control as well. Modernizing this concept has proven to be the problem. How do you make it work and make it convenient has been the challenge. According to research done by Paul Salon, Plant Materials Specialist, USDA-NRCS, Syracuse, NY, this concept does work as his test plots at Empire Farm Days have proven. We would like to see ***how*** we can make it work for this farmer and others in Vermont.

For more info on interseeding and if it would work for you, contact Paul Salon at: USDA-NRCS, 441 S. Salina St., Suite 354, Syracuse, NY 13202. (315) 477-6535, paul.salon@ny.usda.gov

For more info on this project, contact: Steve Stocking, Birch Meadow Farm, 143 Birch Meadow Rd., Fairlee, VT 05045. (802) 333-4840.

For more info on project specifics or soil quality testing, contact: Juanita Facteau, 57 Jamies Ln., Hartland, VT 05048. (802) 436-2342, or at: bennyfacteau@aol.com