Northern NY Agricultural Development Program
2024 Project Report

Field Crop Performance Network Development Pilot Project

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Collaborator(s):
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Cooperating Producers:
- Mark Karelus Farm, Lowville, NY, Lewis County (soybean)
- Silvery Falls Farm (Farney), Lowville, NY, Lewis County (corn, alfalfa)
- Willsboro Research Farm, Willsboro, NY, Essex County (soybean, corn, alfalfa)

Background:
Recent work with the NY/VT Corn Silage Hybrid Evaluation Program has consistently demonstrated the value to dairy and crop producers of monitoring, interpreting, and sharing the annual performance data (yield and forage quality) in the context of the weather conditions the crop experienced, in addition to hybrid-specific information which was traditionally the focus of field trials.

Program results have shown the strong influence of growing environment on key corn silage forage quality parameters, such as fiber digestibility and starch content. Furthermore, greater differences in crop performance (of many types of field crops) are often seen across locations as influenced by each location's growing environment and conditions compared to trials of several different varieties at a single location.

For these reasons, this proof-of-concept project was designed as a pilot test to evaluate the value in collecting crop performance data from a small number of different crop varieties across a greater number of locations. In other words, instead of testing 30 varieties at one location, we proposed testing 3 varieties at multiple locations. As a pilot project to test this approach field locations were established with three major crops grown in New York: corn, soybeans, and alfalfa.

Methods:

Plots were established for each crop under evaluation at two field locations in Northern New York (NNY). Two farms in central Lewis County (western NNY) hosted the project with Karelus Farm hosting the soybean trial and Silvery Falls Farm hosting both corn and alfalfa trial plots. The Cornell Willsboro Research Farm in eastern NNY hosted trials of corn, soybean, and alfalfa.

Figure 1: Crop research plots at the Willsboro Research Farm; photo: Joe Lawrence.

Two hybrids of corn, two soybean varieties, and two alfalfa varieties (Table 1) were selected and planted at the trial locations. This allowed for comparison of the same crop genetics across the two growing environment locations.

Table 1: Crop Varieties: Corn Hybrids, Field Crop Performance Network Development Pilot Project. NNYADP, 2024.

Crop	Variety	Relative Maturity / Group #	Traits
Corn	A	93	Smartstax RIB
	B	98	Smartstax RIB
Alfalfa	A	-	RR
	B	-	RR, LH
Soybean	A	1.1	Enlist E3
	B	1.6	Enlist E3

RR = Roundup Ready, LH = Potato Leafhopper-Resistant

Background field information (soil type, soil fertility, crop rotation, etc.) was collected for each location (Table 2).

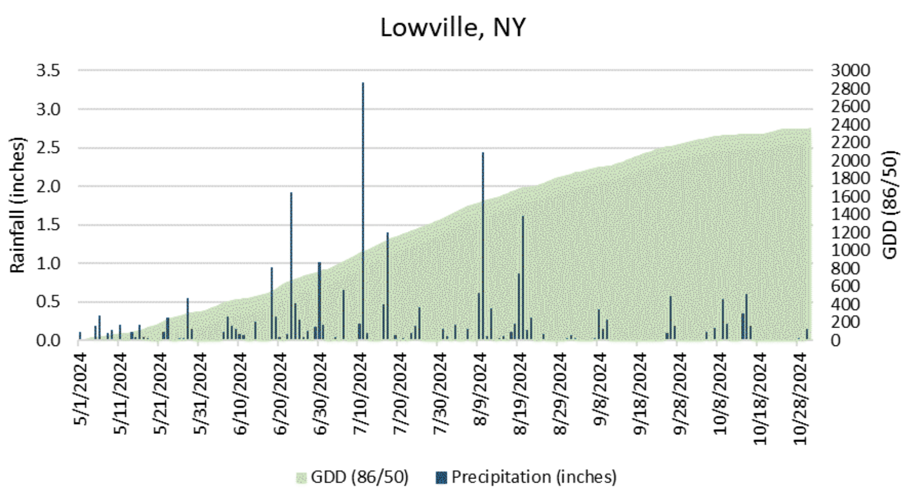
Table 2: Field Information for Trial Locations, Field Crop Performance Network Development Pilot Project. NNYADP, 2024.

Location	Crop	Soil Type	Planting Date	Harvest Date
Lowville (Silvery Falls)	Corn	Kars	05/04	09/15
Lowville (Silvery Falls)	Alfalfa	Mohawk	05/03	07/01 (1st), 07/27 (2nd)
Lowville (Karelus)	Soybean	Galway	05/10	10/04
Willsboro	Corn	Stafford	05/07	08/29 (silage), 10/11 (grain)
Willsboro	Alfalfa	Stafford	05/03	09/24
Willsboro	Soybean	Stafford	05/07	10/23

Plots were established in the spring of 2024 as the weather permitted with the selected varieties planted in blocks (Figure 2). Proper agronomic practices (planting, pest management, plant nutrition) were utilized to maintain crops throughout the season.

Figure 2: Example of how plots are integrated into the host farms fields, Field Crop Performance Network Development Pilot Project. NNYADP, 2024.

Weather data was collected utilizing on-site observations and the Cornell Northeast Climate Center's gridded weather data (Figure 3, Table 3). Season-long, in-person scouting of the trial locations was performed to monitor crop stage, crop performance, and potential impacting events, such as pest outbreaks.



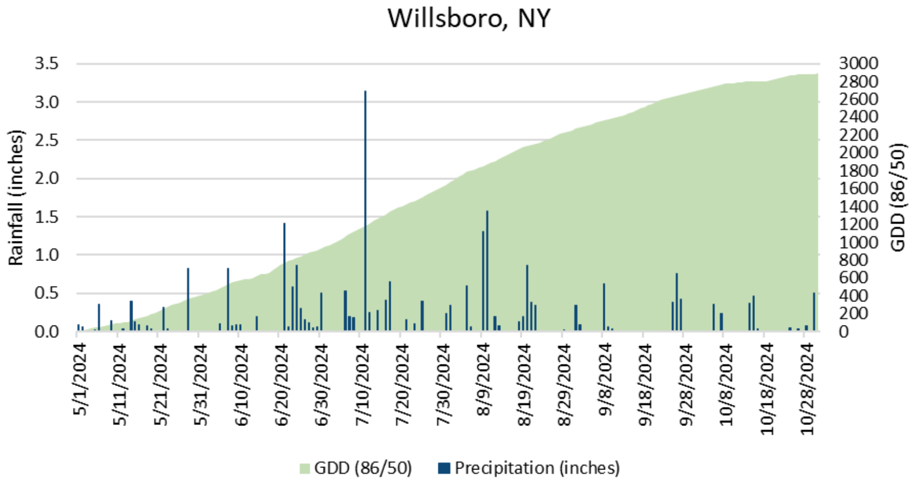


Figure 3: Precipitation and Growing Degree Days for Trial Locations, Field Crop Performance Network Development Pilot Project. NNYADP, 2024.

While the Lowville locations experienced higher rainfall totals than Willsboro, both locations experienced above average rainfall (Table 3). Furthermore, Lowville received intensive rainfall resulting in significant flash flooding in mid-July that inflated rainfall totals for the season; however, this rainfall ran off so quickly it was not likely meaningful to the crop.

Table 3: Monthly Precipitation and GDDs for Trial Locations, Field Crop Performance Network Development Pilot Project. NNYADP, 2024.

	Precipitation in Inches		Growing Degree Days (86/50)	
Month	**Lowville**	**Willsboro**	**Lowville**	**Willsboro**
May	2.58	2.62	330	398
June	6.51	5.51	443	531
July	7.33	6.54	595	719
August	7.29	6.1	474	604
September	1.77	2.72	369	435
Total	25.5	23.5	2210	2686

Harvest of each crop occurred near the target growth stage with replicated sampling. Forage samples were submitted to Cumberland Valley Analytical Servies for forage quality testing.

The Cornell Net Carbohydrate and Protein (CNCPS) model was utilized to develop balanced lactating cow diets utilizing the evaluation of the forages harvested at each location.

Results:

This pilot project demonstrates the impacts of growing environment on plant performance and forage quality parameters. See Tables 4 and 7 on later pages for “Corn Silage Yield and Key Nutritional Parameters” data and “Alfalfa Yield and Key Nutritional Parameters” data respectively.

Corn Silage Performance

Consistent with documented trends, overall growing environment influenced how corn hybrids utilized the available growing degree days (GDDs). Willsboro experienced a higher rate of GDD accumulation (Table 5) resulting in 176 more GDDs in 14 fewer calendar days (planting to harvest). Resulting whole plant dry matter (DM) of corn silage at harvest varied by location and hybrid relative maturity (Table 4); however, the crop reached similar DMs despite this variation in GDDs and days from planting to harvest for each location.

This information highlights the opportunity to utilize GDD accumulation as a tool to estimate harvest timing while also recognizing the need to validate plant progress with DM testing before final harvest decisions are made.

Table 5: Corn Silage Growing Environment Data for Trial Locations, Field Crop Performance Network Development Pilot Project. NNYADP, 2024.

Location	Planting Date	Harvest Date	Rainfall, inches Plant to Harvest	GDD (86/50) Plant to Harvest	Calendar Days Plant to Harvest
Lowville	May 4	Aug. 29	24.5	1984	131
Willsboro	May 7	Sept. 15	20.2	2160	117

Fiber digestibility is influenced by rainfall, with a trend toward lower fiber digestibility with higher rainfall. See Table 4 for impact of the above-average rainfall at both trial locations on the key forage quality metric of corn silage yield (Table 4).

The Lowville trial area received higher than average rainfall and when reviewing the 30-hour NDF (neutral detergent fiber) digestibility values, the location results followed the expected trend with lower digestibility values compared to the Willsboro trial (*p*-value: 0.0170). However, the Lowville location also reported lower aNDFom (amylase NDF organic matter), (*p*-value: <0.0001) and the combination of these two factors resulted in a smaller pool of undigestible fiber, reported as uNDF240om, (*p*-value: 0.002) which is counter to the anticipated trend. The intense rainfall inflating seasonal totals at Lowville as noted earlier likely partially explains this interesting pattern in the data. **This data combination highlights the value of this level of analysis in understanding how the forage will perform in a dairy diet.** One measured value of fiber or fiber digestibility only explains part of how a forage will perform in the dairy cow diet; multiple measurements allow for much more precise understanding of how the feed may be utilized by the cow.

Starch content data followed expected trends as it relates to crop maturity with a positive relationship between DM and higher starch content (Table 4). Similarly, the negative relationship between DM and lower in-vitro digestibility followed expected patterns. Following accepted laboratory procedures for determining the digestibility of starch the starch was ground to a size of 4 millimeters and incubated in rumen fluid for 7 hours.

Corn Silage Harvest Height

This project provided the opportunity to respond to in-season scenarios and questions by farm collaborators. Due to the high rainfall patterns and expectation of strong yields resulting from good overall growing conditions, the question of optimal corn silage cutting height under the 2024 environmental conditions was brought forward. The Lowville trial location offered a chance to evaluate this with additional sampling at harvest.

Plots were harvested with corresponding forage quality samples collected at the standard 8-inch cutting height for comparison across both locations (Lowville and Willsboro), as reported in Table 4. Additionally, plots were re-sampled at a cutting height of 20 inches. The resulting differences in forage yield and quality are reported in Table 6. Results were in line with existing data on the topic, where the higher cutting height led to a decline in overall yield; however, results showed a trend toward improvements in starch content and fiber digestibility. **These findings highlight the opportunity to utilize knowledge on the influence of growing season factors on forage quality to make strategic harvest decisions; for example by reinforcing the use of cutting height as a management tactic for balancing forage yield and quality needs for an optimal dairy cow diet and milk production.**

Alfalfa Performance

For this trial with seeding-year alfalfa, harvest management was based on farm practices with the goal of successful establishment, including weed control and positioning the crop for winter survival. The alfalfa at Lowville was harvested twice following the host farm's harvest schedule. Alfalfa establishment at Willsboro was slower and the first harvest was not sampled for forage quality due to weed pressure. A second cut taken later in the season was analyzed for yield and key nutritional parameters: aNDFom, crude protein, NDFd 30 hr, uNDF240om, and relative feed quality (Table 7).

The Lowville location experienced low levels of Potato Leafhopper (PLH) pressure. The presence of one PLH-susceptible variety (A) and one PLH-resistant variety in the trial plots provided an opportunity to compare performance as PLH is known to lower yield and crude protein content. The susceptible variety showed a trend toward lower crude protein content, though it was not statistically significant (Table 7).

Forage Nutritional Value by Location and Influences on Dairy Rations

Utilizing the corn silage and alfalfa silage nutrient analysis from each location allowed the opportunity to build dairy diets with the trial-harvested forages to evaluate the influence of each forage on the diet ingredient usage and efficiency.

Utilizing the Cornell Net Carbohydrate and Protein System (CNCPS, NDF v6.5) a base diet was established for a 1,600-pound Holstein cow with the goal of 97 pounds of milk production with 4.25% fat and 3.20% protein content. The corn silage and alfalfa from the base diet were then removed and the corresponding forages from each location were then substituted into the trial diet to evaluate how the change in forages impacted the predicted cow performance from the diet.

The impact of the trial-formulated diet based on allowable metabolizable protein (MP) and metabolizable energy (ME) in the milk compared to the base diet was evaluated. The higher overall nutritional value with the Lowville trial resulted in an increase in predicted milk over the base diet, while the diet formulated utilizing forages from Willsboro resulted in a decrease in predicted milk production compared to the base diet (Table 8).

The diets were reformulated (rebalanced) by adjusting the amount of the trial forages and other ingredients included to better meet the nutrient needs of the cow to achieve the milk production goal (Table 9). The quantity of corn silage and alfalfa at Willsboro had a notable impact on the amount of forage the Willsboro trial diet was able to include as well as the resulting milk production (Table 9). The diets were 64.6% and 52.8% forage for Lowville and Willsboro, respectively.

This project calculated on-farm feed and purchased feed costs economics (Table 9). Milk production was 8.6 pounds per cow lower at Willsboro than at Lowville. Diet adjustments to achieve equivalent milk production to that at Lowville would negatively impact feed

Field Crop Performance Network Development Pilot Project 2024 Project Report Tables 4, 6, 7

Table 4: Corn Silage Yield and Key Nutritional Parameters for Trial Locations, Field Crop Performance Network Project.

Location	Harvest Date	Hybrid Relative Maturity	Dry Matter, %	Yield Estimate tons/acre, 35% DM	aNDFom, %	Crude Protein, %	NDFd 30 hr, % NDFom	uNDF240om, % DM	Starch Content, %	InVitro Starch Digestibility 7 hr, 4 mm
Lowville	Sept. 15	A / 93	38.4	20.1	34.7	7.3	52.9	9.6	41.8	56.8
		B / 98	31.8	22.1	35.5	7.1	51.9	10.8	37.8	65.1
Willsboro	Aug. 29	A / 93	35.4	24.6	40.1	6.9	56.8	13.8	36.6	68.1
		B / 98	31.0	28.0	41.5	6.3	54.6	14.9	33.6	69.1

Table 6: Corn Silage Cutting Height Comparison at Lowville, Field Crop Performance Network Development Pilot Project. NNYADP, 2024.

Location	Hybrid Relative Maturity	Chop Height, inches	Dry Matter, %	Yield Estimate tons/acre, 35% DM	aNDFom, %	Crude Protein, %	NDFd 30 hr, % NDFom	uNDF240om, % DM	Starch Content, %	In-vitro Starch Digestibility 7 hr, 4 mm
Lowville	A / 93	8	38.4	20.1	34.7	7.3	52.9	9.6	41.8	56.8
		20	41.4	22.2	32.7	7.3	56.0	8.5	43.6	56.4
Lowville	B / 98	8	31.8	22.1	35.5	7.1	51.9	10.8	37.8	65.1
		20	34.6	27.1	33.7	7.2	53.5	9.6	40.5	61.7
p-value			*0.2125*	*0.0847*	*0.0756*	*0.4572*	*0.0305*	*0.1411*	*0.1728*	*0.5594*

* *Interactions between hybrid and cut height were not significant.*

Table 7: Alfalfa Yield and Key Nutritional Parameters for Trial Locations, Field Crop Performance Network Development Pilot Project. NNYADP, 2024.

Location	Harvest Date	Cuttting	Variety	Yield Estimate tons/acre, DM	aNDFom, %	Crude Protein, %	NDFd 30 hr, % NDFom	uNDF240om, % DM	Relative Feed Quality (RFQ)
Lowville	July 1	1st	A	1.4	29.6	16.4	49.2	12.9	215.0
			B	1.5	31.2	18.1	48.6	13.7	204.7
Lowville	July 27	2nd	A	1.0	30.4	19.1	49.8	13.4	212.0
			B	0.8	30.5	21.3	49.7	13.3	221.3
Willsboro	Sept. 24	2nd	A	0.43	27.8	24.4	41.7	14.7	233.3
			B	0.41	32.3	24.4	39.4	17.0	184.7

Table 8: Change in Predicted Milk Production with Trial Forages Versus Base Diet, Field Crop Performance Network Development Pilot Project. NNYADP, 2024.

Change in milk production: Forage change only, no adjustment to other diet ingredients		Lowville	Willsboro
	MP allowable milk, lbs	+2.5	-2.9
	ME allowable milk, lbs	+3.9	-3.4

Key: MP: metabolizable protein; ME: metabolizable energy

and overall milk production efficiency at Willsboro. Even with the diet optimization Willsboro had a greater total feed cost per cow per day and per pound of milk produced compared to Lowville. As a result of the diet optimization, differences in purchased feed cost were minimal between the two locations. This project's comparison of these two locations highlights the importance of rebalancing the dairy diet to optimize the value of the farm-grown forages.

Table 9: Comparison of Diets Reformulated for 97 Lbs. of Milk Based on Corn Silage and Alfalfa Silage Content Values for Trial Locations with Total Feed, Field Crop Performance Network Development Pilot Project. NNYADP, 2024.

Ingredient	Pounds Dry Matter		
	Lowville	Willsboro	Difference
Corn Silage	30.2	27.8	2.4
Alfalfa Silage	8.6	4.0	4.6
Corn Grain Ground Fine	2.9	5.7	-2.8
Canola Meal Solvent	3.4	1.0	2.4
Soybean Hulls Ground	2.2	2.2	0.0
High Moisture Corn	3.9	8.9	-5.1
Soy Plus	2.5	4.5	-2.0
Soybean Meal 47.5 Solvent	3.7	1.5	2.2
Molasses Cane	0.2	0.8	-0.6
Nurisol	0.6	1.1	-0.5
MinVit	1.1	1.1	0.0
Urea 281 CP	0.1	0.6	-0.6
Smartamine M	0.0	0.0	0.0
Sodium Bicarbonate	0.6	0.8	-0.2
Salt White	0.1	0.1	0.0
Totals	60.0	60.1	
Forage in Diet, %	64.6	52.8	11.8
Milk Production, lbs/cow	97.0	88.4	8.6
Total Feed			
Cost/head/day, $	4.778	5.632	-0.854
Cost/lb DM, $	0.388	0.454	-0.066
Cost/ lb milk, $	0.24	0.282	-0.042
Purchased Feed			
Cost/head/day, $	1.031	1.006	0.025
Cost/lb DM, $	0.084	0.082	0.002
Cost/ lb milk, $	0.051	0.051	0.000

Soybean and Corn Grain Performance
The relatively good growing conditions and small differences in the growing season conditions provided for relatively good performance at both locations for soybeans (Table 10). A harvesting issue allowed corn grain performance at only one location. (Table 11).

Table 10: Soybean Performance Data, Field Crop Performance Network Pilot Project.

Location	Harvest Date	Variety / Group #	Moisture at Harvest, %	Test weight (lbs/bu)	Yield Estimate (bu/a, 13%)
Lowville	Oct. 4	A / 1.1	11.1	57	58.1
		B / 1.6	11.0	55	66.4
Willsboro	Oct. 23	A / 1.1	12.5	-	43.2
		B / 1.6	12.1	-	47.7

Table 11: Corn Grain Performance Data, Field Crop Performance Network Pilot Project.

Location	Harvest Date	Relative Maturity	Moisture at Harvest, %	Test weight (lbs/bu)	Yield Estimate (bu/a, 13%)
Willsboro	Oct. 11	A / 93	20	52	266.5
		B / 98	27	53	292.0

**Grain harvest did not occur at Lowville location due to miscommunication with custom harvester.*

Conclusions/Outcomes/Impacts:

The 2024 growing season facilitated the creation of a template to deliver data to contrast the impact of growing environment on crop performance and the practical implications of that impact on forage quality and composition, dairy diet formulation, and associated costs for dairy farmers utilizing forages.

The results of this pilot project have achieved significant milestones:

- showing proof-of-concept and potential for cost effectiveness of conducting distributed field plots to characterize crop performance by growing environment to obtain benchmarking data for farms to compare their forage production to plot locations with similar growing environments.
- establishing a potential framework for a new method for better understanding when the value of forage to a dairy diet is constrained by the growing environment or by management of the forage. This understanding can help determine whether it is most impactful to allocate resources to improving forage management strategies (e.g., when a farm's forage quality does not align with forage results/benchmarks from similar growing conditions) or to adjusting dairy diet management (e.g., when the growing environment is shown to be the constraint in forage value);
- establishing a framework for developing a comprehensive system for evaluating crop performance in terms of growing environment factors, such as rainfall, along with forage quality, forage impact on dairy ration formulation (and when adjustments are needed), impact on farm-grown and purchased feed costs, and ultimately farm economics

- as above, creating a framework that could be expanded to dovetail with existing and ongoing NNYADP–funded research that would incorporate such factors as corn silage variety trial histories, soil health, tile drainage, nutrient balancing, manure value and other agronomy practices and factors into evaluations when growing environment differences indicate the need for attention.

Outreach:

Project results were presented at:

- Willsboro Farm Field Day, July 10, 2024;
- Penn State Corn Silage Trial Collaborators Meeting, January 21, 2025; and
- South Central NY Cornell Cooperative Extension Winter Crop meetings, January 23- 24, 2025.
- Extension article in development for NNY CCE newsletters.

Next Steps:

With the success of this pilot project, additional funds were secured from the NY Corn Growers Association. This, in addition to 2025 support from NNYADP, establishes a path to move this project out of the pilot phase to a sustaining project that can provide timely and practical annual information to dairy producers and field crop growers.

Thanks to the support of the Northern New York Agricultural Development Program in initiating this pilot effort, the project has secured additional funding from the NY Corn Growers Association and other sources to expand to at least 10 locations (including those established through this project in NNY) for the 2025 growing season. This expansion will further the goal of contrasting different growing environments and setting a solid foundation for applying this approach to deliver timely and practical data to forage growers and dairy and livestock farmers in NNY and across New York State. A collaborator with the University of Vermont is expected to participate with this effort as well and is a partner in the NY/VT Corn Silage Hybrid Evaluation Program.

Acknowledgments:

The Northern New York Agricultural Development Program provided financial support for this project and has a record of supporting innovative projects that have proven successful not only for its own region's agriculture industry but for the farming community statewide. Special Thank You's go to Mike Davis at the Willsboro Research Farm, Mark Karelus of Karelus Farm, and Dallen and Cody Farney of Silvery Falls Farm for hosting field locations and supporting field operations.

For More Information:

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Northern NY Agricultural Development Program
Field Crop Performance Network Development Pilot Project
2024 Project Report APPENDIX

Appendix A: Supplemental Report Contrasting All 2024 Trial Locations
Separate funding was utilized to implement trials at additional locations elsewhere in New York State for this pilot project. Growing season data was collected for each location (Tables 1A, 2A, 3A). All locations experienced above-average precipitation; however, there was an 8-inch range from highest to lowest.

Table 1A: Field Information: NNY and Other Trial Locations

Location	Crop	Soil Type	Planting Date	Harvest Date
Lowville, NY	Corn	Kars	05/04	09/15
Lowville, NY	Alfalfa	Mohawk	05/03	07/01 (1st), 07/27 (2nd)
Willsboro, NY	Corn	Stafford	05/07	08/29 (silage), 10/11 (grain)
Willsboro, NY	Alfalfa	Stafford	05/03	09/24
Morrisville, NY	Corn	Palmyra	05/24	09/10
Morrisville, NY	Alfalfa	Lansing	04/26	08/15
Alburgh, VT	Corn	Benson	05/07	09/24
Alburgh, VT	Alfalfa	Benson	04/26	07/22 (1st), 08/26 (2nd)

Table 2A: Monthly Precipitation Data (inches): NNY and Other Trial Locations

Month	Lowville	Willsboro	Morrisville	Alburgh
May	2.58	2.62	4.07	2.71
June	6.51	5.51	4.65	6.89
July	7.33	6.54	3.12	6.65
August	7.29	6.1	6.92	9.6
September	1.77	2.72	2.16	3.02
Total	25.5	23.5	20.9	28.9

Table 3A: Monthly Growing Degree Day data (GDD, 86/50)

Month	Lowville	Willsboro	Morrisville	Alburgh
May	330	398	349	378
June	443	531	496	513
July	595	719	660	668
August	474	604	535	567
September	369	435	400	406
Total	2210	2686	2439	2531

The same procedures were utilized to analyze forage quality for diet formulation and milk production efficiency (Table 4A). When diets were optimized for location-specific forages there was a 3.3 pound difference in the amount of corn silage used and a 7.3 pound difference in the amount of alfalfa silage used reflecting the impact of fiber and overall nutrient digestibility in limiting the predicted dry matter intake by the cow.

Table 4A: Comparison of Diets Reformulated for Optimization of Forage Quality and Milk Production Efficiency Based on Corn Silage and Alfalfa Silage Nutritive Value by Location: NNY and Other Trial Locations

Ingredients	**Pounds Dry Matter per cow per day**						
	Lowville	**Willsboro**	**Alburgh**	**Morrisville**	**Min**	**Max**	**Range**
Corn Silage	30.2	27.8	30.6	27.3	27.3	30.6	3.3
Alfalfa Silage	8.6	4.0	7.5	11.3	4.0	11.3	7.3
Corn Grain Ground Fine	2.9	5.7	5.1	1.3	1.3	5.7	4.5
Canola Meal Solvent	3.4	1.0	0.0	3.7	0.0	3.7	3.7
Soybean Hulls Ground	2.2	2.2	2.0	0.7	0.7	2.2	1.6
High Moisture Corn	3.9	8.9	5.1	5.9	3.9	8.9	5.1
Soy Plus	2.5	4.5	2.8	3.2	2.5	4.5	2.0
Soybean Meal 47.5 Solvent	3.7	1.5	4.1	1.7	1.5	4.1	2.6
Molasses Cane	0.2	0.8	0.0	2.0	0.0	2.0	2.0
Nurisol	0.6	1.1	0.6	0.7	0.6	1.1	0.5
MinVit	1.1	1.1	1.1	1.1	1.1	1.1	0.0
Urea 281 CP	0.1	0.6	0.0	0.0	0.0	0.6	0.6
Smartamine M	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sodium Bicarbonate	0.6	0.8	0.6	0.6	0.6	0.8	0.2
Salt White	0.1	0.1	0.1	0.1	0.1	0.1	0.0
Totals	60.0	60.1	59.7	59.6	59.6	60.1	0.6
Forage in Diet, %	64.6	52.8	64.0	64.8	52.8	64.8	12.0
Milk Production, lbs/cow	97.0	88.4	97.0	97.0	88.4	97.0	8.6
Total feed							
Cost/head/day, $	4.778	5.632	4.823	4.982	4.778	5.632	0.854
Cost/lb DM, $	0.388	0.454	0.392	0.406	0.388	0.454	0.066
Cost/ lb milk, $	0.240	0.282	0.243	0.249	0.240	0.282	0.042
Purchased feed							
Cost/head/day, $	1.031	1.006	1.387	1.133	1.006	1.387	0.381
Cost/lb DM, $	0.084	0.082	0.112	0.093	0.082	0.112	0.030
Cost/ lb milk, $	0.051	0.051	0.071	0.057	0.051	0.071	0.020