

FINAL REPORT

1. Project Name and Contact Information

Project Name: Low Spray Disease Resistant Apple Variety Evaluations

Project FNE07-614

Louis Lego
Elderberry Pond, LLC
3728 Center Street Road
Auburn, NY 13021

Phone 315-252-3977
lou@elderberrypond.com

2.Goals:

1. Compare 10 apple varieties in each of three seasons (Early, Mid –Season, and Late Season for the following uses:

1. Eating “out of hand”
2. Baking
3. Juicing
4. Fresh Slice
5. Drying

The apples evaluated in each season were to be selected from three general classes of apples grown on our farm. These are:

Heirloom varieties grown in the Northeast in the early 1900’s

Commercial varieties now widely grown and marketed in the region

Newly released disease resistant apple varieties

It was hoped that some of the new disease resistant apple varieties that have never been evaluated for all of these uses would make a good showing and that this might eventually lead to more widespread planting of these varieties. We were also interested to determine how the newer varieties would stack up to the classic apple varieties from the turn of the century that are considered by some to be unsurpassed in eating and particularly baking.

3. Farm Profile

Elderberry Pond is a 100 Acre Certified Organic Farm located in the Finger Lakes Region of Upstate New York. We produce a wide variety of fruits, vegetables and pasture raised meats. My wife Merby, and my son Christopher and I operate the business on a full time basis.



In 1998 we received a SARE grant to evaluate alternate growing and pest management techniques for organic and low spray IPM apple orchards. The grant enabled us and other Northeast farmers to reduce pesticide and fungicide use. One result of this effort was to convince us of the value of disease resistant apple varieties in reducing sprays. What has amazed us since this 1998 effort is that the quality of newly released disease resistant varieties has steadily improved to where they are now among our best selling apples!

Our focus at Elderberry Pond for the past twenty seven years has been to introduce customers to the best tasting fruits, vegetables and pasture raised meats available. We have done this through our country food store, through a CSA, and farmer's markets, and most recently through "The Restaurant at Elderberry Pond." In all of our market venues we emphasize the important role that varieties, or breed play in the quality of our offerings. Our restaurant menu includes the variety of potatoes, fruits and vegetables that are used by the chefs. For example right now we are serving a baked apple nest desert prepared with Caville Blanc d' Hiver, one of the best baking apples grown.

It is this focus on produce quality that made this project of interest to us. We felt that our farm and restaurant would be well suited to the effort. As mentioned earlier we grow many of the new disease free apple varieties. We also grow most of apple varieties that are currently commercially available. We also grow heirloom apple varieties, which in some cases set the standard for excellence.

We have on our staff chefs and bakers with degrees from the Culinary Institute of America and Paul Smith's Culinary School. With their expertise and our modern commercial kitchen we will be able to credibly evaluate the qualities of these apples. We also have a large apple tasting room adjacent to our country food store where we provide our customers (over 15,000 each year) the opportunity to taste and compare our many apple varieties.

4. Participants

Our Technical Advisor, Brian Caldwell, is considered to be one of the leading experts in the sustainable production of apples. Brian is an organic apple grower, a past research educator with NOFA, NY and is currently a project manager at the Cornell University Research Farm in Freeville, NY. Brian advised us on the selection of varieties to evaluate and on the comparative disease resistance of apple varieties.

We also participate in a small group of Northeast organic and sustainable apple growers that communicate regularly and meet annually in the Berkshires to discuss sustainable apple growing methods, and apple varieties. This group includes Michael Phillips, author of "The Apple Grower, A Guide for Organic Orchardist", as well as John Bunker from FEDCO Trees, and Bill MacKentley of St. Lawrence Nurseries, both leading sources of new and heirloom disease resistant apple varieties. One of our favorite topics is the qualities of new vs. old apple varieties. This group will be a valuable resource for our work on this project.

We have also worked in the past with apple breeders and entomologists from the Agriculture Experimental Station at Geneva. We had discussions and a review meeting with Dr. Olga Padilla-Zakour and some of her staff at the Geneva Food Venture Center prior to beginning the project. We reviewed our plan for evaluating the apples with them and took away many suggested improvements in our evaluation plan.

Our restaurant staff including our Pastry Chef Pam Reeves, Executive Chef, Chris Lego and our Chef de Cuisine, Bekah Ropel also took part in the project.

5. Project Activities

A. Apple Characterization

All of the apples tested were characterized immediately after picking. Some apples were retested after 6 weeks in storage. The apples were all tested at 40 degrees F. The firmness was measured with a Wagner Instruments FT327 fruit pressure tester, the brix with an Atago ATC-1E refractometer, and the pH with a Hanna Instruments EC-TDS temperature corrected pH meter.

B. Apple Tastings

Four formal apple tastings were held and during the months of September, October and November informal tastings were held each Saturday in the barn tasting room. The apple varieties were arranged and cards were available for the participants to fill out. The results of the tastings are shown in the next section.



C. Apple Pie Baking

A total of about 40 pies were baked. The first 6 were to get a standard recipe set. Normally our pies are made with several varieties of apples in each pie, and the sweetness is adjusted to taste for the apples used. For this evaluation we decided to use the exact same recipe for each pie. This allowed us to evaluate the quality of each apple variety in terms of the slice firmness, the taste, and the consistency of the filling. In the actual evaluation we rated 34 apples. The results are presented in the next section.



D. Apples for Juicing

All of the apples were juiced with a Breville 800 professional juicer. In each case three pounds of apples were juiced. The pH, and Brix were measured and the color of the juice was noted. The results are presented in the next section.



E. Apples for Drying

The 37 apple varieties were cored and sliced and spread out on drying racks. They were then dried using an Excalibur electric food dehydrator.



Color, texture and taste were evaluated by farm and restaurant staff. The results are presented in the next section

F. Apples for Fresh Slice

The apples that were evaluated for drying qualities were also tested for use in fresh slice. Taste, color stability, and texture were evaluated. The apples were exposed to air for 1 hour and measured at 20 minute intervals for color degradation. No dips or other additives were used for color preservation.



G. Overall Apple Ratings

The final part of this effort was to use the results of these evaluations as well as previous data on storage qualities and general tree characteristics to recommend what we believe are the twelve “best” overall varieties for small farm plantings.

6. RESULTS

In this section the results of each of the project activities are presented along with some interesting observations made during the project.

A. General Characterization

The tables on the next page show the results of the apple general characterization. As mentioned, we tested about 40 percent more apple varieties that we had planned when we proposed the project. This was because it was an unusually good year and we thought the additional data would be worthwhile for not much more effort. There were some apple varieties that did not bear this year and could not be found locally. This was regrettable, since some of them were ones that we thought might do well in the evaluations. The apples that we did not have to evaluate were: York, Bramley's, Cox's Orange, Gravenstein, Baldwin, Rome Beauty. and Grimes Golden.

GENERAL CHARACTERISTICS OF APPLES SELECTED

DISEASE RESISTANT VARIETIES

	GENERAL CHARACTERISTICS							TREE NOTES
	DATE	SIZE	COLOR	TEXTURE	FIRM	BRIX	ACIDITY	
	PICKED	DIA					PH	
LODI	4-Aug	3	YEL	SOFT	6.5	12.8	2.6	FAST GROWTH - MESSY SOMETIMES BI-ANNUAL
RED ASTRACHAN	6-Aug	2	RED	FIRM	9.5	15	2.7	FAST GROWTH- NICE FORM
DUCHESS	3-Aug	2.5	RED	SOFT	8.5	11	2.9	RELIABLE BEARER- NICE FORM
PRISTINE	15-Aug	3	YEL-RD	CRISP	8	11	3.6	MODERATE GROWTH RELIABLE NICE TREE- DR
WILLIAM'S PRIDE	20-Aug	3.4	RED	FIRM	5	12.5	3.6	NICE TREE GROWTH - RELIABLE FRUITING- DR
AKANE	26-Aug	2.5	RED	FIRM	10	11	3.1	NICE TREE- RELIABLE
GINGER GOLD	28-Aug	3.4	GOLD	CRISP	9	13	3	NICE TREE - RELIABLE-SCAB SUCEPTABLE
WOLF RIVER	28-Aug	4.2	RED	SOFT	9	8.5	2.9	DROOPY TREE- HARD TO MANAGE
SANSA	23-Aug	3.5	RED	CRISP	6.5	13.8	2.9	NICE STURDY TREE - EXC DR
RED FREE	26-Aug	2.9	RED	HARD	13	11	3.1	NICE TREE VERY RELIABLE- DISEASE RESISTANT
EMPRESS	25-Aug	2.4	RED	SOFT	5	12.5	3.2	VERY SHORT.PICKING TIME
SUMMER TREAT	24-Aug	3.6	RED	FIRM	8	10.5	3.1	BEAUTIFUL TREE- RELIABLE- BUT HARD TO FIND
MACOUN	23-Sep	4	RED	FIRM	21	10.5	3	GOOD TREE AND RELIABLE FRUITING
GOLDEN SUPREME	25-Sep	4	GOLD	FIRM	21	13.7	2.7	GOOD TREE BUT INCONSISTENT FRUIT
GALA	25-Sep	3	RED	FIRM	24	13	3.1	VERY RELIABLE GREAT TREEsSUPREME DR
20 OZ PIPPIN	24-Sep	4-5	RD-GRN	FIRM	22	12.2	2.8	A BIT DROOPY, BUT RELIABLE FRUIT
PINK PEARL	25-Sep	4	YEL	FIRM	19	9.8	2.6	CRAZY TREE - BEAUTIFUL FRUIT- RED FLESH
HONEYCRISP	25-Sep	4-5	RD-GN	CRISP				GOOD TREE, BUT DIFFICULT FRUITING
POUND SWEET	29-Sep	5	GREEN	SOFT	15	11.8	4	GOOD TREE EASY TO MANAGE
LIBERTY	29-Sep	3	RED	CRISP	23	11.5	3	GOOD TREE RELIABLE BEARING- DISEASE RESISTANT
FREEDOM	27-Sep	4	RED	FIRM	15	12.5	3.1	GOOD TREE RELIABLE BEARING - DISEASE RESISTANT

GENERAL CHARACTERISTICS OF APPLES SELECTED (CON'T)

DISEASE RESISTANT VARIETIES

	GENERAL CHARACTERISTICS							TREE NOTES
	DATE	SIZE	COLOR	TEXTURE	FIRM	BRIX	ACIDITY	
	PICKED	DIA					PH	
SMOKEHOUSE	1-Oct	3	RED	FIRM	21	14	3.1	DIFFICULT TO MANAGE - VERY DENSE GROWTH
MELROSE	2-Oct	4	RED	FIRM	19	11.3	3	EASY TO MANAGE- RELIABLE
FORTUNE	4-Oct	5	RED	FIRM	24	11.2	3	BRITTLE TREE AND LARGE FRUIT- SOME DR
JONAFREE		3	RED	FIRM	18	11	3	GREAT TREE- RELIABLE- DISEASE RESISTANT
EMPIRE	9-Oct	3	RED	FIRM	21	10.3	3	GREAT TREE- RELIABLE-
NORTHERN SPY	9-Oct	5	RD-GN	FIRM	25	14.9	2.7	GOOD TREE A BIT DROOPY - 6 YRS FOR FRUIT
CORTLAND	9-Oct	4-5	RD-GN	FIRM	22	12	3.2	GOOD TREE - NO OVERBEAR
ESOPUS SPITZENBERG	9-Oct	4	RED	FIRM	22	12	2.8	GREAT TREE- VERY RELIABLE
GOLDEN DELICIOUS	15-Oct	4-5	GOLD	FIRM	11	14	3.3	GOOD TREE - A BIT BRITTLE
McINTOSH	12-Oct	4	RED	FIRM	20	14	3.2	GOOD TREE- VERY DISEASE SUSCEPTABLE
CAVILLE BLANC	28-Oct	5	YEL-GN	FIRM	14	13	2.9	OK TREE- A BIT SPORADIC AND SHALLOW ROOTS
GOLDRUSH	30-Oct	4	GOLD	HARD	23	11	2.9	GOOD TREE- NEEDS THINNING
STAMEN WINESAP	3-Nov	4	RED	FIRM	18	15	3.1	GOOD TREE RELIABLE FRUIT
ASHMEADS	3-Nov	3-4"	TAN-RD	HARD	21	18	2.7	GOOD TREE RELIABLE FRUIT -DIS AND BUG RES
SUNCRISP	3-Nov	3"	YEL-RD	FIRM	15	11.5	13	A BIT BRITTLE- AND SOMETIMES BI-ANNUAL
ENTERPRISE	12-Nov	4-5"	RED	FIRM	18	12	3.2	BEAUTIFUL TREE VERY RELIABLE- BUG AND DIS RES
MUTSU (CRISPIN)	12-Nov	5"	GREEN	FIRM	10	12	2.9	GOOD TREE SOMETIMES BI-ANNUAL
SEEK NO FURTHER	12-Nov	4"	TAN-RD	FIRM	11	13.5	3.1	GOOD TREE - SOME BUG AND DIS RESISTANCE
GRANNY SMITH	15-Nov	3-4"	GREEN	FIRM	13.5	11.5	2.9	GOOD TREE - BUT SOMETIMES RIPENS TOO LATE
FUJI	15-Nov	3-4"	RED	FIRM	15	12	3.7	RELIABLE- SCAB RES, BRITTLE AND NEEDS THINNING
CAMEO	15-Nov	3-4"	RD-GN	FIRM	16	12	3	-RELIABLE- GET ORIGINAL GREEN VERSION POOR DR
GOLDEN RUSSETT	15-Nov	2-3"	TAN-RD	HARD	13	15	3.2	GREAT TREE VERY RELIABLE- TAKES 6 YRS

RESULTS (CON'T)

B. Apple Tastings for Eating Out of Hand Evaluation

The tastings were held during the growing season from the end of August until mid November. About 300 tasters were involved and each filled out cards ranking the apples at that particular tasting from Best to Worst of tasting. Each tasting had about twelve apple varieties and in some cases apples were repeated in more than one tasting. The results of the tastings are shown in the chart below.

Results of Apple Tastings

	AUGUST 25TH	SEPT 16TH	OCTOBER 13TH	NOV 3RD	NOV 16TH
1	PRISTINE	PRISTINE	GALA	GOLDEN DELICIOUS	HONEY CRISP
2	SANSA	SUMMER TREAT	PINK PEARL	SUNCRISP	ENTERPRISE
3	AKANE	GALA	LIBERTY	HONEYCRISP	CAMEO
4	GINGER GOLD	PINK PEARL	EMPIRE	LIBERTY	FUJI
5	WILLIAM'S PRIDE	RED FREE	JONAFREE	EMPIRE	GOLDRUSH
6	RED ASTRACHAN	MACOUN	FREEDOM	MCINTOSH	WINESAP
7	DUCHESS	EMPRESS	HONEYCRISP	MELROSE	LIBERTY
8	LODI	GINGER GOLD	MELROSE	WINTER BANANA	EMPIRE
9		AKANE	FREEDOM		
10		GOLDEN SUPREME	POUND SWEET		

APPLE TASTING RESULTS (CON'T)

Observations:

A couple interesting observations were made during the tastings.

In some cases the sweetest tasting apples had the lowest Brix or soluble sugar measurements. The most dramatic example of this was with *Pound Sweet*, perhaps the sweetest tasting apple we grow and *Granny Smith*, one of the most tart. The data is summarized below:

Example:	Brix	pH	Taste
Pound Sweet	11.8	4.0	Very Sweet
Granny Smith	11.5	2.9	Tart

The reason for the apparent discrepancy is a well known fact that the acidity of a fruit greatly impacts your perception of sweetness. I had heard of this but had no idea of how dramatic the impact can be. We repeated this test on many other apple varieties with the same result. Even a slightly lower acidity (or higher pH) makes the fruit taste much sweeter.

The second observation would be of no surprise to apple growers. The late season apples as a group have much more depth and flavor than early season varieties. There is however one important exception and that is ***Pristine***. This apple has many of the taste and storage characteristics of late apples, yet is one of the first varieties picked. It was judged best of group in both the August and September tastings and my guess is that it would have fared well in the October tasting if I had thought of including it.

The fact that Honeycrisp did much better in the November tasting than in the less demanding October tasting had something to do with the quirky nature of Honeycrisp. As they ripen, the apple (in some years) changes dramatically as the season progresses. This year in many of the Upstate NY orchards, Honeycrisp developed beautiful color in late September but did not taste very good until picked in November. Many articles have been written about the strange attributes of Honeycrisp, but in a good season it remains one of our customer's favorite tasting apples.

C. APPLE PIE EVALUATION RESULTS

Throughout the season, we got more inquiries from farm customers and the area press on the pie baking part of the project than on any other part. We expected this since those who still take the time to bake apple pies from scratch are pretty fussy about the apples they select.



NORTHERN SPY- OUR TOP BAKER

We baked 34 pies, 3 to 5 at a time throughout the season. We also baked several dish pies to see if there would be a difference in the way the apples held up and tasted, but there was no difference, and we switched to baking all of the pies in normal top and bottom crusts. As mentioned earlier, our restaurant pastry chef, Pam Reeve, baked the pies, and they were evaluated by our other chefs and by the farm and restaurant staff. The results of the evaluations are shown in the table below:

APPLE PIE RATINGS



RATINGS	Early Season August- Mid Sept	Mid Season Mid Sept to Early Oct.	Late Season Mid Oct. to Late Nov
APPLES RECEIVING "BEST IN GROUP" RATING	DUCHESS	SMOKEHOUSE PINK PEARL 20 Oz PIPPIN WOLF RIVER	NORTHERN SPY GOLDEN DELICIOUS MUTSU (CRISPIN) GRANNY SMITH SPITZENBERG
APPLES RECEIVING "GOOD TO VERY GOOD" RATING	RED ASTRACHAN	GINGER GOLD PRISTINE AKANE LIBERTY	CORTLAND CAVILLE BLANC ENTERPRISE SEEK NO FURTHER MCINTOSH GOLDRUSH
APPLES RECEIVING "LEAST GOOD" RATING	LODI	WILLIAMS PRIDE POUND SWEET	ASHMEAD'S KERNEL

APPLE PIE EVALUATIONS (CON'T)

Some observations:

Those apples that during the juicing evaluation produced the least amount of juice per pound of apples produced the best pies.

Those apples that had the most acid (lowest pH) produced the most flavored filling.

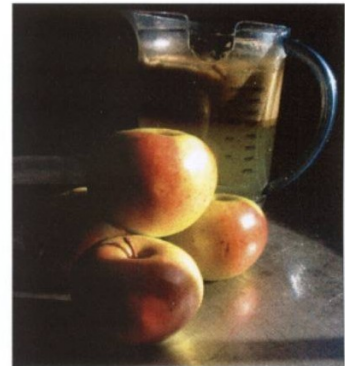
The Late season apples produced the best pies.

Finally, what all great pie bakers already know. The best pies are made from a mixture of more than one apple variety. Most of the pies baked had less interesting flavor than our normal multi-variety pies.

D. EVALUATION OF APPLES FOR JUICING

This was the most interesting part of the project for us. Though we have many customers who buy apples for juicing, we have never juiced apples ourselves.

We make sweet and hard cider each year, but never just juice. So many aspects of the juicing operation were revealing. We bought and used what the juicers consider the Cadillac of juicers the Breville 800 Juicer. It was amazingly fast and easy to use and clean. The results of our juicing evaluation is shown in the table below. The apple juice from each variety was tasted immediately and again three days later



JUICE APPLE RANKINGS

	APPLE VARIETY	YIELD oz. / 3#	TASTE	COLOR	BRIX	pH
1	SPITZENBERG	21	BEST	BRILLIANT RED	12	2.8
2	NORTHERN SPY	18	EXC	YELLOW/GREEN	14.9	2.7
3	ENTERPRISE	30	EXC	BRIGHT RED	12	3.2
4	GOLDEN RUSSET	17	EXC	GREEN	15	3.2
5	TWENTY OUNCE	20	EXC	TAN	12.2	2.8
6	WINESAP	23	EXC	RED	15	3.1
7	PINK PEARL	21	EXC	PINK/TAN	9.8	2.6
78	GOLDRUSH	27	EXC	GREEN	11	2.9

Observations:

1. The taste of an apple is no indicator of the taste of its juice!

As ridiculous as this seems, some of the best tasting apples when eaten out of hand i.e. bitten into, produced flat tasting colorless juice. I would guess that this might be due to the fact that the skin of the apple produces much of the flavor and that the juicer somehow excludes this taste from the juice. Now the problem with this theory is that with some apples the juice seemed better than the apple!

2. From the same apple variety Cider pressed with a cloth rack system tastes very different than the juice produced with the juicer. For whatever reason the juice squeezed with the rack and cloth system immediately begins to oxidize (turn brown), but the juice from the juicer does not. It did seem that the best cider apples were also some of the best juice apples i.e. Spitzenberg, Golden Russet, Winesap etc.

3. Again there was little correlation between the sweet taste sensation of the juice with its soluble sugar measurement (Brix). The acidity of the juice played a big part in its flavor.

E. DRYING APPLE EVALUATIONS

As mentioned nearly all of the 42 apple varieties were dried and tasted. All of the apples were dried to crispness rather than partially dried as is often done. The color, taste and texture were compared, and again enormous differences in quality of the final product were found. The table below shows the results of these tests.



RANKING OF APPLES FOR DRYING

RANK	APPLE VARIETY	DRYING QUALITIES				NOTES
		DRY COLOR		TEXTURE	TASTE	
		SKIN	FLESH			
1	SPITZENBERG	DK RED	TAN	EXCELLENT	RICH	BEAUTIFUL COLOR AND TASTE
2	ENTERPRISE	DK RED	TAN	EXCELLENT	EXCELLENT	ALMOST AS GOOD AS SPITZENBERG
3	SUMMER TREAT	RED	RED /TAN	GOOD	SWEET	BEST OF EARLY APPLES
4	NORTHERN SPY	DK GREEN	TAN	CRUNCHY	TART	GREAT APPLE FLAVOR
5	PINK PEARL	YELLO W	PINK	GOOD	TART	KIDS LOVE COLOR AND TASTE
6	RED FREE	DK RED	TAN	GREAT	BALLANCED	GREAT FOR AN EARLY APPLE
7	CAMEO	DK RED	TAN	CRUNCHY	BALLANCED	VERY GOOD
8	GRANNY SMITH	DK GREEN	LT TAN	CHEWY	TART	VERY GOOD
9	CAVILLE BLANC	TAN	GREEN	GOOD	TART	GREAT FLAVOR, BUT NO COLOR
10	GOLDEN RUSSET	TAN	TAN	GOOD	TART	GREAT FLAVOR, BUT NO COLOR

Dried Apple Evaluations (Con't)

Observations:

There is not much correlation between fresh eating quality and drying quality. For example Pristine, Ginger Gold, Sansa, Fuji and Suncrisp are among the best eating apples but all dried with practically no taste.

Some apples dried very badly... like tasteless cardboard for example McIntosh, Golden Delicious, Red Delicious, Fuji.

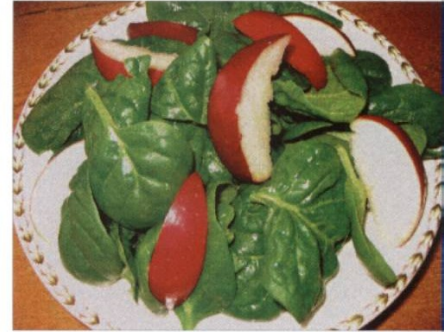
Color of skin and flesh is important for marketing dried apples.



F. EVALUATION OF APPLES FOR FRESH SLICE

Each of the apples used in the dried apple evaluations was also tested for skin and flesh color retention, taste and texture. In our own fresh slice apple use we value non coloring flesh, bright colored skin and a crisp texture.

The salad at the right was made with Enterprise apples, which was our top tested variety. The table below shows the overall results of the evaluation



FRESH SLICE APPLE RANKINGS

RANK	APPLE	SKIN COLOR	FLESH COLOR			CRISPNESS	NOTES
			INITIAL	20 MIN	1 HR		
1	ENTERPRISE	DK RED	WHITE	WHITE	LT TAN	EXC	GREAT SWEET-TART
2	PINK PEARL	YELLOW-BLUSH	PINK	PINK	PINK	EXC	BEAUTIFUL
3	NORTHERN SPY	RED/GREEN	WHITE	WHITE	TAN	EXC	GREAT TASTE
9	CAMEO	RED/GREEN	WHITE	WHITE	TAN	EXC	AMAZING TART FLAVOR
4	SMOKEHOUSE	RED/GREEN	WHITE	WHITE	WHITE	GOOD	GREAT FLESH COLOR
5	SPITZENBERG	RED	CREAM	CREAM	TAN	GOOD	GREAT FLAVOR
6	WINESAP	DK RED	CREAM	CREAM	CREAM	GOOD	BEAUTIFUL
7	GOLDRUSH	GOLD	WHITE	WHITE	TAN	EXC	TART AND CRISP
8	FORTUNE	RED	WHITE	WHITE	TAN	GOOD	GREAT SKIN COLOR
10	SUMMER TREAT	DK RED	WHITE	WHITE	TAN	EXC	BEST EARLY APPLE

Observations:

The best apple varieties for fresh slice were those with relatively low pH i.e. high acidity. This is not a remarkable finding. We normally dip apples in lemon juice (citric acid) to help the keep color better

G. OVERALL APPLE VARIETY RECOMMENDATIONS

One of the objectives of this effort was to use the data we collected over the summer to make variety recommendations for those home or market growers considering starting a new orchard. In order to do this we also considered additional information on each variety that was not collected on this effort but rather is known from our many years experience with the varieties we have used. Two important characteristics were tree vigor and maintainability and apple storage characteristics. The table below compares all of the important characteristics for the 14 apples we think are best suited for a high quality, long season sustainable orchard operation.

Apple Recommendation Chart

Apple	Harve	Tree	Disease	Apple Uses						Notes
				Eating	DR	DR	DR	DR	DR	
Pristine	Aug	Exc	Exc	Best	Good	Fair	Poor	Good	Good	Best early Apple
Summer Treat	Aug	Exc	Fair	Exc	Good	Fair	Exc	Exc	Poor	Beautiful Tree
Gala	Aug	Exc	Fair	Exc	Fair	Fair	Poor	Poor	Fair	Great Eating
Pink Pearl	Aug	Fair	Good	Exc	Exc	Exc	Exc	Exc	Exc	Fresh Tart-Multiuse
Jonafree	Sept	Exc	Exc	Exc	Exc	Good	Exc	Good	Exc	Great Taste- Multiuse
Liberty	Oct	Exc	Exc	Exc	Exc	Good	Good	Good	Exc	DR better than Empire
Northern Spy	Oct	Good	Good	Good	Best	Exc	Exc	Good	Exc	Great Classic
Spitzenberg	Oct	Exc	Good	Exc	Exc	Best	Best	Exc	Exc	Best Overall
Cameo	Oct	Exc	Fair	Exc	Fair	Good	Exc	Exc	Best	Great taste-Storage
Enterprise	Nov	Exc	Exc	Exc	Good	Exc	Exc	Best	Exc	2nd Best overall
Golden Russet	Nov	Exc	Exc	Good	Good	Exc	Exc	Good	Exc	Great Cider Apple
Goldrush	Nov	Fair	Exc	Exc	Good	Exc	Exc	Good	Exc	Delicious DR

7. Conditions:

The conditions for this project were excellent, which enabled us to evaluate 42 rather than the originally planned 30 apple varieties. As mentioned previously there were a few apple varieties that did not bear fruit this year, but overall it was an outstanding apple year.

8. Economics

There were no economic factors considered as part of this project.

9. Assessment

The project pointed out the vast differences in apple varieties for different uses. It also showed the many of the best apple varieties are either new disease resistant types or old heirlooms. In general the commercial varieties that are widely available in the supermarkets (McIntosh, Red Delicious etc.) are not the best for many uses. It would be useful to expand the list of evaluated varieties to include those we could not test this year due to unavailability. I also think it would be useful to publish the results in some sort of a small booklet that would include more information on the recommended varieties as well as some information on how to manage the orchard using sustainable practices.

10. Adoption

We will continue to use the evaluation tools we developed during this project to evaluate new apples as they become available. We now have some good benchmark data.

11. Outreach

There has been a great deal of interest in this project in our local community and in the sustainable farming community. It is one area where we underestimated the expenses that would be incurred as indicated in our final financial report. Some of the outreach efforts that have taken place thus far are:

Article published in The **Auburn Citizen** entitled "Which Apple is Best" on October 4th. It described the project and how the tests were being conducted. The citizen will publish the final results of the program during the spring or early summer of 2008.

"Organic Abundance" a NOFA New York Fundraiser was held on the farm September 16th. As part of the program, a tour of the farm and review of the "apple to apple" program was given to two separate groups of about 50 attendees each.

On Sunday October 14th, a workshop was held here at the farm where the "apple to apple" preliminary findings were presented as well as a tour of the orchards where some of the "winning" apples were seen and tasted. Another workshop on the final results as well as planning and planting the recommended orchard is planned for April 2008.

In early November a review and preliminary findings of the "apple to apple" project was presented to **the Cornell University Small Farm Working Group** in Ithaca, NY.

On Saturday February 9th an afternoon workshop entitled **"Apples to Apples"** was presented at **PASA's 17th annual Farming for the Future workshop**. At this workshop the final results of the project were presented and samples of fresh apples, dried apples and fresh apple juice were served to nearly 100 participants. A copy of the presentation has been included with this final report submission.

A request to present that same paper to the NOFA New York annual winter meeting at Saratoga was made, but they suggested that that presentation be delayed until **the NOFA summer workshop**, where it will be presented along with some other papers on sustainable apple production.

A summary of the presentation was given to two freelance writers who plan to submit drafts to the popular food magazines in hopes of getting articles on our program over the summer. These articles may not be published until fall of 2008 due to the effort not being completed during the fall 2007 apple season.

The apple to apple results are being presented on March 5th at the Berkshire apple meeting where about 15 to 20 Northeast Organic and Biodynamic apple growers meet to discuss 2007 growing season. Michael Phillips of Lost Nation Orchards and writer of *The Apple Grower* is hosting this meeting.

I believe there will be many more opportunities to present the results of our project during the summer and fall of 2008, based on the number of inquiries we have had.

12. Report Summary

The “Apple to Apple” project (as it has been called) was conducted to determine which of the many apple varieties that are available today are best for eating and culinary uses. This information would not only be useful to consumers, but would also be of value to growers contemplating the planting of new organic or sustainable farm orchards. The project evaluated over 40 apple varieties for use in eating out of hand, baking, juicing, drying and for fresh slice uses. The project recommended the best ten apples for each specific use as well as recommending 14 varieties for planting in new orchards that could provide season long apple supply that would be address all of the eating and culinary uses evaluated. Many of the varieties recommended are either new or heirloom varieties having significant resistance to apple diseases. We believe this is one of the most complete apple evaluations conducted in recent years.

Louis Lego

February 23, 2008