

NE-183 Regional Project: Consumer Survey of Some of the Most Promising New Apple Varieties

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In recent years, there has developed an increased interest in new apple varieties. Part of this resurgent interest can be attributed to the introduction of and strong consumer acceptance of first Granny Smith, followed by Gala, Braeburn, and Fuji. Consumers liked the added variety, different tastes, and the apparent improvement in overall internal quality. It is now well documented that consumers are increasingly making their decision of the purchase of apples based more on taste, flavor, crispness, and internal quality than on size, color, or cosmetics. Shelf space in the produce section of stores, however, is not unlimited, thus only the most heavily planted varieties will be regularly available to the consumers.

An observation that we made in the past few years is that some consumers can become quite enthusiastic about being able to purchase and eat high-quality, unique apples. Individual growers have the ability to plant and harvest many more varieties than are available in a normal grocery store. There is the potential that fruit farms, roadside stands, and grower-operated retail stands could become destinations for consumers if unique, good-tasting apples could be grown and sold. It was the purpose of this survey to obtain feedback from customers about which apples they liked, what they like about them and if these new varieties could change their apple buying habits.

Methods

Nine of the most promising varieties being evaluated in either the 1995 or 1999 NE-183 Regional Project were selected to be included in the survey. NE-183 was a Regional Project that originated to evaluate new and unique apple varieties for quality, horticultural characteristics, and insect and disease susceptibility. Between 1 and 3 bushels of fruit were harvested

at an appropriate maturity for at-harvest evaluation. Fruit were immediately placed in regular air storage at 32° F. When the retail stand at the University of Massachusetts Cold Spring Orchard Research & Education Center was opened in the morning, a portion of the fruit in a box was placed prominently on a table in the sales area. Additional fruit were brought in from the cold storage area as the box was emptied. A sign was placed above the box that informed customers that we were asking for their help in evaluating new apples. The results of the responses would be used as a guide in helping to decide which apples we plant and which apples that we encourage growers in Massachusetts to plant. They were given an apple to taste and eat with the understanding that they would fill out the Variety Evaluation Form. We did not have a person at the stand whose sole responsibility was to monitor tasting. Thus, many enjoyed eating the apple but neglected to fill out the form. Others were so impressed with the apple they tasted that they put apples under evaluation in the bag of mixed fruit they were selecting to buy. We received 482 completed forms, which represents about a 35% return rate. At the end of the season, all data were analyzed. Numerical data are expressed as means or percent of the total responses.

Variety Descriptions

Ambrosia. This attractive red variety originated in British Columbia as a chance seedling. Since it was discovered in an area where Golden Delicious and Starking Delicious were growing, some speculate that these were its parents. It is a medium-sized, somewhat-conical apple that is very attractive. It is firm and has a very pleasant taste with a good sugar-to-acid ratio. The right to grow this variety has been purchased. Special permission appears to be necessary to grow

VARIETY EVALUATION FORM

Variety _____

Please sample the apple(s) on display and provide us with an evaluation of the variety by filling out this short form. Please circle the appropriate number.

Appearance

Like very much 1 2 3 4 5 6 7 8 9 10 Dislike

Taste

Like very much 1 2 3 4 5 6 7 8 9 10 Dislike

Crispness

Like very much 1 2 3 4 5 6 7 8 9 10 Dislike

Juiciness

Like very much 1 2 3 4 5 6 7 8 9 10 Dislike

Texture

Like very much 1 2 3 4 5 6 7 8 9 10 Dislike

Overall

Like very much 1 2 3 4 5 6 7 8 9 10 Dislike

Additional comments on this variety:

What variety do you usually purchase _____?

Would you purchase this variety? Yes No

Would you purchase this variety in preference to your normal variety? Yes No

What type of apple do you usually like (circle one)

Sweet

Sweet/tart

Tart/sweet

Tart

this apple.

Arlet (Swiss Gourmet). Arlet is a red, slightly tart, medium-sized apple that ripens slightly later than Gala. Quality is good. The skin becomes greasy if harvest is delayed. Use of a preharvest-drop-control compound is appropriate, since Arlet is prone to preharvest drop before fruit becomes fully red. Fruit have a tendency to develop russet, especially at the calyx end, on as much as 25% of the surface. Red color can mask much of the russet if fruits remain on the tree long enough to develop good red color. It stores quite well if it is harvested at an appropriate time.

Creston. This variety originated in British Columbia. Frequently Creston is compared with Jonagold, a variety with which it shares many characteristics including large size, only moderately good color, firmness, time of ripening, and fruit quality. Fruit are medium to large, crisp and juicy, pleasant and refreshing with a good sugar-to-acid ratio. It lacks good red color and can be stored for 3 to 4 months. It is considered an alternative to Jonagold with a different and pleasant taste.

Hampshire. This is a very attractive seedling selection that originated in New Hampshire. It has medium and very uniform size. It ripens with Delicious with nearly 100% red color. It has white flesh and a good, mild flavor. It stores well, especially in CA storage. Hampshire is a grower-friendly tree, and it appears to be somewhat annual.

NJ 90. A unique taste characterizes this McIntosh-type apple. It is medium-sized, extremely attractive apple that has a deep ebony-red color that may be masked by a very heavy bloom on the surface of the apple. It has some preharvest drop tendencies. The skin is thick and, when eaten, it gives the impression of being tough.

Pinova. This has been a difficult apple to follow since it has gone through several name changes in the past five years: Pinova, Corail, Sonata, and most recently, and perhaps finally, Pinata. It is a medium-sized, somewhat-red apple. It is slightly tart and the Cox's Orange Pippin in its parentage is quite evident in the taste. It ripens in late September. The taste of Pinova may improve after a period of cold storage. The rights to plant and sell this apple have been purchased. Special permission is necessary to grow Pinova.

Sansa. Fruit can be harvested from Sansa starting about 3 weeks before Gala, a variety that is re-

sembles in size, shape, color, and taste. When ripe, it has an aromatic and tropical-fruit taste that is rivaled by few apples. Good light exposure is required to achieve good red color. Fruit will store up to 2 months. It is a moderate- to weak-growing tree, and the leaves have a mottled appearance that resemble but is not apple mosaic virus.

Shizuka. Mutsu and Shizuka have the same parents, Golden Delicious and Indo, and consequently they are very similar apples. Shizuka is an alternative to Mutsu, and under some circumstances, it may be a better choice. Shizuka is smaller, ripens about 5 to 7 days before Mutsu, and it is reported not to be susceptible to infection by the bacterial disease blister spot. Its flesh is a little softer than Mutsu, and it does not store as well.

Zestar. This is a medium-sized, somewhat-attractive apple that was released from the Minnesota breeding program. It has pinkish red color on up to 50% of the surface. Zestar ripens with Ginger Gold or perhaps slightly earlier. It has a very unique flavor with an excellent sugar-to-acid ratio where both sugar and acids are quite evident and pleasant. It has a somewhat columnar shape but with branches that have a wide crotch angle. It is precocious and a grower friendly tree. Fruit stores well for several weeks. It is an extremely attractive tree.

Results

Each participant was asked to rate the apple being tested for appearance, taste, crispness, juiciness, texture, and overall on a scale for 1 to 10, where 1 was the best score and 10 was the lowest score. Overall the ratings for all varieties in each category were high, and the responses appeared to be clustered such that rarely did one variety differ from one another numerically by more than 1.0 on the 1-10 scale (Table 1). I interpret this to mean that participants liked the selections that were provided.

Another and perhaps more valid method to evaluate new varieties is to ask participants if they would buy these apples (Table 2). All apples in this survey were well received and well liked by participants. Approximately 75% of the participants said that they would purchase Shizuka, Ambrosia, or NJ 90, between 80 and 85 % said that they would purchase Arlet, Pinova, and Sansa, while over 90% said that they would purchase Zestar, Creston, or Hampshire. Respondents

were also asked to indicate if they would purchase this apple in preference to the apple(s) that they normally purchase. The differences among varieties in response to this question were quite large. Only 22% of the individuals

indicated that they would purchase Shizuka in preference to their normal variety, whereas between 61% and 71% indicated that they would purchase Zestar, Sansa, or Creston, respectively. Regardless of the actual percentage, it is noteworthy and significant that a substantial number of people liked these new varieties, and many liked them sufficiently well to change their apple buying habits.

Each respondent was asked to indicate the variety or varieties that they normally purchase (Table 3). The variety most frequently mentioned was Macoun, followed by McIntosh and Cortland. Clearly, these preferences which represents over 50% of the total responses are regional and differ significantly from national sales figures. This stands in stark contrast to US apple production statistics where Delicious is now the #1 apple in productions, representing 28% of total apple produced in the US (Table 4). The fact that only 2% of the respondents normally buy Delicious is an indication that taste and quality are a major component in their buying decisions. It also indicates that the respondents were a very eclectic group that liked a wide range in colors and tastes. Another reason for deviation from the national average may be that

this was not a random survey. Only individuals interested in tasting new apple varieties took the time to participate in the survey. My interpretation of these data is that individuals purchasing fruit at a roadside stand represent a different group of individuals from those that regularly purchases apples in a grocery store. They like different varieties as indicated by the wide range of varieties that they normally purchase. They also will buy new varieties if the quality is good, and

Table 1. Sensory rating on a scale from 1 to 10 of apples evaluated survey participants at the University of Massachusetts CSOREC. 1 = likes very much; 10 = dislikes.

Cultivar	Appearance	Taste	Crispness	Juiciness	Texture	Overall
Ambrosia	2.4	3.5	2.7	2.4	3.3	3.2
Arlet	3.2	3.2	2.8	2.7	3.0	3.1
Creston	3.3	2.5	2.4	2.3	2.6	2.4
Hampshire	2.4	3.1	2.5	2.3	2.3	2.7
NJ 90	2.5	3.5	2.4	2.4	2.7	2.9
Pinova ¹	2.7	2.1	2.1	1.5	3.2	2.1
Sansa	3.1	2.4	2.3	2.0	2.3	2.2
Shizuka	3.0	3.5	2.7	2.3	2.7	3.3
Zestar	3.2	2.7	2.7	2.1	2.9	2.6

¹Also known as Corail, Sonata, and Pinata.

Table 2. Survey results of consumer tastes evaluation of new apple cultivars.

Cultivar	Would you purchase this variety?		Would you purchase this variety in preference to you normal variety?	
	Yes	No	Yes	No
Ambrosia	75	25	38	62
Arlet	80	20	44	56
Creston	92	8	71	29
Hampshire	91	9	57	43
NJ 90	76	24	44	56
Pinova ¹	85	15	45	55
Sansa	84	16	64	36
Shizuka	73	27	22	78
Zestar	90	10	61	39

¹Also known as Corail, Sonata, and Pinata.

Table 3. Summary of the apple cultivar that survey participants listed they normally buy.

Cultivar	Percent of Total
Macoun	23
McIntosh	16
Cortland	14
Gala	9
Ginger Gold	4
Honeycrisp	4
Jonagold	4
Granny Smith	4
Golden Delicious	3
Empire	3
Mutsu	3
Delicious	2
Other	11
Total	100

with some of the preferred varieties you can change their buying habits. I also feel that introduction and the sale of new varieties will be far more effective when done at a roadside stand. If these apples are in relatively short supply, then orchardists who grow these and roadside stands that sell them may be destinations for purchasers who are looking for special new varieties and unique tastes.

Individuals were asked what taste preference they have and results are shown in Table 5. Of those responding, 14% like sweet apples, 54% sweet/tart, 28% tart/sweet, and only 4% like tart apples. The preferred distribution is surprisingly similar to a survey published by Bob Stebbins in Oregon where 5% liked very sweet apples, 24% sweet apples, 65% sweet/tart, and only 6% like tart apples.

Table 4. Top 10 apple varieties produced in the United States in 2003. Source: US Apple.

Variety	Percent of total US Production
Delicious	28
Golden Delicious	13
Gala	9
Fuji	9
Granny Smith	8
McIntosh	5
Rome	5
Idared	3
Jonathan	3
Empire	2

Table 5. Summary of consumer preference of participants in the apple cultivar evaluation.

Type of apple	Percent of total respondents
Sweet	14
Sweet/tart	54
Tart/sweet	28
Tart	4

Table 6. Parentage of cultivars evaluated at the University of Massachusetts Cold Spring Orchard Research and Education Center.

Cultivar	Parentage
Ambrosia	??? (Golden Delicious x Starking Delicious)
Arlet	Golden Delicious x Idared
Creston	Golden Delicious x BC381049
Hampshire	??? (McIntosh x Delicious)
NJ 90	Spartan x 136055
Pinova ¹	Golden Delicious (Dutchess of Oldenburg x Cox Orange Pippin)
Sansa	Gala x Akane
Shizuka	Golden Delicious x Indo
Zestar	State Fair x Mn. 1691

¹Also known as Corail, Sonata, and Pinata.

The parents or suspected parents of the varieties in this evaluation are listed in Table 6. One very obvious observation is that Golden Delicious appears to be a very good breeding parent since is or is suspected of being one of the parents in over half of the selections.

Summary

A substantial number of participants in this survey indicated that they would buy these new varieties. They also indicated that they would buy several of these in preference to

the varieties that they normally purchase. Planting and selling new apple varieties may be a unique opportunity for New England growers to increase apple sales in their retail stands.

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Penetration of Overwintered Plum Curculio into Commercial Apple Blocks of Differing Tree Size

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To confirm findings from our 2003 Hatch-funded studies, in 2004 we continued to study the extent to which overwintered plum curculio (PC) adults penetrate into interior rows of sprayed sections of commercial apple orchards before petal fall. In 2004, however, we were also interested in determining the influence of tree size on the outcome. In 2004, 160 Circle traps, made of aluminum screen with a PC-capturing device integrated on top, were used for this study. For each of the 12 blocks used, 20 Circle traps, distributed in four transects of five traps each, were deployed on perimeter-row and interior-row trees. One block was located at the UMass Cold Spring Orchard Research & Education Center (CSOREC). Figure 1 shows that, by petal fall, for blocks having large trees (M.7 rootstock) most PCs were found on perimeter-row

trees compared to interior-row trees; however, PCs were more likely to be found inside orchard blocks rather than on perimeter-row trees if trees were small in size (M.9 rootstock). Regardless of tree size, at least a few PCs were found up to 40 m inside of blocks.

Our second study, conducted in two unsprayed sections of the UMass Cold Spring Orchard, sought to quantify the extent to which PCs are able to overwinter beneath perimeter-row trees, with respect to type of

