



Pennsylvania Fruit News

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President's Message

Greetings from Gardners!

As I write this message, harvest is almost finished and we are very busy. Since I last wrote, we have survived two hurricanes which brought a total of eight inches of rain. Yet, this still has been the "driest" period of the entire growing season. While those storms laid over many trees and blew off a lot of apples, we all know it could have been much worse. We feel for those who lost so much in Florida and other states. We may know people affected by tornadoes in Lebanon and Franklin counties. We may not feel like it just now, but we were lucky.

We have fared as well with internal feeders. With the removal of many of the good and lasting controls and the severe limitations of many others, control was extremely difficult. Certainly control was very costly with 1.5 - 2 inches of rain per week to wash off and residual problems were numerous. Add to this the pressure of abandoned orchards and the pressure is just too great. The degree of the problem is so great that many are talking of selling out. A gloom has spread over the industry. The situation needs to be addressed from all directions to deal with and change the situation. Someone told me that they didn't think they had any internal feeders but that their pesticide bill was \$600 per acre. I think this just exchanged one problem for another. Affordable controls are needed. Please support research to achieve this objective.

Now, I have to go deliver another load of Yorks to the processor. The short crop which kept getting shorter was and is way long on problems. Go figure. My thanks to those who keep the lines moving and their spirits up. I salute you!

Until next time.....Dave Wenk

Editorial Views

By Dr. Rob Crassweller

"Bits & Pieces"

The students returned on a hot muggy weekend and the pace of life here in central Pennsylvania has again jumped up a notch. Traffic has become dense and parking scarce. The annual Hort Show will be held on October 9-10th. It is well worth a trip up to the area to see the show. If the Nittany Lions don't improve, you should have no trouble getting tickets to the football game that weekend as well.

This fall, for the first time in a number of years, the department will be offering Horticulture 431 – Small Fruit Production. Dr. Elsa Sanchez has redesigned the

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Apple Cultivars For The Mid-Atlantic Industry

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Introduction

Interest in new apple cultivars has risen significantly among U.S. apple growers and consumers over the past 10 to 15 years. While a number of reasons have been cited for this heightened interest, a few are worth repeating including: higher prices received by the grower for unique cultivars, enhanced pest resistance requiring fewer pesticide inputs, more distinct apple flavors available to consumers, and better fruit quality (specifically crispness and texture) (Greene, 1998; Greene and Weis, 2003; Harker, 2002; Miller, 1991; Stebbins, 1994). It could be said that among apple growers, consumers, processors, and apple breeders the search for that "perfect" apple continues.

Between the late 1950s and the early 1980s apple production in the U.S. centered on a limited number of cultivars, primarily 'Delicious' and 'Golden Delicious', which comprised over 50% of total production, and to a lesser extent 'Rome' and 'McIntosh' with about 16% of U.S. production. In 1973 only 11 cultivars represented 90% of U.S. apple production (U.S. Department of Agriculture, 1980). This was not always the case, however. In the mid-1940s, while 'Delicious' was the primary cultivar with almost 20% of the production, the remaining 70% of production was attributed to 16 other cultivars. As we begin 2004 the apple cultivar picture is again changing and in some respects it is a case of "history repeating itself." 'Delicious' and 'Golden Delicious' make up a smaller share of the total U.S. production (about 40%) with several newer cultivars such as 'Gala', 'Fuji', 'Granny Smith' and 'Idared', being added to the list of significant cultivars. The U.S. Apple Association's recent production analysis (2003) listed 15 cultivars that comprised 90% of total U.S. production. Clearly growers and consumers are interested in a wider selection of apple cultivars.

In some respects, a discussion of apple cultivars is similar to a discussion of politics or religion – everyone has an opinion and often that opinion is expressed with emotion. The comments I will provide here concerning apple cultivars for the mid-Atlantic industry represent my own opinion based primarily on observations and experiences I have gained over the past nine years as a

cooperator in the NE-183 Regional Project, "Multidisciplinary Evaluation of New Apple Cultivars". I will try to avoid any emotional enthusiasm I might have for selected cultivars in this presentation and instead rely on the objective data and observations collected using the regional project's standard protocol.

The primary objective in the NE-183 project is to evaluate the horticultural characteristics and pest susceptibility of new apple cultivars, strains and advanced selections at many locations across North America. Details and information on the project may be found in published articles (Brown and Maloney, 2003; Greene, 1998; Greene and Weis, 2003; Miller, 2002) or on the virtual orchard website <http://www.virtualorchard.net/NE183/>. Briefly, the project was initiated in 1995 with 23 apple cultivars (or advanced selections) on Malling 9 rootstock (Table 1) planted in 18 states and 2 Canadian provinces. At each site there were five replicate blocks of the 23 cultivars. At the Appalachian Fruit Research Station (AFRS) in West Virginia a duplicate planting was made, one for horticultural evaluations and one for pest evaluations separated by about one-quarter mile. Five replicated blocks of 20 cultivars (some represented advanced selections) (Table 1) were added to the plantings in 1999 (only a horticultural evaluation planting was made at the AFRS site). All trees received minimal pruning during the first 5 years in the orchard. The local spray schedule for commercial orchards was followed throughout except in the pest planting where a reduced schedule was implemented depending on the specific objective (disease or insect) for that year.

The mid-Atlantic apple industry is best characterized as three industries in one. Apples grown for processing have long represented a major portion of the region's industry. Wholesale fresh market apples comprise the other major portion of the mid-Atlantic apple industry. More recently a local retail and niche market industry has begun to emerge primarily because of demographic changes in the region, poor returns for apples delivered to the processor, and global competition in the wholesale fresh market industry.

Processing Cultivars - Processing is a well established part of the mid-Atlantic apple industry and as such there is an established list of apple cultivars well suited for processed products. Cultivars such as 'York Imperial', 'Golden Delicious', 'Rome Beauty' and 'Jonathan' have, and will continue to be considered high quality processing apples. More recently cultivars

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Table 1. Apple cultivars and advanced selections planted in the 1995 and 1999 NE-183 "Multidisciplinary Evaluation of New Apple Cultivars" regional project trial orchards.

1995 NE-183 cultivars and selections		
Arlet	Ginger Gold	Pristine*
Braeburn	Golden Delicious	Sansu
Cameo	Golden Supreme	Senshu
Creston	GoldRush*	Shizuka
Enterprise*	Honeycrisp	Suncrisp
Fortune	NY 75414-1*	Sunrise
Fuji Red Sport #2	Orin	Yataka
Gala Supreme	Pioneer Mac	
1999 NE-183 cultivars and selections		
Ambrosia	Golden Delicious	Runkel
Autumn Gold	Hampshire	Silken
BC 8S-26-50	September Wonder Fuji	Coop 29 (Sundancer)*
Chinook	NJ 109	Zestar! TM
Coop 39 (Crimson Crisp)*	NJ 90	NY 428
CQR10T17*	NY 79507-49*	Corail (Pinova) ^z
CQR12T50*	NY 79507-72*	NY 65707-19* ^z
Delblush	Cripps Pink	Coop 25 (Scarlet O'Hara)* ^z

* a scab resistant cultivar

^z cultivar not planted at the AFRS site

such as 'Granny Smith', 'Fuji', 'Idared' and 'Ginger Gold' have been added to the list of "established" processing apples. Among the newer cultivars that I feel have potential for processing include 'GoldRush', 'Enterprise', 'Shizuka', 'Gala Supreme', 'Suncrisp', 'Autumn Gold', and an advanced selection, 'NY 79507-49'. An important characteristic for a processing cultivar is yield. All the potential cultivars identified rank among the top 10 cultivars in cumulative yield for their respective NE-183 plantings at the AFRS site, except 'Suncrisp' (Table 2). The tendency of 'Suncrisp' toward alternate bearing has had a negative impact on the cumulative yield of this

cultivar. It is possible that cumulative yield for 'Suncrisp' would have been higher had chemical thinners been used to adjust crop load rather than hand thinning. Compared to 'Golden Delicious' (the reference standard cultivar in our NE-183 plantings) two potential processing cultivars in the 1995 planting had higher cumulative yields, 'Enterprise' and 'GoldRush', and both cultivars identified as potential processing cultivars in the 1999 planting had cumulative yields greater than 'Golden Delicious'. It should be pointed out, however, that in the case of the 1999 planting cumulative yields are based only on the first three bearing years.

Table 2. Cumulative yield and rank of potential processing cultivars or advanced selections identified in the 1995 and 1999 NE-183 regional project apple cultivar evaluation planting at the USDA Appalachian Fruit Research Station, Kearneysville, WV.

1995 Cultivars	Cumulative yield ^z		1999 Cultivars	Cumulative yield ^y	
	boxes/acre	Rank ^x		boxes/acre	Rank ^w
Enterprise	7237	1	Autumn Gold	1607	1
GoldRush	6148	2	NY 79507-49	1143	4
Gala Supreme	5511	6	Golden Delicious	1014	6
Shizuka	4735	9			
Suncrisp	3095	16			
Golden Delicious	5716	3			
Mean, all cultivars ^{x,w}	4206			712	

^z First seven bearing years (1997-2002); 42 lb. boxes; trees planted 6 x 16 ft.^y First three bearing years (2001-2003); 42 lb. boxes; trees planted 6 x 16 ft.^x Among 23 cultivars/advanced selections in the 1995 planting.^w Among 20 cultivars/advanced selections in the 1999 planting.

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Several characteristics, in addition to yield potential, are considered important in processing apple cultivars including fruit size, flesh firmness, flesh color, soluble solids (sugar), and the sugar:acid ratio (Crassweller and Greene, 2003). The means for these characteristics for the newer apple cultivars identified as processing cultivars are given in Table 3. Except for 'Golden Delicious' and 'GoldRush' all cultivars had a mean fruit size greater than three inches. Flesh firmness was good and generally above the overall mean except for 'Enterprise' and 'Autumn Gold' both rather large apples with somewhat coarse textures. Soluble solids, at the time of harvest, were generally very good for the identified processing cultivars. Soluble solids improved in storage for 'GoldRush' and 'Suncrisp' (data not shown), which increased the sugar:acid ratio for these two cultivars after about 2 months in regular refrigerated storage. A sugar:acid ratio of 25:1 up to 60:1 is considered best for processing apples (Crassweller and Greene, 2003).

Additional observations and characteristics of the cultivars identified for processing include: **'Enterprise'** - Besides a regular bearing habit, large fruit size, and a round, regular shape, this cultivar is scab immune with

excellent resistance to fire blight and good resistance to powdery mildew and cedar apple rust. The tree is vigorous, but it has a spreading form that encourages higher productivity. Average date of harvest for 'Enterprise' has been 7 October. Problems shown by this 'Rome' like apple are a tough skin and susceptibility to low soil pH problems which produce a condition similar to internal bark necrosis reported in 'Delicious'. **'GoldRush'** is only moderately vigorous with a spreading growth habit. At the AFRS site average date of harvest has been 22 October. 'GoldRush' is very firm with an exceptional storage life and resistance to scab, powdery mildew, bitter rot and black rot. Fruit have been successfully stored for nine months in regular cold storage. An aggressive thinning program will help maintain regular cropping and improves fruit size on 'GoldRush'. The lenticels on 'GoldRush' are often large, irregular, and rough and the fruit has shown a tendency to crack in some seasons. We are currently working with growth regulator treatments to improve fruit finish and reduce cracking in 'GoldRush'. **'Gala Supreme'** is not a sport of 'Gala' as some believe, but is a chance seedling. Fruit have been large and they hang very well, but are prone to developing a greasy skin at full maturity. Average date

Table 3. Selected quality attributes for potential processing apple cultivars or advanced selections identified in the 1995 and 1999 NE-183 Regional project evaluation planting at the USDA Appalachian Fruit Research Station, Kearneysville, WV. 'Golden Delicious' is included as the standard for reference.

	Diameter	Firmness	SSC ^z	TA ^z	Sugar:acid
1995 Cultivars ^y	(in.)	(lbs.)	(%)	% malic acid	ratio:1
Enterprise	3.44	15.3	14.2	0.54	26.3
GoldRush	2.95	17.8	14.4	0.79	18.2
Gala Supreme	3.31	18.6	14.2	0.57	24.9
Shizuka	3.50	16.1	14.7	0.51	28.8
Suncrisp	3.16	17.1	14.2	0.68	20.9
Golden Delicious	3.01	16.8	14.6	0.52	28.1
1995 Overall Mean	3.07	16.2	13.5	0.56	25.6
1999 Cultivars^x					
Autumn Gold	3.19	15.3	13.3	0.28	47.5
NY 79507-49	3.37	17.9	13.3	0.47	28.3
Golden Delicious	2.97	16.8	15.6	0.50	31.2
1999 Overall Mean	3.07	17.4	13.9	0.55	27.4

^z SSC = soluble solids concentration; TA = titratable acidity.

^y Mean of 10 trees through four seasons (1997-2000); overall mean represents 23 cultivars.

^x Mean of 5 trees through three seasons (2001-2003); overall mean represents 20 cultivars.

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of harvest at our location has been 2 October. The flesh is firm, coarse textured, mildly sweet to subacid with a tough skin. 'Gala Supreme' has a poor appearance when grown in the mid-Atlantic due to the large rough lenticels and russet. It does have good resistance to scab, powdery mildew, cedar apple rust and black rot. '**Shizuka**' has the same parents as 'Mutsu' and is very similar in appearance and quality, however, it is sweeter and matures about 19 Sept., a week ahead of 'Mutsu'. Like 'Mutsu' this cultivar is triploid and should have at least two other cultivars for pollination. 'Shizuka' is prone to scarfskin and slight russet in the stem bowl, but is more resistant to blister spot than 'Mutsu'. The flesh is not as firm as 'Mutsu' and storage life is less than 'Mutsu'. Among the 23 cultivars in the 1995 planting 'Shizuka' has ranked poorly for both early and summer diseases at the VPI&SU planting site in Winchester, Virginia (Keith Yoder, personal communication). '**Suncrisp**', the only cultivar among the potential processing group that blooms after 'Golden Delicious' (average plus one day), tends to overset and if not thinned aggressively can exhibit strong alternate bearing characteristics. The tree is very susceptible to fire blight and tends to grow upright and would benefit from spreading. When thinned properly, 'Suncrisp' fruit are large. 'Suncrisp' is prone to a fine net-like surface russet. The fruit have good resistance to white rot and fly speck, but poor resistance to mildew. The mean date of harvest for 'Suncrisp' at the AFRS site has been 8 October. '**Autumn Gold**' has been a rather vigorous tree at our planting site, but has a strong spreading habit that lends to easier management and annual cropping. Fruit have been large, moderately sweet, with very low acid and a high sugar: acid ratio (Table 3). Fruit harvested at early maturity [starch index (SI) rating 3 to 4 (Blandpied and Silsby, 1992)] have been firm, but fruit harvested at full maturity (SI rating 6 to 7) have been noticeably less firm with reduced storage life. Average harvest date has been 26 Sept. for this cultivar at AFRS. 'Autumn Gold' produced at our location have been nearly russet free (when present, russet generally occurred in the stem bowl). Stink bug damage has been severe in several years on this cultivar. There has also been some corking observed on 'Autumn Gold' suggesting this cultivar may be susceptible to low calcium disorders. Preharvest fruit drop has been a problem in 'Autumn Gold' averaging about 21% over the first three bearing years. An advanced selection from the Cornell University breeding program, '**NY 79507-49**' is a large apple resembling one of its parents, 'Empire'. Fruit are mildly sweet with a moderate level of acid and good firmness at harvest,

which has generally occurred on 3 Sept. at the AFRS site. 'NY 79507-49' is a scab resistant selection with good resistance to cedar apple rust, powdery mildew, and fire blight. Fruit harvested at a mid-level maturity (SI rating 4 to 5) have exhibited watercore. Corking has also been observed in this selection.

Fresh-Market Cultivars - Competition from apples produced in California, Oregon and Washington and imports from the major southern hemisphere producers severely limit, in my opinion, the list of apple cultivars suitable for the mid-Atlantic fresh market. Established cultivars that still have some place in the region's fresh market industry include: 'Delicious', 'Golden Delicious', 'Rome Beauty', 'Stayman', and 'Gala'. Cultivars in the NE-183 plantings that I feel have potential for the wholesale fresh market include: 'Golden Supreme', 'Cameo', 'Shizuka', 'September Wonder Fuji', and 'Cripps Pink'. Three additional cultivars, 'Hampshire', 'Crimson Crisp' (Coop 39), and 'Autumn Gold' deserve some attention as fresh market apples, but additional trials are needed to determine if they are fully worthy of planting for fresh market production.

Yield, fruit size, and surface red color are several important attributes for fresh market apples. Data collected from the AFRS site for these attributes and those cultivars identified as potential fresh market candidates are presented in Table 4. In addition to 'Golden Delicious', 'Braeburn' is included as a reference for the 1995 planting. Among the recommended cultivars, yields have generally been good, since all ranked in the top ten of their respective plantings except 'Cripps' Pink'. Experience, albeit limited, with 'Cripps Pink' suggests this cultivar requires several years to settle down and produce uniform crops. In addition, an aggressive thinning program is needed to encourage larger fruit sizes once trees begin to bear regularly. 'Golden Supreme' is prone to alternate bearing and unless thinned early can produce large biennial crops of very small fruit, a condition that led to a lower cumulative yield in this planting. 'Crimson Crisp' is another cultivar with excellent flavor but suffers somewhat from its small size. Average fruit diameter has been greater than 3 inches for 'Cameo', 'Shizuka', 'September Wonder Fuji', 'Autumn Gold' and 'Hampshire'. Among the potential fresh market red-skinned cultivars, 'Cameo' had the least surface red color and 'Hampshire' had the most surface red color (Table 4).

Additional comments concerning the fresh market cultivars include: '**Golden Supreme**' is an attractive

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Table 4. Yield, fruit size and red color of potential fresh market apple cultivars identified from the 1995 and 1999 NE-183 regional project apple cultivar evaluation plantings at the USDA Appalachian Fruit Research Station, Kearneysville, WV. 'Golden Delicious' and 'Braeburn' are included as standards for reference.

1995 Cultivars ^z	Cumulative Yield	Yield	Fruit Size		Color
	boxes/ac	rank	wt (g)	diam. (in.)	% red (rank)
Golden Supreme	4432	10	164	2.98	6
Cameo	5414	7	200	3.20	55 (6)
Shizuka	6622	2	247	3.50	-----
Golden Delicious	5716	3	157	3.01	-----
Braeburn	3258	15	205	3.03	62 (3)
1999 Cultivars^y					
September Wonder Fuji	932	8	197	3.14	59 (10)
Cripps Pink	452	16	163	2.77	70 (6)
Autumn Gold	1607	1	222	3.18	-----
Crimson Crisp (Coop 39)	792	9	171	2.88	82 (4)
Hampshire ^x	623	4	247	3.34	90 (2)
Golden Delicious	1014	6	180	2.97	-----

^z Yield based on first seven bearing years; size and color based on first four years; color rank based on the 16 red skin cultivars evaluated in the 1995 planting.

^y Yield based on first three bearing years; size and color based on first two years; color rank based on the 14 red skin cultivars evaluated in the 1999 planting.

^x Data for 'Hampshire' represents first two bearing years only; crop severely damaged by rosy apple aphid in the third season.

bright yellow conic apple that resembles 'Golden Delicious' but without the large conspicuous lenticels or surface russet. Its average maturity date at this location has been 27 Aug., about 2 to 3 weeks before 'Golden Delicious'. 'Golden Supreme' is crisp and very juicy with a mild sweet flavor. Its disadvantages are that it requires multiple pickings and it is prone to excessive preharvest fruit drop. The low productivity reported for this apple in the northeast (Brown and Maloney, 2003; Greene and Weis, 2003) has not been as evident at our test site. 'Cameo' is a large apple with prominent red stripes that resemble the original 'Hawkeye Delicious'. Fruit mature about 30 Sept. in WV. 'Cameo' hangs very well and will improve its surface red color significantly if allowed to remain on the tree past early maturity (SI rating of 3 or 4), however, the storage life for late harvested fruit is reduced. 'Cameo' is firm and crisp with a pleasantly mild sweet-tart flavor. The canopy is dense, spurry and easy to manage. Like 'Golden Supreme', 'Cameo' blooms with 'Golden Delicious'. 'September Wonder Fuji' (originally 'Jubilee Fuji') is a whole tree mutation of 'Fuji' that matures in our area about 5 Sept., or about 4 to 5 weeks before standard 'Fuji'. Fruit have the same fine texture and sweet, juicy characteristics of standard 'Fuji', but do not store as well as standard 'Fuji'. Color

of 'September Wonder Fuji' has been much superior to standard 'Fuji', although in cloudy warm seasons color has been more dull, brownish red than bright red. The fruit have shown good resistance to bitter rot, and the tree has demonstrated moderate resistance to rosy apple aphids. 'September Wonder Fuji' has ranked high for summer disease resistance and moderately high for early season disease resistance at the Winchester, VA test site (Keith Yoder, personal communication). 'Cripps Pink' ('Pink Lady'®) is the latest maturing cultivar among all those evaluated in the NE-183 plantings. Its average maturity date at AFRS has been 29 Oct. with harvest occurring as late as 4 November. This may be too late for some of the major growing areas in PA, but this apple should do well in most other mid-Atlantic areas. 'Cripps Pink' is one of the most attractive cultivars released in recent years. It develops a distinct pink-red color over a greenish yellow ground color in late October. Early harvested fruit are high in acid and tart, but flavor improves to subacid with some storage. 'Cripps Pink' harvested from young trees has been subject to a condition termed 'hammering'. This condition can best be described as small raised areas or bumps on the surface of the fruit thought to be caused by excessive vigor

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associated with high nitrogen levels. The condition has disappeared in more mature fruiting trees. **'Crimson Crisp'** (Coop 39) is an attractive bright red on yellow apple that is scab immune, but susceptible to fire blight. Fruit have matured about 8 Sept. at the AFRS site. In some respects 'Crimson Crisp' resembles 'Jonathan' but has a better sweet-tart flavor especially at medium to full maturity (SI rating 5 to 7). The flesh is very firm, dense and somewhat prone to watercore at full maturity. At room temperature 'Crimson Crisp' may develop a greasy skin. The tree is somewhat vigorous with a rather dense canopy and good spur development. **'Hampshire'** is one of the few northern apples (it was discovered in New Hampshire as a chance seedling) that seem to do well in a warmer climate. Fruit have been larger than in its native climate (Greene and Weis, 2003) with 90 to 100% dark red overcolor and a mild, somewhat aromatic flavor with a good balance of acid and sugar. 'Hampshire' may exhibit "bloom" and scarfskin on the surface. Fruit have matured on 28 Sept. at AFRS, about the time of standard 'Delicious', and 'Hampshire' has been prone to preharvest drop in this area. Fruits may exhibit watercore and occasionally minor russet in the

stem or calyx ends of the apple. The tree is productive, moderately vigorous, semi-spurry, fairly easy to manage, but appears to be highly susceptible to rosy apple aphid.

Local Retail Cultivars - Almost any cultivar can be grown to serve a local or niche market. The choice a grower makes depends on several factors including the preferences shown by the customers in the local region, ease of management, and the potential for high returns. Among the cultivars discussed for processing or fresh market virtually all are suited for local markets, with the possible exception of 'Enterprise' and 'Gala Supreme'. Among the cultivars in our NE-183 plantings that I feel deserve special mention for the local retail market industry in the mid-Atlantic include: 'Pristine', 'Sansa', 'Arlet', and 'Honeycrisp' from the 1995 planting and 'Princess' (CQR12T50), 'NJ 90', 'Delblush', 'Ambrosia', 'Crimson Crisp' and 'Hampshire' from the 1999 planting. While yield may be of less importance in producing a given cultivar for the local retail market, yield is of interest. The cumulative yields for the cultivars identified for retail marketing are presented in Table 5. When compared to 'Golden Delicious',

Table 5. Cumulative yield for selected apple cultivars in the NE-183 regional project plantings at the USDA Appalachian Fruit Research Station, Kearneysville, WV with potential for the local retail or niche markets in the mid-Atlantic region. 'Golden Delicious' is included as the standard for reference.

1995 Cultivars	Cumulative yield ^z boxes/acre ^y	Rank ^x
Arlet	5069	8
Pristine	3030	17
Honeycrisp	2275	20
Sansa	2038	21
Golden Delicious	5716	3
Overall Mean ^x	4206	
1999 Cultivars		
Princess (CQR12T50)	1154	3
Crimson Crisp (Coop 39)	792	8
Hampshire	623 *	10
NJ 90	490	13
Delblush	418 *	15
Ambrosia	81	20
Golden Delicious	1014	6
Overall Mean ^x	712	

^z For 1995 cultivars, first seven bearing years (1997-2002); for 1999 cultivars first three bearing years (2001-2003) except * which represents only first two years (crop lost in third season to rosy apple aphid damage).

^y 42 lb. boxes and trees planted 6 x 16 ft.

^x Among 23 cultivars in the 1995 planting; among 20 cultivars in the 1999 planting.

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many of these cultivars have been far less productive. However, fruit quality and consumer demand may outweigh the need for high yields.

Noteworthy characteristics of the cultivars identified for the local retail market industry are as follows: **'Sansa'** is a small to medium sized apple that matures about 7 Aug. in our area. This cross between **'Gala'** and **'Akane'** has a robust sweet-tart taste and good red color on a yellow ground color. I rate it as the best tasting early apple available. Yields for **'Sansa'** have been low in this planting (Table 5) possibly because the original budwood was virus infected. **'Pristine'** is the earliest maturing cultivar among the NE-183 selections; average harvest date at AFRS has been 20 July. **'Pristine'** tends to be biennial, and has low yields (Table 5). Fruit are medium to large and have an attractive bright yellow color with little or no russet except occasionally in the stem bowl. **'Pristine'** is quite tart at early maturity but becomes more subacid with a somewhat spicy flavor at late maturity (SI rating of 7 or 8). **'Pristine'** requires multiple pickings, has a very short shelf life, and is easily bruised. **'Pristine'** is a scab resistant cultivar and has ranked very high for both early and summer disease resistance in the mid-Atlantic area (Keith Yoder, personal communication), but in controlled tests has exhibited high susceptibility to bitter rot and white rot (Biggs and Miller, 2001, 2003). **'Arlet'** is a medium size apple with a tart taste at early maturity but a pleasant sweet-tart taste at late maturity (SI of 6 to 7). Average harvest date for **'Arlet'** at the AFRS site has been 19 August, but it stores well for a late summer apple. **'Arlet'** suffers from severe russet in some seasons, but the flavor and fine flesh texture may outweigh the poor appearance. Red color improves if fruit are allowed to hang on the tree until a late harvest, but fruits are prone to preharvest drop and may develop a greasy skin under these conditions. Much has been published about **'Honeycrisp'** over the past several years as the popularity of this University of Minnesota bred apple has soared. Volume 34 (2001) of *Compact Fruit Tree* (publication of the IDFTA) and Volume 11, issue 3 (2003) of the *New York Fruit Quarterly* (publication of the N.Y. State Horticultural Soc.) have recently been devoted to this cultivar. **'Honeycrisp'** is best known for its exceptional crisp texture and good keeping quality. Fruit mature about 24 Aug. in the WV growing area. **'Honeycrisp'** can have a robust "sprightly" acid flavor with a slight sweet after-taste, but it can also be quite bland when grown in warmer temperatures, which are common to the mid-Atlantic region. Fruit at full or late maturity sometimes develop a fermented flavor that is objectionable. When to harvest **'Honeycrisp'** for peak

flavor is a problem, in my opinion. Multiple pickings are definitely required. **'Honeycrisp'** color in some seasons can be very poor unless fruit are allowed to hang into September, a risky decision. **'Honeycrisp'** is a weak growing tree when budded on dwarfing rootstocks like M.9 and cropping can be rather low. Trees exhibit a distinct leaf chlorosis and cupping and are very susceptible to Japanese beetle. Fruit are susceptible to low calcium disorders. **'Honeycrisp'** blooms 1 to 2 days after **'Golden Delicious'**.

'Princess' (advanced selection CQR12T50 from the PRI breeding program and selected at Purdue University) is an early (30 Aug.) yellow, medium size apple that may exhibit a cream colored cheek and a pink-orange blush at full maturity. The fine texture is tart early, but turns subacid and spicy at a later maturity. **'Princess'** resembles the old cultivar **'Winter Banana'** in color and appearance, except it is more uniform in shape and the flavor is superior to **'Winter Banana'**. Fruit may develop russet in the stem and basin areas. **'Princess'** is a scab resistant cultivar with good resistance to fire blight, but only moderate resistance to the early (scab, mildew, cedar apple rust) and summer (sooty blotch, fly speck, rots) diseases. The tree has only moderate vigor, is somewhat spreading, and has an open canopy. **'NJ 90'** is a medium dark reddish purple (burgundy) colored apple that has matured about 20 Sept. in the WV growing area. Color develops in early September on this apple along with surface bloom and some scarfskin, and fruit are very susceptible to preharvest drop. The flavor is subacid and almost spicy. Fruit are best harvested at early to mid-maturity (SI rating 3 to 5). The skin on **'NJ 90'** is thick and tough, which is a disadvantage. **'Delblush'** may be best characterized as a smaller **'Golden Delicious'** with more tartness than **'Golden Delicious'** and an orange blush. The texture is firmer and more coarse than **'Golden Delicious'**. Fruit are subject to russet and enlarged, rough lenticels. **'Delblush'** has shown excessive preharvest drop in our planting. Fruit store better than **'Golden Delicious'**. Trees of **'Delblush'** have been somewhat upright with a small leaf, but fairly good spur development. **'Ambrosia'** is a chance seedling from British Columbia that appears more like a smooth **'Splendour'** (in my opinion) than a **'Delicious'** to which it has been likened (Brown and Maloney, 2003). Fruit are medium size with a rose-pink color over a cream-yellow ground color. In some seasons color is very poor in the warmer mid-Atlantic climate. Occasionally the lenticels may be slightly rough and irregular much like **'Splendour'**. At mid-maturity (SI rating 5 to 7) **'Ambrosia'** has a sweet taste, similar to **'Delicious'** but

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more robust and aromatic. The flesh texture is fine and crisp. The tree has a good spur habit, but is quite upright and has produced poorly in our planting at AFRS. 'Ambrosia' appears to have medium storage life.

Cultivars Not Recommended for the Mid-Atlantic – Not all the cultivars planted in the NE-183 test orchards have potential for the mid-Atlantic area. Several of the cultivars or advanced selections in our planting in WV have exhibited poor performance in one or more characteristics. I have labeled these cultivars my "not worth the effort" cultivars and would not recommend them for planting in the mid-Atlantic region. This list includes: 'Creston', 'Fortune', 'NY 75414-1', 'Orin', 'Senshu', 'Chinook', 'CQR10T17', 'NJ 109', 'NY 79507-72', and 'Silken'. '**Creston**', '**Chinook**', and '**Silken**' are cultivars from the Summerland B.C. breeding program, an area with low humidity and conditions conducive to good coloring. Like many of the cultivars developed in that region, when grown in a warmer climate their quality is quite variable from one season to the next and color is often very poor. Fruit size can also suffer on these cultivars when grown outside their selected region. 'Chinook' has been exceptionally small and rough skinned in our planting. 'Silken' has suffered from an unusual watersoaked spot that develops on the surface of the fruit near harvest. The condition is thought to be associated with high temperatures and may be a form of sunscald. '**Fortune**' has exhibited good yields – it ranked fifth among the 23 cultivars – but this apple is too large and has often been excessively lopsided. These characteristics would prove to be a disadvantage for processing, which it is best suited. Color has also been extremely poor on 'Fortune' produced at our site. The selection '**NY 75414-1**' has exhibited severe cracking in many seasons and is prone to preharvest rots. '**Orin**', a sister to 'Mutsu', is a green, rough skinned apple with an objectionable very sweet taste. '**Shenshu**', an early 'Fuji' type has consistently had a bland flavor and very poor color. The advanced selection '**CQR10T17**' has such hard flesh at maturity that it's difficult to eat out-of-hand, and at later maturity the fruit have had excessive watercore. Yields for '**NY 109**' and '**NY79507-72**' have been very poor and flesh quality has been variable.

As always, growers who wish to grow new cultivars are encouraged to plant a small test planting initially so they may evaluate cultivar performance on their site using their management techniques.

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