

*[Note: The following was written in 1995.]*

# **An Update on Scab-Resistant Cultivars and Advanced Selections for Consideration in New Plantings**

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About four years ago, the Northeast SARE Apple Production Project published descriptions of the most promising scab-resistant apple cultivars in the *Management Guide for Low-Input Sustainable Apple Production*. Since then, we have accumulated extensive observations with some of these cultivars, and additional selections have been named or released for limited testing. This update provides a synthesis of published and unpublished information concerning the characteristics, qualities, and availability of scab-resistant cultivars and advanced selections (SRCs).

Some of the new SRCs have been evaluated in more locations than others. Advanced selections from Cornell's Geneva breeding program, for example, are frequently evaluated by numerous researchers because trees have been available through the Fruit Testing Association Nursery (formerly New York State Fruit Testing Cooperative). Weaknesses in new selections generally become apparent as selections are evaluated in different environmental settings. Thus, the SRC descriptions which follow are probably biased against cultivars which are older or have been more widely tested. Where relatively little information is provided, most of the strengths and weaknesses remain to be discovered.

## **New SRC Releases and Availability:**

GoldRush, Enterprise, and Pristine are new cultivars which were released from the PRI (Purdue-Rutgers-Illinois) breeding program during the past four years and are now available from commercial nurseries.

Advanced selections released by the PRI program for grower testing include Co-op 27, Co op 29, Co-op 31, Co-op 32, Co-op 33, Co-op 34, Co-op 35, Co-op 36, Co-op 37. Trees of these advanced selections are available only by special arrangements with the University fruit breeders or by special order (50 tree minimum) from Ed Fackler of Rocky Meadow Nursery, New Salisbury, Indiana (tel. 812-347-2213).

Advanced selections available from Cornell University's apple breeding program at Geneva include NY 65707-19, NY 73334-35, NY 74840-1, NY 75413-30, NY 75414-1, NY 81204-42. Trees of these selections are available from the Fruit Testing Association Nursery, Inc., P.O. Box 462, Geneva, NY 14456 (tel. 315-787-2205; fax 315-787 2216). After spring of 1995, the Fruit Testing Association Nursery, Inc. will go out

of business and numbered selections will be available only by special arrangements with the apple breeder, Dr. Susan Brown.

Some of the SRCs developed in Nova Scotia and Quebec are available in the U.S. or can be shipped from Canadian nurseries whereas other cultivars cannot yet be imported. Canadian cultivars available in the US include Novamac and Nova Easygro. Cultivars that are not yet available include Novaspy, Richelieu, Rouville, Trent, and BelMac. However, Novaspy was cleared for importation into the U.S. in 1994 and commercially-propagated trees may be available within several years.

### **Suitability of SRCs for commercial production:**

SRCs have not been widely planted by commercial growers because of potential difficulties in marketing new cultivars. However, some of the new cultivars and selections produce fruit of acceptable commercial quality. Growers who retail some of their fruit directly are encouraged to experiment with marketing these newer scab-resistant cultivars.

Many of the SRCs reportedly have a better flavor after storage than they do at harvest. Thus, those experimenting with new SRCs should evaluate eating quality both at harvest and after fruit are stored. With some cultivars ([Liberty](#) is an example), eating quality at harvest may be better in northern areas with cool growing seasons. Acidity at harvest seems to be greater when these cultivars are grown under hot conditions.

Storage potential for SRCs has not been widely investigated. SRCs maturing in August generally have only 2-3 weeks of storage life. Moira, Prima, and Priscilla were extensively tested at Nova Scotia and were judged suitable only for short-term storage of 2 months in regular (air) cold storage. [Liberty](#), Novamac, Nova Easygro, Macfree were judged suitable for 2-4 months of regular storage whereas Novaspy and Trent were held well for > 4 months in regular storage. GoldRush, Enterprise, and some of the advanced selections from the PRI and Cornell programs have also held up well in long-term storage in other more limited tests.

### **Disease Control for SRCs:**

Although scab-resistant cultivars will need less fungicide than highly susceptible cultivars such as McIntosh, Delicious, and Empire, we now know that some fungicide protection will be needed almost everywhere these cultivars are grown. Flyspeck can cause extensive fruit blemishing as far north as Maine on fruit which are not protected with fungicides during summer. In addition, we have discovered that none of the cultivars evaluated to date are completely immune to cedar apple rust. Cultivars and advanced selections which have been listed as resistant to cedar apple rust still develop small pin-point lesions when exposed to heavy rust inoculum. The rust fungus in these lesions is unable to grow into normal rust lesions as one would see on rust-susceptible cultivars. However, the pin-point rust lesions provide entry sites for weak pathogens such as *Phomopsis*, *Botryosphaeria*, and *Alternaria*. These weak pathogens sometimes enlarge the pin-point rust lesions and cause a leaf-spotting similar to frog-eye leaf spot. Rust-induced leaf spotting is sometimes severe enough to cause premature defoliation. Thus, even rust-resistant cultivars will need fungicide protection from cedar apple rust if they are planted adjacent to cedars which harbor cedar apple rust.

***Additional comments on cultivars and advanced selections that were previously listed in the Management Guide for Low-Input Sustainable Apple Production:***

Co-op 27 - (Illinois #2 X PRI 1042-100): Late-season dark red apple comparing favorably to Winesap and matures one week after Delicious. Fruit have moderately thick skin, with firm, crisp to slightly tough flesh texture. Fruit ripen uniformly, but may be slightly woody at harvest, mellowing in storage. Tree has moderate vigor, upright spur-type habit similar to spur-type Delicious, is resistant to rust and fireblight, moderately resistant to mildew.

Co-op 29 - (Golden Delicious X 1050NJ1): Late-season apple pink blush over pale yellow smooth skin. Fruit matures 2.5 weeks after Delicious. Flesh is cream to white, very crisp and breaking, moderately coarse-grained, juicy, full-flavored and slightly spicy. Fruit are born in clusters and develop some stem-end russet. Good quality winter storage apple. Tree is moderately vigorous, slightly upright, with leggy branches and some blind wood. Resistant to cedar apple rust, moderately resistant to mildew and fire blight.

Co-op 30 - See Enterprise

Co-op 31 - (Rock 41-112 X PRI 841-103): Late-season apple with potentially rough appearance, but good spicy flavor and good storage potential. The fruit may be splashed, striped, or mottled medium red to purple red with green ground color. Scarf skin has been noted some seasons. Very susceptible to cedar apple rust.

Dayton - (NJ 123249 X PRI 1235x100): Early-season red apple maturing in the Paulared season. Very susceptible to rust (as bad as Prima). Some reports suggest it is not cold-hardy enough for northern growing areas. Fruit quality considered mediocre in Vermont.

Enterprise (formerly Co-op 30; PRI 1661-2 X PRI 1661-1): A smooth, glossy, 90-100% red apple with yellow-green ground color. Fruit mature the same time as Rome Beauty, are round to elongated in shape, occasionally lopsided. Lenticels can be conspicuous. Flesh is medium grained, firm, crisp and breaking at harvest; remains firm and crisp in storage. Flesh color is pale yellow to cream. Flavor is very spicy, rich and sprightly acid at harvest, improves after one month in storage. Retains quality and texture for over 6 months when stored at 1°C. Fruits hang well on the tree even when overripe. Tree is spreading, round topped, vigorous, with a standard bearing habit, highly resistant to fire blight, resistant to cedar apple rust, and moderately resistant to powdery mildew. Relatively thick skin makes this apple more palatable when peeled. Lenticel spotting of unknown etiology (possibly bitter pit or a similar disorder) has been a problem on fruit from young trees in some locations. Late maturity may limit its northern adaptability.

Freedom - (NY 18492 X NY 49821-46): Mid-season orangish-red fruit ripens with Delicious. Fruit have prominent lenticels. When grown without fungicides, fruit quality varies considerably from year to year. In bad years, fruit may be very rough in appearance with numerous superficial blemishes and some black rot infections at lenticels. Rated as fair or poor-quality cultivar in Vermont and Maryland, but some people really like the unique spicy flavor. If picked too early, storage scald is a major problem. Only moderately resistant to fire blight.

Jonafree - (855-102 X NJ 31): This mid-season red apple ripens with Delicious. Fruit color well and trees are annually productive. Rated as fair fruit quality in Vermont. Fruit have very hard flesh; skin is slightly thick, tough, dry, waxy. May be more acceptable in areas where Jonathan is a preferred cultivar. Susceptible to cedar apple rust, but moderately resistant to mildew and fire blight.

Liberty - (PRI 54-12 X Macoun): Mid-season red apple maturing with Empire. Probably one of the best scab-resistant cultivars for the McIntosh growing region. Trees are consistently productive (equal to Empire) with good

winter hardiness. Flavor and quality are excellent when picked at the right time, but harvest window may be narrow. Fruit left on the tree too long soften rapidly, develop an off-flavor, and may drop. After hot growing seasons, fruit are very acid at the optimum harvest date but eating quality improves after several weeks of storage. Fruit tend to be small if trees are not adequately thinned. Mature trees on M.9 have been difficult to thin in eastern NY, but adequate thinning was achieved with 10 ppm NAA at 4-5 mm fruit size in Vermont. Fruit may develop brown core if held more than 3-4 months in regular cold storage.

Macfree - (McIntosh X PRI 48-177): Mid-season red apple. Trees are susceptible to mildew and cedar apple rust. Tendency to be biennial. Fruit coloring is a problem in southern areas just as with McIntosh.

Nova Easygro - (Spartan X PRI 565): Early-mid season dark red fruit matures with McIntosh. Rated fair quality in Vermont; eating quality improves with storage. Some fruit russetting has been noted in older trees. Fruit coloring is a problem in southern areas just as with McIntosh. Only moderately productive.

Novamac - (McIntosh X PRI 1018-3): Early-mid season red apple maturing with McIntosh and sharing flavor, texture, and premature drop characteristics with McIntosh. Considered only fair quality in Western NY.

NY 73334-35 - (Liberty X Delicious): Very large dark red fruit maturing after Delicious. Many fruit develop parthenocarpically. Some irregularly shaped fruit. Not as precocious as Liberty or Empire. Unusually large size may make fruit attractive for direct-market sales.

NY 65707-19 - (Spartan X NY 140-9): Late-season red fruit maturing after Delicious. Fruit is extremely attractive, very "typey"; resembles Delicious in appearance and texture. Fruit stores very well, but flavor is considered too mild by some.

NY 66305-139 - (NY 55140-9 X NY 45500-3): Good quality, mid-August red apple, but may not be highly productive.

NY 75414-1 - (Liberty X Macspur): Mid-season red apple maturing between McIntosh, and Delicious. The Macoun appearance, flavor, and fruit crispness of this selection have attracted attention, but a "chalky" aftertaste has been noted under certain growing conditions. Tree habit is very upright; branches on young trees break out relatively easily during spreading. Scarf-skin and the conspicuous light-colored lenticels may reduce attractiveness of fruit. Fruit retains flavor and crispness during 5-6 months of regular cold storage, but fruit may shrivel like Golden Delicious if relative humidity of storage is too low. Fruit are susceptible to moldy core. Trees are less precocious than Empire and Liberty.

NY 74840-1 - (NY 58524-1 X Empire): Mid-season red apple matures with Delicious. Fruit resemble Empire in appearance, but are somewhat larger and considerably more acid at harvest. Eating quality is best after fruit have been stored for a month or two. Trees have been highly productive at Geneva, only modestly productive in Vermont. May be biennial if not thinned.

Prima - (PRI 14-510 X NJ 123249): Early-season red-orange apple matures with Jonamac. Rated as a fair to good-quality SRC in Vermont, poor quality (soft, rough finish) in Maryland. Requires multiple harvests. High susceptibility to cedar apple rust limit its usefulness where rust is a problem. Lacks winter hardiness required for some northern climates.

Priscilla - (Starking Delicious X PRI 610-2): Mid-season dark red apple matures with Empire. Fruit develops 70-90% red blush over pale yellow background. Flesh is firm, pale creamy colored, medium grained, crisp, juicy, with sweet, aromatic, somewhat licorice-like flavor. Resistant to rust, mildew, and fire blight.

**Redfree** - (Raritan X PRI 1018-101): Early season red cultivar matures with Paulared, has good eating quality for an August apple, and is generating increased interest among commercial growers. Redfree is sweeter, less acid than Paulared; unusually crisp for a summer apple, though quality may vary from year to year. Trees are low in vigor; small fruit size may be a problem. Resistant to cedar apple rust, but only moderately resistant to mildew and fire blight.

**Sir Prize** - (Tetraploid Golden Delicious X PRI 14-152): Late mid season yellow apple matures with Delicious; bruises very easily and therefore is unsuitable for standard commercial packing. Triploid. Susceptible to cedar apple rust, but moderately resistant to mildew and fire blight.

**Williams Pride** -(PRI 1018-101 X NJ 50): Early-season red-purple apple ripens before Paulared; somewhat uneven ripening with fruit sometimes showing water core or bitter pit. Fruit quality may vary with the summer growing conditions. Resistant to cedar apple rust, moderately resistant to mildew and fire blight.

***Advanced selections that were previously listed in the Management Guide for Low-Input Sustainable Apple Production, but which are no longer recommended for planting:***

NY 61345-2: No longer recommended for trial because of inferior fruit quality, problems with fruit cracking.

NY 66305-289: Discontinued because of rather unattractive appearance, average performance, and susceptibility to mildew.

NY 74828-12: Attractive pale red fruit with good flavor ripening with or slightly before McIntosh. Reported to make an excellent pink applesauce in Vermont. Trees set heavy annual crops and require thinning. Discontinued because the fruit softened very quickly after harvest and because a high proportion of the fruit developed symptoms of sunburn during the last few weeks before harvest. Sunburn symptoms may be virus-induced (dapple apple virus?) and were less severe in Vermont than in eastern NY. Susceptible to one race of scab.

NY 75441-67: Discontinued because fruit developed severe net russetting and cracking at many locations where this selection was evaluated.

***Information on cultivars not previously listed in the Management Guide for Low Input Sustainable Apple Production:***

Co-op 28 - (PRI 1982 X Prima): Variable but medium-sized red apple matures with McIntosh. Tree is vigorous, upright and spreading, somewhat limber, with blind wood in basal portions of branches. Fruit are oblate-round to round or short conic, slightly striped 50-90% medium red over yellow ground color. Flesh is cream-colored, very crisp and breaking, with medium to slightly coarse grain, moderately juicy, mildly subacid to sweet, slightly spicy. Flavor, flesh, and appearance are similar to Prima, but with less acid. Fruit retains firm crisp texture throughout storage. Very susceptible to fire blight and has a tendency toward biennial bearing.

Co-op 32: Medium sized, yellow apple maturing in early August; pleasant, mild summer apple with a smooth, attractive finish; quality and shelf-life is significantly better than 'Lodi' or 'Yellow Transparent'.

Co-op 33: Small-sized red apple maturing one week before Delicious. Exceptionally crisp, breaking flesh texture and excellent flavor at harvest.

Co-op 34: Medium-sized red apple maturing one week after Delicious. Annually productive. Conic-shaped fruit has 'Jonathan'-like quality and appears well adapted to the mid-west.

Co-op 35: Yellow apple maturing with Rome. Flavor is mild and pleasant with crisp breaking flesh. Fruit size is smaller than 'Golden Delicious' but storage-life is superior .

Co-op 36: Yellow apple maturing with Rome. Flavor is mild and pleasant with crisp breaking flesh. Fruit size is smaller than 'Golden Delicious' but storage-life is superior .

Co-op 37: Yellow fruit matures with Rome; fruit has a full rich, complex flavor; crisp and breaking yet melting flesh type; fruit size is smaller than 'Golden Delicious' but storage life is superior.

GoldRush (formerly Co-op 28; Golden Delicious X Co-op 17): Medium-sized yellow- bronze apple maturing after Rome and 3-4 weeks after Delicious. Fruit are ovate and regular, greenish yellow at harvest turning to deep yellow in storage, sometimes with a fine net-like russet. Skin is nonwaxy, tender, thin to medium in thickness with conspicuous russeted lenticels. Flesh is pale yellow, medium coarse-grained, firm, very crisp with a complex, spicy flavor. Eating quality is very good at harvest and improves to excellent in storage. Stores at least 7 months at 1 C, but may shrivel slightly. Trees are susceptible to cedar apple rust, slightly upright, moderately vigorous, with limited branching, semi-spur bearing habit, and some biennial tendency. Fruits hang well on the tree even when over-ripe. Late maturity may limit its northern adaptability.

Moira - (McIntosh X DG22-81): Late-season dark red apple maturing after Delicious. Released from the Agriculture Canada breeding program in Trenton, Ontario. Fruit are moderate in size, round to round-conic, lightly ribbed, medium to dark red over a greenish-yellow ground color. Flesh is cream-white and slightly coarse. Tree is moderately vigorous, resistant to cedar apple rust, but susceptible to mildew, fire blight, and quince rust.

Nova Spy: Fruit are similar to Northern Spy, with red blush or stripes on greenish- yellow background. Flesh is creamy yellow, fine-grained, very firm, crisp, juicy, and moderately acid. Considered a promising new SRC. Moderately resistant to mildew, but susceptibility to fire blight and rust diseases is unknown.

NY 75413-30 - (Liberty X Starking): Very large dark red apple reported to mature with Delicious at Geneva, but maturing slightly ahead of Empire in the Hudson Valley in 1994. Fruit are slightly oblate in shape. Flesh is cream colored, firm crisp and juicy. Flavor is slightly astringent, but may mellow with storage. Stores well. Trees are vigorous and productive. Many fruit develop parthenocarpically, and some unevenness in fruit shape has been noted. Considerable fruit drop has occurred during wind storms when fruit are left on the tree too long. Not as precocious as Liberty or Empire.

NY 79529-7 - (NY 66305-259 X Empire): Late-season red apple maturing with Golden Delicious. Fruit resembles Empire, but with a more acid flavor.

NY 81204-42 - (Empire X NY 65707-19): A large fruited McIntosh type that is productive and good quality. Will not color well in low light conditions.

Priam: Red fruit maturing about a week before Delicious. Fruit moderate to large in size, round-conic, with a moderately tough skin, flush red over a greenish-yellow ground color. Flesh is fine-textured, crisp, acid. Eating quality is better after storage. Of interest in Europe where a late-ripening, highly acid cultivar was desired. Susceptible to mildew. Not available in the US.

Pristine -(formerly Co-op 32; Co-op 10 x Camuzat): Medium-sized, yellow apple maturing with Lodi in late July to early August. Pleasant, mild flavor with a smooth attractive finish. Quality and shelf-life is significantly better than Lodi or Yellow Transparent. Wood is limber, resulting in drooping tree habit. Susceptibility to other diseases is unknown.

Richelieu - (Ottawa 521 X 11-51): Medium sized fruit, 60-65% red on light green background, mature one week before McIntosh. Fruit are oblong conical with crisp, juicy, white flesh, mild to sub-acid with high sugar and aroma. Tree is medium vigor, spreading, precocious, annually productive, moderately resistant to mildew and fire-blight, but very susceptible to cedar apple and quince rust.

Rouville - (52-05-312 X 69-52): Large, 75% red fruit with pale green-yellow ground color. Fruit are oblate, symmetrical, somewhat ribbed with white to cream-colored, juicy, slightly coarse flesh. Flavor is sub-acid with high sugar and tannin content. Fair quality, dual purpose-fruit. Tree is vigorous, semi-spreading, precocious, annually productive, cold hardy, but susceptible to race 5 of apple scab.

Trent: Dark red, very late maturing cultivar from the Agriculture Canada program in Ontario. Flesh is firm, juicy, cream colored with greenish tinge, and slightly, coarse. Tree is vigorous, upright, susceptible to cedar apple rust and quince rust. Fruit are moderate to large, round to slightly conic, medium to dark red with faint striping over a greenish-yellow ground cover. Prone to bitter pit.

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### **Recent Publications About SRCs:**

The Northeast SARE Apple Production Project has published eight issues of *The Northeast Sustainable Apple Production Newsletter* since 1989. Some of the more recent newsletter articles relating to SRC culture and quality are cited below:

Brown, S. 1990. An overview of the best scab-resistant cultivars from New York. *Northeast LISA Apple Production Newsletter* 1(2):1-2.

Clements, J. Cowgill, W., Costante, J. Heleba, D., Berkett, L., Granger, R.L. 1993. Scab resistant apple cultivars have the right stuff in Canada and the U. S. *Northeast Sustainable Apple Production Newsletter* 4(1): 22.

Clements, J., Cowgill, W., Costante, J., Heleba, D., Berkett, L., and Granger, R. L. 1993. Scab resistant apple cultivars have the right stuff in Canada and the US.

*Northeast Sustainable Apple Production Newsletter* 4(1):22-23. Costante, J. F., Berkett, L. P., and Clements, J. 1990. Scab-resistant cultivars: the good, the bad, and the ugly. *Northeast LISA Apple Production Newsletter* 2(1):4-5.

Costante, J. F., Berkett, L. P., and Clements, J. 1992. Liberty tops in taste!. Northeast LISA Apple Production Newsletter 2(3):10.

Costante, J., Berkett, L., and Clements, J. 1994. Liberty thinning experiment yields positive results. Northeast Sustainable Apple Production Newsletter 5(1):9-11.

Crosby, J. A. 1990. Five new disease-resistant apple selections released by Purdue, Rutgers and Illinois. Northeast LISA Apple Production Newsletter 2(1):1-3.

Polk, D. F., Durner, E. F., and Rizio, E. F. 1994. Reduced spray trials for scab resistant apples in New Jersey. Northeast Sustainable Apple Production Newsletter 9(1):4-6.

Polk, D. F., Durner, E. F., Goffreda, J. C., and Rizio, G. F. 1992. Consumer acceptance trials with named and numbered disease resistant cultivars in 1991. Northeast LISA Apple Production Newsletter 2(3):3,11.

Prokopy, R. J., Mason, J. Duan, J. J., Elliott, R., and Cooley, D. R. 1993. Second-level IPM in orchards of scab-resistant cultivars. Northeast Sustainable Apple Production Newsletter 4(1):13-15.

Rosenberger, D. A., Meyer, F. W., and Engle, C. A. 1993. Sooty blotch and flyspeck on 'Liberty' apples: Impacts of the diseases on projected value of the crop and unexpected impacts of summer fungicides. Northeast Sustainable Apple Production Newsletter 4(1):1-5.

Rosenberger, D. A., Meyer, F. W., and Engle, C. A. 1994. Are apple fungicides providing more benefits than generally recognized? Northeast Sustainable Apple Production Newsletter 5(1):6-9.

Rosenberger, D. A., Meyer, F. W., and Engle, C. A. 1994. Rust-induced leaf spots and powdery mildew on scab-resistant apple cultivars are affected by planting location. Northeast Sustainable Apple Production Newsletter 5(1):1-3.

The Northeast SARE Apple Production Project sponsored a workshop on SHCs in January 1993 and proceedings from the workshop were published in the January 1994 issue of *Fruit Varieties Journal*, vol. 48, pages 33-57. Articles from the proceedings which contain information or data that might be of immediate interest to growers are listed below:

*An Explanation for Reports of Apple Scab Infection on Fruit of NY 74828-12.* S. K. Brown and L. P. Berkett.

*Disease Management of Scab-Resistant Cultivars.* L. P. Berkett, J. F. Costante, K. N. Bower, J. M. Clements, and D. Schmitt.

*Super-Marketing and Tasting 'Liberty' Apples in Vermont.* J. M. Clements, J. F. Costante, and L. P. Berkett.

*Seven Disease Resistant Apple Selections Released for Grower Testing.* J. A. Crosby, J. Janick, P. C. Pecknold, S. S. Korban, S. M. Hies, J. Goffreda, and A. Voordeckers.

*Promising Scab Resistant Apple Selections for Quebec, Canada.* H. L. Granger, S. Khanizadeh, and O. Carisse.

*'Enterprise' and 'GoldRush,' Two New Disease-Resistant Cultivars.* J. A. Crosby, J. Janick, P. C. Pecknold, S. S. Korban, S. M. Hies, J. Goffreda, and A. Voordeckers.

*Arthropod Pest Pressure Among Several Disease-resistant Apple Cultivars.* D. F. Polk, E. F. Durner and E. F. Hizio.

*Using Disease-Resistant Apple Cultivars to Reduce Fungicide Applications for Disease Control.* W. H. Shaffer .

*Non-Target Effect of a Fungicide Spray Program on Phytophagous and Predacious Mite Populations in a Scab Resistant Apple Orchard.* K M. Bower, L. P. Berkett, and J. F. Costante.

*Disease Resistant Apple Cultivars: Twelve Years of Observations.* R. F. Heflebower and C. S. Walsh.

*A Maturity and Storage Study of Scab-Resistant Cultivars.* J. R. DeEll, and R. K. Prange.

*Early-Season Diseases Occurring on Scab-Resistant Apple Cultivars and Advanced Selections Grown in Southeastern New York State.* D. A. Rosenberger, F. W. Meyer, and C. A. Engle.

*Evaluation of Four New Scab-Resistant Apple Varieties Compared with 'Empire' in New York Orchards.* I. A. Merwin, D. A. Rosenberger, and C. Engle.

*Summer Fungicides Applied to 'Liberty' Apple trees Affect Timing of Autumn Leaf Drop and Effectiveness of Fruit Thinning with NAA the Next Year.* D. A. Rosenberger, F. W. Meyer, and C. A. Engle.

### Other Publications About SRCs.

Anonymous. 1994. A catalog of new and noteworthy fruits. New York State Fruit Testing Cooperative Association, Inc.

Autio, W. R. and Costante, J. F. 1992. Ripening and storage of the 'Liberty' apple. *Fruit Var. Jour.* 46:235-244.

Bonn, W. G. 1993. Response of apple and crabapple cultivars and lines to fire blight, 1992. *Biological and Cultural Tests for Control of Plant Diseases* 8:3.

Crosby, J. A., Janick, J., Pecknold, P. C., Goffreda, J.C., and Korban, S. S. 1994. 'Enterprise' apple. *HortScience* 29:825-826.

Crosby, J. A., Janick, J., Pecknold, P. C., Goffreda, J.C., and Korban, S. S. 1994. 'GoldRush' apple. *HortScience* 29:827-828.

## [Return to the UVM Apple Orchard](#)

modified September 6, 2000

UVM Apple Team