Cornell University
College of Agriculture
and Life Sciences

Five Important Apple Varieties Named by Cornell

IMPACTS 2006

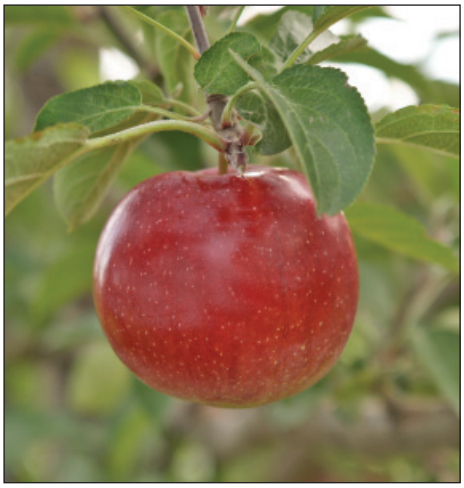
SUMMARY

Over the last century, apple breeders at Cornell have named 62 apple varieties. These added value and diversity to the New York apple industry until they were replaced by newer varieties. Some Cornell varieties continue to receive national and international recognition, and remain popular with consumers and growers to this day. Five of Cornell's best-known releases are 'Empire', 'Jonagold', 'Cortland', 'Macoun' and 'Liberty'. New York ranks second in the nation in apple production behind Washington, with 45,000 acres of apples under production, and a crop that was valued at $194 million in 2004.

THE ISSUES

Apple breeders at Cornell continue to integrate traditional breeding and more modern molecular techniques to genetically improve apple. Greater quality, better storage and shelf life, and reduced dependence on chemical control of insects and diseases have long been the goals of Cornell's apple breeding program. All varieties go through rigorous testing in Cornell orchards and commercial orchards before being named and released. Five of Cornell's most important apple varieties are profiled here: 'Empire', 'Jonagold', 'Cortland', 'Macoun', and 'Liberty'.

THE IMPACTS



Empire

- A hybrid of 'McIntosh' x 'Delicious', 'Empire' was named by Cornell in 1966, and is still very popular within New York, the U.S. and internationally.

In New York:

- The second most important apple variety being grown in New York, after 'McIntosh', is 'Empire'.
- In 2004, New York orchards produced 180 million pounds of 'Empire', nearly doubling the 1995 production of 95 million pounds.
- 'Empire' is the leading export variety for New York growers, representing 60.7 percent of total apples exported in 2004/2005, with a total of 23.8 million pounds shipped to four countries—the United Kingdom, Canada, Ireland, and Panama.
- In 2001, there were over 4,800 acres of 'Empire' representing a total of more than one million trees planted in the state.

- From 1988 to 1990, 27 percent of all apple trees planted in New York were 'Empire'.

- In the late 1980s, New York growers planted more than 50,000 'Empire' trees annually.

In the U.S.

- 'Empire' ranks #9 in U.S. production.

- From 1996-2004 the annual production of Empire in the U. S. averaged 4.2 M bushels with a fresh market value of 41.1 million dollars.

- New York growers produce 50 percent of the total U.S. 'Empire' crop.

Worldwide:

- In 2000, 'Empire' ranked 17th worldwide (China excluded) with production of 118 thousand metric tons.

Interesting facts:

- 'Empire' received the Outstanding Fruit Cultivar Award from the American Society for Horticultural Sciences' Fruit Breeding working group in recognition of its importance to the fruit industry.

- 'Empire' is one of the apples being used in McDonald's newly packaged fresh cut slices, "Apple Dippers." McDonalds is now the largest purchaser of apples in the U.S.

- 'Empire' is a parent of the 'Fortune' apple that was released by Cornell in 1995.

- In 2003, 12,000 pounds of 'Empire' were featured in the largest 'Pride of New York' apple display at Wal-Mart.

Jonagold

- A hybrid of 'Jonathan' x 'Golden Delicious', 'Jonagold' was named in 1968, and is still in production today.

In New York:

- In 2001, over 319,000 trees of 'Jonagold' were planted in New York on 1,225 acres.

- From 1996-2000, 'Jonagold' production in New York averaged 523,000 bushels with a farm value of 3.8 million dollars.

- In 1995, New York production was 14.1 million pounds, and Washington State production was 14.9 million pounds.

- 'Jonagold' is the apple featured in Harry and David's fruit baskets, heralded for their quality.

Worldwide:

- 'Jonagold' is one of the major varieties grown worldwide. It ranks 6th overall, with production of 1,078 thousand metric tons. (Note: China excluded).

- 'Jonagold' accounted for nearly 60 percent of apple production in Belgium.

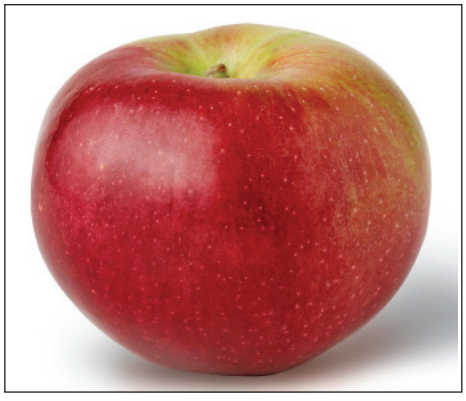
- In Tasmania, 'Jonagold' is the fourth top variety representing 8.9 percent of total production.
- 'Jonagold' is also an important variety in Japan, and is the third most important variety in Canada.

Interesting Facts:

- 'Jonagold' was judged the best dessert apple by 19 apple experts from nine countries (Norton, 1989).
- 'Jonagold' received the Outstanding Fruit Cultivar Award from the American Society for Horticultural Sciences' Fruit Breeding working group.
- Nearly 100 genetic strains, or mutations having redder fruit, have been identified, and tested redder strains are favored because consumers are attracted to well colored fruit.

Cortland

- A hybrid of 'Ben Davis' x 'McIntosh', 'Cortland' was named in 1915.
- Awarded the Wilder medal of the American Pomological Society.
- In 1965, 'Cortland' was the third most important apple cultivar grown in New York.
- In 2001, a total of 543,944 trees of Cortland were planted on 3,494 acres in New York.
- In 2004, 'Cortland' was the 6th top variety in New York, with 85 million pounds produced.
- From 2000-2004 the annual production of 'Cortland' in the U.S. averaged 2.3 M bushels with a fresh market value of 22.7 million dollars.
- Cortland is ranked fourteenth in production worldwide.
- 'Cortland' was released 90 years ago, yet is still popular with growers and consumers.
- 'Cortland' is known for cold hardiness, and is suitable for use in salads because its fl esh resists browning when cut.



Macoun

- A hybrid of 'McIntosh' x 'Jersey Black', 'Macoun' was named in 1923, and is still commercially available today.
- In 2001, over 200,000 trees of 'Macoun' were planted on over 1,000 acres in New York.
- 'Macoun' has a reputation with consumers as a high quality apple and thus it often receives premium prices.
- There has been renewed commercial interest in 'Macoun' sparked by the positive effect of 'Smartfresh' (MCP) on its storage life.

Liberty

- A hybrid of 'Macoun' x 'Purdue 54-12', 'Liberty' was named in 1978.
- The first scab-resistant apple cultivar named by Cornell, 'Liberty' was among the first 10 scab-resistant apples to be named in the U.S.
- 'Liberty' was chosen as the cultivar for the apple rootstock trials.
- 'Liberty' is used as a scab-resistant parent in many breeding programs worldwide, including those in Belarus, Germany, Italy and Latvia.
- 'Liberty's fire blight resistance, coupled with scab resistance, makes it useful as a control variety in evaluating plant resistance to disease.

Additional Apple Breeding Accomplishments through Cornell Research

- Published the first apple genetic linkage map.
- Identified molecular markers (tags) for fruit color.
- Developed markers for scab-resistance genes from several sources of resistance.
- Markers for plant architecture (columnar and weeping) will aid in our understanding of the genetics of branching.
- Studies on non-browning flesh and increasing vitamin C are important in developing new apple products such as fresh cut slices.
- Research on fruit quality traits such as juiciness and crispness will help in the development of apples that have qualities important to the consumer.

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