Minnesota Apple Trees

Growing Shorter in the 1950s

Jeff A. Jenson

Anyone driving along the beautiful Mississippi, St. Croix, or Minnesota River valleys during late summer or early autumn is bound to notice at least one apple orchard—more likely, several. Managers of these orchards undoubtedly possess different educational and professional backgrounds and widely divergent views on marketing their apples. However, the state's many commercial and backyard (homeowner) orchards share one obvious, common characteristic: Trees are relatively diminutive and can be picked, often entirely, from the ground.

The romance of Johnny Appleseed notwithstanding, commercial apple trees today are not grown from seed but from grafts. Grafting entails connecting a rootstock—a healthy root system (essentially, a stump) selected for particular characteristics, such as hardiness—to a desired variety of apple. The result is one tree created from at least two different plants. Size-controlled dwarf rootstocks, as the name implies, produce trees that are shorter than the standard, ranging from five-feet to sixteen-feet tall, depending on type. The introduction of dwarf and semi-dwarf trees during the 1950s proved to be a watershed innovation in Minnesota, one that forever altered the style, form, and methods of growing, picking, and processing the state's apples.[1]

Planting and cultivation of apples in the region commenced in earnest during the 1850s, when large numbers of European American settlers began arriving in territorial Minnesota. Most orchards were located in the areas that became the southeastern portion of the state: present-day Dakota, Dodge, Hennepin, Houston, Rice, Wabasha, Waseca, Washington, and Winona counties. Not only did early settlement concentrate in these locations, but also growing conditions seemed hospitable there. These pioneers faced considerable obstacles

Tall ladders and long poles: harvesting apples, about 1910

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in learning how to best grow apples in their new surroundings, however. Southeastern Minnesota's somewhat moderate weather conditions led many to believe that their initial plantings would succeed. Their hopes were often dashed by hot summers and harsh winters.[2]

Early growers first started apple trees from seed. By 1900, almost all commercial orchardists were grafting desirable varieties onto what they hoped were hardier rootstocks.[3] Regardless of the method, many attempts ended dismally, often in tree death brought on by Minnesota's cold winters. Some great successes did occur, most notably Peter M. Gideon's propagation of the winter-hardy Wealthy apple, still grown today. But many would-be apple growers outside of the La Crescent area (Houston and Winona counties), with its bluff geography and the state's most moderate growing conditions, and the Lake Minnetonka region, home to Gideon, fared poorly.[4]

Orchardists sought to improve their chances by forming the Minnesota Fruit Growers Association in October 1866; this organization became the Minnesota Horticultural Society in September 1868. Through this group, they shared and disseminated information concerning soil types, apple varieties, shelter, orchard layouts, and propagation methods. In addition, the University of Minnesota (U of M) in 1908 created its Fruit Breeding Farm (now known as the Horticultural Research Center) expressly to breed and select resilient new apple varieties that could withstand the North Star State's substantial climatic extremes. Over the next several decades, a number of transitions occurred that made growing fruit trees more of a science than a game of blind chance.[5]

Influential University of Minnesota horticulturalist William H. Alderman

While the general appearance of apple trees remained fixed from the nineteenth into the twentieth century, important changes did occur. Hardier and tastier varieties were introduced, and the use of pesticides and herbicides became common practice. Still, though, trees remained tall and broad. The widespread transition to smaller (dwarfing) trees began in Minnesota much later than in other areas of the country and the world. Although the knowledge needed for growing them existed in the state's horticultural circles, Minnesotans continued cultivating traditional trees, in part because hardy dwarfing rootstocks suitable for the climate were, at best, scarce. Furthermore, horticulturists were unsure whether dwarf trees could survive the rigors of Minnesota's climate long enough to be profitable. (The average profitable lifespan of a commercial apple tree is 25 years or more.) As a result, prominent members of the university's department of horticulture avoided direct advocacy until the late 1950s.[6]

It is possible that the movement toward dwarfing would have begun earlier in the state had it not been for Dr. William H. Alderman, a professor at the University of Minnesota and the state's most influential horticulturalist. He warned against dwarfing rootstock in 1928: "In general, dwarf apples . . . are not recommended for Minnesota," he cautioned, because of "smaller bearing capacity" and unremarkable fruit quality.[7] Growers, by and large, followed this seemingly prudent

advice and continued planting traditional trees.

The status quo changed fairly quickly following the arrival in May 1953 of a British transplant named Gordon Yates. With a diploma from the Royal Danish Horticultural Society and previous experience managing a small orchard in Bridport, Dorset County, England, Yates was hired to manage Fruit Acres, a farm with about 75 planted acres located on a bluff above La Crescent. Intending to develop the business into a first-class orchard, he began, as he later wrote, "importing [dwarfing] rootstocks from England and Holland and started growing [his] own trees" after some ambitious site preparation: dynamiting rock outcroppings, filling gullies and ravines with the exploded rock, plowing and disking the land, seeding the orchard with appropriate grasses, and then, finally, planting trees. Yates was energetic, intelligent, and compelling. He became an active and prominent advocate of dwarf trees and helped form the Dwarf Fruit Tree Association in March 1958.[8]

It was during this same period that the U of M's department of horticulture altered past practice and began testing various dwarf rootstocks at its Fruit Breeding Farm near Chaska in Carver County. Size-controlled trees became practical in Minnesota only after a painstaking process of trial and error. During the mid-1950s, growers successfully grafted a preferred variety of apple onto an English rootstock called Malling IX and got a hardy dwarf tree. While the propagation process appeared to work, it remained difficult for growers to obtain appropriate rootstock from commercial dealers. Limited availability was due, in part, to competing demand from other areas of the country. In addition, there were lingering concerns about long-term hardiness in Minnesota's climate. Nevertheless, the conversion from traditional to size-controlled trees had begun.[9]

Articles published in the *Minnesota Horticulturalist* and surveys of the state's commercial orchards chronicle the acceptance of dwarf trees and the ensuing transformation of Minnesota's apple-growing industry. In 1968 the Apple Tree Survey, a joint report by the state and federal departments of agriculture, revealed that no Minnesota growers had planted dwarf trees before 1955. From that year through 1959, however, orchardists around La Crescent

Apple-blossom time for some of the state's first semi-dwarf trees, La Crescent area, May 1958

planted 2,401 controlled rootstocks, and growers elsewhere in the state added 1,105 to the total. While the largest enterprises, located in Minnesota's southeastern counties, had initiated the move to dwarfing rootstock, orchardists in the other apple-growing regions of the state soon followed. St. Croix-area growers and those in nearby semirural environs of the Twin Cities—all on relatively confined acreages—became active proponents of dwarfing.[10]

By the start of the 1960s, the large orchards in the La Crescent area led the state in apple production. With 39 percent of Minnesota's orchards, this region accounted for 53 percent of its apple trees, prompting local boosters to promote the town by nicknaming it Minnesota's Apple Capital. The other leading apple region was the St. Croix area, primarily Washington County. By 1974, orchards in this growing zone had 47 percent of the state's dwarf trees.[11]

The movement from standard to dwarf trees brought with it changes in harvesting and storing. In past eras, picked apples could be kept for a limited time either in cellars or the coolest areas of barns. This practice, albeit somewhat restrictive and too dependent on unregulated ambient temperature, worked well enough when production was limited and local consumers or markets purchased much, if not most, of the produce. But unlike standard trees, apple varieties on dwarfing rootstocks bore at a younger tree age, exhibited precocious early growth, and were planted at high tree density, resulting in much more fruit on many more trees per unit area of land.[12]

Bulk production, the holy grail of modern agriculture, altered the status quo. Growers now had to find innovative methods of handling forthcoming harvests. As the number of apples increased, so did the space needed to store them—at the same time that the ability to sell most of the crop locally decreased. The smaller orchards, primarily in the St. Croix region, could still move their increased harvests through the traditional retail networks of roadside and grocery-store sales. But the large fruit farms from Lake City downriver to La Crescent, increasingly dependent on wholesalers, could not distribute their greater quantities of fruit rapidly enough. Increased yields necessitated the construction of larger packing facilities, often with costly cold-storage rooms where the harvest could be processed and held without spoiling until purchase orders arrived.

These buildings were expensive and constituted a substantial long-term investment. At Yates's farm, Fruit Acres, the estimate to build its cold-storage facility totaled $100,000 in 1958, the year that the orchard posted its largest gross profit to date: $85,000.[13] At the time, Fruit Acres was the state's largest orchard with approximately 400 acres; its facility was completed in 1960. Some businesses could not manage the changes accompanying this evolution, however, and were forced to close. Nevertheless, construction of cold-storage buildings began at some large fruit farms, mostly from Lake City to La Crescent, during the late 1950s and early 1960s.[14]

Growers also sought new methods of getting fruit off of the trees and out of the orchards. The time-honored practice of climbing large

Some Minnesota Apples

In 1908 the University of Minnesota's Fruit Breeding Farm was established specifically to develop winter-hardy apples, the "King of Fruits," for the state. A remarkable number of its apples are still favorites today, while the farm, now called the Horticultural Research Center (administratively merged with the nearby Minnesota Landscape Arboretum) continues breeding new apples and many other kinds of fruit, as well.

Minnehaha	1920	Regent	1964
Folwell	1922	Honeygold	1969
Wedge	1922	Red Baron	1969
Haralson	1923	State Fair	1978
Beacon	1936	Sweet Sixteen	1978
Prairie Spy	1940	Keepsake	1979
Minjon	1942	Honeycrisp	1991
Victory	1943	Zestar!	1998
Fireside/Connell Red	1943	SnowSweet	2006
Redwell	1946	Frostbite	2008
Oriole	1949	SweeTango	2009
Lakeland	1950		

Sources: Minnesota Landscape Arboretum Horticultural Research Center Fact Sheet, 2005 (see footnote 5), supplemented by *www.apples.umn.edu/varieties.html.* In some cases the dates refer to final development; in others, introduction to the market.

Harvest scene: Gordon Yates with backdrop of bulk bins, Fruit Acres loading dock, September 1966

ladders and packing apples on the spot into bushel baskets was inefficient for handling increased quantities of fruit. Dwarf trees decreased the need for workers to spend time hauling the awkward, heavy ladders traditionally used to reach ripe fruit. Harvesting from the ground or on more manageable ladders became commonplace and resulted in faster picking rates. As a result, many orchardists began using bulk bins to bring apples from the orchard inside for cleaning and packing or for storage in their new, air-conditioned warehouses. To move and stack the bins, growers had to purchase forklifts and related equipment such as bin trailers, bin fillers, and specialized handling equipment.[15]

Important choices made during the 1950s resulted in the rapid transformation of the state's orchards and helped create Minnesota's modern apple industry. Once academic horticulturists and orchardists overcame the obstacles of climate, supply, and propagation methods, dwarfing rootstocks became popular in the state for many reasons. They allowed trees to bear apples sooner, increased tree density per acre and thereby resulted in more bearing surface per acre of land, sped up the harvesting process, and provided more robust yields of high-quality apples.

The appearance of Minnesota's orchards changed as a result, as did the appearance of the industry. Two distinct types of fruit farms emerged from the traditional mix as growers veered away from conventional large trees on seedling rootstocks. Orchardists with large farms built or expanded facilities, purchased the implements and machinery needed to process bigger harvests, and increasingly sold their harvests to wholesalers. If expenses could be met, these growers improved their economies of scale and remained viable. Orchardists with smaller fruit farms, located primarily in the outer environs of the state's urban core or near heavily traveled roadways, benefited by being able to raise more trees on limited tracts without having harvests sizable enough to require large storage facilities or expensive

new equipment. They had ample fruit to stock roadside stands and supply markets, even if a portion of their produce came, as earlier, from the state's larger fruit farms. For growers managing middle-sized orchards, however, the picture was not so rosy. The upfront costs of moving to bulk production were prohibitive for them, and these orchards—along with those without long-term plans—ceased operations.[16]

The groundbreaking efforts of Gordon Yates and University of Minnesota horticulturists during the 1950s helped transform the way Minnesota's orchards were planted and how its fruit was warehoused and distributed. The commitment to controlling size has continued unimpeded for the last 50 years, and today, approximately 90 percent of the state's apple trees are grown upon dwarfing rootstocks.[17] ▣

Notes

1. Although there are distinct differences between dwarf and semi-dwarf trees, the two types—and other, similar variations—are all referred to as dwarf trees in this article. There are hundreds of apple varieties or cultivars, but most are not suitable for Minnesota; for a fairly thorough list, see *www.allaboutapples.com/varieties/* (accessed Dec. 17, 2010).

2. Emily Hoover, David Bedford, and Doug Foulk, "Apples for Minnesota and Their Culinary Uses" (2000), *http://www.extension.umn.edu/distribution/horticulture/DG1111.html* (accessed Dec. 17, 2010). Perhaps the first apples grown successfully in Minnesota came from a tree Rev. Gideon Pond planted in Bloomington in 1844; W. H. Alderman and A. E. Hutchins, "Outline of History of Minnesota Horticulture," *Minnesota Horticulturist* 86 (June 1958): 71.

3. Growers dabbled with root grafting prior to statehood, but the process proved expensive, and early efforts often failed. J. S. Harris, "Progress in Horticulture," *Minnesota Horticulturist* 27 (1899): 451–52; W. G. Brierley, W. J. Koppen, and G. A. Pond, *The Cost of Producing Apples in Minnesota, 1916–1920* (St. Paul: University of Minnesota Agricultural Experiment Station, Apr. 1924), 7.

4. Edgar C. Duin, "Peter M. Gideon: Pioneer Horticulturist," *Minnesota History* 44 (Fall 1974): 96–103.

5. Alderman and Hutchins, "History of Minnesota Horticulture," 70–77; Duin, "Peter M. Gideon," 98–99; Jeff A. Jenson, "The Expansion and Contraction of La Crescent-Area Apple Orchards" (master's thesis, Minnesota State University, Mankato, 2003), 10–30; Minnesota Landscape Arboretum Horticultural Research Center, Fact Sheet (Sept. 2005), *www.arboretum.umn.edu/UserFiles/File/Arb_HRC_Fact_Sheet_9_2005.doc* (accessed Dec. 17, 2010).

6. Samuel B. Green, *Apples and Apple Growing in Minnesota* (St. Anthony Park: University of Minnesota, July 1903), 1–3, 5; E. Ferrand, "Cordon Dwarf Apple Trees," *The Horticulturalist and Journal of Rural Art and Rural Taste* 21 (1866): 143–44; J. D. Winter, "Dwarf Fruit Trees for Home Planting," *Minnesota Horticulturalist* 85 (May 1957): 51, which also discusses propagation and commercial usage. Lifespan from Minnesota Agricultural Experiment Station, "Minnesota Impacts," 2003, *www.mnimpacts.umn.edu/impact.aspx?impactId=242* (accessed Dec. 21, 2010).

7. W. H. Alderman, "Dwarf Fruit Trees in Minnesota," *Minnesota Horticulturist* 56 (Nov. 1928): 342–43.

8. *Commercial Grower*, Jan. 15, 1960, n. p.; Gordon Yates, "Fruit Acres: A Brief History" (internal business document, Fruit Acres, Inc., Fall 2001): 3–4; *Houston County News*, Jan. 16, 1986, p. 1; *La Crescent Times-Hokah Chief*, Mar. 13, 1958, p. 1.

9. Winter, "Dwarf Fruit Trees," 51.

10. Minnesota and U.S. Depts. of Agriculture, Crop and Livestock Reporting Service, "1968 Apple Tree Survey Selected Growing Areas in Minnesota," 5; Leonard B. Hertz, "Minnesota Apple Tree Survey Completed in 1974," *Fruit Growers' Letter*, Jan. 1975, n. p. Some home and commercial growers had, in fact, experimented with dwarfing rootstock before 1955. For example, in 1974 Aamodt's Stillwater Orchard had a stand of size-controlled trees that had been planted in 1904; Leonard B. Hertz, "Minnesota—Wisconsin Summer Orchard Tour," *Fruit Growers' Letter*, July 1974, n. p.

11. "1968 Apple Tree Survey," 5; Minnesota and U.S. Depts. of Agriculture, Crop and Livestock Reporting Service, "Minnesota Apples—1962," 3, and "1974 Apple Tree Survey: Selected Growing Areas in Minnesota," 3; Hertz, "Survey Completed in 1974," n. p. The percentage of dwarf trees in the St. Croix area is interesting, since the total number of trees there ranked behind both the La Crescent and Red Wing—Rochester zones.

12. Here and below, La Crescent Apple Festival Committee, *1961 Apple Festival* (La Crescent: privately printed, 1961), 12; Yates, "Fruit Acres," 5; E. G. Dean, C. J. Haines, and Jewell Nurseries, *Lake City, Minnesota* (Lake City: Lake City Centennial, 1972), 23–24.

13. Yates, "Fruit Acres," 5.

14. Orchards with cold-storage facilities included Fruit Acres, Little Swiss Fruit Farm, and Old Hickory Orchard in La Crescent and Southwind Orchard in Winona County. During the 1960s Bremer's Orchard and Courtier's Orchard in the Lake City area also built refrigerated warehouses. La Crescent Apple Festival Committee, *1961 Apple Festival*, 12; Yates, "Fruit Acres," 5; Dean, Haines, and Jewell Nurseries, *Lake City*, 23–24. Closures began occurring somewhat more regularly by the late 1960s and 1970s, according to information gleaned from various Apple Tree Surveys (wherein regional definitions fluctuate) and listings of local orchards in La Crescent Apple Festival booklets.

15. Yates, "Fruit Acres," 7. Growers facing equipment outlays learned about additional financial benefits in their statewide trade publication, the *Fruit Growers' Letter*, issued by the University of Minnesota Agricultural Extension Service. A Washington State study showed that pickers working in dwarfed orchards averaged 18.1 boxes per hour versus 11.7 on standard trees and that each additional foot in ladder height reduced picking rates by a factor of .4 per hour; *Fruit Growers' Letter*, Jan. 1973, p. 4.

16. Hertz, "Survey Completed in 1974," n. p.

17. Minnesota and U.S. Depts. of Agriculture, "1999 Apple Tree Survey," *Minnesota Ag News* (St. Paul, 2001), 3.

The photo on p. 195 is courtesy Ralph Yates. All other images are in MHS collections.

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