

Heritage Apple Cultivars Grown in Homesteads, Nurseries and Orchards in Wyoming

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Abstract

Apples (*Malus x domestica*) played a significant role in America's westward expansion. Heritage apple trees can still be found in old orchard plantings and abandoned homesteads that were established during the 19th and early 20th centuries. In Wyoming, there are reports of 29 cities where apples were grown from the beginning (1870) to the rapid decline (1940s) of apple production. According to our review of the literature, 218 apple cultivars were tested or successfully grown in Wyoming's cold, windy and drought-prone climate between 1870 and 1940. Sixty-two of the 218 cultivars reported in Wyoming Agricultural Bulletins (WGB) and University of Wyoming Experimental Fruit Farm Station Bulletins (EFFB) originated from Russia, Wisconsin and Minnesota. 'Wealthy' was the most frequently mentioned cultivar in the historic literature and was prized for being successful across Wyoming's rugged landscape. Although trees from the 1800s and early 1900s can still be found in Wyoming, many of the largest orchards have experienced substantial losses over the last half century. Current conservation efforts seek to capture the cultivar diversity of Wyoming's heritage apple varieties.

Lander, Wyoming, or "Apple City", at one time consisted of over 4700 trees of 207 cultivars and comprised over 90% of the state's apple diversity (Magby and Miller, 2018; Miller, 2014; Wyoming Archives, 2015). Recognizing that only 3% of the original apple trees remain in Lander today, an effort has been underway to document and conserve what remains of this and other heritage apple orchards in Wyoming. A review of the Wyoming Agricultural Bulletins (WGB) and University of Wyoming Experimental Fruit Farm Station Bulletins (EFFB), as well as regionally available nursery catalogs, revealed the names and sources of heritage apple cultivars that were planted in Wyoming's homesteads, orchards and nurseries as early as 1870.

Heritage Apples in Wyoming

The passage of the Homestead Act (1862) and Timber Culture Act (1873) encouraged Americans to move west and claim land. The Homestead Act allowed U.S. citizens to lay claim to 160 acres of surveyed govern-

ment land once they proved residency and improvement of their land over a five-year period (Dolan, 2009; Potter and Schamel, 1997). The Timber Culture Act additionally granted 160 acres of free land to homesteaders that were looking to improve the land by planting trees for wood and fuel for newly developing towns (Goetz, 2013). The first documented apple trees and orchards were planted in Wyoming in the late 1870s to early 1880s.

The state of Wyoming has some of the driest and coldest winters in the lower forty-eight states, with a ranking of fourth in average low temperature and fifth in average low precipitation (Magby et al., 2018; NOAA, 2018). In Wyoming, the city of Laramie reports the lowest mean temperature (5.1 °C) and the city of Wheatland (9.8 °C) has the highest mean temperature (US Climate Data, 2018). In comparison to Wyoming, Washington's five main apple growing regions; Okanogan, Lake Chelan, Wenatchee Valley, Columbia Basin (e.g. Douglas, Grant,

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Lincoln, Adams, Franklin, Whitman and Spokane Co.) and Yakima Valley report an average mean temperatures of 6.8 °C and precipitation of 47.41 cm (e.g. 5.1 °C, 26.39 cm; Magby et al., 2018; NOAA, 2018, Washington Apple Commission, 2018).

Although apples are not usually grown in conditions such as those experienced in Wyoming, remnants of apple orchards from the late 19th and early 20th centuries have survived in Wyoming's rugged landscape. Unlike most other ornamental and native trees, the apple provided food (i.e. eating or baking) and a means for making products (i.e. jams from the pectin, sweet and hard ciders, vinegar for preserving, medicine and even household cleaners) that were not easily found on the plains (Miller, 2014). Early Wyoming homesteaders relied on water provided by mountain streams to irrigate fruit trees. This technique was utilized at dude ranches like the HF Bar Ranch in Buffalo, Wyoming to produce fruit for Wyoming residents prior to modern irrigation techniques. At their prime, the largest Wyoming orchards produced apples for market sales, rootstock trees for local residents, and even selected new cultivars that improved yield and performance under Wyoming's cold and drought-prone conditions.

Nursery Sources

Historic orchard information was compiled from WGB and EFB bulletins that listed owners of in-state nurseries, orchards and homesteads, the names of apple tree cultivars, as well as the names of the registered out-of-state nurseries that provided planting materials to Wyoming between 1870-1940. A review of WGB and EFB that were published between 1897-1924 revealed 218 apple cultivars that were sold and/or grown in Wyoming. Of these, 11 different cultivars were produced and sold by Wyoming nurseries and 207 cultivars were from out-of-state sources. For a full list of the two hundred and eighteen cultivars reported in Wyoming (i.e. WGB and EFB) bulletins, see website

found in acknowledgment section. Included is the origin of each cultivar, the year cultivar was introduced or bred, the total citations found in Wyoming bulletins for each cultivar and their current availability in commercial orchards (A), conservation orchards (B) and USDA Malus germplasm collection (C). (Bussey and Whealy, 2016; Magby and Miller 2018; Nelson, 1905, 1907, 1909, 1912, 1915, 1916, 1918^{Jan}, 1918^{Dec} and 1924; University of Wyoming Agricultural Experiment Station, 1897). Lists of apple cultivars appearing in each of these registered out-of-state nurseries provided information about cultivars that were available for purchase. In total, 96 nursery catalogs from 17 states spanning thirty-two years (1889-1921) were used to describe popularity and reliability for finding known cultivars previously mentioned in WGB and EFB bulletins (Biodiversity, 1925). No additional historic nursery catalogs were recovered for in-state registered nurseries passed 1925 which was already mentioned in WGB and EFB bulletins for the cultivars that were grown.

Twenty nurseries in 11 Wyoming cities were registered to sell within state from the 1870s to the 1940s (Figure 1). The most southern locations of these were located in Lander and Casper, WY, with the remaining nine nurseries located north in Basin, Buffalo, Cowley, Kaycee, Lovell, Powell, Sheridan, Thermopolis and Worland, WY. The Duncan Grant Ranch Rural Historic Landscape in Wheatland, WY offered cultivars to Wyoming residents, but was not listed as a registered nursery in available EFB and WGB bulletins. This also includes G.W. Barlow of Sheridan, WY (e.g. mentioned in bulletins, but not listed), whose family originally homesteaded in Fort Collins, CO and sold apples along the Overland Trail through Laramie to Cheyenne, WY (Magby and Miller, 2018; Nelson, 1905, 1907, 1909, 1912, 1915, 1916, 1918^{Jan}, 1918^{Dec} and 1924; University of Wyoming Agricultural Experiment Station, 1897).

Seventy nurseries in 20 states were regis-

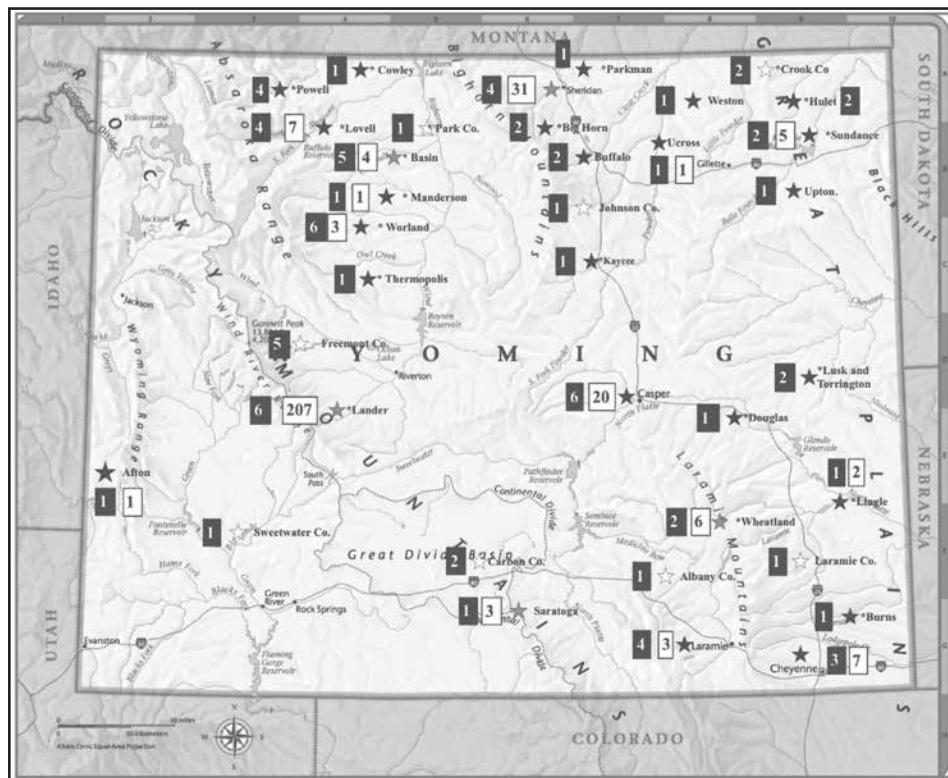


Fig. 1. Distribution of orchards, nurseries and homesteads reported across Wyoming cities in WGB and EFFB bulletins. Total cultivars grown (white box) and total locations (black box) reported in WGB and EFFB bulletins for Wyoming cities. First cities reported growing apples are denoted by (gray stars) and the locations reported by county (white stars) (map modified from National Geographic Society, 2014).

tered to sell to Wyoming residents from the 1870s-1940s (including twenty within the state of Wyoming). The most common out-of-state nurseries were in Nebraska, Colorado, Minnesota, Wisconsin and New York. The University of Wyoming Experimental Fruit Farm Station in Lander originally sourced cultivars from Greens Nursery in Rochester, NY and O.D. Shields Nursery in Loveland, CO after a heavy hailstorm killed most of the trees planted prior to 1907 (Magby and Miller, 2018; Nelson, 1905, 1907, 1909, 1912, 1915, 1916, 1918^{Jan.} 1918^{Dec.} and 1924; University of Wyoming Agricultural Experiment Station, 1897).

Key cultivars were provided by prominent

nurseries, including 'Wealthy', 'Gideon' and 'Martha' (Peter M. Gideon, Excelsior, Minnesota); 'Lodi', 'Cortland' and 'Empire' (New York Experiment Station); 'Haralson', 'Prairie Spy', 'Fireside', 'Regent', 'Oriole', 'Sweet Sixteen', 'State Fair' and 'Beacon' (University of Minnesota); and 'Charlamoff', 'Dolgo', 'Dutchess of Oldenburg', 'Hibernial', 'Lowland Raspberry' and 'Yellow Transparent' (Russia). For a list of the seventy out-of-state and twenty in-state nurseries registered to sell to residents of Wyoming from 1897 to 1924, see website link in acknowledgment section. (Bussey and Whealy, 2016; Magby and Miller, 2018; Magby et al., 2018).

Historic Orchards

Between 1870 and 1940, 29 cities and towns had orchards, registered nurseries, and homesteads with apple trees that were listed in WGB and EFFB bulletins (Figure 1; Magby and Miller, 2018; Nelson, 1905, 1907, 1909, 1912, 1915, 1916, 1918^{Jan}, 1918^{Dec} and 1924; University of Wyoming Agricultural Experiment Station, 1897). The Ed Young Orchard, in Lander, WY, dates to the early 1880s and was the first documented commercial orchard in Wyoming. It contained roughly 3,000 trees in its prime (1898), making it the largest orchard recorded in the state of Wyoming to date (Figure 2; Magby and Miller, 2018). By the turn of the century, Young's success inspired farmers and ranchers around the state to start their own orchards (Wyoming Archives, 2015). The Lander Experimental Fruit Farm was originally a homestead for William Nichols (1873), later purchased by the residents of Lander for the State Agricultural College (1892), and then donated to the University of Wyoming (e.g. University of Wyoming Lander Experimental Fruit Farm) in 1917 (Figure

3; Morneau et al., 2016). It was run by Superintendent John Steinbreck from 1907 until his death in 1939. The University of Wyoming (Lander) Experimental Fruit Farm was the second largest orchard (e.g. 1,700 trees) in its prime in 1924 and was the most diverse with at least 175 cultivars (Magby et al., 2018; Miller, 2014; Morneau et al., 2016).

Other prominent heritage orchards in Wyoming from the late 19th and early 20th centuries were the Duncan Grant Ranch Rural Historic Landscape (Wheatland, WY), Box Cross Ranch (Sheridan, WY), HF Bar Ranch (Buffalo, WY), Spea's Orchard (Casper, WY), Archer Field Station (Cheyenne, WY) and multiple other Experimental Fruit Farms located in Sheridan, Wheatland, Laramie and Sundance, WY. Apple trees can still be found growing and producing fruit at many of these locations despite the harsh winter conditions and frequent neglect over the last century (Magby and Miller, 2018; Nelson, 1905, 1907, 1909, 1912, 1915, 1916, 1918^{Jan}, 1918^{Dec} and 1924; University of Wyoming Agricultural Experiment Station, 1897).



Fig. 2. Past (A-B) and present (C) images of Ed Young Orchard, in Lander, WY (Magby and Miller, 2018; Nelson, 1905)

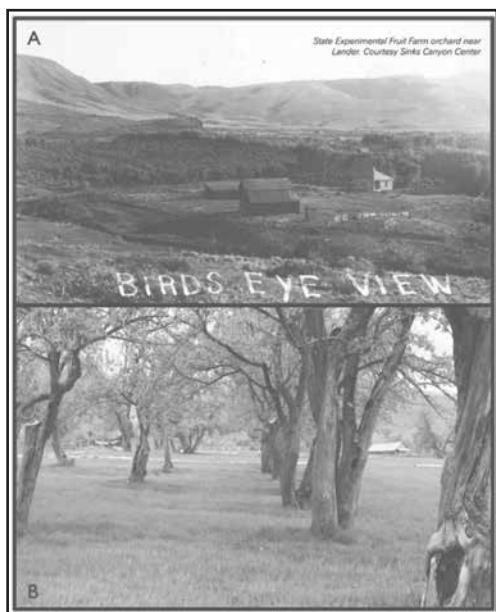


Fig. 3. Past (A) and present (B) images of University of Wyoming Experimental Fruit Farm Station in Lander, WY (Magby and Miller, 2018; Miller, 2014)

Cultivars of Wyoming

The 218 apple cultivars that were documented to be grown in Wyoming were originally bred or identified in 28 states and six different countries; (Bussey and Whealy, 2016). ‘Wealthy’ was the most frequently mentioned apple cultivar (44 citations) in WGB and EFFB, and is well known for its success in Wyoming’s rugged landscape (Magby and Miller, 2018; Nelson, 1905, 1907, 1909, 1912, 1915, 1916, 1918^{Jan}, 1918^{Dec} and 1924; University of Wyoming Agricultural Experiment Station, 1897). ‘Wealthy’ was offered in 87 of 96 out-of-state nursery catalogs that were registered to sell trees to Wyoming residents. ‘Yellow Transparent’ (76 citations), ‘Jonathan’ (75 citations), ‘Northwest Greening’ (63 citations), ‘Wolf River’ (59 citations), ‘Early Harvest’ (58 citations), ‘Whitney No. 20’ (58 citations), ‘Gano’ (56 citations), ‘Rome Beauty’ (56 citations) and ‘Duchess of Oldenburg’ (55 citations), com-

prised the remaining top ten cultivars that were offered in nursery catalogs from registered nurseries selling to Wyoming (Biodiversity, 1925).

Cultivars reported in Wyoming bulletins (218) were commonly introduced and/ or imported into the US between 1870 and 1940 or bred from locations with similar growing conditions to those in Wyoming. One hundred thirteen of 218 cultivars mentioned in Wyoming were either introduced or imported between 1850 and 1925, including 300 Russian cultivars imported by the United States Department of Agriculture in 1870 (Dolan, 2009). Cultivars ‘Bolham’, ‘Everette’, ‘Kerskovka’, ‘Lusovka’ ‘Vanhamb Winter’ ‘Scotts Winter’ and ‘Humbmans Favorite’ reported in WGB and EBB bulletins could be 1) synonyms of previously known cultivars not listed in pomological records or 2) unique cultivars missing from pomological records today.

Cultivars from Russia and Minnesota were most commonly reported in Wyoming bulletins, with Wisconsin coming in third. Other cultivars originating from New York and Canada were also highly successful in Wyoming (Magby et al., 2018). It is likely that a combination of popularity and origin affected the choice of cultivars that were being grown or tested in Wyoming. Along with suggestions from the Wyoming Horticultural Society bulletins, which listed viable cultivars for Wyoming (Magby and Miller, 2018; Nelson, 1905, 1907, 1909, 1912, 1915, 1916, 1918^{Jan}, 1918^{Dec} and 1924; University of Wyoming Agricultural Experiment Station, 1897).

Novel Cultivars

During the early 20th century, novel cultivars were developed in Wyoming by both the Ed Young Orchard and the University of Wyoming Experimental Fruit Farm Station in Lander, WY. Eleven cultivars were selected specifically for Wyoming’s cold, high elevation and drought-prone climate. Superintendent John Steinbreck at the Land-

er Experimental Fruit Farm named his cultivars 'Margaret', 'Brecksteinia', 'Fremont', 'Poposia', 'Mart', 'Nelson' (in honor of Aven Nelson, the longtime secretary of the Wyoming Horticultural Society and Botanist at UW), 'Roberts', 'Sundance', 'Washakie', and 'Wyoming-Fremont'. Ed Young called his cultivar 'Wyoming -Ed Young'. Cultivars 'His Fathers Pride' and 'No Apology Needed' reported in WGB and EFB bulletins could either be 1) new novel cultivars developed for Wyoming conditions or 2) synonyms of previously known cultivars not listed in pomological records today.

Cultivars Recovered

Magby et al., (2018) recently used genetic fingerprinting techniques to identify the presence of the cultivar 'Mart' in the Murraymere Orchard (Powell, WY). It was also identified at the original University of Wyoming Experimental Fruit Farm Station (i.e. Central Wyoming College Orchard) in Lander, WY. Trees of cultivars 'Brecksteinia' and 'Margaret' were also found in the Murraymere Orchard, but were not confirmed to be alive in Lander, WY. Ten more cultivars listed in WGB and EFB bulletins were recovered in the city of Lander (including eight in Sheridan, WY, four in Casper, WY, one in Cheyenne, WY, and one in Wheatland, WY) (Magby et al., 2018).

Conservation

In 2009, 11 apple cultivars account for 90% of the apples sold in United States grocery stores (Dennis, 2008; Routson et al., 2009). While the overall genetic diversity of cultivated *Malus × domestica* is high, the 11 apples in commercial orchards that provide the bulk of the market exhibit much lower diversity (Gross et al., 2014).

The decline of apple production in Wyoming was likely due to the increase in production of agronomic crops (i.e. wheat, alfalfa and corn) and livestock (i.e. cattle) in the 1930s. Additionally, the introduction of super markets around this time decreased the

dependency on local fruit crop production (Magby et al., 2018). Orchards and homesteads were often abandoned in Wyoming, resulting in high tree mortality and losses to local cultivar diversity.

One hundred twenty-seven trees of 22 cultivars remain of the 4700 trees representing 207 cultivars that were originally planted at the Ed Young Orchard and University of Wyoming Experimental Fruit Farm Station in Lander WY. The University of Wyoming Botany Department used microsatellite fingerprinting techniques to identify most of these trees, including 25 more heritage apple cultivars around the state of Wyoming (Magby et al., 2018).

Ongoing orchard restoration projects at the Ed Young Orchard (e.g. now Nanette Slingerlands Spear S Produce Company) and University of Wyoming Experimental Fruit Farm Station (e.g. now CWC Field Station in Sinks Canyon) have preserved original trees and a Wyoming heritage apple collection is being developed at the Sheridan Research and Extension Center orchard located in Sheridan, WY (Morneau et al., 2016). Information about the history and access to Wyoming's heritage apples will help specialty crop growers, local nurseries, and residents select apple cultivars that may be more productive in Wyoming's challenging climatic conditions. This will help rebuild and conserve Wyoming's heritage apples for future generations to come (Magby and Miller, 2018).

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Farms Orchard and Joanne Slingerland of the Central Wyoming College (CWC) Field Station: Apple restoration project.

For more information (Use, characteristics, year, origin, synonyms and disease resistance) on the 218 cultivars grown and/or 47 relocated in Wyoming Apple Project, visit our website <https://malusdomestica.wixsite.com/wyomingappleproject>

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