

Hard-Kernelled Red Winter Wheat: A Legacy of Our German-Russian Ancestors on the Great Plains of North America

By Dr. Glenn D. Kuehn

About the Author: The author Dr. Glenn D. Kuehn claims full ancestral heritage among the Germans from Russia. All four sets of his great-grandparents immigrated to the United States from the German-Russian colonies of Paris (Kühn family), Rohrbach (Büchler family), Brienne (Richter family), and Lichtental (Schcid family), respectively. His wife, Donna Reuther, has similar heritage from the colonies of Neudorf (Reuther family), Beresina (Strobel family), Wittenberg (Stickel family), and Borodino (Schmidt family). The author grew up on a cattle and winter wheat ranch in eastern Montana, Prairie County, and spent his career as a faculty member in the Department of Chemistry and Biochemistry at New Mexico State University, Las Cruces, NM, from 1970 to 2013. He can be contacted by email at: glkuehn@nmsu.edu.

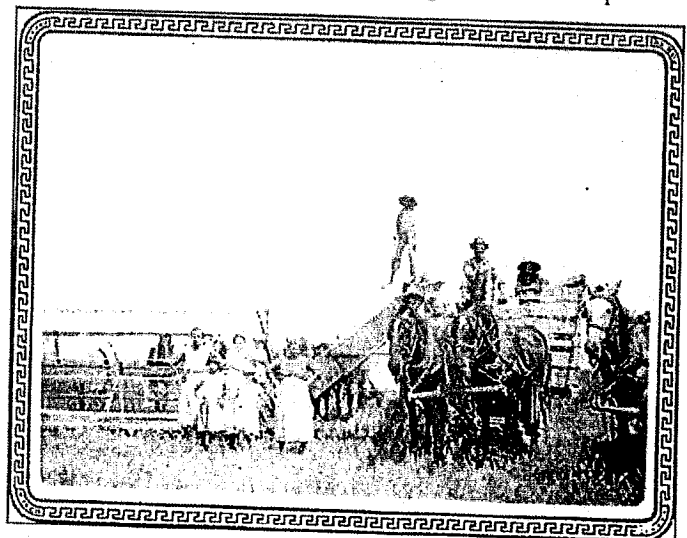
Images used in this article were taken ca. 1920s in Gove County, near Park, Kansas, of the Thomas & Amelia (Heier) Hartman family during the wheat harvest. All photos courtesy of Cynthia Stone, Ottawa, Kansas.

Wheat was first domesticated from grasses about 8,600 years ago in a small southeastern region of the country of Turkey. Its cultivation then spread throughout the Middle East, into Europe, and eastward into Asia and the Orient. In the Western Hemisphere, wheat was imported to the continents and cultivated only after the arrival of Europeans. Ordinary bread wheat, *Triticum aestivum*, is the staple food for thirty percent of the world's population (1). Wheat is the second most-produced cereal in the world, surpassed only by maize (2). It is grown on more land area of the Earth than any other commercial food. Globally, wheat is the leading source of plant protein in human food, having a higher protein content than its closest competitors, maize and rice. The United States is ranked third in the world in wheat production behind China and India (2). About fifty percent of wheat produced in the United States is exported (3). Approximately seventy-five percent of wheat production in the United States is winter wheat known for its high quality flour for baking bread, which is produced by milling operations (2).

During the initial three decades of settlement on the steppes in Bessarabia and the Black Sea regions of South Russia from 1814 to 1840, the cultivation of land played a minor role in the livelihood of our ancestral German

settlers. There were several reasons for this. First, before it had been settled by Germans, that is, before 1812, Bessarabia and the Black Sea region to the east was a treeless steppe that was totally undisturbed by previous agricultural cultivation. The endless undulating plains were covered with "goatsbeard" grass that grew as tall as a man, thorn groves, prairie thistles, spurge, and wormwood brush. The task of converting this immense entanglement of growth into manageable agronomic fields required decades of intensive labor. Thus, the raising of livestock, namely, cattle, sheep, and horses, became the first chief occupations and livelihood of the first German colonists on the Russian steppes beginning in 1812. Sheep dominated since they produced four annual products: wool, pelts, meat, and breeding stock. Second, in the early nineteenth century, agricultural implements were still primitive, much like those of a thousand years earlier. Large-scale grain production was impossible simply because of the high labor-intensive practices that it required. Third, in the initial years of settlement, there was a shortage of draft animals so that independent farmers literally did not have sufficient horsepower to cultivate acreages of any appreciable size. Thus, most of the land immediately adjacent to the German colonial villages on the steppes was initially used for grazing purposes. Wheat, oats, potatoes, flax, and vegetables were grown on nearby fields of not more than 15-30 acres per farm. Fourth, frequent drought made exclusive farming of grains risky. Thus, it was prudent to diversify the means of raising food.

Three innovations made it possible for the Germans in Russia ultimately to earn their reputation as the master wheat farmers of the Russian steppes: (a) the inventions of new mechanized implements for cultivating wheat; (b) the willingness of Russian nobility, who owned vast estates on the Russian steppes, to rent large tracts of their arable land to German farmers; and (c) the recognition of the superior



growth and nutritional properties of a special variety of hard red-kernelled winter wheat.

Prior to about 1840, the most common varieties of wheat grown by the German colonists in the Black Sea and Volga River regions were spring wheat varieties, which were planted in March/April and harvested in September. One early variety from Greece was called Arnaut (4, 5). Arnaut required a nutrient-rich soil and thus was a good producer on virgin soil that had recently been put under cultivation. With repeated cultivation on the same fields, however, it soon lost its capacity to produce high yields. Other early varieties from Poland were Sendomirka (5, 6) and a long-eared red-kernelled variety called Krasnokolosta (5). In later years, a beardless Asian variety known as Girka (5) was widely sown. Girka ripened in 100-110 days and was highly suitable to the short growing season of the Russian steppes. Girka produced a fine flour from which the German colonists made excellent white bread called "Franzoll." All of these wheat varieties being spring varieties gave limited productivity due to frequent drought conditions on the steppes in July and August, just as the wheat was ripening.

As early as 1819, regions around Odessa and a thousand miles north, up the Dniester River valley, were reported to have begun growing a hard red-kernelled winter wheat (7). This wheat was planted in September, survived the Siberian bora winds of Russian winters, benefited from early snow moisture and rains in the spring, and matured before the perennial droughts of July/August. By the 1840s, most of the German colonists were raising this hard red-kernelled winter wheat as evidenced by the village history reports which were written in 1848 for each German-Russian colonial village on the order of Russian authorities. For example, see the 1848 Village Report for Kassel (8). This variety of winter wheat came from Turkey and was called "Krimka" by colonists. It was winter hardy, rust resistant, and produced an exquisite white flour that was highly prized for baking bread. West European markets in England, France, and Spain clamored for this wheat. The export demand was insatiable.

From 1840 to 1860, a slow agricultural revolution overtook the Russian steppes with increasing acreage being seeded into Krimka winter wheat. Average farm acreages under cultivation by German colonists increased from fifty acres per family farm in 1848 to ninety acres in 1875, and to 120 acres in 1888 (9, 10). Many German farmers cultivated much larger acreages by leasing additional arable land from Russian aristocracy who owned large estates on the steppes. In 1861, serfdom, a form of agrarian slavery, was abolished in Russia, depriving Russian nobility of the chief manpower required to manage their large estates. The



nobility leased their land to colonial German farmers in order to maintain productivity of their fields. Simultaneously, farm implements became available which allowed colonial farmers to cultivate more acres of wheat with less expenditure of human effort. Introduction of a facsimile of the Ransome plow with multiple steel blades became available in Russia in the late 1840s. The shoc drill for seeding wheat was also introduced in the late 1840s. A horse-drawn mechanical reaper was available by the mid-1850s, followed by a reaper-binder combination by the late 1860s. Larger discs and harrows were manufactured which could be drawn with six- and nine-horse teams. Each of these inventions allowed colonists to increase the acreages under cultivation on their farms. In 1816, the average acreage devoted to raising wheat by a colonist family was about ten acres. By 1888, 120 acres (10), a twelve-fold increase, comprised the average German-Russian wheat farm.

Most of this increase in land productivity was devoted to raising the winter wheat, Krimka, as evidenced by the annual increases in winter wheat delivered to Odessa merchants for export after 1850 (11). Annual wheat exports from Odessa increased from 0.284 million tons in year 1820 to 0.425 million tons in year 1840, only a 1.5-fold increase in twenty years. However, with the introduction of Krimka winter wheat and expansion of wheat acreages under cultivation, annual exports of winter wheat increased to 0.574 million tons per year by 1850; 0.625 million tons per year by 1860; 1.26 million tons per year by year 1870; 1.81 million tons per year by 1880; 2.67 million tons per year by 1890; 2.73 million tons per year by 1900; and 4.24 million tons per year by 1910 (11). Russia thus became the breadbasket of Europe by growing Krimka winter wheat. Approximately one-third of the land on which Krimka was grown was owned outright by German colonists. In actuality, due to the willingness of the Russian nobility to lease

their land to colonial German farmers, nearly sixty percent of the land in South Russia was actually farmed by German colonists (11).

Although the German-Russian colonists grew several varieties of wheat between 1812 and 1850, the preferred variety of wheat cultivated by 1873 was winter wheat Krimka (11) due to high export demand. Krimka was grown everywhere throughout Bessarabia Province, the north-shore Black Sea, and the Volga River regions of Russia by 1873 (11). Krimka was a bearded, hard red-kernelled winter wheat variety. This wheat was planted in early autumn, generally by mid-September, and grew to about five to six inches in height before freezing winter began. It survived extremely cold winters and benefited from early moisture in the spring from melting snow and spring rains. It tolerated extreme environments that varied from deep-freezing cold in winters and springs to scorching dry heat in summers. It matured early and was generally able to be harvested in the month of July of the following year that it was planted. The wheat kernels were hard and red in color. Plants were of medium height with heads that were about 3 to 3 ½ inches long.

In 1873, most newly immigrated Germans from Russia planted Krimka on the Great Plains of the North American continent on their new homesteads. They brought sacks of their own grain seeds from South Russia for planting flax and Krimka. Recall that the first German-Russian immigrants to America in 1873 included three different groups: one group emigrated from the Beresan District of South Russia who elected to settle around Sutton, Nebraska; a second group comprised of Lutheran, Reformed, and Catholic German colonists from the Beresan District who chose to push farther west to the Dakota Territory, west of Yankton; and a third group comprised of Mennonites from the Molotschna District of South Russia, who elected to homestead in Kansas (12). The Dakota Territory had just opened for homesteading in the spring of 1873 with the offer of homesteads of 320 acres in Bon Homme County west of Yankton. All three groups planted their first winter wheat fields in the fall of 1873 with the same variety of hard red winter wheat that they and their respective ancestors had been growing in South Russia since the 1850s. This wheat, called Krimka (Crimea) in Russia, became known in the United States as Turkey, Hard Red Turkey, or Turkey Red winter wheat (13). Thus, the notion that a single family or a single religious group introduced Krimka or Turkey Red into the Great Plains of the United States at a specific locality is a myth (13, 14, 15, 16). Russian hard red winter wheat in North America was simultaneously introduced from South Russia in the autumn of 1873 everywhere that German-Russian immigrants settled on the

Great Plains. It was introduced into southeastern Dakota Territory (17) and into northern Nebraska (18) by Black Sea Germans from Russia and by Mennonite Germans from Russia into Kansas (15). These groups had originally lived within about 180 miles from one another in South Russia, and they all raised the same winter wheat variety, Krimka, in Russia before immigrating (9, 11).

From 1873 to 1887, most all of the Germans from Russia who established homesteads in the Dakota Territory grew winter wheat of the Krimka variety. For example, the homestead claim of Johann and Katharina (nee Schuh) Büchler (Anglicized to Buechler), my great-grandparents, which they submitted in July 1878 to the U.S. Department of the Interior in order to take ownership of their homestead application of 1873, shows that during the five years after their arrival in late spring of 1873, they planted flax, winter wheat, corn, and a variety of garden vegetables, on their homestead in Bon Homme County, Dakota Territory. Immigrant neighbors on the Great Plains who came from countries other than Russia noticed the cold hardness and high productivity of this type of wheat and quickly switched to growing Krimka as well. From 1874 to 1884, a Mennonite leader, agricultural entrepreneur, and real estate broker in Kansas, Bernhard Warkentin, traveled extensively in the prairie states of the United States and the provinces of Canada. He noted the favorable economic impact that Turkey Red (Krimka) was having on the production of wheat in Manitoba, Minnesota, the Dakota Territory, Kansas, Oklahoma, and Texas (19). Increased production of this wheat in all areas, however, was limited by the availability of seed. Thus, in 1885 Warkentin made arrangements in South Russia for 15,000 bushels of Turkey Red wheat to be shipped for seed that was distributed among Mennonite farmers in Kansas. He was assisted by his brother-in-law, Johann Philipp, and his nephew, Bernhard Enns (16). In 1900, he again brokered the shipment of another 15,000 bushels of Turkey Red from Russia which was used for seed on the Great Plains of the United States (16).

In 1887, the Hatch Act authorized the establishment of an agricultural experiment station in each state. The states were each directed to construct an experimentation station in affiliation with its land grant college of agriculture. Land grant colleges had been authorized earlier by the Morrill Act of 1862. The central mission of these stations was to conduct scientific research that investigated difficulties and potential improvements to producing agronomic crops for food production and businesses. Agronomists, who were hired to work at these experiment stations, soon recognized in the late 1880s the superiority of the Russian Turkey Red winter wheat which immigrant German-



Russian farmers had been growing since 1873, as noted above. They began immediately collecting samples of the wheat for experimentation. Turkey Red exhibited three major important properties by which it surpassed other wheat varieties, namely marked winter hardiness, drought resistance, and early-summer maturity. The most important property was the first listed. These three traits allowed Turkey Red to produce comparatively higher yields than other wheat varieties under the extremely variable climatic conditions of the Great Plains of North America.

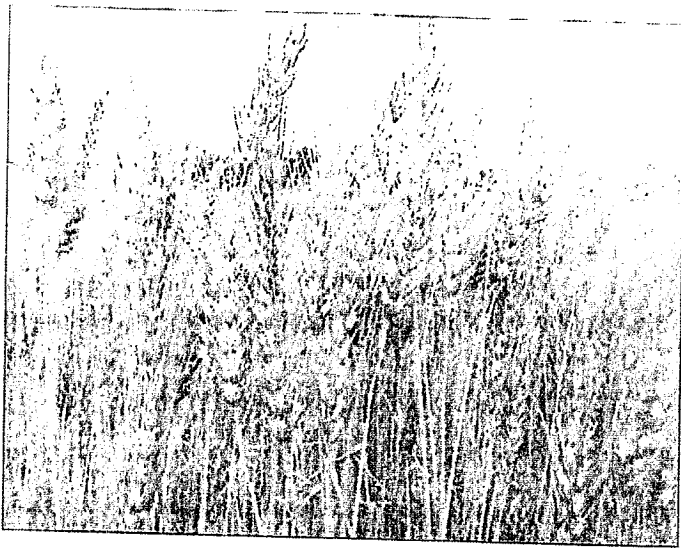
Turkey Red became the central germ plasm for conducting future selections and constructing genetic crosses (plant breeding) with other wheat varieties in order to improve its hardiness and increase resistances to numerous microbial diseases (smut, leaf and stem rust, bunt, etc.) and insect infestations (aphids, midges, chinch bugs, etc.). The number of distinct varieties of hard red winter wheat grown in the United States increased dramatically owing to thousands of selections and genetic crosses conducted in agricultural experiment stations from 1900 to 1935. This research was conducted in the major wheat growing states of North Dakota, Montana, South Dakota, Kansas, Nebraska, Oklahoma, Colorado, Texas, Washington, Idaho, and Oregon. The different varieties became known under a large number of names. Their identities with regard to their genetic origins are often difficult to establish through a clear line of published works in the scientific literature. However, the following listings can be verified from the original published scientific literature.

By 1938 (15), Turkey Red, known as Krimka in Russia, had been given many other names by plant breeders in the United States and Canada. Other names included Kharkof, Alberta Red, Crimean, Defiance, Egyptian, Hard Winter, Hundred-and-One, Improved Turkey, Malakof, Minnesota Red Cross, Minnesota Reliable, Pioneer Turkey, Red Russian, Red Winter, Russian, Ulta, World Champion, Argentine, Bulgarian, Hungarian, Romanella, and Theiss. All of these varieties were derived from plant stalk or plant head selections from Turkey Red, propagated into seed,

and then distributed as new or improved varieties under a new name. However, they are all genetically the same as Turkey Red.

In later years, from the 1940s to 1960s, a large number of new winter wheat varieties were recommended for growth on the Great Plains by state agricultural experimentation stations and commercial seed companies. While all of these varieties had a unique history of development, their ultimate relatedness to Turkey Red can be verified. All were derived from a genetic cross or a selection from a progenitor strain of Turkey Red or a strain that had previously been developed with Turkey Red lineage. These major varieties included Blackhull, Superhard, Kanred, Karmont, Nebraska #60, Nebraska #6, Ten Mar Q, Minturki, Iobred, Karmont, Redhull, Early Blackhull, Cheyenne, Cooperatorka, Utah Kanred, Eagle Chief, Montana No. 36, Ioturk, Iowin, Sherman, Oro, Yogo, Ashkof, Wisconsin Pedigree No. 2, Ukrainka, Rio, Relief, Beloglina, Bacska, Iowa No. 404, and Regal. Newer varieties of hard red winter wheat grown in Kansas, Oklahoma, and Texas were known as Kaw, Lancer, Scout, Sturdy, Triumph, Warrior, and Wichita. All had Turkey Red ancestry (13).

In Canada, where winters are harsher and longer, early agricultural researchers developed cold hardy strains of winter wheat that were initially derived from the countries of Scotland (Red Fife), Australia (Early Triumph), and India (Hard Red Calcutta). However, as Turkey Red derivatives developed in the United States became more available and established sound records of productivity in the northern plain states of the country by the 1930s, these Turkey Red derivatives were used to develop more cold hardy varieties that subsequently became stalwart winter wheat varieties grown in the Canadian Provinces of Alberta, Saskatchewan, and Manitoba. Turkey Red derivatives developed there included Early Red Fife, Canus, Thatcher, Saunders, Chinook, Canthatch, Cypress, Park, Manitou, Neepawa, Pictic 62, Glenlea, Napayo, Canuck, and Sinton (20).



Much has been written about the “Green Revolution” wheat varieties that were developed by the plant breeder and Nobel Prize Laureate, Dr. Norman Borlaug, in the 1960s at his test facility in Mexico. Using a parent Japanese wheat variety called Norin 10, Borlaug and his associates developed a series of semi-dwarf wheat varieties with short stiff stalks that resisted lodging (bending over) in damp climates and produced large kernelled heads. These wheat varieties were adaptable for growth in many regions of the Earth where wheat had previously been difficult to grow. The cultivation of Norin 10 strains prevented hundreds of millions of human deaths by starvation throughout the world since the 1960s. It took almost 10,000 years of worldwide food grain production to reach one billion tons of annual wheat in 1960, and only forty years to reach 2 billion tons in year 2000 (21). This unprecedented increase in wheat production has therefore been named the “Green Revolution.” It resulted from the creation of the famous Norin 10 varieties of winter wheat derived from Japanese Norin 10 strains. However, much of the hardiness and productivity of the Norin 10 strains was derived from Turkey Red ancestry (13, 22). Japanese scientists who developed the original Norin 10 acknowledged that they used Turkey Red in their genetic crosses to develop the original Norin 10 parent from which Borlaug produced his “wonder varieties” (13).

The astounding persistence of the Turkey Red pedigree in the development of cultivated winter wheat varieties continues and extends to present-day varieties recommended for growth throughout the United States and Canada. In the decade of 2000-2010, agricultural experimentation stations and commercial seed companies developed and recommended hundreds of new varieties of winter wheat for planting in the Great Plains from Texas to the Canadian Provinces (23). The varieties are too numerous to list all of them here, but the record is clear: All of

them that are agronomically and economically viable strains bear Turkey Red ancestry. For example, in Montana varieties were developed with the names Big Sky, NuSky, Yellowstone, Norris, Judec, and Hyalite. In North Dakota, varieties called Jerry, Ransom, and Elkhorn were introduced. South Dakota released Expedition, Wendy, and Alice. Nebraska developed Wahoo, Millennium, Robidoux, Pronghorn, and McGill. Colorado introduced Bond CL, Hatcher, Ripper, Bill Brown, and Cowboy. Idaho released Neeley, Gary, and Blizzard. Washington produced MDM and Bauermeister. Canadian researchers developed Kestrel, Peregrine, Broadview, and Emerson.

Finally, even in the current planting year, Turkey Red’s legacy continues. The USDA recommendation for fall 2014 planting of winter wheat in Montana is a variety that has led all others in planting acreage in the state since 2011. It is called Yellowstone variety (24). In North Dakota, a variety called Jerry is the dominant variety of winter wheat grown there. In South Dakota, a variety named Alice is recommended. All three are derivatives of Turkey Red.

These listings are but a small representation of the total legacy of the Turkey Red pedigree in winter wheat research and development. To quote one researcher who is active in tracing the lineages of winter wheat varieties throughout North America: “I would argue that all winter wheats in the United States and Canada harken back to Turkey Red in their pedigree” (25). This legacy will continue far into the foreseeable future since the world must increase its food production sixty percent by year 2050 due to projected population growth, which will reach 9.1 billion people (26).

So, the next time that you pass a winter wheat field, wherever you are on the Great Plains of North America, or purchase a bag of flour for baking bread, give pause to think about its origin. It is a lasting legacy of our ancestral Germans from Russia that we encounter every day: “Give us this day, our daily bread.”

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