

Dedication:  
Orville A. Vogel  
Wheat Breeder, Agronomist, Inventor

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Orville A. Vogel was born on a farm near Pilger, Nebraska, on May 19, 1907, where he lived until 1919. Had it not been for the Great Depression, he would have remained in farming. Fortunately for the profession of plant breeding, he continued his formal education. In 1927 he received a teaching certificate from Yankton College. This exposure to teaching methods would serve him later when he taught physics at Washington State University during World War II. His B.S. and M.S. degrees in Agronomy were obtained from the University of Nebraska in 1929 and 1931, respectively. He received the Ph.D. degree in Agronomy from Washington State University in 1939.

For a brief period Dr. Vogel worked as an agent for the Forage Crops and Disease Project, United States Department of Agriculture (USDA), at Lincoln, Nebraska. From February 1931 to his retirement in 1973, he was a Research Agronomist, Project Leader, with the USDA Agriculture Research Service, and Professor of Agronomy at Washington State University. His outstanding accomplishments as a wheat breeder, innovator of specialized plot equipment, and wheat research consultant won him a reputation as a leading wheat scientist by his contemporaries both at home and abroad. He is recognized as a pacesetter who possesses a truly outstanding capability to think, plan, analyze problems, and initiate work. In order to emphasize the breadth of his contributions, we shall discuss his breeding work, equipment inventions, and personal characteristics.

Dr. Vogel's name is synonymous with the successful development

of semidwarf wheats and record yields. He is frequently referred to by his fellow scientists as a "plant breeder's plant breeder." The emphasis he placed on parent building is clearly reflected in his development of the Norin 10/Brevor 14 germplasm. This was a major plant breeding accomplishment because the donor source of the dwarf genes, 'Norin 10,' was quite sterile, susceptible to most diseases, and agronomically poor. However, by employing intensive selection in large segregating populations under diverse environments, he isolated the desired fertile types. This task accomplished, he then transferred the necessary disease-resistant genes to the fertile types and selected the desired ideotype: short, stiff straw for lodging resistance, adaptation to early seeding for erosion control, improved tillering capacity, and the potential for increased grain yield under diverse climatic and soil conditions.

The resulting Norin 10/Brevor 14 germplasm, which he generously shared with breeders everywhere, was an important ingredient in development the Mexican dwarf wheat cultivars that gave birth to the explosion of agricultural productivity in the underdeveloped world that has been dubbed the Green Revolution. It has been estimated that over 11 million ha of Norin 10/Brevor-derived semidwarf cultivars are in production on five continents.

'Gaines' wheat was a product of this breeding strategy and is recognized as a historic benchmark for yield in wheat. Dr. Vogel's initial interest in developing semidwarf wheat was to avoid the frequent lodging problems observed with standard height cultivars, particularly in the lower areas of the hilly Palouse country of eastern Washington where moisture and fertilizer tended to accumulate.

As a plant breeder, Dr. Vogel has been an exceptionally keen observer, who has subjected his breeding material to a myriad of hazardous environments and disease complexes. He also has maintained a very positive and practical approach to breeding. For example, when a new disease or physiological race of an existing disease destroyed much of his nursery, rather than being discouraged, he would be excited about the few plants that survived. One particular year the experimental plots were badly lodged, and when he harvested only those plots that were still standing, several colleagues were quick to criticize, pointing out that only by harvesting all the plots could an appropriate statistical analysis be performed. Dr. Vogel responded that an asterisk denoting levels of significance would not result in improved lodging resistance.

In addition to the well-known 'Gaines' and 'Nugaines,' Dr. Vogel released eight other cultivars, all of which at one point in time commanded major acreage in the Pacific Northwest. It was these cultivars along with fungicides that saved the region from the common bunt

disease in the 1940s and 1950s. For many years the cultivars grown from the dryland and irrigated areas of the Columbia Basin to the high-rainfall regions of the Pacific Coast were, without exception, from his program. The success of these widely adapted wheats proved that his concept of employing intensive selection over a wide range of environments was sound. These widely adapted cultivars did not hold any unexpected surprises for the farmer. Dr. Vogel, not satisfied simply to release semidwarf cultivars to growers, encouraged others to do the necessary agronomic research so that with the appropriate package of cultural practices their full genetic yield potential could be realized.

Dr. Vogel's wheat breeding program always focused on future needs. His concern for the environment was clearly demonstrated 30 years ago through his successful development of cultivars for early fall planting to reduce soil erosion by the establishment of a ground cover prior to heavy winter rains. Long before plant pathologist and plant breeders were concerned about generalized, horizontal, or durable type disease resistance, he had already started selecting lines with low incidence of stripe rust. Despite frequent changes in physiological races over the past 25 years, 'Gaines' and 'Nugaines' type resistance has remained effective to stripe rust in the Pacific Northwest. He was the first breeder in the United States to initiate a program for developing resistance to *Cercospora* foot rot. Dr. Vogel also exploited a low level of resistance to snowmold to an economic advantage. Many other examples can be cited where he correctly anticipated future problems. Shortly after the high yield potential of the semidwarf wheats was recognized, he pointed out that with the change in the plant canopy and more intensive management practices, new disease problems would be forthcoming. He also noted that with changes in cultural practices, such as no or minimum tillage, new sets of problems would emerge and that it would be even more important for breeders to develop cultivars for specific management practices.

When Dr. Vogel relaxed from the rigors of plant breeding, he invented new equipment and gadgets. He designed and put into production more than a dozen inventions that have facilitated and expedited the work of the plant breeder and agronomist. Long before he became famous as a developer of semidwarf wheats, there was scarcely a small-grain improvement program anywhere in the world that did not have one or more Vogel plot threshers. He developed a combination one-row or three-row seeder in 1932. This was subsequently replaced in 1954 when he perfected a semiautomatic eight-row seeder to enable rapid uniform planting of plots in adverse soil and weather conditions. Because of the efficiency of this seeder, the planting operation is no longer a limiting factor in breeding programs. In 1971, for ex-

ample, more than 330,000 plot rows were seeded by this machine in eastern Washington.

These specialized planters and combines are easily transported and therefore fit the research requirements of conducting the testing phase of a breeding program over a large area. This equipment ushered in the age of mechanization for agricultural scientists much as Cyrus McCormick's thresher initiated the mechanical revolution for the nation's farmers a hundred years earlier. It has been noted that in addition to the development of the Norin 10/Brevor 14 semidwarf germplasm, Dr. Vogel's inventions may have contributed indirectly even more to expanding world food production. By allowing for the handling of vastly greater numbers of genetic materials and agronomic plots, such equipment has permitted the developing nations to better utilize the scarcest of their resources, trained scientific manpower.

Orville Vogel is a man of paradoxes. He is known to be persistent, impatient, hardheaded, and warmhearted. Although never known to back down from a cause or concept he felt strongly about, he is always patient and respects other points of view. As a young scientist he frequently quarreled with administrators over how research should be conducted. He published enough research papers to survive the publish-or-perish syndrome but made it perfectly clear that this academic trap has cost the farmer and the public a whole lot more than it has profited institutions. He describes himself: "I've never been a pure scientist, but a dumb wheat breeder." His major contribution to science during his long career was his genius for taking science out in the field and applying it and designing procedures to cut the odds against finding the answers.

Adversity has always presented a challenge to Dr. Vogel. Many of his administrators failed to appreciate the time he spent inventing equipment to speed up research. In fact on several occasions before the full impact of his work was realized, it was suggested that he should seek other opportunities where his abilities would be more appreciated. When 'Gaines' wheat was proposed for release, some in the milling industry objected strenuously because it milled noticeably slower than club and hard wheats. Dr. Vogel insisted on its release, convinced that millers imposed excessively idealistic requirements on milling quality; he recognized the tremendous potential 'Gaines' wheat held for the wheat industry. The millers soon modified their milling systems and accepted a more liberal milling requirement, thereby greatly alleviating an excessive cost bottleneck in breeding the dual-purpose soft white wheats for the Pacific Northwest.

Dr. Vogel is a master of teaching by example. He had, and still retains even after retirement, a very demanding work ethic. His prior-

ities have always been clearly defined. Once when traveling to a professional meeting with two colleagues, he decided to stop and see one of the experimental sites. Unfortunately, noxious weeds had invaded the plots. Much to the consternation of his colleagues, who had dressed appropriately for the meeting, the next few hours were spent hand-weeding the plots.

To spend a day traveling through the Palouse hills with Dr. Vogel is an education in itself. The history of each wheat field unfolds as he describes past problems or cultural practices that have been employed. He still takes great delight in showing visitors how, on the steep hillsides near Dayton, Washington, the farmers farm both sides of the field, top and bottom.

Dr. Vogel has always had time for people. Whether it be a foreign visitor who has traveled thousands of miles to visit this famous wheat breeder or a farmer with a specific problem or perhaps a student with a personal problem, he will drop whatever he is doing and spend whatever time is necessary. One never leaves a discussion with him feeling that he is too busy to visit or that he does not have time to listen. Those whose good fortune it was to be a part of his research team gained more than just a sound concept of plant breeding; they obtained a philosophy of life that, regardless of the circumstances, would see them through. One message, loud and clear, was that one must be prepared to do battle for what one believes.

To the wheat producers of the Pacific Northwest, Vogel is a household word. For 41 years they relied on his expertise as a breeder, agronomist, and friend. He kept them ahead of the ever-changing disease complexes and in a position to produce high yields of excellent quality soft white wheat. At field days, Orville was like a magnet attracting farmers who came from miles to gain some of his insight. His expertise was also recognized internationally. He was and still is in demand for counsel by students and experts both at home and abroad. His consulting trips to foreign countries illustrate the demand for his services and attest to his wide reputation as an authority on wheat improvement.

Dr. Vogel served in 1966 on an agricultural expert team to advise the Minister of Agriculture of Turkey regarding programs to speed agricultural development. He is recognized as the key individual in the unusually successful wheat improvement program. Dr. Vogel has been a special consultant in several other instances. In 1963 he served with a special team from the Foreign Agricultural Service and Western Wheat Associates Inc. to study the Australian wheat industry. In 1965 and 1967 he went to Mexico with the Centro Internacional de Mejoramiento de Maiz y Trigo and the U.S. Agency for International De-

velopment as a consultant on improving the production and quality of semidwarf wheats. In 1968 he traveled to Mexico and Canada to consult on wheat and triticale research in those countries and to advise on selections for northern latitudes. In 1968 he also visited Australia, Japan, and New Zealand, where he assessed the progress in breeding new cultivars of wheat resistant to soilborne diseases and in increasing the gluten strength of cultivars for the Asiatic market.

Even in retirement Orville, with his wife Bertha, have continued their interest in wheat research. They have established a foundation, which bears their name, and personally contributed to launch the new research fund to ensure that wheat research at Washington State University will remain strong and serve the needs of the farmers and consumers in the Pacific Northwest.

Orville Vogel has received many awards. In 1976, he received the National Medal of Science from President Gerald Ford for his contributions to agriculture. He also received the USDA Superior Service Award, the Crop Science and Edward W. Browning Awards from the American Society of Agronomy (ASA); he is a Fellow of ASA and the Crop Science Society of America. He received the Washington State University Board of Regents Distinguished Alumnus Award. The University of Nebraska presented him with an Honorary Doctor of Agriculture. His concern and work with young people was recognized by the National Farmhouse Fraternity Master Builder of Men Award. Of the awards he has received, those that perhaps mean the most to him are from those he served, namely the farmers. A few examples of the many such awards are the Commendatory Plaque awarded by the Whitman County Associate of Wheat Growers, the Washington Association of Wheat Growers Appreciation Award, Federal Land Bank of Spokane Bronze Medal, Pacific Northwest Forum Special Certificate of Recognition, and Honorary Citizen of Garfield County.

Dr. Vogel is a member of the American Society of Agronomy, Crop Science Society of America, Western Crop Science Society, Alpha Zeta, Delta Sigma Zeta, Phi Sigma, and Sigma XI.

Orville A. Vogel is truly a superb wheat breeder, notable agronomist, and ingenious inventor. He is also a master teacher, a sincere humanitarian, and a wise and good man.

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