

DR. EVANGELINA VILLEGAS AND DR. SURINDER K. VASAL AWARDED 2000 WORLD FOOD PRIZE FOR DEVELOPMENT OF QUALITY PROTEIN MAIZE (QPM), ONE OF THE MOST SIGNIFICANT FOOD STAPLES ON EARTH

Miracle maize provides higher quality nutrition for millions of malnourished people in developing countries and stands to benefit hundreds of millions more in the new millennium.

DES MOINES, IOWA, USA (September 7, 2000) – Ambassador Kenneth M. Quinn, President of The World Food Prize Foundation, announced today that the 2000 World Food Prize has been awarded to biochemist Dr. Evangelina Villegas of Mexico and plant geneticist Dr. Surinder K. Vasal of India. Dr. Villegas is the first woman ever to receive The World Food Prize. Quinn said that Dr. Villegas and Dr. Vasal will be honored twice: at a special ceremony on October 12 in Des Moines where the Foundation is headquartered, and also at a luncheon in New York City October 16 – World Food Day – featuring remarks by U. S. Ambassador Richard C. Holbrooke and Secretary of Agriculture Dan Glickman.

The two scientists collaborated for over two decades on a complex, conventional maize breeding and biochemical testing effort designed to improve the quality of protein available from maize while also maintaining the palatability and yield of the normal varieties. Hundreds of millions of people in developing countries depend on maize as a primary food source and as a livestock feed.

The Prize, referred to the world over as the “Nobel” Prize for Food, has been awarded for the Villegas/Vasal team’s success in developing maize with both higher quality protein and desirable agronomic characteristics. Their collaboration is hailed by researchers as one of the most innovative team approaches to plant breeding to achieve a common goal. Known as Quality Protein Maize, or QPM, the grain has significantly improved the quality and quantity of food in the world, underlying criteria for The World Food Prize. In a world where nearly one seventh of the total population (well over 800 million people) is malnourished if not starving, the significance of QPM is substantial.

QPM was developed by Drs. Villegas and Vasal in the 1970s and 1980s while they were working at Centro Internacional de Mejoramiento de Maiz y Trigo also known as the International Maize and Wheat Improvement Center or CIMMYT in Mexico. Both acknowledge that CIMMYT’s commitment, leadership and funding was instrumental in facilitating development of QPM. CIMMYT’s current Director General Timothy Reeves stated, “The potential contributions of QPM to the world population are enormous. The

efforts of Drs. Villegas and Vasal have laid the foundation for what will be one of the most important contributions to food security in human history. The Honorable Jimmy Carter, Member of the World Food Prize Council of Advisors adds, "Dr. Villegas and Dr. Vasal not only achieved a remarkable breakthrough on maize quality, but their efforts to teach and train others in furthering QPM adoption are exemplary." John Ruan, chairman of the World Food Prize Foundation commented, "Food security brought about by QPM is a fundamental advance to help the poor break the cycle of poverty and malnutrition. We salute Dr. Villegas and Dr. Vasal for their contribution to humanity.

THE NEED FOR QPM

In Central and South America, Africa, and Asia, several hundred million people rely on maize as their principal daily food. Many small livestock farmers or smallholders also use it to feed pigs. Maize is widely used as a weaning food for babies. Conventional maize is lacking in quality protein content, especially lysine and tryptophan, which are two essential amino acids the human body cannot synthesize and therefore must be obtained from food. Normal protein deficient maize is not a quality food staple. People relying on it heavily typically suffer from malnutrition. Babies weaned on it are frequently underweight, prone to disease, and are at high risk for starvation. At a time when UNICEF reports 1,000,000 infants and small children alone are starving each month, the use of QPM in daily rations can improve health and even save lives. QPM offers 90 percent the nutritional value of skim milk, the standard for adequate nutrition value. Babies and adults consuming QPM are healthier, and at lower risk for malnutrition disorders such as Marasmus and Kwashiorkor – seen all too commonly in photos of children with bone-thin limbs and distended bellies. Pigs fed on QPM experience rapid weight gain and are ready for market sooner or as an additional quality protein source for small farm families.

WORLDWIDE IMPACT

While the discovery of QPM came through the painstaking scientific detective work by Drs. Villegas and Vasal in Mexico, their teaching and that of others helped spread its adoption and use across the globe. Hybrids were developed and tested for widely varying climatic and growing conditions. The maize germplasm developed at CIMMYT contributes over \$1 billion annually to the economies of developing countries. Data from Mexico, Africa and other countries repeatedly report better utilizable protein levels in diets of the resource-poor, complete recovery from malnutrition and enhance nutrition and growth in pigs. CIMMYT and other initiatives such as Sasakawa – Global 2000 continue the research and development of QPM. Quality Protein Maize has had positive impact on millions of people. "It can remedy nutritional deficiencies from diets heavy in maize," said Vasal. In studies in Columbia and Peru, malnourished children were restored to health on controlled diets using QPM as a protein source.

QPM research and development have spread from Mexico to Central and South America to Africa, Europe and Asia. Just one dramatic example of the impact of QPM is the miraculous turnaround in lives of the poor in Guizhou, the poorest province in China. QPM hybrid yields are 10 percent higher than other hybrids. New pig production

enterprises enabled by QPM have brought increased food security and disposable income. As an elderly woman farmer explained, “We have always worked hard but barely kept alive until QPM arrived (in 1994). Now my family is happy. I have a good house, good clothes and I can travel to the local town.”

HOW QPM CAME ABOUT

Dr. Surinder Vasal and Dr. Evangelina Villegas were born half a world apart: he in 1938 in India, she in 1924 in Mexico. Sam, as he is known to his friends, developed an early love for maize and pursued his interest after receiving his Ph.D. in Genetics and Plant Breeding from the India Agricultural Research Institute in New Delhi. Eva credits a love of chemistry and biology, an ongoing interest in maize as a vitally important crop in Mexico and the support of her family and professors as key ingredients leading to her Ph.D. in Cereal Chemistry and Plant Breeding from North Dakota State University.

The two met in 1970 at CIMMYT when Eva was in charge of the lab and Sam was newly assigned as the plant breeder to work on QPM. Through a unique show of determined teamwork, they integrated cereal chemistry and plant breeding techniques to develop QPM germplasm by combining opaque-2 gene maize with genetic modifiers resulting in a maize with hard kernel characteristics, good taste and higher quality levels of lysine and tryptophan.

Along the way they overcame numerous obstacles and setbacks to widespread acceptance of QPM varieties. Maize with the opaque-2 gene was developed at Purdue University in 1963, although its origins date back to the 1920s. The kernel was opaque, chalky in appearance and soft instead of hard and transparent. While lysine and tryptophan levels were better than in conventional maize, opaque-2 had lower yields and was more susceptible to ear rot and insect damage. The taste and kernel appearance weren't acceptable to farmers.

And so the stage was set for the work to come. As Dr. Vasal states, “The work was difficult in the beginning. We had to develop very large quantities of germplasm and it was a time consuming process of elimination. By mid 1975, we had some materials which yielded better agronomic characteristics and by 1984 we made definite advance.”

Dr. Villegas added, “We had a very good group of people and the support to analyze thousands of samples a year. Sometimes 20,000-25,000 analyses per year – with up to 500 a week.”

Along the way, conflicting nutrition reports on the need for protein vs. the need for calories in the diets of people in developing countries diminished interest in QPM.

Early varieties even with their accompanying drawbacks were rushed to market and were ultimately rejected. Villegas and Vasal realized that the higher protein maize would not reach the stomachs of the malnourished until they, the scientists, improved yields to compete with normal maize.

By the mid 1980s, their persistence paid off. They had developed maize with both high quality amino acids and an almost completely normal grain type.

Dr. Norman E. Borlaug, Nobel Laureate and World Food Prize Founder states, "I'm extremely pleased that the efforts of Drs. Vasal and Villegas are being recognized by the World Food Prize. Their efforts in developing QPM, working through times when QPM research was quite unpopular, has resulted in significant inroads to alleviating malnourishment and poverty in developing countries. What they have done has inspired other gut-fighting teams of scientists who labor to serve human beings, not just as an academic exercise."

THE WORLD FOOD PRIZE

The World Food Prize was conceived by Dr. Norman E. Borlaug, recipient of the 1970 Nobel Peace Prize. Since 1986, The World Food Prize has honored outstanding individuals who have made vital contributions to improving the quality, quantity, or availability of food throughout the world. Previous laureates have been recognized from the United Kingdom, India, Switzerland, Bangladesh and the United States.

In 1990, Des Moines businessman and philanthropist John Ruan assumed sponsorship of The Prize and established The World Food Prize Foundation located in Des Moines, Iowa.