



## Te-Tzu Chang



Shanghai, China, 3 Apr. 1927 - Tamsui, Taiwan, 24 Mar. 2006

**Nomination** 17 Mar. 1997

**Field** Agriculture (Crop Science)

**Title** Researcher, Institute of Botany, Academia Sinica, Taiwan

**Commemoration** – Over the span of his highly productive life, Te-Tzu Chang made major contributions to the alleviation of hunger through the development of improved varieties of rice, the most important food crop in the world. His contributions led to the development of a substantially elevated food supply and thus to the improved well-being of hundreds of millions of people throughout the world. With almost half of the world's people depending on rice as their major source of food, the great importance of Dr. Chang's efforts is easy to understand. For 30 years, Dr. Chang was principal geneticist and head of the International Rice Germplasm Center at the International Rice Research Institute (IRRI) in the Philippines. His research and the research of the unit he headed on evolution and variation in rice led to advances in the productivity of a number of strains and their resistance to disease. His development of a new variety of dwarf rice, introduced in 1962, led to the possibility of producing an extensive series of semi-dwarf, sturdy rice varieties that greatly improved rice productivity in southern China and in tropical areas throughout the world. He played a major role in the development of the institutions and programs that we count on today to protect the overall diversity of cultivated rice and its wild relatives, with his institute alone arranging for the collection of some 44,000 samples in Asia and Africa, now conserved in IRRI for the benefit of the entire world – an incredible asset for improving the characteristics of cultivated rice varieties for the future. Overall, the rice germplasm collection at IRRI holds some 85,000 samples and receives hundreds of thousands of requests for seeds to use in rice breeding and selection programs throughout the world. In 2007, IRRI dedicated its Genetic Resources Center (GRC), based in part on the IRGC that he founded, to his memory as the T.T. Chang Genetic Resources Center, an indispensable resource for rice breeders throughout the world. The importance of IRRI's collection of rice varieties was demonstrated clearly after the Asian tsunami of December 26, 2004, when the Institute was able to send salt-resistant varieties of rice they had developed to the areas that had been rendered salty by the flooding. With an annual contribution from the Global Crop Diversity Trust unlocked by private contributions to the support of the GRC, the future of these unique and indispensable rice collections will be assured permanently. Born April 3, 1927, in Shanghai, China, he attended Nanking University and St. John's University and went on to work as an apprentice in agronomy in Canton before completing his graduate work at Cornell University and the University of Minnesota, where he earned his Ph.D. degree in 1959. Working for a couple of years in Taiwan, he moved to IRRI in 1961, developing rice varieties that formed part of the foundation of the Green Revolution. The important semi-dwarf rice variety IR5, adopted widely all over Southeast Asia, and its productivity and resistance to disease played a major role in ending the famine of 1966-8 and alleviating a second predicted famine four years later. Professor Chang retired from IRRI in 1991 and returned to Taiwan, where he had made further contributions to rice breeding and germplasm collection through the National Crop Germplasm Center. He died accidentally falling from a ladder on March 26, 2006, just short of his 79th birthday. Throughout his career, Te-Tzu Chang published on his basic and applied research prolifically and mentored hundreds of rice researchers and breeders, who have made and are making important contributions throughout the world. He was appointed to the Pontifical Academy of Sciences in 1997 and was a member or foreign member of several other academies, including the U.S. National Academy of Sciences, the American Academy of Arts and Sciences, and the Third World Academy of Sciences. He received many prizes and awards during his long and distinguished career, including the Tyler Prize for Environmental Achievement, the award for International Service in Agronomy, and the Frank Meyer Award and Medal on Plant Germplasm. He was a

strongly collaborative scientist whose distinguished life offered a great deal to the advancement of his field of study, so important for human welfare, and to the fellowship of our Academy.

Peter H. Raven

### **Most important awards, prizes and academies**

*Awards:* John Scott Award and Medal (for the invention of IR8 dwarf rice); International Service in Agronomy Award; Frank Meyer Award and Medal on Plant Germplasm and International Service in Crop Science Award of the CSSA; Rank Prize in Food and Nutrition, London; Tyler Prize for Environmental Achievement. *Academies:* Agricultural Association of China, Taiwan; American Society of Agronomy; Crop Science Society of America; Institute of Biology, UK; Society for the Advancement of Breeding Research in Asia and Oceania; Crop Science Society, Philippines; Foreign Associate of the National Academy of Sciences, USA; Fellow of the National Academy of Agricultural Sciences, India; Third World Academy of Sciences, Trieste, Italy; Academia Sinica; Hon. Foreign Member, American Academy of Arts and Sciences.

### **Summary of scientific research**

Dr. Chang directed his attention to crop improvement and genetic resources conservation. He played a pivotal role in the 'Green Revolution' in rice by introducing and incorporating the sd-1 semidwarfing gene from Taiwan which confers high productivity on tropical rices, and supported continuing advances by supplying useful germplasm. He also rescued numerous threatened land races and wild rices through collaborative field collecting and persuading Asian and African nations to deposit their national rice collections for safekeeping in the IRRI Germplasm Center with the guarantee of repatriation, and helped China, the USA, India and Taiwan in designing modern seed preservation banks. In addition, he trained more than a thousand young rice workers from developing nations in rice production, breeding, and germplasm conservation.

### **Main publications**

Chang, T.-T., 'Genetics and Evolution of the Green Revolution', *UNESCO-CSIC Symp. On Biology and Ethics*, CSIC (Madrid, 1979), pp. 187-209; Chang, T.-T. and Li, C.C. 'Genetics and Breeding', *Rice: Production and Utilization*, AVI (Westport, 1980), pp. 87-146; Chang, T.-T., 'Sustaining and Expanding the Green Revolution in Rice', *South-East Asia's Environmental Future: The Search for Sustainability*, UN University Press (Tokyo, 1993), pp. 291-320; Chang, T.-T. *et al.*, 'The Conservation and Use of Rice Genetic Resources', *Adv. Agron.*, 35, pp. 37-91 (1982); Chang, T.-T., 'Conservation of Rice Genetic Resources: Luxury or Necessity?', *Science*, 224, pp. 251-6 (1984); Chang, T.-T. *et al.* 'Management and Utilization of Plant Germplasm Collections', *Beltsville Sympos. on Agric. Research* 13, Kluwer (1989), pp. 127-59; Chang, T.-T., *Expansion of the U.S. National Seed Storage Laboratory*, National Academy Press (1988); Chang, T.-T., 'The Case for Large Collections', *The Use of Plant Genetic Resources*, Cambridge Univ. Press (1989), pp. 123-56; Chang, T.-T., 'The Human Factor', *Plant Genetic Resources Conservation: Perspectives for the 2000s*, TARI, Taichung (Taiwan, 1994), pp. 123-4; Chang, T.-T., 'The Origins and Early Cultures of the Cereal Grains and Food Legumes', *The Origins of Chinese Civilization* (California, 1983), pp. 65 ff.; Chang, T.-T., 'The Impact of Rice on Human Civilization and Population Expansion', *Interdisciplinary Science Review*, 12, pp. 63-9 (1987); Chang, T.-T., 'Plant Genetic Resources: Key to Future Food Production', *Iowa State J. Research*, 59, pp. 325-496 (1985); Chang, T.-T., *Managing Global Genetic Resources: Agricultural Crop Issues and Policies*, National Academy Press (1993); Chang, T.-T., 'Rice', *The Cambridge World History of Food*, Cambridge Univ. Press (2000), Vol. I, pp. 132-49; Chang, T.-T. *et al.* (eds.), *Food Needs of the Developing World in the Early Twenty-First Century*, **The Pontifical Academy of Sciences** (1999), p. 475.