DOI: http://doi.org/10.1590/1678-992X-v79n4obituary

SCIENTIA AGRICOLA

ISSN 1678-992X

In memoriam of the father of hybrid rice – Prof. Yuan Longping (1930-2021)

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Edited by: Paulo Cesar Sentelhas

Received May 31, 2021
Accepted June 22, 2021

Prof. Yuan Longping, a Chinese agronomist, was born in Beijing in 1930. He graduated from Southwest Agriculture College in 1953 and later began to teach at an agriculture school in Anjiang, Hunan Province from 1953-1971. During his teaching career, he initiated the research on rice male sterility in 1964 (Yuan, 1966). In 1970, Yuan Longping led his research team to identify the critical rice germplasm-wild abortive (WA) male sterile rice for the female parent of three-line hybrid rice in Hainan, China, providing a new opportunity for the successful exploitation of rice heterosis. In his research, the first sets of three lines (Male sterile for A line; Maintain line for B line; Restore line for R line) were developed for three-line system hybrid rice (Yuan, 1974). In 1973, he cooperated with others to develop the first *indica* rice hybrid, Nan-You 2, which had 20% more rice yields than the improved inbred varieties. Then, the hybrid rice varieties had been put into commercial production in China since 1976. Prof. Yuan donated the indispensable male sterile line to IRRI in 1980. Many countries obtained this precious resource through IRRI to create many excellent male sterile lines and their hybrid varieties.

He set up Hunan Hybrid Rice Research Center in 1984 and China National Hybrid Rice Research & Development Center in 1995 in Changsha city, Hunan Province. In light of the discovery of the environment-conditioned genic male sterility (EGMS) Nongken 58s put forward by another Chinese researcher, Shi Mingsong, Prof. Yuan proposed a strategy for the two-line system hybrid rice breeding using EGMS materials, including Nongken 58s. Guided by Prof. Yuan's method, his research team found important EGMS lines AnnongS-1 in 1987. He also developed the two-line hybrid rice application system and many larger-scale two-line hybrid rice varieties.

Moreover, Prof. Yuan developed super-high-yield hybrid rice which could yield from 10.5 to 15 t ha^{-1} for one season (Huang et al., 2020). Since then, the hybrid rice planting area in China exceeded 13.33 million hectares in 2019, accounting for 51 % of the total rice planted area, and its yield accounted for about 58 % of the total rice yield. In the meantime, the planted area of hybrid rice reached 8 million hectares outside of China. When he was getting older, he also mentored heterosis mechanism research, the genetically engineered hybrid rice, salt-tolerant hybrid rice breeding, and other related studies.

Prof. Yuan in person and his research associates had many times traveled to India, Vietnam, Myanmar, Bangladesh and Sri Lanka, etc. to provide advice and consultation to hybrid rice development.

Since 1980, Prof. Yuan trained more than 30 PhD or Master's students in China and 14000 researchers and technicians of researchers from over 80 countries, and served as a chief consultant to the FAO since 1990. He was elected an honorary member of the Chinese Academy of Engineering in 1995 and U.S. Academy of Sciences in 2006. For his outstanding contributions, he was awarded with numerous honors and prizes, including the first China national special invention prize, the UNESCO Science Prize in 1987, China Science and Technology Top Awards in 2000, World Food Prize in 2004, Wolf Prize in Agriculture in 2004, China's Medal of the Republic in 2019 and so on.

Prof. Yuan spent his life thinking, creating, and working and he was without a doubt very approachable and a true friend to many farmers. Yuan once said he had two dreams: "enjoy the cool under the rice crops taller than men" and that hybrid rice could be grown all over the world to help solve global food scarcity. He hoped that the hybrid rice development could benefit people the world over.

Prof. Yuan Longping, age 91, passed away peacefully on May 22, 2021. He left his wife and three sons. Rest in peace, Prof. Yuan.

We received the letter from the editor that the paper, Low Fertilizer Inputs do not Adversely Affect Yield or Performance of Indica Hybrid Rice, which was written by me and co-authored by Prof. Yuan and seven other researchers, was accepted by *Scientia Agricola* in the morning on May 22, 2021. However, Prof. Yuan passed away in the afternoon on the same day. Our research team (four people in total) of heterosis mechanism of hybrid rice was established under the devoted instruction and great support of Prof. Yuan for more than 10 years ago. We wrote this article in memory of him.

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