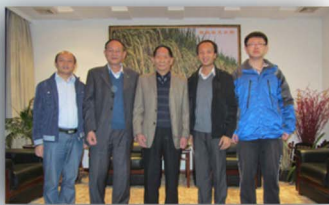


Rice Production Mechanization Research Team

College of Engineering, South China Agricultural University



Rice production mechanization research team, supported by the Key Laboratory of Key Technology on Agricultural Machine and Equipment (South China Agricultural University), Ministry of Education, P. R. China, mainly engages in paddy field precision leveling technology and equipment, rice precision hill-drop drilling technology and equipment, key technology and equipment for agricultural machinery navigation and automatic operation, agricultural aviation technology, and fast acquisition technology for agricultural information. Led by the academican of Chinese Academy of Engineering, Professor Luo Xiwen of South China Agricultural University, the research team has developed to have a reasonable discipline structure, a significant research direction and young team members with innovative awareness. Currently, the team consists of nine research members, including one academican, two professors, three associate professors (research associate), and three lecturers (assistant researcher). Six members hold doctoral degree. The research team has made a number of major scientific achievements in teaching, research, technology development and applications. Among them, "Rice precision hill-drop drilling technology and equipment" and "paddy field laser leveling technology and equipment" were evaluated to be the world-leading level. "Key technology for agricultural machinery navigation" reaches the international advanced level.

In the past five years, there have been 56 new scientific research projects with more than 75 million RMB Yuan funded to the team. Over 70 scientific papers have been published in academic journals with nine SCI indexed and more than 50 EI indexed articles. More than 50 pieces of invention patents were applied and 24 pieces authorized. Three scientific and technological achievements have passed achievement appraisal. The research team has been awarded with one First Prize and one Second Prize of provincial/ministerial-level science and technology award. A total of 14 doctoral students and 16 master students in the team graduated in the past 5 years, among which 5 master students directly upgraded to PhD program ahead of time. The team also obtained the Second Prize of National Teaching Achievement Award.



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1. Rice precision hill-drop drilling technology and equipment

“Three synchronous” rice precision hill-drop drilling technology was proposed by the team for the first time in the world, including rice precision hill-drop drilling with synchronously opening furrows and forming ridges, forming ridges and applying fertilizer with synchronously opening furrows, and forming ridges and spraying with synchronously opening furrows. Two major types and 15 models of rice precision hill-drop drilling machines have been developed for paddy field and dry lands. Application and extension results in 26 provinces (cities, districts) of China and six other countries including Thailand et al. show that the application of this technique can increase rice yield and save production costs. Compared with other rice cultivation methods, rice precision hill-drop drilling has significant effects with the increase of income up to 1500 RMB Yuan per hectare. The scientific and technological achievements appraisal identified the technology as “international leading level in paddy field rice mechanical drilling research”. Rice precision hill-drop drilling technology and equipment also won the First Prize of Technology Invention Award, Ministry of Education in 2009.



2. Paddy field laser leveling technology and equipment

Laser leveling machinery with adjustable height and level has been successfully developed by the team for paddy field and dry land with the leveling error less than 3 cm. The leveling technology and equipment was appraised to reach “the international leading level in paddy field leveling technology and equipment” and was granted “the Third Prize of China Shennong Agricultural Science and Technology Award” in 2008.



3. Key technologies for agricultural machinery navigation

The team conducted thorough research on agricultural machinery navigation and automatic operating system, and obtained breakthrough in ten key technologies. Three major innovative achievements have been made in navigation positioning, path tracking and automatic operation. For the first time in China, the team successfully developed unmanned rice transplanters, rice direct seeding machines, cotton planters, and tractors with rotary operation. The overall level of key technologies for agricultural machinery navigation research was evaluated to reach “the leading level in China”. The research on paddy field machinery navigation reached “the international leading level”.



4. Key technology for agricultural aviation

The team was the earliest in China to propose the strategy of “China must accelerate the development of agricultural aviation”. The team organized and founded the first “National Agricultural Aviation Industry Technology Innovation Strategic Alliance” in China and South China Agricultural University was selected as the chairman organization. The team has carried out wide and profound research on aviation spraying special chemicals, agricultural aerial work platforms, agricultural aerial remote sensing, agricultural UAV flight control and agricultural aviation technical standards. Forty-one related invention patents have been applied. At present the team has become the leader in basic conditions and scientific research of agricultural aviation in China.



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