

Research Team on Technology and Equipment for Crop Frost Protection, School of Agricultural Equipment Engineering, Jiangsu University

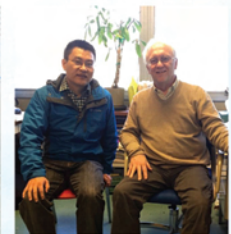
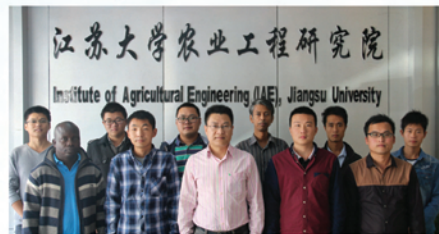
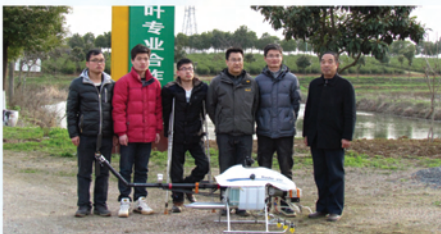


Prof. Hu Yongguang
Director, Institute of
Facility Agriculture
Engineering

Research team on technology and equipment for crop frost protection was founded by Prof. Hu Yongguang in 2005, focusing on the fundamental and applied research on all aspects of frost protection for tea plants. Team members include Prof. Li Pingping, Prof. Zhang Xiliang, Associate Prof. Wang Jizhang and more than 15 graduate students. Under the financial support of National Natural Science Foundation of China, National High Technology Research

and Development Program, Special Fund of Non-profit Scientific Research for Agriculture and 948 Program (Ministry of Agriculture), the mechanisms of frost protection via airflow disturbance and sprinkler irrigation, control strategy, critical temperature measurement, frost prediction, customized frost protection airfoils/blades/wind machines/sprinklers, operation timing and wireless monitor and control through Internet of Things have been researched and developed. The combination of wind machines and sprinkler irrigation for frost protection is now under investigation.

The team is the first professional and academic one to conduct research and development of frost protection technology and equipment in China and keeps close relationship with experts and research teams from University of California, Davis (USA), University of Plymouth (UK) and Agricultural Technology Center of Mie Prefecture (Japan) through exchange and cooperation. As a principal investigator, Prof. Hu is currently undertaking a key project of National Hi-Tech R&D Program. More than 30 papers and dissertations have been output in the field, and 30 patents and software copyrights have been applied, among which 15 were authorized. A professional company has been set up for technology transfer and extension, and the products have been put into use on almost ten tea farms.



Institute of Facility Agriculture Engineering, Jiangsu University



Professor Mao Hanping

Institute of Facility Agriculture Engineering, Jiangsu University aims for R&D of key technology and equipment for the production process of facility agriculture to improve the productivity and cost effectiveness through information sensing of agricultural and biological environment, intelligent and optimal control of protected environment, precise fertigation, prevention from plant stress, harvesting robotics, and agricultural Internet of Things. Five professors and five associate research fellows are working at the research characteristics of interdisciplinary cross and fusion to achieve stronger innovation capability. One of them is a member of Discipline Evaluating and Appraising Group, the Academic Degrees Committee of the State Council. One is the grantee of Outstanding Youth Science Foundation(NSFC), National 100 Excellent Doctoral Dissertation and 100-Talent Program of Chinese Academy of Sciences. More than 60 graduates and post-

doctors at the institute are encouraged to participate in modeling, observation, theoretical studies of the interaction relationship among plants, structures, water and soil, atmosphere, and agricultural equipment, with special emphasis upon the flow of energy and information, modern agricultural logistics and equipment development.

The institute has successfully developed model bases of greenhouse crop growth, climate and environment control, and established comprehensive environment control system for greenhouse production with optimal economy. The dynamic adjustment of nutrient solution ingredients was developed and applied to the automatic fertigation apparatus. Spectroscopy, machine vision, polarization imaging, microelectrodes and biochemical sensors are fused to indicate the crop growth and physiology. The technologies of frost protection, harvesting robotics and Internet of Things have been adopted to develop corresponding equipment and decision-making system for tea and orchard production in hilly areas. The institute has won the second prize of National Award twice, and 10 provincial and ministerial-level R&D awards. 95 patents and 20 pieces of software copyright have been licensed. More than 300 academic papers have been published, among which 132 papers have been indexed by SCI/EI.

The institute is currently carrying out one key project and five regular projects of Natural Science Foundation of China, one National Key Technology Support Program and two National High Technology Research and Development Programs. We are expecting the fruitful, fundamental and applied research in agro-biological environmental engineering for a better life in the near future.



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