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| **Breeding of Rice and Major Economic Crops**  |
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| **Research background:**Breeding of crops and animals is a high-tech industry, which is depended on multiple basic disciplines such as genetics, genomics, molecular biology, and on other agricultural sciences such as agronomy, plant protection and soil science.The development and application of biotechnology, intelligent technology, information technology and big data technology have greatly promoted the advance of breeding industry.Zhejiang University has a wide range of scientific disciplines needed for crop and animal breeding, such as strong agricultural sciences, biotechnology, as well as information technology and big data technology, andhence it owes obvious comparative advantages.To better integrate the research platforms and expert resources, and to take advantage ofthecomprehensive nature of Zhejiang University, the Alliance for Breeding of Rice and Major EconomicCropswas established in 2016, which aims toenhance Zhejiang University’scapability of and contribution to breeding,cultivate high-level talents, foster the advance of relevant scientific disciplines, and promote the progress of the strategic and emerging seed industry. |
| **Main research topics and progress:****Main research topics:**1. Genetic resource innovation,characterization and utilization.2. Innovation of breeding technologies, methods and theories.3. Breeding and industrializationof crop varieties.4. Exploration of cross-discipline cooperation for crop breeding in Zhejiang University.**Main progresses:**1. Breedingof new varietiesRapeseed. New rapeseed varieties bred by the alliance have become predominant varieties in Zhejiang and neighboring provinces in the past few years.One of them,"Zheda 619", was awarded the "Top 10CropVarieties of Zhejiang Province2011-2015" in 2016.The newly released variety “Zheda 630” has the highest oil content (49.82%)among all conventional rapeseed varietiesin China.Rice. Significant progress has been made in rice breedingusing biotechnologies. Since 2016, six rice varieties have been awarded with new plant rights, including “Zhedao No.1”and “Yudao No.1”. A new rice production system,in which rice grown in fish farms instead of paddy field, has been established, using special rice varieties known as ‘Yudao’ or FisheryRice.This Fishery Rice system has been popularized in Zhejiang, Jiangsu, Hubei and Jiangxi, and hasalready achieved good social and economic benefits.Gene editing technology has already used for breedingrice withsuper-lowcadmium (Cd) accumulation in rice grain, which is expected to provide an economical and efficient solution for rice production in Cd polluted paddy fields.Other crops. Transgenic corn varieties resistant to insects and herbicide glyphosate have been developed with excellent performance, which is in a leading position in China.New watermelon varieties of “Zhemi” series have been developed and widelygrown in Hangzhou, Shaoxing, Taizhou and other regions.2. Theoretical and technologicalresearch of crop breedingProfessor ZHANGGuopinghas been a key member of the International Barley Genome Consortium, results of barley genome sequencing and analysis has been published on Nature.Professor ZHANGMingfang's team has disclosed the pickle genome and relevant findings were published on Nature Genetics.Professor FANLongjiang's team has been working on genome sequencing and studies on weedy rice andthe most destructive weed(barnyard grass) in rice production, two research papers summarizing their discoveryies have been publishedon Nature Communications.3. Establishment of breeding facilities and demonstration platforms.The alliance has built a number of research facilities both inand outthe university, such as:(1)Zhejiang University RapeseedGene Bank.(2)Zhejiang University Big Data Breeding Platform(3) The Wuxi-Zhejiang University Joint Breeding Center.(4) Joint Precision Cotton Breeding Center of Zhejiang University –Jiushenhehe.In addition, the alliance has established a number of platforms for demonstratingtransgenicmaize, colored rice,new varieties of rapeseed,melon and fruit in Yunnan and Anhui provinces.4. Cooperation with seed industry in ChinaThe alliance promotes research and development cooperationwith seed industry, has signed a number of bilateral and multilateral agreement.For bilateral cooperation, the alliance has reached strategic and comprehensive cooperation agreementwith“Long Ping High-Tech" andFengle Seed Ltd. The alliance has establishedthe Rice Consortium of Zhejiang University and SeedIndustries and theAlliance for Precision Breeding and Industrialization of Low Cadmium Rice in China. |
| **Member and college:**Team Leaders:ZHANG Guoping, SHU Qingyao, ZHOU Weijun, ZHANG Mingfang, SUN Chongde, BAO Jinsong, FAN Longjiang, SHEN Zhicheng.Other members:ZHU Shuijin(College of Agriculture and Biotechnology, CAB), WU Feibo(CAB), HU Jin(CAB), ZHANG Tianzhen(CAB), WU Dianxing(CAB), CUI Hairui(CAB), TU Jumin(CAB), SHI Chunhai(CAB), HU Dongwei(CAB), YE Gongyin(CAB), LOU Yonggen(CAB), WU Liang (CAB), JIANG Lixi(CAB), LU Gang (CAB), YANG Jinghua(CAB), XU Jianhong(CAB), YI Jianwei (College of Computer Scienceand Technology), MAO Chuanzao (College of Life Sciences), SHOU Huixia (College of Life Sciences). |
| **Representative achievements:**1. Research funding. Thealliance has obtained a total scientific research funding over 50 million RMB, throughten key national and industrial projects.2. Publications. One paper was published in Nature, one in Nature Genetics, and three in Nature Communications. Besides, 28 papers were published in PANS, Plant Cell and other famous journalswith an IF>5.0.3.Scientific awards. Members of the alliance have won a number of awards for science and technology advances at provincial, ministerial and nationallevel.4. New crop varieties. One new rapeseed variety was released, six rice varietiesare awarded with new plantright, and seven rice varieties have been under test in the regional trial of new varieties.5. Attraction ofresearch talents.The alliance has attracted a number of high level research professionals, including one Distinguished Young Scholars, oneYoung Professionalsof the Thousand TalentsPlan, and three professors supported by the Hundred Talents Program of Zhejiang University. |