Qian Chuntao

Areas of Research
Plant genetics and breeding in *Cucumis*

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Research Interests

Production of haploid and doubled haploid in melon and cucumber; interspecific hybridization in melon; disease resistant genes exploitation and cultivar improvement in melon

1. Haploid and doubled haploid production in *Cucumis*

Haploid and doubled haploid is very important in improving the efficiency of melon cultivar breeding. However, melon parthenogenesis has a high genotypic dependency and methodological issues that impede the efficient production of DHs such as: low levels of female flowers developed once pollinated with irradiated pollen; low production of haploid embryos; difficulty to detect seeds containing haploid embryos; low germination of haploid embryos in vitro; high mortality of germinated embryos and growing plantlets; very low or null spontaneous chromosome duplication; difficulty to induce chromosome doubling in haploid plants due to a high mortality and hyperhidricity; high ratio of haploid and mixoploid plants; low pollen germination levels of chromosome doubled plants which trigger a decrease of fruit set and seed recovery; and low DH seed germination. Our lab has achieved some progresses in methodology and obtained several genotypes of doubled haploid in melon.

2. Interspecific hybridization in melon

There are lots of valuable interesting traits or genes in wild species in *Cucumis,* and the wild species have been considered as the useful alien gene resources both for cucumber and melon genetics and breeding. Thus, interspecific hybridization has always absorbed lots of focuses from breeders since last century, especially in melon for its narrow genetic variation. However, only embryo or infertile F1 hybrid between melon and its wild species has been produced, which shows it is unsuccessful yet in the interspecific hybridization in melon until now. There are two

types of limited points, including prefertilization and postfertilization disorder. Our lab has achieved the first artificial amphidiploid species from the cross between cucumber and wild species *C. hystrix* L., which can provide useful support for research of the interspecific hybridization between melon and wild species in *Cucums*.

3. Disease resistance improvement in melon

Gummy stem blight (GSB) is a severely destructive foliar disease of cucurbits caused by the ascomycele fungus Didymella bryoniae (Auersw.) Rehm and its anamorph Phoma cucurbitacearum (Fr.:Fr.) Sacc. Several sources of resistance to GSB have been reported in the ensuing decades, GSB-resistant melon varieties and breeding lines released to date, all derive resistance from PI 140471 (a wild melon) and have failed to provide adequate levels of resistance. Resistance gene combinations may give significantly higher levels of GSB resistance than single gene alone. Marker-assisted selection of these single loci would greatly facilitate the creation of resistance gene pyramids. And a comprehensive understanding of the resistance mechanism in the pyramided resources is very necessary to determine which breeding strategies will be most likely to yield success. Our lab has performed a series of experiments to reveal the underlying secrets and produced some disease resistance improved melon cultivar.

4.

Education Background

Bachelor： Nanjing Agricultural University of China
Master： Nanjing Agricultural University of China
Doctor： Nanjing Agricultural University of China

Work experience

Assistant Professor, Nanjing Agricultural University, 2006-2018

Research Professor, Nanjing Agricultural University, 2019-

Selected Publication

ZHANG Ning, XU Binghua, QIAN Chuntao*, et al. 2017. Development of a muskmelon cultivar with improved resistance to gummy stem blight and desired agronomic traits using gene pyramiding. Czech J. Genet. Plant Breed., 53(1): 23–29.

XU Binghua，QIAN Chuntao*，WANG Hongying et al. 2014. The expression analysis of defense genes in the genes pyramided melon (*Cucumis melo* L．) resistance to gummy stem blight. Journal of Nanjing Agricultural University, 37(5) : 63-68.

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