

Plant Genomics

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Meixue Zhou

University of Tasmania, Australia

Adapt agriculture to changing environment: Introgressing stress tolerance genes to varieties through conventional breeding

Climate is changing so we need to change, so does the plant. Plant breeders have been trying to develop stress tolerant crops using genetic variation in crops at intraspecific, interspecific and intergeneric levels. Two main approaches were employed: Traditional breeding and transgenic approach. Traditional breeding relies largely on the natural intraspecific genetic variations. When introducing a gene from different species, there is not much success due to reproductive barrier and/or the risk of other undesirable traits transferred with the target traits. To avoid this problem, genetic engineering strategy is more preferred, as it only deals with the specific genes transferred. Many abiotic stress tolerance genes have been successfully expressed in intergeneric species. Without any doubt, transgenic technology will continue to aid the search for the cellular mechanisms that underlie tolerance. However, the public acceptance of transgenic plants may face consumer backlash, which limits the use of transgenic approaches in improving abiotic stress tolerance. An effective procedure of introgressing stress tolerance genes to varieties through backcrossing program has been developed. Assisted with molecular markers, this procedure will make it possible to breed varieties or pre-breeding materials with added specific genes within 2-3 years. To achieve this, we need the genes making significant contribution to the traits, molecular markers closely linked to the genes and techniques to speed the process. Detailed requirements and technique will be discussed.

Biography

Meixue Zhou has been involved in plant research for more than 30 years which includes more than 10 years of experience in China. His major research areas include physiological and molecular mechanisms of plant biotic and abiotic stress tolerance. He is serving as a Review Panel Member for ARC of Australia and the Natural Science Foundation of China. He is the Co-Director of Australia China Research Centre of Plant Stress Biology. He has published more than 100 papers in various peer-reviewed journals. He is a Member of Editorial Board of several journals.

mzhou@utas.edu.au

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