

SEMINAR

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Hosted by Prof Prakash Kumar

In Vitro Breeding Accelerates Papaya Crop Improvement



By Puthiyaparambil Josekutty

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About the Speaker

Dr Josekutty is an agricultural Biotechnologist and Academic with ~37 years' experience internationally (Australia, USA, New Zealand, Micronesia, South Africa). Jose uses in vitro breeding with molecular tools to speed up genetic improvement of horticultural crops. Since 2017 he has been the Research Manager at Skybury farms (skybury.com.au), Australia. He developed and managed commercial Plant Tissue Culture Facilities of Flemings nursery (flemings.com.au) and Yuruga nursery (yuruga.com.au) in Australia before joining Skybury. Jose was at Penn State Univ, USA (2010-2012) and in New Zealand with Plant and Food Research, and Univ of Canterbury, Christchurch (2005-2007) and New Zealand Forest Research Institute (2007-2010). Jose also worked for US Department of Agriculture in Micronesia (1998-2005). He started his academic career as a Lecturer at the MS University of Baroda, India. He has been a Lecturer at the Walter Sisulu University, South Africa (1996-98), and Senior Scientist at MS Swaminathan Research Foundation (mssrf.org) (1993-95). Jose is a Current Director of International Plant Propagator's Society, Australia region since 2018.

Skybury farms operates a 1400-acre papaya farm in Queensland, Australia. Using biotechnology, we have rapidly developed an improved 'Skybury Sweet Red' papaya variety, which has captured ~70% of the Australian market share. Conventional breeding is difficult in papaya because of low genetic variability and its complex sex system with male, female, bisexual and hermaphrodite forms. In vitro breeding strategy involving high throughput somatic embryogenesis and large-scale field trial helped us to generate high yielding, flavoursome papaya lines with high brix value. Genetic variability was induced (mutagenesis) in embryogenic cell lines, which yielded variant papaya lines. Large-scale field trials helped to recover unique variants with better agronomic and fruit qualities. Some mutant lines are free of the Papaya Sticky Disease (PSD) caused by the Papaya Meleira Virus (PMeV). Also, a rapid and reliable molecular diagnostic test (PCR Test) and lateral flow device (LFD) kit for rapid screening for PSD were developed. Our experience suggests that in vitro breeding approach is the best way for non-GM papaya crop improvement. This talk will give an overview of our efforts in obtaining PSD-free lines of highly improved papaya lines for Australia.