Development of a perfect marker for WA-CMS trait in rice

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Rice is the most important staple food crop and we need to significantly increase our rice production in the coming decades. Compared to inbred varieties, Hybrids in rice have 15-20% more yield advantage and cultivation of rice hybrids can enhance rice production and productivity significantly. Commercial rice hybrids are produced by the three-line system of breeding involving a Wild abortive Cytoplasmic male sterile (WA-CMS) line, its cognate iso-nuclear maintainer line and a restorer line. Maintenance of genetic purity of WA-CMS is essential as admixture of these lines with maintainer line during hybrid seed production is expected. Various molecular markers like SSR, STS with varying degree of efficiency were developed to distinguish WA-CMS line from maintainer lines at early stages of growth. These markers have less reliability in analyzing purity of seed lots, as they are developed from flanking regions of gene or repeat regions in the mitochondrial genome. In the present study, we have developed a robust co-dominant functional marker based on the candidate gene for WA-CMS trait, ORF126. The candidate gene marker is designed to target the indel polymorphism observed by alignment of the ORF126 gene from mitochondrial genomes of WA-CMS and maintainer lines. The efficiency of the marker was validated in set of all WA-CMS lines and their cognate iso-nuclear maintainer lines. The functionality of the marker was validated and established in detection of impurities in commercial seed lots of WA-CMS through single seed/seedling based assay.

Biography
Karnati Pranathi has completed her MSc Biotechnology from Sri Krishnadevaraya University in 2010. She is a DST-INSPIRE Fellow and current pursuing PhD in Biotechnology.

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