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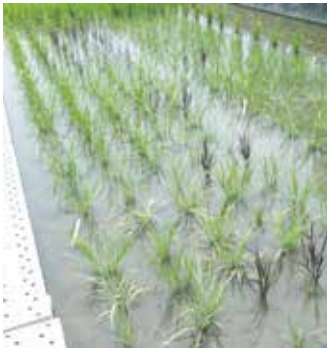
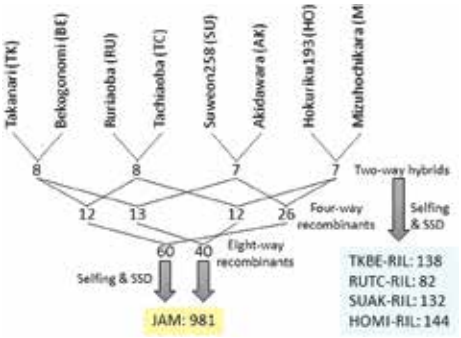
Development of remote cross breeding in rice via polyploidization

For breeding of super rice varieties with useful new genes, it is important to promote allelic exchange in existing cultivars by crossing them with wild or genetically remote cultivars. However, hybrids are rarely obtained from such distant crosses due to multitude of reproductive barriers. Interestingly, we found a fertile tetraploid progeny derived from anther culture of Asian rice cultivar, *O. sativa*, and African rice cultivar, *O. glaberrima*. Using genomic and phenotypic analyses, we now aim to clarify mechanisms involved in recovery of seed set in these plants. Furthermore, we hope to establish a novel remote cross breeding strategy in rice that overcomes reproductive barriers by introduction of polyploidization and haploidization.



Genetic dynamics in rice multiparent cross population



The expansion of genetic diversity in crossed populations is essential for faster and more efficient crop improvements. To overcome a limiting factor of biallelic gene combinations in rice breeding that depends on classical 2-way crosses, we developed a new multiparent population using 8-way cross strategy. By comparing genomic and phenotypic dynamics of this population, with those found in usual 2-way populations or parents, we aim to demonstrate the usefulness of multiparent populations for genetic improvement and development of novel breeding approaches in rice.