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**HOMOEOLOGOUS CHROMOSOME PAIRING AND ALIEN INTROGRESSION
ANALYSES IN WIDE-CROSS DERIVATIVES OF *ORYZA* THROUGH
FLUORESCENCE *IN SITU* HYBRIDIZATION**

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ABSTRACT

NGUYEN THI NGOC HUE, University of The Philippines, Los Baños, April 2004,
Homoeologous Chromosome Pairing and Alien Introgression Analyses in Wide-Cross Derivatives of *Oryza* through Fluorescence *In Situ* Hybridization.

Major Professors: Dr. A. A. Barrion and Dr. D. S. Brar.

Homoeologous chromosome pairing among different genomes of *Oryza* was studied through classical and molecular cytogenetic techniques using genomic *in situ* hybridization (GISH) and fluorescence *in situ* hybridization (FISH). FISH protocols were modified for analysis of pachytene and other meiotic chromosomes. Meiotic chromosome analysis showed limited homoeology among AA genome of rice and FF, GG and HHJJ genomes of wild species. FISH was used successfully to characterize parental genomes and homoeologous pairing in hybrids involving different genomes: AA x CC, AA x FF, AA x GG and AA x HHJJ. Both allosyndetic and autosyndetic pairing was detected in the hybrids, which was not possible through classical cytological techniques. Chromosome segments introgressed from wild species into the rice genome were also identified through GISH. Autosyndetic pairing within *sativa* genome is indicative of duplication of chromosome segments, probably rice is secondary polyploid. Both *O. minuta* and *O. ridleyi* showed extensive pairing within BC and HJ genomes, respectively. FISH using centromere specific probe (pRCS2) showed hybridization signals on each of the 12 chromosomes at pachytene as well as on 24 somatic chromosomes of rice, however, no centromeric signal could be detected in five wild species (*O. officinalis*, *O. brachyantha*, *O. granulata*, *O. minuta* and *O. ridleyi*).

The parental chromosomes, extra alien chromosome in MAALs and introgressed segments in backcross progenies derived from *O. sativa* x *O. ridleyi* were clearly identified using GISH. Restructured chromosome(s) of both *sativa* and *ridleyi* were also detected. The introgressed segments of *O. australiensis* were located on rice chromosomes in the advanced breeding lines derived from *O. sativa* x *O. australiensis*.