

# FAO/IAEA International Symposium on Plant Mutation Breeding and Biotechnology



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## CHIMERISM IN MUTANT WOODY CROPS

Because somatic mutations begin in a single mutated cell surrounded by wild-type cells, the mutants are inevitably in a chimeric state for some time after they first occur. The periclinal chimera state (e.g., only one layer in a shoot apical meristem consists of mutant cells) is usually held to be stable. Here, we used mutant cultivars of Japanese pear (*Pyrus pyrifolia*) and mulberry (*Morus* spp.) to study periclinal chimera patterns and mutant stability in woody crops. The mutant cultivars included gamma-ray-induced, spontaneous, and ploidy mutants. To separate the chimeras, we obtained regenerated plants from adventitious shoots generated by *in vitro* culture. The immature leaves in winter buds were isolated aseptically and cultured on solid medium containing 1-50  $\mu$ M thidiazuron. After several sub-cultures, the regenerated shoots were acclimatized by grafting or cutting. The regenerated plants and their original cultivars were analysed by morphological observation, crossing experiments, flow cytometry, PCR, and other methods. Flow cytometry analysis of polyploid mutants (cytochimeras) and the regenerated plants derived from them indicated that the regenerated shoots were predominantly derived from L1 cells. For example, the majority of regenerated plants from the 4-2-2 cytochimera mulberry strains, which had tetraploid L1 layers, were tetraploid. Among the regenerated plants derived from mutant mulberry and pear cultivars and strains, wild-type (original-type) plants occurred at a high frequency, depending on the particular cultivar or strain. These results indicate that wild-type cells were maintained though long-term cultivation or repeated mutagenesis in some cultivars and strains. Periclinal chimerism was stable for a long time, indicating that additional procedures are needed to isolate pure (non-chimeric) mutant plants if all cells need to be mutant. These findings have implications for the utilization of somatic mutants of woody crops. This research was partially supported by SATREPS, JST/ JICA (Japan).

### Country or International Organization

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