



Application of molecular cytogenetic methods in plant breeding

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Fluorescence in situ hybridisation (FISH) techniques, which enable the direct chromosomal localisation of labelled DNA probes, have been increasingly applied to plant genome mapping in recent years. We have developed FISH methods for the accurate localisation of repetitive DNA sequences at chromosomal sub-arm level in Brassica species. In addition we apply genomic in situ hybridisation (GISH) for identification and characterisation of parental genome components in rapeseed hybrids. The detection of short, low-copy molecular markers is not possible by FISH, however this shortcoming can be overcome by physical localization of megabase DNA clones containing markers of interest. BAC clones were localised in sunflower and an 8 kb transgene insert could be localised on Vicia faba chromosomes. Highresolution FISH can provide information about ordering and physical distances between molecular markers, both important considerations for physical mapping and positional cloning. Practical applications of FISH and GISH in rapeseed breeding are discussed.