ABSTRACT. Genomic in situ hybridization (GISH), which is a modification of fluorescent in situ hybridization, has been widely used in the study of plants. It has become one of the most important techniques for molecular cytogenetics. GISH is a technique that allows distinguishing the genomes in a cell. With this technique, it is possible to differentiate the genomes in a hybrid; consequently, this tool has been applied to the study of hybrid lineages, genetic improvement programs, and studies of the evolution of polyploids. Moreover, GISH can be applied to the analysis of the meiotic behavior in hybrids and polyploids, providing information concerning the relationship between species. This review presents the wide application of this technique in plants.

Key words: GISH; Intergeneric hybrids; Interspecific hybrids; Allopolyploids; Plant improvement