

Abstract

Genetic variation is necessary for crop improvement. Induced mutations are a highly effective way of enhancing natural genetic resources and have successfully been used to develop improved cultivars among both seed and vegetatively propagated crops. So far, among more than 2300 officially released mutant varieties worldwide, 566 represent ornamental plants (see <http://www-mvd.iaea.org>). Some of the selected traits in the annual ornamental plants are flower color, flower morphology, plant architecture, compact growth, flower type, and variegated leaves. Mutation-assisted breeding (MAB) has contributed high economic benefits in several countries. However, in fruit trees few cultivars have been released by MAB due to the long life cycle. Nevertheless, examples of MAB in apples, pears, *Citrus* spp., mango, banana and pineapple are encouraging. MAB can be a useful tool for developing cultivars with changed biochemical or physiological characters that can enhance product quality. Good screening techniques are an essential feature of the process. Their application has led to the development of mutants with novel uses generated from old crops and has accelerated the domestication of new crops. Mutation induction in combination with *in vitro* regeneration systems (somatic embryogenesis, protoplasts, doubled haploids) can provide a means to generate large mutant populations followed by micropropagation of selected mutants that are multiplied in large numbers for further evaluation. Moreover, induced mutants do not raise public health concerns, unlike food generated from genetically modified crops. This review describes the achievements of MAB in horticultural crops, emphasising pre and post-harvest quality traits (storage, quality, nutrition) and future prospects for transgenic breeding.