Chapter

3

PROTOPLAST FUSION AND APPLICATIONS IN CITRUS BREEDING

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1. GENERAL ACCOUNT ON CITRICULTURE

Citriculture is widespread worldwide, and economically important in the subtropical and tropical subtropical regions where climate and soil conditions are adequate. Citrus production lands are generally in subtropical, semi-tropical and tropical regions of the world which are generally located at the latitudes of 40°N and 40°S. From this point of view, there are three main regions where citrus production is mainly carried out. Although citrus fruits are originated from tropical and semitropical regions, citrus production is focused on subtropical regions. In the tropical and semitropical regions, the inner and outer coloration of the fruit is not as good as it is in subtropics, and the aroma remains insufficient. In this framework, citrus production for fresh consumption is located in subtropical regions in terms of superior fruit quality. In certain areas, such as the mountainous regions of China and the coastal plains in many countries, such as California and Florida in the USA, Valencia in Spain and Adana in Turkey, the citrus industry is considered as the leading industry. (Table 1, FAO 2020). The global production of citrus fruit reached 152.448.800 tons in 2018, according to estimates, and consists of 49.47% of oranges, 22.56% of mandarins and tangerines, 12.71% of lemons and limes, 6.15% of grapefruit and pummelos, and 9.12% of other citrus fruits including most of the genotypes those are used as rootstocks in cultivation.

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are of great importance, because the purpose of breeding is to reveal or combine the current genetic capacities of parents. In general, somatic hybridization studies have provided facilities to develop improved citrus germplasm by enabling the production of allotetraploid breeding parents that are the combination of elite scions, haploid + diploid protoplast fusion, productions of cybrids, production of superior rootstock genotypes and production of wide hybrids of Citrus with wild relatives. As somatic hybridization/cybridization technology in citrus continues to develop, the development of novel nuclear/cytoplasmic combinations will be further investigated.

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