

099 - ADVANCES IN APPLE CULTURE WORLDWIDE

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Summary - Over the last 60 years, planting densities for apple have increased as improved management systems have been developed. Dwarfing rootstocks have been the key to the dramatic changes in tree size, spacing and early production. The Malling series of dwarfing rootstocks (M.9 and M.26) have been the most important dwarfing rootstocks in the world but are poorly adapted in some areas of the world and they are susceptible to the bacterial disease fire blight and the soil disease complex, apple replant disease which limits their uses in some areas. Rootstock breeding programs in several parts of the world are developing improved rootstocks with resistance to fire blight, and replant disease, and improved cold hardiness and yield efficiency. A second important trend has been the increasing importance of new cultivars. New cultivars have provided opportunities for higher prices until they are over-produced. A new trend is the “variety club” in which variety owners manage the production and marketing of a new unique cultivar to bring higher prices to the growers and variety owners. This has led to many fruit growers being unable to plant or grow some new cultivars. Important rootstock and cultivar genes have been mapped and can be used in marker assisted selection of future rootstock and cultivar selections. Other important improvements in apple culture include the development of pre-formed trees, the development of minimal pruning strategies and limb angle bending which have also contributed to the dramatic changes in early production in the 2nd-5th years after planting. Studies on light interception and distribution have led to improved tree forms with better fruit quality. Simple pruning strategies and labor positioning platform machines have resulted in partial mechanization of pruning which has reduced management costs. Improved plant growth regulators for thinning and the development of a thinning prediction model based on tree carbohydrate balance have improved the ability to produce the optimum fruit size and crop load. Other new plant growth regulators have also allowed control of shoot growth, control of preharvest fruit drop and control of fruit softening in storage after harvest. As we look to the future, there will be continued incremental improvement in our understanding of plant physiology that will lead to continued incremental improvements in orchard management but there is likely to be dramatic changes in orchard production systems through genomics research and genetic engineering. A greater understanding of the genetic control of dwarfing, precocity, rooting, vegetative growth, flowering, fruit growth and disease resistance which will lead to new varieties and rootstocks which are less expensive to grow and manage.

Keywords: planting system, tree density, tree shape, rootstock, light interception, light distribution, feathered trees, tree training, limb angle, pruning, profitability, genome mapping