

Title Fruit quality and yield of different apple cultivars as affected by tree density
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Abstract

The evolution of growing techniques and the diffusion of dwarfing rootstocks resulted in a deep revolution of apple culture, not only in traditional Italian apple growing locations on the hills, but also in the plains, where a longer growing season and a higher soil fertility do not allow very high planting density because of the vigour of the trees. With the aim of evaluating the best tree density to achieve high yield and good fruit quality for the most important varieties grown in the Po valley (Golden Delicious, Fuji and Braeburn) an experimental field was established in the spring 1996 in the Po valley. Four Golden Delicious clones were considered (clone B, Smoothee, Reinders and Crielaard), three Fuji (Naga-fu 6, Red Sport, Mori Hofu 3A) and three Braeburn clones (B. standard, Red Braeburn and B. CTIFL). All the plants were on M9 rootstock and spindle trained, at a distance of 4.5 m between rows. The distance of the plants on the row was 75, 100, 150 or 200 cm with corresponding tree density from 1111 to 2962 trees/Ha. Yearly, trunk cross section, total weight and number of fruit of each tree was checked and fruit quality was evaluated by means of physical and chemical parameters at harvest and after 5 months in cold storage. Increasing tree density resulted in higher yield per hectare, but lower yield per tree was evident as soon as the trees began to compete with each other. Highest planting density significantly reduced fruit size and quality, but different results were observed in different varieties and clones. As regards fruit size and quality, variation between years was wider than variation between planting densities: a significant decrease of fruit mass and soluble solids content was observed during the last six years, indicating a progressive competition between trees. The trunk cross size was reduced at high planting density, due both to competition between trees and to the higher productivity (yield per hectare), which limit tree growth. It was concluded that, in the Po valley, the best tree density for the cultivars tested is 2222 trees/ha.