Sustainable Fruit Orchard Management

Cristos Xiloyannis*

Professor of Pomology, University of Basilicata, Potenza, Italy

*Corresponding author: cristos.xiloyannis@unibas.it

Abstract

The productive performance of an orchard and fruit quality is strongly affected by the grower capacity in choosing, combining, and properly performing the agronomical practices and new technologies in the appropriate pedoclimatic conditions. Climate changes (mainly increased temperature and precipitation changes) will have agricultural consequences on the interrelations between climate, plant and soil, water cycle and landscape changes. The appropriate choice of the variety and rootstock and the correct orchard design are important to obtain high yield of good quality, increase the efficiency of the resources and control the environmental impact. Over the past sixty years, the transition from the traditional soil management system (crop consociation, shallow tillage, organic fertilization) to the conventional one (repetitive tillage, reduced input of stabilized organic material, burning of pruning residues) resulted in a strong influence on the humus cycle with a progressive impoverishment of soil organic matter (SOM) content and loss of its fundamental functions into the soil (structural, nutritional, hydrological, etc.). Cover crops, seeded or spontaneous, can cover the orchard ground permanently or temporarily depending on climate and water availability for irrigation. No tillage/limitate tillage is very effective in protecting soil from erosion and increasing the infiltration of water during the rainy season. A well balanced and appropriate fertilization should take into account some steady points: a) nutrient needs of trees along the different stages of plant life cycle; b) soil nutrient availability and tree nutritional status; c) synchronization between nutrient requirements by the plants and their availability in soil volume where roots are present; d) fertilization techniques and their efficiency (application to the soil, fertigation, canopy spray); e) soil management techniques and water availability. Localized irrigation methods (drip irrigation, micro-sprinkler subsurface irrigation) are most commonly used in fruit-growing and can achieve very high efficiency (90-95% for drip irrigation) through reduced evaporation and percolation losses, because water is distributed in a very limited soil zone where most absorbing roots are. Moreover, small volumes of water can be distributed at high frequency. They can also be used for applying fertilisers, for frost protection (micro-jet), with saline water and municipal waste waters.