Geophysical Research Abstracts,
Vol. 10, EGU2008-A-01043, 2008
SRef-ID: 1607-7962/gra/EGU2008-A-01043
EGU General Assembly 2008

Soil fertility remediation in fruit tree orchards in Mediterranean areas

G. Montanaro, G. Celano, B. Dichio, A. Sofo, C. XIloyannis

Department of Crop Systems, Forestry and Environmental Sciences, University of Basilicata, 85100 Potenza, Italy

(giuseppe.montanaro@unibas.it / Fax: ++39 0971205378 / Phone : ++39 0871 205266)

In recent decades intensive agricultural practices (continual tillage, use of mineral fertilisers, use of low-quality irrigation water and removal of pruning waste) as combined with Mediterranean climate characteristics (i.e. low precipitation, high summer temperatures) have dramatically degraded cultivated soil, reducing soil organic carbon (SOC) to about 1%. Such poor condition negatively affects a large number of soil characteristics being unfavourable for plant physiology and thus for achievement of high fruit quality. Particularly, soil hydrological properties are impaired and soil water-holding capacity reduced. Increase water stored into soil by increased SOC may represents a key factor to face with recurrently water shortage in the Mediterranean-type-climates. Therefore, the aim of the present study was to explore effects of different agricultural management practice on SOC content.

We report carbon stored into soil by peach and kiwifruit orchards obtained by accurately monitoring CO_2 fluxes between orchards and atmosphere. Results show that a sustainable soil management (cover crop, no-tillage, compost application, mulching of pruning residues, regulated deficit irrigation) determines a net CO_2 fluxes to be negative (about -17 t ha^{-1} $year^{-1}$) because emissions are lower than stored CO_2 increasing SOC. While in a conventionally managed orchard such a flux was positive (about + 6 t ha^{-1} $year^{-1}$) continuing to impoverish SOC. Potential role of soil fertility remediation through increasing its carbon content to sequester atmospheric CO_2 is also discussed.