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Foreword

Organic farming and sustainable soil management are unequivocally linked because the role of soil in the complex process of food production is not limited to being the substrate in which the crops are physically supported but it also contains many mineral and biological elements that impact on sustainability (Brevik *et al*. 2015). Soils act as a filter for water, one of the key components for the plant development, and is a unique source of food and fibres controlling the geochemical cycles such as the carbon cycle (Keesstra *et al*. 2012; Berendse *et al*. 2015; Parras-Alcántara *et al*. 2015).

It is worth noting that the soil and the entire terrestrial environment undergoes constant changes and can be affected not only by natural phenomena, such as the weather, the topographic location or the actions of live organisms, but also the anthropic effect. Soil is often utilised, in an unpunished manner and without taking its nature into account, as a waste sink for society, including agricultural activity which contribute to the degradation and erosion of the soils (Cerdà 2000; Novara *et al*. 2015). This makes it an extremely unstable environment that is necessary to protect as it is the place where organic matter is recycled (Ndah *et al*. 2015).

The purpose of this special issue on *Sustainable Soil Management and Organic Farming* was to address different points of view on various problems that are focused on soil. The possible solutions to these problems were analysed from an organic perspective in different countries and environments. All 15 papers included in this special issue are based on the premise that arable soils are a non-renewable and finite resource.

This special issue is mainly associated with the Session '*Organic farming and Soil management*' (SSS10.3) presented at the General Assembly of the European Geoscience Union (EGU) which took place in 2013 and 2014 in Vienna, Austria. EGU's annual General Assembly is the most prominent European geosciences event which is participated by a large number of scientists from all over the world. EGU is organised in several Divisions and one of them being Soil System Sciences (www.egu.eu/sss/home/), also known as SSS Division. Since its first year at EGU in 2009, SSS Division has been growing and capture the attention of many soil scientists till the present being an obliged meetings to keep an update in the emergent topics in soil science as well as multidisciplinary research in soils.

The complex processes of soil erosion, degradation and desertification, as well as their impact on soil fertility, are thought to have a large impact on climate change caused by global warming. In this regard, different research works compiled in the current issue are focused on this problem in terms of sustainability. Cavoski *et al*. (2016) present the results of different fertilisation scenarios in an open-field tomato crop experiment. Their study demonstrates that recycling of nutrients from on-farm or food-industry wastes might be a good strategy to increase productivity and sustainability of Mediterranean organic agriculture. The use of conventional tillage and no tillage is currently a controversial topic in the field of soil management. Each of them has clear advantages and disadvantages that many authors try to highlight. Thus, the study performed by López de Herrera *et al*. (2016) in an adult olive orchard by using appropriate experimental methodology and an advanced statistical analysis showed that the effects of different tillage are more evident in deeper soil layers. The use of wastes from agro-food industries as a source of organic matter and nutrients is widely studied by researchers. Among other aspects, they try to clarify which of them can be used mainly to increase soil fertility. Similarly, Requejo *et al*. (2016) showed that nitrogen mineralisation increased in the soil after addition of compost derived from the wine-distillery industry in the laboratory and field study. Models developed under control conditions overestimated mineralisation rates under field condition, except in the case when considering the mixture of soil and compost, which reflects the important role of soil to evaluate N mineralisation caused by the addition of organic wastes.

The interest and concern for soil degradation by losses caused by runoff in intense episodes of rain, frequent in Eastern Spain, is reflected in the study developed by Cerdà *et al*. (2016) on a persimmon plantation setup using rainfall simulation experiments on bare and straw covered plots. They found that straw mulch was extremely efficient in reducing soil erosion rates. There is a great demand of organic soybean for food. In South America, huge areas of land is cultivated with transgenic varieties and intensive production. Landers *et al*. (2016) gives some solutions for organic soybean production focusing on weed control. Moreover, the maintenance and recovery of soil fertility by adopting less aggressive cultural practices require great effort and inputs in order to thoroughly analyse the soil nutrient dynamics and their interactions. Mohamad *et al*. (2016) focus on different aspects relative to organic fertilisation compared with conventional management in ancient olive orchard, concluding that manure was the main contributor to increasing soil organic carbon content in the organic system resulting in a higher efficiency of carbon sequestration in the soil by significant addition of organic matter.

In organic farming, the increase in the organic matter levels in poor soils leads the farmers to use green manure generally based on cereals or legumes. Gioacchini *et al*. (2016), through a series of experiments, investigated the mechanisms leading to nitrogen dynamics and the stabilisation in soil aggregates for achieving sustainable production. Nutrients release from legume residues and composted wastes as well as aged goat manure were followed by Al Chami *et al*. (2016) in Lebanese soils. The finding of their *in-situ* trials indicates an effect of the type of materials (fresh versus the aged products) as well as the calcium carbonate contents of the soils. Marín Guirao *et al*. (2016) address an alternative method to the common chemical disinfection in intensive horticulture in greenhouses by the use of biofumigation through the addition of organic amendments with or without solarisation (biosolarisation and biofumigation, respectively). Biosolarisation produced good results; in addition, it minimised the impact of nitrate leaching and improved yield and quality of a tomato crop.

The role of the microorganisms in the soil can be altered by practices like mulching. Three papers of this special issue are focused on the use of biodegradable materials like biopolymers and papers as eco-friendly alternatives to the conventional polyethylene mulch. Thus, Moreno *et al*. (2016) performed a field study on the effect of some biodegradable mulches on the soil temperature and tomato yield during three years in different locations, showing positive results for most of the biodegradable materials tested. In the remaining two papers, Barragán *et al*. (2016) and Martín-Closas *et al*. (2016) describe the degradation processes of some biodegradable mulches under laboratory and field conditions, respectively, in the field studies by the use of a qualitative scale applied to the above-soil and in-soil degradation rate.

Sánchez Ormeño *et al*. (2016) analyse the influence of mycorrhizal colonisation of native species in field conditions to revegetate solar photovoltaic farms. The authors provided useful information about which species should be recommended to ensure the success of revegetation under these conditions. Teng *et al*. (2016) discuss the negative effects of the current excessive application of nitrogen chemical fertilisers on surface and ground water pollution in China. They focussed on the influences of different synthetic chemical and organic fertiliser treatments on rice pests and diseases, concluding that the application of chemical fertilisers stimulate rice vegetative growth at a higher rate, but finally lead to lower grain yield due to higher incidences of pests and diseases. Finally, Erhart *et al*. (2016) present an interesting study about humus and energy balance and greenhouse gas emissions by using a model based on a 14-year field trial. The results indicate that the organic supplies hold a potential for carbon sequestration and for the reduction of greenhouse gas emissions, although this potential is bound to level off with increasing soil C saturation.

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