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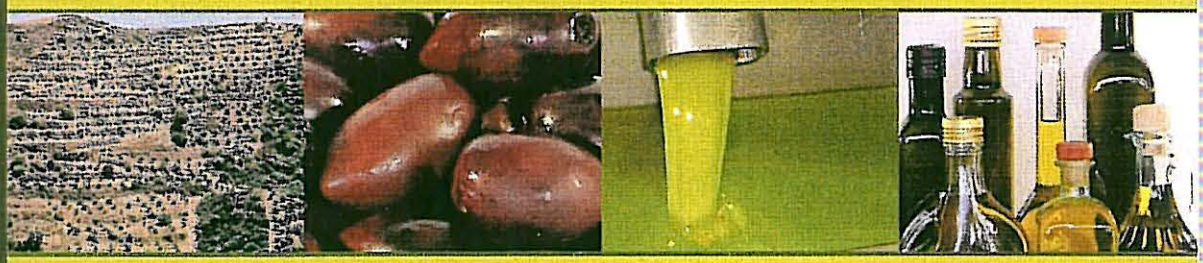

Chania, Crete, GREECE, October 31st - November 4th, 2011

In cooperation with:

International
Olive Council

# BOOK OF ABSTRACTS

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Under
the Auspices of:

The Greek Ministry
of Rural Development
& Food

Conference Center:
Caldera Creta Paradise Resort
Chania, Crete, GREECE

## Cover crops for the sustainability of rainfed olive orchards

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Olive tree (*Olea europaea* L.) is present in large areas of mainland Portugal, predominantly in less-favored regions. In spite of the fact that irrigated areas are currently increasing, most of the olive orchards are still cultivated under rainfed conditions. The success of olive farming under rainfed conditions is mainly due to the high capacity of olive tree to develop anatomical, physiological and biochemical drought resistance mechanisms. Nevertheless, the productivity is low. We propose cover cropping to control soil erosion, improve soil quality and fertility of rainfed olive orchards. Cover cropping is widespread in fruit farming in temperate climates and in irrigated olive orchards, where water is not a limiting resource. The effects of cover cropping were investigated on a 14-year-old olive orchard (*Olea europaea* L., cv. Cobrançosa) with 240 trees $ha^{-1}$, grown under rainfed conditions. The commercial orchard was located in Mirandela, in the Northeast of Portugal (41° 31' N; 7° 12' W). Four different soil management systems were compared: (i) development of natural vegetation, (ii) self-reseeding pasture species, such as subterranean clover and other annual legume species with short growing cycle grown as cover crop; (iii) white lupine cover crop; (iv) conventional tillage, included as the control treatment. We verified that self-reseeding pasture cover crop improved the photosynthetic activity of the olive trees in association with increases of stomatal conductance, the quantum effective efficiency of PSII, the photochemical quenching and the apparent electron transport rate. The total leaf soluble protein content in the leaves was higher in trees with self-reseeding pasture cover crop that may represent increased activity of antioxidant enzymes. The level of lipid peroxidation, measured in terms of thiobarbituric acid-reactive substances (TBARS) contents, was lower in pasture cover crop and in the control treatments during the dry season. In early winter lupine cover crop and conventional tillage had higher TBARS concentrations, revealing increased peroxidative damage. At this early stage of the study, data support the use of cover crop in olive rainfed orchards, specially using self-reseeding pasture species.

**Keywords:** annual legume species, cover cropping, *Olea europaea* L., rainfed conditions, sustainability, natural vegetation