

## Plant Signaling

from Algae to Higher Plants

Marie Curie ITN COSI



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Bowler, Chris (FR)  
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Osteryoung, Katherine (USA)  
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# Plant Organellar Signaling

from Algae to Higher Plants



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**Abstract Book**

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**P07 - BIOMARKERS OF OXIDATIVE STRESS IN OLIVE RAINFED ORCHARDS UNDER DIFFERENT COVER CROPS**

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In Northeast Portugal, as in other regions of the Mediterranean Basin, most of the olive orchards are cultivated in hilly areas under rainfed conditions and this picture will not significantly change in the near future due to natural limitation on water resources. We propose cover crops to limit soil erosion, improve soil quality and fertility, reduce the use of herbicides and other chemicals and develop the nutritional value of food products. Conversely, major problems derived from cover cropping are the competition for water and nutrients. Under adverse conditions, imbalances in metabolic processes may lead to increased accumulation of ROS, forming a potential threat of oxidative damage to cells. Meanwhile, ROS levels also have a vital role in stress signaling and thereby on adjustments of gene expression and cell structure. Five treatments were investigated in spring 2011 (second experimental year) on a 15-year-old olive orchard (*Olea europaea* L., cv. Cobrançosa): (1) development of natural vegetation; (2) self-reseeding pasture species, such as subterranean clover and other annual legume species with short growing cycle; (3) white lupine; (4) white lupine sown in 2009; (5) conventional tillage. Lipid peroxidation, total thiols, phenols, carotenoids and catalase, ascorbate peroxidase and glutathione S-transferase were used as biomarkers. Results show that cover crops can be used to replace tillage since the trees had similar degree of oxidative stress. Trees with white lupine sown in 2009 were less susceptible to oxidative damage, exhibiting leaves with lower contents of TBARS and total thiols and higher catalase and glutathione S-transferase activities.