

Séminaire Biologie des Plantes

Les séminaires ont lieu sur le Campus Montpellier SupAgro/INRA de La Gaillarde
(2, place P. Viala Montpellier)

Contact IBIP :

Sabine Zimmermann (zimmerma@supagro.inra.fr)

Philippe Nacry (nacry@supagro.inra.fr)

Christine Granier (granier@supagro.inra.fr)

Chantal Baracco (baracco@supagro.inra.fr)

ATTENTION : Jour et horaire inhabituels

Lundi 11 avril 2011
Amphi 206 (Cœur d'Ecole) à 10h30

Leonardo Casieri

(UMR INRA Dijon - Plant-Microbe-Environment)

**Role of the AM interaction on S-uptake and S-starvation resistance in
*Medicago truncatula***

During the last three decades in response to increasing environmental and health awareness the sulfurous emissions have been strongly reduced (86% reduction between 1980 and 2007). Consequently, the indirect sulfur fertilization decreased, which has led to an important rise in cases of S deficiency in crop species (Lefohn et al., 1999; Baumgardner et al., 2002).

Sulfur is an essential macronutrient for plant growth, development, and response to various abiotic and biotic stresses due to its key role in S-containing compounds biosynthesis, including amino acids (Cys and Met), proteins, glutathione (GSH) and secondary products (Hell and Rennenberg, 1998). Therefore, a deficiency in this element might have dramatic economical impacts.

The first limiting step in plant sulfur nutrition is the acquisition of sulphur from the soil in the form of sulfate (in lower amount and susceptible to be leached compared to the organically bound forms), which has been shown to be an H⁺-dependent co-transport process (Hawkesford et al., 1993; Smith et al., 1995; Davidian et al., 2000). After being absorbed through the plasma membrane of epidermal and cortical root cells, sulfate is transported within the plant under the control of different sulfate transporters (For an extensive review of the sulfate transporter gene family: Hawkesford, 2003).

Although our knowledge of proteins involved in SO_4^- transport in higher plants has been growing significantly, little is still known about the effect of the AM interaction on sulfur uptake if compared to the more widely known uptake of other nutrients (N and P).

The ability of mycorrhizal fungi to transfer N and P from organic compounds has been shown by different authors (Guo et al., 2007; Banerjee et al., 2003). Recently the possibility that mycorrhized plants might obtain S from organic sources was investigated by means of ^{35}S -labeling experiments performed on transformed carrot (*Daucus carota*) roots and *Glomus intraradices* grown monoxenically (Allen and Shachar-Hill, 2009).

The aim of our work was to access the role of the AM interaction between the model leguminous plant *Medicago truncatula* and *Glomus intraradices* on sulfur uptake. The use of nutritive solutions at different S concentration on mycorrhized (Myc) and non-mycorrhized (Mock) plants highlighted the enhanced S-starvation resistance in plants due to AM interaction. Moreover, this allowed us to compare gene expression of putative sulfate transporters (identified by blasting highly conserved regions of S transporter sequences, already described in *Arabidopsis thaliana*, on the Mt genome) in roots of Myc and Mock plants cultivated at low S concentration. Heterologous expression in yeast and analyses of retrotransposon TNT1 mutant lines allowed us to characterize one of the putative S transporter in *Medicago truncatula* (homologous to group 3 AtSULTR).

Contact :

Sabine ZIMMERMANN

Équipe Canaux Ioniques

Institut de Biologie Intégrative des Plantes

Laboratoire de Biochimie et Physiologie Moléculaire des Plantes

Agro-M/INRA/CNRS/UM2 UMR 5004

2, Place Viala

F-34 060 Montpellier Cedex 1

FRANCE

<http://www.montpellier.inra.fr/ibip/bpmp/equipes/canaux.htm>

Phone: + 33 (0)4 99 61 27 18

Fax : + 33 (0)4 67 52 57 37

Courriel : zimmerma@supagro.inra.fr

Séminaires à venir :

Jeudi 12 mai : Eva Zazimalova (Contact Philippe Nacry nacry@supagro.inra.fr)

Jeudi 26 mai : Tracey Ann Cuin (Signalisation)