



Tropentag, October 7-9, 2008, Hohenheim

“Competition for Resources in a Changing World:  
New Drive for Rural Development”

## Nitrogen Transfer in Soybean/Chilli Pepper Intercropping Systems via Arbuscular Mycorrhiza Hyphae

SAFRIZAL SAFRIZAL, MARKUS WEINMANN, TORSTEN MÜLLER, VOLKER RÖMHELD

*University of Hohenheim, Institute of Plant Nutrition, Germany*

### Abstract

Soybean and chilli pepper are important food and cash crops in Indonesia. It was hypothesised that beneficial interactions in soy bean/chilli pepper intercropping systems are due to positive nutrient effects, such as increased biological nitrogen (N) fixation by symbiotic rhizobia, direct or indirect nutrient transfer between the two crops and increased nutrient utilisation efficiencies. Furthermore, the suppression of pathogens and pests could be a beneficial side effect. Arbuscular mycorrhiza (AM) might play a key role within these processes.

The objective of this experiment was to investigate the transfer of N from soybeans to chilli pepper via arbuscular mycorrhizal hyphae. Therefore, soybeans and chilli pepper were grown in separate compartments within pots containing 10 kg soil (collected at Banda Aceh, Indonesia) which had been inoculated with the AM-fungus (*Glomus intraradices* strain 510). For fertilization a low rate of N (20 mg kg<sup>-1</sup> soil) and phosphorus (30 mg kg<sup>-1</sup> soil) as well as sufficient amounts of potassium (K), magnesium (Mg) and micronutrients were supplied. The compartments were separated by use of different nylon nets which selectively allowed the penetration by mycorrhizal hyphae (pore size 40 µm) or not (pore size 1 µm). To study the effect of biological N<sub>2</sub>-fixation, soybeans were inoculated or not with rhizobia (Biomax, Grupo Bio Soja, Brasil).

The results showed that the chlorophyll concentration in leaves of soybean and chilli pepper measured by Chlorophyll Meter SPAD-502 as indicator for the nitrogen status of the plants were increased in pots inoculated with rhizobia and separated by nylon nets which allowed mycorrhizal hyphae to pass through. These findings suggest biologically fixed nitrogen had been transferred from soybean to chilli pepper via the network of arbuscular mycorrhizal hyphae.

**Keywords:** AMF, intercropping, nutrient transfer