



Centre for Functional Ecology



UNIVERSIDADE DE COIMBRA



POLITÉCNICO
DO PORTO

Escola Superior de Tecnologia da Saúde do Porto



ciimar
Centro Interdisciplinar
de Investigação
Marinha e Ambiental

Arbuscular mycorrhizal fungi can be an alternative to the application of chemical fertilizer in the production of coriander

**Rui S. Oliveira^{1,2}, Ying Ma¹, Inês Rocha¹, Maria F. Carvalho³, Miroslav Vosátka⁴,
Helena Freitas¹**

¹*Centre for Functional Ecology, Department of Life Sciences, University of Coimbra, Coimbra, Portugal*

²*Department of Environmental Health, Research Centre on Health and Environment, School of Allied Health Sciences, Polytechnic Institute of Porto, Vila Nova de Gaia, Portugal*

³*CIIMAR - Interdisciplinary Centre of Marine and Environmental Research, University of Porto, Porto, Portugal*

⁴*Institute of Botany, Academy of Sciences of the Czech Republic, Průhonice, Czech Republic*



BioGreenhouse



3rd INTERNATIONAL SYMPOSIUM ON
ORGANIC GREENHOUSE HORTICULTURE

11 - 14 APRIL 2016 / IZMIR, TURKEY

INTRODUCTION

- The application of chemical fertilizers and pesticides is a major source of environmental pollution that leads to reduced ecosystem functioning and soil and water degradation
- There is thus a rising need to find alternatives to chemical fertilizers in plant production
- Arbuscular mycorrhizal fungi (AMF) are a group of soil microorganisms that forms mutualistic associations with plants
- AMF can improve nutrient uptake and protect plants from a variety of biotic and abiotic stresses

AIM

To evaluate the potential use of AMF as an alternative to application of chemical fertilizer for improving growth performance of the medicinal and aromatic plant coriander



MATERIAL AND METHODS



Seeds of *Coriandrum sativum* L. were surface sterilized



Pre-germinated



Transplanted to pots containing agricultural soil



Inoculated with *Rhizophagus irregularis* BEG163



Application of water soluble chemical fertilizer



-Control
-Fertilizer
-R.i.
-Fertilizer + R.i.

4 treatments



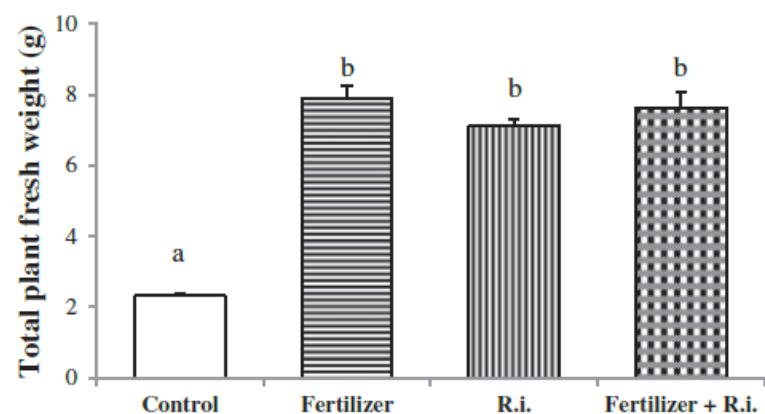
Grown for 62 days under a controlled greenhouse



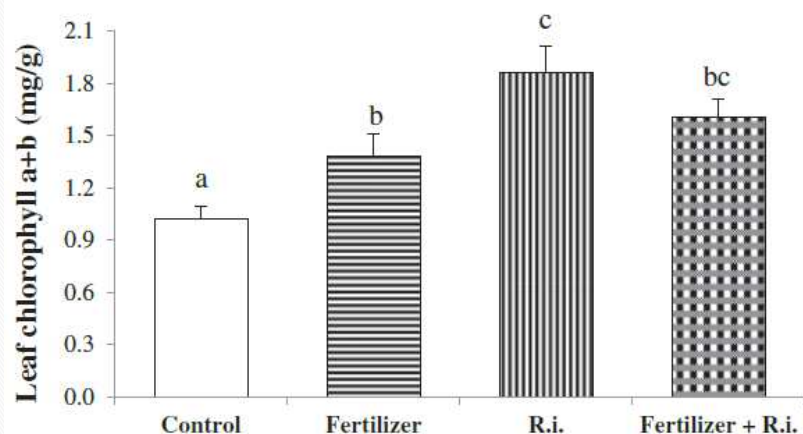
Plant growth and nutrition analyzed



RESULTS



No significant differences in biomass between plants inoculated with *R. irregularis* and those supplemented with chemical fertilizer

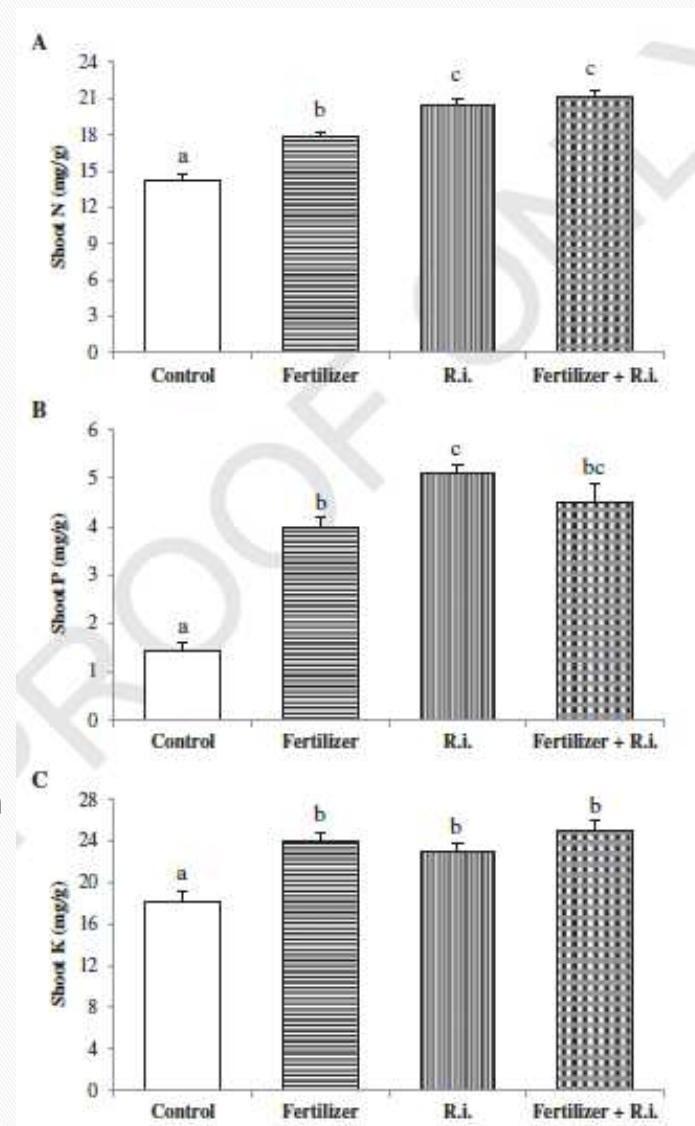


Leaf chlorophyll was significantly higher in plants inoculated with *R. irregularis*

Shoot N and P were significantly higher in plants inoculated with *R. irregularis* and there was an increase of 44 and 254%, respectively, compared to controls

No significant differences in shoot K between plants inoculated with *R. irregularis* and those supplemented with chemical fertilizer

No benefit in AMF inoculation and chemical fertilization together for any parameter



CONCLUSIONS

- Inoculation with *R. irregularis* was equally or more effective than application of chemical fertilizer in promoting growth and nutrition of coriander
- AMF may contribute to improve organic production of food plants and reduce the dependence on agrochemicals in horticulture

Rui S. Oliveira
rsoliveira@uc.pt

R.S. Oliveira and Y. Ma wish to acknowledge the support of Fundação para a Ciência e a Tecnologia (FCT) through the research grants SFRH/BPD/85008/2012 and SFRH/BPD/76028/2011 and Fundo Social Europeu (FSE). I. Rocha was supported by the FCT grant BI-EXPL/AGR-TEC/1204/2013. M. F. Carvalho acknowledges Investigator FCT program supported by FCT, FSE and Programa Operacional Potencial Humano (POPH). This work was financed by national funds through FCT under the Project EXPL/AGR-TEC/1204/2013 and by Fundo Europeu de Desenvolvimento Regional (FEDER), Eixo I do Programa Operacional Fatores de Competitividade (POFC) of Quadro de Referência Estratégica Nacional (QREN) (COMPETE: FCOMP-01-0124-FEDER-041572).



3rd INTERNATIONAL SYMPOSIUM ON
ORGANIC GREENHOUSE HORTICULTURE
11 - 14 APRIL 2016 / IZMIR, TURKEY