



Work Programme 2012 "COOPERATION"

Theme 2: FOOD, AGRICULTURE AND FISHERIES, AND BIOTECHNOLOGY

Activity 2.3: Life sciences, biotechnology and biochemistry for sustainable non-food products and processes

Area 2.3.5: Environmental biotechnology

KBBE.2012.3.5-03

Biotechnological waste water treatments and reuse in agronomical system

Call: FP7-KBBE-2012-6

Integrating biotreated wastewater reuse and valorization with enhanced water use efficiency to support the Green Economy in EU and India

Grant agreement no.: 311933

Funding scheme: Collaborative Project

Coordinator: Dr Antonio Lopez, IRSA-CNR (Italy)

Water4Crops - EU

Work Package n°: 4

Improving WUE and drought tolerance of maize, sorghum, millet and tomato via genomics approaches and modelling

Deliverable 4.6

Training of 6 young scientists in crop management and molecular breeding.

Due date: month 48

Actual submission date: month 48

Start of project: 1/08/2012

Deliverable Lead contractor: UNIBO

Participants: UNIBO – HORTA

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Dissemination level: PU



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1. INTRODUCTION

The University of Bologna was founded in 1088 and is considered to be the oldest university in Western Europe. Nowadays, it still remains one of the most important institutions of higher education across Europe with more than 200 degree programmes among its 33 Departments, 11 Schools and over 81,000 students. University of Bologna has always favoured a multi-disciplinary, cross-cultural approach; it invests in international, multicultural training, research and services and places special emphasis on the quality of education and research.

UNIBO-DIPSA (Department of Agricultural Sciences - University of Bologna) was created in 2000. Research activities include most disciplines related to Agriculture. Mission of DIPSA is to foster the adoption of profitable, environmentally sound, and socially responsive agricultural systems. The groups involved in W4C are from the Agronomy, Crop Science and Plant Genetics Areas. In the W4C project, DIPSA was involved in the genetic and agronomic characterization of experimental cross populations and germplasm collections in maize and tomato, including mapping quantitative trait loci (QTLs) for morpho-physiological traits (e.g. root architecture, water-use efficiency) related to drought tolerance, both in controlled environments and in the field.

Every year approx. 10 students choose the groups of Agronomy, Crop Science and Plant Genetics Areas for their training and many of them have been involved in experiment related to Water4Crops project. In particular, six of them have focused their degree thesis on experiments related to the Water4Crops project. However, it should be considered that all students have to spend other 150-200 hours in training on topics different from the one chosen for thesis.

1. Eleonora Scarpa: Bachelor thesis in 2014 University of Bologna, degree course in Biotechnology, supervisor Prof. Roberto Tuberosa, correlator Dott.ssa Silvia Giuliani.

Title: Molecular and phenotypic characterization of a QTL for seminal root number in maize
She collaborated in the paper roll screening of 720 F2 seedling of maize for seminal root number. The work is part of WP 4.4 for the fine mapping of a QTL for seminal root number. She collaborated in the screening with SSR markers of the F2 seedling, phenotyping with the paper roll technique and data analysis.

2. Freddi Matteo: Master thesis in 2014, University of Bologna, Faculty of Agriculture. Supervisor Prof. Andrea Monti, correlator. Dr. Walter Zegada Lizarazu

Title: Photosynthesis and root morphology in two maize NILs under drought stress conditions.

He collaborated in the evaluation of the stress response of two Maize NILs at mature growth stages (WP4.2). He collaborated in the phenotyping of the maize line in big rhizotrons (1m³) for root traits, drought related traits (gas exchange measurement, photosynthesis measurements), yield and biomass. He also collaborate in data analysis.



3. Ravaglia Chiara: Master thesis 2015. University of Bologna, Faculty of Agriculture. Supervisor Prof. Andrea Monti, correlator. Dr. Walter Zegada Lizarazu

Title: Evaluation of maize NILs for root traits with minirhizotron.

He collaborated in the evaluation of the response to water stress of two maize NILs (Near isogenic lines) seedlings: B73 and 94-6-1-6 of corn (WP 4.3). The two NILs were compared under different soil moisture conditions (12-18-23% v/v) until the fifth leaf growth stage using zhizotron box. Root development and canopy biometric measurements were taken throughout the growth cycle. He also collaborated in the data analysis.

4. Guerri Filippo: Bachelor thesis 2016, University of Bologna, degree course in Biotechnology, supervisor Prof. Roberto Tuberosa, correlator Dott.ssa Silvia Giuliani

Title: Association mapping for the identification of genes involved in the control of root shape in tomato

He collaborated in the screening of a tomato collection for root traits using rhizotron boxes (task 4.2). Scanned images were analysed with root specific software (Giaroots, Root system analyzer) and he also collaborated in the association mapping analysis in order to identify association between genotypic marker information and phenotypic traits.



5. Busanello Carlos: Phd Erasmus exchange program with Brasil, Federal University of Pelotas. He spent one year at the DIPSA mainly working on the implementation of the high throughput phenotyping system of shovelomics images. He also collaborated in QTL analysis of the introgression library B73 x Gaspé Flint for root, yield and drought response (task 4.2).



6. Ferrara Pietrantonio Master thesis in progress, University of Bologna, Faculty of Agriculture, Supervisor prof. Silvio Salvi, correlator dott. Silvia Giuliani

Title: Identification of genes involved in root morphology in tomato through an association mapping approach

He collaborated in the setting up of a screening method for tomato root architecture phenotyping with a rhizotron system (task 4.2). He also collaborated in image analysis with dedicated software and in the statistical analysis of the results (association mapping).

