European Network for the durable exploitation of crop protection strategies

IA3 Activity: *Human resource exchange*

ENDURE - Internal Mobility

Final activity report
(The form has to be filled in and sent to the activity leader – message should be sent to his p.a. federica.piccolo@ibaf.cnr.it *– within 15 days after the end of the visit)*

Topic of the visit
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1. Information about researcher and sending partner

Name and surname: Gionata Bocci

Professional status: *Junior Scientist*

Sending partner: Scuola Superiore Sant'Anna

Institute/Department/Research Unit: Land Lab

Address: *Piazza Martiri della Libertà, 33 - 56127 Pisa (Italia)*

E-mail and phone number of the researcher: +39050883567

Supervisor name*: Paolo Bàrberi

Supervisor e-mail*: barberi@sssup.it

Supervisor phone number*: +39(0)50883525

*Supervisor information only for PhD student, post-doc and junior researchers

2. Information about hosting partner

Hosting partner: AU (Aarhus University)

Institute/Department/Research Unit: Department of Integrated Pest Management

Address: *(street, postal code, city)* Forsøgsvej 1, DK-4200 Slagelse

Supervisor name*: **Niels Holst**

Supervisor e-mail*: Niels.Holst@agrsci.dk

Supervisor phone number*: +45 89993591

* For senior scientist indicate the name of the collaborating colleague

3. Information about the visit

Starting date: 20/02/2010   **Ending date: 03/04/2010**
(please specify starting date and ending date for EACH period of mobility, add lines if needed)

Total duration *(number of weeks): 6*

4. Description of the activities and outcomes

Background and context: *maximum 10 lines*

Both the visiting and the hosting researchers were involved in the ENDURE task related to the modelling of Weed Population dynamics and both participated in a joint experiment which run in different European research stations and was aimed at testing the phenological behaviour of two different population of two common weed species. Both researches were also involved in the 2nd ENDURE Summer School which has "Modelling and Crop Protection" as its main topic.

Objective: *maximum 10 lines*

Main objective of the mobility period was, for the visiting researcher, to become confident with the use of the Unviversal Simulator (previously known as WeedML) program and learn basic elements of modelling of Weed Population dynamics. Aim of the hosting Researcher was to have its program run by a novel user in order to test its "usability" and discover whether any bugs (errors in the program) could be detected. A common aim of both visiting and hosting researcher was to refine the implementation of a plant growth model (the Conductance Model) into the Universal Simulator.

Activities carried out: *maximum 20 lines*

- Study of the basic elements of C++ programming (the C programming language being already known).
- Analysis of the C++ source code of the already existing implementation of the Conductance Model.
- Implementation of the Conductance Model into the R language in order to have a second implementation of the model (useful for running comparisons and testing the validity of the simulated results).
- Creation of a program for the automatic detection of the "lear area" and the "crown zone area" on photographs of crop individuals (these two parameters are used for calibration of the Conductance Model)
- The above cited program was developed on a Linux platform, so as a last activity (which was only partially completed) we aimed at the development of a cross-platform version of the program (using the Python programming language)

5. Links between visit activity and ENDURE

Describe links and relevance of your visit in relation to a specific ENDURE activity(ies) and sub-activity(ies) – maximum 15 lines

RA4.5 Weed biology and management

This sub-activity has the objective of developing a database and a modelling tool to predict weed community dynamics under different management strategies and environmental conditions that is pertinent to both current and future growing conditions in the EU.
Learn to use the modelling program (Universal Simulator, previously known as WeedML) and refine it was the main aim of the visiting researcher.

6. Impact

Added value for the researcher: *maximum 10 lines*

The main outcomes for the visiting researcher were:
- *lerning the basic elements of Weed Population and Plant Growth modelling*
- *learning useful programming techniques (namely, use of Object Oriented style of programming) for implementing Population and Growth Models*
- *applying his knowledge of Remote Sensing Techniques and GIS programming to develop useful tools for analysis of images (needed for parameters estimation for the Conductance Model)*

Added value for sending partner and hosting partner: *maximum 10 lines*

The hosting partner had the chance to find bugs (and to correct them) in the Universal Simulator Program. Researchers of the hosting partner were also shown how to use Remote Sensing Technique to analyse imges of crops to extract information useful for modelling. The sending Institution had the chance, through this mobility, to "import"

knowledge about modelling in its working groups. Both Institutions aim at making the collaboration lasting in the near future.

Date of submission **07/04/2010**

Dr. Maurizio Sattin
IA3 activity leader

Approved