



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 go to his p.a. elisa.scanzi@ibaf.cnr.it – within 15 days after the end of the visit)

Topic of the visit

Resistance to glyphosate in grass weeds. Characterise the non-target-site based herbicide resistance. Use of biochemical tools to perform enzymatic studies and to diagnose herbicide resistance.

1. Information about researcher and sending partner

Name and surname: Alberto Collavo

Professional status: junior researcher

Sending partner: CNR

Institute/Department/Research Unit: Istituto di biologia Agro-ambientale e forestale

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E-mail and phone number of the researcher: alberto.collavo@ibaf.cnr.it – +39 348 038 78 44

Supervisor name*: Maurizio Sattin

Supervisor e-mail*: maurizio.sattin@ibaf.cnr.it

Supervisor phone number*: +39 049 827 2820

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

2. Information about hosting partner

Hosting partner: Universidad de Cordoba - Spain

Institute/Department/Research Unit: Quimica Agricola - Edafologia

Address: Campus de Rabanales - Edif. Marie-Curie, 3ª planta - 14071- Córdoba SPAIN

Supervisor name*: Prof. Rafael de Prado

Supervisor e-mail*: qe1pramr@uco.es

Supervisor phone number*: +34 957 218 600

* For senior scientist indicate the name of the collaborating colleague

3. Information about the visit

Duration: 3 months (splitted in two periods: 5 November 2008 – 20 December 2009 and 29 January 2009 – 11 March 2009)

Starting date: 5 November 2008

Ending date: 11 March 2009

4. Description of the activities and outcomes

Background and context: Glyphosate resistance in weeds has evolved worldwide as a consequence of the intensive use of the herbicide since the seventies. Glyphosate is an emerging problem in Italy too and the knowledge of the mechanism(s) involved in the resistance is necessary to better design control strategies.

Objective: At present in our structures it is possible to investigate through greenhouse experiments to confirm resistance at plant level and to infer resistance mechanism at molecular level. The objective of the activity proposed in collaboration with the University of Cordoba was to improve my knowledge on non-target site resistance mechanisms, particularly on glyphosate resistance. The know out will be transferred in our laboratory.

Activities carried out: The research activity has focused in different glyphosate investigation: 1. metabolism; 2. retention; 3. absorption and translocation. During the first period the activities carried out were the study of metabolites of glyphosate at 24, 48, 72 and 96 hours after treatments of three resistant and two susceptible populations. Metabolites were detected by capillary electrophoresis technique and beside AMPA, the most known glyphosate metabolite, other substances were detected in treated plants when compared with untreated: glyoxylate, sarcosine and formaldehyde. The method appears to discriminate susceptible from resistant plants when comparing glyoxylate but the source of this product is still under investigation. Retention experiments did not reveal to be the cause for resistance since the resistant plants retained more herbicide than the susceptible one.

During the second period I repeated the metabolism experiment on two resistant and one susceptible *Lolium* populations. These populations have been investigated in the absorption and translocation of glyphosate radio-labelled. The herbicide absorbed and translocated was monitored at 12, 24, 48, 72 and 96 hours after treatment. Neither differences in absorption and translocation was the cause for resistance in the resistant populations.

5. Links between visit activity and ENDURE

The visit addressed to Research activity 4.1: Pesticide resistance management.

6. Impact

Added value for the researcher:

The visit allowed me to improve my knowledge on different investigation techniques. Beside the laboratory work the importance of the visit lay also in the opportunity to talk with other researcher and Prof. Rafael De Prado.

Added value for sending partner and hosting partner:

I think that the staying has been profitable for both the partners as it has been an occasion to share knowledge and experience on herbicide resistance investigations. We aim to publish as soon as possible the results gained during the visit, confirming the importance of this collaboration.

Date of submission

25 March 2009



Dr. Maurizio Sattin
IA3 activity leader

Approved