



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. denise.barreiro@ibaf.cnr.it – within 15 days after the end of the visit)

Topic of the visit

1. Information about researcher and sending partner

Name and surname: Mr Richard Hull

Professional status: Junior Researcher

Sending partner: Rothamsted Research

Institute/Department/Research Unit: Rothamsted Research, Plant & Invertebrate Ecology Department, Herbicide Resistance Group

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E-mail and phone number of the researcher: richard.hull@bbsrc.ac.uk
01582 763133 ext 2554

Supervisor name*: Dr Stephen Moss

Supervisor e-mail*: stephen.moss@bbsrc.ac.uk

Supervisor phone number*: 01582 763133 ext 2521

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

2. Information about hosting partner

Hosting partner: Aarhus University

Institute/Department/Research Unit: Faculty of Agricultural Sciences, Dept. of Integrated Pest Management, Pesticide Research and Environmental Chemistry

Address: Research Centre Flakkebjerg
DK-4200 Slagelse

Supervisor name*: Solvejg K. Mathiassen

Supervisor e-mail*: Solvejg.Mathiassen@agrsci.dk

Supervisor phone number*: +45 89993581

* For senior scientist indicate the name of the collaborating colleague

3. Information about the visit

Duration: 8 weeks (split into 5 and 3 week stays)

Starting date: 14th April 2009

Ending date: 20th June 2009

4. Description of the activities and outcomes

Background and context:

Black-grass (*Alopecurus myosuroides*) is the biggest problem weed that arable farmers have to control in the UK and increasingly across Western Europe. Black-grass has increased in the last 15 – 20 years due to a reduction in spring cropping, earlier drilling of autumn sown crops and lack of rotations. Because the rotations are less diverse, fewer active ingredients are being applied to control the weed, therefore resistance is increasing and control is reduced. Many of the newer herbicides are also more prone to resistance than the older herbicides. The work carried out during this visit is looking at factors which can affect the efficacy of the herbicide, "Atlantis" (mesosulfuron+iodosulfuron) which is being used very widely throughout Europe. Resistance to this product by both enhanced metabolism and target site resistance is on the increase in the UK and other EU countries, and the aim of these experiments was to provide useful information to understand why control may be poorer than expected, and identify possible solutions.

Objective:

Improving methodologies for the assessment and interpretation of herbicidal effects on grass-weed species. The two linked specific topic areas were: 1. Herbicide resistance diagnostics in black-grass; 2. Antagonism of pesticide mixtures on control of black-grass.

Activities carried out: *maximum 20 lines*

Four main activities were carried out during the stay. Three outdoor pot experiments were run looking into factors affecting the efficacy of "Atlantis" in controlling resistant populations of black-grass. The first experiment looked at the length of time after application of "Atlantis" that control of black-grass was still adversely affected by rainfall ('rainfastness'). The second experiment looked into the possibility of antagonism occurring when "Atlantis" is applied in mixture with the fungicide "Bravo" (chlorothalonil). Both experiments were set up to quantify the decrease in efficacy by factors under spray operators control, especially when control from "Atlantis" appears to be dropping slightly. The last pot experiment looked into a new compound which potentially could increase the activity of "Atlantis". By using piperonyl butoxide (PBO), which acts in a synergistic manner, will this increase efficacy on resistant populations of black-grass? The other activity carried during the stay was to develop a new petri-dish test to detect enhanced metabolism in black-grass using prosulfocarb. Prosulfocarb was tested because at present pendimethalin is currently used in petri-dish tests, but may not be available to farmers in future as a consequence of revision to Directive 91/414/EEC.

Formattato: Inglese (Regno Unito)

5. Links between visit activity and ENDURE

The visit addresses Research Activity 4.1: Pesticide resistance management.

Herbicide resistant weeds are an increasing problem and the most important species in Europe is black-grass (*Alopecurus myosuroides*). Both resistance and herbicide antagonism reduce potential efficacy leading to greater use of herbicides to compensate. A better appraisal of methods for the early diagnosis of resistance and quantifying the impact of antagonism is required. Solvejg Mathiassen and colleagues have much experience in conducting and analysing results of herbicide assays. Richard Hull has worked at Rothamsted on weed projects for over 5 years. The aim is to improve methodologies in research areas which have a direct bearing on more sustainable weed control.

6. Impact

Added value for the researcher: *maximum 10 lines*

I enjoyed my stay at the Flakkeberg institute and it was a great opportunity to work in a different environment. Very similar experiments are carried out at both institutes, but using different equipment and techniques. Even though the quantity of work is much higher at Flakkeberg, which is why they have more equipment to increase the speed of setting up experiments, there are several techniques that are transferable to my own institute. These include, using plastic containers when carrying out dose response experiments, looking into obtaining large trolleys to move plants around, a system to print all pot labels and many more. It is a great way to bring fresh ideas and thinking into the methodologies used at Rothamsted. And finally, and most importantly to build hopefully a long lasting collaborative relationship between the two institutes

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

A close relationship between the scientists has been established during the visit and this is expected to lead to further collaboration between the institutions in the future. A plan for joint presentations of the results produced during the visit has been made. Discussions concerning the experiences of resistance development and management strategies in UK have been useful for considerations about the best resistance strategy in Denmark. We also received good advices regarding the design of some experiments planned for the Nordic-Baltic Resistance Group during the autumn 2009 and Rothamsted Research offered some well described reference seed samples of resistant black-grass for this test.

Date of submission

02/07/09



Dr. Maurizio Sattin
IA3 activity leader

Approved