



**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](mailto:denise.barreiro@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:** Karin Thygesen

**Professional status:** *(PhD student, post-doc, junior or senior scientist) Post doc*

**Sending partner:**

**Institute/Department/Research Unit:** Aarhus University, Dept of Agricultural Sciences

**Address:** *(street, postal code, city)* Forsoegsvej 1, 4200 Slagelse

**E-mail and phone number of the researcher:** [Karin.Thygesen@agrsci.dk](mailto:Karin.Thygesen@agrsci.dk)

**Supervisor name\*:** Lise Nistrup Jorgensen

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**Supervisor phone number\*:** +45 89993652

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

**2. Information about hosting partner**

**Hosting partner:**

**Institute/Department/Research Unit:** Rothamsted Reseach, Dept Plant Pathology and Microbiology

**Address:** (street, postal code, city) West Common, Harpenden, Herts, AL5 2JQ

**Supervisor name\*:** Bart Fraaije

**Supervisor e-mail\*:** Bart.Fraaije@bbsrc.ac.uk

**Supervisor phone number\*:** +44 (0) 1582763133

\* For senior scientist indicate the name of the collaborating colleague

### **3. Information about the visit**

**Duration:** (number of weeks or months) 2 months

**Starting date:** 9 March 2009

**Ending date:** 9 May 2009

### **4. Description of the activities and outcomes**

**Background and context:** The fungus *Pyrenophora tritici-repentis*, cause of tan spot of wheat, is an important foliar pathogen worldwide. Fungicide resistance (triazoles) has been shown to vary considerably both within and between fields. However, not much is known regarding the genotypic mechanisms. Thus the current project aims to search for triazole resistance parameters.

Triazoles have been used for about 25 years for control of various fungal pathogens in agriculture and medicine. These compounds are sterol demethylation inhibitors (DMIs) with a mode of action based on inhibition of sterol 14- $\alpha$  demethylase, encoded by the *CYP51* gene (Yoshida and Aoyama (1987)). *Pyrenophora tritici-repentis* has two copies of this gene. Despite many years of use and their single-site mode action, triazoles still have good efficacy in controlling various plant diseases. However, field resistance to triazoles have been observed in several important plant pathogens, including *Blumeria graminis*, *Mycosphaerella graminicola* and other fungal pathogens common mechanisms of triazole resistance include (a) mutations in the *CYP51* gene; over expression of the *CYP51* gene and (iii) over expression of ATP-binding cassette (ABC) transporters encoding efflux pumps. Additionally, some unknown mechanisms may also confer triazole resistance.

**Objective:** The objective of this current project is to investigate parameters involved in triazole sensitivity in the wheat pathogen *Pyrenophora tritici-repentis*. More specifically to test the two copies of the *CYP51*-gene for various mutations conferring resistance towards triazoles. Also to look for other fungicide resistance mechanisms.

**Activities carried out:** Sequencing of 20 isolates with variable sensitivities towards the triazole fungicides prothioconazole, propiconazole, and epoxiconazole did not reveal any mutations in the cyp51 gene. Expression analyses showed the two sensitive isolates had reduced expression in Cyp51A and Cyp51B compared to less sensitive isolates. Expression analyses of more isolates are needed and will be carried out shortly.

## **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*

As Tan spot is a serious disease research of mechanisms underlying fungicide resistance is of importance in the Endure context.

## **6. Impact**

**Added value for the researcher:** Greater knowledge of the underlying mechanisms regarding the serious Tan Spot disease.

**Added value for sending partner and hosting partner:** The activities lie very well within the research of both sending and hosting partner, who both work with (among other things) fungicide resistance and understanding the underlying mechanisms.

### **Date of submission**

2009-05-26



Dr. Maurizio Sattin  
IA3 activity leader

Approved

