



***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:** Aude Alaphilippe

**Professional status:** junior scientist

**Sending partner:** INRA

**Institute/Department/Research Unit:** UERI de Gotheron

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## **2. Information about hosting partner**

**Hosting partner:** Agroscope

**Institute/Department/Research Unit:** Forschungsanstalt Agroscope Reckenholz-Tänikon ART (Forschungsgruppe Okobilanzen)

**Address:** Reckenholzstr. 191; CH-8046 Zurich

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

**Duration:** 3 months

**Start date:** 1<sup>st</sup> of March 2009

**End date:** 30<sup>st</sup> of May 2009

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

### **Background and context:**

Gotheron experimental unit, that I recently joined, aims at performing multi-criteria evaluations of orchard systems. My research work focusses on the environmental impacts of different apple production/protection systems and is part of the PIC (Crop Integrated Protection) INRA network. In this context, I need to learn different methods to evaluate environmental impacts, among which the Swiss Agricultural Life Cycle Assessment (LCA) tool developed by Agroscope Reckenholz-Tänikon ART.

### **Objective:**

The present visit is first an opportunity to be trained to the Swiss methodology for Life Cycle Assessment (SALCA). Then, the objective is to contribute to both the implementation and the validation of this method in orchards using the set of data collected in Gotheron since 2004 in our pluriannual orchard systems; and lastly to contribute to the implementation of an international generic tool.

### **Activities carried out:**

The goal of my work with SALCA was to compare the environmental performances of different crop protection strategies for apple production. Usual categories of impacts assessed by SALCA are energy use, global warming (greenhouse gases), acidification, eutrophication, emission of eco-toxicological and human-toxicological pollutants...

The first step consisted in learning the procedures of LCA as defined by the ISO 14000 environmental management standards, its potential use and to discover the tools used for computing the assessment.

The second step consisted in describing our apple protection systems and in creating the so-called inventory. This 'Inventory' phase involves the data collection and description of the production systems, as well as the description and checking of the datasets. Outputs such as air emissions or water emissions were then calculated with SALCA. The results of the inventory provided information about all inputs and outputs of the studied orchard systems in the form of elementary flows to and from all the processes involved in the orchard management.

The third phase was the assessment of the environmental impacts and aimed at evaluating the contribution of the studied systems to the defined impact categories (i.e. global warming, acidification, see above). Impacts were assessed from the elementary flows previously calculated.

The last step 'interpretation' is still in progress.

## **5. Links between visit activity and ENDURE**

This visit matches with the expectations of the Endure network activities from RA2 and RA3, especially on environmental impacts of apple production strategies assessed by LCA.

Indeed, the aim of the pluriannual orchard system experiment at Gotheron is to compare different protection strategies. The knowledge collected from this experiment is shared within the sub-activity RA2.5 (Orchard SCS). To compare those different strategies we developed the LCA method to assess the environmental impact of the studied crop protection strategies in orchards. This method is proposed as a reference tool within the sub-activity RA3.4 (Life Cycle Assessment). As the focus of the RA3.4 is now on the development of the LCA approach for the orchard system case study, our work contributed to optimise and to implement the LCA method by testing it and validating it with our set of data.

## **6. Impact**

### **Added value for the researcher:**

My research work aims at performing multi-criteria evaluations of orchard systems and focuses on the environmental impacts of different apple production/protection systems. During this exchange, I have learned to use the Swiss Agricultural Life Cycle Assessment tool developed by Agroscope Reckenholz-Tänikon ART. This method allows a multicriteria assessment of our experimental orchard systems and permits a comparison of the environmental efficiency of the three studied crop protection strategies. Life-cycle analysis is a powerful tool for analyzing environmental impacts of quantifiable systems, especially when the inventory step is detailed, which is the case here thanks to the range and number of data collected in our trial. Collaboration between the two teams involved in this partnership (i.e. ART and UERI) will continue to complete the interpretation step and for further implementation of the SALCA tool.

### **Added value for sending partner and hosting partner:**

We as the hosting Institution have several gains from the exchange. The first one is to have a really detailed dataset for a LCA of apple orchards in combination with researchers (and their knowledge of apple production) interested in LCA analysis of their trial. This enables us to describe the orchard and all the activities very well and allows a detailed verification of our method (bottlenecks and its usability) for the assessment of orchards. A second added value is the cooperation between ART and the INRA UERI Gotheron. We hope to establish a cooperative environmental impact assessment of the next years of this

system comparison, to further increase our knowledge in orchard systems and to improve our tools. The third point is that this exchange can be seen for RA3.4 as a preparation for the 3JPA and our calculations for the orchard system study (RA2.5). Last but not least it is always interesting to have an exchange with researchers from other European countries, because of many reasons.

**Date of submission**

Friday, the 5<sup>th</sup> of June



Dr. Maurizio Sattin  
IA3 activity leader

Approved

