

## **FINAL REPORT SHORT-TERM SCIENTIFIC MISSION (STSM) COST ACTION FA1404**

**Applicant:** Monique Mul, Wageningen UR Livestock Research, The Netherlands

**Host:** Dr. Irene Vänninen, Dr. T. Tuovinen, Natural Resources Institute (LUKE) in Finland

**Period of stay:** 3 – 10 December 2015

**AIM OF THE STSM:** Acquire knowledge of the implementation of Integrated Pest Management (IPM) in general and more specific in poultry husbandry against *Dermanyssus gallinae* to identify the scientific knowledge necessary for an effective implementation of IPM in layer farms against *Dermanyssus gallinae*. This visit will provide the applicant both the basic knowledge and more in depth knowledge about IPM, as well as theoretical and practical knowledge. This, in order to feel more comfortable when discussing the topic in the introduction and general discussion of the PhD thesis of the applicant and to set goals for the Cost action FA 1404.

**ACTIVITIES DURING STSM:** During the STSM, two main activities were carried out: (1) discussing IPM in general, in horticulture and in laying hen husbandry, 2) discussing the steps to be carried out for a successful implementation of IPM in general, the required knowledge and methods for effective and accepted IPM against *D. gallinae* in laying hen facilities.

**Activity 1:** Discussing IPM in general, in horticulture and in laying hen husbandry

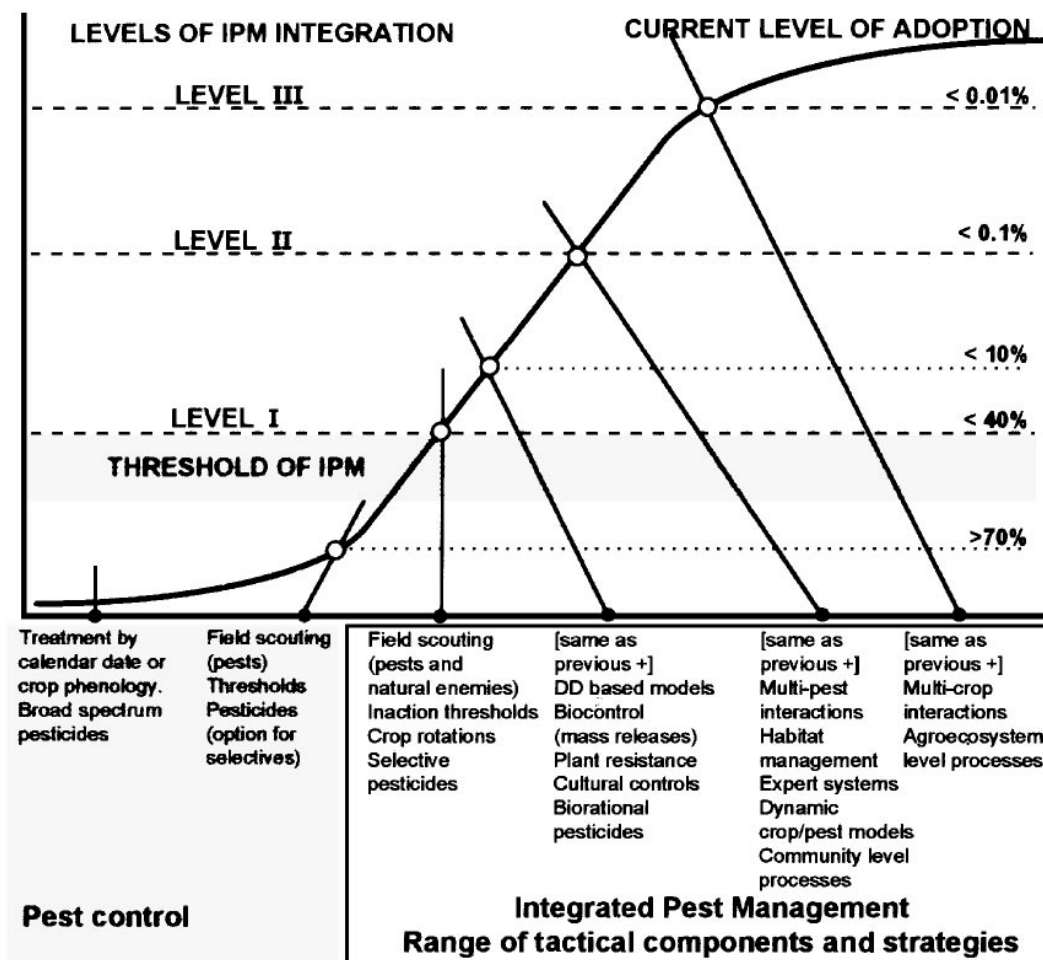
In general terms as used in the EU, IPM consists of 8 steps. All these steps together contribute to sustainably reduce pests.

1. Measures for prevention and/or suppression of harmful organisms
2. Tools for monitoring
3. Threshold values as basis for decision-making
4. Non-chemical methods to be preferred
5. Target-specificity and minimization of side effects
6. Reduction of use to necessary levels
7. Application of anti-resistance strategies
8. Records, monitoring, documentation and check of success

Kogan (1998) distinguishes three levels of IPM as shown in figure 1.

Even though IPM finds its origin in controlling entomological pests, IPM is merely seen as a method to reduce plant pests and diseases. Figure one shows that joint existence with plant protection issues. Nevertheless, we were able to identify the current level of IPM in Poultry farming in Finland and The Netherlands. A farm visit in Finland illustrated that IPM level I was not reached as farmers were not able to indicate the hiding places and the moment of treatment was only addressed by the number of mites on the eggs. Also in The Netherlands treatments are applied when animal care takers complain or when blood spots from mites are seen on the eggs. Monitoring is not recognised as being helpful in indicating the moment of treatment and the effect of the applied treatments.

When it concerns IPM in the growing of strawberries and raspberries and greenhouse crops in Finland, much more progress can be seen due to the effort of Luke. Luke focused on healthy seeds and plants, monitoring, thresholds, crop rotation, biocontrol, models and involved groups of growers into the projects. For more than twenty years, the IPM strategy was disseminated during farmer's conferences and in farmer's magazines. The result of this is that the awareness about IPM of at least among part of the Finnish growers is high and reaching level III of IPM as described by Kogan (1998). However, majority of the growers still lack knowledge to apply IPM themselves, such as monitoring methods, preventive measures and thresholds. The weekly advice services from, in this situation, Biotus who produce and sell Biocontrol methods seems to be necessary for effectively controlling plant pests on farms with Biocontrol measures as they are continuously checking the situation by asking the farmers.



**Fig. 1** Three levels of IPM showing the different strategies belonging to the different IPM levels. The IPM threshold is when a set of control tactics are available and can be chosen from and when there are rules set for the application of these control tactics.

During the discussion about the applicability of the developed methods and tools for *Dermanyssus gallinae* to horticulture, it was concluded that the situation in horticulture with multiple pests is making the direct application of the current tools more difficult. However, automated monitoring of pests and registration of the effect of an application, is very much desired for improved adaptation of IPM. A thorough discussion about pests in horticulture should give more insight in the possibilities of application into horticulture.

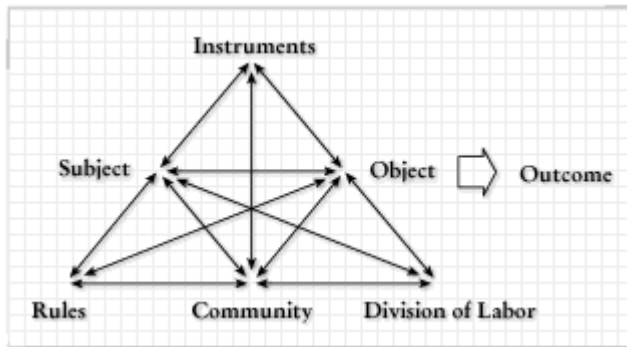
**Activity 2:** Discussing the steps to be carried out for a successful implementation of IPM in general, the required knowledge and methods for effective and adopted IPM against *D. gallinae* in laying hen facilities.

The implementation of IPM can already start when common knowledge about the pest is available. It starts with the involvement of farmers on the long term. Along the way farmers can, with help from scientific knowledge, adapt their procedures towards IPM. In Finland, Luke organises every year a two day workshop about IPM. There they started with questioning their knowledge about IPM and how they are combatting pests and diseases at their farm in their crops. During the workshop Luke researchers told the farmers about IPM and the methods and possibilities to prevent and control pests. Where farmers initially asked about chemical products and their efficacy, they later asked for methods preventing the pests and increasing the plant health. During the years, farmers incorporated more IPM in their way of controlling pests.

Farmers networks can be an important method to disseminate IPM knowledge. This method has also been widely used in The Netherlands and rely on bottom up co-innovations. Dr. I. Vänninen

used the method of Change laboratory and Learning clubs. The Change laboratory (<http://www.helsinki.fi/cradle/Change%20laboratory.html>) was developed to speed up the learning cycle and consists of the steps:

1. Questioning (mirror data, observe)
2. Analysis (historical, actual empirical, use of Cultural-historical Activity Theory (CHAT))  
Modelling the new activity (what do we need for that, how do we do it, who will we need, do we have to change the subject). Show how you want it to be.
3. Test the new model on paper, discuss it and examine it
4. Implement the new model (one element first)
5. Reflect on the process
6. Consolidate new practices and turn back to number 1.



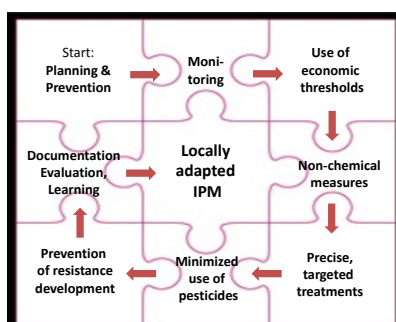
**Fig.2** The structure of a human activity system used in the CHAT method (Engeström, 1987, p. 78)

The discussions with researchers, poultry farmers and a producer of predatory mites of *Dermanyssus gallinae* revealed that poultry farmers are not willing to monitor the pest population. However, monitoring is one of the key steps for an effective IPM. The use of the Change laboratory method combined with the CHAT method may elucidate the reason for the unwillingness to monitor *Dermanyssus gallinae* and further apply the IPM method.

As a first step, we suggest to inform the poultry industry better about *Dermanyssus gallinae*.

- I. its biology,
- II. its effect on welfare, health and production,
- III. the current available preventive methods
- IV. the current available repressive methods
- V. available control methods
- VI. available monitoring methods

This can be done by using the IPM jig saw puzzle as described by Vänninen. Each puzzle piece is for one IPM step. Hereby the farmers indirectly acquire knowledge about the IPM strategie.



Eventually we can use the network method to disseminate the knowledge and implement the knowledge on-farm. However, we should notice that layer farmers are not all in the same stage of the egg producing cycle (e.g. starting up at the same time and culling at the same time) which was an advantage with the networks of raspberry growers. Within a network we may be able to differentiate 4-6 different types of farmers when on concerns the control of pests. We may use the CHAT method to identify the difference in objects/subjects/community and learns from them how to differentiate the methods to make the farmers apply IPM in the poultry farm against *Dermanyssus gallinae*.

**Joint acquired knowledge:** The national implementation of the principles of integrated pest management (IPM) as called for by Directive 2009/128/EC on the sustainable use of pesticides was discussed for Finland and The Netherlands. In The Netherlands the ministry of Economics takes a leading role in the implementation of IPM in agriculture, where in Finland the ministry of Agriculture leaves the initiative to the stakeholders. In The Netherlands stakeholder were involved in the set up of the Strategic Research Agenda (SRA) and research will be funded by both companies, SME's and the ministry of Economics. The group of Luke identified through the discussion about the development of the SRA, what their role could be.

Concerning the implementation of IPM to reduce *Dermanyssus gallinae*, this visit learned us that poultry farmers still lack a lot of knowledge about *D. gallinae*. As a first step, the available knowledge about *D. gallinae* and IPM should be frequently distributed to farmers and advisers. It was agreed by Hanna Hamina, president of the Finnish Poultry Association, that she was willing to take part in the spread of *Dermanyssus gallinae* knowledge coming from the COST action towards layer farmers. A poster based on the jig saw puzzle as mentioned above, about control measures against *Dermanyssus gallinae* will be made by the Finnish Poultry Association and distributed among layer farmers. After the meeting, she received the checklist for preventing the introduction and spread of *Dermanyssus gallinae*, which could be used by layer farmers as a first step of controlling *Dermanyssus gallinae* in layer farms. Hanna also would take responsibility in translating, commenting and distribute the questionnaires as produced by the leader of Working Group 1, Kathryn Bartley.

#### Contacts/ visits:

- Finnish rearing and layer farm
- Hanna Hamina, Finnish Poultry Association (<https://twitter.com/haminahanna>)
- Jan Hulshof, Biotus Oy (<http://www.biotus.fi/>)
- Heini Koskula. Biotus Oy
- Tuomo Tuovinen (Luke)
- Irene Vänninen (Luke)
- Anne Nissinen (Luke)
- Kari Tiilikkala (Luke)
- Kaisa.Kuoppala (Luke)



