STSM – Cost Action FA1404 COREMI

Title: Study on predatory mite communities in layer farms: resistance against acaricides and interest for IPM of the Poultry Red Mite Dermanyssus gallinae (De Geer, 1778)

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Host: Dr. Tomasz Cencek, National Veterinary Research Institute, Poland.

Period of stay: November, 2nd – 6th 2015

Description of the work carried out during the STSM

Global rationale

1. Comparison of predatory mite's communities in layer farms.
2. Sensitivity tests (bioassays) against commonly used acaricides/insecticides (on predatory mites and the PRM pest mite).

Description of the main results achieved

1. Characterization of predatory mite's communities in Polish layer farms with different PRM infestation histories.

Our first aim was to design and carry out a small sampling campaign. Pawel Kusik and I visited 8 farms: 7 cages and 1 free range. In the cage systems, dust were collected from structures and from the ground. I also collected dry droppings when it was possible. In the free range farms, I collected droppings under and on perches. The droppings around the nest and the straw in the nests were also sampled.
Additionally, during the last day, samples of litter from 4 backyard farms were collected by Marek, a colleague of Pawel K.

Extraction of the mites. The samples were sieved with water in order to extract living mites.
In cage systems, no other mites or any other arthropods excepted PRM were found in either the dust or the droppings.
In the free range farms, more arthropods were found:

- In straw, I found only PRM.
- In the droppings around nest and perches, I found some predatory mite individuals. All looked like a mite currently used for PRM control in farms, namely *Androlaelaps casalis.* However, in this case, the presence of this species – if confirmed – is not the result of any artificial inoculation (information from farmers).
- In the droppings on the perches, I found a lot of PRM individuals and some insects, the lesser mealworm belonging to genus *Alphitobius.*

In the backyard farms, I found mites in samples collected from 2 farms of 4:

- In the first farm, I found two different morphospecies. The interesting point is that one of these morphospecies closely looks like another one I found previously in some French free range farms. We'll compare them in order to determine whether indeed they belong to the same species.
- In the other farm, I found some unidentified protonymphs.

2. Rough comparison of the composition of mite assemblages

The primary focus of the study is on free range farms. We were not allowed to visit enough free range farms (a single one) in Poland to get a precise idea but maybe we'll confirm that there is one common species between both countries.

To date, sampled mites were installed in appropriate containers and they are taken care of from then on, in such a way as to allow them to grow and reproduce. Once we'll have obtained enough individuals to test their sensitivity, we'll also proceed with their specific identification. This will allow us more specifically comparing the Polish sampled mites with the French ones (because we need to perform subsequent bioassays, killing mites to perform specific identification is not appropriate to date, we need to take care of them in first).

3. Search for resistance

The tests on the PRM are ongoing with a pyrethroid. We are comparing the strain from Poland to a "sensitive" strain from a French farm. The idea here is to use PRM as a pest reference to assess the range of selective pressure.

Concerning the predatory mites, the tests will take place after the mites have reproduced enough (see above).

4. Discuss protocol for testing mite sensitivity to chemicals

During the STSM, Pawel K. provided me with the experimental design for the sensitivity test for *D. gallinae* developed by Tomasz Cencek and I was allowed to take part to some such experiments. In this design, the chemical is put on thin wooden piece fixed on a plastic plate. Around 50-100 PRM are dispatch on this wooden board during 24 hours after the wooden piece was dried. Then dead and living mites are roughly counted. The difference with the method developed by Lise Roy to test sensitivity is that mites are not followed individually. Indeed, this two tests have different objectives. The test developed by the Polish team aims at evaluating the sensitivity of different field strain of PRM and it has to be done quickly and easily. The main goal of the other test is to estimate if there is any resistance in a population, which implies more accurate observations of individual behaviour and specific counts of reactive and unreactive individuals, as well as to be able to assess the individual survival duration.

5. Comparison of pest control practices in layer farms between Poland and France

In Poland, the most popular farm system is cages. There is almost no alternative management strategies to control PRM. Polish farmers are used to apply many different pesticides, including several pyrethroids, some carbamates and sometimes a phenylpyrazole, the fipronil. The Phoxim, an organophosphate allowed in several European counties including France, apparently is not associated to any marketing authorizations for use in Polish layer farms.

As for biological control means, these did not appear to be commonly used in the Polish farms I visited. Farmers apparently didn't know about the use of predatory mites in layer farms for example.

Future collaboration with the host institute

Following the COST workshop in Montpellier, a questionnaire concerning the farms practices in Europe will be implemented in the next future. Pawel and I have already thought about items in order contribute to this collaborative work.