



## HORTIN II Co Innovation Programme

*Towards cost effective, high quality value chains*

Integrated pest management in sweet pepper  
Application of pesticides and use of biological control against thrips

### Mission Report 7

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The purpose of the HORTIN II programme is to contribute to the development of cost effective high quality value chains for the selected commodities hot pepper, shallot and sweet pepper. Among others this can be achieved when technology development takes place in close collaboration between public institutions, farmers and private companies.

In Indonesia, the programme is carried out by the Indonesian Vegetable Research Institute (IVEGRI) in Lembang. In the Netherlands Applied Plant Research (APR), WUR-Greenhouse Horticulture (GH) and Agricultural Economics Research Institute (AEI), all part of Wageningen University and Researchcentre, are the principal partners.

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## Executive summary

A visit to Indonesia was made by Marieke van der Staaij from December 8 till December 15 2007. The purpose of the visit was to help finding solutions for the problems to control trips in sweet pepper and as a result reduce the amount of pesticides used during the growing season.

The problems were discussed with Dr. Laksminiwati Prabaningrum (IVEGRI) and Ir. Tonny K. Moesakan (IVEGRI) and Rien rodenburg (PT East West Seed Indonesia).

With a presentation held at a meeting and with demonstrations in the greenhouse growers were shown how to improve the results of their application of pesticides.

The site where the experiment with *A.mblyseius swirskii* and *Orius laevigatus* will be carried out was visited and the proposal was discussed.

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## 1. Introduction

The purpose of the visit to IVEGRI from December 8 till December 15 was:

Discuss the problems in sweet pepper concerning the control of thrips.

Discuss the methods of application of pesticides.

Discuss the project proposal "Study of effectivity of *Amblyseius swirskii* and *Orius laevigatus* against *Thrips parvispinus* on sweet pepper".

Help finding solutions to control trips in sweet pepper with the experience from the situation in the Netherlands and in doing so reduce the use and the amount of chemical pesticides.





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## 1.1. Visit report

The first day, after arriving at the institute in Lembang, made acquaintance with the researchers working within the HORTIN Programme specially both entomologists who I will be working with.

The site of the sweet pepper project of Nikardi Gunardi and Ruud Maaswinkel was visited.

During the whole day the problems with the control of thrips in sweet pepper were discussed. In the afternoon an application of pesticides in sweet pepper at the institute attended and I gave a small demonstration of who to use the spraying device.

The second day I showed my presentation on application techniques (made for advisors in Turkey) to Laksminiwati Prabaningrum and Tonny Moesakan. They want me to gif this presentation to a group of growers on Thursday. The presentation was translated in to Indonesian.

We discussed the side-effects of pesticides on *Amblyseius swirski* and *Orius laevigatus* and other biological control agents. Gave the researchers a list with pesticides and there effect on all available natural enemies (Koppert B.V.) in the Netherlands (in English).

Visit to a shop which sells pesticides and application apparatus.

In the afternoon brief meeting was held with the director of the institute Dr. F. Kasim.

Problems in sweet pepper and planned research discussed with Rien Rodenburg of PT East West Seed Indonesia.

The third day in the morning we, Nita and I, talked about the project proposal.

Visit to the location were the experiment with *A. swirski* and *O. laevigatus* will be carried out.

Demonstrated the best way the growers have to apply pesticides in sweet pepper.

In the afternoon we visited the site were the have two greenhouse with sweet pepper. In one greenhouse IPM was applied, in the other one only pesticides were used to control thrips.

At this location growers meet once a week and exchange information about almost every thing concerning breeding/cultivation of sweet pepper.

The fourth day the researchers showed an instruction-video for growers to improve their methods of breeding vegetables (cultivation, plant protection, harvest, packaging, quality).

Their laboratory visited.

In the afternoon I held a presentation about application techniques for sweet pepper growers and there was a demonstration on how to apply pesticides in the greenhouse; what pest or disease needs to be controlled, spray pressure, dosage, execution time, deposition and penetration in the plants.



The fifth day in the morning we made a trip to a volcano in the neighbourhood.

In the afternoon we evaluated my trip and talked about a possible continuation of the cooperation in 2008 when the experiments with *swirski* and *laevigatus* will start. We also talk about a better way of teaching the grower how to use pesticides in demonstrations and with presentations more adjust to their situation.

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## 2. Report

### 2.1. Problems in sweet pepper concerning the control of thrips

Control of *Thrips parvispinus* in sweet pepper in Indonesia is a problem. It is not clear what the cause of the problem is. All modern pesticides are available. There are several options:

- incorrect use of the spraying equipment or use of equipment which is not suitable so the pesticide is not deposited on places of the plant where the pest is situated.
- the use of dosages lower than the recommended dosage and the repeated use of one type of pesticide which cause resistance in the pest. (Because of the export of sweet pepper to Singapore the use of some pesticides is banished)
- the amount of water used during spraying
- knowledge about the pesticides (contact, stomach, vapour)
- lack of knowledge about the pest (where is the pest situated)

### 2.2. Methods of application of pesticides

With the equipment available it is possible to control thrips in sweet pepper. With the right spray-pressure (8 - 10 bar in front of the hose, the length of the hose reduces the pressure) and covering the under side and upper side of the leaves with pesticide the result of an application will become better. Eventually this will result in a reduction of the amount of pesticides used during the whole growing season.

Of what I have seen during demonstrations of an application only the upper side of the leaves was covered with pesticide. Sweet pepper is a difficult crop to spray. The leaves are hanging down and act as umbrellas so the inside of the plant stays dry. In this way only part of the plant is covered with pesticide the rest is clean.

In the presentation it was shown how in the Netherlands an applicator of pesticides protects him or herself against the risks involving the pesticides, this led to some discussion. Most of the protection material is expensive.



Figure 1. Application of pesticides



Figure 2. Spray nozzle



Figure 3. Knapsack sprayers and bottles with pesticides

### 2.3. Project proposal

Based on the results of this study *A. swirskii* and *O. laevigatus* will officially be registered in Indonesia and will get an import licence. This gives growers of sweet pepper the opportunity to use not only pesticides but also use natural enemies to control trips.

Some growers already use *Menochilus sexmaculatus* in combination with *Verticillium lecanii*, but the results are not good enough so they still have to use pesticides. Lack of knowledge of the effect of pesticides (insecticides and fungicides) on both biological agents makes the control of thrips even more difficult.

In the past they have searched for predators and parasites in the surrounding fields (in Indonesia). None were found.

*A. swirskii* and *O. laevigatus* are both excellent predators but they are both expensive. Another mite, *Amblyseius cucumeris*, also is a good predator of thrips and is three times cheaper than *A. swirskii* and seven times cheaper than *O. laevigatus*. It appeared that the project proposal cannot be changed or adjusted. The proposal has been approved by an official authority which works for the government. And has to be conducted according the official request.



Figure 4. One of the compartments for the experiment with *A. swirskii* and *O. laevigatus*

Approximately one month before the start of the experiment in the greenhouse (20 compartments) all use of pesticides must be stopped. All fruits will be removed from the plants to increase plant growth and increase the number of new flowers.

The recommend dosages for *A. swirskii* and *O. laevigatus* will be used.

At the start, before the introduction of *swirskii* and *laevigatus*, the number of thrips in the flowers and on the leaves will be established.

Use of pesticides in the surrounding of the greenhouse will, if possible, be stopped to prevent drift of pesticides into the greenhouse. Proper documentation of all pesticides used in the greenhouse as well as in de surrounding area is advisable.

There will be only one introduction of the natural enemies. Better would have been three or four introductions over a period of time. This reduces the risk of failure.

