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**INTEGRATED CONTROL OF TETRANYCHID MITES ON
GREENHOUSE CUCUMBERS**

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Executive Summary

The purposes of the project at the first year at both locations, the Palestinian areas and Israel were:

1) To observe the phenology of injurious and predacious mites 2) To determine species presence and to establish a laboratory colony of the native mites.

The study of population fluctuations and species composition was conducted in commercial and unsprayed cucumber greenhouses in the West Bank – Toul Karim area in the Palestinian Authority and an Israeli area ca. 30Km apart, at Sandalla village – Jezriël valley. Seasonal injurious (Tetranychidae) and predatory (Phytoseiidae) mite population phenology were examined by observing mites from the planting period – April or October 2000, until the end of yield.

Observations through the entire period from end of October 2000 to March 2001, on cucumber plants in the greenhouse showed that population of injurious or predacious mites at this period of time did not develop, probably due to cold weather.

Observations through the entire period from April to June 2001, showed that the injurious mites started to appear in mid May and increased until the end of the yield – late June. Details are in paragraph B – Research Accomplishments.

Over the entire observation periods, no native predatory mites were found. The injurious tetranychid mite (TM) Tetranychus cinnabarinus (Boisd) was found in both locations at very high levels.

Similar results were obtained in the Palestinian area. Detailed results were not received because of the political situation in the area.

A laboratory colony of the native TM were established in both locations.

These findings are basic for the continuation of the project and will help to achieve the project objectives. The Israeli principal investigator with his technician visited the Palestinian investigator many times and guided him in each step until the security situation started to be impossible.

The start of the project was delayed by one year, due to the delay of the collaborating institute – An-Najah University to sign the Grant Agreement.

A. Research Objectives:

The ultimate goal of the project is developing an integrated pest management program for control of tetranychidae injurious mites in cucumber greenhouse.

To search this goal specifically, the proposed study will be concerned with:

- 1) Determining the species of the injurious and the predacious mites present, and studying their phenology.
- 2) Establishing a colony of the predatory mite
- 3) Assessing the toxicity of commonly used pesticide to predatory mites associated with cucumber crops
- 4) Choosing the most selective pesticides that have minimum injurious effect on the predatory mite to be used for controlling other pests
- 5) Integration of chemical and biological control, while using the “pest-in-first” method of the biological control strategy.

The purposes of the project at the first year at both locations were sections 1 and 2.

B. Research Accomplishments

The results showed that in the cucumber plants in the greenhouse at Sandala, the injurious tetranychid mites (TM) expressed in mites / leaf (henceforth M/L) increased in the summer variety gradually from the beginning of May ($x=1.1$ m/l) to peak in mide June (to $x= 41.8$ m/l). In the winter variety the injurious mite started to appear at the end of May ($x = 0.1$ m/l) and gradually increased to peak in mid June (to $x = 47.7$ m/l).

Table: *Average number of motile stages per leaf (third leaf from apex) of injurious tetranychid mites on an untreated cucumber plants in a commercial greenhouse at Sandala, 2001, (seeding was at 30.3.01).*

Variety	Date							
	16/IV	01/V	14/V	21/V	28/V	06/VI	11/VI	18/VI
Summer IV 36	0.0	0.0	1.1	12.4	12.3	28.1	41.8	28.4
Winter Mohassan	0.0	0.0	0.1	0.0	0.2	0.3	0.9	10.3

Similar results were obtained in the Palestinian area. Details are not available at the time being because of the hard situation exist since summer of 2001.

C. Scientific Impact of Collaboration

During this first year of the project the scientists were in very close relations. The Israeli principal investigator visited the Palestinian one several times and guided him in each step: how to recognize mites, storing mites for identification, sampling methods and establishing and rearing laboratory of the native mite. Except visits, there were discussions by telephone.

D. Project Impact

The results are basic data for the continuation of the project. In accordance of the results we will concentrate on the cucumber greenhouse that of the Spring season – from April to late June and on the injurious mite Tetranychus cinnabarinus . The further steps of the project objectives will be based on these results.

E. Strengthening of Developing country institutions

At the developing country institution – An-Najah University, equipments for establishing a laboratory colony of mites and for growth chamber for rearing the mites were purchased.

F. Future Work

The project is on schedule if the political situation in the area will permit that, so we can continue to do our study mainly the research objectives number 3 & 4, namely 3) assessing the toxicity of commonly used pesticides to predatory mites associated with cucumber crops. 4) choosing the most selective pesticides that have minimum injurious effect on the predatory mite to be used for controlling other pests