



האוניברסיטה העברית בירושלים  
THE HEBREW UNIVERSITY OF JERUSALEM



**COST Action FA1105 – Biogreenhouse**

**Towards a sustainable and productive EU organic greenhouse horticulture**

**An International Training School**

**Biological Management of Arthropod Pests in Greenhouse Crops:  
Principles and their Application**

**7-11 October 2015**

at the

**R.H. Smith Faculty of Agriculture, Food and Environment  
The Hebrew University of Jerusalem, Rehovot, Israel**

**Organizers**

**Prof. Dan Gerling**, Department of Zoology, Tel Aviv University;  
[dange@tauex.tau.ac.il](mailto:dange@tauex.tau.ac.il)

**Prof. Moshe Coll**, Department of Entomology, The Hebrew University of Jerusalem;  
[moshe.coll@mail.huji.ac.il](mailto:moshe.coll@mail.huji.ac.il)

**Dr. Shimon Steinberg**, Research and Development, BioBee Sde Eliyahu Ltd;  
[s\\_stein@biobee.com](mailto:s_stein@biobee.com)

**Ms. Mala Braslavsky**, Division for International Studies, The Hebrew University of Jerusalem;  
[admin.iobcwg@mail.huji.ac.il](mailto:admin.iobcwg@mail.huji.ac.il)

**Rationale**

Israeli agriculture in general and the application of biological control in particular, are known for their advanced and innovative technologies. The training school will take full advantage of the Israeli know-how. The course is designed to provide the trainees a comprehensive understanding necessary for implementing biological pest management in organic greenhouse cropping systems. Participants, coming from different European Community countries and beyond, will gain both academic and practical exposure to the topic, and thus gain familiarity of the most advanced approaches to biological pest control in greenhouse horticulture.



האוניברסיטה העברית בירושלים  
THE HEBREW UNIVERSITY OF JERUSALEM

The course will (a) be taught by experts in various aspects of greenhouse cropping systems and biological pest management; (b) offer hands-on experience with pests and their natural enemies through laboratory practices; and (c) provide exposure to biological pest management in greenhouse operations through a day-long field excursion to commercial farms. Lecturers from Israel and abroad will integrate basic and practical know-how needed for innovative and wide application of biological control in greenhouses and other cropping systems.

Finally, the Training School will be held in conjunction with the meeting of the International Organization for Biological Control (IOBC/WPRS) Working Group on “Integrated Control in Protected Crops, Mediterranean Climate”, scheduled for 11-15 October 2015 at the same venue. Therefore, trainees will have a unique opportunity to attend this international scientific meeting and thus further their knowledge, learn of new developments in the field, and make contacts with researchers and practitioners of biological and integrated control in protected cropping systems. All trainees are invited to register for the meeting through its website at <http://www.agri.huji.ac.il/icpc-working-group/index.html>. A discounted student rate of €200 will be payable on arrival.

## Objectives

The Training School is aimed at teaching approaches for biological pest management in organic greenhouses and horticultural cropping systems, explore the influence of various factors in the agroecosystem on biological control practices, and expose trainees to most advanced biological control technologies employed in pesticide-free crop production systems.

## Dates and Venue

From Wednesday, 7<sup>th</sup> until Sunday, 11<sup>th</sup> of October 2015.

The Training School will be held in Rehovot on the campus of the R.H. Smith Faculty of Agriculture, Food and Environment (<http://www.agri.huji.ac.il/english/index.html>) of the Hebrew University of Jerusalem (<http://new.huji.ac.il/en>). The campus is centrally located, with easy access by public bus and train transportation to many attractions throughout the country. Modern, fully equipped lecture hall and teaching laboratories will be available for the school.

## Contact persons

**Mala Braslavsky**, secretariat - [admin.iobcwg@mail.huji.ac.il](mailto:admin.iobcwg@mail.huji.ac.il)

Division for International Studies,  
The Robert H. Smith Faculty of Agriculture, Food & Environment,  
The Hebrew University of Jerusalem, P.O.B. 12, Rehovot 76100 Israel  
Tel: +972-8-9489344; Fax: +972-8-9470171



האוניברסיטה העברית בירושלים  
THE HEBREW UNIVERSITY OF JERUSALEM

## Trainers

- Dr. David Ben-Yakir
- Dr. Einat Bilu
- Dr. Cristina Castañé Fernández
- Dr. Jonathan Cnaani
- Mr. Moshe Cohen
- Mr. Itzhak Esquira
- Dr. Rami A. Horowitz
- Prof. Jaacov Katan
- Prof. Zvi Mendel
- Dr. Gerben Messelink
- Dr. Michael Parrella
- Dr. Alex Protasov
- Dr. Eric Palevsky
- Dr. Shimon Steinberg
- Dr. Hagai Yasuor

## Participants

Participation is limited to 30 trainees. A COST grant may partially cover participation costs of up to 15 of the trainees arriving from countries participating in this COST Action (see below).

## Eligibility

In general, applicants must be MSc students, PhD students, post-docs, early career researchers, or people active in the organic greenhouse/protected farming industry and have the needed background and experience to participate. Therefore, the interest and/or first-hand experience of applicants should fit the topic of this training school.

Applicants must be enrolled in or affiliated with an Institution or a business located in a country participating in this COST Action. These countries are: Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Ireland, Israel, Italy, Malta, Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovenia, Spain, Sweden, Switzerland, Turkey and United Kingdom. In addition, applicants from the following approved Near Neighbor country institutions are also eligible to apply: Faculty of Agricultural Technology, Al-Balqa' Applied University (Jordan) and Cairo University (Egypt).

Selection of trainees from all eligible applicants will be based on: (i) applicant's background that will allow him/her to benefit from the training; (ii) the degree wherein the trainee will promote the objectives of the Biogreenhouse COST Action (i.e., advance sustainable and productive EU organic greenhouse horticulture), (iii) the ability/opportunity of the trainee to use the acquired knowledge in organic greenhouse/protected horticulture in the near future in one of the COST countries/institutes participating in this Action; (iv) applicant achievement record (application material), and (v) our strive to maintain a reasonable country balance among overseas participants. First-time applicants will have priority over those who already participated in a Biogreenhouse Training School.



האוניברסיטה העברית בירושלים  
THE HEBREW UNIVERSITY OF JERUSALEM

## Financial Support

COST Action FA1105 is offering partial support to 15 trainees at the school, on a competitive basis. The participating trainees will be offered a grant of 300-1000€ as a contribution towards the costs of participation, travel, accommodation and meals. The exact grant offered will depend on travel cost to the venue as it differs considerably across eligible countries. Modest accommodation in shared apartments and meals (excluding 2 dinners) will be provided on the HU campus in Rehovot at a cost of **€350\*** for the duration of the school (4 days). This amount must be paid in cash on arrival. Please note that reimbursement from the COST grant will be paid by bank-to-bank transfer after the course has ended.

\* Consists of accommodation and four breakfasts and lunches and two dinners.

## Medical Insurance

It is the responsibility of each participant to provide adequate insurance coverage (personal, travel and medical) for the duration of the training course and travel period.

## Travel

Ben Gurion Airport (TLV; [click here to Ben Gurion airport website](#)), the main International airport in the country, is located about 15 km from the TS venue in Rehovot. From the airport, the HU campus could be reached by taxi (ca €42), or by train and bus ([Click here to Israel Railways website](#) and [click here to Egged buses website](#), respectively). Jordanian trainees could arrive by land, through the Allenby (King Hussein) Bridge. Information concerning Visa requirements is found at: [click here to visa information](#).

Other travel information could be found at: [click here to travel information](#).

## How to apply

Send a letter of application stating your interest in participating in this training school to **Ms. Mala Braslavsky** ([admin.iobcwg@mail.huji.ac.il](mailto:admin.iobcwg@mail.huji.ac.il)) and to the chair of the Action **Ir. Rob Meijer** ([rob.meijer@wur.nl](mailto:rob.meijer@wur.nl)). The letter must be accompanied by the following documents:

- 1) A short CV (*maximum 3 pages*) that includes your personal information, current home and university/institution mailing addresses, e-mail, Skype name (if possible), university qualifications, current enrolment status, training/work experience, list of publications, etc. Please underline in your CV your previous experiences in a COST action, if any.



האוניברסיטה העברית בירושלים  
THE HEBREW UNIVERSITY OF JERUSALEM

- 2) A letter of motivation stating why you would like to participate in this training school (*must not exceed one page*).
- 3) For MSc and PhD students: contact details of your advisor or any other academician who may be contacted for information about your capabilities and experience.
- 4) For non-students only: contact details of a relevant professional who may be contacted for information about your capabilities and experience.
- 5) Application form <http://goo.gl/forms/8OSCYcFJu8>

**All application materials must be received by  
10 August 2015**

**By 24 August 2015, you will hear from Rob Meijer,  
chair of the COST Action FA1105 BioGreenhouse,  
whether you are selected for participation and  
about the amount of support granted**

Co-funded by  
the European Union





האוניברסיטה העברית בירושלים  
THE HEBREW UNIVERSITY OF JERUSALEM

## Program (subject to changes)

### Wednesday, 7<sup>th</sup> October

- 09:00-12:00** Arrival, registration, and room assignment  
**12:00-13:00** Welcome & introduction of participants  
**13:00-14:00** *Lunch*

### **PART I. Introduction to biologically-managed greenhouse systems**

- 14:00-15:00** The physical environment: Greenhouse structures and types (types of cover, types of substrate and their implications for plant growth and protection); the controlled greenhouse environment – air movement, ventilation and humidity; differences between Mediterranean and temperate climate greenhouses – **Mr. Itzhak Esquira**
- 15:00-17:00** The plant: Physiological and cultural peculiarities of greenhouse-grown plants; effects of temperature, lighting conditions and humidity; reaction of different crop plants to the artificial environment; growth forms in the greenhouse (staking, detached soil, etc); management of greenhouse conditions, including soil, water and atmosphere – **Dr. Hagai Yasuor**
- 18:30-20:30** *Welcome dinner*

### Thursday, 8<sup>th</sup> October

- 08:00- 09:00** Pollination: Needs, peculiarities of the used organisms and relationships (constraints) with the overall control practices; relations between pollinator-friendly environments and pest management practices – **Dr. Jonathan Cnaani**
- 09:00-10:00** Disease management: Main diseases of horticultural greenhouse crops, their biological management and impact on pest control – **Prof. Jaacov Katan**
- 10:00-10:15** *Coffee break*
- 10:15-11:00** Application of pest controlling chemicals: Action and reaction in greenhouse environment, methods of application, and mode of degradation; Organically-approved chemicals, modes of action, limitations, soil amendments and crop protection – **Dr. Rami A. Horowitz**

## PART II. Use of beneficial organisms to control greenhouse pests

- 11:00-12:30** Approaches to natural enemy use – augmentative vs. conservation practices in greenhouse systems; commercial production and implementation; quality assurance; regulatory concerns – **Dr. Gerben Messelink**
- 12:30-13:30** *Lunch*
- 13:30-15:30** The natural enemies – insect predators and parasitoids, entomophagous nematodes, disease organisms (Classification, life cycle, behavior, ecology, advantages and shortcoming, and manipulation methods). **Dr. Shimon Steinberg**
- 15:30-15:45** *Coffee break*

## PART III. Main pests in greenhouse cultures and their suppression

- 15:45-17:15** Characteristics of major greenhouse insect pests – their biology, agricultural impact, symptoms, field monitoring, economic threshold, more – **Dr. Cristina Castañé Fernández**
- 17:15-18:15** Biological control of major pests – Lectures and lab work
- Thrips: Western flower thrips (*Frankliniella occidentalis*), Chili thrips (*Scirtothrips dorsalis*) – **Dr. David Ben-Yakir**
- 18:15-19:45** *Dinner*
- 19:45-21:00** Student presentations

### Friday, 9<sup>th</sup> October

- 08:00-12:00** Biological control of major pests (Cont'd) - Lectures and lab work
- Whiteflies: Sweet potato whitefly (*Bemisia tabaci*), Greenhouse whitefly (*Trialetrodes vaporariorum*) – **Mr. Moshe Cohen**
  - Lepidoptera: Various moth spp. (*Spodoptera exigua*, *S. littoralis*, *Helicoverpa armigera*, *Tuta absoluta*, *Duponchelia fovealis*) – **Mr. Moshe Cohen**
  - Aphids: Green peach aphid (*Myzus persicae* + *M. p. nicotianae*), Melon aphid (*Aphis gossypii*) – **Dr. Einat Bilu**
  - Mites: Red spider mite (*Tetranychus urticae=cinnabarinus*), Tomato russet mite (*Aculops lycopersici*) and Broad mites (*Polyphgotarsonemus latus*) – **Dr. Eric Palevsky**
  - Mealybugs – **Prof. Zvi Mendel**
- 12:00-13:00** *Lunch*



האוניברסיטה העברית בירושלים  
THE HEBREW UNIVERSITY OF JERUSALEM

#### **PART IV. Integrated Pest Management of Organic Greenhouse pests**

- 13:00-14:30** Other sustainable, environmentally-friendly pest management techniques – Sanitation inside the greenhouse and its surrounding, screening, cultural practices, host-plant resistance, more – **Dr. Michael Parrella**
- 14:30-16:30** Crop-specific case studies – integrative approaches to pest management in organic greenhouse systems – **Dr. Cristina Castañé Fernández, Dr. Gerben Messelink & Dr. Michael Parella**
- 16:30-18:00** Concluding discussion

**Saturday, 10<sup>th</sup> October**

#### **Free day**

Two optional sightseeing tours will be offered at cost; details are provided at:  
<http://www.agri.huji.ac.il/icpc-working-group/tours.html>.

**Sunday, 11<sup>th</sup> October**

#### **PART V. Field trip**

- 07:30-17:00** Visits to various commercial protected cropping systems; meet growers and extension personnel to learn about pest monitoring practices, the application of biological control programs, more.