

# First International Advanced Course on Using Managed Pollinators for Dissemination of Biological Control Agents for Suppression of Insect, Fungal & Other Pests of Crops

Charlotte Coates, Susan Willis Chan, Peter Kevan, Ljubiša Stanisavljević, and Guy Smagghe

The First International Advanced Course on Using Managed Pollinators for Dissemination of Biological Control Agents for Suppression of Insect, Fungal & Other Pests of Crops, hosted at the University of Belgrade, Faculty of Biology, Serbia, from 6–10 May 2019 was a great success, attracting around 20 participants and instructors from 10 countries. The course was co-sponsored by the International Commission for Plant-Pollinator Relationships (ICPPR), International Organisation for Biological and Integrated Control – West Palaearctic Regional Section (IOBC-WPRS), International

Union of Biological Sciences (IUBS) and the Arthur Dobbs Institute based in Cambridge, Ontario.

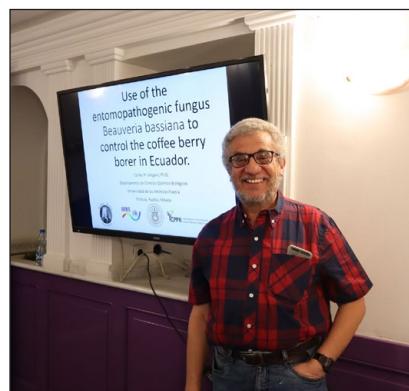
Special thanks go out to the main organizers, Dr Ljubiša Stanisavljević (University of Belgrade) and Dr Peter Kevan (University of Guelph) for all their work bringing the group together and organizing the curriculum.

Apivectoring/entomovectoring technology, which uses managed bees to disseminate biological control agents to flowering crops, can boost crop yields by providing non-chemical protection from pests and disease while enhancing pollination. The advanced course covered the basic principles of pollinator/flower relations, crop pests, the technological development of apivectoring from experimental tests to commercial



Course participants and instructors and raspberry farmers after setting up two bumble bee hives in a raspberry orchard in Majur, Serbia.

group photo from conference



C. Coates

Dr Carlos H. Vergara from the Universidad de las Américas Puebla presenting work on coffee berry borer in Ecuador.

Charlotte Coates ([coatesc@uoguelph.ca](mailto:coatesc@uoguelph.ca)) is a research associate in the School of Environmental Sciences at the University of Guelph contributing to an apivectoring project on greenhouse strawberry crops in Ontario. Susan Chan is a PhD candidate at the University of Guelph studying squash bees. Peter Kevan is a professor emeritus at the University of Guelph and the current President of the International Commission for Plant-Pollinator Relationships. He has played a key role in the research and development of apivectoring technology. Ljubiša Stanisavljević is a professor at the University of Belgrade. In addition to his role as an organizer for the course in Belgrade, he presented results using bumblebees as bioagent vectors to control *Sclerotinia* head rot on sunflowers in Serbia. Guy Smagghe is a professor at the University of Ghent in the Faculty of Bioscience Engineering and has contributed greatly to the development of apivectoring technology.

application, advantages and disadvantages of biological control agents, dosing the vector and crop, dispersal of biocontrol agents through pollinator foraging ranges, monitoring methodology, analysis of the cost-benefits associated with apivectoring, registration of biological control agents considering vector safety, environmental issues, human exposure safety, and formulation and labelling.

International examples of apivectoring research trials were presented by participants from Canada, Mexico, Colombia, Brazil, Belgium, Serbia, Kenya and Senegal. Researchers, industry partners, and students shared their respective experiences and showcased their success controlling crop pests on strawberries, raspberries, orchard crops, sunflower and canola oilseed crops, coffee and other crops around the world. Highlights of the course included a field excursion to NS-Seme Institute of Field and Vegetable Crops Novi Sad (IFVCNS), Serbia, where successful trials using bumble bees to vector biocontrol agents against head rot in sunflower were completed. The IFVCNS team has now turned its attention to using *Osmia* spp. as vectors in canola. During a trip to the Jevremovac Botanical Garden, course participants were able to see the collection of micro and macro fungal specimens isolated from the garden in the University of Belgrade mycology lab. The group also visited the Institute for Crop Protection to examine the collection of crop pathogens and entomopathogens. During a field trip, course participants set up several *Bombus terrestris* BioBest Flying Doctor® hives with a *Clonostachys rosea* formulation to control grey mold (*Botrytis cinerea*) on raspberries. These educational, hands-on, experiences were complemented by a visit to the Museum of Beekeeping and Wine Cellar Zivanoci where the group learned about traditional Balkan beekeeping and tasted a variety of Serbian honeys and wines.

In addition to the excellent discussions and presentations throughout the week, participants in the Course will continue to work together to write a white paper detailing the next steps for apivectoring implementation research worldwide. For the three participants from Ontario, the course offered the opportunity to network and exchange ideas with other researchers from around the world. To read more please go to: <https://www.icppr.com/>



Saira Espinosa presenting her work on apivectoring in Colombia.

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Dr Christina Mogren from the University of Hawaii helping to set up a Flying Doctor® hive at a raspberry orchard in Majur, Serbia.

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The apivectoring group enjoying their visit to the Jevremovac Botanical Garden.

group photo from conference