

Molecular mechanism of plant-insect interactions

Course number: 001-2-2071

Lecturer: Prof. Vered Tzin

Course credits: 3

Course Description:

Plants are members of complex communities and interact both with antagonists and beneficial organisms. An important question in plant-insect interaction research is how plants integrate signals induced by insects into the most appropriate adaptive response. Molecular, chemical and genomic approaches are being used to discover the networks and the mechanisms of these interactions. Molecular biologists, analytical chemists, and ecologists are joining forces to place the mechanisms of plant responses to insects. In this course, we will learn about plant responses to insect cues. We will discuss these effects in a molecular level including signaling and recognition toward biosynthesis of an array of chemical that functions in defense and communication with the environment. Also, we will practice plant insect interaction bioassay using different methods of plant bioassays and metabolic analysis.

Syllabus

- 1) Signaling and recognition: phytohormones and cross-talk between systems
- 2) Coevolution - herbivores, pollinators, and florivores
- 3) Strategy for herbivore deterrent – mechanism and chemicals
- 4) Specialized metabolites - biosynthesis and regulation of toxic molecules and volatiles
- 5) Strategy for pollinator attraction
- 6) Methods for chemical ecology – insect bioassay and analytical chemistry
- 7) Methods for molecular ecology – transcriptome and large dataset integration
- 8) Plant-insect in agriculture – GMO and breeding
- 9) Integrated pest management – solution for reducing pesticides
- 10) Hands-on practice with aphid/caterpillar-maize interaction bioassay and metabolite measurements LC-MS, GC-MS, EPG

Course requirements and grading

Compulsory attendance to exercises – 80%

Compulsory submission of weekly assignments - 80%

Component Weight:

Class attendance and participation - 30 points

Midterm quiz 20 points

Final presentation (25%) and written abstract (25%) 50 points

Total: 100%