

Insect-Plant interactions

Course No.	ENT-50806
Earliest possible year	3 rd year BSc/Msc
Duration	6 weeks half days
Credits	6 ECTS
Course level	BSc/MSc
Examination	Written examination on the contents of the book (essay questions); evaluation of report and presentation of mini-research project
Teaching	Lectures and a mini-research
Block placement	Period 5, mornings
Teaching Language	English
Mandatory prerequisites	2 nd year BSc curricula Biology and Plant Sciences prepare adequately for this course
Restrictions	A maximum of 20 students can participate
Areas of competence the course will address	<p>After having attended this course, the student is expected to be able to demonstrate knowledge and understanding of:</p> <ol style="list-style-type: none">1. principles underlying molecular, physiological and biochemical interactions between plants and insects;2. implications of these interactions at the level of the organism on processes at other trophic levels and at the population level. The student should be able to define and explain concepts, provide arguments and give examples in writing in reply to exam questions. <p>The student is expected to be able to:</p> <ol style="list-style-type: none">3. translate a biological question into a feasible experimental approach,4. demonstrate experimental skills in a range of methods and techniques commonly used in the subject area;5. design, organise and carry out experiments. <p>The student is expected to</p> <ol style="list-style-type: none">6. master the statistical analysis of quantitative data collected during experiments;7. interpret results obtained in the context of existing literature, after a critical evaluation
Objectives	Acquiring knowledge about the role of insects in society in the past, present and future
Content	Flowering plants and insects represent the two largest taxa of interacting terrestrial organisms, both in terms of abundance of species as well as in amount of biomass. Insect-Plant interactions include problems at different levels of biological analysis. This course focuses on the mechanistic analysis of nutritional and behavioural mechanisms of insects, and on the adaptation of plants to the insects: defense against harmful of insects and attraction of pollinators and natural enemies herbivorous insects particularly through the production of attractive, repellent and/or toxic metabolites. Ecological and evolutionary aspects are also addressed, because insights derived from studies at the organismal level are often useful elements in ecological models. In

addition, observations at the behavioural/ physiological level can only be understood when put in an ecological perspective. Attention is paid to the application of this knowledge about insect-plant interactions for crop protection.

Teaching and learning methods

Working sessions on chapters of the book *Insect-plant Biology: from physiology to evolution* (see below) will be presented and discussed-
Mini-research: a project is selected from a list of possibilities, based on available plant and insect species and techniques. A range of measuring techniques and (semi-)automated set-ups for quantifying sensory and behavioural responses in insects and analytical equipment to quantify (volatile) metabolite formation in plants in response to insect herbivory are available. The results will be presented orally and will be reported using the format of a short scientific publication of maximally 2000 words.

Literature

L.M. Schoonhoven, J.J.A. van Loon & M. Dicke (2005) *Insect-Plant Biology*. Oxford University Press. 421 pp.

Responsible

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Available upon registration

Scope

Lectures	53h
Practical	53h
Project	53h
Examination	3h

Sum	162h
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Fundamental and Applied Aspects of the Biology of Insects

Duration	6 weeks half days
Earliest possible year	3 rd year BSc/Msc
Credits	6 ECTS
Course level	BSc/MSc
Examination	Evaluation of essay or research proposal
Teaching	Lectures, instruction for making report and excursion
Block placement	Period 1,2,3,4 and 5
Teaching language	English
Areas of competence the course will address	<p>At the end of the course the student is expected to be able to:</p> <ol style="list-style-type: none">1. describe an overview of what the major topics are in insect biology2. select a limited number of relevant scientific papers that cover two timely topics in the biology of insects3. identify and evaluate scientific information on state-of-the art topics in insect biology4. develop a logical outline for a scientific essay that includes an integrative discussion of a selection of the scientific literature5. present scientific information on current topics in the biology of insects in a comprehensible way into a written text, demonstrating that the information has been integrated and synthesized6. explain biological details of two state-of-the-art topics in insect biology
Objectives	<p>The student will gain knowledge of and insight in recent developments in the research on the biology of insects, with special emphasis on how insects function in multitrophic interactions. The student will learn to develop research questions based on specific problems by collecting knowledge and by integrating this into a research plan. This involves both fundamental and applied knowledge as well as information on research methodology.</p>
Contents	<p>This course deals with fundamental as well as applied aspects of insects and focuses on major themes in modern insect biology. Each student can choose his/her own trajectory so as to develop essential knowledge on (1) biological phenomena for which insects are good model systems or on (2) novel methods to apply fundamental knowledge to the management of insects in natural or agricultural environments, in temperate zones or in the tropics. Major aspects cover (a) chemical and molecular ecology, (b) behavioural and population ecology and (c) functional biodiversity and agroecology and their application in crop protection, protection of human health, vector control and functional biodiversity. Each student chooses 2 topics that will be developed into 2 essays under the supervision of the staff of the Laboratory of Entomology.</p>

Teaching and learning methods

Introduction lectures and writing of 2 reports on different subjects

Literature

A flyer with information is available. All relevant material will be available at the course.

Responsible

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Available upon registration

Scope

Lectures	7h
Self study	100h
Individual paper	53h
Sum	160h

Bee keeping

Course No.	ENT-52302
Earliest Possible Year	3 rd year BSc/MSc
Duration	One week
Credits	2 ECTS
Course level	BSc/MSc
Examination	Written exam
Teaching	Lectures and practical
Block placement	Period 5
Teaching language	English
Objectives	Acquiring knowledge and insight about bee keeping and elementary practical training.
Contents	Lecture subjects: honeybee species and races, life cycle and behaviour of worker bees, queen and drone; caste differentiation, artificial insemination, collection and processing of nectar and pollen by bees, nectar plants and pollination, wax secretion and hive building, bee language. Practical subjects: dealing with bees, preventing swarming, queen rearing and selection, pollination in greenhouses, harvesting and processing of bee products, diseases and parasites of bees; commercial methods for bee keeping.
Teaching and learning methods	Attending lectures and studying of course reader. Checking bee hives, preparing queen rearing, performing training experiment, behavioural observations, checking for diseases and parasites
Literature	Course reader
Responsible	Dr. W.H. Boot, Department of Entomology, Phone: +31317482320
Home Page	Not available
Scope	Lectures 8h Practical 28h Self study 14h Examination 3h Sum 53h