GHENT UNIVERSITY

Course Specifications

Valid as from the academic year 2025-2026

Life Cycle Biology, Physiology and Behaviour of Plant-parasitic Nematodes (C003951)

Course size *(nominal values; actual values may depend on programme)*

Credits 4.0 **Study time 120 h**

Course offerings and teaching methods in academic year 2025-2026

A (semester 2)	English	Gent	peer teaching
			lecture
			seminar
			independent work

Lecturers in academic year 2025-2026

Wesemael, Wim	WE11	lecturer-in-charge
Perry, Roland	WE11	co-lecturer

Offered in the following programmes in 2025-2026	crdts	offering
International Master of Science in Agro- and Environmental Nematology	4	A

Teaching languages

English

Keywords

Agro-ecosystems, biology, ecology, interaction, population variability

Position of the course

This course builds upon the acquired information of some of the general courses and is therefore given in the 2nd semester.
Plant-parasitic nematodes have an important impact on agro-ecosystems. They damage crops and, as a consequence, reduce their yield. The course˙Life Cycle Biology, Physiology and Behaviour of Plant-parasitic nematodes´ provides information on life cycle biology linked to functional aspects of physiology and behaviour. It is necessary to understand host-parasite interactions and the ability of plant-parasitic nematodes to survive in the absence of a host and to locate and invade the host. This knowledge is vital in order to develop rational novel control strategies based on perturbing the nematode life cycle.

Contents

The course overviews the principle groups of plant-parasitic nematodes: root-knot nematodes, cyst nematodes, migratory endoparasitic nematodes, semi-endoparasitic nematodes, and ectoparasitic nematodes.
For each of these groups details of their life cycle and behaviour, host response to parasitism, effect on plant growth and yield, cytogenetics, morphological particularities, principle species and their identification, and interactions with other plant pathogens, are discussed. Specific aspects of hatching physiology, host location, survival attributes, and behaviour will be presented in the context of possible targets for novel control strategies.

Initial competences

Students should have basic academic knowledge of both botany and zoology.

Final competences

1 Advanced knowledge of theories, models, areas, methods, techniques, processes and applications from Biology and Agronomy to be applied to analyse and solve new or complex theories or experimental problems in Nematology in Agro-ecosystems, Nematology in Natural Ecosystems and Nematode systematics

(Taxonomy, Phylogeny, Biodiversity).

2 Apply specialized knowledge of nematode systematics of plant- and insect-parasitic nematodes and all free-living nematode taxa for creative and efficient problem solving and research in Agro-ecosystems or Natural-ecosystems.

3 Investigate and understand interactions between Nematology and related science domains such as genetics, plant biology, ecology and ecotoxicology, molecular biology and, statistics and integrate them in a multidisciplinary way to facilitate problem solving practical applications and solutions in the area of agronomy and/or the environment or general biology.

4 Demonstrate profound understanding in the most recent scientific developments as presented by an international team of experts in nematology.

5 Recognise nematological problems in developing countries and be creative/inventive in efforts to tackle these problems.

6 Demonstrate critical consideration and evaluation of known and new theories, models or interpretation within the field of nematology. Show creativity to formulate hypotheses and to discover new relationships and to formulate a valid opinion derived from basic data and information which may, in certain circumstances, be limited, incomplete or contradictory.

7 Independent systematic and critical evaluation of personal thinking and acting, and translate this into well thought out conclusions and improved solutions in Nematology.

8 Build up independent logical and analytical reasoning within and outside the discipline of Nematology, and comprehend and critically evaluate complex reasoning.

9 Demonstrate problem-prevention and problem-solving abilities in agriculture or the environment, and use them in diverse situations or in a non-familiar context.

10 Interact in English with nematologists originating from different countries who may have English as a second language.

11 Act ethically and socially responsible within a group of people originating from all over the world and with different cultural backgrounds.

12 Be able to take up a job in which biology, agronomy and nematology is of paramount importance.

13 Initiate outreach programmes to inform the local people about the importance of nematodes and organize trainings in recognition of the symptoms of nematode infection and how to remedy the adverse effects.

Conditions for credit contract

Access to this course unit via a credit contract is determined after successful competences assessment

Conditions for exam contract

This course unit cannot be taken via an exam contract

Teaching methods

Seminar, Lecture, Independent work, Peer teaching

Extra information on the teaching methods

Seminar prepared and presented by groups of students. Visit to European nematological laboratories active in the subjects treated in the course (see course Networking and Seminars); visit to field experiments. Critical evaluation of published work related to life cycle biology of PPN.

Study material

Type: Handbook

Name: Plant nematology
Indicative price: € 115
Optional: yes
Language : English
Author : Perry, Moens & Jones (editors)
ISBN : 978-1-80062-242-5
Number of Pages : 635
Oldest Usable Edition : Plant nematology
Online Available : Yes
Available in the Library : Yes
Usability and Lifetime within the Course Unit : regularly
Usability and Lifetime within the Study Programme : intensive

Usability and Lifetime after the Study Programme : regularly

References

Perry, R.N. & Wright, D. (1998). Physiology of Nematodes
Luc, M., Bridge, J. Sikora, R. (2006). Nematodes of Tropical Crops
Evans, K., Trudgill, D. & Webster, J. (1993). Plant-Parasitic Nematodes in Temperate Agriculture.
Brown, R.H. & Kerry, B. (1995): Principles and practices of nematode control

Course content-related study coaching

Staff nematology laboratory ILVO

Assessment moments

end-of-term and continuous assessment

Examination methods in case of periodic assessment during the first examination period

Oral assessment, Written assessment with multiple-choice questions, Written assessment with open-ended questions

Examination methods in case of periodic assessment during the second examination period

Oral assessment, Written assessment with multiple-choice questions, Written assessment with open-ended questions

Examination methods in case of permanent assessment

Possibilities of retake in case of permanent assessment

examination during the second examination period is possible

Extra information on the examination methods

Period bound: The written exam evaluates whether the student disposes of the necessary basic knowledge, is able to discuss differences in life cycle biology between different species and masters techniques to assess life cycle studies.

Calculation of the examination mark

Period bound evaluation (100 %)