

## Molecular Aspects of Plant-Nematode Relationships (C002810)

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

**Credits 3.0**

**Study time 90 h**

### Course offerings and teaching methods in academic year 2025-2026

A (semester 2)

English

Gent

lecture

group work

independent work

peer teaching

seminar

### Lecturers in academic year 2025-2026

Gheysen, Godelieve

LA25

lecturer-in-charge

Jones, John

WE11

co-lecturer

### Offered in the following programmes in 2025-2026

[International Master of Science in Agro- and Environmental Nematology](#)

**crdts**

3

**offering**

A

### Teaching languages

English

### Keywords

nematode feeding sites, hypersensitive response, parasitism genes, avirulence genes, resistance genes, secreted peptides, plant hormones, RNAi, protease inhibitors.

### Position of the course

This course follows 'Molecular toolbox'.

The aim of this course is to give the student knowledge and insight in the interaction between plants and nematodes at the molecular level: which signals are exchanged, how is gene expression affected, which techniques can be used for this analysis, which types of applications can come out of this knowledge?

### Contents

1. Nematode genes involved in parasitism
  - cuticula
  - subventral gland
  - dorsal gland
2. The plant response in the compatible interaction
  - cytological
  - gene expression
  - role of plant hormones
3. The incompatible interaction
  - resistance genes
  - avirulence genes
  - the hypersensitive response
4. Nematode genomics and transcriptomics for gene discovery.
5. Strategies and techniques for functional gene analysis.
6. Engineering plant nematode resistance.

### Initial competences

Knowledge from and insight in molecular techniques.

Knowledge of biology of plant-parasitic nematodes.

**Final competences**

- 1 Insight in molecular techniques related to the course.
- 2 Knowledge of biology of plant-parasitic nematodes.
- 3 Understand the principles of nematode plant interactions.
- 4 Explain the role of nematode genes involved in parasitism.
- 5 Select the best molecular technique for the analysis of a plant-pathogen interaction.
- 6 Explain the plant response in the compatible and incompatible interaction.
- 7 Discuss strategies for engineering plant nematode resistance.
- 8 Critically present the information extracted from a scientific paper.
- 9 To work in an international team for analysis of scientific literature and making a presentation.

**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**

Group work, Seminar, Lecture, Independent work, Peer teaching

**Extra information on the teaching methods**

Personal activity and microteaching: the students will read several scientific publications. One of those they have to represent for the class, all publications are discussed in group. The students also get an assignment in which they consider a specific nematode and have to estimate the appropriate effectors.

**Study material**

Type: Slides

Name: ppt

Indicative price: Free or paid by faculty

Optional: no

Language : English

Number of Slides : 520

Available on Ufora : Yes

**References**

- Review papers available on ufora

**Course content-related study coaching**

by email or personal contact (after the class or upon appointment)

**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 open-ended questions

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

Oral assessment, Written assessment with open-ended questions

**Examination methods in case of permanent assessment**

Participation, Assignment

**Possibilities of retake in case of permanent assessment**

examination during the second examination period is possible in modified form

**Extra information on the examination methods**

- Oral examination with written preparation.
- Part of the score obtained in the permanent evaluation is valid for the second exam period.

**Calculation of the examination mark**

- 80% on examination
- 20% on report and presentation

