# Parasitic and mutualist strategies

Composante
Faculté des sciences

## En bref

- Langue(s) d'enseignement: Anglais
- Méthodes d'enseignement: A distance
- Ouvert aux étudiants en échange: Oui

# Présentation

## Description

OVERVİEW OF THE THREE LESSONS
1. Plant-Microbe Symbioses
The “Plant-Microbe Symbiosis” course invites you to discover the mutualistic interactions between plants and certain microorganisms, particularly mycorrhizal fungi and nitrogen-fixing bacteria. Sequence 1 lays the theoretical foundations of symbiosis and specifies its different forms. The following sequences explore two main types of symbiosis: mycorrhizae, in particular arbuscular mycorrhiza (AM), which plays a key role in nutrient absorption and the evolution of terrestrial plants; and nitrogen-fixing symbiosis between legumes and *Rhizobium*, which enables the formation of root nodules and the integration of atmospheric nitrogen. These symbioses are discussed in terms of their molecular mechanisms, development, immune regulation, and applications in sustainable agriculture.
2. Chronic loss of apple scab immunity
The course “Chronic Loss of Apple Scab İmmunity” addresses the evolution of varietal resistance in apple trees to scab, a fungal disease caused by *Venturia inaequalis*. Using an evolutionary ecology framework, the course explores how the introduction of the Rvi6 resistance gene from *Malus floribunda* has changed the structure of pathogen populations.

Through an in-depth case study in Europe, the various sequences analyse the origin of virulence, the identification of the AvrRvi6 gene, and the role of wild reservoirs in the loss of immunity. Genetic tools (GWAS, crossing, heterologous expression) are used to trace the emergence of virulent strains and assess the consequences of their hybridization with local populations. The course concludes with implications for breeding programs, sustainable resistance management, and health policies in arboriculture.
3. Parasitic strategies
The “Parasitic Strategies” course invites you to explore the mechanisms used by phytopathogenic bacteria to invade, colonize, and infect host plants. İt draws on a comparative study of two major species, *Xylella fastidiosa* and


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*Xanthomonas* spp., to illustrate the diversity of infectious strategies. The sequences cover their life cycles, transmission routes (vectors, plant material), secretion systems involved in virulence, and molecular interactions with plants. The course also sheds light on the environmental and human factors that promote the emergence of new diseases, as well as epidemiological surveillance tools (typing, modeling, genomics).

Each of these three courses includes a comprehension test to help you assess your knowledge and identify concepts to review before the evaluation.

## Heures d'enseignement

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| CM | Cours magistral | 6h |
| CM | Cours magistral | 4h |
| CM | Cours magistral | 7h |



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