

Syllabus: PLG0035 Plant Protection Biology to meet the UN's Sustainable Development Goals, 7.0 credits

Växtskyddsbiologi

Subject: Biology

Marking scale: Pass / Failed

The requirements for attaining different grades are described in the course assessment criteria, under examination below. Current information on assessment criteria shall be made available at the start of the course.

Prerequisites:

PhD students interested in e.g. (agro)ecology, entomology, plant breeding, plant molecular biology, nematology, mycology, plant protection, plant pathology, IPP/IPM, pest/pathogen and plant interactions.

Objective:

The increasing environmental awareness, to some extent induced by the increasing number of reports on global climate change, has and will have a large impact on management of future cropping systems, especially concerning plant protection. The overall objective of this course is to give PhD students from different subject areas (e.g. ecology, entomology, nematology, plant breeding, molecular biology etc.) a deeper understanding of challenges and constraints in relation to modern plant protection in different systems. Different protection strategies will be set in relation to the 17 UN's sustainability goals.

Content

The aim of the course is to bring together PhD students from different backgrounds (biology, agronomy, horticulture, agroecology etc.) working on plant protection related areas and set them in relation to aspects of policy governing their field of study. To account for the expected diversity of student backgrounds and to make sure that they are on a comparable scientific level in the management strategy discussions, some lectures in the beginning will be devoted to introducing the fundamental aspects of the topic. The lecturers will be asked to give a brief basic introduction to the subject area and then to move on and end with the latest results (will also be discussed during the literature seminars).

The following topics will be dealt with during the course: A comparison of the natural system and the cultivated system - why do different organisms become pests? Plant defense, resistance biology and breeding. Pests and pathogens (especially insects, nematodes, fungi, oomycetes) - ecology/population dynamics, life cycle etc. - some typical examples from each group. Crop loss assessment and presentation of different management methods, e.g. biological and chemical control, resistance breeding, molecular tools, disease prediction, chemical ecology/pheromones etc. Development of management strategies based on the different methods that are at hand - examples from different cropping systems - agriculture, horticulture and forestry. How current knowledge in plant protection is translated into policy and regulation of agriculture and forestry. How different protection strategies help

to meet the UN's conflicts sustainable developmental goals (SDGs), but also how both synergies and conflicts can arise between both protection methods as well as different SDGs. Plant protection strategies are crucial for sustainable global development. To accelerate research in this area we need to foster global partnerships, across regions (SDG 17) using agriculture to help achieve SDGs related to Zero Hunger (2), Good Health and Well-being (3), Responsible Consumption and Production (12), Climate Action (13), and Life on Land (15), while simultaneously contributing towards other SDGs such as Gender Equality (5) and No Poverty (1). Specific challenges will be raised in relation to global climate change.

Literature/links:

A course homepage will be set up and literature provided in the form of research articles, reviews and book chapters.

Examination criteria:

1. Attendance during course lectures
2. Oral presentation of own research
3. Active participation during discussions and literature seminars. For each literature seminar, a smaller group of students will be asked to formulate questions based on the lectures and the assigned readings to start off the discussion
4. Oral and written report of the case study presenting a pest/pathogen management strategy for a cultivation system or global pest/pathogen problem. In the project an appropriate management strategy should be proposed, knowledge gaps be identified, an IPM strategy be considered and the growers' social, economic and technological needs be taken into account

Additional information

Pedagogical approach

It is important that the students take active part in their own learning. Therefore they will do a 'case study' that will be presented both orally - where all students should participate actively in the discussions - and as a written report. The work should be done in groups to profit from the different expertise of the PhD students in the discussions and development of management strategies. In addition they will get a chance to practice oral presentation when they present their own research. The literature seminars will give them an opportunity to read recent and relevant literature (papers selected by the lecturers and handed out before the course) and to discuss - in smaller groups - with each other and experienced scientists (the lecturers) within the subject area.

Learning outcome

By studying the biological aspects of plant protection - the natural system vs the cultivated system, plant defence, ecology/biology of the pests and pathogens, pest/pathogen-plant interactions, molecular mechanisms, pest/pathogen management methods and strategies - the students will, in addition to their own specialization, get a broad scientific basis for current and future work in relation to development of environmentally sustainable plant protection methods. They will become familiar with the latest results and trends within plant protection that will allow them to evaluate their own research in a broader perspective. Furthermore, influences and inputs from related fields may create new ideas, inspire to new approaches in ongoing projects. Whether, after finishing their PhD, the students stay in science or

move on to other careers at e.g. private companies or national boards for agriculture or similar institutions, a broad knowledge of plant protection will be valuable.

The course is given 3-13 August 2020

Application and further information: erik.alexandersson@slu.se

Application no later than 1 July 2020

Course organizer: Dept. of Plant Protection Biology, LTV-faculty, SLU.

Minimum of participants to give the course is 12.

Responsible department

Dept. of Plant Protection Biology, LTV-faculty, SLU, and Marie Curie-SI. ITN PROTECTA

Location

Pieve Tesino, Italy