



Department of Plant protection

College of Agriculture

University of Salahaddin

Subject: Biological control

Course Book – year 4

Lecturer's name: Tavga Sulaiman Rashid, PhD

Academic Year: 2023-2024

1. Course name	Biological control of diseases
2. Lecturer in charge	Dr. Tavga Sulaiman Rashid
3. Department/ College	Plant protection department/ Agriculture college
4. Contact	e-mail: tavga2020@yahoo.com , tavga.sulaiman@gmail.com , tavga.rashid@su.edu.krd , Tel: 009647504524781
5. Time (in hours) per week	Theory: 2 Practical: 3
6. Office hours	Availability of the lecturer to the student during the week
7. Course code	
8. Teacher's academic profile	BCs (Bachelor of Science) from Faculty of Agriculture, plant protection department, at Salahaddin University, Erbil, Iraq in July 2004. After obtaining MSc (Master of Science) at the same college in January 2008 in Plant Pathology, cooperated as a lecture in Agriculture college, Salahaddin University for a period of 4 years. Received PhD from Faculty of Agriculture, plant protection department / University Putra Malaysia (UPM) May 2016. Published 24 journal articles in the international journals, 2 patent, research projects, seminar proceeding and workshops. https://www.researchgate.net/profile/Tavga_Rashid5
9. Keywords	Biological control, plant extracts, beneficial microbes and bio-fertilizer
10. Course overview:	Plant diseases need to be controlled to maintain the quality and abundance of food, feed, and fiber produced by growers around the world. Beyond good agronomic and horticultural practices, growers often rely heavily on chemical fertilizers and pesticides. Such inputs to agriculture have contributed significantly to the spectacular improvements in crop productivity and quality over the past 100 years. However, the environmental pollution caused by excessive use and misuse of agrochemicals, as well as fear-mongering by some opponents of pesticides, has led to considerable changes in people's attitudes towards the use of pesticides in agriculture. Today, there are strict regulations on chemical pesticide use, and there is political pressure to remove the most hazardous chemicals from the market. Additionally, the spread of plant diseases in natural ecosystems may preclude successful application of chemicals, because of the scale to which such applications might have to be applied.
11. Course objective:	-Understand theory and application of biological control principles. -Introduce students to the biological control agents used to control plant pathogens. -Gain a deeper understanding for the history of biological control -Provide the student with an overview of the field of biological control -Study the interactions of these biological control agents with their target, host plant, and environment.

<p>-Discusses the feasibility of utilization these control agents in a real and practical way. -Explore how biological control fits into integrated pest management and sustainable agriculture systems.</p>	
<p>12. Student's obligation Students are responsible and required to attend every lecture on time and they have to be ready for the daily quizzes and follow the lecture. They are responsible for the explanations and all details that given during the lecture and write down them in their notebook.</p>	
<p>13. Forms of teaching The lecturer will uses data show by preparing PowerPoint presentations in which outlines of each lecture will be shown however the details of the lecture will be narrated by the lecturer herself. In some cases, samples will be shown to students to have a close and real idea on the subject.</p>	
<p>14. Assessment scheme</p>	
<p>15. Student learning outcome: - On successful completion of this module, students should be able to: -Explain the history, theory, practice and science of biological control. -Evaluate scientific studies and concepts related to biological control. -Asses the current and future roles of biological control within context of agricultural and natural ecosystem. -Apply ecological principles of biological control and methods used in biological control of plant pathogens. -Design and implement projects involving biological control agents and methods.</p>	
<p>16. Course Reading List and References: ▪ Key references: Baker, K. F., & Cook, R. J. (1994). <i>Biological control of plant pathogens</i>. WH Freeman and Company.. Cook, R. James, and Kenneth Frank Baker. <i>The nature and practice of biological control of plant pathogens</i>. American Phytopathological Society, 1983. Wilson, M., & Backman, P. A. (1999). Biological control of plant pathogens. <i>Handbook of pest management</i>, 309-335. Madigan, M. T., Martinko, J. M., & Parker, J. (2017). <i>Brock biology of microorganisms</i> (Vol. 13). Pearson. Berg, G., Köberl, M., Rybakova, D., Müller, H., Grosch, R., & Smalla, K. (2017). Plant microbial diversity is suggested as the key to future biocontrol and health trends. <i>FEMS microbiology ecology</i>, 93(5).</p>	
17. The Topics:	Lecturer's name
<p>1. Biological control Botanical Biological control (Plant extracts) Major Groups of Plant Secondary Metabolites Extraction procedures</p> <p>2. Beneficial Microorganisms Mycorrhizae Penicillium species Rhizobium bacteria</p>	<p>Dr. Tavga Sulaiman (2 hrs)</p>

<p>Actinomycetes Pseudomonas species Bacillus species Cyanobacteria species</p> <p>3. The Role of Beneficial Microorganisms in Plant Growth Biofertilizers and Plant Growth Promoting Biocontrol Agents Improvement of Plant Nutrition</p> <p>4. Detection of beneficial microbes Isolation and identification</p> <p>5. Beneficial plant–microbe interactions (Genetic programs for the nodule development, Systemic control over nodulation, Systemic control over nodulation, Plant-specific inducers of nod genes, Genetic control of Nod factors synthesis)</p> <p>6. Epiphytic strategy and Endophytic strategy in plant growth-promoting rhizobacteria</p> <p>7. Drug and Pesticide Discovery (Metabolism and phyto-compounds, TLC, GCMS,LCMS,HPLC)</p>	
<p>18. Practical Topics</p> <p>1. Plant extraction Solvent extraction Soxhlet extraction</p> <p>2. In vitro antibacterial and antifungal activity Disc diffusion test The Minimum inhibitory concentration (MIC) minimum bactericidal concentration (MBC)</p> <p>3. Beneficial Microbe isolation and identification Antagonistic activity</p> <p>4. Epiphytic Beneficial Microbe Isolation and testing</p> <p>5. Endopytic Beneficial Microbe Isolation and testing</p> <p>6. In vivo methods Fruit coating</p>	<p>Dr. Tavga Sulaiman+ Mrs. Brwa Azad (3hrs)</p>

Seed treatments Spraying 7. Beneficial Microbe preservation	
Isolation and identification of endophytic and epiphytic beneficial fungi and bacteria from soil, root, leaf and stem. Test beneficial bacteria against phyto-pathogens.	Dr. Tavga S. Rashid (3hrs)
19. Examinations:	
20. Extra notes: Here the lecturer shall write any note or comment that is not covered in this template and he/she wishes to enrich the course book with his/her valuable remarks.	
21. Peer review پیداچوونہوہی ھاوہل I approve that the course is comprehensive and cover all the aspects of the course. Name: Degree: Specialty: Sign: Date:	