

《生物防治》课程教学大纲

| 课程基本信息 (Course Information) | | | | | |
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| 课程代码 (Course Code) | AB304 | *学时 (Credit Hours) | 32 | *学分 (Credits) | 2 |
| *课程名称 (Course Name) | (中文) 生物防治 | | | | |
| | (英文) Biological control | | | | |
| 课程性质 (Course Type) | 专业选修课 (Major Elective Course) | | | | |
| 授课对象 (Target Audience) | 本科生四年级 (Senior Undergraduates) | | | | |
| 授课语言 (Language of Instruction) | 双语教学 (Chinese and English) | | | | |
| *开课院系 (School) | 农业与生物学院(School of Agriculture and Biology) | | | | |
| 先修课程 (Prerequisite) | 植物保护学 (Plant Protection), 微生物学 (Microbiology), 动物学 (Zoology) | | | | |
| 授课教师 (Instructor) | 陈捷 | 课程网址 (Course Webpage) | | | |
| *课程简介 (Description) | <p>(中文 300-500 字, 含课程性质、主要教学内容、课程教学目标等)</p> <p>生物防治学是研究利用有益生物防控植物有害生物的理论与实践科学, 其核心是如何利用生防微生物和天敌昆虫防治农林作物有害生物的发生与危害, 属于一种环境友好型绿色防控技术。本门课程是资源环境科学专业本科生在完成《植物保护学》课程学习的基础上, 进一步学习和掌握植物病虫害鼠害绿色防控的理论和技术的选修课。主要讲授生物防治学发展历史、发展动态及在现代农业有害生物治理中的地位, 有害生物生物防治的基本概念与原理, 生防微生物、天敌昆虫的种类及与植物和有害生物间的相互关系, 有害生物生物防治的作用机理和应用途径, 其中植物土传病害和害虫的生物防治机制和应用技术是本门课程的学习重点。通过本门课程学习使学生掌握农业有害生物生物防控的基本理论和应有途径, 为今后从事植物有害生物的绿色防控工作奠定理论和技能基础。</p> | | | | |
| *课程简介 (Description) | <p>Biological control or biocontrol is a science on how to use beneficial microbes or natural enemy insect to control plant pest insect and diseases. The core parts of the course are composed of theory and practice with biocontrol microbes and natural enemy to prevent plant disease, pest insect as well as rat in which the crucial technique is a kind of environmental-friendly plant pest control measure. The course is selective course provided to undergraduate student majoring in resources and environment science. The course mainly introduces the history of biocontrol science, development and its role in the IPM of modern agriculture, and also further details concepts and principle of biocontrol of plant pest, the interaction between biocontrol microbes, natural enemy insect and plants, as well as the biocontrol mechanism and application</p> | | | | |

against plant pests. To well learn the course, the basic knowledge on plant protection science should be taken ahead. The key points to learn the course are for understanding biocontrol mechanism of soilborne diseases and pest insect and its application approaches, so as to offer students with major biocontrol theories and techniques, and to lay a foundation for to practice the green control of plant pests in future.

课程教学大纲 (Course Syllabus)

***学习目标(Learning Objectives)**

1. 掌握生物防治的基本概念、原理，科学认识生物防治的生态学本质，拓展《植物保护学》的课程内容 (A1, A5, B3)。
Grasp basic concepts, theories of biocontrol science, understand ecological essential characteristics of biocontrol science, and also expand students what they have learnt in the course 《Plant Protection》.
2. 了解目前主要生物防治微生物和天敌昆虫的种类和作用，使学生了解如何利用物防治因子控制有害生物 (B2, B3, B9)。
Know major species of biocontrol microbes and enemy insects and how to use them to control plant pest insect and diseases.
3. 掌握生物防治病虫草鼠害的生态学和分子机理，了解生物防治的理论研究和应用技术发展新动态 (B3, B4, B10)。
Grasp the knowledge on ecological and molecular mechanisms of biocontrol against plant diseases and pests. Know the latest advances in the research and development of biocontrol science and technology.
4. 树立马克思主义系统自然观，提高学生综合分析和解决实际问题的能力 (B3, C3, C4, C5, C7, D1)。
Establish Marxist systematic view of nature, and improve students' abilities in comprehensive analysis and problem solving.

| | 教学内容 (Content) | 学时 (Credit hours) | 教学方式 (Teaching method) | 作业及要求 (Assignment) | 基本要求 (Requirements) | 考查方式 (Examination mode) |
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| <p>*教学内容 进度安排及要求 (Class Schedule&Requirements)</p> | <p>第一章 绪论 第一节 植物有害生物与防治 第二节 生物防治的概念 第三节 生物防治历史 第四节 生物防治相关学科 第五节 讨论 Chapter 1 Introduction Section 1 Plant pests and its control Section 2 Concepts of biocontrol Section 3 History of biocontrol Section 4</p> | 4 | 多媒体授课与讨论 Multi-media teaching and Discussion | 课外作业一次，1-2题；百分制评价 Homework required at end of the chapter;1-2 questions for homework and evaluated by hundred-mark system | 掌握生物防治技术的基本概念；掌握生物防治发展动态和应用途径 Understand the basic concepts of biocontrol and its application and latest development | 作业 Assignment |

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| | Relevant disciplines of biocontrol Section 5 Discussion | | | | | |
| | 第二章 生物防治的基本原理 第一节 植物生态系与微生物环境 第二节 微生物的相互作用 第三节 生物防治机理 Chapter 2 Basic theories of biocontrol Section 1 Plant ecosystem and microbial environment Section 2 Interaction of microbes Section 3 Biocontrol mechanism Section 4 Discussion | 4 | 多媒体授课与讨论 Multi-media teaching and Discussion | 课外作业一次，2-3题；百分制评价 Homework required at end of the chapter;1-2 questions for homework and evaluated by hundred-mark system | 掌握生物防治病害机理；了解生物防治微生物-植物互作的特异性；了解昆虫病原真菌的致病机理；4.掌握生防微生物诱导抗性的原理 Grasp biocontrol mechanisms; understand biocontrol specificity on microbe-plant interaction; Understand pathogenic mechanisms of fungus pathogens; Grasp inducible resistance mechanism of biocontrol microbes | 作业 Assignment |
| | 第三章 土传病害生物防治 第一节 真菌病害生物防治 第二节 细菌病害生物防治 第三节 线虫病害生物防治 第四节 影响生防效果的因素与解决途径 第五节 疫病土壤的概念与原理 第六节 讨论 Chapter 3 Biocontrol of soil-borne diseases Section 1 Biocontrol of fungal disease Section 2 Biocontrol of bacterial disease Section 3 Biocontrol of nematode disease Section 4 Factors affecting biocontrol efficacy and | 6 | 多媒体授课与讨论 Multi-media teaching and Discussion | 课外作业一次，3-4题；百分制评价 Homework required at end of the chapter;1-2 questions for homework and evaluated by hundred-mark system | 掌握植物真菌病害生物防治技术与细菌病害生物防治技术；认识利用非致病微生物防治病害的优缺点；掌握拮抗木霉菌生物防治的主要分子机理 Grasp biocontrol techniques of plant fungal and bacterial diseases; Understand advantages and disadvantages of biocontrol using non-pathogenic microbes; Grasp primary molecular mechanism of antagonistic Trichoderma against plant diseases | 作业 Assignment |

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| | <p>resolution approaches</p> <p>Section 5 Concepts and principles of disease-Suppressive soil</p> <p>Section 6 Discussion</p> | | | | | |
| | <p>第四章 叶部病害与产后病害生物防治</p> <p>第一节 叶部病害生物防治</p> <p>第二节 产后病害生物防治</p> <p>第三节 讨论</p> <p>Chapter 4 Foliar disease and post-harvest disease biocontrol</p> <p>Section 1 Foliar disease biocontrol</p> <p>Section 2 Post-harvest disease biocontrol</p> <p>Section 3 Discussion</p> | 2 | 多媒体授课与讨论 Multi-media teaching and Discussion | 课外作业一次, 1-2 题; 百分制评价 Homework required at end of the chapter;1-2 questions for homework and evaluated by hundred-mark system | 掌握.叶部病害生物防治技术 ; 掌握.产后病害生物防治的技术 Grasp foliar disease biocontrol techniques; Grasp post-harvest disease biocontrol techniques. | 作业 Assignment |
| | <p>第五章 植物害虫的天敌</p> <p>第一节 寄生性天敌</p> <p>第二节 捕食性天敌</p> <p>第三节 讨论</p> <p>Chapter 5 Natural enemy of plant insect pests</p> <p>Section 1 Parasitic enemy</p> <p>Section 2 Predatory enemy</p> <p>Section 3 Discussion</p> | 6 | 多媒体授课与讨论 Multi-media teaching and Discussion | 课外作业一次, 1-2 题; 百分制评价 Homework required at end of the chapter;1-2 questions for homework and evaluated by hundred-mark system | 掌握.寄生性天敌防虫机理; 掌握.天敌人工繁殖和释放技 样。 Grasp insect protection mechanism of parasitic enemy; Grasp artificial propagation and releasing enemy techniques | 期中测 检; 作业 Mid-term examination and Assignment |
| | <p>第六章 昆虫病原生物</p> <p>第一节 害虫流行病的影响因子</p> <p>第二节 昆虫病原细菌</p> <p>第三节 昆虫病原真菌</p> <p>第四节 昆虫病毒</p> <p>第五节 昆虫病原线虫</p> <p>第六节 讨论</p> | 6 | 多媒体授课与讨论 Multi-media teaching and Discussion | 课外作业一次, 2-3 题; 百分制评价 Homework required at end of the chapter;2-3 questions for homework and evaluated by hundred-mark system | 掌握昆流行病发生条件和机理; 掌握.昆虫病原细菌、真菌、病毒杀虫机理因子; 掌握昆虫病原线虫防虫机理。 Grasp pest epidemic outbreak conditions and mechanism; Grasp insecticidal mechanism of entomopathogenic bacteria, fungus, | 作业 Assignment |

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| | <p>Chapter 6 Entomopathogens</p> <p>Section 1 Impact factor of pest epidemics</p> <p>Section 2 Entomopathogenic bacteria</p> <p>Section 3 Entomopathogenic fungus</p> <p>Section 4 Entomopathogenic virus</p> <p>Section 5 Entomopathogenic nematodes</p> <p>Section 6 Discussion</p> | | | | virus. Acquire insect protection mechanism of entomopathogenic nematodes. | |
| | <p>第七章 杂草和鼠害生物防治</p> <p>第一节 杂草生物防治的天敌和病原微生物种类</p> <p>第二节 生物除草利用途径</p> <p>第三节 鼠害天敌和病原微生物的种类</p> <p>第四节 鼠害生物防治途径</p> <p>Chapter 7 Weed and rodent pest biocontrol</p> <p>Section 1 Enemy of weed biocontrol and pathogen species</p> <p>Section 2 Weed biocontrol methods</p> <p>Section 3 Enemy of rodent pests and pathogenic microbes species</p> <p>Section 4 Rodent pest biocontrol methods</p> | 4 | | <p>课外作业一次，1-2题；百分制评价</p> <p>Homework required at end of the chapter;1-2 questions for homework and evaluated by hundred-mark system</p> | <p>掌握.杂草生物防治的原理与难点；了解病原微生物防治鼠害的途径。</p> <p>Grasp principles and difficulties of weed biocontrol; Understand biocontrol methods of rodent pest by pathogenic microbes.</p> | <p>作业与期末考试</p> <p>Assignment and Final examination</p> |

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| <p>*考核方式(Grading)</p> | <p>最终成绩由平时作业、期中考试、参与讨论和期末考试成绩组合而成。各部分所占比例如下： 平时成绩包括课外作业(10%)和参与讨论程度(10%)总共占比 20%。主要考核学生平时对知识点的掌握程度、分析解决问题； 期中考试成绩占 20%； 期末考试成绩占 60%。主要考核对生物防治基本原理和关键技术的掌握程度。</p> <p>Final course scores are co-calculated based on the average scores of homework, performance in discussion and mid-term examination and final term examination. The percentages of the three parts in final scores are as follows: Homework scores account for 10%, mid-term examination scores for 20% and performance in discussion for 10%, final term written exam for 60%.</p> |
| <p>*教材或参考资料 (Textbooks & Other Materials)</p> | <p>教材： 《植物病虫害生物防治学》，吴云锋主编，第一主编不是交大教师，中国农业出版社，2016年7月，第二版，ISBN:978-7-109-21815-4, 该教材使用2届，中文教材，全国高等农林院校“十二五”规划教材。</p> <p>参考资料：</p> <ol style="list-style-type: none"> 1. 《微生物生态学》，杨家新主编，化学工业出版社，2004年8月 2. P.Narayanasamy. Biological Management of Disease of Crops. Vol 1. Characteristics of Biological Control Agent. Springer, 2013 3. M. J. Bailey, A.K. Lilley et al. Microbial Ecology of Aerial Plant Surfaces, Atheneum Press, 2006 |
| <p>其它 (More)</p> | |
| <p>备注 (Notes)</p> | |

备注说明：

1. 带*内容为必填项。
2. 课程简介字数为 300-500 字；课程大纲以表述清楚教学安排为宜，字数不限。