科目ナンバリング	U-LAS14 20067 LE68						
授業科目名<英訳>	Plant Biotechnology-E2 Plant Biotechnology-E2			担当者所属職名・氏名	農学研究科　准教授 YASIR SERAG ALNOR MOHAMMED SERAG ALNOR		
群	自然科学科目群			分野(分類)	生物学(各論)	使用言語	英語
旧群	B群	単位数	2単位	週コマ数	1コマ	授業形態	講義（対面授業科目）
開講年度・開講期	2026・後期	曜時限	水3	配当学年	主として1・2回生	対象学生	理系向

[授業の概要・目的]

Purpose
The course will deal with the basic principles and selected applications of biotechnology for plants/ agricultural crops, emphasizing the need for a different type of agricultural, in order to support the increasing needs for food (quantity and quality) facing climatic changes as well as increased abiotic and biotic stress conditions. The basic aspects of the major biotechnological tools and solutions will also be discussed.

[到達目標]

1. Gain a deeper understanding of major basic biotechnologies related to agricultural production.
2. Explain the major practical biotechnologies aimed at solving agriculture and food production problems.
3. Evaluate the achieved progress, the possible risks and future needs of agricultural biotechnologies.
4. Be familiar with the ecological, sociological and ethical issues associated with genetically-modified (GM) plants and their products.

[授業計画と内容]

The following topics will be covered during the 14 weeks of the semester. Week 15 is an exam session and feedback class is given at week 16.

Main topics
1. Background to general biotechnology: introductory remarks and limitations of traditional agriculture in meeting land, environmental and economic constraints.
2. Overview on the basic procedures in plant biotechnology.
3. Micropropagation and in vitro production of pathogen-free plants.
4. Germplasm storage, conservation of plant genetic resources.
5. Introduction to asexual (somatic) cell genetics: protoplasts, haploids and selection.
6. Introduction to plant transformation and transgenic crop plants: achievements, expectations and public perception.
7. Molecular breeding for plant abiotic stress tolerance (drought, heat, salinity etc.).
8. Molecular breeding for plant pest control (viruses, insects, herbicides).
9. Biotechnology of crop yield and quality traits: improved functional protein content, flowering, ripening, color, scent, plant architecture etc.
10. Genetic engineering for biomaterials: industrial products, pharmaceuticals, bioenergy. Plants as bioreactors.
11. Commercial, legal, sociological, and public aspects of agricultural plant biotechnologies.
12. Intellectual Property Rights in Biotechnology. Plant breeder's rights, farmer's rights, plant variety protection, convention of biodiversity and patenting.

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Plant Biotechnology-E2(2)

[履修要件]

English proficiency sufficient for understanding lectures, reading articles and texts, and participating in class discussions. A knowledge of high school biology and chemistry is also required.

[成績評価の方法・観点]

Grading: Class attendance and active participation (20%), assignments and quizzes (30%), and final exam or coursework (50%)

[教科書]

未定
Introduced during class

[参考書等]

（参考書）
Handouts and supplemental readings will be distributed electronically and/or as a hard copy in class

[授業外学修（予習・復習）等]

Students should read or listen to the required pre-class materials and submit any required assignment before the class, and come to class ready to participate in class activities.

[その他（オフィスアワー等）]

No fixed office hours. Students are requested to make appointments directly or by email.

[主要授業科目（学部・学科名）]