

## Plant Breeding (IIIrd Year , VI-th SEMESTER)

Credit value (ECTS) 4

### Course category

Speciality (Compulsory course)

### Course holder:

Lecturer PhD. Violeta SIMIONIUC

### Discipline objectives (course and practical works)

The aim of the course is to help the students to acquire knowledges regarding the plant breeding objectives, sources of germplasm and methods which can be used.

Practical works seek to familiarize students with laboratory technical work with the ways to analyse the germplasm sources and with special techniques in laboratory or in the field.

### Contents (syllabus)

Course (chapters/subchapters)
1. INTRODUCTION
2. THE ORGANISATION OF PLANT BREEDING PROCESS
3. GERMPLASM VARIABILITY
4. PLANT BREEDING OBJECTIVES
4.1. Definition, classification, factors involved in choosing of plant breeding objectives
4.1.1 Yield improvement
4.1.2. Quality improvement
4.1.3. Biotic stress tolerance improvement
4.1.4. Obtaining cultivars with different precocity
4.1.5. Lodging improvement
4.1.6. Winter hardness improvement
4.1.7. Drought tolerance improvement
4.1.8. Cultivars for intensive technologies
5. GERMPLASM USED IN PLANT BREEDING
5.1. Importance, classification, characterization
5.2. Origin and genetic centers
5.3. The collection, classification, study and preservation of the germplasm
6. CONVENTIONAL METHODS IN PLANT BREEDING
6.1. The importance of choosing the method
6.2. Classification and characterisation of conventional methods in plant breeding
6.2.1. Selection
6.2.2. Hybridisation
6.2.3. Inbreeding
6.2.4. Mutagenesis
6.2.5. Polyploidy
7. MODERN METHODS IN PLANT BREEDING
7.1. Importance
7.2. "In vitro" cultures
7.2.1. Micro propagation
7.2.2. Embryo and ovules culture
7.2.3. Anthers and ovary cultures
7.2.4. Somaclonal variations
7.2.5. Protoplasts cultures and somatic hybridisation
7.3. Genetic transformation
7.3.1. Importance methods used for gene transfer and for confirmation of the transgenesis
7.3.2. Application in plant breeding

7.4. Molecular markers in plant breeding
7.4.1. Importance and type of molecular markers
7.4.2. Molecular markers methods
7.4.3 Marker Assisted Selection
7.4.4. Uses of molecular markers in plant breeding
<b>Practical works</b>
The organisation of plant breeding activities in Romania
Plant breeding fields
Variability of the characters at plants
Heritability of the characters at self pollinated plants
Heterosis at cross pollinated hybrids
Obtaining and selection of the inbreed lines
Choosing and analysing of the elite plants at wheat
Choosing and analysing of the elite plants at maize
Choosing and analysing of the elite plants at sun flower
Artificial pollination
Germplasm preserving
"In vitro" culture laboratory
New plant breeding methods
Test

### Bibliography

- Crețu A., Simioniuc D., Crețu L., 2000 – *Plants breeding, seed and seedling production*. Ed. "Ion Ionescu de la Brad" Iasi.
- Crețu A., 1995 – *Plant breeding, seed production and multiplication*. Practical works, Internal use, U.A.M.V. Iasi.
- Leonte C., Simioniuc Violeta, 2018 – *Methods and techniques used in agronomic research*, Ed. Ion Ionescu de la Brad, Iasi.
- Gabur I., Simioniuc D.P., 2020 – *Metode si tehnici utilizate in cercetarea agronomica*, Ed. Ion Ionescu de la Brad, Iasi.

### Evaluation

Evaluation form	Evaluation Methods	Percentage of the final grade
Exam	Writing and oral examination	60%
Appreciation of the activity during the semester	Oral assessment during the semester, verification tests	40%

### Contact

#### Lecturer PhD. Violeta SIMIONIUC

Faculty of Agriculture - ULS Iasi  
 Aleea Mihail Sadoveanu nr. 3, Iași, 700490, Romania  
 Phone: 0040 232 407536, fax: 0040 232 219175  
 E-mail: [vsimion@uaiasi.ro](mailto:vsimion@uaiasi.ro)