UCLouvain

lbrai2220a

2026

Quantitative genetics, crop improvement and biotechnology

3.00 credits	20.0 h + 7.5 h	Q2

Teacher(s)	Baret Philippe ;Draye Xavier ;
Language :	French > English-friendly
Place of the course	Louvain-la-Neuve
Learning outcomes	
Evaluation methods	The assessment method will be communicated at the beginning of the term.
Teaching methods	Lectures, computer exercises, field trips
Content	Population genetics · Gene and genotype frequencies, Hardy-Weinberg principle · Factors of variation (selection, migration, mutation, drift) · Diagnostics (population structure, inbreeding) · Quantitative genetics Values · Decomposition of genotypic variance and heritabilities · Selection and heterosis · GWAS and genomic selection Biotechnologies and plant genome manipulation · Cloning, haplo-diploidization, interspecific crosses, protoplast fusion, and transgenesis · Plant breeding Reproduction modes, constraints, and opportunities of plant reproduction systems · Genetic diversity management · Description and critical analysis of different breeding strategies (crossbreeding and phenotypic selection schemes applied to self-pollinating, cross-pollinating, and vegetatively propagated plants; exploitation of heterosis) · Critical assessment of the potential contributions of each breeding strategy in relation to selection objectives and the determinism of the trait under study · Consequences in terms of conservation and exploitation of genetic diversity, improvement of qualitative and quantitative traits, diversification of production. Integration of different strategies into current breeding. · Climate change and sustainable agriculture: selection for organic farming, adaptation to environmental stresses (salinity, water resources, toxicities, pests and diseases, etc.), preservation of biodiversity,
Inline resources	The resources are posted on Moodle.
Bibliography	Références citées dans les montages powerpoint fournis
Faculty or entity in charge	AGRO

Programmes containing this learning unit (UE)

Program title	Acronym	Credits	Prerequisite	Learning outcomes
Master [120] in Statistics: Biostatistics	BSTA2M	3		🔍
Master [120] in Agricultural Bioengineering	BIRA2M	3		🔍