UCL Université catholique de Louvain

LBRES2106C
2012-2013

Gestion intégrée du système sol-plante : Fertilisation

2.0 credits	15.0 h	2q

Teacher(s) :	
Language :	Français
Place of the course	Louvain-la-Neuve
Main themes :	The course is comprised of three modules: Module A: Soil-plant interactions A1 Properties, functioning and evolution of the cultivated soil in time and space: what makes the soil fertility? A2 Dynamics of root exploration A3 Rhizosphere processes Module B: Biosoil processes and cycles B1 Nutrient cycling in the soil-plant system B2 Role of underground communities in nutrient cycling. Ecological requirements, functions of soil microbes in the soil chemistry B3 Soil degradation and alteration of biological properties Module C: Fertilisation C1 Estimation of nutrient demand C2 Usage of mineral and organic fertilizers, forecasting methods C3 Recent technological development
Aims :	The course aims at integrating soil-plant interactions at the field scale to support a better management of cultivation systems and of their impacts on the soil, the plant and the underground microbial communities. Knowledge - The student will gain a dynamic perception of soil-plant interactions in the perspective of the functioning of the cultivated soil (macroscopic and rhizosphere scales) and of the strategies of the plant to explore the soil (including the plant responses to the soil environment and the effect of the cultivation system on the soil). Know-how - The student will be able to use this knowledge to develop an environment-friendly and rationale management of cultivation systems, which involves the adoption of ad hoc technical solutions and the monitoring of the cultivation system. *The contribution of this Teaching Unit to the development and command of the skills and learning outcomes of the programme(s) can be accessed at the end of this sheet, in the section entitled "Programmes/courses offering this Teaching Unit".*
Content :	The themes discussed in this course are : Module A: Soil-plant interactions A1 Properties, heterogeneity, functioning and evolution of cultivated soils. Factors influencing soil fertility and indicators of soil fertility. Assessment of soil nutrients and organic matter. Bio-availability. A2 Soil exploration by roots: growth and development of the root system of major crop species, impact of transient or local soil conditions on root distribution. Root architecture modelling. A3 Rhizosphere processes: soil-plant interactions at the rhizospere scale (uptake, acquisition strategies, exsudation) in a dynamic perspective. Module B : Processes and biogeochemical cycles. B1: Nutrient cycling in the plant-soil system: study of cycles at the field and profile scale. Loss estimations; perception through anlytical data. B2 : Impact of soil living organisms (fauna and flora) on major nutrients cycling, ecological demands/significance and biogeochemical function of living organisms : biocenoses study with particular emphasis lay upon rhizosphere; symbioses (Rhizobium, mycorrhizae, ...) B3 : Soils Degradation and "impoverishment ou fertily loss": genesis (ou evolution) of soils under intensive farming practices, degradation of soils biological functions , notions of soil resistance against roots deseases (je ne connais pas l'expression suppresive soil) suppressive soils versus root pathogens (pedo- climatic and cultivation/ cultural factors: cases studies). Module C: Fertilisation C1 Estimation of needs in nutrients: methods of diagnosis and measurement (field trials, plant tissue and soil analysis, deficiency symptoms, indicator plants; methods of analysis) C2 Mineral and organic fertilisers; description of the different fertilisers available and use in crop management taking into account soil and climate, fertiliser recommendation (case studies) C3 New trends in fertilisation, organic agriculture, intensive agriculture, and environmental issues (case studies)
Other infos :	Prerequistes Soil sciences (mandatory), applied soil sciences (recommended) Fertilisation : plant production, plant physiology
Cycle and year of study :	> Master [60] in Biology

Faculty or entity in charge:	AGRO