PPHYS-121 Fundamentals of Crop Physiology 2(1+1)

Theory

Introduction to crop physiology and its importance in Agriculture; Plant cell: an Overview; Diffusion and osmosis; Absorption of water, transpiration and Stomatal Physiology; Mineral nutrition of Plants: Functions and deficiency symptoms of nutrients, nutrient uptake mechanisms; Photosynthesis: Light and Dark reactions, C3, C4 and CAM plants; Respiration: Glycolysis, TCA cycle and electron transport chain; Fat Metabolism: Fatty acid synthesis and Breakdown; Plant growth regulators: Physiological roles and agricultural uses, Physiological aspects of growth and development of major crops: Growth analysis, Role of Physiological growth parameters in crop productivity.

Practical

Study of plant cells, structure and distribution of stomata, imbibitions, osmosis, plasmolysis, measurement of root pressure, rate of transpiration, Separation of photosynthetic pigments through paper chromatography, Rate of transpiration, photosynthesis, respiration, tissue test for mineral nutrients, estimation of relative water content, Measurement of photosynthetic CO2 assimilation by Infra Red Gas Analyser (IRGA).

Lecture Schedule:Theory

S. N.	Topic	No. of lectures
1	Introduction: Definition of crop physiology and its importance in Agriculture and Horticultural crops	1
2	Plant cell: an overview discussion and structure and functions of cell organalles	1
3	Diffusion and Osmosis: Definition, differences and its importance in plant physiology	1
4	Plant water relationship: concept, Importance of water, water absorption mechanism,	2
5	Transpiration: definition and significance of transpiration in relation to crop productivity; Stomatal physiology: structure, frequency, distribution and stomatal opening and closing mechanism	2

6	Mineral Nutrition: Criteria of essentiality, beneficial nutrients, Functions and deficiency symptoms of nutrients, mineral salt absorption mechanism	2
7	Photosynthesis: Light and dark reaction, C3, C4 and CAM plants and photorespiration	2
8	Respiration: Glycolysis, TCA cycle and ETS	1
9	Fat Metabolism: fatty acid synthesis and its breakdown	1
10	Plant growth regulators: Definition, classification and role of PGR's in agricultural crops	1
11	Physiological aspects of growth and development of major crops	1
12	Growth analysis: definitions and mathematical formulae, role of growth parameters in crop productivity	1

Lecture Schedule:Practical

S. N.	Topic	No. of lectures
1	Plant cell: An overview study, Structure and functions of major plant cell organelles	2
2	Structure and distribution of stomata	2
3	Demonstration of imbibitions, osmosis and plasmolysis	2
4	Measurement of root pressure	1
5	Measurement of transpiration by different methods	1
6	Separation of photosynthetic pigments through paper chromatography	2
7	Measurement of respiration by using Ganong's respirometer.	1
8	Tissue tests for mineral nutrients	2
9	Estimation of relative water content (RWC)	1
10	Measurement of photosynthetic CO_2 assimilation by Infra Red Gas Analyser (IRGA)	2