



Dipartimento di Scienze e Tecnologie

ACCADEMIC YEAR 2017/2018

STUDY COURSE Biology
TEACHING Plant Physiology
Prof. Rocco Mariapina

The Plant Cell

The cell wall: structure, modification and growth.

Water and solids transport: water absorption and movement. The water potential. Xylematic transport. Transpiration. Stomach: structure, opening and closing mechanism. Nutrients and their distribution. Ion absorption. Active and passive transport through plasmalemma and tonoplast. Moving nutrients. Floating transport.

Photosynthesis: photosynthetic structure, light absorption, electronic transport mechanisms. Photosynthesis of carbon. Energy efficiency of photosynthesis. Photorespiration. Ecophysiology of Carbon Assimilation, C4 Plants and CAM Plants. Starch and sucrose biosynthesis.

Nitrogen metabolism: nitrogen-fixing organisms. Inorganic nitrogen forms that can be used by the plant cell. Organizing the nitrogen. Nitrogen compounds biosynthesis.

Growth development and regulation: the hormonal system of plants. Structure, biosynthesis, physiological effects and mechanism of action of auxine, gibberelline, cytokinin, abscissic acid and ethylene.

Environmental control factors of growth

Photomorphogenesis. The phytochromes: discovery, photochemical and biochemical properties, tissue and cell localization. Physiological effects of light mediated by phytochrome and its action mechanism. Photoperiodism and circadian rhythms. Control of flowering. Responses to blue /UV Light Phototropism.

Plant defense mechanisms: secondary plant metabolism products;

Pathogenic organisms; Plant Resistance Mechanisms: gene resistance for gene; The hypersensitive response; Systemically acquired resistance Resistance induction by gene transformation (GMO plants)

Abiotic Stress: Plant defense mechanisms at abiotic stress

Suggested texts:

Taiz L. e Zeiger E. "Fisiologia Vegetale" Piccin, Padova. -quarta edizione-

Alpi A., Pupillo P., Rigano C., "Fisiologia delle Piante" Società Editrice Scientifica, Napoli.

Maffei M. "Biochimica Vegetale" Piccin, Padova.

Buchanan, Gruissem, Jones " Biochemistry and Molecular Biology of Plants" American Society of Plant Physiology "