

Note: This paper should be typed in “Times New Roman” of 12pt.

Presentation Title(Should be no more than 20 words):

Development of plant resistance to abiotic stresses

Alejandro Mentaberry, Ph.D.

Abstract :

Demographic and economic projections indicate that world food production must be increased between two and three times in the next 25 years, thus imposing an extraordinary burden on agricultural activities. Persistent soil degradation, shortages of irrigation water, and climate instability added new uncertainties to this challenge. The development of intensive agriculture is the main cause of soil degradation and depletion of water in developed and developing countries. According to recent estimates, nearly a quarter of world's arable land is affected by desertification, threatening the food security of about 900 million people. In Argentina, soil erosion processes affect about 60 million hectares and influence the life conditions of 9.5 million people. In addition, prolonged periods of drought caused yield losses of 20-30% in major agricultural crops during the period 2008-2009.

Along with improved management of soil and water resources, biotechnological applications can make a significant contribution to mitigate the effect of drought and soil salinity. Tolerance can be conferred either by traditional breeding assisted by molecular markers or by genetic engineering techniques. Since tolerance to environmental stresses depends on the concerted activity of many genes and encompasses a complex set of metabolic activities, a plausible strategy to achieve this purpose is the expression (constitutive or inducible) of genes encoding transcription factors or signalling molecules involved in natural plant responses to these constraints.

Several research groups from Argentina, located in both the public and private sector, are developing activities related to this issue. Research on mechanisms of stress responses, transformation with different genetic constructions, and field tests under controlled conditions are being carried out to introduce drought tolerance in soybeans, wheat and alfalfa. The transgenes used to this end included sequences coding for transcription factors that control drought tolerance responses and enzymes involved in phytohormone biosynthesis. In addition, research to introduce salt tolerance in pastures (*Paspalum dilatatum*) and forages (alfalfa) is carried out by transformation with transgenes controlling ion homeostasis. An overview of the experimental work being carried out by research groups from Argentina and on the projects to be initiated in this field will be presented.