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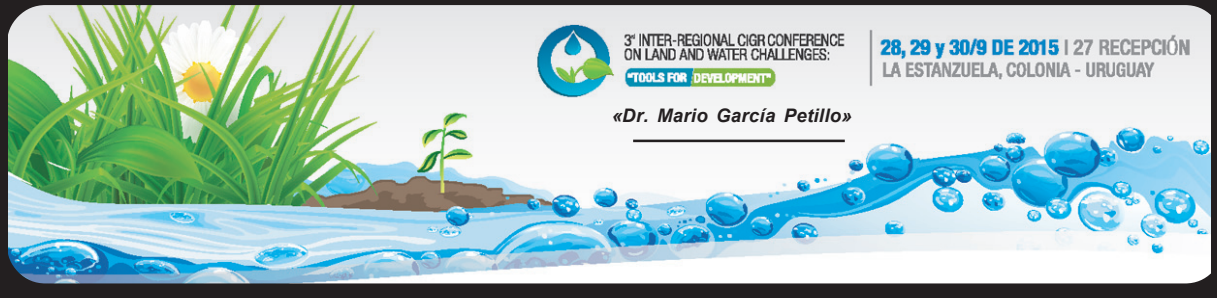

3rd Inter-Regional CIGR Conference on Land and Water Challenges: Tools for developing *«Dr. Mario García Petillo»*

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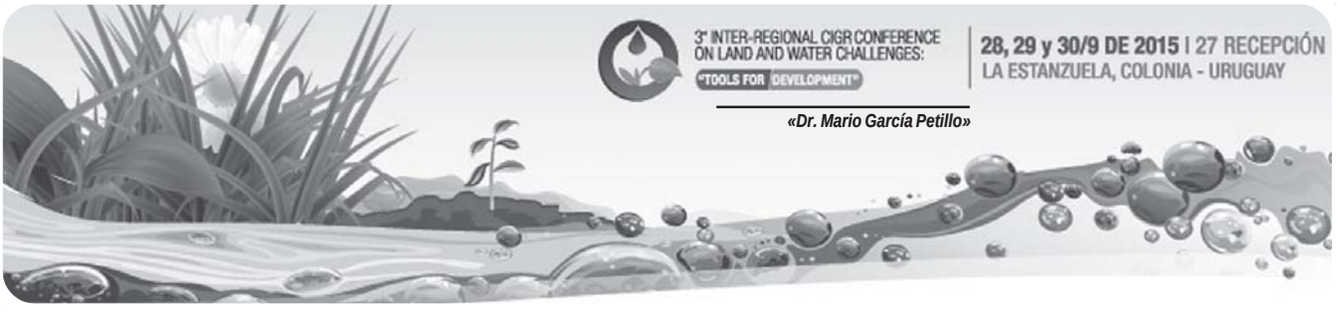

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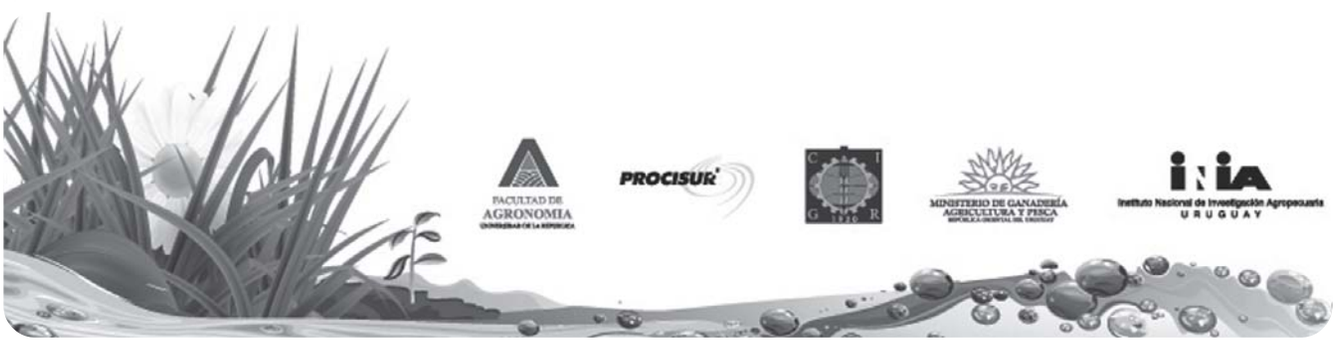
SETIEMBRE 2015



Soybean Yield Potential Under Contrasting Maturity Groups, Plant Population and Soil Water Regimes in Eastern Uruguay

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Abstract

Soybean is the main crop in Uruguayan agricultural systems. Integrated crop management practices are critical to increase productivity while reducing climatic vulnerability in soils with restricted water holding capacity. The objective was to evaluate the impact of contrasting crop management practices and water regimes on crop yield potential. We conducted a three year (2012-2013, 2013-2014 and 2014-2015) field scale study on an Abruptic Argiaquoll at INIA Treinta y Tres, Uruguay. In each season, two experiments were set under contrasting water regimes: rainfed (RF) and supplementary irrigation (SI). Each experiment evaluated 4 Maturity Groups (MG): 5.0, 5.5, 6.1 and 6.8; and 4 Plant Populations (PP): 15, 25, 35 and 45 plants m^{-2}. A RCB split plot design was used and analyzed using mixed models. The greatest productivity was obtained in 2012-2013 (4030 kg ha^{-1}), 22% higher than the average of other seasons. No water regime effect on yield was observed in the first two seasons. In 2012-2013, no yield differences were observed between MG. However, 15 plants m^{-2} had 4.4% lower yield than other PP (4067 kg ha^{-1}). In 2013-2014 no productivity differences were observed between PP, but MG 5.5 had 11 % higher yield than other MG (3271 kg ha^{-1}). In 2014-2015, SI yield (3760 kg ha^{-1}) was 1020 kg ha^{-1} higher than RF. SI received 105 mm of supplementary irrigation. In RF, 5.0 MG had a trend of higher yield (16%) compared to other MG (2608 kg ha^{-1}) and 45 plants m^{-2} decreased yield by 6% compared to other PP (2754 kg ha^{-1}). In SI, the greatest yield was obtained with MG 5.0 (3941 kg ha^{-1}). The aggregate of data suggests that yield potential without water restrictions was 4000 kg ha^{-1} for most MG, with higher yields in high PP. However, under water limiting conditions in reproductive stages, high populations decreased yield. Water productivity reached 10 kg grain mm^{-1} applied, reflecting the positive impact of supplementary irrigation.

Keywords: yield potential, supplementary irrigation, water productivity