The Crop Nutrition Network in the CREA Region of Southern Santa Fe

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The Regional Consortium of Agricultural Experimentation (CREA), a farmer organization based in Southern Santa Fe, has collaborated with IPNI to establish a network of field experiments with the objectives of: 1) determining direct and residual responses to N, P, S, and where indicated, to K, Mg, B, Cu, and Zn; 2) evaluating recommendation methods for N, P, and S fertilization; and 3) identifying the level of deficiency and potential response to nutrients other than N, P, and S. In 2007/08, three sites within a corn-wheat/soybean (C-W/S) rotation were planted to wheat/soybean, and four sites within a corn-soybean-wheat/soybean (C-S-W/S) rotation were planted to full season soybean.

After 7 years of experimentation, grain yields in the continuous check treatment showed the effect of depleted soil N, P, and S reserves, reaching only 36%, 56%, and 82% of the yield obtained in the continuous NPS treatment for wheat, double-cropped soybean, and full season soybean, respectively.

For wheat, average responses to N, P, and S were 2,100, 1,930, and 102 kg/ha, respectively. A significant response to NP was observed at all three sites. Considering the seven seasons and 28 sites under wheat, significant relationships were established between grain yield and soil N supply as predicted by soil nitrate-N at sowing + fertilizer N rate. Use of 130 to 140 kg/ha allowed for high grain yields of 4,000 kg/ha. A critical level of 15 to 20 ppm Bray 1 P has been established below which wheat P responses are highly probable.

For full season soybean, average responses to N, P, and S were 178, 554, and 416 kg/ha, respectively. For double-cropped soybean, average responses to N, P, and S were 517, 1,757, and 595 kg/ha, respectively. Out of the seven sites under soybean, six showed significant yield responses to P and four showed responses to S. Considering the 31 sites under soybean during seven seasons, a critical level of 13 ppm Bray 1 P has been established below which soybean P responses are highly probable. A critical level of 10 ppm sulfate-S has been estimated below which soybean S responses are highly probable.

Sites will be planted to corn in the C-W/S rotation and to wheat/soybean in the C-S-W/S rotation during the 2008/09 season.