Potassium Nitrate As A Supplemental Foliar Fertilizer For Rice Production

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Foliar feeding of rice represents an opportunity for producers to correct nutrient deficiencies during the growing season. In the past we have looked at using foliar solutions of KNO3 to increase grain yields. This evaluation was conducted on a potash deficient soil. It was demonstrated that foliar KNO3 could increase grain yields if the plants were deficient in K. We also found evidence of non yield benefits. These benefits included increased stalk strength, decrease lodging, and greater disease resistance. These benefits may or may not be directly translated into yield. This raised the question "Could foliar KNO3 benefit rice grown on a soil where K was adequate?" In 2010, with support from the Potassium Nitrate Association, we began a study which investigated the effect of foliar applied potassium nitrate on grain yields, stalk breaking strength and lodging in rice production. We looked at soils where potash was limited and adequate for rice production.

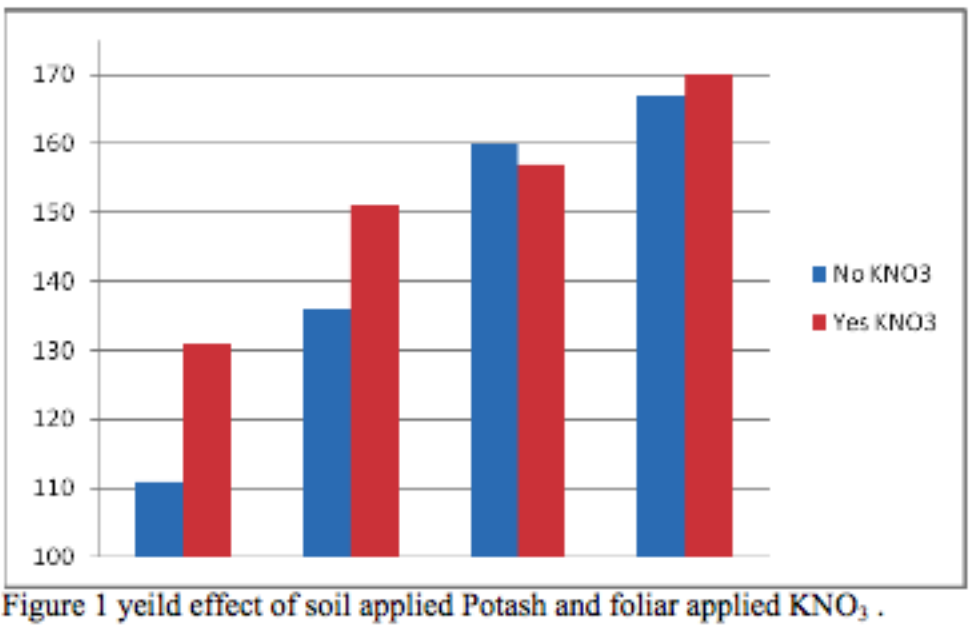

Figure 1 yeild effect of soil applied Potash and foliar applied KNO_3 .

Rice field plots were established in 2010 on a Crowley silt loam soil located at the Missouri Rice Research Farm at Qulin, MO. The initial soil test K levels at this location was 92 lbs K/a. The University of Missouri recommended rates for K was 60 lbs K2O./a. Research plots were established reflecting 0, 50, 75, or 100% of this K rate with pre-plant applications of KCl. Subsequently each plot received either did or did not receive in-season foliar KNO3 applications. Those plots that did were treated three times pre-flood, inter-node elongation, and 10% heading. At each of these times 10 lbs KNO3 /a or 4.6 lb K/a were applied.

The yield results for 2010 from this experiment are presented in Figure 1. The untreated check produced the lowest yields of all treatments. A linear relationship (r2=0.98) was found between rice yields and pre-plant K rates with no foliar additions of KNO3. These two findings indicates that low soil K fertility conditions may have been limiting rice yields. When averaged for both KNO3 added and KNO3 not added there was a stare step increase in yield with each addition of soil applied K. This increase amounts to 1 bushel of rice for each 1.25 lbs of soil applied K. When averaged for all soil applied K rates foliar KNO3 treatments increased rice yields by 9 bu/a. This represents an increase of 1 bushel of rice for 3 lbs of foliar applied K. However it should be noted that the largest yield increases for the foliar KNO3 were found at the lower rates of soil applied K. At the 0 soil K applied there was a 20 bu/a increase with foliar applied KNO3, while at the soil test recommended rate of applied K this yield benefit was only 3 bu/a. We are currently evaluating our plant tissue K levels for rice. We are hoping to develop a critical level that will guide producers in making decisions as to when foliar KNO3 will increase yields.

When stalk breaking strength and lodging were compared neither were not consistently effected by soil K applications (Table 1). Foliar applied KNO3 however, increased stalk strength and decreased lodging. These effects may not directly affect yields. They may however, be of economic, and harvest efficiency benefit to rice producers.

We are not ready to recommend foliar KNO3 be applied to non K deficient rice. However, if K deficiency is present in rice KNO3 would be a good choice for correcting this problem. Δ

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