K-Mag AGRI FACTS

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Use K-Mag For More Profitable Rice Production!

In the past, K-Mag has not been commonly applied to rice. However, new information from various rice producing areas worldwide indicates that K-Mag use on this crop should receive serious consideration here in the United States. K-Mag contains three nutrients that are essential for the growth of rice: potassium (22% K_2O), magnesium (11%Mg), and sulfur (22%S).

Potassium

High-yielding rice cultivars absorb large amounts of K. A crop yielding 7000 lb. of grain will absorb about 170 lb. of K_2O (compared to about 115 lb. of nitrogen). Potassium increases both leaf development and tillering, as well as the size and weight of the grains. K deficiency greatly reduces stem strength, and *lodging* becomes an increasing problem.

Potassium has been shown to have a marked effect on resistance to insects and diseases. Resistance to *leaf spot*, *stem rot* and *bacterial leaf blight* increases with increasing K fertilization rates. Results in Table 1 show that brown planthopper infestation is sharply reduced due to K fertilization.

Table 1. K Fertilization Reduces Brown Planthopper (BPH) Infestation.

K Applied lbs/A	BPH Count[1] Number/Sq. Meter
0	800
33	625
67	580
100	302

[1] 105 days after planting

Magnesium

The rice plant absorbs about as much Mg as it does phosphorus. Application of straight N-P-K fertilizers (that do not contain any Mg) over a period of years, can severely deplete soil Mg levels. Furthermore, on low Mg soils, application of K fertilizers can greatly reduce a plant's ability to absorb Mg. Under these conditions, K-induced Mg deficiencies can cause major problems.

Magnesium is a component of chlorophyll, the green coloring matter of plants. Chlorophyll is essential for the process of photosynthesis, and many experiments have shown that under Mg deficiency conditions, the rate of photosynthesis is severely reduced. As the rate of photosynthesis declines, many essential biochemical reactions are adversely affected. Recent field trials, on a series of soils, showed that on Mg deficient soils, application of Mg fertilizer increased rice yield up to 17% (from 5259 to 6174 lbs/A). Furthermore, it was found that Mg fertilization had a positive effect on crop quality (Table 2). It was observed that responses to Mg most often occurred when exchangeable soil Mg levels were below 26 ppm (52 lbs/A). However, it was also found that the ratio of available soil K to available soil Mg had an effect on the yield response to Mg. When exchangeable K/exchangeable Mg was greater than 1, (ppm basis), responses to Mg were observed at exchangeable soil Mg levels up to 49 ppm (98 lbs/A). This is a prime example of the need to maintain a proper balance of these two nutrients in soil.

Table 2. Mg Improves Quality Of Rice.

Treatment	% Milled Rice	% Crude Protein	% Total Starch
Control, 0 Mg	73.3	10.7	80.6
+Mg[1]	76.4	12.8	85.3

[1] application rate = 17 lbs Mg/acre

Sulfur

Sulfur is a component of several amino acids and is thus essential for the formation of plant proteins. Application of S fertilizers has frequently been found to increase plant protein levels. Sulfur fertilization can also markedly improve the efficiency of nitrogen (N) fertilizers. In field experiments with rice, it has been shown that under S deficiency conditions, N accumulates in the leaf blades, and protein content of the grain is reduced. This indicates that N absorbed

by the plant is not completely used. In addition to these crop quality considerations, the overall yield of rice is markedly decreased under conditions of S deficiency. In the 1980's, the Food and Agriculture Organization of the United Nations conducted over 3300 field experiments with rice to determine the frequency and magnitude of response to plant nutrient S. The average yield increase attributed to S in all these plots was 375 lbs. grain per acre. Clearly, rice is a plant that responds well to S.

K-Mag For Rice

K-Mag is a highly water-soluble, plant available source of K, Mg and S. It is a nonacidifying material and has no effect on soil pH.

In addition, K-Mag is essentially a chloride-free fertilizer, guaranteed to contain less than 1.5% Cl. When soils or irrigation water contain appreciable levels of soluble salts, this low Cl content of K-Mag assumes considerable importance.

Application rates are determined by soil analysis, but typical rates vary from 150-250 lbs/A. K-Mag is typically used to supply the Mg and S requirements — additional K is usually required, and this can be supplied as muriate of potash (60% K_2O).

In summary, there are many reasons for considering the use of K-Mag in rice fertility programs. When applied to soils that are low in Mg or S, according to soil test values, it is an economical source of these two nutrients, as well as a source of non-chloride potash.