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Spudman — November-December 1999

An Extra Dose — Added magnesium means more potatoes, higher quality

Even when soil tests show sufficient magnesium levels, potato growers still may need to make additional applications to satisfy the crop's nutrient requirements, according to a recent study.

Larry Murphy, president of Murphy Agro, says a large-scale study conducted in the Pacific Northwest showed that providing an extra dose of magnesium significantly increased yields and quality premiums. In fact, results revealed that the addition of magnesium in the form of potassium-magnesium sulfate (K-Mag) produced additional profits of more than \$600 per acre.

"This is the first time in 35 years I have seen such a magnitude of data that shows the clear connection between crop quality and nutrition and the overall value of the crop," Murphy says.

Typically, a 600 cwt. an acre crop of potatoes will take up about 540 pounds of potash, 40 pounds of magnesium and 29 pounds of sulfur per acre. In addition, the harvested tubers from this crop will actually remove 264 pounds of potash, 13 pounds of magnesium and 14 pounds of sulfur per acre from the field.

In the nine-year study, more than 100,000 data points were collected on more than 1,000 potato fields. All were center-pivot irrigated potato fields with sand and silt loam soils, largely Russet Burbank. Comparisons of results indicated that magnesium applications of 20 or more pounds per acre as K-Mag increased both yield and quality.

The additional magnesium helped produce a 3.05 tons an acre increase in useable potatoes from 25.29 to 28.34 tons an acre. Overall potato yields increased from 31.43 to 33.20 tons an acre. Assuming a price of \$90 per ton, \$274.50 in additional income per acre resulted. Using McCain's 1998 contract values, quality premiums added \$13 per ton on all useable tons for an increased return of \$368.42 an acre.

While additional magnesium applications to the overall fertility program cost \$38.85 per acre, if calculated as an add-on treatment, the net profit was \$604.07 per acre. Actual costs of magnesium applications were closer to \$19 per acre due to the substitution of K-Mag for other components of the fertility program.

Why Magnesium?

"The study exhibited the significance of nutrient interactions that can occur in what appears to be a sound fertilization program," Murphy says. "These interactions may limit the ability of plants to uptake certain nutrients."

He noted the high availability of potassium, calcium and ammonium in the normal production practices for the region. These elements interact to depress the uptake of magnesium. Adding magnesium to these soils, even though soil tests indicated that levels were sufficient, helped increase magnesium availability, boosting yields and quality.

"This study provides voluminous evidence that proper and complete fertilization programs that include K-Mag can boost potato yields, quality and profits," Murphy concludes. "Even if the effects were only one-sixth as great, added magnesium is worth a serious look by potato growers in other areas."

Ray Hoyum, vice president of market development and communications, IMC Global, agrees that proper plant nutrition is key to high yielding, high quality potatoes.

"Not only do potatoes need large amounts of nitrogen, phosphorus and potassium, they require magnesium and sulfur in the proper amounts to achieve balanced nutrition," he says. "K-Mag provides the proper balance of these needed nutrients to produce a desired crop."

Mined by IMC Global, K-Mag is a 3-in-1 combination that consists of 21-22% sulfur, 20-22% potassium and 10-11% magnesium.

"Most of today's high-analysis fertilizers fail to effectively provide the needed magnesium," Hoyum says. "Plus, since K-Mag contains both potassium and sulfur, growers may be able to reduce the amount of these nutrients from other sources in the overall mix, further reducing costs."

A low salt index, low chloride content and the fact that K-Mag is 100% water-soluble are additional features that attract potato growers to the product.

"K-Mag is in mineral form, which dissolves slowly to resist leaching, yet dissolves completely," he notes. "And it does not change the soil pH, even at high application rates."

"Higher yields remove even more nutrients. Therefore, it's essential for potato growers to replenish the soil using a balanced fertility program that pays close attention to magnesium."



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