

SUL-PO-MAG[®] AGRI-FACTS

Grapes

The fertilizer material Sul-Po-Mag contains three nutrients essential for the growth of all plants: potassium (21-22% K₂O), magnesium (10.5-11% Mg), and sulfur (21-22% S). These nutrients are especially important in the production of high-yielding, high quality grapes.

POTASSIUM. Grape vines are very responsive to applications of K. In some instances it has been reported that grapes have a higher requirement for K than they do for any other nutrient, including nitrogen. As a result, application rates of K are often very high, and can be economical at rates exceeding 1000 kg K₂O/ha. Research results from throughout the world confirm that beneficial effects due to applications of K fertilizers include yield increases, vigor of the vines, soluble solids (sugars) and increased winter hardiness and frost resistance. Experiments in the northeast U.S.A. compared the effects of several N-P-K grades on various components of yield (Table 1).

Table 1. Effects of Fertilizer Application on Yield of Concord Grapes. U.S.A.

Fertilizer Treatment	Yield (kg/vine)	Clusters per vine	Wt. per cluster (kg)	Prune Wt. (kg/vine)
N	9.9	79	82.6	0.83
N-P	9.8	79	81.7	0.86
N-P ₃	9.9	77	81.3	0.92
N-K	11.0	84	84.9	1.06
N-P-K	12.7	92	89.9	1.14
N-P ₃ -K	12.1	91	88.1	1.17

Many studies have been carried out to determine the most effective chemical form of potash (potassium chloride -vs- potassium sulphate) for grape fertilizers. And, while findings have not been fully consistent, where differences have been noted, the sulphate form of potash has generally been shown to be superior. All the potash in Sul-Po-Mag is in the sulphate form, which is an added (and often overlooked) benefit of Sul-Po-Mag for grapes.

MAGNESIUM. Magnesium deficiencies of grapes have been widely reported. The Mg requirement of grapes,

and the tissue content of Mg, is about the same, or slightly higher, than that of phosphorus. Magnesium is a component of chlorophyll, the green coloring matter of plants. Chlorophyll is essential for the process of

photosynthesis, the reaction whereby plants convert carbon dioxide and water (in the presence of sunlight) into simple sugars. This process of photosynthesis is extremely important in the growth of all plants, and is especially so with plants high in sugars, such as grapes.

It is especially important to carefully monitor Mg levels in vegetative tissues (petioles) of grapes. This is because grapes are frequently heavily fertilized with potash. There is a strong antagonistic reaction between K and Mg in plant nutrition. At increasing levels of K fertilization, plant absorption of Mg is reduced. At moderate, and especially low, levels of soil Mg, applications of K can actually induce a deficiency of Mg. By including Sul-Po-Mag in the fertility program, a proper balance of these two nutrients can be maintained. It's been suggested that Mg deficiency of grapes is likely when the Mg saturation of the cation exchange capacity (CEC) is less than 5%. Also, the % Mg saturation of the CEC should be 2-3 times as high as exchangeable K.

Studies in Europe and Canada have shown that Mg applications reduce the occurrence of rachis necrosis, a disease that causes the breakdown of bunch stems and premature berry drop. Calcium also seems to be involved in some manner, and applications of Ca have likewise reduced the severity of this condition.

An interesting interaction between phosphorus (P) and Mg has been observed in grape vines. Under low soil P levels, the translocation of Mg from roots to leaves is markedly decreased. Mg deficiency and reduced rates



of photosynthesis have been observed on soils apparently sufficient in Mg, but deficient in P.

SULFUR. Grape vines have a high requirement for S. A 20-ton crop will absorb approximately 30 kg S. All the S in Sul-Po-Mag is in the sulphate ($\text{SO}_4^{=}$) form. This is the chemical form of S that is absorbed by plants: the S in Sul-Po-Mag is therefore immediately available for absorption. Also, whereas some S-containing fertilizers are acid-forming when applied to soils, Sul-Po-Mag is not. Sul-Po-Mag is a neutral salt and has no effect on soil pH.

Sul-Po-Mag FOR GRAPES. Sul-Po-Mag is used on grapes to supply the Mg (and S) requirements. Rates will depend on soil and/or petiole analysis, but typical rates are 250 - 500 kg/ha. Additional K_2O is usually required, and this can be supplied by muriate of potash (KCl) or sulphate of potash (K_2SO_4). By including Sul-Po-Mag in grape fertility programs, a proper balance between K and Mg is maintained. Also, Sul-Po-Mag is a highly water-soluble material. The contained K, Mg and S are therefore immediately available for absorption.