



Spring 2003, No. 6

DODGING DROUGHT DAMAGE...WITH POTASSIUM?

“ If only I could control the weather.” That statement is frequently heard among farmers, especially after the drought experienced in the southeastern U.S. and some other areas in 2002. Nobody can control the weather, but farmers can help reduce the damaging effects of drought with good management. Good potassium fertility is one of the key management factors that can enable farmers to dodge some of the damage from drought.

Plants depend on potassium to regulate the opening and closing of leaf stomates (leaf pores). Proper functioning of stomates is essential for photosynthesis, water and nutrient transport, and plant cooling. When potassium is deficient, translocation of calcium, magnesium, and amino acids within plants is depressed, and enzyme systems and hormonal balance can be disrupted. Plants acquire potassium from the soil solution primarily by diffusion. As soils become drier, it is more difficult for potassium to move by diffusion from soil areas of high concentration to growing root surfaces where the potassium is rapidly depleted by plant uptake. By providing high levels of potassium in the soil, plants do not have to work as hard to take up the potassium they need.

Benefits of good potassium management are often reflected in sustained yield potential during periods of low in-season rainfall and soil moisture. For example, recent research by Mississippi State University scientists showed that even on a soil testing high in potassium, K_2O rates from 70 to 210 pounds per acre resulted in 22 to 57% increases in no-till cotton lint yield per inch of rainfall received. The 140 and 210 pound K_2O rates were able to sustain yields better than the lower rate in the drier years. Potassium fertilization also resulted in more efficient use of the applied nitrogen.

Forages also benefit from good potassium management. Research by scientists with Louisiana State University showed that as annual K_2O rates increased from 0 to 400 lb/A on a low potassium soil, the amount of bermudagrass forage produced per inch of rain received increased from 21 to 55%.

Plants deficient in potassium are less able to absorb water from the soil and are more subject to stress when water is in short supply. Deficient plants wilt more quickly, are more susceptible to leaf spot and other diseases, and they experience reduced formation and translocation of sugars and starch. By ensuring adequate potassium nutrition, through annual potassium fertilization or maintenance of high soil potassium levels, farmers can help plants dodge the damage of drought and protect crop yield potential, and when rainfall is received, plants are better able to respond to improved environmental conditions.

Growers should also remember that when drought-damaged crops were harvested for hay or silage last year, removal of potassium (as well as other nutrients) may have been greater than if a normal crop had been harvested. Proper potassium fertilization replaces harvested potassium, improves yield potential, and helps sustain yields during drought.

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