



Summer 2004, No. 5

LEAF SPOTS AND THE POTASSIUM LINK

Many field crops, forages, vegetable crops, and horticultural plants suffer each year from damage associated with foliar diseases. The symptoms may be minor or they can result in a significant economic loss for the producer.

A number of fungus and bacterial diseases that attack plant leaves appear early as tiny “freckle-like” spots. The spots may appear as oval or irregular-shaped brown, purple, yellow, or gray spots on leaf surfaces. With favorable environmental conditions, and a susceptible host plant, more spots may develop or they can enlarge until the majority of leaf surfaces become affected. Leaf spots cause a loss in the plant’s ability to capture sunlight and to carry out specific metabolic functions. If severe, leaf spots can result in premature leaf senescence, significant yield losses, and plant death. The presence of leaf spots may also be a prime indicator of imbalanced plant nutrition.

There is considerable scientific evidence of the interaction between nutrients and plant diseases. Nitrogen and potassium are frequently cited as the nutrients having the most influence on plant health. Potassium is involved in nearly all cellular functions that affect disease severity and it is a key regulator of enzyme activity. In potassium deficient plants, sugars and soluble nitrogen compounds may accumulate, while the levels of starch may decrease. Leaf spot and other disease organisms may be attracted to the accumulation of these simple chemical compounds and use them as food sources. Adequate potassium favors the development of lignin and suberin compounds that aid resistance to pathogen attack and development. Adequate potassium also increases the plant’s ability to escape disease. For example, many diseases enter plants through the stomata (leaf pores). Stomata will remain open longer in potassium deficient plants, which can favor infection.

A balance between nitrogen and potassium nutrition is required for normal plant growth and development, and disease avoidance. Excessive potassium application will provide no more benefit than adequate potassium nutrition. The key is to strive for both adequate levels and balance.

Avoid and reduce the damage from common leaf spot organisms in rice (*Bipolaris*), cotton (*Alternaria*, *Cercospora*, *Stemphyllium*), soybeans (*Cercospora*), forages (*Helminthosporium*), and many vegetable and horticultural crops (*Alternaria*, *Cercospora*, *Septoria*) this year by ensuring that your plants receive adequate potassium nutrition.

Remember, good plant nutrition also reduces the risk of numerous other economic plant diseases. Start with a soil test to estimate the need for potassium, rely on local unbiased research for the determination of appropriate application rates, and follow-up with plant tissue tests (i.e. leaf nutrient analyses) to be certain that the plants are taking up proper amounts. **You can minimize economic losses from leaf spot and other disease organisms by simply improving potassium and nitrogen nutrition.**

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