

Silicon Nutrition of Pumpkin for Suppression of Powdery Mildew
Joseph Heckman, Email: heckman@aesop.rutgers.edu
Rutgers University, 59 Dudley Rd, New Brunswick, NJ 08901

Silicon is the second most abundant element in mineral soils. Because of its ubiquitous nature, it is not given much attention as a limiting factor in crop production. This is beginning to change as agronomists become more aware of the valuable functions of silicon nutrition in crops and soils and even animal life. In 2012, silicon was officially designated as a “plant beneficial substance” by the Association of American Plant Food Control Officials (AAPFCO). Labels on fertilizers and soil amendments will now be permitted to list the content of plant available silicon.

Of the many benefits associated with enhanced silicon nutrition, the one that appears most outstanding is suppression of powdery mildew disease. Wheat, pumpkin, Kentucky bluegrass, and dogwood are examples of crops where silicon nutrition has been shown to help control powdery mildew disease in experiments conducted in New Jersey.

More research is underway to study silicon needs of other crops and soils and about how the nutrient cycles through the environment. The levels of silicon taken up into the plant tissue of pumpkin and other silicon accumulating crops are substantial. Leaf concentrations of silicon may reach levels comparable to that of macronutrients.

Silicon supplementation of soil is more effective for suppressing powdery mildew diseases than spraying silicon on the plant foliage. Calcium silicate products are among the most effective sources of plant available silicon. Wollastinite, is a naturally occurring calcium silicate mineral mined in New York State. Some brands of silicon fertilizers are OMRI listed and may be used in organic farming.

Calcium silicates, besides supplying plant available silicon, are also effective liming materials. To be effective for disease suppression, calcium silicate amendments should be applied at rates similar to regular agricultural liming materials. Calcium silicate products typically have a calcium carbonate equivalent ratings similar to calcium carbonate limestone.

Although silicon soil amendments may not entirely prevent powdery mildew disease on pumpkin, field research indicates that it can significantly reduce the need for sprays and other control measures for this disease. Amending soils used to grow pumpkin with calcium silicate may reduce production costs by decreasing the need for fungicide sprays. The soil applied calcium silicate also serves as a substitute for regular agricultural limestone.

The 2012 issue of my newsletter provides a comprehensive summary about silicon and soil fertility. See link here: <http://njaes.rutgers.edu/pubs/soilprofile/>