

## **Pumpkin Production Practices that Reduce Cost**

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Pumpkin growers looking for new cultural practices to improve production and fruit quality while reducing input cost may benefit from findings of research conducted at the Rutgers University, New Jersey Agricultural Experiment Station.

One of our experiments compared the influence of different types of liming materials to neutralize soil acidity and improve pumpkin plant health. Regular agricultural limestone, chemically referred to as calcium carbonate, was compared with calcium silicate in a field with an initial soil pH of 5.9. Calcium silicate is an alternative liming material that supplies the nutrient silicon in a plant available form. Silicon is now recognized as a quasi-essential nutrient with beneficial effects on disease suppression and stress tolerance on several crops. In cucurbits and wheat, for example, enhanced silicon nutrition has been shown to suppress or at least delay the onset of powdery mildew disease. Both calcium carbonate and calcium silicate liming materials have the same neutralizing ability, and they cost about the same amount per ton, but the calcium silicate product was found to have the advantage of suppressing powdery mildew disease and increasing yield of pumpkin. Using calcium silicate as a liming agent can also have long term benefits on rotation crops. For example, we later observed suppression of powdery mildew disease and increased yield of wheat on the same land area originally amended with calcium silicate. Thus, because it is recommended that pumpkin be grown in rotation with other crops, it is useful to know that enhanced silicon nutrition may benefit them as well. Although amending soil with calcium silicate suppresses powdery mildew disease, it may not completely prevent the disease, and therefore disease scouting and IPM should be a part of the overall pumpkin crop management. The potential savings of several fungicide applications during the season may reduce the cost of pumpkin production. Wollastonite is a naturally occurring mined source of calcium silicate that may be an acceptable Si fertilizer for organic production but check with your organic certifier to be sure it is allowed. The calcium silicate product used in our research was a by-product of the steel industry: [www.excellminerals.com/about\\_excell.asp](http://www.excellminerals.com/about_excell.asp)

Other field trials conducted over the last two decades have demonstrated that farms can benefit from leaves collected from city shade trees. Leaves have been found to be a valuable resource for building soil fertility and organic matter content. Leaves contain plant nutrients that are released slowly to crops over a period of several years after application. The material is especially rich in calcium and tends to cause a slight elevation in soil pH. The improvements in soil quality associated with the build up of soil organic matter content was found to increase soil water holding capacity and reduce drought stress of crops grown on land amended with shade tree leaves. Field trials with pumpkin found that when leaves are applied as surface mulch, the crop could be grown free of annual weeds without the need for herbicides. The leaf mulch was also found to improve pumpkin fruit quality and increase fruit size. Compared to bare soil, the leaf mulch was also observed to be very effective in controlling soil erosion. Using leaf mulch in place of herbicides to control weeds would save pumpkin growers

approximately \$40 per acre. For U-pick operations, having accessible fields during wet conditions is critical. Because leaf mulch can help produce a cleaner fruit, it can make field conditions more enjoyable for agritourism. The mulch also helps to prevent mud from adhering to customer shoes. In crops following pumpkin, the residual benefits of leaf application were exhibited in higher yields of sweet corn and rye straw.

For good pumpkin yields it is especially important to manage the crop for optimum nitrogen availability from the soil. When pumpkin is oversupplied with N, vegetative growth is encouraged and fewer flowers and fruit are produced. Soil nitrate testing just as vines (6 to 12 inches long) begin to run can be useful for predicting if sidedress N fertilizer is needed. Avoiding excess N application reduces cost of production and maintains pumpkin yield potential. Further information about how to perform soil nitrate testing is available on the web:

<http://www.rcrc.rutgers.edu/pubs/publication.asp?pid=E285>

Heckman, J.R., S. Johnston, and W. Cowgill. 2003. Pumpkin Yield and Disease Response to Amending Soil with Silicon. *HortScience*. 38(4):552-554.

Wyenandt, A.C., J.R.Heckman, and N.L. Maxwell. 2008. Pumpkin Fruit Size and Quality Improves with Leaf Mulch. *HortTechnology*. 18:361-364.

Heckman, J.R., and D. Kluchinski. 2000. Agronomics of Land Application of Municipal Collected Shade Tree Leaves; I. Soil Properties. *Journal of Sustainable Agriculture* 17:33-40.

Heckman, J.R., and D. Kluchinski. 2000. Agronomics of Land Application of Municipal Collected Shade Tree Leaves; II Soybean and Corn Production. *Journal of Sustainable Agriculture*. 17:41-52.

Heckman, J.R. 2002. In-season Soil Nitrate Testing as a Guide to Nitrogen Management for Annual Crops. *HortTechnology*. 12:706-710.



