

Silicon's effect on sunflowers studied

May 7 2008



Helianthus L. - sunflower. Credit: Clarence A. Rechenthin @ USDA-NRCS PLANTS Database

Vibrant, showy sunflowers are revered worldwide for their beauty and versatility. While many varieties of sunflower are grown specifically for their nutritional benefits, ornamental sunflowers have become standards for commercial growers and everyday gardeners. As sunflowers' popularity grows, scientists are looking for new supplements and growing methods to enhance production and quality of this celebrated annual.

Horticulturists have found ample evidence that plants depend on "essential nutrients"; naturally occurring elements that are found in normal plant tissue that are essential for the completion of the life cycle of the plant. Although silicon, a predominant element in mineral soil, is not considered to be an essential nutrient for most plants, there has been

limited evidence that silicon supplements affect the aesthetic qualities of ornamental flowers and crops.

Drs. Sophia Kamenidou and Todd J. Cavins, formerly of the Department of Horticulture and Landscape Architecture at Oklahoma State University, published a research study in the February, 2008 issue of HortScience in which they examine the effects of silicon supplements on sunflowers grown in greenhouse environments.

"In greenhouse production, most floricultural crops are cultivated in soilless substrates, which often supply limited amounts of plant-available silicon. The goal of this study was to determine the effects of silicon supplementation on greenhouse-produced ornamental sunflower (*Helianthus annuus* L. 'Ring of Fire').", explained Cavins. "This is one of the first studies to highlight supplemental silicon impact on horticultural traits. Most previous research on silicon has focused on disease suppression in hydroponic vegetable production. This is also one of the few examples of detrimental effects seen from high silicon concentrations."

Depending on the source and concentration of silicon used, several horticultural traits were improved as a result of silicon supplementation. "We observed thick, straight stems, increased flower and stem diameters, and increased height in some of the treatments, upgrading sunflower quality compared with untreated controls. However, growth abnormalities were observed when concentrations of silicon at 100 and 200 mg per liter were supplied as potassium silicate substrate drenches. In these treatments, plants appeared stunted with deformed flowers and were delayed in flowering. Consequently, the effects of silicon supplementation on greenhouse-produced sunflowers can vary from beneficial to detrimental depending on the applied source and concentration.", stated Cavins.

Summarizing the study outcomes, Cavins said, "Silicon is a key component in mineral soil, but it has been overlooked for years since it is not considered an essential element for plant growth and development. Sunflowers are capable of accumulating silicon from multiple sources and we found major benefits to some silicon supplements, such as increased stem diameter and improved quality."

Source: American Society for Horticultural Science

Citation: Silicon's effect on sunflowers studied (2008, May 7) retrieved 10 April 2024 from <https://phys.org/news/2008-05-silicon-effect-sunflowers.html>

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