



Silicon In Agriculture

L.E. Datnoff (Editor) , G.H. Snyder (Editor) , G.H. Korndörfer (Editor) , L.E. Datnoff (Editor)

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Presenting the first book to focus on the importance of silicon for plant health and soil productivity and on
our current understanding of this element as it relates to agriculture.

Long considered by plant physiologists as a non-essential element, or plant nutrient, silicon was the center of
attention at the first international conference on Silicon in Agriculture, held in Florida in 1999.

Ninety scientists, growers, and producers of silicon fertilizer from 19 countries pondered a paradox in plant
biology and crop science. They considered the element Si, second only to oxygen in quantity in soils, and
absorbed by many plants in amounts roughly equivalent to those of such nutrients as sulfur or magnesium.
Some species, including such staples as rice, may contain this element in amounts as great as or even greater
than any other inorganic constituent. Compilations of the mineral composition of plants, however, and much
of the plant physiological literature largely ignore this element. The participants in Silicon in Agriculture
explored that extraordinary discrepancy between the silicon content of plants and that of the plant research
enterprise.

The participants, all of whom are active in agricultural science, with an emphasis on crop production,
presented, and were presented with, a wealth of evidence that silicon plays a multitude of functions in the
real world of plant life. Many soils in the humid tropics are low in plant available silicon, and the same
condition holds in warm to hot humid areas elsewhere. Field experience, and experimentation even with
nutrient solutions, reveals a multitude of functions of silicon in plant life. Resistance to disease is one,
toleration of toxic metals such as aluminum, another. Silicon applications often minimize lodging of cereals
(leaning over or even becoming prostrate), and often cause leaves to assume orientations more favorable for
light interception. For some crops, rice and sugarcane in particular, spectacular yield responses to silicon
application have been obtained. More recently, other crop species including orchids, daisies and yucca were
reported to respond to silicon accumulation and plant growth/disease control. The culture solutions used for
the hydroponic production of high-priced crops such as cucumbers and roses in many areas (The Netherlands
for example) routinely included silicon, mainly for disease control. The biochemistry of silicon in plant cell
walls, where most of it is located, is coming increasingly under scrutiny; the element may act as a
crosslinking element between carbohydrate polymers.

There is an increased conviction among scientists that the time is at hand to stop treating silicon as a plant
biological nonentity. The element exists, and it matters.

Silicon In Agriculture Details

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