CALCIUM SILICATE

Mineral Mulch

Cost-effective Sustainable Soil Amendments

A highly economical Refined not Mined alternative to entrenched agricultural products such as Gypsum with the added Benefit of Silica and other Trace elements.

Silicon (Si) may be one of Earth's most prevalent macronutrients however, its availability to plants is limited unless certain requirements are met *Mineral Mulch Calcium Silicate* is a unique product as it contains both a high percentage of water-soluble silicon and plant available calcium (Ca).

Mono-silicic acid is the only silica form that is absorbed by the plant roots but it requires adequate Calcium to be present to move the silica into the epidermal (outer) tissues and create a Si-cellulose membrane, this in turn makes Mineral Mulch Calcium Silicate with its provided 4 forms of highly available Calcium, Calcium Carbonate (Lime), Calcium Oxide (Burnt Lime, or Slacked Lime), Calcium Silicate and Calcium Sulphate (Gypsum) an ideal agricultural silica and Calcium source.

Our products have been manufactured with the end-user in mind being both easy to store and apply, whilst also being a cost-effective input. Best of all it is sourced from 100% sustainable and recycled materials, containing no substances that will contaminate the soil.

CALCIUM SILICATE BENEFITS

- Increased Stress Relief Drought, Frost, Heat and UV Resistance [1,8]
- Alleviation of salt stress [4,11]
- Stronger, more resilient plants through the hardening of the outer cell wall [12]
- Alleviates the toxicity of metal ions especially Fe, Al, Mn, Pb, Hg, Cd and Zn [2,3,5,6,7,14]
- Improved Utilisation of Fertilisers , particularly nitrogen[13], phosphorus [2] and Potassium
- Increases the plant availability of P, whether deficient or excessive in soil.[2]
- Improves disease resistance, especially against blight, [9] mildew,[10] Grey leaf Spot[20,21] and Turf Mites[19]
- Effective in the control of Phytophthora [22]
- Improves photosynthesis. [16]
- Reduced Lodging.[15]
- Denser root mass[18]
- Contains adequate plant available Calcium present to move into the epidermal (outer) tissues and create a Si-cellulose membrane which provides protection.
- Sourced from 100% sustainable and recycled materials

WWW.MINERALMULCH.COM **PHONE 1300 895 988**

CALCIUM SILICATE

Mineral Mulch

Cost-effective Sustainable Soil Amendments

"silica deficiencies in the plant reduce the plant's ability to resist disease and pest attack due to a loss of strength and cell structure"

Silica Deficiency

With nutrients regularly being removed through plant growth and crop harvest and many common fertiliser inputs not replenishing this deficit, nutrients predominantly are being 'locked up' by quartz and soil clays (e.g. kaolinite), which must undergo weathering over a number of years before the silicon is made available to the plants, on this basis it is easy to see how silica deficiencies can become common and readily occur in Australian soils.

References

1. HEATHER A. CURR IE and CAROLE C. PERRY*(Silica in Plants: Biological, Biochemical and Chemical Studies) Biomolecular and Materials Interface Research Group, School of Science and Technology, Nottingham Trent University, Clifton Lane, Nottingham NG11 8NS, UK p 1384.
2. J. F. Ma, "Role of silicon in enhancing the resistance of plants to biotic and abiotic stresses," Soil Science and Plant Nutrition, vol. 50, no. 1, pp. 11–18, 2004.
3. Hodson MJ, Sangster AG. 1993. The interaction between silicon and aluminium in Sorghum bicolor (L.) Moench: growth analysis and X-ray microanalysis. Annals of Botany 72: 389–400
4. Matoh, T., Kairusmee, P., and Takahashi, E. (1986). Salt-induced damage to rice plants and alleviation effect of silicate. *Soil Sci. Plant Nutr.* 32, 295–304. doi: 10.1080/00380768.1986.10557506
5. Apoplastic Binding of Aluminum Is Involved in Silicon-Induced Amelioration of Aluminum Toxicity in Maize1 Yunxia Wang, Angelika Stass, and Walter J. Horst* Institute for Plant Nutrition, University of Hannover, D–30419 Hannover, Germany
6. A.M., D.; M.M., H.; N., S.; A.A., E.-A.; L., M. Effect of Silicon on the Tolerance of Wheat (*Triticum aestivum* L.) to Salt Stress at Different Growth Stages: Case Study for the Management of Irrigation Water. *Plants* **2018**, *7*, 29
7. Effect of Silicon Application on Cadmium Uptake and Distribution in Strawberry Plants Grown on Contaminated Soils Waldemar Treder &Grzegorz Cieslinski Pages 917-929 | Received 16 Apr 2003, Accepted 10 Aug 2004, Published online: 16 Aug 2006
8. J. F. Ma, "Role of silicon in enhancing the resistance of plants to biotic and abiotic stresses," *Soil Science and Plant Nutrition*, vol. 50, no. 1, pp. 11–18, 2004
9. A. Fawe, M. Abou-Zaid, J. G. Menzies, and R. R. Bélanger, "Silicon-mediated accumulation of flavonoid phytoalexins in cucumber," *Phytopathology*, vol. 88, no. 5, pp. 396–401, 1998
10. Y. Nakata, M. Ueno, J. Kihara, M. Ichii, S. Taketa, and S. Arase, "Rice blast disease and susceptibility to pests in a silicon uptake-deficient mutant lsi1 of rice," *Crop Protection*, vol. 27, no. 3–5, pp. 865–868, 2008
11. Z. Zhu, G. Wei, J. Li, Q. Qian, and J. Yu, "Silicon alleviates salt stress and increases antioxidant enzymes activity in leaves of salt-stressed cucumber (*Cucumis sativus* L.)," *Plant Science*, vol. 167, no. 3, pp. 527–533, 2004
12. E. Epstein, "The anomaly of silicon in plant biology," *Proceedings of the National Academy of Sciences of the United States of America*, vol. 91, no. 1, pp. 11–17, 1994
13. N. Ohyama, "Amelioration of cold weather damage of rice by silicate fertilizer application," *Agriculture Horticulture*, vol. 60, pp. 1385–1389, 1985
14. Silicon alleviates the toxicity of cadmium and zink for maize (Zea mays L.) grown on a contaminated soil Karina Patrícia Vieira da Cunha1, Clístenes Williams Araújo do Nascimento1*, and Airon José da Silva1 1 Federal Rural University of Pernambuco, Department of Agrono my, Recife, PE, 52171900, Brazil
15. Importance of Silicon and Mechanisms of Biosilica Formation in Plants Biomed Research International Volume 2015 |Article ID 396010 | 16 pages | https://doi.org/10.1155/2015/396010
16. Deren, C.W. 1996. *Photosynthesis, biomass partitioning, and nutrient concentration of silicon-fertilized rice*, Agronomy abstracts 101Madison, WI: American Society of Agronomy.
17. D.G. LUMSDON, V.C. FARMER. (1995). *Solubility characteristics of proto- imogolite sols: how silicic acid can de-toxify aluminium solutions*. European Journal of Soil Science
18. J. Plant Nutr. Soil Sci. 2013, 176, Silicon uptake by wheat: Effects of Si pools and pH Martina Gocke1*, Wu Liang2, Michael Sommer3,4, and Yakov Kuzya-kov5,6
19. Fergus P. Massey, Department of Biology and Environmental Science, University of Sussex. Silica in grasses as a defence against insect herbivores: contrasting effects on folivores and a phloem feeder First published: 31 March 2006
20. Datnoff, L., Brecht, M., Kucharek, T., Trenholm, L., Nagata, R., Snyder G., Unruh,B., and Cisar, J. 2005. Influence of silicon (Si) on controlling gray leaf spot and more in St. Augustine grass in Florida. TPI Turf News 3:30-32.
21. Datnoff, L. E., and Nagata, R. T. 1999. Influence of silicon on gray leaf spot development in St Augustine grass. Phytopathology 89:S19.
17. EFFICACY OF WATER SOLUBLE SILICON FOR CONTROL OF PHYTOPHTHORA CINNAMOMI ROOT ROT OF AVOCADO Theo Frederik BekkerUniversity of Pretoria