Silicon (Si) is considered a beneficial nutrient for sugarcane (Saccharum spp.).

The benefits of Si for sugarcane were realised early in Hawaii in 1965 when field experiments with Si rich compounds gave highly significant yield increases.

Si deficiency in sugarcane is characterised by ‘freckling’, poor tillering and ratooning.

The beneficial effects of Si are associated with its deposition in plant tissues.

In sugarcane – improved silicon nutrition has been shown to:

- Increase plant height and weight, stem diameter and number of millable stalks
- Reduce lodging
- Increase sugar yield
- Increase the plant’s tolerance to cold conditions
- Increase tolerance to drought
- Increase water economy by reducing leaf transpiration
- Alleviate frost damage
- Increase tolerance to various pests (shootborer, stemborer, stalkborer)
- Improve P nutrition (availability and solubility)

Si is taken up in sugarcane at levels equal or greater than the essential nutrients such as Nitrogen and Potassium. Si is therefore considered a nutrient of agronomic essentiality for high Siaccumulator crops such as Sugarcane.

The loss of Si from soils is a natural weathering process that is favoured in humid tropical environments as a direct consequence of high rainfall and temperature. This process removes Si from the soil as does the practise of cultivation and subsequent crop removal. For example, a 100 t/ha sugarcane crop removes 500-700 kg Si/ha/annum.

In continuous cropping with high Si-accumulator species like sugarcane, the removal of Si can be greater than the supply via natural processes releasing it into the soil.

The application of Si fertilisers to soils low in Si has produced dramatic field responses in both cane and sugar yields in many countries, including Australia, Hawaii, Mauritius, South Africa, Puerto Rico and Florida.

It has been shown in the large sugarcane growing areas of Queensland that the level of Si in the soil is insufficient to maintain optimum crop growth and has been attributed with declining yields of sugar.

Australian sugarcane soils are considered deficient in Si if the concentration is less than 10-15mg Si/kg dry soil following extraction with 0.01M CaCl₂.

Recent studies in the wet tropics of North Queensland have demonstrated significant increases in both the cane and sugar yield when Si fertiliser was applied.

The CSIRO has reported “Current sugarcane production systems often apply nitrogen at rates far in excess of what may be considered necessary for maximum yield, and with high soil concentrations of phosphorus, may result in unbalanced nutrient supply on many sugarcane soils.”

This report also indicates that many Australian sugarcane soils are Silicon deficient and that the application of high levels of Plant Available Silicon to sugarcane may increase yield by balancing nutrient levels. It may therefore not be necessary to increase N applications to achieve higher yields but rather to apply Plant Available Silicon.

Agripower has been running trials for 3 years in sugarcane in Australia and India quantifying the effect of Agripower Silica on yield and nutrient use efficiency.

We have already demonstrated:

- Sugarcane yields were increased when Agripower Silica was added at 250 and 500kg/ha with the standard fertiliser amounts
- Sugarcane yields were also increased at these rates of Agripower Silica with half the standard fertiliser amounts.
- Total uptake of Nitrogen increased with the application of Agripower Silica
- At 300kg/ha Agripower Silica and 50% Grower Standard N fertiliser, overall yield was reduced slightly but the CCS increased.

In order for any plant to benefit from Si, it must be able to acquire this element in high concentrations. Plants can only absorb Si in the form of soluble monosilicic acid, or plant available silicon (PAS).

Different Si sources have different dissolution rates and rich sources of plant available Si are required to address soil silicon deficiency. In choosing a Si fertiliser it is important to ensure that it does not contain contaminants. Some Si “fertilisers” such as slags can contain high levels of heavy metals.

Note most standard commercial fertilisers contain little or no Si.

Agripower’s Silica unique granular fertiliser range has been designed to provide a rich source of plant available Si and is a natural mineral with no contaminants.

A recommended application rate of 250 – 500kg/ha use of Agripower Silica, equates to approximately $125 - $250/hectare.

For further detailed information on Agripower’s range of Si products go to our website: