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Introduction

Welcome to our second newsletter.
It has been a busy time for Agripower, with commercial expansion into India and Turkey and progress with product registration in a number of countries including China, USA and Sri Lanka.

We wish all our customers and associates a very prosperous 2018.

Agripower expands into India and Turkey

Agripower have recently appointed a Country Manager in Turkey to drive the expansion.

Both India and Turkey have large agricultural and horticultural industries and have soil types and growing conditions that are very responsive to Agrisilica. Trial programs conducted in both countries have proven conclusively the advantages of using Agrisilica.



Mr Nihat Kiran based in Antalya has commenced as Country Manager Turkey.

Nihat has an impressive background in leading successful business units and in commercialising new agricultural products.

A new Country Manager in India will be appointed shortly.



Latest research from the International Silicon Conference

Agripower Australia was the Major Sponsor of the 7th International Conference on Silicon in Agriculture recently held in Bengaluru, India.

The conference was attended by over 200 delegates from all around the world, with many of the leading Silicon researchers present.

Latest developments in silicon research in agriculture were presented with the main areas of interest being the mechanisms of silicon-mediated alleviation of abiotic stress and the role of silicon in crops grown under nutrient deficiency.

One thing is clear, Silicon is gaining the attention of the agricultural science community. In this newsletter and subsequent newsletters we will present some of the general findings from the conference.

In each newsletter we will briefly describe how silicon is protecting crops from one specific stress event. In this newsletter we explain how Silicon is protecting crops against the stress with the biggest global effect on crop production - water deficit.

Technical Update : How Silicon works to increase crop production

Biotic & Abiotic Stresses

Silicon protects crops against stress events that the crop is subjected to. These stress events are numerous (Fig 1) and are preventing crops from yielding to their true genetic potential.

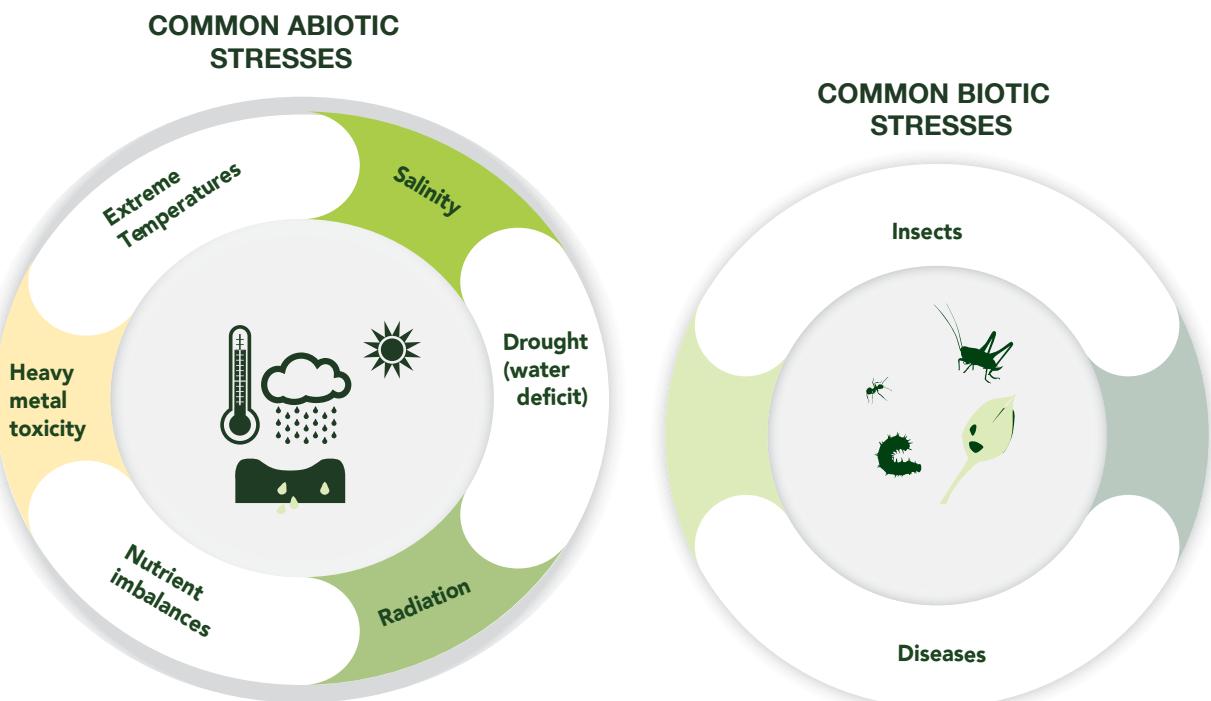
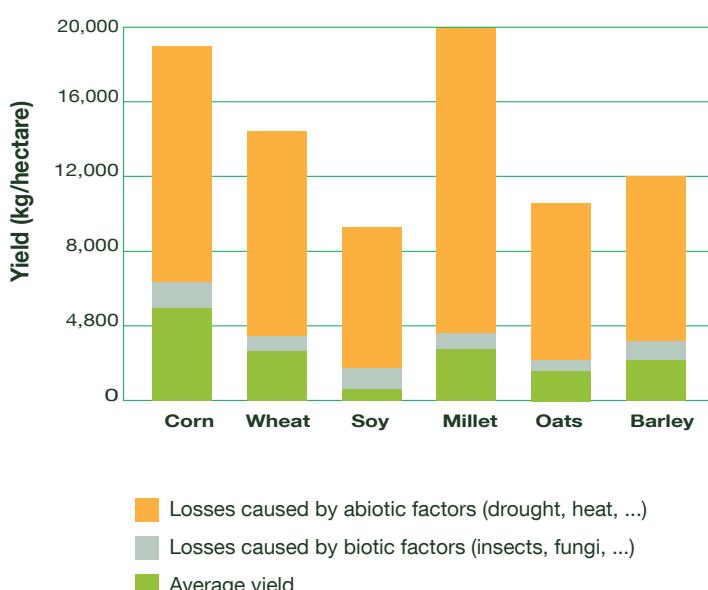


Fig 1. Common abiotic and biotic stresses.

Estimated yield reductions caused by abiotic stress (drought, salinity) and biotic stress (pest and disease) in many crops. Can be over 80% dependent on the crop (Fig 2)



51-82% of potential yield of annual crops is lost due to abiotic stress (heat, drought, nutrient imbalances, salinity).

Estimated crop losses due to biotic and abiotic stresses.

Source: Bayer Crop Science 2008,
<http://www.seedquest.com/News/release/2008/october/23973.htm>

Fig 2. Losses to crops, caused by abiotic and biotic stresses.

Biotic & Abiotic Stresses

It has been estimated that drought stress (or sub-optimal amounts of water in the case of irrigated crops) causes a 20% reduction in crop yields worldwide (Emam et al 2014). The incidence of drought stress is only going to be more evident as water resources becomes scarcer and food security becomes more important. Because water is necessary for all plant growth phases, limiting the impact of water deficiency by ensuring or making the crop more drought tolerant, is critical.

Silicon is considered to be one of the few nutrients that can assist in alleviating drought stress by improving plant tolerance against drought stress and increasing water uptake. Silicon does this by :

1. Reducing transpiration

Silicon in the available form is absorbed by the plant roots and transported around the plant, eventually irreversibly deposited into plant cell walls in the form of amorphous silica. Silica accumulation in plant tissues forms a physical barrier thereby reducing the transpiration rate. Silicon also play a role in controlling the opening and closing of stomata, also reducing transpiration.

2. Boosting the plant's antioxidant defence systems

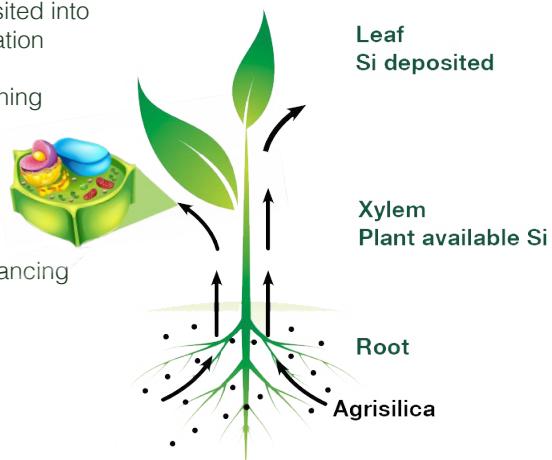
Resulting in reduced damage to cell wall membranes and enhancing plant drought tolerance

3. Osmoregulation

Silicon enhances the accumulation of osmoregulators that protect the plant cells in drought stress conditions.

Gene expression

Drought stress stimulates the expression of genes that consequently result in metabolic changes that aim to protect the plant. Silicon is involved in the regulation of several drought responsive genes.



About the products



CROPS	APPLICATION RATE	COMMENTS
VEGETABLE	250-500 KG/HA*	BAND OR BROADCAST AT OR PRIOR TO SEEDING OR TRANSPLANTING
TREE CROPS (MATURE, BEARING)	300-600 KG/HA*	SPLIT APPLICATION INTO TWO, TIMED WITH MAIN NPK APPLICATIONS. BAND ALONG THE IRRIGATION DRIPLINE
TREE CROPS (IMMATURE, NON-BEARING)	200-400 KG/HA*	SPLIT APPLICATION INTO TWO, TIMED WITH MAIN NPK APPLICATIONS. BAND ALONG THE IRRIGATION DRIPLINE
VINES (MATURE BEARING)	200-400 KG/HA*	SPLIT APPLICATION INTO TWO, TIMED WITH MAIN NPK APPLICATIONS. BAND ALONG THE IRRIGATION DRIPLINE
VINES (IMMATURE NON BEARING)	150-300 KG/HA*	SPLIT APPLICATION INTO TWO, TIMED WITH MAIN NPK APPLICATIONS. BAND ALONG THE IRRIGATION DRIPLINE
SUGAR CANE	300-600 KG/HA*	AT PLANTING OR BROADCAST IN RATOON CROP
BERRIES	500-750 KG/HA	AT PLANTING
FIELD CROPS (INCLUDING CEREALS, PULSE CROPS, OILSEEDS, COTTON, MAIZE)	150-300 KG/HA	AT PLANTING
TURF	250-500 KG/HA	TOPDRESS AS REQUIRED

*Use higher application rates when soil fertility and silicon levels are low.

Agrisilica 2-5 mm granules

Agrisilica Turf 0-2mm granules

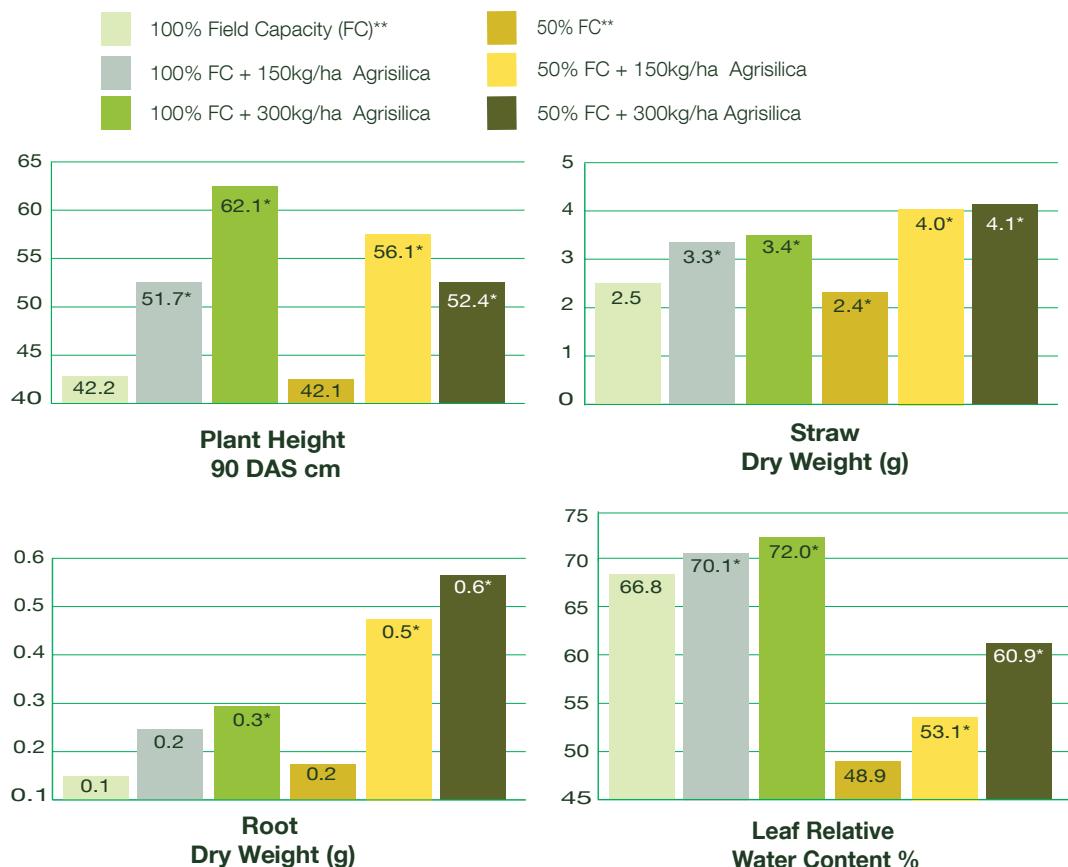
are now packaged in attractive new 25 kg bags



Trial of Month

A replicated trial was conducted on rice to demonstrate the value of Agrisilica in drought stress (water deficit) conditions.

The replicated pot trial was conducted by the University of Agricultural Sciences, Bengaluru:



*Field Capacity is the amount of water held by the soil after excess water has drained away

**Results are statistically significant ($P=0.05$)

Conclusions :

Applying Agrisilica at different rates had a significant effect on growth parameters (plant height and biomass weight) and the leaf relative water content on rice plants. The greatest effect of Agrisilica was when plants were grown under the most stressful conditions i.e. 50% Field Capacity.

50% Field Capacity is considered to be a significant drought stress imposed on rice plants



Agrisilica - Agrisilica / Control - Control
300 kg/ha 150 kg/ha
100% Field Capacity

Control - Control / Agrisilica - Agrisilica
300 kg/ha 150 kg/ha
50% Field Capacity