

Alethea mode of action

Our patented Alethea™ technology is designed to help crops cope with abiotic stress by increasing antioxidant production.

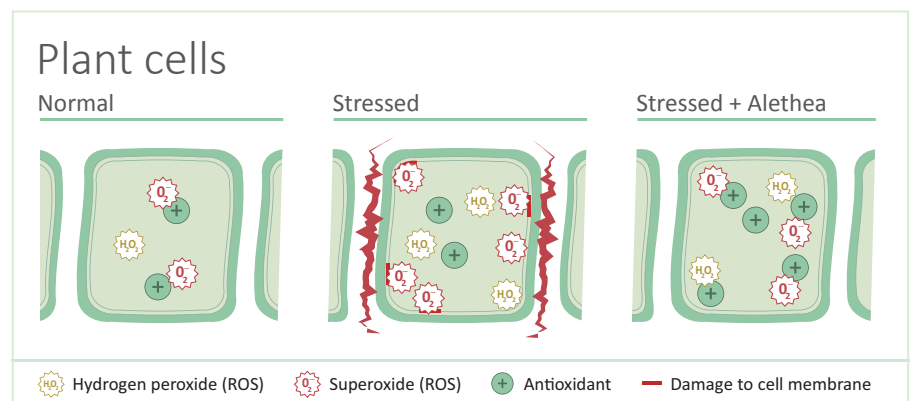


Benefits of Alethea technology

- ✓ Increased antioxidant production
- ✓ Improved resilience against abiotic stress
- ✓ Improved crop quality, and yield
- ✓ Compatibility with other agrochemical foliar sprays.

Antioxidants and reactive oxygen species (ROS)

Plants naturally contain ROS, such as superoxide (O_2^-) and hydrogen peroxide (H_2O_2), at low levels, and these are neutralised by antioxidants. However, under stressed conditions ROS levels can increase and there may be insufficient antioxidant activity to control them. When ROS levels are too high they can cause cell damage, for example, by affecting cell membranes.



The role of Alethea

Alethea contains a novel (patented) combination of plant signalling analogues that can cause plants to increase antioxidant production. More antioxidant activity combats ROS, and in doing so helps plants to mitigate the effects of abiotic stress, such as heat, cold, salinity, UV and drought.

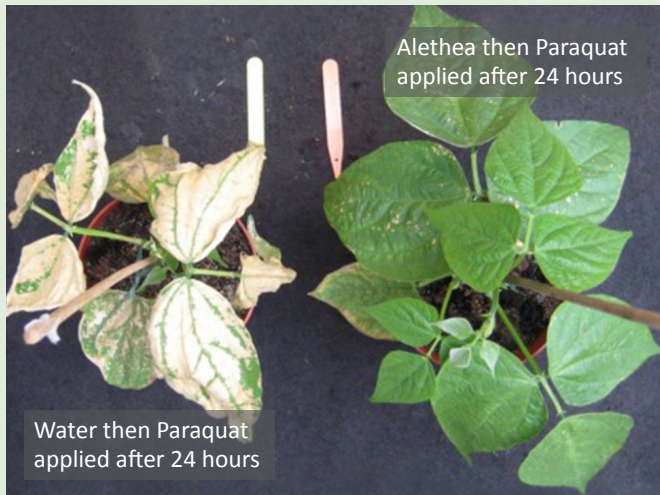
Use of paraquat herbicide as a model stress inducer to demonstrate increased antioxidant activity

The Plant Impact R&D team worked with experts at Lancaster University, UK to demonstrate the effect of the Alethea technology on antioxidant production. The active ingredient of paraquat herbicides (Methyl Viologen) was used as a model stress. This inhibits photosynthesis and instead produces destructive ROS, especially the superoxide free radical.

A sublethal dose of paraquat was used in trials, this showed leaf

damage (scorch) a few days after application in the control plants. However, when plants were treated with Alethea 24 hrs earlier, the leaf damage from paraquat was greatly reduced (see images below). This was the case in all of the plant species tested.

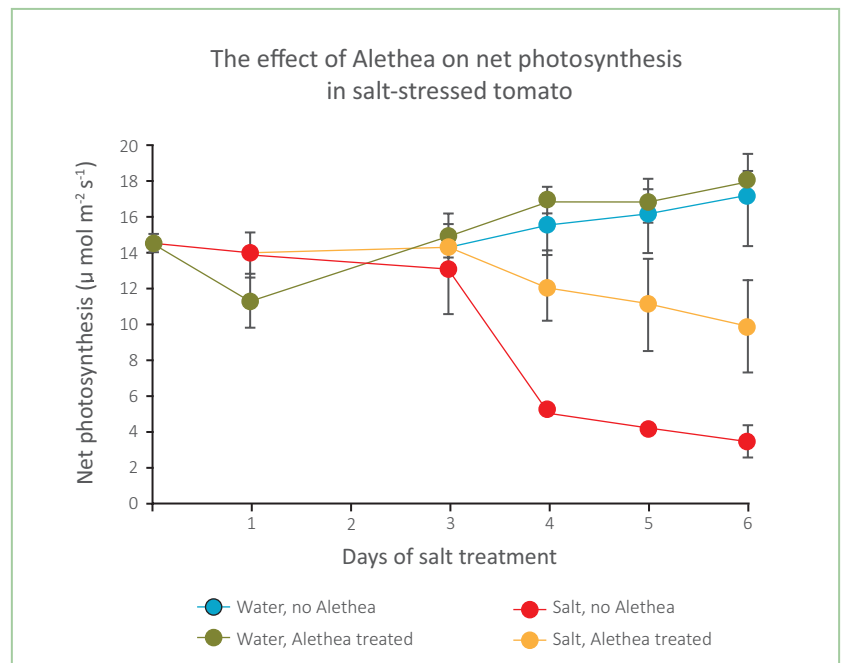
Samples of plant materials were taken at various timepoints for laboratory analysis. Higher antioxidant activity was measured and this was further supported by gene expression analysis.



Improved photosynthesis with Alethea under stressed conditions

The team at Lancaster University also looked at the effect of applying Alethea to plants exposed to abiotic stress. A high strength salt solution (100mM NaCl), was added to the pots of tomato plants (variety Ailsa Craig). Leaves showed a rapid reduction in net photosynthesis (by measuring the amount of carbon dioxide taken up by specific leaves) after 3 days, when compared to plants that were not given the salt solution, this was followed by a slight recovery. Interestingly, the salt treated plants that were sprayed with Alethea recovered better than those sprayed only with water.

In a subsequent experiment, tomatoes were exposed to a more gradual build up of salt in the root zone from a 40mM NaCl solution. In this case it took around 4 days for the salt treatment to have an impact, but again spraying with Alethea gave some amelioration against the effects of salt (see graph to right). Alethea reduced the impact of the salt stress by around half.



Find more information on our Alethea technology at:
www.plantimpact.com e: info@plantimpact.com