



# BIOZ

Biostimulant product line from ICL

# Environmental factors affecting plant development

Plants face constant challenges handling the physico-chemical conditions imposed on them by the environment. When these environmental conditions are not ideal for growth, plants are considered to be under stress, leading to potential plant damage and reduced yield.

## High light intensity

- Photoinhibition;
- Production of ROS;
- Inhibition of PSII repair system;
- Reduction of CO<sub>2</sub> fixation.

## High temperatures

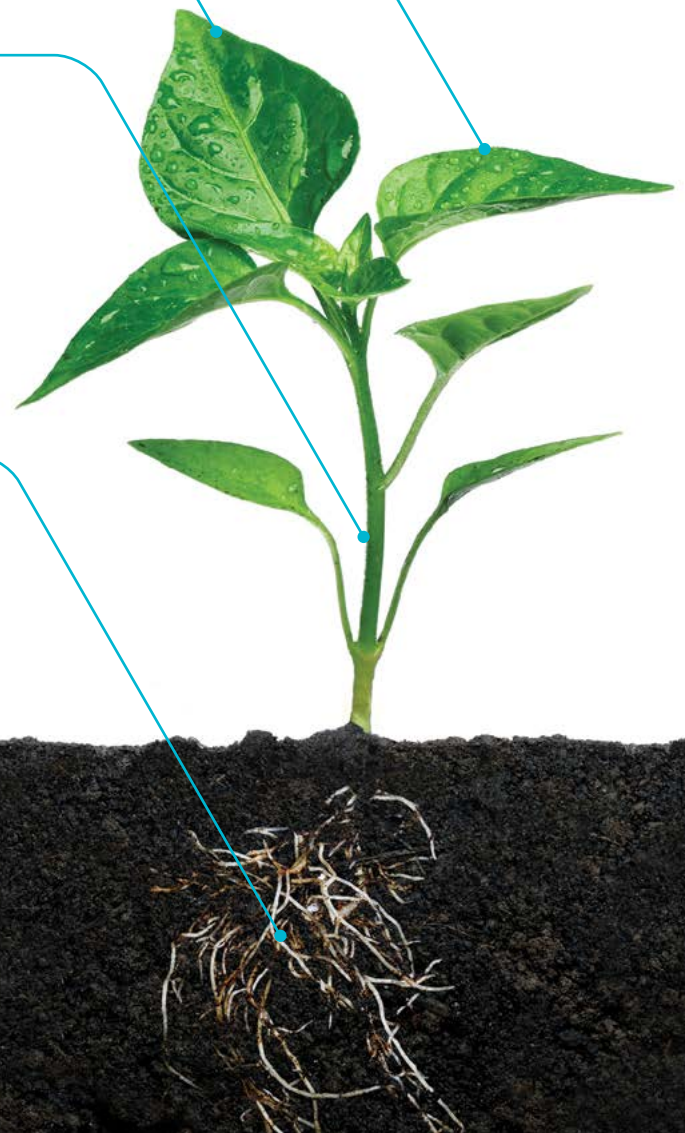
- Destabilization of membranes and proteins;
- Photosynthetic and respiratory inhibition;
- Production of ROS;
- Cell death.

## Water deficit

- Reduction of leaf expansion;
- Reduction of metabolic activities;
- Stomatal closure;
- Photosynthetic inhibition;
- Leaf abscission;
- Production of ROS;
- Cell death.

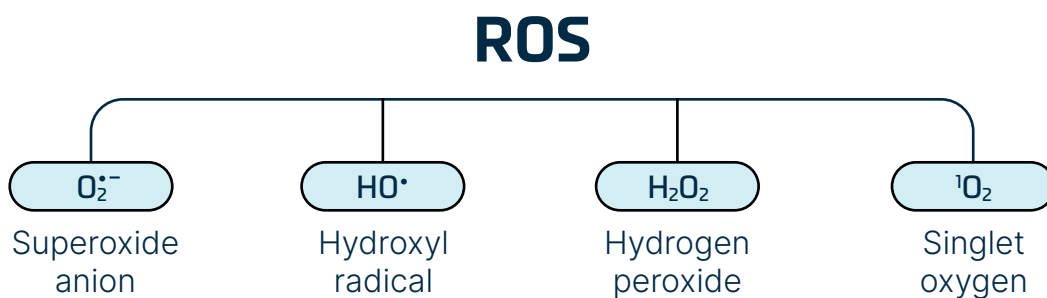
## Soil compaction

- Reduction in respiration;
- Low ATP production;
- Production of toxins by anaerobic
- Production of ROS;
- Stomatal closure.



# Reactive Oxygen Species

Also known as ROS, these are normal by-products of plant metabolism. They are essential for the functioning of plant cells, and for improving plants' tolerance to stress. But high ROS levels can cause irreversible damage to plant cells.



## Main ROS impacts

An imbalance or accumulation of ROS can inhibit metabolic processes essential to survival, leading to cell death.

### ROS can

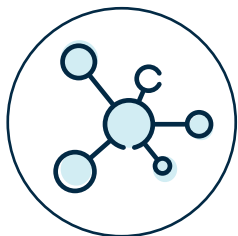
- Weaken cell walls
- Lead to stomatal closure
- Induce cell senescence
- Impact photosynthesis

## Anti-stress

Antioxidant enzymes are part of the mechanism for reducing ROS levels, making them crucial for stress tolerance in plants. These mainly include catalases (CATs), superoxide dismutases (SODs), and peroxidases (PXs).

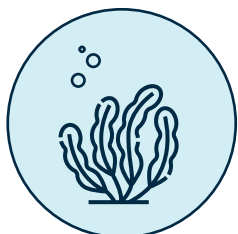


# 3 Stress Mitigators for Damage Control



## Amino acids

Amino acids are one of the well-known compounds for mitigating natural abiotic stresses. Glutamic acid, valine, proline, leucine, and cysteine are examples of amino acids efficient at stress attenuation.



## Algae extracts

Algae extracts trigger adaptability mechanisms which make plants more tolerant to drought, reduce the degree of wilting, delay leaf senescence, improve leaf stomatal conductance while also boosting defense mechanisms.



## Micronutrients

Micronutrients play a key role in reducing the effect of a variety of plant stresses. They are highly efficient in activating enzymes from the antioxidant complex. The antioxidant defense system inhibits and reduces the damage caused by the production of ROS and copper, zinc, and manganese micronutrients act as activators or cofactors of the antioxidant enzymes SOD-CU/Zn, and SOD-Mn.

## **Emerald and Sapphire**

### Greener plants and low stress

Compositions formulated to promote balance between growth stimulus and anti-stress-promoting compounds. Together they form a synergistic association of algae extract, amino acids, and micronutrients, which makes an application of Emerald and Sapphire unparalleled at reducing damage caused by natural abiotic stresses or phytotoxicity. These products are excellent at increasing plant metabolism, keeping crops at a state of high physiological activity to ensure they handle stress conditions with minimal impact on crop performance and yield.



## Gomed

### Stimulus for fast growth and recovery

Gomed has everything needed for a full recovery from stress. Gomed's extremely efficient composition combines specific amino acids, algae extract, and micronutrients. The supply of compounds sourced from algae extracts, together with manganese and zinc, activate plant enzymes to neutralize deleterious compounds and produce a positive response to stresses. This unique combination makes Gomed the best stress recovery product for any crop.

The application of Gomed increased the activity of Catalase, reducing lipid degradation. A reduced damage allows higher physiological activity and more free energy to the plant, resulting in an increase in protein content. The stress management with Gomed increased yield by 8.2% bags/ha (492 kg/ha).





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