

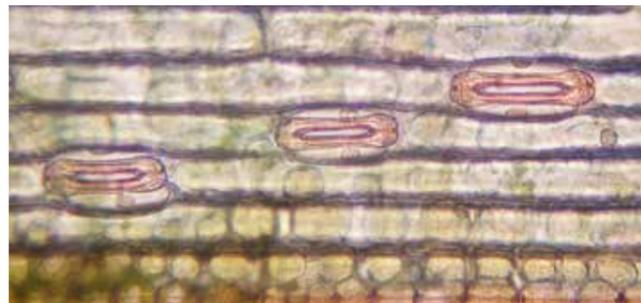
Drought stress

How does the plant react to drought stress?

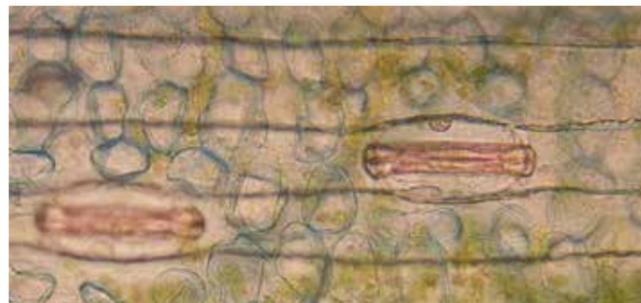
During their development, plants have developed effective mechanisms to survive temporary or prolonged periods of drought. These include **anatomical adaptations** such as leaves with thick cuticle, small leaves, formation of hairs as protection against evaporation and overheating, but also many physiological adaptations. And a **well-developed root system is crucial**.

Short-term dry spells are a major stress for plants. In agriculture, drought stress is one of the major causes of reduced yields or even complete crop failure.

Plants can **react very quickly to drought stress and control water release**. The so-called stomata are located on the leaf surface. The plant can control the opening state and thus the amount of water released (see illustration for oats).



Open stomata: Water release - water loss



Closed stomata: no water loss

At the cellular level, **many molecules** such as carbohydrates, antioxidants but especially amino acids (e.g. proline) are **accumulated** to protect the living cells.

However, closing the stomata also reduces the uptake of CO₂. This is problematic because the plant can no longer fully utilise the absorbed sunlight in photosynthesis. This creates **oxygen radicals that can damage the cells** and must therefore be rendered harmless.

Effective protection

AMALGEROL ESSENCE has been proven to reduce drought stress in tomato plants.

AMALGEROL ESSENCE has been successfully used in agriculture for many years to **strengthen plants and better protect them from stress**.

To test this known positive effect, a **scientific trial was conducted at the Vegenov Institute in France**.



In this trial, tomato plants were treated differently in the greenhouse:

- (1) Optimal supply of water: no stress.
- (2) Reduction of the amount of water to 50 %: Drought stress
- (3) Reduction of water supply to 50 %: Drought stress + treatment with AMALGEROL ESSENCE.

How do you know if a plant is stressed?

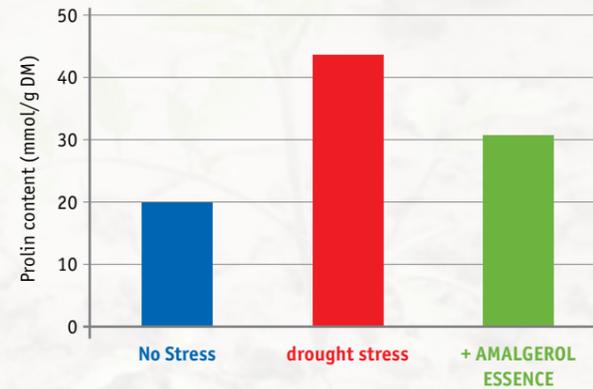
From scientific studies have shown that stress leads to an accumulation of the amino acid proline in all plants. This amino acid fulfils a variety of tasks in the defence against stress. **Proline is therefore a biochemical marker for screening stress**.

Less stress. The result of the measurements was very impressive. Plants treated with Amalgerol Essence were significantly less stressed than the plants with drought stress. Another factor measured was **stomatal conductivity**. This can be used to determine how much water the plant loses through the stomata. In the stressed plants there was a strong reduction down to 35 %. In plants treated with AMALGEROL ESSENCE, however, the reduction to 55 % was significantly lower.

No yield loss. While the plants with drought stress showed strong yield losses, the **yield with AMALGEROL ESSENCE was almost identical to that of the optimally supplied plants**.

AMALGEROL ESSENCE

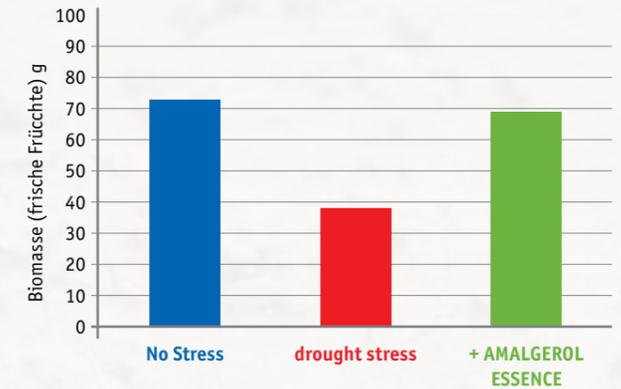
Less stress



The content of the amino acid **proline increases strongly in the cells of stressed plants**.

In plants treated with **AMALGEROL ESSENCE**, the **increase is significantly lower**, indicating that the plant has less stress.

No loss of yield



The drought stress led to a reduction in yield of almost half in the untreated tomatoes.

Whereas plants treated with **AMALGEROL ESSENCE**, had practically **the same yield as the plants optimally supplied with water**.

How does AMALGEROL ESSENCE with drought stress?

- ▶ **Better water supply** through increased root growth and optimal soil structure (prevention)
- ▶ Osmolytically active substances (carbohydrates, amino acids) for **increased cell integrity**
- ▶ Antioxidants for **defence against oxygen radicals**

