

Comparative Study: the effect of TerraCottem[®] and a combination of fertilisers & polymer on plant growth

This report illustrates TerraCottem[®]'s benefits on plant growth and water use efficiency in comparison with those of a combination of a pure polymer and fertilisers. The result of the synergetic effect of TerraCottem[®]'s components is far more superior than that of the combination of fertilisers and polymers.

What is TerraCottem[®]?



... was developed at the University of Ghent
... is a physical soil conditioner
... stimulates biomass production and plant growth
... increases the capacity of the soil or substrate to retain water and nutrients
... is a blend of more than 20 substances, all assisting plant growth in a synergetic way

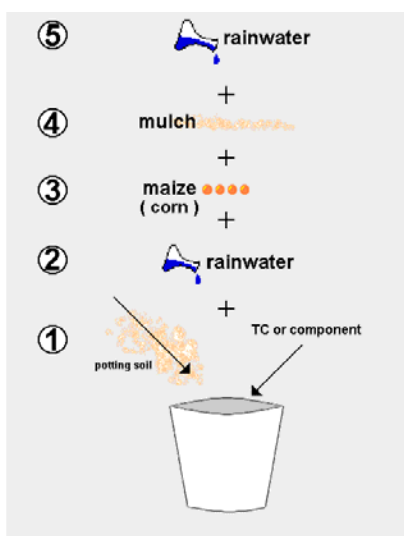
These substances can be divided in 6 groups:

- 1) Hydroabsorbent polymers
- 2) Soluble mineral fertilisers
- 3) Slow release mineral fertilisers
- 4) Synthetic organic fertilisers
- 5) Carrier material LAVA
- 6) Growth stimulators

- Improve plant and root growth
- Increase germination
- Reduce the volume and frequency of necessary irrigation
- Stimulate microbiological activity
- help plants to withstand periods of stress by drought or transplantation
- reduce maintenance costs
- ...

Trials on maize (*Zea mays L.*)

1. TRIAL SET-UP



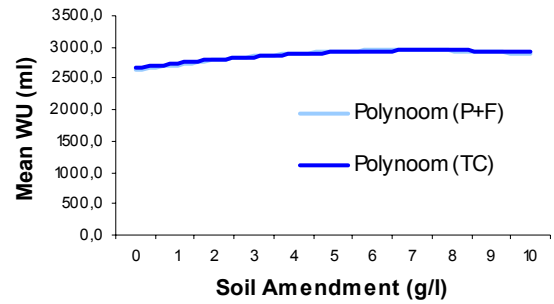
The trial was done at the Belgian Experimental Station for Ornamental Plants (Proefcentrum voor Sierteelt, PCS). Half of TerraCottem[®]'s composition is made out of roughly 10% of fertilisers and 40% of polymers. Therefore, in this trial X grams of TerraCottem[®] are compared to 0.1X grams of fertilisers and 0.4X grams of polymers. To have an objective trial, the fertilisers used for reasons of comparison are the same as those in the TerraCottem[®]-mixture and the polymer is one of the TerraCottem[®]-polymers. Eleven application rates of TerraCottem[®] (0, 1, 2, ..., 10 grams of TC per litre of substrate) are homogeneously mixed with the substrate. The same was done for the combination of polymer and fertilisers with the paragraph above kept in mind. Five replicates of each treatment were prepared. Each container was filled with 300 grams of potting soil and one of the above-mentioned rates of TerraCottem[®] or combination of fertilisers and polymer. Hundred ml of water was added to each container, as well as 4 kernels of maize. The substrate was covered with a mulch layer

of 60g of potting soil (1 litre = 360 g). Finally, the total weight of each container was brought to 500g by adding water. Twice a week the weight of the containers was measured and each container was re-filled to 500g with water due to water loss (evapotranspiration). This is how the water consumption is being measured. The biomass above soil level was cut and weighted 70 days after set up of the trial. The amount of biomass production per volume water is the water use efficiency.

2. RESULTS

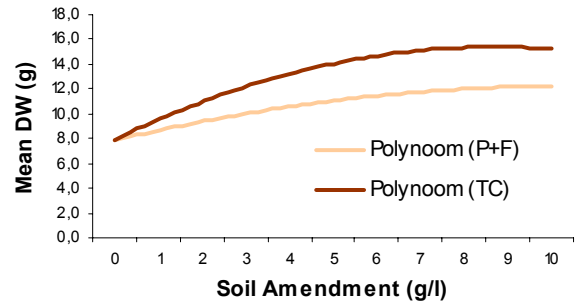
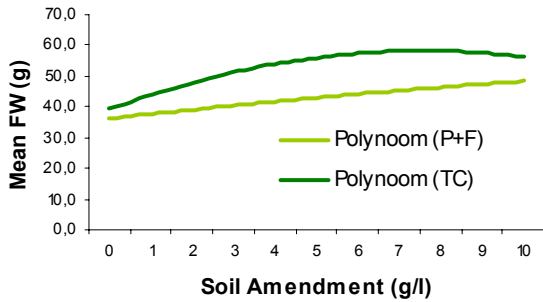
2.1 Water Use

The WU in both the substrates treated with TERRACOTTEM® and POLYMER + FERTILISERS are practically the same.



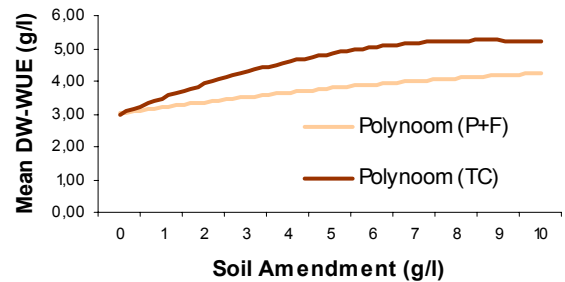
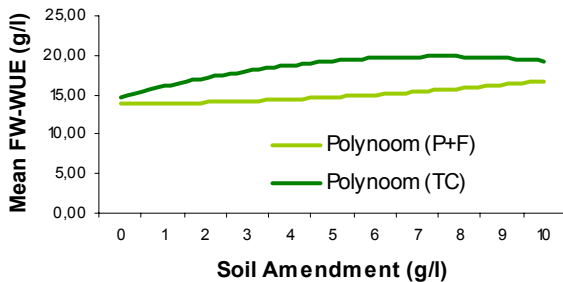
2.2 Biomass production (Fresh Weight FW and Dry Weight)

It is clear that the increase in both FW and DW biomass production due to the addition of TerraCottem® exceeds that of the combination fertilisers + polymer to the potting soil. The average FW and DW in the TerraCottem®-treated potting soil is respectively 26% and 25% higher than the biomass production in potting soil + fertilisers + polymer.



2.3 Water Use Efficiency (FW-WUE and DW-WUE)

The increase in both FW-WUE and DW-WUE due to the addition of TerraCottem® exceeds that of the combination polymer + fertilisers. On average, FW-WUE and DW-WUE in the TerraCottem®-treated substrate are here as well respectively 26% and 25% higher than those in potting soil + fertiliser + polymer.



3. CONCLUSION

When the effect on plant growth by adding various application rates of TerraCottem® or a combination of fertilisers + polymer to the potting soil is compared, this summarizing figure can be made:

This means that with the same amount and quality of fertilisers (same application rate, same NPK) and polymer (same application rate), **25% more plant growth and a 25% higher water use efficiency is achieved when using the “total package” TerraCottem®** instead of a combination of fertilisers + polymer.

TerraCottem® is more than just the combination of fertilisers + polymer. It contains:

- An optimum combination of **different types of hydroabsorbant polymers**, all screened thoroughly for best performance in the TerraCottem®-mixture. The use of different hydroabsorbent materials with different characteristics provides a much broader range of benefits than the use of a single hydroabsorbent material.
- **Root growth activators** who contain growth precursors combined with vitamin compounds, starches and proteins. They play an important role in the initial growth phase of the plant, despite representing only a small percentage of the entire mixture. They are particularly valuable in activating root cell elongation and differentiation, and for promoting leaf development and biomass production.
- A **carrier material** consisting of a particular kind of volcanic pyroclastic rock (lava). The material acts as a component binder, a vehicle for the growth stimulators and allows homogeneous distribution of all components.

It is the synergy of all of TerraCottem®’s components which determines the product’s effectiveness in growing media, and which make it a soil conditioner. The combination of hydroabsorbent, nutritive and root growth activating elements work in synergy, more effectively than any single element, to significantly benefit plant development and water use efficiency.

