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SUMMARY RESEARCH REPORT

Effects of topsoil treatments on afforestation in a dry Mediterranean climate

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This report summarises the results of a study conducted by University of Málaga, Spain in which the effects of five types of soil amendments on the afforestation success (e.g. plant growth and survival rate) of a Mediterranean semi-arid area were assessed. The amendments tested were straw mulch, mulch containing chipped branches of Aleppo pine, sheep manure compost, sewage sludge from a wastewater treatment plant and TerraCottem® Universal. This research confirms the positive effect of the TerraCottem® soil conditioning technology on plant growth.

El Pinarillo experimental site (Sierra Tejeda, Almijara y Alhama Natural Park)

1. Facts & Figures

- Topography: very steep and marble mountains
- Climate: dry Mediterranean climate
  - ➔ mean annual temperature: 18°C
  - ➔ mean annual rainfall: 589mm/yr
- Soil: eutric Leptosols
  - ➔ high level of rock fragment cover on the surface (> 50 %)
  - ➔ high gravel content in the profile
  - ➔ sandy–loam texture (sand: 60 %, silt: 32 %, clay: 8 %)
- Plots: 12 plots, 2m x 12m = 24m²
- Plants: *L. stoechas, L. dentata, L. multifida, R. officinalis,* and *T. Capitatus*;
  - ➔ 0.5 x 0.5 plant spacing
- Soil amendments:
  - straw mulching (SM),
  - mulch composed of chipped branches of Aleppo pine (PM),
  - sheep manure compost (SH),
  - sewage sludge from a wastewater treatment plant (RU), and
  - TerraCottem® Universal (HP)
  - ➔ 2 replicates each = 10 plots + 2 control plots
  - ➔ 1000kg/ha each

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WATER EFFICIENCY waterwise

2. Monitoring

- Seedlings were assessed twice a year in the period 2011–2014;
- Parameters:
  - Survival rate
  - Soil parameters (electrical conductivity EC, soil organic carbon (SOC), pH, pF)
  - Plant height
  - Maximum diameter of the canopy

3. Results

A **positive effect on survival rate** for all species was significantly evident in the case of TerraCottem® Universal with little to no mortality.

In the TerraCottem® Universal plots, significant differences in diameter and height were observed depending on the species used: **taller plants** with **bigger maximum canopy diameters** in 4 out of 5 species (the 5th having a high standard deviation).

No effect of TerraCottem® Universal on EC, SOC nor pH.

Positive effect of TerraCottem® Universal **on plant available water content** (AWC).

4. Conclusions

QUOTE:

"Under dry Mediterranean climate conditions, the afforestation success (e.g. plant growth and survival rate) varied depending on the amendments applied to the soil in the experimental plots."

"The amendments, applied to the soil to improve plant survival, did not cause significant changes to the soil organic carbon content, pH, or electrical conductivity."

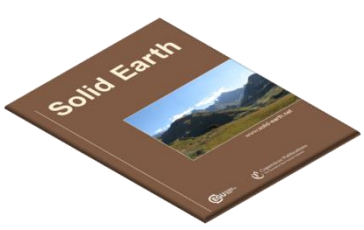
"Significant differences in the water available for plants occurred among the various soil amendment treatments, with the straw mulch, Aleppo pine, and TerraCottem® Universal treatments having very positive effects on plant growth."

"In terms of land management, this study shows that the addition of mulch or TerraCottem® Universal can reduce transplanting stress and improve the success of afforestation programs by reducing the mortality of plants."

UNQUOTE

The full article can be downloaded on the webpages of:

- Solid Earth: http://www.solid-earth.net/7/1479/2016/se-7-1479-2016.pdf



- TerraCottem: http://terracottem.com/new-study-effects-topsoil-treatments-afforestation-dry-mediterranean-climate