



EcoFungi – Trial in tomato (*Lycopersicon esculentum*) during propagation in the greenhouse

Product: EcoFungi
Crop: Tomato

Trial setting: Nursery
Location: Cochabamba, Bolivia

Oscar Colque Fuentes, Hans Mercado & Ángel Carrillo Fuentes

The potential yield of tomato in the region oscillates between 30 to 45 tons ha⁻¹ (CNPSH, 2001). However, the average yield currently obtained is between 26.7 and 30.4 tons ha⁻¹. This represents an economic loss between 1,031 and 2,357 U\$ per hectare per production cycle.

The main causes of yield loss are mortalities caused by nematodes and the pathogenic fungi *Fusarium*, *Phytophthora* and *Rhizoctonia* (Nuez, 2001). The use of chemical pesticides helps control pathogens for a short time, but after the degradation of these compounds the pests and pathogen populations rebound, leading to root damage and mortality (Rosero, 2006). EcoFlora was evaluated as an alternative to chemical pesticides, to improve plant development and reduce plant mortalities.

Methods

The trial was carried out in a greenhouse from the National Center of Seed Production in Cochabamba, Bolivia. The temperature range in the greenhouse during the experimental period oscillated between 16.35 and 28.2°C.

We used certified tomato seed variety Pioneer from the Centro Nacional de Produccion de Semilla de Hortalizas Cochabamba.

The substrate used was made from burnt rice hull, lime, peat moss, and coarse sand at a ratio of 1:1:1:0.5. Two thirds of the substrate were disinfected with water vapor (105 °C for 55 minutes), while the remaining one third was not treated.

Three treatments were evaluated:

(a) EcoFungi applied to the seed at a concentration of 40 g ha⁻¹. Treatment designation: EcoFungi SD

(b) EcoFungi applied to the substrate. Treatment designation: EcoFungi ST
(c) Control. Treatment

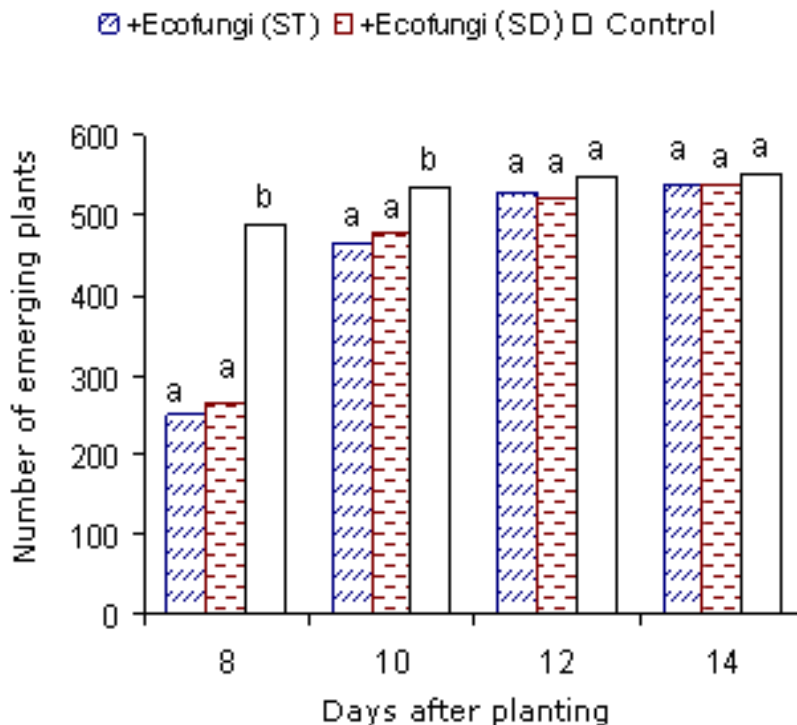
A randomized block experimental design was used with three replicates per treatment, each one of them with 3 trays of 128 cells; one seed was placed per cell for a total of 1,152 plants. All plants were watered three times a day.

The following measurements were carried out: Plant emergence, plant height (cm), and foliar, root and whole plant dry weight during a period of 41 days.

The data was analyzed by the randomized block design of Steel and Torrie (1992), and the comparison between treatments was carried out by the least significant difference test and the t-student distribution using the program SAS.

Results

Plant emergence

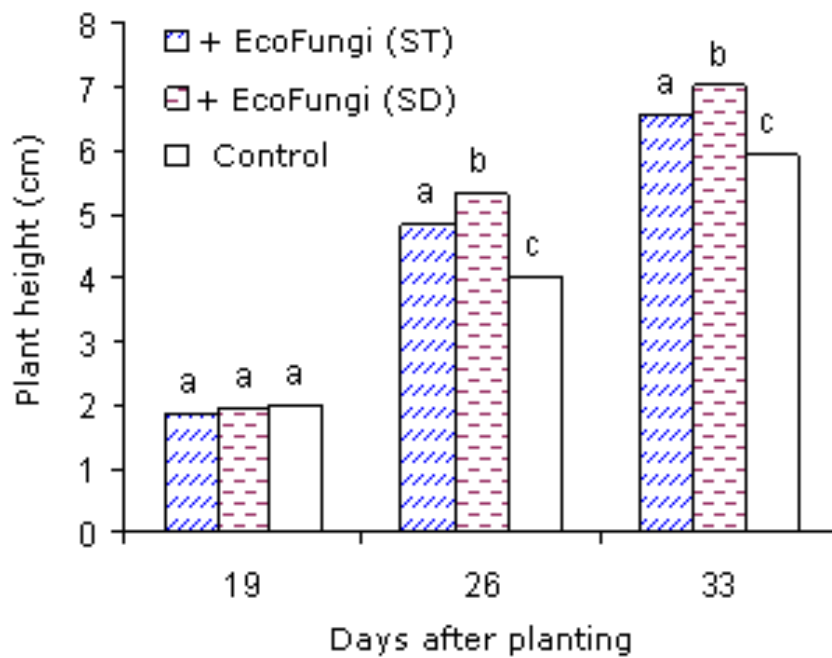


There were significant differences ($P < 0.05$) in plant emergence between the three treatments after 8 and 10 days after planting. The control treatment had higher emergency rates than either of the two other treatments. After 12

days of planting there were no differences among treatments in emergency rates as shown in the previous graph.

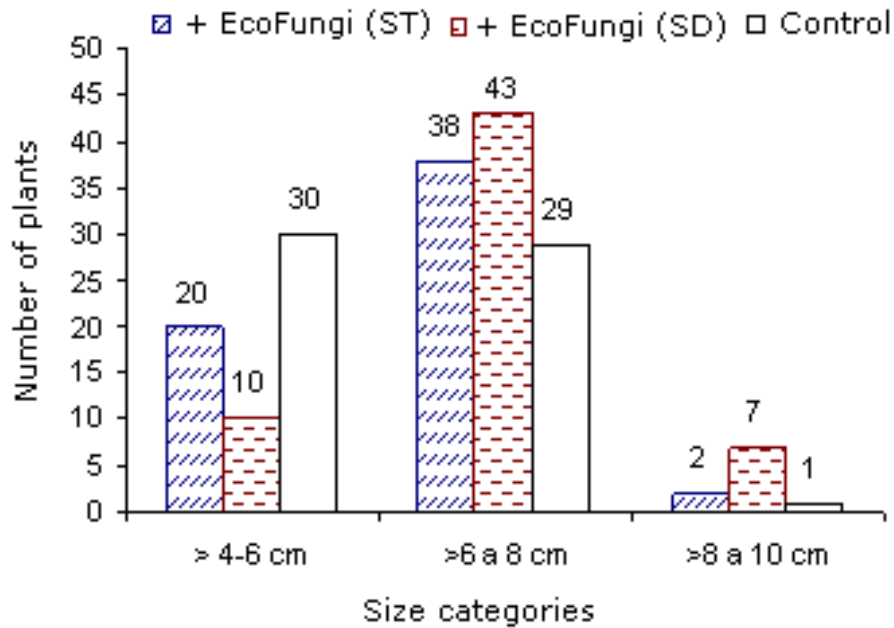
Plant height

There were no significant differences in plant growth after 19 days of culture, but after 26 and 33 days the EcoFungi treated plants were significantly larger than the control, particularly the plants that were treated at the seed level.



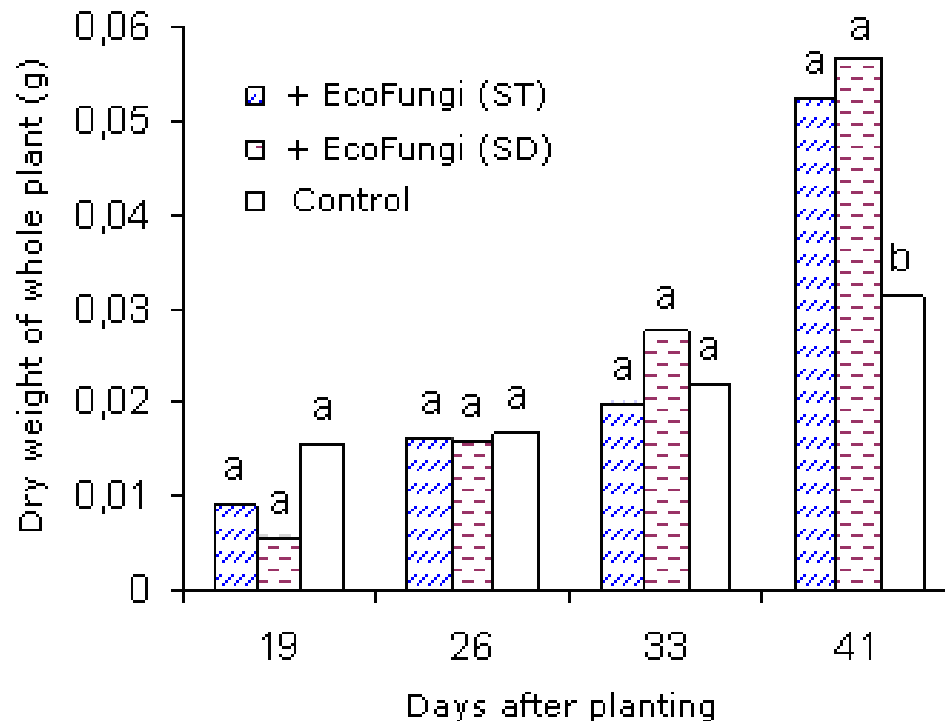
Size categories

Thirty three days after planting all plants were separated in three size categories, smaller than 6 cm, 6 to 8 cm, and 8 to 10 cm. The largest proportion of plants in the smallest category corresponded to control plants. In contrast, there were higher proportions of plants in the 6 to 8 cm and 8 to 10 cm categories under both EcoFungi treatments than in the control.



Plant dry weight

Plant dry weights were not statistically different between treatments at 19, 26 or 33 days after planting. However, 41 days after planting plants inoculated with EcoFungi had a significantly higher dry matter weight than the control plants.



In conclusion, tomato plants inoculated with EcoFungi had similar emergence rates than control plants; however, plant growth rate and dry matter weight were significantly higher in EcoFungi treated plants than controls 41 days after planting.

References

- CNPSH (Centro Nacional de producción de Semilla de Hortalizas). 2001. Presentación de Variedades. Villa Montenegro, Cochabamba. 24p.
- Nuez, F. 2001. El cultivo del tomate. Mundi – Prensa. México, D.F. 793 p
- Rosero, J. 2006. 2006. Factores Ecofisiológicos en el Desarrollo de Cultivos Agrícolas. Ecuador, Mundo Verde. 1 disco compacto.