in *Solanum lycopersicum* L. (Solanaceae)

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**ABSTRACT**: **in *Solanum lycopersicum* L. (Solanaceae)**. Chloro

**Key words:** chlorophyll, dry mass.

**RESUMEN:** Se midió la

**Palabras clave**: Fluorescencia, partición.

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*Solanum lycopersicum* L. (tomato) is among the most important and widely traded vegetable crops in the world and has a central position in the human diet as source of vitamins, carbohydrates, proteins, and mineral nutrients ([Seddon et al., 1994](#_ENREF_3); [Szeto, Tomlinson, & Benzie, 2002](#_ENREF_4)). Tomato plants exhibit rapid growth and differential dry mass accumulation in response to changes to nitrogen supply ([Ortigosa, Valderrama‐Martín, Ávila, Cánovas, & Cañas, 2019](#_ENREF_2)). Tomato was used as a model plant to study of *Chl* fluorescence application for diagnosis of effect N and light deficiency. We evaluated growth, dry mass partitioning, and *Chl* concentration of tomato grown in a greenhouse. Finally, due to the research project has been developed in the frame of a “Plant Anatomy and Physiology” course for students of second year of Biology Degree in National University of Costa Rica, it is desired to make the extension to address of a *GitHub* repository for access to *R* script, database, and statistical analyses results (see: https://github.com/JPASTORPM/Project---Trichoderma.git). This can be used to elaborate scientific analysis reports, for teaching in order to aid students data interpretation and to increase scientific communication skills.

Materials and Methods

**Study area:** The research was conducted between October and December 2018 in the greenhouse of the Laboratory of Functional Ecology and Tropical Ecosystems (LEFET), National University of Costa Rica, Heredia. According to [IMN (2019)](#_ENREF_1" \o "IMN, 2019 #464), average monthly temperature, precipitation, and relative humidity of air during the study period were between 19.5-20°C, 184.2-441 mm, and 83-88% (max.-min.), respectively.

**Experimental design, plant material, and growth conditions:** The experiment consisted of two light

**Data analysis:** *H*,

**Ethical, conflict of interest and financial statements:** the authors declare that they have fully complied with all pertinent ethical and legal requirements, both during the study and in the production of the manuscript; that there are no conflicts of interest of any kind; that all financial sources are fully and clearly stated in the acknowledgements section; and that they fully agree with the final edited version of the article. A signed document has been filed in the journal archives.

Results

Chlorophyll

Discussion

Nitrogen

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References

IMN. (2019). Instituto Meteorológico Nacional de Costa Rica. from https://[www.imn.ac.cr/en/web/imn/inicio](http://www.imn.ac.cr/en/web/imn/inicio)

Ortigosa, F., Valderrama‐Martín, J. M., Ávila, C., Cánovas, F. M., & Cañas, R. A. (2019). Understanding Plant Nitrogen Nutrition through a Laboratory Experiment. *Biochemistry and Molecular Biology Education*.

Seddon, J., Ajani, U., Sperduto, R., Hiller, R., Blair, N., Burton, T., . . . Miller, D. (1994). Dietary carotenoids, vitamin-A, vitamin-C, and vitamin-E, and advanced age-related macular degeneration. *Jama-Journal of the American Medical Association, 272*(18), 1413-1420.

Szeto, Y. T., Tomlinson, B., & Benzie, I. F. (2002). Total antioxidant and ascorbic acid content of fresh fruits and vegetables: implications for dietary planning and food preservation. *British journal of nutrition, 87*(1), 55-59.

Co-auther Letter