



Area: Biology

Nº FAPESP: 2023/03330-3

Project title: Light and stress signal transduction pathways: how to optimize multiple responses for improving crop yield and quality

Specific area: Plant Molecular Physiology

Principal Investigators: Luciano Freschi and Maria Magdalena Rossi

Institution: Departamento de Botânica, Instituto de Biociências, Universidade de São Paulo

Application deadline: 31/05/2024

Publication date: 07/05/2024

Address: Rua do Matão, 277. Cidade Universitária, CEP05508-090, São Paulo, SP, Brazil

### **Abstract**

Knowing the challenge imposed on science for ensuring food security in times of climate change, it is essential to identify the genetic variables that modulate crop yield and quality, understand their mechanisms of action, and evaluate how these mechanisms are affected by the changing environmental conditions. In this context, the general objective of this proposal is to study common factors involved in light and stress signal transduction, aiming to optimize multiple responses for improving the production and nutritional quality of food feedstock. Using *Solanum lycopersicum*, an eudicot of high nutritional interest for human diet, as model species; this project proposes to expand the knowledge about the function of light signaling factors, as well as tocopherol metabolism, a well-known stress protector, in the crosstalk between light and biotic and abiotic stress signaling pathways. To achieve the objective, the following activities are proposed: (i) to investigate the role of phytochrome (PHY)-mediated light signal transduction and nitric oxide (NO) signaling on tomato stress responses; (ii) to investigate the role of PHY-mediated light signal transduction and NO signaling on tomato fruit metabolism; (iii) to investigate the role of B-box (SIBBX) and interacting proteins in shade avoidance and biotic stress; (iv) to investigate the link between SIBBXs and epigenetic regulation and; (v) to engineer plants for high tocopherol content for stress tolerance and nutritional quality improvement.

### **Candidate profile:**

PhD in plant biology or related field within the last four years.

Knowledge and experience in molecular biology, protein-protein and protein-DNA interaction and transient expression techniques; plant transformation; plant-pathogen interaction; bioinformatics; statistics; and scientific writing.

Candidates should be creative and capable of developing a competitive research project while working in autonomy under the supervision of a team leader.

Besides performing original research, the successful candidates are expected to participate in graduate student project and supervise undergraduate students.

**Vacancies: 2**

1) Tocopherol metabolic engineering for stress tolerance and nutritional quality improvement

For application send:

- a) CV;
- b) intention letter;
- c) recommendation letter.

To Magdalena Rossi exclusively by email ([mmrossi@usp.br](mailto:mmrossi@usp.br)) until May 31<sup>st</sup>, 2024.

General information:

The initial contract is for 12 months, but it can be extended up to 04/30/2029. The stipend is R\$ 9.047,40 monthly. Starting time will be January 1st, 2025. Full time position.

2) BBX action on tomato responses to stress conditions

For application send:

- a) CV;
- b) intention letter;
- c) recommendation letter.

To Luciano Freschi exclusively by email ([freschi@usp.br](mailto:freschi@usp.br)) until May 31<sup>st</sup>, 2024.

General information:

Full time position. The initial contract is for 12 months, but it can be extended up to 04/30/2029. The stipend is R\$ 9.047,40 monthly. Starting time will be September 1st, 2024.