FOLIA
Food Laboratory for Innovation and Agrobiodiversity

Logo

UNIVERSITÀ DI SIENA 1240

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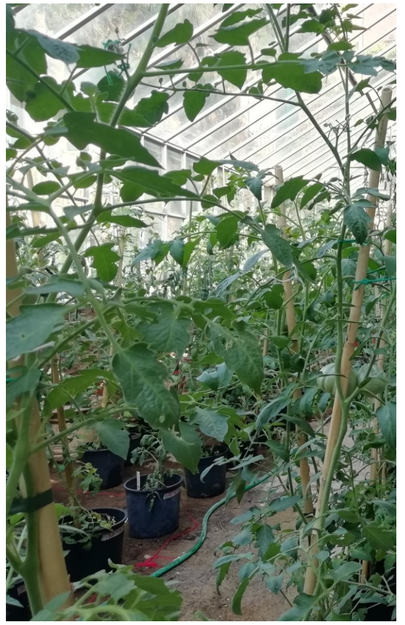
DIPARTIMENTO: Life Sciences

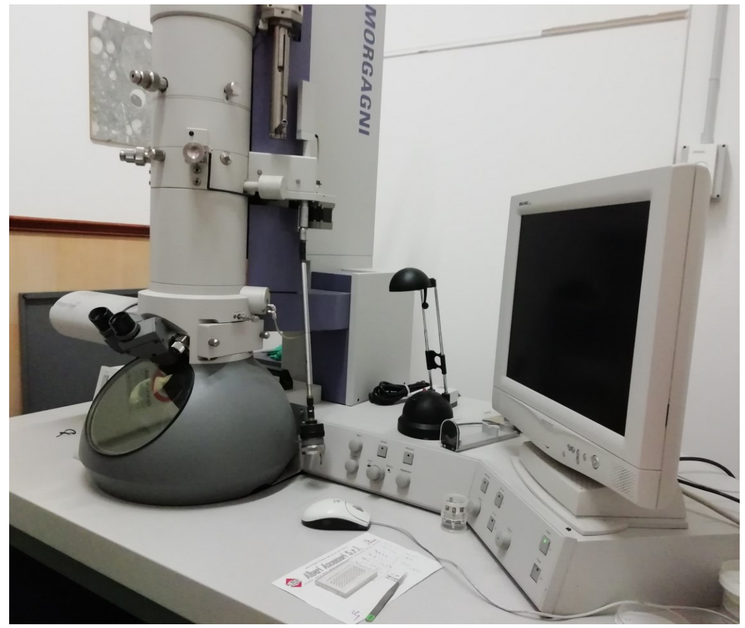
LABORATORY OF MOLECULAR AND CELL BIOLOGY OF PLANTS

Research activity

1. Self-incompatibility. This research line aims at improving crops and agricultural production (e.g., preventing self-fertilization in plants that normally allow it, increasing genetic variability and potentially disease resistance and productivity), biodiversity conservation, at predicting and mitigating the effects of climate change on food production (environmental stresses alter the incompatibility barrier). Understanding the mechanisms of self-incompatibility can aid the production of hybrid plants with desirable traits.
2. Environmental stresses. This research activity concerns the study of the effects of environmental stresses on plants, both pollen and woody plants. The research aims to understand how plants implement protective barriers against environmental stresses. The effects of specific stress conditions (heat, cold, drought, UV) on the growth and productivity of plants with commercial interest (tomato, olive) are studied.
3. Genetic traceability and food safety. This research line focuses on the identification and verification of the origin and quality of food products through molecular biology techniques. Genetic traceability helps prevent food fraud, ensures the authenticity of products, and protects consumers. In addition, it can help improve the management of genetic resources in cultivated plants.

Images





Technologies and services

We currently use different techniques and instruments, including:

1. Biochemical analyses: These analyses involve the use of techniques such as one- and two-dimensional electrophoresis, high-performance liquid chromatography (AKTA) to identify and quantify protein compounds found in plants.
2. Molecular analysis: Molecular biology techniques, such as PCR, DNA sequencing, and gel electrophoresis, are critical for studying plant genetics and understanding the molecular mechanisms underlying their life processes.
3. Microscopic analysis: Microscopy, both optical and electron microscopy, is essential for examining the structure and morphology of plant cells and allows the visualization of specific cell structures and molecules.
4. Physiological analyses: These analyses involve the study of the critical functions of plants, such as photosynthesis, respiration, and transpiration. Instruments such as transpiration meters are commonly used in these analyses.

Various services can be offered to companies, especially those in the agricultural and food sectors:

1. Biochemical analyses to help companies identify and quantify protein compounds in their products or plant samples.
2. Molecular genetics services, including plant genotyping, identification of genetic variants that influence desirable traits, and verification of varietal authenticity and purity.
3. Microscopy, to help companies understand the structure and morphology of plant cells in their products.
4. Physiological analysis, to help companies optimize growing conditions for their plants and understand how plants respond to various environmental stresses.

Applications and collaborations

1. Funding from the Tuscany Region for the TOSCOLATA project: nutraceutical enhancement of innovative Tuscan cocoa-based food products, PRAF 2012-2015
2. Funding from the Tuscany Region for the TOSCO MAGNATUM TRACE project: Molecular and digital tracking of Tuscan white truffle products, PRAF 2012-2015
3. Funding from the Ministry of University and Scientific Research (PRIN) for the study of the self-incompatibility process in fruit plants (2015)
4. Funding from the Tuscany Region for the BASIQ (Sustainability, Quality and Identity of Food) project under the PSR 2014/2020
5. Funding from the Tuscany Region for the INNOVACEREALI project under the PSR 2014/2020
6. Funding from the Tuscany Region for the development of artificial pollination systems in olive trees(OLIMPOLLI, 2018-2021)
7. Funding from the Tuscany Region for the PIF Drago project for the characterization and use of flours derived from locally grown wheat (2019-2020)
8. Funding from the Tuscany region for the NoBrett project for the traceability of Brettanomyces in the wine supply chain (2021-22)
9. Progetto PRIN 2022 (2023-2025). Deciphering global warming effects on reproductive biology of Mediterranean mandarins.
10. SIM project for automated pollination in olive trees, funded by Cassa Depositi e Prestiti (2024).

For more information

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