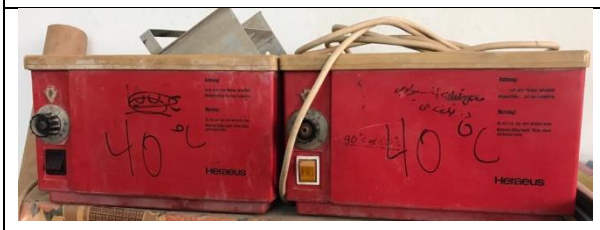
- Physiological studies, biochemical estimates and bio metabolic activity of plants under the influence of herbicides or other pesticides
- Study the vulnerability of plants to various environmental factors such as heat change, drought, salinity, light and other factors.
- Study plant nutrition and provide the best conditions for its germination and growth under the influence of various growth regulators.
- Study of enzymes at the molecular and physiological level and isoenzymes of plants placed under unsuitable environmental conditions.
- Isolation and purification of enzymes from plant cells and test the activity of certain enzymes.

Lab instruments

Device image	Description /use
	**Spectrophotometer** is used to measure the intensity of a light beam at different wavelengths.
	A ***fluorometer*** or ***fluorimeter*** is a device used to measure parameters of visible spectrum fluorescence

	***flame photometer*** is used to determine the concentration of certain metal ions.
	**Water bath** is used to incubate samples at a constant temperature over a long period of time
	A **rotary evaporator** is a device used for the efficient and gentle removal of solvents from samples by evaporation.
	A **pH meter** is an instrument used to measure hydrogen ion activity in solutions
	**Incubator** is used to grow plant seeds in controlled conditions (e.g. temperature, humidity, light, …).

	**Electronic balance** is used in the accurate measurement of weight of materials.
	The **refrigerator** is used to maintain samples, in a controlled environment, various fluids and substances, so that they are kept in good condition the lower the temperature, the lower chemical and biological activity.
	A **photosynthetic system** was used to measure CO_2 assimilation rate (A), stomatal conductance (gs), transpiration rate (E), and internal CO2 concentration/ambient CO_2 ratio (Ci/Ca).
	A **centrifuge** is a device that uses centrifugal force to separate various components of a fluid.

Staff members

Name	Scientific degree	e-mail	Specializations
Khalaf Ali Fayez	Professor	khalaffayez@yahoo.com	Plant physiology
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Ass. Lecturers & Demonstrators			
Name	Scientific degree	e-mail	Specializations
Amany Edrees	BSc.		Plant physiology

Institutions and entities benefiting from the laboratory

- **Faculty of Agriculture**
- **Faculty of pharmacy**
- **Faculty of science**

Microbial Genetics

Research plan for Genetics Laboratory

- Studies on antibiotics resistant bacteria and identifying the responsible genes using PCR.
- Biosynthesis of different metals nanoparticles and studying its antimicrobial and the synergistic effects of; nanoparticles with antibiotics, anti-inflammatory properties, and blood coagulation properties.
- Identifying of bacteria using traditional and molecular tools.
- Studying of plasmid incidence in bacteria and its role in bioremediation of xenobiotic compounds in soil and water

Research activities:

- DNA and RNA extraction.
- Isolation and identification of bacteria.
- RFLP, RAPD, 16S r-RNA genes identification, ITS identification, rep PCR (BOX – ERIC – Rep)
- Nanoparticles synthesis and identification. .
- Screening of antibiotics, heavy metals resistance.
- Study on some human pathogenic bacteria from urine and wounds of diabetic and no-diabetic persons.
- Bacteriological Assessment of Different Water Resources in Sohag governorate
- Some Ecological and Physiological Studies on halophilic Bacteria Isolated from the Red Sea
- Plasmid incidence in bacteria isolated from agricultural soil and its role in bioremediation.

Services provided by the laboratory

- Bacteriological Assessment of Different Water Resources in Sohag governorate

- Bacterial and viral diagnosis using serological and DNA tests.
- DNA fingerprinting.
- Antibiotics susceptibility test.
- Plasmid incidence in bacteria isolated from agricultural soil and its role in bioremediation.
- Biological Synthesis and Structural Characterization of Selenium Nanoparticles and Assessment of Their Antimicrobial Properties.

Lab instruments

Device image	Description /use
	Hormone measurement
	Bacterial culture
	Absorbance measurement

	Bacterial growth
	Water distillation
	Sample centrifugation
	Polymerase chain reaction (PCR)

Staff members

Name	Scientific degree	e-mail	Specializations
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Amira Atef Rashad Ahmed	**Demonstrator**	**amira.aatef26@gmail.com**	**Bacteriology**

Institutions and entities benefiting from the laboratory

- Faculty of Agriculture
- Faculty of medicine
- Faculty of science

Plant Ecology

Plant Ecology Lab Research Plan

- Rationalizing energy consumption and searching for alternatives. Production of biofuels from plant organisms and the use of more environmentally friendly energy systems.
- Supporting environmental sustainability for water quality, and abundance. Development of filters from renewable natural sources such as cellulose for use in removing heavy metal ions and biological pollutants from water. Climate change and its impact on plants
- Conservation of natural resources and elimination of environmental pollution and its causes
- Study of the development and protection of vegetation and flora in the southern region of Egypt - Biodiversity and the maintenance of supporting environments in southern Egypt - Preservation of wildlife and natural reserves - Environmental pollution (soil - air - water)
- Foundations of treatment and biomonitoring of environmental pollutants - Water purification from pollutants - Wastewater treatment - Environmental impact assessment of planting trees on wastewater - Making a genetic fingerprint of plant and animal resources of economic value - Environmental development, safe and sustainable agriculture and utilization of agricultural residues - Relationship Pollution by the emergence of diseases.

Research activities:

- **Wastewater Treatment Using Wetland Planted with Aquatic Macrophytes**
- **Monitoring and Phytoremediation of Wastewater Using Hydroponic Technique**
- **Trees as bio-monitor to assess the ecological function of urban ecosystems**
- **The Radiological Effects of Non-nuclear Industries and Their Bio monitoring using Urban Trees**

Services provided by the laboratory.

- The response of some common Egyptian plants to O3 and their use as bioindicators Information gain in environmental monitoring through bioindication and biomonitoring methods
- Response of Antioxidant enzymes in Pyrchantha coccinea as biomarkers for the detection of Pb in urban atmosphere.
- Experimental study on removal of toxic metals and nutrient salts from secondary treated wastewater
- Removal of heavy metals from wastewater by natural growing plants on River Nile banks in Egypt

Lab instruments

Device image	Description /use

	A spectrophotometer is a device measures the intensity of electromagnetic energy at each wavelength of light in a specified region, Operate in the ultraviolet, visible and near infrared regions. The spectrophotometer consists of a light source, a way to focus light onto the sample, a method to collect the light from the sample, a monochromator to separate the light into its component wavelengths and a detector to measure the intensity of light at each wavelength.
	A **pH meter** is an instrument used to measure hydrogen ion activity in solutions
	**Electric balance NUL-TEC: Weight of different chemicals and others**

	A **centrifuge** is a device that uses centrifugal force to separate various components of a fluid.
	**Oven Heraeus: Heat sterilization purposes and samples' drying.**
	The **refrigerator** is used to maintain samples, in a controlled environment, various fluids and substances, so that they are kept in good condition the lower the temperature, the lower chemical and biological activity.

Staff members

Name	Scientific degree	e-mail	Specializations
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Shimaa Mostafa	demonstrator		Plant ecology

Institutions and entities benefiting from the laboratory.

- **Biomonitoring Authority**
- **Faculty of medicine**
- **Faculty of (emistry DepartmentScience (ch**
- **Faculty of Engineering**
- **Faculty of Agriculture**
- **Faculty of Veterinary**

Plant tissue and cell culture

Research plan for Tissue culture Laboratory

- *In vitro* clonal propagation of different plant species.
- Micropropagation of endangered plants and germplasm conservation.
- Characterization of different plant cultivars by tissue culture and molecular methods.
- Production, conservation and conversion of synthetic seeds
- Production, conservation and conversion of microtubers.
- Callus induction and proliferation from different plant species.
- Production of somatic embryos (somatic embryogenesis) from plants.
- *In vitro* selection of abiotic stress tolerant variants through the induction of somaclonal variations.
- Selection of stress tolerant cultivars by physical methods (X-ray or gamma ray)
- Treatment of the vitrification in different plants.
- Studying of gene expression in plants under the effect of different *in vitro* and/or physiological conditions.
- Determination the polymorphism in plants by PCR technique using different types of primers such as RAPD, ISSR and/or SSR.
- Studying the natural and induced genetic variation in different plant species by molecular methods.
- Cytogenetic studies in plants under different conditions.

Research activities:

- Multiplication of different plants especially the endangered ones by tissue culture techniques.
- Physio-molecular characterization of different plant taxa by *in vitro*, physiological, and molecular methods.
- Induction of abiotic stress tolerant variants by the induction of somaclonal variation.
- Isoenzymes, denatured proteins, and DNA extraction from plants.
- Resolving of isoenzymes and denatured proteins by polyacrylamide gel electrophoresis (PAGE) and SDS-PAGE, respectively.
- Resolving of DNA and PCR products by Agarose gel electrophoresis.
- Analysis of bands on different types of gels and determination of polymorphism.