Summary: ILRI Biosciences facility tour
ILRI Nairobi campus

23 November 2022

Overview

The International Livestock Research Institute (ILRI) Bioscience facility is a shared research and capacity building platform based in Nairobi, Kenya. The platform was established to ensure that modern technological approaches are accessible to African scientists and scientists working in Africa to address key agricultural challenges through research, capacity building and provision of research-related services. The facility hosts and supports the work of scientists from African national agricultural research systems (NARS), One CGIAR institutions, Advanced research institutions (ARIs), consortia and private companies.

The facility hosts high-end bioscience technology platforms which cover a range of technologies required for genomics, bioinformatics, nutrition and mycotoxin analysis, diagnostics, precision breeding, immunology, imaging, plant transformation and tissue culture. The facility also provides research-related services including, DNA/RNA extraction, genotyping and sequencing, plant growth facilities, Biosafety level 3 laboratory, and a biorepository.

Through these platforms the facility provides opportunities to increase the capacity of individuals and institutions in Africa to conduct biosciences-related research and develop and deliver new technologies for regional impact in improved agricultural productivity, food and nutritional security.

The Laboratory facilities

Genomics platform: *The genomics platform is equipped with both capillary electrophoresis and next generation sequencing equipment. These technologies are actively being used to support the analysis of larger amounts of genetic data over shorter periods of time. The enhanced performance of the platform has been coupled with a significant reduction in sequencing costs.*

The platform supports research projects ranging from animal and plant virus discovery, detection, and diagnostics of pathogens in crops and livestock, in-depth studies of genetic material recovered directly from environmental samples, genetic studies of viruses and their interactions with infected hosts, molecular breeding and detection of food borne pathogens.

The platform provides the following services: nucleic acid extraction, Sanger sequencing, full range genotyping services (KASP and Microsatellite-SSR), Primer Design for KASP Genotyping, seed testing and a range of next generation sequencing services (library preparation, whole genome sequencing, 16S metagenomics)

The platform hosts SeqArt Africa which is a partnership between ILRI and the private sector company Diversity Array Technology Pty Ltd, Australia. SeqArt provides genotyping (genome sequencing-based genetic profiling) and associated bioinformatics data management, analysis and decision support services to enable breeders improve the efficiency and effectiveness of plant and livestock breeding programs.

Plant tissue culture and transformation platform: *Tissue culture is among the most widely used biotechnologies in African agricultural improvement. It enables the large-scale production of disease-free, high performing and farmer-preferred varieties. The aim of the platform is to enhance the operations of tissue culture facilities in sub- Saharan Africa to enable them to provide disease-free planting materials of a wide range of crop species contributing to food and nutrition security of smallholder farmers*

The facility hosts a certified plant genetic transformation laboratory dedicated to the improvement of crops through the addition of economically important traits, and maintenance of clean materials generated.

Plant growth facility*: The facility consists of a green house, screen house, growth chambers and culture rooms. The green house contains eight containment compartments (six biosafety level-2 greenhouses for transgenic plant screening trials and two biosafety level-1 compartments). Greenhouse compartments are equipped with computer-controlled roof vents and evaporative cooling mechanisms to regulate temperature and humidity. The facility contains a weather station, light intensity controls, rainwater collection and biosafety chambers. There are eight growth rooms with programmable controls and sensors to monitor power, light, temperature and humidity.*

Mycotoxin/nutrition analysis platform*: The platform enables the detection and screening of specific toxins that affect food safety and quality. Complete nutritional profiling of foods can also be undertaken on the nutrition platform. The facility is equipped with technologies that provide a combination of both qualitative and quantitative techniques for aflatoxin and other mycotoxin measurements. In addition, other micronutrients including but not restricted to amino acids, plant toxins, antibiotics, pesticides and herbicide residues, antioxidants, vitamins can be measured. The platform is ISO/IEC 17025:2017 accredited for Total Aflatoxin testing.*

Diagnostic platform*: The platform is equipped with technologies to detect several crop and livestock disease pathogens including; ELISA, PCR, qPCR and digital droplet PCR instruments and rapid, simple, cost effective diagnostic tools such as the LAMP assay. The platform is greatly involved in technology transfers to NARS and private sector.*

For more information about the ILRI Biosciences facilities kindly contact:

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https://www.ilri.org/research/facilities/bioscience-facility

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