

AQUACULTURE AND ANIMAL HEALTH



science, technology
& innovation

Department:
Science, Technology and Innovation
REPUBLIC OF SOUTH AFRICA



CSIR
Touching lives through innovation



The CSIR's Aquaculture and Animal Health group specialises in developing advanced technologies to enhance agricultural biosecurity, aquaculture and animal health. This includes the development of next-generation technologies for disease diagnostics, including lab-on-chip and point-of-care solutions, as well as mRNA and plant-expressed vaccines targeting diseases of socioeconomic importance.

We are also developing the System for Agricultural Biosecurity and Epidemiological Research (SABER), which will be a national platform for biosecurity, biosafety, surveillance and epidemiology of infectious diseases which threaten the agricultural ecosystem (livestock, crops and horticulture) in South Africa.

AQUACULTURE AND ANIMAL HEALTH INFRASTRUCTURE AND CAPABILITIES

Our newly renovated aquaculture and animal health laboratories facilitate the development of advanced technologies for point-of-care diagnostics and mRNA vaccines. These laboratories support aquatic animal health by enabling fast, accurate pathogen detection, which facilitates early intervention, improved disease surveillance and enhanced productivity across aquaculture systems.

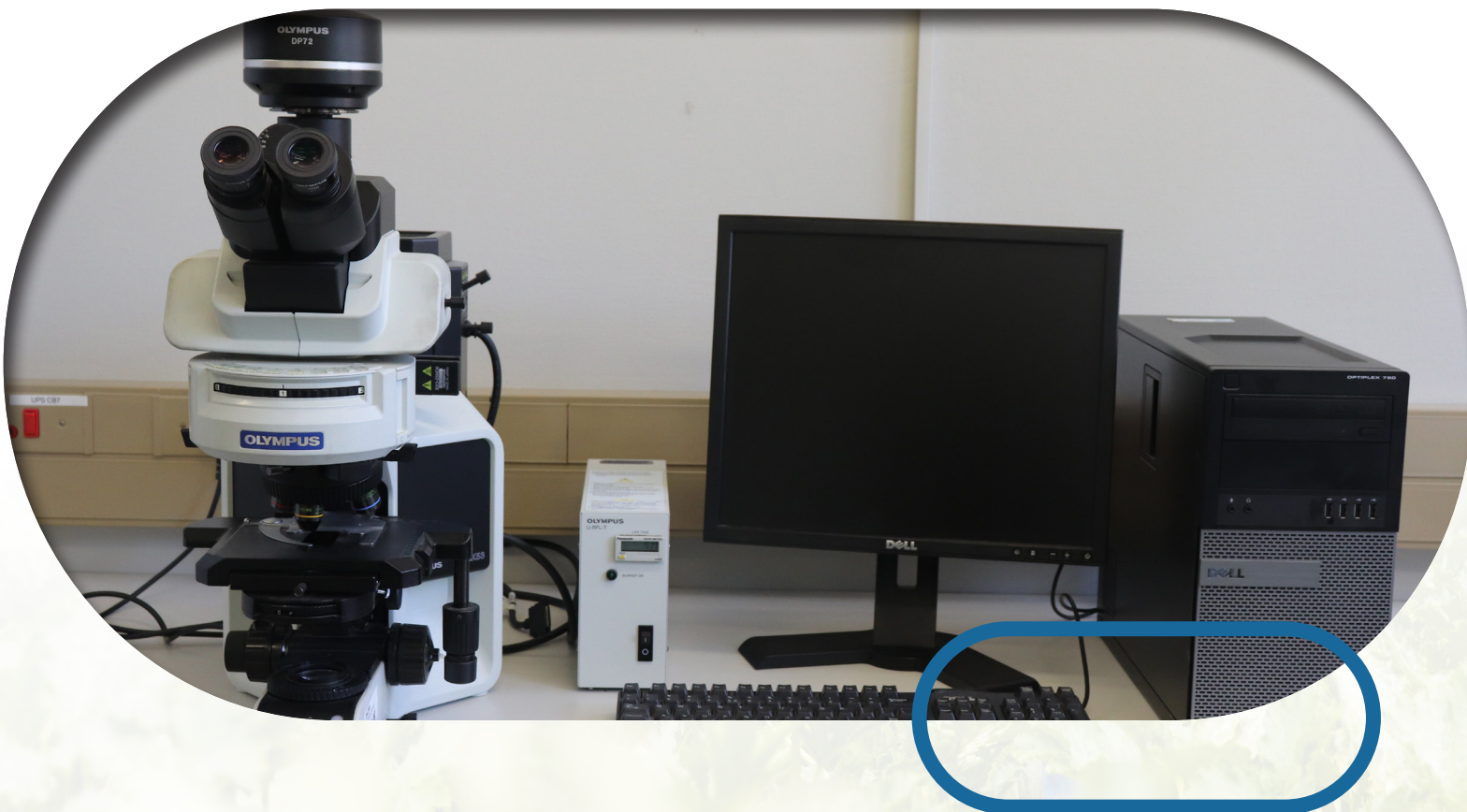
The laboratories have been recently recognised as Biosafety Level 2 (BSL-2) by the Animal Health Directorate of the Department of Agriculture. The next phase will focus on international recognition as a Collaborating Centre Laboratory for Aquatic Animal Health by the World Organisation for Animal Health (WOAH). This will enable the CSIR to better support the freshwater aquaculture industry in the broader Southern African Development Community region.

AQUACULTURE AND CELL CULTURE LAB

Freshwater fish farming plays a vital role in Africa's food security, offering an affordable, nutritious and sustainable source of animal protein for millions of people. However, viral diseases can severely impact production, livelihoods and economic growth in the sector. We work closely with national and international research partners to validate innovative diagnostic assays developed at the CSIR for detecting viral diseases that threaten African aquaculture.

Our newly upgraded aquaculture and cell culture laboratories support mRNA vaccine development, disease research and diagnostic innovation to address challenges associated with infectious pathogens that are of socio-economic importance to freshwater aquaculture production.

Our research focuses on technological innovation to develop rapid, point-of-care diagnostics technologies for pathogens such as Tilapia Lake virus (TiLV) and Infectious Spleen and Kidney Necrosis Virus (ISKNV). Additionally, through our national and international collaborations e.g. with the Centre for Environment, Fisheries and Aquaculture Science in the United Kingdom, the labs integrate advanced Zebrafish capabilities to enable in vitro and in vivo vaccine and diagnostic testing, cell line propagation and cellular assays to advance health solutions for aquatic species and terrestrial livestock in controlled, sterile environments.





ANIMAL HEALTH – DIAGNOSTICS AND VACCINE LABORATORIES

In the animal health laboratory, we develop the next-generation diagnostics and vaccines using recombinant plant-expressed and mRNA technologies for economically significant diseases that affect the livestock industries.

We have developed the prototype ONE Dx point-of-care (POC) molecular diagnostics platform to facilitate rapid disease detection directly at farm/production unit level, thereby reducing the impact of disease outbreaks, and vaccines to improve animal health, biosecurity and sustainable livestock production systems.

AGRICULTURAL BIOSECURITY

The One Food programme, a collaboration between the UK and South Africa, aims to integrate One Health approaches to support sustainable food systems and reduce food insecurity, food loss and waste. Together with our internal partners at CSIR Next Generation Enterprises and Institutions and the Centre for Environment, Fisheries and Aquaculture Science (Cefas, UK), we have developed the One Food Risk Tool (OFRT) to address food sustainability through application of One Health principles. The OFRT enables researchers, scientists and policy makers to develop and monitor evidence-based policies and interventions to mitigate the impacts of hazards on food systems and improve food security.

In relation to food security, pests and diseases of agricultural crops are a major challenge in South Africa and the rest of the world. In this regard we are adapting the ONE Dx molecular diagnostics platform to facilitate POC detection of bacterial wilt disease and other pathogens which affect crop and horticultural production.

In addition to the variety of pests and diseases associated with plant production, there are numerous controlled and notifiable diseases that affect livestock production in South Africa and cause significant socio-economic losses annually.

To address this, we are also developing the System for Agricultural Biosecurity and Epidemiological Research (SABER) which will be a national platform for biosecurity, biosafety, surveillance and epidemiology of infectious diseases which threaten the agricultural ecosystem (livestock, crops and horticulture) in South Africa.

OFFERING TO INDUSTRY

Local industry is invited to engage with the team to enhance their competitiveness through deployment of technologies developed, and services offered, by the Aquaculture and Animal Health group to reduce the impact of infectious pathogens, pests and diseases on the aquaculture, livestock and crop production sectors.





WORK WITH US:

FOR MORE INFORMATION, PLEASE CONTACT:

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A SUSTAINABLE FUTURE TOGETHER!**