

Invasion of the Nile tilapia:

140 dams and rivers sampled in two months to map the spread in Limpopo and Mpumalanga

*Invasive alien species are a major threat to South Africa's biodiversity. The uncontrolled introduction and spread of invasive species to ecosystems and habitats where they do not naturally occur, can cause harm to the environment and to biological diversity in particular. Responding to the need to understand invasive species, a collaborative project between the NRF–South African Institute for Aquatic Biodiversity (NRF-SAIAB), the South African National Biodiversity Institute (SANBI) and the Department of Forestry, Fisheries and Environment (DFFE) is underway to determine the current extent of the spread of the invasive alien Nile tilapia (*Oreochromis niloticus*) in the Limpopo and Mpumalanga provinces.*

Nile tilapia invasions can result in hybridization with native tilapias such as the Mozambique tilapia (*Oreochromis mossambicus*), but at the same time, Nile tilapia is the most favourable species for warm-water aquaculture, a sector which, despite considerable attempts at development, has remained stagnant. Current knowledge of the Nile tilapia's distribution is therefore essential and needed for well-informed biodiversity management and decision making.

Tracking conflict species

"The complication to South Africa's freshwater ecosystem is that it consists of species that are economically valuable but also cause harm to biodiversity. Such species are called conflict species, as the different values associated with them results in considerable conflict with other ecosystem species," said Dr Mandla Magoro, one of the leading researchers in the Nile tilapia project and a postdoctoral researcher at the South African Institute for Aquatic Biodiversity (SAIAB). In South Africa, conflict species are typically angling species such as trout, largemouth bass and carp, or aquaculture species such as Nile tilapia.

According to Magoro, effective management of South Africa's conflict species is hampered by incomplete

knowledge which has resulted in decisions being made based on expert opinion rather than on the basis of strong scientific knowledge.

"This constrains the effective development of management strategies and weakens the national response by public organisations who oppose the Alien and Invasive Species (AIS) regulations and strategy," explained Magoro. Thus, the regulation of conflict species requires proactive approaches to management, such as the proposed zoning scheme on national maps, which include permitted and prohibited zones for AIS.

The filling of these knowledge gaps about conflict species and developing scientific data to support decision making will become a major component of the National Invasive Species Strategy and Action Plan, which is under development by the DFFE. One of the important species defined as a priority in this Plan, is the Nile tilapia.

Expected Impact

The project will produce an up-to-date map of the current distribution of Nile tilapia in the rivers and dams of the



Dr Lubabalo Mofu deploying a cast net at the Noordsandrivier in Hazzyview, Mpumalanga.



Dr Lubabalo Mofu using a cast net to sample for tilapia in the Klein Letaba River, Limpopo.



The Olifants River near Phalaborwa, Limpopo.

two provinces, whilst also revealing key areas currently inhabited by pure strains of the native Mozambique tilapia.

The project addresses the Sustainable Development Goal 2 aimed to achieve “zero hunger” and to contribute to food security and improved nutrition. This will be achieved as the data collected during this project will inform policy on future freshwater aquaculture developments and activities in the Limpopo and Mpumalanga provinces. Aquaculture plays an important role as far as the country’s food security is concerned, and this study will aid in the process of demarcating zones where populations of Nile tilapia will be permitted for use in aquaculture facilities, with prospects for job creation.

Intensive field collection

Field data collected at selected sites will determine the presence or absence of Nile tilapia, or their hybrids. To date, Magoro and colleagues have completed two months of field work in the Limpopo and Mpumalanga provinces.



Sampling for Mozambique and Nile tilapia at Oreochromis at Heyshope Dam, Mpumalanga.

The initial agreement was for the team to sample 100 sites, but they have managed to surpass this figure by sampling more than 40 additional sites. The second phase of the project will involve the use of molecular genetics to confirm morphological identifications and to determine the presence of hybrids.

“This phase will allow for a more robust determination of the current distribution of pure Mozambique tilapia, non-native Nile tilapia, as well as hybrids of the aforementioned species,” said Magoro.

Magoro’s role in this project includes being part of the field survey team (tasked with planning, implementation and stakeholder engagement), specimen and data management, as well as managing all the reporting activities (tilapia meetings, technical reporting and data management).

Unfortunately, due to the sensitive nature of the project, as well as other contractual obligations between SAIAB, SANBI and DFFE, the research team cannot yet share any of the study results. All findings will be communicated once all the stakeholders have commented on the final report, a process expected to be completed before the end of 2023.

Article written by Dr Mandla Magoro, of the NRF-SAIAB Nile tilapia project team, and Lucky Dlamini, communications and stakeholder relations manager for the NRF-SAIAB. The full project team consists of Drs Mandla Magoro, Albert Chakona, Angus Paterson and Lubabalo Mofu.