

Tilapia now SA's own bio-indicator of water pollution

Southern African water specialists can now use a local Tilapiine species - instead of alien fish species - to test whether water sources are polluted by compounds that can cause hormonal imbalances. Such chemicals can subtly mimic the female hormone oestrogen and alter the male hormone testosterone, whilst others disturb thyroid-hormone functioning.

Researcher Dr Marna Esterhuyse from the Botany and Zoology Department recommends the use of the hardy Mozambique tilapia - which is sensitive to water pollution - over that of the alien zebrafish which is currently often used as a bio-monitor.

"This work brings South Africa one step closer to its own fish model - similar to that of most developed countries - that can monitor chemicals in water sources that cause hormonal imbalances," Dr Esterhuyse's promoter, Prof Hannes van Wyk, believes. During such monitoring, scientists analyse the tissue, study the physiology and look at the changes in the genetic levels of fish species exposed to polluted water and chemicals.

"Aquatic animals are good bio-monitors because

chemicals that cause endocrine imbalances are rapidly absorbed through the gills and stored in the body," Dr Esterhuyse says.

Dr Esterhuyse's toxicogenomic study focuses particularly on the interaction between pollutants and some of the genes specifically associated with the body's endocrine systems. Due to Dr Esterhuyse's genetic test model, fish exposed to a water sample can now be examined after only a few hours.

"Research on frogs, crocodiles and some fish species shows that endocrine disturbance caused by hormone mimicks in polluted water results in, inter alia, deviations in the reproductive system and in the malfunctioning of the thyroid gland," Dr Esterhuyse explains.

Pesticides (such as DDT), household products, by-products of paper- and plastic manufacturing industries and contraceptives all contribute to the number of endocrine disrupting compounds in our water effluent.

Dr Esterhuyse is now extending these studies with postdoctoral work on genes influenced by thyroid hormones.



Postgraduate course boosts biomaths

The Department of Mathematical Sciences has joined forces with the African Institute for Mathematical Sciences (AIMS) to develop a new postgraduate focus in biomathematics.

The course - the first of its kind in South Africa - will involve both local and international specialists.

It significantly expands the Department's existing honours programme to new postgraduate target groups. Its interdisciplinary undergraduate stream was introduced this year and has already attracted students interested in fusing their solid mathematical skills with a sound knowledge about molecular biology, ecology, biomedical science and systems biology.

"We want to train mathematicians who can formulate and analyse precise models for experimental data arising from real-life biological and medical research problems - from predicting the influence of HIV, Aids, malaria and tuberculosis to the effects of climate change on South Africa," Prof Ingrid Rewitzky of the Department explains.

The National Research Foundation, the SU Strategic Fund, AIMS and the South African Centre for Epidemiological Modelling and Analysis (SACEMA) support ten full honours bursaries.

Careers in fundamental scientific research and/or diverse applications - including drug design, immunology and medical applications, forensics, molecular evolution and population biology, and sustainable environment - await graduates.

- Contact Prof Rewitzky at 021 808 3289 or rewitzky@sun.ac.za, or visit <http://math.sun.ac.za>.

Attending the IAVS symposium were organisers Prof Valdon Smith (left) and Prof Laco Mucina (second from right) of the SU Department of Botany and Zoology, with Prof Bastow Wilson (University of Otago, New Zealand) and IAVS president Prof Robert Peet (University of North Carolina). (Photo: Engela Duvenage)



FIRST MEETING IN AFRICA FOR

vegetation scientists

Evolution was hotly debated when leading international and national plant scientists met at Stellenbosch University in September for the first-ever annual symposium of the International Association for Vegetation Science (IAVS) held on the African continent.

The symposium was the 51st of its kind. The IAVS is one of the oldest ecological societies in the world and supports research in the core ecological discipline of vegetation science.

"The various guided field trips to discover South Africa's exceptionally rich floral diversity was a drawcard," IAVS secretary-general Prof Ladislav Mucina of the SU Department of Botany and Zoology says.

The theme of the meeting was "Frontiers of vegetation science: An evolutionary angle" and aimed to extend the interface and deepen the cooperation between evolutionary biology and vegetation science.

"Technologically driven progress in evolutionary research is changing the face of many traditional biological sciences," Prof Mucina, the first representative from Africa to be appointed secretary-general of the IAVS, says. "To some extent, vegetation science does already react to this new phase by reaching out to ecological disciplines traditionally closer to evolutionary biology - such as population biology and palaeoecology - and by using evolutionary research tool."