Making learning about water fun in the Middle Olifants

The Phalaborwa region saw some exciting benefits of collaboration between the Kruger National Park and the Middle Olifants South Africa (MOSA) programme earlier this year.

MOSA, funded by the German Federal Ministry of Education and Research, is a consortium of water science and management institutions from Germany and South Africa developing integrated water resource management options within the Middle Olifants catchment area. This bilateral cooperation has now extended to the lower Olifants, in particular with the Kruger National Park, where a variety of applied works have taken place including using a mobile water quality laboratory to undertake spatial snapshot sampling of the lower Olifants and Ga-Selati catchments .

As part of this collaboration MOSA and the KNP joined forces to provide outreach to both schools and neighbouring institutions in the Phalaborwa region, both of which were hugely successful. Two local schools were invited to the event and received training in the field on aquatic bio-monitoring from SANParks and SAEON scientists and were then able to play the DHI Middle Olifants Water Game (mosa.aquarepublica.com) on computers sponsored by Gijima, remembering of course that the Water Research Commission funded the hugely successful National Water Competition during 2014 using the same Serious Game.

The students really enjoyed their experience and benefited greatly from their exposures to these events as demonstrated.

There then followed two days of intensive water resource management lectures on sustainable operations and maintenance of waste water treatment works, hydrological modelling and new decision support technologies that can be used to analyse and map hydrological risk at a catchment scale. With significant attendance from the local municipalities, mining companies and provincial operations office of the Department of Water and Sanitation the organisers believe that the outreach had the desired effect of enlightening a broad suite of stakeholders to be exposed to new and innovative matters in the field of integrated water resource management in their region.

Rhodes University celebrates honorary appointments in fish science

Rhodes University have welcomed two new Honorary Professors into the Department of Ichthyology and Fisheries Science (DIFS).

Drs Paul Cowley and Olaf Weyl, principal scientists at the South African Institute for Aquatic Biodiversity (SAIAB) were appointed following their prolonged and ongoing teaching and supervision of large numbers of post-graduate students at Rhodes University.

The staff of SAIAB expressed their pride of this recognition and wish to continue this mutually beneficial relationship with DIFS and other departments in the university. In the words of SAIAB MD, Dr Angus Paterson, "National Research Foundation facilities, such as SAIAB are required to be highly integrated into the higher education system, and these honorary appointments indicate that our organisation is indeed playing a significant role in this sector. Rhodes, along with a number of other universities, are our stakeholders and we look forward to ongoing fruitful collaboration."
Source: SAIAB

Diary

Irrigation: August 3-6
The South African Irrigation Institute (SABI) will be holding its national congress 2015 at the Protea Hotel Ranch Resort in Polokwane, Limpopo province. The event kicks off the celebrations of the organisation's 40th Anniversary year with the theme '40 Years of Irrigation Development – Quality through Innovation'. Enquiries: Isobel van der Stoep (isobel@sabi.co.za) or Annemarie van der Westhuizen (annemarie@sabi.co.za);
Tel: +27 (0) 21 850-8220 or
Visit: www.sabi.co.za.

World water: August 23-28
The annual World Water Week will take place in Stockholm, Sweden, as usual. This year is the jubilee year for both the Week and the Stockholm Water Prize. The theme is 'Water for Development'.
Visit: www.worldwaterweek.org

Large dams: September 1-3
The South African National Committee on Large Dams (SANCOLD) is hosting its annual conference in Cape Town with the theme 'Dam safety, maintenance and rehabilitation of dams in southern Africa'. Apart from the technical presentations, the conference also includes the SANCOLD Young Engineer's Forum as well as technical site visits to the Clanwilliam and Bulshoek dams, as well as the Table Mountain Dams.
Enquiries: Nom Buthelezi (Conference Secretariat) at Tel: +27 (0)11 676-3417;
Email: secretariat@sancold2015.org.za or
Visit: www.sancold.org.za

Land rehabilitation: September 8-15
The Third Annual Conference of the Land Rehabilitation Society of Southern Africa will be held at Glenburn Lodge, Muldersdrift. The theme is 'productive value from rehabilitated land'. Enquiries: Glaudin Kruger (conference organiser); Tel: +27 (0)28 316-2905;
kruger@krugerassociate.com;
Visit: http://www.larssa.co.za/conference

Social science: September 13-16
The World Social Science Forum will be held in Durban. A broad range of topics will be discussed under the theme of 'transforming global relations for a just world'.
Visit: www.ssf2015.org

Groundwater: September 21-23
The 14th Groundwater Conference will be held at Muldersdrift with the theme 'From theory to action'. This conference aims to highlight the issue of improving the uptake of existing knowledge and experiences of groundwater in South Africa to assist in solving environmental and societal problems.
Email: info@gwd.org.za or
Visit: www.gwd.org.za

Aquaculture: September 28-30
The 2015 conference of the Aquaculture Association of Southern Africa will be held in Polokwane with the theme 'Aquaculture: Shaping the future'. Enquiries: Mandy Jordaan (conference organiser);
Tel: +27 (0)71 874-5200;
Email: info@aasa-aqua.co.za

Environment and health: October 1-2
The 6th Annual Ecohealth and Wellbeing Conference will be held at UNISA, Pretoria with the theme 'Community studies: Team engagement in ecohealth and wellbeing research'. The conference will address a range of inter-disciplinary, and inter-institutional disciplines related to sub-themes such as communities and nature-related issues, communities and tourism, communities and the value of traditional beliefs, community engagement and municipal governance.
Enquiries: Petra Lawson;
Tel: +27 (0)83 231 6538;
Email: conferencepl@gmail.com

Water and Development: October 18-22
The International Water Association is holding its Water and Development Congress and Exhibition in Jordan with the theme 'Water security for sustainable growth'. The Congress features a range of topics and a diverse set of viewpoints from global water leaders. Visit: http://www.iwa-network.org/WDCE2015/congress/

Municipal engineering: October 28-30
The annual conference of the Institute of Municipal Engineering in Southern Africa will take place at the Grand West Hotel and Casino, in Cape Town.
Visit: www.imesa.org.za

Young Water Professionals: November 16-18
The theme for the 4th YWP South African biennial conference, which will be held in Pretoria, is 'Stop talking, start doing'. Conference topics include domestic and municipal water and sanitation; drinking water and bulk water supply; industrial and mine-water; environment water; and capacity building and training. Enquiries: Jaco Seaman (Conference organiser),
Tel: +27 (0)11 805-3537;
Email: events@wisa.org.za;
Visit: www.ywp-za.org/

Race still on to eliminate use of bucket toilets in South Africa

The Department of Water and Sanitation will spend close to a billion Rand to replace 30 000 bucket toilets with alternative, safe sanitation during the 2015/16 financial year.

This is according to the Minister of Water and Sanitation, Nomvula Mokonyane. She was speaking at the National Council of Provinces Budget Review in Parliament earlier this year.

Currently, it is estimated that some 88 127 households in formal settlements are still utilising the bucket system as a form of sanitation. This backlog is found predominantly in the Eastern Cape, Free State, Northern Cape and North West.

Mokonyane further announced a budget of R115-million to be invested in 11 000 dry sanitation units to eradicate rural sanitation backlogs through the Rural Household Infrastructure Grant.

"In pursuit of sustainability of the programme, we shall also strive to standardise sanitation costs, align sanitation projects amongst the various government departments, and ensure that adequate budgets are set aside for the operations and maintenance of the infrastructure," she noted.

SA's bilateral research chair sees funding from Switzerland

Minister of Science and Technology, Naledi Pandor, launched the first bilateral research chair at the University of Cape Town (UCT).

She was joined by Swiss State Secretary for Education and Research, Dr Mauro Dell'Ambrogio and Swiss Ambassador to South Africa, Christian Meuwly.

This is the first time another country has been involved in funding a chair under the South African Research Chairs Initiative. According to the Department of Science and Technology (DST), this is expected to provide a model for other countries to participate in the department's flagship programme.

The joint research chair will focus on mitigating environmental health risk in South Africa, particularly in the communities that are most vulnerable to the effects of environmental exposure. The five-year Swiss-South Africa Global Environmental Health Research Chair will incorporate epidemiological, clinical, molecular-biological and social science approaches. Emphasis will be placed on putting the research findings to use through proactive engagements with communities.

Headed by Prof Mohamed Agiel Dalvie of UCT, work will include a focus on major drivers of environmental health, such as exposure to chemical and biological pollution and climate change, as well as the interactions between them. Human rights and environmental justice issues will also be addressed.

The research chair will be supported and managed by the National Research Foundation, the University of Basel, and the Swiss Tropical and Public Health Institute (TPH). The latter two organisations will fund the first year of the chair to the tune of R1.3-million. The remaining four years will be covered through funding arrangements with the Swiss School of Public Health, the Swiss TPH and the University of Basel. South Africa will contribute R1.5-million per annum for the five-year duration of the research chair.

Source: DST

Enhancing water quality in the Western Cape

The Department of Water and Sanitation supported 17 municipalities in the Western Cape to enhance water security and improve water quality through the Regional Bulk Infrastructure Grant programme.

This was highlighted during a Minister and Mayors (MinMay) meeting of the Western Cape Province meeting earlier this year attended by Minister of Water and Sanitation, Nomvula Mokonyane, in Worcester. The meeting follows an invitation by Western Cape MEC of Local Government, Environment and Development Planning, Anton Bredell, with an aim to share with both provincial and local government the national government's plans on water and sanitation as they relate to the province.

The Western Cape is one of the provinces most affected by rapid urbanisation. Population growth figures in the province have had a direct impact on the ability of government to deliver water and sanitation services. Speaking at the meeting, Mokonyane informed the MEC and mayors that the department has recently completed a study on the bulk water and sanitation infrastructure needs for the province for the next 15 to 20 years.

In this regard, Minister Mokonyane said 1 641 bulk water and sewerage infrastructure projects have been identified and require the pooling of resources, both capacity and financial resources between all three spheres of government to ensure delivery. "As the department we have identified three key priorities, namely, water resource management, solutions to service delivery challenges and the finalisation of a long-term master plan for South Africa on water and sanitation. Our engagements must direct us towards servicing un-serviced communities and maintaining our infrastructure adequately in serviced areas," the minister added.

Freshwater biodiversity

New freshwater species discovered in Eastern Cape waters

After more than a hundred years of scientific discovery one would think that all is known about South Africa's freshwater fauna. Not so it seems as researchers from the South African Institute of Aquatic Biodiversity (SAIAB) report the discovery of a species of copepod, a type of crustacean.

The new species was discovered in the Eastern Cape, and has just been described. Despite Grahamstown being a hotspot for southern African aquatic biodiversity research, this little crustacean had managed to fly under the radar and avoid attention until now.

It was in June last year that research collaborators from SAIAB and Rhodes University collected copepods from a temporary (ephemeral) pond on a farm outside Grahamstown. Immediately suspecting that the species had not been described, samples were sent to Dr Eduardo Suárez-Morales, a freshwater copepod specialist based at El Colegio de la Frontera Sur in Mexico.

Copepods are tiny crustaceans that average two millimetres in length – about the thickness of a coin. They are an important ecological component in most aquatic habitats around the globe. They are a key trophic group often forming the intermediary link between the primary producers (algae) and secondary consumers such as fish, frogs and birds.

Scientists have studied copepods for centuries given their importance in the sustenance of many organisms higher up the food chain (such as commercial fish stocks), which ultimately link to the feeding and survival of humans. Scientists have found copepods living in waters around the globe.

They are found in fresh water and oceans from the surfaces to the depths. They're in frigid polar waters as well as hot springs, rivers, lakes, streams and caves. Conservatively, there are more than 10 000 species of recognised copepods, and they are the most abundant multi-celled animal on the planet, even more than insects.

This latest discovered copepod was identified as belonging to the group *Paradiaptomus* and the genus *Lovenula*. Prior to this discovery there were four species of *Lovenula* known, namely *L. falcifera, L. africana, L. excellens* Kiefer and *L. simplex* Kiefer. The new species was named *Lovenula raynerae*, after Dr Nancy Rayner for her outstanding contributions to the taxonomical knowledge of this particular group of copepods. (To read more about Dr Rayner and her work see the *Water Wheel* May/June 2014).

The male (lower left) and female (upper right) Lovenula raynerae sampled from the Grahamstown region. Note the eggs carried by the female. (Credit: SAIAB)

Most of the knowledge on the South African paradiaptomines gathered to date is from the Western Cape Province; relatively few records are from the Eastern Cape Province, which makes this discovery a real find.

Perhaps the most striking thing about *Lovenula raynerae* is its size (it is 4 to 5 mm long). This makes it one of the world's largest freshwater copepods, and it is likely the largest of all African copepods. Even more impressive is that this group of crustaceans produce eggs that are capable of withstanding dry conditions for extended periods of time.

The many sites around Grahamstown where the copepods have subsequently been sampled are all ephemeral and undergo periods when they dry out completely. Adults produce eggs before the ponds dry and these eggs settle into the sediment, which dries out completely, sometimes for years at a time. The dormant eggs then hatch out when the dry ponds fill with water once again following good rains.

What is the importance of this find?

The fact that such a conspicuous crustacean could be overlooked in one of Africa's aquatic research hotspots highlights the nation's current lack of invertebrate taxonomic expertise.

The knowledge generated by taxonomic findings such as this can have far reaching implications. Taking stock of the biodiversity present in our water bodies is of the utmost importance, especially given the increase in habitat degradation

associated with development, water abstraction and other pressures placed on our scarce water resources.

In addition, it is impossible to understand the ecology of a system when scientists do not know the identity of the key organisms present. Only when the ecology of an environment is understood can researchers begin to quantify their ecosystem services and benefits to humans.

Ephemeral ponds are particularly vulnerable aquatic habitats which are difficult to protect given their dynamic nature and sensitivity to degradation during dry periods. Little information is available on these habitats in Africa despite their importance for many invertebrates, amphibians and water birds. Ephemeral ponds are among the most difficult freshwater ecosystems to map or restore primarily because of their unique hydrological and ecological properties.

The taxonomic and ecological work on ephemeral ponds of the region is ongoing with the primary investigators including Drs Ryan Wasserman and Olaf Weyl from SAIAB as well as Dr Tatenda Dalu and Prof William Froneman from the Department of Zoology and Entomology at Rhodes University. Further collaborative work with Dr Suárez-Morales and numerous other researchers and institutes is underway.

Dr Tatenda Dalu collecting water from one of the ephemeral ponds found to contain Lovenula raynerae, the new species of copepod.

The Eastern Cape contains numerous ephemeral ponds, but these environments are, for the most part, not even mapped let alone surveyed. There is much research potential for further taxonomic and ecological work in these environments.

- The discovery has been published in the journal *Crustaceana* **88**(3) in 2015. To access this article, Visit: http://booksandjournals.brillonline.com/content/journals/10.1163/15685403-00003416

Source: SAIAB

Sanitation Indaba

Need for a sanitation revolution in South Africa, indaba delegates hear

Deputy President, Cyril Ramaphosa, delivering the opening address.

Nothing short of a sanitation revolution will lead to the provision of basic services to all South Africans.

These were the closing remarks of Minister of Water and Sanitation, Nomvula Mokonyane at the 2015 National Sanitation Indaba, held in Durban earlier this year. "To us the sanitation revolution should become a vehicle through which the objectives of the National Development Programme can be achieved in a more organic and integrated manner to realise a people-centric, radical strategic socio-economic transformation," she told delegates.

It is estimated that around 74% of households currently have access to safe sanitation in South Africa.

At the centre of this approach, according to Mokonyane, was the introduction of innovative and technologically advanced sanitation innovations that did not place additional stress on the country's scarce water resources, but rather brought about benefits at every step of the sanitation value chain.

The aim of the indaba, which attracted close to 500 delegates, was to showcase the practical demonstration of appropriate sanitation technologies suitable for implementation in South Africa; provide an engagement space for communities on the feasibility of technology implementation as it pertains to their contexts; pool ideas and experience to accelerate the adoption of sanitation technologies; and develop a roadmap for scaling-up of sanitation solutions in South Africa.

In his opening address, Deputy President, Cyril Ramaphosa, said that the restoration of people's dignity could not be achieved merely through budgetary allocations. "It cannot be achieved through a model of service provision in which the people who use the services remain passive recipients. It requires a deep sense of human solidarity and the full commitment and involvement of all social partners."

He added that

"To succeed, we must ensure that the solutions we pursue take into account local dynamics, our history, culture, geography and aspirations. All stakeholders must demonstrate a willingness to explore new sanitation delivery models. This must be done with careful planning and engagement with our communities."

The Deputy President commended the Department of Water and Sanitation for hosting the sanitation indaba. "It will go a long way in generating awareness, stimulating innovation and promoting greater usage. It will help challenge conventional motions about sanitation and dispel concerns about the efficacy and reliability of new technology," he said.

The indaba also included a site visit, led by minister Mokonyane, to several sanitation technology demonstration sites in and around eThekwini Municipality. Invited guests were encouraged to participate in a dialogue with community representatives on the feasibility of the technologies demonstrated and their scaling-up potential.

Executive Mayor of eThekwini Municipality, James Nxumalo, Minister of Water and Sanitation, Nomvula Mokonyane, Deputy President, Cyril Ramaphosa, and KwaZulu-Natal Premier, Edward Senzo Mchunu.

Delegates at the opening plenary of the Sanitation Indaba.

WRC Executive Manager, Jay Bhagwan, provided the framing presentation on sanitation technology assessment and evaluation.