

## Prof. Jo van As

# **Overview**

The Department of Zoology and Entomology is organised into six research groups, each with its own objectives and specific study area. There is also a satellite department on the Qwaqwa Campus.

The groups do, however, share common goals within the strategic priorities of the Faculty of Natural and Agricultural Sciences and the UFS. Prof. Jo van As, Departmental Chairperson, is also involved in activities of the cluster for "Water management in water-scarce areas".

The **Aquatic Parasitology group** spent the April 2007 recess at the De Hoop Nature Reserve in the Western Cape with the third-year Zoology students as part of the practical part of the Marine Ecology course. This has been ongoing for the past 15 years and since 2004 the group has held a combined excursion with students majoring in Zoology and Botany.

During the 2007 excursion the group was joined by Prof. Robin Overstreet and Dr Ash Bullard, both from the Gulf Coast Research Laboratory at the University of Southern Mississippi, Ocean Springs, United States of America (USA). Prior to the ecology excursion the Aquatic Parasitology Research group undertook a week-long field trip to the De Mond Nature Reserve in the South-western Cape where they sampled in the estuary as well as in the Zoetendalsvlei area. Although the group concentrated on mullets, they also searched for the fish hosts of the elusive *Argulus capensis* and other branchiurans. Fish collected in the De Mond estuary revealed a number of parasitic crustaceans, a variety of worms and numerous ciliates.

During the second week, Prof. Jo Van As, Departmental Chairperson, and Dr Liesl van As spent their time with the thirdyear students on the rocky shore at De Hoop. Prof. Overstreet and Dr Bullard accompanied Prof. Linda Basson and the postgraduate students in collecting and examining fish in the tidal pools of the rocky shore. Both visiting scientists gave lectures during the excursion to all the ecology students. Prof. Overstreet spoke about the eating habits of parasites, while Dr Bullard entertained the students by informing them about the life of a world-travelling scientist.

During October and November 2007, Prof. Van As and Dr Van As accompanied postgraduate students on a field trip to the

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Leseding Research Camp in the Okavango. They were joined by Dr Paul Grobler of the Department of Genetics at the UFS and Prof. Louis Scott, well known pollen-paleontologist from the Department of Plant Sciences at the UFS.

During their seven-day visit samples were collected in the panhandle. They also spent a few days at Lake Ngami, where they collected pollen samples with a soil sampling tube. They collected water samples and tadpoles, and spent an afternoon at the Harry Oppenheimer Okavango Research Centre (HOORC) in Maun, Botswana. The director of the HOORC, Prof. Lars Ramberg, visited them in Leseding Research Camp at the end of the field trip. During this visit collaboration between the UFS and the University of Botswana was confirmed. Prof. Louis du Preez from the North-West University also joined the excursion to collect different frog species. He made use of this research trip and the infrastructure of the Leseding Camp to take photographs for a book he is presently working on. The book deals with tadpoles and frogs that specifically occur only in that area.

Another highlight of this trip was a two-day visit from the Matshwane Primary School in Botswana and their teacher, Ms Linda Klopper. During their visit the children were introduced to the wonderful life of the delta. The school was also presented with six stereo-microscopes, donated to the group by the Microscopy Society of Southern Africa.

During a four-week survey in the Okavango the group mainly concentrated on water samples from various riverine localities. They collected tadpoles as part of the master's study of Ms Hanlie Groenewald. Tadpoles act as hosts to some of the same kinds of ciliophorans also found on fish. Part of the biodiversity project is to determine which species are also associated with non-fish hosts.

Ms Groenewald as well as other students in the department attended the 36th Congress of the Parasitological Society of Southern Africa at the Pestana Kruger Lodge, just outside Malelane in Mpumalanga. This congress was hosted by the industry, with the Intervet Pty (Ltd), Malelane Research Unit and Argos Veterinary Science/Volcano Life Science the main organisers of the conference.



Ms Deidre West doing water analysis with school children from the Matshwane Primary School in Botswana.

Profs Van As and Basson, and Drs Van As and Candice Jansen van Rensburg attended the Seventh International Symposium on Fish Parasites held in Viterbo, Italy in September 2007, where three papers were presented.

The Arachnology group's field work during 2007 involved visiting several reserves in KwaZulu-Natal during June-July 2007 to collect spiders. Included were the Ithala Game Reserve, Ophathe Game Reserve, Greater St. Lucia Wetlands Park, Tembe Elephant Park and Ndumo Game Reserve. Several postgraduate students from the department assisted with collecting spiders, and also spent time doing bird and mammal surveys in each reserve. During November-December 2007 a month was spent collecting spiders in southern Mozambique. This area is remarkably poorly studied compared to South Africa, with only 150 species recorded from Mozambique compared to the more than 2 000 species known from South Africa. It is also a biogeographically important region, forming the northern part of the Maputaland coastal plain, which is regarded as an important centre of endemism for plants and animals.

During earlier studies on the fauna of Ndumo and Tembe, more than 400 species of spiders were collected in each reserve, and the group was interested in assessing the relationships between Mozambican and KwaZulu-Natal fauna, with particular reference to the family Corinnidae, the focus of the group's research. It came as no surprise that many KwaZulu-Natal species have extended distributions up the coast, and may occur even further north into East Africa.

Ms Robin Lyle undertook a trip to the natural history museums in Paris, Geneva, Brussels (Tervuren) and London during the June-July 2007 recess. She examined type material and other specimens of the subfamily Trachelinae (Araneae: Corinnidae) for her M.Sc. project. During her time in Belgium she met with Dr Jan Bosselaers, an experienced researcher working on the Corinnidae, and was able to obtain valuable guidance regarding her project. Her M.Sc. thesis will be submitted for examination in May 2008, and will include revisions of three genera from this group.

During August 2007 Mr Charles Haddad attended the 17th International Congress of Arachnology in Sao Pedro, Brazil, where he presented a paper on termitophily and termitophagy in spiders, and a poster on East African spider diversity patterns. This was the largest ever international meeting, with more than 250 delegates.

Ms René Fourie completed her B.Sc. honours during 2007. She studied the grass- and tree-dwelling spider communities in the Erfenis Dam Nature Reserve in the central Free State. This study has been expanded for her M.Sc. to include a chapter investigating the impacts of controlled burning of grasslands on the succession processes and species diversity of spiders.

The research group of the Pesticide Resistance Testing and Research Facility is fully operational for the determination of tick resistance to chemical control by employing conventional resistance testing. Clients consist of companies such as Bayer, who are contracted for the use of the services of the research facility until 2009, Virback and Novartis, as well as private clients from farms in areas with serious resistance problems. Promotion of these services, as well as establishing possible research collaboration, was done by visiting Bayer, Virbac and a private consultant, Pierre van Niekerk, early in August 2007.

The group attended the Mooi Rivier Fat Stock Show organised by Voermol, where valuable contacts with pharmaceutical companies and produces were made. Various veterinarians in the Kwa-Zulu-Natal problem areas were visited to identify needs in the field. The facility's website, www.ticks.co.za, describing the services of the facility, was also updated to promote the availability of information to the clients.

Equipment for use in the investigation and development of molecular techniques for the determination of tick resistance to chemical control was finalised at the end of 2007. The laboratory is now ready to commence with the development of molecular resistance testing procedures. Tick material (larvae) of the ticks *Rhipicephalus* (*Boophalus*) decoloratus and *R.* (*Boophalus*) microplus from various parts of South Africa was collected during 2007 to be tested for the presence of resistance mechanisms once the procedures are in place.

Research projects on the geographic distribution of *Ixodes* (Acari: Ixodidae) ticks in the Free State province and the seasonality of those associated with African Buffalo, were performed by Mr Whitey Jordaan as part of his M.Sc. dissertation entitled: Geographic distribution of Ixodes (Acari:Ixodidae) ticks in the Free State Province and seasonality of those associated with African Buffalo. A taxonomic description of all four stages of four Ixodes (Acari: Ixodidae) tick species is currently being done by Ms Sharon Terry. The study commenced at the beginning of 2007 and most of the fieldwork and identification work has been completed. Ms Terry's M.Sc. dissertation is entitled: A Taxonomic description of all stages of four Ixodes (Acari: Ixodidae) ticks. Her promoter is Prof. Ivan Horak.

Ms Octavia Motlogeloa did her honours degree dissertation on the Influence of water quality on tick mortality.

Ms Terry attended the student workshop of the South African Biosystematics Initiative (SABI) held in Pretoria, Gauteng. She was elected as a member of the student council and as member of the student website council of SABI. She was also elected President of the department's Postgraduate Forum.

Ms Ellie van Dalen and Christa Du Randt attended the WHO/TDR Good Laboratory Practice Training Workshop held at the Faculty of Health Sciences of the UFS.

Prof. Horak and Mr Jordaan presented a poster talk at the 36th Annual Conference of the Parasitological Society of Southern Africa, held at Pestana Kruger Lodge, Malelane, South Africa in September 2007.

Research projects undertaken by the **Etho Ecology group** investigated the general biology and ecology of larks in the central Free State as well as the general biology of the feral pigeon in the Bloemfontein area. The influence of eye size on the behaviour of some Free State bird species was also examined. Research on larger animals included the comparative behaviour and ecology of the red hartebeest and black wildebeest. The etho-ecology of the bles- and bontebok with special reference to hybridisation was undertaken in collaboration with the Department of Genetics.

Members of the group undertook an annual honours excursion to the Willem Pretorius Nature Reserve. Prof. Ordino Kok gave an oral presentation on bird hazards at inland airports, at an international congress in Kingston, Canada.

During 2007, 11 students were registered for the third-year Entomology course (ENT334), presented by the Medical, Veterinary and Forensic Entomology group.

One honours student, Mr Theo Viljoen, completed his research project on Forensic Entomology, in collaboration with the Department of Genetics at the UFS. Ms Karen Ehlers was the co-supervisor of this project. The project was entitled: *Blowfly crop analysis: The pre-*



South Africa has a shortage of forensic entomologists, Prof. Theuns van der Linde of the Medical, Veterinary and Forensic Entomology group said in his inaugural lecture as full professor. He is one of only two practising forensic entomologists in South Africa. Forensic entomology is used, among other things, in the solving of murder cases, suicide cases, rape and these days also in solving in transito robberies. The theme of his lecture was: The detective was an insect - a short overview of forensic entomology. At the lecture are, from the left: Profs Frederick Fourie, Rector and Vice-Chancellor of the UFS, Van der Linde, Herman van Schalkwyk, Dean: Faculty of Natural and Agricultural Sciences at the UFS, and Jo van As, Departmental Chairperson.



South African researchers at the 17th International Congress of Arachnology in Sao Pedro, Brazil are, from the left: Dr Lorenzo Prendini, American Museum of Natural History, New York, United States of America (USA), Dr Ansie Dippenaar-Schoeman, Agricultural Research Council's (ARC) Plant Protection Research Institute (PPRI), Pretoria, Mr Leon Lotz, National Museum, Bloemfontein, Mr Charles Haddad, Arachnology group, and Dr Stefan Foord, University of Venda, Thohoyandou.

sence of genomic DNA and the effect of degradation.

Mr Gert Venter completed his Ph.D. study in November and his thesis was submitted in December 2007. The title of his thesis is: The oral susceptibility of South African livestock-associated Culicoides species to selected orbivirsuses".

Three publications in accredited scientific journals were published during 2007 by members of Prof. Theuns van der Linde's research group. Although Prof. Van der Linde was kept busy supervising his students, he did several crime investigations with the South African Police Services (SAPS) and wrote confidential reports, which were submitted to the SAPS and the State Pathologists during 2007.

Prof. Van der Linde was also an invited speaker at the congress of the International Organisation for Forensic Odonto-Stomatology (IOFOS) from 21-23 November 2007 at the Breakwater Lodge, V & A Waterfront, Cape Town. Prof. Van der Linde is also involved as coorganiser of the Medical and Veterinary Section of the 23rd International Congress of Entomology (ICE2008) to be hosted in Durban during July 2008. He is also co-organiser of the Symposium on Forensic Entomology at the same congress.

Currently two Ph.D. students in Forensic Entomology are nearing the completion of their studies. Mr Kobus Kolver is studying aspects of insect succession on burnt bodies, and Ms Sonja Brink is doing research on the morphology of the immature stages of various blowfly species of forensic entomological importance. A further two M.Sc. students and one B.Sc. (Hons.) student joined this research group in 2007, two of them in Forensic Entomology and one in Veterinary Entomology.

Various criminal investigations were undertaken during 2007 by members of the Forensic Entomology Research Group in collaboration with the SAPS and State Pathologists. Confidential reports were submitted.

The **Nematology research group** concentrates on plant parasitic nematodes occurring in the Free State Province, which in the long run will aid farmers in this area.

In 2006 Mr Theuns Louw received his B.Sc Honours in Entomology and registered for his M.Sc. in Nematology in 2007. In November 2006 Dr Candice



Here are Dr Liesl van As (background, left) and Prof. Jo van As, Departmental Chairperson (background, right) working with Dr Ash Bullard (front left) and Prof. Robin Overstreet (front right) from the Gulf Coast Research Laboratory of the University of Southern Mississippi, United States of America (USA) during the research trip to the De Mond Nature Reserve.

Jansen van Rensburg and Mr Louw visited the Agricultural Research Council's (ARC) Plant Protection Research Institute at Rietondale, Pretoria to make contact with the nematologists at this institution. The group also visited the ARC's Grain Crops Institute in Potchefstroom to establish possible collaboration projects.

During the autumn recess of 2007 Dr Jansen van Rensburg accompanied Dr Van As and Profs Van As and Basson on the annual third-year excursion to the Potberg Environmental Centre in the De Hoop Nature Reserve in the Western Cape.

Dr Jansen van Rensburg and Mr Louw also attended the Nematological Society of southern Africa's bi-annual conference held in Port Elizabeth at the beginning of May 2007 where they were exposed to a number of interesting and informative talks and got to meet world-class scientists in this field. During the June/July 2007 winter recess Dr Jansen van Rensburg and Mr Louw attended a twoweek training course on laboratory techniques and identification of various plant parasitic nematode genera.

Dr Jansen van Rensburg, together with Dr van As and Profs Van As and Basson attended the 7th International Symposium on Fish Parasites in Viterbo, Italy in September 2007.

The Insects on New Crops Programme (INCroP) conducted research on pistachio (client: Industrial Development Corporation – Green Valley Nuts, Prieska), cactus pear (client: SA CactusNet), kenaf (client: Sustainable Fibre Solutions, Cape Town), Hoodia (clients: Phytopharm and Unilever, United Kingdom (UK)) and agave (client: Agave Distillers, Graaff-Reinet).

Co-operative research was also conducted on lettuce cultivation under shade house conditions (with the Central University of Technology (CUT), Bloemfontein), wheat leaf miner biology (with the ARC's Small Grain Institute, Bethlehem and Griqualand West Corporation, Douglas), parasitoid complex on coral tree species (with the ARC's Plant Protection Research Institute, Pretoria), Russian wheat aphid biotypes (with the ARC's Small Grain Institute, Bethlehem); mango weevil population dynamics and management (research conducted at Bavaria Fruit Estates, Hoedspruit); Hemipteran insects as vectors of sorghum diseases (with the Department of Plant Sciences at the UFS); and arboreal insect stratification along the Omaruru River, Namibia (with Polytechnic of Namibia, Windhoek). Postgraduate students are involved in all these projects for degree purposes.

Mr Haddad, a lecturer in the department, carried out research on the systematics of the Corinnidae spider family for his Ph.D. degree, whilst Mr Vaughn Swart, a registered Ph.D. student in Environmental Management and Entomology, investigated the role of insects on new crops as bio-indicators in South African agribusiness. Prof. Schalk Louw participated in the 6th International Congress of Cactus Pear and Cochineal hosted in João-Pessoa, Paraíba, Brazil during October 2007.

Prof. Louw was involved in the structuring of the UFS research cluster entitled: "Technologies for sustainable crop industries in semi-arid regions". He was co-recipient of a Technology Award of the National Departments of Trade and Industry and Science and Technology for research on and development of kenaf, a new industrial crop for South Africa. Prof. Louw is also the Deputy Chairperson: Congress Management Committee of the prestigious 23rd International Congress of Entomology to be hosted in Durban during July 2008.

An M.Sc. dissertation in Entomology entitled: Atelocera raptoria (Hemiptera: Pentatomidae) on pistachio (Anacardiaceae: Pistacia vera) in South Africa: Implementation of a plant health management strategy was completed by Mr De Villiers Fourie.

# Research outputs

## **Research articles**

**Blodgett, J.T., Swart, W.J., Louw, S.VdM. & Weeks, W.J.** 2007. Soil amendments and watering influence the incidence of endophytic fungi in *Amaranthus hybridus* in South Africa. *Applied Soil Ecology* 35(2): 311-318.

Butler, H.J.B. & Kok, O.B. 2007. Habitatsvoorkeure, voedafstande en vliegrigtings van vee-reiers (Bubulcus ibis) in die sentrale Vrystaat. Suid-Afrikaanse Tydskrif vir Natuurwetenskap en Tegnologie 26(3): 196-204.

**Grünewald, H., Butler, H.J.B. & Scholtz, N.** 2007. Die effek van ongerehabiliteerde uraanmyne op kleinsoogdier populasies. *Suid-Afrikaanse Tydskrif vir Natuurwetenskap en Tegnologie* 26(1): 93-94.

Kiggundu, A., Gold, C.S., Labuschagne, M., Vuylsteke, D. & Louw, S.VdM. 2007. Components of resistance to banana weevil (*Cosmopolitus sordidus*) in *Musa* germplasm in Uganda. Entomologia Experimentalis et Applicata 122: 27-35.

Le Roux, P.D.S., Kok, O.B. & Butler, H.J.B. 2007. Kransduif x Tuinduif-hibried? Suid-Afrikaanse Tydskrif vir Natuurwetenskap en Tegnologie 26(4): 299-301.

Reed, C., Basson, L., Van As, L.L. & Dyková, I. 2007. Four new myxozoans (Myxosporea: Bivalvulida) from intertidal fishes along the south coast of Africa. *Folia Parasitologica* 54: 283-292.

Van As, L.L. & Van As, J.G. 2007. Lamproglena hepseti n. sp. (Copepoda, Lernaeidae) gill parasite of the African Pike, *Hepsetus odoe* (Bloch, 1794) from the Okavango River and Delta, Botswana. Systematic Parasitology 67: 19-24.

Vidrine, M.F., Lötter, Z., Van As, J.G., Bogan, A.E. & Bastian-Stanford, M. 2007. Unionicola (*Coelaturicola*) gledhilli n. subgen., n. sp. (Acari: Unionicolidae) from freshwater mussels in Botswana and East Africa. International Journal of Acarology 33(2): 167-171.

### **Reports**

Adendorff, J., Prinsloo, G.J. & Louw, S. VdM. 2007. Aspects of the bio-ecology of the grass leafminer on wheat in central South Africa. Report to Griqualand West Corporation, Douglas, South Africa.

Cronjé, M., Jankielsohn, A. & Louw, S. VdM. 2007. The effect of different soil treatments on the reproduction rates of and damage caused to different wheat cultivars by the Russian wheat aphid biotype, Diuraphis noxia (RWASA2). Report to the Agricultural Research Council (ARC) Small Grain Institute, Bethlehem, South Africa.

Louw, S.VdM. 2007. Towards the management of Paramecops stapeliae on Hoodia gordonii plants. Annual report to Phytopharm plc, Godmanchester, UK & CePHMa, University of the Free State, Bloemfontein, South Africa. (Co-operative Agreement).

# Conference contributions

Basson, L. & Van As, J.G. 2007. An enigmatic relationship between fish trichodinids (Ciliophora: Peritrichia) and other hosts. Paper presented at the 7th International Symposium on Fish Parasites (ISFP VII): Fish Parasitology in the 21st Century: From Biodiversity and Ecosystem to Global Warming, Viterbo, Italy. 24-28 September.

**Basson, L. & Van As, J.G.** 2007. An enigmatic relationship between fish trichodinids (Ciliophora: Peritrichia) and other hosts. Proceedings of the 7th International Symposium on Fish Parasites (ISFP VII): Fish Parasitology in the 21st Century: From Biodiversity and Ecosystem to Global Warming, Viterbo, Italy. 24-28 September. Volume 49: 123.

Christie, J., Basson, L. & Van As, L.L. 2007. Mantoscyphidia (Ciliophora: Peritrichia) of gastropods in a marine environment. Paper

## Staff

#### Main Campus:

**Professors:** Profs Jo van As, Linda Basson, Ordino Kok, Schalk Louw, Theuns van der Linde

**Extraordinary Professors:** Profs Leon Fourie, Gerhard Prinsloo

**Senior Lecturers:** Drs Liesl Van As, Léan van der Westhuizen

**Lecturers:** Dr Candice Jansen van Rensburg, Ms Ellie van Dalen, Messrs Hennie Butler, Charles Haddad

**Affiliated Researchers:** Profs Dawie Kok, Ivan Horak, Dr Johan Welman

#### Permanent Non-Academic

**Staff:** Mss Christa du Rand, Ina Erasmus, Isabel Human, Sylvia Teele, Patrick Mohasi, Messrs Emannuel Palesa, Andreas Tlou, William Lesoana

### Qwaqwa Campus

**Lecturers:** Dr Michael Cunningham, Ms Hafeleni Matete, Messrs Sibusiso Mtshali, Johann van As

### **Contact details**

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During the Nematology research group's visit to the Agricultural Research Council's (ARC) Plant Protection Research Institute (PPRI) were, from the left: Dr Antoinette Swart, from the ARC, Mr Theuns Louw, from the department, Dr Mariette Marais, from the ARC, Dr Candice Jansen van Rensburg, Lecturer at the department, and Dr Esther van den Berg, from the ARC.

presented at the 36th Annual Conference of the Parasitological Society of Southern Africa, Pestana Kruger Lodge, Malelane, South Africa. 18-20 September.

**Groenewald, H., Basson, L. & Van As, J.G.** 2007. *Trichodinid ectoparasites of Anuran larvae*. Paper presented at the 36th Annual Conference of the Parasitological Society of Southern Africa, Pestana Kruger Lodge, Malelane, South Africa. 18-20 September.

Jansen van Rensburg, C., King, P.H. & Van As, J.G. 2007. Diplostomatids inducing behavioural changes in fish species of the Okavango River and Delta, Botswana. Paper presented at the 7th International Symposium on Fish Parasites (ISFP VII): Fish Parasitology in the 21st Century: From Biodiversity and Ecosystem to Global Warming, Viterbo, Italy. 24-28 September.

Jansen van Rensburg, C., King, P.H. & Van As, J.G. 2007. Diplostomatids inducing behavioural changes in fish species of the Okavango River and Delta, Botswana. Proceedings of the 7th International Symposium on Fish Parasites (ISFP VII): Fish Parasitology in the 21st Century: From Biodiversity and Ecosystem to Global Warming, Viterbo, Italy. 24-28 September. Volume 49: 289.

Louw, S.VdM., Parau, J.V. & Olevano, J.C. 2007. Bio-ecology of sap beetles, a new double impact pest on cactus pear in South Africa. Poster presented at the VI International Conference on Cactus Pear and Cochineal and the VI General Meeting of the FAO- CACTUSNET, João-Pessoa, Brazil. 22-26 October.

Modise, E.M., King, P.H., Baker, C. & Van As, J.G. 2007. Monogenean parasites on gills of freshwater fish from the Okavango Delta, Botswana. Paper presented at the 36th Annual Conference of the Parasitological Society of Southern Africa, Pestana Kruger Lodge, Malelane, South Africa. 18-20 September.

Modise, E.M., King, P.H., Baker, C. & Van As, J.G. 2007. Morphology of two new monogenean species on the tigerfish and silver catfish from the Okavango Delta, Botswana. Paper presented at the 7th International Symposium on Fish Parasites (ISFP VII): Fish Parasitology in the 21st Century: From Biodiversity and Ecosystem to Global Warming, Viterbo, Italy. 24-28 September.

Modise, E.M., King, P.H., Baker, C. & Van As, J.G. 2007. Morphology of two new monogenean species on the tigerfish and silver catfish from the Okavango Delta, Botswana. Proceedings of the 7th International Symposium on Fish Parasites (ISFP VII): Fish Parasitology in the 21st Century: From Biodiversity and Ecosystem to Global Warming, Viterbo, Italy. 24-28 September. Volume 49: 94.

Rangaka, I.I., King, P.H. & Basson, L. 2007. A review of Myxobolus species (Myxosporea) on African Hydrocynus species. Paper presented at the 36th Annual Conference of the Parasitological Society of Southern Africa, Pestana Kruger Lodge, Malelane, South Africa. 18-20 September. Rangaka, I.I., King, P.H. & Basson, L. 2007. Diversity of myxosporeans from two fish species in the Okavango Delta, Botswana. Paper presented at the 36th Annual Conference of the Parasitological Society of Southern Africa, Pestana Kruger Lodge, Malelane, South Africa. 18-20 September.

Rangaka, I.I., King, P.H. & Basson, L. 2007. Myxosporeans of two fish species in the Okavango Delta, Botswana. Paper presented at the 7th International Symposium on Fish Parasites (ISFP VII): Fish Parasitology in the 21st Century: From Biodiversity and Ecosystem to Global Warming, Viterbo, Italy. 24-28 September.

Rangaka, I.I., King, P.H. & Basson, L. 2007. Myxosporeans of two fish species in the Okavango Delta, Botswana. Proceedings of the 7th International Symposium on Fish Parasites (ISFP VII): Fish Parasitology in the 21st Century: From Biodiversity and Ecosystem to Global Warming, Viterbo, Italy. 24-28 September. Volume 49: 167.

Reed, C.C., Basson, L. & Van As, L.L. 2007. Coelozoic myxozoans from the south coast of Africa. Paper presented at the 7th International Symposium on Fish Parasites (ISFP VII): Fish Parasitology in the 21st Century: From Biodiversity and Ecosystem to Global Warming, Viterbo, Italy. 24-28 September.

Reed, C.C., Basson, L. & Van As, L.L. 2007. Coelozoic myxozoans from the south coast of Africa. Proceedings of the 7th International Symposium on Fish Parasites (ISFP VII): Fish Parasitology in the 21st Century: From Biodiversity and Ecosystem to Global Warming, Viterbo, Italy. 24-28 September. Volume 49: 168.

Terry, S., Jordaan, A.J. & Horak, I.G. 2007. The geographic distribution and a taxonomic description of ticks in the Free State Province. Poster presented at the 36th Annual Conference of the Parasitological Society of Southern Africa, Pestana Kruger Lodge, Malelane, South Africa. 18-20 September.

Van As, L.L. & Van As, J.G. 2007. Crustacean ectoparasites of fishes from the Okavango River and Delta, Botswana. Paper presented at the 7th International Symposium on Fish Parasites (ISFP VII): Fish Parasitology in the 21st Century: From Biodiversity and Ecosystem to Global Warming, Viterbo, Italy. 24-28 September.

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