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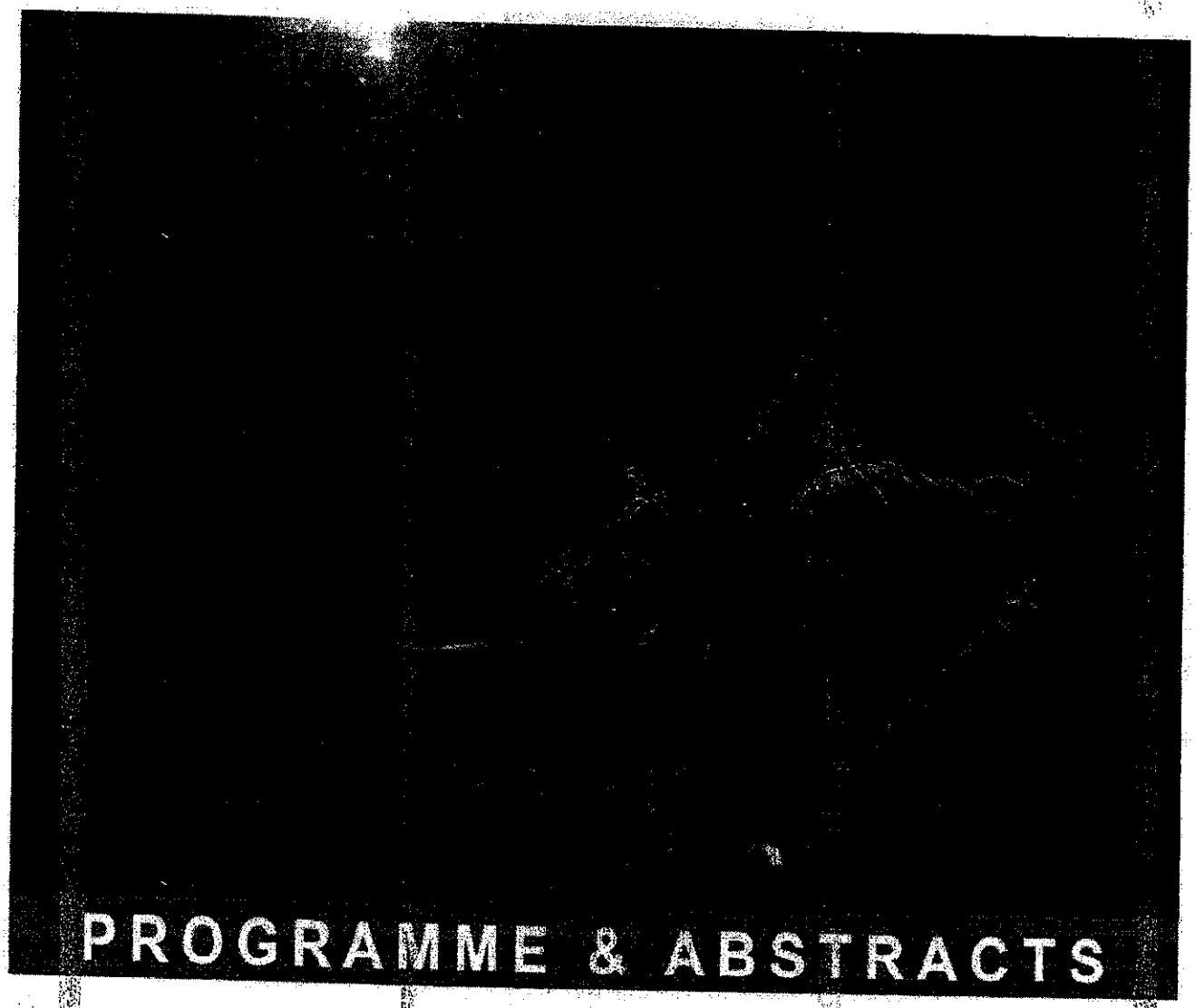
Southern African Society of Aquatic Scientists Congress 2018

24-28 June 2018

Aquatic ecology in the Anthropocene



PROGRAMME & ABSTRACTS

4	14:15	Quintin Schutte – Habitat selection of juvenile fishes in the Mhlathuze Estuary (South Africa) 40 years after harbor construction	Josie South – [illegible]
5	14:30	Sazi Nzama – Macrobenthic community response to finfish farming in [illegible] Richards Bay Harbour	[illegible]
6	14:45	Anja Greving – Comparison of metal and organic biomagnification in estuarine systems of the warm-temperate south coast and the subtropical east coast	[illegible]
	15:00	Afternoon Tea	
		Estuaries	Functional Traits, Morphology and Response
1	15:30	Jaime Johnson – First report on carbon storage in warm-temperate mangroves of South Africa	Hester Strauss – Comparing the foraging ecology of fish parasitic cymothoid isopods with different host attachment sites using stable isotope analysis
2	15:45	Jessica Els – Ecosystem services of the Swartkops Estuary salt marsh and seagrass habitats focussing on carbon storage and the potential of these habitats to [illegible]	Jeremias Chindia – Phytoplankton settling depends on cell morphological traits, but what is the best predictor?
3	16:00	[illegible]	Delsy Sifundza – Habitat associations of an endangered southern temperate riverine fish and implications for species protection
4 - 6	16:15	Poster Session	
	19:00	Supper	

		[illegible]	
		Breakfast	
Session	Time	Room A	
		Key Note Session	
	08:30	Housekeeping	
1	08:40	[illegible]	
2	09:20	[illegible]	
3	10:00	[illegible]	
4	10:15	[illegible]	
5	10:30	[illegible]	
	10:45	Morning Tea	
Session	Time	Room A	Room B
		Freshwater Ecology	Functional Traits, Morphology and Response
1	11:15	[illegible]	Dumisani Khosa – Comparative functional response of two invasive species and linking it to temperature
2	11:30	[illegible]	Nonjabulo Matenela – Ecomorphological variation and resource partitioning between two newly identified sympatric lineages of Afromontane stream catfishes (*Chiloglanis* and *Amphilius*)

Poster list

ID	Presenter	Title
1	Anja Vermaak	Rediscovering marine parasites in South Africa: Digeneans of *Clinus superciliosus* (Perciformes: Clinidae) in the Tsitsikamma National Park
2	Nthuthuko Masikane	Effects of synthetic salts, stocking density and sample volume on the survival of the estuarine amphipod *Grandidierella lignorum*: Recommendations for developing an effluent toxicity test method
3	Gordon O'Brien	Probflo: A regional scale ecological risk framework for E-Flows
4	Sibusiso Yokwana	Cohort stock assessment of the Blue Bream *Pachymetopon aeneum* (Gilchrist and Thompson, 1908), a South African linefishery species
5	Quintin Schutte	Salinity tolerance in *Oreochromis mossambicus* (Mozambique Tilapia) under laboratory conditions: Preliminary results
6	Emiline Miller	Riparian plants as indicators of salinity in non-perennial rivers
7	Rian Pienaar	Use of stable isotope analysis to enhance the understanding of dietary variation in the super klipfish (*Clinus superciliosus*)
8	Nthuthuko Masikane	Short-term methods for estimating chronic toxicity effects of liquid-phase samples using the sea urchin *Echinometra mathaei* is inadequate for the sea urchin *Tripneustes gratilla*
9	Khesa Pitso	Kidney and heart histopathology as biomarkers for DDT toxicity on *Oreochromis mossambicus* in a multi-toxicant exposure
10	Peter Malome Mochecela	Longline fishing for food security in South Africa: Harvesting of *Clarias gariepinus* in rivers and dams
11	Ncumisa Matam	An analysis of inland fisheries development in the Eastern Cape, South Africa
12	Ayabulela Mnbata	Salinity tolerance of the estuarine shrimp *Palaemon peringueyi* (Caridea: Palaemonidae) in the [illegible] Estuary
13	Asandiswa Nonyukela	Physiological response of the salt marsh crab, *Parasesarma catenatum*, exposed to altered salinity regimes
14	Thabisa Mavubengwana	Macrozoobenthic community structure of two permanently open estuaries, Eastern Cape, South Africa
15	Melissa Wade	The lower Thukela River and Estuary: past, present and future
16	Michael Silberbauer	A guide to the effective use of the South African national water quality database for monitoring change
17	Sharone Bajaba	The use of Baited Remote Underwater Video (BRUVs) as a monitoring tool for freshwater fishes
18	Ina Wagenaar	Morphology of the urogenital papillae of the male African sharptooth catfish, *Clarias gariepinus*: considered [illegible]
19	Kylen Brown	The role and distribution of freshwater macrophytes along the Krom River
20	Bethe Muller	Estimating the population size and habitat association of the Clanwilliam rock catfish *Austroglanis gilli* (Barnard, 1943) in the Krom River, Olifants-Doring River catchment, Cape Fold Ecoregion
21	Pieter Swanepoel	Myxozoan detection and identification by means of silver-nitrate impregnation
22	Gcinikaya Nkete	Detecting the presence of native and non-native fishes in the Krom River, Western Cape, South Africa: A comparison between eDNA and conventional monitoring techniques
23	Whitney Engelbrecht	Germination and establishment of perennials in Non-perennial rivers
24	Mahlatse Fortunate Mashabane	Diversity, conservation and use of the Mozambique tilapia in KwaZulu-Natal
25	Precious Omoruwou	Condition Factor and Length-weight Relationship of Bagrus bayad macropterus (Daget, 1954) from Agbura River a tributary of the Lower Nun River, Niger Delta, Nigeria
26	[illegible] Manukaza	Comparative assessment of the prawn community of seagrass and mangrove habitat in the [illegible] Estuary
27	Buyani Khulakahle Mazeka	Harbour associated impacts on nematode communities in intertidal subtropical mangroves
28	Busisa Ntshangase	*Pseudodiaptomus* spp. distribution in the Mlalazi Estuary
29	Liam Connell	A Biomarker Assessment of *Clarias gariepinus* on the Vaal River System
30	Gabbi Crystal Lloyd	Biomarker Responses in *Clarias gariepinus* from the [illegible] River System, Limpopo, South Africa
31	Richard Greenfield	Artificial breeding and normal development of *Synodontis zambezensis* (Peters, 1852)
32	Cobus Van Dyk	[illegible] in a hypereutrophic freshwater impoundment: A seasonal and species comparison
33	Sanele Dweba	A preliminary study on intraspecific differences in critical thermal maxima and habitat use of the salt marsh crab Parasesarma catenatum in Mngazana Estuary
34	Balance Phala	Establishing the effect water inflow has on fish health and the ecological status of Flag Boshielo Dam
35	Busisa Ntshangase	Population dynamics, stock assessment and zoea larval development of *Callichirus kraussi* in Richards Bay Harbour
36	Rochen Wiltshire	Monitoring Wetland Vegetation between 2006-2017 in Hogsback, Raymond Mhlaba Local Municipality, Eastern Cape, South Africa

MYXOZOAN DETECTION AND IDENTIFICATION BY MEANS OF SILVER-NITRATE IMPREGNATION

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ABSTRACT

Myxozoans are regarded as harmful pathogens in aquaculture systems and have an impact on fish welfare either directly or indirectly. Myxozoans have been the direct cause of devastating mortalities in the aquaculture industry. The identification of myxozoans species are therefore very important, but requires specialized methods. This study proposes the simple method of silver-nitrate impregnation, a modification of Klein's technique, to identify both myxozoans and trichodinids that can occur simultaneously on the same skin or gill smears, collected from a single fish specimen.

INTRODUCTION

The accurate identification of myxozoans to species level generally requires a combination of morphometric data from fresh live specimens, histology and molecular methods. This methods requires specialized skills and equipment that aquaculture farms may not have access to.

Therefore the authors suggest the method of silver-nitrate impregnation to identify myxozoans in aquaculture and field conditions. The advantage of this method (traditionally used only for peritrichs) is that it provides sufficient morphological information for the identification of both myxosporean and trichodinids to species level occurring on the same host. This method can be used by fish health professionals in the aquaculture industry for rapid species level discrimination of these potential pathogens.

Furthermore the advantages of this method allow for sampling in remote locations and for medium to long storage of appropriately stained and mounted reference material for diagnostic and taxonomic purposes.

METHODS

Silver-nitrate impregnation, a modified method of Klein's technique as describe by Lom (1958).

- If parasites were found on skin or gill smears, the wet microscope slides were left to air dry.
- Slides (containing myxozoans and trichodinids) were impregnated with 2% silver-nitrate ($AgNO_3$) for 10 min.
- The slides were rinsed, 2-3 times, transferred to a white staining dishes and covered in distilled water.
- Slides were exposed to UV-light for 45 min to 1 hour until the parasites were impregnated correctly.
- The slides were air dried and permanently mounted using Eukitt mounting medium.

RESULTS

Based on the evaluation of silver-nitrate impregnated specimens, seven species of the genus *Myxobolus* Bütshili, 1882 were found, where two are possibly new to science based on spore morphology (Figures 1 and 2). All the specimens were found on fish species of the genus *Enteromius* Cope, 1869 from the Okavango Delta in Botswana and the Pongola River in South Africa (Table 1).

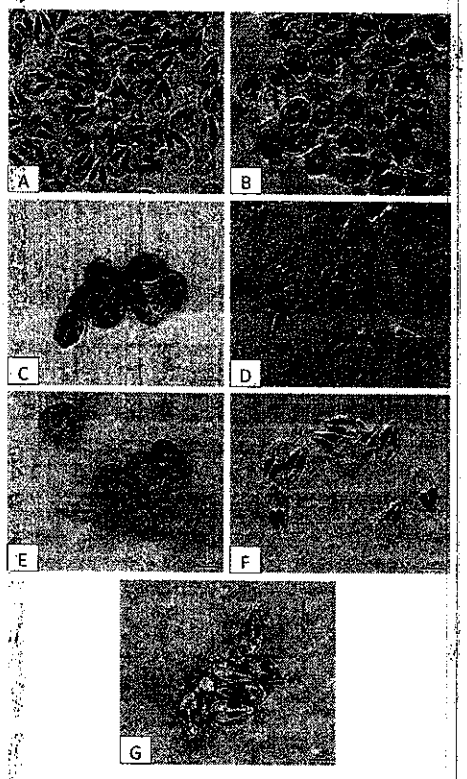

Figure 1: Light micrographs of silver-nitrate impregnated spores of A – *M. nayangana* from the gills of *E. radiatus*, B – *M. olai* from the gills of *E. radiatus*, C – *M. paludinosus* from the gills of *E. paludinosus*, D – *M. etsatsaensis* from the gills of *E. afrohamiltoni*, E – *Myxobolus* sp. 1 from the skin of *E. afrohamiltoni*, F - *Myxobolus* sp. 2 from the gills of *E. radiatus* Peters and G - *Myxobolus* sp. 3 from the gills of *E. paludinosus*. Scale bar: A-E and G 5 µm, F 10 µm (Swanepoel *et al.*2015).

Table 1: *Myxobolus* species found by means of silver-nitrate impregnation.

Myxobolus sp.	Fish Host	Locality
M. nayangana	*E. radiatus*	Okavango Delta
M. olai	*E. radiatus*	Okavango Delta
M. paludinosus	*E. paludinosus*	Pongola River
M. etsatsaensis	*E. afrohamiltoni*	Pongola River
Myxobolus sp. 1	*E. afrohamiltoni*	Pongola River
Myxobolus sp. 2	*E. radiatus*	Okavango Delta
Myxobolus sp. 3	*E. paludinosus*	Pongola River

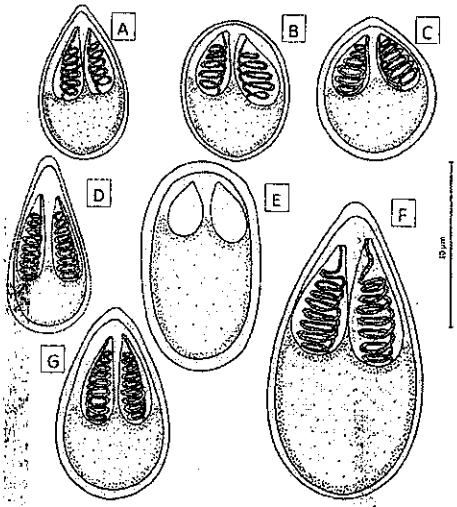

Figure 2: Microscope projection drawings of silver-nitrate impregnated spores of *Myxobolus* species. A – *M. nayangana* from the gills of *E. radiatus*, B – *M. olai* from the gills of *E. radiatus*, C – *M. paludinosus* from the gills of *E. paludinosus*, D – *M. etsatsaensis* from the gills of *E. afrohamiltoni*, E - *Myxobolus* sp. 1 from the skin of *E. afrohamiltoni*, F - *Myxobolus* sp. 2 from the gills of *E. radiatus* and G - *Myxobolus* sp. 3 from the gills of *E. paludinosus*. Scale bar: 10 µm (Swanepoel *et al.* 2015).

CONCLUSION

The silver-nitrate impregnation method of myxosporean detection and identification proposed, does not necessarily provide enough variance to describe new species, but it does provide a valid basis to discriminate between species.

The classification of myxosporean species is in transition from spore-based morphology to where molecular characteristic should be taken into account (Lom and Dyková 2006). Silver-impregnations should therefore not be used to describe new species, but to compare spore morphology under field conditions in remote areas (Swanepoel *et al.* 2015).

REFERENCES

LOM, J. 1958. A Contribution to the systematics and morphology of endoparasitic trichodinids from amphibians, with a proposal of uniform specific characteristics. *The Journal of Protozoology* 5: 251-263.

LOM, J & DYKOVÁ, I. 2006. Myxozoan genera: definition and notes on taxonomy, life-cycle terminology and pathogenic species. *Folica Parasitologica* 53: 1-36.

SWANEPOEL, P. J., VAN AS, J.G., VAN AS, L.L. & CHRISTISON, K.W. 2015. *Parasites of Barbus species (Cyprinidae) of southern Africa.* MSc. Dissertation. University of the Free State, South Africa. 190 pp.

ACKNOWLEDGMENTS

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The role and distribution of freshwater macrophytes along the Krom River

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Freshwater macrophytes are integral to the functioning of aquatic environments due to their complex ecosystem role. Macrophytes function as producers, are important sources of food and refuge and provide habitats for aquatic invertebrates. This study aims to identify the ecosystem role of the submerged macrophyte *Isolepis digitata* in addition to determining the physical parameters that influence the distribution and abundance of this species in the Krom River and how these physical parameters affect changes in morphology. *Isolepis* samples were collected at two sites along the Krom River during February 2018. In order to investigate the habitat function of *I. digitata*, aquatic invertebrate samples were also collected. Preliminary field observations demonstrate that *I. digitata* supports a larger number of aquatic invertebrates compared to the surrounding bedrock and that the shallower plants display greater invertebrate abundances than the deeper plants. These observations emphasise the habitat importance of macrophytes in aquatic ecosystems.

Estimating population size and habitat association of the Clanwilliam rock catfish *Austroglanis gilli* (Barnard, 1943) in the Krom River, Olifants-Doring River catchment, Cape Fold Eco-region

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The Cape Fold Ecoregion (CFE) contains the highest concentration of endemic and threatened freshwater fishes in South Africa. In order to conserve and manage the remaining populations of these species, knowledge of the population size and habitat requirements are required. An isolated population of the Cederberg endemic Clanwilliam rock catfish *Austroglanis gilli* (Barnard, 1943) is found in the Krom River tributary of the Matjies River in the Olifants-Doring River Catchment. The population occurs in a 6-km stretch of the upper Krom River where variation in abundance may be related to habitat features such as substrate. The aim of this study was to further our understanding of the population size and habitat requirements (in terms of substrate) of the *A. gilli* population in the Krom River. A survey of the Krom River was completed to identify reaches dominated by substrate classes bedrock, boulder, cobble and sand. Depletion electrofishing was used in five 20-m reaches within each substrate class to estimate the relative abundance of *A. gilli*. Bedrock, cobbles (which were generally highly embedded) and sand supported low abundances of *A. gilli*. The preferred habitat of the species appears to be characterised by boulder substrates, which may be an important consideration in conserving the species.

Myxozoan detection and identification by means of silver-nitrate impregnation

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Myxozoans are regarded as harmful pathogens in aquaculture systems and have an impact on fish welfare either directly or indirectly. Myxozoans have been the direct cause of devastating mortalities in the aquaculture industry. The accurate identification of myxozoans to species level generally requires a combination of morphometric data from fresh live specimens, histology and molecular methods. These methods are often difficult to implement under field conditions or on site at remote aquaculture facilities as they require dedicated, specialized equipment. Consequently, myxozoans are diagnosed from fish and never properly identified to species level. This paper proposes the simple method of silver-impregnation, a modification of Klein's technique, to identify both myxozoans and trichodinids that can occur simultaneously on the same skin or gill smears, collected from a single fish specimen. The advantage of this method (traditionally used only for peritrichs) is that it provides sufficient morphological information for the identification to species level of both myxosporean and trichodinids occurring on the same host. Furthermore, the advantages of this method allow for sampling in remote locations and for medium to long storage of appropriately stained and mounted reference material for diagnostic and taxonomic purposes. Silver-nitrate impregnation was used in this study to identify seven *Myxobolus* species, two of which are possibly new to science based on spore morphology. This method can be used by fish health professionals in the aquaculture industry for rapid species-level discrimination of these potential pathogens.