

Polystomes of the world (Polystomatidae: Monogenea): An appraisal of intestinal morphology and species diversity

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Dissertation submitted in fulfilment of the requirements for the degree
Magister Scientiae in *Environmental Sciences* at the Potchefstroom
Campus of the North-West University

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November 2014

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Acknowledgements

My gratitude towards God for the patience, strength and inspiration throughout this study as well as for the many blessings in my life.

Prof L.H. Du Preez for the guidance, support and motivation throughout this study.

African Amphibian Conservation Research Group (AACRG) for their support and guidance.

The School of Biological Sciences, North-West University, Potchefstroom, South Africa, for the use of their facilities as well as support received.

To the USGS in Gainesville, Florida and in particular Dr. Tim Gross for financing this research visit and for making use of their facilities.

Many thanks and love to my loving parents, Eugene and Magda Delpport, as well as my awesome husband, C.S. van Rooyen, for their unconditional love, support, guidance, motivation, and for always believing in me.

Without you all this dissertation would not have transpired

THANK YOU

Abstract

Species interact and exploit one another for a number of reasons, including transportation, shelter or nutrition such as in parasitic relationships. Parasitism is an important aspect in life and is common in all taxonomic groups. Parasites are often host-specific and can be endoparasites or ectoparasites. The phylum Platyhelminthes includes the class Monogenea or monogenetic parasitic flukes. Monogeneans are mainly parasitic in fish but the family Polystomatidae, also commonly referred to as polystomes, are found on the skin and gills of the Australian lungfish, tadpole gills, kidneys and urinary bladders of frogs, gills and skin of salamanders, cloaca and phalodeum of caecileans, on the eye, in the nose, mouth or urinary bladder of freshwater turtles and on the eye of the hippopotamus.

Polystomes have a cosmopolitan distribution, and are found on all hospitable continents. Polystome species were first discovered in the 1758. Between 1961 and 1980 French researchers focussed on Central and West Africa and described a large number of parasites. Polystome discovery has steadily decreased in the last 30 years, however despite this, new species are still being discovered annually.

The list of currently known polystomes is most likely only a small portion of the species that exists. Wherever scientists searched for polystomes, new species were discovered. The current distribution of polystomes is not at all a true reflection of their global distribution but merely an indication of research effort.

Monogenean flatworms exhibit many variations in the morphology of the intestinal tract. These parasites display two distinct diets, where one group mainly feeds on blood while the other mainly feeds on mucus and epithelial tissues. Thus the feeding habits and other factors such as the shape of the caeca, the presence/absence and number of medial and lateral diverticula as well as anastomosis may play a role in the morphology of the intestinal tract, which can be used as a classification tool to classify polystome species into specific genera.

The three aims of the study were to:

- Conduct a literature study to compile a species list and source of information on all valid polystome taxa.
- Review the intestine shape of all polystomes and evaluate it as a taxonomic characteristic.
- Conduct a species description of a new North American chelonian polystome belonging to the genus *Polystomoides*.

Keywords: Parasitism, Platyhelminthes, Monogenea, Polystomatidae, polystomes, intestinal tract, feeding habits, anastomosis, diverticula

Opsomming

Parasitiese wisselwerking tussen spesies is algemeen en word uitgevoer vir redes soos veroer, skuiling en voeding. Parasitisme is „n belangrike aspek in lewe en is in alle organismes teenwoordig. Organismes wat nie self parasities is, dien as gasheer vir parasiete. Parasiete is dikwels gasheerspesifiek en kan endoparasiete of ektoparasiete wees. Die Filum Platyhelminthes sluit in die klas Monogenea (Familie: Polystomatidae). In die volksmond word na die groep as polistome verwys. Monogenieërs is meestal parasities op visse, maar die Polystomatidae parasiteer die Australiese longvis; amfibieërs waar hul aangetref word op die kieu van paddawisse, niere en urieneblaas van paddas, die kieu en vel van salamanders, kloak en voortplantingsbuis van wurmamfibieërs; op die oog, in die neus, mond of urieneblaas van varswaterskilpaaie asook op die oog van die seekoei.

Polistome het „n kosmopolitaanse verspreiding en word op alle bewoonbare kontinente aangetref. Die eerste polistoom is in 1758 ontdek. Tussen 1961 en 1980 het Franse wetenskaplike in sentraal en wes Afrika gefokus en tientalle spesies beskryf. Alhoewel die toename in nuwe spesies geleidelik oor die afgelope drie dekades afgeneem het word nuwe spesies steeds beskryf.

Die lys van bekende polistome is heel waarskynlik „n klein fraksie van die spesies wat wel bestaan. Waar wetenskaplikes hul navorsing gefokus het, is nuwe spesies beskryf. Die huidige verspreidingskaart is dus glad nie „n getroue weergee van polistome se globale verspreiding nie, maar dui eerder aan waar navorsing uitgevoer is.

Polistome vertoon groot variasie in die vorm van die spysverteringskanaal. Die met „n diet van bloed het tipies meer komplekse en uitgebreide spysverteringskanale terwyl die mukusvoerders eenvoudige stelsels het.

Spesifieke oogmerke van hierdie studie was om:

- „n Literatuurstudie te onderneem en „n lys op te stel asook basiese inligting van alle geldige polistoomspesies.
- Die variasie in die vorm van die spysverteringskanaal van alle polistome te dokumenteer en „n klassifikasiesistiem daar te stel.
- „n nuwe skilpadpolistoom uit die VSA te beskryf.

Sleutelwoorde: Parasitisme, Platyhelminthes, Monogenea, Polystomatidae, polistome, spysverteringskanaal, voedingsgedrag, anastomose, divertikula