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CHECKLIST

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Checklist of acanthocephalan parasites of South Africa

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Abstract

Twenty-one species of acanthocephalans, representative of thirteen genera from ten families of seven orders and three classes, are included in this updated checklist of acanthocephalans in South Africa.
Although South Africa appears to have a less diverse acanthocephalan fauna compared to some other countries such as Iran in Asia, or Brazil in South America, this is probably an artefact of fewer parasitological surveys.

Keywords

Acanthocephala, helminths, diversity, wildlife, Africa

Introduction

South Africa's landscape is the third most biologically diverse in the world with 6% of the world's mammal species, 8% of bird species and 5% of reptile species of which many are endemic (da Silva and Willows-Munro 2016). In regard to invertebrates, only 36,803 species are listed for Africa, and 12,098 for South Africa (Hamer 2010). It is said that in South African habitats, there are many undiscovered and undescribed animal species, especially invertebrates. It is estimated that as many as 80,000 South

African animal species remain to be discovered or described, and most of these animals are invertebrates (Hamer 2013).

The most comprehensive checklist of helminth parasites of Africa was compiled for freshwater fishes by Khalil (1971) and updated by Khalil and Polling (1997). It included very few records of acanthocephalans considering the total number of freshwater fish species present in the continent. The updated list (Khalil and Polling 1997) comprised 568 adult helminth parasites of which only 21 species are acanthocephalans. These records were compiled from 359 species of African freshwater fishes (assigned to 89 genera belonging to 32 families) of an estimated 3000 existing inland fish species (Khalil and Polling 1997). These examples illustrate the lack of knowledge of the helminth fauna of the wildlife of the African continent in general and in South Africa in particular.

This is the first checklist of acanthocephalans of South Africa and the aim is to provide a comprehensive record of all the previously reported species of Acanthocephala occurring in South African hosts as well as new records from our on-going research on parasites of wildlife, while simultaneously demonstrating the need for more extensive parasitological surveys.

Materials and methods

Data were obtained from two sources, published records and our own ongoing studies on the Acanthocephala of South African wildlife. These data are presented in two parts. In the first part parasites are listed systematically, with families, genera, and species in alphabetical order. The scientific name, including any synonyms, followed by the scientific and common name of the host, the locality in which the parasite was reported and museum (location) of type specimens where known. In the second part, the hosts are listed systematically by their scientific names and parasite records from each host are given together with locality and reference. The records without references are those of our ongoing study that are being reported here for the first time.

Classification of the Acanthocephala follows Amin (2013). For the hosts, fish taxonomy is based on Skelton (2001, 2016) and Fishbase (Froese and Pauly 2016), bird taxonomy is based on Clements et al. (2016) and mammal taxonomy on Wilson and Reader (2005) and Apps (2012).

Abbreviations for museums are:

BMNH	Natural History Museum London, London, UK;
GNM	Gothenburg Natural History Museum, Gothenburg, Sweden;
SAMCTA	South African Museum at Cape Town, South Africa;
SAM	South Australian Museum, Adelaide, Australia;
USNM Helm. Coll.	United States National Museum Helminthological Collection
USNPC	United States National Parasite Collection now held in the Invertebrate Zoology collection of the Smithsonian Museum, Washington, USA.

Acanthocephalan specimens from our ongoing wildlife parasitology projects were mostly collected from roadkill animals, museum collections, hunting/culling surveys and other research permits received for a limited number of specimens through the Limpopo Department of Economic Development, Environment and Tourism (LEDET) (permit number CPM004961 and ZA/LP/HO/3370 for freshwater fish research, 001-CPM403-00012 and ZA/LP/HO/3448 for frogs, ZA/LP/HO/3432 for rodents and ZA/LP/87586 for roadkills).

Acanthocephalans from freshly dead animals were placed in tap water and refrigerated for a few hours to one day until the proboscis was everted and then fixed and stored in 70% ethanol until studied. Acanthocephalans from frozen hosts were fixed and stored in 70% ethanol. Some specimens were prepared for examination by staining in Mayer's acid carmine, destained in HCl in 70% ethanol, dehydrated through increasing concentrations of ethanol, cleared in xylene, and mounted as whole worms in Canada balsam. Other worms were examined as temporary mounts following clearing in lactophenol or beechwood creosote.

A total of 102 species of birds (151 individuals), 72 of mammals (420 individuals), 9 of reptiles (18 individuals) and 42 (1050 individuals) of fishes were examined for this study (details in Table 1).

Table 1. Total number of host taxa examined and those infected with acanthocephalans (i.e. number of taxa that harboured acanthocephalans, in parenthesis) during our ongoing study on wildlife parasites in South Africa.

Taxon Group	Order	Family	Genus	Species
Amphibians	1 (0)	8 (0)	13 (0)	19 (0)
Birds	21 (5)	50 (5)	87 (5)	102 (5)
Fishes (freshwater)	8 (1)	13 (1)	24 (1)	42 (1)
Mammals	10 (4)	26 (4)	59 (6)	72 (6)
Reptiles	3 (1)	6 (1)	7 (1)	9 (1)
Totals	43 (11)	103 (11)	190 (13)	244 (13)

Parasite-Host List

Acanthocephala
Class: Archiacanthocephala Meyer, 1931
Order: Gigantorhynchida Southwell & Macfie, 1925
Family: Gigantorhynchidae Hamann, 1892
Genus: *Mediorhynchus* Van Cleave, 1916

***Mediorhynchus africanus* Amin, Evans, Heckmann & El-Naggar, 2013**

Empodius segmentatus (de Marval, 1902) Southwell & Mac-Fie, 1925
Mediorhynchus selengensis Harris, 1973
M. gallinarum (Bhalerao, 1937) Van Cleave, 1947 *sensu* Junker & Boomker, 2006

Notes. *M. gallinarum* is found only in Asia and the species in Africa is actually *M. africanus* (Amin et al. 2013; Amin 2013) and not *M. gallinarum* previously reported in South Africa (Junker and Boomker 2006).

Host. *Numida meleagris* (L. 1758) (Helmeted Guineafowl) (Numididae) (type host).

Localities. Kruger National Park, Mpumalanga Province, South Africa (type locality) (Junker and Boomker 2006); Vicinity of Petrus Steyn, Free State Province, South Africa (Davies et al. 2008); Musina, Limpopo Province, South Africa (Junker and Boomker 2007; Junker et al. 2008).

Mediorhynchus mokgalongi Smales & Halajian, 2018

Host. *Turdus smithi* Bonaparte, 1850 (Karoo Thrush) (Turdidae) (type host).

Locality. Polokwane, Limpopo Province, South Africa (type locality) (Smales et al. 2018).

Type specimens. Holotype male SAM AHC 48068, allotype female SAM AHC 48069, paratype SAM AHC 48070.

Mediorhynchus numidae (Baer, 1925) Meyer, 1932

Heteroplus numidae Baer, 1925; *Empodisma numidae* (Baer, 1925) Yamaguti, 1963

Host. *Numida meleagris* (L. 1758) (Helmeted Guineafowl) (Numididae)

Locality. Pretoria, Gauteng Province, South Africa (Oosthuizen and Markus 1967).

Mediorhynchus taeniatus (von Linstow, 1901) Dollfus, 1936

Echinorhynchus taeniatus von Linstow, 1901; *E. segmentatus* de Marval, 1902

Host. *Numida meleagris* (L. 1758) (Helmeted Guineafowl) (Numididae).

Locality. Rooipoort farm, Kimberley, Northern Cape Province, South Africa (Crowe 1977).

Host. *Tockus leucomelas* (Lichtenstein, 1842) (Southern Yellow-billed Hornbill) (Bucerotidae)

Locality. Limpopo Province, South Africa.

Order: Moniliformida Schmidt, 1972
Family: Moniliformidae Van Cleave, 1924
Genus: *Moniliformis* Travassos, 1915

***Moniliformis kalahariensis* Meyer, 1931**

Host. *Atelerix frontalis* (Smith, 1831) (Southern African Hedgehog) (Erinaceidae)

Locality. Mohlonong village and University of Limpopo, Limpopo Province, South Africa (Amin et al. 2014).

***Moniliformis moniliformis* (Bremser, 1811) Travassos, 1915 (type species)**

Echinorhynchus moniliformis Bremser, 1811
E. grassi Railliet, 1893
E. canis Porter, 1914
E. belgicus Railliet, 1919
Moniliformis moniliformis aegypticus Meyer in Petrochenko, 1958
M. dubius Meyer, 1932
M. travassosi Meyer, 1932 (*fide* Machado Filho 1946, Van Cleave 1952)

Host. *Atelerix frontalis* (Smith, 1831) (Southern African Hedgehog) (Erinaceidae).

Locality. Hammanskraal, Gauteng Province, South Africa (Le Roux 1930).

Notes. Host recorded as *Aethechinus frontalis* in Le Roux (1930).

***Moniliformis acomysi* Ward & Nelson, 1967**

Host. *Gerbilliscus leucogaster* (Peters, 1852) (Bushveld Gerbil), *Mastomys natalensis* (Smith, 1834) (Natal Mastomys), *Mus minutoides* (Pygmy mouse) (Muridae).

Localities. Bloemhof, Free State Province; Vyeboom village, Limpopo Province; Hoopstad, Free State Province; South Africa.

***Moniliformis* sp.**

Host. *Otolemur crassicaudatus* (É. Geoffroy Saint-Hilaire, 1812) (Thick-tailed Bushbaby) (Galagidae).

Locality. Venda, Limpopo Province, South Africa.

Remarks. One male and one female worm were found in the small intestine of an adult bushbaby.

Order: Oligacanthorhynchida Petrochenko, 1956
Family: Oligacanthorhynchidae Southwell & Macfie, 1925
Genus: *Heptamegacanthus* Spencer Jones, 1990

***Heptamegacanthus niekerki* Spencer Jones, 1990 (type species)**

Host. *Chrysospalax trevelyani* (Günther, 1875) (Giant Golden Mole) (Chrysochloridae) (type host).

Locality. Nqadu Forest, Transkei, Eastern Cape Province, South Africa (type locality) (Spencer Jones 1990).

Type specimens. Holotype male BMNH 1988.2480; allotype female BMNH 1988.2481; paratypes BMNH 1988.2482-2491.

Oligacanthorhynchidae sp.

Host. *Varanus albigularis* Daudin, 1802 (Rock Monitor) (Varanidae).

Localities. Tzaneen; Tolwe, Limpopo Province, South Africa.

Class: Eoacanthocephala Van Cleave, 1936
Order: Gyracanthocephala Van Cleave, 1936
Family: Quadrigyridae Van Cleave, 1920
Genus: *Acanthogyrus* Thapar, 1927
Subgenus: *Acanthosentis* Verma & Datta, 1929

***Acanthogyrus* (*Acanthosentis*) *phillipi* (Mashego, 1988) Amin, 2005**

Acanthosentis phillipi Mashego, 1988

Host. *Enteromius neefi* (Greenwood, 1962) (syn. *Barbus neefi*) (Sidespot Barb) (Cyprinidae) (type host).

Locality. Lingwe River, Venda, Limpopo Province, South Africa (type locality) (Mashego 1988).

Type specimens. Holotype in Transvaal Museum no. TM14659; Paratypes TM5 at University of Limpopo, Zoology, 5.

***Acanthogyrus* sp.**

Host. *Oreochromis mossambicus* (Peters, 1852) (Mozambique Tilapia) (Cichlidae).

Locality. Molepo Dam, Limpopo Province, South Africa (Kunutu et al. 2013).

Order: Neoechinorhynchida Southwell & Macfie, 1925
Family: Neoechinorhynchidae (Ward, 1917) Van Cleave, 1928
Genus: *Neoechinorhynchus* Stiles & Hassall, 1905
Subgenus: *Neoechinorhynchus* Hamann, 1892

***Neoechinorhynchus* (*Neoechinorhynchus*) *dorsovaginatus* Amin & Christison, 2005**

Host. *Argyrosomus japonicus* (Temminck & Schlegel, 1843) (Japanese Meagre, Dusky Kob) Sciaenidae) (type host).

Locality. Breede River Estuary, Western Cape Province, South Africa (type locality) (Amin and Christison 2005).

Type specimens. No. SAMCTA29536 (holotype male and allotype female; same slide), nos SAMCTA29537-29545 (paratypes), USNPC no. 94918 (paratypes).

Class: Palaeacanthocephala Meyer, 1931
Order: Echinorhynchida Southwell & Macfie, 1925
Family: Pomphorhynchidae Yamaguti, 1939
Genus: *Longicollum* Yamaguti, 1935

***Longicollum chabanaudi* Dollfus & Golvan, 1963**

Host. *Barnardichthys fulvomarginata* (Gilchrist, 1904) (syn. *B. fulvomarginatus*) (Soleidae) (Sole).

Locality. False Bay, Western Cape Province, South Africa (Dollfus and Golvan 1963).

***Longicollum* sp. innom.**

Host. *Pegusa nasuta* (Pallas, 1814) (syn. *Solea bleekeri*) (Blackhand Sole) (Soleidae).

Locality. Klein River estuary, Hermanus, Western Cape Province, South Africa (Bray 1974).

Remarks. Three contracted and immature specimens were found in one fish and one male in another fish. Thus it could not be identified to species level (Bray 1974).

Family: Rhadinorhynchidae Lühe, 1912
Genus: *Rhadinorhynchus* Lühe, 1911

***Rhadinorhynchus cadenati* (Golvan & Houin, 1964) Golvan, 1969**

Nipporhynchus cadenati Golvan & Houin, 1964

Host. *Thyrsites atun* (Euphrasen, 1791) (Snoek) (Gempylidae).

Locality. South Africa's West and South coasts (Nunkoo et al. 2016).

Rhadinorhynchus capensis Bray, 1974

Host. *Pegusa nasuta* (Pallas, 1814) (syn. *Solea bleekeri*) (Blackhand Sole) (Soleidae) (type host)

Locality. Heuninges River estuary, near Cape Agulhas, Western Cape Province, South Africa (type locality) (Bray 1974).

Type specimens. British Museum, Registration number 1974.521-550.

Rhadinorhynchus sp.

Host. *Ruvettus pretiosus* Cocco, 1833 (Oilfish) (Gempylidae).

Locality. South Africa's West coast, Atlantic Ocean (Nunkoo et al. 2017).

Order: Polymorphida Petrochenko, 1956
Family: Centrorhynchidae Van Cleave, 1916 (Golvan, 1960)
Genus: *Centrorhynchus* Lühe, 1911

Centrorhynchus sarehae Smales & Halajian, 2017

Host. *Kaupifalco monogrammicus* (Temminck, 1824) (Lizard Buzzard) (Accipitridae) (type host).

Locality. Makhado (Louis Trichardt), Limpopo Province, South Africa (type locality) (Smales et al. 2017).

Type Specimens. Holotype male SAM AHC 47858; allotype female SAM AHC 47859; paratypes SAM AHC 47860.

Centrorhynchus clitorideus (Meyer, 1931) Golvan, 1958

Gordiorhynchus clitorideus Meyer, 1931 (*nec clitorideum*)

Host. *Bubo africanus*(Temminck, 1821) (Spotted Eagle Owl) (Strigidae).

Locality. Zandrivierspoort Farm, Polokwane, Limpopo Province, South Africa.

***Centrorhynchus* sp.**

Host. *Felis catus* L., 1758 (Domestic Cat) (Felidae).
Locality. Pretoria, Gauteng Province, South Africa (Baker et al. 1989).

***Centrorhynchus* sp.**

Host. *Mungos mungo* (Gmelin, 1788) (Banded Mongoose) (Herpestidae).
Locality. Polokwane, Limpopo Province, South Africa.

Family: Plagiorhynchidae Golvan, 1960
Genus: *Plagiorhynchus* Lühe, 1911
Subgenus: *Prosthorhynchus* Kostylew, 1915

***Plagiorhynchus* (*Prosthorhynchus*) *cylindraceus* (Goeze, 1782) Schmidt & Kuntz, 1966**

Echinorhynchus cylindraceus Goeze, 1782
E. pici Gmelin, 1791 *fide* Florescu and Ienistea 1984
E. merulae Gmelin, 1791 *fide* Florescu and Ienistea 1984
E. transversus (Rudolphi, 1819) Travassos 1926
E. obliquus Dujardin, 1845 *fide* Florescu and Ienistea 1984
Centrorhynchus cylindraceus (Goeze 1782) Kostylew, 1914
C. fasciatus (Westrumb, 1821) Travassos, 1926 *fide* de Marval 1905
C. rostratus de Marval, 1902 *fide* Florescu and Ienistea 1984
Prosthorhynchus rosai (Porta, 1910) Meyer, 1932
Prosthorhynchus rostratus (de Marval, 1902) Meyer, 1932
Plagiorhynchus formosus Van Cleave, 1918 *fide* Amin et al. 1999
Plagiorhynchus taiwanensis Schmidt et Kuntz, 1966 *fide* Amin et al. 1999.

Host. *Calidris ferruginea* (Pontoppidan, 1763) (Curlew Sandpiper); *Charadrius pecuarius* Temminck, 1823 (Kittlitz's Plover); *Charadrius tricollaris* Vieillot, 1818 (Three-banded Plover) (Charadriidae).
Locality. Berg River, Western Cape Province, South Africa (Amin et al. 1999).
Host. *Crecopsis egregia* (Peters, 1854) (syn. *Crex egregia*) (African Crake) (Rallidae).
Locality. Blouberg, Limpopo Province, South Africa.
Host. *Vanellus armatus* (Burchell, 1822) (Blacksmith Lapwing) (Charadriidae).
Locality. Berg River, Western Cape Province, South Africa (Amin et al. 1999).

Unidentified plagiorhynchid

Host. *Charadrius marginatus* Vieillot, 1818 (White-fronted Plover), *Charadrius pallidus* Strickland, 1852 (Chestnut-banded Plover); *Charadrius pecuarius* Temminck, 1823 (Kittlitz's Plover); *Himantopus himantopus* (L., 1758) (Black-winged Stilt); *Vanellus armatus* (Burchell, 1822) (Blacksmith Lapwing)

Locality. Berg River, Western Cape Province, South Africa (Amin et al. 1999).

Family: Polymorphidae Meyer, 1931
Genus: *Andracantha* Schmidt, 1975

***Andracantha tunitae* (Weiss, 1914) Zdzitowiecki, 1989**

Corynosoma tunitae Weiss, 1914

Host. *Microcarbo africanus* (Gmelin, 1789) (Long-tailed Cormorant) (Phalacrocoracidae).

Locality. Dyer Island, South Africa (Van Cleave 1937).

Notes. Van Cleave (1937) is mentioning that he looked at a large number of immature worms and he tentatively assigning them to *C. tunitae*.

Genus: *Arhythmorhynchus* Lühe, 1911

Skrjabinorhynchus Petrochenko, 1956

***Arhythmorhynchus turbidus* (Van Cleave, 1937) Golvan, 1994**

Corynosoma turbidum Van Cleave, 1937

Host. *Phalacrocorax neglectus* (Wahlberg, 1855) (Bank Cormorant) (Phalacrocoracidae) (type host).

Locality. Dyer Island, South Africa (type locality) (Van Cleave 1937).

Type specimens. Holotype female (1737, 3) and one paratype female (1737, 1) in GNM. One paratype female (1737, 2) in the collection of H.J. Van Cleave, Urbana, Illinois, U.S.A.

Genus: *Bolbosoma* Porta, 1908

***Bolbosoma capitatum* (von Linstow, 1880) Porta, 1908**

Echinorhynchus capitatum von Linstow, 1880
Bolbosoma physeteris Gubanov, 1952 (*fide* Amin & Margolis, 1998)

Host. *Ruvettus pretiosus* Cocco, 1833 (Oilfish) (Gempylidae).
Locality. South Africa's West coast, Atlantic Ocean (Nunkoo et al. 2017).

***Bolbosoma vasculosum* (Rudolphi, 1819) Porta, 1908**

Echinorhynchus vasculosum Rudolphi, 1819
Bolbosoma annulatus Molin, 1858
B. aurantiacus Risso, 1826
B. pellucidus Leukart, 1828
B. serrani Linton, 1888
B. thunni Harada, 1935 (*fide* Petrochenko 1958)

Host. *Thyrsites atun* (Euphrasen, 1791) (Snoek) (Gempylidae).
Locality. South Africa's West and South coasts (Nunkoo et al. 2016).

Genus: *Corynosoma* Lühe, 1904 (*fide* Van Cleave, 1945)

Chentrosoma Monticelli, 1905
Centrosoma Lühe, 1912
Coryusoma Railliet & Henry, 1907 (misprint)
Echinosoma Porta, 1907

***Corynosoma australe* Johnston, 1937**

Corynosoma otariae Morini & Boero, 1961

Host. *Thyrsites atun* (Euphrasen, 1791) (Snoek) (Gempylidae).
Locality. South Africa's West and South coasts (Nunkoo et al. 2016).

Host-Parasite List

Host	Parasite	Locality Country/ Reference
Class Aves		
Order Accipitriformes		
Family Accipitridae		
Kaupifalco monogrammicus (type host)	*Centrorhynchus sarehae* (Centrorhynchidae)	Makhado (Louis Trichardt), Limpopo Province, South Africa
Order Bucerotiformes		
Family Bucerotidae		
Tockus leucomelas	*Mediorhynchus taeniatus* (Gigantorhynchidae)	Limpopo Province, South Africa
Order Charadriiformes		
Family Charadriidae		
Calidris ferruginea	*Plagiorhynchus* (*Prosthorhynchus*) *cylindraceus* (Plagiorhynchidae)	Berg River, Western Cape Province, South Africa (Amin et al. 1999)
Charadrius marginatus	Unidentified plagiorhynchid acanthocephalan (Plagiorhynchidae)	Berg River, Western Cape Province, South Africa (Amin et al. 1999)
Charadrius pallidus	Unidentified plagiorhynchid acanthocephalan (Plagiorhynchidae)	Berg River, Western Cape Province, South Africa (Amin et al. 1999)
Charadrius pecuarius	*Plagiorhynchus* (*Prosthorhynchus*) *cylindraceus* (Plagiorhynchidae)	Berg River, Western Cape Province, South Africa (Amin et al. 1999)
	Unidentified plagiorhynchid acanthocephalan (Plagiorhynchidae)	Berg River, Western Cape Province, South Africa (Amin et al. 1999)
Charadrius tricollaris	*Plagiorhynchus* (*Prosthorhynchus*) *cylindraceus* (Plagiorhynchidae)	Berg River, Western Cape Province, South Africa (Amin et al. 1999)
Vanellus armatus	*Plagiorhynchus* (*Prosthorhynchus*) *cylindraceus* (Plagiorhynchidae)	Berg River, Western Cape Province, South Africa (Amin et al. 1999)
	Unidentified plagiorhynchid acanthocephalan (Plagiorhynchidae)	Berg River, Western Cape Province, South Africa (Amin et al. 1999)
Family Recurvirostridae		
Himantopus himantopus	Unidentified plagiorhynchid Acanthocephalan (Plagiorhynchidae)	Berg River, Western Cape Province, South Africa (Amin et al. 1999)
Order Galliformes		
Family Numididae		
Numida meleagris (type host)	*Mediorhynchus africanus* (previously identified as *Mediorhynchus gallinarum*) (Gigantorhynchidae)	Kruger National Park, Mpumalanga Province, South Africa (Junker and Boomker 2006); Vicinity of Petrus Steyn, Free State Province, South Africa (Davies et al. 2008); Musina, Limpopo Province, South Africa (Junker and Boomker 2007; Junker et al. 2008)
	Mediorhynchus numidae (Gigantorhynchidae)	Pretoria, Gauteng Province, South Africa (Oosthuizen and Markus 1967)
	Mediorhynchus taeniatus (Gigantorhynchidae)	Rooipoort farm, Kimberley, Northern Cape Province, South Africa (Crowe 1977)
Order Gruiformes		
Family Rallidae		
Crecopsis egregia	*Plagiorhynchus* (*Prosthorhynchus*) *cylindraceus* (Plagiorhynchidae)	Blouberg, Limpopo Province, South Africa
Order Passeriformes		
Family Turdidae		
Turdus smithi (type host)	*Mediorhynchus mokgalongi* (Gigantorhynchidae)	Polokwane, Limpopo Province, South Africa (type locality) (Smales et al. 2018)

Host	Parasite	Locality Country/ Reference
Order Strigiformes		
Family Strigidae		
Bubo africanus	*Centrorhynchus clitorideus* (Centrorhynchidae)	Zandrivierspoort Farm, Polokwane, Limpopo Province, South Africa
Order Suliformes		
Family Phalacrocoracidae		
Microcarbo africanus	*Andracantha tunitae* (Polymorphidae)	Dyer Island, South Africa (Van Cleave 1937)
Phalacrocorax neglectus (type host)	*Arhythmorhynchus turbidus* (Polymorphidae)	Dyer Island, South Africa (type locality) (Van Cleave 1937)
Class Actinopterygii		
Order Cypriniformes		
Family Cyprinidae		
Enteromius neefi	*Acanthogyrus* (*Acanthosentis*) *phillipi* (Quadrigyridae)	Lingwe River, Venda, Limpopo Province, South Africa (Mashego 1988)
Order Perciformes		
Family Cichlidae		
Oreochromis mossambicus	*Acanthogyrus* sp. (Quadrigyridae)	Molepo dam, Limpopo Province, South Africa (Kunutu et al. 2013)
Family Gempylidae		
Ruvettus pretiosus	*Bolbosoma capitatum* (Polymorphidae)	South Africa's West coast, Atlantic Ocean (Nunkoo et al. 2017)
	Rhadinorhynchus sp. (Rhadinorhynchidae)	South Africa's West coast, Atlantic Ocean (Nunkoo et al. 2017)
Thyrsites atun	*Bolbosoma vasculosum* (Polymorphidae)	South Africa's West and South coasts (Nunkoo et al. 2016)
	Corynosoma australe (Polymorphidae)	South Africa's West and South coasts (Nunkoo et al. 2016)
	Rhadinorhynchus cadenati (Rhadinorhynchidae)	South Africa's West and South coasts (Nunkoo et al. 2016)
Family Sciaenidae		
Argyrosomus japonicus (type host)	*Neoechinorhynchus* (*Neoechinorhynchus*) *dorsovaginatus* (Neoechinorhynchidae)	Breede River Estuary, Western Cape Province, South Africa (type locality) (Amin and Christison 2005)
Order Pleuronectiformes		
Family Soleidae		
Pegusa nasuta (*Solea bleekeri*) (type host)	*Rhadinorhynchus capensis* (Rhadinorhynchidae)	Heuninges River estuary (Bray 1974)
	Longicollum sp. innom. (Pomphorhynchidae)	Klein River estuary (Bray 1974)
Barnardichthys fulvomarginata (type host)	*Longicollum chabanaudi* (Pomphorhynchidae)	False Bay, Western Cape Province (Dollfus and Golvan 1963)
Class Mammalia		
Order Afrosoricida		
Family Chrysochloridae		
Chrysospalax trevelyani (type host)	*Heptamegacanthus niekerki* (Oligacanthorhynchidae)	Nqadu Forest, Transkai, Eastern Cape Province, South Africa (Spencer Jones 1990)
Order Carnivora		
Family Felidae		
Felis catus	*Centrorhynchus* sp. (Centrorhynchidae)	Pretoria, Gauteng Province, South Africa (Baker et al. 1989)

Host	Parasite	Locality Country/ Reference
Family Herpestidae		
Mungos mungo	*Centrorhynchus* sp. (Centrorhynchidae)	Polokwane, Limpopo Province, South Africa.
Order Eulipotyphla		
Family Erinaceidae		
Atelerix frontalis (*Aethechinus frontalis*)	*Moniliformis kalahariensis* (Moniliformidae)	Mohlonong village and University of Limpopo, Limpopo Province, South Africa (Amin et al. 2014)
	Moniliformis moniliformis (Moniliformidae)	Hammanskraal, Gauteng Province, South Africa (Le Roux 1930)
Order Primates		
Family Galagidae		
Otolemur crassicaudatus	*Moniliformis* sp. (Moniliformidae)	Venda, Limpopo Province, South Africa
Order Rodentia		
Family Muridae		
Gerbilliscus leucogaster	*Moniliformis acomysi* (Moniliformidae)	Vyeboom village, Limpopo Province, South Africa
Mastomys natalensis	*Moniliformis acomysi* (Moniliformidae)	Bloemhof, Free State Province
Mus minutoides	*Moniliformis acomysi* (Moniliformidae)	Hoopstad, Free State Province, South Africa
Class Reptilia		
Order Squamata		
Family Varanidae		
Varanus albigularis	Oligacanthorhynchidae sp. (Oligacanthorhynchidae)	Tzaneen; Tolwe, Limpopo Province, South Africa

Results and discussion

A total of twenty-one species of acanthocephalans, from thirteen genera from ten families of seven orders, comprise this updated checklist of acanthocephalans in South Africa. Representatives of three of the four classes of acanthocephalans (Amin 2013) have been reported in South Africa, with only the Polyacanthocephala Amin, 1987 not having been recorded yet. The composition of reported acanthocephalan fauna shows that the Polymorphidae is the most represented family with five named species parasitic in marine fish and wild birds.

In South Africa, birds have the highest species richness of acanthocephalans to this date with nine named species (from five genera) and five records only identified to group level, followed by fish with eight named species (from six genera) and two species only identified to genus level, mammals with four named species (from two genera) and three species only identified to genus level and finally reptiles with a single species only identified to group level. No acanthocephalans have been reported in amphibians to date. During the current study 110 frog specimens belonging to 19 species were examined but none harboured any acanthocephalans. However, this forms a small part of the entire amphibian fauna of the country which includes 128 described frog species (Frost 2018).

Only a small fraction of the vertebrate fauna of South Africa has been surveyed for acanthocephalans and we expect that in future additional acanthocephalan species will be discovered and described. For example it is estimated that many of South Africa's marine fish parasites have yet to be discovered (Smit and Hadfield 2015). South Africa has an extremely rich biodiversity (Huntley et al. 2005), with nearly 8% of the world's known species of birds, 6% of mammal species and 5% of reptile species (Driver et al. 2012). Therefore we might expect a more diverse acanthocephalan fauna compared to that of Brazil which has 23 genera and 34 species (from only 119 fish species) (Santos et al. 2008) or Iran with 30 described species (Tavakol et al. 2015). The lower species richness reported for South Africa probably reflects sampling effort rather than the true diversity of the acanthocephalan fauna. Until more data are available it will not be possible to determine the true species richness of the South African acanthocephalan assemblage.

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