A new species of *Argulus* from Kosi Bay, South Africa and distribution records of the genus

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A new species of the fish ectoparasite *Argulus* i.e. *A. kosus* is described from Kosi Bay in South Africa. This species is characterised by deep antero-lateral depressions of the dorsal carapace which delimit a pronounced frontal region, scales are present on the mouth tube, varying numbers of sclerites are present on the maxillae, no flagella occur on the swimming legs nor any scales on the antennae. The shape of the respiratory areas are also typical for this species. A table of the distribution of the genus in South Africa and a map showing the localities, is also included.

Key words: *Argulus*, Kosi Bay, distribution.

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Introduction

The genus *Argulus* is widely distributed in both marine and freshwater habitats throughout Africa, and 32 different species have been described from this region (Rushton-Mellor 1994). In South Africa, work on this group was pioneered by Barnard (1955) with his descriptions of a number of species. Since his paper, no additional taxonomical paper appeared from this region, although a number of papers on other aspects of this genus has recently been published on the introduced *Argulus japonicus* (Kruger *et al.* 1983; Swanepoel & Avenant-Oldewage 1992; Avenant-Oldewage & Swanepoel 1993; Lutsch & Avenant-Oldewage *in press*).

Despite extensive surveys since 1983 in rivers in the areas then known as Transvaal and northern Natal, *Argulus japonicus* was the only representative of this genus in South Africa and, at times, at catostrophic densities (Kruger *et al.* 1983). Recently, two specimens of an as yet undescribed species were found in Kosi Bay. These are described below.

Materials and methods

During July 1993, two adult females (*Argulus* sp.) were collected from the skin surrounding the dorsal fin of a strepie, *Sarpa salpa* Linn., at Kosi Bay in northern KwaZulu-Natal. It was fixed in Todd's fixative (Todd 1986). Prior to examination they were washed in running tap water, dehydrated in an ascending ethanol series to 70%, and cleared in 90% lactic acid. They were studied with the aid of a Zeiss Lab 18 microscope with a drawing tube attachment.

The specimens are in the collection of the Albany Museum, Grahamstown, holotype no. RAU 2A and paratype RAU 2B

Results

Argulus kosus spec. nov.

Description

Adult female. General body shape ovoid (Figs. 1a & b), carapace comprising 71% of total body length. Body length of largest individual 5,88 mm. Body dorsally covered by a carapace with lobes extending to cover the fourth pair of legs. Sinus in carapace 19% of

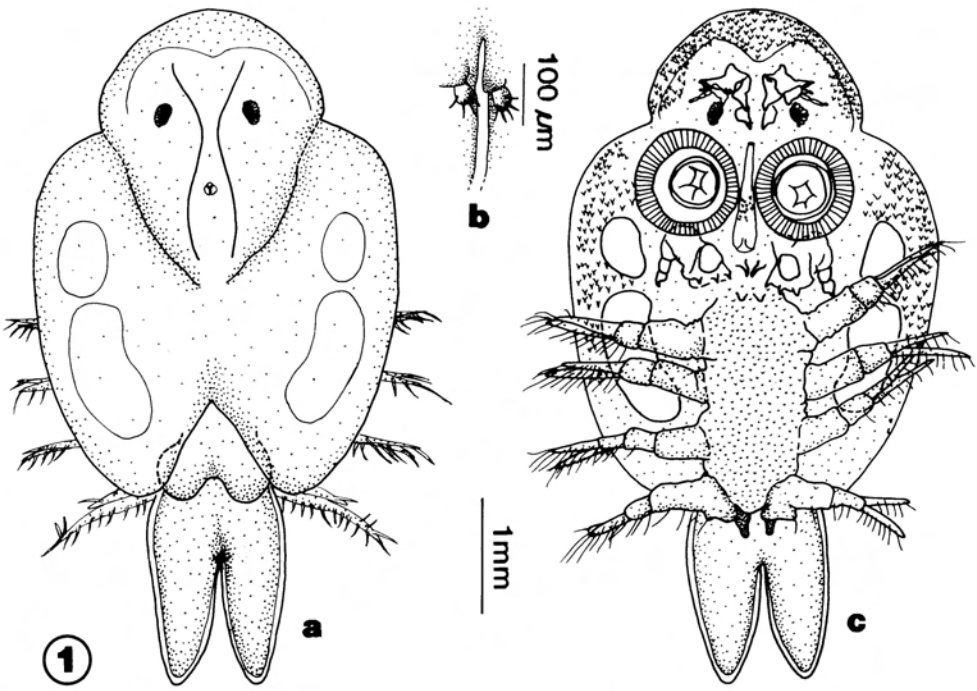

Fig 1. *Argulus kosus* spec. nov. (a) dorsal view, (b) furcal rami, (c) ventral view.

length of carapace and expose the third and fourth thoracic segments dorsally. A kidney-shaped lobe present on the fourth thoracic segment — the lobes thereof extending over the abdomen (Fig. 1a).

Compound eyes small, crescent-shaped, dark brown and present in the anterior third of the body. Distance between eyes almost equal to distance from lateral margin. Nauplius eye same distance from eyes as distance between eyes forming an equilateral triangle.

Colour in live specimens milky white with green tinge. Antero-lateral depressions pronounced forming broad, rounded frontal region.

Abdomen slender, anal sinus along 66% of its length to form two pointed lobes. Two furcal rami situated at base of anal sinus (Figs. 1a & b). Rami are simple rounded structures with three to four setae. Paired spermathecae situated anteriorly.

Ventral surface of carapace peripherally covered by numerous, regularly-arranged spines of similar size extending along two thirds of carapace (Fig. 1c). Paired respiratory areas on ventral surface, smaller respiratory area approximately half size of larger and located entirely anterior to large area, both oval, with non-indented outlines (Figs. 1a & c).

Antennulae (Fig. 2a) comprising two sections; stout proximal part posessing large spines; slender distal part bearing setae. Proximal part bears a small hook-like anterior spine, a large hook-like terminal spine as well as a prominent medial spine. Proximal sec-

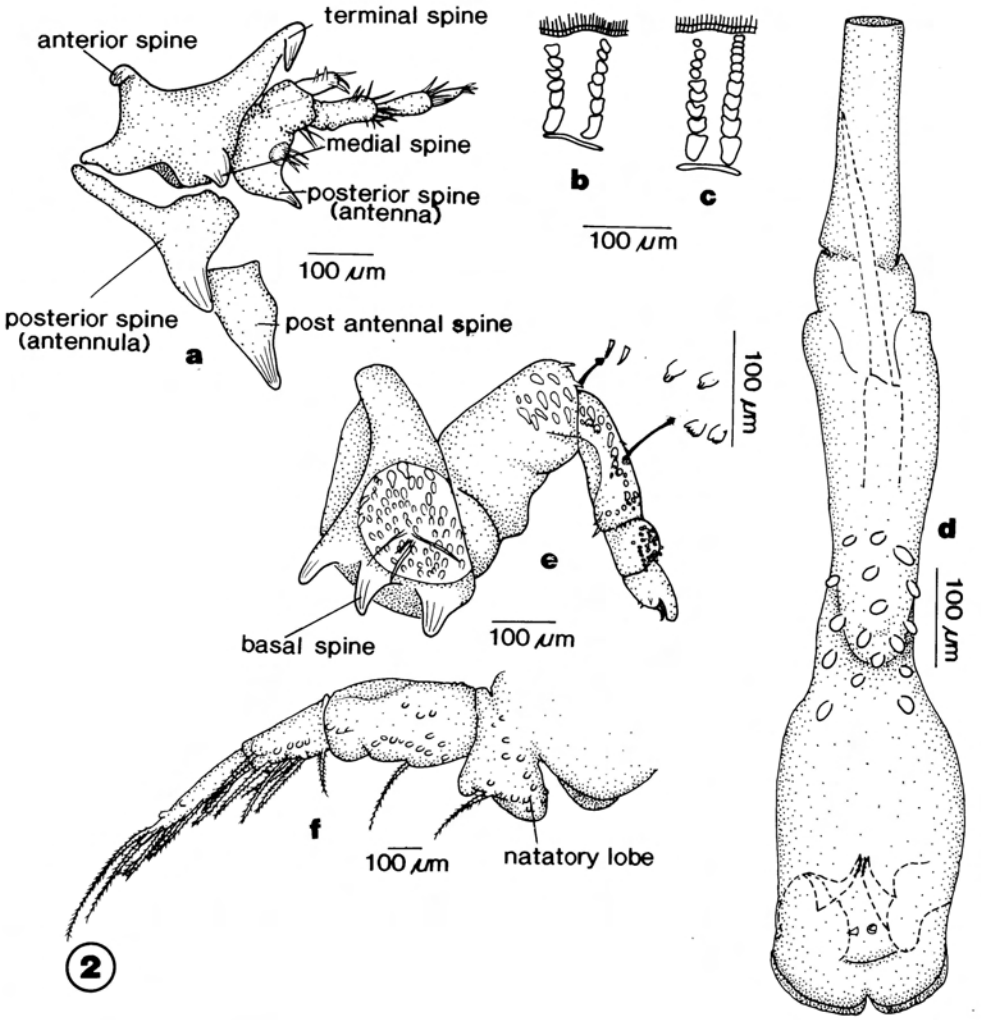

Fig. 2. *Argulus kosus* spec. nov. (a) antennula and antenna, sclerite rows on maxillula on (b) outer rim and (c) inner rim, (d) mouth tube and retractile spine, (e) maxilla, (f) fourth leg with natatory lobe.

tion extend beyond anterior spine and forms a triangular extension towards the midline. Distal tubular section extends beyond terminal spine and comprises of two parts; penultimate lacks setae, terminal segment with group of apical setae. Posterior spine with long triangular extension proximally and sclerotized spine posteriorly. Single well developed post-antennal spine. Antennae four segmented (Fig. 2a). Basal segment massive bearing posterior spine and numerous setae. Distal three segments tubular bearing setae on their distal margins.

Maxillulae forming suckers (Fig. 1c) with sclerites acting as supporting rods in the sucker rim (Figs. 2b & c). Although supporting rods is considered to be of taxonomic value in other *Argulus* species in *A. kosus* number as well as shape of sclerites vary dramatically with larger numbers of sclerites

(9-11) on the inner and smaller numbers (6-7) on the outer margin (Figs. 2b & c).

Maxillae five segmented, basal segment with basal plate covered by simple scales and bearing tuft of setae centrally (Fig. 2e). Spines increasing in size, distally present on posterior surface of basal segment. Second to fourth segments with simple and pectinate scales. Terminal segment with a sharp claw and two blunt protrusions.

Retractile pre-oral spine and mouth tube (Fig. 2d) located between the maxillulae. Mouth tube slender twice as long as wide carrying simple scales basally, denticulate mandibles and so-called "labral" spines visible in cleared specimens.

Pair of accessory spines located between maxillae and pair of thoracic spines posterior to maxillae (Fig. 1c). First to fourth pairs of legs biramous and of near equal size, sympods consists of two podomeres. Endopods and exopods present on all legs, exopod on leg 3 consists of two parts. Endopods and exopods bear two rows of plumose setae each. Flagellum absent on all legs. Natatory lobe on fourth leg simple (Fig. 2f).

Minute, simple scales present on the area between legs as well as on the antero-proximal surface of leg 1 (Fig. 1c) and scattered on the sympod and natatory lobe of leg 4 (Fig. 2f).

Male unknown.

Remarks

Distinctive features of *Argulus kosus* are the deep antero-lateral depressions of the dorsal carapace which delimit a pronounced frontal region, the presence of scales on the mouth tube, the unstable number of sclerities on the maxillulae, the shape of the respiratory areas, the absence of flagella on the swimming legs as well as the absence of scales on the antennae.

Argulus kosus resembles *A. capensis* Barnard, 1955 as well as *A. fryeri* Rushton-Mellor, 1994, but it is clearly distinguishable from both. *A. kosus* differs from *A. fryeri* in the following unique features: flagella are absent on all legs, the shape of the natatory lobes as well as the respiratory areas differ, a hook-shaped anterior spine is present on the antennula, the shape of the posterior spine of the antennulae has a very long proximal extension; a bilobed structure is present on the dorsal surface of the fourth thoracic segment. Furthermore, the shape of the spines on the basal plate of the maxillae differ considerably from that of *A. fryeri*.

Argulus kosus differs from *A. capensis* in the general shape and number of sclerites on the maxillulae as well as the presence of a bilobed structure on the fourth thoracic segment.

Argulus in South Africa

Five species of *Argulus* have hitherto been recorded from South Africa i.e. *A. belones* van Kampen 1909, *A. capensis* Barnard, 1955, *A. multipocula* Barnard, 1955, *A. japonicus* Thiele, 1900 and the new *A. kosus*. The distribution of these are summarised in Table 1 and illustrated in Fig. 3. It is interesting to note from these data that only the introduced *A. japonicus* is present in numbers and distribution of any significance. The three species recorded by Barnard in 1955 has not been recorded since then and even in the case of the newly described *Argulus kosus*, only two specimens were found although 125 fishes were examined of which 37 were of the host species.

Kosi Bay is a misnomer, as this water body is connected to the sea to form an estuary that can be closed in by a sand bank, depending on the dominant wave climate and longshore current action. At such times temporary lakes form. *A. kosus* was found in one of these temporary lakes.

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Table 1
Distribution of Argulus *spp. in South Africa.*
Numbers with species correspond with numbers used in Fig. 3

Species	Host	Locality	Reference
1. *Argulus belones* van Kampen, 1909	*Sphyraena commersoni*	Natal	Barnard (1955)
2. *Argulus multipocula* Barnard, 1955	Free-swimming	Richards Bay, Natal	Barnard (1955)
3. *Argulus capensis* Barnard, 1955	*Sandelia capensis* (Cuvier, 1831)	Zoetendals Vlei near Bredasdorp	Barnard (1955)
4. *Argulus japonicus* Thiele, 1900	*Barbus holubi* Steindachner, 1894	Lake Barberspan	Kruger, Van As & Saayman (1983)
	Labeo capensis (Smith, 1841)	Lake Barberspan	Kruger, Van As & Saayman (1983)
	Labeo umbratus (Smith, 1841)	Lake Barberspan	Kruger, Van As & Saayman (1983)
	Clarias gariepinus (Burchell, 1822)	Lake Barberspan	Kruger, Van As & Saayman (1983)
	Tilapia sparrmanii Smith, 1840	Lake Barberspan	Kruger, Van As & Saayman (1983)
	Cyprinus carpio Linn	Bloemhof Dam	Kruger, Van As & Saayman (1983)
	Barbus kimberleyensis Gilchrist & Thompson, 1913	Bloemhof Dam	Kruger, Van As & Saayman (1983)
	Barbus holubi Steindachner, 1894	Bloemhof Dam	Kruger, Van As & Saayman (1983)
	Labeo capensis (Smith, 1841)	Bloemhof Dam	Kruger, Van As & Saayman (1983)
	Labeo umbratus (Smith, 1841)	Bloemhof Dam	Kruger, Van As & Saayman (1983)
	Clarias gariepinus (Burchell, 1822)	Bloemhof Dam	Kruger, Van As & Saayman (1983)
	Barbus holubi Steindachner, 1894	Boskop Dam	OUR
	Labeo capensis (Smith, 1841)	Boskop Dam	OUR
	Labeo umbratus (Smith, 1841)	Boskop Dam	Van As & Basson (1984)
	Barbus marequensis Smith, 1841	Hartbeespoort Dam	Van As & Basson (1984)
	Oreochromis mossambicus (Peters, 1852)	Hartbeespoort Dam	OUR
	Labeo rosae Steindachner, 1894	Loskop Dam	OUR
	Clarias gariepinus (Burchell, 1822)	Loskop Dam	OUR
	Oncorhynchus mykiss (Walbaum, 1792)	Leydenburg Fish Hatchery	Van As & Basson (1984)
	Cyprinus carpio Linn	Roodeplaat Dam	OUR
	Barbus marequensis Smith, 1841	Roodeplaat Dam	Van As & Basson (1984)
	Barbus mattozi Guimaraes, 1884	Roodeplaat Dam	Van As & Basson (1984)
	Clarias gariepinus (Burchell, 1822)	Roodeplaat Dam	OUR

Table 1 (continued)

Species	Host	Locality	Reference
4. *Argulus japonicus* Thiele, 1900 (continued)	*Oreochromis mossambicus* (Peters, 1852)	Roodeplaat Dam	Van As & Basson (1984)
	Labeo capensis	Roodeplaat Dam	Van As & Basson (1984)
	Cyprinus carpio Linn	Vaal River Barrage	OUR
	Barbus holubi Steindachner, 1894	Vaal River Barrage	OUR
	Labeo capensis (Smith, 1841)	Vaal River Barrage	OUR
	Labeo umbratus (Smith, 1841)	Vaal River Barrage	OUR
	Clarias gariepinus (Burchell, 1822)	Vaal River Barrage	OUR
	Labeo umbratus (Smith, 1841)	Potchefstroom Dam	OUR
	Labeo capensis (Smith, 1841)	Potchefstroom Dam	OUR
	Barbus holubi Steindachner, 1894	Potchefstroom Dam	OUR
	Labeo umbratus (Smith, 1841)	Klerkskraal Dam	OUR
	Cyprinus carpio Linn.	Nooitgedacht Dam	OUR
	Barbus kimberleyensis Gilchrist & Thompson, 1913	Douglas Weir, Vaal River	OUR
5. *Argulus kosus* spec nov.	*Sarpa salpa* Linn.	Kosi Bay	OUR
6. *Argulus* sp.	Wild *Labeo* sp.	Irrigation Dam, Eastern Transvaal	Du Plessis (1952)
	Clarias gariepinus (Burchell, 1822)	Goda-Goda Dam, North Eastern Transvaal	Lombard (1968)

OUR - Own unpublished record
If fish names were changed since publication of the reference, this was rectified.
Only the original record is listed i.e. if it was later quoted, this is not referred to.

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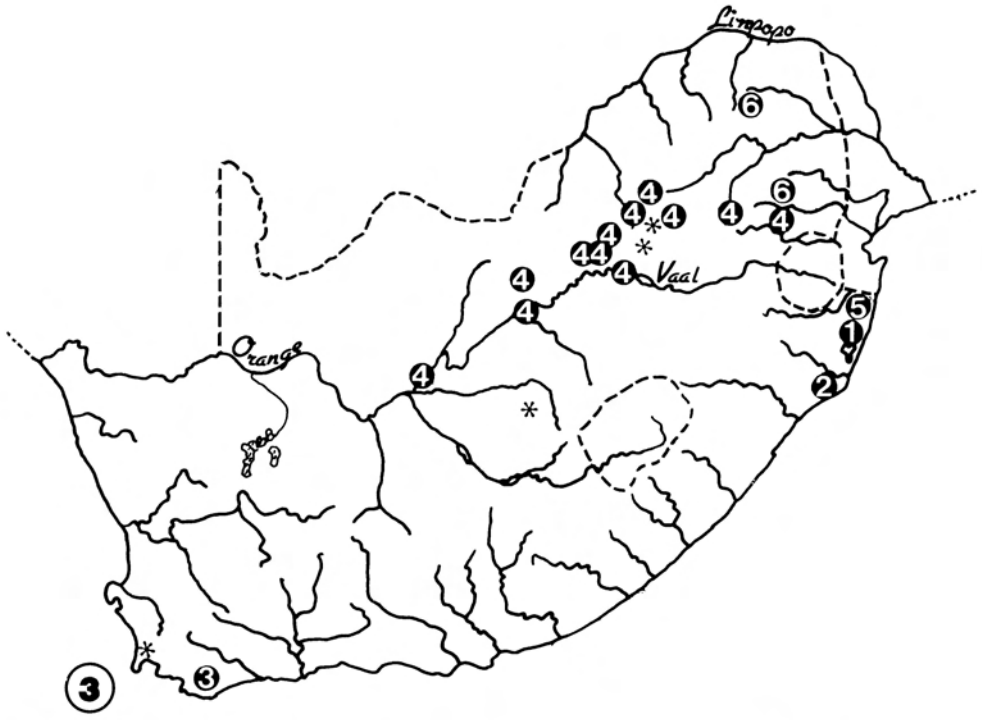

Fig. 3. Map of South Africa to show distribution of the genus *Argulus* 1 = *A. multipocula*; 2 = *A. capensis*; 3 = *A. japonicus*; 4 = *A. kosus*; 5 = *Argulus* species. Broken lines represent borders not formed by rivers, asterisks represent major cities. Numbers correspond with those in Table 1.

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