

A new species of *Argulus* (Crustacea: Branchiura) from a bony fish in Algoa Bay, South Africa

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The new species is characterized by the unique shape of the antennule, antenna and maxilla. In addition, huge scales are present on the mouth tube and smaller scales are present on the base of the mouth tube. A row of small spines is present inside the sucker rim of the maxillule. A round dimpled structure occurs ventral to the male gonopore and the unique accessory copulatory structures are described.

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Three marine species of *Argulus* occur in South Africa. Two species were recorded by Barnard (1955), i.e. *A. multipiccola* Barnard, 1955 from Richards Bay and *A. belones* Van Kampen, 1909 from Natal, and *A. kosus* Avenant-Oldewage, 1994 from Kosi Bay. These species are clearly distinguishable from each other and from specimens recently donated by the Port Elizabeth Museum to the authors. A new species is therefore described.

Three female and one male *Argulus* were removed from a unicorn leatherjacket *Aluterus monoceros* (Linn., 1758) collected on 9 April 1991 close to the Port Elizabeth harbour in Algoa Bay and given to the Port Elizabeth Museum. The *Argulus* were fixed in 10% formalin and preserved in 70% propanol. The specimens were donated to the authors by Dr Malcolm Smale of the Museum.

For microscopic study, the specimens were cleared in 90% lactic acid and drawn with the aid of a drawing tube attachment on a Zeiss Lab 18 microscope. Specimens are in the collection of the Albany Museum, Grahamstown, holotype no.

RAU 3A and paratype no. RAU 3B

Argulus smalei n.sp.

Adult female. General body shape ovoid (Figures 1 & 2) with paired incisions of antero-lateral carapace to form defined frontal region. Colour in formalin-fixed specimens yellowish with spermathecae dark brown. Body length of holotype 5,6 mm, paratypes 4,1 mm and 4,0 mm respectively. Carapace comprising 74% of total body length. Body covered dorsally by carapace with lobes extending over all four pairs of swimming legs. Sinus in carapace, 24% of carapace length. Dorsally, sinus exposing kidney-shaped lobe on fourth thoracic segment.

Compound eyes small, colourless and situated in frontal region i.e. first 25% of carapace. Nauplius eye not visible.

Abdomen broad with well-defined anal sinus along 61% of its length. Abdomen 31% of total length. Furcal rami minute, simple round structures with three to four setae each. Paired spermathecae situated anteriorly.

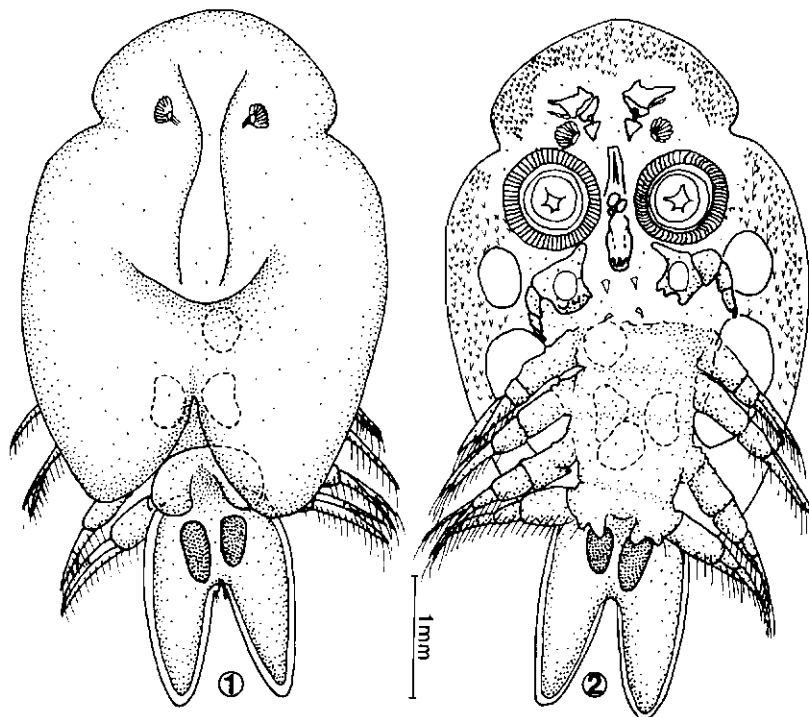


Figure 1–2 *Argulus smalei* n.sp. female. Figure 1 dorsal view; Figure 2 ventral view.

Ventral surface of carapace covered peripherally by numerous spines arranged in regular manner, but of irregular size (Figure 2). Paired respiratory areas present on alae of carapace. Smaller respiratory area situated entirely anterior to the larger pair. Anterior pair round, posterior pair kidney-shaped.

Antennule (Figure 3) consisting of two parts: stout chitinized proximal part bearing hooks and slender distal part. Proximal part bearing a blunt, non-recurving anterior spine, large hook-like terminal spine as well as large recurving medial spine. Distal tubular section extending beyond terminal spine and consisting of two podomeres each bearing setae distally. Posterior spine of antennule with large posteriorly directed hook. Antennae four-segmented, basal segment bearing posterior spine as well as two tufts of setae, each arranged on rounded protuberance. Remaining three podomeres tubular, each bearing setae apically. Post-antennal spine huge.

Maxillulae forming suckers, sclerites differing in number, anterior border with 6–9, posterior with 5–6, inner with 5–7 and outer with 8–10 (Figure 4). Fringe of setae present around border of sucker rim whilst inner margin supported by short chitinized bars. Row of small, evenly distributed spines present inside sucker rim.

Retractile pre-oral spine and mouth tube present between the maxillulae (Figures 2 & 5). Pre-oral spine slender, basally covered by 3–5 large, round scales. Mouth tube somewhat wider, basally with scattered, simple, small scales. Upper lip with deep sinus to expose so-called 'labial' spines that are in fact situated on the tongue. Lower lip crescentic. Two sickle-shaped mandibles visible in cleared specimens.

Maxillae five-segmented (Figure 6). Basal segment with

basal plate covered by simple scales, three blunt, evenly spaced spines, and long antero-lateral process. Second podomere simple, tubular with scales distally. Two types of scales distinguishable, simple comb-like and hand-shaped scales, in a variety of complexities (Figure 6). Third podomere with club-shaped protrusion apically. Protrusion covered by small sharp scales, central part of podomere with hand-shaped scales. Fourth podomere with elevation covered by blunt simple scales. Fifth podomere lacking scales and terminating in fleshy lobe and two claws.

Pair of accessory spines located between maxillae (Figures 2 & 6) and pair of thoracic spines posterior to maxillae (Figure 2). Four pairs of swimming legs of near equal size on each thoracic segment. Sympods of each leg consisting of two podomeres, endo- and exopodites on all legs. Exopodites on legs 3 and 4 consisting of two parts. Endo- and exopodites bearing two rows of plumose setae each. No flagella present. Natatory lobes on fourth legs consisting of two bulbous lobes, with few setae.

Area between legs covered by minute simple/pectinate scales (Figure 2). Similar scales also present on the anterior surface of the coxopodites of leg 1 and leg 4.

Adult male. Total length 3,9 mm. Carapace comprising 59% of total body length, sinus in carapace extending along 25% of carapace length. Abdomen comprises 34% of total length: anal sinus differing in shape from that of females and shorter i.e. 45% of length of abdomen. Paired testes with elongated sperm cells visible inside, arranged parallel to lateral walls of testes. Abdomen covered ventrally with spines similar to those on thorax.

Accessory sexual structures present on second to fourth

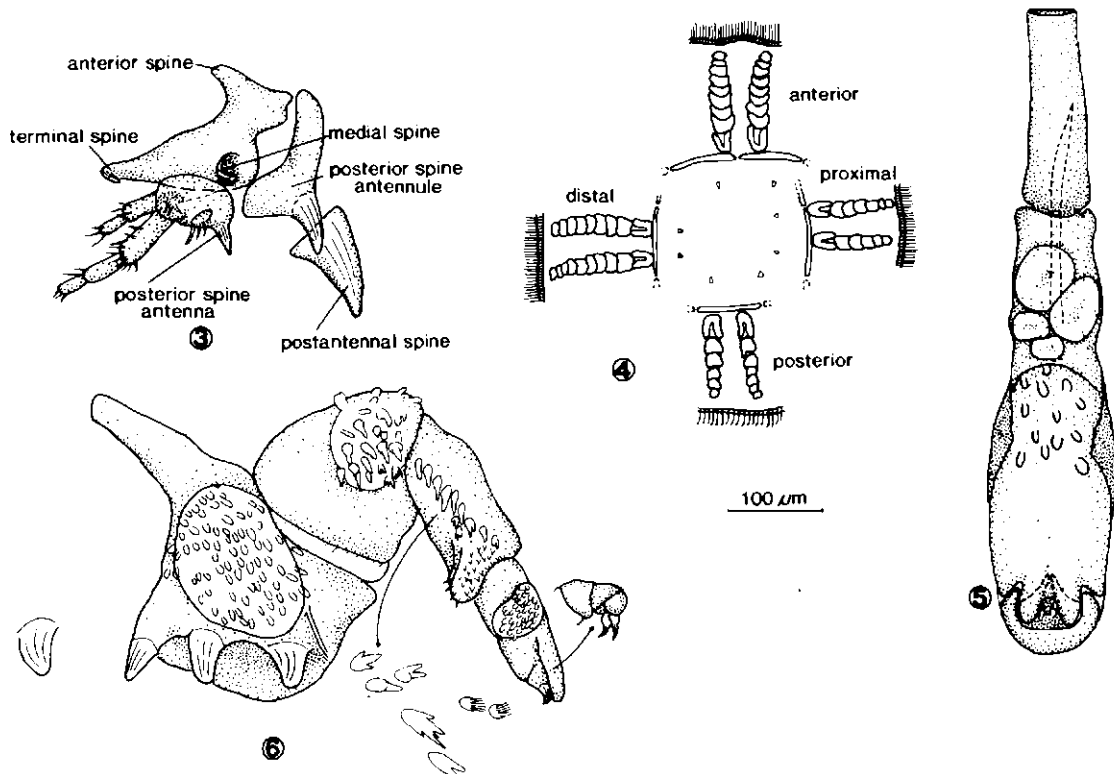


Figure 3–6 *Argulus smalei* n.sp. female and male. Figure 3 antennule and antenna; Figure 4 sclerite rows on different areas of maxillule; Figure 5 mouth tube and retractile pre-oral spine; Figure 6 maxilla.

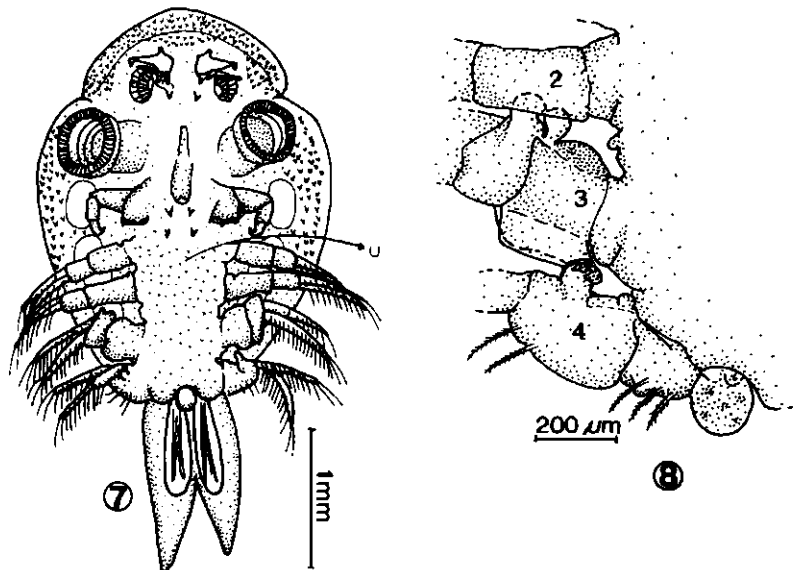


Figure 7–8 *Argulus smalei* n.sp. male. Figure 7 ventral view; Figure 8 ventral view of basipodite of legs 2, 3 and 4 to show accessory sexual structures.

legs (Figure 8). On posterior face of second leg flat disc covered by pectinate scales present. Two bulbous and flag-like protrusions covered by scales present on anterior face of third leg, and cup-shaped socket present on the posterior face. Directly underneath socket copulatory peg present on anterior surface of basipodite of fourth leg. Peg divided into two equal bulbous structures. Two smaller protrusions present proximal to peg. Cushion-shaped structure present on posterior face. Natatory lobe reduced to small round protrusion.

Spherical, fleshy structure with dimpled surface attached to thorax ventral to gonopore (Figure 8).

Remarks

The *A. smalei* male resembles those of *A. arcassonensis* Cuènot, 1912 in that it possesses a round, dimpled structure ventral to the gonopore, but the species is unique in the shape of the antennae, antennulae as well as the maxillae. In addition huge scales are present on the mouth tube and much smaller scales on the pre-oral spine. Another unique feature is the presence of spines inside the sucker rim of the maxillule.

This discovery of *A. smalei* at Algoa Bay represents the first marine *Argulus* from the Cape Province, as the previous three marine species were all collected from Natal. Although

A. smalei is the first marine *Argulus* from the former Cape Province, *A. capensis* Barnard, 1955, a freshwater species, was found further south, approximately 100 km from the southern end of Africa, at Soetendals Vlei near Bredasdorp. The scanty information available at present indicates that in South Africa no *Argulus* species infest marine as well as freshwater fishes. This was reported by Rushton-Mellor (1994) for a number of species found further north in Africa.

Etymology

This species is named after Dr Malcolm Smale of the Port Elizabeth Museum who donated the specimens to us.

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