

Redescription of *Cavisoma magnum* (Southwell, 1927) (Acanthocephala: Cavisomidae) from the Milkfish, *Chanos chanos*, in the Philippines

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ABSTRACT: *Cavisoma magnum* (Southwell, 1927) Van Cleave, 1931, is redescribed from specimens collected from the intestine of adult milkfish (*Chanos chanos* (Forsskål)) caught in the Basilan Strait off the city of Zamboanga, southern Philippines. An emended definition of the genus *Cavisoma*, for which *C. magnum* is the type and only species, is also provided. This is only the second finding of *C. magnum*, which is the only acanthocephalan reported from milkfish whose specific identity has been determined.

KEY WORDS: Acanthocephala, *Cavisoma magnum*, redescription, fish parasites, *Chanos chanos*, Philippines.

During a survey of the parasite fauna of milkfish (*Chanos chanos* (Forsskål) (family Chanidae)) in the Philippines (see Regidor and Arthur, 1992) adult acanthocephalans were found in the intestines of adult milkfish (known locally as *sabalo*) examined at Zamboanga, Mindanao Island, Philippines. These specimens were identified as *Cavisoma magnum* (Southwell, 1927) Van Cleave, 1931, a species that until this time was known only from the original description. Southwell (1927) described *Oligoterorhynchus magnus* Southwell, 1927, from 2 perciform fishes, *Acanthurus strigosus* Bennett (syn. of *Ctenochaetus strigosus* (Bennett), the goldring surgeonfish, also known as the spintail in Southeast Asia) and *Serranus* sp., collected from the Indian Ocean off Ceylon. As the original description and illustrations of this species are inadequate by current standards, we take the opportunity to redescribe this acanthocephalan from Philippine material.

Materials and Methods

Five adult milkfish (72-88 cm in fork length) were purchased from local fishermen at Zamboanga, Mindanao Island, Philippines, on 23 March 1987. Fish were necropsied fresh at the Bureau of Fisheries and Aquatic Resources, Regional Fisheries Training Center at Zamboanga. The intestines of 2 of the milkfish were infected with 30 and 32 acanthocephalans, respectively.

Acanthocephalans were cleaned with physiological saline, fixed with 70% ethanol, and stored in a solution of 10% glycerine in 70% ethanol for later identification. Specimens were pricked repeatedly with a dissecting needle and flattened prior to staining with Semichon's acetocarmine and mounting in Canada balsam or Per-

mount. Additional specimens were stained without flattening with Schneider's acetocarmine and mounted in Permount. Eggs were dissected from the pseudocoel for measurement. Illustrations were prepared with the aid of a drawing tube.

Identification was confirmed by comparison with 3 of the type specimens of *Oligoterorhynchus magnus* Southwell, 1927, part of a lot of unmounted specimens collected from *Serranus* sp. that was deposited in the collection of the Liverpool School of Tropical Medicine by T. Southwell. The specimens were stained unflattened with Schneider's acetocarmine and mounted in Permount.

Measurements (range followed by the mean and standard deviation in parentheses) are in millimeters unless otherwise indicated.

Redescription

Genus *Cavisoma* Van Cleave, 1931

DIAGNOSIS (emended from Golvan, 1969): Cavisomidae Van Cleave, 1931. Medium-sized acanthocephalans. Trunk unarmed, elongate, subcylindrical. Proboscis, short, clavate, armed with longitudinal rows of hooks; posterior hooks slender, rootless; anterior hooks robust, strongly recurved, with well-developed simple roots. Double-walled proboscis receptacle attached to base of proboscis. Cerebral ganglion located near middle of receptacle. Lemnisci digitiform, of variable length, generally about equal to receptacle. Reproductive organs of male occupy only posterior one-third of trunk. Testes, 2, tandem, contiguous. Four tubular cement glands. Gonopore terminal in both sexes. Eggs fusiform, thin-shelled, with well-developed polar prolongations of middle membrane. Parasites of the digestive

tract of marine fishes. Type and only species: *Cavisoma magnum* (Southwell, 1927) Van Cleave, 1931.

***Cavisoma magnum* (Southwell, 1927)**

Van Cleave, 1931

Syn.: *Oligoterorhynchus magnus*

Southwell, 1927

(Figs. 1–6)

GENERAL: With the characters of the genus. Trunk subcylindrical, elongate. Neck short, often retracted. Proboscis armed with 12–13 (typically 12) rows of hooks, 8–10 hooks per row. Four basalmost hooks in each row slender, slightly curved, rootless; 5th to apical hooks more robust, recurved, with well-developed simple roots. Hooks increase in size anteriorly from basalmost hook to 6th or 7th hook, then decrease slightly to apical hook. Lemnisci approximately equal in length, typically extending to distal end of proboscis receptacle. Proboscis receptacle elongate digitiform, often with constriction at middle.

MALES (based on 15 flattened and 6 unflattened specimens; measurements for internal structures are from flattened specimens only):

Trunk 19.42–51.36 (35.37 ± 9.27) long. Trunk width at midbody 0.73–1.53 (1.25 ± 0.27) in flattened specimens, 0.86–1.25 (0.98 ± 0.27) in unflattened specimens. Ratio of trunk length/trunk width 24.5–34.8 in flattened specimens, 29.1–43.2 in unflattened specimens. Neck 0.25–0.40 (0.31 ± 0.08) long, 0.46–0.50 (0.48 ± 0.02) wide at base ($n = 3$). Proboscis 0.91–1.05 (0.97 ± 0.06) long ($n = 5$), 0.33–0.48 (0.39 ± 0.04) wide ($n = 16$); armed with 12–13 (typically 12) rows of hooks, 9–10 hooks per row. Basal hooks 70–90 μm (80.0 ± 5.8) long ($n = 10$); largest hook 105–125 μm (116.2 ± 6.5) long, its root 90–110 μm (96.5 ± 6.3) long ($n = 20$). Proboscis receptacle 1.23–3.09 (2.60 ± 0.46) long, 0.34–0.52 (0.44 ± 0.05) wide. Lemnisci 1.46–4.05 (2.60 ± 0.78) long, 0.25–0.58 (0.37 ± 0.10) wide ($n = 13$). Testes 2, tandem, elongate to oval. Anterior testis 0.70–2.53 (1.42 ± 0.50) long, 0.25–2.09 (0.56 ± 0.44) wide; posterior testis 0.60–1.49 (1.04 ± 0.25) long, 0.24–0.94 (0.51 ± 0.21) wide. Vas deferens runs ventrally along cement glands, extends from posterior margin of posterior testis to proximal end of penis, often enlarged at anterior and posterior ends. Separate seminal vesicle not detected. Cement glands 4, elongate tubular, extending from near posterior margin of posterior testis to midlevel of Saeftigen's pouch

before narrowing into cement ducts. Cement glands 1.52–4.49 (2.99 ± 0.82) long, 0.06–0.27 (0.17 ± 0.06) wide. Total length of male reproductive system 6.28–11.96 (8.57 ± 1.88); ratio male system to trunk length 0.165–0.358. Saeftigen's pouch highly muscular, in specimens with noneverted copulatory bursa typically with bulbous anterior and narrow posterior portions. Total length of Saeftigen's pouch 1.28–2.85 (2.16 ± 0.39), maximum width 0.39–0.98 (0.62 ± 0.17).

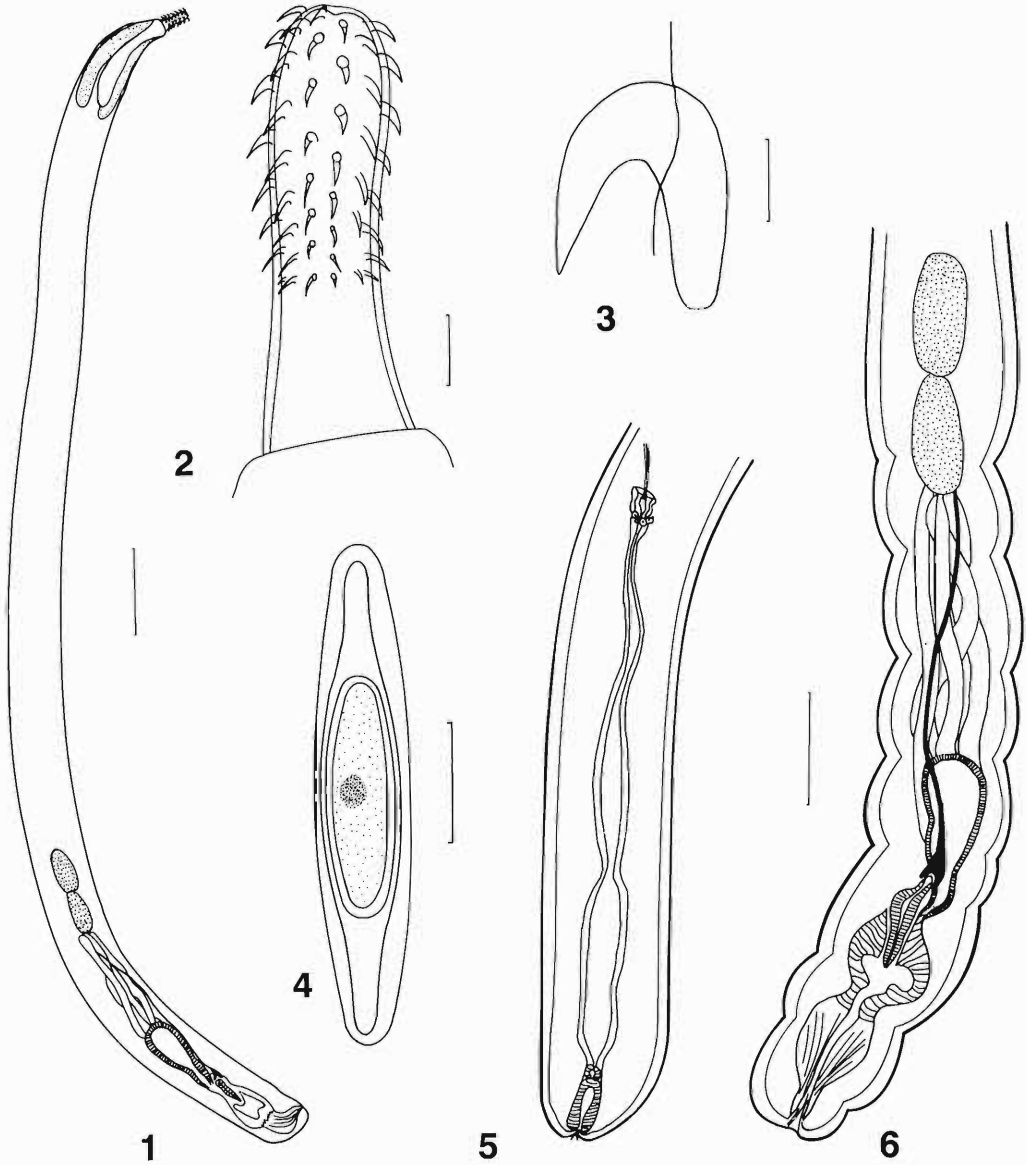
FEMALES (based on 16 flattened (10 mature, 6 immature) and 7 unflattened [all mature] specimens): Trunk 10.67–48.93 (30.21 ± 12.04) long (27.72–48.93 in mature specimens). Trunk width at midbody 0.54–1.89 (1.11 ± 0.44) in flattened specimens, 0.91–1.57 (1.26 ± 0.25) in unflattened specimens. Ratio of trunk length/trunk width 18.8–27.8 in flattened specimens, 27.4–36.2 in unflattened specimens. Neck 0.19–0.44 (0.25 ± 0.08) long, 0.43–0.57 (0.50 ± 0.05) wide at base ($n = 15$). Proboscis 0.79–1.08 (0.95 ± 0.10) long ($n = 11$), 0.32–0.43 (0.37 ± 0.03) wide ($n = 20$); armed with 12 rows of hooks, 8–9 hooks per row. Basal hooks 65–95 μm (80.5 ± 7.4) long ($n = 22$); largest hooks 105–130 μm (115.9 ± 6.6) ($n = 16$) long, their roots 80–105 μm (94.7 ± 8.3) long ($n = 16$). Proboscis receptacle 1.57–3.21 (2.30 ± 0.48) long, 0.23–0.63 (0.42 ± 0.09) wide. Lemnisci 1.58–4.14 (2.72 ± 0.88) long ($n = 14$), 0.13–0.44 (0.25 ± 0.12) wide ($n = 12$). Eggs fusiform, thin-shelled, with well-developed polar prolongations of middle membrane, 103–121 μm (113.4 ± 4.3) long × 15–20 μm (17.0 ± 1.7) wide ($n = 30$).

HOSTS: *Serranus* sp. and *Acanthurus strigosus* (syn. of *Ctenochaetus strigosus*) (goldring surgeonfish) (type host not specified by Southwell, 1927); *Chanos chanos* (milkfish).

LOCATION: Stomach[?] and pyloric caeca (see Southwell 1927); intestine.

LOCALITIES: Indian Ocean "off Negapatam, Ceylon" [=Negappattinam, India] from *Serranus* sp. and from an unspecified locality off Ceylon (Sri Lanka) from *A. strigosus* (see Southwell 1927); Basilan Strait off Zamboanga, Zamboanga del Norte Province, Mindanao Island, Philippines.

DEPOSITION OF SPECIMENS: Types: *Oligoterorhynchus magnus* Southwell, 1927–No. L40 (LSTM No. TA/2/01) from *Serranus* sp., and No. L41 (LSTM No. TA/2/02) from *A. strigosus*, type collection of the Liverpool School of Tropical Medicine, curated by the CAB International Institute of Parasitology, St. Albans, UK. Spec-



Figures 1–6. *Cavisoma magnum*. 1. Lateral view of male. Scale bar = 3.0 mm. 2. Proboscis. Scale bar = 150 μ m. 3. Anterior hook. Scale bar = 50 μ m. 4. Egg. Scale bar = 30 μ m. 5. Posterior of female. Scale bar = 1.5 mm. 6. Posterior of male. Same scale as Figure 5.

imens from *Chanos chanos*: Helminth Collection of the CAB International Institute of Parasitology (IIP No. 6586; 10 mounted and 11 unmounted specimens); Zoological Reference Collection, National University of Singapore (Nos. ZRC.1994.988–996; 9 mounted specimens); remainder in the personal collection of JRA.

Remarks

Cavisoma magnum was originally placed in the genus *Oligoterorhynchus* Monticelli, 1914 (family Echinorhynchidae), by Southwell (1927). Van Cleave (1931) later established a new family, Cavisomidae, and genus, *Cavisoma*, to contain *O. magnum*, as *C. magnum* (Southwell, 1927) Van

Table 1. Comparison of mensural and meristic characters for *Cavisoma magnum* (measurements are in mm unless otherwise indicated).

	Southwell, 1927		Original	
	Males	Females	Males	Females
Trunk				
Length	About 36*	About 70*	19.42–51.36	10.67–48.93
Width	1	1.5	0.73–1.53	0.54–1.89
Proboscis				
Length	1.1		0.91–1.05	0.79–1.08
Width	0.45		0.33–0.48	0.32–0.43
Hooks				
No. longitudinal rows	12			12–13
No./row	8–10			8–10
Length of largest	About 110 μm		105–125 μm	105–130 μm
Length of smallest	About 70 μm		70–90 μm	65–95 μm
Proboscis receptacle length	2.6		1.23–3.09	1.57–3.21
Anterior testis				
Length	1,170 μm		0.70–2.53	
Width	105 μm		0.25–2.09	
Posterior testis				
Length	1,030 μm		0.60–1.49	
Width	105 μm		0.24–0.94	
Cement gland length	3.25		1.52–4.49	
Egg				
Length		120–130 μm *		103–121 μm
Width		22 μm		15–20 μm
Hosts	<i>Ctenochaetus strigosus</i> , <i>Serranus</i> sp.		<i>Chanos chanos</i>	
Locality	Indian Ocean off southern India and Sri Lanka		Basilan Strait, Philippines	

* Indicated measurements were taken from largest specimens.

Cleave, 1931, the type and only species. Subsequent authors have either retained *Cavisoma* within a distinct subfamily (either Cavisominae or Cavisomatinae) within the Echinorhynchidae (Myer, 1932; Yamaguti, 1963), placed it within the family Fessisentidae (Golvan, 1969), or maintained a distinct family (Cavisomatidae) to contain it (Petrochenko, 1956). Most recently, Amin (1985) has retained Cavisomidae as a distinct family in the order Echinorhynchida to contain *Cavisoma* and 9 other genera.

The original description of *O. magnum* by Southwell (1927) is brief and rather incomplete. Measurements obtained during this study, for the most part, agree well with those given by Southwell (Table 1). Males from *C. chanos* show a considerably larger maximum size as compared to that previously reported (51.36 vs. about 36 mm in length), approaching that found for females; while the maximum size observed for females is somewhat smaller than that previously

recorded (48.93 vs. about 70 mm). Additionally, the maximum egg size for specimens from *C. chanos* is somewhat less than that previously reported (130 vs. 121 μm). Although the tegument of the 3 type specimens of *Cavisoma magnum* examined by us shows strong irregular external pseudosegmentation, this is much less pronounced in our Philippine material and, as noted by Golvan (1969), is probably an artifact of fixation. Southwell (1927) noted that the anterior testis of *C. magnum* was apparently fused to the posterior testis; however, in our flattened specimens, they are clearly unfused. Although this species was noted to lack a neck, a short neck is present, although it is often withdrawn in mature individuals. Southwell (1927) recorded *C. magnum* from the host's stomach and pyloric caeca, while our specimens were obtained from the intestine. His record from the stomach is probably the result of postmortem migration. Southwell (1927) noted that his material from *Serranus* sp.

was collected "off Negapatam, Ceylon." However, this city, now known as Negappattinam, is actually in Tamal Nadu, India, only about 50 km north of Sri Lanka (formerly Ceylon).

Previously, Velasquez (1976, 1977) reported the presence of unidentified acanthocephalans in *sabalo* (adult *Chanos chanos*) from Philippine waters and later (Velasquez, 1979), in apparent reference to the same material, noted that numerous worms were found in the intestine of this fish from Nasugbu, Batangas, and from Mindoro. Although she (Velasquez, 1984) subsequently referred this report to *Acanthocephalus* sp., it seems probable that this finding also involves *Cavisoma magnum*. The only other report of acanthocephalans from milkfish is that of Ruangpan and Tanomkiat (1980), who reported an unidentified species of *Acanthosentis* from the intestine of fish examined from coastal Thailand.

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