



## ***Squalonchocotyle squali* MacCallum (Monogenoidea, Hexabothriidae) on *Squalus acanthias* Linneaus (Elasmobranchii, Squalidae) from the Atlantic coast of Argentina**

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**Abstract.** The presence of *Squalonchocotyle squali* MacCallum 1931 parasite of *Squalus acanthias* Linneaus, 1758, is reported for the first time in the Atlantic coast of Argentina, previous descriptions by MacCallum (1931), Price (1942) y Dillon & Hargis (1968) were compared. The possibility of the monogenoidean parasite of *S. acanthias*, from the Falkland Islands, collected by Kuznetsova (1975) and cited as *Squalonchocotyle* sp being representative of *S. squali* is discussed. The geographical range of distribution of *S. squali* is increased, and it's presence on the Southeast of the Atlantic Ocean is confirmed.

**Key words:** Monogenoidean, gill parasites, sharks, South Atlantic, San Jorge Gulf.

**Resumen.** *Squalonchocotyle squali* MacCallum (Monogenoidea, Hexabothriidae) en *Squalus acanthias* Linneaus (Elasmobranchii, Squalidae) de la costa Atlántica Argentina. Se cita por primera vez para la costa Atlántica Argentina la presencia de *Squalonchocotyle. squali* MacCallum 1931 parásito de *Squalus. acanthias* Linneaus, 1758. Se comparan descripciones previas realizadas por MacCallum (1931), Price (1942) y Dillon & Hargis (1968). Se discute la posibilidad de que el monogeneo parásitos de *S. acanthias*, provenientes de las Falkland Islands, colectados por Kuznetsova (1975) y citado como *Squalonchocotyle* sp. sea representantes de *S. squali*. Se amplía el rango de distribución geográfica de *S. squali* y se confirma su presencia en el sudeste del Océano Atlántico.

**Palabras clave:** Monogeneos, parasitos branquiales, tiburones, Atlántico Sur, Golfo de San Jorge.

Hexabotrids monogenoidean have been reported in chondrichthyans with over 60 species described up to date. (Whittington & Chisholm 2003). These authors mentioned that for the total of polyopisthocotylean reported for chondrichthyans, 86.5 % were Hexabothriidae. Inside this family, *Squalonchocotyle* Cerfontaine 1899 was reported on sharks belonging to four different families (Squalidae, Lamnidae, Dalatiidae and Centrophoridae). *Squalonchocotyle squali* MacCallum (1931) was first described on the Piked dogfish *Squalus acanthias* Linneaus, 1758 from Woods Hole, Massachusetts (mid-Atlantic Ocean), and later on the gills of *Squalus lebruni* (Vaillant) Berg, 1895 at South Island (South Pacific Ocean) by Dillon & Hargis (1968).

On the South Atlantic Ocean, Kuznetsova

(1975) reported *Squalonchocotyle* sp found on the gills of *S. acanthias* proceeding from the coast of the Falkland Islands (South Atlantic Ocean in front of the Argentinean coast).

During a parasitological study on marine fish from Argentina, infections with hexabotrids monogenoidean were observed, the primary objective of this study was to report the presence of *S. squali* on the gills of *S. acanthias* and to compare it with previous reports of this specie.

Fifty specimens of *S. acanthias* caught by a research vessel of the National Institute of Fisheries Research (INIDEP, EH02/01) at San Jorge Gulf (48°S-55°W; 100-200 m depth) were examined. The fish were frozen at - 20° C and once landed they were immediately transported to the laboratory. Gills were examined under a stereoscopic microscope for

monogenoidean. Parasites were fixed in AFA, stained in hydrochloric carmine, dehydrated in a series of alcohols, cleared with creosote and mounted in Canada balsam. Drawings were made by the aid of a drawing tube. All measurements were taken with an ocular micrometer and were reported in micrometres followed by the ranges in parenthesis (unless otherwise stated). Three relations among different structures were also used for morphological comparison with another report of this species: BL/HL: body length/ haptor length; BL/HHL: body length/ haptor hooks length; and HL/HAL: haptor length/ haptoral appendix length. The generic classifications follow Boeger & Kritsky (1989) and the key given by Bullard & Dippennar 2003. Host classification follows Compagno (1984, 1999).

**Taxonomic summary**

*Squalonchocotyle squali* MacCallum, 1931 (Figs. 1-4)

Host: *Squalus acanthias* Linneaus, 1758

Locality: San Jorge Gulf, coastal region (38° 80' S 57° 33' W; 100-200 m depth), Argentina ,South western Atlantic Ocean)

Site of infections: gills

Prevalence, Mean intensity: 11.1%, 0.2

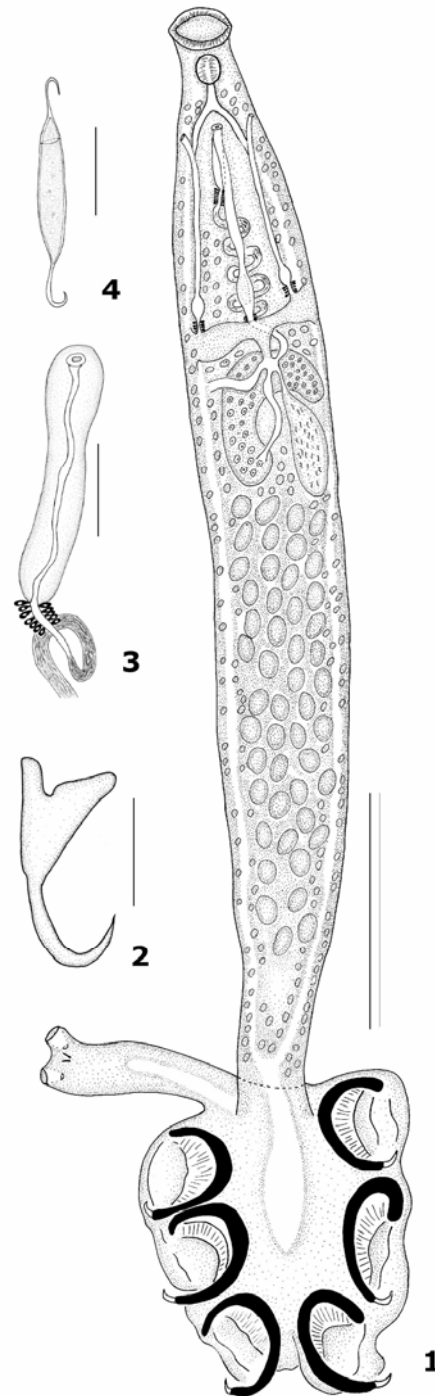
Voucher specimens: deposited in the Museo de La Plata Helminthological Collection (MPHC) (La Plata, Argentina) under the number: 5525

Descriptions: (based on 17 mounted specimens and 1 specimen in serial transversal sections, measurements taken on 11 specimens).

With the characters of *Squalonchocotyle* (*sensu* Boeger & Kritsky 1989). Body elongate 5.80 (4.76 -6.96) mm. long (excluding haptor) by 69 (62-87) wide (maximum) (fig 1). Haptor symmetrical of *Squalonchocotyle* type (Boeger & Kritsky 1989 ) 1.20 (1.12-1.26) mm. long by 1.00 (0.83-1.25) mm. wide, with six armed suckers; BL/HL 4.8:1 (4.2:1-5.5:1); appendix: 1.27 (0.94-1.35) mm. long by 190 (100-210) mm wide, bearing one pair of terminal suckers and single pair of anchors; suckers of the appendix 100 (90-110) in diameter; HL/HAL 4.5:1 (5:1-5.1:1); anchors: 58 (50-70) long with V shaped root, outer root length 16 (14-18) ; inner root length 13 (12-14); point length 20 (17-23) (fig. 2). Haptoral suckers 35 (30-37) in diameter; sucker sclerites similar in shape and size, total length 74 (57-91); point length 90 (70-12) and maximum width 100 (80-120); BL/HHL 7.6:1(3:1-7.8:1). Oral sucker terminal 230 (190-270) in diameter; pharynx 70 (50-120) in diameter; intestinal branches with lateral diverticula, joining the testes posteriorly, and with a

single branch penetrating into the haptor and the appendix.

Testes 45 (30-69) in number, located in the intercaecal area, posteriorly to the ovary and not reaching back to the union of intestinal branches. Vasa efferentia with thin wall. Vas deferens, dorsal to the uterus, thin walled, reaching a cirrus sac and opening in a common genital pore.



**Figures 1-4.** *Squalonchocotyle squali* MacCallum, 1931. Fig 1: Whole mount (ventral view) scale bar = 1mm. Fig. 2: Anchors scale bar = 0.05 mm. Fig.3: Detail of the terminal male genitalia scale bar = 0.05 mm. Fig.4: Egg, scale bar = 0.2 mm

Cirrus sac elongated 90 (75-100) long by 45 (40-50) wide and surrounded in its posterior end by glandular clusters. This sac was congruent with the "elongated cirral bulb type" described by Boeger & Kritsky (1989) (Fig. 3). Genital pore mid ventral, posterior to the pharynx 10 (8-12) in diameter, and located 50-60 posteriorly to intestinal bifurcation. Ovary folded into itself, placed on the pre-equatorial region; oviduct receiving the ducts of the seminal receptacle and the median vitelline duct. Seminal receptacle sac shape 500 (400-550) long, by 120 (100-150) wide; ootype fusiform with 7-10 internal ribs; uterus reaches the genital pore. Vaginal pores latero-ventral, located at each side of the median longitudinal line, at the level of the genital atrium; vaginal ducts straight, parallel, with basal glands, terminal portion non-muscular, and ending in the corresponding transverse vitellary duct. Vitellaria follicular, extending from the level of the pharynx to join the testes posteriorly without penetrating in the haptor neither in the appendix. Vitelline reservoirs Y shaped with each arm join with vaginal ducts. Eggs oval, operculated, 283 (250-350) long by 100 (80-130) wide, with a short curve filament 50-60 long at each pole (fig 4).

By the presence of a symmetrical haptor, sucker sclerites equals, haptoral appendix marginal with anchors, egg with two filaments, vaginae differentiated with parallel duct and non-muscular terminal portion, ovary proximal branched, seminal receptacle present, male copulatory organ with distal portion, and by the absence of dilated vas efferentia with glandular wall, the monogenoidean described now could be included in *Squalonchocotyle*. Present specimens of *Squalonchocotyle* are similar in their morphological features (body measurements, haptor length, pharynx and mouth diameter, haptoral hooks and anchors measurements, and the ratios (BL/HL, BL/HAL, BL/HHL) to *S. squali* described by Price (1942) based on the Mac Callum's (1931) material. On the other hand BL/HAL and BL/HHL relationships in *S. squali* parasite of *S. lebruni* described by Dillon & Hargis (1968) are bigger than those stated in the description by Price (1942) and than those described here; besides, the egg size are smaller. The sharks *S. acanthias* and *S. lebruni* are cogenetic, represent different species and come from different latitudes and regions (mid Atlantic Ocean and South Pacific Ocean respectively). Therefore it would be interesting to restudy the monogenoidean described by Dillon & Hargis (1968).

*Squalonchocotyle* sp studied by Kuznetsova (1975) on the same host that the monogenoidean reported now, could be representative of *S. squali*,

thus confirming the presence of this specie in the South Atlantic

At moment, in Argentina, Hexabothriidae family is represented by four species: *Callorynchocotyle marplatensis* Suriano & Incorvaia, 1982; *Erpocotyle schmitti* Suriano & Labriola, 1998, *E. microstoma* (Brooks, 1934) Yamaguti, 1963, and *S. squali*, present study. *E. microstoma* was reported as unconfirmed in the revision of Boeger & Kritsky (1989) but in same year of these publications it was reported and confirmed for *Sphyrna (Platysqualus) tudes* (Valenciennes, 1822) by Suriano & Labriola (1989).

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