

Short Note

Cercaria meretrix n. sp., from the Hard Clam *Meretrix meretrix*

Jyh-Wei Shin^{1,*}, Chiou-Ming Wen², Guang-Hsiung Kou² and Shiu-Nan Chen²

¹Department of Parasitology, National Cheng Kung University, Tainan, Taiwan 701, R.O.C.

²Department of Zoology, National Taiwan University, Taipei, Taiwan 106, R.O.C.

(Accepted June 16, 1995)

Jyh-Wei Shin, Chiou-Ming Wen, Guang-Hsiung Kou and Shiu-Nan Chen (1996) *Cercaria meretrix* n. sp., from the hard clam *Meretrix meretrix*. *Zoological Studies* 35(1): 68-70. A new marine cercaria, *Cercaria meretrix* n. sp., was found in the hard clam *Meretrix meretrix* from a local fishing market in Wuhsi, Taichung County, Taiwan. Sporocysts were found in the foot, mantle, gonad, and digestive gland, and they elicited heavy inflammatory responses in the host. This new species is a distome, pharyngeate cercaria with a long slender, spinose tail, no eye-spot, three pairs of penetration glands, an omega-shaped ceca, and 16 flame cells. Cercariae matured in the sporocyst. Sporocysts, when found in infected hard clams, were filled with germinal balls, and developing, immature, and mature cercariae.

Key words: *Meretrix meretrix*, Trematode, Marine cercaria, Sporocyst.

In a series of investigations of parasites in marine and brackish-water molluscs, a new cercaria was discovered in *Meretrix meretrix*, clams purchased from a fish market in Wuhsi, Taichung County, Taiwan. *M. meretrix* is a marine hard clam living in muddy coastal areas of the intertidal zone and distributed in Tanshui, Changhwa, Chiayi, Tainan, Kaohsiung, and Tongkang in Taiwan. It is one of the commercially important hard clams in Taiwan. This report describes a new cercaria, *Cercaria meretrix* n. sp., found in the hard clam.

Specimens of the hard clam, were collected in the local fish market in Wuhsi, Taichung County, Taiwan. Because of the improving relationship between mainland China and Taiwan, these hard clams may have come from illegal trade conducted at sea. The clams most probably originated from coastal areas of the Chinese mainland. From 1991 to 1993, 800 specimens were obtained of which two were infected ($N = 100$ during each market collection). The clams were kept in iced sea water for 24 hours before examination. Cercariae were collected from clams individually isolated for 48 h in 0.3% artificial sea water at room temperature. Released cercariae were observed alive in sea water and were stained alive with neutral red (Wardle 1988). Cercariae were heat-killed in sea water and measured by use of an autoimage analysis system (LV-2, WINSTAR, Taiwan). Infected clams were subsequently opened to reveal sporocysts and developmental stages, which were examined in sea water, then fixed in warm buffered formalin fixative, and stored in 70% alcohol for later measurement and reference. Unless otherwise specified, measurements are in μm and ranges are followed by means in parentheses.

Family Fellodistomidae

Cercaria meretrix n. sp.

(Fig. 1)

Host: *Meretrix meretrix* (Linnaeus, 1758) (Bivalvia: Veneridae).

Locality: Wuhsi fish market, Wuhsi, Taichung County, Taiwan.

Infected tissue: foot, mantle, gonad, and digestive gland.

Date: December 12, 1991, and November 19, 1992. (one specimen each date).

Type specimen: Sporocyst in 70% alcohol (#D000003) deposited in the National Museum of Natural Science, Taichung, Taiwan.

Cercaria: This is a distomous, pharyngeate cercaria with a long slender tail bearing bilateral rows of setae (Fig. 1). Body 146-155 (av. 150) ($N = 10$) long and 83-87 (av. 85) wide, surface smooth without spines; sensory hairs not observed. Eye-spots lacking. Tail stem 196-205 (av. 200) long and 23-25 (av. 24) wide; with 27 pairs of spinose tufts, each tuft with 6 stylets. Oral sucker 33-36 (av. 35) in diameter, well developed, globular and without a stylet. Penetration glands large and long, posterior to oral sucker, about three pairs of glands with ducts opening anteriorly. Pharynx 13-17 (av. 15) in diameter and globular-sharped. Intestine shaped like the Greek letter "omega (Ω)" with bifurcate tracks. Anteriorly two short S-shape cecae partially surround the acetabulum. Acetabulum well developed in middle of body, almost equal in size to oral sucker. Testis barely discernible lateral to the acetabulum, but no ovary seen on our specimens. Excretory bladder V-shaped, opening posteriorly through a duct entering upper part of tail stem. The bladder joined laterally and subterminally by main excretory ducts which divide at acetabulum level. Each

*To whom all correspondence and reprint requests should be addressed.

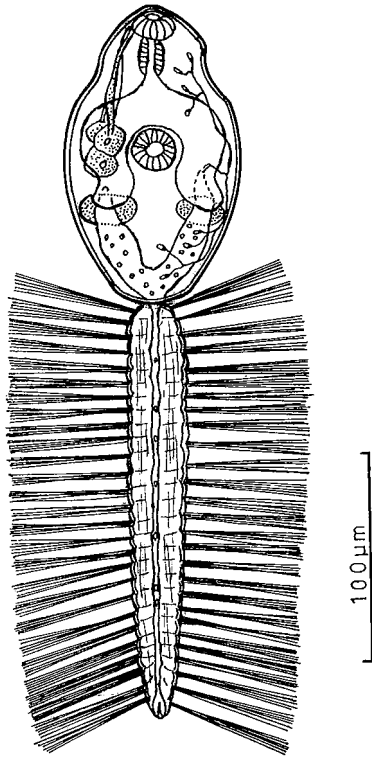


Fig. 1. Cercaria, ventral view of *Cercaria meretrix* n. sp. from the clam *Meretrix meretrix* from Taiwan.

branch of excretory duct drains two sets of two flame cells; flame cell formula is $2[(2+2) + (2+2)] = 16$. Slender, spinose tail coalesced at end of body and lakes membranes. Excretory pore found at end of tail.

Sporocyst: In gross aspect the gonadal and digestive gland areas of the clams filled with milky clusters of sporocysts. Sporocyst milky colored, thick-walled with birth pore at one end (Fig. 2G), uneven in diameter (from 190 to 450 (av. 318) ($N = 60$)) and length (from 570 to 3 750 (av. 1647) ($N = 30$)), having irregularly alternating swellings and constrictions. Germ balls and numerous cercariae in various stages of development visible through sporocyst tegument.

Cercaria development started from a germ ball at the 20 μm development stage (Fig. 2A). Tail buds appeared at the 40 μm development stage (Fig. 2B), and elongated at the 100 μm development stage (Fig. 2C). Excretory bladder and small projections on tail formed at the 200 μm development stage (Fig. 2D). At about the 250 μm development stage (Fig. 2E), the acetabulum, pharynx, and distinguishable tail spines formed. Later, the spine growth and maturation of internal organs continued until well-developed cercaria formed (Fig. 2F, G).

The specific name, *meretrix*, refers to the generic name of the first known intermediate host, *M. meretrix*.

Discussion—*Cercaria pectinata* has a long lateral set of finlets on the tail and has only been reported parasitize one species of *Meretrix lusoria* (Huet 1891, Chun and Lee 1976, Bae et al. 1977). *Cercaria meretrix* n. sp. morphologically resembles *C. pectinata*. *Cercaria* of *C. pectinata* Huet, 1891, as redescribed by Shimura et al. (1982) differs from *C. meretrix* in being about three times larger (850-1 000 μm). Careful examination of the

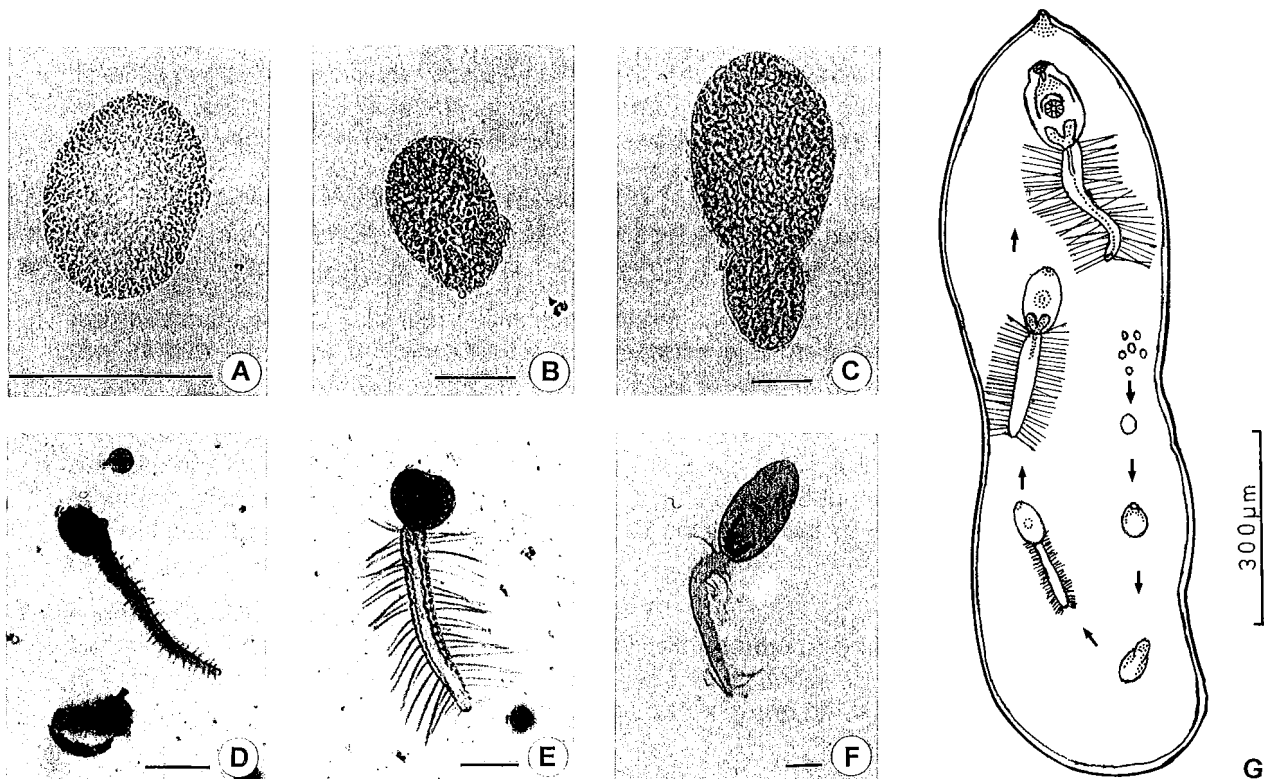


Fig. 2. Sporocyst development of *Cercaria meretrix* n. sp. A: 20 μm stage, B: 40 μm stage, C: 100 μm stage, D: 200 μm stage, E: 250 μm stage, F: mature cercaria, G: dynamic chart of development. Scale bar, A~C: 20 μm ; D~F: 50 μm .

exterior morphology of the body of *C. meretrix* reveals that there is a hollow on the lateral one third of the body (Fig. 1). Upon careful examination and comparison of the number of setae per tuft in the tail, it was found that both *C. meretrix* and *C. pectinata* have 27 pairs of setae, but the length of each seta differs. This is unlike the cercaria of *Cercaria caribbea* as described by Cable (1956), whose tail had 28 pairs of finlets, each composed of setae joined by a delicate web. Each seta of *C. meretrix* is 60 μm long with six stylets in each tuft, but in *C. pectinata* each seta is 120 μm long and with 6 to 10 stylets (average 7) in each tuft (Bae et al. 1977, Shimura et al. 1982). *C. caribbea* has 6 or 7 setae of up to 125 μm in length (Cable 1956). Seta formation and growth origination of *C. meretrix* occurs at a later stage, a major difference between *C. meretrix* and *C. pectinata* (Chun and Lee 1976, Bae et al. 1977). *C. meretrix* adults probably are one of the fellodistomids that were common in herbivorous fishes examined. The studies of the life cycle, distribution and geographic occurrence of this cercaria are in progress.

Acknowledgements—This investigation was supported by the National Science Council, Republic of China (NSC82-0211-B-0002-050).

References

Bae PA, PA Kang, Y Kim. 1977. Studies on the *Cercaria pectinata* infection to hard clam, *Meretrix lusoria*. Bull. Fish Res. Develop. Agency 18: 131-140.

- Cable RM. 1956. Scientific survey of Puerto Rico and the Virgin Islands. Marine Cercariae of Puerto Rico. N.Y. Acad. Sci., Part 4, 16: 490-577.
- Chun SK, JB Lee. 1976. Studies on the trematode larvae infected in the hard clam, *Meretrix lusoria*. Bull. Kor. Fish. Soc. 9: 35-42.
- Huet L. 1891. Un nouveau cercaria (*Cercaria pectinata*) chez *Donax anatinum*. J. Anat. Physiol. p. 162.
- Shimura S, T Yoshinaga, H Wakabayashi. 1982. Three marine cercariae in the clam *Tapes philippinarum* from Lake Hamana, Japan: Morphology and level of infection. Fish Pathol. 17: 129-137.
- Wardle WJ. 1988. A bucephalid larva, *Cercaria pleuromerae* n. sp. (Trematoda: Digenea), parasitizing a deepwater bivalve from the Gulf of Mexico. J. Parasitol. 74: 692-694.

Appendix:

The Chinese localities cited in the text contrasted with their romanizations:

Romanization	Chinese	Romanization	Chinese
Changhwa	彰化	Tainan	台南
Chiayi	嘉義	Tanshui	淡水
Kaohsiung	高雄	Tongkang	東港
Taichung	臺中	Wuhsui	梧棲

文蛤體內發現之新種吸種

辛致煒¹ 溫秋明² 郭光雄² 陳秀男²

本文報告自文蛤(*Meretrix meretrix* (Linnaeus, 1758))體內所發現的一種新種吸蟲類之胞蚴與尾蚴。該新種尾蚴的描述如下：*Cercaria meretrix* n. sp.：總長350 μm ，體長150 μm ，尾幹長200 μm 。體表無明顯感覺器，無眼點，各具有一個口吸盤與腹吸盤。尾幹上有27對棘叢，每一束棘叢上有6隻刺針。焰細胞的模式為2 [(2+2)+(2+2)] = 16。

關鍵詞：文蛤，吸蟲，尾蚴，胞蚴。

¹ 國立成功大學醫學院醫學系寄生蟲學科

² 國立臺灣大學理學院動物學系