

## A report on the *Myxobolus* sp. (Myxosporea : Bivalvulida), found from the gills of the pale chub, *Zacco platypus*

Bo-Young Jee, Ki-Hong Kim and Soo-Il Park

*Department of Fish Pathology, College of Fisheries Science,  
National Fisheries University of Pusan*

The mature spores of present *Myxobolus* sp. was ovoid in front view with no distinct ridges of folds, lemon-shaped in side view with a straight sutural ridge. Spore valves showed symmetrical and smooth. Spores were 9 to 12  $\mu\text{m}$  (Mean=10.4 $\pm$ 0.7, n=50) in length, 6 to 9  $\mu\text{m}$  (Mean=7.7 $\pm$ 0.6, n=50) in width and 5.0 to 7.5  $\mu\text{m}$  (Mean=6.2, n=7) in thickness. Two polar capsules of spore were pyriform in shape, equal or nearly equal in size, 3 to 6  $\mu\text{m}$  (Mean=4.6 $\pm$ 0.6, n=50) in length, 2 to 3  $\mu\text{m}$  (Mean=2.2 $\pm$ 0.3, n=50) in width, Polar filaments of spore were composed with six to seven coils within capsules. Extended polar filaments were 55 to 135  $\mu\text{m}$  (Mean=78.7, n=50) in length. The matured spore showed iodophilous elliptical vacuole, intercapsular appendix, and mucous envelope. The shape and measurements of the present *Myxobolus* sp. spores were very similar with the spore of *M. cyprinicola* Reuss, 1906.

---

Key words : *Myxobolus* sp., Pale chub, Korean freshwater fish, Gill parasite

In the course of the survey on the protozoan parasites of Korean freshwater fish, we found numerous small white cysts, which were filled with mature myxosporidian spores, in the gill filaments of pale chub, *Zacco platypus*. From the scrutinized observation of shape and morphometrics, the species of these myxosporidian spores were identified as *Myxobolus* sp. In this study, we described the spore morphology of *Myxobolus* sp. in detail and compared with other species of *Myxobolus* in the world.

The pale chub was collected at Yulha stream in JangYu, Kyongsangnam-do, Korea on the 1st June 1995. 4 fish species including pale chub,

dark chub, false dace and flat bitlering were collected by a casting net and were transported to the laboratory in live state. Fish were anesthetized and pithed and all organs were removed. Each removed organ was examined thoroughly for seeking parasites under the dissecting and light microscopes.

Measurements of *Myxobolus* sp. spores were made from wet mounts of cyst contents. Fresh spores were smeared and air dried for a few minutes. Then, they were stained with May-Giemsa for 25min. The polar filaments were stained after having been extruded from the polar capsules by allowing a saline suspension of fresh spore.

Fig. 1. Light micrographs of *Myxobolus* sp. from gills of the pale chub. (A-B) Fresh wet preparations of cysts. (A) Gill filament showing position of cysts.  $\times 40$ . (B) Ruptured cyst with released spores  $\times 400$ . (C-D) May-Giemsa stain preparations of spores. (C) Polar filament within polar capsule.  $\times 1000$ . (D) Extruded polar filaments.  $\times 100$ .

The measurements given below are in micrometers unless otherwise indicated.

The *Myxobolus* sp. were not found in the collected fishes, exclusive of pale chub. The mature spores and cysts of *Myxobolus* sp. were found

only in the gill filaments of the infected pale chub. While the cysts were found in the moribund fish, mature spores were found in the dead fish. The cysts were found in three of 12 fish examined. The infection rate was 66.6% of the examined

pale chub (Length : 11.8~15.0 cm, Individual number=12). Developed cysts, whitish in color and visible to the naked eye, were found on the distal half of gill filament of infected pale chubs. Cysts ranged from 300 to 700  $\mu\text{m}$  ( $n=7$ ) in length and were oval to circular in shape. Cysts were polysporous and only mature spores were observed in wet mounts of gills(Fig. 1, A).

Spores were ovoid in frontal view with no distinct sutural edge folds, lemon-shaped in side view with straight sutural ridge and line(Fig. 1, B). The features of spores were 9 to 12 (mean=10.4 $\pm$ 0.7,  $n=50$ )  $\mu\text{m}$  in length, 6 to 9 (mean=7.7 $\pm$ 0.6,  $n=50$ )  $\mu\text{m}$  in width and 5.0 to 7.5 (mean=6.2,  $n=7$ )  $\mu\text{m}$  in thickness. Two polar capsules were pyriform in shape, equal or nearly equal in size, 3 to 6 (mean=4.6 $\pm$ 0.6,  $n=50$ )  $\mu\text{m}$  in length and 2 to 3(mean=2.2 $\pm$ 0.3,  $n=50$ )  $\mu\text{m}$  in width(Table 1). Polar filaments coiled six to seven turns within the capsules. The extended polar filaments 55 to 135 (mean=78.7,  $n=50$ )  $\mu\text{m}$  in length when stained with May-Giemsa(Fig. 1, C, D). An iodophilous vacuole was elliptical, intercapsular appendix present, and mucous envelope present.

In the world, 453 species in the genus *Myxobolus* have been described from fish (Landsberg and

Table 1. Spore morphometrics of *Myxobolus* sp. of the pale chub.

Characteristics	Spore measurement( $\mu\text{m}$ )		
	Range	Mean $\pm$ SD	No. of examined
Spore			
length	9~12	10.4 $\pm$ 0.7	50
width	6~9	7.7 $\pm$ 0.6	50
thickness	5~7.5	6.2	7
polar capsule			
length	3~6	4.6 $\pm$ 0.6	50
width	2~3	2.2 $\pm$ 0.6	50

Lom, 1991). Among them, some species show specificity for certain host species. The mature spores and cysts of present *Myxobolus* sp. were found only in the gill filaments of the pale chub. Although infection locus of *M. koi* and *M. toyamai* resembles this parasite, it differs significantly in spore size and PCs shape(Table 2). And although the spore morphometrics of several *Myxobolus* spp. were similar to present *Myxobolus* sp.(Table 3), it differs significantly in infection locus, host, and shape of spore. Spores of the present *Myxobolus* sp. were most closely resembled to those of *M. cyprinicola* Reuss, 1906.

Table 2. Comparison of morphological features among *Myxobolus* spp. which infect in the gill filaments.

Items	<i>Myxobolus</i> spp.		
	<i>M. koi</i>	<i>M. toyamai</i>	Present
Hosts	<i>Cyprinus carpio</i>	<i>C. carpio</i>	<i>Zacco platypus</i>
	<i>C. c. haematopterus</i>	<i>C. c. haematopterus</i>	
Spore shape	slender tear-shape	slender tear-shape	ovoid
length( $\mu\text{m}$ )	14~16	14~15	9~12
PCs shape	equal	unequal	equal
length( $\mu\text{m}$ )	7~9	7~8 and 2.8~3.2	3~6
Cyst size( $\mu\text{m}$ )	250	100	300~700

Table 3. Comparison of spore morphometrics of *Myxobolus* species similar to present *Myxobolus* sp..

<i>Myxobolus</i> spp.	Spore dimensions (µm)	
	Length	Width
<i>M. disparoides</i>	9~12	6
<i>M. undulatus</i>	9~10.5	7~8.5
<i>M. venkatesshi</i>	9~10	7~8
<i>M. diversicapsularis</i>	12.7	12
<i>M. jahnricei</i>	12.4	15.5
<i>M. pavlovskii</i>	10.7	8.8
<i>M. lomi</i>	11	8
<i>M. intimus</i>	12.5	10
<i>M. microcystus</i>	11~14	7~10
<i>M. dechtiari</i>	10~14	7~9
<i>M. cyprinicola</i>	9~12	7~9

Lom and Arthur(1989) presented guidelines for decriptions in Myxosporea as follows : "The finding of Myxosporea in a different host species, site of infection or new geographical locality is,

thus, no adequate justification of creating a new species". From this standpoint, we reported this species as *Myxobolus* sp., tentatively.

### Reference

- Bykhovski, B. E. : Key to the determination of parasites of freshwater fish of the USSR. (In Russian). Izdat. Akad. Nauk SSSR, Moscow, 776 pp. 1962.
- Landsberg, J. H. and Lom, J. : Taxonomy of the genera *Myxobolus/Myxosoma* group(Myxobolidae : Myxosporea), current listing of species and revision of synonyms. Systematic Parasitology 18 : 165-186, 1991.
- Lom, J. and Arthur, J. R. : A guideline for the preparation of species descriptions in Myxosporea. Journal of Fish Diseases, 12 : 151-156, 1989.

# 한국산 담수어류 피라미의 아가미에 기생하는 *Myxobolus* sp.에 관하여

지 보 영 · 김 기 홍 · 박 수 일

부산수산대학교 수산과학대학 어병학과

피라미의 아가미로부터 검출된 *Myxobolus* sp.의 성숙 포자는 정면에서 특징적인 봉합용기가 없는 난형, 측면에서 직선적인 봉합면을 가진 레몬모양을 나타내었고 대칭적이며 표면이 평평한 포자각을 가졌다. 평균적인 포자의 길이, 넓이 및 두께는 각각 10.4  $\mu\text{m}$ , 7.7 mm 및 6.2  $\mu\text{m}$  였고 평균적인 극낭의 길이와 넓이는 4.6  $\mu\text{m}$ 와 2.2  $\mu\text{m}$ 로 측정되었고 극낭속에 있는 극사는 6 또는 7 coil로 관찰되었으며 방출된 극사의 길이는 55-135  $\mu\text{m}$ 이었다. 한편으로 성숙 포자는 작은 극포간 돌기, 타원형의 요오드 친화성 공포 및 점막이 존재하는 것으로 관찰되었고 성숙 포자의 형태 및 크기는 *M. cyprinicola* Reuss, 1906 과 가장 비슷한 것으로 나타났다.

---

Key words : *Myxobolus* sp., Pale chub, Korean freshwater fish, Gill parasite.