THE MORPHOLOGY OF CERCARIA STURNIAE TANABE, 1948 (CERCARIA OF GIGANTOBILHARZIA STURNIAE TANABE, 1951), A CAUSE OF CERCARIA DERMATITIS IN JAPAN

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Cercaria sturniae was found by Tanabe in the year of 1948. Cercaria dermatitis in Japan was recently proved by Tanabe (1948) to be caused by penetration of the cercaria. It was known for more than ten years by the name of "Kogan Byō" (lake side disease) along side Lake Shinji in Shimane Prefecture. According to Tanabe (1951), Cercaria sturniae is the larval form of Gigantobilharzia sturniae Tanabe, 1951, infesting usually in the vein of Sturnia philippensis (Forster) and its first intermediate host being Segmentina nitidella (Polyphyllis hemisphaerula (Benson, 1842)). The first description of this cercaria was made by Tanabe (1948) but very briefly.

In the early summer of 1951, the authors had an opportunity of making a trip to Shimane Prefecture to collect Segmentina nitidella from infected area. The collected Segmentina was proved to have been infested with this cercaria for about 8%. Following is the description of this cercaria.

PARTHENITA: The parthenita of this cercaria is a sporocyst. The mother sporocyst, which only but one specimen was available, is in a slender thread form measuring 1,920μ long and 170μ wide, and had 14 young sporocysts in it. The daughter sporocyst is much the same in form as the mother one, its mature form measures 750μ-1,200μ in length, while its width is irregular measuring 30-190μ. The cercaria contained in it usually numbers 5-10.

CERCARIA: This cercaria is a furcocercous type of medium size and has a pair of eye spots. The body is long ellipsoid in shape slightly tapering at its anterior end. The measurements were made on 11 specimens fixed by 10% hot formalin, the results of which are as shown in Table 1.
Fig. 1, a. Young mother sporocyst, drawing by camera lucida.
b. Mature daughter sporocyst, drawing by camera lucida.

Table 1. Measurements of *Cercaria sturniae*

<table>
<thead>
<tr>
<th>Measurement</th>
<th>Value</th>
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<tbody>
<tr>
<td>Body</td>
<td>165–292 (av. 230) x 67–127 (av. 94.8) μ</td>
</tr>
<tr>
<td>Anterior organ</td>
<td>55–89 (av. 70.7) x 43–59 (av. 47.9) μ</td>
</tr>
<tr>
<td>Acetabulum</td>
<td>15–26 (av. 21.7) x 17–35 (av. 29.8) μ</td>
</tr>
<tr>
<td>Eye spot</td>
<td>6–9 (av. 6.9) μ in diameter</td>
</tr>
<tr>
<td>Interval of eye spots</td>
<td>24–63 (av. 38.1) μ</td>
</tr>
<tr>
<td>Anterior part of body from eye</td>
<td>0.86 0.7</td>
</tr>
<tr>
<td>Posterior part of body from eye</td>
<td>1 1</td>
</tr>
<tr>
<td>Anterior part of body from acetabulum</td>
<td>2.3 1.9</td>
</tr>
<tr>
<td>Posterior part of body from acetabulum</td>
<td>1 1</td>
</tr>
<tr>
<td>Tail stem</td>
<td>127–258 (av. 205) x 29–41 (av. 32.9) μ</td>
</tr>
<tr>
<td>Furcal rami</td>
<td>95–137 (av. 114) x 10–22 (av. 15.1) μ</td>
</tr>
<tr>
<td>Tail cap</td>
<td>15–18 (av. 16.7) μ in length</td>
</tr>
<tr>
<td>Fin fold</td>
<td>6–9 (av. 7.4) μ in width</td>
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</table>

The body is transparent. The cuticula is relatively thin. Its surface is covered with minute spines directing their tips backwards, while larger spines are found particularly on the ventral part of the anterior extremity around the opening of the anterior organ. These larger spines direct
their tips forwards in their usual manner. Such a feature becomes more conspicuous when the anterior part of the anterior organ is in a protruded state. The anterior organ occupies the greater part of the anterior end of the body tapering at its posterior end. It measures about 85μ in length. Two pairs of muscle bundles are seen in it. One of them runs from its opening to its posterior end and the other from its opening to the dorsal posterior end of it. In this organ a sack-formed structure is recognized. It is contractible and attains to half the length of the anterior organ. The anterior end of the anterior organ is also contractible and the part around its opening where larger spines beset is protrusile as well as retractile into the body. When this part is retracted, the larger spines direct themselves backwards thus helping supposingly the cercaria adhering to the host.

(Fig. 2).

Fig. 2, a. Cercaria, semidiagramatic drawing.

b. Body of the cercaria, semidiagramatic drawing.

SH, Sensory hair: AO, Anterior organ: FC, Flame cell:
ES, Eye spot: Es, Esophagus: Ac, Acetabulum:
Ci, Cilia: MB, Muscle bundle: PG, Penetration gland
cell: EB, Excretory bladder: IC, Island of Cort.
Fig. 3, a. Arrangement of spines on the surface of cercaria, ventral view. Note the anterior larger spines.

b. Cercaria, lateral view. Showing the positions of muscle bundles, penetration gland cells and caudal fin folds.

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Seven pairs of the sensory hairs are observed. Three of them are located on the dorsal margin of the opening of the anterior organ, the length of which measuring 2.7μ long, being the shortest of all. The others are located along the lateral margin of the body; the first pair locating behind the opening of the anterior organ, the second a little below of the first. Both of them are about the same size measuring 3.3μ long. The third and the fourth locating laterally to the posterior half of the anterior organ are shorter than the former two measuring 2.7μ long and the fifth locating lateral to the eye spots are longest measuring 5.3μ long. All these sensory hairs are found on each small papilla. The mouth opens median at the dorsal margin of the opening of the sack formed structure. The esophagus succeeding the mouth opening is slender and extends to the point between eye spots and the acetabulum. No pharynx is recognized.
The protruded acetabulum is located ventrally median at the level of about two thirds of the body. It is small in size and short ellipsoid in shape. Around the margin of its opening are found a dense row of rather large spines. From the acetabulum run seven strong muscle-bundles to the dorsal cuticula of the body. A pair of eye spots are found laterally at the level a little anterior between the posterior margin of the anterior organ and the anterior margin of the acetabulum. They are filled with brown black pigment corpuscles. A lens is also recognized in its lateral side. The central nerve commissure is recognized transversely between both eye spots.

The penetration gland cells, five pairs in all, occupy the major part of the posterior body around the acetabulum. The upper three pairs of them are coarsely granulated. The lower two are finly granulated and are larger in size than the former three. Each gland cell has a small nucleus in it. Their ducts, making a bundle altogether in each side, run forwards, enter into the anterior organ and open on the dorsal margin of the opening of the anterior organ. Beside these, two pairs of gland like structures are observed on the lateral side of the sack-formed structure in the anterior organ, but their openings can hardly be recognized. The genital primordium is recognized as a compact mass of cells median just behind the lower margin of the acetabulum.

The excretory bladder is located median at the posterior end of the body. It is small in size and is succeeded by the excretory canal penetrating longitudinally through the tail. At the end of the tail stem it bifurcates and enters into both furcal rami and opens respectively at the end of the tail cap. The excretory pore opens at the point where the excretory tube of the tail succeeds to the bladder. The island of Cort is also recognizable. The main collecting tube starts from the lateral side of the excretory bladder, runs laterally up to the lateral side of the acetabulum, and, after convoluting here several times, divides into the anterior and posterior secondary collecting tubes. The main collecting tube has two ciliae near the part where it divides itself into both secondary collecting tubes. Both secondary collecting tubes have three flame cells respectively. The capillary of the most posterior flame cell of the posterior secondary collecting tube enters into the tail, so its flame cell is found near the base of the tail. Thus the flame cell formula of this cercaria is \(2((1+1+1)+1+1+1))\).
The stem of the tail is a little shorter than the body-length and both furcal rami a little longer than half the length of tail stem. The furcal rami has a dorso-ventral fin fold ending at the tip of a tail cap, on which opens the excretory tube in the furcal rami. The surface of the tail is covered with minute spines as that of the body.

REFERENCES

8) Komiya, Y., J. Ito and J. Goto: A survey on the so called "Rice pad dermatitis" in Aichi Prefecture, the morphology and behavior of a cercaria, which is thought to be a cause of this dermatitis. Jour. Publ. Health, 10, 32-33, 1951 (in Japanese).