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AN ACANTHOSTOMID METACERCARIAL INFECTION IN SOME OF OUR FRESHWATER FISHES

In a great variety of trematode, cestode and nematode parasites of fish-eating fishes and higher vertebrates including man, fishes are known to act as second intermediaries. The collection available, during examination of numerous specimens of juveniles under 20 species, revealed infestation with diverse types of metacercarial cysts including an acanthostomid. The present paper is concerned with the incidence, morphology and systematic position of this common form.

MATERIAL AND METHODS

The fishes caught, during February 1971 to February 1972, from a tributary of the permanent pond near Chinhat (situated about 15 km east of Lucknow) were examined under a Bausch and Lomb Stereoscopic Dissecting Microscope. Metacercarial cysts occurred beneath scales, on operculum, fins and vertebral rays in Amblypharyngodon mola (Ham.), Esomus danicus (Ham.), and Channa punctatus (Bl.)—the latter, however, did not reveal an infection of vertebral rays; below scales, in Colisa lalbus (Ham.) and Nandus nandus (Ham.); in caudal fins, of Lepidocephalus puntea (Ham.) and Osteobrume cotoo (Ham.); and in vertebral rays, of Chelo laubuca (Ham.) and Xenentodon cancila (Ham.). Metacercarial cysts, after isolation, were examined under a Compound Microscope. Excystment was accomplished from a slight pressure of a needle on the coverlip. Excysted stages were studied alive and from live specimens stained with dilute neutral red. Specimens fixed in 10% formalin, after staining with alcoholic Borax carmine, were processed for preparation of permanent mounts to elicit details of genital rudiments. Sketches were drawn with the aid of a Spencer's Camera Lucida.

OBSERVATIONS AND REMARKS

Acanthostomum burminis

(a) Metacercarial cyst.—Nearly rounded, transparent cyst of slightly yellowish or white colour contained coiled larva lined by small cuticular spines and, measuring 223·0–324·0 μ x 187·0–288·0 μ in size, had 1·7–3·0 μ thick cystic wall of parasitic origin and 4·0–14·0 μ thick of host origin. Other structures visible included: fingerbowl/funnel-shaped/cup-shaped oral sucker of 36·0–119·0 μ x 47·0–145·0 μ size carrying a crown of 27–28 collar spines of 14·0–18·0 μ x 4·0 μ size; 32·0–58·0 μ x 29·0–55·0 μ sized pharynx; acetabulum of 29·0–58·0 μ x 32·0–47·0 μ size; well-developed excretory bladder full of corpuscles, y-shaped, with a long median stem extending behind acetabulum and receiving lateral cornua reaching to near pharyngeal zone; and a wider intestinal caecum carrying prominent corpuscles (Figs. 1 and 2).

FIG. 1. Metacercarial cyst, beneath a scale in N. nandus.

FIG. 2. Another cyst, isolated from operculum of A. mola.
(b) *Metacercaria.*—Excysted larva elongated, with bluntly rounded extremities, of 570.0–1200.0 μ \( \times \) 105.0–195.0 μ size, with 27–28 collar spines of 14.0–22.0 μ \( \times \) 4.0–5.0 μ in size (5% KOH treated spines of 22.0 μ \( \times \) 5.0 μ size), had oral sucker of 104.0–144.0 μ \( \times \) 130.0–173.0 μ size; 25.0–65.0 μ long prepharynx; 58.0–72.0 μ \( \times \) 50.0–79.0 μ sized, barrel-shaped pharynx; 11.0–25.0 μ long oesophagus dividing, at 200.0–295.0 μ distance behind anterior end, into intestinal caeca with prominently wider left caecum opening at an situated at 68.0–72.0 μ distance in front of posterior extremity—left anal opening being distinctly wider; acetabulum of 40.0–58.0 μ \( \times \) 40.0–68.0 μ size; terminal excretory pore with long main stem and two longitudinal canals. In intravitam stained specimens, genital rudiments included a pretesticular rounded ovary and two spherical testes lying in tandem, in first half of posterior fourth of body. The stained permanent mounts, however, revealed an additional mass lying contiguous to the ovary and a developing uterus. The measurements recorded were: length 375.0–600.0 μ; maximum breadth 90.0–165.0 μ; oral sucker 76.0–115.0 μ \( \times \) 86.0–104.0 μ; collar spines 14.0–18.0 μ; prepharynx 7.0–18.0 μ; pharynx 43.0–54.0 μ \( \times \) 36.0–72.0 μ; oesophagus 4.0–7.0 μ; right intestinal caecum of 4.0–11.0 μ and left 14.0–43.0 μ thickness; an at 50.0–76.0 μ distance in front of posterior end; acetabulum 32.0–43.0 μ \( \times \) 36.0–47.0 μ; ovary 11.0–18.0 μ \( \times \) 14.0–29.0 μ; anterior testis 14.0–22.0 μ \( \times \) 18.0–25.0 μ; posterior testis 14.0–22.0 μ \( \times \) 18.0–25.0 μ (Figs. 3 and 4).

On account of the shape and armature of oral sucker; presence of prepharynx, well-developed pharynx, short oesophagus dividing immediately in front of acetabulum into unequal caeca with anal openings; extent of median stem and collecting canals of excretory bladder; and position of developing genitalia, this metacercaria is assignable to *Acanthostomum* Looss. 1899 (*Acanthostomidae*: *Acanthostominae*). This genus, in this region, is represented by *A. burminis* 126 and *A. indicum*, recorded in crocodile. The original description for *A. burminis*, published in 1926, was subsequently modified with reference to the presence of a very much attenuated right intestinal caecum and anal openings. While distinguishing *A. indicum* from *A. burminis*, Sinha4 had relied on such differential characters as ratio of 2 suckers, a very long prepharynx, extreme posterior position of gonads, collar spines being 22 instead of 24–27 and the host being a crocodile. He had, however, failed to consult the paper of Bhalariao2 as his description...
lacks reference to anal openings and precise extent of excretory bladder because the excretory system was not studied either from live specimens or sectioned material. A restudy of Sinha’s material, therefore, appears essential to clarify these points.

Among the species reported from other countries, as cited by Yamaguti, Thatcher, in the description of *A. megastomum* (from Mexican Indigo snake), likewise includes, amongst specific characters, variable diameter of intestinal caeca, presence of anal openings and Y-shaped excretory bladder with collecting canals extending to near the oral sucker. The piscine species, *A. bagri* from *Bagarus docmac*, according to Thomas, has anal openings and Y-shaped excretory bladder extending behind seminal vesicle. Fischthal and Kuntz too have reported the finding of anal opening in each caecum, particularly visible in younger forms of *A. spiniceps*, from *B. bayad* (from Egypt) and anal openings in *A. absconditum*.

The present findings record 9 of our freshwater fishes as second intermediaries of *A. burminis* which requires 3 hosts for completion of its lifecycle.

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EFFECT OF NONIONIC SURFACTANTS ON POLLEN GERMINATION AND POLLEN TUBE GROWTH

In recent years the use of surfactants, which were initially used to enhance the penetration and effectiveness of foliar applications of herbicides and pesticides, has been extended to various biological investigations involving interaction of many growth substances. Investigations have shown that many of the surfactants have independent biological effects in animal and plant systems. The communication reports the effect of two nonionic surfactants, Tween 80 (Polyoxyethylene sorbitan monooleate) and Triton X-114 (Alkyl phenoxypolyethoxy ethanol), on pollen germination and pollen tube growth in *Trigonella foenum-graecum* Linn.

Three concentrations of Tween 80 and Triton X-114 (10, 100 and 200 ppm v/v) were added to the pollen culture medium containing sucrose (10%) and boracic acid (100 ppm). Hanging drop cultures of pollen grains collected from just dehisced anthers were raised in cavity slides and incubated at 22 ± 2°C under diffuse light conditions (100–200 Lux). Two cultures were raised for each treatment. Three observations were taken for all the treatments 1, 2 and 3 hours after culture. For each treatment, at least 200 pollen grains and 50 pollen tubes were scored for germination and tube length, respectively, using both the cultures. The experiment was replicated 5 times.

**Table I**

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Percentage germination</th>
<th>Tube length (in µ)</th>
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<td>1 hr</td>
<td>2 hr</td>
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<tr>
<td>Control</td>
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<tr>
<td>Triton X-114</td>
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<tr>
<td></td>
<td>100 ppm</td>
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<td></td>
<td>200 ppm</td>
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*Average of all replicates. † In these treatments cultures were maintained up to 8 hr to see if delayed germination occurs; in 100 ppm it reached 32% and in 200 ppm there was no germination.*

In *Trigonella foenum-graecum* pollen grains are shed at the 2-celled stage. Acetocarmine preparations of mature pollen, however, show only the generative nucleus. The table gives the percentage