

## Ectoparasites of the freshwater food fishes of Haryana

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MS received 23 January 1984; revised 14 August 1984

**Abstract.** This communication records eight ectoparasites of the gills and skin from edible freshwater fishes of Haryana. Since all eight parasites collected differ from those described earlier in the literature, they are briefly redescribed and arranged systematically.

**Keywords.** Parasites; cyst; denticle; carapace.

### 1. Introduction

Most of the common freshwater food fishes of India, are known to harbour parasites belonging to practically every major phylum (Halder and Mukherjee 1979). In course of routine examinations for ectoparasites of the gills and skin of edible fishes of Haryana, the authors obtained *Trichodina indica* from the skin of *Hypophthalmichthys molitrix* (Silver Carp), *Ichthyophthirius multifiliis* from the skin of *Cyprinus carpio* (Common Carp), *Chilodonella cyprini* from the gills of *Labeo rohita* and *Catla catla*, *Gyrodactylus* from the skin of the *Salmo trutta* (Trout); *Posthodiplostomum* from black spots on the body of *Labeo calbasu* (Black baas); *Argulus* and *Ergasilus* from both the skin and gills of *Rita rita* and *Notemigonus crysoleucas* (golden shiners) and *Lernaea elegans* from the skin and gills of carp, tench and pike. As this is the first survey of the ectoparasite fauna of the edible and cultured freshwater fishes of Haryana, short redescrptions of the various ectoparasites collected are presented.

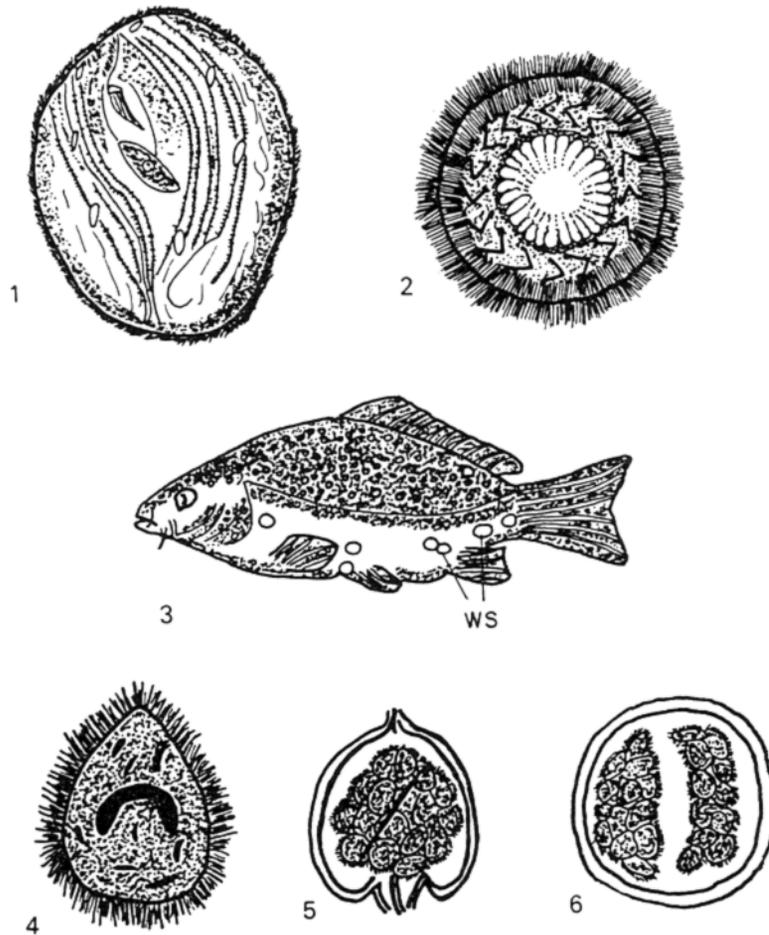
### 2. Material and methods

The host fishes were collected from the ponds of Haryana Government Fish Seed Farm (HGFSF), Jyotisar and Central Inland Fisheries Research Institute (CIFRI), Karnal and brought immediately to the laboratory in the Department of Zoology, Kurukshetra University, Kurukshetra. All the ectoparasites collected from the skin and gills of the fishes after careful examination were thoroughly washed in physiological saline, fixed in hot 70% alcohol and preserved in 5% glycerine alcohol. Permanent slides of the parasites were prepared by staining them in Borax carmine, Giemsa and Heidenhain's iron alum-haematoxylin. All figures have been drawn using a camera lucida.

### 3. Results and discussion

#### 3.1 *Chilodonella cyprini* (Protozoa: Ciliata: Chlamyodontidae) (figure 1)

The body (length: 42–72  $\mu$ , breadth: 20–30  $\mu$ ) is heart or leaf-shaped and is dorsoventrally flattened. The dorsal side is swollen and bare and has no stripes, the ventral side is



**Figures 1–6.** 1. *Chilodonella cyprini*: showing ciliary rows and cytostome. 2. *Trichodina indica*: the adult parasite showing cilia on the periphery. 3. Carp with white spots (WS). 4. *Ichthyophthirius multifiliis*: Cilia and horse-shoe-shaped nucleus are clearly seen. 5–6. White spot cysts: in which the parasite undergoes rapid division into a number of young but complete parasites.

completely flat, striped and partially ciliated. The anterior end of the body has slightly larger cilia than the posterior end, lateral cilia being absent. Internally *C. cyprini* has two contractile vacuoles and a nucleus. cursory examination indicated that the *C. cyprini* from Haryana are distinctly smaller than those studied by Hoffman *et al* (1979). *Chilodonella cyprini* has 6–11 ciliary rows compared to 5–10 ciliary rows of *C. hexasticha* (Hoffman *et al* 1979). This is the first record of *C. cyprini* from North India as well as the first report from a new host, *Ictalurus punctatus*.

### 3.2 *Trichodina indica* (Protozoa: Ciliata: Urceolariidae) (figure 2)

The mature stages of this ciliate are found on the skin and gills of the common carp in the form of white irregular patches over the head and body. The body of *T. indica* is

symmetrical measuring 50–86  $\mu$  in length and 45–79  $\mu$  in breadth. Curved denticles (18–21) are present around the adhesive disc forming an external ring. The slender denticles have long sharp hooks, the junction of these hooks with the central conical portion, protruding forward to form a small round projection. The inner thorns (rays) of the denticles taper gradually to their ends while the central part of the denticle has no appendage. There is no clear area in the centre of the adhesive disc. Descriptions of this species given by other workers (Tripathi 1954a; Wellbarn 1967; Lucky and Hoffman 1980) are similar but differ in the number, shape and arrangement of the denticles *e.g.*, Hoffman (1980) reached 26–32 denticles, whereas, Lucky (1977) recorded 18–21 denticles on the adhesive disc. Tripathi (1954a) recorded *T. indica* from the gills and skin of fry and fingerlings of the Indian major carps with 14–18 small denticles.

### 3.3 *Ichthyophthirius multifiliis* (Protozoa: Ciliata: Ophryoglenidae) (figure 4)

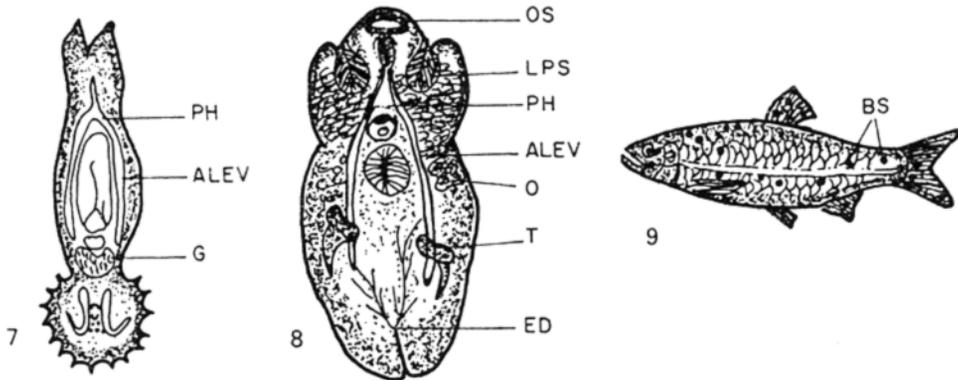
This ectoparasite appears as small white or grey nodules (0.5–1 mm in dia.) over the body surface of the host especially on the fins and the skin (figure 3). Each spot is in reality a small bladder, containing one or more parasites. The mature parasites (250–900  $\mu$ ) secrete a cyst around themselves (figures 5–6) which is generally spherical or ovoid in shape although considerable variation in shape has been observed. The whole body of *I. multifiliis* bears a large number of cilia used by the parasite to move through the water and penetrate the skin of the host fish. *I. multifiliis* has a tubular mouth, several vacuoles and a large horse-shoe-shaped nucleus (figure 4). Lucky (1977) reported *I. multifiliis* from all the species of cultured fishes sampled, whereas, in Haryana this parasite was recorded only from the skin of common carp, catfish and gold fish. Tripathi (1955) experimentally induced the infection of *I. multifiliis* in Indian major carps. The diameter of *I. multifiliis* recorded by Gopalakrishnan (1964) ranged from 152–170  $\mu$  which is considerably smaller than the Haryana records.

### 3.4 *Gyrodactylus elegans indicus* (Platyhelminthes: Monogenea: Gyrodactyloidae) (figure 7)

This flat worm has an elliptical-shaped body and measures approximately 0.6–0.9 mm in length and 0.1–0.2 mm in breadth. Two conical projections bearing openings of sticky liquid secreting glands are present on the anterior tip of the body but no eyes are present. A strong disc-shaped attachment organ is present on the posterior end. The haptor has one pair of central hooks without an external prominence and two connecting bars, of which the basal one often has a membranous extension and 16 marginal hooks. The central hooks are 82–162  $\mu$ m long. The basal plate has long proximally directed prominences. However, *G. elegans indicus* from Haryana are very similar to *G. elegans indicus* described by Tripathi (1954, 1959), except that they do not have a distinct shelf on the hooklet toe. This is the first record of a monogenean from *Salmo trutta fario*.

### 3.5 *Posthodiplostomum cuticola* (Platyhelminthes: Trematoda: Digenea: Diplostomatidae) (figure 8)

*Posthodiplostomum cuticola* are found enclosed in oval-shaped black cysts on the skin, fins, eyes and mouth of the host (figure 9). The size of these irregular black spots varies



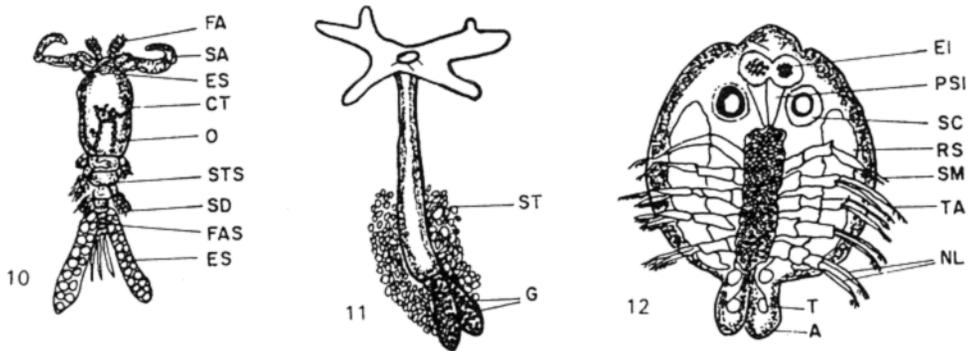
Figures 7-9. 7. *Gyrodactylus elegans indicus*: showing the adult stage of parasite. (PH-pharynx, ALEV-anterior lateral excretory vessel, G-glycogen vacuoles.) 8. *Posthodiplostomum cuticola*: a parasite removed from its cyst. (OS-oral sucker, LPS-lateral pseudosucker, O-ovary, T-testes, ED-excretory duct.) 9. Fish infected with black spot (BS) disease.

between 0.86 and 3.80 mm. Each parasite in the cyst measures approximately 1 mm in length. The body is typically flat and consists of two equally sized lobes, although the anterior half is filled with glands and is thus less transparent than the posterior half. There are two suckers and an attachment organ on the body. The oral sucker is broader than long. The mouth leads to an elongated pharynx which continues as a narrow and slender oesophagus, before forming the intestinal caecae which extend far into the hind body. Accessory suckers are laterally situated and are prominent and larger than the oral sucker. The acetabulum is smaller than the oral sucker and is located in the region of the bifurcation of the oesophagus. The hold fast located behind the acetabulum is nearly as large as the accessory suckers and is circular or oval, with a longitudinal cavity. Genital rudiments are confined to the posterior half of the body and recognizable as an oval lobed ovary to the outside of the caecum, and have three lobes of the testes, two of which are elongated and overlies the caeca while the third lobe is oval and apposed to one of the elongated lobes. Two branched excretory ducts on the inside of the caeca unite posteriorly to open by a common terminal pore.

The larval forms of *Posthodiplostomum cuticola* were first reported by Ganapati and Hanumantha Rao (1954) from *Catla catla* and a year later by Abraham and Anantaraman (1955). *P. cuticola* is almost identical with the metacercaria described by Ganapati and Hanumantha Rao (1955) and Gopalakrishnan (1961). The larval forms of *P. cuticola* are described as *Diplostomulum cuticola* by Ganapati and Hanumantha Rao (1962) and recorded from domestic animals by Thapar (1956).

### 3.6 *Ergasilus sieboldi* (Arthropoda: Crustacea: Copepoda) (figure 10)

The body is pear-shaped and cyclops-like, narrowing posteriorly, and measures 1.4-2.6 mm in length including egg sacs, and 1.1-1.6 mm without egg sacs. The long hook-shaped second antennae form fixation organs. The cephalic and thoracic segments are fused to form a cephalothorax, which is inflated dorsally and has a single median eye towards the anterior end. The thorax has six segments; the fifth segment is often short and difficult to distinguish, whereas, the sixth is enlarged to form genital



Figures 10–12. 10. *Ergasilus sieboldi*: the adult female parasite. (FA-first antenna, SA-second antenna, ES-eye spot, CT-cephalothorax, O-ovary, STS-second thoracic segment, SD-swimming legs, FAS-first abdominal segment, ES-egg sac.) 11. *Lernaea cyprinacea*: the adult parasite. (ST-stalked ciliates, G-gonads.) 12. *Argulus indicus*: the adult male parasites. (EI-eye, PSI-pre-oral sting, SC-suction cup, RS-respiratory area, SM-second maxilliped, TA-thoracic appendage, NL-natatory lobe, T-testes, A-abdomen.)

organs. The first four pairs of swimming legs are branched and the fifth pair is rudimentary and is analogous to a finger-shaped uniramous prominence with two bristles on the top and one near the base. The small narrow abdomen has three segments, the most posterior of which bears a pair of anal lamellae. The head has two pairs of antennae; the first is sensory and has six segments with numerous setae, the second pair is stout and modified for grasping the gill filaments of a fish. The mouth parts are well developed and modified for biting. The adult male is similar in form but shorter (1 mm) and more slender than the female with all the appendages reduced except for the maxillipeds which are enlarged. No other secondary sex characters are evident, except a pair of spines on the genital segment. *E. sieboldi* has been described earlier by Bowen (1966) but this is the first attempt from the cultured fishes in Haryana. Karamchandani (1952) described a new species, *Ergasilus batai* from the gills of *Labeo bata* in India but the *E. sieboldi* specimens described here are considerably larger than that of *E. batai*.

### 3.7 *Lernaea cyprinacea* (Arthropoda: Crustacea: Copepoda) (figure 11)

The body of the male is unsegmented while the mature female is 8–22 mm long and consists of a head and an elongated body with degenerate swimming legs. Posteriorly egg-sacs are usually present. Anteriorly the head expands into large cephalic horns which are soft and leathery in texture. The attachment organs are analogous to finger-shaped cephalic prominences and tong-like antennae. The first and fourth pairs of swimming legs are forked. The individual pairs of legs are considerably distant from each other and the fifth pair is reduced to a small prominence. The sixth pair of thoracic legs is short and unsegmented. The present description of *L. cyprinacea* is similar to that given by Putz and Bowen (1968), Srinivasachar and Sundarabai (1974) and Lucky (1977).

### 3.8 *Argulus indicus* (Arthropoda: Crustacea: Branchiura) (figure 12)

The cephalothorax is broad and flattened. The dorsal part forms a convex cephalothoracic carapace which does not exceed the front margin of the caudal fin and whose posterior part is heart-shaped. The cephalothorax is sunken at the ventral side, on which there are two faceted eyes. Antennae I are transformed into a clasping organ and terminate with bent hooks while antennae II are not branching. The mandibulae occur in the cavity of a short proboscis with the maxillae transformed into enormous suckers. The abdomen is small and its rear end (seminal receptacle) forms two lobes (caudal fin) containing testes. The thorax has four segments, the first of which is fused with the carapace. Each thoracic segment bears a pair of branched swimming legs. The tail contains the gills. The body of the female is 6–7 mm long and lacks the usual oval egg sacs while the male grows to only 4–5 mm in length. The caudal fin has rounded lobes covered with small thorns. *Argulus indicus* differs from *A. foliaceus* (Bowen and Putz 1966; Hoffman 1977) in having small thorns on the caudal fins. *A. indicus* previously known from Java and Thailand was first recorded from India by Ramakrishna (1952).

## 4. Conclusion

*Trichodina indica*, *Ichthyophthirius multifiliis*, *Chilodonella cyprini* (Protozoa), *Posthodiplostomum cuticola*, *Gyrodactylus elegans indicus* (platyhelminthes), *Argulus indicus*, *Ergasilus sieboldi* and *Lernaea cyprinacea* (Crustaceans) were obtained from the fishes cultured in the Nursery-cum-Research-cum-Stocking Ponds at Karnal and Jyotisar (Kurukshetra). All these ectoparasites of cultured and edible fishes are described morphologically and arranged systematically.

## Acknowledgements

The authors express their sincere thanks to Dr S P Sharma, Chairman, Department of Zoology for laboratory facilities and to Shri K L Shah, Scientist, CIFRI, Karnal for help in collection of host fishes.

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