

The bugs were maintained under identical laboratory conditions of temperature $27 \pm 1^\circ\text{C}$ and RH of $65 \pm 5\%$ and fed on soaked cotton seeds. The compound 22–25 diazacholesterol-DiHCl was prepared in distilled water. $1 \mu\text{l/insect}$ of 500 ppm was injected into freshly moulted fifth instar nymphs. Controls were injected $1 \mu\text{l}$ of distilled water. Experiments were repeated thrice. Insects after ecdysis were observed and morphological and gonadal abnormalities studied.

The freshly ecdysed fifth instar nymphs moulted into almost normal adults but the gonads were drastically affected.

The males exhibited several structural abnormalities. The testes varied in shape and size, sometimes extra bulging of the follicle was observed. The vasa deferentia was bulbous or elongated tube-like. It sometimes appeared funnel-shaped while at other times it formed narrow-curved ducts. Often ducts of an insect varied in size. The accessory glands also showed abnormalities and variation in size. Most of the glands appeared as a homogenous mass without distinct globules.

Subsequent examination of ovaries revealed severe defects concerning primarily the differentiation of oocytes. The germarium was reduced and previtellarium contained few or no oocytes. Lack of well-formed egg chambers, failure of the ovarioles to initiate yolk deposition as well as resorption of the partly grown oocytes led to the formation of sac-like structures and these appeared as consequences either of an incomplete number or a dysfunction of follicular cells⁷.

These results suggest that azasteroid 22–25 diazacholesterol-DiHCl is an effective growth regulator for *D. similis*.

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INFECTION BY A CILIATE AND A FLUKE ON THE FRY OF INDIAN MAJOR CARPS

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Six nursery ponds, each having an area of 0.1 ha, of the State Fisheries farm at Kulia (West Bengal) were stocked with spawn of catla, rohu and mrigal at a density of 2 millions/ha on 15.6.1986. About a fortnight after stocking, when the fry were 10–15 mm in length and 130 mg in average weight, a good number of them were found to die daily in one of the tanks. On examination of a sample of 60 fry in the laboratory, all were found to harbour ciliates and flukes on the surface of their skin (figure 1).

For preparation of slides, Klein's silver impregnation technique was followed for the ciliates, while the trematodes were fixed, stained with Semichon's carmine, dehydrated using alcohol and mounted with DPX.

An examination of the prepared slides under high power magnification revealed that the worms are monogenetic trematodes belonging to the family Gyrodactylidae. The presence of two head projections and a sucking disc at the anterior end, the absence of eyes, the presence of one pair of central hooks with two connecting bars and 16 marginal hooks on the haptor were sufficient characters to place them under the genus *Gyrodactylus* (figure 2). The hat-shaped ciliates were identified as urceolariids due to the rings of cilia and the arrangement of denticles like a circular saw. With the help of various morphometric measurements, the urceolariids were identified as *Trichodina nigra* (figure 3.).

The present observation is a record of both Trichodinosis and Gyrodactyliasis. Red patches were observed all over the body surface of infected fishes. These red patches were probably formed due to the scrapping and sucking action of the flukes



Figures 1-3. Photomicrograph of the 1. Infected fish fry; 2. *Gyrodactylus* sp.; 3. *Trichodina nigra* (silver impregnated specimen).

feeding on the blood of the hosts. Excessive secretion of slime over the skin was also observed, probably due to the irritation caused by the to and fro movements of ciliates and the creeping of worms. Reluctance of feeding, emaciation and secondary fungal infection were also observed in infected fishes. The infected fry were found to move in shoal along the marginal water rubbing their body surface against the marginal weeds. They were seen to move erratically on the water surface for a few minutes and finally die.

The trichodinid ciliates are found quite frequently in fish and occur particularly in large numbers when the animals have already been weakened by other causes. They are very motile and frequently change their locality on skin and gills. Generally they cause only superficial damage, but sometimes bore themselves into the depth of the epithelia and dig canals. Excessive secretion of mucus, formation of whitish or creamish patches on the gills, respiratory distress and asphyxiation are also found to occur¹. On severe trichodinosis, hypertrophy and hyperplasia of the gill epithelia are reported².

Gyrodactyliasis, popularly, called skin fluke infection, is a common disease mostly encountered in surface feeders like *Catla catla*. Excessive secretion of mucus, dropping of scales and formation of red patches are the common symptoms of skin fluke infection³. The parasite feeds on the blood and epithelial debris of their hosts¹.

Fishes infected with trichodinids can be cured completely by giving a bath in 2-3% common salt solution for 5-10 min⁴. A 5% common salt bath for

5 min duration has been found to be effective against trematodes⁵. In the present observation, the infected fish were given dip treatment in 5-10 ppt sodium chloride solution for 2 min and 2-3 ppm potassium permanganate for 1 min. Each chemical was used on alternate days. After seven days of treatment, the fry were found to be free of infection.

Pond treatment with the same chemicals, but at a lower dose for a week, has also given positive results. For this, common salt and potassium permanganate were used at 6-7 ppm and 0.3 ppm respectively. Both the chemicals were diluted initially and spread uniformly all over the water surface.

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