show very low algal counts at urban site spread over only three months in 1977 and four months in 1978. Highest catches were recorded during February in both the years. At Mydanahalli higher algal catches were recorded throughout the trapping period. Chlorophycean cocci and filamentous forms showed higher catches during rainy seasons (April–July).

The higher catches of algae in rural site could be ascribed to the proximity of agricultural fields, where the soil-borne algae are carried by wind. The presence of small pools, mud walls and tiled roofs of houses form good substrata for algal growth. These algae become air-borne either due to rain[9] or strong winds[10]. Further, the spore trap is kept at a lower height in the village. The low algal catches in urban site of the University campus is due to absence of agricultural fields in the vicinity. The area is covered with vegetation, but there are a few temporary water bodies to support algal growth. The data reveal that air-borne algae may exist in sufficient quantity in rural areas and cause inhalent allergy[4]. The data further shows no seasonal trend as revealed earlier[2,11]. Algae lack adaptations, facilitating take off into air, though some simpler types of algal cells are regularly air-borne[6,11]; their distribution is largely governed by local sources and meteorological factors.

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OTOLITH AS AGE INDICATOR IN THE MAHSEER, *TOR PUTITORA* (HAMILTON)

THE otolith is widely used as age indicator in marine fishes[1–3] but literature is scanty on freshwater fishes[4]. No report on the otolith as age indicator in *Tor putitora* is available. The present paper is a first report on the otolith (sagitta) of the mahseer *T. putitora* for age determination and confirmation (along with scales, operculum and vertebrae).

The otolith of *T. putitora* was studied for two years from periodic collections of the fish from the cold water lake of Bhimtal, Kumaun. The transverse width of the saggitta was determined by ocular micrometer and micro-photographs prepared with the help of camera lucida.

The largest otolith of *T. putitora* has a concavity at its centre which may be called the central concave region, with a clear ridge all around it. Outside the ridge it is flattened with many sharp edges, which may be called the outer flattened region (Fig. 1). Each annulus has two rings, one light and the other dark, seen clearly in the central concave region, while the outer flattened region has faint year marks, which were used for confirmation of the annuli in the central concave region.

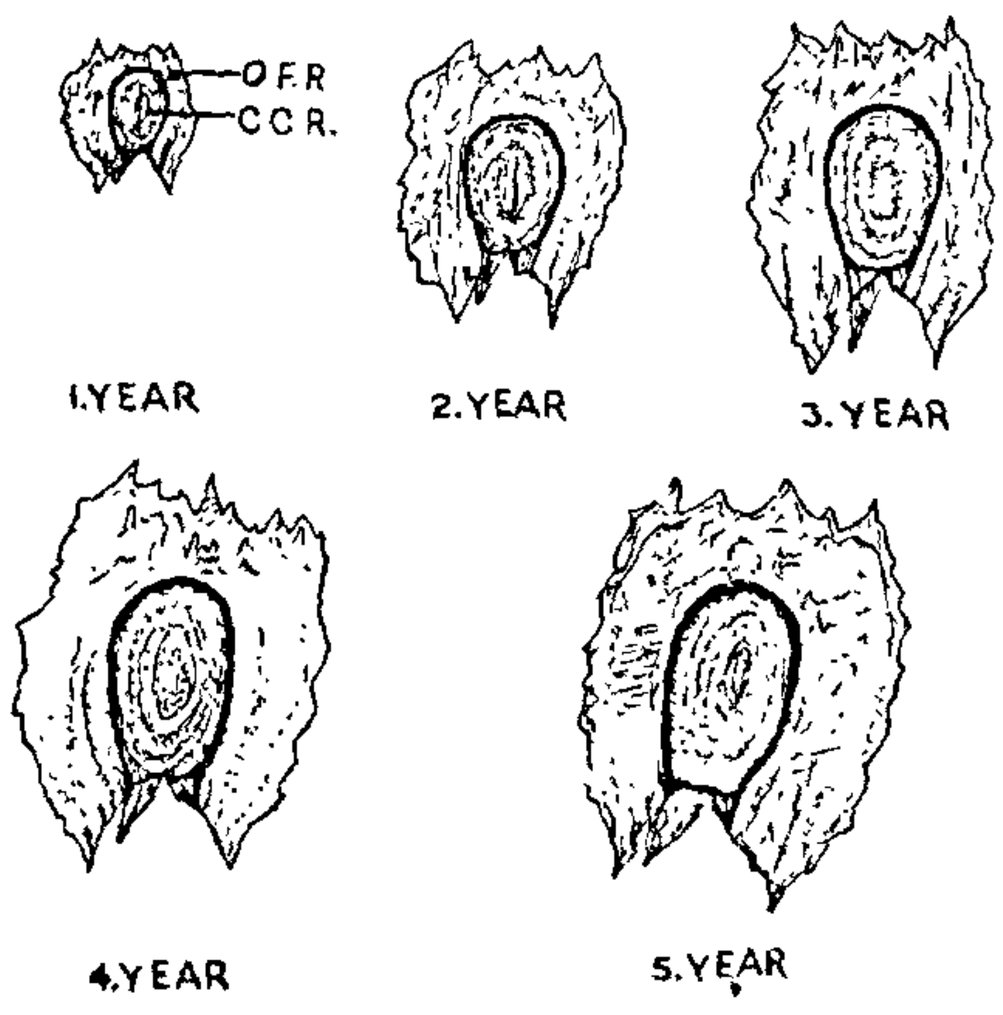

FIG. 1

Observations on age determination in *T. putitora* by sagitta were done from one to five year old fishes. The age was also confirmed by other means (scale, operculum and vertebra, given in a separate contribution). *Tor putitora*, one to five years of age, has average lengths of 126·10 mm, 237·40 mm, 338·50 mm, 422·00 mm and 499·00 mm respectively. The width of the sagitta, from one to five years of age was 1·46 mm, 2·42 mm, 3·25 mm, 3·68 mm and 4·06 mm respectively.

One to five annuli in the central concave region were clearly seen; and the same number of partial annuli in the outer flattened region in each sagitta, according to the age of fish. These observations on the otolith were not only indicative of the age of the fish but also helped in confirmation of age of the fish when other methods were doubtful. No false rings were present, either in the central concave region or the outer flattened region of the sagitta.

Two rings in a year in the sagitta of the fish showed low winter feeding and high summer feeding as determined by feeding intensity recorded by Pathani[5]. Ricker[6] also recorded two rings in a year in the otolith for some fishes of U.S.A.

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EFFECTS OF SUBOPTIMAL TEMPERATURES ON THE HATCHING AND INCUBATION PERIOD OF EGGS OF *PYRILLA PERPUSILLA* WALKER

THE sugarcane leaf hopper *Pyrilla perpusilla* is abundantly found in sugarcane growing belts of India and its heavy infestation often adversely affects the quality as well as the quantity of sugarcane. According to the observations of Stewart and Walton[1] the time required for hatching of eggs of Southwestern cornborer, *Ziadiatrea grandiosella* when refrigerated at 7·2° to 12·7° C for different periods of time and then allowed to hatch at room temperature was directly proportional to the age of eggs, temperature and duration of refrigeration. In spite of severe infestation of the pest, there is practically no information on the effects of suboptimal temperatures on hatching of fertile eggs within tolerable limits. Hence an attempt is made here to study the phenomenon in this species.

The eggs of *P. perpusilla* were obtained from adults collected in the field and kept for further rearing in the laboratory. Eggs of different age groups were refrigerated for 24, 48, 72, 96 and 120 hr at 6–8° C. The ages of eggs at the beginning of refrigeration were 24, 48, 72, 96 and 120 hr respectively. After refrigeration the eggs were kept at 30° C.

The results (Table I) show that 8·0% and 2·0% of freshly laid eggs hatched after 24 and 48 hr of refrigeration respectively while none of them hatched when the refrigeration period was extended to 72, 96 and

TABLE I

Extension of incubation period of Pyrilla perpusilla *eggs by refrigeration*

Age of the eggs (Before refrigeration) in hours	Refrigeration period									
	24 hours		48 hours		72 hours		96 hours		120 hours	
	% Hatchability	Incubation period in days	% Hatchability	Incubation period in days	% Hatchability	Incubation period in days	% Hatchability	Incubation period in days	% Hatchability	Incubation period in days
Freshly laid	8·0	11	2·0	11	Nil	Nil	Nil	Nil	Nil	Nil
24	40 0	12	22·0	12	4·0	13	Nil	Nil	Nil	Nil
48	50 0	12	32·0	12	20·0	13	4·0	13	Nil	Nil
72	82·0	9	66·0	10	64·0	10	40·0	11	0·0	14
96	100·0	8	90·0	10	64·0	10	48·0	10	46·0	12
120	100·0	8	100·0	9	94·0	9	80 0	10	62·0	11

The incubation period and percentage hatch of eggs at 30° C was 8 days and 100% respectively.