

were sacrificed one and two weeks after the operation, whereas those operated during February 1973 and September 1972 were sacrificed four and fifty weeks after the operation. Blood samples were drawn at autopsy from the caudal veins and the cholesterol content was determined colorimetrically according to the method of Abell *et al.*<sup>5</sup>. Statistical analysis was based on Student's 't' test.

It is seen from the results (Table I) that there is no significant difference between the serum cholesterol levels in the controls and in the hypophysectomized animals within a period of one week.

TABLE I

Effect of hypophysectomy on serum cholesterol (mg/100 ml) in *Heteropneustes fossilis*

Duration (weeks)	Controls	Hypophysectomized fish
1	380±40 (6)	420±60 (6)
2	410±28 (5)	*810±37 (5)
4	430±39 (6)	*1065±84 (6)
50	524±52 (5)	*670±47 (4)

\* P < 0.001.

Number of animals is given in parenthesis.

However, the serum cholesterol level becomes almost double within two (810 ± 37 mg/100 ml) and four (1065 ± 84 mg/100 ml) weeks after hypophysectomy as compared to the cholesterol values in the corresponding controls (410 ± 28 mg and 430 ± 39 mg/100 ml). After one year the serum cholesterol level is depleted in the hypophysectomized animals as compared to that in the other experimental groups, although it is still higher than the corresponding control level. These observations indicate the presence of hypocholesteromic pituitary factor(s) in *Heteropneustes fossilis*. The depletion of cholesterol level in hypophysectomized animals after one year is a significant feature and is probably due to the hormonal imbalance as a result of hypophysectomy which has affected the mobilization and/or utilization of cholesterol in this fish.

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### THE EFFECT OF HEAT TREATMENT ON THE MOISTURE, VOLATILE MATTER AND CALORIFIC CONTENT OF THE DEPOT FATS OF SOME FRESHWATER FISHES

DESPITE considerable work on the chemistry of fish lipids<sup>1-8</sup>, information on the moisture and volatile matter and the relation between volatility and the calorific value of the fats of Indian freshwater fishes seems to be lacking. The present study which is based on the quantitative estimates of moisture, volatile matter and energy content in the depot fats of four species of freshwater teleosts, namely, *Rita rita* (Ham.), *Heteropneustes fossilis* (Bloch.), *Wallagonia attu* (Bloch.) and *Ophicephalus punctatus* (Bloch) is an attempt in this direction.

The methods for the determination of moisture and volatile matter in the fat and that of heat treatment were the same as given in the A.O.A.C.<sup>9</sup>. All values have been calculated on wet weight basis.

The concentrations of the two constituents were found to differ in different species of fishes (Table I). In the teleosts investigated, the moisture and volatile matter were found to be least concentrated in the cat-fish, *Rita rita*, while their con-

TABLE I

Moisture, volatile matter, and loss in calorific content during heat treatment of the depot fats of some freshwater teleosts

Species of fish	Moisture and volatile matter (%)	Loss in calorific content during heat treatment (calories per 100 g fresh depot fat)
<i>Rita rita</i> (Ham.)	4.650	43.245
<i>Heteropneustes fossilis</i> (Bloch.)	7.278	67.685
<i>Wallagonia attu</i> (Bloch.)	8.965	83.374
<i>Ophicephalus punctatus</i> (Bloch.)	13.636	126.814

centrations were highest in the murrel, *Ophicephalus punctatus*. Since drying of lipids during various technological processing has been reported to lead to a substantial loss in the quantity of more volatile fractions, such as short-chain fatty acid methyl esters and some of the shorter-chain fatty acids<sup>10</sup>, the loss in the calorific value of fish lipids would depend directly upon the degree to which they are volatile. Thus, the loss in the calorific value of the depot fat of *Ophicephalus punctatus*, with high volatile matter was greater than that in *Rita rua*, with low volatility (Table I).

The authors are grateful to Professor S. M. Alam, Head of the Department, for providing laboratory facilities. Two of us (SM and IA) are thankful to the C.S.I.R., New Delhi, for the award of Research Fellowship.

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### DIURNAL RHYTHMS IN MITOSIS OF CELLS OF THE WHEAT ROOT TIP MERISTEM

PREVIOUS studies have shown that diurnal rhythms occur in mitosis in the root tip of several plant materials<sup>3,4,6</sup>. Of these the onion showed a four-peaked diurnal rhythm in mitotic activity in root tips grown in darkness at constant temperature<sup>1,2</sup>. This in fact, is contrary to the view held by several other workers including Lewis and Wolff *et al.*<sup>7</sup> who observed two peaks of cell division in roots of onion bulbs. However, no such information is available

on diurnal fluctuations in mitosis in cells of wheat root tip meristem. This is a brief report on the rates of mitosis of cells in the wheat root tip meristems under variable conditions of illumination at a fixed temperature.

Seeds of wheat variety C 591 were sown at 1 hour intervals for 24 hours in 52 mm petridishes on Whatman 40 filter-paper moistened with 5 ml of distilled water and were kept in the incubator in complete darkness at  $20 \pm 1^\circ \text{C}$ . Same procedure was followed when seeds were grown under continuous illumination provided by 300 watt incandescent Lamp at  $20^\circ \pm 1^\circ \text{C}$ . Twenty seeds were germinated in such petridish. After 72 hours, 3 mm long roots were pretreated with a saturated solution of  $\alpha$ -bromo naphthalene for 1 hour at  $20 \pm 1^\circ \text{C}$ , followed by distilled water. They were fixed in 1:3 aceto-alcohol. Roots were hydrolysed in 1N HCl for 15 min. at  $60^\circ \text{C}$  and stained in Feulgen reagent. Three roots were examined in each collection period. Root tips of approximately 0.5 mm length were cut and squashed in 1% aceto-carmin and 500 cells from the apical meristem were scored under oil immersion. Cells exhibiting well defined prophase on, through to complete formation of the cell plate in telophase were observed.

The study of frequency of the dividing cells in mitosis in wheat root tip meristem showed a regular wave of cell division during 24 hours when wheat seeds were germinated in darkness. The frequency in mitotic cell division gradually increased starting from 0 hour and reached maximum at 12 noon. Thereafter, there was a gradual decrease in mitotic activity and it became minimum towards 0 hour (Fig. 1 b). In contrast, constant illumination abo-

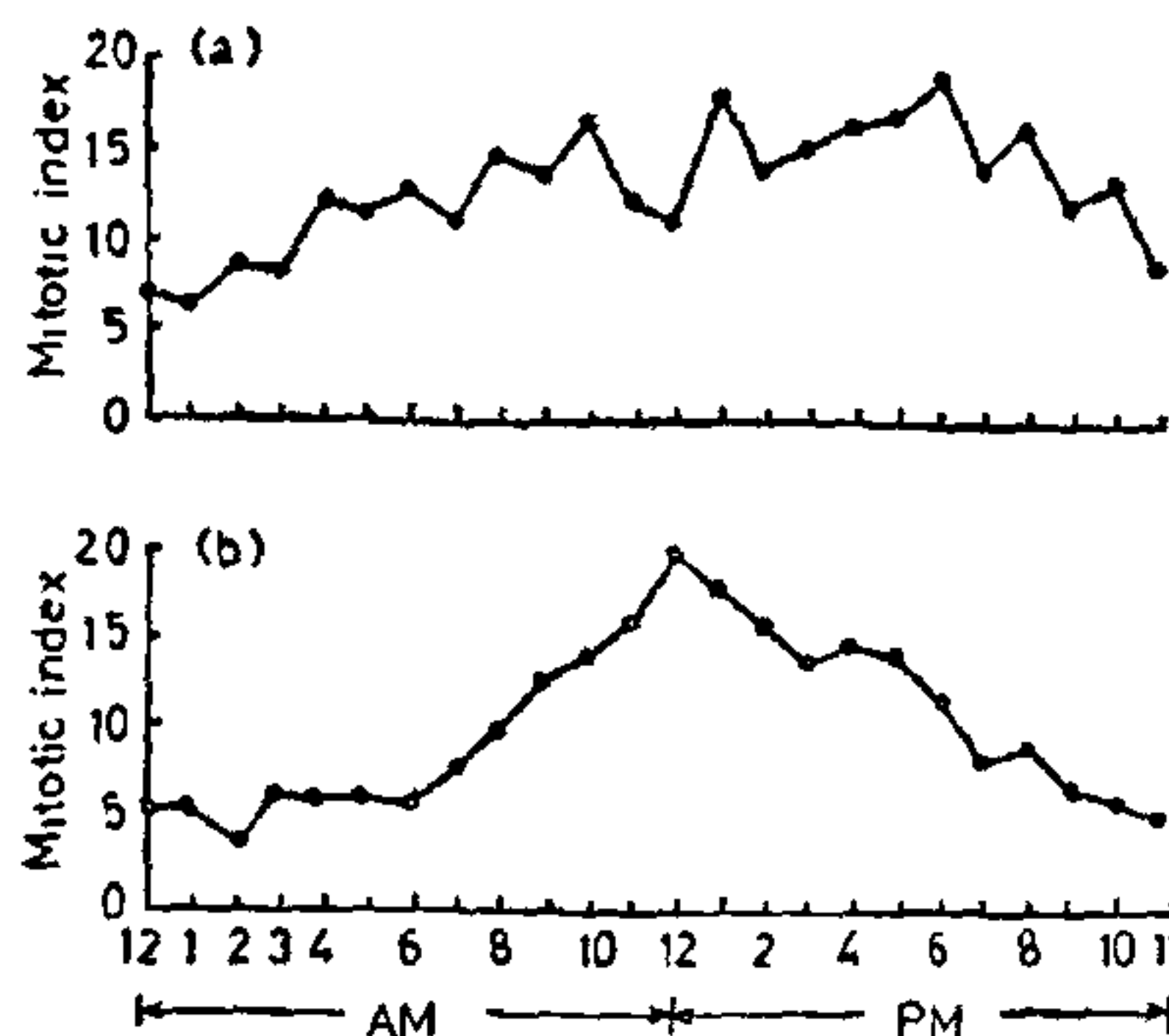


FIG. 1. Mitotic indices in wheat root tip meristem. a, Under constant illumination cell division was extremely variable with many irregular peaks and no perceptible mitotic rhythm; b, Under constant darkness a single maximum peak in mitotic activity at noon, 12 O' clock.