The survey showed that the tea bushes had shown complete or partial loss of their leaf-bearing capacity, patches of unthrifty growth, with the affected bushes appearing to be 'thin' due to a deficiency of maintenance foliage. Varying degrees from a few to about eight per cent of total foliage showed smaller leaves and/or yellowed leaves. The intensity of decline has been found to be in increasing order with increase in altitude.

It was observed that nineteen species of plant parasitic nematodes within thirteen genera were associated with tea plantations in Darjeeling district. They are *Aglenchus agricola*, *Aphelenchus avenae* (Bastian, 1865), *Aphelenchoides* sp., *Atlantadorus porosus* (Allen, 1957) Siddiqui, 1980, *Colsenchus* sp., *Helicotylenchus dihystera* (Cobb, 1893) Sher, 1961, *H. erythrinae*, *Helicotylenchus* sp., *Hemicriconemoides cocophilus* (Loos, 1949) Chitwood and Birchfield, 1957, *H. mangiferae* Siddiqi, 1961, *Macroposthonia ornata* Raski, 1958, *M. onoensis* (Luc, 1959) De Grisse and Loof, 1965, *Meloidogyne brevicauda* Loos, 1953, *Paratylenchus lepidus* Raski, 1875, *P. dianthus* Jenkins and Taylor, 1956, *Pratylenchus loosi* Loof, 1960, *P. brachyurus* (Godfrey, 1929) Filipjev and Schuurmans Stekhoven, 1941, *Tylenchus* sp. and *Xiphinema* sp.

A perusal of the literature[1,3–5,7,8] showed that *Pratylenchus loosi*, *Pratylenchus lepidus*, *Helicotylenchus erythrinae*, *Atlantadorus porosus*, *Aglenchus agricola*, *Coslenchus* sp. are being reported for the first time from around tea plants in India.

Pratylenchus loosi is reported to be a serious nematode pest of tea plantations in Sri Lanka and Japan wherein they are restricted to 900–1,800 m and up to 300 m respectively[8]. Our results showed the widespread occurrence of *P. loosi* in all plantations surveyed and recovery of its high numbers from soil and feeder root samples suggested its association with decline symptoms which was further confirmed by the presence of discrete lesions on feeder roots.

Moderate to heavy galling was noticed in the primary and secondary roots causing characteristic root-knots. Perennial pattern identification[9] of mature sedentary females confirmed the occurrence of *Meloidogyne brevicauda*.

Among others, *Helicotylenchus dihystera* ranked first in mean population density/site although it was less frequent as compared to more serious parasitic nematodes mentioned earlier.

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FAT AND GLYCOGEN CONCENTRATIONS IN FLESH OF CATFISH *HETEROPNEUSTES FOSSILIS* (BLOCH) AS INDICATORS OF LIVING CONDITION

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OF the various biochemical constituents of fish, fat and glycogen are known to exhibit the most profound variations. Their levels in the body can be used as indicators of the general well-being of the fish. Despite some attempts to express the condition of fish through the quantitative estimates of fat[1–6], glycogen seems to have received little attention in this context. The objective of the present study is to correlate the concentrations of fat and glycogen in the flesh (white muscle) with the biological condition of *Heteropneustes fossilis* (Bloch), an economically important catfish.

Fish specimens captured from the local ponds at Aligarh were brought to the laboratory aquaria and allowed to rest for 48 hours before sampling. Water at a temperature of 16° ± 2°C was supplied to the aquaria and the dissolved oxygen concentration was maintained at 5 ± 1 ppm. At the time of investigation the individuals were taken out, measured for total length, weighed and killed by decapitation. The fillets were removed and weighed for the determination of 'Fillet Condition Factor' according to the formula proposed by Wilkins[7]. The muscle

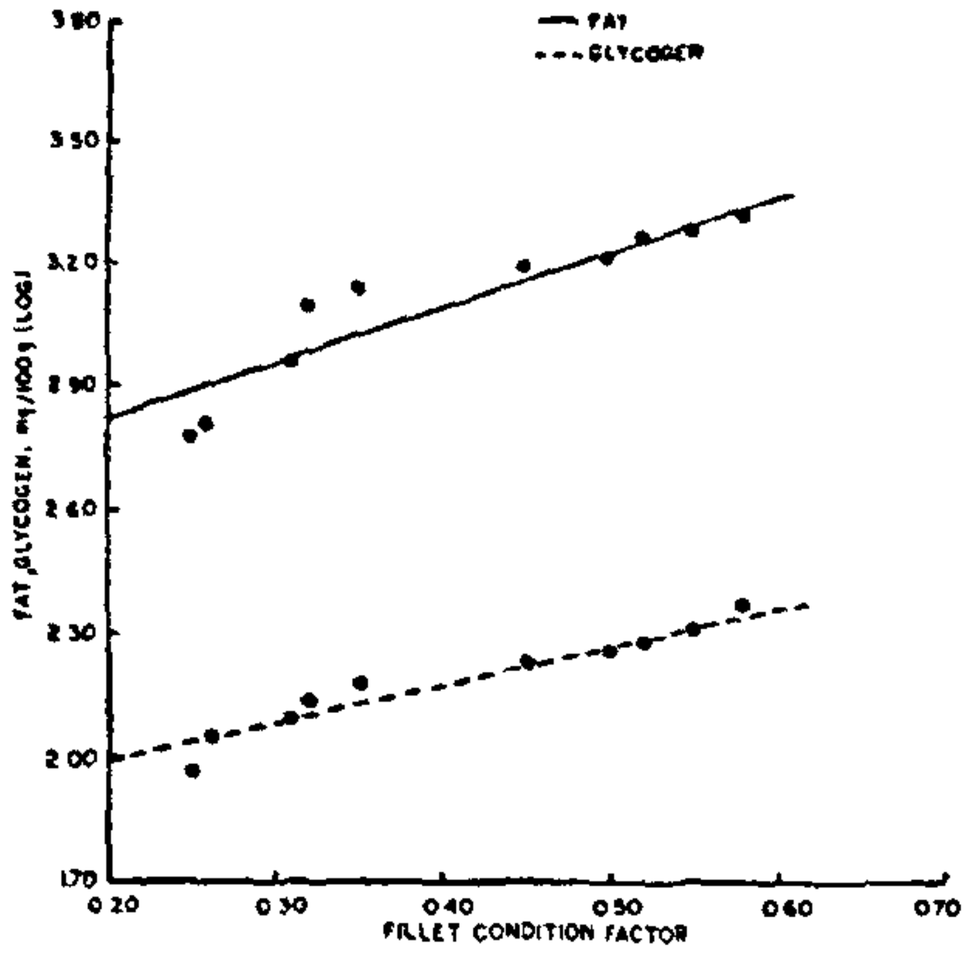

FIG. 1. Fat and glycogen concentrations in relation to fillet condition factor in *H. fossilis*.

sample used for chemical estimations was removed from the epaxial portion of the trunk. Procedure employed for the quantitative estimation of fat was the same as adopted by Jafri *et al.*[8]. Glycogen was isolated from the tissue through the method given by Ashman and Seed[9] and determined quantitatively using the technique of Montgomery[10]. The values of of fat and glycogen were recorded on fresh weight basis. Care was taken to analyse the specimens of approximately the same size ($21 \cdot 5 \pm 0 \cdot 5$ cm) to avoid the differences that are reported to be associated with the change in the length of fish[11–14].

The consistency with which the fat and glycogen concentrations of the flesh increased linearly with the fillet condition factor (Fig. 1) enabled the formulation of the regression models which permitted the prediction of the concentrations of these constituents for a given fillet condition factor of fish. The equation establishing the relationship between fat concentration and fillet condition factor was expressed as :

$$\log F = 2 \cdot 4901 + 1 \cdot 5023\ C$$

where, F was the fat (mg/100 g tissue) and C was the fillet condition factor. The correlation coefficient, 'r' being 0·884, significant at 0·001 level of probability.

The regression analysis of the relation between glycogen concentration and fillet condition factor was given by the equation :

$$\log G = 1 \cdot 7720 + 1 \cdot 0089\ C$$

where, G was the glycogen (mg/100 g tissue) and C was the fillet condition factor. The value of correlation coefficient (0 910) for this relationship was highly significant ($P < 0\ 001$). Given high strength of these correlations, a major advantage of fat and glycogen estimations is that they could possilby be used as indicators of growth in weight for a particular length, nutritional status of the fish and above all as indices of the relative fitness of different environments for pisciculture. These could be done for each commercially important species if ranges of fat and glycogen concentrations in the fish are established by prior experimentation. Obviosuly, such information would be of considerable utility to fish culturists.

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PHOSPHATASE ACTIVITY IN THE HEPATOPANCREAS AND THE LARVAL DIGENEAN PARASITES OF *LYMNAEA LUTEOLA*

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THE series of changes brought about in the carbohydrates of *Lymnaea luteola* during parasitic invasion has been reported[1,2]. Changes in the phosphatase activities of the digestive gland of other molluscan