SUMMARY

CHAPTER 1.

A general account of the habits, habitats and fishery of the two fishes, Hilsa ilisha (Ham.) and Hilsa toli (Cuv. & Val.) has been given. H. ilisha is an anadromous migratory fish, migrating up the major rivers of India for spawning. H. toli is a non-migratory marine fish, found along the coast of India. These non-migratory fishes get drifted into the river mouth due to the force of tidal currents.

CHAPTER 2.

The histological alterations in the alimentary canal during the different phases of life cycle of migratory H. ilisha and non-migratory H. toli have been made.

The oesophagus showed inner longitudinal and outer circular muscle layers. The corpus also showed similar arrangement of the muscle layers. Throughout the corpus the muscle layers were composed of striated fibres. Gastric glands in the pyloric stomach is reported.

The corpus was observed to store fat in mature H. ilisha. The possible conversion of the muscle fibres of the immature stage into fat storing cells is suggested.

The alterations observed are discussed in relation to hyperadrenocorticism, aging and stress due to spawning and change in the external medium.

CHAPTER 3.

The changes in the liver of migratory H. ilisha and

non-migratory H. toli during different phases of life cycle were studied histologically.

Accompanying maturation and migration, alterations like vacuolization of cytoplasm, pycnotic nuclei, deposition of collagen material and arteriosclerosis, necrosis of hepatic cells were noticed.

These changes are discussed in relation to maturation, aging and hyperadrenocorticism.

CHAPTER 4.

A study was made of the changes in the lipid content in the liver of migratory H. ilisha during various stages of life cycle.

Lipid content of the liver decreased as gradual development and migration proceeded. A rapid fall in the lipid value was observed during the spawning period.

Female gonads showed a continuous increase in the lipid content as maturity was attained. In the male gonads the lipid content increased up to pre-migration period only.

The changes in lipid content have been discussed in relation to maturity, migration and hormone changes.

CHAPTER 5.

The present histochemical study incorporates investigation on the activity and distribution of acetyl- and butyryl-cholinesterase in the stomach and liver of migratory H. ilisha and non-migratory H. toli. Alterations of enzymic activity in the

above mentioned structures of starving H. ilisha during migration and drifted H. toli captured from river has been reported.

Epithelium and the neck cells of glands showed both the enzyme activity. Neuromuscular junctions of striated muscles showed 'en grappe' type of endplates. The muscles showed multiple innervations. Smooth muscles showed nerves showing both enzyme activity. During starvation alterations were noticed in the enzymic activity.

Liver showed perivascular localizations of both the enzymes. No major alterations were noticed. A role of liver cholinesterase in the fat metabolism has been suggested. No new conclusive proof regarding the role of cholinesterase in the alimentary canal could be suggested.

CHAPTER 6.

Histological studies of alterations occurring in the pancreas of migratory H. ilisha and non-migratory H. toli were made.

Two types of cells, beta and alpha, could be differentiated using the conventional staining methods. In addition, groups of cells showing no affinity towards any of the stains used were also observed. These were probably agranular cells, representing young, immature islet cells.

It was found that the exocrine cell granulation decreased in the mature fish. In mature H. ilisha, beta and alpha cells were degranulated and some islets showed degeneration. On the other hand, in mature H. toli, alpha and beta cells

were partially degranulated and showed no sign of degeneration.

The above alterations are discussed in relation to carbohydrate metabolism and hormone systems.

CHAPTER 7.

Histological alterations in the spleen of migratory H. ilisha and non-migratory H. toli during different phases of life cycle were studied.

As maturity is attained, depletion in the number of lymphocytes, increase in connective tissue and thickening of the capsule were observed. These changes are probably due to hyperadrenocorticism.

CHAPTER 8.

The present comparative histological study deals with the alterations occurring in the kidney of migratory H. ilisha and non-migratory H. toli during maturation and migration. Kidney of drifted H. toli captured from river has also been studied.

Degenerative changes like arteriosclerosis, degeneration of the glomerulus and tubules etc. advanced as maturation and migration proceeded.

These alterations have been discussed in relation with hyperadrenocorticism, neurohypophyseal hormones, aging, stress due to maturation and change in the external media.

CHAPTER 9.

Histological changes of the corpuscles of Stannius

were studied in migratory H. ilisha, non-migratory H. toli and also H. toli drifted into the freshwater.

Corpuscles of Stannius were noted to be in an active stage in the fingerling of H. ilisha returning to the sea as evident by mitotic division of the cells.

As maturity is attained degenerative changes in corpuscles of Stannius advances. Maximum destructive changes were observed in the drifted H. toli.

The possible role of the corpuscles of Stannius in migration and maintenance of electrolyte balance has been discussed.

CHAPTER 10.

Histological studies were made on the Ultimobranchial bodies of migratory H. ilisha and non-migratory H. toli during the different phases of life cycle.

The present study suggests that this gland is under the influence of thyroid, as the activity of thyroid gland shows a correlation to the activity of the Ultimobranchial gland during different phases of life cycle in both H. ilisha and H. toli.

The changes occurring in the Ultimobranchial body during the different stages of maturity indicates that this gland may act as a growth centre.

CHAPTER 11.

The present study deals with the catecholamine secretory cells in the heart of migratory H. ilisha and non-migra-

tory H. toli. These cells are brown in colour, elongated and with bi- or multipolar processes.

Activity of these cells during various phases of life cycle have been discussed in relation with lipolysis and activity of heart muscles.