ABSTRACT

The present investigation is an attempt to probe into the functional anatomy of the pituitary gland with special reference to its control of the reproductive cycle of two freshwater teleost fish: *Clarias batrachus* (Linn.) and *Mastacembelus nancalus* (Ham.).

The morphology, histology and cytology of the pituitary gland have been studied and the seasonal changes in the proximal pars distalis of the gland have been studied in correlation with the reproductive cycle.

The histogenesis of the pituitary gland has been studied in *Clarias batrachus* in nine stages showing correlation with the broad morphological characters of the fish at these stages. Four stages in the development of *Mastacembelus armatus* (Lacépède) have been compared with those of *Clarias batrachus*.

A detailed study of the hypothalamo-hypophysial vascular relationship has been made in *Clarias batrachus* in order to know the possible paths along which the hormones secreted in the hypothalamus (hypothalamic nuclei) are passed to the pituitary gland. An attempt has been made to understand the possible integration between the hypothalamus and the pituitary gland so far as the regulation of other endocrine glands and the vital body functions such as reproduction etc. are concerned.
The reproductive systems and reproductive cycles of *Clarias batrachus* and *Hastacambelus panceulus* have been studied with respect to the structure (morphological and histological) and seasonal changes of gonads. In order to be more precise regarding the reproductive cycles, seasonal changes in the gonads of these fish have been studied on a statistical basis. The study of ova diameter of different oogenetic stages and the appearance of corpora atretica and post-ovulatory follicles have been assessed statistically.

The cytological changes occurring in the proximal pars distalis region of the pituitary gland, have been correlated with the reproductive cycle. This correlation has been further confirmed statistically in *Clarias batrachus* by studying in different seasons the mean maximum length of the acidophils and basophils, a criterion selected, indicating the activity of these cells.