ABSTRACT

The present investigation deals with the study of the functional morphology of only the hypothalamus (its nuclear centres), the pituitary gland and the gonadal system of two fresh-water teleosts—Garra goltysa goltysa (Gray) and Clarias batrachus (Linn).

The hypothalamo-neurohypophysial neurosecretory system, including the structure of hypothalamus, nucleus pre-opticus, tractus preoptico-hypophyseus and neurohypophysis, has been studied. The morphology, histology and cytology of the pituitary gland have also been studied.

The gonadal system and gonadal cycle of Garra goltysa goltysa have been studied with respect to the morphology, histology and seasonal changes of the gonads. The gonadal cycle has been assessed on a statistical basis in order to have a more precise study of this aspect. The variations in the volume of gonads, gono-somatic index, relative number of the spermatogenetic stages in the testes, relative number of the oocytes of different diameter and the number of corpora atretica as well as the post-ovulatory follicles in the ovaries during different months of the year, have been studied for the statistical assessment of the gonadal cycle of the fish.

The gonadal cycle of Clarias batrachus has been assessed on the basis of morphological changes in the gonads and gono-somatic index of the fish.
The seasonal changes occurring in the nucleus preopticus, tractus preoptico-hypophyseus and the neurohypophysis have been correlated with the gonadal cycle, in both the fishes. The Karyometric changes in respect of the nuclear volume of nucleus preopticus have also been studied and have been correlated with the gonadal cycle. Seasonal variations in the cells of proximal pars distalis of the pituitary gland have also been found in correlation with the gonadal cycle. In addition to the cytological changes occurring in the basophils and the acidophils, the variations in the percentage of these cells, during different months of the year, were also studied, a criterion selected, indicating the activity of these cells during the gonadal cycle. This correlation has been further confirmed statistically, by studying the Karyometric changes in respect of the nuclear volume of these cells in different months.

A detailed study of the vascular relationship between the hypothalamus and pituitary gland has been made in Garra cotyla cotyla in order to understand the pathway and the regulatory mechanism of the hypothalamic control over the adenohypophysial activities in the regulation of other endocrine glands and the vital body functions such as reproduction etc. are concerned.

Thus, this study on the functional morphology of hypothalamus, pituitary gland and the gonadal system has been made to analyse the concept of a hypothalamic dependence of the pituitary gland and to understand, in what way, the hypothalamus has an influence over the regulation of different vital functions of the body such as reproduction etc. via the medium of the pituitary gland.