General Summary
1) An attempt has been made in the present investigation to evaluate the sublethal dose effect of BHC (15 ppm) on the gonads and kidney of *H. fossilis*. The effects were observed on the gonadal and kidney protein, DNA, RNA, Ascorbic acid, Adrenaline and Noradrenaline and on the surface ultra structure. The sublethal dose was selected after the determination of LC<sub>50</sub> value.

2) The protein concentration of treated testis was recorded at a higher level than the controlled set of 45th day, however, it declined considerably on the 75th day and 90th day. The ovarian protein registered a higher concentration throughout the experiment. The protein concentration of the kidney although considerably enhanced on 15th day with the concomitent fall on 45th day, yet it registered an overall enhancement over the controlled throughout the period of experimentation.

3) the DNA quantity of testis showed highest fall on 30th day and enhanced on 45th day. However, significant fall of DNA on 75th day was recorded with subsequent rise on 90th day.

4) The ovarian DNA of treated fish was recorded at the highest level on the 45th day and thereafter, with gradual fall, however, maintained comparatively enhanced DNA concentration over its controlled counterpart.
5) The DNA of BHC exposed kidney registered its highest concentration on 60th day.

6) The RNA concentration of BHC treated fish exhibited an erratic pattern of concentration with sharp elevation on 45th day and a tendency of being revived to normal or near normal in the testis and ovary of 90th day. Similarly, the kidney also revealed the same trend except on 90th day where RNA appeared to be significantly enhanced over the controlled.

7) BHC even at low dose promote toxicity in the fish could be inferred from the estimated values of DNA, RNA and Protein in the gonads. The higher DNA content of the ovary and kidney even after BHC exposure at prolonged period may be attributable to a high frequency of rejection. Because DNA of the higher organism contains nucleotide sequence that repeat much more frequently that can be expected occasionally.

8) Ascorbic acid is present in high concentration in the testis and ovary. The ascorbic acid of gonads were found to be decreased after BHC exposure from 30th to 45th day might be due to enzyme substrate inhibition and increased expenditure of glucornic acid. But significant increase of ascorbic acid was recorded in 15th day, 60th day and 90th day test group testis and ovary might be due to rapid utilisation of hexose sugar and associated with the restoration of normal cellular function.

9) The kidney ascorbic acid was found to be decreased throughout the period of experimentation. However, enhanced ascorbic acid value was noticed from 60th day to 90th day in
the BHC exposed *H. fossilis*, still lower than respective control. The deficiency of ascorbic acid in kidney might be due to increase metabolic need for ascorbate associated with the release of adrenaline and corticoids.

10) The adrenaline and noradrenaline of the gonad were increasing up to 90th day except on 45th day. Highest level of adrenaline was recorded on 30th day. Similarly kidney adrenaline and noradrenaline also exhibited enhanced trend over the control throughout the period of experimentation.

11) The enhanced adrenaline due to toxic stress may increase cyclic AMP. In kidney it might be responsible to increase the force and amplitude. But enhanced noradrenaline under toxic stress might be responsible for the constriction of the blood vessels of testis and ovary.

12) Adrenaline after BHC exposure might be responsible for the hyperglycaemia and enhances the catalytic activity of gamma amylase and enhances the blood glucose level.

13) The enhanced epinephrine after BHC stress was responsible to meet certain kinds of emergency situation.

14) The noradrenaline after BHC exposure was released in enhanced quantum after the blood pressure level of the fish and responsible for circulatory adjustment.

15) Under SEM the control testis exhibited intact follicles with microprojection, podocytes, and few number of blebs. In the earlier stage of experiment disintegration of follicles, increase number of blebs were observed. At the later part of
140

the experiment reappearance of distinct follicles with cytopodia and podocytes were observed.

16) The control ovary exhibited a distinct follicular structure with microprojections. The 15th and 30th day treated ovary exhibited rupture of membranes along with bend microprojection and increase number of blebs and fillopodia. Though on 60th day disintegration of surface structure with few fillopodia were observed yet on 90th day the ovarian follicles exhibited distinct structure with a very few number of blebs and microprocesses.

17) In kidney chromaffin cells were generally more uniform and rounded in appearance than the internal cells. The parital epithelium made a capsule which is spherical in shape. The outer surface of parital epithelium was smooth and there was presence of basal lamina, whereas the inner parital epithelium exhibited cilia. Finger or bleb like microprojection were noticed on the free surface of parital cells.

18) Visceral epithelium of kidney composed of podocytes, finger or bleblike microprojection were present.

19) An attempt has been made to correlate the interaction of different macromolecules with the pesticides toxicity. As the pesticide covalently binds to the macromolecular structure of DNA and hence there was change in the RNA and protein synthesis. The ascorbic acid is influenced by BHC which in turn act upon the adrenal gland to release adrenaline and noradrenaline. Further, the adrenals influenced by the
pituitary gland bringing out the change under toxicant stress. However, the organs registered a tendency of normalisation by way of immune response.