

6. SUMMARY

6.1 Studies on the annual variations in thyroid gland, ovary and liver of *H. fossilis*

Seasonal variations in thyroid activity in relation to ovarian cycle revealed that thyroid activity index (TAI), ova-diameter measurements, ovarian protein, ovarian glycogen and GSI contents were lowest during December-January (late post-spawning phase) which gradually increased to their highest level in July (spawning phase). Ovarian moisture percentage showed opposite trend with TAI in being minimum during July and maximum during December-January.

Annual cycle of various biochemical constituents of liver showed that protein value was minimum during late post-spawning phase and gradually raised to its maximum level in July. On the otherhand, glycogen content of liver was lowest in spawning phase and subsequently increased till it reached to its highest level during late post-spawning phase. Hepatic glycogen variation was found to be associated with decrease and increase in hepatosomatic indices. Moisture content did not exhibit any significant change throughout the year.

Such an association of thyroid in reproduction presumably might be through the liver at least for the energy purpose.

6.2 Effects of thyroid hormone on ovary and liver of *H. fossilis*

In intact fish, thyroxine (T_4) increased ovarian protein, ova-diameter measurements and GSI but decreased hepatic glycogen and HSI values. Thiourea treatment caused opposite changes in both the tissues. Both T_4 and thiourea were not effective in inducing such changes in hypophysectomised regressed specimens. Though T_4 alone was not able to influence ovarian protein synthesis in hypophysectomised fish, but it did accelerate ovarian response to SG-G100 after pituitary ablation. The results indicate that T_4 acts synergistically with gonadotropin in this species to bring ovarian maturation by stimulating protein synthesis. Possibly, T_4 directly or indirectly increases ovarian sensitivity to gonadotropic stimulation in this species.

6.3 Influence of sex steroids on thyroid gland, ovary and liver of *H. fossilis*

Different sex steroids viz. methyl testosterone (MT), testosterone propionate (TP), estradiol (E) and progesterone (P) stimulated TAI when compared with controls. This is confirmed by the removal of ovary which inhibited TAI at 12 and 20 weeks post operation against the same operated ones. Pituitary thyrotrops revealed no sign of stimulation in both the conditions. It seems that sex steroids influence thyroid activity without

affecting pituitary thyrotropin stimulation.

Biochemical constituents of ovary and liver following the treatment with graded doses of MT and TF revealed that protein and glycogen values of ovary and liver were significantly increased and the changes were dose dependent. Moisture percentage of both the tissues, GSI and HSI did not change significantly following the steroids administration. Careful statistical comparison of MT and TF revealed that MT was more effective in inducing such changes in both the tissues at all dose level tested.

Female sex steroids like E and P failed to cause any significant variations in ovarian protein, glycogen and moisture contents and GSI values at all dose levels studied. In liver, E and P increased the protein level and decreased the glycogen contents and these changes were dose dependent. Water content of liver and HSI values were found to be unaltered following the treatment with these steroids.