Review of Literature
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The chemicals which are used to control different pests was started long back in 18th century. Arsenicals were the first insecticides to be employed to protect foliage against the attack of insects. Hydrogen cyanide was the first poison introduced in 1927. The principal insecticide utilized before World War II were all organic compounds. The synthetic organochlorine insecticide (DDT) was discovered at Balse, Switzerland in 1939.

Among the pesticides, BHC is the most widely used insecticide in India (Jales 1980). It is highly toxic to fish and moderately toxic to man and bird (Holum 1977). Harvey in 1974 estimated that DDT mainly found in marine environment and band in USA, Europe and Japan. A few data is available in India, Jenson et al 1972. Tanabe et al 1980, Kureishy et al 1978, Kannan and Sengupta 1987. In India every year pesticide and insecticide used 55000 tones average (Sengupta and Qasim 1985). Organochlorine pesticides can also be concentrated by zoopalankton, Kureishy et al 1978, William and Holden 1978 and Patel et al. 1977. Organochlorine insecticides may affect in both terrestrial and aquatic ecosystem, (Aruda et al 1988 Cochiene and Arnese 1988, Sarkar and Sengupta 1988) Organochlorine insecticide residues become an intrinsic part of biological, geological and chemical cycles of the earth and measurable in water (Pillai and Agarwal 1979, Yamto et al

Heteropneustes fossilis is a common pond fish in India and high value of calcium among freshwater fish (Saha and Guha 1939) Its eggs are also analysed (Hasan and Jafri 1964), histology of gonads (Ghosh and Kar 1952) and seasonal morphology of gonads in relation to pituitary observed (Sunderaj 1959).


DNA of higher organism contain nucleotide sequence that repeat much more frequently than can be expected by chance (Britten and Kohne 1969). Choudhuri and Mandal (1981) studied the ovary of H fossilis where DNA content increased while protein and RNA increased only in matured stage. Walter et al (1980) noted reduced DNA and RNA of lymphocytes due to melathion treatment. Gantaya and Patnaik (1975) noted reduction of protein content DNA/RNA ratio and total DNA content in testis and liver of rat due to heavy metal treatment.
Protein and RNA content of liver of Cyprius carpio is reported to be declined after lead nitrate exposure (Narbonne et al 1975). Ansari and Kumar (1988) showed in Zebrafish that due to diazinon the DNA, RNA and protein content were significantly reduced. Exposure to DDT also happens the same result but Saxena et al (1981) observed the reduced DNA, RNA and protein content only within three days. Ross et al (1979) reported that herbicide cause DNA damage. Balakrishnam et al (1975) observed the increase protein content when treated with BHC. Venosten and Gibson (1975), Rip and Cherry (1976) studied the effect of pesticide and recorded increase value of protein content. But Ahmed et al (1978) and Mohini et al (1984) observed the decreased of protein content in melathion treatment. Shankar and Seth (1980) Drozdz et al (1976) noticed decreased total protein content of blood in guineapig after pesticide exposure. Decreased protein content reduce the activity of resting muscles which accumulation of glycogen and lipid in muscle (Piska et al 1992).

Protein content is associated with the increased lysosomal activity (Shah 1980). Bhatnagar and Soni (1990) rise of protein, DNA and RNA in swiss albino mice of testis after prolong exposure to phosphamidon. The reduction of total protein content in the testis due to the action of BHC is suggested by Huqqui and Adhami (1979).
Nasiell et al (1978) suggested that at the time of transformation of normal cell to neoplastic cell and the DNA quantity was enhanced which had been confirmed by Sach and Winzer (1976). Bowman and Daniel (1977) suggested DNA synthesis might be an early event in the transformation of cells. DNA strand have found to duplicated while exposed to Diazion toxicity on the Zebra fish (Ansari and Kumar 1988).

The role of ascorbic acid in the fish reproduction is very much unknown. However, it is known that the ascorbic acid is synthesized from the glucose catalysed by I-gulonolactone oxidase (Young and Newberne 1981). Variation of ascorbic acid during breeding period has been recorded in frog (Kumari et al 1991). Stubbs and Mc Kernan (1967) suggested that ascorbate significantly higher in male rats. Salmon and Stubbs (1961) demonstrated that hypophyseal influence on ascorbic acid biosynthesis in rats. Jennings (1970). shown that gonadotropic stimulation of corpus luteum in pregnancy caused a rapid decrease in ascorbate content. Deb and Chatterjee (1963) found that estrus cycle of rat could be corrected by injection of ascorbic acid. Ascorbic acid also possesses antitoxicant activity due to the enhancement of vitamin E (Niki et al 1984 and Bendich et al 1986). Standingen and associates (1961) studied the presence of an ascorbic acid dependent NADH oxidation in the rat liver and kidney microsomes.
Ascorbic acid is related with the synthesis of different vitamins Chatterjee et al 1961 Herbert, 1974, Campbell, 1975. Czina in 1959 explained the decrease of ascorbic acid due to glucornic acid. The pesticide toxicity of ascorbate may reduce due to presence of some chemicals in carbon tetrachloride (Kunert and Tappel 1983) and cyclophosphamide (Kola et al 1989). And in presence of ultraviolet light in the vitamin c may reduce the tumour growth (Gardiner and Duncan 1989).

Cameron and pauling (1979) suggested that vitamin C is more protective to the cellular matrix and more resistent the growth of tumour invasiveness (Sigel and Morton 1977). Dunham et al (1982) noted that L-ascorbic acid decreasing the onset of malignant lesion in mice after exposed to uv.


Matty (1985) suggested that the kidney of fish under a stressful condition invariably causes and increased the
Catecholamine. In fish the catecholamine increase in response to hypoxia (Butler et al 1978, Butler, Taylor and Davison 1979) and physical stress (Nakano and Tomlinson 1967). Liu et al (1990) after exposure of heavy metals the leyding cells of testis are adversely effected. Matty (1985) described the adrenaline increases the plasma cyclic AMP levels in trout although origin is not known. Epinephrine can be treated by increasing glucose through glycogenolysis (Birnbaum et al 1976). Mazeand and Mazeand (1981) that blood glucose is enhanced within two hours of adrenaline administration.


In addition to catecholomine, thyroid hormone influences the reproduction in teleost and enhanced the hormone of gonad (Ball 1960, Sage 1973, Ichikawa et al 1974, Dodd 1975, Hurlburt 1977, Deltlaff and Davydova 1979, Sen and Bhattacharya 1981, Bhattacharya et al 1982).
The increased adrenaline and noradrenaline under toxic stress in H. fossilis may occur due to β adrenergic receptors which suggested by Holmgren (1977). On the other hand the enhancement of the epinephrine and norepinephrine in testis and ovary is supported by Bullough (1955).

Baruffaldi et al (1989) observed that after using DDT, the ultrastructural study showed the increase number of erygastroplasm, cytoplasmic lipid etc. Braunbeck et al (1989) studied the liver of zebra fish when exposed 4 nitrophenol and the ultrastructural study revealed the structural modification in different regions. Liu (1990) studied the testicular atrophy in rat which showed the changes of spermatocyst and damaged of specific reproduction.

Sanglang and O'Halloran (1974) suggested that the inhibition of spermatogenesis blocked the steroid synthesis in trout due to Cdcl₂. Pandey and Schagel (1985) noted the deformed primary and secondary spermatocyst in Tilapia mossambia at different concentration. Bhattacharya et al (1989) suggested that due inhibition of releasing hormone the spermatogenicity of fish are consequently arrested. Pandey and Shukla (1985) showed that adverse effect on hypothelamic nuclei and nucleus lateralis tuberis which regulates with pituitary hormone.
In some oocyte the 'nuclear bleb' appear which gradually shift towards periphery of the oocyte (Mishra and Munnet 1979). The immature oocytes become columnar in mature oocytes (Belsare 1974). The follicular cells are primary concerned with supplying nourishment to the developing oocyte and help yolk deposition (Ginburg 1968, Hoar 1969). Saxena and Garg (1978) found higher oocyte on treatment of C punctatus with carboxyl and fenitrothion. Srivastava (1989) observed the changes of ovarian histology of H fossilis after exposed BHC.