The thesis with a brief introduction brings out the present state of knowledge relating to the impact of metal and metal mixtures on fresh water fish and their response to it. The results obtained on the individual and combined effect of metals on *G. affinis* are summarised:

1) The increasing order of toxicity for *G. affinis* was found to be copper < zinc < nickel.

2) Metal mixtures are predominantly antagonistic in their toxicity.

3) Alterations in the oxygen consumption on exposure to lethal and sublethal levels of metals and metal mixtures, as evidenced by mucus secretion and haemorrhage through the gills and pectoral fin.

4) Nitrogen excretion as an indicator of intensity of metabolism along with the oxygen uptake by fish under metal stress.

5) Bioaccumulation of metal in fish tissues provides an information indicating increased metal availability and potential metal stress in the fresh water environment. It also provides a rational basis for anticipating and
understanding the ecological effects of accelerated inputs of metals in the environment.

6) Accumulation of metal is influenced by the inter elemental interactions in the aquatic media.

7) Symptoms of metal poisoning are identical for the metal and metal mixtures.

8) Preference and avoidance of metal plumes exists and certain metals lure the fishes to the toxic environment.

9) Aquatic animals such as fresh water fish have considerable potential in biological monitoring of environmental pollution.

10) Fresh water fishes are the end consumers in the aquatic food chain and thus can be monitored as an indicator of heavy metal enrichment.

11) Results are discussed in the light of the literature available and scientific significance of the research undertaken is also mentioned.