WATER QUALITY MANAGEMENT IN AQUARIUM

CHAPTER 1: WATER QUAILTY MANAGEMENT

5.1.1 Introduction

Water is the prerequisite for the maintenance, breeding and culture of tropical ornamental fishes. For ornamental fish farming water is mainly obtained from rain, river, artesian well, canal and reservoir. The physico-chemical characteristics of water such as pH, hardness, temperature, dissolved oxygen; chlorine and carbondioxide content play a key role in the breeding and production of many ornamental fish species.

5.1.2 pH

The pH of water usable for ornamental fish farming may vary from acidic to alkaline depending upon its source, chemical and biological factors. Marshy and peaty water has acidic pH. Similarly, water springing from a soil poor in calcium will have acidic pH.. Some ornamental fishes such as oscar and discus will spawn only in slightly acidic pH and soft water. To this, various makes of water softeners are used and inorganic acids, for example, hydrochloric acid can be used. If the pH of the water falls below the desired value, it must be increased by the addition of required doses of calcium hydroxide (slaked lime). The optimal pH for the growth and breeding of majority of the ornamental fishes should be neutral or slightly alkaline i.e. 7-8. Water in ornamental fish tanks should never fall below 5 or rise above 8.5. Ornamental fishes preferring slightly acidic pH (6.2-7) include rosy barb, tiger barb, tetra, angel and danio. On the other hand, certain fishes like cichlids, goldfish, koi and gourami prefer alkaline pH.

5.1.3 Chlorine

Ornamental fish culturists in cities often have water quality problem as the tap water used by them contains chlorine beyond permissible level. The growth and survival of any sensitive fish are affected by chlorinated tap waters. Chlorine content as low as 0.1.ppm itself is toxic to fishes. The chlorine content of such waters can be dechlorinated by heating the water.. Alternatively water with chlorine will have to be kept over night where the chlorine escapes and the water becomes usable.

5.1.4 Water hardness

It is nothing but the total soluble calcium and magnesium salts present in the water expressed as its calcium carbonate equivalent. The total hardness of water however, includes the sulphates and chlorides of calcium and magnesium. The total hardness is mainly used to classify waters into ‘hard water’ or ‘soft water’. Water with hardness of 100-300 ppm have been found to be optimal for the normal growth of majority of ornamental fish. Water with less than 12 ppm require liming for higher production of fish. Hard water is also known to influence feed intake and growth of cichlids such as angel, black zebra, firemouth, blue morph and auratus.

5.1.5 Carbondioxide

Free carbondioxide at a concentration of more than 15 ppm is detrimental to ornamental fishes.

5.1.6 Temperature

Water temperature is one of the most important factors influencing the breeding, rearing and transport of tropical fishes. Although majority of the ornamental fishes tolerate water temperatures between 21 and 30^{o}C, 28^{o}C, have been found to be most suitable for the breeding of tropical ornamental fishes. In order to maintain optimal temperatures, suitable devices have to be used.

5.1.7 Oxygen

Dissolved oxygen content of the water plays a crucial role in fish culture. Fishes of aquarium tank would be under stress and be liable for parasitic attack if optimal oxygen levels are not maintained. The solubility of oxygen in water depends on its temperature and also on the rate at which it is kept in contact with water. Oxygen dissolved in water by direct diffusion at the air-water interface. Further, it is also made available by the presence of aquatic plants. The oxygen level of aquarium tanks can be enhanced by constant aeration, circulation of water, sprinkling of water, surface agitation, etc.

OPTIMUM LEVEL OF WATER QUALITY PARAMETERS REQUIRED FOR ORNAMENTAL

FISH CULTURE

Factors	Optimum Level
Temperature	24-28^{0}C
Oxygen	More than 5ppm
pH	7-8
Hardness	150-200ppm
Ammonia	Trace
Nitrite	Trace
CO_2	less than 1ppm