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Fishes need lower osmotic pressure to breed naturally and detectable by osmometer, analogue to digital computers

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Abstract

Most fishes prefer to swim within certain range water quality parameters, however for natural breeding most inland fishes may need specific osmotic pressure as well. It is found that most fishes like to breed under the natural waters like in rivers. The reason may be that natural waters condition possibility of lower osmotic pressure owing to melting of ice or dilution by rain waters and having lesser total dissolved solids (TDS) appropriate for most fishes. It is also found that environmental stress to the fishes is minimum during the monsoon period owing to higher dissolved oxygen (DO) value and natural fish breeding. The osmometer or devices attached to computer can detect suitable water for natural breeding for certain species on the basis of osmotic pressure. As this computer and electronics can read analogue signal to digital output.

Keywords: Variation of osmotic pressure, natural waters, natural fish breeding, sustainable fisheries, computers and electronics.

1. Introduction

By now it is believed that in aquatic systems fishes may prefer certain osmotic pressures as well along with the certain water qualities. In inland fisheries every individual species like a suitable range of water qualities and also waters with certain osmotic pressure. Osmotic pressure should be at the lower end when the species naturally breeds. As natural breeding is important for existence of species, inland fisheries bio-diversity and overall the sustainable inland fisheries. Effects of thermal and osmotic stress on growth, osmoregulation is studied in sea cucumber (Dong *et al.* 2008) [4]. In this study osmotic pressure of environment is treated as osmotic shock that determines the survival of the species *A. Japonicus*. Effect of differential osmotic of the water environment may control in gene transfer of fish *spermatozoa* is studied (Kang *et al.* 1999) [1] of hypo osmotic solution for carp spermatozoa and when such osmotic pressure has been increased sperm cells become loosen its fertility in the experimented environment. Effect of ammonia is found to be survival criteria of lobster is found (Young Lai, 1991) [3]. Influence of acclimatization, temperature and osmotic regulation is studied (Alexis *et al.* 1984) [2]. The apparent reason is body tissue dehydration. This research communication emphasises on why the natural fisheries has more importance over the cultural means when osmotic pressure is one of the criteria and needs to specific to the most species on natural sustainability issue.

2. Methodology

Total dissolved solid (Fig. 1), certainly related with osmotic pressure of waters, is an indicator to measure osmotic pressure of natural waters. With high TDS value prevailing higher osmotic pressure, experimentally when partitioning with distilled water, may not be liked by the most fish species during the time of spawning. As most species like to migrate in water having lower osmotic pressure (lower TDS) and this is possible in river streams, or during the period of dilution at the periods of monsoon rain. TDS may be an analogue signal that can be measured by analogue to digital devices like osmometer of a computer.

Possible external fertilization often takes place under an isotonic or hypotonic water environments and may not be under hypertonic water environment. Conversion of hypertonic solution to desired isotonic or hypotonic environmental medium takes place during the monsoon periods of upward migration of fishes. Only exception species in fisheries is prawn, not actually a fish, which migrate down stream during the breeding period owing to get appropriate pH and DO (Fig. 2) environment along with the lower osmotic pressure.

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On the other side the cultural waters usually have higher osmotic pressures like more TDS may not be suitable most species to spawn.

Biological reasons are due to protect and adapting more soft cells viz. egg cells and sperm cells while in external medium of low osmotic pressure waters medium. Often fish is the indicator of pollution and species can detect osmotic pressure of such environmental waters.

At present day, Osmometer is such a device that helps to measure osmotic pressure of natural waters attached to the computer, or separately digitally. For individual species, recording of osmotic pressure may be done where actually the particular species breeds naturally, and accordingly such can be maintained to other waters when we expect the species to prevail.

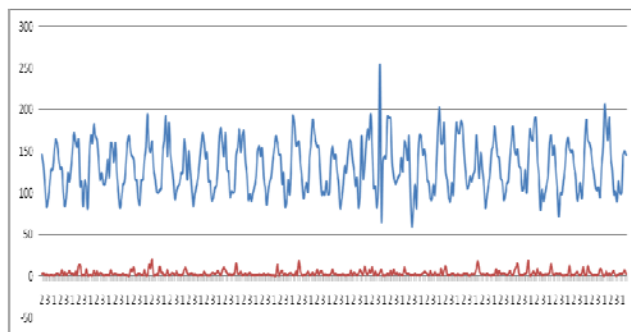


Fig 1: Seasonal (1, 2, 3) variation of Total Dissolved Solid (TDS) in ppm, in the lower stretch of the river Ganges

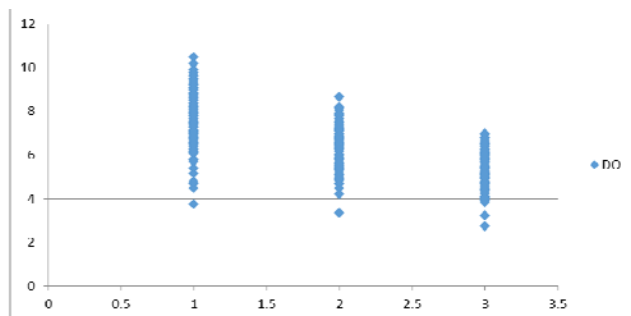


Fig 2: Seasonal (1, 2, 3) variation of Dissolved Oxygen (DO) in the lower stretch of the river Ganges.

3. Conclusion

Today computer and electronics are used in fisheries in identifying water bodies suitable to natural breeding of many fish species of fresh waters systems. It has been found that most inland fish species may not breed under cultural water bodies as species may prefer to breed under the condition of natural system like in rivers, during the monsoon periods. Scientific facts behind such reasons are due to variation of osmotic pressure inserted by different water bodies. During the monsoon periods such osmotic pressure of water is comparatively lesser along with during such period environmental stress to fish species is minimised. Also that every species may requires a certain range of ecological conditions within which fishes may prefer to swim. Osmotic pressure whenever remains less, usually in rainy season, fish may breed. Today computers can be useful in measuring such specific osmotic pressure digitally of natural waters conditions, towards sustainable fisheries. Osmotic pressure of different fresh water is always less than sea water having osmotic pressure 27 atm

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5. References

1. Jung Ha Kang, Goro Yoshizaki, Osamu Hommma, Carlos A Strssmann, Fumio Takashima. Effect of an Osmotic Differential on the Efficiency of Gene Transfer by Electroporation of Fish Spermatozoa. *Aquaculture*. 1999; 173(1-4, 30):297-307.
2. Maria N Alexis, Elli Paparaskeva Papoutsoglou, Sofronios Papaoutsoglou. Influence of Acclimation Temperature on the Osmotic Regulation and survival of Rainbow Trout (*Salmo Gairdneri*) Rapidly Transferred from Fresh Water to Sea Water. *Aquaculture*. 1984; 40(4, 15):333-341.
3. Young Lai WW, Charmantier Daures M, Charmantier G. Effect of Ammonia on Survival and Osmoregulation in Different Life Stages of the lobster *Homarus americanus*. *Marine Biology*. 1991; 110(2):293-300.
4. Yunwei Dong, Shuanglin Dong, Xianliang Meng. Effects of Thermal and Osmotic Stress on Growth, Osmoregulation and Hsp70 in Sea Cucumber (*Apostichopus Japonicus Selenka*). *Aquaculture*. 2008; 276(1-4, 30):179-186.