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Research Article

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Species Migration & Conservation of Hilsa (Tenulosa Ilisha), Ray-Fish Using the Digital Techniques

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Abstract

Abstract

Research communication dealt here, a digital application on a species migration & conservation of Hilsa (Tenulosa ilisha), Ray-fish of Ganges and others using the digital technique and described. Application comes in Hilsa, Ray fish and few others are described based on one of the most important water quality parameters, fisheries for migration and conservation. Known that Hilsa has got an immense importance among the fish lovers and to the fish-eating people because of taste and nutrition. Hilsa is one of the most popular among the fishes found in Bay, Estuary or Rivers of Indian Continent. A single matured Hilsa can be weighing around 6 kg. When get matured. Distribution of Hilsa fish are found in Bays, in and around the great Sundarbans and migrates to adjacent waters across the upward of river stretches mainly Ganges, Padma and Godavari rivers while to breed. As like most other fish species this Hilsa species migrates in search of a suitable Total Dissolved Solids (TDS), and in this communication, the study area from coastal Bay of Bengal to the upward fresh-waters of river Ganges. The extent of migration may depend on the fact that till this species gets suitable minimum total dissolved solids on the way to migration while to perform the course of natural breeding. During the breeding period, like every other fish species, this Hilsa fish tries to find a minimum TDS to breed naturally. The threshold value of TDS can easily be detectable computer and electronics devices or simply a TDS meter. This research-study found that a Hilsa fish can breed naturally when the TDS value may become closer to 95-105 ppm, found near up-to the middle stretch of river Ganges regions. Species Hilsa, can migrate mere a 100-300 km or even more in search of mentioned suitable TDS and after the course of natural breeding, the species re-migrate to Bay along with all juveniles unless being caught. For growth and maturity of Hilsa fish like to prefer TDS of a range, 120 to 260 ppm, usually at the Sundarban Estuary and coastal regions of Bay of Bengal.

Keywords: Osmotic Pressure, Optimum Total Dissolved Solids, Computer and Electronics in Fisheries

Introduction

Factors involving fish-migrations are mainly fish-feed, light intensity, as most fishes have affinity towards light, may be either sun or even moon light. Movement of fishes owing to light may be a spontaneous. However time specific or age old fish movement or long-term migration of most fishes are due to the osmotic pressure or optimum total dissolved solids (TDS) prevailing in existing waters. This fish migration is not only for physiological demands like fry to juvenile, juvenile to adults or adults to spawning. Some-time fishes may migrate else they may suffer in diseases. In situation of rivers originated with melting of pure ice with least value (0 ppm) and gradually goes up to high a value of TDS, 200 ppm at the river mouth. at bay TDS may varies 200 ppm to 1000 ppm or even more depending on spatial locations, and Hilsa migrates accordingly in the range of TDS (220 to 95 ppm) Satellite captures spectral reflectance and then converted to grey values of certain dimension oriented water body, say academically a minimum dimension of 2.4 m x 2.4 m. It is known that in passive remote-sensing clear waters have got higher light penetration in visible wave lengths range, compare to turbid waters. Digital value of spectral signature of water body having a low TDS may become comparatively less. Since long-period most water quality parameters are being assessed by remotely sensed data through regression modelling [1]. Among them TDS measure is also could be possible either online remote sensing and off line field data collection methods. Water bodies of low TDS is important for fisheries existence especially during the season of natural breeding. As time and again it is found that most Indian Major Carps can naturally be breed within and around 100 ppm of TDS. Whereas other hardy species, excepting cold water fishes may bear up to a TDS of 150 ppm, as detected by computer and electronics or even with a mere TDS meter. One may think whether TDS may be the only important parameter in ecological waters for fishes to migrate even other than to search their feed. As communicated that 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 Digital computer and electronics may help the detection of fish breeding environments, specifically for most inland species are made possible [2]. This research communication is presented based on ecological observations. Most inland species

may breed naturally within below 150 ppm of TDS or equivalent osmotic pressure. Such osmotic pressure is highly specific to species. As communicated that most important water quality parameter responsible for conductive natural breeding of fishes is osmotic pressure of ecological waters alternatively the total dissolved solids prevailing in natural waters. An analogue to Digital computer, Osmometer or simply digital TDS Meter can identify or measure the records of osmotic pressure or synonymously total dissolved solids that prevailed in natural or cultured waters. A higher osmotic pressure act as hypertonic mediums and aquatic breeding cells may die through plasmolysis. Computer and electronics are being used in fisheries during the recent days. This may be an approach when human observation becomes erroneous. We can find natural breeding sites of many inland fish fishes through such measures. Osmotic pressure is most crucial as identified to perform natural fish breeding. This may be desirous in respect to fisheries sustainability. Principle behind the osmotic pressure is that solvent like water move from lower concentration to higher concentrated solution through a semi permeable membrane. In situation of fish breeding cell membrane acts as this semi permeability. Higher concentrated aquatic medium is simply judged by amount of Total Dissolved Solids (TDS). Most simple device may be TDS meter. If you are getting bored, alternatively we can use Osmometer of Analogue computer for identifying such desirous aquatic environments to fishes. As all known, that fish has got an external fertilization or reproductive system. To get the reproduction process being successful in the aquatic environment optimum.

As known that satellite captures most spectral signatures of any certain dimension oriented water-bodies and may useful in fisheries resource management. Satellite imagery data can describe the value of Total Dissolved Solids (TDS) which is among important water quality parameters and can be detected digitally. This digital value is a prime aquatic parameter and may be termed as a principal component parameter to determine species existences in most geographic and breeding habitat of aquatic organisms. A scientific study found that Marine aquatic species may breed naturally within the TDS value, below 250 ppm. Never to forget that most aquatic species may breed during the rainy season and rain water has got a TDS value in a range of 5-50 ppm. On the other side a study found that most sweat water inland aquatic species may breed naturally within below the TDS of 150 ppm. This value of TDS measure act to insert osmotic pressure to the individual aquatic species and also to the reproductive cells. Study found that every species has got a very specific tolerance of osmotic pressure and may be uniquely sensitized by individual species. Today computer and electronics like a mere TDS meter digitally can identify such aquatic requirements of species. However satellite imagery in a large extent may identify the habitat distributions and identification of breeding zones of every individual species either in inland or marine environments to keep aquatic species safer. Specific osmotic pressure may essential for fisheries sustenance, such desirous osmotic pressure in digital signature is identified through computers and electronics and may be needful in further research [6] in fish and all aquatic living organisms as a whole. Institute has taken an initiative for sustaining inland fisheries either naturally or through semi-natural means using digital approaches and also through information sharing.

Materials and Methods

We may know that water quality parameters can be measured digitally, either with their concentration, mass, by considering optical density or based on ionic charged, electronically usually measured with spectro photometers and ionic study respectively. Also Satellite data of fisheries waters an explain the optical density based on reflectance from fisheries waters as well in a different principle. Most important component among the water quality parameters for occurring to fish migration apart from fish-feeds, is Total Dissolved Solids (TDS). Its' magnitude is correlated with fish-health as well as fish migration. This similar hypothesis is applicable in Fish-diseases and pathogenic or microbial infestations, on the existing water-qualities prevailing in fisheries aquatics for fish migrations and or fish shoal. Inland waters have variable ranged of records measured in TDS, this is ranging from almost 0 to 200 ppm of TDS (Fig.3). Most inland species prefer to breed naturally within below 150 ppm of TDS whereas IMC can breed naturally within the TDS value of 100 ppm. The role of this dissolved solid (TDS) is to act as generating osmotic pressure cellular membrane in all phases of fish lives and particularly during the natural breeding seasons. Most inland aquatic species needs a lower end of osmotic pressure in the aquatic system where the species survive. Low to medium osmotic pressure or low TDS act as a hypotonic or iso-tonic medium to the membranous fishes or eggs. Under the hypertonic medium a reversed osmosis may take place and fishes may live under stress. In such situation of reversed plasmolysis the survival ability of most eggs are almost lost. Study found different species has different tolerance ability of such osmotic pressures. Yolk density and density of ecological waters should also be healthy and matching so as to reproductive-cells find an optimum environment, In no way cell fluid should come out to the aquatic medium either through biological osmosis process or ionic means. Comparatively in cellular environment egg-cell contains more fluids than a sperm-cell. Fishes have sensory organs and additionally sensitized with aquatic ions for which species has to adapt while maturity stages and also to migrate. Different aquatic-mediums with having variable total dissolved solids (TDS) in natural fisheries, fruitful natural hatching as said may dependant to TDS of ecological waters. Among the common distributions shown above this might have Cubic, Quadratic and S distributions may be significant with an example species on a presumed data of A testudineus An experience at cold water fisheries is also may be added with that in high altitudes fishes may start natural breeding after the melting of ice is over. Fishes of Dal Lake may breed during the month of March when the osmotic pressure or TDS value of melted water become minimum. Whereas under plain condition most species breed naturally on set of monsoon at optimum TDS. In natural fisheries, fruitful natural hatching as said may dependant to TDS of ecological waters. Among the common distributions shown above this might have Cubic, Quadratic and S distributions may be significant with an example species on a presumed data of A testudineus An experience at cold water fisheries is also may be added with that in high altitudes fishes may start natural breeding after the melting of ice is over. Fishes of Dal Lake may breed during the month of March when the osmotic pressure or TDS value of melted water become minimum. Whereas under plain condition most species breed naturally on set of monsoon at optimum TDS.

Results and Discussion

This research communication is dealt on open water fisheries of lower stretches of River Ganges, Sundarban estuaries and river mouth of Ganges and leading to Bay of Bengal. This natural fisheries at the lower stretches of the River Ganges and to obtaining specific data was the prime objective of this research communication which is achievable with a TDS meter. A long term time series data is also

analysed and presented. TDS based fish migration is applicable for all most all the fishes either in inland or marine species, however extend of migration with species, may varying little around of 5 km (Puntius spp) to 500 km (Hilsa sp) or even more. As for example other than Hilsa author has investigated on Ray-fish as well. Ray-fish has got an immense importance to the fish lovers as well as among the fish-eating people. Ray-fish is one of the largest among the fishes found in estuary when this species is being caught by the fishermen. A single ray-fish can be weighing around 100 kg. When get matured. Distribution of Ray fish are found in and around the great Sundarbans and adjacent waters across the upwards of river Ganges while to breed. Alike most other fish species this specie migrates as well, from Sundarbans to upwards fresh-waters of major rivers mostly, the river Hooghly. The extent of migration may depend on the fact that till this species gets suitable minimum total dissolved solids on the way to migration while to perform the course of natural breeding. During the breeding period, like every fish species, this Ray fish tries to find a minimum TDS to breed naturally. The threshold value of TDS is easily detectable by computer and electronics devices or simply a TDS meter. This research-study found that a Ray fish can breed naturally when the TDS value may become closer to 100-120 ppm, found near at Balagarh regions of the river Hooghly viz. the lower stretches of river Ganges. Alike the species Hilsa, Ray fish can also migrate mere a 100-500 km stretches in search to get a suitable TDS and after the course of natural breeding, the species re-migrate to Sundarbans along with all juveniles. For growth and maturity this Ray fish like to prefer more than 120 to 195 ppm which is prevailing at the Sunderbans' estuarine water. Osmotic pressure of river waters, optimum total dissolved solids, Computer and electronics in fisheries, Natural breeding of Ray-fish, Ray-fish conservations may be followed in years to come.

Conclusions

As stated all fishes are migrated owing to physiological reasons and existing of variable total dissolved solids, prevailing differently in various river courses and also in oceanic zones. This TDS based migration is long-term fish migration. In contrast short-term fish migration is due to existing of fish feeds, and photo intensity. Fishes can breed naturally when the species get minimum osmotic pressure or running through a minimum TDS. It may happen scientifically that obtaining multiple breeding in a single year in inland fishes may possible once biological process is known and records of digital instrument is such that this may be achievable.

Fig.1. Hilsa ilisha migration study can be possible using Computer and electronics

Once a well maintained digital value prevail in inland aquatic system, a multiple breeding may become possible in species of inland fisheries, species associated with Hilsa and Ray-Fish are namely, A mola, Puntius spp, Tilapia mossambica, Labeo bata, Ompok pabda, Glossogobius giuris and Macrobrachium rosenbergii. Being digital is a decision making process in fisheries as well Analogue signatures may be changing in nature and accordingly fish may migrate based on the specific osmotic pressures suitable to breed . TDS of ecological waters as well and this alternatively measured in ppm as detected by computer & electronics viz. TDS meter, Osmometer, Analogue computer or a imagery of a remote sensing satellite. May however, it is found that Satellite data is complex to be modelled accurately by using regression-based methods. Therefore, study attempts to develop an artificial intelligence modelling method for mapping concentrations of both optical and non-optical SWQPs Present Recorded digital value is to remind a scientific associated with inland fisheries and also for academic reasons. This digital detection process or approaches towards fisheries research may be vital in most situations as manual method may remain biased or erroneous. As found that this specific digital values is not only an important criteria for natural breeding of many fish species but for their adaptive migrations, as well. The purpose of this research communication is for conservation of Hilsa and Ray-fish of Bay of Bengal and the river Ganges in a long-term basis using computer and electronics in fisheries,

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