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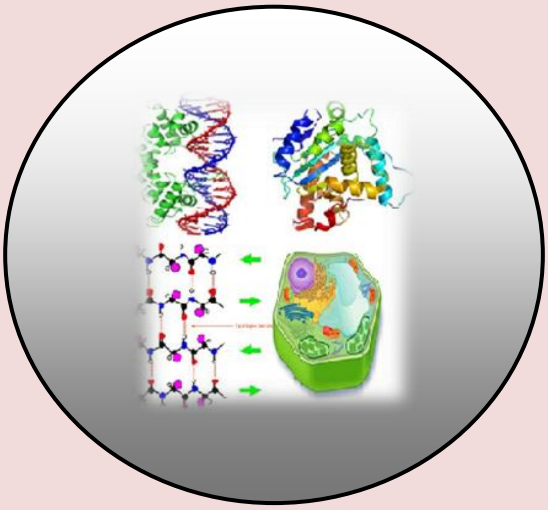

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RESEARCH PAPER

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Study on Bacterial Community in Ponds

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ABSTRACT

It is the collection of organisms (e.g. algae, bacteria, heterotrophic microbes and detritus) that live on the surface of submerged plants, animals and other underwater objects(e.g. rocks, coral, carbonate or silica sands) in most aquatic ecosystems. So many bacterial communities present in ponds. The presence, composition, and growth of periphyton are controlled or influenced by 5 broad classes of environmental variation: disturbances, stressors, resources, hydraulic conditions, and biotic interactions. In turn, periphyton communities affect water chemistry, hydraulic conditions, habitat availability, and food web dynamics. The periphyton algae are immensely important, as they provide the community structure and primary productivity (than do the phytoplankton) that supports a wide array of other organisms. It serves as an important food source for invertebrates, tadpoles, and some fish. The periphyton serve as an indicator of environmental changes as they absorb contaminants, removes them from the water column and limiting their movement through the environment responses of this community to pollutants can be measured e.g., pollution-induced community tolerance studies. Global warming, excessive use of chemicals and nutrients due to dumping of wastes from agricultural activities, Waste Water Treatment Plants, deforestation, and soil instability lead to the excessive growth of periphyton in open waters. Bacterial communities are used in aquaculture food production systems for the removal of solid and dissolved pollutants in ponds.

Keywords: Bacteria, Periphyton, Algae, Denitrifying Bacteria and Fish Pond.

INTRODUCTION

In the studies of aquatic ecology, bacteria have been uncared for despite its vital role in nutrient uptake and transfer to the upper trophic organisms. Being the component of food chain as attached organism it takes part in nutrient cycling in the ecosystem like that of suspended planktonic counterparts. The present review, with an aim to understand the role of periphyton in nutrient transfer from benthic environment to upper trophic level, focuses many aspects of periphyton-nutrient relationship based on available literatures. The presence, composition, and growth of periphyton are controlled or influenced by 5 broad classes of environmental variation: disturbances, stressors, resources, hydraulic conditions, andbiotic interactions. In turn, periphyton communities affect water chemistry, hydraulic conditions, habitat availability, and food web dynamics. The periphyton algae are immensely important, as they provide the community structure and primary productivity (than do the phytoplankton) that supports a wide array of other organisms. The environment responses of this community to pollutants can be measured e.g., pollution-induced community tolerance studies. Global warming, excessive use of chemicals and nutrients due to dumping of wastes from agricultural activities, Waste Water Treatment Plants, deforestation, and soil instability lead to the excessive growth of bacteria in open waters. Bacteria communities are used in aquaculture food production systems for the removal of solid and dissolved pollutants.

MATERIALS AND METHODS

Collection of plankton

Hand net

The hand net is conical and the diameter of the month is 20 cm. It is made of bolting skill, 120-250 mesh. Collect 50 liters of water from different zones of the pond with a bucket.

Image of Plankton net with plankton jar.

Periphyton and denitrifying Bacterial Count

Sample was Water undertaken from July 2015 to May 2016 and July 2016 to May 2017. The plate count method was used for the determination of nitrifying bacteria and denitrifying bacteria. The water sample was immediately brought into the laboratory and diluted up to 10-10 using sterilized pipettes tubes and distilled water. Then sterilized nutrient Agar medium (Beef extract 3 gm, peptone 5gm, Agar 15 gm distill water 1000 ml, pH 7) is melted and poured is sterilized petri-dishes and the plates are then allowed to solidity. After about 2 an hour of median is pouring. Then a glass spreader is sterilized by buying and with it the suspension is spread carefully and aseptically over the media with in petri-dish. The plates are kept within an incubator under 37 °C temperature for 24 – 48 hours.

Periphyton bacteria

Serial dilution is prepared according to previous manner.

The periphyton bacterial medium compositions.

$(NH_4)_2SO_4$	300 mg
K_2HPO_4	300mg
NaCl	600 mg
$MgSO_4$, $7H_2O$	150 mg
$FeSO_4$	Trace
Distilled water	300 ml
Beef extract	900 mg
Peptone	1.5 gm
Agar Agar	4.5 gm
pH	7

Melted and poured in sterilized petri-deshes and the plates are then allowed to solidify. After about 2 an hour of media pouring, 0.5ml of 10^{-2} to 10^{-5} dilution suspension is taken and placed in the plate aseptically in separate petri-dishes. Then a glass spreader is sterilized by burning and with it the suspension is spread carefully and aseptically over the media within petri-dish.

The plates are kept within and incubator under 25^0C temperature for 24 – 48 hrs. After 24 – 48 hrs of incubation, the plates are absorbed and the numbers of colonies are counted.

Denitrifying bacteria
Serial dilution of the sample is prepared in previous procedure.
Sterilezed stabs of denitrifying media (Asparagine – nitrate – citrate solution)
Solution

(A) KNO_3 – 500 mg
Asparagine – 500 mg
Distilled water – 125 ml

(B) Neutral sodium citrate – 4.25 gm
KH_2PO_4 – 5.00 mg
$MgSO_4, 7H_2O$ – 5.00 mg
$CaCl_2, 6H_3O$ – 5.00 mg
$FeCl_3, 6H_2O$ – 100.00 mg
Distilled water – 125.00 ml

Solution A and B are mixed

Beet extract	–	900.00 mg
Peptone	–	1.5 gm
Agar – Agar	–	3.75 gm
pH	–	7

Are melted in water both and then the temperature is brought down to nearly 42 – 45^{0}C. Then 1 ml of sample suspension of 10^{-2} – 10^{-5} dilution is taken by a stelized pipette and poured within the sterile petri-dish aseptically.
Then the stab is poured in to the petri-dish containing sample. All the operation done aseptically near the flame and the petri-dish is allowed to solidity. After solidification the plate is kept in a incubator (35^{0}C) in inverted position. After 24 – 48 hrs of incubation the plates are observed and the numbers of colonies are counted. Genus *Aerobactor* and *Bacillus* were found in this method.
Results of Periphyton bacterial population in different pounds 1st and 2nd year
I have selected the five ponds in Sabang block areas. These are the one control pond (CP) name is Ghat pond and four are experimental pond (EP1, EP2, EP3, EP4) Ep1 is Dhara pond, EP2 is Majari pond, EP3 is Nandan pond, EP4 is Masanta pond. I saw the (Table No-4.1.A) month wise periphyton bacterial population in different ponds. In first year in control pond (Ghat pond) month wise number of periphyon change. Periphyton bacteria in different pond was in the month of July 2015 in CP pond 2.36X10^4, EP1 pond 4.01 X10^4, EP2 pond 3.99 X10^4, EP3 pond 3.51 X10^4 & EP4 pond 3.40 X10^4. In the month of August periphyton bacteria was in CP pond 2.23 X10^4, EP1 pond 3.75 X10^4, EP2 pond 3.77 X10^4, EP3 pond 3.01 X10^4 and EP4 pond 2.11 X10^4. In the month of April periphyton bacteria was in CP pond 3.91 X10^4, EP1 pond 4.10 X10^4, EP2 pond 4.26 X10^4, EP3 pond 2.70 X10^4 and EP4 pond 2.39 X10^4. In the month of May 2016 periphyton bacteria was in CP pond 3.00 X10^4, EP1 pond 3.8 X$10^4$1, EP2 pond 3.90 X10^4, EP3 pond 2.85 X10^4 and EP4 pond 2.74 X10^4. Low number of periphyton was 2.10X10^4 in the month of November. High number of periphyton bacteria was 3.91 X 10^4 in the month of April. Low number of periphyton bacteria was 2.11X10^4 in the months of August. High number of periphyton bacteria was 3.40X10^4 in the month of July. In the 1st year most of the ponds lowest number of periphyton is present in the month of November and most of the pond highest number of periphyton is present in the month of April. In second year (Table no- 4.2.B) the result of periphyton bacteria population in different pond is given. In the month of July 2016 periphyton bacteria was in CP pond 2.31 X10^4, EP1 pond 2.80 X10^4, EP2 pond 2.30 X10^4, EP3 pond 2.42 X10^4 and EP4 pond 2.30 X10^4. In the month of August periphyton bacteria was in CP pond 2.23 X10^4, EP1 pond 3.21 X10^4, EP2 pond 2.50 X10^4, EP3 pond 2.11 X10^4 and EP4 pond 2.21 X10^4. In the month of April periphyton bacteria was in CP pond 3.92 X10^4, EP1 pond 4.32 X10^4, EP2 pond 3.52 X10^4, EP3 pond 2.93 X10^4 and EP4 pond 3.22 X10^4. In the month of May 2017 periphyton bacteria was in CP pond 4.02 X10^4, EP1 pond 4.50 X10^4, EP2 pond 3.81 X10^4, EP3 pond 3.55 X$10^4$and EP4 pond 3.50 X10^4. In 2nd year lowest number of periphyton in CP was 2.01X10^4 in the month of September and high number of periphyton was 4.02X10^4 in the month of May. In EP4 minimum number of periphyton was 2.21X10^4 in the August month and minimum number was 3.50X10^4 in May month. In 2nd year most of the pond lowest number of periphyton was present in the month of August and highest number of periphyton is present in the month of May.

Table of periphyton bacterial population (m1^{-1}water) in different pounds First year (2015-16).

Months	CP	EP1	EP2	EP3	EP4
July	2.36×10^4 $\pm0.15\times10^4$	4.01×10^4 $\pm0.18\times10^4$	3.99×10^4 $\pm0.89\times10^4$	3.51×10^4 $\pm0.15\times10^4$	3.40×10^4 $\pm0.17\times10^4$
August	2.23×10^4 $\pm0.13\times10^4$	3.75×10^4 $\pm0.21\times10^4$	3.77×10^4 $\pm0.09\times10^4$	3.01×10^4 $\pm0.13\times10^4$	2.11×10^4 $\pm0.18\times10^4$
September	2.12×10^4 $\pm0.12\times10^4$	3.52×10^4 $\pm0.22\times10^4$	3.67×10^4 $\pm0.10\times10^4$	2.50×10^4 $\pm0.13\times10^4$	2.26×10^4 $\pm0.07\times10^4$
October	3.00×10^4 $\pm0.11\times10^4$	3.52×10^4 $\pm0.16\times10^4$	3.87×10^4 $\pm0.19\times10^4$	2.26×10^4 $\pm0.13\times10^4$	2.32×10^4 $\pm0.18\times10^4$
November	2.10×10^4 $\pm0.05\times10^4$	3.60×10^4 $\pm0.13\times10^4$	3.62×10^4 $\pm0.14\times10^4$	2.03×10^4 $\pm0.08\times10^4$	2.22×10^4 $\pm0.12\times10^4$
December	3.20×10^4 $\pm0.14\times10^4$	3.64×10^4 $\pm0.23\times10^4$	3.74×10^4 $\pm0.13\times10^4$	2.33×10^4 $\pm0.08\times10^4$	2.36×10^4 $\pm0.17\times10^4$
January	2.41×10^4 $\pm0.05\times10^4$	3.51×10^4 $\pm0.08\times10^4$	3.78×10^4 $\pm0.09\times10^4$	2.60×10^4 $\pm0.19\times10^4$	2.43×10^4 $\pm0.09\times10^4$
February	2.61×10^4 $\pm0.18\times10^4$	3.81×10^4 $\pm0.09\times10^4$	4.50×10^4 $\pm0.92\times10^4$	2.31×10^4 $\pm0.13\times10^4$	2.32×10^4 $\pm0.18\times10^4$
March	3.70×10^4 $\pm0.10\times10^4$	3.90×10^4 $\pm0.0\times10^4$	4.70×10^4 $\pm0.98\times10^4$	2.18×10^4 $\pm0.11\times10^4$	2.50×10^4 $\pm0.13\times10^4$
April	3.91×10^4 $\pm0.86\times10^4$	4.10×10^4 $\pm0.88\times10^4$	4.26×10^4 $\pm0.89\times10^4$	2.70×10^4 $\pm0.28\times10^4$	2.39×10^4 $\pm0.18\times10^4$
May	3.00×10^4 $\pm0.85\times10^4$	3.81×10^4 $\pm0.18\times10^4$	3.90×10^4 $\pm0.07\times10^4$	2.85×10^4 $\pm0.08\times10^4$	2.74×10^4 $\pm0.23\times10^4$

Table of periphyton bacterial population (m1^{-1}water) in different pounds Second year (2016-17).

Months	CP	EP1	EP2	EP3	EP4
July	2.31×10^4 $\pm0.09\times10^4$	2.80×10^4 $\pm0.17\times10^4$	2.30×10^4 $\pm0.08\times10^4$	2.42×10^4 $\pm0.10\times10^4$	2.30×10^4 $\pm0.09\times10^4$
August	2.23×10^4 $\pm0.13\times10^4$	3.21×10^4 $\pm0.10\times10^4$	2.50×10^4 $\pm0.14\times10^4$	2.11×10^4 $\pm0.25\times10^4$	2.21×10^4 $\pm0.13\times10^4$
September	2.01×10^4 $\pm0.12\times10^4$	3.51×10^4 $\pm0.18\times10^4$	2.31×10^4 $\pm0.08\times10^4$	2.34×10^4 $\pm0.14\times10^4$	2.41×10^4 $\pm0.14\times10^4$
October	1.90×10^4 $\pm0.33\times10^4$	3.42×10^4 $\pm0.18\times10^4$	2.12×10^4 $\pm0.25\times10^4$	2.45×10^4 $\pm0.11\times10^4$	2.80×10^4 $\pm0.17\times10^4$
November	2.12×10^4 $\pm0.13\times10^4$	3.50×10^4 $\pm0.18\times10^4$	2.22×10^4 $\pm0.11\times10^4$	2.53×10^4 $\pm0.14\times10^4$	2.50×10^4 $\pm0.14\times10^4$
December	2.21×10^4 $\pm0.14\times10^4$	3.71×10^4 $\pm0.15\times10^4$	2.79×10^4 $\pm0.22\times10^4$	2.62×10^4 $\pm0.18\times10^4$	2.31×10^4 $\pm0.10\times10^4$
January	2.50×10^4 $\pm0.14\times10^4$	3.31×10^4 $\pm0.18\times10^4$	3.56×10^4 $\pm0.17\times10^4$	2.74×10^4 $\pm0.24\times10^4$	2.90×10^4 $\pm0.18\times10^4$
February	2.81×10^4 $\pm0.24\times10^4$	3.81×10^4 $\pm0.08\times10^4$	3.78×10^4 $\pm0.17\times10^4$	2.97×10^4 $\pm0.23\times10^4$	3.11×10^4 $\pm0.12\times10^4$
March	3.41×10^4 $\pm0.10\times10^4$	4.20×10^4 $\pm0.05\times10^4$	3.92×10^4 $\pm0.08\times10^4$	2.63×10^4 $\pm0.10\times10^4$	3.30×10^4 $\pm0.20\times10^4$
April	3.92×10^4 $\pm0.08\times10^4$	4.32×10^4 $\pm0.05\times10^4$	3.52×10^4 $\pm0.09\times10^4$	2.93×10^4 $\pm0.21\times10^4$	3.22×10^4 $\pm0.13\times10^4$
May	4.02×10^4 $\pm0.08\times10^4$	4.50×10^4 $\pm0.02\times10^4$	3.81×10^4 $\pm0.80\times10^4$	3.55×10^4 $\pm0.18\times10^4$	3.50×10^4 $\pm0.19\times10^4$

Periphyton bacterial population (m1-1water) in different pounds during experimental trial control pond (CP), treated with periphyton bacteria (EP1 & EP2), denitrifying bacteria (EP3 & EP4).

Results of denitrifying bacterial population in different ponds 1st and 2nd year

In the pond ecosystem denitrifying bacteria is a member for realizing the Nitrogen (N) from the water or water bodies. I saw the population of denitrifying bacteria in selected five ponds (CP, EP1, EP2, EP3 & EP4) during two years. Every years and every month July to May collected the denitrifying bacteria and counted every month. I saw the (highest and lowest) number of denitrifying bacteria in every year in different ponds (table no 4.2.A & 4.2.B). In the month of July 2015 the denitrifying bacterial population was in CP pond 1.14 X10^4, EP1 pond 1.23 X10^4, EP2 pond 1.26 X10^4, EP3 pond 1.92 X10^4 & EP4 pond 2.94 X10^4. In August month the denitrifying bacterial population was in CP pond 1.16 X10^4, EP1 pond 1.23 X10^4, EP2 pond 1.22 X10^4, EP3 pond 1.93 X10^4 & EP4 pond 2.14 X10^4. In the month of April the denitrifying bacterial population was in CP pond 1.56 X10^4, EP1 pond 1.63 X10^4, EP2 pond 1.62 X10^4, EP3 pond 2.62 X10^4 & EP4 pond 2.51 X10^4. The denitrifying bacterial population in the month of May 2016 was in CP pond 1.71 X10^4, EP1 pond 1.45 X10^4, EP2 pond 1.22 X10^4, EP3 pond 2.54 X10^4 & EP4 pond 2.84 X10^4. In control pond (CP) I saw the lowest amount of denitrifying bacteria in December month and highest number of denitrifying bacteria was in the month of May. In EP4 (Masanta pond) I saw the lowest quantity of denitrifying bacteria (1.84X10^4) in the month of December, 2015 and the highest number of denitrifying bacteria (2.97X10^4) in the month of March, 2016.

Table of denitrifying bacterial population (ml^{-1} water) in different ponds First year (2015-16).

Months	CP	EP1	EP2	EP3	EP4
July	1.14×10^4 ±0.19×10^4	1.23×10^4 ±0.08×10^4	1.26×10^4 ±0.08×10^4	1.92×10^4 ±0.08×10^4	2.19×10^4 ±0.09×10^4
August	1.16×10^4 ±0.05×10^4	1.23×10^4 ±0.08×10^4	1.22×10^4 ±0.01×10^4	1.93×10^4 ±0.12×10^4	2.14×10^4 ±0.19×10^4
September	1.26×10^4 ±0.08×10^4	1.25×10^4 ±0.05×10^4	1.15×10^4 ±0.08×10^4	1.83×10^4 ±0.20×10^4	2.18×10^4 ±0.18×10^4
October	1.15×10^4 ±0.05×10^4	1.32×10^4 ±0.05×10^4	1.22×10^4 ±0.09×10^4	2.03×10^4 ±0.13×10^4	2.97×10^4 ±0.08×10^4
November	1.24×10^4 ±0.18×10^4	1.03×10^4 ±0.09×10^4	1.17×10^4 ±0.04×10^4	1.83×10^4 ±0.19×10^4	2.04×10^4 ±0.22×10^4
December	1.00×10^4 ±0.03×10^4	1.17×10^4 ±0.04×10^4	1.45×10^4 ±0.07×10^4	2.00×10^4 ±0.21×10^4	1.84×10^4 ±0.10×10^4
January	1.02×10^4 ±0.09×10^4	1.03×10^4 ±0.10×10^4	1.13×10^4 ±0.18×10^4	2.41×10^4 ±0.11×10^4	2.14×10^4 ±0.05×10^4
February	1.07×10^4 ±0.09×10^4	1.24×10^4 ±0.06×10^4	1.02×10^4 ±0.10×10^4	2.17×10^4 ±0.07×10^4	2.33×10^4 ±0.14×10^4
March	1.21×10^4 ±0.18×10^4	1.69×10^4 ±0.23×10^4	1.54×10^4 ±0.10×10^4	2.23×10^4 ±0.12×10^4	2.97×10^4 ±0.03×10^4
April	1.56×10^4 ±0.10×10^4	1.63×10^4 ±0.27×10^4	1.62×10^4 ±0.27×10^4	2.62×10^4 ±0.18×10^4	2.51×10^4 ±0.01×10^4
May	1.71×10^4 ±0.18×10^4	1.45×10^4 ±0.17×10^4	1.22×10^4 ±0.18×10^4	2.54×10^4 ±0.13×10^4	2.84×10^4 ±0.06×10^4

Table number 4.2.B represents the data of denitrifying bacteria in the five ponds and every month. In the month of July 2016 the denitrifying bacterial population was in CP pond 1.24 X10^4, EP1 pond 1.44 X10^4, EP2 pond 1.44 X10^4, EP3 pond 2.23 X10^4 & EP4 pond 2.33 X10^4. The denitrifying bacterial population in the month of August was in CP pond 1.34 X10^4, EP1 pond 1.63 X10^4, EP2 pond 1.64 X10^4, EP3 pond 2.17 X10^4 & EP4 pond 2.14 X10^4. The denitrifying bacterial population in the month of April was in CP pond 1.54 X10^4, EP1 pond 1.72 X10^4, EP2 pond 1.84 X10^4, EP3 pond 2.89 X10^4 & EP4 pond 2.89 X10^4.

In the month of May 2017 the denitrifying bacterial population was in CP pond 1.87 X10^4, EP1 pond 1.52 X10^4, EP2 pond 1.41 X10^4, EP3 pond 2.61 X10^4 & EP4 pond 2.82 X10^4. In CP (Ghat pond) represents the lowest amount of denitrifying bacteria (1.02 X 10^4) in the month of December, 2015 and highest quantity of denitrifying bacteria (1.87X10^4) in the month of May, 2016. In EP4 (Masanta pond) represents the minimum quantity of denitrifying bacteria (1.93X10^4) in the month of December, 2015 and the highest amount of denitrifying bacteria (2.93 X 10^4) in March month, 2016.

At last we saw in first year (2015-2016) lowest count of denitrifying bacteria is present in the month of December, 2015 and highest number of denitrifying bacteria is present in April month, 2016. We saw in the 2nd year (2016-2017) lowest amount of denitrifying bacteria is present in the month of December, 2015 and the highest quantity of denitrifying bacteria is present in April month, 2016.

Table of denitrifying bacterial population (ml^{-1} water) in different ponds Second year (2016-17).

Months	CP	EP1	EP2	EP3	EP4
July	1.24×10^4 $\pm0.09\times10^4$	1.44×10^4 $\pm0.08\times10^4$	1.44×10^4 $\pm0.14\times10^4$	2.23×10^4 $\pm0.06\times10^4$	2.33×10^4 $\pm0.10\times10^4$
August	1.34×10^4 $\pm0.13\times10^4$	1.63×10^4 $\pm0.18\times10^4$	1.64×10^4 $\pm0.18\times10^4$	2.17×10^4 $\pm0.08\times10^4$	2.14×10^4 $\pm0.01\times10^4$
September	1.23×10^4 $\pm0.04\times10^4$	1.32×10^4 $\pm0.08\times10^4$	1.32×10^4 $\pm0.09\times10^4$	2.41×10^4 $\pm0.13\times10^4$	2.33×10^4 $\pm0.19\times10^4$
October	1.42×10^4 $\pm0.16\times10^4$	1.59×10^4 $\pm0.03\times10^4$	1.59×10^4 $\pm0.02\times10^4$	2.15×10^4 $\pm0.11\times10^4$	2.03×10^4 $\pm0.10\times10^4$
November	1.13×10^4 $\pm0.18\times10^4$	1.23×10^4 $\pm0.19\times10^4$	1.49×10^4 $\pm0.14\times10^4$	2.20×10^4 $\pm0.24\times10^4$	2.03×10^4 $\pm0.17\times10^4$
December	1.02×10^4 $\pm0.19\times10^4$	1.09×10^4 $\pm0.04\times10^4$	1.09×10^4 $\pm0.18\times10^4$	1.93×10^4 $\pm0.02\times10^4$	1.93×10^4 $\pm0.04\times10^4$
January	1.96×10^4 $\pm0.16\times10^4$	1.22×10^4 $\pm0.14\times10^4$	1.23×10^4 $\pm0.04\times10^4$	2.84×10^4 $\pm0.16\times10^4$	2.22×10^4 $\pm0.19\times10^4$
February	1.02×10^4 $\pm0.09\times10^4$	1.24×10^4 $\pm0.17\times10^4$	1.25×10^4 $\pm0.14\times10^4$	2.89×10^4 $\pm0.07\times10^4$	2.54×10^4 $\pm0.15\times10^4$
March	1.52×10^4 $\pm0.14\times10^4$	1.61×10^4 $\pm0.09\times10^4$	1.54×10^4 $\pm0.17\times10^4$	3.04×10^4 $\pm0.10\times10^4$	2.93×10^4 $\pm0.13\times10^4$
April	1.54×10^4 $\pm0.04\times10^4$	1.72×10^4 $\pm0.18\times10^4$	1.84×10^4 $\pm0.10\times10^4$	2.89×10^4 $\pm0.07\times10^4$	2.89×10^4 $\pm0.07\times10^4$
May	1.87×10^4 $\pm0.33\times10^4$	1.52×10^4 $\pm0.19\times10^4$	1.41×10^4 $\pm0.09\times10^4$	2.61×10^4 $\pm0.09\times10^4$	2.82×10^4 $\pm0.04\times10^4$

Overall discussion on bacterial community in five ponds

Plankton density is an important index of the nutritive condition in biological productivity of a pond. Welch. 1952 and essential density of the plankton for a fish pond has been reported as Alikunhi, (1957) as 1.5-2.0 ml of Zooplankton 45 litre^{-1} water. The rate of production was sufficient in all experimental ponds treated with periphyton bacterial population than the denitrifying bacterial population but both are higher than CP. Bacteria capable of fixing nitrogen and mineralizing phosphorus have been widely applied to agricultural soils in the former Soviet Union and are claimed to increase nutrient concentration can't yield Cooper 1959; Brown 1974. Water quality deterioration and off-flavor in fish are common problems in the commercial culture of fish (Boyd. C.E, 1979).

Recently the selling of bacterial suspension in fish farming by making the increase of lower phosphorous concentration increases dissolved oxygen level etc. was studied by (Boyd, 1979). It is claimed to contain 45x10^9 live, saprophytic bacteria per liter. The bacterial suspension consists of *Bacillus, Nitrobactro, Pseudomous, Aerobactor, Rhodopesudomonas*. Farther, it is claimed that when the suspension is applied to water, the bacteria immediately being to utilize various substrates without going through a lag phase. Aerobic heterotrophic bacteria in the pond water fluctuated between 0.01-8.7X10^5 ind/ml, den, denitrifying.

Bacteria fluctuate 0.15-2.5 X 10^5 in d/ml. and periphyton bacteria fluctuated between 0-4.50 in d/ml. Jun et al, (2000) and further claimed periphyton bacteria are strongly correlated with physic-chemical factors, indicating that they have an important role in the management of water soil quality and growth of fishes. Distribution of periphyton bacteria in polyculture system is in the fish culture tank. Periphyton bacterial population, which was recorded throughout the experimental period at monthly interval and highest value, was found EP2 and EP1 in first year and also second year. Denitrifying bacterial population, which we recorded throughout the experimental period highest value in EP3 and EP4 in the first year and in the second year highest value also found in EP3 and EP4. However, periphyton bacterial population proved to be relatively more powerful for enhancing the production of fish. Denitrifying bacterial population is also sowed better result (although the application rate is same) than the result obtained from (CP) control pond.

CONCLUSION

Study on bacterial community in ponds is scanty. But it has to be tremendous economic significance and relevance aquaculture practice which is likely to open new vistas pertaining to the sustainable development.

So the objective of the study was too evaluated of the routine use of a commercially produced bacterial community with improvement of water and slude quality of ponds.

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