

Diversity of Pond Ecosystem and Its Components: A Mini-review

Rajesh T^{1*} and Preethi J²

¹Department of Environmental sciences, Osmania University, Hyderabad, Telangana, India

²Acharya Nagarjuna University, Guntur, Andhra Pradesh, India

*Corresponding author: Rajesh T, Department of Environmental sciences, Osmania University, Hyderabad, Telangana, India, Tel: +7 (499) 976-0480; E-mail: mailme_rajesh520@rediffmail.com

Received date: March 03, 2017; Accepted date: March 24, 2017; Published date: March 27, 2017

Copyright: © 2017 Rajesh, et al. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

Abstract

Basic unit in ecology formed from the cohabitation of plants, animals is known as Pond ecosystem, Ponds shallow water bodies barely reach 12 to 15 feet in-depth. A Pond biological community is a freshwater biological community in which groups of living beings depend on each other and the water environment for their supplements and survival.

Ponds are a vital part of the hydrological framework; and perform various parts in the biosphere. Thinks about on lake environments are, in any case, regularly dismissed, likely, because of their little size.

Keywords: Community; Environment; Ecology; Microphytes; Conservation

Introduction

Ponds are among the maximum various freshwater habitats and were recently determined to help extra species, in addition to extra unusual, rare, and threatened species in comparison to lakes, rivers, and streams [1-10]. The conservation of ponds represents a cost-powerful manner of maintaining or improving biodiversity, due to the everyday small length of pond catchment regions.

A Pond may indicate blends of three diverse nourishment web parts: one based upon cyanobacteria and green growth, another based upon expansive plants, and another based upon rotted plants [11-15].

Pond biological systems have both abiotic and biotic segments.

Biotic components

- light, water and temperature are the environmental factors
- oxygen, carbon dioxide and nitrogen are the inorganic components
- carbohydrates, Proteins, amino acids nucleic acids and fats are organic components

Abiotic components

An abiotic component includes producers, consumers and decomposers.

In which producers are aquatic green plants, consumers are heterotrophic organisms and decomposers includes heterotrophic microorganisms [16-25].

Producers

These are the aquatic green plants which may be of two types:

- Microphytes

- Macrophytes.

Microphytes are also known as phytoplanktons, which are microscopic in nature. For example Spirogyra and Volvox.

Macrophytes are large in nature.

A submerged plant, floating plants and immersed plants comes under macrophytes.

Consumers

The heterotrophic organisms are known as consumers in which primary, secondary and territory consumers [26-35].

Primary consumers

These are herbivores animals completely depending upon auto trophic organisms [36-45].

Example: Zooplankton.

Secondary consumers

These are Carnivores depends upon animals.

Example: Insects and Fogs etc.

Tertiary consumers

These fed upon either plants or animals, these are called as second grade of carnivores.

Decomposers

Decomposer includes all heterotrophic microorganisms like fungi, bacteria [46-50].

These produce food materials by breaking down the organic complex food material to simple inorganic compounds [51-70].

According to pond stratification based on qualities like depth of water, penetration of light and both animals and plant vegetation decomposers are of three zones [71-96].

They are Littoral zone, Limnetic Zone, Profundal Zone.

Uses of Pond Ecosystem

- These can be used as important hotspot for biodiversity.
- Ponds are also wonderful for our terrestrial wildlife.

References

1. Mohanty S, Choudhury PK, Dash A, Samanta M, Maiti NK (2011) Genotypic and phenotypic diversity of *Bacillus* spp. isolated from Freshwater Ecosystems. *J Aquac Res Development* 2: 112.
2. Gebre T, Dessie M, Hagos S, Getachew M, Sinshaw M, et al. (2016) An Assessment of Risks and Opportunities Related to Ecosystem Services, in the case of Mekelle city. *J Ecosyst Ecogr* 6: 217.
3. Yadav R, Barua A (2016) A Study of Urbanization and Ecosystem Services of Guwahati City from Forest Footprint Perspective. *J Ecosyst Ecogr* 5: 004.
4. Valdez VC, Ruiz-Luna A, Berlanga-Robles AC (2016) Effects of Land Use Changes on Ecosystem Services Value Provided By Coastal Wetlands: Recent and Future Landscape Scenarios.
5. Shamim A, Mursheda AK, Rafiq I (2015) E-Waste Trading Impact on Public Health and Ecosystem Services in Developing Countries. *J Waste Resources* 5: 188.
6. Knox OGG, Marsden TJ, Warnick S3, Birch G3, Scherbatskoy MN, et al. (2015) Improved Sustainability and Ecosystem Services from Seaweed Additions to an Old Agricultural Production System.
7. Khadka R, Shrivastav A (2015) Poverty Reduction Program through Adaptive Management of Ecosystem Services: The Concept Notes for Nepal. *J Ecosyst Ecograph* 5: 154.
8. Grazhdani D (2013) Applying Contingent Valuation Survey to Assess the Economic Value of Restoring Ecosystem Services of Impaired Rivers: A Case Study in Transboundary Buna River Region, Albania. *International Journal of Innovative Research in Science, Engineering and Technology*.
9. Ventrubova K (2015) Toolbox with Valuation of Forest Ecosystem Services Approaches. *Forest Res* 4: e114.
10. Piotr S (2013) Biodiversity and Ecosystem Services in Soil under Threat. *J Pollut Eff Cont* 1: e101.
11. Lin YP (2012) Sustainability of Ecosystem Services in a Changing World. *J Ecosyst Ecograph* 2: e111.
12. Boon E, Ahenkan A (2013) Assessing Climate Change Impacts on Ecosystem Services and Livelihoods in Ghana: Case Study of Communities around Sui Forest Reserve. *J Ecosyst Ecogr* 3: 001.
13. Afolayan TA (1978) Savanna burning in Kainji Lake National Park, Nigeria. *E Afr Wildl J* 16: 254-255.
14. Wahab MKA (2014) Wildlife and ecotourism management. Ph.D. Thesis, University of Ibadan.
15. Agbelusi EA (1994) Wildlife conservation in Ondo State. *The Nigerian field* 59: 73-83.
16. Kormos R, Boesch C, Bakarr MI, Butynaki TM (2003) West African Chimpanzees: Status survey and conservation action plan. Gland, Switzerland: IUCN.
17. Falconer J (1992) Non-timber forest products in Southern Ghana. Report to Forestry Services Division of Ghana, AGRIS.
18. Asibey EOA (1986) Wildlife as a source of protein in Africa south of Sahara. *Biol Conserv* 6: 32-39.
19. Ntiama-Baidu Y (1987) West African wildlife: A resource in jeopardy. *Unasylva* 156: 27-42.
20. Collins WB (1960) Wildlife conservation in Ghana: part II. *Ghana Fmr* 5: 28-35.
21. Korem A (1985) Bushfire and agricultural development in Ghana. Ghana Publishing Corporation.
22. Happold DCD (1995) The interaction between humans and mammals in Africa in relation to conservation: a review. *Biodiver Conserv* 4: 395-414.
23. Abayie BA (1998) Traditional conservation practices: Ghana's example in biodiversity conservation: traditional knowledge and modern concepts. In: Amlalo DS, Atsiatome LD, Fiati C (eds.). Proceedings of the Third UNESCO-MAB Regional Seminar on Biosphere Reserves for Biodiversity Conservation and Sustainable Development in Francophone Africa (BRAAF), Cape Coast. pp: 42-51.
24. Anadu PA, Oates JF (1987) The status of wildlife in Bendel State, Nigeria with recommendations for its conservation. Report to the Bendel state Ministry of Agriculture and Natural Resources, the Nigeria Federal Ministry of Agriculture, the Nigeria Conservation Foundation, the New York Zoological Society, the World Wildlife Fund (USA).
25. Amlalo DS, Atsiatome LD, Fiati C (1998) Biodiversity Conservation: Traditional knowledge and modern concepts In: Amlalo DS, Atsiatome LD, Fiati C (eds.). Proceedings of the Third UNESCO-MAB Regional Seminar on Biosphere Reserves for Biodiversity Conservation and Sustainable Development in Francophone Africa (BRAAF), Cape Coast. pp: 1-6.
26. Ayeni JSO (1985) Attitude of utilization and management of wildlife in rural areas. 8th annual conference of Forestry Association of Nigeria, Kano.
27. Collar NJ, Crosby MJ, Stattersfield AJ (1994) Birds to watch 2 (The world list of threatened birds). Official source for birds on the IUCN red list. Birdlife International, Cambridge, UK.
28. International Geosphere and Biosphere Programme/Human Dimensions Programme (IGBP/HDP) (1993) Relating land use and global land-cover change. IGBP Report No. 24, HDP Report No. 5, Stockholm.
29. Kormondy EJ (1976) Concept of Ecology. Prentice -Hall, D. C. Cliffs Eaglewood.
30. Mather AS (1986) Land use. Longman, London.
31. McNeely JA, Gadgi M, Leveque C, Padock C, Redford K (1995) Human influence on biodiversity. In: Heywood VH, Watson RT (eds.) Global biodiversity assessment. Cambridge University Press, Cambridge. pp: 771-821.
32. Odum EP (1963) Ecology: Modern biology series. Holts Rinchert and Winston, London.
33. Santher JM, Smith RD (1984) An over view of major wetland functions and values. Fishand Wildlife Service, FWS/OBS-84/18, Washington DC. pp: 152.
34. Tunner BL, Clark WC, Kate RW, Richard JF, Matthews JT, et al. (1990) The earth as transformed by human action. Cambridge University Press, Cambridge.
35. Wilson EO (1992) The diversity of life. Belknap, Cambridge, Massachusetts.
36. Ilardi V (2014) Could Transgenic Plants Expressing Virus-Derived Sequences Create New Routes for Virus Evolution. *Biosafety* 3: e151.
37. Nandy S, Sinha R, Rajam MV (2013) Over-expression of Arginine Decarboxylase Gene in Tapetal Tissue Results in Male Sterility in Tomato Plants. *Cell Dev Biol* 2: 117.
38. Kumar S (2012) Phytoremediation of Explosives using Transgenic Plants. *J Pet Environ Biotechnol* S4-001.
39. Kumar S, Jin M, Weemhoff JL (2012) Cytochrome P450-Mediated Phytoremediation using Transgenic Plants: A Need for Engineered Cytochrome P450 Enzymes. *J Pet Environ Biotechnol* 3: 127.
40. Gils M, Kempe K, Boudichevskaia A, Jerchel R, Pescianschi D, et al. (2013) Quantitative Assessment of Wheat Pollen Shed by Digital Image Analysis of Trapped Airborne Pollen Grains. *Adv Crop Sci Tech* 2: 119.
41. Alagna F (2013) Innovative Transcriptomics Approaches for Large Scale Identification of Genes Involved In Plant Secondary Metabolism. *J Plant Biochem Physiol* 1: e107.
42. Sekhon KK (2013) GM Crops: Safe or Not – the Fear must be Allayed. *J Pet Environ Biotechnol* 4: e116.

43. Jouzani GS (2012) Risk Assessment of GM Crops; Challenges in Regulations and Science. *Biosafety* 1: e113.
44. Escaler M, Teng PPS, Powell AD (2012) Challenges of Harmonization of Agricultural Biotechnology Regulatory Systems across APEC Economies. *Biosafety* 1: 101.
45. Assemi H, Sajjadi A, Naghizadeh F (2014) Investigation of Different Values of Nanoimidacloprid for Control of Tobacco Aphids *Myzus persicae* nicotianaen Laboratory. *Agrotechnol* 3: 128.
46. Jain M (2013) Emerging Role of Metabolic Pathways in Abiotic Stress Tolerance. *J Plant Biochem Physiol* 1: 108.
47. Fufa M (2013) Genetic Divergence in Ethiopian Coriander. *Adv Crop Sci Tech* 1: 116.
48. Pandiarajan G, Balaiah NT, Kumar BM (2012) Exploration of Different *Azospirillum* Strains from Various Crop Soils of Srivilliputtur Taluk. *J Biofertil Biopестици* 3: 117.
49. Malaghan SV, Lokesha R, Savitha R, Ranganatha ARG (2013) Adventitious shoot regeneration in Sesame (*Sesamum indicum* L.) (Pedaliaceae) via deembryonated cotyledonary explants. *Res J Biol* 1: 31-35.
50. JianLong Xu, Jauhar Ali (2014) Connecting rice germplasm to plant breeding: backcrossing for allele mining and recurrent selection for allele pyramiding through molecular marker technology. *Adv Crop Sci Tech* 2: e114.
51. Ranade SA, Yadav H (2014) Universal Molecular Markers for Plant Breeding and Genetics Analysis. *J Plant Biochem Physiol* 2: e121.
52. Estari M, Venkanna L, Sripriya D, Lalitha R (2012) Human Immunodeficiency Virus (HIV-1) reverse transcriptase inhibitory activity of *Phyllanthus emblica* plant extract. *Biol Med* 4: 175.
53. Ghous T, Akhtar K, Nasim FUH, Choudhry MA (2010) Screening of selected medicinal plants for urease inhibitory activity. *Bio Med* 2: 077.
54. Sreerag RS, Jayaprakas CA (2015) Management of Two Major Sucking Pests using Neem Oil Formulation. *J Biofertil Biopестици* 6: 147.
55. Veeresham C, Chitti P (2013) Therapeutic Agents from Tissue Cultures of Medicinal Plants. *Nat Prod Chem Res* 1: 118.
56. Habibi-Pirkooch M, Malekzadeh-Shafaroudi S, Marashi H, Moshtaghi N, Nassiri M (2014) Expression of Foot and Mouth Disease Virus. *IJPAES* 4: 1-5.
57. Thangjam R (2014) Application of Biotechnological Tools for Evaluation of Genetic Diversity, In Vitro Propagation and Genetic Transformation in *Parkia Timoriana*. *IJPAES* 4: 1-3.
58. Sah SK, Kaur A, Kaur G, Cheema GS (2015) Genetic Transformation of Rice: Problems, Progress and Prospects. *J Rice Res* 3: 132.
59. Rivera AL, Goacutemez-Lim M, Fernandez F, Loske AM (2014) Genetic Transformation of Cells using Physical Methods. *J Genet Syndr Gene Ther* 5: 237.
60. Kamionskaya AM, Kuznetsov BB, Ismailov VY, Nadikta VD, Skryabin KG (2012) Genetically Transforming Russian Potato Cultivars for Resistance to Colorado Beetle. *Clon Transgen* 1: 101.
61. Kamle S, Ali S (2013) Reverberations on Biosafety Issues Pertaining to Genetically Modified Crops. *Biosafety* 2: 112.
62. Pauwels K (2012) Are 'OMICS' Contributing to the Identification of Unintended Effects in Genetically Modified Crops? *Biosafety* 1: e103.
63. Rath M, Panda SS, Dhal NK (2014) Synthesis of Silver Nano Particles from Plant Extract and Its Application in Cancer Treatment: A Review. *IJPAES* 4: 1-9.
64. Parveen T, Sharma K (2015) Pythium Diseases, Control And Management Strategies: A Review. *IJPAES* 5: 1-14.
65. Parihar N, Kumar S (2013) Study of Antifungal Potential of *Aegle Marmelos*: A Medicinal Plant. *IJPAES* 3: 1-4.
66. Pattanayak M, Nayak PL (2013) Ecofriendly Green Synthesis of Iron Nanoparticles from Various Plants and Spices Extract. *IJPAES* 3: 68-78.
67. Sahu Dk, khare CP, Patel R (2014) Eco friendly management of early blight of tomato using botanical plant extracts. *Jr. of Industrial Pollution Control* 30: 215-218.
68. Saeed BQ, Hassan HF, Arteen HI (2014) Effect of Some Medical Plant Extracts on Metabolism of *Leishmania tropica* Promastigotes In vitro. *J Med Microb Diagn* 3: 165.
69. Singh K, Panghal M, Kadyan S, Yadav J (2014) Evaluation of Antimicrobial Activity of Synthesized Silver Nanoparticles using *Phyllanthus amarus* and *Tinospora cordifolia* Medicinal Plants. *J Nanomed Nanotechnol* 5: 250.
70. Ibrahim TA, Fagbohun ED, Olalumade BB (2014) Study of the Synergistic Effect of Antibiotics and Plant Extracts against Clinical *Staphylococcus aureus* Strains. *Pharmacy and Pharmaceutical Sciences*. 2014.
71. Bajpai S, Pathak R, Hussain T (2014) Anti-Inflammatory Activity of Ethanobotanical Plants Used as Traditional Medicine: A Review. *Journal of Botanical Sciences*.
72. Bianchini A, Stratton J, Weier S, Cano C, Garcia LM, et al. (2014) Use of Essential Oils and Plant Extracts to Control Microbial Contamination in Pet Food Products. *J Food Process Technol* 5: 357.
73. Hajt T, Admy A, Baranyai L, Langmár Z, Kirsch A, et al. (2014) Can Standardized Plant Extracts Induce Complete Remission in Patients with Metastatic Tumors?. *Altern Integ Med* 3: 161.
74. Zainal B, Abdah MA, Taufiq-Yap YH, Roslida AH, Rosmin K (2014) Anticancer Agents from Non-Edible Parts of *Theobroma cacao*. *Nat Prod Chem Res* 2: 134.
75. AbdelHaleem AA (2014) Cytotoxicity of Plant Extract *Origanum syriacum* on Gametogenesis of Two Terrestrial Slugs, Using TEM. *J Cytol Histol* 5: 224.
76. Ademe A, Ayalew A, Woldetsadik K (2014) In Vitro and In Vivo Activity of Selected Plant Extracts against *Papaya Carica papaya* L. *J Horticulture* 1: 104.
77. El-Khateeb AY, Elsherbiny EA, Tadros LK, Ali SM, Hamed HB (2013) Phytochemical Analysis and Antifungal Activity of Fruit Leaves Extracts on the Mycelial Growth of Fungal Plant Pathogens. *J Plant Pathol Microbiol* 4: 199.
78. Sucharitha E, Estari M (2013) Evaluation of antidiabetic activity of medicinal plant extracts used by tribal communities in rural areas of Warangal district, Andhra Pradesh, India. *Bio Med* 5: 20-25.
79. Matsinkou RS, Ngondi JL, Kuate D, Mbofung C, Oben JE (2012) Antioxidant and anti-hyperglycemic potential of pulp extracts of *Irvingia wombolu* fruits. *Bio Med* 4: 153.
80. Wan Nordini Hasnor WI, Fathilah AR, Rahim ZHA (2013) Plant Extracts of *Psidium guajava*, *Mangifera* and *Mentha* sp inhibit the Growth of the Population of Single-species Oral Biofilm. *Altern Integ Med* 2: 102.
81. Abou-Zeid AM (2012) Review on Citrinin: Production, Effect of Some Plant Extracts and Gene Involved in its Biosynthesis. *J Civil Environ Eng* 2: 113.
82. Soumaya K, Rouissi K, Hamrita B, Ouerhani S, Cherif M, et al. (2012) Therapeutic Effects of Aloe Vera Plant Extract Against Cyclophosphamide and Buthionine Sulfoximine Induced Toxicities in the Bladder. *Biochem Pharmacol* 1: 101.
83. Morsy Azzam RH, Sorour MA, Elmahrouky AS (2011) Improvement of Jute Packages to Resist Insects during Storage of Bean Seeds. *J Textile Sci Engg* 1: 101.
84. Begum N, Sharma B, Pandey RS (2011) Toxicity Potential and Anti AchE Activity of Some Plant Extracts in *Musca Domestica*. *J Biofertil Biopестици* 2: 108.
85. Rumschlag-Booms E, Zhang H, Soejarto DD, Fong HHS, Rong L (2011) Development of an Antiviral Screening Protocol: One-Stone-Two-birds. *J Antivir Antiretrovir* 3: 008.
86. APHA (2002) Standard Methods for the examination of Water and Waste water(21stedn.) Washington, D.C, USA.
87. WHO (2008) Guidelines for Drinking water (3rdedn.) Geneva.
88. European (2011) National Drinking Water Quality Standards.
89. Drinking Water Standards (2004) BIS 10500 by BIS.
90. Raveen R, Daniel M (2010) Spatial changes in water quality of urban lakes in Chennai (India) - A case study. *J Environ Science Engg* 52: 259-264.

-
91. Jumbe AS, Nandini N (2010) Physico-chemical and heavy metals evaluation of polluted urban wetlands of Bangalore. *Res J Chem Environ* 14:22-35.
 92. Verandani S, Vardhan D (2012) Study of groundwater quality of Ulhasnagar city in Thane district, Maharashtra, India using multivariate and microbial analysis. *Res J Chem Environ* 16: 58-64.
 93. Muthulakshmi L, Ramu A, Kannan N (2010) Assessment of groundwater quality in Virudhunagar district (India): A statistical approach. *J Environ Sci Engg* 52: 229-234.
 94. Guide manual: Water and waste water analysis by Central pollution control board, A Govt. of India org.
 95. Heydari MM, Abasi A, Rohani MS, Hosseini SMA (2013) Correlation study and regression analysis of drinking water quality in Kashan city, Iran Middle-East. *J Scientific Res* 13: 1238.
 96. Shrestha R, Kafle B, Sillanpää M (2010) Water quality of Dhulikhel area, Nepal. *Res J Chem Environ* 14: 36-38.