

A Study on the Genetic Diversity as a Buffer in respect of Biodiversity

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ABSTRACT: *The variety of life on Earth, comprising millions of plants, animals, microorganisms and the genes they carry, refers to biodiversity or biological diversity. It simply means the presence of the natural habitats of a wide range of plant and animal species or the diversity of plant and animal life in a given habitat. Biodiversity has a large number of values and is typically represented at three stages genetic diversity, diversity of the organisms, diversity of the environment. An ecosystem is a group of life forms (biotic components) that interact with one another and their environment's non-living elements (abiotic components). Nearly every ecosystem retains its own environmental insurance. Biodiversity has a large number of values and is typically represented at three stages genetic diversity, diversity of the organisms, diversity of the environment. An ecosystem is a group of life forms (biotic components) that interact with one another and their environment's non-living elements (abiotic components). An ecosystem requires three kinds of diversity to sustain this system: biological, genetic and functional. Biological diversity refers to the species' richness in a specific area; genetic diversity refers to a specific species' way of adapting to changing conditions, while functional diversity is equal to the biophysical processes that take place in the area. One of genetic diversity's most noticeable impacts is that it serves as a genetic diversity's buffer against environmental variability, particularly in the medium and long terms.*

KEYWORDS: *Biological Diversity; Conservation; Genetic Diversity; Ecosystem; Values; Society.*

INTRODUCTION

The word 'biodiversity' has diverse meanings. It is 'life diversity at all stages of biological organization,' according to Gaston and Spicer (2004)[1]. Biodiversity is often seen as a measure of the relative diversity of the various habitats among the species present. Diversity is variation within species and comparative diversity between habitats are included. The totality of genes, organisms, and ecosystems of a region can also be described as biodiversity. Biodiversity is defined by the Convention on Biological Diversity (Glowka et al, 1994) as the heterogeneity between living organisms from all sources, including, but not limited to, terrestrial, marine and other aquatic ecosystems and the ecological complexes to which they belong, including diversity within species, between species and ecosystems[2].

Biodiversity or natural variety alludes to the assortment of life on Earth, including plants, creatures, miniature life forms and the qualities they contain[3]. It basically implies the presence of a wide assortment of plant and creature species in their regular habitats or the variety of plant and creature life in a specific environment. Biodiversity is seen as a proportion of the general variety among life forms present in various environments. In this definition, variety incorporates variety inside species and among species, and relative variety among environments. Biodiversity may likewise be characterized as the 'entirety of qualities, species, and environments of a locale'.

The Convention on Biological Diversity (Glowka et al, 1994) characterizes biodiversity as the fluctuation among living creatures from all sources including, in addition to other things, earthbound, marine, and other oceanic environments and the natural edifices of which they

are a section; this incorporates variety inside species, among species and of biological systems[2]. An audit of writing uncovered that tremendous endeavors have been taken and various researchers have worked a great deal on biodiversity. Some of them are Kaushik et al, (2008), Odum (1971), Wilson (1988), Nair (1992), Bhatt (1997), Subba Rao (2001), Verma et al, (2015, 2016a, 2016b), Prakash et al, (2015, 2016a, 2016b), Verma (2016a, 2016b, 2016c, 2016d. 2017) and so forth[4][5]. The biodiversity is typically depicted at three levels and it has an enormous number of employments and qualities also. In present conversation, creator is attempting to examine hereditary variety as cradle and safeguard of biodiversity in current setting.

THREE BASIC TYPES OF BIODIVERSITY AND BIODIVERSITY LEVELS

At the following three stages, biodiversity is discussed and all three work together to establish the mystery of life on Earth:

1. Genetic diversity
2. Diversity of Organisms
3. Diversity of the Environment

Biodiversity is discussed and defined at three levels: the diversity of habitats, the diversity of organisms and the diversity of genes. The diversity of the environment is the diversity of ecosystems (the location where an organism or a population of organisms naturally occurs), including the various types of life within them[6]. On three levels, diversity occurs at the level of culture and environment. Alpha diversity (within group diversity) is first, beta diversity (diversity between communities) is second, and gamma diversity is third (diversity of the habitats over the total landscape or geographical area)[7]. The diversity of species relates to the variety of species within an area. It is the variability found within a species' population or between a community's various species. The species is the true basic unit used for the classification of organisms, and its diversity is the level of biodiversity definition that is most widely used. It broadly reflects the richness of species and their abundance in a population. Consequently, organisms are distinct units of diversity, each playing a particular role in the ecosystem. The number and type of species, as well as the number of individuals per species, differ in nature, contributing to greater diversity. The species are grouped together according to common characteristics into families.

Genetic diversity is the diversity within a population of the fundamental units of genetic knowledge (genes) which are transmitted from one generation to the next[8][9]. Genetic variability contributes to differences, because the underlying cause of biodiversity is the basis of the amount of genetic variation. Genetic diversity helps a population to adapt to its climate, which is therefore important for natural selection. With environmental variability, genetic variation within a population also increases, but not all animal classes have the same degree of genetic diversity. Different populations of a species must be conserved in order to preserve genetic diversity.

VALUES OF BIODIVERSITY

Biodiversity is of immense significance in nearly all facets of life. Biodiversity's various applications include[10]:

1. Consumptive use in which products of biodiversity are directly harvested and consumed, e.g. fuels, fruit, medications, medicines, fibres, etc. For human beings, a significant number of wild plants and animals are sources of food. Around 75% of the world's population depends on plants or extracts of plants. Medicinal goods: The miracle drug penicillin used as an antibiotic is derived from a fungus called *Penicillium*, a bacterial tetracycline, for example. Quinine, the malaria antidote, is derived from *Cinchona* tree bark, two anticancer drugs are obtained from *Catharanthus* plant and so on, namely vinblastin and vincristin. Our woods have been used as fuelwood for centuries. Coal, petroleum and natural gas from fossil fuels are all products of fossilized biodiversity.
2. Efficient use in which animal products such as musk from musk deer, silk from silkworm, sheep wool, fur from many species, lac from lac insects, etc. are commercially traded. In addition, many sectors rely on the efficient use of biodiversity values, such as the paper and pulp industry, the plywood industry, the railway sleeper industry, the textile industry, the leather industry and the pearl industry.
3. Social meaning, in which people's social life, traditions, faith and psycho-spiritual elements are related, i.e. biodiversity, connected to various cultures, has distinct social value. Many of the plants in our country are considered sacred and sacred, such as Tulsi, Peepal, Mango, Lotus, etc. These plants' leaves, fruits or flowers are used in worship, or the plant itself is worshipped. Tribal social life, songs, dances and customs are closely related to wildlife. In our psycho-spiritual arena, many animals such as donkey, bull, peacock, owl, snake, etc. also have a significant position and therefore hold unique social significance.
4. Ethical meaning or value of life, which is based on the 'Live and Let Live' principle. Biodiversity is valuable because if we want our human race to live and continue, then all biodiversity, i.e. 'all life must be preserved', must be protected.
5. Aesthetic appeal that entertains eco-tourism. People from far and wide spend a great deal of time and money visiting wilderness areas where they can appreciate biodiversity's aesthetic value, because biodiversity has great aesthetic value.
6. Service benefit of the environment, which acknowledges the non-consumptive use of self-maintenance of the ecosystem and different ecosystems. It refers to ecosystem services such as soil erosion prevention, flood prevention, soil fertility maintenance, nutrient cycling, nitrogen fixation, water cycling, pollutant absorption and the reduction of the danger of global warming, etc.

Scientific and developmental importance, in which each species offers scientists some hints as to how life on earth has evolved and will continue to evolve. In fact, biodiversity helps scientists understand how life works and the role of each species in ecosystem sustainability. Moreover, biodiversity still has many other values.

Existence Values of Biodiversity

Richard (2015) has suggested that genetic variation plays an important role in a species' survival and adaptability. Its various concepts and uses include: Consumptive use, constructive use, social value, scientific and evolutionary principles, aesthetic value, etc. In addition, biodiversity is of ethical or existential importance, which is based on the 'Live and Let Live' concept. Biodiversity is valuable because if we want our human race to live and continue, then all biodiversity, i.e. 'all life must be preserved', must be protected. We must

conserve all biodiversity if we want our human race to thrive, because biodiversity has the meaning of nature from the natural and ecological point of view.

Almost every ecosystem maintains its own environmental insurance policy, according to Chris Maser (2009), for which it requires three forms of diversity: biological, genetic and functional. Biological diversity refers to the species' richness in a specific area; genetic diversity refers to a specific species' way of adapting to changing conditions, while functional diversity is equal to the biophysical processes that take place in the area. One of the most significant impacts of genetic diversity is that, especially in the medium and long term, it acts as a buffer against the variability of environmental conditions. There is a rich diversity of animals, plants and microbial life in the living world, which tends to be well adapted to the climate. For the shared survival and life of living beings, this complex nature must be preserved. If a population of a species has a very diverse gene pool, therefore there would be more variation in the characteristics of that population's individuals and thus more characteristics to act on for natural selection to pick the most appropriate individuals to survive. Biodiversity is depleted by habitat loss and destruction, resource exploitation, unprecedented climate change, deforestation, pollution, etc. Diseases, changing agriculture, poaching of wild life, etc. Because all the benefits of biodiversity are derived from human beings, they should therefore take careful care of the protection of biodiversity in all its forms and the good health and safety of the future generation.

CONCLUSION

An ecosystem is a group of life forms (biotic components) that interact with one another and their environment's non-living elements (abiotic components). Therefore, the ecosystem is a group of living species and their physical environment together. As we lose species, whether local or complete or global, from life, we lose not only their structure and function diversity, but also their genetic diversity. Sooner or later, the loss of genetic diversity would make it so easy to change complex ecosystems that they will lack the productivity and durability to support us as a culture. Biological diversity has therefore been reproduced by genetic diversity, which essentially preserves functional diversity. Genetic diversity, especially in the medium and long term, acts as a buffer against the variability of environmental conditions. An ecosystem can be stable and sensitive. Positive to the disruptions in its own environment, to which it is accustomed. The net effect is that safe environments of all forms will act as shock absorbers.

REFERENCES

- [1] Gaston K. J. and Spicer J. I. (2004)., *Biodiversity: An Introduction*. 2nd ed. Blackwell Publishing. .
- [2] Glowka L. et al, "A Guide to the Convention on Biological Diversity Environmental Policy and Law Paper No. 30 IUCN Gland and Cambridge. (1994)."
- [3] A. Brennan and N. Y. S. Lo, "Biodiversity," in *The Routledge Handbook of Global Ethics*, 2015.
- [4] M. J. Nieuwenhuijsen, "Environmental studies," in *Handbook of Spatial Epidemiology*, 2016.
- [5] R. L. Millstein, "Environmental Ethics," in *History, Philosophy and Theory of the Life Sciences*, 2013.
- [6] S. L. Pimm, G. J. Russell, J. L. Gittleman, and T. M. Brooks, "The future of biodiversity," *Science*, 1995, doi: 10.1126/science.269.5222.347.
- [7] N. G. Swenson *et al.*, "Phylogenetic and functional alpha and beta diversity in temperate and tropical tree communities," *Ecology*, 2012, doi: 10.1890/11-0402.1.



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- [8] E. Nevo, "Genetic Diversity," in *Encyclopedia of Biodiversity: Second Edition*, 2001.
- [9] R. Frankham, "Genetics and extinction," *Biological Conservation*. 2005, doi: 10.1016/j.biocon.2005.05.002.
- [10] P. Dasgupta, A. P. Kinzig, and C. Perrings, "The Value of Biodiversity," in *Encyclopedia of Biodiversity: Second Edition*, 2013.