



INTERNATIONAL RESEARCH JOURNAL OF HUMANITIES AND INTERDISCIPLINARY STUDIES

(Peer-reviewed, Refereed, Indexed & Open Access Journal)

DOI : 03.2021-11278686

ISSN : 2582-8568

IMPACT FACTOR : 5.71 (SJIF 2021)

Taxonomists, Systematists and their contribution in Public Health

Dr. Seema Saxena

HOD, Zoology,

S. S. Jain Subodh Girls P.G. College,

Sanganer, Jaipur (Rajasthan, India)

E-mail: rajivsaxena07@rediffmail.com

DOI No. **03.2021-11278686** DOI Link :: <https://doi-ds.org/doilink/10.2021-43755125/IRJHIS2110014>

Abstract:

Taxonomy is the science of classifying organism on the basis of similarities and differences from large to small groups. Systematics is the science of integration. It is an important branch of biology. Systematics is a complete study of the diversity of life on earth. It aims to discover and explain new biological diversity and to understand the origins of evolution and biogeographic relationship. There is an enormous contribution of systematist to other branches of biology and to human kind as a whole. The Systematist contributes significantly to the public health sector. Thousands of diseases causing organisms and their vectors need to be properly identified and classified accurately and systematist does the same in a complete way. They play a vital role in controlling disease among species, especially humans. A systematist provides information on the pathogenicity and epidemiology of pathogens.

Keywords: Taxonomists, Systematist, Systematics, Pathogens.

Introduction:

A specialist in taxonomy is known as taxonomist. Taxonomist work in a range of field to identify and describe various concept or organism, then sorting them based on similar characteristics. A systematist, researches plants and animals species in their natural habitats and provide specific details of the species needed for further research.

Systematics is a field of Biology that deals with the diversity of life. It is a study of organisms living today and in the past, involving comparative biological studies and relationship between these organism. Systematics is an important part of biogeography, ecology, conservation biology and

management of biological resources. Systematics include area of taxonomy and phylogenetics.

Taxonomy includes the discovery of species, the recognition, the identification, the diagnosis, the comparison between living beings (Vane Wright, 2013). The taxonomy is naming, describing and classifying of all living organism and fossils. It is the basis for all meaningful research on biodiversity, pest management, medicine, fisheries, quarantine control, defense etc. Before initiating any kind of studies, it is very important to know the correct name of the organism on which studies are initiated (Narendran, 2000 & 2006).

Phylogenetics is the study of evolutionary relationship among organism. The systematist collect plants and animals and group them according to the pattern of variation. The systematist plays an important role in the field of agriculture, wildlife management, forestry and public health (Keeton, 1993; Gardner, 1972). It explores relationship between species and higher taxonomic unit in an evolutionary context (Wiens, 2007).

Today hundreds of millions of people worldwide suffer from diseases caused by pathogenic viruses, bacteria, protozoans, worms and fungi. Recently during covid-19 pandemic, millions of peoples are suffer from covid-19 (due to Coronavirus-viral disease) and majority from black fungus. Everyone is in serious health danger. It has also had a significant impact on the global economic and financial market. The covid-19 pandemic has hit the already weakened global economy.

Coronavirus is a single stranded positive-sense enveloped RNA virus belonging to the coronaviridae family (Mahony, 2007). There are many different types and variants of coronaviruses. Coronavirus strains are Alpha coronavirus, Beta coronavirus, Gamma coronavirus and Delta coronavirus. To date six types of coronaviruses (CoVs)-OC43, 229E, NL63, HKU1, Severe Acute Respiratory Syndrome Coronavirus (SARS-CoV2) and Middle East Respiratory Coronavirus (MERS-CoV) have been identified in humans (Li G, *et al.*, 2020). The species of the same genus must share many behavioural, ecological and biological properties in common. Because they are closely related evolutionarily, most of the systematist uses cladistic classification. Human infections and human to human transmission can be seen among the CoV subtypes that causes common cold. In addition to this, Middle East respiratory syndrome related coronavirus (MERS) and Severe Acute Respiratory Syndrome related coronavirus (SARS-CoV2) are the member of same family of viruses that causes severe and fatal infections (Hadoksuz, M.2020). This is the systematist's responsibility to find out reasons behind these differences in pathogenicity. This coronavirus continues to mutate its strain and a large number of variants occurs in sequence.

On 19th May, 2018, an outbreak of Nipah virus disease (NiV) was reported from Kozhikode district of Kerala, India. This was the first outbreak of Nipah virus in South India. Nipah virus Infection is a Zoonotic disease, an animal disease that can be transmitted between humans, transmitted by an infected fruit bat (Pteropus) and person to person transmission takes place

(WHO, 2020).

Recently, the Monkey pox viral infection in China and Zika virus infection have also been reported in various parts of the world. Monkey pox and smallpox viruses are biologically similar. The infested corona causing viruses have different strain and show different pathogenicity. Now the question is, who provide this knowledge and decodes these variants?

Systematist and Public Health:

The systematist plays a very important role in identifying these pathogens. Viruses are rapidly changing their strain through genetic mutations and causes dreaded diseases in humans. There is little progress that can be made to coping with these diseases without systematist who identifies organism and determine evolutionary relationship. The systematist conducts several studies at a time.

A Systematist involved in searching for and find the organism causing diseases. He /she isolate and describe the various type of pathogens, establishes various unique taxonomic attributes (characters) of organism that separate it from numerous morphologically similar pathogens (at least in humans) organism, thus enabling rapid identification. They give detailed information about the mode of transmission of pathogens as well as how to render the organism vulnerable to destruction from diseases. Systematist use comparison among related organism to derive phylogenies (evolutionary history of an organism) to make predictions about pathogenicity, epidemiology and genetic mechanism causing transmission.

A systematist distinguishes among hundreds of thousands of species or genetically differentiated type or strains of organism. Phylogeny of organism shows diversity in their morphology, anatomy, cytology, genetics, embryology, ecology, physiology and breeding system. A systematist cataloguing all the essential data for biological diversity of disease causing organism of different species. Disease causing organism of different species may differ significantly with regards of pathogenicity, drugs sensitivity or resistance or response to vaccine formula.

Genetic mutations regularly causes a constant change in genetic composition of organism, as in case of covid-19 pandemic. In covid-19, different types of variants of viruses appear and causes unexpected symptoms. Their pathogenicity frequently changes. Increased use of unprescribed drugs causes resistance against corona virus. The systematist play an important role in public health management.

A systematist give information regarding disease-causing pathogens and different strains responsible for this so that control strategy can be planned in such a way that only the target species is controlled without having any damage to beneficial organism. This is possible only if we are provided with the correct identification of the species. The proper diagnosis of this micro-organism disease, causes high level o effective control microorganisms ensures maximum number of efficient control at minimum expense.

Conclusion:

New taxonomic and systematic discoveries classify the status of population and the recognition of distinct species. Information on Good taxonomic databases are provided by the taxonomists that are essential for studying biodiversity. Systematists have found smaller difference between otherwise biologically related species. All evolutionary phenomenon can only be studied reliably if a sound taxonomic foundation is present. The Taxonomist, Systematist classifies hundreds or thousands of genetic variant. During the process of evolution organism shows diversity in their anatomy, physiology, and DNA. Taxonomy allows the systematist to organise essential data for all biological diversity. Systematist contribute to medical and public health, agriculture, conservation of species, management of natural resources, epidemiology, biological control, wildlife management and provide basic understanding about the component of biodiversity which is necessary for effective decision-making about conservation and sustainable use.

Finally the key to the problem was provided by the systematists.

References:

1. Gardner, E. J. 1972. History of Biology. 3ed. Burgess Mineapolis.
2. Hadoksuz, M., S. Lilic., F. Sarac 2020: Coronavirus and SARS-COV-2. Turk.J.Med.Sci. **50 (SI-1)**. 549-556.
3. Keeton William T. L. James, Gould and Carol Grant, Gould 1993: Biological Science. 5th ed. New York .W. W. Norton and Company, Inc.
4. Li G., Y. Fan, Y. Lai 2020. Coronavirus infections and immune responses. 2020. J. Med. Virol. **92(4)**. 424-432.
5. Mahony J. B. 2007: Coronavirus .In. Murray. P.R., E.J. Baron, J.H. Jorgensen, M. L. Landry, M.A. Pfaller editor's. Manual of clinical microbiology. Washington: ASM press., 1414-, 1423.
6. Narendran, T. C. 2000. Importance of systematics. Resonance. **5 (6)**. 60-68.
7. Narendran, T. C. 2006. An introduction to taxonomy. Zoological Survey of India pub. **1-80** pp (ed. Directors Zoological Survey of India). Kolkata .
8. Vane Wright R.L. 2013. Taxonomy methods of In. Encyclopedia of Biodiversity, Vol. 2nd. (ed. SA Levin) pp. 97-107.
9. WHO. 2020. Modes of transmission of virus causing COVID-19: Implications for IPC precaution recommendation .scientific brief 29 March 2020.
10. Wiens, J. J. 2007. Species delimitation; new approaches for discovering diversity. Systematic Biology. **5.875-878**.