

**THEORY
PERSPECTIVES
AND
PRACTICES
ACROSS
DISCIPLINES**



**EDITOR
DR. EKNATH MUNDHE**

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S. M. Joshi College, Hadapsar, Pune-28

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PREFACE

This book is wholly a collective venture. The aims to publish this book are bringing Scientists, Engineers, Academicians, Researchers and Professionals to exchange and share most recent Theory, Perspectives and Practices across Disciplines. Book is to allow share the ideas and promote the Theory, Perspectives and Practices in Science, Technology, Humanities, and Commerce & Management. To provide a premier interdisciplinary forum for Scientists, Engineers, Academicians, Researchers and Professionals to navigate the future research for better mankind. The book aims to provide a forum for the exchange of ideas on the Global Issues in Multidisciplinary Academic Research during recent times. The book aims to provide a common platform for researchers from the Academia as well as the Industry to publish their research work.

Dr. Eknath Mundhe

ACKNOWLEDGEMENT

The world is a better place where we live and lead the development around us. From time to time the professionals and academics play a more important role in enhancing the skills of the students. Intellectual role as a mentor is important in developing the talent of the student at various levels. Being professional educationists, we are happy to express our gratitude to our experience and to the authors who supported us morally in bringing out this book, which focuses on Theory, Perspectives and Practices in Science, Technology, Humanities, and Commerce & Management.

I would like to express my sincere gratitude to all the authors, researchers and reviewers, who provided their detail research and views for “Theory, Perspectives and Practices across Disciplines”. I would like to thank my Teacher family. This volume is wholly a collective venture. This cause would not have been possible without the great efforts paid by all the authors and we are sure their valuable contributions increased the significance of the book. All the authors played an equal role in bringing out this book.

Dr. Eknath Mundhe

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CHAPTER-42**A REVIEW ON AEROBIOLOGY STUDY IN INDIA**

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The environment is made up of a diverse range of living species, ranging from microorganisms to the macroorganisms. Air is one of the most vital components of the ecosystem. The first thing a human does after birth is breathing in the air, and the respiratory system is the first target organ. A typical human can survive for a few weeks without food, a few days without drink, but just a few minutes without air. If the food is spoiled, one can refuse to eat it; if the water is contaminated, one can refuse to drink it; but if the air is polluted, one cannot stop breathing; one must inhale it for survival, whether it is pure or polluted. Pollution is of two kinds chemical and biological, Biological includes Pollen grains, fungal spores, hyphal fragments, plant hairs, and other miscellaneous debris are some of the organic particles in the atmosphere beyond a threshold value. Aerospora is the microbial population in the atmosphere at any given location. Aerobiology is a discipline of biology concerned with the dissemination of insects, fungal spores, bacteria, viruses, pollen, and other organisms. Since 1930, the term aerobiology has been used to refer to the study of airspora, such as airborne fungal spores. Aerobiology is a multidisciplinary discipline that integrates mycology, phycology, palynology, air pollution, allergies, entomology, phytogeography, and bio-deterioration. The term was further expanded to incorporate studies of airborne biological materials with the establishment of the International Biological Programme in 1964. Aerobiological investigations are of two different types intramural (indoor) and extramural (outdoor). Intramural aerobiological investigations include studies inside library, laboratory, poultry shade, warehouse, hospitals, buildings etc. whereas extramural aerobiological investigations include studies over crop fields, garbage depot, gardens, parks, markets etc.

An exciting aspect of aerobiology is its history. It can be traced back to Hippocrates, the father of medical science, who was aware that men were affected by epidemic fever when they inhaled air contaminated with pollutants harmful to the human race, and it was probably one of the first times that the idea that the atmosphere is a corridor, if not a home for microorganisms, was conceived.

However, contemporary research in aerobiology dates back over a century, when Louis Pasteur (1861) demonstrated via his classical experiments in battling the hypothesis of spontaneous production of life and inventing the germ theory of diseases that the air is a carrier of many common germs. But, with Ehrenberg's (1872) first published information on the microorganisms he collected from atmospheric dust and Cunningham's (1873) analysis of microorganism's contents in the air over Presidency jails in Calcutta, India. Our existing knowledge about the composition of airspora can be said to have started accumulating during the 1870's. Miquel (1883) pioneered experimental aerobiology and developed procedures for

analyzing atmospheric microbial composition. Frankland (1886 and 1887) was perhaps the first to perform long-term studies to explore the effect of aerodynamics on the airspora, and he noted that aerodynamic effects are crucial in creating a system for trapping airborne particles. Saito (1904 and 1922) in Japan, and Bullar and Lav (1911) in Canada, concentrated on investigations to analyze the components of airspora using various methodologies during the turn of the century. However, credit for establishing the subject of microbiology of the atmosphere as a special discipline goes to Meir *et. al.*, (1933) of the United States and Stepnove (1933) of the Soviet Union, since this branch of science concerning the atmosphere began to gain interest and importance, and by the mid-twentieth century, a flurry of contributions poured in from aerobiologists from all over the world.

Gregory (1945 and onward) conducted extensive and detailed studies on airspora in the United Kingdom. At Cardiff, Hyde and Willims (1949) conducted a census of mould spores in the air. Collins-Willims and Best (1955) recorded air mould counts in Toronto, and Hirst (1952 and onwards) conducted experiments in the United Kingdom (Canada) Di-Meena (1955) investigated the Duenedin airspora (New Zealand). Pady, Kramer, and their co-workers in the United States (1961 and onwards), Meredith in the West Indies (1961 and onwards), Sreeramulu and his co-workers in Waltair (1958 and onwards), Tilak and his co-workers in Aurangabad (1958 and onwards) in India, and Subba Reddy and his co-workers in Waltiar (1970 and onwards) in India. Gregory and Hirst (1957) on Rothamstad airspora, Haroenden, Dransfield (1966) on Samaru aerospora, and Turner (1966) on Hongkong airspora are also noteworthy. Aeromycological work by Derric and Mchenna (1963 & 1966) in Melbourne (Victoria), Australia, Goodman et al (1965) in the Phoenix metropolitan area, Shapiro et al (1965) in Los Angeles, California, Barlow (1963) in Southern and Central Ontario, Lentimake (1977) in Finland, Finegold (1975) in South-east Florida, and Al-Doory et al (1980) in Washington is worth mentioning. In Baghdad, Iraq, Atikrita et al (1980), Penny Cook (1980), McDonald and Odriscoll (1980) in Ireland, and Calvo et al (1980) in Barcelona, Spain. These persons obtained a huge data on general aeromycology and worked out the composition and components of airspora.

Cunningham (1873), for his aerobiological investigations at Calcutta jail, is credited for doing the first research on aerobiology in India. "Microscopic examination of air" was the title of his comprehensive work, which he published as a book. It's possible that this was India's first aerobiology paper.

Mehta (1940) examined airspora in relation to wheat phytopathological concerns after a lengthy hiatus. He was working on a solution to the problem of wheat rust. After that, Sreeramulu and his coworkers in Visakhapatnam (1958 and onward), Tilak and his coworkers in Aurangabad (1960 and onward), and Subba Reddy and his coworkers in Waltiar (1970 and onward) gathered a large amount of data on general aeromycology and worked out the composition and components of airspora.

In Maharashtra, Karla and Dumbry (1957) started aerobiological studies at Army Medical College in Pune, and later Karnik (1962), Chaubal and Deodikar (1964), and Chitle and Bajaj (1973, 1974, and 1975) published their work in Nagpur. Tilak is responsible for the development of aerobiological research in the Maharashtra region. Tilak and his colleagues examined airspora over Jowar, sugarcane, maize, bajra, cotton, vegetables, arhar, groundnut banana, as well as in the vegetable market, cattle barn, hospital words, industry area, and

other places in Aurangabad from 1967 onwards. At Aurangabad, Tilak and Srinivasulu (1967) reported airspora. From Aurangabad, Talde (1969) examined airspora over sugarcane and vegetable crops. Gailwad (1974) investigated the airspora over Ahmadpur's sorghum farms. At Nanded, Pande (1976) investigated the airspora over orange, mung, and CSH-1 hybrid Jowar. At Vaijapur, Mane (1978) researched the airspora over bajra and wheat crops. The concentration of airspora over bajra fields was highlighted by Tilak and Chakre (1978). At Aurangabad, Bhalke (1981) analysed the airspora over a sorghum field and a vegetable market. At Aurangabad, Babu (1983), Patil (1983), Shanta (1983), Saibaba (1983), Bhasale (1983), Wankhede (1983), Jogdand (1987), Ramchander Rao (1987) investigated the airspora over bajra, cotton, vegetable, and Jowar fields, respectively. Many workers have made major contributions during the previous 20 years, with many new research centers. During the last twenty years several workers have contributed significantly as mentioned below.

Nautial and Sahaney (Allahabad), Kamal and Srivastava (Gorakhpur) Chauhan (Agra), Mishra and Khandelwal (Lucknow), Mahesh Roy, Mishra, Trivedi (Patna), Kale Ghani (Bhagalpur), Tiwari & Jadhav (Raipur), Agashe (Banglore), Rajasab (Gulberga), Karuna Verma (Jabalpur), A.K.Jain (Gwalior), Ramchandar Rao and Bhagya Laxmi (Hyderabad), Tilak and Pande (Aurangabad) Tilak, More and Jogdand (Pune), Gaikwad and Jagannath (Ahmadpur), Vitthal (Chennai), C.S.Reddi and Atuluri (Waltair), K.M.Munshi (Shrinagar), and recently Sarma (1993) (at Gawahati), Srivastava & Shukla (1990) (at Balrampur), Karlekar & Patil (1998) Mari Bhat (1991) (Gulberga), Jyoti Nair (1991) (Sikanderabad), Satish et al (1993) (at Tiruchirapalli). Gupta et al (1993), Jain (1990, 1991, 1992, 1994, 1998, 1995, 1996) Jadhav (1994, 1991, 1994, 1997), Kalkar (1990, 1994), Kakde and Saoji (1998), Prabhudesai (2006), Reddi (1994, 2002, 2005,) Ramlingum (1994), Ramchander Rao (1995, 1990) Sinha et al (1988), Singh et al (1994), Singh (1991), Talde (1994), Tilak (1990-91), Tilak and Jogdand Aurangabad (1987, 1989, 1989), Jogdand (1997), Tilak and Pande (1999), Tilak (1996, 1998, 2005) Tiwari et al (1991, 1995, 1997, 2004), Verma and Khare (1990), N.I.Singh (1990), (Manipur).

The volume of research work and publications has skyrocketed; indicating that this applied area of Aerobiology is growing, developing, and establishing itself. Wherever possible, for the sake of convenience and in the interest of the researcher's relevant important observations on previous reviews, have been added. We must keep up with modern and recent breakthroughs and do even more to push aerobiology forward. It's encouraging to see how far we've come.

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