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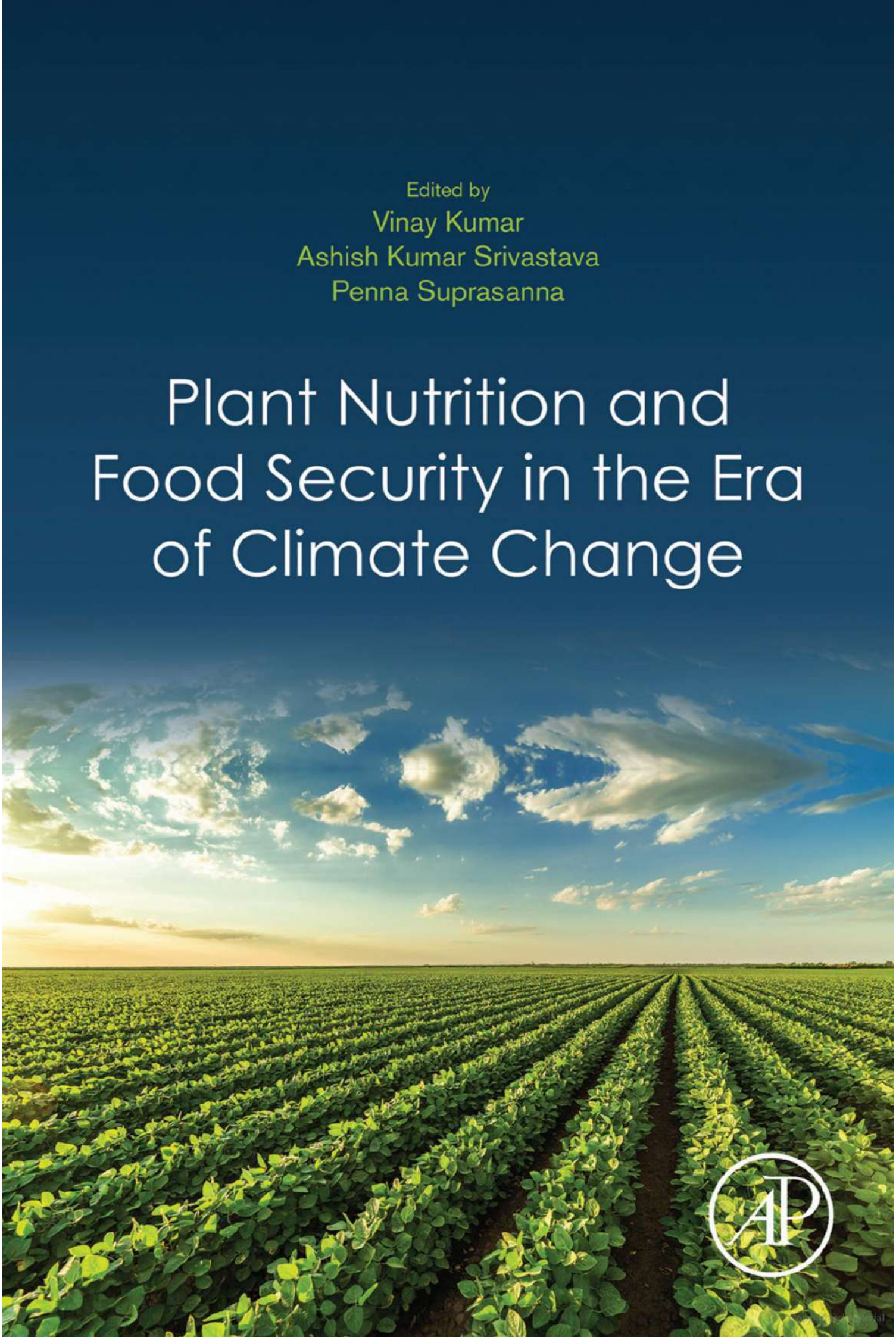

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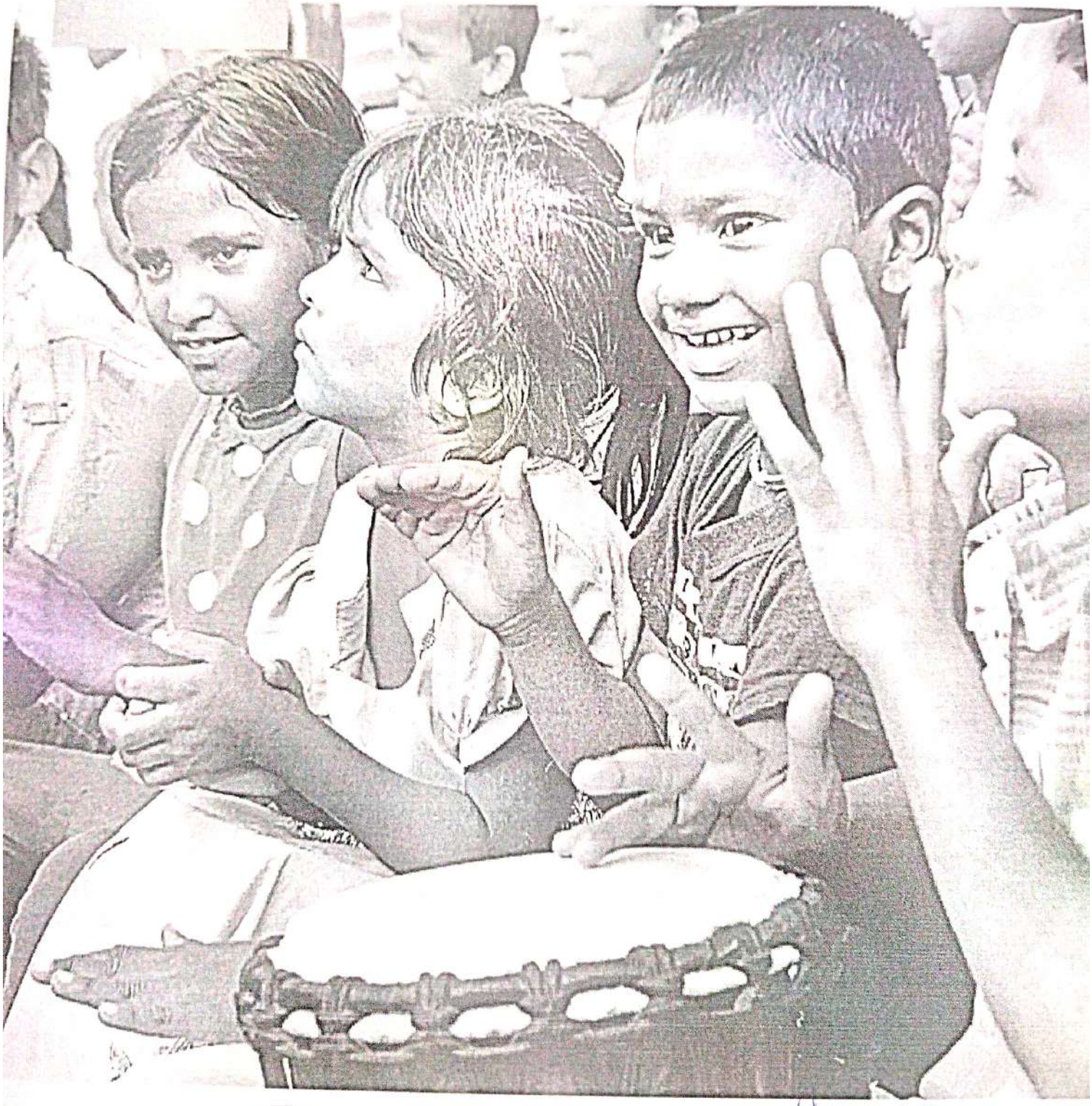

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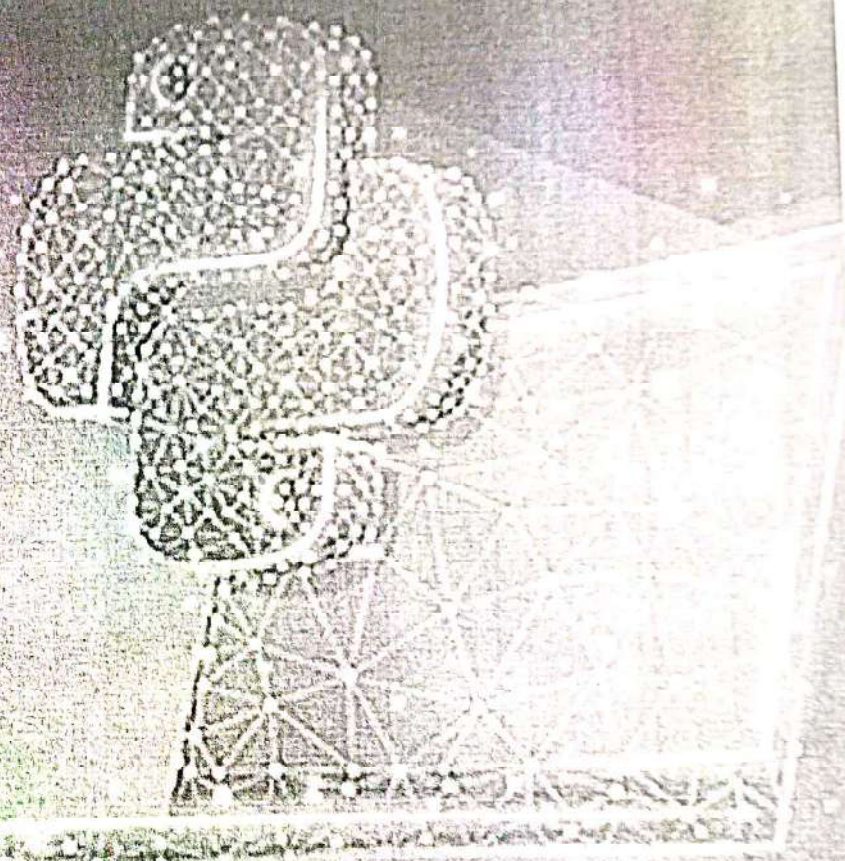

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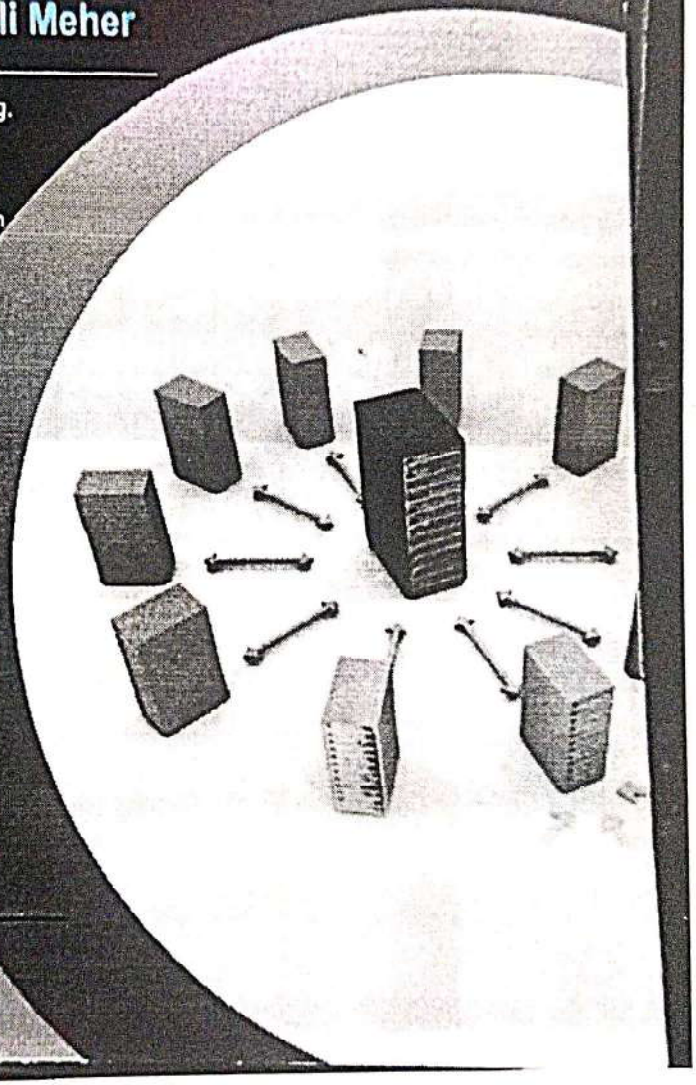

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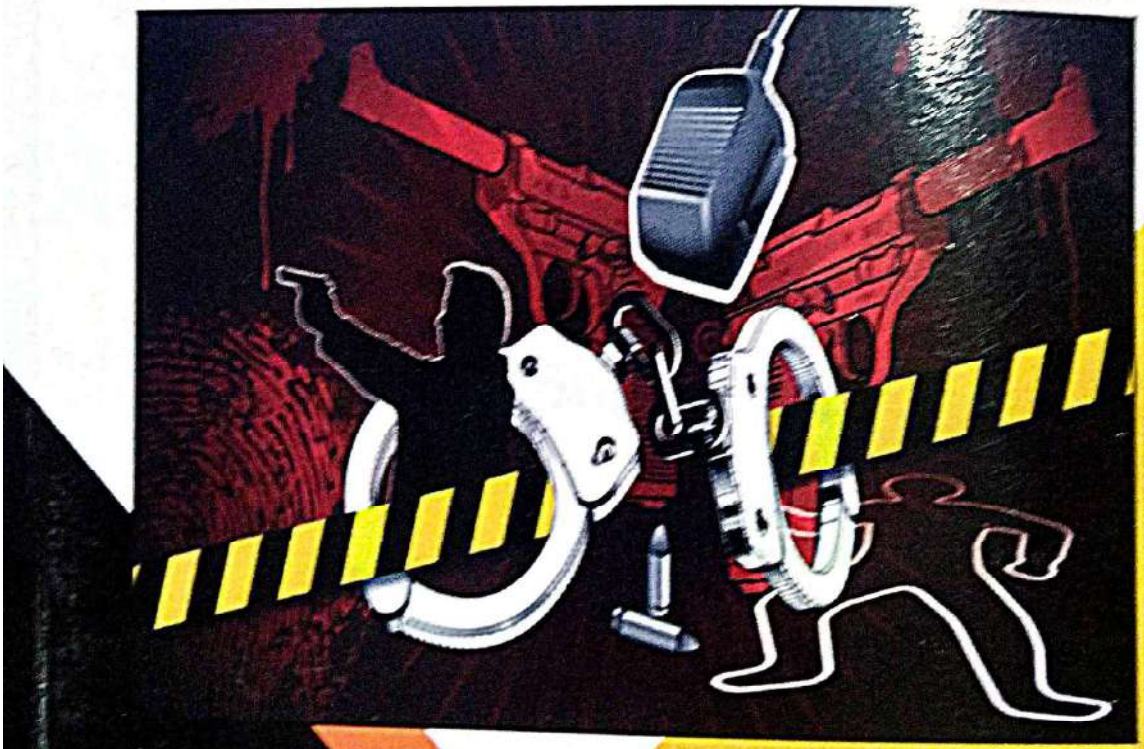

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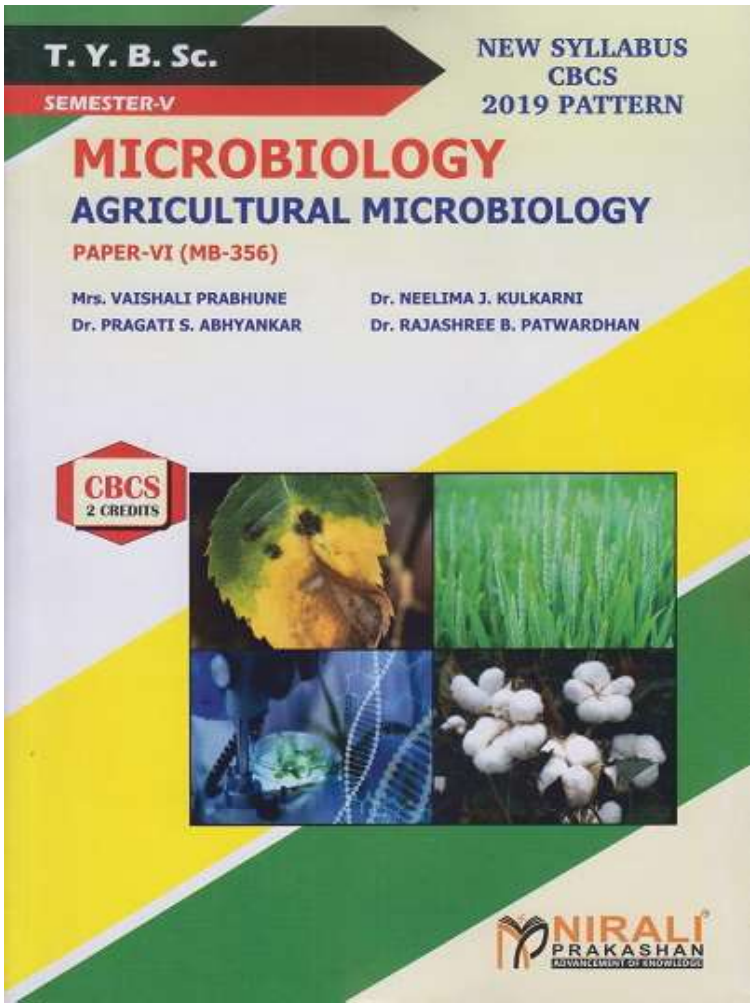

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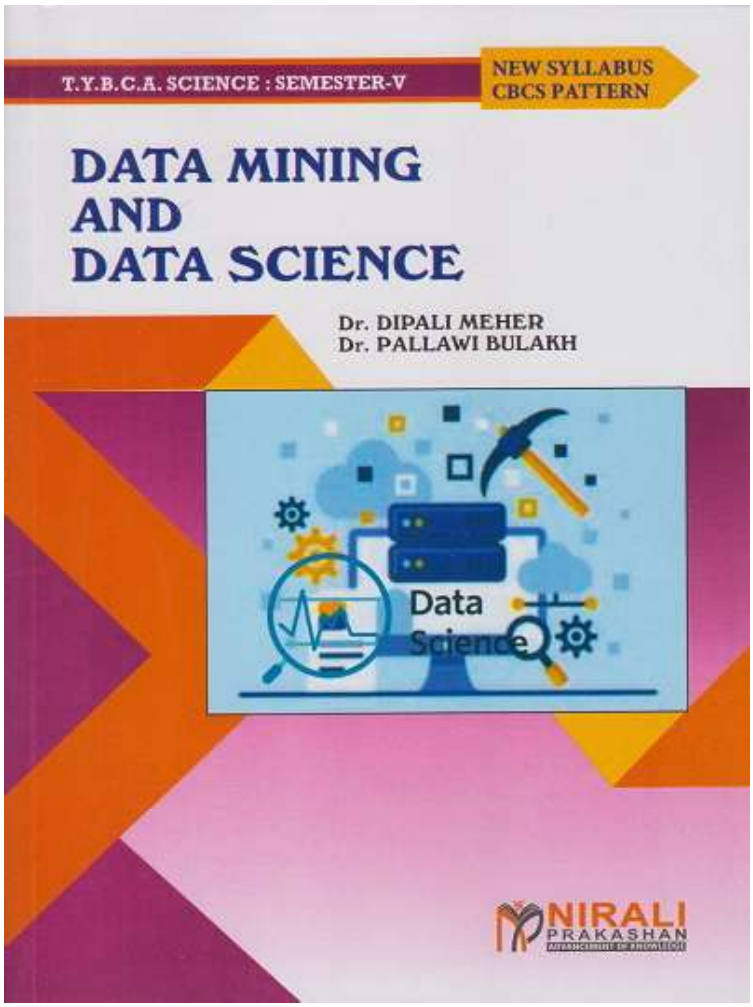

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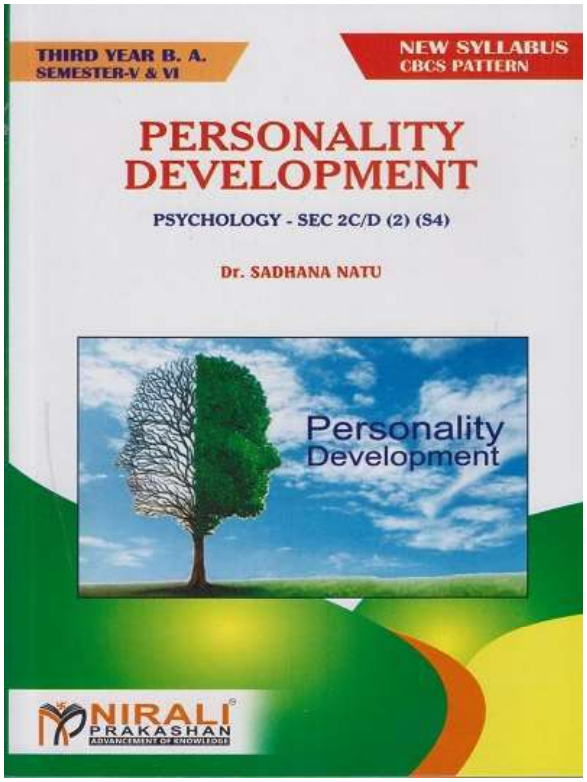

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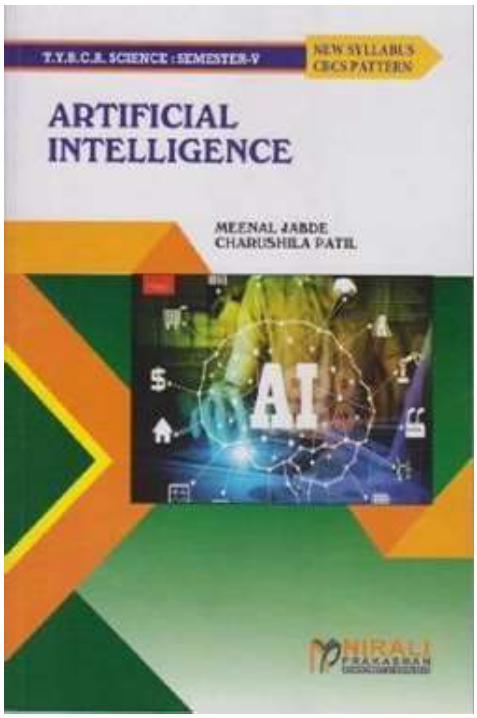

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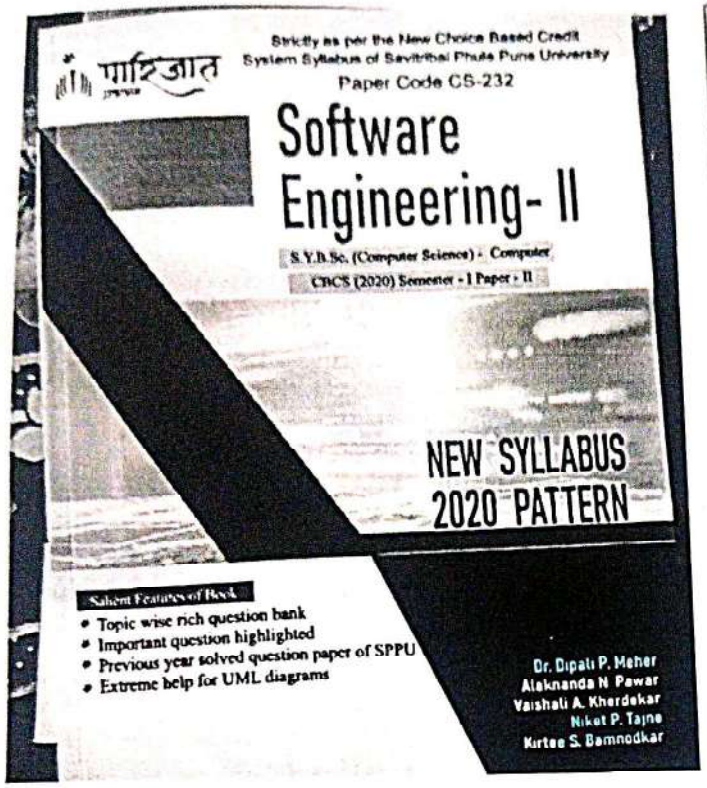

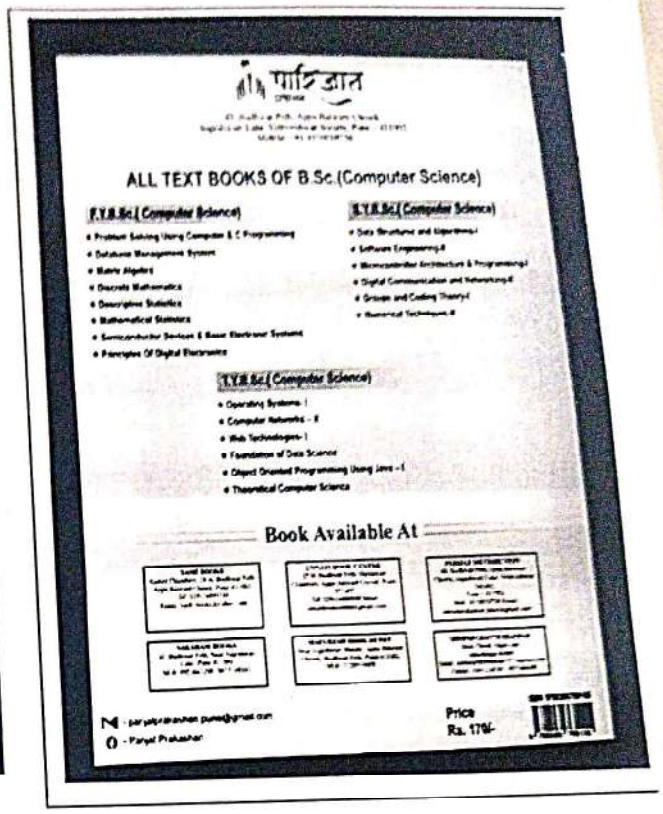

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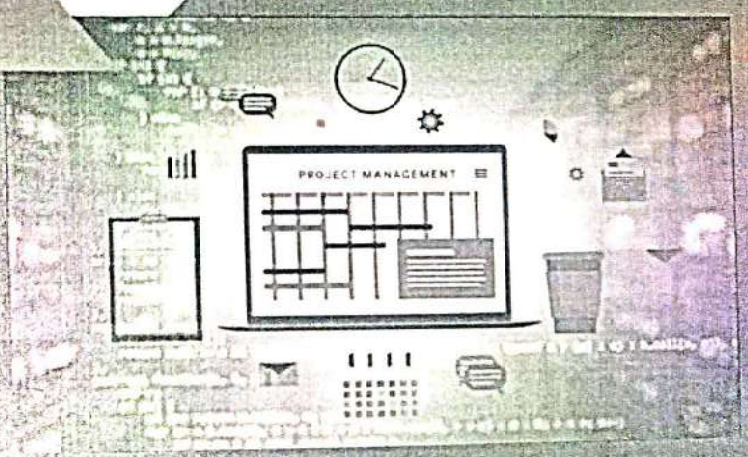

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Nanoparticle-Induced Oxidative Stress in Plant

Shalini Dhiman, Palak Bakshi, Nitika Kapoor, Priyanka Sharma, Sukhmeen Kaur Kohli, Bilal Ahmad Mir, and Renu Bhardwaj

1 Introduction

In recent years, nanotechnology emerged as a revolutionary science, with a tremendous evolution for various industries. These uprising nanoparticle (NP) industries are expected to contribute diverse products and services in a society. Nanoparticle has very unique chemical, physical, as well as biological properties that have a serious impact on the living system. Nanoparticles also play an important role in the electronic device, antimicrobial gene expression, and catalytic and electromagnetic properties. Thus, rapid advancement in every aspect of these modern field forces the large-scale production and usage of particles at the nanoscales (1–100 nm) (Weir et al. 2012). Mainly through industrialization waste and various other means, nanoparticles enter into the environment. These nanoparticles get accumulated into the ecosystems and pose a serious threat to living organisms. Inside the plant system, toxicity of nanoparticles creates negative as well as undesirable consequences such as membrane damage, induction of oxidative stress or of cellular dysfunctions, etc. which finally cause the morphological, physiological, and molecular level damage. However, the most important mechanism adapted by the plant against toxicity created by nanoparticles is the production of the reactive

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A-5

Aggregation-induced emission materials for cell membrane imaging

Dipratn G. Khandare*

Department of Chemistry, Modern College of Arts, Science and Commerce Ganeshkhind, Pune, India
*Corresponding author: e-mail address: dipratnkhandare7885@gmail.com

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Abstract

The living cells are consist of protective layer, which is called cell membrane. The cell membrane is associated with numerous biological functions and they are intensely depended on fundamental physicochemical properties of cell membrane. The cell metabolism and functions can be studied by investigating morphology of cell membrane. Cell membrane disruption causes depolarization due to which cell content leakage and cell death can occur. The fluorescence technique has been extensively used to monitor intracellular structure and for cell membrane imaging. Tang's group reported a group of fluorophore/luminophore which emit more light in the aggregated form than in solution. Aggregate formation played constructive role in this kind of luminogens in the light emitting phenomenon. The aggregated form of reported series of silole molecules/fluorophores were found to be more emissive rather than in solution. These luminophores showed exactly opposite emission behavior to ACQ and this phenomenon coined as "Aggregation-Induced Emission" (AIE). In this chapter we have given a brief review of the AIE materials for cell membrane imaging.

Progress in Molecular Biology and Translational Science
ISSN: 1877-1173
https://doi.org/10.1016/bs.pmbts.2021.06.008

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Antimicrobial Resistance

Underlying Mechanisms and Therapeutic Approaches

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V. Kumar et al. (eds.), *Antimicrobial Resistance*,
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Antimicrobial Resistance and Medicinal Plant Products as Potential Alternatives to Antibiotics in Animal Husbandry

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V. Kumar et al. (eds.), *Antimicrobial Resistance*,
https://doi.org/10.1007/978-981-16-3120-7_13

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Plant-Assisted Plasmid Curing Strategies for Reversal of Antibiotic Resistance

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Geetanjali M. Litake

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Abstract

Antibiotic resistance attributed to mobile genetic elements (MGEs) has a universal concern in the management of treatment of infectious diseases. One of the modern-day strategies to have a check on these transmissible antibiotic resistance genes (ARGs) can be plasmid curing and anti-plasmid approaches. The in vitro tools implemented for plasmid curing make use of nontherapeutic chemicals, therapeutic drugs, and plant-derived compounds. The recent approach to deal with the reversal of multidrug resistance includes conjugation inhibition,

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V. Kumar et al. (eds.), *Antimicrobial Resistance*,
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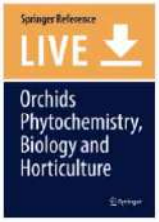

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Eulophia spp.: In Vitro Generation, Chemical Constituents, and Pharmacological Activities

Varsha Shriram and Vinay Kumar

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Abstract

Eulophia R.Br. ex Lindl represents one of the largest, wide-spread, and important genera of the family *Orchidaceae*. *Eulophia* shows an extraordinary kind of morphological diversity and occupies a wide variety of habitats. Current records testify that it encompasses around 230 species, out of which 203 are the accepted ones. This genus is of prime importance because of its distinctive ecology and broad-spectrum ornamental and therapeutic properties. Crude solvent extracts and phytochemicals have been assessed from the members of this genus and found to possess potent pharmacological activities including anticancer, anti-diabetic, anti-inflammatory, and DNA protection among others. Keeping this in view, we are presenting herein an account on the distribution and botanical description of the genus *Eulophia*, chemical constituents reported from the *Eulophia* species along with their ethno/pharmacological activities/claims

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J.-M. Mérillon, H. Kodja (eds.), *Orchids Phytochemistry, Biology and Horticulture*, Reference Series in Phytochemistry, https://doi.org/10.1007/978-3-030-11257-8_31-1

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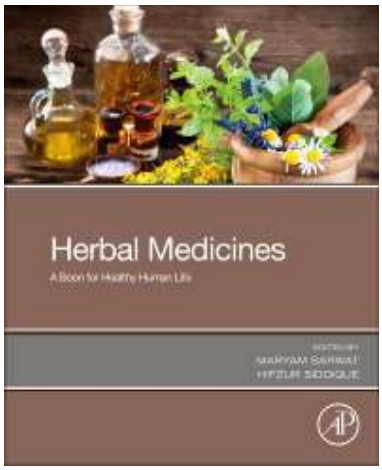

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Herbal Medicines: A Boon for Healthy Human Life provides a comprehensive overview of the role of herbal medicines for treating a broad variety of human diseases, from neurological disorders to cancer and major disorders such as infectious diseases, metabolic disorders, and more. Each chapter summarizes the current state and future direction of the use of herbal medicines against multiple diseases from a translational point-of-view, making this reference a valuable source of information for a large audience, including researchers and healthcare providers interested in the field of herbal remedies.

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CHAPTER 3

Q1

Herbal remedies against Huntington's disease: Preclinical evidences and future directions

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Q2

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3.1 Introduction

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Huntington's disease (HD) is an autosomal dominant, devastating progressive neurodegenerative genetic disorder with a distinct phenotype distinguished by the gradual development of involuntary dystonia and chorea, cognitive deterioration, incoordination, neuropsychiatric problems and behavioral difficulties [1,2]. These phenotypes result in neuronal impairment which ultimately leads to death in selective regions of the brain, the principal targets being the striatum and cerebral cortex [1]. Huntingtin (mHtt), the protein product of the mutant gene responsible for HD (the gene, linked to a polymorphic DNA marker maps to human chromosome 4), occurs due to an expanded repeat of CAG which in turn leads to a polyglutamine strand of indefinite length at the N-terminus [2–4]. This protein has a molecular weight of 350-kilodalton and after mutation, it decreases the production of Brain-derived neurotrophic factor (BDNF) in the cortex [5]. The mutant protein, mHtt disturbs vesicle trafficking and decontrols autophagy in the nerve cells, hence leading to cellular death [6]. The onset of the

Herbal Medicines: A Boon for Healthy Human Life.
DOI: https://doi.org/10.1016/B978-0-32-390572-5.00010-X
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0010-ELSST135-Siddique-978-0-323-90572-5

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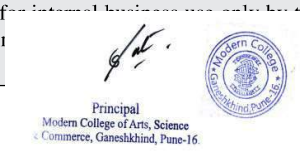

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Abstract

Plants hold the ability to produce wide types of bioactive secondary metabolites. Having emerged in the pregenomic era, increasingly more biosynthetic genes are being discovered in plants, leading to the discovery of new types of bioactive secondary metabolites. Utilisation of classical techniques is limited that hampers the discovery of pharmacologically important secondary metabolites. However, the development of CRISPR (clustered regularly interspaced short palindromic repeats)/Cas (CRISPR associated protein)-based tools may alleviate this impasse. This chapter briefly presents existing information about the CRISPR/Cas9 system, and by what implies it was engineered to enhance important secondary metabolite production in plants. CRISPR/Cas systems have been among the most versatile genome editing tools available, revolutionising molecular biology. This chapter intends to highlight and discuss the lasting challenges of CRISPR/Cas-based genome editing and the improvement of secondary metabolite amount in plant natural product engineering. The plants canvassed in this chapter include *Atropa belladonna*, *Brassica napus*, *Camelina sativa*, *Dendrobium officinale*, *Dioscorea zingiberensis*, *Glycine max*, *Humulus lupulus*, *Papaver somniferum* and *Salvia miltiorrhiza*. Additionally, we highlight the prospects of using CRISPR/Cas in plant secondary metabolite engineering.

Keywords (separated by '-') CRISPR/Cas9 - Metabolites - Plant natural products - Medicinal plants genome editing

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Chapter 8
CRISPR/Cas Genome Editing in Engineering Plant Secondary Metabolites of Therapeutic Benefits

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Abstract Plants hold the ability to produce wide types of bioactive secondary metabolites. Having emerged in the pregenomic era, increasingly more biosynthetic genes are being discovered in plants, leading to the discovery of new types of bioactive secondary metabolites. Utilisation of classical techniques is limited that hampers the discovery of pharmacologically important secondary metabolites.

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T. Aftab, K. R. Hakeem (eds.), *Metabolic Engineering in Plants*,
https://doi.org/10.1007/978-981-16-7262-0_8

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ISBN 978-1-64368-216-7 (print)
ISBN 978-1-64368-217-4 (online)
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ISSN 1879-808X (online)

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ISBN 978-1-64368-216-7 (print)
ISBN 978-1-64368-217-4 (online)
Library of Congress Control Number: 2021949311
doi: 10.3233/APC39

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Recent Trends in Intensive Computing
M. Rajesh et al. (Eds.)
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doi:10.3233/APC210233

E-19

Node Failure Management to Improve the Performance of Wireless Sensor Networks

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Abstract. A sensor network can be defined an assembly of sensor nodes which associated by all together to complete particular detailed task. These sensor nodes are mostly in huge amounts also compactly installed moreover in the network area or very near to it. Sensor networks can be worked for several sectors such that: environmental monitoring, home, health care, Industries, military, and habitat. Failure of network is unavoidable in wireless sensor networks because of unfriendly location and non-reachable placement. Hence, it is needed that network faults are discovered in time and proper methods are engaged to bear network task. So, it is important to deliver fault forbearing systems for spread sensor applications. Numerous new work in this field yield severely different methodologies to talking the fault tolerance concern in routing. In this propose review and equate present fault tolerant practices to provision for sensor applications.

Keywords. Wireless sensor networks, node failure reasons, fault detection approaches, fault management, fault detection and recovery.

1. Introduction

A dynamic field of concern for researchers and manufacturing group is Wireless sensor networks (WSNs). A WSN is usually a network of scattered sensor nodes assembling data from the atmosphere to observe the situations of that atmosphere. There are two types of nodes are used for WSN application which are completely depend on the application requirement, static nodes and movable nodes are the categories of the nodes. Static nodes stay fixed and complete to recognizing the events, routing of packets, else perform as destination nodes, although movable nodes travel everywhere in the network to identify network situation and different jobs such as changing dead nodes. Node distribution is depend on application may be physical or random. In physical distribution, the sensors are physically dropped and data is routed with selected paths [1]. The presentation of WSNs completely rest on the assumption that the nodes are linked till the destination node., few nodes those are situated away from the sink node and because of this its require several steps to communicate with neighboring nodes and transfer the date to destination node[2, 3]. Restricted resources are the one of the design issues in sensor node.

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E-10

ABIOTIC STRESS AND LEGUMES

Tolerance and Management

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4

Modulations of legume plants in response to heavy metals induced stress

Neeru Bala, Priyanka Sharma, Anjana Kumari, Navdeep Singh, Renu Bhardwaj, Avinash Kaur Nagpal and Jatinder Kaur Katnoria

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4.1 Introduction

Innumerable human activities including domestic, industrial, transportation, as well as extraction of mineral resources result in heavy metal contamination in both soil and water ecosystems. Dumping solid wastes along with emissions from vehicles, in the past years, has become a serious environmental problem worldwide (Pajuelo et al., 2007). Soil contamination with heavy metals such as arsenic, chromium, copper, cadmium, nickel, lead and zinc can lead to toxic effects in plants, humans, and other organisms that play a vital role in maintaining the ecological balance. The presence of such contaminants can threaten various living forms including humans because heavy metals can accumulate in food chains and can further cause different types of toxicities, viz., mutagenicity: induction of mutations (genetic alterations) by a physical or chemical agents; genotoxicity: damaging effects on DNA causing variations in its integrity; cytotoxicity: alteration in functioning of a living cell by chemical pollutants; teratogenicity: causing malformations in developing embryo or fetus; and last but not least, oxidative stress: effecting or altering various biochemical reactions.

Although climatic and geological changes play a significant role in intensifying the pollution levels in different ecosystems, one of the major sources of heavy metals leading to soil pollution is the use of direct or untreated sewage water for agricultural purposes. Pagliai et al. (1981) in a study reported that the direct use of sewage sludge in agricultural fields resulted in

Abiotic Stress and Legumes. DOI: https://doi.org/10.1016/B978-0-12-815355-0.00006-0
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E-11

Molecular Approaches to Potassium Uptake and Cellular Homeostasis in Plants Under Abiotic Stress

Role of Potassium in Abiotic Stress pp 41-75 | Cite as

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First Online: 01 January 2022

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Abstract

Intracellular potassium (K^+) homeostasis is an essential requirement for the optimum processing of plant metabolism and overall functioning of plants. It is regulated by K^+ ion uptake, efflux, and intracellular and long-distance translocation, which is arbitrated by a great amount of K^+-selective and nonselective channels and transporters placed at both plasma and vacuolar membranes. Various abiotic stresses like drought, salinity, water-logging stress, etc. led to drastic deterioration of intracellular potassium homeostasis. These stresses aggravate a K^+ channel and transporter expression along with the posttranslational control of their actions and optimization of K^+ absorption and

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Biodiversity and Sustainable Resource Management

(Basic to Research and Applied)

Edited by

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Modern College of Arts, Science
& Commerce, Ganeshkhind, Pune-16.

Modern College
Ganeshkhind, Pune-16.

Bharti Publications
New Delhi- 110002 (INDIA)

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Title: Biodiversity and Sustainable Resource Management
(Basic to Research and Applied)

Editor: Dr. Debabrata Das

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First Published, 2022

ISBN:

Published by :

Bharti Publications

4819/24, 2nd Floor, Mathur Lane

Ansari Road, Darya Ganj, New Delhi-110002

Phone: 011-23247537

Mobile : +91-989-989-7381

E-mail : bhartipublications@gmail.com

info@bharatipublications.com

Website : www.bhartipublications.com

Printed in India, by: Sagar Color Scan, Delhi

Disclaimer: The views expressed in the book are of the author and not of the publisher and editor. Author themselves are responsible for any kind of Plagiarism found in the book and any related issues found with the book.

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3 Microbial Diversity and Its Importance

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**Assistant Professor, Department of Zoology, Modern College Arts Science Commerce Ganeshkhind Pune, Maharashtra*

***F. Y. BSc Student, Department of Zoology, Modern College Arts Science Commerce Ganeshkhind Pune, Maharashtra*

Abstract

From recycling nutrients, climatic changes to the health of humans, microbial diversity has a huge influence on our world. Due to its influence, it has solutions to various environmental problems. Microbial diversity is a fledgling field with many unresolved questions. With the help of modern developments, we are exploring this field to understand how microbes are influencing the environment, and how microbial diversity should be harnessed for sustainable development. In this extract, we will study the use of microbial diversity in agriculture, food web, ecology, human health, fuel, in maintaining the biochemical cycles, biodegradation, decomposition, etc. Further, we look towards the future and suggest the possible use of microbes.

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4 Medicinal Plants and Their Uses

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Abstract

Medicinal plants are a category of plants that are used widely by a large group of people for their purposes to make them fit in various ways. It is found that most of the people of many countries are cultivating these plants for their economy even as a passion to grow them in their conservatory or own garden. In this article a few globally used medicinal plants have been presented for the reference study or it may be used for our own purpose.

Keywords: *Medicinal plants use value, Importance.*

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5 Introduction to Invasive Alien Species

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Abstract

Invasive Alien Species (IAS) are animals, plants, fungi, and micro-organisms introduced accidentally or unintentionally and established in the environment outside their natural habitat/geographic range. Species are introduced unintentionally through means of land and water transportation, travel, and scientific research or intentionally through fish farming, pet trade, horticulture and bio-control. Invasive species threaten global biodiversity, economies and human livelihood. One-sixth of the global land surface is highly vulnerable to invasion, including substantial areas in developing economies and biodiversity hotspots. Here, we learn about drivers of invasion, the invasion process, the impacts and threats of invasive species on biodiversity and various socio-economic factors.

Keywords: *Invasive Alien Species, Invasion process, Threats and biodiversity*

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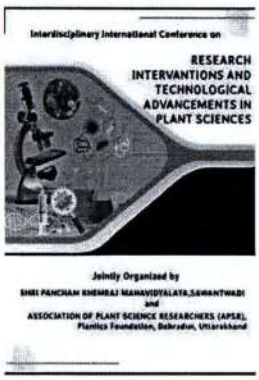

ISBN:- 978-81-951982-3-8

RESEARCH INTERVANTIONS AND TECHNOLOGICAL ADVANCEMENTS IN PLANT SCIENCES (RITAPS 2021)

Diversity and Seasonal Incidence of Darkling Beetles (Family Tenebrionidae) of Pune District, Maharashtra

Presenting Author:-

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Type
Oral Presentation

Track
Biodiversity

Abstract

Western Ghats (also known as Sahyadri) is a mountain range that runs parallel to the western coast of the Indian peninsula, located entirely in India. It is one of the eight "hot-spots" of biological diversity in the world. Beetles are omnipresent. They are found on land, in water bodies, on trees, even in dung. Beetles have two pairs of wings in which the front or first pair of wings is modified into hard structures called elytra which protects the second pair of wings during flight. This allows them to survive in all types of habitats (Johansson et al. 2012). Beetles play an important role in the ecosystem. Staphylinid beetles are bioindicators of urbanized area and presence of radionuclides in the environment (J. Bohac. 1999). The family Tenebrionidae belongs to the suborder Polyphaga of the order Coleoptera. The family is divided into 10 subfamilies, 96 tribes and 61 subtribes. Doyen JT (1972) Tenebrionidae are the fifth largest family of Coleoptera with 14,641 species worldwide and 1,345 occurring in the United States. These numbers are low since in the past three decades, many changes have been made in the classification of the family and many new taxa have been described. Watt JC (1974) The present study deals with the sampling of beetles from various areas of Pune. The beetles were collected by hand picking, with the fine forceps and brushes, by sweeping, by dusting, by using aspirators for very small beetles, by laying pit fall traps and light traps. Collections were also made from leaf litters and under the stones.

Keywords Beetles, Coleoptera, diversity, seasonal, darkling, Tenebrionidae.

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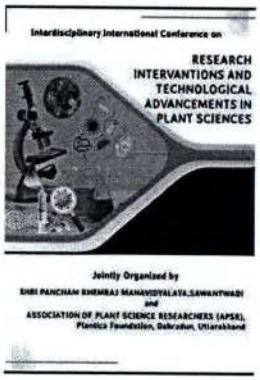

ISBN:- 978-81-951982-3-8

RESEARCH INTERVANTIONS AND TECHNOLOGICAL ADVANCEMENTS IN PLANT SCIENCES (RITAPS 2021)

Study of Molecular Taxonomy of Beetles of Family Hydrophilidae of Pune Region (MS), India

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Type
Oral Presentation

Track
Biodiversity

Abstract

Beetles belong to the largest insect order 'Coleoptera' which means 'sheath wings' in Greek. They are omnipresent, found in terrestrial as well as aquatic ecosystems. Due to their huge population and diversity, it is necessary to study their presence in different regions along with their identification. Pune being an urbanized city present in the state of Maharashtra, India, included under the Western Ghats, which are the hotspots of Biodiversity. Many forest areas, hills, lakes and protected parks are found in this region. The climate is dry, with ample amount of sunlight. Due to this, a large number and variety of flora and fauna can be found in this region. Taxonomic identification is necessary for placing the beetles in their respective family, genus and species taxa so as to simplify their study. Molecular identification is necessary for studying the evolution of the species as well as its relation with other species. Hydrophilidae in Greek means 'water loving'. They are water scavenger beetles comprising about 2500 known species (Fikacek et al. 2010).The following study shows the diversity of hydrophilid beetles found in the Sinhagad area, Tamhini Ghat, ARAI (Automotive Research Association of India), Pashan area and Kothrud area of Pune Region. It also focuses on the taxonomic and molecular identification of two species of 'dung loving water beetles' belonging to the family Hydrophilidae found in the Kothrud area of Pune.

Keywords

Beetles, Coleoptera, taxonomic, molecular, identification, diversity, Hydrophilidae.

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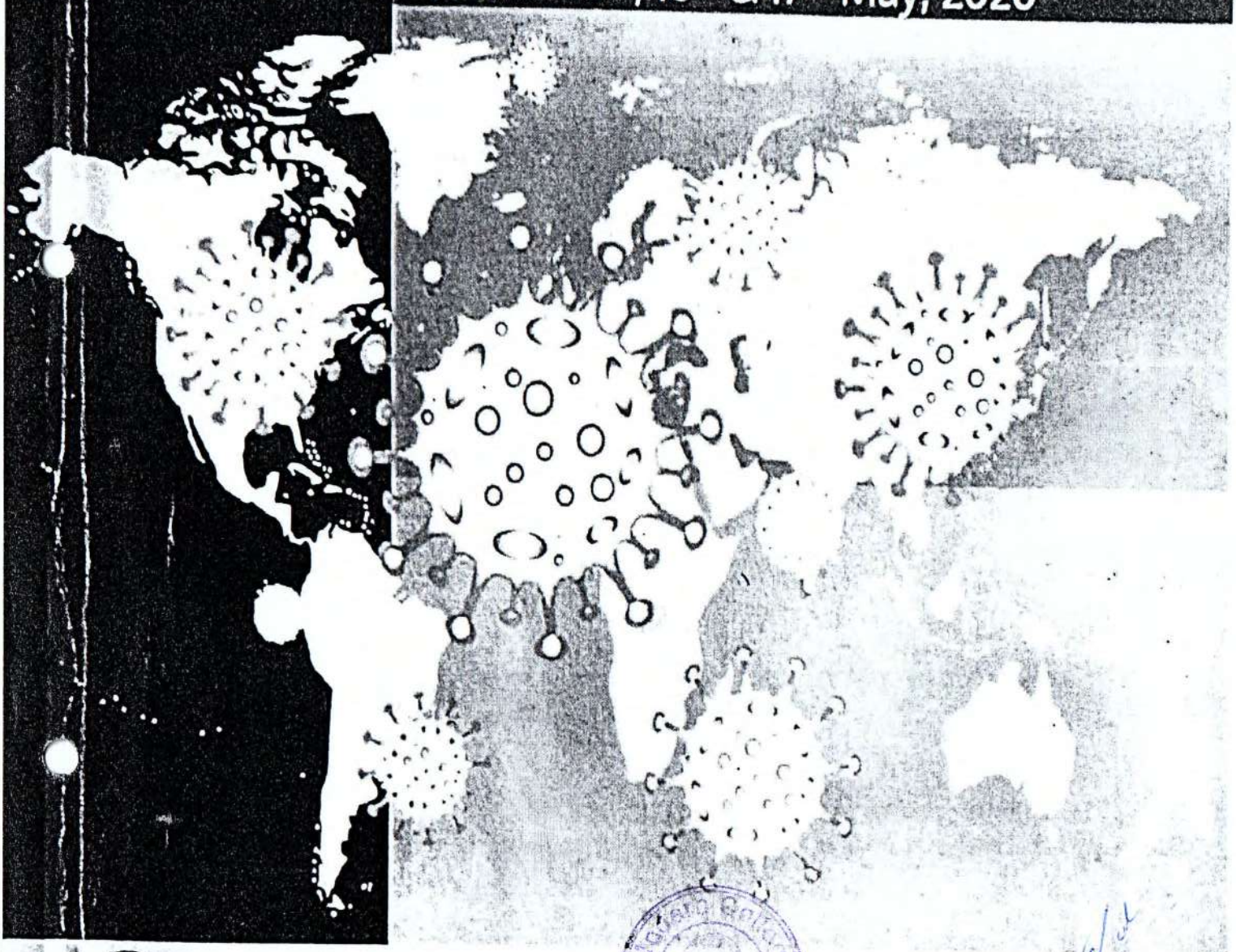
Conference Proceedings: SCHE-DC19-LPIW | 2020

ISBN: 978-93-5407-920-7

International E-Conference on "Strategies & Challenges in Higher Education during COVID-19 Lockdown Period in India with reference to World" 15th, 16th & 17th May, 2020



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Organized By
Government of Maharashtra
Higher and Technical Education
Government Vidarbha Institute of Science and Humanities,
Amravati, Maharashtra – 444 604 India
NAAC re-accredited 'A' Grade (II Cycle) with 3.32 CGPA

Editor in Chief: Prof Vasant Baburao Helavi Reddy

Editors: Prof Kishor Gopal Patil, Dr Yasmeen Sultana Siddiqui

Organizing Secretary: Prof S P Yawale

IQAC Coordinator: Dr S N Malode

International E-Conference Proceedings of

Strategies and Challenges in Higher Education during COVID-19 Lockdown Period in India with reference to the World

15th – 17th May, 2020

Title: SCHE-DC19-LPIW – 2020

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The views expressed in various chapters are there of the author and not or publisher of the book.

ISBN: 978-93-5407-920-7

Published By: Self Publish

Printed By: Government Vidarbha Institute of Science and Humanities, Amravati, Maharashtra – 444 604

PRINTED IN INDIA

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Corona Virus & It's Chemistry

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Corona virus is a member of viruses which traditionally belongs to the family of Coronaviridae. This family of viruses is known to be surrounded by a crown or a halo like envelope of glycoproteins giving it the characteristic appearance of a crown, that is a corona and hence the name. Coronaviruses commonly occur in avian and mammalian species. The viruses of both the species resemble each other in morphology and chemical structure, the coronaviruses of humans and cattle are antigenically related and probably may have evolved to be isotopes or haplotypes of each other.

The virus is closely classified based on the nature and chemical properties of glycoproteins followed by its unique replicative and target (host) invasive properties.

As is the case with any other virus, which for ages across the evolutionary lineages are considered as acellular entities. They have no independent existence of their own. They need a target that is a biological host, to activate it's life cycle and which normally happens in a living cell through the processes of genomic replication (either DNA or RNA depending on the viral genetic material), transcription and translation.

Once a virus enters the host cell, it can adopt two infective mechanisms and ensure their propagation either by means of the lytic or lysogenic cycles (as is seen in the case bacteriophages)

Structure of the Coronavirus: It is spherical pleomorphic in shape having nucleoprot enveloped within an extensive glycoprotein capsid coat. The virus contains a single-strand (positive-sense) RNA as it's genomic mater The crown like projecting glycoprotein envelope forms the matrix of the virus.

Classification of the Corona virus: The fam Coronaviridae consists of two basic gene namely the Coronaviruses and the Toro virus The coronaviruses were originally grouped in the family Coronaviridae on the basis of th crown or halo-like appearance given by th glycoprotein-studded envelope on electro microscopy. This classification has since bee confirmed by unique features of the chemist and replication of these viruses. Most huma coronaviruses fall into one of two groups: 229 like and OC43-like. These differ in both antigen determinants and culturing requirements: 229E like coronaviruses can usually be isolated i human embryonic fibroblast cultures; OC43-like viruses can be isolated, or adapted to growth, i suckling mouse brain. There is little antigenic cross-reaction between these two types and are known to cause independent epidemics.

Life-cycle and chemistry of the virus

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International (Web) Conference on Recent Advances in Freshwater Aquaculture (RAFA-2021)
Organized by
Department of Zoology
M.S.P. Mandal's - Sunderrao Solanke Mahavidyalaya Majalgaon,
Dist. Beed (M.S.) India (Golden Jubilee Year, 2020-2021)
January 21 & 22, 2021

Abstract No. 44

NUTRIENT COMPOSITION OF *XENENTODONCANCILA* (HAMILTON, 1822) FROM BHIMA RIVER OF MAHARASHTRA, INDIA

R. M. More*[1], J. P. Sarwade[2], R. V. Kshirsagar[1], S. A. Inamdar[1], M. S. Mategaonkar[1]

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Abstract:

As per Fish Base Indian freshwater support about 1030 species of freshwater fish hence it classifies as a freshwater eco-region. Fishes provides nutritional and financial security to the marginalized communities. Few of fishes consider as trash fish because of low market demand, such common trash fish species *Xenentodoncancila* (Hamilton, 1822) which inhabits across the Indian freshwater were studied for proximate analysis. Estimation of the nutritional profile of fish which are fit for human consumption is essential and thus a bio-monitoring study was carried out to find out the proximate composition of freshwater needlefish *Xenentodoncancila* (Hamilton, 1822) in Bhima river of Maharashtra. Bhima river is the major tributary of Krishna river system, flows for 681km before entering Krishna.Carbohydrate,protein, lipid (fat), ash and moisture composition in the muscle of fish species were studied. Proximate analysis revealed that the percent of protein is15.86±0.23, lipid (i.e., fat) 0.71±0.01, Ash 3.57 ±0.06 and moisture 78.11±0.09. the result fine near similar to the previously literature. Hence fishes of Ujani reservoir of Bhima river are recommended for consumption. The results can be used as a baseline data for comparing the various nutritional profiles of fishes in future.

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In Joint Collaboration with
Nepal Aquaculture Society, Kathmandu, Nepal (NEAQUAS)
Asian Biological Research Foundation (ABRF), Prayagraj, (U.P.), India
Glocal Environment & Social Association (GESA), New Delhi

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Certificate presented to *Ms. Mithila Chinchalkar*

from *Modern College Arts Science Commerce, Ganeshkhind, Pune*

for an Poster Presentation titled "Studies on Ethology of Planaria With reference to Phys Chemical Stimuli " at the Online International Conference on Biotechnology in Conservat Sustainable Development held from 1 - 3 February 2022.

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PLAA 02

Temporal Variation in Zooplankton Diversity in a Tropical Pond, Pune, Maharashtra, India

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Aquatic Ecosystems are source of life on earth. Freshwater although constitutes small portion of land harbours vast diversity of fauna ranging from planktons to some vertebrates. A study was carried out in lentic habitat- small seasonal pond located in Savitribai Phule Pune University (SPPU) campus, Pune, to assess the temporal variation in Zooplankton diversity from August 2016 to March 2017. Water sampling was done at three sites along shores of pond. Physicochemical parameters were also recorded and sample was analyzed qualitatively as well quantitatively. A total of 4 groups and 19 genera of zooplanktons were identified from all three sites. Two groups of copepods- Cyclopoid and Calanoid were found throughout the study period, with Cyclopoid number increasing gradually. Seven species of rotifers were found all belonging to order Ploima; Genus *Lecane* being dominant. Cladocerans were represented by 5 genera, whereas ostracods are represented by 9 genera. The Shannon diversity index and Dominance index were also calculated. The value of Shannon index was maximum in November at site 1, indicating maximum diversity. For site 2 and 3 the values were high during August-September, the values declined during winter and again showed rise in post winter season. The copepods were found throughout the study period. Rotifers were abundant during Monsoon season, with fall in abundance during post monsoon season.

Keywords: Zooplankton; Tropical pond; Pune; Shannon index.

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