See discussions, stats, and author profiles for this publication at: https://www.researchgate.net/publication/365603178

National Conference on Climate Change: Its Impact on Bio-Resource of the Himalayan Region (CCIBHR-2022)

Book - September 2022

cTATIONS

0

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

Development of new green medicine/ formulations from traditional medicinal resources and their chemical profiling for quality control View project







SOUVENIR

National Conference Climate Change: Its Impact on Bioresources of The Himalayan Region (CCIBHR-2022)

ORGANIZED BY

Department of Chemistry S.S.M.M.U.S.S.S. Government Post Graduate College Dwarahat, Almora (Uttrakhand) India

SPONSORED BY Uttarakhand State Council for Science & Technology, Dehradun and in collaboration with Uttarakhand Science Education & Research Center, Dehradun

Editor Dr. Darshan Singh



National conference

on

Climate Change: Its Impact on Bioresources of the Himalayan Region (CCIBHR-2022)

(5th & 6th June 2022)

Organized by



Department of Chemistry S.S.M.M.U.S.S.S. Government Post Graduate College Dwarahat, Almora (Uttrakhand) India Sponsored by Uttarakhand State Council for Science & Technology & In Collaboration With



Uttarakhand Science Education & Research Centre (USERC), Dehradun



Prof. C.S. Mathela Former Head (Chemistry) & Dean Science Kumaun University Nainital



Prof. Om Prakash

G.B. Pant University of Agriculture and Technology, Pantnager





Prof. Ajay Singh Rawat Former Head & Convener (History) Kumaun University Nainital



Prof. B.S.Kotlia UGC Research Scientist Kumaun University, Nainital



Dr. R.C. Padaliya

Principal Scientist Central Institute of Medicinal and Aromatic Plants, Lucknow Registration Link: https://forms.gle/iUSGUUqGRwmKLFrs6 E-mail Address for sending abstract: gpgcdwarahat@gmail.com kambojdarshan@gmail.com Contact No: Organizing Secretory 9458922030, 7536881606 Account Details for Depositing Registration Fee: A/c Name: GOVERNMENT PG COLLEGE SEMINAR A/c No: 004100100006999 IFSC Code: AUCB0000005 Only RTGS or NEFT will be Accepted.







National Conference

On

Climate Change: Its Impact on Bioresources of the Himalayan Region (CCIBHR-2022)

5th-6th June, 2022

SOUVENIR

Organised by:

Department of Chemistry, S.S.M.M.U.S.S.S. Government Post Graduate College Dwarahat, Almora, Uttarakhand, India

Editor

Dr. Darshan Singh





Sponsored by

Uttarakhand State Council for Science & Technology,

Dehradun

and

Uttarakhand Science Education & Research Centre (USERC),

Dehradun

Editor Dr. Darshan Singh

Printed by:-

KUNAL BOOKS

4648/21, 1st Floor, Ansari Road, Daryaganj, New Delhi-110002 Phones: 011-23275069, +91-9811043697 *E-mail:* kunalbooks@gmail.com *Website:* www.kunalbooks.com







About the Conference

AIM

A crucial challenge for humanity is to reduce the adverse effect of climate change. The consequences of climate change have several multifaceted effects which might lead to the collapse of the ecosystem and loss of biodiversity Uttarakhand is mostly known for its rich and varied biodiversity. The Himalayan region is well known for its medicinally and commercially important herbs, some of which are now endangered due to climate change. This seminar will give some new ideas for minimizing the adverse effect of climate change.

Themes

- Environmental Pollution and climate change
- New approach for pollution control
- Impact of climate change on bio-resources
- Natural products and green chemistry
- Impact of Climate Change on natural products
- Green technique for extraction of natural products
- Green chemistry
- How to minimize the impact of climate change
- Space weather and climate change
- Recent changes in climate and its impact on Uttarakhand
- Role of natural resources in development of remote hill areas and economic potential.
- Environmental friendly pesticides.
- Natural products for sustainable empowerment of society
- Social and economic impacts of climate change







Dr D.P. Uniyal Joint Director



UTTARAKHAND STATE COUNCIL FOR SCIENCE & TECHNOLOGY (UCOST)

Department of Information, Science and Technology, Govt. of Uttarakhand Vigyan Dham, Jhajra, Dehradun – 248007, Uttarakhand, India

The Indian Himalayan Region is one of the most diverse places in the world due to its sociocultural mix and natural characteristics. It represents the significant biodiversity hotspots and provides a number of pressure from regional and global changes that are a result of both natural and anthropogenic forces. Mountains are among the most fragile ecosystems, with the weakest resilience to climate change. If they continue to degrade, they will fail to provide the resources which will severely cost not only the local communities but the entire society living down-streams. Compared to their counterparts in the lowlands, mountain communities' livelihoods are more vulnerable to changes in the economy and environment. For the mountain ecology and mountain people, the stresses of globalization, urbanization, institutional evolution, and climate change are, including natural disasters, migration, land abandonment, environmental degradation, a food crisis, and water scarcity. The attempts to create and put into practice efficient policies and management methods for mitigation and adpation depend on our ability to comprehend and predict the effects of climate change on the Himalayan ecosystem and the services they provide to humans. Foreseeing potential effects of climate change on the structure and functions of the distinctive mountain ecosystem and evaluating their socio-cological sustainability requires long-term monitoring and modelling of climate change dynamics.

Climate change impacts such as increasing temperature, melting glaciers and extreme weather events are severely deteriorating the fragile ecosystem and natural resources of the Himalayas, thus inducing the loss of bioresources at an alarming rate, affecting the aesthetic and cultural aspects of Indian Himalayan Region. Plants from mid- and low-elevation regions reportedly started to colonize highelevation mountain locations. Publications over the past year have emphasized the same pattern in some animal species, including birds. Other environmental variables, such as increasing precipitation, may allow some species to survive at lower elevations in arid areas. For a wide range of species in the Himalayas, there is growing evidence of altering tree line ecotones, which could have an impact on the community composition at the landscape scale. Additionally, fire frequency, severity, and area are all increasing as a result of climate change effects on fuelwood moisture, vegetation composition, weather patterns that favour fires, and the length of the fire season. The influence of climate and cryosphere change in the highlands on the river and water systems downstream leads to water scarcity and insecurity. Climate change is having a negative impact on food, fiber, and other ecosystem products, which is bad for the community's way of life and economic prosperity in mountainous areas.

The knowledge, experience, and capacity of the local mountain communities to manage their fragile ecosystem have been largely ignored for years, which may present a significant opportunity for addressing the growing environmental issues. The current global challenges have had a significant negative impact on mountain regions and the people who live there. It's critical to comprehend how resilience, adaptation, and sustainable development work together in mountain regions to fight climate change. Mountains can be used to explore nature-based solutions (such as afforestation, agroforestry, and climate being, sustainable environmental management, and livelihoods. Planning and implementation of adaptation strategies in mountains must be grounded in context-specific socio-ecological and climatic realities due to the mountains' complex and dynamic biophysical characteristics as well as high socio-cultural variety. Many mountain regions need solutions to address the socioeconomic auses of vulnerability, expanding the range of potential solutions. Coordination and monitoring networks have an increasing potential to address data inadequacies, close knowledge gaps, and streamline implementation processes. Mountain ecosystem development and preservation needs to be addressed, as it benefits not only the locals but the larger regional, national, and international communities as well.

I would like to compliment the organizer of the event for publishing souvenir of the conference.

1.P. 2 (Dr D.P. Uniyal)

t +91-8193099164, e. dpuniyal.ucost@gmail.com, uniyaldp.ucost@gmail.com, w. www.ucost.in







Uttarakhand Science Education & Research Centre (USERC) Department of Information and Science Technology (Government of Uttarakhand)



Message

It gives me an immense pleasure to Congratulate Government P.G. College, Dwarahat (Almora) Uttarakhand for organizing a National Conference on Climate Change: its impact on Bioresources of the Himalayan Region (CCIBHR-2022) in Collaboration with Uttarakhand Science Education & Research Centre (USERC) held on 05-06 June 2022.

The Existence of the Himalaya, which sustains the Asian Continent, is being threatened by the degradation of environment and ecosystem of the Planet earth. The urgency to save Himalaya is the responsibility of all of us. It is also imperative to study the changes in the Himalayan ecosystem and its bioresources. The climate change is instigating the destabilization of environmental, social and economic fabrics of society in these states including Uttarakhand.

I'm sure that this conference would be beacon of inspiration for the participating Research Scholar, Scientists and Academician and hopeful that this Conference will be useful and of immense help to all the Stakeholders.

1: 1: Prof. (Dr.) Anita Rawat

Director, USERC

21/4, E.C. Road, Dehradun - 248 001, Uttarakhand, INDIA. Ph.: 91-135-2710302, Web: www.userc.in, E-mail: u.serc@rediffmaill.com







उच्च शिक्षा निदेशालय, उत्तराखण्ड हल्द्वानी – 263139 (नैनीताल) फोन नं0-06946-240555,240666,240777

Mail-higherducation.director@gmail.com



MESSAGE

I am extremely delighted to learn that, Department of Chemistry, SSMMUSSS Government Post Graduate College, Dwarahat, Almora (Uttarakhand) is organizing a National Conference on "Climate Change: Its Impact on Bioresources of Himalayan Region" on 05 & 06 June 2022.

I Hope that this Conference would provide valuable, useful and innovative ideas to the participants and help them in acquiring knowledge about the Climate change and its impact on Bio-resources. It would be a good opportunity for the participants to have a common platform for discussion on burning issues of climate change and will get some workable solutions to the emergent environmental problems before they reach irreversible levels.

I extend my warm greetings to the organizers and all the participants of the Conference and wish all success to the organization of the Conference.

(Prof. Sandeep Kumar Sharma) Director Higher Education, Uttarakhand





MESSAGE

I am extremely delighted to learn that, Department of Chemistry, SSMMUSSS Government Post Graduate College Dwarahat, Soban Singh Jeena University, Almora is organizing a National conference on Climate Change: Its Impact on Bio-resources of Himalayan Region during 05-06 June 2022.

I hope that this conference would provide valuable, useful and innovative ideas to the participants and help them in acquiring knowledge about the Climate Change and its impact on Bio-resources. It will be a good opportunity for the participants to deliberate on the burning issues of Climate Change and finding workable solutions to the emergent environmental problems before they reach irreversible levels.

I extend my warm greetings to the organizers and all the participants of the conference and wish all success to the organization of the conference.

28/05/2022

Prof.N.S.Bhandari Vice-Chancellor Soban Singh Jeena University Almora







Kumaun University

Nainital, Uttarakhand, India.

Massage from Chief Guest



I am delighted to write this message for National Conference on Climate Change: Its Impact on Bioresources of the Himalayan Region (CCIBHR-2022), which going is to be organized by the Department of Chemistry, Government Post Graduate College, Dwarahat (Almora) Uttarakhand, in the beautiful hill station and the town of temples, Dwarahat, India on 5-6 June 2022. It is my great pleasure and honor to serve as the Chief Guest for the CCIBHR-2022. Especially when the organizingDepartment, The Department of Chemistry, is completing 40 glorious years of its existence.

In addition, I would like to take this opportunity to thank all the organizing committee members who have been working very hard to finish reviews and the organization of the programin a timely manner. I would like to express my sincere appreciation to members and volunteers of various committees and reviewers of CCIBHR-2022. Our sincere gratitude goes to all the authors and invited speakers, for their participation and for providing the intellectual sharing of experiences. I would like to thank Prof. A. S. Rawat, Prof.A. K. Joshi, Prof. Anil Joshi, Prof. Om Praksh, and Dr. Darshan Singh, whose leadership helped rganization of the conference. I hope that all participants enjoy the program as well as the beauty of Dwarahat.

athere

Prof. C. S. Mathela (Emeritus Scientist & Emeritus Professor) Former Convenor& Head Department of Chemistry Kumaun University, Nainital, Uttarakhand, India.







Government Post Graduate College

Dwarahat, Almora, Uttarakhand-263653

Massage from Patron



I am delighted to write this message for National Conference on Climate Change: Its Impact on Bioresources of the Himalayan Region (CCIBHR-2022), which going is to be organized by the Department of Chemistry, Government Post Graduate College, Dwarahat (Almora) Uttarakhand, in the beautiful hill station and the town of temples, Dwarahat, India on 5-6 June 2022.

The Department of Chemistry takes great pleasure in organizing the CCIBHR-2022 National Conference on Climate Change: Its Impact on Bioresources of Himalayan Region at SSMMUSSS Government Post Graduate College, Dwarahat (Almora) Uttarakhand. The conference is organized in association with USERC and UCOST, Dehardun. We are extremely happy to host distinguished personalities from academics and industry as keynote speakers. These include Prof. C. S. Mathela, Prof. A. S. Rawat, Prof. Om Prakash, Dr. B. S. Kotliya, and Dr. R. C. Padaliya. These talks along with the presentations of selected papers are expected to be a feast for the academics and research community.

In addition, we would like to take this opportunity to thank all the technical committee members who have been working very hard to finish reviews in a timely manner. I would like to express my sincere appreciation to members and volunteers of various committees and reviewers of CCIBHR-2022. Our sincere gratitude goes to all the authors and invited speakers, for their participation and for providing the intellectual sharing of experiences. I would like to thank Prof. A. S. Rawat, Prof. C. S. Mathela, Prof. Anil Joshi, Prof. Om Praksh, and Dr.Bharatji Upadhyay, whose leadership helped with the overall organization of the conference. I hope that all participants enjoy the technical program as well as the beautiful town of hills, Dwarahat.

On behalf of the organizing committee, I welcome you all to CCIBHR-2022 and hope that the conference in particular leaves positive memories for you to cherish.

Prof. A. K. Joshi (Principal)

Government Post Graduate College Dwarahat (Almora) Uttarakhand







Department of Chemistry

SSMMUSSS Government Post Graduate College, Dwarahat, Almora, Uttarakhand-263653

Massage from Organizing Secretory



I am delighted to write this message for National Conference on Climate Change: Its Impact on Bioresources of the Himalayan Region (CCIBHR-2022), which going is to be organized by the Department of Chemistry, Government Post Graduate College, Dwarahat (Almora) Uttarakhand, in the beautiful hill station and the town of temples, Dwarahat, India on 5-6 June 2022.

The Department of Chemistry takes great pleasure in organizing the CCIBHR-2022 National Conference on Climate Change: Its Impact on Bioresources of Himalayan Region at SSMMUSSS Government Post Graduate College, Dwarahat (Almora) Uttarakhand. The conference is organized in association with USERC and UCOST, Dehardun. We are extremely happy to host distinguished personalities from academics and industry as keynote speakers. These include Prof. C. S. Mathela, Prof. A. S. Rawat, Prof. Om Prakash, Dr. B. S. Kotliya, and Dr. R. C. Padaliya. These talks along with the presentations of selected papers are expected to be a feast for the academics and research community.

We received 250 submissions from around the world, which helped us to develop a very strong and interesting program for this conference. The TC members completed all the reviews in a very timely manner. Based on the review outcomes we chose 150 papers for the conference and developed a very high-quality program for two days.

In addition, we would like to take this opportunity to thank all the technical committee members who have been working very hard to finish reviews in a timely manner. I would like to express my sincere appreciation to members and volunteers of various committees and reviewers of CCIBHR-2022. Our sincere gratitude goes to all the authors and invited speakers, for their participation







and for providing the intellectual sharing of experiences. I would like to thank Prof. A. S. Rawat, Prof. C. S. Mathela, Prof. A.K. Joshi, Prof. Anil Joshi, Prof. Om Praksh, and Dr.Bharatji Upadhyay, whose leadership helped with the overall organization of the conference. I hope that all participants enjoy the technical program as well as the beautiful town of hills, Dwarahat. On behalf of the organizing committee, I welcome you all to CCIBHR-2022 and hope that the conference in particular leaves positive memories for you to cherish.

Dr. Darshan Singh Kamboj

Organizing Secretary (CCIBHR-2022) Assistant Professor & Head Department of Chemistry Government Post Graduate College Dwarahat (Almora) Uttarakhand







SSMMUSSS Government Post Graduate College

Dwarahat, Almora, Uttarakhand-263653

Massage from Chief Proctor



I am delighted to write this message for National Conference on Climate Change: Its Impact on Bioresources of the Himalayan Region (CCIBHR-2022), which going is to be organized by the Department of Chemistry, Government Post Graduate College, Dwarahat (Almora) Uttarakhand, in the beautiful hill station and the town of temples, Dwarahat, India on 5-6 June 2022. It is my great pleasure and honor to serve as the Chief advisor for the CCIBHR-2022. Especially when the organizing Department, the Department of Chemistry, is completing 40 glorious years of its existence.

As Chief Advisor and on behalf of the Organizing Committee, I take great pleasure and pride in hosting the National Conference on Climate Change (CCIBRHR-2022) by The Department of Chemistry. The conference isscheduled from June 5-6, 2022, and is organized in association with USERC and Ucost, Dehradun, India.

Millions said 'the apple fell' but Isaac Newton was the only one to ask 'why'. This is the true spirit ofcuriosity and inquisitiveness that CCIBHR-2022 aspire for. The conference is envisaged to be a congregation academicians, researchers, practitioners, engineers, educators, administrators, and students. Thedeliberations, discussions, and sharing of thoughts and ideas shall enable the participants to take up newchallenges and initiatives in their chosen area of research.

Dr. Bharat Ji Upadhyay Chief Proctor Government Post Graduate College Dwarahat (Almora) Uttarakhand





Brief Profile of Prof. C.S. Mathela





C.S.Mathela, Hony. Emeritus Professor, a noted Natural Product Chemist, has been Head Chemistry Department, Dean Science Faculty, Co-ordinator FIST (DST), Director R & D and Emeritus Scientits (CSIR) in Kumaun University, Nainital where he served for over four decades. He has been Fulbright Fellow in University of California, Devis (1986-87; with Prof. Albert. T. Bottini), Visiting Faculty in California State Politechnic University Pomona in 1985, 1991 & 1997 and Visiting Professor in Kathmandu University in 2000. In early carrier, he availed UGC National Associateship (CDRI Lucknow) and CSIR Visiting Associateship (NCL Pune). He dekivered Plenary/ Invited lectures in Conferences/ Workshop in Singapore. Washington DC. Cal Poly, Pomona Zug (Switzerland), London and Nanjing (China). He supervised 50 research scholars for Ph.D. drgree and published 185 research paper (3510 citation index). He has been President ISCA (Chemical Sciences; 200-6) and Editor JICS (Organic- Biochem; 2011-24). He received various research/ academic/ social awards including Acharya Narendra Dev Alankar for Meritorious service

Topic of Key Notes Address

HIMALAYAN FLORAL RESOURCE: EXPLOITING CHEMICAL DIVERSITY AS CONTRIBUTOR IN HEALTHCARE SYSTEM IN THE POST-COVID-19 ERA AND ROLE IN REGIONAL SUSTAINABLE DEVELOPMENT AND PROVIDING SOLUTION TO MIGRATION FROM HILLS

Professor C.S. Mathela





Plenary Lecture



Phytochemical Composition and Biological Potential of Some Herbaceous Flora from Uttarakhand Himalaya

Prof. Ajay Singh Rawat

Abstract

Forests are a very striking feature of the land surface. They vary greatly in composition and density and the scenic effect of forests changes with the seasons. The forests of a country are a natural asset of immense value, which unlike mineral sources can be kept permanently productive and useful under proper management. Forests are the abode of wild life and add to the beauty of the landscape. The ameliorative role of well managed forests is generally taken for granted. The need for them is realized only when the destruction of forests brings about shortage of essential forest products, by causing floods and damage to the agricultural land, which adversely affects the economy of the people and the change in climate. It has a still greater importance in this country because, in addition to being a source of material progress, it has also been a source of spiritual and moral advancement. In my lecture I will focus on the history of forestry of the country and biodiversity of the Central Himalayan region (Uttarakhand) which will be followed by a visual presentation on the flora and fauna of Uttarakhand. Central Himalayan biodiversity is a subject which is receiving global attention as it is the catchment area of the Indo-Gangetic plain, one of the most fertile plains on the face of the earth where more than one third of the Indian population resides, It attracts diversity of views and these views are as important as the subject itself because here latitude, longitude and altitudinal variation have moulded the characteristics as well as multiplicity of habitats, different micro climates and varied environmental niches of plants, animals and human beings.





Plenary Lecture



Climate change in Indian Himalaya during last 5,000 years: Impact on Civilization

Prof. B. S. Kotlia, UGC Research Scientist (retd.), Kumaun University, Nainital

For the last ca. 20,000 years, the extreme climate events are known from everywhere to occur at millennial (e.g., Last Glacial Maxima, Older Dryas, Younger Dryas,) and centennial (e.g., the 8.2 ka event, Medieval warming, 4.2 ka event, Little Ice age) by using the lakes. However, today's demand in the climate science is to comprehend the multi-annual to decadal scale climatic changes (e.g., droughts, floods, and climatic extremes with duration of 1-5 years) in the past. Recently, this research has indeed taken a pace throughout the globe in general and Indian Himalaya in particular. The sole objective of such a high-resolution research has been to ascertain the cyclicity of extreme/abrupt events in the past and their possible recurrence in the future through climate modeling.

Of late, it is proved that the Holocene climatic changes in the Himalaya are inversely correlated with that of Peninsular India, mainly because of the two active sources of precipitation in the former compared to dominance of one monsoon in the latter. Within the Himalaya itself, there are two major precipitation regimes from western to northwestern Himalaya. Because of the contribution of both the Indian Summer Monsoon (ISM) and Indian Winter Monsoon (IWM), exceptional conclusions have been drawn by our group for the Upper Holocene of the Himalaya, e.g., a wetter/warmer Little Ice Age (LIA; 1,300-1,850 AD) with very high precipitation in the western Himalaya in contrast to otherwise in Peninsular India where ISM was declined during this time. It is established that conditions were warmer and drier during the preceding Medieval Climate Anomaly (MCA; 950-1,250 AD) and also in the post-LIA periods, as evidenced by high resolution speleothem research. During the LIA, a weaker ISM brought drought conditions to the core ISM area but triggered more monsoon 'breaks' that brought higher precipitation to the Himalaya. This also makes us believe







that the so-called global events are never synchronous and their initiation and termination must be different in the regimes of different precipitations.

For our research, we used $\ddot{a}^{18}O$ and $\ddot{a}^{13}C$ isotopes of speleothems (shivlings) taken out from narrow caves and dated these with U/Th dating—the most dependable continental dating method (current TIMS and ICP-MS give age errors of about 500±8 years, 10,000±45 years, and 50,000±180 years). Low $\ddot{a}^{13}C$ values indicate abundant C3 type vegetation (under wetter/warmer climate), corresponding with low $\ddot{a}^{18}O$ values (specifying higher rainfall) and vice versa. The stalagmite $\ddot{a}^{18}O$ values, ranging between -5.3‰ to -10‰, show a large variation, compared to the areas dominated by a single monsoon, and this can be ascribed to the two sources of moisture (e.g., ISM and IWM) in the Himalaya during the Upper Holocene. The climatic reconstruction, within the age uncertainties, indicates strengthened precipitation from 4.0 ka BP with a sharp drop (>-2‰) in $\ddot{a}^{18}O$ values, peaking at ~3.7 ka BP. A gradual decline in precipitation is observed from ~3.7- 3.0 ka BP with droughts, centered at ~3.4, ~3.2- ~3.0 ka BP, ~2.5-2.4 ka BP and ~2.1-2.0 ka BP.

Within this time bracket, climatic amelioration took place between ~3.0-2.9 ka BP, showing fluctuating trend in ä¹⁸O values with comparatively more rainfall, possibly generated by the IWM in the form of thunderstorms and hailstorms from ~2.9-2.7 ka BP. Precipitation declined from ~2.7 to 2.4 ka BP with a decadal scale major drought event, strongest in our data set, at ~ 2.5-2.4 ka BP, whereas, an abrupt drop in stalagmite ä¹⁸O values from ~2.4-2.3 ka BP points to increased precipitation intensity. Thereafter, the precipitation gradually decreased until ca. 2.1 ka BP with one of the driest events at ~2.1 ka BP. From 1,200 AD onwards, the precipitation increased and reached to its highest at 1,750 AD. Furthermore, from 1,620 to 1,950 AD, as much as 26 drought events, each lasting from 2-4 years have been recorded by us in the youngest stalagmite from Kumaun Himalaya.

We stipulate that the increasing aridity and droughts between <"3.7 and 3.0 ka BP contributed to the gradual decline in the Harappan civilization, its breakdown in steps (in contrast to what was thought earlier) and complete collapse around <"3.0 ka BP. During this period, the shift of Harappan settlements from large urban cities to lesser villages as well as migration of population may have also been a result of limited resources brought on by mounting aridity and scarcity of water. We also suggest that the IWM played a critical role in the Holocene climate of the Indian Himalaya and suppose that the IWM produced winter crop failure may have been responsible for gradual demise of the Harappan society. Recent models have suggested that IWM precipitation and surface air







temperatures would increase in northwestern India towards the end of this century. Therefore, a precise role of the IWM is to be understood using additional stalagmite based multi-annual to decadal scale data particularly in regions where instrumental records cover only the last 120 years.

Despite dedicated efforts, a comprehensive quantification of the ISM and IWM for the Indian Himalaya has been elusive, especially on the time scales relevant to the society. Absence of quantitative, multi-annual to decadal records and complexity and multiplicity of factors influencing the monsoon have hindered the efforts to understand their independent behavior. This is yet to be addressed because any changes in the nature of the influencing factors or the magnitude of their impact are critical for land-use planning etc. In order to better understand the extreme climatic events in the Himalaya especially during the MCA and LIA, we are on the way to develop very high-resolution records by using precise archives and specific proxies. Undoubtedly, better dated speleothem records from the Himalaya are needed to test the IWM hypothesis and also to understand the interplay of the ISM and IWM circulations. I foresee tomorrow's time as "palaeo-weather changes" and not the "palaeo-climatic changes" in the climate history.





Plenary Lecture



Phytochemical Composition and Biological Potential of some Herbaceous Flora from Uttarakhand Himalaya

Om Prakash, Professor, Department of Chemistry, College of Basic Sciences & Humanities G.B., Pant University and Agriculture and Technology, Pantnagr, 263 145, Us. Nagar, Utarakhand., India

Email: oporgchem@gmail.com, ph. 9411159551/8475005999

Abstract

Uttarakhand is a godsend big repository of medicinal and aromatic plants and witnessed by its rich biodiversity. Family Lamiaceae with common examples like Salvia, Mentha, Ajuga, Mosla, Ocimum etc, along with other many angiosperm and gymnosperm families provide an ample opportunity to explore the flora of this region for their nutraceutical, pharmaceuticals and bio pesticidal applications. Synthetic pesticides are used to combat with agricultural pests viz; insects, weed, nematodes, fungi etc. so that the crop yield can be increased in order to meet out the demand of society for food security. Due to the excessive use of pesticides the pests have developed resistance and at the same time the residual and environmental effects of pesticides may be toxic or detrimental. There has been a growing trend in recent decades for researchers and companies to "go green" or be more environmentally benign. In spite of the advent of modern techniques of drug/pesticide discovery, screening of traditional knowledge systems have given clues/lead to the discovery of valuable bioactive molecules. Traditional medicinal plants are easily available, easily consumable, low costing and environmental friendly. In present scenario, practicing traditional knowledge form an integral part of complementary or alternative source of bioactive compounds. Developing natural product based pesticides can overcome the resistance developed against pesticides because of synergetic effects of the major, minor or even trace components in essential oils/extracts or formulations based







on these. In present deliberation Phytochemical composition and biological potential of some herbaceous flora from Uttarakhand Himalaya like *Ajuga*, *Mentha*, *Plectranthus*, *Mosla*, *Ocimum*, *Skimmia Artemisia* etc with their biological potential studied will be presented.







Plenary Lecturer

Climate Change and its Impact on Bio-resources of the Himalayan Region

R.C. Padalia and Amit Chauhan Principal Scientist, Phytochemistry Division CSIR-CIMAP, Research Centre, Pantnagar-263149

Abstract

Nature empowered humans with many natural resources such as food, water, medicine, space and natural environment to survive, thrive and sustain life on the earth. India with its unique geography, history, culture, biodiversity and varied agro-climatic conditions is considered one of the mega spot for its floristic diversity. The Indian Himalayan region possesses various medicinal and aromatic plants of industrial relevance. The origin of medicinal and aromatic plants (MAPs) is as old as agriculture, as are their essences and extracts. Their use begins with the wild harvesting of plants, then with the selection and cultivation of useful plants, and finally with their expansion as a crops for cultivation. The international market for herbal products derived from the medicinal and aromatic plants is estimated to be of US\$ 62 billion, and it is poised to grow to US\$ 5 trillion by the year 2050. Climatechange refers to change in weather patterns, which isattributed directlyby deforestation, grazing, and illegal collection of bio resourcesor indirectlyby urbanization, industrialization, emission of greenhouse gases etc. thatalters the composition of the global atmosphere. Climate change is likely to have a number of impacts on biodiversity from ecosystem to species level. Climate change adversely affected the crop yield and agriculture productivity across the globe. The effects of climate change are evident in ecosystems around the world, including medicinal and aromatic plant populations. Agriculture in the Himalayan region is mainly rain fed and therefore due to climate changes including changing temperature, precipitation trends, and many other associated variables of climate change have posed a huge impact on biotic and abiotic components of agriculture. All these factors (abiotic and biotic) have profound influence on yield and quality







of MAPs. Adoption of new crops, new agro technologies and varieties can moderate this impacts on agriculture. Education, training and rural extension services can facilitate these adaptation efforts. With the aim of mitigation and adoption, region specific high yielding cultivars, new agro-technologies, for cultivation of MAPs is prerequisite to enhance farmer's income. CSIR-CIMAP, with sustainable approach have developed various varieties and agro-technologies of MAPs that are suitable not only for large scale cultivation in fertile land but also in weather extreme conditions such as in barren lands, drought prone areas, salt enriched areas, coastal areas, dessert areas, flood prone areas etc. The Uttrakhand state has very vast geographical area with variable land use and cultivation practices. Some of the land areas fall into non cultivable category where either soil quality or lack of irrigation/ requirement of high water etc. does not support cultivation of food grain crops etc. Therefore, cultivation of suitable medicinal and aromatic plants makes an important contribution to the incomes and livelihood of relatively poor rural populations in general. Moreover, CSIR-CIMAP through various society oriented projects (Government of India) is popularizing superior varieties and agro-technologies, and assessment of their suitability for specific climatic regions without causing harm to the environment and creating opportunities for income generation of marginal farmers living in rural areas. In addition CSIR-CIMAPis constantly engaged in providing state of the art training-cum-demonstration, skill developments tobeneficiaries (farmers, agro-entrepreneurs) in agro practices, processing of MAPsas per market demand. Apart from this CSIR-CIMAP also plays a bridge between buyers and producers through interactive meet, Kisan Mela, workshops etc.







Plenary Lecturer

Plastic Waste: Its effect on the Himalayan Region, Problems and Fruitful Solutions

Sandeep Pandey* and Nanda Gopal Sahoo

Professor Rajendra Singh Nanoscience and Nanotechnology Centre Department of Chemistry, DSB Campus, Kumaun University, Nainital Email: sandy.coedu@gmail.com

Abstract

Today, the untouched feet of the Himalayas are continuously touched by the unwilling presence of plastic waste, which are continuously deteriorating the ecosystem of the Himalayan region. The situation has been reached to its drastic condition in recent years, which must be controlled in order to preserve the immense prestige of the Himalayas. On the one way, continuously increasing tourist activities enhancing the economical growth of the local community of the Himalayas, on the other hand, plastic waste littering caused by some of the tourist activities enhancing the plastic waste density around the Himalayan region. Hence an urgent solution is needed in order to save the ecology and economy the Himalayan region. Our group recently developed a very innovative process for the Upcycling of plastic waste and reported first time the mass scale production of the graphene nanosheets from plastic waste along with value added fuel. The technology thus developed has been commercialized and several applications of the graphene nanosheets from plastic waste have been identified such as solar cells, supercapacitors, water purification, polymer nanocomposites and in cementing applications. Not limited to plastic waste, we have also explored the Upcycling routes for the paper waste, tyre waste, cotton waste and agriculture waste. In this talk, we are targeting the problems associated with the plastic waste and its impact on the climate change and its solution for the conservation of ecology, economy and energy.

Keywords: Plastic waste, Upcycling, Graphene nanosheets, Solar cells, Supercapacitors







Content

•	Effect of Climate Change on Biodiversity of Himalayan Region	1
	Krishna Kumar Singh	
•	Fenton's Degradation of a Persistent Dye Bromophenol Blue: An Ecofriendly Approach	
	Mahesh Chandra Arya, Arun Bughani, Nitish Semwal, Divya Mahar	
•	Climate Change Indicators in Uttarakhand	3
	Balam Singh Bisht	
•	Kinetic study of Amino Acids Metal Complexes by Hexacyanofer rate (III) ion in Presence of Os (VIII)	3
	Tejpal Singh	
•	Green, Facile and Selective Oxidation of Benzylic and Secondary Alcohols using KBr-H2O2: A Reusable Reagent System	4
	Girdhar Joshi	
•	Essential Oils and Plant Extracts as Green Medicines	5
	Poonam Kushwaha, Darshan Singh and B.P. Sinha	
•	Antibacterial Activity of Crude Oil of Cryptomeriya Japonica and Tsuga Dumosa	6
	Pramod K Ojha and Bipin C Joshi	
•	Effect of Metal Treated soil on Essential oil Constituents of Mentha Spicata L.	7
	Gitu Kunwar	
•	Environmental Friendly Biopolimer Strach: Isolation and Characterization of Rice Starch	8
	Geetanjali*, Rashmi Khulbe, Jagdish Prasad, Bhuwan Chandra, N.D. Kandpal	

A HIGH	AR A DE LA D	
•	Chemical Composition and Antifeedant Activity of Nepeta Hindos (B. Heyne ex Roth) Haines Grown in North India	tana 8
	Himani1, Ravendra Kumar*, Om Prakash, D.S. Rawat, R. M. Srivastav	
•	Nanostructured Copper Hexacyanidoferrate; its Synthesis, Characterization and Applications in Voltammetric Detection of Paracetamol: A Green Technology	9
	Himani Pant, Shah Raj Ali	
•	Green Synthesis of CuO-Starch Nanocomposite	10
	Jagdish Prasad, Vinod Kumar, Anshu Tamta, Asha Kandpal, Anjali Bhoj, Rajendra Joshi	
•	Triterpenoids from the Aerial part of Skimmia laureola and their Biological Activity	10
	Jyoti Darmwal, Pushpa Joshi	
•	<i>Ajuga L</i> .: Chemical Composition, Phytopharmacological and Biological Activities	11
	Kirti Nagarkoti, Om Prakash**, Ravendra Kumar, Satya Kumar, A.K.Pant	
•	Effect of Climate Change and its Alternatives	12
	Mahendra Lal Tamta	
•	Climate Change : Imitation of Impact of Climate Change on Bio-resources	13
	Manju Kandpal, Anil Kumar, Supriya Verma	
•	Waste to Graphene Nanosheets and their application in Energy Storage System: A Novel Path towards Circular Economy of Himalayan Regions	14
	Mayank Pathak*, Nanda Gopal Sahoo	
•	Ag-Cu-CeO ² Nanocomposites: Efficient Photocatalyst for Visible Light Induced Photocatalysis of Malachite Green	15
	Nitish Semwal*, Divya Mahar, Mahesh Chandra Arya	







•	Seasonal Variation on Chemical Composition of Essential Oils of Fresh Cinnamomum Camphora L.	16
	Bhawana Kanyal, Chitra Pande, Geeta Tewari, Rajendra Chandra Padalia, Krishna Rana	
•	Agricultural Waste Derived Grapheme Oxide Based PVA Polymer Nanocomposites for Structural Applications.	17
	Bhashkar Singh Bohra, Tanuja Arya, Nanda Gopal Sahoo	
•	Eco-friendly Approach for Adsorption of 4-Chlorophenol Using iron-zirconium Mixed Oxide Nanoparticles	18
	Rajesh Kumar, Shah Raj Ali and Naved Haider	
•	Green Solvent Status of Aqueous Ethylene Glycol: Interaction Studies	19
	Rashmi Khulbe*, Devesh Pandey, Bhuwan Chandra, N.D. Kandpal	
•	Nanostructured Nickel Hexacyanid of Errate as a Green Catalyst for the Oxidation of Benzyl Alcohol	19
	Rakshita Pandey, Shah Raj Ali	
•	<i>Hedychium Coccineum</i> Essential Oils: Chemical Composition and Biological Activities	20
	Ravendra Kumar, Sushila Arya, Om Prakash, Satya Kumar	
•	Phytochemical Screening of <i>Blumea Mollis</i> (D. Don) Merr. from Foothills of Northern India	21
	Sushma Kholiya, Ameeta Tiwari, R.C. Padalia	
•	Phytochemical Analysis and Pesticidal Activities of <i>Cautleya Spicata</i> (Sm.) Baker from Kumaon, Uttarakhand, India	22
	Sonu Kumar Mahawer, Ravendra Kumar, Om Prakash, and Satya Kumar	
•	Climate Change: Social and Economic Impacts of Climate Change	23
	Supriya Verma	







•	Chemical Composition, Nematicidal, Insecticidal and Herbicidal Activities of <i>Hedychium coronarium</i> J. Koenig rhizome Part Chloroform Extract	24
	Sushila Arya, Ravendra Kumar, Om Prakash, Satya Kumar	
•	The Essential Oil Composition of <i>Zingiber Officinale</i> Roscoe. Fresh Rhizomes	24
	Aabha, Neeta Negi, Geeta Tewari, Chitra Pande	
•	Biofuels Resources Coconut and Sesame oil: Extraction and Chemical Examination	25
	Anchal Aneja, Kailash Tamta, Renu Loshali, Devesh Pandey, NaraianDatt Kandpal	
•	Composition and biological activities of <i>Thymus linearis</i> Benth. collected from Kumaun Region of Uttarakhand	25
	Tanuja Kabdal, Ravendra Kumar, Om Prakash, D. S. Rawat, R. M. Srivastava	
•	Phytochemical Composition of the Essential Oil from aerial parts of <i>Strobilanthes tomentosa</i> (Nees). from Uttarakhand, India and its Antibacterial Activity.	27
	Vandana Koshyari, Pushpa Joshi	
•	Impact of Climate Change on Mountain Agriculture in Uttarakhand.	27
	Amisha*, Sanjay Kumar	
•	Proliferation of Invasive Alien Species in Different Forest Types of Western Himalaya	28
	Anita Mehra and Lalit Mohan Tewari	
•	Impact of Climate Change on Invasive Alien Species in Kumaun Himalayas, Uttarakhand, India	29
	Bharti*, Deepak Kumar, Pankaj Arya, Renu, Mahima Pandey, Jyotsna Tiwari, Abhay Chaturvedi and Prasun Bhardwaj	
•	Impact of Climate Change on Diversity, Structure and Regeneration Status in Community Managed Forests of Kumaun Himalaya, India	30
	Bhawana Kapkoti, Neelu Lodhiyal, Bhawana Adhikari, L.S. Lodhiyal and Bipin Chandra Suyal	







IT HIER	EDUCATION CONTRACTOR OF CONTRA	
•	Ethno-Medicinal Plants of the Kumoun Himalaya Used to Cure Various Diseases: A Case Study	31
	Bipin Chandra Suyal and Bhawana Kapkoti	
•	Impact of Climate Change on Kumaun Himalayan Region of India: A Critical Review	32
	Deepak Kumar, Bharti, Pankaj Arya, Renu, Mahima Pandey, Abhay Chaturvedi, Prasun Bhardwaj and Jyotsna Tiwari	
•	Climate Change: It's Impact on Bio Resource of the Himalayan Region	32
	Bindu, Nitin Agnihotri	
•	Three New Aquatic Hyphomycetes from Foothill Region of Kumaun Himalaya, India	33
	Saraswati Bisht*; Ruchi Jalal; Saima Altaf	
•	Role of Van Panchayat Forests in Climate Change and Livelihood Development in Bageswar District of Uttarakhand	34
	Inder Rautela and L.S. Lodhiyal	
•	Bryodiversity composition of <i>Cedrus deodara</i> (Roxb. ex D.Don) G.Don Forest Floor at Lohaghat, (Champawat), Uttarakhand	35
	Manisha Bhandari, S.D.Tewari and Prachi Joshi	
•	Bioactivity of a Leafy Liverwort <i>Heteroscyphus hyalinus</i> (Stephani) A. (Srivast. & S.C. Srivast.) Against a Common Wheat Pest Sitophilus Granarius Linn.	36
	Neha Binwal, Prachi Joshi, S.D. Tewari, Saraswati Bisht	
•	Abnormal Leaf Structures in Some Himalayan Mosses- An Observation	37
	Neha Kohli, S. D. Tewari, Sapana Pant, Prachi Joshi	
•	Social Impact of Climate Change in Hills of Uttarakhand.	37
	Nirmala Pargaien	







•	The Impact of Forest Fire on Flora and Fauna and physio-Chemical Property of Soil of Lamgara Block, Almora Uttarakhand	38
	Pankaj Arya*, Deepak Kumar, Bharti and Renu	
•	Epiphytic Bryophytes of <i>Aesculus indica</i> (Wall.ex Cambess.) Hook. of Pindari Catchment Area, Central Himalaya	39
	Prachi Joshi, S.D. Tewari & Neha Binwal	
•	Effect of Climate Change on Diversity of Aquatic Hyphomycetes	40
	Pratibha Arya	
•	Ecotonal Bryodiversity of Sal-Pine Forest in District Nainital, Uttarakhand	41
	Richa Arya, S. D. Tewari and Prachi Joshi	
•	Antagonistic Activity of Aquatic Hypomycetes Against Some Plant Pathogenic Fungi	42
	Ruchi Jalal, Saraswati Bisht; Saima Altaf	
•	Long- Lost, Red Listed Indian Liverwort Sewardiella tuberif era Kashyap-Recollected from Mukteshwar Region of District Nainital, Western Himalayas	43
	Sapana Pant, S.D. Tewari, Prachi Joshi & Manisha Bhandari	
•	Herbal Gardens for Conservation of Medicinal Plants of the Himalayan region	44
	Uma Pandey Padalia and Madhulika Pathak	
•	Signifinance of Agrobiodiversity of Agroforestry System on Livelihood and Climate Change Mitigation in Tarai Region of Kumaun Himalaya	l 45
	Vasundhra Lodhiya, L. M. Tewari and A. Tewari	
•	Importance of Native Biodiversity of Honey Bees in Buffering the Impacts of Climate Change	46

Sharmishtha







•	Prey Preference of the Aphidophagous Ladybird, Coccinella Transversalis on Two Aphid Species (Coccinellidae: Coleoptera)	47
	Mamtesh Kumari and Noorin Saifi	
•	Physico-chemical Characteristics of River Kosi in Districts Nainital and Udham Singh Nagar (Uttarakhand)	48
	Ravi Kumar* and Pramod Kumar	
•	Ovipositional Behaviour of an Aphidophagous Ladybird Beetle, Menochilus Sexmaculatus (Fabricius) in Terms of geo- and Phototaxis.	48
	Mamtesh Kumari and Deepa Arya	
•	Effect of Environmental Changes on Species Richness and Butterfly Diversity in Bhimtal and Ramnagar Region of District Nainital Uttarakhand	49
	Reeta joshi and Promod Joshi	
•	Basking Behavior of Butterflies Across Elevations of Champawat in th Western Himalaya	e 50
	Aman Verma and Mahipal Singh Kutiyal	
•	Species Composition and Diversity of Sal and Shisham Dominated Forest in Central Himalaya	51
	Falak Siddiqui* and L.S. Lodhiyal	
•	Role of Van Panchayat Forests in Climate Change and Livelihood Development in Bageswar District of Uttarakhand	52
	Inder Rautela and L.S. Lodhiyal	
•	Impact of Climate Change on Wetlands	53
	Nivedita Sijwali	
•	Green Chemistry	53
	Pranjal Rawat	
•	Health Risk Assessment of Heavy Metals in the Lakes and other Drinking Water Sources of Nainital Distict, Kumaun Lesser Himalaya, India	54

Nirmit Sah and Rajeev Upadhyay







•	Solar activity: A possible cause for Modulation in Ionosphere	54
	Suman Garia	
•	Potential Spectroscopic Probe to Find the Non-Biological Water Contaminants	55
	Neetu Pandey	
•	Exceptional Optical Properties of Cspbbr3 Quantum Dots	56
	Richa Gahlaut, Aparna Shinde, Shailja Mahamuni	
•	The Inherent Benefits of Carbon Farming in Present Scenario	56
	Narendra Kumar Singh	
•	Urbanization as a Cause of Climate Change: A Theoretical Analysis	57
	Upasna Sharma	
•	Impact of Climate Change on Bio Resources	58
	Neema Pant	
•	Assessment of Indigenous Method of Crop Protection and its Effectiveness Against Rhesus Macaques: A Study of Uttarakhand	59
	Bhupender Oulakh, Deepa Vinay	
•	Eco-dystopia: a Long Shot or a Near Threat	60
	Divankar Singh and Nazish Khan	
•	How To Minimise the Impact of Climate Change	60
	Mamta Goswami	
•	Apocalyptic Visions in Works of Mary Shelley and Margaret Atwood	61
	Nazish Khan and Pooja Arya	
•	Segregation – The Key to SWM – A Case of Jhadsa Village– Gurugram	62
	Pradip Kumar Nath and Rimple Manchand	
•	Climate Change: Its Impact on Bio-resources of Himalayan Region	63
	Rita Goswami and Anjum Ali	







•	Review and Analysis of Consequences of Climate Change and Global Warming on the Himalayas.	64
	Shailja Rawat	
•	Climate Change Perception of College Students in Kanda, Uttarakhand	65
	Shalini Pandey, Neetu and Bharti	
•	Climate Changes : Its Impact on Bioresources of the Himalayan Region Recent Changes in Climate & its Impact on Uttarakhand	65
	Shikha	
•	Impact of Climatic Change Infarming in Hilly Region of Uttarakhand	66
	Dinesh Joshi	
•	Impact of Climate Change on Agricultural Production in Uttarakhand Since 2001	67
	Neha Chauhan and Neeraj Kumar	
•	Environment Pollution and Climate Change (Microbial Function on Climate Change)	68
	Nirdoshita Bisht	
•	Electrochemical Sensing of Organophosphorus Pestcides over Nano Hybrids Modifierd Electrodes	69
	Shubham Sharma, Sameena Mehtab and Md. Ghulam Haider Zaidi	
•	Black Carbon and it's Impact in the Himalayan Regions	70
	Bhagwati Prasad Bahuguna	
•	Physico-chemical Characteristics of River Kosi in Districts Nainital and Udham Singh Nagar (Uttarakhand)	71
	Pramod Kumar, Promod Joshi and Ravi Kumar	
•	Religious Scriptures and Environmental Concerns	71
	Dr Gurjot Kaur	

	RAKINS	
•	mùkj&vkèkqudrk dk Hkkjrh; I anHk] i kfjfLFkfrdokn vkj fgUn&Lojkt	73
	çdk'kp n Hkê	
٠	fgeky;hlal—frrFkki;kbj.k	74
	vate vyh	
•	dyk dh fofHklu foèkkvkadk i ; kbj.k l j{k.k ea ; kxnku	75
	Mamta Suyal	
•	tyok;qifjorlu dk xkeh.k thou ij ilkko ^mRrjk[k.M dsfo'ksk l nHk2esî	76
	ekfgr tkskh	
•	ÞÁnwík.k fu;æ.k dsfy, u;h vo/kkj.kk⊅	77
	fu'kk ∨k; kţ Å′kk ik.Ms	
•	mRRkjk[k.M eai; 1/u dk cnyrk Lo: lk , oatyok; qifjor1u dk bl ij iHkko	78
	iwe iUr	
•	Hkkjreai;koj.kh; lj{k.k vkanksyu , oaefgyk, a	79
	geyrli, 'kýdæ diekj	
•	i;kobj.kçn#k.k,dxEHkhjleL;k	80
	fdju	
•	pkj èkke ; k=k vk j tyok; qifjorlı dk v ril cè k	81
	Hkir a e flag	
•	tyok; qifjorlu	82
	eUtwdBk; r	
•	i;kbj.klj{k.keaykddykdkdykRed;kxnku	83
	Nivedita Lohiya	







•	igkMh {ks=kaeaek\$Vsvukt tyok;qifjorlu dsçHkko dksde djusvk§ [kk lġ{kk çnku djusealgk;d	83
	Priyanka Gupta	
•	lrr fodkl ,oatyok;qifjorlu : ,d vè;;u ½mùkjk[kM dsfo'kšk lnHk2e½	84
	j{kR] Hkjr th mikè;k;	
•	vk/FkZd fodkl dsikkllkfgr dkjdkadk tyok;qifjo/ru ij ikkko	85
	l kfgr oekl	
•	tyok;qifjorlu Hkkjrh; ijEijk vkg lal—fr ealekèkku	88
	ruqtk ikMs	
•	tyok; qifjorlu dk Xys'k; jkaij çHkko	87
	vfuy Mcjky çdk'kp n Hkê	
•	tyok; qifjorlu dk , frgkfl d Lekjdkaij çHkko: & Hkkjr dsl nHklea	88
	ns'kkar usch	






Effect of Climate Change on Biodiversity of Himalayan Region

Krishna Kumar Singh

Department of Chemistry, St. Joseph's College for Women, Civil Lines, Gorakhpur

Abstract

Climatic and environmental changes are an integral part of our surrounding environment. The whole world is living through a period of ongoing climate and environmental change and nowhere are the impacts more visible than here in the Himalayan region. Natural and human driving forces are having impacts on biodiversity, ecosystems, and water resources in the mountains. Biodiversity hotspots in the Himalayan region are vulnerable to climate change because they are rich in endemic species with restricted distribution. Threats to biodiversity include the loss of habitats, genetic resources and species. Climate change increased the risk of floods and landslides, an increase in temperature, land degradation, drying up of water sources, outbreaks of pests, and food shortages. Thereby climate change impacts can be classified as impacts on biodiversity, food and feed, water availability, natural hazards regulation, spirituality and cultural identity, aesthetics, and recreation. The temperature data available for the Eastern Himalayas show that there is a definite warming trend in surface air temperatures and those areas at altitudes above 4,000m seem to be experiencing the greatest warming trend. The warming trend observed ranges from 0.01 to 0.06°C/yr and the annual mean temperature is expected to increase by 2.9°C by the middle of the century. Thus, the real issue is that the ongoing and expected climatic changes are much faster than what evolution and migration are commonly able to track, thus, there is an urgent need a policy to promote the conservation and sustainable use of valuable biodiversity of the region. In addition to policy interventions, there is immediate need for developing and implementing adaptation strategies to reduce vulnerability of forests and biodiversity due to projected climate change impacts.







Fenton's Degradation of a Persistent Dye Bromophenol Blue: An Ecofriendly Approach

Mahesh Chandra Arya, Arun Bughani, Nitish Semwal, Divya Mahar

Chemistry Department, DSB Campus, Kumaun University, Nainital, Uttarakhand 263002, India. E-mail: mcarya181@gmail.com

Abstract

The effluent produced by paper, pulp and textile industry contains dyes and released directly into the water bodies without any treatment; this is becoming the most serious environmental problem nowadays. Many of these dyes are quite stable in environment and damage the aquatic and vegetative life. These dyes disintegrate to give toxic, carcinogenic and mutagenic product. Bromophenol Blue is an acid phthalein dye. It is used as a pH indicator (or acid-base indicator because it changes color as pH changes), color marker and a dye for imparting a strong blue color. Due to its complex structure its biodegradability is very slow and because it is stable in nature for a long it is hazardous for human health. This work explores the potential of Fenton's oxidation process to degrade Bromophenol Blue from its aqueous solution. Effect of various parameters viz. effect of pH, concentration of hydrogen peroxide, concentration of ferrous catalyst, concentration of dye, contact time and temperature has been studied on the Fenton's process. The experiments reveal that it shows maximum efficiency of 90.24% at an optimum pH of 3.0 and contact time 60 min.

Keywords: Bromophenol Blue, Fenton's oxidation, hydrogen peroxide, ferrous catalyst.







Climate Change Indicators in Uttarakhand

Balam Singh Bisht

Department of Chemistry, Government Postgraduate College Berinag, Uttarakhand

Abstract

Climate change, as one of the most powerful natural phenomena, has an impact on all aspects of human life. Uttarakhand Himalayas are one of the most vulnerable regions to climate change. Uttarakhand has been suffering from the effects of climate change for some years. In these regions, there are a number of markers that provide a vivid picture of climate change referred as climate change indicator.

Kinetic study of Amino Acids Metal Complexes by Hexacyanoferrate (III) ion in Presence of Os (VIII)

Tejpal Singh

Department of Chemistry, S. P. M. College, Udantpuri, Bihar Sharif, Nalanda Email: singhtejpal24@gmail.com

Abstract

Amino acids and their metal complexes have vital role in functioning the metabolism of all living system. Amino acids can undergo many types of reactions in acidic as well as in alkaline medium. The reactions of amino acids metal complexes have been selected in alkaline medium for the present study. The rate of the reaction was found to be one with respect to Osmium (VIII) and zero order with respect to hexacyanoferrate (III) ion. The kinetics of oxidation of amino acids metal complexes by alkaline Os (VIII), which was continuously regenerated by hexacyanoferrate (III) ion was studied in the 0.01-0.10 M and 298 K - 318 K temperature range. The rate of reaction was found to be zero with respect to $[Fe(CN_{\lambda})]^{3-}$ and one with respect to Os (VIII).

3







Keywords: Kinetics, oxidation, amino acids metal complexes, Osmium (VIII), hexacyanoferrate (III).

Green, Facile and Selective Oxidation of Benzylic and Secondary Alcohols using KBr-H₂O₂: A Reusable Reagent System

Girdhar Joshi

Department of Chemistry, Govt. Post Graduate College Gopeshwar Chamoli, Uttarakhand 246401, India E-mail: drgirdharjoshi@gmail.com

Abstract

An environmentally friendly and cost-effective reagent system is reported herewith for the selective oxidation of benzylic and secondary alcohols in aqueous 1,4-dioxane medium under mild conditions. Oxidation of benzylic/secondary alcohols to corresponding carbonyl compounds was achieved via in-situ generation of reactive (BrOH) by reaction of a bromide source and oxidant reagent system efficiently in aqueous 1,4-dioxane under mild conditions. Generation of BrOH was also confirmed by UV spectrophotometric study of various concentrations of reagent. Excellent selectivity and conversion/yields of aldehydes/ketones were obtained without use of any precious metal catalyst under aqueous conditions. The reagent could be successfully recycled up tofive cycles with good to excellent yields of the products.



Keywords: Selective oxidation, benzylic alcohol, secondary alcohol, KBr, H₂O₂, reusable reagent,







Essential Oils and Plant Extracts as Green Medicines

Poonam Kushwaha¹, Darshan Singh² and B.P. Sinha³

¹Govrnment Girls Inter College, Dineshpur, Udham Singh Nagar, Uttarakhand ²Government Post Graduate College, Dwarahat, Almora, Uttarakhand ³Government Post Graduate College, Rudrapur, Uttarakhand

Traditional healers and pharmacists in developing countries are important sources of information about plant sources of new drugs. Only a fraction of the earth's natural pharmacopeia has been analyzed with modern techniques. The threat of imminent extinction of many plant species, especially in tropical areas, makes it urgent that scientists learn as much as possible before old remedies are forgotten or their raw materials are destroyed. This process requires observing and recording medical techniques, identifying plant materials, and experimental investigation of the ingredients and their effects. The success of ethnopharmacology often depends on earning the trust of local experts. For this reason, a special effort to maintain the great diversity of plant species would undoubtedly help to alleviate human suffering in the long term. Proven agroindustrial technologies should be applied to the cultivation and processing of medicinal plants and the manufacture of herbal medicines.

Studies have shown that people tend to gravitate towards plant-based medicines (clinically tested) as a product of family tradition, making them a "first-stop" therapy for many people with mild to moderate illness, or those with multiple conditions. So, there is a need for research in this field to verify the scientific authenticity of these traditional medications and prepare formulations according to the market needs of the present scenario by using the green approach to their preparation.







Antibacterial Activity of Crude Oil of Cryptomeriya japonica and Tsuga dumosa

Pramod K Ojha and Bipin C Joshi

Dept of Chemistry, LSM P.G.College, Pithoragarh

Nature has been a source of medicinal agents for thousands of years and an impressive number of modern drugs have been isolated from natural sources, many based on their use in traditional medicine. Natural herbal medicines have been used to boost health since the time of immemorial and the success of modern medical science largely depends on drugs originally obtained from natural resources. In the past, a large number of antibacterial compounds were discovered from synthetic and natural products for the treatment and control of infectious agents. The emergence of multidrug-resistant bacteria has further compromised the accessibility and affordability of many currently prescribed antibiotics worldwide. As a result, it reduces the effectiveness of the treatment regimens and increases morbidity, mortality, and health care costs. To this effect, the search for a novel antibiotic from natural products is ultimately an important source.

The therapeutic agents derived from plants are justified by the emergence of diseases and the growth of scientific knowledge about herbal medicines as important alternatives or complementary treatment of diseases. The bioactive compounds present in the plants showed biological activity against infectious diseases. The crude oils of *Cryptomeriya japonica* and *Tsuga dumosa* were subjected for screening of in vitro antibacterial activity against selected pathogens. The crude oil has antibacterial activity, inhibit the growth of *Pseudomonas aeruginosa*. Antibacterial study was carried out by well diffusion method against the pathogens by using the crude oil. In this study, the selected medicinal plants were collected from Dharchula and Thal region of Pithoragarh district.







Effect of Metal Treated soil on Essential oil Constituents of Mentha spicata L.

Gitu Kunwar

Department of Chemistry, Govt. P.G. College Dwarahat Uttarakhand, India gitukunwar@gmail.com

Essential oils as substances with a complex chemical composition are the main active components which has a big tradition and still a wide application in therapeutics.

In the aspect of medicinal plants cultivation in areas with contaminated soils, the influence of heavy metals on oil yield in medicinal plants is interesting. An increased concentration of metals in the nutritional environment of aromatic plants affects essential oil content and chemical composition, but only in some species.

The genus *Mentha* belonging to the family Lamiaceae comprises of 25 to 30 species that grow in the temperate regions of Eurasia, Australia and South Africa. *M. spicata*, commonly known as spearmint and used for spice and flavoring agent. The plant is commonly used to treat various diseases such as gastrointestinal disorders, nausea, and vomiting and also used as a breath antiseptic mouth rinse, toothpaste, and freshener.

M. spicata L. saplings were grown to Pb, Cu and Cd amended soil along with control to evaluate the effect of this metal on essential oil composition.

The aerial part of *M. spicata L.* was hydro distilled using Clevenger apparatus. The oil samples were analyzed by GC and GC/MS. The report shown minor effect of Cu, Cd and Pb adding on oil composition. The major components in all treatments were found to be piperitenone oxide, *trans*-caryophyllene and *trans*-muurola-4(14), 5-diene.

Keywords: Heavy metal; soil, piperitenone oxide, trans-caryophyllene.







Environmental Friendly Biopolimer Strach: Isolation and Characterization of Rice Starch

Geetanjali^{1*}, Rashmi Khulbe¹, Jagdish Prasad², Bhuwan Chandra¹, N.D. Kandpal¹

¹Department of Chemistry, Soban Singh Jeena University, Campus Almora, 263601, Uttarakhand, India ²Department of chemistry, Hukum Singh Bora Government Post Graduate College Someshwer (Almora), 263637, Uttarakhand, India email: geeetanjalig148@gmail.com

Abstract

Starch have been successfully isolated from rice flour using dilute sodium hydroxide solution with constant heating and stirring at temperature 298 K. The starch isolated has been compared with the pure starch obtained from Qualigens Fine Chemicals, Mumbai by using XRD analysis and FTIR analysis.

Keywords: Amylopectin, Amylose, Starch, FTIR, Biopolymers.

Chemical Composition and Antifeedant Activity of *Nepeta hindostana* (B. Heyne ex Roth) Haines Grown in North India

Himani¹, Ravendra Kumar^{*1}, Om Prakash¹, D.S. Rawat², R. M. Srivastava³

¹Department of Chemistry, College of Basic Sciences and Humanities, G.B. Pant University of Agriculture and Technology, Pantnagar, U.S. Nagar-263145, Uttarakhand, India ²Department of Biological Sciences,College of Basic Sciences and Humanities, G.B. Pant University of Agriculture and Technology, Pantnagar, U.S. Nagar-263145, Uttarakhand, India ³Department of Entomology, College of Agriculture, G.B. Pant University of Agriculture and Technology, Pantnagar, U.S. Nagar-263145, Uttarakhand, India Corresponding Author: ravichemistry.kumar@g

Abstract

Nepeta hindostana commonly known as North Indian Catmint, is an important Indian aromatic and medicinal plant of family Lamiaceae, the leaves of which are extensively used as cardiac tonic and gargle to cure sore throat in the form of extract or decoction. However, there are few reports in the literature on the chemical composition of its aerial part essential oil from different regions of

8







India, the chemical composition of essential oil from roots have not yet been explored. In this sense, the present study was aimed to characterize the chemical composition and to evaluate antifeedant activity of the essential oil from aerial and root part of the plant. 24 and 34 compounds, contributing 95.5% and 90.7% of the total oil composition from aerial and root parts have been identified using GC-MS analysis.Anti-feedant activity performed via leaf disc method in no choice condition against *Spilosoma obliqua* showed significant results in both the oils with 100% feeding inhibition.

Nanostructured Copper Hexacyanidoferrate; its Synthesis, Characterization and Applications in Voltammetric Detection of Paracetamol: A Green Technology

Himani Pant, Shah Raj Ali

Department of Chemistry, Kumaun University, Nainital, 263002, Uttarakhand, India

Scientific research is considered to be sustainable and feasible if its outcomes do not harm the environment. Here, green chemistry plays a significant role in solving environmental issues without threatening our ecosystem. The development of electroanalytic techniques is a subject of great importance as these techniques do not use any hazardous chemicals.

Once compared to other commonly used techniques, such as GC-MS, HPLC, TLC, electrophoresis, and spectrophotometry, the advantage of voltammetric sensors is a fascinating issue because the sensors are associated with extreme simplicity, short analysis time, low cost, high sensitivity, and specificity. As a result, voltammetric methods have been identified as a green analytical technique.

The development of a voltammetric sensor for the determination of paracetamol is presented. On a glassy carbon electrode, a nanocomposite material made from nanostructured copper hexacyanidoferrate with 70-100nm size and carbon nanotubes (CNT) was used for the detection of paracetamol drug using cyclic voltammetry. The composite material was found to be a potential electrocatalyst for the oxidation of paracetamol in cyclic voltammetric experiments. It lowered paracetamol's peak potential by about 55 mV. The modified electrode had a strong linear response throughout a wide range of paracetamol concentrations.







Green Synthesis of CuO-Starch Nanocomposite

Jagdish Prasad¹, Vinod Kumar², Anshu Tamta³, Asha Kandpal³, Anjali Bhoj³, Rajendra Joshi³

¹Department of Chemistry, Hukum Singh Bora Govt. P.G.College, Someshwar (Almora) -263637, Uttarakhand, India.

²Department of Chemistry, School of Sciences, Uttarakhand Open University, Haldwani (Nainital)- 263139, Uttarakhand, India.

³Department of Chemistry, Soban Singh Jeena University Campus, Almora-263601, Uttarakhand, India. *Mobile No.: 9456309163 E-mail: jkohli12july@gmail.com,

Abstract

The recent development in the nanotechnology has gain the attention towards green synthesis of nanomaterial. These methods are eco-friendly cost- effective reliable sustainable and simple. In this study we have prepared the nanostructured composite material using biopolymer starch. The material has been confirmed and characterized by XRD analysis, SEM and FTIR.

Keyword- Green Synthesis, Nanocomposite, CuO, Starch

Triterpenoids from the Aerial part of Skimmia laureola and their Biological Activity

Jyoti Darmwal, Pushpa Joshi

Department of chemistry, D.S.B Campus, Kumaun University, Nainital, Uttarakhand E-mail : Jyoti.darmwal1995@gmail.com

Abstract

Skimmia laureola belongs to family Rutaceae, locally known as 'Nair Pati' or 'KedarPati' in Kumauni language. Skimmia laureolais strongly aromatic perennial shrub distributed throughout temperate Himalaya from Kashmir eastward and also in Garhwal and Kumaun hills between 1800 to 3000m altitude. The leaves are used for cold, fever, headache and smallpox treatment. Aerial parts of Skim







*Skimmialaureola*yielded a triterpene 16-29-dihydroxy, 20-ene cyclolaudenol along with twelve known compounds. The structures of these compounds were identified by spectroscopic studies.

Keywords: Skimmialaureola, Rutaceae, Medicinal plants, Triterpenoids.

Ajuga L.: Chemical Composition, Phytopharmacological and Biological Activities

¹Kirti Nagarkoti, ¹Om Prakash^{**}, ¹Ravendra Kumar, ²Satya Kumar, ¹A.K.Pant

¹Department of Chemistry, ²Department of Plant Pathology, College of Basic Science and Humanities, G.B. Pant University of Agriculture and Technology, Pantnagar, U.S. Nagar-263145, Uttarakhand, India *Corresponding author: oporgchem@gmail.com, kirti.nagarkoti121@gmail.com

Abstract

Background-The Himalayan region has been reported as rich accumulation of natural wealth, particularly of aromatic and medicinal plants. Indian *Ajuga* species (*Ajuga brachystemon, Ajuga integrifolia, Ajuga macrosperma* and *Ajuga parviflora*) belonging to Lamiaceae family have been reported from different parts of Uttarakhand. Phytochemical studies revealed presence of various bioactive compounds including neo-clerodane diterpenoids, steroids, phytoecdysteroids, triterpenoids, flavonoids, fatty acids and withanolides,. Modern pharmacological activities of *Ajuga* species including anti-inflammatory, antioxidant activity, anti diabetic activity, antifungal activity, insecticidal activity and cytotoxity have been published by various researchers.

Objective-The present study is aimed to explore chemical composition, pharmacological and biological activities of *Ajuga* species as worked out by researchers and to explore its impact on bio-resources of the Himalayan region in climate change.

Methods- The analysis of essential oils and plant extract has been reported through solvent extraction, steam distillation method, GC-MS analysis and HPLC whereas different biological activities have been reported by various methods.







Results- Literature survey revealed reports of *Ajuga* L. to be used in treatment against various ailments such as stomach-ache, dermatitis, malaria, snake-bite, ear-ache, asthma, pneumonia, respiratory problems, fever, and joint pain.

Conclusion- It is useful to conserve *Ajuga bracteosa* due to over exploitation for research purpose whereas *Ajuga brachystemon* and *Ajuga macrosperma* have been reported rarely in the wild as these medicinal plants are very important for climatic ecology.

Keywords- *Ajuga brachystemon, Ajuga integrifolia, Ajuga macrosperma, Ajuga parviflora,* phytochemical, climate change, conservation status.

Effect of Climate Change and its Alternatives

Mahendra Lal Tamta

 $\label{eq:local_local_state} Lecturer, Applied Chemistry, Government Polytechnic Kulsari, Chamoli, UK mltamtagpkulsari@gmail.com$

Abstract

Preventing the effects of environmental pollution is not an easy task; still life is the name of continuity. Problems come and man opens his mind and starts looking for alternatives. We have seen an example of this in the recent Covid period, the vaccine which took years to make, that scientists did it in a very short time. There is a saying that precaution is better than cure is better under the above title or maybe we can identify such steps. Identify such effects due to which environmental pollution is increasing very fast. Direct example of this is unilateral destruction of the forests which is being done in the name of development. So the practice of tree plantation should be increased. One more thing the fertility of the soil is deteriorating, maintaining the availability and nutritional value of cereal crops is also a challenge. The scarcity of water is definite in the future. There may be an alternative to it, will have to be found. Growing population is directly related to environmental imbalance. Government has to take strict steps in this matter. The increasing unilateral population pressure on plain cities has to be stopped to reduce climate change.

Keywords: Environment, Alternatives, Population, Climate Change.







Climate Change : Imitation of Impact of Climate Change on Bio-resources

Manju Kandpal, Anil Kumar, Supriya Verma

Department of Chemistry IPGG (PG) College of Commerce Haldwani. Nainital,(263139) (Affiliated to Kumaun university Nainital) Uttarakhand, India Corresponding author: E-mail: anilkumarchauhan03@gmail.com Mob. No. 919756374061

Abstract

Climate change is defined as the shift in climate patterns mainly caused by greenhouse gas emissions from natural systems and human activities. So far, anthropogenic activities have caused about 1.0 °C of global warming above the pre-industrial level and this is likely to reach 1.5 °C between 2030 and 2052 if the current emission rates persist. In 2018, the world encountered 315 cases of natural disasters which are mainly related to the climate. Approximately 68.5 million people were affected, and economic losses amounted to \$131.7 billion, of which storms, floods, wildfires and droughts accounted for approximately 93%. Economic losses attributed to wildfires in 2018 alone are almost equal to the collective losses from wildfires incurred over the past decade, which is guite alarming. Furthermore, food, water, health, ecosystem, human habitat and infrastructure have been identified as the most vulnerable sectors under climate attack. In 2015, the Paris agreement was introduced with the main objective of limiting global temperature increase to 2 °C by 2100 and pursuing efforts to limit the increase to 1.5 °C. This article reviews the main strategies for climate change abatement, namely conventional mitigation, negative emissions and radiative forcing geoengineering. Conventional mitigation technologies focus on reducing fossil-based CO₂ emissions. Negative emissions technologies are aiming to capture and sequester atmospheric carbon to reduce carbon dioxide levels. Finally, geoengineering techniques of radiative forcing alter the earth's radiative energy budget to stabilize or reduce global temperatures. It is evident that conventional mitigation efforts alone are not sufficient to meet the targets stipulated by the Paris agreement; therefore, the utilization of alternative routes appears inevitable. While various technologies presented may still be at an early stage of development, biogenic-based sequestration techniques are to a certain extent mature and can be deployed immediately.

Keywords : Climate change; Anthropogenic activity; Global warming; Mitigation.







Waste to Graphene Nanosheets and their application in Energy Storage System: A Novel Path towards Circular Economy of Himalayan Regions

Mayank Pathak*, Nanda Gopal Sahoo

Prof. Rajendra Singh Nanoscience and Nanotechnology Centre Department of Chemistry, D.S.B. Campus Kumaun University, Nainital, India Email: mnkpthk27@gmail.com

Over the past few years, demands for energy supply and storage has increased in a dramatic manner due to the rapidly increasing consumer and overpopulation, worldwide. The dependence upon the fossil fuels leading towards the direction of ending the available fuel soon in the future. These problems of overpopulation and energy shortage provoking the researchers to find the solution of these threats. Electric Double Layer Capacitor/Supercapacitor (SC) is a greener energy storage device which may be the solution of both the problems stated, maintaining the ecology. The main concern of the researchers about the electrode material of a SC device always remains that it should be highly conducting, cheaper, porous with high specific surface area. Graphene may be the suitable candidate as electrode material for such applications as it has tremendous electron mobility, high electrical conductivity, and high specific surface area. The electrode material mainly used in a SC device is Highly Pure Graphite (HPG) or its composite, which increase the cost of the device. Here, in our work we demonstrated the synthesis of graphene nanosheets (GNs) from natural waste raw materials like Kinnow Peel Waste (KPW) and Cow Dung (CD) and use of such synthesised GNs as electrode material in the fabrication of a SC device. Both the devices showed high specific capacitance while maintaining the % capacitance retention to more than 90% in 5000 cycles of charge-discharge. Thus fabricated devices also showed the ultrahigh power density and energy density. We demonstrated that the readily available waste in Himalayan regions can be upcycled into high value graphene nanosheets and further, these GNs can be used as a substitute of HPG in energy storage systems leading towards the circular economy of Himalayan regions.

Keywords: Graphene nanosheets, Kinnow Peel Waste, Cow Dung, Supercapacitor







Ag-Cu-CeO₂ Nanocomposites: Efficient Photocatalyst for Visible Light Induced Photocatalysis of Malachite Green

Nitish Semwal *, Divya Mahar, Mahesh Chandra Arya

Department of Chemistry, DSB Campus, Kumaun University, Nainital 263002, Uttarakhand, India. **E-mail:** < mcarya181@gmail.com>

Abstract

Pure and Ag-Cu-doped cerium oxide nanocomposites were synthesized by facile aqueous coprecipitation method from the precursor's cerium nitrate hexahydrate, copper sulphate and silver acetate using CTAB as the capping agent. The percentage mixing of Ag and Cu were 10 mol% and 30 mol% respectively. The synthesized material was characterized by XRD, SEM, EDX, TEM and UV-Vis spectroscopic techniques. The Debye-Scherrer analysis revealed that synthesised material had fluorite structure with crystallite size in 40-50 nm range. TEM analysis confirmed the morphology and asserted the average particle size in the range 45-50 nm. Combined results of XRD and SEM-EDX indicated the doping of Ag and Cu into CeO₂ matrix and formation of a nanocomposite. UV-visible spectroscopic analysis of Ag-Cu doped CeO, nanoparticles showed a decrease in band gap on doping. The band gap of pure and Ag-Cu-doped CeO, nanocomposites was determined to be 3.2 eV and 2.1 eV, respectively. Photocatalytic activity of the pure and Ag-Cu-doped CeO, nanocomposite was evaluated by studying the degradation of Malachite green dye under visible light. The photocatalytic degradation of 94.8% by Ag-Cu doped CeO2 nanoparticles under visible irradiation was observed in 90 minutes whereas it was 32.3% in case of pure CeO₂ after 6 hr. The results of photocatalytic activity reflected that doping led to increased photocatalytic activity of the nanocomposite towards the dye degradation within short time period. Being heterogeneous in nature the photocatalyst can act as a green solution to the problem of dye pollution.

Keywords: Ag-Cu-doped CeO₂ nanocomposites, photocatalytic activity, dye degradation.







Seasonal Variation on Chemical Composition of Essential Oils of Fresh Cinnamomum camphora L.

Bhawana Kanyal^{1*}, Chitra Pande¹, Geeta Tewari¹, Rajendra Chandra Padalia², Krishna Rana¹

¹Department of Chemistry, Kumaun University, Nainital 263002, Uttarakhand, India ²CSIR- CIMAP, Research Center Pantnagar- 263149, Uttarakhand, India

Abstract

Cinnamomum camphora L. belongs to Family Lauraceae, is an aromatic evergreen plant. In present study, the fresh leaves of plant collected from Nainital district at two different seasons (summer and winter). Hydrodistillation of both fresh samples were carried out by using Clevenger apparatus and essential oil obtained was analyzed by Gas chromatography and GC-MS. Twenty eight compounds were identified in the essential oil collected in summer season while thirty three compounds were present in fresh sample collected in winter season. The essential oil content was found to be highest in summer season (0.8 mL) followed by winter season (0.5 mL). Camphor (71.1-48.4%), limonene (5.54-12.7%), á-pinene (3.36-9.03%), myrcene (2.64-5.60%) and camphene (2.78-4.41%) were the major constituents of essential oils under different season respectively. Essential oil yield and composition were affected by seasonal variation. As we know essential oils are a mixture of volatile compounds that are unstable when exposed to moisture, oxygen, and temperature. Major amount of camphor which exhibits a number of biological properties and highest essential oil content were present exclusively in the essential oil of summer season collection.

Keywords: Camphor; *Cinnamomum camphora* L.; seasonal effect; Gas chromatography-mass spectrometry; essential oil.







Agricultural Waste Derived Grapheme Oxide Based PVA Polymer Nanocomposites for Structural Applications.

Bhashkar Singh Bohra, Tanuja Arya, Nanda Gopal Sahoo

Prof. Rajendra Singh Nanoscience and Nanotechnology Centre, Department of Chemistry, D.S.B. Campus, Kumaun University, Nainital-263002, Uttarakhand, India Email address-ngsahoo@yahoo.co.in, Phone - 05942-235055

Abstract

Graphene oxide (GO) is an ideal filler for the development of high performance polymer nanocomposites because of its superior properties such as high mechanical, high thermal properties as well as high surface area. Herein, a novel ecofriendly and cost-effective one step hydrothermal route has been developed for the synthesis of GO from Agricultural waste i.e. Quercus ilex Fruit. Furthermore, the synthesized GO used as a reinforcing filler to fabricate polyvinyl alcohol (PVA) polymer nanocomposites by employing solution mixing process. Advanced characterization techniques such as Fourier transform infrared spectroscopy (FT-IR), Raman spectroscopy, differential scanning calorimetry analysis (DSC), thermogravimetric analysis (TGA) and dynamic mechanical thermal analysis (DMTA), and X-ray diffraction (XRD) analysis have been done for the evaluation of interactions between GO and PVA. The strong interaction between the GO and the PVA greatly enhanced the dispersion as well as the interfacial adhesion. As a result, the overall mechanical and thermal properties of the PVA nanocomposites significantly improved by incorporating GO into PVA polymers.

Keywords: Graphene Oxide, Polyvinyl Alcohol, Polymer Nanocomposites, Mechanical Properties, Thermal Properties.







Eco-friendly Approach for Adsorption of 4-Chlorophenol Using iron-zirconium Mixed Oxide Nanoparticles

Rajesh Kumar^{*1, 2}, Shah Raj Ali² and Naved Haider²

¹Department of Chemistry, S.S.J. University, Campus Almora, 263601, Uttarakhand, India. ²Department of Chemistry, D.S.B. Campus, Kumaun University, Nainital 263002, Uttarakhand, India ***Corresponding author** (Email: drkumarntl@gmail.com, Mobile No. +91-6395556474)

The adsorption of 4-chlorophenol (4-CPh) from aqueous solutions is an important issue as it causes several adverse effectson human health and the environment. This work aimed at exploring the potential use of iron-zirconium mixed oxide nanoparticles (IZO-NPs) as adsorbent for the adsorption of 4-CPh from aqueous solutions. The IZO-NPs was synthesized using co-precipitation method and characterized in terms of XRD pattern, TGA, FT-IR spectroscopy, BET surface area analysis; TEM, SEM-EDX, and Zeta potential measurement. In brief, ferric chloride and zirconium oxychloride solutions were combined and heated to roughly 60°C. A solution of sodium hydroxide was steadily added to this hot mixture with continuous stirring until the pH reached 10. The resulting precipitate was filtered, washed, dried, and crushed into tiny particles. Batch adsorption method was used for the adsorption of 4-CPhon IZO-NPs and the concentration of 4-CPh before and after adsorption was analyzed by UV-Vis spectrophotometry. The adsorption data were found to follow the Langmuir adsorption isotherm more effectively compared to the Freundlich and Temkin. This research demonstrates that IZO-NPs can be employed as an effective adsorbent for the adsorption of 4-CPh from aqueous solutions. It is a cost-effective and environment friendly technique to reduce waste and use it as an adsorbent.

Keywords: Binary oxide nanoparticles, adsorption, chlorophenol, Langmuir adsorption isotherm.







Green Solvent Status of Aqueous Ethylene Glycol: Interaction Studies

Rashmi Khulbe*, Devesh Pandey, Bhuwan Chandra, N.D. Kandpal

Department of Chemistry, Soban Singh Jeena University Campus, Almora-263601, Uttarakhand, India. Corresponding author E-mail: rashmikhulbe00@gmail.com

Abstract

The goal of green chemistry is to design the synthetic method that reduces the use or production of toxic products, bio-products, solvents and other associated products. In the synthetic chemistry, solvent plays an important role in this context. The knowledge of these solvent is the subject of green solvent. Water is the universal eco-friendly green solvent. In this study an attempt has been made to study the molecular interaction of ethylene glycol in water system. Ethylene glycol belongs to the solvent having maximum eco-friendly characteristics. In this study the interaction studies of water and ethylene glycol have been studied viscometrically. Interaction parameters have been reported using different forms of Jones-Dole equation.

Keywords: Aqueous ethylene glycol, Green solvent, Molecular interactions, Jones-Dole equation

Nanostructured Nickel Hexacyanid of Errate as a Green Catalyst for the Oxidation of Benzyl Alcohol

Rakshita Pandey, Shah Raj Ali

Department Of Chemistry, Kumaun University, Nainital, 263002, Uttarakhand

Abstract

The Green Chemistry program strategies the use of more environmental friendly chemical processes which reduce or even eliminate the involvement of hazardous substances. It includes, the waste minimization, use of catalysts in place of reagents, use of non-toxic reagents, use of renewable resources, and use of solvent-free medium or recyclable environmental friendly solvents.







The partial oxidation of benzyl alcohol to benzaldehyde is an elementry synthetic transformation in organic chemistry. The traditional schemes for oxidation of benzyl alcohol to benzaldehyde involves the use of highly toxic inorganic oxidents and the generation of torr products. Therefore it is an important issue to design a catalyst for the oxidation of benzyl alcohol to benzaldehyde under green conditions.

In light of the above, nickel hexacyanidoferrate(NiHCFe) nanoparticles have been used as a heterogeneous catalyst for the oxidation of benzyl alcohol. The nickel hexacyanoferrate nanoparticles have been synthesized using coprecipitation method and characterised by EA, TA, FT-IR, and XRD studies. The synthesized NiHCFe nanoparticle was found as an effective catalyst. Under optimized conditions, it showed 36% conversion of benzyl alcohol to benzaldehyde under heterogeneous and solvent-free condition with good selectivity and high recyclability using H₂O₂ as an oxidant.

Hedychium coccineum Essential Oils: Chemical Composition and Biological Activities

Ravendra Kumar*, Sushila Arya, Om Prakash, Satya Kumar¹

Department of Chemistry, College of Basic Science and Humanities, G.B. Pant University of Agriculture and Technology, Pantnagar-263145, U.S. Nagar, Uttarakhand, India. ¹Department of Plant Pathology, College of Agriculture, G.B. Pant University of Agriculture and Technology, Pantnagar-263145, U.S. Nagar, Uttarakhand, India Correspondence: ravichemistry.kumar@gmail.com

Abstract

Hedychium coccineum Buch.-Ham. ex Sm. belonging to the family Zingiberaceae. The aim of the present study was to compare the chemical composition and nematicidal, antifungal and antibacterial activities of *H.coccineum* rhizome part essential oil (HCCRO) and *H. coccineum* aerial part essential oil (HCCAO). The comparative study of the rhizome and aerial part essential oils of *H.coccineum* showed that (*E*)-nerolidol(15.9%), bornyl acetate (13.95%), davanone B(10.9%), spathulenol(8.9%) and 1, 8-cineol(8.5%) contributed majorly to the HCCRO, while 7-hydroxyfarnesen(15.5%), á-farnesene(11.1%), á-pinene (10.9%), spathulenol (7.7%)







and â-pinene(6.8%) were identified in the HCCAO. Both the essential oils showed good to moderate nematicidal, antifungal and antibacterial activitiy.

Keywords: Hedychium coccineum, (*E*-) nerolidol, 7-hydroxyfarnesen, Nematicidal, Antifungal and Antibacterial

Phytochemical Screening of *Blumea mollis* (D. Don) Merr. from Foothills of Northern India

Sushma Kholiya^{a,b}, Ameeta Tiwari^b, R.C. Padalia^a

^aCSIR-Central Institute of Medicinal and Aromatic Plants (CIMAP), Research Center,, Pantnagar, Uttarakhand, India

^bDepartment of Chemistry, M.B. Govt. P.G. College Haldwani, Kumaun University, Nainital, Uttarakhand, India

Abstract

Medicinal and aromatic plants are source of raw materials for pharmaceuticals, fragrance, flavors, and various herbal formulations. These plants and their products provide a valuable source of income for farmers and entrepreneurs, as well as earning precious foreign cash through export. Asteraceae family is one of the largest plant families, with ca. 1600- 1700 genera and about 24,000 species and accounts for over 10% of all flowering plants distributed intropical, subtropical, and sub-temperate to temperate climatic conditions. Most of the plants of this genus are herbaceous, although there are also shrubs and trees, as well as creepers and climbers. Various member of this family viz. sunflower, marigolds, chrysanthemum, calendula, chamomile, yarrow, artemisia, echinacea, silybum, dandelion, solidago, wedelia, tansy, arnica, safflower, artichoke, lettuce, dahlia are among well known plants for their diverse use as medicinal, ornamental, and as cash crops for farmers. Blumea mollis (D. Don) Merr. is an aromatic annual herb of Asteraceae family, commonly found in India. It has an erect stem, soft glandular hairs with ovate-oblong leaves and pink purple bell shaped flowers. It is widely distributed in agricultural lands and wastelands. The leaf of plant is traditionally used for skin diseases and herb decoction for diarrhea. The essential oil of Blumea has shown to possess antimicrobial, antioxidant, antihelminthic, antibacterial, anticancer and larvicidalactivities. After viewing its notable phytochemicals and associated pharmacological activities, our study is focused







on to evaluate phytochemical screening of *B.mollis* from foothills of northern India. The hydrodistilled essential oil from aerial part of *Blumea mollis* was analyzed using chromatographic and spectrometric methods. The analyses revealed that the essential oil of aerial part of *Blumea mollis* contained 45 compounds; and the major compounds identified were â-caryophyllene (21.7%), caryophyllene oxide (19.4%), germacrene-D (11.3%), allo-aromadendrene (2.7%), and linalool (1.4%).

Phytochemical Analysis and Pesticidal Activities of Cautleya Spicata (Sm.) Bakerfrom Kumaon, Uttarakhand, India

Sonu Kumar Mahawer¹, Ravendra Kumar¹, Om Prakash¹, and Satya Kumar²

¹Department of Chemistry, G. B. Pant University of Agriculture and Technology, Pantnagar – 263145, Uttarakhand, India ²Department of Plant Pathology, G. B. Pant University of Agriculture and Technology, Pantnagar – 263145, Uttarakhand, India

Abstract

Cautleya spicata (Sm.) Baker is one of the important species belonging to the genus *Cautleya* the Zingiberaceae family. Only around 3 to 4 species of this genus are found are found in high altitude (1800-2800) tropical andtemperate Eastern Himalayaregions and *C. spicata* is one of them. For present investigation, the plant material i.e., rhizome as well as arial part was collected from Kumaon region, Uttarakhand, India. Essential oils were extracted via hydro distillation by using claviger type apparatus. The essential oils were yielded about 0.06% for arial part and 0.08% for rhizome part. Obtained essential oils were subjected to GC-MSanalysis for phytochemical profiling. The oils were screened for insecticidal as well as nematicidalactivities. Results showed that both the oils have good insecticidal activity at lower concentrations and antifeedant activity at higher concentration. Nematicidal activity was recorded as concentration dependent. Essential oil from arial part showed significantly higher nematicidal activity as compared to rhizome essential oil.

Keywords: Cautleya spicata, Essential oils, Phytochemicals, Nematicidal, Insecticidal







Climate Change: Social and Economic Impacts of Climate Change

Supriya Verma

Department of chemistry I.P.G.G.P.G. College of commerce Haldwani, Nainital (Affiliated to Kumaun university Nainital) E-MAIL: Priyavermaksp@gmail.com Mobile: +917500075427

Abstract

Climate change is highly dependent on the concentration of greenhouse gases in the Earth's atmosphere. Climate is changing in an accelerating pace. It is recognized as a serious threat to ecosystem, biodiversity, and health. It is one of the main environmental challenges facing the world today. This article reviews the social and economic impacts of climate change and the policy implications of the results. Climate change would impact in a most all social and economic sectors across the globe including food, water, public health, energy demand, livelihoods. It also reduce GDP growth and increase migration, displacement, and civil conflicts. GDP reductions would be less in rich nations than in poor countries. Climate change would represent additional stress on the ecological and socioeconomic systems that are already facing tremendous pressure due to rapid industrialization, urbanization and economic development which is associated with alterations in the physical environment of the planet Earth. Wealthy countries and its populations will be able to adapt effectively to future climate changes because they have greater resources compared to poor developing countries. In short, poor developing countries and its people would be most affected due to climate change and would need more resources, training, and education on climate change adaptation.

Keywords: GDP growth, Physical environment, Migration, Biodiversity, Urbanization.







Chemical Composition, Nematicidal, Insecticidal and Herbicidal Activities of Hedychium coronarium J. Koenigrhizome Part Chloroform Extract

Sushila Arya¹, Ravendra Kumar^{*1}, Om Prakash¹, Satya Kumar²

¹Department of Chemistry, College of Basic Science and Humanities, G.B. Pant University of Agriculture and Technology, Pantnagar, U.S. Nagar, Uttarakhand, India. ²Department of Plant Pathology, College of Agriculture, G.B. Pant University of Agriculture and Technology, Pantnagar, U.S. Nagar, Uttarakhand, India

Correspondence author:ravichemistry.kumar@gmail.com

Abstract

The aim of the present study was to evaluate nematicidal, herbicidal and insecticidal activity of chloroform rhizome extract of Hedychiumcoronarium J. Koenig. The GC-MS analysis led to identification of fifteen compounds comprising of 87.9% of total extract composition. The extract exhibited the significant nematicidal activity against the *Meloidogyne incognitanematode* and effective herbicidal activity against the Raphanussativus seeds on the basis of three distinct parameters that is percent inhibition of seed germination, inhibition of root length, and inhibition of shoot length respectively. And also showed potent insecticidal activity by using no choice leaf dip method in a sequentially dose and time dependent manner against Spodopteralitura.

Keywords: Hedychium, GC-MS analysis, Insecticidal, Nematicidal

The Essential Oil Composition of Zingiber officinale Roscoe. Fresh Rhizomes

Aabha, Neeta Negi, Geeta Tewari, Chitra Pande

Department of Chemistry, D.S.B. Campus, Kumaun University, Nainital. E-mail-aabhagangwar3@gmail.com

Abstract

In the view of COVID 2019, the use of herbal plants has increased many folds especially plants like Zingiber officinale Roscoe. for its medicinal and therapeutic







potential. Therefore, the aim of the present work is to analyse the essential oil composition of *Z. officinale* Roscoe collected from Tarai region of Kumaun. For this study, fresh ginger rhizomes were collected and the essential oil was extracted by hydrodistillation method using Clevenger apparatus for 6h. The components were identified by GC and GC-MS techniques. The oil yield was 0.2 % on the volume/weight basis. The GC analysis of the essential oil revealed the presence of total 73 compounds out of which 52 compoundswere identified consisting 95.28% of total oil. The oil contained geranial (17.53%), â-phellandrene (14.12%), *cis*-citral (12.47%), geranyl acetate (12.24%),camphene (7.87%) and geraniol (5.42%)as predominant components along with á-pinene, â-myrcene, á-zingiberene, á-farnesene, *trans*-nerolidol, ar-curcumene and linaloolas minor constituents. Geranial has antimicrobial and antibacterial Properties. This study shows significantly different composition from other studies from Uttarakhand, India.

Biofuels Resources Coconut and Sesame oil: Extraction and Chemical Examination

Anchal Aneja¹, Kailash Tamta², Renu Loshali³, Devesh Pandey⁴, Naraian Datt Kandpal⁴

1.D.S.B. Campus(Nainital) Kumaun University, Uttarakhand, India

2. Govt Degree College, Kanda (Bageshwar), Uttarakhand, India

3. Govt Degree College, Jainti(Almora), Uttarakhand, India

4. S.S.J.University Campus, AlmoraUttarakhand, India

Corresponding Author Email:anejaanchal1991@gmail.com]

Abstract

Pure plant oil can be used in diesel engine as bio-diesel. Oils are an important class of fatty acids and their esters exist in various seeds and nuts. All oils are useful for production of various products in industries. The traditional methods have been applied in the study for the extraction of oil from coconut and sesame seeds. The oils have been examined for their chemical composition.

Keywords: Bio-diesel, Oil extraction, Coconut, Sesame.







Composition and biological activities of *Thymus linearis* Benth. collected from Kumaun Region of Uttarakhand

Tanuja Kabdal¹, Ravendra Kumar^{*1}, Om Prakash¹, D. S. Rawat², R. M. Srivastava³

¹Department of Chemistry, College of Basic Sciences and Humanities, G. B. Pant University of Agriculture and Technology, Pantnagar-263145, U.S. Nagar, Uttarakhand, India

²Department of Biological Sciences, College of Basic Sciences and Humanities, G. B. Pant University of Agriculture and Technology, Pantnagar-263145, U.S. Nagar, Uttarakhand, India

³ Department of Entomology, College of Agriculture, G. B. Pant University of Agriculture and Technology, Pantnagar-263145, U.S. Nagar, Uttarakhand, India

Kabdaltanuja1998@gmail.com Corresponding Author ravichemistry.kumar@gmail.com

Abstract

Thymus linearis belonging to the family Lamiaceae is an important medicinal plant. It is used traditionally for a number of purposes around the world including herbal tea, antitussive tonic, antiseptic and against eczema and psoriasis. It is an important source of Thyme oil. This research assessed the chemical composition and biological activities of essential oils extracted from *Thymus linearis* Benth. collected from Kumaun region of Uttarakhand in rainy season. The essential oil yield was recorded about 1.3%. The oil was analyzed by GC and GC-MS. Thymol was the marker component in the oil with composition 31.9%. The antioxidant activity of the oil was investigated *in vitro* using three assays: DPPH radical scavenging activity, H_2O_2 radical scavenging activity and metal chelating activity and significant antioxidant potential was observed in the essential oil. The oil showed good inhibition of protein denaturation ($IC_{50}=26.55\pm0.03$ ig/mL). The oil inhibited the activity of á-amylase with IC_{50} of 32.87±0.04 ig/mL. Insect antifeedant activity performed using the leaf dip method against *Spodoptera litura* afforded significant results







Phytochemical Composition of the Essential Oil from aerial parts of *Strobilanthes tomentosa* (Nees). from Uttarakhand, India and its Antibacterial Activity.

Vandana Koshyari, Pushpa Joshi

E-mail: vandanakoshyari1994@gmail.com Department of Chemistry, D.S.B Campus Nainital, India.

Abstract

Plants have been used for medicinal purpose since antiquity, with the volatile oil fraction being an important economical and medicinal extract. *Strobilanthes tomentosa* (Nees) J.R.I.Wood belongs to family Acanthaceae; is an important medicinal and aromatic herb and a natural sources of essential oil. The objective of present study was to evaluate comparative phytochemical compositions and antibacterial activity of essential oils of its fresh aerial parts. Constituents of both essential oils were characterized with the help of GC and GC-MS and were found to be a complex mixture of mono and sesquiterpenoids. major constituents in both of the essential oils were identified as â-pinene, â-phellandrene, âcaryophyllene, germacrene D, á-muurolol, kessane with quantitative variations.

Impact of Climate Change on Mountain Agriculture in Uttarakhand.

Amisha*, Sanjay Kumar

Department of Botany, P.G. College Bageshwar, Uttarakhand - 263642

Abstract

Climate change is biggest challenges to the rural food production and livelihood of the Himalayan mountains (Uttarakhand). Uttarakhand is well known for its rich biodiversity. Traditional farming in the Himalayan mountains constitutes of the main source of rural food, &also provides the livelihood opportunities. Agriculture is considered highly vulnerable to climate change. The effect of







climate change will be felt by people on their livelihood.Temperature is the main cause which is affecting the production of crops, development of the unfamiliar pests & diseases, rise water stress etc. That's why climate change in Uttarakhand declines in agriculture productivity, discouragethe farmers and lead people to abandon the farming at high altitude and also increase the trend of migration. Therefore, the present study shows the impact of climate on mountains agriculture. This could be beneficial to policy planner to develop and design appropriate strategies to cope up with the impact of climate change, and to enhance the capacities of agricultural communities living in mountain area.

Proliferation of Invasive Alien Species in Different Forest Types of Western Himalaya

Anita Mehra*1 and Lalit Mohan Tewari²

DSB, Campus Kumaun University Nainital , India^{1,2} Email- Annumehra414@gmail.com, 9410700533

Abstract

Invasive Alien species compete native species for food, water and space and are one of the major causes of biodiversity loss. When native species become impacted by the presence of invasive species, it affects local biodiversity. Present study was carried out to understand the proliferation status of Invasive Alien species along altitudinal gradient (600-2100) in different forest types (Sal, Pine, Oak and Deodar) of western Himalaya. Major invasive species in the region were Lantana camara, Ageratinaadenophora, Ageratum conyzoides and Parthenium hysterophorous. Ageratinaadenophora was highly spreading invasive species present in all forest type of the region, where maximum density (8291/ha.) and frequency (63.75%) was recorded in Pine forest, important value index (IVI) of Ageratinaadenophora increase from 23.4 to 25.71 followed by in Sal (6.32 to 8.41), Deodar forest (11.2 to 12.83) and Oak forest (5.07-5.84). Ageratum convzoides, Lantana camara and Parthenium hysterophoruswere present only in Sal Forest, Lantana camarashowed high density (244/ha.) and frequency (41)as compare to other invasive species in Sal Forest(IVI increase from 29.9 to 30.78). Most of oak forest in the region were under van panchayat and managed by local communities and allowed less rate of invasion of alien species.







Impact of Climate Change on Invasive Alien Species in Kumaun Himalayas, Uttarakhand, India

Bharti^{*}, Deepak Kumar, Pankaj Arya, Renu, Mahima Pandey, Jyotsna Tiwari, Abhay Chaturvedi and Prasun Bhardwaj

Department of Botany, L.S.M. Govt. P.G. College, Pithoragarh, Uttarakhand *Presenting author- Email: bhartirautela77@gmail.com

Abstract

Invasive alien species are non-native species that impart negative effects on the survival of native biodiversity, ecosystem functioning, global economy, and human health. The present study deals with the impact of climate change on invasive alien species in the Kumaun Himalayas. Ageratum conyzoides, Anagallis arvensis, Bidens pilosa, etc. are noxious species associated with agricultural fields; Lantana camara, Eupatorium adenophorum, Urena lobata, etc. are troublesome in forest; and Parthenium hysterophorus, Galinsoga parviflora, Malvastrum coromandelianum, etc. in wastelands. Climate change favours the establishment and proliferation of these problematic invasive alien species in the natural ecosystem. It weakens the adaptability and resilience capacity of natural habitats, thus promoting biological invasion. Invasive alien species find an opportunity to expand their distribution in these modified habitats. Thus, an integrated management strategy needs to be strengthened for early control of invasive species and ecosystem sustainability.

Keywords: Climate change, Kumaun Himalayas, Invasive alien species, Biodiversity, Ecosystem.







Impact of Climate Change on Diversity, Structure and Regeneration Status in Community Managed Forests of Kumaun Himalaya, India

Bhawana Kapkoti¹, Neelu Lodhiyal², Bhawana Adhikari³, L.S. Lodhiyal^{*} and Bipin Chandra Suyal¹

E-mail: kapkotibhawana@gmail.com

¹Department of Botany Govt. P.G. College Dwarahat, Almora

^{2&3}Department of Botany, D.S.B. Campus, Kumaun University, Nainital-263002, UK

Department of Forestry and Environmental Science, D.S.B. Campus, Kumaun University, Nainital-263002, Uttarakhand, India

Abstract

Climate change is impacting the ecosystems of the world and it is expected that magnitude of these impacts will increase along with temperature over this century. Many plant species in the ecosystem may not be able to adapt as the effect of global warming and allied disturbances, such as floods, drought, wildfire, soil erosion etc are compounded by other stresses such as land use change, overexploitation of resources, loss of water resources, pollution and fragmentation of natural system. Present study deals with diversity, structure and regeneration of tree species in community forests (van panchayat forests) of Central Himalaya. Forest disturbance was assessed on the basis of tree canopy cover, density, collection pressure and status of tree lopped in the forest. Density of trees, saplings and seedlings were 443-910, 207-1290 and 1003- 6660 ind.ha⁻¹ for studied VP forests, respectively. The density of herbs was ranged from 12.0 to 203.7 ind.m⁻² in studied forest sites. Species diversity of trees, shrubs and herbs were 0.10-2.98, 1.30- 2.60 and 2.03-4.39 in community forests, respectively. In present study, sal mixed forests showed good regeneration whereas teak mixed, pine mixed and oak mixed forests showed fair regeneration. Therefore, it is very essential to develop proper management and conservation strategies for maintenance of tree species and their sustainability in the forest of the region. Thus management strategies should be framed in such a manner that involvement of local people should be increased, so that they can play an important role to reduce the global carbon emission, conservation and better management of forest in the area.

Keywords: community forests; regeneration; density; oak; sal; chir-pine







Ethno-Medicinal Plants of the Kumoun Himalaya Used to Cure Various Diseases

Bipin Chandra Suyal and Bhawana Kapkoti

Department of Botany, Govt. P.G. College Dwarahat Almora Email: bipinchandrasuyal@gmail.com

Abstract

The present study was carried out in some interior areas of Nainital and US district of Uttrakhand to collect the information of traditionally used medicinal plants by the communities. The Himalaya is considered as one of the most important botanical region of the world. Medicinal plants have been used as a source of curing various stomach disorders since ancient times and more so in the hilly region of the Himalayan states. Present study was based on extensive and intensive field surveys. PRA tool was used for identification of medicinal plant during the survey and to explore the more information about the traditional knowledge with the help of indigenous people. Present study provides information on total 34 plants species having various ethno-medicinal properties belong to 23 families were studied that represents in four major vegetation layer i.e. herb, under shrub, shrub and tree. Out of these plant species 13 species are herb, 07 shrub, 14 trees specie. The study area is rich in medicinal plant resources which are mostly tree species and are used in indigenous traditional method for curing diseases. The plant parts used for medicinal preparation were root, leaves, bark, flower, fruit, bud, plant gel, seed, stem and whole plant. Thus it is expected that this investigation will be helpful to conserve the heritable knowledge in the field of herbal treatment and general uses of plants in village ecosystem. Local communities, especially, older age people, including women traditionally use these locally available medicinal plants for health and believe that these are easily available, less expensive, better cure and have no side effects.







Impact of Climate Change on Kumaun Himalayan Region of India

Deepak Kumar, Bharti, Pankaj Arya, Renu, Mahima Pandey, Abhay Chaturvedi, Prasun Bhardwaj and Jyotsna Tiwari

Department of Botany, L.S.M.G.P.G. College, Pithoragarh (262502) Email: dk.botany2020@gmail.com

Abstract

Climate change has direct effect on the environment, biodiversity, water resources and socio-economy of any regional culture and civilization. Continuing climate change can disturb the timing and intensity of Asian monsoon. It will affects on the availability of water resources. Water resources are the one of the key factors for the rich biodiversity heritageand the survival of mankind in Himalayan region. Existing data of different research in recent years, clearly indicates that seasonal temperature hasrisen approximately 0.3°C to 0.7°C. Increase In temperature could lead to higher rate of melting of glacier, lose of biodiversity and also reduce the snow and ice deposition, which reduces the water storage capacity of mountains. One sixth of Earth's population depends on glaciers and seasonal snow for itswater supply. Thus, climate change has tremendous impact on agriculture, domestic and industrial demands of water. In present paper an endeavour made to compile and overview the various impactof climate changeon Kumaun Himalayan region, based on literature review. This study will help to aware about the threats and to develop different beneficial national policies, strategies and planningto the people of these region.

Keywords: - Climate change, Kumaun Himalaya region, water resources.

Climate Change: It's Impact on Bio Resource of the Himalayan Region

Bindu, Nitin Agnihotri

Abstract

The chief cause of climate change is the exponential growth of human population and over exploitation of natural resources. We have reduced biodiversity by







destroying, fragmenting, degrading, and simplifying wildlife habitats. We have cleared forests, dug up grasslands and filled in wetlands to grow food or to construct buildings, highways and parking lots. This leads into loss of overall biodiversity and a degradation of the earth's natural capital. Microplastics have been found in the guts of fish in the Alaknanda a major river that flows through Srinagar city of Pauri district in Uttarakhand.

We need to maintain the balance between simplified, human-altered communities and the more complex natural communities on which we and other species depend, and we need to slow down the rates at which we are simplifying homogenizing and degrading nature for our purposes. Otherwise, what is at risk is not the resilient earth but rather the quality of life for our own species and the existence of other species we drive to premature extinction.

Three New Aquatic Hyphomycetes from Foothill Region of Kumaun Himalaya, India

Saraswati Bisht*, Ruchi Jalal, Saima Altaf

Department of Botany, I.P.G.G.P.G. College of Commerce, Haldwani- 263139, India *Email: saraswatibisht.4321@gmail.com

Abstract

Aquatic hyphomycetes are the fungi with distinctive conidial shapes mostly inhabiting in dead submerged leaf litter of fresh water-bodies. Primarily, these fungi colonize and decomposes the dead leaf litter in aquatic bodies playing important role in natural biogeochemical cycles. However, their versatility helps them to survive on land as well as in temporary water. These conidial fungi have been extensively reported from all over the world including Kumaun Himalaya, India by many workers. Till date,approximately 90 species of aquatic hyphomycetes have been reported from hilly regions of Kumaun Himalaya, still less information is available from foothills. In the present study, water bodies flowing through Amritpur and Machilivan region as well as irrigation canals of Haldwani were explored for the first time and found very diverse for the growth of aquatic hyphomycetes. The study sites being situated in foothills have comparatively warmer temperature and different substrate pool. Deaddecomposed







submergedleaf samples were collected, processed, incubated and observed for identification. Three speciesnamely, *Dicranidion sp.*Harkness, *Monacrosporium lysipagum*(Drechsler) Subramand *Wiesneriomyces laurinus*(Tassi) Kirkwere found to be new isolates from Kumaun Himalaya.

Keywords: Aquatic hyphomycetes, Foothill region, Freshwater streams, Irrigation canals, Newrecords.

Role of Van Panchayat Forests in Climate Change and Livelihood Development in Bageswar District of Uttarakhand

Inder Rautela and L.S. Lodhiyal

Department of Forestry and Environmental Science, D.S.B. Campus, Kumaun University, Nainital Mobile Number: 8193986543, E mail: inderrautela333@gmail.com

Abstract

Present study was carried out in Van Panchayat forests of Bageswar district of Uttarakhand. Van Panchayat forests play a vital role in the socio-economic development as they provide basic needs of village people in the hill region. Apart from this, van panchayat forests also play a significant role in climate change mitigation by sequestration and storage of carbon as a carbon sink. The present situation of changing climate and livelihood issues has become a critical for investigation particularly in hills where livelihood security is directly affected by human activities, climatic and basic social factors as they are all interconnected. Therefore, this study is an effort to explore the impact on climate change, land use practices and anthropogenic pressure on sustainable livelihood and natural resources. According to the findings, soil erosion is more likely in areas where the plantation was sparse and runoff was considerable. According to community perceptions, climate change is responsible for the diminished snowfall and water availability in the region. Water shortage has already started to affect people adversely. The majority of people in the area believe that there is a change in the timing of plant blossoming and fruiting. A decline in agricultural field productivity has also been recorded. In addition, the region has seen an increase in insect infestations and animal invasions. As a result, the communities are forced to adapt various changes to their traditional life support activities due to changing climatic conditions. Changing in the cropping patterns, uses of cash







crops instead of traditional crops, uses of chemical fertilizer were the main adaption resulted by climate change. To make things practical and acceptable to the people, they must be investigated, recorded, explored, and improved with suitable inputs from institutional science and technology.

Keywords: Van panchayat forest, climate change, livelihood security, socio-economic

Bryodiversity composition of *Cedrus deodara* (Roxb. ex D.Don) G.Don Forest Floor at Lohaghat, (Champawat), Uttarakhand

Manisha Bhandari*, S.D.Tewari and Prachi Joshi

Department of Botany, I.P.G.P.G.G.College of Commerce Haldwani, Nainital *Presenting Author: Manisha Bhandari

Email: bmannu4@gmail.com; Mob: 7454885727

Abstract

Bryophytes (both liverworts and mosses) are the main component of Himalayan forest floor vegetation. These fascinating and largely unnoticed plants provide essential ecosystem services such as nutrient cycling, water regulation, and seedbed formation. The forest floor provides diverse habitats and microhabitats for the growth and spread of bryophytes species and communities. Unfortunately, the forest floor bryophytic layer has never been explored in terms of its bryodiversity richness. In the present study, the C. deodara forest floor (pH 4.20-4.74) at lohaghat is taken into consideration to explore its bryodiversity potential. In all, 102 bryotaxa, belonging to 34 families were recorded to be flourishing from diverse habitats offered by the understory of the deodar forest. Out of which, 31 liverworts, 1 hornwort, and 70 mosses were documented. Amongst liverworts, Leafy liverworts were the dominant component followed by thalloid, whereas pleurocarps were recognized as dominant over acrocarps in mosses. Members of the families Aytoniaceae in thalloid, Frullaniaceae in leafy liverworts, Pottiaceae in acrocarps, and Brachytheciaceae in pleurocarps mosses were turned out to be the dominant. Interestingly, 19 bryotaxa were identified as gemmiferous. The forest floor bryodiversity was found to be rich in comparison to the bryophytic epiphytes of Cedrus phorophytes. The loss of the bryophytic components in a







forest ecosystem may negatively influence ecosystem services. The depletion of the forest floor bryophytic layer will indicate rapidly changing environmental conditions.

Keywords: Bryodiversity, Cedrus, forest floor, liverworts, mosses

Bioactivity of a Leafy Liverwort Heteroscyphus hyalinus (Stephani) A. Srivast. & S.C. Srivast. Againsta Common Wheat Pest Sitophilus granarius Linn.

Neha Binwal*, Prachi Joshi, S.D. Tewari, Saraswati Bisht

Department of Botany, I.P.G.G.PG. College of Commerce, Haldwani- 263139, India *Email: nehabinwal171@gmail.com

Abstract

Bryophytesare the potentially bioactive plants, representing the second largest group in the plant kingdomthat remained unexplored concerning their bio-activity. Many researchers are involvedinscreening and isolating the bioactive compounds from bryophytes possessingantimicrobial and insecticidal activity. The frequent use of chemical insecticides causessoil pollution and insects are becoming resistant to them. Therefore, the present study aims to monitor the eco-friendly insecticidal property of potential Himalayan bryophytestoreduce the excessive use of chemical insecticides. In the present study, in all 10 bryophytes (both liverworts and mosses) were screened and tested against the wheat pest viz., Sitophilus granarius(wheat weevil) of the family Curculionidae. Out of which, leafy liverwort viz., Heteroscyphushyalinusbelonging to the family lophocoleaceaewas found to be effective against S. granarius. Ethanolic extract of leafy liverwort H. hyalinus was evaluated against S.granariusby two methods," Area Preference Method" and the "No Choice Bioassay (NCB) with some modifications" in three replicates. Theresponse of *H. hyalinus*extract was found to be effective against insectrepellent and mortality. This is the first report on the bioactivity of *H. hyalinus*againstwheat weevil which may be beneficial to serve as a guideline for developing effective measures to control S.granariusattack.

Keywords: Bryophytes, Leafy liverwort, Insecticidal activity






Abnormal Leaf Structures in Some Himalayan Mosses- An Observation

Neha Kohli, S. D. Tewari, Sapana Pant, Prachi Joshi

Bryophytes are the green group of non-vascular, cryptogams. In mosses usually, leaves are the key diagnostic tool (shape, size, costa and internalcellular organization) for their identification. While analyzing bryophyte collections gathered for taxonomic studiesfrom varied habitat and localitiesin Kumaun and Garhwal region of Uttarakhand, Western Himalayas, we noticed someunique, unusual, morpho-structural and internal cellular aberrations in some moss leaves. In all, nine species of mosses belonging to seven different families were fortuitously observed to present abnormalities in their leaves. The anomalies noticed in these mosses interpreted as Chick embryo-like leaf, pseudo-dual tips of the leaf, irregularly splitted leaf tip, disproponate distichous leaf, cordate leaf, misdirected costa of the leaf, commingled bifurcating abnormal leaf and spider web like arrangement of leaf cells. The present paper elucidates the teratology of deformed moss leaf structures is being reported for the first time. Although, theactual cause of these foliar abnormalities in mosses is uncertain however, changes in regional physicochemical substrate conditions, as well as rapid climate change could be a responsible factor. These preliminary findings will serve as a stepping stone for greater research in the future.

Keywords- Anomalous, Bryophyte, Morpho-structural, Moss Leaves, Western Himalayas.

Social Impact of Climate Change in Hills of Uttarakhand.

Nirmala Pargaien

Department of Botany, M.B.G.P.G. College, Haldwani Mobile – 9412905304, email – n.pargaien@gmail.com

Abstract

The hilly areas of Uttarakhand are highly prone devastating effects of climate change. The areas at higher elevation are having greater warming. Seventy percent







of agriculture in these areas is rainfall dependent. This has lead to disrupting in farming activities. There is a constant fall in agriculture and horticulture. The rainfall pattern also has been erratic in past decades with both periods of excessive floods and drought in most of districts. The groundwater levels are going down all over the area. The foods are disrupting the critical infrastructure in hills; like roads, bridges, and irrigation and drinking water systems.

This all is leading to migration from hills, leading to ghost villages, abandoned houses. Also in the populated villages, almost all the men have migrated to cities. This is leading to neglect of women, children and elderly in these villages. The social fabric is irreparably torn in many villages.

Another effect is reverse migration of rich to hills, due to high pollution and traffic in cities. The affluent colonizers are misappropriating scant natural resources like water thereby destroying the local communities and the local way of life.

Keywords: - Uttarakhand, Climate change, migration, reverse migration.

The Impact of Forest Fire on Flora and Fauna and physio-Chemical Property of Soil of Lamgara Block, Almora Uttarakhand

Pankaj Arya^{*}, Deepak Kumar, Bharti and Renu

Department of Botany, L.S.M.G.PG. College, Pithoragarh (262502), Uttarakhand (Email-parya246@gmail.com)

Abstract

The present study was conduct to document the effects of forest fire on vegetation of Lamgara Block, Almora Uttarakhand. Fire is one of the most destructive threats faced by the forests of Uttarakhand. Thefire season starts in March/April continues up to June. The main reason of forest fire in Uttarakhand is Chir Pine(*Pinusroxburghii*). In Uttarakhand, Chir Pine (*Pinusroxburghii*) forests spread over appx. 16% of total forest area (between 1000 and 1800 m asl) are particularly prone to forest fire (FF) due to resin-rich leaf litter accumulation on the forest floor during summer. Wildfires not only destroy flora (trees, herbs, grassland, forbs, and so on) and their diversity, but they also have a significant long-term harmful influence on fauna, especially wild endangered species.Fire







can alsoinfluence a physico-chemical property of soil including texture, color, bulk density, pH, porosity, organic matter, nutrientavailability and soil biota.Drought, disease, insect infestation, overgrazing or a combination of these factors mayincrease the impact of fire on an individual plant species or communities. Common effects include plant mortality, increase flowering, seed production and numerous communal affects. Fire affected area showed reduction in speciesdiversity both in flora and fauna.People of ruler areas of Uttarakhand are dependent on forests for fuel wood, grass and other biomass.Fire has a direct impact on people, property, and infrastructure in a social environment, affecting individual and community health and livelihood.

Keywords- forest fire, Chir Pine (*Pinusroxburghii*), resin-rich, flora, fauna, physicochemical property

Epiphytic Bryophytes of Aesculus indica (Wall.ex Cambess.) Hook. of Pindari Catchment Area, Central Himalaya

Prachi Joshi, S.D. Tewari & Neha Binwal

Department of Botany, I.P.G.G.PG. College of Commerce, Haldwani-263139, India

*Email: prachi.pragya21@gmail.com

Abstract

Bryophytes are found at the interface of air and substrate, where climatic conditions can be drastically different. Bryophytes form a specialized population of epiphytes at tree bases. Barks of standing trees provide a suitable substratum for the growth of various epiphytes. Tree bases represent the shadiest habitat coupled with the highest degree of humidityand offer a wide variety of microhabitats for bryophytes. In the present study, the bark of *Aesculus indica* commonly called horse chestnut was selected to reveal its species composition at thevillage Khati located at Pindari Glacier track at an elevation of 2300m. The bark of *A. indica* was sparse, leaving bare areas in various places. Species diversity of epiphytic bryophytes was determined by placing 12 quadrats each of 5x5 cm size on four aspects. Overall, fourteen species of bryophytes were present, out of which eleven were pleurocarpous mosses, one acrocarpous, and the remaining one was leafy liverwort. Low species richness may be due to the low moisture content of bark, low water holding capacity, and acidic nature of the bark (6.49-6.58).

Keywords: Bryophytes, Epiphytes, Species composition







Effect of Climate Change on Diversity of Aquatic Hyphomycetes

Pratibha Arya

Assistant Professor, Department of Botany, Government Degree College Talwari, Tharali-246482, Chamoli, Uttarakhand. E-Mail: pratibha82arya@gmail.com

Abstract

Aquatic Hyphomycetes also known as fresh water Hyphomycetes, Amphibious Fungi or Ingoldian Fungi are the dominant colonizers of allochthonous organic materials (leaves, needles, twigs and branches of terrestrial plants). They are characterized by tetraradiate or sigmoid spores. Among all the fungi which colonize the submerged leaves, Aquatic Hyphomycetes are known to be the most active group. They increase the nutritive value of leaves and the detritivores prefer such colonized leaves. They also macerate leaf tissues with pectinolytic enzymes and facilitate release of fine particulate organic matter which is an important food resource for aquatic invertebrates. Diversity of aquatic Hyphomycetes is highest in non-polluted, relatively cool, well aerated streams running through deciduous forest.

It is well known that climate change has been affecting the ecology of living organism. The changes in climate are expected to have an impact on fungal biodiversity. Climate change effects in the community composition, growth, reproduction and decomposing activity of Aquatic Hyphomycetes. Low concentration of oxygen and high concentration of metals, nitrate and sulphate reduced the diversity of Aquatic Hyphomycetes. Temperature appears to be an important factor affecting the occurrence, distribution and metabolism of the Aquatic Hyphomycetes.

Keywords: Aquatic Hyphomycetes, Diversity, Climate change.







Ecotonal Bryodiversity of Sal-Pine Forest in District Nainital, Uttarakhand

Richa Arya, S. D. Tewari and Prachi Joshi

Department of Botany, I.P.G.PG.G. College of Commerce, Halwani, Nainital

Abstract

The present exploratory study is aim to document the existing bryo-vegetation of ecotonal zone (800-1200m) of Shorea robusta Gaertn. (Sal) and Pinus roxburghii Sarg. (Pine) forests met within an altitudinal gradient from foothill Kathgodam (500m) to higher elevation (Baldiakhan- 1700m) in district Nainital. The ecotonal zone present between these two dominating major forest types has a rich biodiversity with the dominance of vascular flora. However, the bryophytes of the ecotonal zone have not been explored earlier. The present bryoexploratory survey indicates that the bryophyte richness and abundance were found meager in pine forests than that in the Sal forest. Interestingly, in the intermingled ecotonal zone the high bryodiversity was observed. In all, 57 bryophyte species including **39** mosses, **17** liverworts and **2** hornworts were documented. Out of which a leafy liverwort Heteroscyphus hyalinus (Stephani) S.C. Srivast. & A. Sriavst. and a moss species **Aulacopilum glaucum** Wilson turned out to be a new addition to Kumaun Himalayan bryoflora. It was also noteworthy, that the ecotonal zone was found to support the growth of Thuidium sparsifolium (Mitt.) A. Jaeger of Sal forest and **Brothera leana** (Sull.) Mull. Hal. of Pine forest. Interestingly, these species were not found extending beyond the transitional zone to their respective forest habitats which indicate their restricted distribution. Deforestation, urbanization, and cementation are accelerating the phenomenon of climate change. Consequently, the existing bryo-vegetation of different forest types is also reducing.

Keywords: Bryodiversity; Ecotone; Sal-Pine Forest







Antagonistic Activity of Aquatic Hypomycetes Against Some Plant Pathogenic Fungi

Ruchi Jalal *; Saraswati Bisht; Saima Altaf

Department of Botany, I.P.G.G.P.G. College of Commerce, Haldwani- 263139, India *Email: ruchijalal13@gmail.com

Abstract

Aquatic hyphomycetes the member of Fungi Imperfecti are the major microbial element in aquatic ecosystems occurring as active colonizer of submerged decaying leaf litter. These fungi are recognized to possess secondary metabolites which may lead to the discovery of new bioactive products of medicinal and agricultural importance. Initially, in 1999, Gulis and Stephanovich reported antibiotic effects of 29 species of aquatic hyphomycetes and some of these fungi were also reported to have antifungal properties. 'Anguillosporal' and 'Quinaphthin' are the antimicrobial compounds obtained from Anguillospora longissimaand Helicon richonisrespectively. In the present study, antagonistic activity of two potential aquatic hyphomycetes viz., Cylindrocarpon aquaticumand Beltrania rhombicawere tested against three plant pathogenic fungi viz., Fusarium oxysporum, F. solaniand Rhizoctonia solaniusing dual culture technique method. C. aquaticum showed antifungal activity against all the three pathogenic fungi while *B. rhombicashowed* positive effects only against F. oxysporum. The present results stipulate the bioactivepotential of aquatic fungi, which can be used as an alternative source of biocontrol agents against plant pathogens.

Keywords: Antagonistic, Aquatic Hyphomycetes, Dual culture technique, Biocontrol agents.







Long- Lost, Red Listed Indian Liverwort Sewardiellatuberifera Kashyap-Recollected from Mukteshwar Region of District Nainital, Western Himalayas

Sapana Pant, S.D. Tewari, Prachi Joshi & Manisha Bhandari

Department of Botany, Indira Priyadarshini Govt. Girls Post Graduate College of Commerce Haldwani, Nainital

Abstract

Bryophytes are surface-dwelling, rootless plants that contribute significantly to the Himalayan vegetation, even minor changes in environmental conditions can have an effect on them. Many bryophytic species are becoming increasingly rarer due to changing climatic conditions. During the course of bryo-exploratory survey, we came across an extremely rare, long lost, red listed, monotypic endemic, Indian liverwort SewardiellatuberiferaKashyap recollected after a lap of over three and half decades from an altogether new location Mukteshwar region (2171 m) of Nainital district in Kumaun Himalayas, Uttarakhand. The remarkable finding of this monotypic, endemic Himalayan liverwort is the most significant information for bryological wealth of the world. Scattered, scanty, sporiferous population of S. tuberiferawere found to be growing on shady, moist, lime stone dominated South -West facing, slopy site in association with other thalloid liverworts and mosses. The presently located site of this hepatic is under the constant pressure of several developmental activities including the mounting pressure of ecotourism. Over these years the plant has totally vanished from its original localities due to disturbed habitat and climatic conditions. Hence serious conservation steps are needed to protect this spot for future aspects.

Keywords: Monotypic; Endemic; Rare Hepatic; Red list; Conservation







Herbal Gardens for Conservation of Medicinal Plants of the Himalayan region

Uma Pandey Padalia^a and Madhulika Pathak^b

Assistant Professor, Government Degree College, Kanda, District-Bageshwar Principal, Government Degree College, Kanda, District-Bageshwar

Abstract

Uttarakhand state is known for its vast forest cover with huge variation in species of medicinal and aromatic plants. These plants are used in traditional local medicines, food, flavors and in local cuisines and variety of other uses worldwide. Various medicinal and aromatic plants are collected from forest and few of them from cultivation are part of trade and source of income to the farmers and local peoples. Climate change with changing weather patterns, industrialization, deforestation, illegal collection of these plants have a huge impact on the population and distribution of the medicinal and aromatic plants. Establishment of herbal garden at college premises, institutions can play an important role in the conservation of medicinal and aromatic plants. Moreover, the herbal gardens help in creating awareness, popularizing the utility of commonly available and frequently used medicinal plants among the people, students, visitors etc. Herbal gardens also offer a great opportunity for improving the guality of education and for learning basic life skills towards our bio resources. With this concept, an herbal garden was developed at Government Degree College, Kanda under 'CM Innovation Scheme' for conservation as well as commercial and entrepreneurship development in students and local farmers for medicinal and aromatic plants. Various economically useful plants viz. oregano, lavender, peppermint, lemon balm, rosemary, lemongrass, citronella, artemisia, rose, alovera, pyrethrum, stevia, chamomile, thyme, sweet marjoram, bael, bahad, harad, awanla etc. are maintained and grown in the established herbal garden for their conservation, creating awareness and for education purpose. In future, the chemo and bio prospection of these medicinal and aromatic plants will be done for various herbal formulations.







Signifinance of Agrobiodiversity of Agroforestry System on Livelihood and Climate Change Mitigation in Tarai Region of Kumaun Himalaya.

Vasundhra Lodhiyal¹, L. M. Tewari¹ and A. Tewari²

¹Department of Botany, D.S.B. Campus, Kumaun University, Nainital, Uttarakhand, India ²Department of Forestry and Environmental Science, D.S.B. Campus, Kumaun University Nainital, Uttarakhand, India.

Mobile No. 9410373658, Email address: vasundhralodhiyal@gmail.com

Abstract

Agrobiodiversity plays a major role in the sustainable development of resources by providing diverse farm products to rural communities. Agroforestry systems are highly diverse and variable as compared to sole cropping systems and considered profitable. Due to ever-growing human population and infrastructure development the need for high and diverse yield systems can be felt globally. Present study was focused on Tarai region of Uttarakhand with particular reference to incomeand climate change mitigation. The present work was carried out onforest tree-based agrisilviculturesystem practiced by farmers. The data collection, identification and use of plant species were determined by using scientific and PRA methods. The existing practices of intercropping were assessed. In the study site, farmers have grown several forest tree species like poplar, eucalypt and teak in their own land for commercial and domestic use. Under the trees, farm crops cultivated are wheat, sugarcane, paddy, mustard, vegetablesand fodder grasses. Based on the study, agrobiodiversity in an agroforestry system providesavariety ofplant produce to the farmers and a greater level of carbon sequestration. Thus, on the basis of findings it can be concluded that an agroforestry system provides a higher yield with much more diversity of crops and is an economically beneficial practice. A tiered agroforestry system helps improvemicroclimate and mitigateeffects of climate change. Agroforestry practices must be promoted for conservation of resources, socio-economic development and climate change mitigation.

Keywords: Agrobiodiversity, agroforestry system, income, climate change mitigation







Importance of Native Biodiversity of Honey Bees in Buffering the Impacts of Climate Change

Sharmishtha

Department of Zoology, SSJ University Campus Almora Email: mehra.sharmishtha@gmail.com

Abstract

Pollination is one of the most important mechanisms in maintaining and promoting biodiversity and life in general on Earth. Pollination also benefits by increasing food security and improving livelihoods. In most ecosystems, bees are the major animal pollinators, and the European honey bee (Apis mellifera L.), in addition to providing vital pollination ecosystem services, is also regarded more productive than others. Climate change is a major threat to honey bees on many levels, including severe weather events (e.g., high temperatures in the winter and summer, decreased rainfall, drought, and heavy water floods), which have a significant impact on honey bee behavior and physiology. Plant and pollinator seasonal phenologies have also shifted due to it. Therefore, pollination services provided by the managed honey bee are expected to decline under climate warming but the opposite is seen in the pollination services provided by most native and wild taxa. This is because differential responses to climate warming by diverse taxa will be enhanced by having a diverse assemblage of species providing the pollination service. As a result, native biodiversity plays an important role in mitigating the effects of climate change, as they are better adapted to severe and varied environments and can cope with future environmental changes. Apis cerana, a native species that provides priceless pollination services to both cultivated and wild landscapes, natural resistance to Varroa and other pests, ease of maintenance, adaptability to local conditions, and well adapted for local breeding and productivity, is thus a preferable species over Apis mellifera for better adaptation to climate change and new pathogens. The purpose of this paper is to discuss how native biodiversity can stabilize ecosystem services against environmental change. The relevance of native species conservation through programmes will necessitate significant commitment and financial assistance.

Keywords: Native, Biodiversity, *Apis cerana, Apis mellifera*, Pollination, Climate change







Prey Preference of the Aphidophagous Ladybird, Coccinella transversalis on Two Aphid Species (Coccinellidae: Coleoptera)

Mamtesh Kumari and Noorin Saifi

Biocontrol laboratory, Department of Zoology, R.H.G.P.G College, Kashipur, U.S.Nagar -244713, Uttarakhand, India.

*Author: noorinsaifi94@gmail.comPhone No.7906806993

Abstract

Various predators, parasitoids and pathogens cause natural suppression of insect pests of different vegetable crops particularly eggplant, tomato, cabbage, cauliflower, chilli, potato, lady's finger etc. Vegetables rank next to cereals and occupy a very important place in human diet and serve as supplementary source of nutrients like carbohydrates, proteins, vitamins, minerals and energy for all.Pest control by using pesticides causes damage to the natural suppression of the pests by killing parasites and predators. The control of these pests by using biocontrol agents is eco-friendly safer to the environment. Amongst the potential bioagents, Coccinellids, popularly known as ladybird beetle, are one of the most successful group of insects. Thus exploiting them as predators or bioagents is one of the ways to generate eco-friendly, cost effective and self-sustaining approach in suppressing pest populations. Coccinella transversaliscommonly known as the transverse ladybird, is an aphidophagous ladybird of oriental region, native to India. Our aim in the present study is to observe the prey preference of the aphidophagous ladybird using eggs, first instar and second instar. Both the male and female adults of beetle prefer to consume A. gossypii in cafeteria setup. However, when provided with aphids separately, the adults showed no significant difference in aphid consumption. The information obtained from the present study will be helpful in summarizing that dietary selection in beetle depends largely on the aphids host combination.







Physico-chemical Characteristics of River Kosi in Districts Nainital and Udham Singh Nagar (Uttarakhand)

Ravi Kumar* and Pramod Kumar

Department of Zoology, Radhey Hari Govt. P.G College, Kashipur, U.S. Nagar – 244713 (Uttarakhand), India; Email: ravigola76@gmail.com *Corresponding and Presenting Author

Abstract

The Present study deals with the assessment of physico-chemical parameters of river kosi in district Nainital and Udham Singh Nagar Uttarakhand, on seasonal basis for one year (2020-21) at four sampling sites. During the study physicochemical parameters were monitored with the help of standard methods of APHA (1995) and Trivedi and Goel (1986). Some selected parameters for water quality assessment are pH, dissolved oxygen(DO), free CO₂, chlorides, total alkalinity, temperature, total dissolved solids, total suspended solids, total solids, velocity, transparency and temperature were analyzed.

Keyword:- water quality, kosi river ,physico-chemical parameters.

Ovipositional Behaviour of an Aphidophagous Ladybird Beetle, Menochilus sexmaculatus (Fabricius) in Terms of geoand Phototaxis.

Mamtesh Kumari and Deepa Arya

Biocontrol laboratory, Department of Zoology, Radhey Hari Govt. P.G. College, Kashipur, Udham Singh Nagar -244713, Uttarakhand, India. *Author: deepa262402@gmail.com Phn No. 9758456594

Abstract

Present scenario of Indian agriculture, most of the economically important agricultural crops are severely attacked by several insects, that cause heavy damage to the crop plants. Amongst them, Aphids (Hemiptera: Aphididae) are the most notorious and severe pests. Amongst the potential bioagents, coccinellids,

48







popularly known as ladybird beetles (Coleoptera: Coccinellidae), are one of the most successful group of insects. Thus exploiting them as predators or bioagents is one of the ways to generate 'eco friendly, cost effective and self sustaining approach in suppressing pest populations'. Menochilus sexmaculatus is an important ladybird for the biocontrol of aphids. Our aims in the present study were to observe the ovipositional behaviour of aphidophagous ladybird, Menochilus sexmaculatus, for geo- and photo-taxis, (individually as well as in combinations), The beetle exhibited a high preference for negatively geotactic substrates for oviposition. There was no clear preference for positively or negatively phototactic substrates. When studied in combination, it was observed that substrates that were negatively geotactic were preferred over other substrates regardless of the phototaxis. Hence, selection of negatively geotactic substrata for egg laying may possibly help in decreasing the predation risk to eggs and grants a shaded and humid microclimate to newly hatched larvae. The information obtained from the present study will be helpful in improving the methods for the massmultiplication of these ladybirds, and aid successful biocontrol of aphid pests.

Effect of Environmental Changes on Species Richness and Butterfly Diversity in Bhimtal and Ramnagar Region of District Nainital Uttarakhand

Reeta joshi and Promod joshi

Department of zoology, R.H.G.P.G College Kashipur U.S Nagar, Uttarakhand, India. E-mail: promodjoshi4@gmail.com, ritujoshi502@gmail.com

Abstract

Taking the increasing anthropogenic pressure and its drastic outcomes on the distribution of vegetation and fearful environmental changes into the consideration following study was done to observe the effect of environmental changes on butterfly diversity on Ramnagar and Bhimtal region in Nainital district Uttarakhand. A total number of 636 individuals comprise on both site of observation which are belonging to 3 families of butterfly. Butterfly population was found to be correlated with the human population as well as with the distribution of vegetation. Maximum number of butterfly was recorded in Bhimtal







lake side and near butterfly museum and village area, due to low pollution level and high elevation and least number of butterfly was observed in town area of study site due to high pollution and temperature.

Basking Behavior of Butterflies Across Elevations of Champawat in the Western Himalaya

Aman Verma¹ and Mahipal Singh Kutiyal²

¹Assistant Professor (Zoology), Government Post Graduate College, Berinag – 262531 (Pithoragarh), Soban Singh Jeena University, Almora, Uttarakhand Email ID: amanzoology187@gmail.com ²Assistant Professor (History), Government Post Graduate College, Berinag – 262531 (Pithoragarh), Soban Singh Jeena University, Almora, Uttarakhand

Email ID: mahipalkutiyal@gmail.com

Abstract

Basking is the specialized mechanism of behavioral thermoregulation in which butterflies principally by orienting their body and wings in a particular position attain a relatively elevated temperature in their thoracic musculature, necessary for efficient and autonomous flight to occur. This process of body thermoregulation is achieved by different behavioral strategies such as selection of perching microhabitat and subtle changes in body orientation and wing posture relative to the sun. In the present study, behavioral thermoregulatory strategies of butterflies were explored across elevations ranging between 250 m to 2450 m in Champawat District of Uttarakhand, Western Himalaya. The highest number of species that performed basking were recorded from the Nymphalidae (48 species), followed by Hesperiidae (17 species), Lycaenidae (15 species), Pieridae (9 species), Papilionidae and Riodinidae (3 species each). Butterflies were observed perching on the foliage, rocks, pebbles, gunny bags, stick, log or trunk of the tress, metalled or unmetalled roads. The reflectance form of basking posture was the most frequently observed thermoregulatory position, followed by lateral basking, dorsal basking and appression form of basking. Such information on climatic adaptations is crucial for butterfly conservation across elevations sensitive to global climate change in the Himalaya.

Keywords: Basking, Behavior, Climate change, Himalaya, Thermoregulation







Species Composition and Diversity of Sal and Shisham Dominated Forest in Central Himalaya

Falak Siddiqui* and L.S. Lodhiyal

Department of Forestry and Environmental Science, S.B. Campus, Kumaun University, Nainital- 263001, Uttarakhand, India Mob.no.-6395577895, E-mail falak0806@gmail.com

Abstract

Forest ecosystem embodied diverse vegetation distributed widely in Himalayas. Pattern and relationships between species diversity and ecosystem functioning are current areas of ecological interest throughout the world. Present study aims to assess phytosociological analysis using quadrat method in sal and shisham dominated forests of sharda range, Haldwani forest division of central Himalaya, Uttarakhand. Among the fifteen tree species, total density of trees and seedlings varied between 290-690 ind.ha⁻¹, and 270-870 ind.ha⁻¹ while saplings showed 560-740 ind.ha⁻¹ in sal dominated forest. Among the ten tree species, total density of trees and seedlings varied between 250-350 ind.ha⁻¹ and 250-740 ind.ha⁻¹ while saplings showed 300-510 ind.ha⁻¹ in shisham dominated forest.Density of shrubs and herbs varied between 720-960 ind.ha⁻¹ and 14.83-53.43 ind.ha⁻¹ respectively in sal dominated forest. Density of shrubs and herbs varied between 1040-1560 ind.ha⁻¹ and 83.93-148.37 ind.ha⁻¹ respectively.Tree species diversity was 1.07-2.11 and 0.87-1.37 in sal and shisham dominated forest. Sal dominated forest showed greater variation in species composition as compared to shisham dominated forest. Biotic pressure and variation in climate causes disturbance in the forest.

Keywords: Shorea robusta; Dalbergia sissoo; density; species diversity; biotic pressure.







Role of Van Panchayat Forests in Climate Change and Livelihood Development in Bageswar District of Uttarakhand

Inder Rautela and L.S. Lodhiyal

Department of Forestry and Environmental Science, D.S.B. Campus, Kumaun University, Nainital Mobile Number: 8193986543, E mail: inderrautela333@gmail.com

Abstract

Present study was carried out in Van Panchayat forests of Bageswar district of Uttarakhand. Van Panchayat forests play a vital role in the socio-economic development as they provide basic needs of village people in the hill region. Apart from this, van panchayat forests also play a significant role in climate change mitigation by sequestration and storage of carbon as a carbon sink. The present situation of changing climate and livelihood issues has become a critical for investigation particularly in hills where livelihood security is directly affected by human activities, climatic and basic social factors as they are all interconnected. Therefore, this study is an effort to explore the impact on climate change, land use practices and anthropogenic pressure on sustainable livelihood and natural resources. According to the findings, soil erosion is more likely in areas where the plantation was sparse and runoff was considerable. According to community perceptions, climate change is responsible for the diminished snowfall and water availability in the region. Water shortage has already started to affect people adversely. The majority of people in the area believe that there is a change in the timing of plant blossoming and fruiting. A decline in agricultural field productivity has also been recorded. In addition, the region has seen an increase in insect infestations and animal invasions. As a result, the communities are forced to adapt various changes to their traditional life support activities due to changing climatic conditions. Changing in the cropping patterns, uses of cash crops instead of traditional crops, uses of chemical fertilizer were the main adaption resulted by climate change. To make things practical and acceptable to the people, they must be investigated, recorded, explored, and improved with suitable inputs from institutional science and technology.

Keywords: Van panchayat forest, climate change, livelihood security, socioeconomic

52







Impact of Climate Change on Wetlands

Nivedita Sijwali

K.P.S. Dwarahat, Almora

We all know that after the Big Bang, the earth came in existence and gradually, unicellular and then multicellular organisms evolved. Whenever we observe various organisms around us in different terrains like - rivers, lakes, forests, mountains, etc - we get so mesmerized. So, what if the terrestrial and aquatic biodiversities meet at one place? That place is known as a Wetland, which is a biodiversity hotspot. Now, the matter of concern is when humans are facing so much crises due to the Climate Change, then how adversely will the Climate Change be threatening the Wetlands?

Green Chemistry

Pranjal Rawat

Shivaji cCollege, DU Contact no-7037362678, Email id- rawat23pranjal@gmail.com

Green Chemistry is a tool for the sustainable development of the chemical industry. It is an approach to the design, manufacture and use of chemical products to reduce or eliminate chemical hazards. It focuses on the reduction, recycling and elimination of the use of toxic and hazardous chemicals in production processes by finding creative alternative routes for making the desired products that minimize the impact on environment and human health. It is one of the most explored topic these days .The three main developments in green chemistry include the use of super critical carbon dioxide ,water as green solvent , aqueous hydrogen peroxide as an oxidizing agent and use of hydrogen in assymetric synthesis. The negative impact of chemicals on environment can be reduced by implementing the 12 principles of Green Chemistry wherever possible like waste prevention,less hazardous chemical synthesis,designing safer chemicals ,safer solvents and auxiliaries etc.Together such fundamental innovations in chemical sciences will lead us to a new generation of chemical synthesis.







Health Risk Assessment of Heavy Metals in the Lakes and other Drinking Water Sources of Nainital Distict, Kumaun Lesser Himalaya, India

Nirmit Sah*1and Rajeev Upadhyay1

¹Department of Geology, Centre of Advanced Study, D.S.B Campus, Kumaun University, Nainital Corresponding Author: nirmitsah@kunainital.ac.in , Telephone num: 7409119189

Abstract

Himalayan lakes are the naturalsource of drinking water for millions of people. Heavy metals are released in lakes either through anthropogenic activities or are leached from the surrounding rocks. Heavy metal pollutants in drinking water have raised serious concerns due to their high toxicity and carcinogenic properties. Thepresent study was conducted in Nainital, Kumaun Lesser Himalaya, India to i) determine the concentration of heavy metals (Lead, Chromium, Cadmium, Molybdenum, Zinc, Copper, Barium, and Nickel) in the lakes and springs of Nainital district and ii) estimate the health risk of carcinogenic and non-carcinogenic heavy metals in adults and children. An orderly arrangement of toxic heavy metals in the study area wasBa>Pb>Zn>Ni>Cu>Cd>Cr>Mo.Contaminationwas more pronounced through ingestion as compared to dermal absorption. The health index calculated for the study area was less than 1 indicating the study area is in the safe zone.

Keywords: lakes, springs, contamination, carcinogenic, non-carcinogenic

Solar activity: A possible cause for Modulation in Ionosphere

Suman Garia

Department of Physics, Government Post Graduate College, Dwarahat, Almora E-mail: sumangariakg@gmail.com:

Abstract

Sun is the primary source of climate on the earth. Solar activities can considerably change the earth's atmosphere and lead to climate change. The







ionosphere is formed by the ionizing effect of solar X-ray and Ultraviolet (Solar XUV). Solar activities (CME, Solar flare, Solar Proton events) modulate Interplanetary Magnetic Fields (IMFs). This modulated IMFs reconnect with earth's magnetic field. The energetic plasma is injected into the earth's upper atmosphere during this process. Thus various physical and chemical processes get affected in the ionosphere, which further modulate the structure of the ionosphere.

In the present study, we take the intensity of solar XUV, CME occurrence and solar proton events as solar activity index and lonosphere Total Electron Content (TEC) as ionosphere index. We do a comparative study between solar activity index and ionosphere index to find the association between solar activity and modulation in the ionosphere structure. This study helps us to understand the ionosphere climatology, which further provides insight into the ionosphere weather problem.

Keywords: Solar XUV, CME, Solar Proton Events, TEC and IMFs

Potential Spectroscopic Probe to Find the Non-Biological Water Contaminants.

Neetu Pandey

Government Degree college, Talwari, Chamoli, Uttarakhand

Abstract

We can't imagine our life without water. It is the basic necessities of life. Increasing population, have created lots of issues related to various environmental pollution and water pollution is one of them. Our waterways have becomes polluted almost beyond redemption. The major cause for this is untreated household and industrial waste. To remedy this situation, we need efficient methods, tools, technique and novel approaches for detection and purification of contaminated water to ensure the safe health.

The present study proposes some potential fluorescence probe to detect the non –biological water contaminants such as heavymetals like Lead (Pb), Mercury (Hg), Nickle(Ni) etcwhich is found in water supply. The detection of different heavy metal in aqueous medium is done through steady state and time resolved fluorescence spectroscopic techniques.







Exceptional Optical Properties of Cspbbr3 Quantum Dots

Richa Gahlaut,^{a,b} Aparna Shinde,^bShailjaMahamuni^b

^aDepartment of Physics, Government Degree College, Chandrabadni (Naikhari), Tehri Garhwal. ^bDepartment of Physics, Savitribai Phule Pune University, Pune. Email: gahlaut.richa@gmail.com , Mobile: 9027005091

Abstract

Cesium lead bromide (CsPbBr₃) perovskite quantum dots are known to have extraordinary optical propertiessuch as extremely high photoluminescence (PL)quantum yield with narrow linewidth. Three different sizedCsPbBr₃ nanocrystals(5.5 nm, 7.3 nm and 10 nm) were synthesized by hot injection method. 5.5 nm sizedquantum dots exhibit nearly ~95% photoluminescence efficiency. Moreover, these small sized QDs are showing stimulated emission at low temperature (10K) which may bebeneficial in constructing QD laser. In addition, these QDs show highly polarized emission. These extraordinary PL properties of CsPbBr₃ make them the potential candidates for the optoelectronic devices. CsPbBr₃perovskite QDs are also used in making solar cells. Solar cells being the great alternative of clean energy and is the utmost need of the present time.

Keywords: Quantum Dots, PL Quantum yield, stimulated emission.

The Inherent Benefits of Carbon Farming in Present Scenario

Narendra Kumar Singh

Department Of Mathematics, GPGC Dwarahat, Almora

Abstract

Now, Agricultural experts and Environmentalists agree that the prudent way to fix our broken food system is Carbon Farming. With a population about 8 Billion at present, it is really very difficult to feed it thrice a day. As we go through the alarming reports of IPCC and UNFCCC, the situation seems terrific. So a serious discussion on the possible ways to survive is the need of hour.







In this paper, we are going to discuss various Pros & Cons of Carbon Farming. This is a comprehensive farming approach to optimize Carbon Capture on Agricultural Landscapes.

Keywords : Carbon Farming, Food System, IPCC, UNFCCC, Carbon Capture etc.

Urbanization as a Cause of Climate Change: A Theoretical Analysis

Upasna Sharma

S.S.M.M.U.S.S.S. Govt. P. G. College Dwarahat, Almora Uttarakhand 263653 Email- drupasna.eco@gmail.com

Urbanisation is an index of socio-economic progress. Infact any attempt towards the attainment of better standards of living must mean in economic terms, creation of new employment opportunities through a diversified economy with accent on non agriculture pursuits. We know some positive implications of urbanization includes the creation of employment generation, technological and infrastructural advancement, improved transport and communication system, quality education and medical facilities.

In present times, due to uncontrolled urbanization many problems have been occurring in so many ways, such as air pollution, noise pollution and water pollution. It can be said that climate change is a result of urbanization. Climate change has become a critical issue at the global platform. Climate change presents a unique risk to the livelihood of people. Over the past few decades, it has become increasingly parent that human actions are changing atmospheric conditions, thereby causing global climate change. Recognitions of climate change as a significant universal environmental challenges, has its origin in the adoption of the United Nations Framework Convention on Climate Change 9UNFCCC) in 1992. It's finding is based on human induced climate change caused due to rapid industrialization, burning fossils fuel and overuse of resources like forest and land. The newly formed climate change department has received its first budgetary allocation of Rs. 100 crore for 2010-11. Above mentioned aspects will be discussed in this paper.

Keywords- Urbanisation, Economic Progress, Climate Change, Atmosphere.







Impact of Climate Change on Bio Resources

Neema Pant

Department of Political Science, Govt Degree College Ramgarh, Nainital

Climate change and its impact on biological resources is a complex and frightening challenge faced by the world at the present time. A change in global or regional climate and long term shifts in temperature and weather pattern is called climate change. Climate change is a problem which occurs due to environmental pollution, the meaning of environment is the overall environment which Is given to man by nature. Air, water and fertile land all are necessary bio resources for living being but due to scientific and technical development and consequently rapid industrialization, urbanization and economic development all the purity/accuracy of environment is on the verge of extinction. After 19th century the temperature of earth increases about 3 to 6 degree Celsius, this climate change has happened so fast that from human to the whole plant world has not been able to live in harmony with it.99% of overall loss of bioresources due to climate change happened in low income countries like India. Due to climate change there are so many adverse impact on bio resources. The main problem due to climate change is decline in agricultural productivity. This is because of change in rainfall patterns, drought, flooding and the geographical redistribution of pests and diseases affect food quality. Projected increase in temperature, change in precipitation pattern, change in extreme weather events and reduction in water availability may all result in reduced agricultural productivity. As we know most of the people of India depends on agriculture directly or indirectly. For a developing economy as India along with these challenges achieving the goal of development is a very difficult task. We can prevent our resources by reduction in greenhouse gases. Strategies like green bonus to greenery rich states, green bank policy, use of traditional knowledge and resources, promotion of organic farming, public people partnership, resource conservation bases technologies can play an important role to save biological resources.







Assessment of Indigenous Method of Crop Protection and its Effectiveness Against Rhesus Macaques: A Study of Uttarakhand

Bhupender Oulakh^{1*}, Deepa Vinay²

 Department of Home Science, Govt. P.G. Degree College, Champawat, Uttarakhand (India)
Department of Family Resource Management, College of Homescience, GBPUAT, Pantnagar, U.S. Nagar Uttarakhand (India)

Mob no.: 8791690826, Email: bhupinder.aulakh117@gmail.com

Deforestation is one of the reasons of climate change and it has negative impact on food security and migration of the wild animals toward residential areas. Wild animals' damage to agricultural interests is a major facet of conflict because it incurs a severe economic loss and inconvenience to small farmers of hills. Rhesus macaques (Monkeys) are the only daytime agents of crop damage throughout the year. Therefore, the present study was designed to develop and assess the indigenous method for crop protection against the rhesus macaques at grass root level in hill region of Uttarakhand. The one-fifty households were randomly selected from different villages of Nainital and Almora districts and interviewed. It was reported by the farmers that Rhesus macaques at day time and wildboar at night are key problematic animals in hills. They destroyed the 50% crops which has been a matter of serious concern among farmers. They said thatthis was the major reason for leaving agricultural practices and migration of people from the hills. By keeping the severity of the problem, a monkey repellent solution was prepared from hatchery waste and sprayed around the crop. It was observed that this spray helps to keep away monkeys from the garden area because it has pungent smell. It was effective for more than ten days and it can be re-sprayed within ten days due to its cost effectiveness and easy availability. It is a good hatchery waste management also. Thus, it can be concluded that it is necessary to provide low-cost intervention especially to women farmers in order to sustain agriculture in hills.

Keywords: Crop protection, Deforestation, Rhesus macaque, Indigenous, Wildlife, Hatchery waste management







Eco-dystopia: a Long Shot or a Near Threat

Divankar Singh and Nazish Khan

Department of English, SSMMUSSS Govt. P.G. College Dwarahat

Abstract

Climate Change refers to long-term shifts in temperatures and weather patterns. These shifts may be natural, such as through variations in the solar cycle. Literature has its fair share in representing climate change and is inextricably linked to presenting a picture of the contemporary society. Dystopia means a diseased, faulty or unfavorable place and Eco dystopia is a variant of the dystopian novel. Eco dystopias are a consequence of eco disasters and the environment—whether forest, ocean, water generally, or the animal world—plays a key character. This research paper tries to draw parallels between a speculated Eco-dystopian community and the contemporary world in function by examining *Parable of the Sower* by Octavia Butler. It focuses on the literary portrayal of nature and ecosystem in this aforementioned text. An Eco-Dystopian perspective would help in bringing to the awareness what the future would be if contemporary ways of living, modernization, industrialization, and nuclearization proceed unchecked.

How To Minimise the Impact of Climate Change

Mamta Goswami

Research Scholar-History Department, S.S.M.M.U.S.S.S. Govt. P.G. College. Dwarahat. Almora

Climate change is a phenomena of shift in weather pattern ie unseasonal & erratic rain, longer and more intense drought, storm, heat waves etc. As a result leading to disrupting the usual balance of nature This poses risk to food security, availability of fresh wateretc which in turn can have cascading effects to mankind

There are some of the ways enumerated as under to minimize the impact of Climate Change:

 Speak Up -This is the simplest thing one can do "Talk to your family & friends" about the gravity of the matter.







- Reduce water wastage-Saving water reduces carbon pollution because it takes lotof energy to pump,heat & treat water
- Use energy efficient appliances- Uses of LED bulb can reduce the energy consumption to one-sixth. Same is with energy star levelled appliances. Turn off the lights when not in use
- Use public transport or use fuel efficient vehicle-Study suggest transport contributes around one-fourth of greenhouse gas emission. Turn off your engine if you are stopped for more than 10 seconds.
- Reduce reuse and recycle
- Hang-dry your clothes instead of using dryer
- Turn vegetarian and reduce food waste.
- Bring your own shopping bag-Plastic are incredibly destructive to the environment they contaminate soil and waterways. It takes around 1000 years to degrade.
- Plant a tree

Apocalyptic Visions in Works of Mary Shelley and Margaret Atwood

Nazish Khan and Pooja Arya

Abstract

In these last two hundred years, human progress has been at its zenith in evolutionary terms butsomewhere these progressive tendencies are depleting our natural habitat in equal proportionand creating an ecodystopian planet. All the artists, poets and writers have been warning us allalong of upcoming crises but we never respond and give an attentive ear to it. This paper analyses Mary Shelley's The Last Man and Margaret Atwood's The MaddAddamTrilogy in ecocritical terms. Their works can be taken as visionary and ingenious tales thatfabricate awareness of self-destructive tendencies of humankind. In brief these works criticallyexamines how the ravaging consequences of ecological damage lead to a terrible upheaval anddownturn.







Segregation – The Key to SWM – A Case of Jhadsa Village– Gurugram

Pradip Kumar Nath and Rimple Manchand

Department of Economics, G D Goenka University, School of Humanities and Social Science, Gurgram

Abstract

Segregation of Solid Waste at source is sine qua non to a sustainable solid waste management regime. The policy issues differ significantly between global north and global south. Though the development path followed by both are more or less the same, the policy implications and their ramification regarding the banes of development like solid waste creation and it's plausible and probable disposal has taken different trajectories in the post war period and sometime at loggerheads in the post globalized world order. The New Economic Policy followed vide the LPG perspectives has catalyzed the fear and concern expressed in the Rio earth Summit a quarter century before. One of the serious factors affecting the future of the earth is the indiscriminate littering of solid waste across the globe. Wastes are normally solid and generally the word is suggestive of the materials those are useless and unwanted. The models and priorities set for waste management by a technological society continues to be an engineering function which does not fit with the realities of developing and middle income category countries. Taking this into consideration the government of India envisioned the Solid Waste Management Rules, 2016 with a paradigm shift with removal of the word Municipal from the established uses of the word as Municipal Solid Waste (MSW) and fixing the responsibility upon the generator in the first place for a better solid waste management (SWM), which may result in a circular economy with reduce, reuse, recycle and repurpose as the basic ingredients of SWM. Taking this into cognizance, the present study is taken up to examine the efficacy of segregation behavior of the household in one of the localities in Gurugram i.e. Jhadsa village located in front of Medanta Hospital. The research paper is based on survey with questionnaire, Focus Group Dissuasion (FGD) and Participant Observation.

Keyword- Segregation, Solid Waste, Household, Postmodernism, Constructivism







Climate Change: Its Impact on Bio-resources of Himalayan Region

Rita Goswami and Anjum Ali

SSMMUSSS Government P.G. College Dwarahat

Abstract

Uttarakhand is Considered to be highly sensitive for climate related changes. Uttarakhand is agricultural state. Climate change is an important aspect that is likely to influence tourism, environment, weather and livelihooods of people. Monsoons and Temprature also affected the climate. Uttarakhand has two different climatic regions hily and plain region and blance is more important in this zone. The frequency and intensity of extreme weather, changes in forest soil, forest fires can damage climate and will make water more expensive, affect the cost of raw materials and production. The ecosystem of uttarakhand is very sensitive and that's affect the climate very easily the frequencey of landscape melting glaciers and harmful gas and people's livelihoods and communities. "Economic climate" usually reflects the state of the jobs market business and stock market and in uttarakhand.its reflects traditional business, tourism, natural herbs, historical heritage and historical places. "Social Climate" reflects relationship, personal growth and communication between environment and group of people. Balance between climate and economy of uttarakhand is more necessary because its related to global economy and communities of people who share and bring change about geographic boundaries. The important methos and solution about climate change is cutting carbon dioxide and other harmful gases because they are core of global warming. Climate change is most challenging problems that humanity and ecosystem and future health has ever faced. Educating girls, family planning, reduceing food and water waste, planting trees, protecting forest from fires, protecting natural soil and hurbes and calm the transport. These are some major keys of climate. Livelihood sources of uttarakhand largely dependent on agriculture and tourism, 80% area of uttarakhand is covered by forest and they divided into the Himalayas, The Shiwalik and Terai region. Economically and socially agriculture and forestry are main occupation of uttarakhand. The originality of uttarakhand's climate is monsoons and coldest temperature, during the monsoon season. There is often heavy rainfall and in winter temperature are between 0°







to 30°c all because of different type of zone. The main implications are all about making balanced climate. Uttarakhand is naturally rich heritage, full of forest. Making health care cost low, reducing immigration, promote economic growth through innovation and internet. Tourism is one of the most important part of economy of uttarakhand, because of nature, temperature and the culture of itself making the generation of income, employment, and foreign-exchange earnings. Foreign exchange of herbs, and culture, language and traditional dress and food make that possible and also the spritual benefits make it great. Modifying the old tradition, food and herbs with some new idea and communication language skill are the main key of social and economic growth.

Keywords: Climate change, Tourism, Economic and social development, balanced climate, livelihood sources, heritage.

Review and Analysis of Consequences of Climate Change and Global Warming on the Himalayas.

Shailja Rawat

GDC Narendranagar, Uttarakhand. India. Email: shailja9j@gmail.com

Himalayan region is considered to be the third pole due to the high amount of ice present in the region. The Himalayan region is one of the 6 biodiversity hotspots located in our country. It is being hit by global warming badly. The temperature of Himalaya has increased by 1 degree centigrade. All the 650 glaciers of this region are facing danger of receding. It is feared that in the absence of concrete steps more than two third of Himalayan glaciers will melt till 2100. The number of potentially hazardous moraine dammed lakes in Himalayas is increasing. The lakes are formed behind unstable ice-cold moraine. Such lakes are like ticking bombs as they can burst any time leading to flash floods and breakage. These are termed as glacial lake outburst floods - GLOFs like the one we saw in Chamoli recently. There is a need for continuous monitoring of such lakes using satellite imagery to avoid any such natural disasters.

Keywords- Himlayan glaciers, climate change, global warming, GLOFs,







Climate Change Perception of College Students in Kanda, Uttarakhand

Shalini Pandey, Neetu and Bharti

Government Degree College, Kanda, Bageshwar, Uttarakhand, India (263619) Mobile: 7740860872, Email: shalinipandey075@gmail.com

Abstract

Uttarakhand is one of the Himalayan State. The ecosystem of the state is not only rich is biodiversity but also very fragile and prone to severe impact of climate change. Student's perceptions of climate change is of great value for understanding how they respond to climate change. As student of today will be citizens of tomorrow and without their active participation impacts of climate change cannot be minimised. Climate change perceptions mean student's observations of the reality and causes of climate change, and the perceived valence, spatial distance, and temporal distance of consequences of climate change. To measure the perceptions, a scale developed by Valkengoed et al. (2021) was used. Based on the scale, data was collected from 100 graduate students of Government Degree College Kanda using google form. The paper enumerate the findings and implication of the same.

Keywords: climate change perception, Himalayan ecosystem, climate change beliefs.

Climate Changes : Its Impact on Bioresources of the Himalayan Region Recent Changes in Climate & its Impact on Uttarakhand

Shikha

Department of History , S.S.M.M.U.S.S.S. Govt. P.G. College Dwarahat

Drastic changes came in climate due to various reason. Earth is going to warm up by 0.5p c over a century and global warming has become gruesome problem. Many of plant & animal species became extinct. Changes persist in popular region







polar region. Glaciers are melting by the effect of global warming. All kinds of ecosystems such as pond ecosystem, forest ecosystem, grassland ecosystem, desert ecosystem, fresh water and marine water ecosystem, etc. are being influenced by it. Greenhouse gas concentration, sea level rise, ocean heat and ocean acidification are the main climate changes indicators which are reported during 2021. Human activities on land, in the ocean and in the atmosphere are having an adverse effect on the climate which are responsible for climate changes. The impact of climate changes on Uttarakhand is taking place by different means. Process of flowering, fruiting and germination etc. are tremendously affected. Some species of plants and animals are shifting to upward regions. Bio diversity is going to fall in Uttarakhand. Change in soil composition and invasion of alien species are the results of the climate changes. Agriculture is also suffered a lot. Glaciers in Uttarakhand are going to melt continuously and rapidly in unnatural way.

Impact of Climatic Change in farming in Hilly Region of Uttarakhand

Dinesh Joshi

Department of Commerce GDC, Kanda (Bageshwar) Email- dineshjoshi356@gmail.com

Uttarakhand, the land of god, in spite of being a small state, has its uniqueness and highlights its potential for growth and development. However, since 2000 mainly development has predominantly been in the plain areas of Uttrakhand, and the hill districts have been lacking behind. All the hill districts have organic subsistence farming as their main economic activity. Due to subsistence livelihood, migration and a remittance economy operate on the hill for their livelihood. Changing climatic conditions are resulting in loss of livelihood capital and changing agro-livestock conditions. The biggest impact is perceived to be on the agricultural sector which accommodates the highest proportion of the workforce of the state. Though the fast pace of migration from the region is held responsible for this, climate change is sure to have an adverse impact on the livelihoods based on forestry, agriculture, Non-Timber Forest Products, and medicinal plants. Communities are observed to react positively to the changed situation and taking advantage of the niche of their area and improvising on their traditional knowledge they have started to grow commodities that are better suited to the changed







scenario and have a ready market. They are also taking advantage of the reduced duration and harshness of winters to grow new crops.

Keywords : infestation, perceived, livelihood, accommodates

Impact of Climate Change on Agricultural Production in Uttarakhand Since

Neha Chauhan and Neeraj Kumar

Department of Commerce, North India College of Higher Education, Najibabad (U.P.) Email ID: nehagaur2004@gmail.com Mobile No. 9927076672 Asso. Prof. Department of Commerce, J.V. Jain College, Saharanpur (U.P.)

Abstract

The present paper attempts to find the changes in agricultural production in Uttarakhand state since 2001-02 to 2020-21. Agriculture is found to be the important mainstay of any nation, as about 70 to 75 percent of population lives in villages and agriculture is the main occupation there. Agriculture in India is strongly influenced by changing climatic conditions and weather. Farmers of India are always ready in dealing with change in weather and year to year variability. The aim of the study is to find significant changes in production for the study period which consist of 19 years. The study is essentially based on secondary and published data and the information available from both governmental agencies and professional journals. The data collected from secondary sources have been suitably edited, analysed and interpreted using unpaired t-test to find the significant changes during the study period.

Keywords: Agriculture, Climate change, productivity, rainfall, food security.







Environment Pollution and Climate Change (Microbial Function on Climate Change)

Nirdoshita Bisht

Department of Sociology, S.S.M.M.U.S.S.S. Government P.G College, Dwarahat (Almora)

Climate Change is the most serious challenge facing humanity. Microbes produce and consume three major greenhouse gases – carbon dioxide, methane, and nitrous oxide – and some microbes cause human, animal, and plant diseases that can be exacerbated by climate change. Greenhouse gases concentration is

increased through time with different human and natural factors. Such as the combustion of coal, oil and other fossil fuels, decay of plant matter and biomass burning. Hence. Microbial research is needed to help ameliorate the warming trajectory and cascading effect resulting from heat, drought, and severe storms. Microorganism have a wide potential especially used in greenhouse gas treatment and reduction through nutrient recycling. It acts as either generators or users of these gases. It provide to reduce environment hazards which is caused by nature and anthropogenic activity. Microbes are involved in many processes, including the carbon and nitrogen cycles, and are responsible for both using and producing greenhouse gases such as carbon dioxide and methane. Microbes can have positive and negative responses to temperature, making them an important component of climate change models.

Keywords: Green - house gases (GHGs), Climate change, Microbial, Environment.







Electrochemical Sensing of Organophosphorus Pesticides over NanoHybrids Modifierd Electrodes

*Shubham Sharma, Sameena Mehtab and Md. Ghulam Haider Zaidi

Department of Chemistry, College of Basic Sciences and Humanities G.B.Pant University of Agriculture and Technology,Pantnagar Uttarakhand(U.K.),India-263143 *shubhamsharma7149@gmail.com,7500829539

Abstract

Organophosphorus pesticides (OPs) are esters derived from phosphoric acid and widely usedin agricultural industries for crop protection and pest management. In the present investigation electrochemical (EC) sensing of OPs was carried out at NHs modified working electrodes (WEs). For this purpose a slurry of NHs was prepared by mixing withPolyvinyl butyral in NMP and coated over stainless steel plates. NHs have proved to be an excellent transducer in ECmonitoring of OPs, due to their unique properties like, high surface area, rapid electrode kinetics, excellent electrical properties, and high mechanical strength. TheEC behavior and quantification of OPswas investigated through cyclicvoltammetry (CV), square wave voltammetry (SWV) and differential pulse voltammetry (DPV) in 0.1 M KCI.CV reflects reversible redox behavior over NHs/WEs in 0.1 M KCI. SWV and DPV shows successive increase in peak currents with the addition of OPs in electrolytic solution. SWV and DPV derived calibration plotsfrom peak currents vs.standard OPs concentrations that reflects a linear correlation and used for estimation of OPs in pesticide treated soil samples. Developed EC sensor showed remarkable selectivity and sensitivity for targeted OPs and can be applied for their monitoring in soil samples upto nano molar concentrations.







Black Carbon and it's Impact in the Himalayan Regions

Bhagwati Prasad Bahuguna

Department of Physics, Government Post Graduate College, Dwarahat, Almora E-mail: bhagwatiprasad999@gmail.com:

Abstract

Black carbon is a short-lived pollutant with the second-largest contribution to warming the planet after carbon dioxide. Black carbon is emitted into the atmosphere due to incomplete combustion of fossil fuels in motor vehicles, aircraft exhausts, bio-fuel and biomass. The fine particles of black carbon absorb light and about a million times more energy than carbon dioxide. This process warms the atmosphere. There are many adverse effects of black carbon on the earth's atmosphere.

In the present article, I have discussed the impact of black carbon in the Uttarkhand Himalayan regions. The glaciers such as Gangotri, Khatling, Milam, Pindari, Nanda Devi group of Glacier, etc., are situated in the Himalayan range of Uttarakhand state. These pristine glaciers are the source of India's most important river bodies that provide fresh water. Recently, there have been many incidents of flash floods after a glacial burst in Uttarakhand. One of the main reasons behind these accidents is an increase in black carbon in the Himalayan region of Uttarkhand. This increase darkens the snow's surface, reduces its albedo (the reflecting power of a snow's surface), warms the snow and hastens melting. The article concludes to find the solution for reducing the emission of the black carbon from cookstoves, diesel engines and open burning of forests.

Keywords: Black carbon, Himalayan range, Glaciers, Hastens Melting







Physico-chemical Characteristics of River Kosi in Districts Nainital and Udham Singh Nagar (Uttarakhand)

Pramod Kumar, Promod Joshi and Ravi Kumar*

Department of Zoology, Radhey Hari Govt. P.G College, Kashipur, U.S. Nagar – 244713 (Uttarakhand), India; **Email:** ravigola76@gmail.com *Corresponding and Presenting Author

Abstract

The Present study deals with the assessment of physico-chemical parameters of River Kosi in district Nainital and Udham Singh Nagar Uttarakhand, on seasonal basis for one year (2020-21) at four sampling sites. During the study period physicochemical parameters were monitored with the help of standard methods of APHA (1995) and Trivedi and Goel (1986). Some selected parameters for water quality assessment are pH, Dissolved Oxygen(DO), Free CO₂, Chlorides, Total Alkalinity, Temperature, Total Dissolved Solids, Total Suspended Solids, Total Solids, velocity, transparency and temperature were analyzed.

Keyword: Water quality, Kosi River, Physico-chemical parameters.

Religious Scriptures and Environmental Concerns

Gurjot Kaur Head, Dept, of History, Kanya I

Head, Dept. of History, Kanya Maha Vidyalaya, Jalandhar M- 9814406986, Profgurjot66@gmail.com

Abstract

Man and nature has lived in close proximity since times immemorial. The three basic requirements necessary for the existence of man on this planet are air, water and food. In the old scriptures of different civilizations of the world, emphasis has been laid on the importance of purity of air, water and food in relation to life on this earth. For example in the Guru Granth Sahib, the holy book of Sikhs; it is cotes for three basic requirements of life as:







"Pawan Guru Panni Pita

Mata Dharat Mahat"

Guru Nanak Dev Ji in Japuji Sahib laid the foundation for a sacred vision for the environment and gave a message of living in harmony with **nature** through the hymn which equates Air with Guru, Water with Father, and Earth with Great Mother of all.

In the present era of uncontrolled human activities like environmental degradation, declining underground water level, overuse of chemicals and fertilizers and cutting of forests are a matter of grave concern. If

Present trend continues, the day is not far when even the very existence of any type of life on this planet will be shaky. In this paper an attempt will be made to study how scriptures have tried to lay emphasis on the purpose of human life and to achieve a blissful state where nature and humans live in harmony.






mùkj&∨kèkqudrk dk Hkkjrh; lanHkq ikfjfLFkfrdokn ∨kg fgUn&Lojkt

çdk'kp**n Hkê** fgUnh foHkkx LoxÊ; Jh enuekgu mikè;k; LorU=rk læke lukuh jktdh; Lukrdkùkj egkfo|ky; }kjkgkV] ∨YekMkj mùkjk[kM bley —drprakashbhatt@gmail.com

; q 'kkkkysk vr% vudkkl fud&ç—fr %Interdisciplinary nature% dk qS | fMfl flyu dh 'kg) rk vk fof k"Vhdj.k dh I hekvkal s ckaj I kous dh fn'kk ea fouez dks' k'k gs foKku ds Hkhrih vulkki uka esax.kukRed i)fr dk 0;kid ∨k§ xakkj ç;kx fn[kkb2 nsrk g§ ml –f"V dh 'kfä Isbadkj ugha fd;k tk I drk | I ektfoKku vkg ekufodh eg0;fä vkg I ekt dh tfVy ç-fr dh I eL;kvkg ds $v\dot{e}$; ; $u e_{a} c\dot{e}kkur% c; da xakkRed i) fr dk viuk fo'ksk egRo gS | cLrr <math>v\dot{e}$; ; $u vud \dot{e}kku ds$ xqkkRed 0; oqkj ij vkekkfjr qS | 'kksk fo"k; ds vkekkj ij ve;; u çekkur%, frqkfld dqk tk|drk qS| bl $\nabla FkZ e_{a}$, frqkfl d fd bl e_{a} ikBd dk $|e_{c}$ & bDdhl ohal nh& fopki ds dae e_{a} qS | ikBd] ys[kd vks] vdMfed vkykpuk }kjk r; fd, vFk2 | sikB dksepä djrk gs xk9; ryc gs fd vrhr dk I edkyhu I nHkZvkfn I svnr rd ekstin gS | gekjsvè; ; u dscht 'kûn g& mûkj&vkèknjudrk] mùkj&l įpukokn] uotkxj.k] vkèkųudrk] ikfjfLFkfrdokn Ænvironmentalism½ rFkk Hkkjrh; rk çR; d Ie; es I kekl; ck) d voèkkj.kkvks %Commonsense concept% dk 0; kid çpkj vk§ çl kj fn[kkb] nsrk g& bDdhlohalnh ea Hkh d,eu Isll }kjk r; fd, x, vFkZlsckgj fudyuk vklku ughagS | rdZ dh ckr djus dks vkLFkk dk fojkisk ekuuk I kekU; ckS) d voèkkj.kk gS| nil jh ckr ; g gS fd gekisle; es Kku dk ekkis fof'k"Vhdj.k gksrk tk jgk gs ve; ; u l (joekk vk) xgjkb2 ds fy,fd; k x; k Kku dk fof'k"Vhdj.k bruk dBkg gks x; k gSfd foKku vkg dyk gh ughacfYd dyk vk§ foKku dh Hkhrjh 'kk[kkvka dh vkil ea ckrphr Hkh de gkrh x; h g| vkxIud | bukxkIud dh $[kM - f^*V]$ fo^{*}k; dh l jpuk dsfy, pukS^{ch} curh tk jqh qS₁ tyok; q ifjorLu dh ?kVuk dks foKku ek= ealhfer djus dh dkg'k'kavke gå Lo; a dks bå/syðppy vký fil på dgus okyka ealkh ; g 0; ogkj çpyu eagS| rhl jh ckr ; vjksi dsvàkdkj; ox dsckn mHkjsçckaku ; k Kkukn; Ænlightenment½ vk vkèkų udrk esitt rigėkez vki foKku dk l2k"kZ fn[krk q ml l2k"kZ dk U; whdj.k dyk læk; vk§ foKku læk; esigksrk pyk x;k g§ můkj vkěkýudrk vkěkýudrk }kjk LFkkfir lexark vk§, drk dk çfrikêk dirh qSmä 'kkêk leL; kvksıls geus 'kkêk ç'u dh lajpuk fufe2r dh g\$| mùkj&vkèkqfud –f"V vk§j i kfjfLFkfrdokn ds l acæk dks eq[; r% xkækh ds fgUn Lojkt $\frac{1}{909}$ es envr% xqtjkrh Hkk"kk es fyf[kr cdkf'kr rFkk fqUnh] væst h rFkk vU;







Hkk"kkvkaeavutinr ½ dsvkèkkj ij le>usdh dkf'k'k dh x;h gS | 'kkèki= dscht 'kCnkadh l pokyuxr ifjHkk"kk ½Operational definition½ r; dh x;h gS | mÜkj&vkèktjud -f"V dsvkykd ea xkèkh dsfgUn Lojkt dk u;k vutire ikB r\$kj fd;k x;k gS tksekuo IH;rk dsvkèktjud ladVkaij fopkj ds fy, fn'kk nsrk gS | vkS | kshdj.k vkèkkfjr vkèktjudrk usfodkl vk§ IH;rk dk tks: i fufe fd;k gSmleagok] ikuh] eud; vk§ la_fr dh fpark,j xk;c gâ | xkèkh bl ckr ij cy nsrsgâ | vkèktjudrk ikB dks0;fä dafær cukdj vFkZ dksckèkrh gSmÜkj&vkèktjudrk ikB dksetä djrh gS gekjh dæh; LFkkiuk gSfd Hkkjrh;rk dsl mHkZeaikfjfLFkfrdokn dsfy, fgUn Lojkt dsmÜkj&vkèktjud cgtyrkoknh Loj dksigpkuus dh t+jr gS | ;tjksih; vkèktjudrk ds cjDl Hkkjrh;] LFkkuh;] nšk vkèktjudrk dk ikB r\$kj fd;k tk I drk gS | 'kkèk i= dsvkf[kjh fgLlseacLrqr 'kkèk vè;;u dh I hekvka dk mYys[k fd;k x;k gS rFkk 'kkèk fo"k; dsvè;;u dksvkxsc<k I da | bl jkLrs Kku dh I jpuk ½Body of knowledge½ ea viuk; ksvnku fn;k x;k gSA

fgeky;hl**i**-fr rFkk i;kbj.k

vate vyh

bfrgkl foHkkx jk0 Luk0 egk0 }kjkgkV ¼/YekMk½

l kj kå k

eud; dspkjkavkj tehu] ty] taxy] tu&tkuoj gåtksi; kbj.k dsed[; ?kVd gå mùkjk[k.M dsi; kbj.k dsed[; ?kVd ogh gåtkslex fgeky; ea gå fgeky; h l al-fr dh èkkfe2d&l kal-frd ijEijk, j xhr&laxhr] yksd&xhr] yksd&

xkFkk, a rFkk ykod i oʻz dgha uk dgha i; kbj.k rFkk ç—fr Ist (MsA gjsyk [ksrh Ist (Mik ykodi oʻz doy vPNh QI y mRiknu dk gh ugha cfYd __r (vka ds çrhd ds: i eneuk; k tkrk gA vkjfEHkd dky Ispyh vk jgh ykod xhr dh ijEijk en ç—fr IEer vk[; ku feyrsgA fgeky; h {ks=kn ds ykod xhrka dh ç—fr ds vHkko en dYiuk ugha dh tk I drhA i; kbj.k dk Inj{k.k mùkjk[k.M dh Int_fr en jgk gA







dyk dh fofHkUu foèkk∨kadk i;kbj.k Iġ{k.k ea;kxnku

Mamta Suyal Department of Drawing & Painting S.C.S.S. Government P. G. College Kapkote Bageshwar (Uttrakhand)

Abstract

ç—fr dh mikluk dyk dk èke2gSA ; fn dyk 'kjhj gSrks ç—fr mldh vkRek A ç—fr lnk Is dykdki dh cii.kk vkekki jah qSA dyk ds bfrakles; g ns[kus dks feyrk qSfd vkfndky Is orzeku rd dykdkika us ç-fr ds fofHklu : ika dk I kan; kzed fp=.k fd; k gSA gM+ik ds feêh ds $cruka ea T; kferh; : i ea if\{k; ka dk vadu] vtark ds fHkfÜk fp=ka ea ckseko {k} dev ds i (lika dk$ fp=.k] viHkalk] tSu rFkk iky 'kSyh ds ikFkh fp=kalea i'kq if{k;ka dk fp=.k] eqxy] jktLFkkuh] iqkMh 'kSyh dsfp=kn en N% __rq ckjq ekl k dk fp=.k \vee kfn Hkkjrh; dyk ds \vee çfre mnkqj.k qS tks tks dyk vkg c-fr ds I cekka dks n'kkirs gSA vkekfud dky ea fofHklu dykdkjka }kjk c-fr ds Lo: ika dk fp=.k fd; k x; k A yfyr dyk dh fofHkUu foèkkvka t9 sfp=dyk] efirdyk] okLrdyk] 0; olk; h dyk ¼Qk\$VkxxkQh], uhešku] xkfQd] foKkiu ½ es ledkyhu dykdkjks }kjk viuh $dyk-fr; ka ds eke; e | si; kbj.k | aj{k.k dk | nsk fn; k qsk jkefdadj cst]; kfeuh jk;] foey$ nki xılırki çak'k dezakihi foukın foqkih eqiktê fodki Hkêkpk; ki T; kir Hkê giunki vkin vuxd dykdkjka us vius ç—fr fp=.k ds ekè; e ls follo ds dyk txr ea [;kfr çklr dh A orèku ea $i;kbj.k \mid i_k t s x k h j \mid eL;k us dykdkjka ds varelu dks > d>ks fn;k gSA dykdkjka us bl$ IeL; k dks viuk fo"k; cukdj fp=.k ckjak fd; k A muds bl dk; l dks i; kbj.kh; dyk ds uke ls tkuk tkrk qSA çLrqr 'kkik i = en fofHkUu fokkvkn ds eke; e I si; kbj.k I j (k.k) i dykdkjkn $k_{i} = d_{i} + d_{i$ dks çdV djrs gq oræku le; ea bldh çkl áxdrk dks çLrq djus dk ekè; e cuxk A







tyok; qifjorlu dk xkeh.k thou ij ilikko ^mRrjk[k.M dsfo"ksk l mHkles

eksgr tkskh

jktuhfrfoKku foHkkx ih ,u th jkt Luk egkfo[ky;] jkeuxj] uûhrky

l kjkák

tyok; qifjorlu dk rkRi; lo\$'od vk\$ r rkieku eaof) ds l kFk t\$Ms l exzek\$ e dh ?kVukvka ea@fed cnyko lsg& eay : lk ls; g n\$u; kaHkj eavk\$ r ek\$ e i\$Vuleanh?k2dkfyd cnyko g& 1800 dsn'kd dse/; lseu\$; kausgok eadkcluMkb&vk\$Ul kbM vk\$j vU; xhugkml x\$ kadh vR; f/kd fjgkblea; kxnku fn; k g\$ ftllso\$'od rkieku eaof) g\$plg\$ ftldsifj.kkeLo: lk tyok; qea yxkrkj ifjorlu gq g\$A; g , d ikdfrd fØ; k g\$ fdUrqekuch; xfrfof/k; ka}kjk tyok; qifjorlu dh nj eavk; h of) fpUrk dk fo"k; g\$A tyok; qeavk; s bu ifjorlukads dkj.kkadks nks Hkkxka ea cka/k tk ldrk g\$A igyk ikdfrd vk\$j n# jk ekuch; xfrfof/k; ka}kjk lk; kbj.k in#i'kr gkus ls tyok; qifjorlu lslk; kbj.k i#kkfor gkrk g\$ rFkk ekuch; xfrfof/k; ka}kjk lk; kbj.k im#i'kr gkus g\$A ikdfrd xfrfof/k; ki; Fkk Hkw[kyu] Tokykeq[kh fcLQk\$/] iFoh dk >\$\$\$ ekuch; xfrfof/k; ka ea 'kgjhdj.k] vk\$| kxhdj.k] ouk\$!ewyu] [kfut [kuu] tula[; k of) vkfnA

Kykscyckfeåx] thok" en baku ds ngu vký ikdfrd lakkkuka ds vR; f/kd nkgu ds dkj.k tyck; q ifjorlu dh xakkhj leL; k mRiUu goplgA; fn tyck; qifjorlu dks le; jgrs u jksdk x; k rks yk[kkn yksc Hkw[kejh] ty ladV vký ck<+tý h foinkvkn ds f'kdkj gkncA; g ladV injh nýu; ka dks ikkkfor djsckA; |fi tyck; qifjorlu dk lclsvf/kd vlj xjhc nskknij iMk gA tyck; qifjorlu vkdIVd {k=] vQhdk vký NkVs}hikn dks vf/kd ikkkfor dj jgk gA

mRrjk[k.M Hkkjro"kZ ds mRrjh Hkkx dk ,d jkT; g& bl dks ik; % noHkmfe ds uke ls lacks/ kr fd;k tkrk gA D;kmfd lEiwkZjkT; en txg& txg fgUnwenfnj o rhFkZ LFkku ik;s tkrs gA ftlenals 93 ifr'kr ionrh; Hkkx gS o 65 ifr'kr ou {ks= gA jkT; dk mRrjh Hkkx vf/kdrj fgeky;h pksfV;kno fgeunknals Hkjk gqvk gA mRrjk[k.M fgeky;h Ja[kyk ds nf{k.kh <+yku ij fLFkr gA bl dh tyok;qvkg ouLifr Å;pkbZ ds vud kj fHkUu gksrs gA ;gka dh o'kkZ dh lakkoukvknavkg ml dh Hkfo"; ok.kh ds fy, ty lak/kuknadh ;kstuk cukus vkg incn/kr djus ds fy, tyok;qifjorn/u ds lakkfor iaHkko lkFk foLrkj ls le>us dh vko'; drk gA



tyok; qifjorlu mRrjk[k.M dsfgeky; h {k=ka dsikfjfLFkfrdhrædsfy, lclscMk [krjk cu jgk gA eSnkuh {k=ka dh vi{kk fgeky; h {k=ka ea tyok; qifjorlu dk nkxuµk vlj ns[kus dks fey jgk gA bldspyrse/; fgeky; h {k= ea, d vkj vk9 r o"kk2 ea deh vk jgh gA ogha ek9 e pØ ea ifjorlu ls; gka dh df"k vk9 QykRiknu ij Hkh bldk ndjikkko ns[kus dksfey jgk gA bl dkj.k ogka dh ouLifr; ka vk9 tSofofo/krk dsfy, Hkh lcdV mRilu gksx; k gA oSKkfudka dk er gSfd gkfudkjd x9 ka dsmRltlu vk9 innWk.k dksde dj dN gnrd tyok; qifjorlu dksjkxdk tk ldrk gA

ÞÁnwk.k fu;æ.k dsfy, u;h ∨o/kkj.kkÞ

fu"kk vk; kZ¹ Å'kk ik.Ms

lgk; d Ák/; kid fgUnh foHkkx] jktdh; Lukrdk&rj egkfo|ky; }kjkgkV lgk; d Ák/; kid okf.kT; foHkkx] jktdh; Lukrdk&rj egkfo|ky; }kjkgkV

′kks⁄k Ikjka⁄k

i; kbj.k lj{k.k dk bfrgkl cgqr ijkuk g& gM+ik låLdfr i; kbj.k lsvksr&Áksr Fkh] rkso&nd låLdfr i; kbj.k lj{k.k gsrqi; k2; cuh jghA Hkkjrh; euhf'k; kauslewph Ádfr gh D; k lHkh Ák—frd 'kfDr; kadks nork Lo: i ekukA mtk2 ds lksr lw2 dks nork ekuk rFkk mldks ^lw2 noks Hko^ dgdj iqdkjkA Hkkjrh; låLdfr eaty dks Hkh nork ekuk x; k g& lfjrkvka dks thounkf; uh dgk x; k g& Hkkjrh; låLdfr eadsyk] ihiy] rqylh] cjxn] vke vkfn i&M-&ikSkkadh iwtk dh tkrh jgh g&

çnwk.k, d çdkj dk vR; ar /khek tgj g\$ tks gok] ikuh] /kwy vkfn ds ek/; e Isu dsoy eud; ds 'kjhj en ços'k dj mIs #X.k cuk nork g\$ oju~tho&tarqvknj i'kq&if{k; knj isM&ik\$ kkm vk§ ouLifr; km dks Hkh I Mk xykdj u"V dj nork g\$ vkt çnwk.k ds dkj.k gh fo'o en Ákf.k; km dk vfLrRo [krjs en iM+x; k g\$ bI dkj.k cgr Is Ák.kh] tho&tard i 'kq&i{kh] oU; &Ák.kh bI Inikj Is foydr gks x; s g\$ mudk vfLrRo gh IekIr gks x; k g\$; gh ugha çnwk.k vusd Hk; kud chekfj; km dks tUe nork g\$ d\$ j] rifnd] jDrpki] "kqxj] nek] g\$tk] us=jksx vkfn ftIIs IEiwkZ fo'o Hk; kØkar g\$ bI çnwk.k dk gh ÁfrQy g\$ vkt IEiwkZ i; kbj.k chekj g\$ ge vkt chekj i; kbj.k en th jgs g\$; yjksi ds; a= Á/kku nskkm en rks o\$Kkfufdkm us cgr igys gh bI ds fo#) porkouh nh Fkh] ijUrq mI ij /; ku ughs fn; k x; k] Qyr% vkt I kjk fo'o bI ds dkj.k fpfrr g\$ 1972 en vUrjk"Vħ; Lrj ij bI IeL; k ds funku ds fy, fo'o ds vusd nskkm us feydj fopkj fd; k] ftI en Hkkjr Hkh IfEefyr FkkA







çnık k.k foKku dk mi; kx] Á-fr dk vikk/kqk&nkgu] voßk [kuu] xyr fuekZk rFkk fouk'kdkjh çnkFkkā ds fy, fd; k tk jgk g\$ bl I sokrkoj.k çnű"kr gkrk tk jgk g\$ ç-fr vk§ çk.khek= dk thou I adV ea i M+x; k g\$ çnikk.k dk , d egRoi wkZ dkj.k os çnikkd çnkFkZ gå ftUga eui; cukrk g\$ mi; kx djrk g\$ vk§ vUr ea "ks k I kexh dks tô eaMy ea Mky nsrk g\$ çnikk.k fu; æ.k vkt I Ei wkZ fo'o ds fy, pukSrh cu x; k g\$ çnikk.k fu; æ.k I s I acaf/kr da I ek/kku bl çdkj gå %

- ekuo tul (; k of) dksjkdus dk ç; kl djuk
- ukxfjdks; k vke turk dks ok; qçn"k.k ds dçHkkoka dk Kku djkuk
- /kweziku ij fu;a=.k yxkuk
- dkj[kkukadh fpefu;kadh mpkbZ∨f/kd j[kuk
- vf/kd I s vf/kd o`{kkjksi.k djuk
- m|ksxkadh LFkkiuk "kgjkao xkaokalsnyi djuk
- vf/kd /kqvkansus okys Lopfyr okguka ij çfrca/k yxkuk
- Ijdkj }kjk çfrcakkRed dkuwu cukdj mYyaku djusokyka ij cM# dkjbkbZ djuk vkfnA çLrqr 'kkak I kjkak ds }kjk çnwk.k fu; æ.k dh ij çdk'k Mkyus dk ç; kI fd; k x; k g\$A

mRRkjk[k.M eai; Vu dk cnyrk Lo: lk ,oatyok; qifjorlu dk bl ij iHkko

iwe iUr ½bfrgkl foHkkx½

Lo0 Jh e0ek0m0 Lo0 I 0 I 0 jktdh; Lukrdk&rj egkfo|ky;] }kjkgkV] vYekMk ¼mRRkjk[k.M½ Email ID-poonampant1408@gmail.com

mRRkjk[k.M e/; fgeky;h {ks= eavofLFkr,d iołrh; jkT; g\$ ftldk u\$ fXkd lk&n;likphu dky lsgh vk?;kfRed fodkl, oa'kkfUr dsfy, tUkekul dksvkdf'kir djrk jgk g\$ idfrds blh vkd"klk usvk/;kfRed, oa/kkfeld;k=kvkadks/khjsk/khjsi;Nu ds: i eaifjofrir dj fn;kA vkt mRRkjk[k.M eai;Nu dh vikj lEHkkouk,aekStm g\$ fdUrqfiNysd(N n'kdkalsekuo tfur

78



gLr{kikaeaof) dsdkj.k jkT; dh tyok;qeafolæfr;kWn{kusdksfeyh g\$jftudk ifj.kke vuxd ikdfrd vkinkvkat§ &Hku[kyu] ckny QVuk] Xyf'k;jkadk VWuk] vkfn ds: lk eal keus vk jgk g\$

mRrjk[k.M ds ek\$ e ea gkus okyk ; s ifjolru jkT; dh vFkD; oLFkk dh jh<+ ekus tkus okys m | kx Þi; l/uß ds fy, eq[; puk\$rh ilrq dj jgk g\$ i; l/u u doy jkT; dh vk; dk eq[; L=ksr g\$ vfirqjkT; dh tul a[; k ds , d cMs oxl dh thfodksiktlu dk l k/ku Hkh g\$ mRRkjk[k.M ea tyok; q ds ifjorlu ds QyLo: lk 0; kid tu&/ku dh gkfu ds vfrfjDr dbl ckj i; l/dka dk thou Hkh [krjs ea iM+tkrk g\$ ½dsnkjukFk =kl nh bl dk ToyUr mnkgj.k g\$ tks vkus okys l e; ea i; l/u m | kx ea vif{kr of} u gkus dk eq[; dkj.k cu l drk g\$

bl 'kkøk i= en ge mRrjk[k.M dk fo'ksk ln HkZ yrsgq ;gkWgksjgstyok;qifjorlu o mlds ekuo tfur dkj.kkn dk fo'ysk.k djrsgq Hkfo"; en bUgn jkodus vFkok budh xfr de djusds fy, vko';d fcUnnykn ij ppkZ djscn

Hkkjr eai;koj.kh; lą{k.k ∨kanksyu ,oaefgyk,a

gseyrk 'kSyslædqekj

jktuhfr foKku foHkkx jktdh; Lukrdkůkj egkfo|ky; }kjkgkV] vYekMkběsy: &drshailendrapolse@gmail-com

l kj kå k

i; kbj.k ekuo thou i) fr ds fy, ; fn vfuok; 2 vax g\$ rks bl dk lj{k.k vk§ cpko Hkh ekuo dk ije drD; cu tkrk g\$ i; kbj.k lj{k.k ekuoh; thou ds fy, vfr vko'; d fo"k; oLrq cu x; k g\$ bl fn'kk esjk"Vh; , oa vUrjk"Vh; Lrj ij vuxd ç; kl , oa vkanksyu vuojr tkjh g\$ cnyrs lkekftd eW;] ?kVrs ekuoh; eW;] uxjhdj.k] o\$ ohdj.k , oa vkekqudrk dh nk\$M+es ge i; kbj.k dks fujUrj çn@"kr djrs tk jgs g\$ çkphu Hkkjrh; l 1_-fr es i; kbj.k lj{k.k ds çfr gekjs l 1_dkjks dks vkekqud l ekt us #f<ekfnrk dg dj ges i; kbj.k lj{k.k ls ny fd; k g\$ fdUrq vkt iqu% ges viuh l 1_-fr dh vk§ yk\$/dj i; kbj.k dks ljf{kr djuk gkxkA Hkkjrh; l UnHkZ es foopuk dh tk; s rks Hkkjrh; efgykvks dk i; kbj.k lj{k.k es egRoiwkZ; kxnku jgk g\$ i; kbj.k







efgykvkads}kjk fd, x, ç;klkadk okLrfod #i ealg;kx fey ldsvk§ i;kbj.k dkscpkdj Hkkjr dksgh ughacfYd lEiwkZfoÜo dkso\$Üod rkieku dsc<rsn(|çHkkolscpk;k tkldavk§ ifj.kkeLo#i ,d xhu foÜo dk fuekZk gksldsA

cLrqr'kkski = frh; d vè; ; u ij vkèkkfjr gksk bl 'kkski = es fofHkUu cdkf'kr l kfgR;] cf foKflr] bVjusV] i=&if=dk, a vkfn vè; ; u ds vkèkkj gkss, oa 'kkskkFkê }kjk , frgkfl d] fo'yšk.kkRe d vk§ o.kkRed vè; ; u i) fr dk c; ksx fd; k tk; sxkA

i;kbj.kçn\k.k,dxEHkhjleL;k

fdju ¼fgUnh½

jkt0egk0 ckx\$Joj

l kj kå k

i; kbj.k nks 'kCnkalsfeydj cuk gSifj\$vkoj.kA ftldk 'kkfCnd vFk& gekjspkjkavkj dk vkoj.kA oKKfud -f"V Isns[kk tk; si; kbj.k dk vfHkçk; mI çk-frd okrkoj.k IsgSftleage Ikal ysrsgSvk§ thou thrsgA vk§ çnWk.k dk vfHkçk; nfr"kr ; k xank djukA bl çdkj i; kbj.k çnWk.k ftlea; çk-frd okrkoj.k dk LoPN u gkusIsgA vFkkT bldk IEcak çk-frd vIargyu Is gA

i; kbj.k vkt l EiwkZ foüo ea lokTèkd pfpir fo"k; cu x; k gA eul; us viuh bPNk dks l rdB djus ds fy, çk—frd okrkoj.k dks u"V dj fn; k gA ftl ds QyLo#i vuxd l eL; k, i mRiUu gks jgh gA i; kbj.k çnilk.k ds vuxd dkj.k gkrs gS l cl s cMk dkj.k rhoz xfr l s gksjgh of Kkfud çxfr gA Hkk&rd l (joèkkvka dks tù/kus ds fy, dy&dkj [kkuka l s; ¢ä vkS] k&rd uxj cl x; s gA mudk jkl k; fud dMk&dpjk] xnk] ty] e'khuka dk 'kkġ l c feydj gekjs i; kbj.k dks nú"kr dj jgs gA okrkoj.k ea c<rh xeÊ ds dkj.k Xy£'k; j fi?ky dj fl d4M+tkrs gA ftlls l eqe dk ty Lrj yxkrkj c<rk tk jgk g\$ tul a[; k foLQkW Hkh i; kbj.k çnilk.k dk , d cMk dkj.k g\$ tul a[; k dh vfèkdrk ds dkj.k i; kbj.k val rgvu c<k gA vUu] ty] vkokl vkfn vko'; drkvka dh i tr7 ds fy, ouka dks dkVk tk jgk gA 'kgjhdj.k l s xnxh c<h gA èkq] 'kkġ] ruko vk§ vuxd l tØked jkxka l s ykx f?kj jgs gA ty çnilk.k] ok; q çnilk.k] èofu çnilk.k] jfM; ks èkeÊ çnilk.k l Hkh i; kbj.k dks çnil"kr djrs gA







i; kbj.k çnwlk.k dk fuokj.k djuk ljdkj ls∨fèkd turk dk mùkjnkf; Ro gS blsjksdus ds fy, lo&Hkkoh mik; g& tu&psruk; k tutkxj.kA turk ljdkj nkuks dks feydj bldh jksdFkke ij xEHkhjrk ls dk; Z djuk pkfg, A blds fy, &ouksvk§ o{kks dk lj{k.k} o{kkjksi.k} çnwfkr ty vk§ ey ds fuLrkj.k dh mfpr 0; oLFkk djuk] èofu&çnwlk.k ij jksd yxkuk vkfnA lkekftd vk§ tufgr dkjh fu; eks ds mYy?ku ij nkškh dks nf.Mr djuk Hkh, d fu; æ.k dkjh mik; g& ges i; kbj.k ds çR; sd çnwlk.k dks jksdus ds fy, xwlkhj vk§ lfØ; gkuk iMsxkA

pkj èkke ; k=k \lor ký tyok; qifjorľu dk \lor ar ližcàk

Hkwisse fliag ½/fgUnh foHkkx½/

LoO Jh enu ekgu mikë; k; Lorærk I ukuh jktdh; Lukrdkůkj egkfo | ky; }kjkgkV vYekMk běsybhupendrakandari89@gmail-com nýHkk"k& 9760102637

l kj kå k

gea xeÊ dsekS e ea xeÊ o I nÊ dsekS e ea BAM yxrh gS;g I c dN ekS e ea gkus okys cnyko ds dkj.k gkork gS ekS e fdI h Hkh LFkku dh vkS r tyok;qgkorh gS ftI s dN I e; kofêk ds fy, ;gka vulko fd;k tkrk gS *i Foh ds è#oka ij gtkjka I kyka I s teh cQZ fi?ky jgh gS n(u;k Hkj ea taxy vkx I s HkLe gksjgs I eqe dk c<rk gqvk tyLrj vkus okys I kyka ea dbZ 'kgjka fudy I drk gS dgha I u[ks I s Hkme catj gksjgh gS vk§ dgha ck<+vk§ rnQku** &v'kkd dqekj tyok;qoKkfudA

bl ek\$le dksr; djusokysekudkaeao"kkZlw,Zdk çdk'k gok ueh o rkieku çeq[k g& ge vius 'kkak i= dsekê; e lstyok; qifjorlu dk mùkjk[k&M dsLFkkuh; lnnHkZeavè; ; u djaxA gekjs'kkak i= dk eq[; ç'u pkj èkke ; k=k vk§j tyok; qifjorlu g& mùkjk[k&M dh vFkD; oLFkk ea pkj èkke ; k=k dk egRoiwkZ; kxnku g\$lkFk gh lkFk mùkjk[k&M ea pkj èkke ; k=k dk èkkfeld egRo vR; ar egRoiwkZ g\$pkj èkke ; k=kvka ds dkj.k dgha uk dgha lkekftd lel; kvka dh vuns[kh gkrh jgh g&

pkj èkke ; k=kvka dk vè; ; u o"k2 lu~2010 ls 2015 LFkkuh; lekpkj i=ka eâ çdkf'kr mä leL; k gh fopkj.kh; gA LFkkuh; lekpkj i=ka ea tyok; qifjorlu vk§ pkj èkke ; k=k fo"k; d lekpkjka dk vè; ; u fd; k tk, xk lkekU; le> vk§ çkFkfed vè; ; u ds mijkar mä leL; k fo"k; d gekjh çkdYiuk gSfd tul apkj ekè; e ds eqer : i }kjk lkekftd nkf; Ro dksiwklr; k ls ugha fuHkk; k x; k gS'kkak leL; k dk lekèkku çekf.kd vkadMka ds vkèkkj ij fd; k tkuk gS; k fd; k tk, xkA



gen xeli ds eksi e en xeli o Inli ds eksi e en B.M yxrh gA ;sIc dN eksi e en gkus okys cnyko ds dkj.k gkrk gA eksi ej fdIh Hkh LFkku dh vksi r tyok;qgkrh g\$ ftIs dN Ie; kofèk ds fy, ogk; vuliko fd; k tkrk gA bI eksi e dksr; djus okys ekudknen o"kk] I wj çdk'k] gok] ueh o rki eku çel[k gA; gk; eksi e ,on tyok;qen vrj dksIe>uk vko'; d gA eksi e en cnyko 'kh?krk Is fuR; çfr gkrk jgrk gA ysfdu tyok;qen cnyko vkus en cgr Ie; yxrk gS vk§ bI hfy, ;s de fn [kkb2 nsrs gA bI Ie; iFoh ds tyok;qen ifjorlu gksjgk gS vk§ IHkh thfor çkf.k; knus bI cnyko dsIkFk I kentL; Hkh cBk fy;k gA fi Nys 150 Is 200 o"kki en tyok;qifjorlu bruh rhork Is gnyk gS fd çk.kh o oulifr txr dks bI cnyko dsIkFk I kentL; cBk ikus en el['dy gksjgk gA bI ifrorlu ds fy, ,d çdkj Is ekuoh; fØ;k&dykigh ftEenkj gA tyok;q ifjorlu ds dkj.kkn dks nks Hkkxkn en ckjVk tk I drk g& çk—frd o ekuo fuferA- çk—frd dkj.k % Natural Causes %& tyok;qifjorlu ds vucd çk—frd dkj.k ftEenkj gA buen Is çel[k g& egk}hikn dk f[kI duk] Tokyke[kh] Ieneh rjaxs vk§ èkjrh dk ?knekoA tyok;qifjorlu ds dN egRoiwk2

çk—frd dkj.k fuEufyf[kr g&

- egk}hika dk f[kl duk
- Tokyke**(**kh
- iFoh dk >qdko
- leqeh rjaxa
- ekuoh; dkj.k /Human Causes/2 &tyok; qifjor/2 dsfuEufyf[kr ekuoh; dkj.k gksldrag&
- ou fouk'k
- thok"e b**l**ku
- oræku —f"k i)fr
- vkS| kxhdj.k rFkk 'kgjhdj.k

82







i; kbj.k lj{k.k earykoddyk dk dykRed ; koxnku

Nivedita Lohiya (Drawing & Painting) S.C.S.S. Government P.G. college Kapkote (Bageshwar)

Abstract

çkxfirgkfl d dky I sgh ekuo ç-fr ij fułkj jgk gårFkk i; kbj.k ds cnyrs Lo: i dks djhc I sn{krsgq fpf=r djus yxkA çk-frd fp=.k dks i; kbj.k ds j[kj[kko ds fy, fpf=r fd; k rks dłkh ç-fr dh I klin; irk o ekkfezdrk dks çLrqr djus ds fy, fd; k x; kA bu rF; ka I s; g egl w gwk fd ekuo dk ç-fr ds çfr vkd"kZ k vkfnekuo dky I s pyk vk jgk gå i; kbj.k ekuo ds fodkl ea -<rk fy, gq gå D; koid i; kbj.k o ç-fr dks çLrqr djus ds fy, yksddyk] fp=dyk] ewirzdyk o ba V, ys ku vkfn dyk dk ç; kx fd; k tkrk gS A yksd dyk vius łkhrj çkphure I a-fr dks fy, gq gå I kFk gh I kFk ekuo & tu dks ç-fr o I a-fr ds çfr tkx: drk çnku djus ea I g; kx dj jgh gå ft I ea dykdkjka dk I a wkZ; kxnku jgk gå ft I ea ; kfeuh jk;] tnck noh] thok I kækek'k} ts LokehukFku] txlukFk fI ag Lokeh vkfn dykdkjka us vius fp=ka ea i; kbj.k ds euekgd -'; ds }kjk çLrqrhdj.k fd; k gS A łkkjro"kZ ea yksd dyk ds fofłkUu dykRed vk; keka dks fy, gq gâ t9 s, si.k] eèkquh] oyf] pk&di ju k] xknuk] dyedkjh] dkgcj] vYi uk] ekMuk o jæksyh fofłkUu çk-frd i {kka dks fn[kk; k x; k gS tks ç-fr ea mifLFkr dykRed , oa çk-frd væka dks n'kkirk gå çLrqr vkys[k ea i; kbj.k I g{k.k ea yksddyk dk dykRed ; kxnku ds I cæk dks j{kkadr djus dk ç; kI fd; k x; k gå A

igkMha {ks=kaeaek\$/s∨ukt tyok;qifjorZukadsçHkko dksde djus∨k§j [kk | lġ{kk çnku djusealgk;d

Priyanka Gupta

Department of Home Science, S.C.S.S. Government P.G. College Kapkote, (Bageshwer)

Abstract

tyok; qifjorlu ekuo thou ij dblçdkj lsçHkko Mkyrk gSA orleku en tyok; qifjorlu gekjs le{k,d cMh puµkSrh gS] tks[kk | lj{kk lst¢Mh gopleL; k vk§j bldk mu — "kdknadsvkthfodk ij iM+us okys vlj tks,dek= [ksrh ij gh fuHk]j djrsgSA fiNys dqN o"kknals; g







ns[kk x;k g\$ fd vfu; fer o"kk2;k de o"kk2 ds dkj.k [ksrh dh i\$nkokj de gksjgh g\$ ft 1 ds dkj.k Hkkstu dh miyCèkrk Hkh de ghp2 g\$ vfu; fer ek\$ e pØ uk doy [ksrh dh i\$nkokj de dj nxk cfYd [kk | 1 gi{kk dksHkh [krjsen Mky nxk | kFk gh ikuh dh Hkh deh gkxhA Hkkjr — f"k çèkku nsk g\$ Hkkjr en fofHkUu çdkj dh Q1 ykn dk mRiknu fd;k tkrk g\$ igys nsk en ykx ek\$/s vukt kn dk 1 ou djrs Fk} ek\$/s vukt t\$ sjkxh/e&Mok ½ Tokj] cktjk] tk\$ 60 o"k2 igys ek\$/s vukt ino2tkn ds Hkkstu dk vfHkUu væ gn/k djrs Fk\$ ijæq | kB ds n'kd gfjr Økår en xgnu vk§ pkoy dks çkFkfedrk feyus ds dkj.k geus ek\$/s vukt to mI ds mi;kfxrk dks Hkmyrs pys x, A ek\$/s vukt i k\$"Vdrk | sifjimk2 vk§ 'kjhj dh jkx çfrjk\$kd {kerk c<kus en cgn gh mi;kxh fl) gn/k g\$ ek\$/s vukt dks bLreky ds fy, r\$ kj djus | s 40% de Åtk2 dh vko'; drk gkrh g\$ | rr [kk | l gi{kk çnku djus ds fy, T;knk ik\$k.k ds xqk okys ek\$/s vukt I s tyok;q ifjor2u ikuh dh deh vk§ | v[ks dh fLFkfr t\$ h | eL;kvkn dk | ekèkku gkrk g\$ çLrnr vky{k en igkMh {ks=kn en ek\$/s vukt ds ik\$"kd en\$";] mI dh mi;k\$xrk vk§ ek\$/s vukt fd1 çdkj tyok;q ifjor2u ds çHkko dks de dj [kk | l gi{kk en | gk; rk çnku djrs g\$ fo"k; ij ppk2 dh xb2g\$

Irr fodki ,oatyok;qifjor2u : ,d vè;;u ¼mÙkjk[kM dsfo'k%k inaHkZeb2

js[kk] Hkjr th mike;k;

lekt'kkL= foHkkx LoxÉ; Jh enu ekgu mikè;k; Lorærk læke lukuh jktdh; Lukrdkùlkj egkfo|ky; }kjkgkV ∨YekMk

l kj kå k

oræku le; en ekuo dk; kin ls xhugkmi xi mRI til en c<kikj hgksjgh gi tks tyok; qifjoril dk eq[; dkjd gi jkT; en tudY; k.k ds pyus ds dkj.k rkieku en gksjgh of) dks vkS kfxd Lrjkn ls Åij rd lhfer j[kus ds fy, lkenfigd dk; bkgh ds fy, vkj vfekd ç; kl fd, tkus dh vko'; drk gi milkjk[ki en fVgjh ckek ti hifj; kstuk, a tyok; qifjoril dk, d çeq[k mnkgj.k gi tofd lrr fodki ds ekxi vkfFkid fufgrkFkigksrs gi vkt ljdkjkn ij tyok; qifjoril vkj lrr fodki is listekr u, djkjkn ds tfj, dk; i djus ds fy, vfekd is vfekd noko cuk; k tk jgk gi ftils ljdkjkn dks rkyesy oBkuk dfBu gksjgk gi vkj t: jrn vfekd is vfekd gkus ds dkj.k fnu çfrfnu ubi; kstukvkn dk i pokyu fd; k tk jgk giftils jkT; en tyok; qifjoril ds çHkko fn[kus yxsgi ; g 'kkek&i = f}rh; d vkadMkn ij vkekkfjr gkxkA f}rh; d vkadMkn dks i =&if=dkvkn







'kkšk xařkká v[kckj vkfn ls,df=r fd;ktk,xkA 'kkšk&i= es vukkojd ,oa voykodu i) fr dk ç;ksx igikru fd;sx;svè;;uks ds vkèkkj ij fd;k tk,xkA

√kfFkZd fodkl dsikXlkfgr dkjdkadk tyok;qifjolru ij iHkko

lkfgr oek2

vFk2kkL=, jktdh; Lukrdk&rj egkfo|ky;, }kjkgkV b&ey% verma.sohit2@gmail.com

vkfFk2d fodkl, d lrr~ifdz, k g& ftlds vUrx2r nsk en miyC/k leLr lk/kuknadk d(kyrk i no2d fonksgu gksrk g& ftlds ifj.kke Lo: i jk'V1h; vk; , oe ifr0; fDr vk; en fujarj, oe nh/k2 dkyhu of) gksrh g& vkfFk2d fo'kerk en deh vkrh g\$ lkekU; turk ds thou Lrj ij dY; k.k en c<krjh gksrh g&

vk/kkjHkur ljipuk] vkfn dks vkfFkbd fodkl dsikkl kgd dkjdka ea lEefyr fd;k tkrk gå vks|kfxdj.k vk/kkjHkur ljipuk] vkfn dks vkfFkbd fodkl dsikkl kgd dkjdka ea lEefyr fd;k tkrk gå vks|kfxdj.k ds {k= ea of} viuh pjekoLrk ij irhr gksjgh gå vFkb; oLFkkvka ea lok {k= ds;kxnku ea of} ds ifj.kke Lo: lk fofHkUu idkj dh leL;k, a mRiUu gksjgh gå buea i;kbj.kh; emnka dh vf/kdrk gå i;kbj.k emnka ea tyok;qifjorlu] Xyf';j fi?kyuk] lempz dk vk;ru c<uk] Å".k dfVcU/kh; pdokr] ek9 e ifjorlu vkfn gå

vkfFkZd fodkl dsikkRlkgd dkjdkadk tyok; qifjoZru ij udkjkRed iHkko nf'Vxkpj gA blea inwkk.k dh leL; k] vkstku ijr dk gkl] e: LFkyhdj.k] tS fofo/krk ea deh] ukfHkdh; vkink] vif'k"V vkfn gA

tyok; qifjołru ena corgki kk gksjgh gkfu dksjkodus gorqlook {k⊱ dkslhfer djd} vkS|kfxd {k⊱ lsdf"k {k⊱ dh vknj mUeq[k gkuk vR; ko'; g\$A bllsidfr inr la k/kukna dk laj{k.k dslkFk loo) Lu gksldxkA







tyok; qfjorlu Hkkjrh; ijEijk ∨k**j la**—fr ealekèkku

ruqtk ik#Ms;

fgnh follkkx LoxÉ; Jh enu ekgu mikè; k; Lorærk I xke I ukuh jktdh; Lukrdkùkj egkfo|ky; }kjkgkV Email: tanipandey8@gmail-com

follo Hkj eatyok; gifjorlu dk fo"k; lolofnr gå orleku eaollod lekt ds lkeus tyok; g ifjor \mathcal{L} I clscMh pulkish q& Hkkjrh; ijajk en ekkfe \mathcal{L} -R; kn en o $\{kkn dh int k dk eq Ro feyrk qA$ ftl çdkj i; kbj.kh; larqyu cuk, j[kus qsrq iFoh ds, d frqkbZ Hkm&Hkkx oukPNkfnr qkus pkfq,] Bhd mlh çdkj çkphu dky e**s** thou dk , d frqkb2 Hkkx çk—frd laj{k.k ds fy, lefi*i*r Fkk] ftllsfdekuo ç—frdksHkyhHkkárle>djmudkleáprmi;kxdjldsvk§ç—frdklrayu cuk jgA ; g Hkkjr dh l kL-frd f'k{kkFkh] tks dN $\vee \gamma x$ ekè; e l s l ekt dks i < kbZ o fl [kkbZ tkrh FkhA i; kbj.k dks ysdj Hkkjr esbruh le`) vk§ ifjiDoo lkL—frd fojklr gkus ds ckotm vkt ge Hkkirh; ykxkaeai; kbj.k dks ydj ykijokgh vk§ tkx: drk dh deh D; kag& vDI j dgk tkrk g\$ fd -f"Vdksk cnyus I s0; ogkj cny tkrk g\$ vkt ge ftrus Hkh i; kbj.kh; I kdVka dk I keuk dj jgsgå mudsihNsç-fr dksydj ykxkads-f"Vdksk ea ifjoru dkQh gnrd ftEenkj g\$A miHkkäkoknh l 1.—fr us, d l koZ HkkSed eW; ds: i es LFkkfir dj fn; k g\$D; ksd vkèkqud inthokn dh uhno lil—fr dsvikkkikik nkgu ij fVdh glpZgA ge tkursgaifd tyok;gifjorlu vkaj vkstku ijr dh leL;k dsfy, osüd : i lstksmik; fd, tkj gsgs mlsge lkenfgd : i ls Hkh viuk, Al I kFk qh muealls t ks Hkh mik; gekjslennk; vk§ I al—fr ds vundny qSmls Hkh c<kok na) D; kafd; g IeL; k osüod Hkys gh gkal ys du bis LFkkuh; igy dk fgLik cukuk Hkh vko'; d g**A** tyok; qifjor**L** dh leL; k lsfuiV us dsfy, bl dk lekèkku Hkkjrh; n'kL vk**§** l**L**-fr e**s** [kksts rks ge $i\mu$ % ykska dks mu eW; ka ds çfr tkx: d dj | drs g§ tgk c-fr dks | tho bdkb2 ds : i esins[kk tkrk FkkA bldsfy, xkækhn'klu] V\$xksj n'klu] t§un'klu] co) n'klu vkfn dh f'k{kkvks dk çpkj&çl kj] nšk&fonšk en 0; kid Lrj ij djuk gkxkA milkkx dh l i -fr us ç-fr dk cM funč, rk. Isnkogu fd;k. gSk. Hkkjrh; i jaijk v kalç Fkk v kalea ç—fr. dh. j{kk. djusdsmik; NojsgSk. bl. hfy., $ge_{a} = L - fr dk_{s} = ut for d = us dh vko'; drk g_{A} - f = erk = s fd; k x; k fodk = c - fr ds fy,$, d leL;k cu xb2g\$A ∨k'p;2dh ckr ;g g\$ fd bldk lekèkku Hkh —f=erk ls<nkk tk jgk g\$A tyok; qifjorlu dh lel; kvka dks qy djus ds fy, foKku ds l kFk&l kkl—frd i utklyj.k dh 'k∉∨kr djuh gksxhA







tyok;qifjorlu dk Xy**s'**k;jkaij çHkko

vfuy Mcjky fgah fołkkx çdk'kpa łkê fgah fołkkx nýłkk"k:& \$91 9759818860 b&eyy:& drprakashbhatt@gmail-com Loxť; Jh enu ekgu mikê; k; ¼or≆rk lxke lukuh jktdh; Lukrdkůkj egkfo|ky; }kjkgkV] ∨YekMk

l kj kå k

mPp fgekybl {ks=ka ea ekuo ds vfu; f=r n[ky] xhu gkml x9 ka ds mRl th] dkch , oa vkS kf xd vif'k"V mRI tu] vkj oukfXu Isc<rh Xykcy okfek IsXyf'k; j fujrj fl dM+stk jgsgA Hkkjr ea fgeky; jkT; ka vk§ dae ljdkj }kjk Xyf'k; jka dks cpkus ds fy, lfefr; ka dk xBu gkrk gA ijarq ekstunk fLFkfr ea muds ç; kl. vi; klr çrhr gkars gå Xys'k; jka dh fLFkfr dgha Hkh vPNh ugha gS os yxkrkj fl dMfrs tk jgs gSA bljks dh, d fjiksVZ es; g ckr lkeus vkbZ fiNys yxHkx 50 I kyka ea fgeun 16 Qhl nh fi?ky podsg& mùkjk[kM dh I Hkh çed[k ufn; ka çk; : Xys'k; jka I sgh fudyrh g\$ tksu dogy jkT; vfirg nsk ds, d cM+Hkm&Hkkx dh is ty] -f"k vk§ m | kxkadsfy, tykifirzdjrh g&k çHkkfor Xyf'k;jkalsbu ufn;kadsvfLrRo ij Hkh yxkrkj [krjk eMjk jgk g& Le; Le; ij buea vl kekll; çokq Hkh ns[kus dks feyus yxk g& Xykcy okfe& Is fi?kyrs Xys''k; j u dxy fgeky; h jkT; ka dks cHkkfor dj jgs gå cfYd bllsnsk vk§ follo dk i; kbj.kh;ikfjfLFkfrdh ræ cojh rjg çHkkfor gksrk fn[kkbZiM jgk g\$A Øk; kLQş j dk nk; jk ?kV jgk g\$A vkbi hl hl h (intergovernmental panel on climate change) dh vkdyu fjiky/2022 dh ekuarks Xykcy okfeik Isrsth fi?kyrsXyg'k; ikalslene dstyLrj ea of) glpZgSrFkk bldk vlj lhèksrki ij è#oka) ioùrka, ∨k§, rVh; {k⊱ dh ikfjfLFkfrdh ij iMk g\$A, Xysf'k; jka, dks opkus dh eqfge ns'k ea dkQh iqys'kq qks x; h Fkh] ijUrq ncly jktuhfrd bPNk'kfä] 'kqjhdj.k] vfu; i=r tul i; k] dkclu mRI tlu], oa vi (kk-r de tu&tkx: drk dspyrs; g e (ge nij dh dkM) + çrhr gkrh gA







tyok;qifjorlu dk ,**s**rgkfld Lekjdkaij çHkko: & Hkkjr ds**la**Hkle**a**

ns'kkar usch

Email: deshantnegi18@gmail-com@7827556756 bfrgkl foHkkx, LoO Jh enu ekgu mikè;k; Lorærk lukuh ihO thO egkfo|ky; }kjkgkV ¼/YekMk½ mÙkjk[kM

l kj kå k

tyok; qfdl h cM + bykds dk vk9 r ek9 e gS tksfd , d yncsle; lscuk jgrk gA yfdu tc bl vk9 r ek9 e en fol xfr; kamRiUu gkrh gS A rksmlstyok; qifjorlu dh l KK nh tkrh gS fi Nys dnN n'kdkm ds nk9 ku Hkkjr dh tyok; qen vl kekU; ifjorlu n{kus dks feys gn ftl dk eq[; dkj.k t50 & la kèkukm dk n#i; kx gS] t50 & la kèkukm lsrkRi; 2 ck—frd la kèkukm lsgA tyok; qen mRiUu gksjgh gS; g fol xfr; ka Hkkjr ds, frgkfl d Lekjdkm ds laj{k.k, on j[kj[kko en puk5r; kn mRiUu dj jgh gS gky gh en Hkkjrh; igjkrkfRod lok[k.k foHkkx }kjk fpark 0; ä dh xb2 gS fd gok en ek5tun èkny d.k vk9 lYQjMkb v,Dl kbM ds dkj.k rktegy dh ped en deh vk jgh gS| bl ds vykok tyok; qifjorlu ds dkj.k lene ds tyLrj en of) gkus ls Hkkjr ds, frgkfl d LFky jke lsrqdk vfèkdkalk fgLl k tyeXu gks puplk gS bl çdkj ge ns[krsgn fd tyok; qifjorlu Hkkjr ds, frgkfl d Lekjdkm dks upll ku ignok jgk gS A vr%ljdkj dks Bk4 dk; kstuk fufelr djuh pkfg,

GST IN: 05AMDPP6190K3ZO

<u>MOB:</u> 8279827626 / 7830621588



<u>Deals' In</u>: Laboratory Chemicals Stockist (Merck, Thermofisher Qualigen's, CDH Chemicals) etc. Glassware Borosil glass, Whatman Filter Paper, Remi, Labline etc. Electronic Instruments Physics, Chemistry, Biology, Geography & Math's Lab Equipment and Apparatus, Plastic Lab Ware, Microscope, Biological Slides, Specimens, Models & Chart.

<u>Regd. Office</u>: -Mayur Vihar, Talli Haldwani, Bareillay Road Haldwani- 263139, (Nainital) Uttarakhand <u>Mobile</u> – 8279827626 / 7830621588 <u>E-Mail – sciencezone2013@gmail.com</u>

<u>Branch Office</u>: -Takana Road, Near Shubham Furniture Mart. Pithoragarh- 262501 (UK) Mobile – 7830621588 / 8279827626

GSTIN No.05AHSPG121	5CIZW	Mobile 96909-17706 84457-40003	
	Shree Che	micals	
Deals in : Biologica	al, Physics, Chemistry, Geography, Survey, Psycholog	y, Electronics, Surgicals,	
oughineering monuments i	app., sary culture, 1 cokits, wooden and steel furnin	are and General Order Suppliers.	
Anênyesi tuê tûşi mintin	app,, sary culture, 1 cokits, wooden and steel furnin	ire and General Order Suppliers.	
Ref. :	app, sary culture, rookits, wooden and steel furnin Quotation	rre and General Order Suppliers. Date :	
Ref. :	app, sary culture, rookits, wooden and steel furnin	ire and General Order Suppliers. Date :	



Organizing Committee



Chief Patron *Prof. (Dr.) Anita Rawat* Director, USERC Dehradun, Uttarakhand



Patron Prof A. K. Joshi Principal, Government P.G. College Dwarahat



Chief Patron Dr. D. P. Uniyal Joint Director, UCOST Dehradun, Uttarakhand



Organizing Secretary Dr. Darshan Singh

Assistant Professor & Head Department of Chemistry Government P. G. College, Dwarahat

Dr. N. K.Singh Assistant Professor Department of Mathematics Mr. Bipin Suyal Assistant Professor Department of Botany

Co-organizing Secretaries Dr. Suman Garia sor Assistant Professor otany Department of Physics

Co-ordinator's

Dr. Bhagwati Prasad Assistant Professor Department of Physics

Ms. Sharmishtha Assistant Professor Department of Zoology

Cheif Advisor

Dr. Bharat Ji Upadhayay

Associate Professor Dept. of Sociology

Organizing Support Team

Dr Nazish Khan Dr. Shailendra Kumar Dr. Upasna Sharma Dr. Anjum Ali Dr. Poonam Pant Dr. Nirdoshita Bisht Dr. Mahendra Prasad Dr. Mohit Joshi Dr. Nisha Dr. Usha Pandey

Treasurer

Mr. Ganesh Kuwarbi Senior Admin, Officer Govt. P.G. College,Dwarahat

Associate professor, Department of English Assistant Professor, Department of Political Science Assistant Professor, Department of Economics Assistant Professor, Department of History Assistant Professor, Department of History Assistant Professor, Department of Sociology Assistant Professor, Department of Sociology Assistant Professor, Department of Political Science Assistant Professor, Department of Hindi Assistant Professor, Department of Commerce Dr. Bhawana Kapkoti Assistant Professor Department of Botany

Dr. Gitu Kunwar Assistant Professor Department of Chemistry

Support

Dr.P.C.Bhatt Assistant Professor Department of Hindi

Young Scientist Award for Best poster & Short Presentation award will be given to the most innovative work.





About Dwarahat Dwarahat - Town of Temples

The peaceful town of Dwarahat is nestled in the ravishing Kumaon hills of Uttarakhand. It is perched at an elevation of 1,510 metres above sea level in the Almora district of Uttarakhand. Dwarahat literally suggests the 'Way to Heaven' in local language. It is famous for the ancient temples constructed by the Katyuri kings. The architecture of these temples is similar to that of the Gurjari School of Art.

About College

S.S.M.M.U.S.S.S. Govt. P.G. College Dwarahat was established in 1983 in Almora district with a motive of providing higher education to students of the surrounding area. It is affiliated to SSJ University, Almora. The college has its own library and Science Laboratories, Computer lab with Internet facility and all kind of modern facilities. The campus is divided into several blocks- Administrative Block, Arts Block, Science Block, Commerce Block and Library. College offers various Post Graduate and Under Graduate level courses.





Our Sister Concern



N.B. PUBLICATIONS SF-1, 2nd Floor, A-5/3, DLF, Ankur Vihar, Loni, Ghaziabad-201102 Mob : 9999829572, 8700829963 E-mail : nbpublications26@gmail.com