3.3.1 Number of research papers published per teacher in the Journals notified on the UGC CARE list during the last five years.

Sl/ No	Title of paper	Name of the author/s	Department of the teacher	Name of journal	Calendar Year of publication	ISSN number	Link to the recognition in UGC enlistment of the Journal /Digital Object Identifier (doi) number		
							Link to website of the Journal	Link to article / paper / abstract of the article	Is it listed in UGC Care list
1	Diatoms : A tool for forensic investigations	R.K. Dwivedi	Botany	Phytotaxonomy	2019	0972-4206	https://www.theplanttaxonomyindia.com/	https://www.theplanttaxonomyindia.com/wp-content/uploads/2022/01/100-104-On-diversity-of-members-of-Surirellaceae.pdf	Listed on web of Science YES

2.	Tetrasporidium javanicummobius (Chlorophyta), a rare species recorded from Arpa River in Bilaspur ,Chhattishgarh,India	R.K. Dwivedi	Botany	Threatened Taxa	2019	0974-7907	https://www.threatenedtaxa.org/index.php/JoTT	https://www.threatenedtaxa.org/index.php/JoTT/issue/view/15091-15218/25	YES
3.	An efficient and stable Lagrangian matrix approach to Abel integral and integro-differential equations	Dr Vinita Devi	Mathematics	Applied Mathematics and Computation	2019	0096-3003	https://www.sciencedirect.com/journal/applied-mathematics-and-computation	https://doi.org/10.1016/j.amc.2019.125005	YES
4.	Triple color image encryption based on 2D multiple parameter fractional discrete Fourier transform and 3D Arnold transform	D. C. Mishra	Mathematics	Optics and Lasers in Engineering Elsevier	2020	0143-8166	https://www.sciencedirect.com/journal/optics-and-lasers-in-engineering	https://doi.org/10.1016/j.optlaseng.2020.106139	YES

5.	**Multilayer Security of RGB Image in Discrete Hartley Domain**	D. C. Mishra	Mathematics	Applications and Applied Mathematics: An International Journal (AAM)	2020	1932-9466	https://digitalcommons.pvamu.edu/aam/	https://digitalcommons.pvamu.edu/aam/vol15/iss2/29/	YES
6	**Colour-image encryption based on 2D discrete wavelet transform and 3D logistic chaotic map**	D. C. Mishra	Mathematics	Journal of Modern Optics	2020	0950-0340	https://www.tandfonline.com/journals/tmop20	https://doi.org/10.1080/09500340.2020.1789233	YES
7	**A new multi-layer RGB image encryption algorithm based on Diffie-Hellman cryptography associated with FrDCT and arnold transform**	D. C. Mishra	Mathematics	Multimedia Tools and Applications	2020	1380-7501	https://link.springer.com/journal/11042	https://doi.org/10.1007/s11042-020-09615-w	YES

8	Security of multiple RGB images by RSA cryptosystem combined with FrDCT and Arnold transform	D. C. Mishra	Mathematics	Journal of Information Security and Applications	2020	2214-2126	https://www.sciencedirect.com/journal/journal-of-information-security-and-applications	https://doi.org/10.1016/j.jisa.2020.102524	YES
9	Lagrange's operational approach for the approximate solution of two-dimensional hyperbolic telegraph equation subject to Dirichlet boundary conditions	Dr Vinita Devi	Mathematics	Applied Mathematics and Computation	2020	0096-3003	https://www.sciencedirect.com/journal/applied-mathematics-and-computation	https://doi.org/10.1016/j.amc.2019.124717	YES
10	An efficient matrix approach for two-dimensional diffusion and telegraph equations with Dirichlet boundary conditions	Dr Vinita Devi	Mathematics	Physica A: Statistical Mechanics and Its Appli	2020	0378-4371	https://www.sciencedirect.com/journal/physica-a-statistical-mechanics-and-its-applications	https://doi.org/10.1016/j.physa.2019.123784	YES

				cations					
11	**Investigation of AntiDiabetic and GC-MS Analysis of Extracts of Lilium polyphyllum**	**Prof(Dr) Sahilendra Prakash Madhwal**	Chemistry	Tropical Journal of Natural Product Research	2020	1478-6419	https://tjnpr.org/index.php/home	https://tjnpr.org/index.php/home/article/view/908	YES
12	**Distribution pattern of Ichthyofaunal diversity in different habitats in the first-, second- and third order streams of Randi Gad from Garhwal Himalaya, India.**	**Dr Pankaj Bahuguna**	Zoology	National Academy Science Letters	2020	0250-541X	https://link.springer.com/journal/40009	https://doi.org/10.1007/s40009-020-01032-9	Yes

13	Studies on the drifting behavioural patterns of macrozoobenthos in Kyunja Gad , a mountain stream from Garhwal Himalaya, India.	Dr Pankaj Bahuguna	Zoology	J. Mountain. Res.	2020	E 2582-5011	https://jmr.sharadpauri.org/	https://doi.org/10.51220/jmr.v15i1.11	Yes
14	Population structure and drifting pattern of aquatic mites in Randi Gad, a tributary of River Alaknanda in Garhwal Himalaya, Uttarakhand, India.	Dr Pankaj Bahuguna	Zoology	J. Mountain. Res.	2020	E 2582-5012	https://jmr.sharadpauri.org/	https://doi.org/10.51220/jmr.v15i1.7	Yes
15	Triple color image encryption based on 2D multiple parameter fractional discrete Fourier transform and 3D Arnold transform	Dr D.C.Mishra	Mathematics	Optics and Lasers in Engineering	2020	0143-8166	https://www.sciencedirect.com/journal/optics-and-lasers-in-engineering	https://doi.org/10.1016/j.optlaseng.2020.106139	Yes
16	Colour-image encryption based on 2D discrete wavelet transform and 3D logistic chaotic map	Dr D.C.Mishra	Mathematics	Journal of Modern Optics	2020	0950-0340 (print) 1362-3044 (web)	https://www.tandfonline.com/journals/tmop20	https://doi.org/10.1080/09500340.2020.1789233	Yes

17	**Security of multiple RGB images by RSA cryptosystem combined with FrDCT and Arnold transform**	Dr D.C.Mishra	Mathematics	Journal of Information Security and Applications	2020	2214-2126	https://www.sciencedirect.com/journal/journal-of-information-security-and-applications	https://doi.org/10.1016/j.jisa.2020.102524	Yes
18	**Multilayer Security of RGB Image in Discrete Hartley Domain**	Dr D.C.Mishra	Mathematics	Applications and Applied Mathematics	2020	1932-9466	https://digitalcommons.pvamu.edu/aam/	https://digitalcommons.pvamu.edu/cgi/viewcontent.cgi?article=1809&context=aam	Yes

19	National Strategy For Financial Education In India	Varun Kumar	Commerce	Himalayan J.Soc.Sci.& Humanities	2020	0975-9891	https://jmr.sharadpauri.org/	http://dx.doi.org/10.51220/hjssh.v15i1.4	NA
20	National Strategy For Financial Education In India	V.K.Saini	Commerce	Himalayan J.Soc.Sci.& Humanities	2020	0975-9891	https://jmr.sharadpauri.org/	http://dx.doi.org/10.51220/hjssh.v15i1.4	NA
21	ROLE OF MEDIA IN OVERALL DEVELOPMENT OF THE COUNTRY: AN ANALYSIS	V.K.Saini	Commerce	Himalayan J.Soc.Sci.& Humanities	2020	0975-9891	https://jmr.sharadpauri.org/	http://dx.doi.org/10.51220/hjssh.v15i1.4	NA

22	ROLE OF MEDIA IN OVERALL DEVELOPMENT OF THE COUNTRY: AN ANALYSIS	**Varun Kumar**	Commerce	Himalayan J.Soc.Sci & Humanities	2020	0975-9891	https://jmr.sharadpauri.org/	http://dx.doi.org/10.51220/hjssh.v15i1.4	NA

23	**Jansankhya pravas bhoogol shiksha ainv rojgaar sah sambandh** (जनसंख्या प्रवास- भूगोल, शिक्षा एवं रोजगार सह संबंध)	**Dr Archna Nautiyal**	Geography	Rohilkhand geographical journal of India	2020	0976-8556	A Refereed Research Journal	A Refereed Research Journal	NA
24	**Observation on the body mass weight-length Relationship and Relative Condition Factor of Macrobrachium assamensis peninsularis from Khoh river, Uttarakhand, India.**	**Dr Pankaj Bahuguna**	Zoology	Uttar Pradesh journal of zoology	2021	0256-971X (P)	https://mbimph.com/index.php/UPJOZ/index	https://mbimph.com/index.php/UPJOZ/article/view/2226/1940	Yes

25	**Macrozoobenthos of Basti Damar stream in Rudraprayag District, Garhwal, Uttarakhand: Diversity and Habitat analysis.**	Dr Pankaj Bahuguna	Zoology	J. Mountain. Res.	2021	E2582-5011	https://jmr.sharadpauri.org/	https://doi.org/10.51220/jmr.v16i1.24	Yes
26	Drifting behaviour of aquatic mites and regulating ecological parameters in Khankra gad stream, a spring fed tributary of Alaknanda River, Rudraprayag Garhwal, Uttarakhand, India.	Dr Pankaj Bahuguna	Zoology	J. Mountain. Res.	2021	E2582-5012	https://jmr.sharadpauri.org/	https://doi.org/10.51220/jmr.v16i1.6	Yes

27	Sex- ratio structure of Puntius ticto in spring fed River Aasan from District-Dehradun, Uttarakhand, India.	Dr Pankaj Bahuguna	Zoology	Uttar Pradesh journal of zoology	2021	0256-971X (P)	https://mbimph.com/index.php/UPJOZ	https://mbimph.com/index.php/UPJOZ/article/view/2194/1921	Yes
28	Biodiversity and monthly density fluctuations of water mites in Khankra gad, a spring-fed tributary of river Alaknanda, Pauri Garhwal, Uttarakhand	Dr Pankaj Bahuguna	Zoology	Journal of Applied and Natural Sciences.	2021	0974-9411	https://www.ansfoundation.org/	https://doi.org/10.31018/jans.v13i1.2568	Yes

29	**Fecundity of the snow fed minor carp Barilius bendelisis (Ham.) (Pisces: Cyprinidae) from River Yamuna, India**	Dr Pankaj Bahuguna	Zoology	Uttar Pradesh Journal of Zoology	2021	0256-971X (P)	https://mbimph.com/index.php/UPJOZ	https://mbimph.com/index.php/UPJOZ/article/view/2096/1857	Yes

30	Security of Digital Images Based on 3D Arnold Cat Map and Elliptic Curve	Dr D.C.Mishra	Mathematics	International Journal of Image and Graphics	2021	0219-4678	https://www.worldscientific.com/worldscinet/ijig	https://doi.org/10.1142/S0219467821500660	Yes
31	Multi-image steganography and authentication using crypto-stego techniques	Dr D.C.Mishra	Mathematics	Multimedia Tools and Applications volume	2021	29067–29093	https://link.springer.com/journal/11042	https://doi.org/10.1007/s11042-021-11068-8	Yes

32	Dr Bhimrao Ambedkar Ek Arthshashtri (डॉ भीमराव अंबेडकर एक अर्थशास्त्री शास्त्री)	**Varun Kumar**	Commerce	Aayushi International Interdisciplinary Research Journal	2021	2349-638X	https://www.aiirjournal.com/index.php	https://aiirjournal.com/uploads/Articles/1620303071Specail%20Issue%2084.DR.BABASAHEB%20AMBEDKAR%20%20AN%20ARCHITECT%20OF%20INDIA.pdf	NA
33	Dr Bhimrao Ambedkar Ek Arthshashtri (डॉ भीमराव अंबेडकर एक अर्थशास्त्री शास्त्री)	**V.K.Saini**	Commerce	Aayushi International Interdisciplinary Research Journal	2021	2349-638X	https://www.aiirjournal.com/index.php	https://aiirjournal.com/uploads/Articles/1620303071Specail%20Issue%2084.DR.BABASAHEB%20AMBEDKAR%20%20AN%20ARCHI	NA

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34	**Study of some freshwater algae form himachal pradesh,India**	**Dr.R.K.Dwivedi**	Botany	International Journal of Advance and Innovative Research	2021	2394-7780	https://ijairjournal.in/	https://iaraedu.com/pdf/ijair-volume-8-issue-2-iii-april-june-2021-part-1.pdf	NA
35	**Dehradun -District Bhogolic vishleshan** देहरादून जनपद- भौगोलिक विश्लेषण	**Dr Archna Nautiyal**	Geography	Printing Area	2021	2394-5303	Peer-Reviewed International Journal	Peer-Reviewed International Journal	NA
36	**Synthesis, Spectral analysis and Anti-microbial properties of Cu, Ag, Au complexes of 2, 5-dihydroxy-1, 4-benzoquinone and 3, 6-dichloro-2, 6-dihydroxy-1, 4-benzoquinone**	**Prof(Dr) Sahilendra Prakash Madhwal**	Chemistry	Results in Chemistry	2021	0346-251X.	https://www.sciencedirect.com/journal/results-in-chemistry	https://doi.org/10.1016/j.rechem.2021.100209	YES

37	ASSESSMENT OF BREEDING CAPACITY AND SEX-RATIO OF Barilius barna (HAMILTON) IN SPRING-FED TAMSA STREAM, GARHWAL REGION, INDIA	Dr Pankaj Bahuguna	Zoology	Uttar Pradesh journal of zoology	2021	0256-971X	https://mbimph.com/index.php/UPJOZ	https://mbimph.com/index.php/UPJOZ/article/view/2322	YES
38	FISH DIVERSITY OF MAL GAD STREAM NEAR PUROLA TOWN FROM UTTARKASHI DISTRICT, UTTARAKHAND, INDIA	Dr Pankaj Bahuguna	Zoology	Uttar Pradesh journal of zoology	2021	0256-971X	https://mbimph.com/index.php/UPJOZ	https://www.mbimph.com/index.php/UPJOZ/article/view/2260	YES
39	Length-weight relationships and relative condition factor of Puntius ticto in the Aasan River, Uttarakhand, India	Dr Pankaj Bahuguna	Zoology	Uttar Pradesh journal of zoology	2021	0256-971X	https://mbimph.com/index.php/UPJOZ	https://www.mbimph.com/index.php/UPJOZ/article/view/2268	YES
40	Reproductive Potential of Puntius ticto in Foothill River Aasan from Doon Valley, India	Dr Pankaj Bahuguna	Zoology	J.Env.Bio-Sci	2021	0973-6913	https://connectjournals.com/pages/journaldetails/JEBS	https://www.researchgate.net/publication/354836477_Reproductive_Potential_of_Puntius_ticto_in_Foothill_River_Aa	YES

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41	OBSERVATION ON ECOLOGY AND DIVERSITY OF PERIPHYTON COMMUNITY IN THE MAL GAD STREAM FROM GARHWAL REGION, INDIA	Dr Pankaj Bahuguna	Zoology	Uttar Pradesh journal of zoology	2021	0256-971X	https://mbimph.com/index.php/UPJOZ	https://www.mbimph.com/index.php/UPJOZ/article/view/2402	YES
42	Security of multiple RGB images in the time domain and frequency domain	Dr D.C.Mishra	Mathematics	ACM Journal	2021	0004-5411	https://www.sciencedirect.com/journal/journal-of-information-security-and-applications	https://doi.org/10.1016/j.jisa.2021.103005	YES
43	MULTIPLE RGB IMAGE ENCRYPTION ALGORITHM WITH MULTILAYERS BY AFFINE HILL CIPHER WITH FRDCT AND ARNOLD TRANSFORM	Dr D.C.Mishra	Mathematics	Fractals	2021	2392-2192	https://www.worldscientific.com/worldscinet/fractals	https://doi.org/10.1142/S0218348X21501516	Yes
44	Dr Bhimrao Ambedkar Ek Arthshashtri (डॉ भीमराव अंबेडकर एक अर्थशास्त्री शास्त्री)	Varun Kumar	Commerce	Aayushi International Interdisciplinary	2021	2349-638x	Page No 881-884 Vol .No. SI No 84(April 2021) PEER REVIEW JOURNAL	Page No 881- 884 Vol .No. SI No 84(April 2021) PEER REVIEW	NA

				Research Journal(AIIRJ)				JOURNAL	
45	Dr Bhimrao Ambedkar Ek Arthshashtri (डॉ भीमराव अंबेडकर एक अर्थशास्त्री शास्त्री)	V.K.Saini	Commerce	Aayushi International Interdisciplinary Research Journal(AIIRJ)	2021	2349-638x	Page No 881-884 Vol .No. SI No 84(April 2021) PEER REVIEW JOURNAL	Page No 881- 884 Vol .No. SI No 84(April 2021) PEER REVIEW JOURNAL	NA
46	Factors Affecting Internal Migration in India	Varun Kumar	Commerce	B.Aadhar (Aadhar International publicatio	2021	2278-9308	Issue no.CCCVII 308 volume C	Issue no.CCCVII 308 volume C	NA

				n) Issue no.CCCVII 308 volume C					
47	Factors Affecting Internal Migration in India	V.K.Saini	Commerce	B.Aadhar (Aadhar International publication) Issue no.CCCVII 308 volume C	2021	2278-9308	Issue no.CCCVII 308 volume C	Issue no.CCCVII 308 volume C	NA
48	Impact of Lockdown on Migrants	V.K.Saini	Commerce	B.Aadhar (	2021	2278-	Issue no.CCCVII 308 volume C	Issue no.CCCVI	NA

				Aadhar International publication) Issue no.CCCVII 308 volume C		9309		I 308 volume C	
49	**Impact of Lockdown on Migrants**	**Varun Kumar**	Commerce	B.Aadhar (Aadhar International publication) Issue no.CCCVII	2021	2278-9309	Issue no.CCCVII 308 volume C	Issue no.CCCVII 308 volume C	NA

				308 volume C					
50	Covid Impact on Agriculture	Varun Kumar	Commerce	B.Aadhar (Aadhar International publication	2021	ISSN-2278-9308	A Peer reviewed journal	A Peer reviewed journal	NA
51	Covid Impact on Agriculture	V.K.Saini	Commerce	B.Aadhar (Aadhar International publication	2021	ISSN-2278-9309	A Peer reviewed journal	A Peer reviewed journal	NA
52	Women Entrepreneurs hip Development in India	Varun Kumar	Commerce	PRINTING AREA Publi	2021	ISSN-2394-53303	A Peer reviewed journal	A Peer reviewed journal	NA

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53	FECUNDITY OF Noemacheilus denisonii DAY FROM RIVER YAMUNA, INDIA	Shraddha Bharti	Zoology	Uttar Prad esh journ al of zool ogy	2021	025 6-9 71X	https://mbimph .com/index.ph p/UPJOZ	https://mb imph.com /index.ph p/UPJOZ/ article/vie w/2784	Yes
54	Reproductive Capacity and Sex-Ratio of Noemachelius multifasciatus Day from Mandal River, India.	Shraddha Bharti	Zoology	J. Mou ntain Res.	2021	097 4-3 030	https://jmr.shar adpauri.org/	https://doi .org/10.51 220/jmr.v 16i3.34	Yes
55	Synthesis and spectral analysis of the Cr (II) lapachol chelate crystal complexes using DMC, H2O mixture	Prof(Dr) Sahilendra Prakash Madhwal	Chemistry	Inor gani c and Nan o-M etal Che mistr y	2022	247 015 56; 247 015 64	https://www.ta ndfonline.com/ journals/lsrt21	https://doi .org/10.10 80/24701 556.2022. 2081202	YES
56	Vitiy Smavesh chunotiyan ainv smadhan (वित्तीय समावेश चुनौतियां एवं समाधान)	Varun Kumar	Commerce	Inter natio nal Jour nal of Adv ance and	2022	234 7-707 5	A Peer reviewed journal	A Peer reviewed journal	NA

				Applied Research					
57	**Plastic Money Prospective and Challenges**	**Varun Kumar**	Commerce	Journal of Research and Development	2022	2230-9578	A Peer reviewed journal	A Peer reviewed journal	NA
58	**Women Entrepreneurs hip Development in India**	**V.K.Saini**	Commerce	PRINTING AREA Publication	2022	2394-53304	A Peer reviewed journal	A Peer reviewed journal	NA
59	**Vitiy Smavesh chunotiyan ainv smadhan (वित्तीय समावेश चुनौतियां एवं समाधान)**	**V.K.Saini**	Commerce	International Journal of Advance and Appli	2022	2347-7076	A Peer reviewed journal	A Peer reviewed journal	NA

				ed Research					
60	**Plastic Money Prospective and Challenges**	**V.K.Saini**	Commerce	Journal of Research and Development	2022	2230-9579	A Peer reviewed journal	A Peer reviewed journal	NA
61	SNOW TROUT, Schizothorax richardsonii (GRAY), FROM THE RIVER YAMUNA, UTTARAKHAND, INDIA: A STUDY ON THE LENGTH-WEIGHT RELATIONSHIP AND RELATIVE CONDITION FACTOR	Shraddha Bharti	Zoology	Uttar Pradesh journal of zoology	2022	0256-971X	https://mbimph.com/index.php/UPJOZ/index	https://www.mbimph.com/index.php/UPJOZ/article/view/2445	Yes
62	Enhanced visible light photocatalytic degradation of rhodamine B using Ni1-xCaxFe2O4 (0 ≤ x ≤ 0.5) nanoparticles: Performance, kinetics and mechanism	Dr Mohd Shahazad	Chemistry	Materials Research Bulletin	2022	0025-5408	https://www.sciencedirect.com/journal/materials-research-bulletin	https://doi.org/10.1016/j.materresbull.2022.111911	YES
63	Fabrication of Er, Tb doped CuO thin films using nebulizer spray pyrolysis technique for photosensing applications	Dr Mohd Shahazad	Chemistry	Optical Materials	2022	1873-1252	https://www.sciencedirect.com/journal/optical-materials	https://doi.org/10.1016/j.optmat.2021.111954	YES

64	On Some Freshwater Soft Algae from Bhulla Taal Lake Lansdowne, District Pauri Garhwal, Uttarakhand	Rakesh Kumar Dwivedi	Botany	Journal of Mountain Research	2021	0974-3030	https://jmr.sharadpauri.org/	http://dx.doi.org/10.51220/jmr.v16i3.32	YES
65	SNOW TROUT, Schizothorax richardsonii (GRAY), FROM THE RIVER YAMUNA, UTTARAKHAND, INDIA: A STUDY ON THE LENGTH-WEIGHT RELATIONSHIP AND RELATIVE CONDITION FACTOR	Sanjay Madan	Zoology	Uttar Pradesh journal of zoology	2022	0256-971X	https://mbimph.com/index.php/UPJOZ/index	https://www.mbimph.com/index.php/UPJOZ/article/view/2445	Yes
66	Himalayan Yellow Raspberry (Rubus ellipticus Smith.): A Plant with Multiple Medicinal Purposes	Dr.Preeti Rawat	Chemistry	records of agricultural and food chemistry	2022	2792-0763	https://www.acgpubs.org/journal/records-of-agricultural-and-food-chemistry	https://www.acgpubs.org/doc/20230115100624A1-13-RAFC-2209-2576.pdf	NA

67	A stable operational matrix based computational approach for multi-term fractional wave model arise in a dielectric medium with Multiple Medicinal Purposes	Dr.Vinita Devi	Mathematics	Chinese Journal of Physics	2023	2309-9097	https://www.sciencedirect.com/journal/chinese-journal-of-physics	https://doi.org/10.1016/j.cjph.2023.12.019	YES
68	Influence of synthesizing parameters on surface qualities of aluminium alloy AA5083/ CNT/MoS2 nanocomposite in powder metallurgy technique	Dr.Mohd Shahazad	Chemistry	Journal of Materials Research and Technology	2023	2214-0697	https://www.sciencedirect.com/journal/journal-of-materials-research-and-technology	https://doi.org/10.1016/j.jmrt.2023.10.043	YES
69	Improvement in ammonia gas sensing properties of La doped MoO3 thin films fabricated by nebulizer spray pyrolysis method	Dr.Mohd Shahazad	Chemistry	Optical Materials	2023	1873-1252	https://www.sciencedirect.com/journal/optical-materials	https://doi.org/10.1016/j.optmat.2023.114464	YES
70	Optimizing the selection of natural fibre reinforcement and polymer matrix for plastic composite using LS-SVM technique	Dr.Mohd Shahazad	Chemistry	Chemosphere	2023	1879-1298	https://www.sciencedirect.com/journal/chemosphere	https://doi.org/10.1016/j.chemosphere.2023.140971	YES

71	A new class of generalized Ellis–Bronnikov wormhole in asymptotically safe gravity	Dr.Subham Kala	Physics	International Journal of Modern Physics D	2023	1793-6594	https://www.worldscientific.com/worldscinet/ijmpd	https://doi.org/10.1142/S0218271823500670	YES
72	Multiple colour image encryption using multiple parameter FrDCT, 3D Arnold transform and RSA	Dr.D.C.Mishra	Mathematics	Multimedia Tools and Applications	2023	1573-7721	https://link.springer.com/journal/11042	http://dx.doi.org/10.1007/s11042-023-17166-z	YES
73	Parvtiy paristhitiki tantra jalvayu parivartan jaiv vividhita hrash sanskritik aur adhyatmik mulyon par prabhav पर्वतीय पारिस्थितिकी तंत्र जलवायु परिवर्तन जैव विविधता ह्रास सांस्कृतिक और आध्यात्मिक मूल्यों पर प्रभाव	Dr.Archna Nautiyal	Geography	IJNRD	2023	2456-4184	https://www.ijnrd.org/index.html	http://doi.one/10.1729/Journal.35144	NA
74	Effect of Pre-Emergence Herbicides on Rice (Oryzasativa L.) and Rice Field Microflora	ChandolaPawanika	Botany	Bioinfolet	2023	0976-4755	https://www.indianjournals.com/ijor.aspx?target=ijor:bil&type=home	https://www.indianjournals.com/ijor.aspx?target=ijor:bil&volume=20&issue=2a&article=005	Yes

75	Fluid inclusion petrography and microthermometery of barren/mineralized quartz veins-reef of malanjkhand CU deposits,central India: Implication on ore and non ore forming environment	Gunjan Arya	Geology	Journal of Geoscience Research	2024	2455-1953	https://gondwanags.org.in/journal-of-geosciences-research-jgsr/	https://gondwanags.org.in/journal-of-geosciences-research-jgsr/contents/jgsr-vol-9-no-2-july-2024/fluid-inclusion-petrography-and-microthermometry-of-barren-mineralized-quartz-veins-reef-of-malanjkhand-cu-deposit-central-india-implication-on-ore-and-non-ore-forming-environment/	YES

76	**Sustainable hydrogen production from waste of expired breads through supercritical water gasification**	**Dr.Mohd Shahazad**	Chemistry	International Journal of Hydrogen Energy	2024	1879-3487	https://www.sciencedirect.com/journal/international-journal-of-hydrogen-energy	https://doi.org/10.1016/j.ijhydene.2024.01.190	YES
77	**Studies on phase transitions and dielectric properties of biowaste synthesized porous carbon nanoparticles – ferroelectric liquid crystal mixture**	**Dr.Kamal kumar**	Physics	Ferroelectrics	2024	0307-1022	https://www.tandfonline.com/journals/gfer20	https://doi.org/10.1080/00150193.2023.2273713	YES

Details of Faculty publishing the Research Papers

Sl/N	Name of the Faculty	Name of Department	Date of Joining	Date of Leaving
1.	Dr R.K.Dwivedi	Botany	18/11/2014	Continuing
2.	Dr Vinita Devi	Mathematics	27/06/2019	Continuing
3.	Dr D.C.Mishra	Mathematics	30/03/2015	Continuing
4.	Prof Dr Shailendra Prakash Madhwal	Chemistry	29/07/2017	Continuing
5.	Dr Pankaj Bahuguna	Zoology	27/01/2020	30/06/2023
6.	Shradha Bharti	Zoology	18/07/2020	Continuing
7.	Varun Kumar	Commerce	25/01/2020	Continuing
8.	Virender Kumar Saini	Commerce	07/02/2020	Continuing
9.	Dr Archna Nautiyal	Geography	03/07/2020	Continuing
10.	Dr Mohammad Sehzad	Chemistry	06/08/2020	Continuing
11.	Dr Sanjay Madan	Zoology	23/07/2016	Continuing
12.	Dr Preeti Rawat	Chemistry	17/11/2021	Continuing
13.	Dr Shubham Kala	Physics	11/05/2022	Continuing
14.	Dr Pawanika Chandola	Botany	17/12/2015	Continuing
15.	Gunjan Arya	Geology	16/03/2019	Continuing
16	Dr Kamal Kumar	Physics	21/11/2015	Continuing

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Diatoms: A tool for forensic investigations

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Diatoms are a type of unicellular algae having cell wall made up of silica and cellulose. They are commonly found in almost all aquatic habitats in planktonic and benthic forms. During drowning, diatoms along with water enter into the lungs of the person and from there they pass to the other vital organs. Tracing the presence or absence of diatoms from the deceased body the reasons for the death may be ascertained. There are certain skeptics behind conclusion drawn on the basis of diatom diagnosis of the drowned person. But still the judicious application of diatom analysis from the site of drowning and the frustules of diatoms reported from the dead body may prove to be helpful to draw the conclusion in forensic investigation.

Key Words: Diatoms; drowning; forensic investigation; frustules; planktonic.

Introduction

Algae are the heterogenous group of photosynthetic organisms and their colorless derivatives which contribute to the primary production in all aquatic habitats. Among different forms of algae the diatoms are mainly unicellular photosynthetic organisms which are generally found in almost all aquatic or semiaquatic ecosystem waters and are grouped among the simplest eukaryotic forms as 'Algae'. Diatoms show ubiquitous distribution and are found in almost all waters. Usually, they are found in planktonic form (floating on the upper surface of water up to the depth of light penetration) or found attached with the mud, stones or submerged vegetation with the help of mucilaginous thread they secrete. Today, diatoms are classified into a new Kingdom Chromista (Cavalier-Smith, 1981) in Division Chrysophyta in Class Bacillariophyta. According to Guiry (2012) there are about more than 20,000 species of diatoms. Diatoms are generally of two types, either bilaterally symmetrical which are grouped into Bacillariales (Pennales) or radially symmetrical called Biddulphiales (Centrales) and the other remaining types of symmetry are classified between these two groups. (Round *et al.* 1990)

Diatom's structure

Diatoms have the siliceous (silicon dioxide) cell wall besides cellulose. The remnants of siliceous cell wall of diatoms are called frustules. Frustules are made up of two overlapping halves fitting closely together by a girdle. This siliceous frustule is resistant to the many chemical and mechanical actions of weathering. Diatom frustules are examined in the cases of death during the drowning. In the human body, diatoms do not occur naturally. Presence of diatoms in the internal body of the human beings is taken as corroborative or even conclusive evidence for the death caused by the drowning. (Holden and Crosfill, 1955 and Rushton, 1961).

Drowning and death

Drowning is defined as death due to partial or complete submergence in a fluid. (Timperman, 1972; Krstic *et al.* 2002). During drowning the death is caused by irreversible cerebral anoxia out of prolonged period of hypoxia (Alexis et al. 2012). The process continues beginning with breath holding until breaking point is reached. It is followed by involuntary aspiration or gasping, leading then to loss of consciousness and finally death (Di Maio and Di Maio, 2001; Timperman 1972). After breaking point the victim breathes in water for several minutes till respiration stops. Consciousness is usually lost within 5 minutes of drowning and cerebral hypoxia continues till death, usually within 10 minutes (Di Maio and Di Maio, 2001). During this time large amount of water enters into the lungs, alveoli and enters into the circulatory system. (Di Maio and Di Maio 2001 & Schwar 1972).

Along with water the penetration of diatoms into the lungs and into the circulatory system and even in the other body parts like bone marrow, brain, and kidneys by drowning is caused by the breathing in water by the victim. (Koseki, 1968, 1969). For forensic examination, the long bones and sternum

2.

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Tetrasporidium javanicum Möbius (Chlorophyta), a rare species recorded from Arpa River in Bilaspur, Chhattisgarh, India

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Chhattisgarh State is located in the central eastern part of India, a part of the central highlan. The state is well known for its unexplored and rich biodiversity and its mineral resources like iron, coal and limestone. The weather is hot and humid due to its proximity to the Tropic of Cancer (21.295°N and 81.828°E). Mahanadi is the largest river of the state and it is fed by the numerous tributaries including the river Arpa. The river originates from the Maikal range near the Kodari-Khongsara Village of Bilaspur District. It flows southwards to meet with Seonath River which in turn meets with the Mahanadi. Once perennial, now the river is mainly rain fed due to the formation of various check dams (Bhat & Geelani 2013). The riverbed is sandy at most of the places having an average height of about 1.5m and is rocky at some places. Arpa is considered as the lifeline for Bilaspur City as it flows through the middle of the city and is the major source of water. The present study deals with the algal flora of Arpa River near Koni, Bilaspur.

Epilithic algal samples were collected in different seasons by random sampling method between 2012 and 2018. They were collected from the submerged pebbles as epilithic algal thalli attached to the pebbles in the riverbed with the help of scalpel. The collected samples were kept in plastic bottles with river water and 4% formaldehyde. Samples were observed under the microscope and photographs were taken with the help of a Leica DM 2000 microscope at Department of Botany, Guru Ghasidas Vishwavidyalay, Koni, Bilaspur. Identification of the taxon was done by referring to standard research papers (Iyengar 1932; Sarma & Suryanarayana 1969; Pandey et al. 1980).

Samples collected in December 2012 (accession number Bsp/Arpa/14; collection date 23.xii.2012) and December 2013 (accession number Bsp/Arpa/02 collection date 22.xii.2013) were identified as *Tetrasporidium javanicum* Möbius (Chlorophyta, Chlorophyceae, Palmellopsidaceae).

The thalli under lower magnification (4x) appear net-like with many round perforations having smooth margins. Each thallus is multicellular, colonial, ranged between 10–30 cm in length, numerous cells are embedded into a common gelatinous matrix which are attached to the substratum with the help of an attachment disc. The cells are spherical to ellipsoidal, 5–12 µm in diameter. Each cell is uninucleate, with a single cup shaped chloroplast and a single, prominent pyrenoid.

Tetrasporidium javanicum Möbius was first reported from Java (Moebius 1893), and subsequently from other

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An efficient and stable Lagrangian matrix approach to Abel integral and integro-differential equations

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ABSTRACT

This article studies Abel integral equations (AIEs) and singular integro-differential equations (SIDEs) and aims to develop two numerical schemes for them. It also emphasises on the comparative analysis of both AIEs & SIDEs which is based on mainly two process namely Gauss-Legendre roots as collocation node points and random node points over the domain [0,1]. For generating interpolating basis functions (IBF), we used Lagrangian interpolating polynomial and for orthonormal Lagrangian basis functions (OLBF), we used Gram-Schmidt orthogonalization algorithm, respectively. Firstly, we introduced the function approximation by using generated IBF and OLBF, then established the error bounds of these approximations. The constructed approximations by both the schemes convert the AIEs and SIDEs into the system of algebraic equations. We have also established error bounds, stability and convergence analysis of the proposed schemes by considering several mild mathematical conditions. Moreover, the stability of schemes is also established numerically. Finally, the test functions with the support of graphs clearly show the reliability and computational efficiency of the proposed methods.

1. Introduction

In the fundamental class of equations, one of the most interesting equations is singular integral equation which appears in different areas of real-life modeling problems and engineering problems (see [1–7]). Due to which, in last few decades many researchers have taken much attention in integral equations; as all integral equations cannot be solved analytically, so it is necessary to develop some numerical schemes with significant accuracy to solve such type of singular problems numerically.

In 1823, N. H. Abel (Norwegian mathematician) studied a real-life modeling problem regarding the relationship between potential and kinetic energies for falling bodies. The standard generalized Abel's integral equation (AIE) is defined by Chakrabarti [8]:

$$\chi(x) = f_1(x)\int_0^x \mathcal{K}_1(x,t)\zeta(t)dt + f_2(x)\int_x^1 \mathcal{K}_2(x,t)\zeta(t)dt, \tag{1}$$

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Triple color image encryption based on 2D multiple parameter fractional discrete Fourier transform and 3D Arnold transform

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2D Multiple parameter fractional discrete Fourier transform
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ABSTRACT

This paper proposes a new encryption and decryption method for triple color images using 2D multiple parameter fractional discrete Fourier transform (MPFrDFT) and 3D Arnold transform (AT). The proposed method converts three color images into Bayer images, which are considered as the three components of a color image. These three Bayer images are combined vertically and then baker chaotic map is applied to permute rows and columns and a similar process is applied in the horizontal combination, the image then obtained is considered as the complex valued image (CVI). Then apply 2D MPFrDFT on this CVI. The output of 2D MPFrDFT is separated into three components. Apply 3D AT into the three components and the output is considered as the three color components of the encrypted image. The experimental results and the security analysis of the proposed method are given to validate the feasibility and robustness of the method. The statistical analyses like histogram, correlation and entropy confirm the robustness of the proposed method against statistical attacks and experimental results show that the method is resistant to occlusion attack. The mathematical analysis shows that the brute force attack is not possible to proposed method.

1. Introduction

Nowadays, due to the rapid flow of multimedia data, such as digital videos and images over open networks, the security of such important data has received much attention by cryptographers. In the past few years, many methods of digital image security based on encryption have been proposed. Digital image security method based on frequency domain transform, such as fractional Fourier transform [19–24], discrete cosine transform [25], Fresnel transform [31–33], gyrator transform [34,35], Hartle transform [36,38], fractional random transform [39] and fractional Mellin transform [40,43] have been proposed. The security of digital images based on discrete forms of FrFT (FrDFT) are presented in [24,25]. The FrDFT provides better performance and security for images due to index additivity and periodicity properties. In [26–30] authors have proposed image encryption methods based on MPFrDFT. One of the benefits of MPFrDFT is that, it larges the key space.

In paper [7], authors proposed a triple color image encryption method based on scrambling and reality-preserving fractional discrete cosine transform (RPFrDCT). In this method, the authors used the idea of format of the color image and they used Chirikov standard chaotic map, RPFrDCT and Arnold transform. Zhou et al. [16] presented a color image encryption algorithm based on the reality preserving fractional Mellin transform (RPFrMT). In this method, the RPFrMT of a different order is applied to the three color components of the image following the rotation of these color components. Further, the result of the former step is scrambled by three-dimensional scrambling to enhance the security of the encryption system. Lang [13] presented a color image encryption method by using color blend and chaos permutation operations in the reality-preserving multiple-parameter fractional Fourier transform (RPMPFrFT) domains. In this method, the original color image is exchanged and scrambled from the red (R), green (G) and blue (B), i.e., RGB color space to R'G'B' color space by rotating the color cube with a random angle matrix and then RPMPFrFT is applied for changing the pixel values of the color image. To further enhance the security of the encryption system, the output of the former step is scrambled by a 3D chaos-based scrambling map. Chen et al. [18] proposed a single channel optical asymmetric cryptosystem for color image encryption in

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Multilayer Security of RGB Image in Discrete Hartley Domain

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Abstract

In this article, we present RGB image encryption and decryption using random matrix affine cipher (RMAC) associated with discrete Hartley transform (DHT) and random matrix shift cipher (RMSC). The parameters in RMAC and RMSC phases act as two series of secret keys whose arrangement is imperative in the proposed algorithm. The computer simulations with results and examples are given to analyze the efficiency of the proposed approach. Further, security analysis and comparison with the prior techniques successfully supports the robustness and validation of the proposed technique.

Keywords: Discrete Hartley transform; Image encryption; Image decryption; Random matrix affine cipher; Random matrix shift cipher

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Colour-image encryption based on 2D discrete wavelet transform and 3D chaotic map

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ABSTRACT

This paper proposes a new lossless encryption and decryption method for digital colour-image using 2D discrete Haar wavelet transform (DHWT) and 3D logistic chaotic map. The proposed cryptosystem provides the security of the digital images using the cryptographic algorithm in the frequency domain of the image. The proposed method uses two levels of 2D DHWT for the decomposition of the image. For the encryption, 2D DHWT is applied on the different colour components of the colour-image and then the encryption method is applied on the different sub-bands of each level of decomposition and for the decryption the reverse process of the encryption is used with the inverse of functions used in encryption. The experimental results and the security analysis like brute force analysis, statistical analysis, occlusion and differential attack of the proposed method are given to validate the feasibility and robustness of the method.

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2D discrete wavelet transform; 3D logistic chaotic map; Haar wavelet transform; colour-image encryption; image decryption; lossless encryption

1. Introduction

The present era of digitalization requires the security of digital images in the process of communication. For the various purposes in human life, the smooth transformation of digital data in communication and the security of digital data from unauthorized users is a challenging task. These digital data may contain a lot of valuable and confidential information. The main objective of the proposed cryptosystem is to develop a lossless method for the security of digital images. In communication technology, image encryption can be classified into two categories: lossless and lossy. The main difference between the two encryption methods is that the lossy encryption method does not restore the data in its original form after decryption, on the other hand lossless encryption method restores and rebuilt the data in its original form after decryption. There are many applications of image cryptography in various areas. Since, images have some inherent features such as bulk data capacity, high redundancy and strong correlation among pixels, so traditional cryptographic algorithms like Rivest Shamir Adleman, Data Encryption Standard, Advanced Encryption Standard are not suitable for practical image encryption. The proposed cryptosystem provides the security of the colour-images using the cryptographic algorithms in the frequency domain of the image. In the literature, several methods are developed to handle the image data based on various methods and primitives in combination. The Fourier [1–5], discrete cosine [6,7], wavelet [8–11], gyrator [12,13], Arnold [13,14] transforms and the chaotic maps [15–17] etc. are some of the common primitives used to determine the image encryption methods.

In the past few decades, many researchers have designed the image encryption methods in the frequency domain. In this process, the original images are encrypted by modifying the frequencies and at the time of decryption, the image pixels can be reconstructed through the reverse process. In paper [1], the author proposed a method for colour-image encryption based on colour blend and chaos permutation operation in the reality-preserving multiple-parameter fractional Fourier transform (RPMPFRFT) domain. First, the image pixels are converted in the frequency domain by using RPMPFRFT, then the output is scrambled by two coupled chaotic logistic maps. In [3], a colour-image encryption algorithm was developed by using two-dimension (2D) compressive sensing (CS) and fraction Fourier transform (FrFT). In this algorithm, the original image is compressed by 2D CS and encrypted by changing the pixels in the frequency domain by using FrFT. Wua et al. [6] designed a triple colour-image encryption method using scrambling and the reality-preserving fractional discrete

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7.

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A new multi-layer RGB image encryption algorithm based on Diffie-Hellman cryptography associated with FrDCT and arnold transform

Vandana Guleria[1] · D. C. Mishra[2]

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Abstract

To protect sensitive data from unauthorized access is a prime agenda nowadays. Cryptography helps us to achieve this goal. An image encryption algorithm for the secure transmission of image data over a public communication channel is proposed. The encryption algorithm uses encryption scheme based on Diffie-Hellman key agreement protocol, fractional discrete cosine transform and Arnold transform. The earlier developed encryption algorithms, pixel values are not disturbed. They are only shifted to other coordinate positions. However, in our approach, pixel values are both disturbed and moved to different coordinate locations. The proposed scheme is secure in both time and frequency domain and gives multi-layer security for RGB image data. In contrast to similar schemes available in the literature, the security of our proposed technique depends upon shared secret keys, and their proper arrangements. The proposed encryption algorithm is susceptible to secret keys. A complete simulation analysis is provided to verify the validity of the algorithm.

Keywords Diffie-Hellman key agreement · Arnold transform · Fractional discrete cosine transform · Image encryption and image decryption

1 Introduction

Secure communication between anonymous parties over an unsecured channel has become a prime focus. Suppose Alice wants to send data to Bob over a public channel in such a way that nobody other than Bob can read the data. Cryptography helps us to protect sensitive data from unauthorized access. In cryptography, the original data that can be directly read by humans is called plaintext. The plaintext could be images, videos, computer programs,

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Security of multiple RGB images by RSA cryptosystem combined with FrDCT and Arnold transform

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ABSTRACT

The security, efficiency and storage of image data are global issues while transmitting images over the Internet. In this paper, we have fabricated a novel approach for security of multiple-color images utilizing asymmetric RSA cryptosystem, reality preserving fractional discrete cosine transform and Arnold transform. In our approach, three indexed images are obtained from three RGB color images by extracting their color maps. These three indexed images are taken as red, green and blue components of an RGB color image. Each element of an RGB image is first encrypted using RSA cryptosystem. The fractional discrete cosine transform is applied on the partially encrypted image which transforms the image data from the time domain to the frequency domain. Finally, Arnold transform dislocates the processed image. The security of the similar encryption schemes available in literature depends upon the secret keys only. If the secret keys are leaked, the encryption scheme is no more secure. Also, these schemes are secure either in the time domain or in the frequency domain. However, the security of our approach depends upon secret keys and their proper arrangements. The proposed method is secure in the time domain as well as in the frequency domain. Due to a single encrypted image, it is easy for storage and transmission over the Internet. Simulation analysis is done with standard examples to conclude that the proposed approach is robust.

1. Introduction

Images are extensively used in online teaching, biometric systems, video conference and advertising, etc. Secure transmission of images over the unsecured channel has become a prime focus nowadays. Cryptography helps us to acquire secure transfer of images over the unsecured network. In real-life application, a large number of images are communicated between unknown parties. Therefore, we need an image encryption algorithm using asymmetric key cryptography. The asymmetric key cryptography is also acknowledged as public key cryptography. The public key cryptography uses two mathematically linked keys. One key which is utilized to encrypt image data is known as a public key. Another key which is used to decrypt encrypted image data is known as a secret key. The public key is in the public domain, and the secret key is hidden. The secret key is with the decrypter only.

A lot of research work has been done in the field of image security. The first optical image encryption algorithm was given by Refregier and Javidi [illegible] using Fourier transform. Their image encryption algorithm motivates the researchers to develop color image encryption algorithms [illegible] incorporating chaos based cyclic shift, random phase encoding, Mellin transform and Arnold transform. Fractional Fourier transform has been used in [illegible]. Hartley transform is closely related to Fourier transform. Chen and Zhao [illegible] and Liu et al. [illegible] presented image encryption algorithms in the Hartley transform domain. Wavelet transform is a potent tool for image compression. Image encryption algorithms using wavelet transform [illegible] are also available in literature. Another area of image encryption algorithm is in Gyrator transform domain [illegible].

The idea of multiple-image encryption was first fabricated by Situ and Zhang [illegible] utilizing wavelet multiplexing. Later, Liu et al. [illegible] and Joshi et al. [illegible] did significant work for multiple-image encryption algorithms in fractional Fourier transform domain. Double-image encryption based on chaotic maps and dual pixel scrambling random phase encoding was introduced by Shan et al. [illegible] and Zhong et al. using fractional Fourier transform with multiple parameters. Shi et al. [illegible] and Li et al. [illegible] used Arnold transform and Gyrator transform to develop the concept of multiple-image encryption algorithms. Simultaneously, Yang et al.

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Lagrange's operational approach for the approximate solution of two-dimensional hyperbolic telegraph equation subject to Dirichlet boundary conditions

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ABSTRACT

The key purpose of this study is to present two schemes based on Lagrange polynomials to deal with the numerical solution of second order two-dimensional telegraph equation (TDTE) with the Dirichlet boundary conditions. First, we convert the main equation into partial integro-differential equations (PIDEs) with the help of initial and boundary conditions. The operational matrices of differentiation and integration are then used to transform the PIDEs into algebraic generalized Sylvester equation. We compared the results obtained by the proposed schemes with Bernoulli matrix method and B-spline differential quadrature method which shows that the proposed schemes are accurate for small number of basis functions.

1. Introduction

Most of the physical problems can be described in the form of mathematical models and these models are consist of partial differential equations (PDEs). PDEs are observed in many fields of applied sciences and engineering. Among these partial differential equations, hyperbolic PDEs play an important role in several areas of applied sciences. The propagation of signal (digital and analog) through media, the propagation of electromagnetic waves in the earth–ionosphere waveguide [1], mechanical wave [2], an ecological and cosmological phenomena are modeled using hyperbolic PDEs [3]. Recently, many methodologies have been investigated to find the numerical solution of telegraph equation due to their universal applications in the area of applied mathematics. In [4], the phenomena of propagation of electric signal in a cable of transmission is described by one-dimensional telegraph equation which can be derived by using basic principles of electricity.

But Goldstien [5] was the first who derived the one-dimensional telegraph equation with probabilistic argument. He proved that a particle which moves forward and backward direction with speed c satisfies the following hyperbolic one dimensional telegraph equation:

$$\frac{\partial^2 p}{\partial t^2} + 2\lambda \frac{\partial p}{\partial t} = c^2 \frac{\partial^2 p}{\partial x^2} \tag{1}$$

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An efficient matrix approach for two-dimensional diffusion and telegraph equations with Dirichlet boundary conditions

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ABSTRACT

This article provides an efficient matrix approach by using Euler approximation for solving numerically the two-dimensional diffusion and telegraph equations subject to the Dirichlet boundary conditions. First, the main equation is reduced into partial integro-differential equations (PIDEs) and then operational matrices of differentiation and integration of Euler polynomials transform those PIDEs into algebraic generalized Sylvester equations. The inclusion of several test examples confirms the predicted accuracy and effectiveness of the method. Comparison of obtained numerical results is made with some earlier works (Zogheib and Tohidi, 2016, Singh et al., 2018).

1. Introduction

Partial differential equations (PDEs) furnish a vicenary description for many central models in physical, biological, and social sciences [1–3]. Due to their key role in several areas of applied sciences, PDEs are studied extensively by many researchers. In this article, we examine the feasibility of applying Euler matrix method for the following two-dimensional diffusion equation [4]:

$$\frac{\partial \omega}{\partial \tau} = \frac{\partial^2 \omega}{\partial \xi^2} + \frac{\partial^2 \omega}{\partial \eta^2} + f(\xi, \eta, \tau), \quad 0 < \xi, \eta < 1, \ 0 < \tau \leq 1, \tag{1.1}$$

with the following initial condition

$$\omega(\xi, \eta, 0) = k(\xi, \eta), \quad 0 \leq \xi, \eta \leq 1, \tag{1.2}$$

and the Dirichlet boundary conditions

$$\begin{cases} \omega(0, \eta, \tau) = f_1(\eta, \tau), \ \omega(1, \eta, \tau) = f_2(\eta, \tau), \quad 0 \leq \eta \leq 1, \ 0 < \tau \leq 1 \\ \omega(\xi, 0, \tau) = g_1(\xi, \tau), \ \omega(\xi, 1, \tau) = g_2(\xi, \tau), \quad 0 < \xi < 1, \ 0 < \tau \leq 1. \end{cases} \tag{1.3}$$

We assume that ω and f are smooth enough.

Among PDEs, two-dimensional diffusion equations are of special interest because of their wide applications in physical and applied sciences. They have been used to model chemical exchange reactions, the transport of ground water in

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Original Research Article

Investigation of the Antidiabetic Activity and GC-MS Analysis of Extracts of *Lilium polyphyllum*

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ABSTRACT

Diabetes is a disease characterized by high blood glucose (hyperglycaemia) due to insufficient insulin production or impaired tissue response to insulin. The hormone Insulin, produced in the pancreas, helps in the regulation of blood glucose. The present study is aimed at finding an alternative approach to blood glucose regulation by the use of *Lilium polyphyllum* Stem extract as potential inhibitor of the enzymes; α-amylase and α-glycosidase, which are responsible for the breakdown of oligosaccharides into glucose molecules. The α-amylase and α-glycosidase inhibitory activities of the extracts of *Lilium polyphyllum in vitro* using standard procedures. The ethanol extract of the plant was subjected to gas chromatographic-mass spectrometric (GC-MS) analysis. The results showed inhibition of α-amylase by 54.95% (water extract), 53.01% (ethanol extract) and 47.87% (dichloromethane extract). The inhibition of α-glucosidase was found to be 48.48%, 48.48% and 43.85% for water, ethanol and dichloromethane extracts, respectively. The possible compounds that could be responsible for the enzyme inhibition were identified by GC-MS analysis as; Methyl 2-furoate, 5-hydroxymethyl furfural, Piperine, Palmitic acid, and Methyl Palmitate. The results revealed that the extracts of *Lilium polyphyllum* could be a possible source of natural antidiabetic medicine.

Keywords: Antidiabetic, *Lilium polyphyllum*, Alpha amylase, Alpha glycosidase

Introduction

Diabetes is a metabolic disease associated with elevated blood glucose levels, leading to major complications such as diabetic neuropathy, nephropathy, retinopathy and cardiovascular diseases.[1] More than 100 million of the world's population are diabetic, and the disease reportedly now kills more people than AIDS.[2] Report over the past two decades revealed that diabetic patients are easily prone to obesity, stress, decrease in physical activities, and appetite loss.[3] People with Type 1 Diabetes do not produce insulin while the Type 2 Diabetics do not respond to insulin and often do not produce enough insulin. In conventional therapy, Type 1 diabetes is treated with exogenous insulin and Type 2 with oral hypoglycemic agents (sulphonylureas, biguanides, etc.)[4] In 2007, it was reported by[5] that diabetes caused about 3.5 million deaths globally. Diabetes initially considered as 'a disease of the rich now spread among all population[6] in India and the whole world.[7] Commercially a large number of oral hypoglycaemic drugs belonging to different classes such as biguanides, sulfonylureas, meglitinides and thiazolidinediones are available to control and treat type 2 diabetes. However, none of these drugs are known to completely cure the disease. On the other hand, long term use of these drugs exhibits several side effects and complications which ultimately lead to cardiovascular problems, liver disease, kidney disease and weight gain. Like many other drugs, anti-diabetic drugs are also known to interfere and interact with other non-anti-diabetic drugs, especially when used for a long time. To combat the side effects of these drugs, complementary treatments may be found as a preventive measure and more promising in the management of the disease. Reports available from a large number of studies stated that complementary therapies may include physical exercises, dietary supplements and Nutraceuticals. Although, different types of oral hypoglycemic agents are available along with insulin for the treatment of diabetes, there is an increasing need for the use of natural products with antidiabetic activity.[8]

Herbal medicine has been part of human existence and as is old as life itself.[9] The use of herbs is an integral part of traditional medicine of different cultures around the world. Herbs are used for the prevention, treatment and mitigation of variety of diseases both in man and animals.[10] Nearly 80% of the human population of developing countries depend directly on traditional medicines, involving the use of plants, for their primary healthcare needs.

Lilium polyphyllum commonly known as Kshirkakoli or white lilly (family Liliaceae) is extensively used in many indigenous preparations from time immemorial. Kshirkakoli have been found to contain Sugar, Alkaloids, Flavonoids, and essential steroids.[11] Medicinally, the bulb of this specie is used as diuretic, antipyretic and as energy tonic.[12,13] Few species of the plant have good economic importance, as they serve as medicines for treatment of diseases and are also taken as food.[14,15] In the traditional system of medicine, the species have been reported to restore health and act as an antioxidant.[16,17] The present study, therefore, seek to investigate the enzyme; α-amylase and α-glycosidase inhibitory activity with a view to assessing the potential antidiabetic activity of the plant.

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SHORT COMMUNICATION

Distribution Pattern of Ichthyofaunal Diversity in Different Habitats in the First-, Second- and Third-Order Streams of Randi Gad from Garhwal Himalaya, India

Pankaj Bahuguna[1]

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Abstract The present study was undertaken to report the ichthyofaunal diversity on spring-fed hill stream Randi Gad from Pauri Garhwal District, Uttarakhand, India. In this work, the author proposed one novel approach, viz. stream order wise study of distribution and diversity of fish fauna from Garhwal Himalaya, India. A total of 121 fish species including 4, 12 and 22 fish species were collected from first-, second- and third-order streams of Randi Gad. The ichthyofaunal biodiversity observed belonged to 4 families, 10 genera and 22 species. The first-order stream had shown minimum diversity (4 species) and fish productivity of 07CPPs. The second-order stream showed productivity of 24CPPs (12 species). The third-order stream was the most diverse (22 species) and showed fish productivity of 38 CPPs (calculated productivity points system). Thus, the spring-fed hill stream Randi Gad has good potential for fish fauna.

Keywords Ichthyofaunal diversity · Hill stream · Garhwal Himalaya · India

Significance statement

The present study is a pioneer attempt conducted on stream wise distribution and diversity of ichthyofaunal from Garhwal Himalaya in three different order streams (1st, 2nd and 3rd order) with different ecological conditions. This observation may be helpful for management and development of indigenous fishery in the local streams of Uttarakhand and other Himalayan states of India.

The Garhwal region is drained by a number of large rivers, which later unite to form mighty River Ganges. Lots of small streams or rivulets contribute their water to these large rivers. Fortunately, many such small streams called Brooks or locally known as Gad or Gadhera surround every watershed of this region. A variety of researches have been reported on the ecology and ichthyofaunal of some of the tributaries of Ganga River system [1–3]. Yet there is a great scope for the analysis of fisheries in various small streams, the present effort being one of the steps in this direction in which a novel approach is planned to study the fish faunal variation in different order streams of same watershed system. This observation may open a door to strengthen the indigenous fish conservation efforts in local streams which are very important for local folks [4].

The study area lies in Randi Gad stream—a spring-fed perennial tributary of Alaknanda River system from Garhwal Himalaya, India. Sampling sites were chosen for first-order stream (origin of stream—sampling site: Lawali village), second-order stream (confluence of two first-order stream creates a second-order stream—sampling site: near Buja village) and third-order stream (confluence of two second-order stream results in a third-order stream—sampling site: Kot village) of Alaknanda (Randi Gad stream) River system. First-, second- and third-order streams in Randi Gad were selected for ichthyofaunal diversity and species composition studies in October 2018–February 2020. Randi stream originates from the Rauni and Bandidhar Peak in the Pauri Garhwal region. A 20-km long stretch of the stream located upstream from the Alaknanda River was chosen as the study area. Fish samples collected

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STUDIES ON THE DRIFTING BEHAVIORAL PATTERNS OF MACROZOOBENTHOS IN KYUNJA GAD, A MOUNTAIN STREAM FROM GARHWAL HIMALAYA, INDIA

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Abstract: Macrozoobenthos displayed several interesting trends with regards to their occurrence and movement in the streams in response to various abiotic and biotic factors constituting the aquatic ecosystem. These are considered of great ecological significance in understanding the quality of the particular ecosystem. The present communication focused on understanding the spatial and temporal diel drifting patterns displayed by macrozoobenthos in different levels of stream orders at different duration round the clock. It was observed that there was a general preference of nocturnal and early evening hours of drifting. The drift by benthic species was performed mainly due to presence of predators, lack of proper food and breeding sites. The study revealed that highest diel drift density and diversity of macrozoobenthos was found in 3rd order in comparison to 2nd and 1st order of Kyunja Gad stream. Variations were also noted in the physico-chemical parameters of streams Kyunja Gad at different orders.

Key words: Macrozoobenthos, Diel Drifting Pattern, Kyunja Gad Mountain stream, Garhwal Himalaya, India

Introduction

Muller (1954) was the pioneer in describing downward transport of benthic invertebrates as drift. It is considered as common phenomenon in running water bodies (Brittian and Eikeland, 1988). Drift is considered to be an important feature of lotic ecosystem as it promotes dispersal and colonization of aquatic organisms (Townsend, 1989; Hughes, 1998).The drift is classified as catastrophic, behavioral, active, distributional and constant (Brittain and Eikeland, 1988). Invertebrate drift is thus defined as the downstream movement of benthic invertebrates in the water column that is generally found in or around the substratum of streams and rivers (Anderwald et al., 1991).

Earlier work on diel periodicity was conducted by Moon (1940) and Harker (1953). Studies on diel drift however, showed a notable trend after 1960, stimulated by the discovery of diel periodicity in many taxa in several parts of the world (Water 1972, Muller 1974). Two mechanisms are recognized for diel periodicity on the substratum namely (a) Diel positioning change and (b) Diel activity levels (Wiley and Kohler, 1984). Diel positioning changes of macrozoobenthos mainly referred to diel density changes in the top surface of the substratum. The reasons mainly accounted for various theories proposed for this mechanism regarding presence of those benthic animals on the top surfaces of the substratum mainly it might being Phototaxis, response to predation, foraging

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POPULATION STRUCTURE AND DRIFTING PATTERN OF AQUATIC MITES IN RANDI GAD, A TRIBUTARY OF RIVER ALAKNANDA IN GARHWAL HIMALAYA, UTTARAKHAND, INDIA

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Abstract: The present paper deals with the population structure and temporal drift pattern study of aquatic mites in Randi gad, which is a third order spring fed tributary of river Alaknanda in Garhwal, Uttarakhand, India. The mites contribute significantly to the structure and function of a stream ecosystem as it is a preferred food of fish and insects. To significantly analyze the drift strength of mites in a stream, a new index, Dobriyal Bahuguna Drifting Index (DBDI) has been developed which is based on the density of mite population in nature and number of drifting individuals in unit time. The maximum mite population in the stream was observed in January (51 units.m^{-2}) and minimum in October (35 units.m^{-2}) with 7 species. It was found that the mites perform specific monthly and diel drift pattern. Various factors like current velocity, breeding, colonization, habitat disturbance and protection from predators are responsible for it. The DBDI value for different mite species was observed highest in February (0.264) and minimum in November (0.227). It was also observed that maximum drift was preferred during late morning hours (8-12 hrs).

Keywords: Aquatic mites, Population structure, Drift pattern, Spring-fed Stream, Garhwal Himalaya, DBDI

Introduction

Aquatic mites form an important community of microbenthos in streams which are generally neglected by the hydrobiologists. They are significant food for benthic as well as nektonic fauna. The knowledge regarding the distribution of aquatic mites from Indian riverine ecosystem is limited and highly fragmentary (Kumar and Dobriyal, 1992; Kumar et.al., 2006, 2007; Pesic et.al., 2007a, 2007b, 2019a, 2019b, 2020a, 2020b). Drifting is a behavior exhibited by the aquatic insects in streams due to various eco-physiological reasons. Lotic ecosystems have strong unidirectional flow of water that transports material from upstream to downstream area and thus helps in the distribution of various aquatic resources. Velocity of water current is perhaps the most important ecological factor that affects the existence of organisms in lotic water bodies. Many invertebrates possess morphological adaptations which help them to avoid being swept away. Nevertheless, many of these organisms move in the water column (actively or passively) and thereafter displace downstream by the current. This phenomenon is known as drift (Waters, 1972; Muller, 1974; Allan, 1995) whereas diel drift periodicity is usually related to predation by visually hunting drift-feeding predators and with their endogenous circadian rhythms, such as

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Triple color image encryption based on 2D multiple parameter fractional discrete Fourier transform and 3D Arnold transform

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2D Multiple parameter fractional discrete Fourier transform
3D Arnold transform
Baker chaotic map
Image encryption
Image decryption

ABSTRACT

This paper proposes a new encryption and decryption method for triple color images using 2D multiple parameter fractional discrete Fourier transform (MPFrDFT) and 3D Arnold transform (AT). The proposed method converts three color images into three images, which are considered as the three components of a color image. These three three images are combined vertically and then baker chaotic map is applied to permute rows and columns and a similar process is applied in the horizontal combination, the image then obtained is considered as the complex valued image (CVI). Then apply 2D MPFrDFT on the CVI. The output of 2D MPFrDFT is separated into three components. Apply 3D AT into the three components and the output is considered as the three color components of the encrypted image. The experimental results and the security analysis of the proposed method are given to validate the feasibility and robustness of the method. The statistical analyses like histogram, correlation and entropy confirm the robustness of the proposed method against statistical attacks and experimental results show that the method is resistant to occlusion attack. The mathematical analysis shows that the brute force attack is not possible in proposed method.

1. Introduction

Nowadays, due to the rapid flow of multimedia data, such as digital videos and images over open networks, the security of such important data has received much attention by cryptographers. In the past few years, many methods of digital image security based on encryption have been proposed. Digital image security method based on frequency domain transform, such as fractional Fourier transform [15–24], discrete cosine transform [7], Fresnel transform [11–13], gyrator transform [4,5], Hartle transform [8,9], fractional random transform [14] and fractional Mellin transform [6,10] have been proposed. The security of digital images based on discrete forms of FrFt (FrDFT) are presented in [24,25]. The FrDFT provides better performance and security for images due to index additivity and periodicity properties. In [26–28] authors have proposed image encryption methods based on MPFrDFT. One of the benefits of MPFrDFT is that, it larges the key space.

In paper [9], authors proposed a triple color image encryption method based on scrambling and reality-preserving fractional discrete cosine transform (RPFrDCT). In this method, the authors used the indexed format of the color image and then used Chirikov standard chaotic map, RPFrDCT and Arnold transform. Zhou et al. [10] presented a color image encryption algorithm based on the reality preserving fractional Mellin transform (RPFrMT). In this method, the RPFrMT of a different order is applied to the three color components of the image following the rotation of these color components. Further, the result of the former step is scrambled by three-dimensional scrambling to enhance the security of the encryption system. Lang [13] presented a color image encryption method by using color blend and chaos permutation operations in the reality-preserving multiple-parameter fractional Fourier transform (RPMPFrFT) domain. In this method, the original color image is exchanged and scrambled from the red (R), green (G) and blue (B), i.e., RGB color space to R'G'B' color space by rotating the color cube with a random angle matrix and then RPMPFrFT is applied for changing the pixel values of the color image. To further enhance the security of the encryption system, the output of the former step is scrambled by a 3D chaos-based scrambling map. Chen et al. [19] proposed a single channel optical asymmetric cryptosystem for color image encryption in

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Colour-image encryption based on 2D discrete wavelet transform and 3D logistic chaotic map

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ABSTRACT

This paper proposes a new lossless encryption and decryption method for digital colour-image using 2D discrete Haar wavelet transform (DHWT) and 3D logistic chaotic map. The proposed cryptosystem provides the security of the digital images using the cryptographic algorithm in the frequency domain of the image. The proposed method uses two levels of 2D DHWT for the decomposition of the image. For the encryption, 2D DHWT is applied on the different colour components of the colour-image and then the encryption method is applied on the different sub-bands of each level of decomposition and for the decryption the reverse process of the encryption is used with the inverse of functions used in encryption. The experimental results and the security analysis like brute force analysis, statistical analysis, occlusion and differential attack of the proposed method are given to validate the feasibility and robustness of the method.

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2D discrete wavelet transform; 3D logistic chaotic map; Haar wavelet transform; colour-image encryption; image decryption; lossless encryption

1. Introduction

The present era of digitalization requires the security of digital images in the process of communication. For the various purposes in human life, the smooth transformation of digital data in communication and the security of digital data from unauthorized users is a challenging task. These digital data may contain a lot of valuable and confidential information. The main objective of the proposed cryptosystem is to develop a lossless method for the security of digital images. In communication technology, image encryption can be classified into two categories: lossless and lossy. The main difference between the two encryption methods is that the lossy encryption method does not restore the data in its original form after decryption, on the other hand lossless encryption method restores and rebuilt the data in its original form after decryption. There are many applications of image cryptography in various areas. Since, images have some inherent features such as bulk data capacity, high redundancy and strong correlation among pixels, so traditional cryptographic algorithms like Rivest Shamir Adleman, Data Encryption Standard, Advanced Encryption Standard are not suitable for practical image encryption. The proposed cryptosystem provides the security of the colour-images using the cryptographic algorithms in the frequency domain of the image. In the literature, several methods are developed to handle the image data based on various methods and primitives in combination. The Fourier [1–5], discrete cosine [6,7], wavelet [8–11], gyrator [12,13], Arnold [13,14] transforms and the chaotic maps [15–17] etc. are some of the common primitives used to determine the image encryption methods.

In the past few decades, many researchers have designed the image encryption methods in the frequency domain. In this process, the original images are encrypted by modifying the frequencies and at the time of decryption, the image pixels can be reconstructed through the reverse process. In paper [1], the author proposed a method for colour-image encryption based on colour blend and chaos permutation operation in the reality-preserving multiple-parameter fractional Fourier transform (RPMPFRFT) domain. First, the image pixels are converted in the frequency domain by using RPMPFRFT, then the output is scrambled by two coupled chaotic logistic maps. In [3], a colour-image encryption algorithm was developed by using two-dimension (2D) compressive sensing (CS) and fraction Fourier transform (FrFT). In this algorithm, the original image is compressed by 2D CS and encrypted by changing the pixels in the frequency domain by using FrFT. Wua et al. [6] designed a triple colour-image encryption method using scrambling and the reality-preserving fractional discrete

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Multilayer Security of RGB Image in Discrete Hartley Domain

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Abstract

In this article, we present RGB image encryption and decryption using random matrix affine cipher (RMAC) associated with discrete Hartley transform (DHT) and random matrix shift cipher (RMSC). The parameters in RMAC and RMSC phases act as two series of secret keys whose arrangement is imperative in the proposed algorithm. The computer simulations with results and examples are given to analyze the efficiency of the proposed approach. Further, security analysis and comparison with the prior techniques successfully supports the robustness and validation of the proposed technique.

Keywords: Discrete Hartley transform; Image encryption; Image decryption; Random matrix affine cipher; Random matrix shift cipher

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Security of multiple RGB images by RSA cryptosystem combined with FrDCT and Arnold transform

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Keywords:
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ABSTRACT

The security, efficiency, and storage of image data are global issues while transmitting images over the Internet. In this paper, we have fabricated a novel approach for security of multiple-color images utilizing asymmetric RSA cryptosystem, reality preserving fractional discrete cosine transform and Arnold transform. In our approach, three indexed images are obtained from three RGB color images by extracting their color maps. These three indexed images are taken as red, green and blue components of an RGB color image. Each element of an RGB image is first encrypted using RSA cryptosystem. The fractional discrete cosine transform is applied on the partially encrypted image which transforms the image data from the time domain to the frequency domain. Finally, Arnold transform dislocates the processed image. The security of the similar encryption schemes available in literature depends upon the secret keys only. If the secret keys are leaked, the encryption scheme is no more secure. Also, these schemes are secure either in the time domain or in the frequency domain. However, the security of our approach depends upon secret keys and their proper arrangements. The proposed method is secure in the time domain as well as in the frequency domain. Due to a single encrypted image, it is easy for storage and transmission over the Internet. Simulation analysis is done with standard examples to conclude that the proposed approach is robust.

1. Introduction

Images are extensively used in online teaching, biometric systems, video conference and advertising, etc. Secure transmission of images over the unsecured channel has become a prime focus nowadays. Cryptography helps us to acquire secure transfer of images over the unsecured network. In real-life application, a large number of images are communicated between unknown parties. Therefore, we need an image encryption algorithm using asymmetric key cryptography. The asymmetric key cryptography is also acknowledged as public key cryptography. The public key cryptography uses two mathematically linked keys. One key which is utilized to encrypt image data is known as a public key. Another key which is used to decrypt encrypted image data is known as a secret key. The public key is in the public domain, and the secret key is hidden. The secret key is with the decrypter only.

A lot of research work has been done in the field of image security. The first optical image encryption algorithm was given by Refregier and Javidi [26] using Fourier transform. Their image encryption algorithm motivates the researchers to develop color image encryption algorithms [8,9,14,16,19,23,38,42,43] incorporating chaos based cyclic shift, random phase encoding, Mellin transform and Arnold transform. Fractional Fourier transform has been used in [12,15,20,22,39]. Hartley transform is closely related to Fourier transform. Chen and Zhao [10] and Liu et al. [24] presented image encryption algorithms in the Hartley transform domain. Wavelet transform is a potent tool for image compression. Image encryption algorithms using wavelet transform [6,11,25] are also available in literature. Another area of image encryption algorithm is in Gyrator transform domain [1–5,29].

The idea of multiple-image encryption was first fabricated by Situ and Zhang [30] utilizing wavelet multiplexing. Later, Liu et al. [21] and Joshi et al. [17] did significant work for multiple-image encryption algorithms in fractional Fourier transform domain. Double-image encryption based on chaotic maps and dual pixel scrambling random phase encoding was introduced by Shan et al. [27] and Zhong et al. using fractional Fourier transform with multiple parameters. Shi et al. [28] and Li et al. [18] used Arnold transform and Gyrator transform to develop the concept of multiple-image encryption algorithms. Simultaneously, Yong et al.

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NATIONAL STRATEGY FOR FINANCIAL EDUCATION IN INDIA

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Abstract: The concept of implementing National Strategy for Financial Education has been gradually building. Most of the nations globally take initiative for implementing sound National Strategy for Financial Education. Whereas some developed countries already have there unified and coordinated national strategy for financial education. India is having second largest population in the world. There is an urgent need to develop a sound and stable financial system. it is more necessary to quickly formulate and implement a national strategy. Financial Literacy and Financial Education play important role in financial inclusion, inclusive growth and sustainable prosperity. Financial Literacy develops confidence, knowledge and skills to manage financial products and services enabling them to have more control of their present & future circumstqnces.59 countries worldwide are implementing National Strategy using guidance from the OECD/INFE high level principles on National Strategy for Financial Education. Several empirical studies have found that financial literacy level amongst Indians low by global standards. The need of the hour is to boost up financial education initiatives and comprehensive research should be done on national strategy for financial education. The present study aims at finding the role and relevance of financial education in India.

Keywords: Financial Education, National Strategies, India

Introduction

According to OECD Financial Education is a combination of financial awareness, skills, attitude and behaviour essential to make better financial decision in order to achieve individual financial wellbeing. Any individual can achieve financial literacy through the process of financial education. When it comes to creating an efficient economy, financial stability and financial literacy are the two sides of the same coin. In this context the Government of India and Reserve Bank of India have begun to include both financial literacy and financial education in their development agenda. On 20 August2020, the RBI released revised National Strategy for Financial Education (NSFE) for 2020-2025, the second one after the2013-18 (NSFE)

RBI released 5-core strategy that is content, capacity, community, communication, and collaboration for promoting financial education in country strategic include skilling on financial education, encouraging savings behaviour, developing credit discipline, improved usage of digital financial services and creating awareness on avenues for grievance redressal.

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ROLE OF MEDIA IN OVERALL DEVELOPMENT OF THE COUNTRY: AN ANALYSIS

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Abstract

For the development of any nation, progressive ideological change in society is very important. Only through communication this change can be brought in the society and economic, social and political development of the nation can be ensured. Today in the changing world system in the form of this global village, India is the second largest country to use telecom services. The presented research paper describes the progressive role of media in the development of the nation.

Keywords: National Development, Role of Media, Analysis

देश के समग्र विकास में संचार माध्यमों की भूमिका–एक विश्लेषण

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सारांश

किसी भी राष्ट्र के विकास के लिए समाज में प्रगतिशील वैचारिक परिवर्तन अति आवश्यक है और संचार के माध्यम से ही समाज में वैचारिक परिवर्तन लाया जा सकता है और राष्ट्र का सामाजिक आर्थिक, राजनीतिक, विकास सुनिश्चित हो सकता है। आज इस वैश्विक ग्राम के रूप में परिवर्तित होती विश्व व्यवस्था में भारत राष्ट्र दूरसंचार माध्यमों का उपयोग करने वाला विश्व का दूसरा सबसे बड़ा देश बन गया है। प्रस्तुत शोध पत्र में राष्ट्र के विकास में संचार माध्यमों की भूमिका एक प्रगतिशीलता का एक अध्ययन प्रस्तुत किया गया है।

कुंजी शब्द: राष्ट्रीय विकास, मीडिया की भूमिका, विश्लेषण

23.

जनसंख्या प्रवास-भूगोल, शिक्षा एवं रोजगार सह सम्बन्ध (देहरादून जनपद के सन्दर्भ में)

-डॉ० संगीता भट्ट
एसोसिएट प्रोफेसर, भूगोल विभाग
डी०ए०वी० (पी०जी०) कॉलेज
देहरादून उत्तराखण्ड

-अर्चना नौटियाल
असिस्टेंट प्रोफेसर, भूगोल विभाग
भक्त दर्शन राजकीय स्नातकोत्तर महाविद्यालय
जयहरीखाल पौड़ी गढ़वाल उत्तराखण्ड

सारांश :-

मानव प्रवास का इतिहास मानव इतिहास के समकालीन ही रहा है। अपनी भौगोलिक, आर्थिक, सामाजिक आवश्यकताओं की पूर्ति हेतु मानव एक स्थान से दूसरे स्थान पर जाता है। किसी क्षेत्र की जनसंख्या का वितरण वहां के प्राकृतिक, आर्थिक, सामाजिक एवं सांस्कृतिक वातावरण से प्रभावित होता है।भारत जैसे विकासशील देश में प्रवास कुछ वर्षों से एक नयी और तेजी से बढ़ने वाली सामाजिक प्रक्रिया बन गयी है। पूर्व में भी प्रवास होता रहा है किन्तु प्रवास की प्रवृत्ति एवं दिशा वर्तमान से भिन्न थी। नगरीय जीवनशैली, कृषि कार्यों से विमुखता से सम्बन्धित है जिसमें प्रतिवर्ष नयी जनसंख्या जुड़ जाती है। अध्ययन क्षेत्र देहरादून जनपद राज्य का राजधानी क्षेत्र होने के साथ ही सबसे विकसित भाग भी रहा है। इसके अन्तर्गत आने वाले मसूरी, ऋषिकेश, चकराता, देहरादून शहर अपनी अलग-अलग विशेषताओं के कारण जनसंख्या के लिए आकर्षण का केन्द्र रहे हैं।

Keywords– प्रवास, शिक्षा, रोजगार, ग्रामीण क्षेत्र, नगरीयकरण

टिवार्थ के अनुसार जनसंख्या के अध्ययन में जन्म -मृत्यु के साथ ही प्रवास भी आवश्यक तथा महत्वपूर्ण भाग है। यह परिवर्तनीयता का सूचकांक है जो किसी स्थान के आर्थिक, सामाजिक, भौगोलिक एवं राजनैतिक महत्व को इंगित करता है। संयुक्त राष्ट्र संघ के प्रवास के विषय में विचार हैं कि प्रवास सामान्यतः निवास बदलते हुए एक भौगोलिक इकाई से दूसरी इकाई के लिए भौगोलिक गतिशीलता का एक रूप है।

प्रवास के प्रकार :-

प्रवास मुख्यरूप से दो प्रकार का होता है-

+ **उत्प्रवास (Out Migration)**-जिस स्थान से जनसंख्या बाहर को ओर जाती है उस स्थान के सन्दर्भ में यह उत्प्रवास कहा जाएगा।
+ **आप्रवास (In Migration)**-जहां पर जनसंख्या अन्य क्षेत्रों से प्रवासित होने का परिणाम होती है, इस उत्प्रवास की स्थिति को आप्रवास कहा जाएगा।

प्रवास किस प्रकार का होगा यह क्षेत्र विशेष की भौगोलिक, आर्थिक, सामाजिक एवं राजनैतिक स्थिति पर निर्भर करता है। इन्हीं कारकों के आधार पर प्रवास का निम्न प्रकार से वर्गीकरण किया जा सकता है।

24.

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OBSERVATION ON THE BODY MASS WEIGHT-LENGTH RELATIONSHIP AND RELATIVE CONDITION FACTOR OF *Macrobrachium assamensis peninsularis* (Tiwari) FROM KHOH RIVER, UTTARAKHAND, INDIA

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AUTHORS' CONTRIBUTIONS

This work was carried out in collaboration among all authors. Authors PB and RR designed the study, wrote the protocol, and first draft of the manuscript. Authors AD and NS collected the prawn sample, performed the statistical analysis, and managed the literature search. All authors read and approved the final manuscript.

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Original Research Article

ABSTRACT

Present study comprises the body mass weight-length relationship and relative condition factor of 114 prawns (54 male and 60 female) from Khoh River, Uttarakhand, India. *Macrobrachium assamensis peninsularis* is commonly known as "Geegu Machi". The prawn samples were grouped in different seasonal and gender groups and close relationships between their length and weight were noticed. The regression coefficient for gender and pooled data varied from a minimum of 1.3002 for the male to a maximum of 1.4988 for the female. The analysis revealed that the total length of *Macrobrachium assamensis peninsularis* was positively correlated to its weight ($r = 0.8672$) in the case of pooled data. The correlation was also high for males ($r = 0.8994$) and females ($r = 0.8758$) separately. For season and gender, it ranged from a maximum 1.0562 ($r = 0.6979$) during monsoon to 1.3893 ($r = 0.8938$) during summer (maximum) for male and from 1.1863 ($r = 0.7546$) in monsoon (minimum) to 1.5630 ($r = 0.8999$) in summer (maximum) for female prawn. For pooled data it ranged from 1.1387 ($r = 0.7277$) during monsoon (minimum) to 1.5057 ($r = 0.8945$) during summer (maximum). The relative condition factor was minimum in August for males (0.825±0.060), females (0.868± 0.072), and in pooled data (0.845±0.067). The maximum value of 0.969±0.052 for males, 0.987±0.061 for females, and 0.976±0.057 for pooled data were observed in January. The second peak values were maximum during June (0.966±0.058) for

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Macrozoobenthos of Basti Damar Stream in Rudraprayag District, Garhwal, Uttarakhand: Diversity and Habitat Analysis

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Abstract: Basti Damar gad is a spring fed tributary of river Mandakini which is quite conducive for biodiversity. As the stream was unexplored, it was taken as an opportunity to investigate the stream for its habitat quality and diversity of benthic organisms. Stream was studied at two different spots one in more or less rhithron zone and the other one in near potamon zone during the year 2019-20. Comparatively, the Spot No 2 had more density (836 individules m^{-2}) and diversity (28genus) of macrozoobenthos than spot No 1 (127 individules m^{-2} and 28 genus) which may be due to better substratum heterogeneity dominated by mixed forest, small gravels, small bolder, low water velocity, high water temperature, low canopy of stream area and good survival rate of periphyton on bottom in the stream. Also the water quality at this spot (comparatively low current velocity, moderate temperature, good amount of DO and high alkalinity and pH) was supportive for flourishing biota. The observations were statistically analysed using coefficient of correlation, coefficient of determination, regression, species similarity, dominance and diversity indices.

Keywords: Macrozoobenthos • Basti Damar Stream • Diversity • Habitat ecology

Introduction

Biodiversity is a prominent attribute of the aquatic ecosystem for maintaining its stability and a mean of coping with any environmental change (Vinson and Hawkins 1998). In fluvial system, the macrozoobenthos are an important community that dwells at the bottom. Any change in water quality and habitat structure greatly influences the composition, abundance and diversity of these organisms. The macroinvertebrates have also been used in bio-monitoring program that make them particularly beneficial biota (Marzin, 2013). Long term assessment of the population diversity and variability of macrozoobenthos in relation to ecological parameter, especially in the spring fed streams, is required to establish their status, trends and productivity patterns.

The biodiversity baseline data are crucial to develop viable conservation and management strategies (Ward and Tockner 2001). Spring fed streams are the most common water spread throughout Himalayan states in India, because of its beneficial use as potable water, in agriculture and fishery. The conservation of benthic community is essential to maintain the structure and function of these streams as they are an important link of food web for other major biota and also utilize the bottom algae and detritus to make the water clean and suitable for other purposes (Dobriyal, 1985). Fair amount of literature is available on the relationship between

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Drifting Behaviour of Aquatic Mites and Regulating Ecological Parameters in Khankragad Stream, A Springfed Trubutary of Alaknanda River, Rudrarayag, Garhwal, Uttarakhand, India

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Abstract: Water mites are a large group of macroinvertebrates that are very vulnerable to contamination and environmental changes. As a result, they are often used to monitor water quality. Khankra gad stream, a third-order perennial spring-fed stream of the Alaknanda River in Uttarakhand, India, was studied to determine the drift behavior of water mites and water quality. Drift nets were set up for 24 hours in both spots of the Khankra stream where there was little or no human influence over a two-year sampling period (June 2018-20). Every four hours, the nets were changed out with new ones. Water mites signify a particular drift month and diel drift pattern. The majority of the drift mite species were present in considerably higher numbers in the daytime. During the two-year study period, a total of 2503 mite samples were collected from the Khankra stream, from which 204 water mite species drifted. The least number of Hydrachnidia (694) were collected from Spot-1, and the highest (1809) were collected from Spot-2, with 106 water mites drifting from Spot-1 and 134 mites drifting from Spot-2 during the study period. From Spot-2 maximum 25 mite species were collected and minimum 19 mite species were collected from Spot-1. For various mite species, the DBDI value ranged from 0.155 (July) to 0.204 (April) in Spot-1 and 0.134 (July) to 0.149 (February) in Spot-2. It was also observed that maximum water mite species were day-drifter. The physico-chemical parameters of the Khankra stream were also reported. The effect of ecological parameters on mite drift was investigated using Canonical correspondence analysis (CCA).

Key Words: Water mites • Drift • Spring-fed stream • Water quality • Garhwal Himalaya • CCA

Introduction

Drifting behavior of aquatic insects, including mites, have a great bearing on the ecosystem productivity and sustainability. The term "drift" was first of all coined by Muller (1954) to describe the downward movement of benthic invertebrates. According to Brittian and Eikeland (1988) the drifting is a natural mechanism in lotic ecosystems. Due to its significant role in the dispersal and colonization of aquatic organisms the drift is considered a vital part of the lotic ecology (Towsend, 1989; Hughes, 1998).

Though the drift in benthic insects has been studied by several workers, yet the mites as such are largely ignored. Also, it is important to find out the ecological and interactive detrimental parameters which cause for insect drift. Certain environmental conditions make drifting species more likely to move away from the stream's bottom and be swept downstream. According to Schreiber (1995) in rivers and streams, invertebrate drift is a natural phenomenon that plays an important role in the ecological cycles. Waters (1962), Muller (1974), and Elliott (1967) were the pioneer to study invertebrate drift diel periodicity, and their results piqued the interest of a number of other researchers (Flecker, 1992; Brewin and Ormerod, 1994). Drift is an important consideration in the study of macrobenthic

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SEX- RATIO STRUCTURE OF *Puntius ticto* IN SPRING FED RIVER AASAN FROM DISTRICT-DEHRADUN, UTTARAKHAND, INDIA

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AUTHORS' CONTRIBUTIONS

This work was carried out in collaboration among all authors. Authors RR and PB designed the study, performed the statistical analysis and wrote the protocol as well as the first draft of the manuscript. Authors VS and DM collected the fish sample, managed the analysis of the study and literature searches. All authors read and approved the final manuscript.

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Original Research Article

ABSTRACT

The present study was conducted to assess the sex ratio of the fish *Puntius ticto* in the spring fed river Aasan in western Doon valley for a period of one year. Being an economically important but ignored species, its sex ratio assessment will help in understanding its occurrence and abundance in this area. During the study a total of 109 individuals were collected and their sex determined. In monthly study, the sex ratio varied from 1.66 male:1.00 female in the month of June to 1.00 male:1.60 female in the month of July, whereas in seasonal study it was recorded highest in spring season as 1.22 male:1.0 female and lowest in monsoon season as 1.00 male:1.56 female.

Keywords: *Puntius ticto*; sex ratio; River Aasan; Doon valley.

1. INTRODUCTION

Fundamental information on the sex-ratio assessment of fishes is significant in the administration practices of fishery science. It is important to determine methods for guaranteeing relative fishing between the two sexes. The Indian minor carp *Puntius ticto* of the Aasan River, is a little sized fish. Because of absence

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Biodiversity and monthly density fluctuations of water mites in Khankra gad, a spring-fed tributary of river Alaknanda, Pauri Garhwal in Uttarakhand, India

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Negi, S. *et al.* (2021). Biodiversity and monthly density fluctuations of water mites in Khankra gad, a spring-fed tributary of river Alaknanda, Pauri Garhwal in Uttarakhand, India. *Journal of Applied and Natural Science*, 13(1): 258 - 267. https://doi.org/10.31018/jans.v13i1.2568

Abstract
Hydrachnidia is an important group of aquatic invertebrates. They play an important role in regulating other invertebrate populations, thus influencing the composition and functionality of river ecosystems. The present study aims to assess the habitat ecology, density and diversity of aquatic mites in the Khankra gad, Rudraprayag district for a period of two year on a monthly basis, from July 2016 to June 2020. The Khankra gad is a perennial spring-fed stream originating from the Banscun peak in district Rudraprayag of Garhwal Himalaya (800 m asl). A total of 2537 Hydrachnidia samples were collected, belonging to 6 families viz. Torrenticolidae, Sperchonidae, Feltriidae, Hygrobatidae, Lebertiidae and Aturidae. Sperchonidae, Torrenticolidae and Hygrobatidae were the common families recorded in both spots, whereas Feltriidae was recorded in Spot-1, Lebertiidae and Aturidae were recorded in Spot-2. The highest numbers (1842) of Hydrachnidia were collected from Spot-2. A total of 19 aquatic mite species were recorded in Spot-1 and 25 species in Spot-2 throughout the study period. Aquatic mites showed maximum density (177 units.m^{-2} in Spot-1 and 274units.m^{-2} in Spot-2) in December and minimum (11 units.m^{-2} in Spot-1 and 12 units.m^{-2} in Spot-2) in July. Various ecological parameters of our study indicated that Khankra gad is a good habitat for aquatic mites.

Keywords: Water mites, Density, Diversity, Habitat ecology, Uttarakhand

INTRODUCTION

Hydrachnidia, commonly called water mites, is among the most diverse freshwater Acari groups, which are widely neglected because of their small size (Cook and Mitchell 1953). In aquatic ecosystems, mites are important for maintaining the food web as they feed on many invertebrate eggs and larvae such as Diptera, Trichoptera, Plecoptera, Odonata and others (Martin 2008). Walter (1928) and Lundblad (1934) were the pioneer in publishing records of Hydrachnidia fauna from the Indian Himalaya. Kumar and Dobriyal (1992) studied the water mite fauna from Garhwal streams for the first time. A significant contribution to taxonomy of hill stream water mites of the Garhwal region have been made by Kumar *et al.* (2006, 2007), Pesic *et al.* (2007a,b), Pesic and Panesar (2008), Pesic *et al.* (2012), Pesic *et al.* (2019a,b) and Pesic *et al.* (2020a,b). Bahuguna *et al.* (2019 for spring-fed water; 2020-for glacier-fed water) carried out extensive work on the hill stream mite species' density and diversity. The 30 water mite species have been reported from Garhwal region so far (Bahuguna and Negi, 2020). Later Bahuguna and Dobriyal (2020) gave a detailed analysis of population structure and drifting pattern on water mites from Garhwal Himalaya, Uttarakhand. In

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FECUNDITY OF THE SNOW FED MINOR CARP *Barilius bendelisis* (HAM.) (PISCES: CYPRINIDAE) FROM RIVER YAMUNA, INDIA

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AUTHORS' CONTRIBUTIONS

This work was carried out in collaboration among all authors. Authors RR, HKJ and PB designed the study, wrote the protocol and wrote the first draft of the manuscript. Authors SG and NS collected the fish sample, performed the statistical analysis and managed the literature search. All authors read and approved the final manuscript.

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ABSTRACT

The present study deals with the observation of fecundity of the snow fed minor carp *Barilius bendelisis* from river Yamuna, state Uttarakhand, India. The fecundity of the snow fed water fish varies from a lowest 162 to a highest 4203, the fish measuring to 58mm to 120mm respectively. It is observed that fecundity was maximum depending upon the fish length and ovary weight than any other body parameter.

Keywords: Fecundity; *Barilius bendelisis*; doon valley.

1. INTRODUCTION

Barilius bendelisis (Hamilton) locally known as "Jabula" is an ornamental fish having food value. It is found to inhabit the sandy and pebbly bottom of Snow fed river Yamuna. *B. bendelisis* belonging to the order Cypriniformes and family Cyprinidae is an ornamental fish and in this local region of Uttarakhand is used as food. Family with low economic conditions use this to fulfil their daily Protein needs. The knowledge of fecundity, its mathematical relationship, with the body parameters and sex-ratio is considered very useful in fishery sciences' as it provides prior information regarding number of eggs that are likely to be received for hatching process and further management of nursery

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Security of Digital Images Based on 3D Arnold Cat Map and Elliptic Curve

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Security of digital data is an important task in the present era. In this paper, we propose a new scheme of digital image encryption and decryption method based on three-dimensional (3D) Arnold cat map (ACM) and elliptic curve. In this proposed encryption method, we have applied 3D ACM on the digital color image which performs the dual encryption first, it performs the permutation and second, it performs the substitution of image pixels. After that, elliptic curve cryptography (ECC) is used to encrypt the image, for this a mapping method is proposed to convert the pixels of the image as points on the elliptic curve. Further, a mapping inverting method is proposed for decryption and then 3D inverse Arnold cat map (iACM) is applied to get the original image. The statistical and security analyses are done on various images and the experimental results show the robustness of the proposed method.

Keywords: Digital image; 3D Arnold cat map; elliptic curve cryptography; encryption; decryption.

1. Introduction

In the present era of communication the security of digital data over open and unsecured networks, is a major concern. Cryptography[1] which plays an important role in the security of data, is the study of mathematical techniques related to the aspects of information security such as confidentiality, data integrity, and the data

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Multimedia Tools and Applications
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Multi-image steganography and authentication using crypto-stego techniques

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Abstract
It is a necessity to protect sensitive information in digital form from an adversary who may indulge in cyber-crimes such as modification, masquerading, and replaying of data. Security systems designed to counter such attacks must keep abreast of the adversary. In this paper, we have proposed a novel multi-image crypto-stego technique using Rabin cryptosystem and Arnold transform that provides a mechanism to hide digital data in the form of text, image, audio, and video. The proposed technique is a novel approach for (n,n) secret sharing that prevents attack by an intruder impersonating as a shareholder. In the proposed technique, the header information is created to retrieve data in the correct order. Randomized encrypted data and partial header information are camouflaged in the edges of multiple images in an adaptive manner. Minimal and distribution sequence keys distribute data in shares. Experimental results yield high values of PSNR and low values of MSE for the audio, image, video signals. Further, as the entropy values for original cover image coincide with the crypto-stego image up to the third place of decimal, the secret message will go unnoticed. Sensitivity analysis reveals that even a minor variation in a single share makes the recovery of the secret message infeasible. Comparison with the state of the art techniques indicates that the proposed technique either scores over its competitors or performs equally well in terms of standard evaluation metrics.

Keywords Encryption · Decryption · Arnold transform · Rabin cryptosystem · Multi-image steganography · Information security · Secret sharing

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डॉ. भीमराव आम्बेडकर - एक अर्थशास्त्री

१.विरेन्द्र कुमार सैनी
सहायक प्राध्यापक (वाणिज्य)
राजकीय स्नातकोत्तर महाविद्यालय जयहरीखाल
जनपद पौडी गढवाल राज्य उत्तराखण्ड

२. वरूण कुमार (सह- लेखक)
सहायक प्राध्यापक (वाणिज्य)
राजकीय स्नातकोत्तर महाविद्यालय जयहरीखाल
जनपद पौडी गढवाल राज्य उत्तराखण्ड

आधुनिक भारत के निर्माता बाबा साहेब डॉ. भीमराव आम्बेडकर की चर्चा एक कानून विशेषज्ञ और समाजशास्त्री, विधिवेद , कुशल राजनीतिज्ञ के रूप में हमेशा होती ही है। लेकिन वह एक बड़े अर्थशास्त्री भी थे, इस बात को कम लोग ही जानते है। नोबल पुरस्कार विजेता डॉ अमर्त्यसेन ने स्वंय स्वीकार करते हुए कहा कि **"बाबा साहेब डॉ. अम्बेडकर मेरे अर्थशास्त्र के जनक है वे दलितों शोषितों के सच्चे और जाने माने महानायक है उन्हें आजतक जो भी मान-सम्मान मिला है वे उससे कहीं ज्यादा के अधिकारी है भारत में वे अत्यधिक विवादित है हालांकि उनके जीवन और व्यक्तित्व में विवाद योग्य कुछ भी नहीं है जो उनकी आलोचना में कहा जाता है वह वास्तविकता के एकदम परें है अर्थशास्त्र के क्षेत्र में उनका योगदान बेहद शानदार है उसके लिए उन्हें सदैव याद रखा जाएगा।"**

अर्थशास्त्र के महत्व को स्वीकार करते हुए डॉ बी.आर. आम्बेडकर ने कहा कि " इतिहास बताता है कि जहाँ नैतिकता और अर्थशास्त्र के बीच संघर्ष होता है वहां जीत हमेशा अर्थशास्त्र की होती है निहित स्वार्थों को तब तक स्वेच्छा से नहीं छोड़ा गया है जब तक कि मजबूर करने के लिए पर्याप्त बल ना लगाया गया हो।"

डॉ आम्बेडकर लोक वित्त विषय के महान विशेषज्ञ थे, कोलंबिया विश्वविद्यालय में अध्ययन करते हुए उनकी एम-एच०डी का शोध विषय ब्रिटिश भारत में प्रांतीय वित्त का उद्भव और विकास था। इसके बाद लंदन स्कूल ऑफ इकोनामिक्स से उन्होंने **"प्राब्लम ऑफ रूपी: इटस ओरिजिन एंड इटस सोल्यूशन"** विषय पर डॉक्टरेट की उपाधी हेतु शोध प्रबंध लिखा और वर्ष १९२३ में डॉक्टरेट की डिग्री अर्जित की ।उन्होंने तर्क दिया कि औद्योगिकरण और कृषि विकास से भारतीय अर्थव्यवस्था में वृद्धि हो सकती है भारत में प्राथमिक उद्योग के रूप मे कृषि निवेश पर बल दिये जाने की बात कही। जिसके उपयोग से ही सरकार को खाद्य सुरक्षा लक्ष्य हासिल करने में मदद मिली।

भारत के अर्थतज्ञ बाबा साहेब आम्बेडकर जी ने भारतीय रिजर्व बैंक की स्थापना में महत्वपूर्ण भूमिका निभाई है, उनके द्वारा दिये गए निर्देशक सिद्धातों के आधार पर भारतीय रिजर्व बैंक की स्थापना की गई थी। बैंक कि काम करने की शैली को बाबा साहेब ने ही हिल्टन यंग कमीशन के समक्ष रखा था, वर्ष १९२६ में कमीशन भारत में रॉयल कमीशन ऑन इंडियन करेंसी एंड फिनांस के नाम से आया इसके सभी सदस्यों ने बाबा साहेब के लिखें ग्रंथ दी प्राब्लम ऑफ दी रूपी से प्रभावित होकर उसका जोरदार समर्थन किया जिसके बाद ब्रिटिश वैधानिक सभा भारतीय रिजर्व बैंक अधिनियम १९३४ बनाया गया और भारत को उसका केन्द्रीय बैंक मिला।

अर्थशास्त्र के क्षेत्र में भी डॉ आम्बेडकर का योगदान अति महत्वपूर्ण है १९३० के दशक में पूरी दुनिया में मंदी का दौर था ब्रिटिश सरकार के सामने गंभीर आर्थिक समस्या थी । दूसरी और ब्रिटिश उपनिवेशों में आजादी की माँग जोर पकड़ रही थी वैश्विक मंदी के कारण भारत की स्थानीय समस्याओं का समाधान करना भी अति आवश्यक हो गया था। भारतीय अर्थव्यवस्था की समस्या जैसे वित्तीय प्रणाली और रूपये पर बाबा साहेब द्वारा महत्वपूर्ण योगदान दिया गया

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STUDY OF SOME FRESHWATER ALGAE FORM HIMACHAL PRADESH, INDIA

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ABSTRACT

The present paper deals with some green algae (Chlorophyceae) collected and identified from the different places of four districts of the state Himachal Pradesh. Total 52 taxa of belonging to Class Chlorophyceae, Order Volvocales, Chlorococcales, Ulotrichales, Cladophorales and Oedogoniales have been reported from both lotic and lentic water bodies of the study areas.

Key words: Freshwater algae, Chlorophyceae, Himachal Pradesh, India.

INTRODUCTION

Himachal Pradesh (H.P.) is the northern state of the India lying in Indo-western Himalayan region. The state has been bestowed with rich heritage of freshwater resources in form of rivers, rivulets, lakes which are yet unexplored for freshwater aquatic biodiversity. Freshwater algae are the backbone for primary production in such habitats and support the growth and diversity of other aquatic fauna in different aquifers. The state is the part of important watershed area of the India by providing water to both the Indus and Ganga river systems. Many small rivers, lakes and other small water bodies make the state rich in aquatic biodiversity.

MATERIAL AND METHODS

Random Sampling Technique was used to collect the freshwater algal samples from district Mandi, Hmirpur, Una, and Shimla of Southern Himachal. The forms present in water bodies as epiphyte were collected by squeezing submerged plants and planktonic forms by using planktonic mesh net (size 40 µm) in the plastic bottles (250 ml). Detailed study of the taxa and microphotography was done with the help of Nikon labophot II microscope at Phycology Research Laboratory, University of Lucknow, Lucknow, India. The algal taxa were identified by standard monographs and journals. The various genera of Chlorophyceae have been systematized according to Fritsch (1935), except order Chlorococcales, which has been followed after Komarek & Fott (1983), order Oedogoniales after Gonzalves (1981) and order Conjugales which has been treated as the order Zygnematales after Smith (1933). Scale bar on photographs are equal to the 10 µm or otherwise mentioned on it.

RESULT AND DISCUSSION

The district wise algal collection sites, date of collection and samples numbers are mentioned in locality table as given below –

S.N.	District	Collection site	Date of collection	Sample number
1.	Una	Saloh pond, Ghaluwal	04/04/2006	HP/UNA/4c
2.	Una	Mubarakpur pond	01/06/2005	HP/UNA/1c
3.	Una	Jaswal Khad	01/06/2005	HP/UNA/2c
4.	Una	Swan river	01/06/2005	HP/UNA/4c
5.	Hamirpur	Kunah Khad, Dindwi	04/06/2005	HP/HAM/12c
6.	Hamirpur	Gawri Khad	02/06/2005	HP/HAM/7c
7.	Hamirpur	Rali Khad, Dagroh	02/06/2005	HP/HAM/6c
8.	Hamirpur	Taal pond	02/06/2005	HP/HAM/5c
9.	Hamirpur	Byas river, Nadaun	03/06/2005	HP/HAM/9c
10.	Shimla	Kufri Pond, Kufri	25/05/2004	HP/SIM/15b
11.	Mandi	Nahar Pond	20/05/2004	HP/MAN/4b
12.	Mandi	Jarol Khad	19/05/2004	HP/MAN/2b
13.	Mandi	Suket Khad	060/4/2006	HP/MAN/6c

Key to the Genera

1. Cells not mutually compressed.....1
1. Cells in a flat, plate like colony.....*Gonium* (2)
2. Colony usually symmetric.....2
2. Cells mutually compressed.....*Pandorina* (3)
3. Colony fewer-celled (16-256).....3

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देहरादून जनपद — भौगोलिक विश्लेषण

डॉ० संगीता भट्ट
असोसिएट प्रोफेसर, भूगोल विभाग,
डी०ए०वी० (पी०जी०) कॉलेज देहरादून,
उत्तराखण्ड

अर्चना नौटियाल
असिस्टेंट प्रोफेसर, भूगोल विभाग,
भक्त दर्शन राजकीय स्नातकोत्तर महाविद्यालय
जयहरीखाल, पौड़ी गढ़वाल, उत्तराखण्ड

९ नवम्बर २००१ को उत्तराखण्ड भारत का सत्ताईसवां राज्य बना जिसकी अस्थाई राजधानी देहरादून बनाई गयी। प्रशासनिक रूप से तेरह जनपदों में विभाजित उत्तराखण्ड के नौ जनपद पूर्णरूप से पर्वतीय है जबकि देहरादून, हरिद्वार, ऊधमसिंह नगर तथा नैनीताल का उच्च तराई–भाभर एवं मैदानी क्षेत्र के अन्तर्गत आता है। अभिलेख देव को देहरादून नाम देहरादून नगर के नाम पर दिया गया है जो भारत की स्वतन्त्रता से पूर्व ही विभिन्न विशेषताओं के कारण प्रसिद्ध रहा है। यह जनपद प्राकृतिक एवं राजनैतिक कारणों से अन्य जनपदों से अधिक महत्वपूर्ण स्थान रखता है।

२.१ स्थिति एवं विस्तार

देहरादून जनपद उत्तराखण्ड राज्य के पश्चिमी भाग में स्थित है जिसका भूगोल ३०८८ वर्ग किमी० एवं विस्तार २९°५७' उत्तरी अक्षांश तथा ७७°३५' पूर्वी देशान्तर से ७८°२०' के मध्य है। देहरादून जनपद उत्तर में शिवालिक श्रृंखला, दक्षिण में गंगा तथा जल–विभाजक में यमुना नदी की प्राकृतिक सीमाओं से घिरा है। जनपद की भौतिक सीमा क्रमशः उत्तर में उत्तरकाशी, पूर्व में टिहरी गढ़वाल एवं पौड़ी गढ़वाल, पश्चिम में हरियाणा तथा दक्षिण में हरिद्वार जिले से जुड़ी हुयी है।

प्रशासनिक दृष्टिकोण से जनपद को ७ विकासखण्ड में विभाजित किया गया है। जिसमें सकलता सबसे कम क्षेत्रफल वाला विकासखण्ड है। क्षेत्रफल की दृष्टि से सकलता सबसे बड़ा तथा कालसी सबसे कम क्षेत्रफल वाला विकासखण्ड है। ७ विकासखण्ड के साथ ही देहरादून जनपद को ६ तहसीलों में विभाजित किया गया है— देहरादून, विकासनगर, ऋषिकेश, सकलता, त्यूनी तथा कालसी।

देहरादून जनपद की जनसंख्या १६९८५६० (२०११) है, जिसमें ८९३२२२ पुरुष एवं ८०५३३८ महिलाएं है। २०११ की जनगणना के अनुसार देहरादून जिले में ९४९५६० शहरी तथा ७४९००० ग्रामीण जनसंख्या निवास करती है। यहां पर जनघनत्व ५५० प्रति वर्ग किलोमीटर है एवं २००१–२०११ के मध्य t ul þ; k ea32-48% की दर से वृद्धि हुई है।

स्कन्द पुराण के अनुसार देहरादून केदारखण्ड का हिस्सा है जिस पर तीसरी शताब्दी में सम्राट अशोक का अधिकार था। प्रारम्भ में देहरादून मेरठ मण्डल का भाग रहा जिसे १९६८ में गढ़वाल मण्डल में सम्मिलित किया गया। देहरादून जनपद हिमालय

मानचित्र १.१ स्रोत – सर्वे ऑफ इण्डिया

के पर्वतपदीय क्षेत्र से प्रारम्भ होकर तराई–भाभर एवं मैदान तक फैला है।

36.

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Synthesis, Spectral analysis and Anti-microbial properties of Cu, Ag, Au complexes of 2, 5-dihydroxy-1, 4-benzoquinone and 3, 6-dichloro-2, 6-dihydroxy-1, 4-benzoquinone

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ARTICLE INFO

Keywords:
Spectral analysis
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Antimicrobial

ABSTRACT

Many complexes of Cu, Ag, Au in combination with diamins derived from 2, 5-dihydroxy-1, 4-benzoquinone and 3, 6-dichloro-2, 6-dihydroxy-1, 4-benzoquinones have been synthesized and analysed for their antimicrobial activity. The I.R, ^{1}H and ^{13}CNMR data reveals that 2, 5-dihydroxy-1, 4-benzoquinone, coordinates as an O, O donor of the o-quinone type in cis-$Na_2[Cu_2O_2(DHQ)_2]$ $5H_2O$, cis-$(PPh_4)_2[Cu_2O_2(DHQ)_2]$, cis-$Na_2[Ag_2O_2(DHQ)_2]$ $4H_2O$, trans-$AuO_2(DHQ).2H_2O$ and chloranilate di-anion functions as an O, O ligand in cis-$Na_2[Cu_2O_2(DDB)_2]$ $6H2O$, cis-$(PPh_4)_2[Cu_2O_2(DDB)_2]$ $4H2O$, cis-$Na_2[Ag_2O_2(DDB)_2]$, cis-$(PPh_4)_2[Ag_2O_2(DDB)_2]$ $5H_2O$, trans-$(n\text{-}Bu_4N)_2[AuO_2(DDB)_2]3H_2O$. The complexes synthesized showed a good response as antimicrobial agents against the bacterial strains, viz, *Bacillus subtilis, Staphylococcus aureus, Xanthomonas malvacearum, E. coli, Rhodococcus* sp, *Pseudomonas putida*.

Introduction

The maintenance of the good health system requires the search, synthesis and the introduction of various class of new antimicrobial compounds having a wide range of action against various microbial strains, and cope up the resistive nature of the pathogens in the current regime [1]. Similarly many revolutionary and cost effective compounds with conjugated π-electron systems have gained the importance and attention of chemists, microbiologists and other researchers for the development of useful and needful products of medical importance [2–7]. Also in design and production of mono or polynuclear (homo (type and hetero type-) complexes as an advanced and more useful with excessive and overwhelming properties in their physical state viz, mechanical, electrical, optical and magnetic), a crucial role is played by oxalate C_2O_4 2 – anion [8], as being potentially a versatile ligand.

The introduction of metals having paramagnetic nature with electron-accepting quinoid rings provides an interesting and promising way in the synthesis of novel chemical compounds, [9] especially spintronics.

2, 5-dihydroxyquinones substituted derivatives like, chloranilic acid (3, 6-dichloro-2, 5-dihydroxy-1, 4-benzoquinone) serve good materials in the synthesis of various chemically important products which have strong proton donor and acceptor [10] capability to form various kinds of hydrogen bonds. Also it had been found that the acidity of the hydroxy-groups of 2, 5-dihydroxyquinone gets increased by substituents with electron-withdrawing nature, so the unsubstituted 2, 5-dihydroxyquinones act as a weak organic acid (pKa values of 2.72 and 5.19, respectively) [11].

It had been found that 2, 5-dihydroxyquinones have the tendency to act as (bis) bidentate ligands having the potential to form coordination bridging forming polymeric complexes [12–20]. But however, some mononuclear complexes of chloranilic acid in which it acts as a terminal bidentate ligand have been synthesized [21–25].

In this paper the coordination chemistry for Synthesis, Spectral Analysis and Anti-microbial Properties of Cu, Ag, Au Complexes of 2, 5-dihydroxy-1, 4-benzoquinone and 3, 6-dichloro-2, 6-dihydroxy-1, 4-benzoquinone, and the complexes, were explored by vibrational, ^{1}H and ^{13}C n.m.r. spectra. The complexes were also analysed for their antimicrobial activity.

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ASSESSMENT OF BREEDING CAPACITY AND SEX-RATIO OF *Barilius barna* (HAMILTON) IN SPRING-FED TAMSA STREAM,GARHWAL REGION, INDIA

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Original Research Article

ABSTRACT

The present study deals with the assessment of breeding capacity of *Barilius barna* in the spring-fed Tamsa stream of Garhwal region (Lat.30°21'25.84"N and Lon.78°01'00.45"E), India. It was found that the absolute fecundity of this species were varied depending on the sizes, the lowest was 401 and highest 1395 recorded in 51 mm to 82 mm fish sizes respectively. The breeding capacity was mostly dependent on the ovary length than any other body parameters. The maximum sex composition was noticed 1.00 male: 1.50 female in the month of April whereas the lowest was observed as 1.25 male: 1.00 female in the month of December and the overall, sex-ratio was recorded 1.00 male: 1.08 female.

Keywords: *Barilius barna*; breeding capacity; Sex-ratio; Garhwal Region; India.

1. INTRODUCTION

convex than the dorsal side. Its mouth is moderate and barbells are absent. Fish body with 7-11 lateral dark

38.

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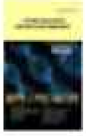

FISH DIVERSITY OF MAL GAD STREAM NEAR PUROLA TOWN FROM UTTARKASHI DISTRICT, UTTARAKHAND, INDIA

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Original Research Article

ABSTRACT

The present study deals with the observation of Ichthyofauna diversity of the different order hillstream from Mal Gad near Purola town, Uttarkashi district, Uttarakhand. Total of four species viz. *Noemacheilus montanus, Noemacheilus rupicola, Tor chelynoides, Mastacembelus armatus* were present in the 1st order stream. Ten fish species were noticed in the 2nd order Mal Gad stream (*Barilius bendelisis, Noemacheilus montanus, Noemacheilus rupicola, Noemacheilus denisonii, Schizothorax richardsonii, Schizothorax plagiostomus, Barilius vagra, Barilius barna, Tor chelynoides, and Mastacembelus armatus*). The presence of fish diversity was directly related to the profile of stream pattern and physicochemical parameters, temperature, and discharge of water.

Keywords: Fish diversity; Garhwal Himalaya; mal gad stream; different order stream.

1. INTRODUCTION

drained by several large rivers, which later unite to

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LENGTH-WEIGHT RELATIONSHIPS AND RELATIVE CONDITION FACTOR OF *Puntius ticto* IN THE AASAN RIVER, UTTARAKHAND, INDIA

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Original Research Article

ABSTRACT

A sample of 109 specimens of *Puntius ticto* was examined from April 2020 to March 2021to find out length-weight relationships and relative condition factor. The total length of the fish sample ranged from 3.9 - 7.5cm. and weight 1.15-7.79gm. Correlation coefficient values for male (r=0.8585), female (r=0.8585) and pool data (r=0.8585) were noticed extremely significant. The relative condition factor was lowest during July i.e. 0.701±0.019 in males, 0.735± 0.029 in females, and 0.719± 0.023 in pool data. Its highest range 0.943±0.028 for males, 0.967±0.037 for the females, and 0.954±0.032 for pool data were observed in December. In the present work, negative allometric growth was observed in males (b= 1.7128), females (b= 1.8623) and pool data sexes (b= 1.7128) of *Puntius ticto*.

Keywords: Length-weight relationship, relative condition factors; *Puntius ticto*; Aasan River; India.

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Reproductive Potential of *Puntius ticto* in Foothill River Aasan from Doon Valley, India

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ABSTRACT The study deals with the examination of reproductive potential of minor carp *Puntius ticto* in spring-fed Aasan River from Doon Valley, Uttarakhand, India. The total reproductive potential of an ornamental fish varied from a minimum 383 to a maximum 1240 in the fish measuring to 50 mm–78 mm respectively. The reproductive potential was dependent on the ovary weight than any other body parameters.

KEY WORDS: *Puntius ticto*, Reproductive Potential, River Aasan, Doon Valley, India

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INTRODUCTION

Puntius ticto (Ham.-Buch.) is one the beautiful species among ornamental fishes. It has been reported from various parts of Indian Territory (Talwar and Jhingran, 1991). Among the large number of fish species, sexual dimorphism has been worked out only in a few species of fresh water fishes in *Barilius bendelisis* by Badola *et al*., 1982, in *Puntius conchonius* by Dobriyal *et al*., 2007, from Garhwal region. Sexual dimorphism in *P. ticto* has been reported by Bahuguna *et al*. (2010a) from Kumaun Himalayan, India. We have also observed the sexual dimorphic nature of *P. ticto* (Ham.-Buch.) from River Aasan in Doon Valley Uttarakhand, India.

Reproductive potential study helps in determining the fecundity of freshwater prawn or fish brood stock development and management strategies for prawn or fish hatcheries along with stock size assessment of their natural population (Bahuguna and Kumar, 2011a, Bahuguna, 2013a). The assessment of reproductive potential and its mathematical relationship with the body parameters are considered very useful in fishery sciences, as it provides prior information regarding number of eggs that are likely to be received for the hatching process and further management of nursery etc. (Bahuguna *et al*., 2007). Similar studies about the fecundity of hill-stream fishes have been made by many earlier workers (Joshi and Khanna, 1980; Pathani, 1981; Singh *et al*., 1982; Dobriyal and Singh, 1987; Kumar *et al*., 2006; Bahuguna *et al*. [2007; 2010b; 2010c; 2011b], Joshi *et al*. [2010], Dobriyal *et al*., 2010; Krishna *et al*., 2011; Bahuguna, 2012; Joshi *et al*., 2013; and Rayal *et al*., 2021). Present communication deals with the reproductive potential of an important ornamental fish *P. ticto* (Ham.-Buch.) from river of Doon Valley, Uttarakhand state, India.

MATERIAL AND METHODS

The fish were caught by means of the traditional fishing gears (Bahuguna *et al*., 2010d). A total of 14 female fish *P. ticto* were collected with the help of local boys at snow-fed river Aasan from Doon Valley during April 2020–March 2021. To identify the mature females for this study, the gonadal observation of all the collected samples was carried out under binocular microscope. For each individual, morphometrics were done to the nearest 1 mm. Whole-body weight (BW) was taken on a digital balance with 0.001 mg

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OBSERVATION ON ECOLOGY AND DIVERSITY OF PERIPHYTON COMMUNITY IN THE MAL GAD STREAM FROM GARHWAL REGION, INDIA

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Original Research Article

ABSTRACT

The current research focuses on the periphytic diversity of the Mal Gad stream in Uttarkashi, Uttarakhand, India. The coordinates of this spring-fed stream are Latitude: 30°52'38.25"N and Longitude: 78°4'11.49"E. During the investigation it was found that the periphytic algal diversity of Mal Gad stream was represented by 19 genera belonging to 3 major classes namely Bacillariophyceae (*Cymbella* sp., *Synedra* sp., *Navicula* sp., *Fragilaria* sp., *Gomphonema* sp., *Achnanthes* sp., *Bacillaria* sp., *Diatoma* sp. and *Tabellaria* sp.), Chlorophyceae (*Oedogonium* sp., *Spirogyra* sp., *Microspora* sp., *Pediastrum* sp., *Zygnema* sp., *Cladophora* sp., *Gonatozygon* sp., and *Ulothrix* sp.) and Cyanophyceae (*Nostoc* sp. and *Rivularia* sp.). The present investigation will be helpful in enhancing the knowledge regarding the production potential of the water body. The dominance of Bacillariophyceae indicates the healthy ecological condition of the stream. Based on the study, the stream is found favorable for the culture of herbivorous rainbow trout, *Schizothorax* sp. on a commercial scale.

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Security of multiple RGB images in the time domain and frequency domain

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ARTICLE INFO

Keywords:
Matrix affine cipher
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Fractional discrete cosine transform
Image encryption and image decryption

ABSTRACT

Secure and efficient transmission of images from a sender to a receiver through the public channel has become a prime agenda. An encryption algorithm to secure three color images simultaneously using matrix affine cipher, fractional discrete cosine transform and Arnold transform is proposed in this paper. In earlier proposed algorithms, pixel intensities were not changed but rather shifted. In our proposed algorithm, pixel intensities are both shifted and changed. The color maps of the three color images are extracted to convert three color images into three indexed images respectively. The three indexed images are taken as R(red), G(green) and B(blue) channels of a color image. The color image is encrypted using the proposed encryption algorithm. The encryption algorithms for the security of color images proposed so far are secure either in time domain or in frequency domain, but the proposed encryption algorithm is secure in both the time and the frequency domain without any loss of data. The security of the proposed encryption algorithm depends not only upon secret keys but also upon the correct arrangement of the secret keys as compared to existing similar encryption algorithms whose security depends only upon secret keys. The encrypted(cipher) image is a single color image and is favorable for secure and efficient transmission over the public channel. Simulation is done with standard examples to analyze the validity of the proposed encryption scheme. We have provided the complete security analysis, statistical analysis and comparison with the existing similar encryption algorithms.

1. Introduction

Network and Communication technologies allow us to transmit images from a sender to a receiver. These images may contain secret and valuable information. Secure transmission of images from a sender to a receiver over a public channel has become a prime agenda.

Cryptography enables us to transmit images over a public channel from a sender to a receiver in such a way that an opponent cannot guess what is being communicated. The public channel could be computer network, telephone line etc. The secret information that the sender wants to send to the receiver is called plaintext. The plaintext could be images, English text, numerical data, or anything. The plaintext is encrypted using a secret key, and the resulting ciphertext is sent through the public channel. The opponent cannot guess the plaintext from the ciphertext. The receiver decrypts the ciphertext using the encryption key and reconstructs the plaintext.

Images are widely used in defense, medical imaging, online teaching, video conference, biometric systems and advertising etc. For example, the images transmitted by the military reveal highly sensitive information about the location and activities of soldiers. So, these images must be encrypted before the transmission over the Internet. Image encryption has attracted a lot of researchers.

Refregier and Javidi [1] introduced the first optical image encryption algorithm using Fourier transform. Color image encryption [2–5] has become a prime focus now a days. Chaos based cyclic shift, random phase encoding, Mellin transform and Arnold transform have been used in developing color image encryption algorithms. Several image encryption algorithms are proposed [6–10] using fractional Fourier transform. Hartley transform and its combination with chaotic mapping is the key ingredient in image encryption algorithms [11,12]. Gyrator transform combined with different techniques are incorporated in [13–18]. Antonini et al. [19], Chen and Zhao [20] and Prasad et al. [21] presented image encryption algorithms using wavelet transforms.

Situ and Zhang [22] developed the concept of multiple image encryption utilizing wavelet multiplexing. Liu et al. and Joshi et al. [23, 24] presented the multiple color image encryption concept incorporating the fractional Fourier transform domain. Simultaneously, Shan et al. and Zhang et al. [25,26] developed double image encryption combining fractional Fourier transform with multiple parameters in combination with chaotic maps and dual pixel scrambling random phase encoding. Shi et al. and Li et al. [27,28] developed multiple image encryption algorithms incorporating Arnold transform and Gyrator transform.

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43.

MULTIPLE RGB IMAGE ENCRYPTION ALGORITHM WITH MULTILAYERS BY AFFINE HILL CIPHER WITH FRDCT AND ARNOLD TRANSFORM

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Abstract

In this paper, we aim to investigate the security of multiple images based on affine hill cipher (AHC), fractional discrete cosine transform (FrDCT) and Arnold transform (AT). Three original RGB images are encoded as a single RGB image by first converting three RGB images into three indexed images by extracting their color maps. These three indexed image are treated as R, G and B channel of a single RGB image. Each channel is first encrypted using cryptographic encryption scheme AHC in time domain. The partially encoded image is transformed to frequency domain using FrDCT. In frequency domain, the partially encoded image is scrambled with the help of AT. The proposed scheme assures security in time domain, frequency domain as well as in coordinate domain. The original images can be recovered correctly by using proper arrangements of secret keys. The storage and transmission of the encrypted image is easy due to single encrypted image. The robustness of the proposed approach is proved by conducting computer simulations on standard examples.

Keywords: Affine Hill Cipher; Arnold Transform; Fractional Discrete Cosine Transform; Image Encryption and Image Decryption.

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1. INTRODUCTION

In the past decade, several images are transmitted over the internet and wireless networks. However due to security reasons, direct transmission of secret images over the public channels is not preferable. Extensive research has been done in the field of secure transmission of images over the unsecured networks. The basic goal of image encryption algorithms is to secure images from unauthorized access. Parallel encryption of multiple images is an emerging research area nowadays. Multiple images are encrypted together to produce a single encrypted image which is easy for storage and transmission over the unsecured networks.

Many image encryption algorithms have been methods based on chaos and the multiple-order discrete fractional Fourier transform with the help of spectrum truncation are presented by Wu *et al.*[8] Wang and Zhao[9] proposed double image encryption algorithm based on phase-truncated Fourier transforms and phase retrieval. Wang and Zhai[10] introduced classical double random phase encoding technique for multiple images. Their proposed scheme resists chosen ciphertext attacks, known-plaintext attacks and chosen-plaintext attacks. A novel double image encryption algorithm based on discrete fractional random transform, chaotic logistic maps and two chaotic random masks from Chirikov standard maps is introduced by Zhang and Xiao.[11] Wu *et al.*,[12] presented triple-color image encryp-

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Impact Of Lockdown On Migrants

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Abstract

This paper examines the impact of lockdown on migration. The outbreak of covid -19 virus across the country, resulting in nationwide lockdown that clamped down on mobility, commercial activities and social interactions. Due to the wide spread of virus there is a crisis of mobility with migrants labourers in big cities seeking for to return their home towns. India has been in nationwide lockdown in phase wise manner since March 25, 2020, That Time economic activities such as production and supply of essential goods and services were completely and partially suspended. Lockdown has severely impacted migrants; many of them lost their jobs due to workplace get shutdown, with no source of income migrant's people in the village hardly manage their daily routine requirement for their livelihood. Despite government promises and various measures to generate employment opportunity in rural areas, some migrant workers began return back to the metro cities due to the lack of employment in their hometowns, lockdown restrictions were reduced as part of Unlock 1.0 in June 2020. A large number of these were returning to Mumbai. The metro cities, reported major shortages of labour in the construction industry and in manufacturing companies. A study conducted in the April–May stated that 77% migrant workers were prepared to return back to cities for get back their work. The return of the migrant's workers to cities is expected to help revive the economy of the nation, which had sustained an impact. In this paper some important issues regarding the effect of pandemic of covid-19 on migrants; these are troubling of low income household, social security, job loss.

Key Words: Migration, Covid-19, Lockdown

Introduction

This paper shed light on some important issues regarding the impact of COVID-19 on the migrants. This outbreak troubling for low-income households, which are less well positioned to cope with earnings losses during a recession, have no other alternative earnings and have no social security. Migrant workers anticipated to be left unemployed in India because of nationwide lockdown and subsequent fear of recession period. The impact of lockdown on migrant workers they returned to their villages, and some of them are just waiting for the lockdown to be lifted soon. Risk for the unorganised sectors workers is higher than the workers of organised sectors who do not have written contracts, or those whose contracts are at the verge of completion. On the other hand, lockdown restriction and social distancing measures are drying up jobs opportunities and incomes sources, it likely to disrupt agricultural production, transportation, and supply chains. The challenge of ensuring food security and controlling already rampant malnutrition, among children's, which is likely to result in increased infant and child mortality rate. There is a need to relook the national migration policies, which assist and protect migrants arriving from other state and cities, or faced with the prospect of returning to, areas affected by health crises issues. According to Prof S Irudaya Rajan (Centre for Development Studies, Kerala), India has an estimated 600 million migrants that means one half of the population of India is living in a place where it wasn't born But this doesn't mean that 600 million Indians were crisscrossing between states in 2020 it's because of the internal migration in India is

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COVID IMPACT ON AGRICULTURE

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Abstract
The Noval Coronavirus pandemic has unsettled the Indian agricultural sector comprehensively. However, the current quarterly GDP estimations post-COVID situation showcases sturdiness and flexibility in Indian agriculture, the single sector to list a optimistic growth of 3.4% during the financial year 2020–21 (Quarter 1: April 2020 to June 2020). At the same time, the immediate past quarter growth was estimated at 5.9% witnessing a decline by 2.5% point, While the contribution of the agriculture sector to Gross Value Added (GVA) declined from 18.3% to 17.8% between 2014-15 and 2019-20, it is estimated to increase to 19.9% in 2020-21.In this context, we aim to create the initial evidence of the COVID impact on the Indian agricultural sector *viz*., production, marketing and consumption followed by a set of possible plans to improve and succeed post-pandemic. Study findings indicate that the epidemic has affected production and marketing sector through labour and logistical restrictions, whereas the adverse income shock limited access to markets and increased prices of food commodities affecting the consumption pattern. The calamity as an opportunity, the state announced a bundle of measures and long-pending reforms.

Keywords
Covid-19, Covid Impact, Agriculture Sector.

Introduction

The Covid-19 pandemic has given rise to an instant, serious, and worldwide human health issues. Essential counter actions to the virus, e.g. isolations and other restrictions will continue in place for many months. National efforts to control the virus by restrictive human movement is inevitably causing economic shocks and social costs that will affect the running of agricultural and food systems in India. The indirect effects of the pandemic on agricultural systems across the Nation. It massively declined demand for restaurant and marketable food services in combination with restrictions in labour, processing capacity and storage has led to farmers dumping their output .Quarantine measures are severely affecting labour availability for key time-critical farming from sowing vegetable crops to picking fruit and other laborious work .Outbreak of Covid-19 develops, these impacts are likely to turn into more widely and deeply felt in agricultural sectors and national economies. The consequence and severity of Covid-19 pandemic, and its likely impact on agriculture nationwide, calls for substantial reflection in both the short term and long-term. We need to understand the instant consequences for the national network of agricultural and food systems on which we rely so heavily. We should track unforeseen risks, weaknesses and systemic shifts to understand short-term effects as well as those that may be long-lasting. The outbreak of Covid-19 pandemic shock can have a greater impact on economies due to lost human lives compared to a weather blow such as drought or flood or a trade restriction. Undeniably, all these shocks affect agricultural systems; however, pandemic shocks affect all the sectors of an economy. The pandemic disrupts demand and supply of food impacting the global food supply chain; although droughts tend to be localized affecting only the associated sector or sponsors.

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भारतीय अर्थव्यवस्था में कृशि क्षेत्र की भूमिका

विरेन्द्र कुमार सैनी (लेखक)

वरूण कुमार (सह–लेखक)।

सहायक प्राध्यापक (वाणिज्य)

राजकीय स्नातकोत्तर महाविद्यालय जयहरीखाल

जनपद–पौड़ी गढ़वाल, राज्य–उत्तराखण्ड, पिन २४६१९३

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सारांष :–

वर्तमान परिपेक्ष्य में भारतीय अर्थव्यवस्था में प्राथमिक क्षेत्र कृशि की महत्तवपूर्ण भूमिका इस तथ्य से स्वत: स्पश्ट हो जाती है कि कोविड–१९ वैषविक महामारी के बावजूद उत्पादन के मामलें मे इसका प्रदर्षन सकारात्मक रहा है। वर्श २०११ की जनगणना के अनुसार देष का लगभग ५४.६ प्रतिषत कार्यबल कृशि कार्य और संबद्व क्षेत्र की गतिविधियों में लगा है, साथ ही कृशि कार्य और संबद्व क्षेत्र का देष के सकल योजित मूल्य वर्श २०१९–२० में लगभग १७.८ प्रतिषत योगदान है। कोविड–१९ महामारी की रोकथाम के लिए देष में लागू हुए लॉकडाउन ने जहां गैर कृशि क्षेत्रों पर प्रतिकुल प्रभाव डाला है, वहीं कृशि के क्षेत्र में वित्तीय वर्श २०२०–२१ में ३.४ प्रतिषत की विकास दर हासिल की और भारतीय अर्थव्यवस्था के लिए संजीवनी का कार्य किया । वैषविक महामारी कोविड–१९ ने भारतीय अर्थव्यवस्था के तीनो विकास स्तंभो –प्राथमिक क्षेत्र ,द्वितीय क्षेत्र, और तीतृय क्षेत्र को प्राभावित किया, लेकिन सभी प्रतिकुल स्थितियों के बाद भी कृशि उत्पाद विषेश रूप से चावल, गेहूं, दाल और सब्जियों जैसे दैनिक आवष्यकता के खाद्य पदार्थों की निरंतर आपूर्ति होने के कारण राश्ट्रीय स्तर पर खाद्य सुरक्षा बनी रही। वर्श २०१९–२० में भारत का कृशि और संबंधित वस्तु निर्यात लगभग २५२ हजार कोरड रूपये का हुआ । कृशि आधारित और संबंधित वस्तुओं के निर्यात में भारत की स्थिति विष्व स्तर पर अग्रणी रही है। इस क्षेत्र मे विष्व का लगभग २.५ प्रतिषत निर्यात भारत से ही किया जाता है प्राथमिक क्षेत्र के महत्तव को दृश्टिगत रखते हुए कृशि क्षेत्र को और अधिक सषक्त बनाने के लिए भारत सरकार ने आत्म निर्भर भारत अभियान के अंतर्गत अनेक सरकारी नितियों को लागू किया गया है, क्योंकि कृशि क्षेत्र देष के औशोगिक विकास का भी आधार है । देष के अधिकांष उद्योगों को कच्चे माल की आपूर्ति कृशि क्षेत्र से ही होती है जैसे सूती वस्त्र उद्योग, चीनी उद्योग, कॉफी, रबर, वनस्पति घी इत्यादि। प्रस्तुत षोध पत्र में भारतीय अर्थव्यवस्था में प्राथमिक क्षेत्र कृशि का राश्ट्रीय विकास में योगदान और भारत सरकार द्वारा कृशि क्षेत्र की विकास योजनाओं को जानने के संदर्भ में एक गहन अध्ययन प्रस्तुत किया गया है।

कुंजी षब्द:–भारतीय अर्थव्यवस्था, कृशि , राश्टीय विकास, कृशि क्षेत्र की विकास योजनाएं।

प्रस्तावना:–

वर्तमान समय में कृशि षब्द व्यापक अर्थ में प्रयुक्त होने लगा है। भारतीय अर्थव्यवस्था के प्राथमिक क्षेत्र में कृशि के साथ वान्यिकी, मत्स्यपालन, पषुपालन, दुग्ध उत्पादन, खनन तथा उत्खनन को भी सम्मिलित किया जाने लगा है। यह कहना कोई अतिषयोक्ति नहीं होगी की कृशि क्षेत्र भारतीय अर्थव्यवस्था का आधारभूत स्तंभ है।जहाँ विष्व में कुल क्षेत्रफल के ११ प्रतिषत भू–भाग पर कृशि की जाती है, वहीं भारत के कुल भू–भाग के ५१ प्रतिषत क्षेत्रफल पर कृशि होती है। भारत की जीडीपी में लगभग १५ प्रतिषत का योगदान प्राथमिक क्षेत्र कृशि का रहता है वहीं देष की आधी जनसंख्या (लगभग ५८ प्रतिषत) रोजगार के लिए कृशि क्षेत्र पर

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Women entrepreneurship Development in India

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Abstract

The growing presence of women as entrepreneurs has led to the change in the demographic appearances of business and financial growth of the country.Women-owned businesses enterprises are playing a prominent role in society inspiring others and generating more employment opportunities in the country. There is need for sustainable growth of women entrepreneurs, to promote a balanced growth in the country, and Start-up India is committed to strengthening the women entrepreneurship ecosystem, through creation of enabling networks.Women entrepreneurship development is an essential part of country development. Today India has 13.5 to 15.7 million women owned enterprises, representing 20 j— of all enterprises. While large in absolute numbers, these are overwhelmingly comprised of single person enterprises, which provide direct employment for an estimated 22 to 27 million people. The ministry of Micro, Small and Medium Enterprisesrecent policy mandates that ministries, departments and public sector undertakings must target 25j— procurement from the MSME sector, of which 3j— must be women owned. This paper focuses on women entrepreneur role in nation building, any understanding of Indian women, of their identity, and especially of their role taking and breaking new paths, will be incomplete without a walk down the corridors of Indian past where women have survived and internalized various role models.

Key Words- Indian Women, Entrepreneurs, Entrepreneurship act.

Introduction

As a result of industrialization, urbanization and democratization in India, the women in India are moving towards emancipation and are seeking gainful employment in various sectors of economy. Besides, in such a transitional phase, heavily overloaded with custom tradition, the Indian women find it more and more difficult to adjust them to the double role that they have to play as customary housewives or mother at home front and contest with her men folks in the field of business and manufacturing. Women have equal opportunities and rights as men. In such a condition, it is crucial to identify suitable technology which will enable the woman to play her role as an effective entrepreneur without disturbing her primacies. Women entrepreneurs are playing a vital role in business,

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Plastic Money Prospective & Challenges

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Abstract: Plastic money is such a word that is widely used. In today's time no one has enough time to deal with their daily tasks and go to the banks and settle their finance related transactions. Keeping in view the usefulness of plastic money is a necessity in today's era. Money has always been considered an important medium of payment, purchase, sale, exchange, obligation etc. In ancient times, the barter system was used in abundance, over the years, money has replaced its form of coins in paper currency and today it is changing in the form of plastic cards. In the present time plastic money is considered as a useful and better medium of exchange. Its use is being encouraged by various financial institutions and the Government of India from the point of view of safety and convenience. In our research paper, we have discussed the advantages and disadvantages of different types of plastic money and their uses. This is our effort in this research paper, money which is a means of exchange, to what extent its utility has taken the form of plastic money.

Key Words -Plastic Money, Barter System, Exchange.

Introduction

Plastic money is actually called a plastic card, through which you can enjoy services, make purchases etc. without a bank note. It contains identifying information such as a signature or picture and authorizes the card holder to make purchases or charge services. Card information is read by automated teller machines (ATMs), banks and the Internet. Money is considered as a medium of exchange and payment tool. In ancient time barter system was used as mode of payment. Over the years, money has changed its form from coins to paper currency and today in formless form as electronic money or plastic card money. The major change in banks which has been brought in by the technology is through introduction of electronics products which are alternative to cash. Plastic cards are one of those types of revolutions through which the clients can make use of banking services just by owning the card allotted by bank and that too without any restricting himself under the official banking hours. Plastic money which is made of the plastic. It is an easy way to settle payment in exchange of goods & services. The concept of plastic money first came in the year nineteen hundred. First plastic cards were used in America. With the help of plastic cards, all types of payments related to goods and services were made very easily. It refers the use of plastic cards like debit & credit cards in the form of electronic transactions keeping in mind the need of the customer while making the large number of transactions so that they don't need to keep paper money with them. Money includes ATM cards, credit cards, debit cards, Money access cards, client cards, key cards, and Cash cards. The purpose of using these plastic monies is only for the ease of customers so that they can make financial transactions and also for their own safety.

Objectives

1. To know the perception of people towards plastic money.
2. To know the importance of plastic money in the daily life of consumers. -
3. To study the benefits of debit card and credit cards.
4. To find out the market leader among the various banks/companies issuing credit and debit cards -
5. To know the problems faced by respondents using plastic money. -
6. To study the satisfaction level of consumers towards plastic money.
7. To Know the RBI Initiative to enhance the use of plastic money.

Review Literature

Some of studies have been done regarding the Plastic Card usage. Following are a few of them: -

1. **Hirschman 1982; Jonker 2005;** -In Their analysis They found that the payment behaviour of customer with qualitative data on payment attribute perceptions. Perceptions - or perceived differences in payment attributes found important determinants of consumer payment behaviour.

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सारांश:- वर्ष २०११ की जनगणना के अनुसार देश में सिर्फ ५१ प्रतिशत परिवारों को बैंकिंग सुविधा उपलब्ध है। शहरों में ८८ प्रतिशत और गांव में ५४ प्रतिशत परिवारों की पहुंच ही बैंकिंग सुविधा तक थी। जिससे स्पष्ट हो जाता है कि आबादी का एक बड़ा हिस्सा बैंकिंग सुविधाओं से जुड़ा होने के कारण गरीबी के चुंगल से बाहर नहीं निकल पाया है, जिस कारण कोई भी मजबूरी होने पर वह साहूकारों के चंगुल में फँस जाते है। गरीबों को वित्तीय रूप से अलग थलग रखकर कोई भी देश स्थायी प्रगति नहीं कर सकता है। वैश्विक स्तर की विभिन्न संस्थाओं जी-२०, विश्व बैंक तथा संयुक्त राष्ट्र के द्वारा भी वित्तीय समावेशन को वैश्विक विकास का महत्वपूर्ण नियामक माना है। वित्तीय समावेशन का मुख्य उद्देश्य ग्रामीणों को बैंकिंग सेवाएं प्रदान कर उन्हें देश की अर्थव्यवस्था से जोड़ना व शहरी और ग्रामीण क्षेत्र के गरीबों को बैंकिंग सेवाएं प्रदान करना है। जिससे सम्पूर्ण देश का समतामूलक विकास सुनिश्चित हो सकें जिसमें समाज का भाव हो जो भेद भाव रहित हो, जिसमें विषमता न हो एवं जिसमें किसी का शोषण न हो।

यह शोध पत्र वित्तीय समावेशन के अभाव के कारण होने वाली असमानताओं और उन असमानताओं को दूर करने के लिए उठाये गये सुधारात्मक उपाय पर ध्यान केंद्रित करता है जिससे हमारे राष्ट्र का समतामूलक विकास सुनिश्चित हो सके और देश वित्तीय समावेशन की विकास नीतियों से लाभांवित हो सके।

कुंजी शब्द:- , वित्तीय समावेशन, समतामूलक विकास , चुनौतियां, सुधारात्मक उपाय।

प्रस्तावना -किसी भी देश के आर्थिक विकास का मुख्य आधार उस देश का वुनियादी ढाँचा होता है जो यह सुनिश्चित करता है कि अंतिम छोर पर खड़े व्यक्ति भी आर्थिक विकास के लाभों को ले सकें अर्थात कोई भी व्यक्ति आर्थिक सुधारों से वंचित न रहें। जो वित्तीय समावेशन से ही संभव हो सकता है जिसके महत्व को स्वीकार करते हुए भारत सरकार द्वारा डिजिटल भारत अभियान प्रारंभ किया गया । भारत को डिजिटल रूप से सशक्त समाज व ज्ञान आधारित अर्थव्यवस्था के रूप में परिवर्तित करने के उद्देश्य से इस कार्यक्रम की नींव रखी गई। वित्तीय समावेशन और डिजिटल भारत के सम्मिलित लक्ष्यों को प्राप्त करने के लिए ही **जैम त्रयी** (जनधन आधार मोबाइल) योजना की आधारशिला रखी गई। वित्तीय समावेशन की जैम त्रयी योजना के द्वारा कोविड १९ के दौरान जरूरतमंदो तक सरकारी सहायता पहुँचाने में सराहनीय भूमिका रही है।

वर्तमान में वित्तीय समावेशन की जो परिभाषा उपयोग में है वह है औपचारिक वित्तीय प्रणाली द्वारा वंचित और अल्प आय वर्ग समूहों को सस्ती लागत पर वित्तीय सेवाएं प्रदान करना है। वित्तीय सेवाओं में, औपचारिक वित्तीय प्रणाली

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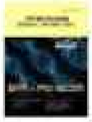

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FECUNDITY OF *Noemachelius denisonii* DAY FROM RIVER YAMUNA, INDIA

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AUTHORS' CONTRIBUTIONS

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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Original Research Article

ABSTRACT

The present observation focuses on the fecundity of *Noemachelius denisonii* Day in the snow-fed Yamuna river from Doon valley, India. The fecundity of *Noemachelius denisonii* Day ranged from 139 to 2015 in fish that measured 50mm to 75mm in length. The weight of the fish has a greater impact on fecundity than any other body parameters.

57.

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Reproductive Capacity and Sex-Ratio of *Noemacheilus multifasciatus* Day from Mandal River, India.

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Abstract: Present communication deals with the reproductive capacity and sex ratio of a hill stream ornamental fish, *Noemacheilus multifasciatus* Day from river Mandal of Garhwal region, Uttarakhand, India. A total 151 specimens were collected for this investigation from Mandal River during October 2020 to September 2021. The morphometric measurements were made within 2-3 days of collection which were total length (TL) fish body weight (F.B.W) ovary length and ovary weight. For the assessment of reproductive capacity, anterior, middle and the posterior part of ovary were taken and number of ova in each sample was counted with the help of binocular microscope. The reproductive capacity in terms of absolute fecundity was calculated as F = S. OW/100. Sex ratio was calculated for whole period of study and its signification was tested by Chi-Square test (χ^2). The length of fishes ranged from 56mm to 80mm whereas fish body weight varied from 2138mg to 6347 mg.. The lowest reproductive capacity (175 eggs) was observed for the fish length 56mm, and body weight 2138mg. whereas highest reproductive capacity (3476 eggs) was estimated in fish measuring 80 mm length and fish body weight 6347mg. The reproductive capacity was more dependent on the ovary length (r= 0.9894) and fish weight (r = 0.9812), than the fish ovary weight (0.9786) and fish length (0.9248). The average ratio was 1.16 for female: 1.0 for male.

Key words: *Noemacheilus multifasciatus*, reproductive capacity, sex-ratio, river Mandal.

Introduction

Noemacheilus multifasciatus Day is a beautiful hill stream loach inhabiting the small streams and river of Garhwal Himalaya.The knowledge on the reproductive biology is essential in understanding life history, stock management and successful culture of a fish species. The fecundity indicates the reproductive potential of a fish during one

2021a-b; Joshi et.al 2010, 2013; Bahuguna and Kumar, 2011a; Krishan et.al, 2011a; Bahuguna 2012; Rashid and Dobriyal, 2020; Rayal et.al, 2021c). The Sex-Ratio of fish has also been studied by several authors which is an important aspect of fish biology (Dobriyal and Singh, 1989; Kumar et.al, 2006; Dobriyal 2011; Bahuguna and Kumar, 2011b; Krishan et.al, 2011b; Bahuguna et.al 2010a-b-f, 2011;

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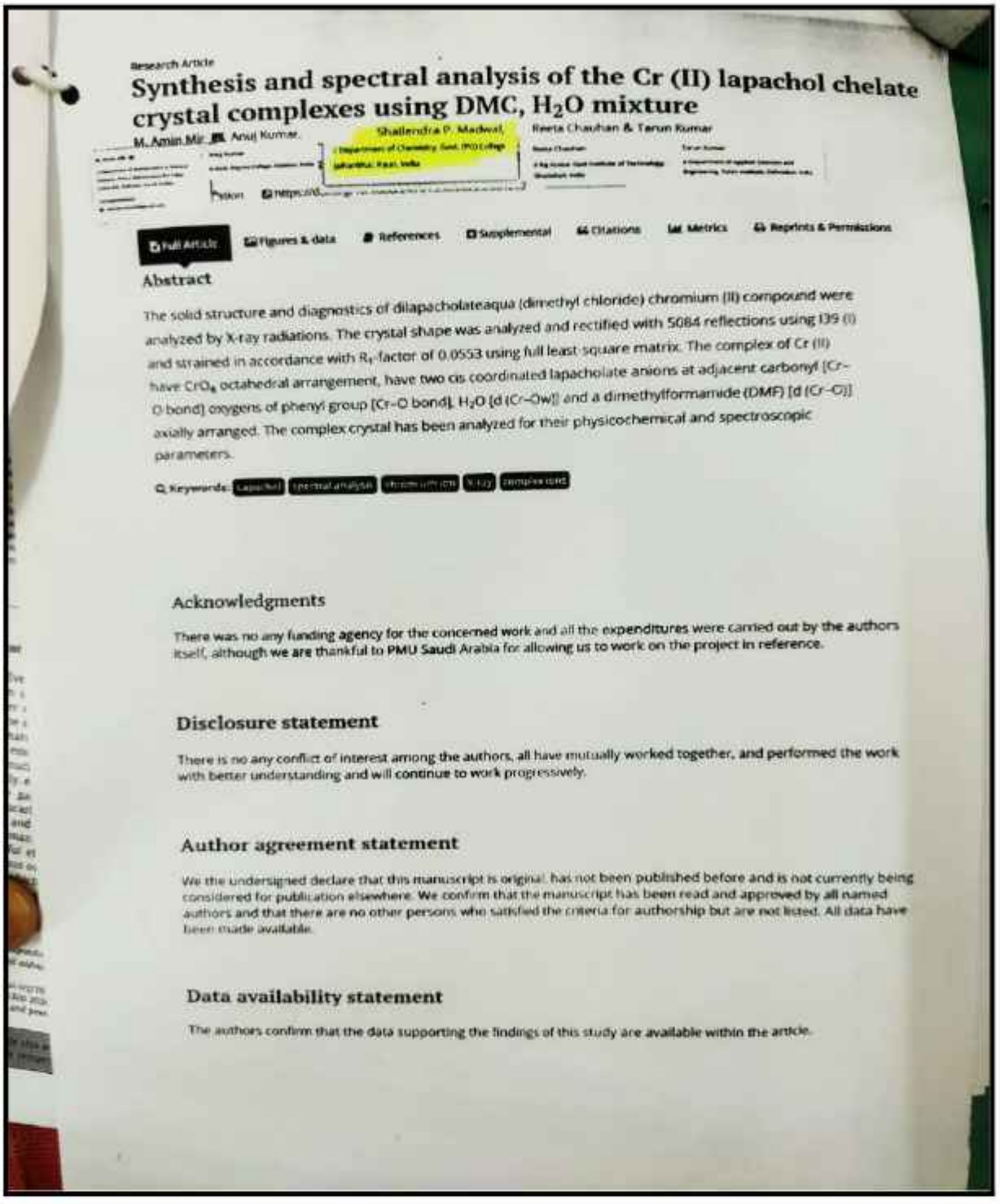

Research Article

Synthesis and spectral analysis of the Cr (II) lapachol chelate crystal complexes using DMC, H_2O mixture

M. Amin Mir, Anuj Kumar, Shailendra P. Madwal, Reeta Chauhan & Tarun Kumar

Full Article | Figures & data | References | Supplemental | Citations | Metrics | Reprints & Permissions

Abstract

The solid structure and diagnostics of dilapacholateaqua (dimethyl chloride) chromium (II) compound were analyzed by X-ray radiations. The crystal shape was analyzed and rectified with 5084 reflections using 139 (I) and strained in accordance with R_1-factor of 0.0553 using full least square matrix. The complex of Cr (II) have CrO_6 octahedral arrangement, have two cis coordinated lapacholate anions at adjacent carbonyl [Cr–O bond] oxygens of phenyl group [Cr–O bond], H_2O [d (Cr–Ow)] and a dimethylformamide (DMF) [d (Cr–O)] axially arranged. The complex crystal has been analyzed for their physicochemical and spectroscopic parameters.

Keywords: Lapachol | spectral analysis | chromium (II) | X-ray | complex ions

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Disclosure statement

There is no any conflict of interest among the authors, all have mutually worked together, and performed the work with better understanding and will continue to work progressively.

Author agreement statement

We the undersigned declare that this manuscript is original, has not been published before and is not currently being considered for publication elsewhere. We confirm that the manuscript has been read and approved by all named authors and that there are no other persons who satisfied the criteria for authorship but are not listed. All data have been made available.

Data availability statement

The authors confirm that the data supporting the findings of this study are available within the article.

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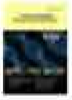

SNOW TROUT, *Schizothorax richardsonii* (GRAY), FROM THE RIVER YAMUNA, UTTARAKHAND, INDIA: A STUDY ON THE LENGTH-WEIGHT RELATIONSHIP AND RELATIVE CONDITION FACTOR

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AUTHORS' CONTRIBUTIONS

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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Original Research Article

ABSTRACT

The length-weight relationship and relative condition factor of snow trout, *Schizothorax richardsonii* (Gray), from the Yamuna River in Uttarakhand are investigated in this study. The results of this study revealed that there is a close relationship between length and weight. For sex-specific data, the regression coefficient ranged from 2.621 for males (r = 0.7693) to 2.709 for females (r = 0.9027). The relative condition factor was maximum 0.645 ± 0.061 for males and 0.750 ± 0.098 for females during the winter season. The minimum value was calculated as 0.019±0.002 for males and 0.046±0.007 for females in the monsoon season. The relative condition factor indicated that the winter season represented better feeding opportunities and suitability of the river habitat.

Keywords: Length-weight relationship; relative condition factor; *Schizothorax richardsonii*; snow trout; Yamuna River.

1. INTRODUCTION

All aquatic organisms, occasionally or [illegible]

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Enhanced visible light photocatalytic degradation of rhodamine B using $Ni_{1-x}Ca_xFe_2O_4$ ($0 \le x \le 0.5$) nanoparticles: performance, kinetics and mechanism

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https://doi.org/10.1016/j.materresbull.2022.111911

Abstract

In this study we have synthesized calcium doped nickel ferrite ($Ni_{1-x}Ca_xFe_2O_4$ ($0 \le x \le 0.5$)) nanoparticles by microwave combustion technique. The prepared nanoparticles and its degradation have been studied using one of the most harmful dye rhodamine B (RhB), by means of enhanced visible light photocatalytic degradation. The structural characteristics of the sample was analysed using XRD, FT-IR, HR-SEM, TEM and XPS. Those were utilised to observe the structure, vibrations and surface morphology of the calcium doped nickel ferrite sample. UV-DRS, PL and VSM studies, give optical and magnetic properties of obtained samples. From XRD the crystallite size obtained were in the extent of 44-20nm. The energy gap of NF1 was noticed to be improved between 3.05 eV and 2.11 eV with calcium doping. Agglomerated coalescence and recombination of electron-hole pairs were observed from HR- SEM and PL spectroscopy respectively. RhB dye degradation performance, mechanism and kinetics

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Fabrication of Er, Tb doped CuO thin films using nebulizer spray pyrolysis technique for photosensing applications

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ARTICLE INFO

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Er and Tb co-doped CuO
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External quantum efficiency
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ABSTRACT

CuO-based high-performance photodetectors are a key area of research and challenge in today's scenario. In view of this, we study undoped, CuO:Er (1%), CuO:Tb (1%), and Er(1%),Tb(1%) dual doped CuO thin films for photodetector applications using the nebulizer spray pyrolysis technique. The structural, morphological, and optical features of the coated samples were systematically studied using few techniques such as X-ray diffraction (XRD), Scanning electron microscope (SEM), UV–Vis spectra, Photoluminescence (PL) and two probes. According to the XRD analysis, all the doped thin films show a good crystalline structure with a predominant peak exhibition (002) plane and the doping process enlarged the crystallite size value and obtained a maximum of [illegible] nm for Er,Tb dual doped CuO film. SEM photo shows the formation of a flaky nanoparticle structure. In the case of light absorption, the absorption level depends on dopant materials such as Er and Tb and the UV absorption level is improved for the dual doped film. The photo-luminescence shows that all the prepared samples exhibit defect-related peaks around 412, 450, 475, 525 nm and the doping process significantly improves the luminescence properties of CuO films. According to Hall effect analysis all prepared samples show the p-type characteristics whose film resistance and mobility are increased and the highest value is noted for Er(1%),Tb(1%) doped CuO thin film. The photodetection capacity was studied by the analysis of optoelectronic properties for these doped CuO thin films. The UV sensing study indicates, high responsivity ([illegible] AW⁻¹), external quantum efficiency ([illegible]), and detectivity ([illegible] Jones) values for the Er, Tb dual doped CuO photodetector. The work also discusses a possible mechanism of ultraviolet photo-detector performance. These findings share a guideline to develop a high performance photodetector.

1. Introduction

The market for high-quality photo-detector using semiconductors has increased because of their exceptional responsiveness, quantum efficiency, and detective demands. Among various semiconductor materials, copper oxide (CuO), a p-type semiconductor, has inspired scientists and industry due to its cost-effectiveness and non-toxic nature compared with existing materials [1–4]. CuO nanostructures are used in a wide array of fields, including photo-catalytic degradation [5], supercapacitors [6], biosensors [7], and gas sensor applications [8]. Recently, photodetector based on CuO material is focused due to its easy fabrication process with low cost instruments. To improve the photodetector process of CuO samples rare earth elements were used in this work.

Rare earth (RE) elements are excellent applicants such as erbium (Er^{3+}), terbium (Tb^{3+}), ytterbium (Yb), neodymium (Nd), praseodymium (Pr), holmium (Ho), and thulium (Tm) [9–11] because of their large cross-section absorption and wide spectrum of excitement

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भारत में आंतरिक प्रवासन के कारक

१ विरेन्द्र कुमार सैनी
२. वरूण कुमार
(सह— लेखक)। सहायक प्राध्यापक (वाणिज्य)
राजकीय स्नातकोत्तर महाविद्यालय जयहरीखाल २४६१९३ जनपद पौड़ी गढ़वाल
राज्य उत्तराखण्ड,agmsaini1981@gmail.com

सारांश :—

किसी भी देश के विकास के लिए उसके नागरिकों के अंतर्राष्ट्रीय प्रवास की तुलना में आंतरिक प्रवास कहीं अधिक महत्वपूर्ण है राष्ट्र निर्माण व देश की अर्थव्यवस्था को सुदृढ बनाए रखने में आंतरिक प्रवासी मानव पूंजी के रूप में प्रमुख भूमिका निभाते है। देश में आंतरिक प्रवास का मुख्य कारण बुनियादी जरूरतों जैसे बेहतर आय, शिक्षा तथा स्वास्थ्य सुविधा एवं जलवायु परिवर्तन, प्राकृतिक आपदा, श्रम की दोषपूर्ण व्यवस्था, सुसंगत नीतिगत ढांचे का अभाव आदि है। एक ओर जहां भारत का संविधान (अनुच्छेद 19)सभी नागरिकों को "भारत की सीमा में पूरी आजादी से आने जाने व भारत की सीमा के किसी भी भाग में रहने व बसने का अधिकार देता है। लेकिन वास्तविक रूप में प्रवासियों के विरूद्ध बहिष्करण तथा भेदभाव जैसे राजनीतिक , प्रशासकीय , सामाजिक–आर्थिक प्रकियाओं के माध्यम से होता है । प्रवासी श्रमिक स्थानीय अर्थव्यवस्था को सस्ता व सहज श्रम उपलब्ध कराते है और स्वयं विपरित परिस्थितियों में कार्य करने को मजबूर होते है जहां न सामाजिक सुरक्षा होती है, न कानूनी संरक्षण प्राप्त होता है । प्रवासी श्रमिक अनाधिकृत कच्ची बस्तियों, झोपडियों में रहने पर मजबूर होते है और उनके बुनियादी हक जैसे सस्ते अनाज, पेयजल, साफ सफाई, सार्वजनिक स्वास्थ्य, शिक्षा आदि के लाभ वंचित रहते है। जिसके लिए समाज में प्रगतिशील वैचारिक परिवर्तन अति आवश्यक है। प्रस्तुत शोध पत्र में भारत में भारत के आंतरिक प्रवासन के कारक और आंतरिक प्रवासी श्रमिकों की समस्या का एक अध्ययन प्रस्तुत किया गया है।

कुंजी शब्द:— आंतरिक प्रवासन , कारक और परिणाम, प्रवासी श्रमिक समस्याएं।

प्रस्तावना:—

जब कोई व्यक्ति किसी कराण विशेष से प्रभावित होकर अपने जन्म स्थान को छोडकर कही अन्यत्र रहने लगता है तो उसे प्रवास कहते और बसने वाला व्यक्ति प्रवासी कहा जाता है। भारतीय परिपेक्ष्य में प्रवास को प्रथम समकालीन जनगणना 1881 ई० से ही समाविष्ट कर लिया गया था, जिसमें देश की जनगणना में प्रवास के संबंध में सूचना होती है जनगणना में प्रवास पर निम्न प्रश्न पूछे जाते थे क्या व्यक्ति इसी गाँव अथवा शहर में पैदा हुआ है? यदि नहीं तब जन्म के स्थान की स्थिति जिले और राज्य का नाम और यदि भारत से बाहर का है तो जन्म के देश के नाम की सूचना प्राप्त की जाती है और उसके आधार पर प्रवासी को अंतराष्ट्रीय प्रवासी व आन्तरिक प्रवासी में विभाजित किया जाने लगा था । आन्तरिक प्रवास मुख्य रूप से चार प्रकार से होता है 1. गाँव से गाँव की ओर 2. गाँव से शहर की ओर 3.नगर से गाँव की और 4.नगर से नगर की ओर।

संयुक्त राष्ट्र संघ के अनुसार :—

प्रवसन एक प्रकार की भौगोलिक, प्रवासित अथवा स्थानिक प्रवासिता है जो एक भौगोलिक इकाई और दूसरी भौगोलिक इकाई के बीच देखने को मिलती है, जिसमें रहने का मूल स्थान अथवा [illegible] का स्थान दोनों भिन्न होते है। इस प्रकार का प्रवसन स्थायी होता है, क्योंकि इसमें मानव का निवास स्थान स्थायी रूप से परिवर्तित हो जाता है।"

64.

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On Some Freshwater Soft Algae from Bhulla Taal Lake Lansdowne, District Pauri Garhwal, Uttarakhand

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Abstract: Bhulla taal is a freshwater artificial lake, famous for tourist attraction in Lansdowne city of Pauri Garhwal district of Uttarakhand state, India. The lake is situated on Shivalik range of the Garhwal Himalaya. Morpho-taxonomic identification reveals total 26 freshwater soft algal taxa from the lake belonging to class Cyanophyceae and Chlorophyceae. Taxon *Coenocystis subcylindrica* Korshikov has been reported for the first time from the western Himalayan range.

Keywords: Freshwater algae, Pauri Garhwal, Uttarakhand

Introduction

Mapping of algal diversity in Himalayan region is a mammoth task. Morpho-taxonomic identification of freshwater soft algae is the part of biodiversity inventories. Sporadic reports have been made so far especially regarding freshwater soft algal taxa of Himalayan region. The Lansdowne city is situated at 1780 meter above msl, in Garhwal Himalaya; a part of Shivalik range of Western Himalaya. Bhulla taal, a famous tourist destination of the area, is an artificial small lake maintained by the army cantonement board of the Garhwal Rifles Regiment Centre. The lake has length 140.75 meter, width 62.81 meter and the area ca. 4004.98 m^2. The lake is surrounded by the oak trees. It has inlet of water from northern end and the water goes

fresh water soft algae have been reported by Dwivedi et al. (2006, 2008, 2008, 2009, 2014) mainly desmids, chlorococcalean and cyanophycean flora from Himachal Pradesh, from Kumaon region of the Uttarakhand, freshwater soft algae have been reported by Misra et al (2007, 2007) while that of from Garhwal Himalaya has been carried out by Habib (1998, 2001), Shukla et al. (2007, 2008), Misra et al. (2008) and Shukla et al. (2010).

Material and method

Freshwater algal samples were collected by random sampling method during summer seasons in May 2015 from the four different margins of the lake and in the middle of the lake through the boat. Epiphytic forms were collected by careful observations on the

65.

UTTAR PRADESH JOURNAL OF ZOOLOGY

[illegible]

SNOW TROUT, *Schizothorax richardsonii* (GRAY), FROM THE RIVER YAMUNA, UTTARAKHAND, INDIA: A STUDY ON THE LENGTH-WEIGHT RELATIONSHIP AND RELATIVE CONDITION FACTOR

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AUTHORS' CONTRIBUTIONS

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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Original Research Article

ABSTRACT

The length-weight relationship and relative condition factor of snow trout, *Schizothorax richardsonii* (Gray), from the Yamuna River in Uttarakhand are investigated in this study. The results of this study revealed that there is a close relationship between length and weight. For sex-specific data, the regression coefficient ranged from 2.621 for males (r = 0.7683) to 2.795 for females (r = 0.8027). The relative condition factor was maximum 0.840 ± 0.061 for males and 0.756 ± 0.086 for females during the winter season. The minimum value was calculated as [illegible] for males and [illegible] for females in the monsoon season. The relative condition factor indicated that the winter season represented better feeding opportunities and suitability of the river habitat.

Keywords: Length-weight relationship; relative condition factor; *Schizothorax richardsonii*; snow trout; Yamuna River.

1. INTRODUCTION

[illegible]

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REVIEW ARTICLE

A C G publications

Rec. Agric. Food. Chem.2:2 (2022) 59-74

records of agricultural and food chemistry

Himalayan Yellow Raspberry (*Rubus ellipticus* Smith.): A Plant with Multiple Medicinal Purposes

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Abstract: Herbal medicinal plants or products remain very popular around the world despite the large amounts of conventional drugs to treat several illnesses. Among the plethora immensity of medicinal plants, there is *Rubus ellipticus*, also known as yellow Himalayan raspberry. The traditional use of the plant is for the treatment of cough, fever, constipation, diarrhea, relief of stomach worms in children, and healing of bone fracture. Due to the broad spectrum of possible actions of *R. ellipticus*, this study aimed to investigate the effects of this plant on health. Google Scholar, PubMed and Embase were searched to perform this review and Preferred Reporting Items for Systematic reviews and Meta-Analyses (PRISMA) guidelines were followed. No Clinical trials were found, however, some in vitro and animal studies were included in this review. *R. ellipticus* present many bioactive compounds such as ascorbic acid, ellagic acid, ursolic acid, quercetin, kaempferol, and anthocyanins. These compounds are possible responsible for the antioxidant, anti-inflammatory, anti-proliferative, anti-microbial, anti-diabetic, antipyretic, analgesic activities, and wound healing effects. For these reasons, the consumption of this fruit could reduce oxidative stress and anti-inflammatory processes and, therefore, reduce diabetes and metabolic-related diseases such as cardiovascular diseases and cancer. *R. ellipticus* also has huge economic importance due to its nutritional value and can be used in the food, cosmetics, and pharmaceutical industries.

Keywords: *Rubus ellipticus*; anti-inflammatory; antioxidant; antimicrobial; anticancer.

1. Introduction

Herbal medicinal plants or products remain very popular around the world despite the large amounts of conventional drugs to treat several illnesses. Although the number of bioactive compounds can be enormous in different plants, most are still not chemically defined. Despite that, the relevance of

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67.

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A stable operational matrix based computational approach for multi-term fractional wave model arise in a dielectric medium

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ARTICLE INFO

Keywords:
Fractional order wave equation
Semi-discretization
Operational matrix
Convergence analysis

ABSTRACT

The semi-discretization technique combined with an operational matrix approach is proposed to solve the fractional order wave equation that arises in a dielectric medium. In this approach, Caputo's derivative terms of order α and β are approximated by the difference scheme of order $O(\tau^{3-\alpha})$ and $O(\tau^{3-\beta})$, $1 < \beta < \alpha < 2$, respectively, to transform the proposed fractional order wave equation into a system of second order ordinary differential equations (ODEs). To solve the ODEs, the operational matrix method is used which has several advantages over the several ODE solvers. The convergence of the approximation taken in the spatial direction at the kth level of time is established. Moreover, the scheme is unconditionally stable with the rate of convergence $O(\tau^{3-\alpha})$ and $O\left(\frac{1}{[illegible]}\right)$ in the time and spatial direction, respectively. Finally, test examples are included to show the efficiency and accuracy of the proposed method and to support the theoretical results.

1. Introduction

The history of fractional calculus is almost as old as classical calculus. However, Leibniz was the first to talk about half-order derivative with some remarks about its possibility [1]. The utility of half-order derivative and integral leads to formulations of certain electrochemical problems which are more economical and useful in comparison to classical calculus. The main advantage of fractional derivative in comparison to classical integer-order models is that it provides an excellent tool for the description of memory and hereditary properties of various materials and processes. However, over the most recent couple of decades, different authors reported that the derivative and integration of fractional order are suitable for the description of the properties of diverse real material [2]. Fundamental physical considerations are in favor of derivatives of non-integer order based models [3,4]. Fractional order derivatives are more interesting because they do not have an obvious interpretation. Moreover, unlike the classical derivative, the fractional derivative has more than one definition. Out of these definitions most frequently used definitions are, the Riemann–Liouville and the Caputo derivative due to the background in the research [5–8].

In recent years, researchers gave attention to the appearance and applications of FDEs in electromagnetic theory [9–11]. In [12,13], authors show that the electromagnetic fields and waves in a vast class of dielectric medium can be represented by FDEs. Tarasov shows in the article [14], that the electromagnetic field in a dielectric medium whose susceptibility follows a fractional power-law dependence can be described by FDEs with non-integer order time derivative. Moreover, the application of the

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68..

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Influence of synthesizing parameters on surface qualities of aluminium alloy AA5083/ CNT/MoS_2 nanocomposite in powder metallurgy technique

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Nanoparticles
SEM
Microhardness

ABSTRACT

Aluminium alloys are indispensable in all manufacturing industries, particularly mechanical engineering. The objective of this study is to enhance the mechanical, wear, and corrosion properties of aluminium alloy AA5083 by incorporating nanoparticles as reinforcements, thereby creating hybrid aluminium nanocomposites. The base material utilized in this study was AA5083, with the reinforcement nanoparticles selected as Carbon nanotubes (CNTs) and Molybdenum disulfide (MoS_2) in concentrations of 1 % and 3 % respectively. Nanocomposites were fabricated using the Powder Metallurgy (PM) technique, employing specific contrasting parameters including ball mill speed (280, 320, 360, and 400 rpm), Mixing time (20, 30, 40, and 50 min), Compaction pressure (300, 350, 400, and 450 MPa), and Sintering time (2, 3, 4, and 5 h). The operating parameters of powder metallurgy were assessed using the Design of Experiments (DOE) L16 Orthogonal Array, and their corresponding outcomes were analyzed. The results revealed that there is a

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[illegible]

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Research Article

Improvement in ammonia gas sensing properties of La doped MoO_3 thin films fabricated by nebulizer spray pyrolysis method

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ARTICLE INFO

Keywords:
La doped MoO_3 thin films
Nebulizer spray pyrolysis
Gas response
Adsorption-desorption model

ABSTRACT

In the present work, different doping concentration (0, 1, 2, 3, 4 and 5 wt%) of Lanthanum (La) doped Molybdenum trioxide (MoO_3) thin films were prepared using low cost Nebulizer spray pyrolysis (NSP)technique. The crystalline, morphology, optical and gas sensing properties of thin films were investigated. The presence of monoclinic MoO_3 structure was confirmed through the XRD investigation for all the samples with highest crystallite of 61 nm was observed for 2 wt% La doped MoO_3 thin film. The surface morphology of the produced thin films exhibits a reticulate nanoflower mesh shape with increased particle size and porosity on addition of 2% La dopants in MoO_3.The UV–Vis results showed the band gap values for the prepared thin films in the range 3.12–3.28 eV and the minimum bandgap was observed for the 2 wt% of La doped MoO_3 thin film. Also the PL results confirmed the presence of more oxygen vacancies for the 2 wt% of La doped MoO_3 thin film. The NH_3 gas sensing study was conducted for the prepared films at room temperature, the 2 wt% of La doped MoO_3thin film exhibits a maximum sensor response of 300, faster response times (28 s and 2 %) compared to other fabricated devices. The results suggest that the 2% La doping in MoO_3 could be an optimum doping concentration for the preparation of commercial NH_3 gas sensors.

1. Introduction

In current scenario, a device that monitors olfactory discrimination is much required for detection, identification and quality evaluation of gaseous mixtures not only in many industries but also essential for environmental pollution control for early diagnosis of diseases [1]. Among various pungent odour gases, Ammonia (NH_3) is a nitrogen source for plant growth, a fertilizer (liquefied gas form), a preservative agent in agricultural field, an anti-fungal agent, a curative agent in the leather industry, a coolant in vehicles, chemical, textile, and paper industries, and an anti-corrosion agent in the petroleum sector [2]. Conversely, its acute exposure implications is perilous. High dosage creates a sun blocking function, smog and aerosols cause sudden temperature drop [3], chronic health issues like headache, vomiting, dyspnoea, pneumoconiosis, even death [4], impaired pulmonary function and Respiratory failures such as persistent bronchitis,

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70.

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Optimizing the selection of natural fibre reinforcement and polymer matrix for plastic composite using LS-SVM technique

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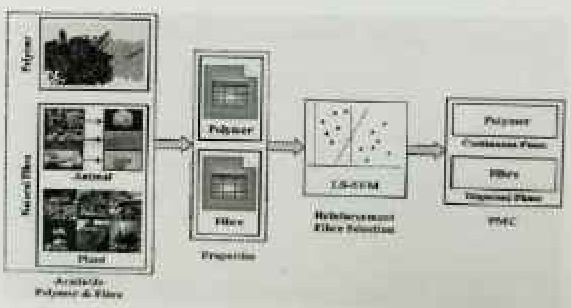
HIGHLIGHTS

- Surveyed natural fibre and polymer combinations for PMC production.
- Suggested a LSO for natural fibre selection with the best proportions.
- Local search optimization uses a basic multi-class SVM as an objective function.
- SVM (LS-SVM) optimization finds the best polymer-natural fibre mix for PMC.
- Tensile, flexural, and flexural modulus are used to evaluate LS-SVM material.

GRAPHICAL ABSTRACT



ARTICLE INFO

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Keywords:
Local search optimization

ABSTRACT

The manufacturing sector is paying close attention to plastic matrix composites (PMCs) reinforced with natural fibres for improving their products. Due to the fact that PMC reinforced with naturally occurring fibres is more affordable and has superior mechanical qualities. Based on the application material requirements, An important step in the production of PMC is choosing the right natural fibres for reinforcing and determining how much of

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71.

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A new class of generalized Ellis–Bronnikov wormhole in asymptotically safe gravity

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In this paper, the asymptotically safe gravity has been taken in the gravitational action to derive the wormhole solutions. The paper is aimed at the study of traversable wormhole solutions having repulsive geometry at the throat. The wormhole solutions are produced in two cases: the first case includes the logarithmic form of the shape function while in the second case, the shape function is derived numerically so that it satisfies necessary properties. In both cases, the nature of the matter supporting the wormhole solution is investigated by testing the energy conditions, and the stability of the solutions is determined. The energy conditions are respected in the region near the throat in the first case and everywhere in the second case. The stability of solutions is obtained in the second case along with the repulsive geometry near the throat and attractive away from it.

Keywords: Wormhole; asymptotic safe gravity; energy conditions; stability.

1. Introduction

Wormholes originally are solutions to the Einstein's field equations (EFEs) of General Relativity (GR) that show unexpected connections between two quite separated regions of the spacetime.[1–5] These two distant spacetime points of wormholes create "a short-cut that allows" faster than light travel between those two points. At the initial stage, the idea was taken seriously by its inventors and proponents.[6–8] Thereafter, it was realized that the Einstein–Rosen "wormhole" is not, contrary to expectations, a stable structure. The wormhole opens up and closes too quickly as well for even a photon to "travel" through it. Later, the detailed study[9] suggested that exotic forms of energy threaded through a wormhole might keep it open but

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2023-24
3.3.2 Research Papers

Multimedia Tools and Applications
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Check for updates

Multiple colour image encryption using multiple parameter FrDCT, 3D Arnold transform and RSA

Vandana Guleria[1] · Yashavant Kumar[1] · D. C. Mishra[2]

Received: 13 June 2022 / Revised: 27 April 2023 / Accepted: 11 September 2023

Abstract

We introduce a novel image encryption and decryption algorithm for multiple images incorporating multiple parameter fractional discrete cosine transform (MPFrDCT), 3D Arnold transform and RSA cryptosystem. Before encryption, the images are changed into their indexed formats by removing their color maps. The indexed formats of the images are taken as the red, green and blue channel of an RGB image. Firstly, the RGB image is taken as the input of 3D Arnold transform. The 3D Arnold transform not only dislocates the pixel positions, but also changes the pixel values. Mathematically, the 3D map performs both permutation as well as substitution. The distorted image is now encrypted using RSA cryptosystem which is a public key cryptosystem. The RSA cryptosystem makes the image secure in public domain as the hard problem is the factorization of large primes which is unbreakable. Lastly, the domain of the encrypted image is changed to frequency domain using MPFrDCT. If the secret keys are known to an unauthorized person, the encryption algorithm is still secure as the security of the presented cryptosystem depends upon the secret keys and the arrangements of the secret keys. The proposed image encryption algorithm is storage efficient. The statistical and simulation analysis are conducted to evaluate the robustness of the presented encryption and decryption processes.

Keywords RSA Cryotosystem · Image encryption · Image decryption · 3D Arnold transform and multi-parameter fractional discrete cosine transform

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पर्वतीय पारिस्थितिकी तंत्र:- जलवायु परिवर्तन, जैव विविधता ह्रास एवं सांस्कृतिक और आध्यात्मिक मूल्यों पर प्रभाव

डॉ.अर्चना नौटियाल

असिस्टेंट प्रोफेसर

भूगोल विभाग

भक्त दर्शन राजकीय स्नातकोत्तर महाविद्यालय जयहरीखाल, पौड़ी गढ़वाल, उत्तराखण्ड, भारत

Abstract - जलवायु परिवर्तन का प्रभाव वैश्विक जैवविविधता ह्रास के रूप में दिखाई देता है। इस परिवर्तन का प्रभाव पर्वतीय पारिस्थितिकी तंत्र पर दिखाई देता है, जिसके परिणामस्वरूप इन क्षेत्रों का सांस्कृतिक-सामाजिक और आध्यात्मिक स्वरूप प्रभावित हो रहा है। जलवायु में होने वाले परिवर्तन, पर्वतीय पारिस्थितिक तंत्र को प्रत्यक्षरूप से प्रभावित करते हैं, जिसमें वनस्पति, जीव-जन्तुओं की विभिन्न जाति-प्रजातियाँ तथा इन स्थानों के संवेदनशील पारिस्थितिक तंत्र सम्मिलित हैं। तीव्र गति से परिवर्तित होती पर्यावरणीय परिस्थितियों के कारण अधिकांश स्थानीय प्रजातियाँ विलुप्त होने की कगार पर हैं या विलुप्त हो चुकी हैं। यह जैविक संकट पर्यावरणीय क्षति के साथ-साथ इन स्थानों से जुड़े सांस्कृतिक एवं आध्यात्मिक क्षति का कारण बन रहा है।

सभी प्राचीन संस्कृतियों में प्रकृति एवं मानव के सम्बन्धों को सह अस्तित्व पर आधारित माना गया है। मानव का व्यवहार प्रकृति के साथ उसके सहयोगी के रूप में रहा है। यही कारण है कि प्राचीन समय में सभी प्रथाएं, अनुष्ठान तथा व्यवहार प्रकृति केन्द्रित होते थे। वर्तमान में केवल जनजातीय समूह ही इन परम्पराओं को व्यवहारिक रूप में क्रियान्वित करते हुए दिखाई देती हैं। इस शोध पत्र में जलवायु परिवर्तन के कारण, जैव विविधता ह्रास एवं स्थानीय जनजातियों पर उनके प्रभाव का अध्ययन किया गया है। पर्यावरण संरक्षण एवं संवर्धन में स्थानीय समुदाय का सहयोग किस प्रकार से लिया जा सकता है, इसका वर्णन इस पेपर में किया गया है।

Keywords - जलवायु परिवर्तन, पारिस्थितिकी तंत्र, जनजातीय समूह, जैव विविधता

पर्वतीय पारिस्थितिक तंत्र स्वयं में एक अद्वितीय और संवेदनशील पर्यावरण है जिसमें उच्च स्तर की जैव विविधता और जटिल पारिस्थितिक सम्बन्ध पाया जाता है। वर्तमान में इन पारिस्थितिक तंत्रों को जलवायु परिवर्तन के अभूतपूर्व खतरों का सामना करना पड़ रहा है, जिसमें तापमान और वर्षा में बदलाव के साथ-साथ मौसम की घटनाओं की आवृत्ति और तीव्रता में वृद्धि हो रही है। पर्वतीय पारिस्थितिक तंत्र वनस्पति और जीव- जन्तुओं की विभिन्न जाति-प्रजातियों को आवास आधार प्रदान करते हैं, साथ ही साथ आपूर्ति जैसी आवश्यक सेवाएं भी प्रदान करते हैं। किन्तु यह संवेदनशील पारिस्थितिक तंत्र मानव-प्रेरित पर्यावरणीय परिवर्तनों के परिणामस्वरूप संकटग्रस्त हो गए हैं।

यह परिवर्तन पौधों और जानवरों की प्रजातियों के वितरण और संख्या को प्रभावित कर रहे हैं। जीव-जन्तुओं तथा वनस्पतियों के मूल निवास स्थान का नष्ट होना और प्राकृतिक संसाधनों का अतिदोहन इस परिवर्तन में सम्मिलित हैं, जिससे पर्वतीय पारिस्थितिक तंत्र की जैव विविधता में व्यापक और गंभीर परिवर्तन हो रहे हैं। उदाहरण के लिए, तापमान और वर्षा के स्वरूप में परिवर्तन से पौधों एवं प्रजातियों के वितरण में परिवर्तन हो जाने के कारण उन पर आधारित जीवों की भोजन और आवास की उपलब्धता भी प्रभावित हो जाती है। यह परिवर्तन दीर्घकाल में शृंखलाबद्ध रूप से सम्पूर्ण पारिस्थितिक तंत्र को परिवर्तित कर विनाशकारी प्रभाव डाल सकते हैं। जलवायु परिवर्तन के प्रभावों के लिए पर्वतीय पारिस्थितिकी तंत्र अत्यधिक संवेदनशील हैं। जलवायु परिवर्तन विभिन्न प्रकार से पर्वतीय पारिस्थितिक तंत्र को प्रभावित करता है पर्वतीय पारिस्थितिक तंत्र पर जलवायु परिवर्तन के कुछ प्रमुख प्रभाव इस प्रकार हैं-

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Effect of Pre-Emergence Herbicides on Rice (*Oryza sativa* L.) and Rice Field Microflora

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Abstract

Present investigation was undertaken on transplanted rice at the Norman E. Borlaug Crop research center, G. B. Pant University of Agriculture and Technology, Pantnagar. The field experiment was conducted as a part of a long-term trial in a rice wheat cropping system under the AICRP on weed control to evaluate the effectiveness of chemical weed management practices. The weed management practices operated in crop of paddy were weedy check, hand weeding, butachlor @ 1.5 kg kg/ha and anilofos @ 0.5 kg/ha. Weed dry weight was lower due to the applicaton in both herbicide treatments, as well as weeding. The leaf area index (LAI) differed significantly due to weed management practices. Anilofos treatment at 30 and 45 days after transplantation (DAT) recorded significantly higher leaf area index. At 60 DAT, highest leaf area index was recorded when weeding was practiced. Hand weeding + herbicide treatments recorded higher photosynthetic rate as compared to that in weedy plot. Bacterial population in soil was higher in (butachlor and anilofos) treated plots as compared to hand weeding and weedy plots, which indicated that soil micro-flora has positive response to weed management practices.

Keywords

Weed management practices, Rice, Leaf area index (LAI), Soil microflora

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Research Article

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Fluid Inclusion Petrography and Microthermometry of Barren/Mineralized Quartz Veins-Reef of Malanjkhand Cu Deposit, Central India: Implication on Ore and Non-Ore Forming Environment

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Abstract

Quartz reefs and veins of variable thickness have been intruded in host Paleoproterozoic Malanjkhand granites in the mine area and are primarily restricted to phyllic as well as potassic alteration zones. They are mainly of two types: mineralized and barren. Fluid inclusion petrography depicts mainly five types of inclusion which are aqueous biphase, monophase, monocarbonic, H_2O-CO_2 and polyphase (L+V+H). They are called here Type I, Type II, Type III, Type IV, and Type V, respectively, and are present in both mineralized and barren quartz veins/reefs. All types of inclusion are common except type V, which appears rare in both. However, the sizes of type II and IV are unexpectedly small. The micro thermometry results imply a relatively high temperature (209.4-376.4°C) of fluid entrapment in the mineralized counterpart. However, it is considerably lower (133.9-182.2°C) for the barren counterpart. Although the salinity of fluid appears low for mineralized quartz veins/reef (0.63-0.87 wt.% NaCl equivalent), while for barren counterpart, it is considerably higher (0.92-6.98 wt.% NaCl equivalent). The observed textural and microthermometry results advocate that the Malanjkhand hydrothermal system has resemblances with the porphyry system and indicates probable genetic linkage between barren and mineralized quartz veins/reef.

Keywords: Fluid Inclusions, Quartz Veins/Reef, Aqueous Inclusions

Introduction

Fluid inclusion studies in hydrothermal ore deposits have recognized to be an important instrument for obliging the physico-chemical conditions of the hydrothermal fluids responsible for vast and pervasive alteration and mineralization processes (Bein and Titley, 1984; Roedder, 1984; Bodnar *et al.*, 2014). The fluid-inclusion physiognomies, such as fluid composition, temperature, and density, vary in different types of ore deposits. Because of the variation in these parameters, fluid inclusions are considered a useful tool for mineral exploration (Haynes and Kesler, 1987; Nonomia *et al.*, 1992). Fluid evolution and ore mineral precipitation in hydrothermal systems are recorded by multiple generations of fluid inclusion assemblages and mineral inclusions, and their trapping sequence can be established through careful thin-section petrography (Klemm *et al.*, 2008; Seo *et al.*, 2009).

Due to their economic significance, Malanjkhand Cu deposits have been intensely investigated and much is known about the host-granite forming environment, age, and tectonism (Sarkar *et al.*, 1996; Panigrahi and Mookherjee, 1997; Sikka and Nehru, 1997; Stein *et al.*, 2004; Asthana *et al.*, 2016). However, the fluid inclusion studies of mineralized and barren quartz veins and reefs are relatively less and produce variable results (Jaireth and Sharma, 1986; Panigrahi *et al.*, 2008). Moreover, it is still a major debate whether the Malanjkhand Cu deposit is a porphyry deposit or not. The present work is focused on the fluid inclusion study of mineralized and barren quartz veins and reef in order to find the nature of fluid, temperature of fluid entrapment and to established the genetic link between barren and mineralized quartz reef. Attempts have also been made to test its very porphyry nature.

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Geology of the Area

Malanjkhand is associated with three different lithological terranes: the Sausar Mobile Belt (SMB) to the northwest, which forms the southern part of the Central India Tectonic Zone (CITZ), the Sakoli Fold belt (SF) to the southwest; the Kotri-Dongargarh (KD) belt to the south. The Sausar Mobile Belt (SMB) lies to the northwest part of Malanjkhand and marks the northern part of CIS (Fig. 1a). The southernmost unit in the SMB is the Bhandara-Balaghat granulite domain bounded by the CIS to the south. The Ramakona-Katangi granulitic belt lies to the northwest of CIS (Stein

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Sustainable hydrogen production from waste of expired breads through supercritical water gasification

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Studies on phase transitions and dielectric properties of biowaste synthesized porous carbon nanoparticles – ferroelectric liquid crystal mixture

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ABSTRACT

Ferroelectric liquid crystals(FLCs), an exciting class of liquid crystals(LCs), found potential applications in the display as well as non-display regimes due to their fast response, low driving voltage and nonvolatile memory. The amalgamation of nanoparticles into FLCs has opened up new avenues in the LCs research field by alterations/modification of the existing properties of LCs. In this work, porous carbon nanoparticles (PCNPs) were dispersed into FLC mixture (W206E) and investigated their doping effect on FLC's textural, phase transition temperatures and dielectric studies in planar-aligned cells. Dielectric spectroscopy was carried out in the frequency range of 20 Hz to 10 MHz to explore the frequency as well as the temperature dependent of FLC in the entire SmC* region. The transition temperature of FLC mixture is increased by 4 °C in PCNPs doped FLC sample then undoped FLC sample. Nearly 8.42% increase in permittivity is observed. A Gold stone relaxation mode at ~622 Hz was observed at lower frequency.

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KEYWORDS
Ferroelectric liquid crystal; porous carbon nanoparticles; dielectric permittivity; dielectric strength

1. Introduction

Soft materials like colloidials, polymers, liquid crystal, surfactants and gels, exhibit unique properties and have found diverse applications in various technological fields. LCs, in particular, possess the ability to flow while maintaining anisotropic properties, making them suitable for applications like flat screens, radio wave antennas, solar cells, plasmonics [1–7]. Among varieties of LCs, FLCs have generated significant interest due to their distinct characteristics, including fast response time, low power consumption, high visual contrast, memory effect, and wide viewing angles [8–13]. The ferroelectric properties of FLC materials arises from the asymmetric structure of chiral smectic C (SmC*) phases.

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